February 1973
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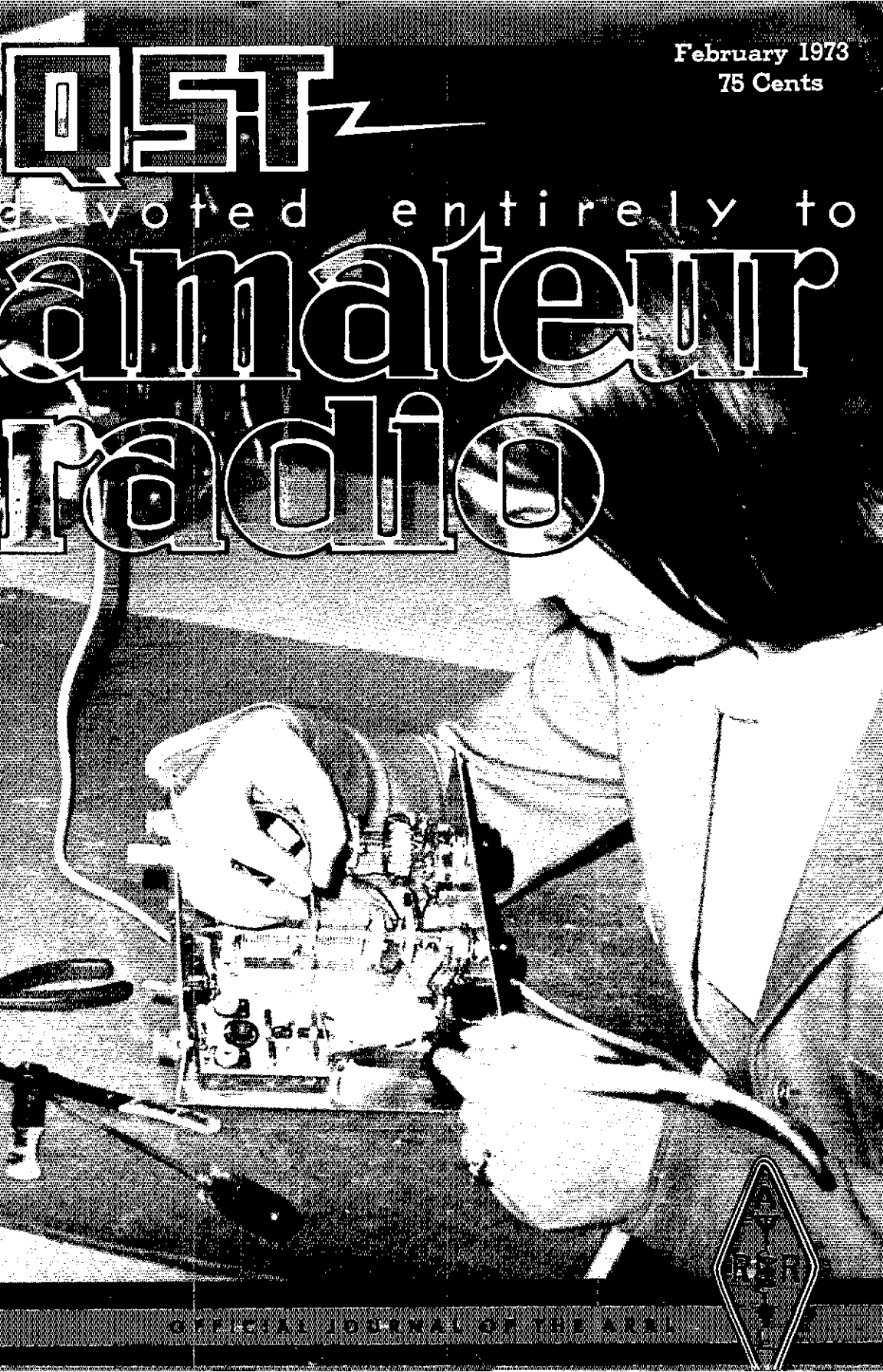

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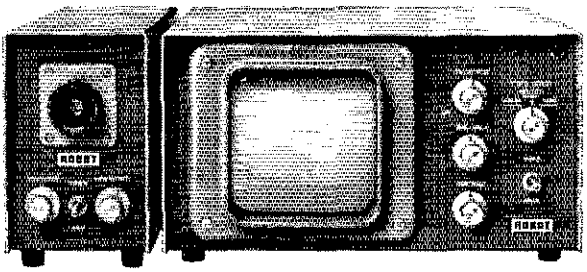

Operating SSTV is easy.
☐ True or ☐ False

How much do you really know about the newest activity in amateur radio? Take this 3 minute TRUE-FALSE quiz and see.

		T	F
1	A slow scan television picture is similar to that projected on TV.	☐	☐
2	Motion can be portrayed on slow scan television.	☐	☐
3	To broadcast slow scan television just add a Robot monitor and camera to your present station. No other equipment is necessary.	☐	☐
4	Slow scan occupies no more space on the band than an audio signal.	☐	☐
5	Any licensed amateur radio operator, except Novice, may operate SSTV.	☐	
6	$295 each for a Robot SSTV monitor and camera is the lowest price in the world for SSTV equipment.	☐	
7	Robot guarantees your satisfaction with all Robot equipment, or your money will be refunded.	☐	
8	New SSTV operators all suffer from lack of sleep.	☐	

ANSWERS:

1. **False.** The slow scan television picture is a greenish-yellow color which takes 8 seconds to transmit. Like radar, the image should be viewed in a darkened room for best results. Also like radar, as the picture progresses it has the appearance of being painted onto the screen by a bright writing line except that the line moves from top to bottom. 2. **False.** Motion results in a blurred picture. 3. **True.** Robot equipment is compatible with all brands of amateur radio equipment and antenna systems. 4. **True.** The SSTV signal contains frequencies ranging from 1200 Hz to 2300 Hz. Therefore, it is comparable to an audio signal. 5. T
6. **True,** as far as we can determine. 7. T
8. **True.** New SSTV operators are so ent
siastic about the fun of operating slow s
television, they hate to quit.

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SPECIFICATIONS: *Frequency range:* 80 meter band — 3.5 to 4.0 MHz; 40 meter band — 7.0 to 7.5 MHz; 20 meter band — 14.0 to 14.5 MHz; 15 meter band — 21.0 to 21.5 MHz; 10 meter band — 28.0 to 28.5 MHz, 28.5 to 29.0 MHz, 29.0 to 29.5 MHz, 29.5 to 30.0 MHz; WWV — 15.0 MHz (receive only) ★ *MODE:* SSB, CW, or FSK ★ *POWER OUTPUT:* 150 watts nominal into 50 ohms for SSB, 125 watts nominal into 50 ohms for CW, 50 watts nominal into 50 ohms for FSK ★ *RF INPUT IMPEDANCE:* 50 ohms ★ *FREQUENCY STABILITY:* Within 100 Hz during any 15 minute period after warmup ★ *CARRIER SUPPRESSION:* Carrier better than 45 db down from output signal ★ *SIDEBAND SUPPRESSION:* Unwanted sideband better than 40 db down from the output signal ★ *HARMONIC RADIATION:* Better than 40 db down from output signal ★ *RECEIVER SENSITIVITY:* 0.5 microvolts for a 10 db signal + noise/noise ratio ★ *RECEIVER SELECTIVITY:* SSB and FSK — 2.2 KHz bandwidth (6 db down), 4.4 KHz bandwidth (60 db down). CW — 0.5 KHz bandwidth (6 db down), 1.5 KHz bandwidth (60 db down) (with optional CW filter installed) ★ *TUBE & SEMICONDUCTOR COMPLEMENT:* 3 tubes (6LQ6 x 2 and 6GK6), 3 IC's, 16 FET's, 57 transistors, 70 diodes ★ *SIZE:* 12.6"W x 5.5"H x 12.6"D

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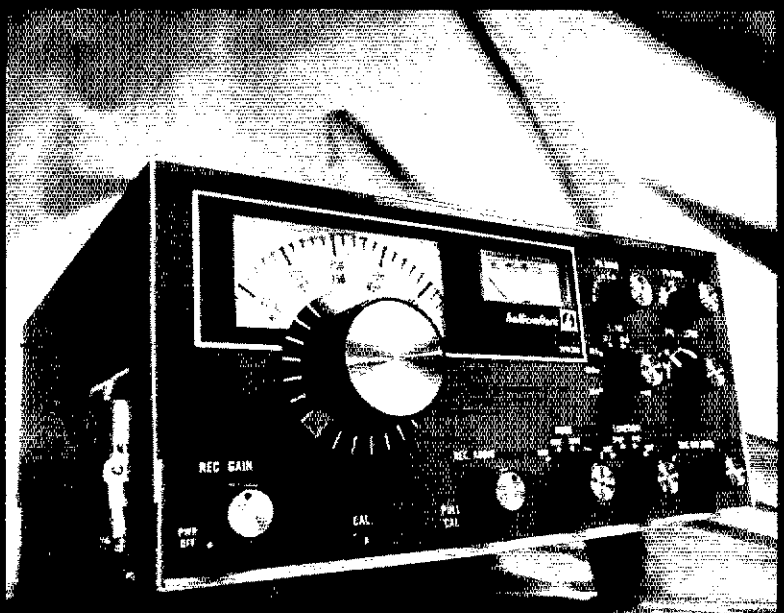

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QST — FEBRUARY 1973

VOLUME LVII NUMBER 2

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Judy Mann, WA1JCN, of the Hq. staff puts the final touch to her copy of the QRP Transmatch described on page 11 of this issue.

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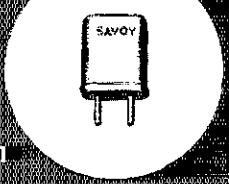

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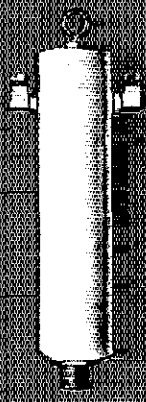

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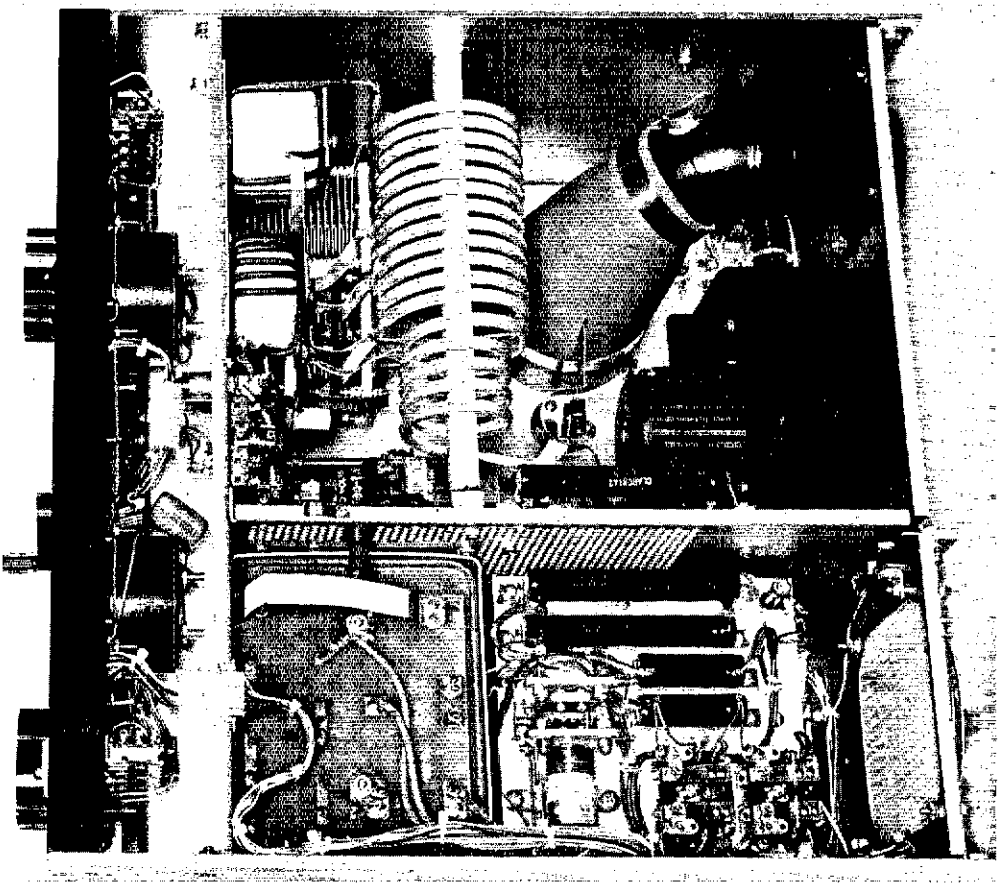

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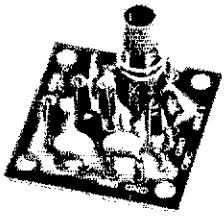

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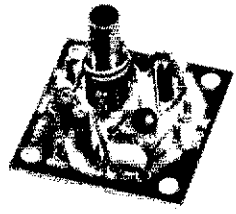

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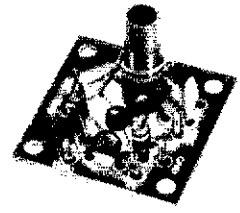

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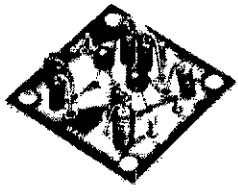

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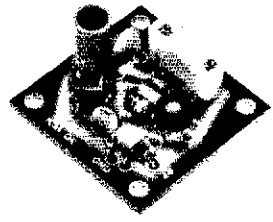

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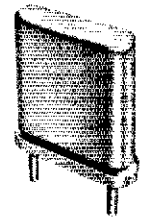

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

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"It Seems to Us..."

DISASTER IN YN

"THE DAY the earth moved" tragically became a phrase applying to Managua, Nicaragua, equally with the 1964 Alaskan earthquake havoc which coined it. That day – or, really, night – was late Friday, December 22. Shortly after midnight, the news which shocked the world came via the only available communications channel – amateur radio.

Against the tragedy of death and destruction, the crisis of no electrical power or water, the urgent need for food and medicinal supplies, came reassurance through the lifeline of amateur communications that help would come from other nations in the hemisphere, that the city was not completely isolated from the rest of humanity.

In monitoring the activity, only a modest familiarity with Spanish is needed to conclude that our brethren to the south are doing an outstandingly effective job of disaster communications. YN1 calls appeared almost in profusion compared with the small amateur population – AGL, BE, ARG, CX, MO, YN, HL, SIRA, JSN, were among the first we heard. Latin neighbors, and W/K hams (largely in Florida) as well, quickly organized nets for assistance and traffic handling; supplies and operators were airlifted to the stricken area. The International Amateur Radio Union showed itself far more than a paper affiliation of national amateur societies. Region II Chairman XE1CCP flew to Managua both to offer needed words of praise and encouragement, and to roll up his sleeves as a relief operator. On Sr. Pita's necessary return to Mexico, IARU President WØDX headed for YN-land with gasoline-powered generators, extra tubes and sets of crystals for (KWM2s), 2-meter transceivers, and such, all provided by ARRL and cooperating manufacturers.

A number of the Hq. staff listened with considerable pride to the disaster communications activities, particularly in the early hours. One (W1SL) had the presence to make a few notes. In the thought that they well convey the amateur picture, good and bad, we reproduce them verbatim:

The very impressive cooperation between stations in the neighboring countries. The efficiency with which they handled official traffic and the courtesy in dealing with hundreds of U.S. callers with health and welfare inquiries. HR2AJS calmly and clearly keeping people apprised of the situation in Managua. The no-nonsense phone patches to the States, asking about medical supplies and personnel . . .

The cooperation of members in the Maritime Mobile Net to give up their usual frequency and assist in keeping it open for emergency traffic. KZ5USA exhibiting great versatility and an outstanding signal, appearing on any frequency where needed. The thoroughness of a doctor faculty member giving a situation report. A tremendous number of stations monitoring and chasing the casual QSO-er away (and the willingness of most of them to move) . . .

WB4ZRA reading traffic from Braille. WB4JOB just out of the hospital, but sticking with the nets through the long hours. Ann, WB4IKS, trying to be several places at once but doing a terrific job with nets and traffic . . .

PY2 repeatedly calling CQ DX on top of the net but not hearing anyone, especially the stations trying to get him to move. WA9– griping about nets, message handling, FCC, ARRL, ad nauseum, meanwhile QRMing some emergency traffic on 14,300. The helpful (unprintable) that left his rig tuned to 14,317 with the vox on, giving his interminably barking dog a wide and unappreciative audience . . .

YN1HL working until ready to drop, finally getting a break for food and rest. YN1JSN at the microphone of W1PUO, trying to guide a YN1 mobile through the devastated area . . .

The facility of Spanish-speaking operators in setting up nets on 40, 20, and 15, handling messages in and out of the area in their native tongue where there was no W-land QRM. The biggest QRM problem on 40 meters: Radio Moscow . . .

Public recognition in the press and on radio/TV of the effective performance by

(Continued on page 23)

On December 27, FCC released a Notice of Proposed Rulemaking, Docket 19658, which would raise the total fees collected by FCC by some 30%. The proposed rates would affect virtually every type of license or permit in virtually every radio service. The basic amateur license fee is proposed to be raised from $9 to $10 for new, upgraded, renewed or modified-and-renewed licenses, and from $4 to $5 for straight modification. It is proposed to keep the special-callsign fee at $25, and the duplicate fee at $6. The Novice, military recreation, RACES and reciprocal operating authorizations continue free of charge. In contrast, broadcast fees are to go up about 33%; common carrier fees to double the present schedule; and commercial operator fees from twice to three-and-a-third times the present (to new rates of $10 across the board). Class D CB will be $25 for up to 5 transmitters. Comment deadline in Docket 19658 is February 13, 1973 and reply comments by February 28, 1973. The ARRL Board of Directors holds its meeting January 18th, 1973; its decision in this matter will be included in "Board Meeting Highlights" next month.

We try to keep up to date on call letter license plate developments, a complex assignment what with all 50 states involved, and with attempts made now and then to cancel the privileges by legislation. Please post us on any such activity in your states; conversely, ask us for background in similar situations when you have need to defend the policy.

No, WIAW didn't blow its 40-meter final amplifier. We abandoned the 7080 kHz spot temporarily at yearend to avoid interference with an adjacent Caribbean net deeply involved in the Nicaraguan disaster.

The California Institute of Technology has high admission standards -- acceptance is limited to the upper three percent nationally in college board exams. Thus it is a major tribute to have Peter M. Miller, director of admissions, say, "If a fellow is a radio ham, or has filled his garage with chemistry experiments, or built an electronics workshop, or taught himself calculus in his spare time, then his drive and desire to study science are more likely to remain steady under Caltech's stiff academic pressures."

This year sees production of the fiftieth edition of The Radio Amateur's Handbook, just coming off the press as you read this. Not strictly a golden anniversary, however; the first edition was in 1926, but multiple editions were brought out in several of the earliest years. Kinda sobering, nevertheless, to realize that in 1976 the Handbook will have been around one-fourth of the total existance of the United States of America!

Speaking of anniversaries, it was just 25 years ago the bi-polar transistor concept was developed by three Bell Labs scientists, instituting a veritable revolution in electronics. QRP and FM mobile are two major areas of many in amateur radio where solid-state has had substantial impact.

Had a QSO through Oscar 6 yet? Far different from its predecessors' life of three weeks or less, this one looks good to achieve its predicted existence of one year. See page 77 for details on recent satellite DX accomplishments.

VE3TEN in Ottawa is now operating 24 hours a day on 28,175 kHz -- a frequency chosen by the IARU Region I beacon project for propagation studies. Fsk signature with 850 hertz shift. Might cause some interference to Novices -- but on the other hand could be very useful in indicating band openings.

Wondering about your DX QSLs? See page 63.

A Transmatch for QRP Ri

BY DOUG DeMAW,* W1CER

THIS TRANSMATCH will handle power levels up to 30 watts with the values given in Fig. 1. The SWR bridge at the input of the circuit has ample sensitivity to assure full-scale deflection on M1 at power levels above 1 watt. The sensitivity can be increased by using a 50-μA meter at M1.

The Circuit

Most modern QRP transmitters are of the solid-state variety. Not all of them contain mismatch-protective circuitry that prevents damage to the PA device in the event of improper termination. Therefore, it is wise to provide a means to assure that the transmitter is terminated by a noninductive 50-ohm load during adjustment of the Transmatch. The circuit of Fig. 1 includes a 3-dB 50-ohm pad at the input port, J1. S1 permits the operator to insert the pad during adjustment of the Transmatch. When the reflected power is reduced to zero, the pad can be switched out of the line and the Transmatch adjusted once more for minimum reflected power. There may be a slight difference in the settings with and without the pad in the line, especially at the high end of the hf range.

The SWR bridge is based on an early design by Bruene[1] and is similar to some units described in *QST*.[2] Performance is good from 3 to 25 MHz and a proper null can be obtained over that range. It would not be difficult to extend the useful range of the bridge to 28 MHz, but some experimentation with parts values would be necessary to assure a good null at 10 meters.

The bridge should be nulled before it is installed in the composite assembly. This can be done by placing a 2-watt, 51-ohm resistor between the top connection of C2 (Fig. 1) and the ground foil of the pc board. Apply transmitter power (at 21 MHz) to the input port of the bridge (top side of C1 to ground foil). Next, adjust R3 for full-scale deflection of M1 with S4 in the FWD position. Then, set S4 in the REF position and adjust C1 for minimum meter reading (a null condition). Now reverse the dummy load and transmitter output connections and repeat the process while adjusting C2 for a null reading. The setting of S4 during the latter is in the FWD position since the bridge is now operating in reverse. Repeat the nulling procedure once more to assure good balance of the bridge.

The remainder of the circuit is similar to that of the Ultimate Transmatch.[3] Inductor L2 is used to reduce the total inductance of the network when

*Technical Editor, *QST*.

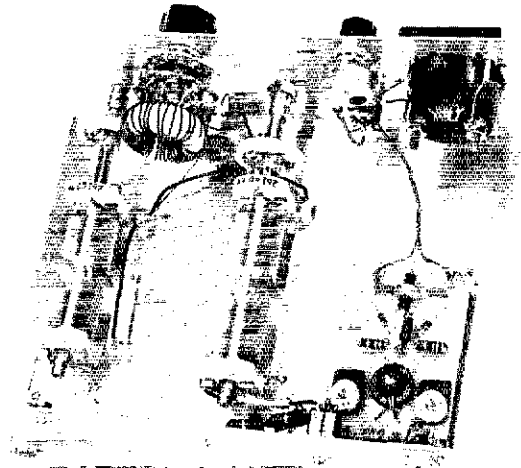
[1] Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959.

[2] DeMaw, "In-Line RF Power Metering," *QST*, December, 1969.

[3] McCoy, "The Ultimate Transmatch," *QST*, July, 1970.

Top chassis view of the QRP Transmatch. Dual-section variables C6 and C7 are insulated from the chassis by their polystyrene base blocks. The shafts are insulated from ground by means of Millen shaft couplers. Panel-bearing assemblies (Millen) connect to the shaft couplers. Toroid L1 is attached to S2 by means of its tap wires. L2 is supported by its pigtails under L1.

This equipment permits matching low-power (QRP) transmitters to a wide range of impedances encountered when using random-length, single-wire antennas of the type common to portable and emergency operation. The unit will also match the transmitter to any coax line regardless of the mismatch reflected from the antenna to the transmitter end of the line.



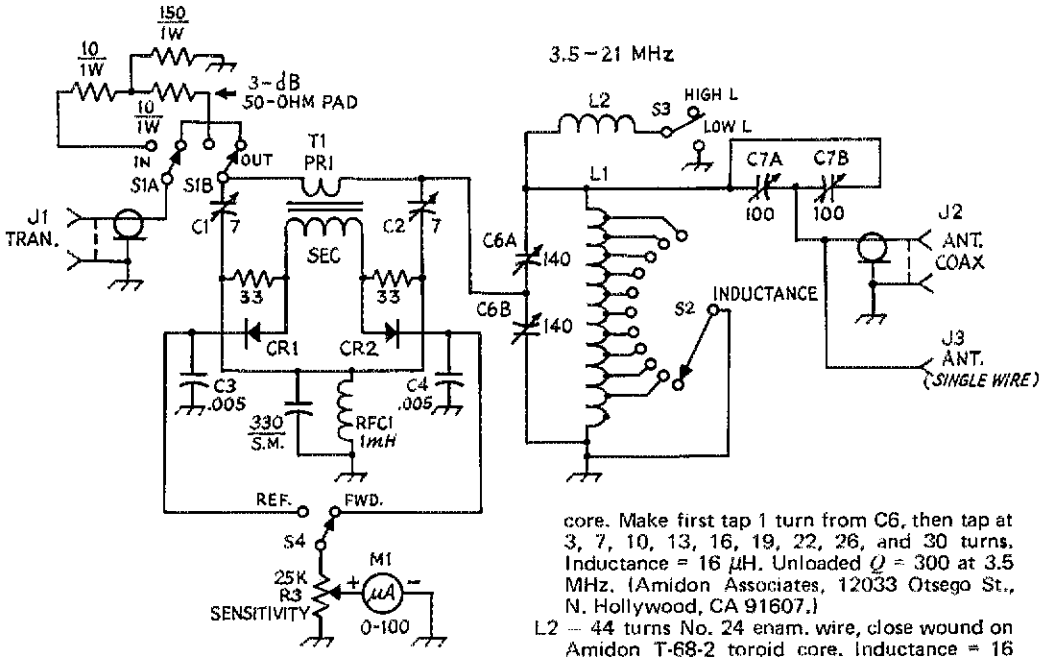


Fig. 1 — Schematic diagram of the QRP Transmatch.

C1, C2 — 1.5- to 7-pF ceramic or air trimmer.
C3, C4 — Disk ceramic.
C5 — Silver mica.
C6 — Dual-section air variable, 140-pF per section. (Millen 26140 RM or equivalent. James Millen Mfg. Co., 150 Exchange St., Malden, MA.)
C7 — Dual-section air variable, 100 pF per section. (Millen 26100 RM with sections in parallel.)
CR1, CR2 — 1N34A diode.
J1, J2 — Coaxial chassis-mount connector.
J3 — Insulated binding post.
L1 — 36 turns No. 20 enam. wire on Amidon T-130 toroid core. Space turns equally around core. Make first tap 1 turn from C6, then tap at 3, 7, 10, 13, 16, 19, 22, 26, and 30 turns. Inductance = 16 μH. Unloaded Q = 300 at 3.5 MHz. (Amidon Associates, 12033 Otsego St., N. Hollywood, CA 91607.)
L2 — 44 turns No. 24 enam. wire, close wound on Amidon T-68-2 toroid core. Inductance = 16 μH. Unloaded Q = 220 at 3.5 MHz.
M1 — 100-μA meter, any type (Simpson Electric meter used in this model).
R1, R2 — 33-ohm, 1/2-watt composition resistor.
R3 — Linear-taper, 25,000-ohm, carbon control.
RFC1 — Miniature 1-mH rf choke (Millen J300-1000 or equivalent).
S1 — Dpdt miniature slide or toggle switch.
S2 — Single-section, phenolic-wafer, single-pole 11-position rotary.
S3, S4 — Spdt miniature slide or toggle switch.
T1 — 60 turns No. 30 enam. wire, close wound on Amidon T-68-2 toroid core. Primary is 2 turns of small-diameter insulated hookup wire over center portion of secondary winding.

operation on 40, 20, and 15 meters is carried out. When S3 is closed L2 is in parallel with L1, thereby halving the inductance of L1. The switch is open during operation on 80 meters.

Those desiring greater flexibility in matching can use a switch with more positions (S2) and place the taps on L1 closer together, perhaps at every turn on the toroidal inductor. Since only 10 taps are used in this model it may be necessary in some instances — depending upon the particular impedance presented by a given random-length antenna — to adjust the tap points on L1 to provide a correct match to the transmitter. A condition of this kind is most likely to occur at 14 MHz or higher. However, with the circuit shown here, a 170-foot end-fed wire could be matched without difficulty from 80 through 15 meters.

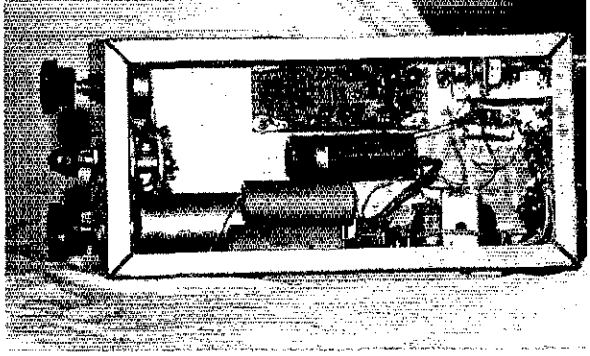
Construction

The Transmatch is assembled on a piece of aluminum sheeting which measures 6 × 8 inches. The front-panel lip is 2-1/2 inches high. The rear apron is 1-1/4 inches high. Greater compactness is possible if the builder wishes to place the components close together. Layout is not critical provided all rf-carrying leads are kept as short as possible.

Adjustment and Use

The Transmatch can be used to disguise SWR on coaxial-fed beams, dipoles, or verticals. It will work nicely with end-fed wire antennas, resonant or nonresonant.

During initial tune-up switch the 3-dB pad into the line, apply transmitter power, and adjust C6 and C7 for the lowest meter reading with S4 in the REF position. (*Warning*: The pad should use resistors with wattage ratings high enough to prevent the pad from heating. The 1-watt resistors indicated should be adequate for power levels up to 5 watts. For operation at higher levels of power use parallel combinations of one- or two-watt resistors that will provide the resistance values given in Fig. 1.) Next, adjust the taps on L1 and readjust C6 and C7 for minimum SWR. Continue the procedure until an SWR of 1 is indicated. The pad can now be switched out of the line and the controls again adjusted for minimum SWR. Retune the PA stage of the transmitter for maximum output indicated on M1 with S4 in the FWD position. QST



The vacuum relay is mounted at the upper right corner, near the coax fitting. Perf board is used for mounting the transistors and associated components.

High-Speed Break-In via a Keyed Vacuum Relay

BY DONALD B. LAWSON,* WB9CYY

FOR A LONG TIME the author has been tinkering with systems to allow full cw break-in operation, and most of the ideas tried out to achieve this were found to be lacking in some respect. Station performance was badly degraded when a separate receiving antenna was used. Several electronic T-R switches were tried; all either had problems with reduced sensitivity or were prone to overloading and all required cut-off bias on the final amplifier during receive. The hassles involved in trying to get good operation from electronic T-R switches made the idea of using a fast antenna relay worth investigating. While the idea may seem slightly archaic, the use of a relay allows the receiver to be connected directly to the antenna (thus getting around the problem of diode noise generated by the final amplifier). Also, it eliminates the dependence of receiver sensitivity on transmitter tuning, and can provide much better transmitter-receiver isolation than can any electronic switch.

What Relay To Use?

Finding a suitable relay for use as a T-R switch can pose a problem. Previous designs[1,2] used small reed relays operating far beyond their rated power-handling capabilities. The state of the art has advanced, however, and the smaller-sized vacuum relays available today are perfect for the application. The particular relay chosen for use here has a typical operating time of 3 milliseconds, can handle 4 kW of rf at 30 MHz, and introduces negligible impedance bumps in coaxial lines for frequencies up to 60 MHz. When used in the T-R switch described here, the relay allows full break-in at speeds of up to 50 wpm.

While the vacuum relay has plenty of advantages over other types of T-R switches, there is one special consideration that must be kept in mind when it is used. Since the transmitter can be effectively keyed by any method that prevents the rf from reaching the antenna, the use of a T-R relay as a brute-force keying switch (which is what it becomes whenever hot-switching occurs) gives the keying wave form an essentially instantaneous rise time. The result: clicks that cover the spectrum! Obviously, if these clicks are to be avoided, some measures are imperative to insure that cold-switching takes place (i.e. to insure that the transmitter is not keyed until its output has been connected through the relay to the antenna, and that the relay does not open until the transmitter output has fallen to zero.)

Another factor to be considered is that for the relays specified, typical switching times are on the order of 3 milliseconds with 8 milliseconds being an upper limit. While this may be fast enough for moderate keying speeds, having an operating time of 1 to 2 milliseconds is to be preferred. These faster operating times can be achieved by momentarily applying an overvoltage to the relay coil, and then dropping the voltage to the coil's nominal 26-volt rating. This can be accomplished by using the "hot shot" circuit of Fig. 1. "RC" in the formulas stands for the relay's coil dc resistance in ohms. In the case of the Kilovac HC-1 or the

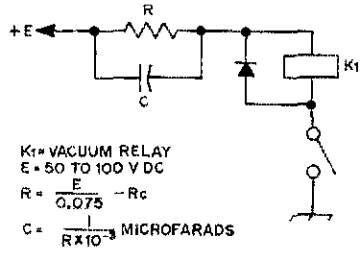


Fig. 1 — Hot-Shot circuit.

*4601 Jay Drive, Madison, WI 53704

[1] Grammer, "A Keyed Antenna Relay," *QST*, July 1964.

[2] "High Power Version of the Keyed Antenna Relay," *QST*, Dec. 1964.

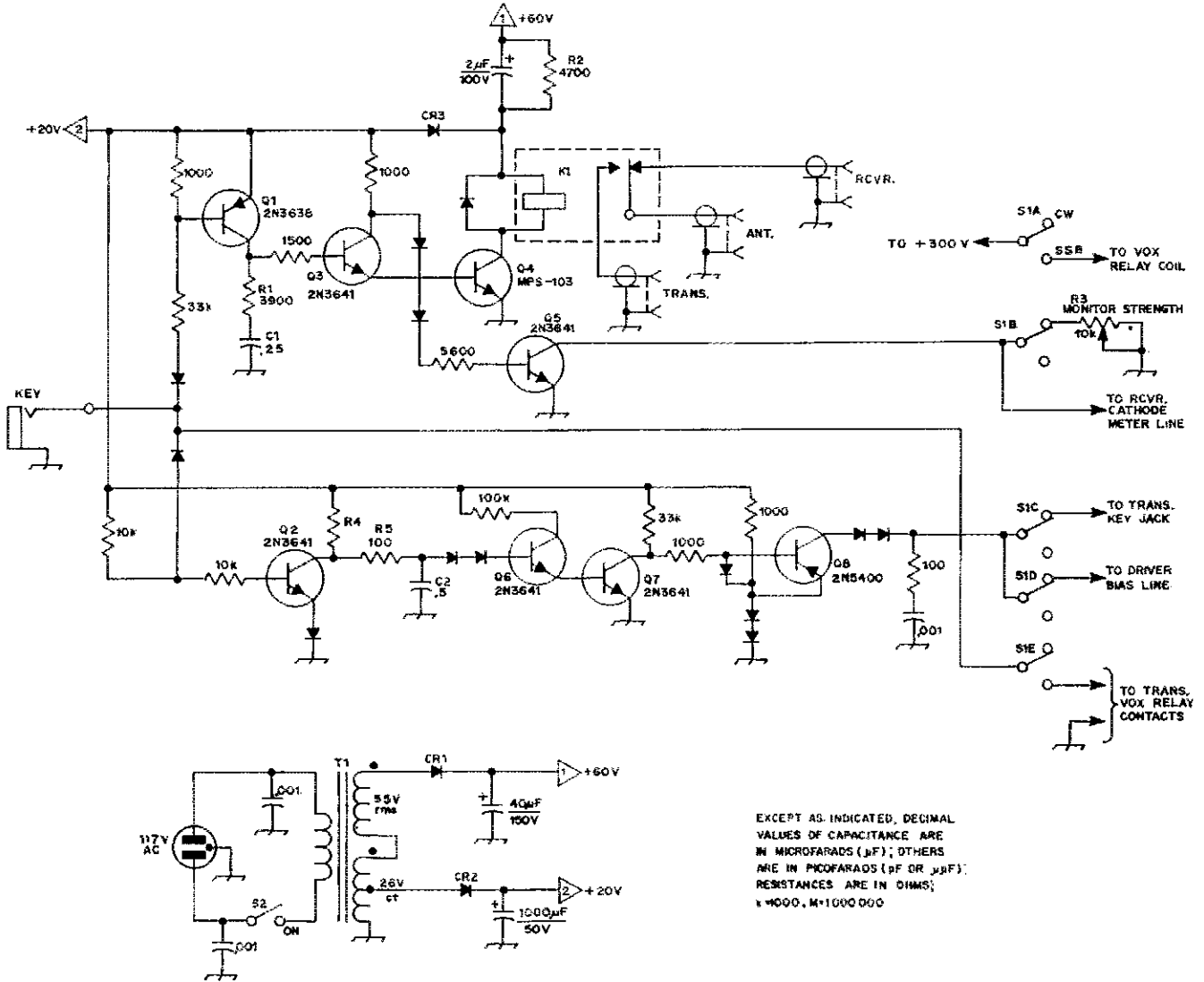


Fig. 2 — Circuit diagram of the T-R switch. All diodes except CR1, CR2, and CR3 are 1N914's or equivalent.
CR1,CR2,CR3 — 100 PRV, 1 A.
K1 — Kilovac HC-1*, Jennings RF1A or RF1D**.
Q1 — 2N3638 or equiv.
Q2,Q3,Q5,Q6,Q7 — 2N3641, MPS6530, or equiv.
Q4 — MPS103 or equiv.
Q8 — 2N5400 or equiv.
R4 — See text.
S1 — Mode switch to suit transmitter and receiver used.
T1 — 117 V pri., Sec. No. 1, 55 V, 35 mA, Sec. No. 2, 26 V center-tapped, 200 mA (Fair Radio Sales No. MW 4535).
*Kilovac, P.O. Box 4422, Santa Barbara, CA 93103
**Jennings Division, ITT, P.O. Box 1278, San Jose, CA 95108

Jennings RJ1 this resistance is 335 ohms; for the Jennings RF1-D and the RF1-E it is 920 ohms.

The Circuit

The T-R switch circuitry is shown in Fig. 2. Most of the circuit sequences the operation of the transmitter and antenna relay to permit cold switching. The remainder is an extension of the mode-switching circuitry of the author's HT-32, and is used mainly to control operation of the VOX relay.

Q1 closes the relay through Q3 and Q4 when the key is closed, and charges up C1 through R1. At the same time, Q2 is turned off, allowing C2 to charge through R4 and R5. By the time the relay has closed, C2 has charged up to a potential of about 2.5 volts, at which point Q6 and Q7 start conducting. As Q7 saturates, the base of Q8 is pulled down enough that Q8 turns on, keying the transmitter. When the key is opened, Q2 discharges C2, turning off the transmitter. Q3 and Q4 are momentarily held on by the charge on C1, thus holding the relay closed while the transmitter output drops to zero.

Q5, the muting switch for the receiver, is turned off whenever voltage is applied across the relay coil. This allows the receiver a little time to recover after the key is opened, and effectively eliminates thumps and clicks in the receiver output; hence, special audio processing for the receiver should be unnecessary. The transmitter can be monitored at a comfortable level by adjusting R3.

The additional circuitry acts as an auxiliary mode switch in that, in the cw position, it allows the transmitter's driver to be keyed along with the rest of the keyed stages. In the case of the HT-32, this is important, since in standby the driver is biased very far beyond cut-off, and the vox relay is normally used to bring the bias to the proper value. The T-R switch is used on phone by connecting vox relay contacts in parallel with the key. To cut down on the acoustic noise in the shack, the vox relay is disabled when the control switch is turned to cw.

Construction and Adjustment

All semiconductors used in the sequencing circuitry should be the silicon type. This is necessary since the timing circuit values were determined for a 0.6-volt drop across each p-n junction. Whereas silicon junctions do not conduct appreciably until about 0.5 volt is applied across them, germanium junctions will conduct a considerably lower voltage. The only other thing to keep in mind when using junk-box transistors is that the V_{CEO}'s be adequate for the applied voltage; values of Beta are unimportant.

Suitable vacuum relays are available on the surplus market at a savings of about 40%. The rest of the components are common surplus items as well, so by careful shopping the total cost can be kept at a very attractive level.

Layout and construction is not critical. The only part of the switch that requires special attention is the relay enclosure. In wiring the relay's rf contacts, be sure that the leads are spaced fairly well (and free of excess solder) to avoid any possible arcing between the transmitter and receiver antenna lines.

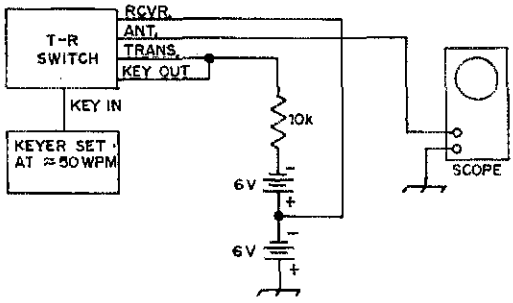


Fig. 3 — Test setup for adjusting R4.

It will probably be necessary to adjust R4 experimentally for best results. The test set-up in Fig. 3 is ideal for this. Adjust R4 for the shortest delay in keying the transmitter consistent with cold switching. For the test jig of Fig. 3, this means adjusting R4 so that definite dips extend down to -12 volts on the scope trace, as shown in Fig. 4. If an oscilloscope isn't available, R4 can be adjusted on the air (on a dead band!) while a local ham listens for clicks on your signal. When the clicks disappear, note the value of R4, add 10% for a margin of safety, and wire in a fixed-value resistor of that ohmage. In the author's case, R4 was found to be 180,000 ohms.

Final Comments

At this point of an article, the typical author lets himself brag a bit about the wonderful results he gets with his gadget, almost as if he were still trying to justify its high cost to himself. All this author will say is that this is the best T-R switch he has ever used, and that is makes an easily built project.

Thanks are due to Leigh Norton, W6CEM, of the Kilovac Corporation for advice and the "hot-shot" circuit formulas, and to WB9DKS for the photo work. QST

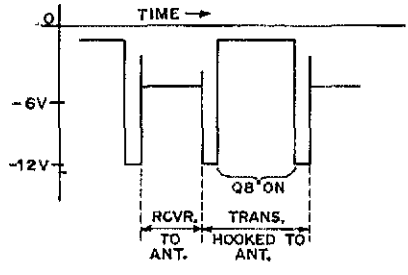


Fig. 4 — Trace on scope for test setup of Fig. 3, R4 adjusted properly.

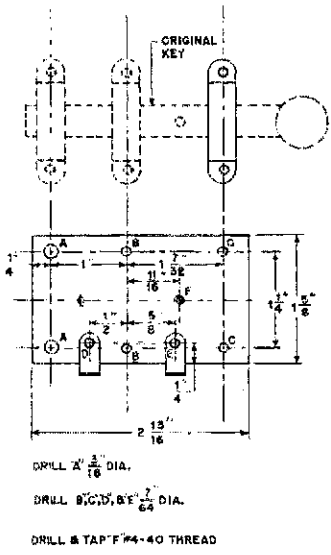


Fig. 1 — Aluminum mounting plate. Note angle brackets at "D" and "E."

A Twin-Paddle Key Made from Surplus "Straight" Keys

BY ROBERT M. MASON,* W8NN

THE AUTHOR CAME across some code practice sets at Fair Radio Co. here in Lima, Ohio. The set consisted of a little, funny looking, and simply constructed, key and buzzer mounted on a highly polished hard-rubber base. The unit sold for $1.50 at the time.

* 551 Turner Ave., Lima, OH 45804.

Using three of these keys and simple tools, I was able to come up with a slick twin-paddle key for the trusty old 9TO keyer. This unit has good looks, fine contacts, bearings that need no adjusting, snappy feel, and the bearings are jumpered with braid. I have used the key for about four months and have had favorable comments from those who have seen it and who have heard the results. The total cost is approximately $6.50 using three keys, but the unit can be constructed using only two keys if you want to make your own backstop brackets.

Construction Details

Modification of the original keys and construction of the twin-paddle counterpart can be seen in the photograph and Fig. 1. The original keys should be disassembled, and the parts laid aside for use later in the construction of the new key. Some new parts will have to be fabricated, and these are:

1) An aluminum mounting plate as shown in Fig. 1. Either lay out the entire plate according to the plan shown in Fig. 1, or use the hard-rubber base of one of the original keys for a template for holes "A" and "B."

2) Four aluminum angle-brackets (1/2 inch on a leg, made from 3/8 × 1/16-inch aluminum stock).

3) A modified No. 4-40 nut, with a No. 4-40 round-head screw (Fig. 3). They are used to hold tension springs in place.

4) Insulating material and spacers for the brackets with the "hot-side" contacts.

5) 3/32-inch fiber glass board for paddles and spacers.

6) Lead or iron plate to increase weight of key.

It should be noted that the two original keys are used as they come with the exception of the following changes:

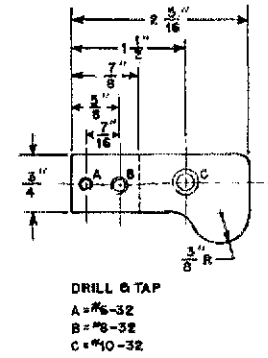
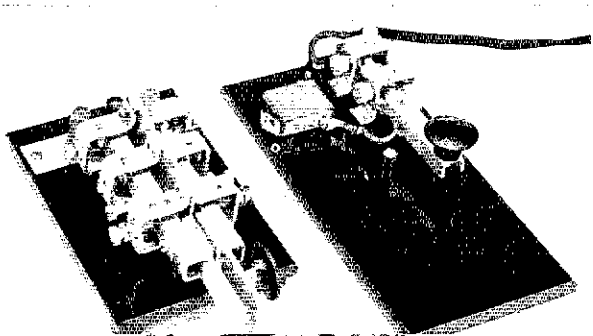


Fig. 2 — Pattern for paddles. Made from 3/32-inch fiber glass, with a 3/32-inch block cemented as shown by the dotted lines. Dimensions of the block are 3/4 × 7/8 inch.



Surplus straight key and twin-paddle key for keyer.

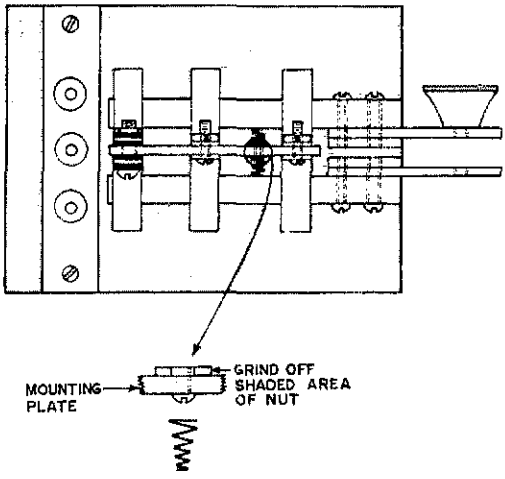


Fig. 3 — General layout. Note method of keeping tension springs in place.

1) Since the original key was mounted on a base of insulating material, some means of insulating the contacts from the aluminum plate is necessary. Use a strip of insulating material (such as fiber glass) under the brackets with the contacts, and use spacers under the screw heads and in the holes in such a manner as to prevent the brackets from shorting to the plate and the other bracket. After assembled, check with an ohmmeter.

2) An extra hole must be drilled in one of the lever arms in order to mount the new paddles. Use the pattern shown in Fig. 2, and cement a block of the fiber glass, preferably with epoxy cement, to the back of each of the paddles as shown in Fig. 3.

3) Some operators still prefer to have the knob on one of the paddles, and one of the original knobs can be cut down, or a suitable replacement, obtained.

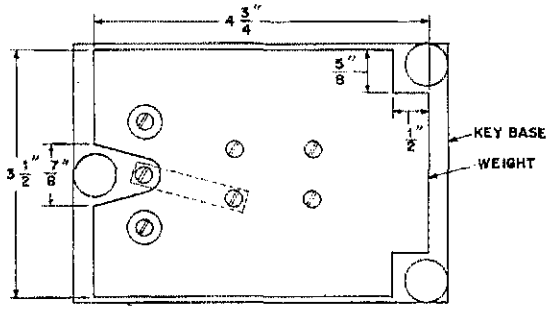


Fig. 4 — Key base showing mounting of optional feet and weight.

This completes the modification of the original keys, and an easy way of locating the hole "F" is as follows. Cut off the head of a No. 6-32 screw, and file a point on the remaining threaded portion. A drill chuck can be used as a vise to hold the screw. Thread the screw with the point down into one of the levers, and mark the plate with the pointed end. This locates hole "F."

Since the original key had another set of normally closed contacts for a backstop, another set of backstops will have to be made. Either the brackets from a third key could be used and modified, or a new set made out of 1/16-inch (or thicker) aluminum stock. Use No. 10-32 screws (with a No. 10-32 nut and lockwasher under them in order to lock them in place once the desired setting is made) threaded into the brackets as adjustments for the spacings on the dot and dash sides of the paddle.

This completes construction of the key, and the key is then mounted on a suitable base. One of the original key bases can be cut off as shown in the photograph and used. The key could then be bolted to the operating table, or extra weight added as shown in Fig. 4. QST

Strays

5-Band Awards

(Updating the June 1972 listing.)

5BDXCC: (Starting with number 171), K8YBU DK1YK K4PUZ DL7NJ DJ6RX YU3OV W3AXW VE3AAZ OZ3PO W6DQX W9EXE CT1UE DL1JW W1FTX K2BK W2PN W1AA K1KNQ EP2DX K5PFL W8QXQ W2CUC K6SDR W5RUB W3QOR WØGNX W8DCH WA4LDM F2IU W1CT VE1AIH W4NJF DL1MD YV1KZ W4WSF OZ5DX G3UML DLØWW HR1KAS PY2FIQ XE1J JA1MCU W6VD OK1ADP OH3YI VE3CDP/9 DM2DTO VP9BK I6FLD WA2FCA DJ2BW.

5BWAS: (Starting with number 107), W2FWK K4CKA VE3DXV/W6 WAØELW K3HZL WØAO W2FBF W3AZD W4REZ W5NCB WB5AFW W5PD KZ5KN KP4DLW W2CUC W8QXQ W7VSE KS6DH W3JXH K7AWB W6EJJ KZ5JF WA1JZC K4AGC WAØPRS W5UR K6QPH K4II W5EIB WA5WQF WA5YSC.

Though most good 2-meter amplifiers represent a substantial investment in tubes and components, topnotch performance can be obtained at moderate cost. Here, largely in pictures, is how one enterprising vhf enthusiast solved the high cost of high power for the 2-meter band.

An Efficient 2-Meter Amplifier — At Moderate Cost

Using Metal Shears to Spare the Pocketbook

ANY EXPERIENCED vhf rig builder can come up with a pretty good 2-meter amplifier, if he doesn't have to worry about the cost of components. There is almost no alternative to external-anode tubes, if the amplifier is to run 200 watts or more, but with conventional methods of construction just new tubes and the air-system sockets for them come to well over a hundred dollars.

Most of us have pondered less expensive ways to do this desirable job, but Guy Howe, K5KHA, Tonkawa, Oklahoma, did more than think about it. Using ceramic loctal sockets (5 cents each, surplus), a pair of 4X150A tubes (also surplus), a used aluminum panel, two sheets of Teflon, miscellaneous small parts, and plenty of flashing copper, Guy put together an efficient amplifier at a fraction of the cost of the usual designs. Duplicating it takes some metal work, but nothing that cannot be accomplished with ordinary hand tools. At least eight similar amplifiers have been constructed over the past ten years. Two are used currently in 2-meter repeaters. Some of the others are operated with high-level amplitude modulation. All deliver efficiency comparable with that obtained with more conventional techniques.

Two important factors in the performance of the K5KHA amplifiers are effective screen bypassing and elimination of moving contacts in the plate-circuit tuning system. Special attention was also given to rf grounding in both plate and grid circuits, with a view to eliminating multiple rf ground paths, and possible instability resulting from common coupling through the chassis. Perhaps because of these precautions, all amplifiers of this general type now in use operate satisfactorily without neutralization, in Class-C amplifier service on a-m, fm and cw.

Construction

Two mechanical layouts are shown in the pictures, made by Corwin Butler, K5INC, Blackwell, Oklahoma. Similar rf components are used, except for bending of the plate circuit to save space in the more compact layout. The larger amplifier, seen in the top three rows of the adjacent photo page, will be described, as it shows the construction features more clearly.

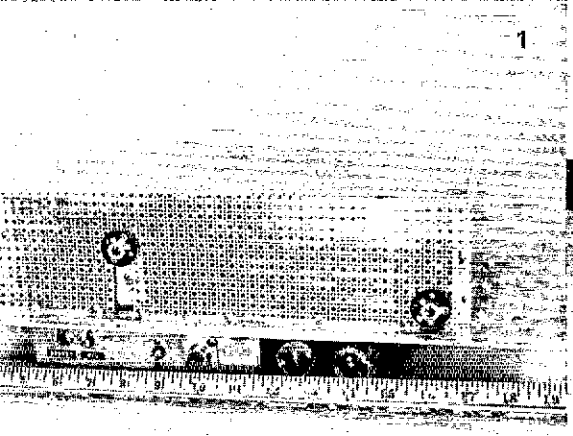
Pictures 1 and 2 are of the complete amplifier, with and without its perforated metal shielding. In the second row, 3 has the amplifier turret still in place, but with the plate inductor (L3 in Fig. 1) detached, and tilted up at the back. The wrap-around clamps used to attach L3 to the tube anodes are also seen in this view. The output-coupling loop, L4, and its series capacitor, C3, are visible at the right. In 4, the turret is resting on its left side, exposing the small main chassis, tube sockets, and screened ventilating holes. Photo 5 details the screen bypassing showing the two Teflon (or mica) sheets, the screen-ring contact element of 0.010-inch brass shim stock, and the top cover. Holes in the shim stock can be conveniently made with a paper punch. The spring fingers for contacting the screen rings of the tubes can be cut with ordinary shears. They should be adjusted with care to permit easy tube insertion, while maintaining good contact. In 6, the assembly is complete, and one tube is in place.

In the bottom row, pictures 7 and 8 illustrate the compact amplifier layout. A separate photo shows the bottom of the amplifier described here.

The tube sockets are mounted 2-1/4 inches apart, center to center, on the top surface of a 5 by 7 by 2-inch aluminum chassis. This is inserted in a hole cut to fit in a thick aluminum plate, which can be a rack panel, as in photo 1. The surfaces of the panel and chassis are flush. Air introduced through a hole in the left edge of the chassis flows across the underside of the tube sockets, up through four screened holes, and out through the tube anodes. Air flow is confined to the tube anodes by a turret of flashing copper, visible in several of the pictures. A hole in the top surface of the turret, extending about a half inch beyond the

Two versions of the low-cost 2-meter amplifier by K5KHA. The larger of the two, shown in the first six photos, is described in detail here. The more compact version, photos 7 and 8, uses similar components, with the plate circuit bent down to save space. Nearly everything in both is homemade, and the rest is inexpensive surplus.

1



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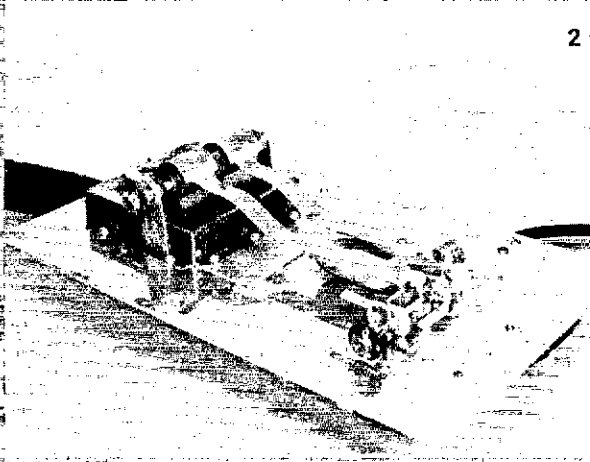

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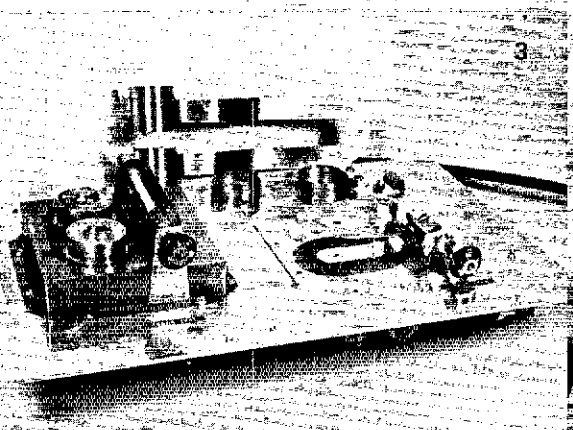

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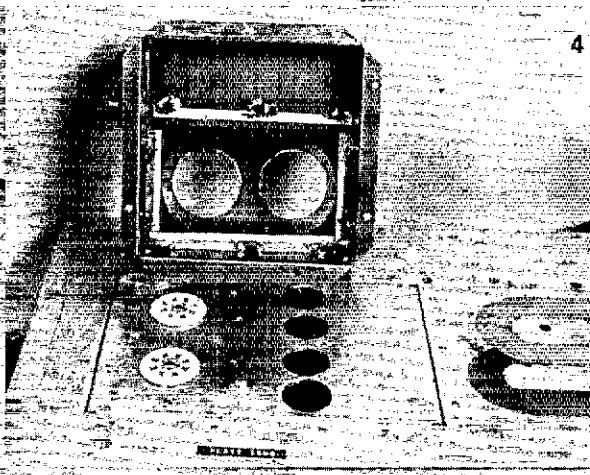

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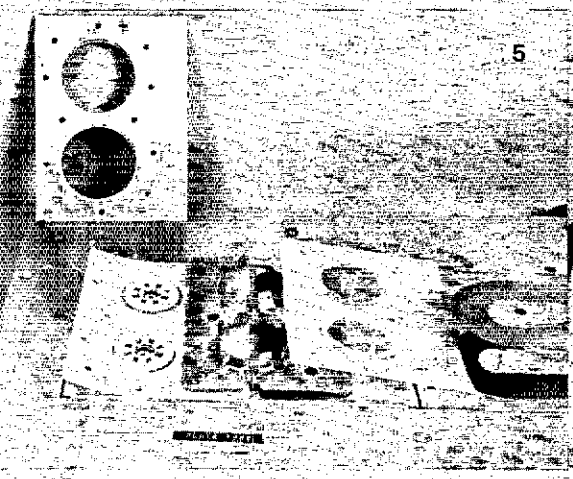

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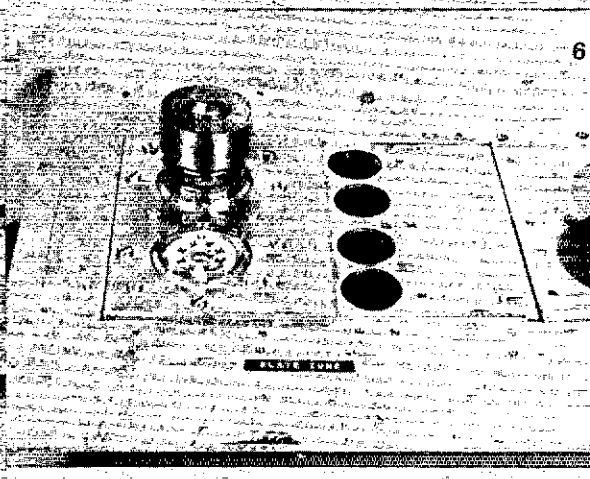

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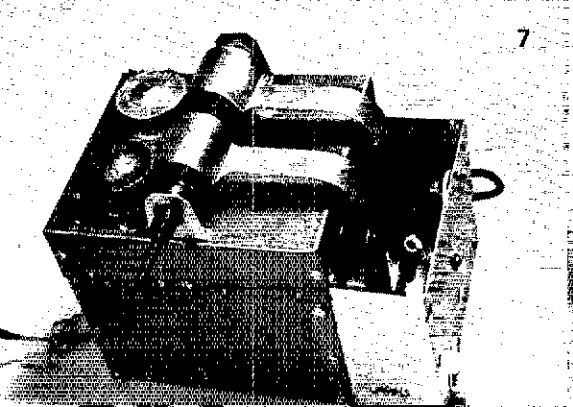

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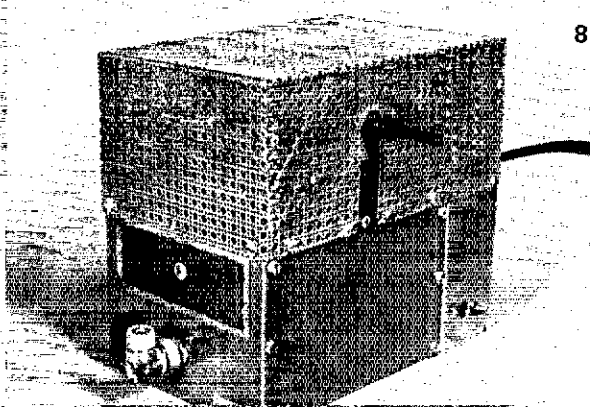
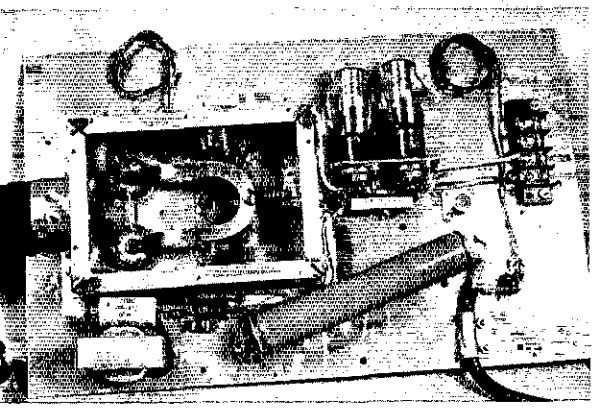




Bottom view of the K5KHA amplifier, with the bottom plate removed from the rf subchassis, to show the amplifier grid circuit.

tube area in all directions, is fitted with an insulating gasket in the form of a 3 by 5-inch sheet of mica or Teflon, on the underside. This has holes just large enough so that the insulation touches the tube structure all the way around, permitting air to leave only by way of the cooling fins. See photo 4.

Mica for several amplifiers was found in hardware stores, which stocked it for replacement use in old stoves. In some areas it may still be easier to find than Teflon. It can be cut fairly smoothly with cuticle shears. If Teflon is used, .030-inch thickness is suitable. Center-to-center spacing of the holes and those for the sockets is related to dimensions of the plate inductor, given in Fig. 2, but the latter need not be exact, as it can be bent readily to fit.

Grid and Plate Circuit Features

The underside of the amplifier, with the cover plate removed from the chassis, is shown in the separate picture. The main inner surface of the chassis is covered with flashing copper, to improve grounding. The sockets are surrounded by small rings of the same material. These provide shielding, and a low-inductance path to ground for the five pins on each socket that are grounded.

Like almost everything else in the amplifier, the rf chokes are homemade. Being self-supporting, airwound, they are also effective. The grid inductor, L1, is of flashing copper, cut to resonate in the band with the input capacitance of the tubes, without tuning. This can be checked readily with a dipper, when the amplifier is complete, except for the plate circuit. Heaters need not be on.

The strip sides are about a half-inch wide, and about 4 inches long, before bending. Some adjustment of effective inductance can be made by bending in various ways, or the U can be cut long

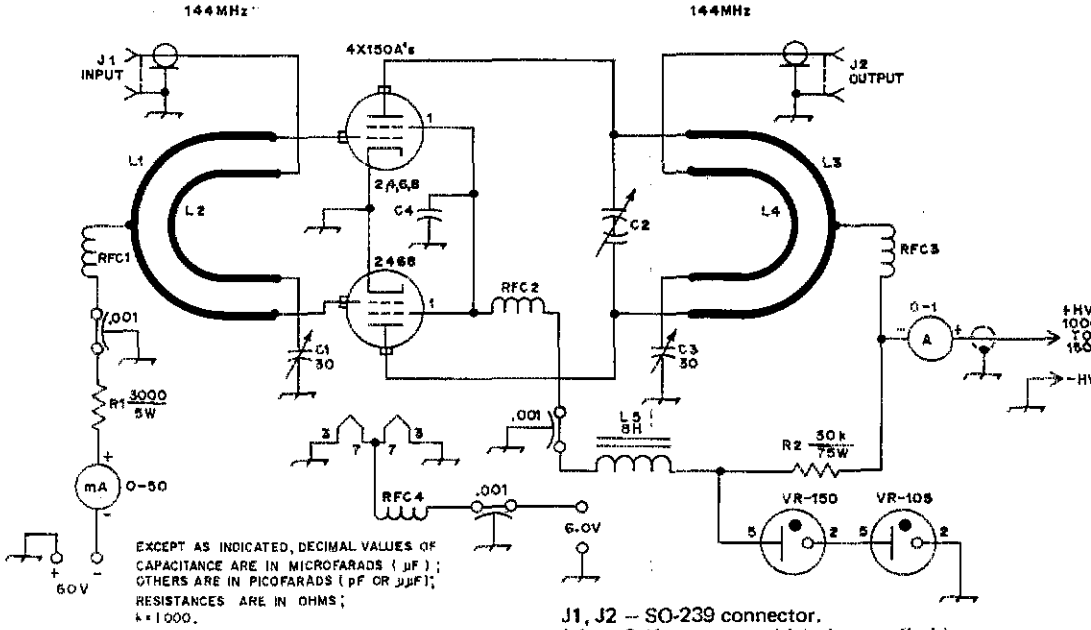


Fig. 1 — Circuit diagram and parts information for the 2-meter amplifier. Parts not described are numbered for text reference. Decimal values of capacitance are in μF, others in pF.

C1, C3 — 30 pF variable; C2 double spaced, with stud mounting, to allow rotor to be grounded as described in text.

C2 — Handmade tuning device; see text and photos.

C4 — Special screen bypass; see text and photos.

J1, J2 — SO-239 connector.

L1 — Self-resonant grid inductor, flashing copper in U shape. See text and photos.

L2 — Loop, No. 12 enameled wire. Adjust size to tune with about 18 pF in C1, and position with respect to L1 for best power transfer.

L3, L4 — Flashing copper plate inductor and coupling loop. See Fig. 2.

L5 — 8-H 50-mA choke. Use only for amplitude modulation. Short out for fm or cw.

RFC1, 2, 3, 4 — 18 inches No. 18 insulated, 1/4-inch dia, self-supporting.

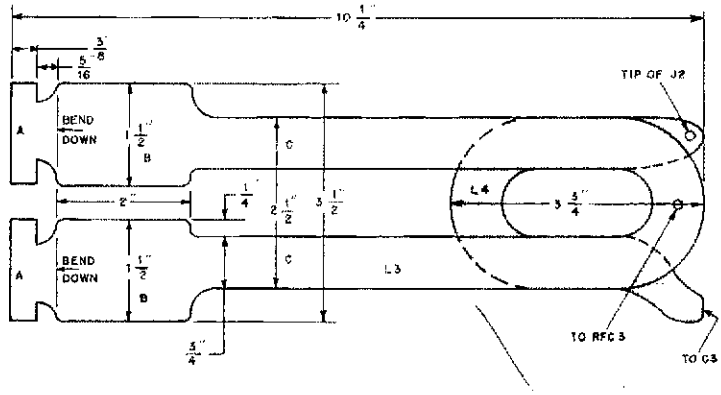


Fig. 2 – Principal dimensions of the plate inductor and output-coupling loop. Both are burnished flashing copper coated with clear lacquer. Dimensions are not critical, as the material can be bent to fit. Parts A wrap around the tube anodes, and are held in place with clamping rings. Sections B are bent into a semicircle to serve as the "stator" plates of C2. The area near C is stepped down as seen in the photographs. The ends of L4 are supported by J2 and C3. L3 has a ceramic support at the point of connection of RFC3.

and trimmed 1/8 inch at a time, for resonance. A loop too short for resonance in the band is usable, if plenty of grid drive is available. Resonance higher than the band may help stability, too, though K5KHA reports that all amplifiers to date have caused no trouble in this respect, even without neutralization of any kind.

Best transfer of power from the driver will occur when the grid circuit and its coupling system represent a 50-ohm load on the driver. This can be achieved by varying the size and position of L2 until C1 tunes it with about 18 pF effective capacitance.

Dimensions of the plate inductor, L3, and the coupling loop, L4, are given for the flat form, before bending, in Fig. 2. Here again, some inductance variation can be achieved by the bending process, but if you miss on the first try there is no expensive material lost. The total cost of the flashing copper needed for the amplifier is around a dollar.

The end portions, A in Fig. 2, are bent to fit around the anode sleeve. Wrap-around clamps, visible in Photo 3, hold them in place. The two-inch sections, B, are bent to form the "stator plates" of C2. The long portion of L2 is "stepped down" approximately at points C, but how this is done gives the builder a chance to vary the effective inductance a little, without appreciable effect on the performance of the amplifier. All copper parts were burnished (not sanded) with a hard slick metal surface, such as the smooth head of a hammer, and then sprayed with clear lacquer.

The rotor of C2 is a half cylinder of flashing copper, 1-1/8 inch diameter and 3-1/2 inches long. The flat piece, about 1-1/2 by 3-1/2 inches in size, was formed around a 1-1/8-inch pipe, by rubbing with a piece of hardwood. End disks of copper 1-1/8 inch diameter are soldered to the trough, and to hubs from flexible couplings. These are supported on a 1/4-inch Teflon rod, in bushings salvaged from old volume controls. K5KHA didn't pass up any money-saving bets, obviously! The shafting was a tight fit in the bushings, but this was corrected by checking the rod in an electric drill, and sanding it down to the required sliding fit. The arc in L3 is adjusted so that it and the surface of the half cylinder are parallel and separate 1/8 inch or more. The rotor is ungrounded, so no dc arc-over to ground is possible.

An interesting precaution was taken in completing the output coupling circuit to ground through the rotor of C3. The capacitor was mounted without grounding the rotor directly, and the circuit was completed with a copper strap running from the rotor to the shell of J2. This was done to prevent large rf current flow in the chassis, at this point.

Operation

The screen voltage is supplied through a dropping resistor from the high voltage, and regulated at 255 volts. This is suitable for any Class-C service. Where Class AB1 linear operation is intended, higher screen voltage and better regulation methods may be called for. The choke, L5, is needed only if high-level amplitude modulation is used.

Where early glass-insulated tubes of the 150-series are used, plate voltage and input should be reduced. Ratings for such tubes are 1250 volts, maximum, for cw, ssb, or fm, and 1000 for plate-modulated a-m. Many users report satisfactory tube life at higher voltages, but an adequate supply of cooling air is a must, if this is to be attempted. The anode structure in the first tubes of this series, and the glass seals in all tubes of the 4X series, can be irreparably damaged with heat levels that are entirely safe with the newer ceramic (4CX) versions.

How far you can go in running up the input is also dependent on the efficiency of the amplifier. From all indications, this design does very well in this department, so if pushing the ratings is safe with any amplifier, it probably is with this one. If you have a supply of the older tube types, you have little to lose. – *W1HDQ*

Fig. 1 — A six-diode voltage divider that will give a constant output voltage over a current range from 125 mA to 10 amperes.

A Constant Voltage Divider

BY WALTER J. STILES,* W7NYO

THE SURPLUS ELECTRONIC parts market has recently been quite active in computer low-voltage dc power supplies of rather impressive specifications. Most of the units available contain a constant-voltage transformer and provide continuous-duty dc current outputs of 10 amperes or better, with filter capacitors in the 300,000-μF category. Other than the size and weight of these units, the principal drawback to their adaptation for amateur use is their high dc-voltage output, usually measuring between 16 and 17. Controlling this excessive dc voltage by connecting a Variac to the primary is impossible because of the transformer's self-regulating feature. Varying the input voltage between 90 and 130 has no appreciable effect upon the output voltage.

Circuit Information

The constant-voltage divider in Fig. 1 (shown schematically in Fig. 2) will solve this voltage-control problem with a minimum of parts, cost, and construction time. Taking advantage of the constant-voltage-drop characteristics of silicon diodes, six HEP-152[1] devices have been connected in series to reduce the voltage in six equal steps, averaging approximately 0.72 volt per diode, or an overall drop of 4.32 volts. Each of these voltage changes are almost constant at any current drain between 125 mA and 10 amperes.

The power dissipated by the six diodes under a 10 ampere drain (4.32-volt drop) is 43 watts. A 2 × 5 × 7-inch chassis provides a heat sink of 83 square inches and was selected to permit the six diodes to operate within their published ratings for an extended period of time. At 10 amperes, using all six diodes, the rise in sink temperature remains under the 100 degrees C (212 degrees F) for up to 8 hours of continuous use with an ambient temperature of 80 degrees F. Use of a 3-minute on, 3-minute off operation, over an operating period of two hours reflects a maximum heat-sink temperature below 75 degrees C (167 degrees F).

Construction Considerations

The unit pictured in Fig. 1 contains six HEP-152 diodes. In actual practice it provides more voltage drop than is required for normal 13.6-volt operation. Therefore a yellow binding post was installed and connected to the output of the fourth series-connected diode. This post is located between the negative (black) and the positive (red) binding posts. The remaining two diodes are connected to the red binding post for additional voltage reduction if needed. If the

* Communications Consultant, Tucson House, Suite 1621, Tucson, AZ 85705.

[1] The HEP-152 is rated at 15 amperes, 50 PRV at a temperature of 25 degrees C. Nominal heat sink operating temperature is 75 degrees C, while maximum rated temperature is 100 degrees C.

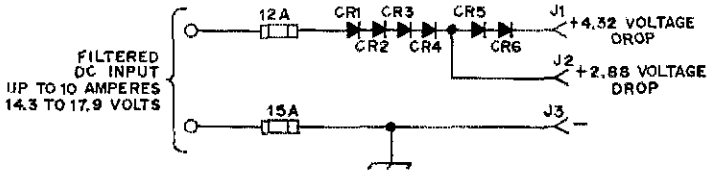


Fig. 2 — The circuit for the constant-voltage divider. Diodes CR1 through CR6 are HEP-152s or equivalent. J1 through J3 are colored six-way binding posts from E. F. Johnson, Calectro, or equivalent.

supply voltage does not exceed 16.5 volts, a constant-voltage divider employing four HEP-152 diodes is satisfactory, similar to the one shown in Fig. 3. It is not recommended, however, that the size of the chassis heat sink be reduced from that which was previously indicated. The increase in average heat-sink area per diode from 14 to 21 square inches will further increase the temperature margin of safety.

Conclusions

The W7NYO station consisting of a 2-meter fm transceiver and amplifier operates from a parallel-connected 20 ampere computer supply, producing a constant 16.5 volts. The dc output from the constant-voltage divider remains satisfactory, using 4 diodes connected to the yellow binding post, between a current of 180 mA and 9.4 amperes. The voltage measured after the fifth and sixth diodes is 12.9 and 12.2 respectively. QST

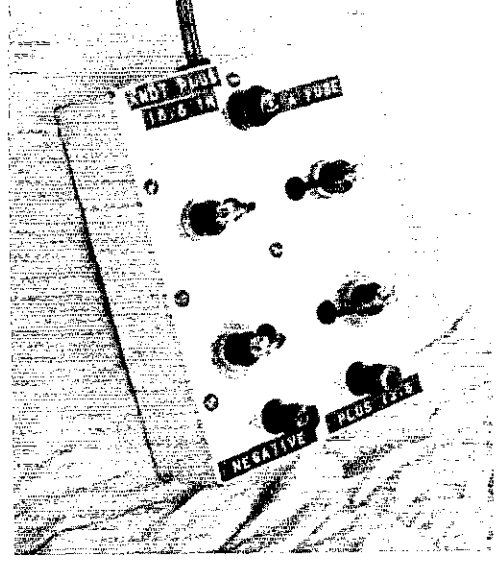


Fig. 3 — A four-diode constant-voltage divider may be used where the input voltage does not exceed 16.5. This unit is built on the same size chassis as the six-diode unit, to gain additional sink area.

FEEDBACK

Stanley P. Sears, W2PQG, author of "Add AVC to Your Swan 260," *QST* for December, 1972, mentions that a few points in the published information may be confusing. The following is provided for clarification. In the text, step 5 should specify that the existing rf/i-f gain control be removed and *discarded*, as it is not used again. Component connections to the new control are given in step 8, and not step 7 as is indicated.

In the pictorial, Fig. 1, the new R2 rf/i-f control should show no reference to the old control, R1614, erroneously shown as R1616. This is a new control, and the reference to the old part number is confusing. The same is true for Fig. 2, where the old part number is erroneously shown as R1615. Actually, R2 is brand new, with the afc push-pull switch feature. R3, as specified in Fig. 2, is the new af gain control with a standard switch. It does not have a push-pull switch as indicated in that description. The Mallory US-26 as called out is a rotary switch, and is suitable.

– . . . –

For "The F2TU for VHF-FM RTTY," January, 1973 *QST*: On page 26, the resistance value shown as 15 for R8 should be 1500 ohms and the capacitor value shown for C2 as 100 should be 1000 μF. The 0.5-megohm monitor level control is R4.

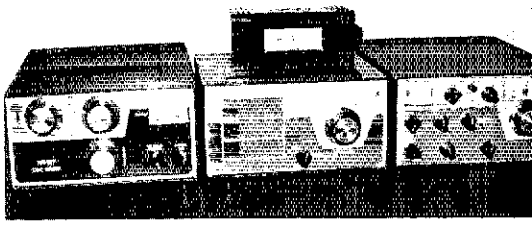
On page 28, Fig. 2 parts layout shows two T1s. The small audio transformer near the center should be labeled T2. All arrow points should be shifted one-quarter inch to the right to show correct component.

It Seems . .

(Continued from page 9)

amateurs in the Nicaraguan disaster is as great or greater than in any emergency in recent times. This is not just because hams are indeed doing an outstanding job. It is also because amateur communication in Latin America is still about the only means of backup when government and commercial circuits go out. There is as yet comparatively little in the way of extensive police and fire, utility, highway trucking, and other mobile facilities, as exist in Canada and U.S., independent of basic power sources and thus able to help in emergency. Amateur radio is *the* lifeline of contact. It was there when needed.

And a very major reason why it was there, and why it was so effective, is the careful planning and organization for such contingencies sponsored by the national societies, FRACAP, and by the IARU region. Amateurs were also free of restrictions on third-party traffic existing in other parts of the world; our national societies have promoted bi-lateral agreements almost universally between the western hemisphere governments, permitting us free exchange. Thus in union, national and international, there is not only the proverbial strength – there is effectiveness. QST



The amplifier was designed with the idea of making it fit well with existing station equipment.

A Homemade Linear Amplifier That Doesn't Look Homemade

BY GARY TIGHE,* WA7NMP

MUCH HAS BEEN written about the plight of the amateur who likes to build his own gear. The most frequent lamentations are lack of available parts, poor resale value, and a subconscious fear of failure to get the device operating. Another reason the author feels many "would-be-builders" avoid homemade projects is that sometimes the finished piece just doesn't look very good sitting beside his commercial gear. The linear amplifier shown in this article illustrates what the average ham can do to overcome most of these objections and end up with reliable good looking equipment. This particular rig uses a pair of 813's in grounded-grid, operating at 1200 watts (PEP). The circuitry is quite conventional so it will not be covered except to mention that nearly all parts, with the exception of the pi-network coil, came from the junk-box or surplus stores.

What is unique about the amplifier is the way it has been designed to complement the author's existing equipment, which in this case is a Drake TR-4. The first step in the project was to order a cabinet, two meters, and five knobs from the R.L. Drake Company. Once this was done we knew the amplifier was going to look pretty close to what we already had in the shack. It was also found, as the building progressed, that a good deal of time was spent in planning just how to get all those parts in that TR-4 cabinet.

I personally prefer to have any difficult metal work done by someone else, and to me, all metal work is difficult. The front and rear panels were done by a local model shop based on my sketches. The finished product proved well worth the additional expense in time savings alone. You will notice that the front panel is actually two pieces of identical aluminum. The first panel is where all the switches, pots, meters, capacitors and miscellaneous nuts and bolts are mounted. The second or actual front panel serves to cover all this and give a professional look to the linear amplifier. Only four screws are used to mount these two panels together and they are in the extreme corners of the "visible" front panel.

The front panel is two-tone gray, with a thin line of unpainted aluminum separating the colors. Thin strips of masking tape were used to achieve this effect. An extremely fine line separation between color combinations can be

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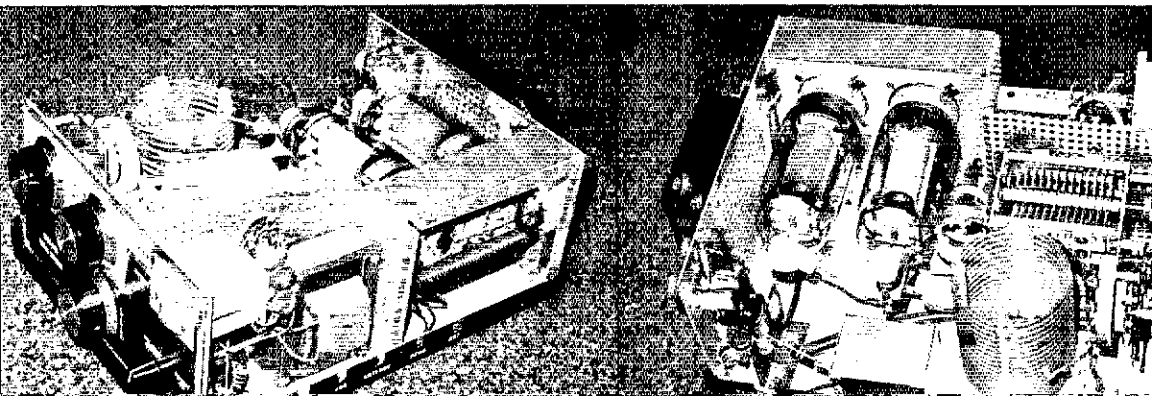
Input and output circuit isolation was achieved with perforated aluminum stock. The right-front quarter contains filament transformer, bias relay, meters and switches.

Here the commercial pi-network coil can be seen in its vertical position to conserve space and provide short leads to the band switch. The transmit-receive relay is mounted on the left portion of the rear panel.



accomplished by using an "X-Acto Knife" to scribe and then scrape away the unwanted paint. This was done here when some paint invariably managed to get under the masking tape. (Murphy at work?) In some cases a completed panel and cabinet can be purchased direct from the manufacturer. Hard to find items like filament chokes, illuminated meters, plate transformers and so forth, can also be obtained from equipment manufacturers.

This particular amplifier has been on the air for two years now with good performance and reliability. It is gratifying to see the surprised look on visiting hams when they see my commercial-looking new amplifier. QST

• New Apparatus

Antenna Specialists 6-Meter Rooftop Antenna

ANYONE WILL CONCEDE that the middle of a metal car roof is the place to put a vertical vhf antenna. Many 2-meter mobile enthusiasts put their whips there, but a full-length 6-meter whip can present some problems. It is sure to run afoul of tree branches, garage doors, and other obstructions, and any whip that is stiff enough to stand erect in the wind is not likely to last long, when roof-mounted. The Antenna Specialists 6-Meter Rooftop Antenna pretty well solves these problems. The whip portion really "whips," and if equipped with the shock spring at the base it will tip over easily enough to permit driving into your garage without removing the antenna.

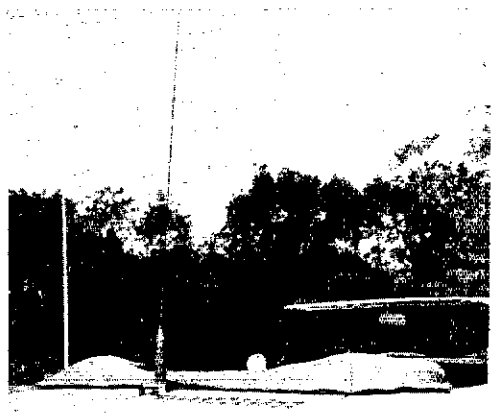
There are some other dividends in the design. The whip (Part No. 19B328-35) is removable, so if you want perfectly matched coverage at both 50.1 and 52.525 MHz you can have it with two whips, which can be interchanged in seconds. The effective length of the whip is adjustable, by moving it up or down in the adapter which is part of the shock spring assembly, to move its center frequency about one Megahertz. The mounting Adapter Assembly (Part 19A1115-1) has a flared base and rubber gasket, providing a firm leak-proof support, but requiring only one 3/8-inch hole. A 15-foot length of RG-58/U, with type UHF connector attached, is supplied with the antenna.

The adapter assembly can be removed, and the fitting in the base of the loading coil can be used to mount the antenna directly in an SO-239 coaxial socket, which is the way the antenna is shown in our photograph.

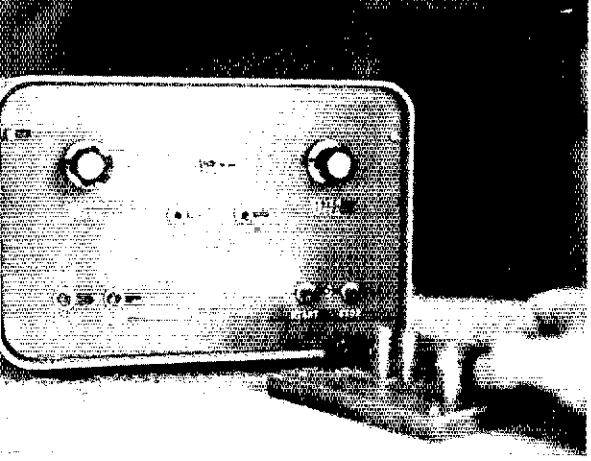
Most amateurs use vhf whips without any attempt at matching, since losses in the short length of coax required in mobile installations are negligible. However, it is nice to have an antenna that presents a 50-ohm load to the transmitter. This is the purpose of the loading coil (Part 19B971-14) supplied with the antenna. With the whip adjusted to the proper lengths the antenna is perfectly matched across the band.

We can't tell you just how the matching is done, because the coil assembly was not made to be taken apart, but presumably the gray plastic sleeve conceals a tuned circuit, with the antenna and coaxial inner conductor tapped on it at the appropriate point. The base of the antenna is at ground potential, so don't try to use it for broadcast reception. The grounded-base system may have a slight signal-to-noise ratio advantage over the usual end-fed whip in some 6-meter installations. No major quieting job was ever done on the particular car shown, and the grounded-base whip does give a slightly better signal-to-noise ratio, through the car's own noise, than a full-length unmatched whip fed directly with coax and mounted in the same position. Communications results are practically identical in other respects, though the conventional whip is never perfectly matched, and line length affects transmitter loading to some degree.

The antennas were compared on two cars, a Volkswagen Squareback and the Corvair convertible pictured, both equipped with SO-239 mounts. As expected, pattern uniformity was better with the antenna in the middle of the Squareback's roof. The mechanical features of this product were really appreciated with the latter installation. We have rarely used a 6-meter whip in the roof mount of this car while in motion, because of danger to both the whip and the car top. The thin springy whip and the shock-spring base make rooftop mounting practical, and it is much superior to cowl and bumper mounts, especially with the wagon type of car. — *WIHDQ*



A base-loaded, six-meter whip that can be mounted in a roof-top location. A PL-259 fitting, part of the base assembly, makes this antenna easy to adapt to several styles of roof-top or rear-deck mount.



An IC Keyer with Programmable Erasable Memory

BY THOMAS P. RILEY * WA1BYM

I HAVE BEEN interested for some time in building an automatic device capable of sending CQ DE WA1BYM at the touch of a button. Several construction articles have appeared in the various amateur publications on the subject but all have had (or lacked) features which discouraged me from building them. Some of the undesirable features have been high cost and complexity, difficulty or absolute impossibility in programming of certain codes, and limited memory capacity.

During the past few years our fast-moving IC technology has brought forth several new products including MOS shift registers, read only memories (ROM), and random access memories (RAM), all of which have brought the fully programmable memory keyer to life. This article describes such a keyer which utilizes MOS shift registers as the main memory element. The circuit has the advantages that any sequence of characters can be programmed in a matter of seconds, it can be erased and reprogrammed equally as fast, stop codes may be programmed so that the device will stop automatically, high capacity (approximately 42 characters), low power consumption which makes it suitable for battery operation, and component costs within the reach of most amateurs.

As stated earlier, the heart of the device is an MOS shift register. MOS stands for metal oxide semiconductor, which is a form of field-effect transistor. MOS devices have the advantage of extremely low power consumption. The device used in this project is a Signetics 2521V dual 128-bit register. The output terminal of one register is connected to the input terminal of the other so the device can function as a single 256-bit register. Two of the devices are used to give an overall capacity of 512 bits.

Many MOS devices require two and sometimes three separate power supply voltages. In addition, logic levels are often quite different from the standard 0 and +5-volt levels used with DTL and TTL ICs. This device was chosen because its input, output, and clock lines are compatible with standard TTL signal-voltage levels and it requires only two supply voltages, +5 and −12 volts. Several manufacturers are producing similar devices. The Signetics unit was chosen on the basis of price and package size. It is housed in an eight-pin dual-in-line package (DIP) which allows two of the devices to be plugged into a single 16-pin DIP socket. The remaining ICs are all TTL devices.

Shift Register Review

Shift registers are generally made up of *J-K* flip-flops. A *J-K* flip-flop is a device with an input, output and a clock line. A "1" or "0" logic level applied to the input terminal does not appear at the output until after a clock pulse has been applied. Eight flip-flops may be cascaded as shown in Fig. 1 to form an eight-bit shift register. Let us assume initially that all the flip-flops are *off*, represented by 00000000. If we now connect the input terminal to +5 V (logic "1") and apply a

* 12 Tickle Rd., Westport, MA 02790.

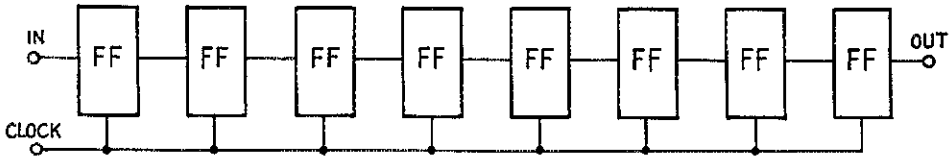


Fig. 1 — Basic form of shift register.

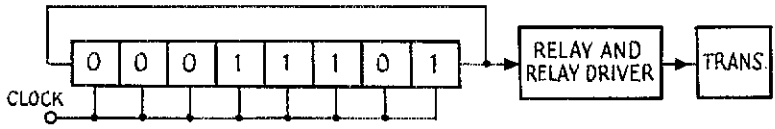


Fig. 2 — A shift register programmed to repeat the Morse code letter A continuously. The output sequence is 1011100010111000.

clock pulse, the 1 present at the input will be shifted into the first flip-flop, represented by 10000000. If we now ground the input terminal (logic "0") and apply another clock pulse, the 0 would be entered into the register and the contents would be shifted to the right (01000000).

Subsequent clock pulses would continue shifting the contents to the right and after the 8th pulse the 1 appears at the output (00000001). The next clock pulse would empty the register (00000000), and it would remain empty for all subsequent clock pulses until more data (1s) are applied to the input. If, after entering the 1 into the first flip-flop, we connected the output terminal to the input terminal, the register would never become empty, but would, instead, continue to recirculate the 1 over and over. This is how data bits are stored in the register so that it can be repeated as many times as is desired.

Operation is very similar to a conveyor belt in which magnets (to represent 1s) are placed on the beginning of the belt in some sequence, and appear later at the output in the same sequence. If the conveyor belt is made of steel, the magnets would not fall off at the end but would continue to recirculate, and the sequence of magnets (1s) and absence of magnets (0s) would appear at the end of the belt repeatedly. The one exception is that a conveyor belt is a smooth continuous flow, while a shift register moves in jumps of one bit at a time when the clock pulse is applied. Fig. 2 is an example of a shift register being used to transmit the letter A repeatedly.

How It Works

A block diagram of the complete memory-keyer circuit is shown in Fig. 3. U1 is a dual voltage-controlled multivibrator (VCMV) IC which is normally used in phase-locked-loop circuitry. The output wave form is a square wave. One of the oscillators is set to approximately 1000 Hz and is used as the sidetone generator. The second oscillator is used as the clock generator for the shift register and is adjustable in two overlapping ranges of about 5 to 20 wpm and 15 to 60 wpm. U2 is a monostable multivibrator (one-shot) IC with an output pulse width which is approximately one second in duration. When push button S5 is depressed, one U2 output pulse is produced. This is used to eliminate multiple pulses which are obtained from S5 because of contact bounce, assuring that only one pulse is produced each time the switch is depressed. Depressing the switch causes the shift register to shift once. The reason for this feature will be explained later.

The characteristics of the MOS shift register are such that if the clock input is allowed to remain low for a period greater than 100 μs the device will lose all the contents stored in it. Thus, an ideal clock wave form would be one that remains high most of the time and provides a short-duration negative pulse. This is accomplished by the use of another one shot, U3, which produces a 5-μs negative pulse each time the input goes from a low to a high state. The outputs of the 1-second one-shot and the variable-frequency clock oscillator are applied to OR gate E so that either of these inputs may fire the 5-μs one-shot and, in turn, clock (shift) the shift register.

A dot is represented by a single 1 and a dash by three consecutive 1s. There never exists the need for storing more than three consecutive 1s. This fact can be used to incorporate a simple automatic stop feature, by detecting the presence of four consecutive 1s. In the case of the MOS shift register, the only output accessible is that of the last flip-flop. An additional 4-bit register, U6 (one in which the output bits of each memory section are available), has been cascaded in series with the MOS register. Each of the outputs of the 4-bit register is monitored by 4-input AND gate B. When a series of four consecutive 1s reaches the 4-bit register, AND gate B goes high and resets FF1, part of U7. This, in turn, shuts off AND gate C, the relay driver, and the relay. This is done so that the "long" dash caused by the four 1s is not transmitted or heard as a sidetone. The clock generator, however, has not been shut off, and the register is still shifting. When the 0 which follows the four 1s reaches the output of the register, the output of inverter J goes high and sets FF1, thus enabling the output circuitry to key again. When this happens, the inverted output ($\overline{Q}$) of FF1 goes from a high to a low state, which clocks FF2 and shuts it off. FF2 is wired with its J input grounded. Each time the necessary clock signal is applied (in this case a high to a low transition), the flip-flop will be shut off. With the Q output of FF2 in a low state, AND gate F is disabled and no further clock pulses are applied to the shift registers, thus stopping the register just after the STOP code went through. FF2 is a J-K flip-flop which normally must have a clock pulse applied to it in order to change its output state. However, grounding the SD (set direct) or RD (reset direct) inputs can manually force the flip-flop on or off. Depressing the START button will set FF2 on (thus enabling AND gate F) and start the shift registers running again until another STOP code appears at the register output. Depressing the STOP button will reset FF2 and stop the shift registers. This can be

done at any time and is generally used when no STOP code has been programmed.

"Switch" S2 is not a mechanical switch at all, but is an arrangement of NAND gates which performs the same function as S2. A mechanical switch is not used because the long leads going from the circuit to a switch on the front panel could impair the operation of the circuit.

When "switch" S2 is in the position shown in Fig. 3, data may be entered into the register by either the 1/0 switch or the output of the electronic keyer. The 1/0 switch is used to program a STOP code or any other code that may be desired. This is done by first depressing the STOP switch in order to stop the register. Depress the 1/0 switch and hold it in that position. This applies a logic 1 to the input of the register. Then depress S5, which fires the 1-second one-shot. An indicator lamp connected to the output of the one-shot indicates the output state. When the lamp goes off the 1 has been entered into the first flip-flop of the register. Depressing S5 three more times (waiting for the lamp to go off before depressing it each time) would enter three more 1s, constituting a STOP code. If S5 is depressed while the 1/0 switch is released, a 0 is entered into the register. Thus, any code combination may be manually programmed by using S5 and the 1/0 switch.

The electronic keyer and its associated pulse generator consists of three ICs and a few discrete components. It has self-completing dots and dashes and a synchronous time base (the pulse generator). It does not have some of the features associated with many of the newer keyers such as dot and dash memories and iambic operation (alternate dots and dashes as can be generated with a squeeze keyer). This type of keyer was incorporated because it suits the tastes of the author. Other features could be incorporated by the builder if so desired. A synchronous time base means that the pulse generator is synchronized to the keyer circuitry. When the keyer is not being operated,

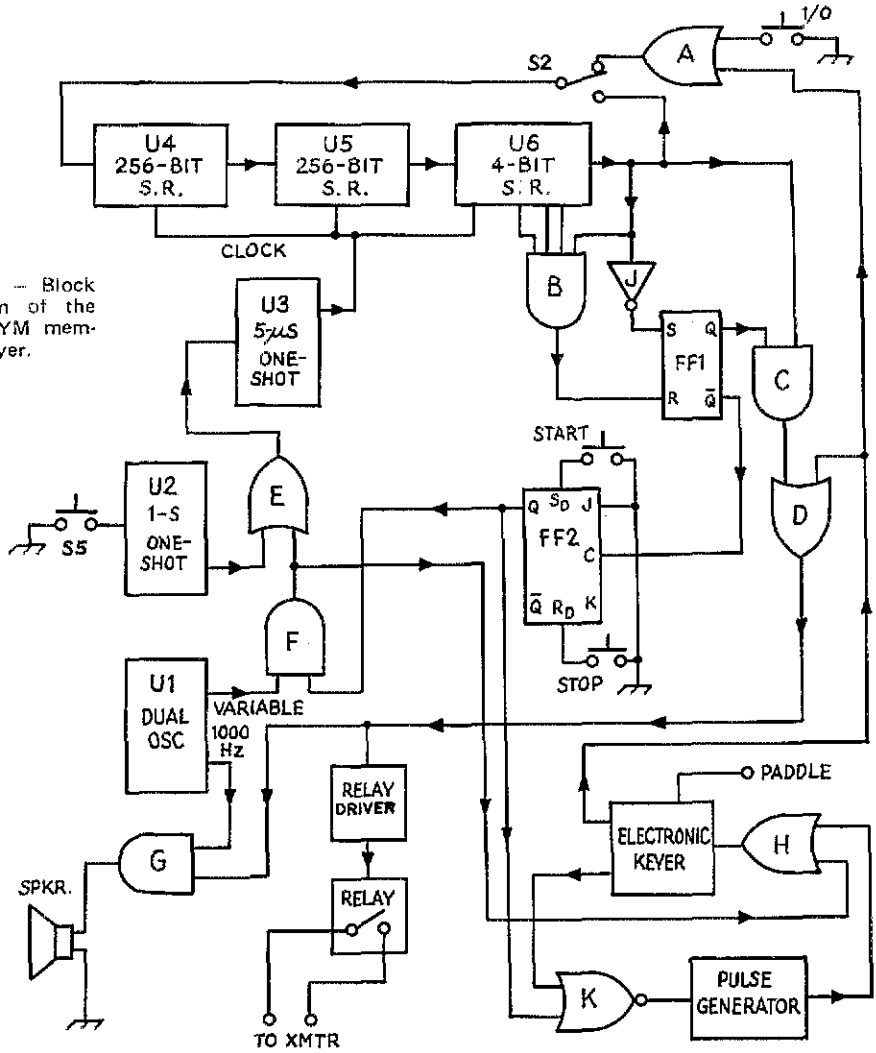


Fig. 3 — Block diagram of the WA1BYM memory keyer.

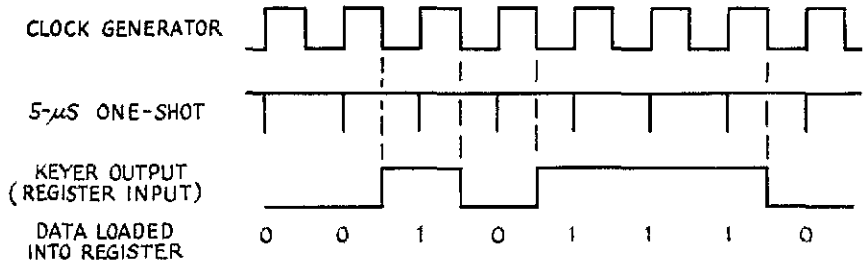


Fig. 4 — The loading of data into the shift-register memory. In this example, the letter A has been loaded.

the pulse generator remains off. When the dot or dash paddle is depressed the pulse generator is enabled and immediately generates its first pulse, starting the dot or dash. The pulse generator remains on until the dot or dash is completed. Once completed, the pulse generator goes off and does not start again until there is another contact closure on the paddle. In a keyer with no dot or dash memories, this type of operation, as opposed to an asynchronous time base, is very desirable. An asynchronous time base is one in which the pulse generator is running continuously, regardless of the state of the keyer. The disadvantage of this type of operation is that if the paddle is depressed just after a pulse has been generated (with no dot or dash memory), the paddle must be held there until the next pulse is generated in order to start the dot or dash. This type of operation is especially undesirable at the higher keying speeds, as the operator tends to "miss" many dots and dashes.

Asynchronous operation is, however, required when using the keyer to store a sequence of characters into the shift register. This is because the pulse generator that operates the keyer is also used to clock the output of the keyer into the shift register. If synchronous operation were used there would be no clock pulses available to load the 0s present between dots, dashes, and characters.

OR gate H allows either the pulse generator or clock generator (output of AND gate F) to operate the keyer. NOR gate K (which actually consists of two discrete npn transistors) provides two means of shutting the pulse generator off. The keyer shuts the pulse generator off between dots and dashes during normal synchronous operation. Whenever the shift register is operating, the output of FF2 is high, which keeps the pulse generator off and allows the keyer to be operated from the clock generator. When the shift register is inoperative, *the pulse generator is allowed to operate normally.* Also there is no clock generator signal present on one of the inputs to OR gate H because AND gate F is disabled. OR gate D allows the relay driver, relay, and sidetone oscillator to be energized by either the shift register output, keyer, hand key, or TUNE switch.

The keyer circuitry responds to the trailing edge of the input pulse applied to it, while the 5-μs one-shot responds to the leading edge. Thus, the loading of data into the shift register is as shown in Fig. 4 for the letter A.

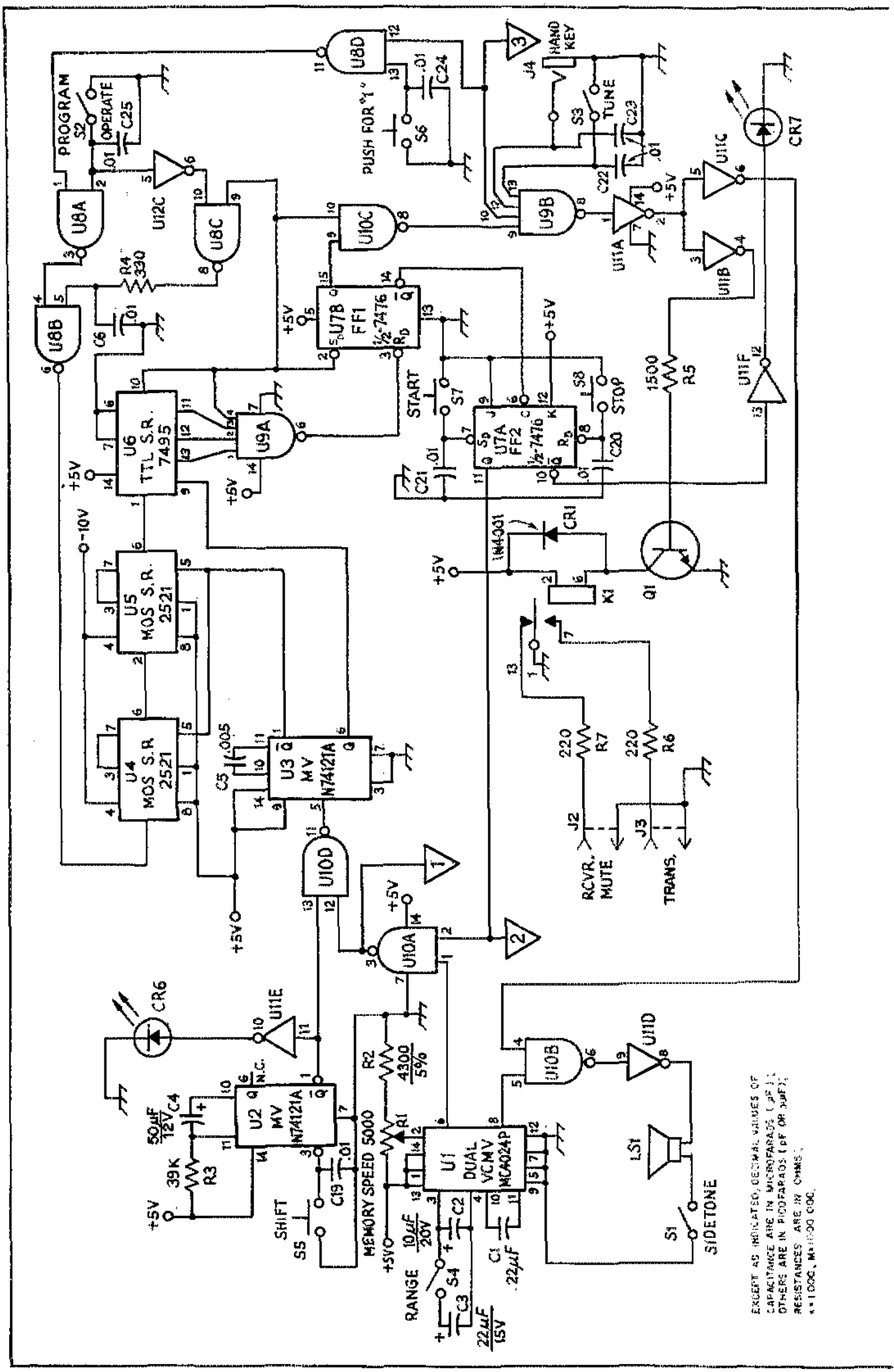
The Circuit

The actual schematic diagram, Fig. 5, is somewhat different from the block diagram because of the fact that AND and OR gates are generally not available in TTL devices. Instead, NAND gates and inverters are used to perform the required functions. In addition, some other slight deviations are also required.

In the circuitry of U1, C1 sets the sidetone frequency to approximately 1 kHz. C2, C3 and the combination of resistors R1 and R2 control the speed of the variable clock generator (shift register and keyer during programming operations). The polarity of C2 and C3 is unimportant. Tantalum capacitors were used because they operate at low voltages. Electrolytic types may be substituted; however, these usually do not exhibit the rated *capacitance until a minimum voltage is applied.* The maximum voltage seen by the capacitors is 5 volts. Therefore, if using electrolytics, choose them with a 10- or 15-volt rating. If a higher breakdown rating is used, they will not operate properly. In addition, the operating speed may vary considerably from the speed obtained when using the tantalum type. The speed may be adjusted to the desired range by trial and error substitution of different values for C2 and C3. Do not substitute different values for R1 and R2 as these will not affect the operating speed.

The capacitors and resistors associated with both one-shots, U2 and U3, determine the duration of the output pulses. In the case of C4, either tantalum or electrolytic may be used because the 1-second output pulse width is not critical to the operation of the circuit.

As was mentioned before, the clock input to the MOS shift registers must remain high and have a short-duration negative pulse. This is accomplished by using the inverted output of the 5-μs one-shot. No such requirement exists, however, for the TTL register, U6. The MOS register actually shifts on the positive-going edge of the clock pulse while the TTL device shifts on the negative-going edge. For proper operation, both registers must shift at the same time. This is done by using the noninverted (*Q*) output of the one-shot to shift the



PROGRAM
S2
OPERATE
C25
U8A
U8B
U8C
U8D
U12C
R4 330
C6
PUSH FOR "I"
S6
C24
HAND KEY
J4
S3
TUNE
C23
C22
U9B
U9A
U10C
U10A
U10B
U10D
U11A
U11B
U11C
U11D
U11E
U11F
CR7
CR6
U7B FF1 1/2-7476
U7A FF2 1/2-7476
START S7
STOP S8
C20
C21
U6 TTL S.R. 7495
U5 MOS S.R. 2521
U4 MOS S.R 2521
U3 MV N74121A
U2 MV N74121A
U1 DUAL VCMV MC4024P
1500 R5
Q1
K1
CR1
1N4001
220 R7
220 R6
J2
J3
RCVR. MUTE
TRANS.
C5 .005
SHIFT S5
C19
MEMORY SPEED 5000
R1
R2 4300 5%
39K R3
50µF 12V C4
N.C.
RANGE S4
C3 22µF 15V
C2 10µF 20V
C1 22µF
LS1
S1
SIDETONE
+5V
-10V

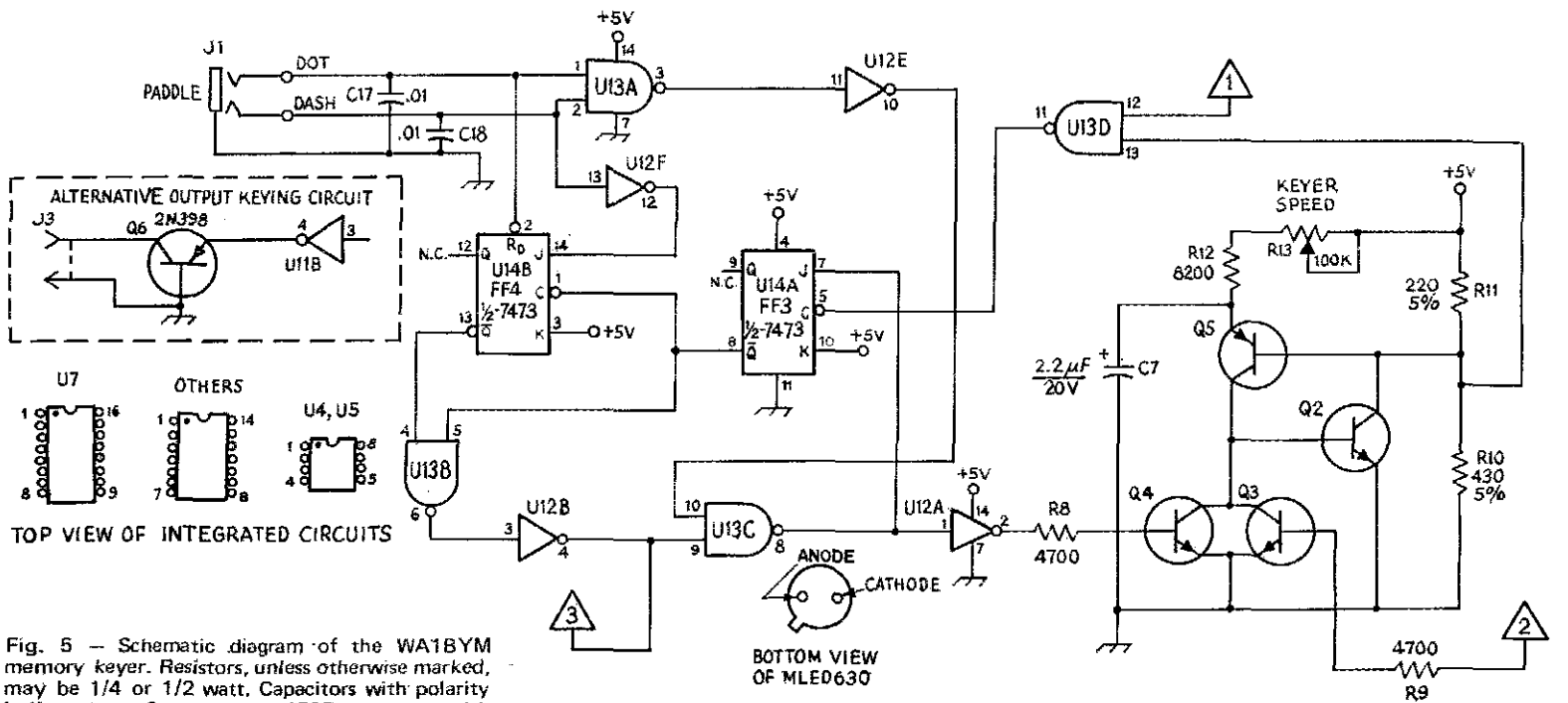


Fig. 5 — Schematic diagram of the WA1BYM memory keyer. Resistors, unless otherwise marked, may be 1/4 or 1/2 watt. Capacitors with polarity indicated are Sprague type 150D tantalum, with the exception of C4, which is electrolytic. Parts not listed below are identified on the diagram for text reference and for parts callout (Fig. 7).

CR6,CR7 — Light-emitting diodes (Motorola MLED 630 or equiv.).

J1 — 3-conductor phone jack (Switchcraft 12B or equiv.).

J2, J3 — Phono jack.

J4 — Phone jack (Switchcraft 11 or equiv.).

K1 — Spdt DIP relay, 5-V coil (Sigma 191TE1C1-5G or equiv.). A spst relay (Sigma 191TE1A1-5G) may be used if receiver muting feature is not desired. Either relay is available from Allied Electronics.

LS1 — Small speaker, any impedance.

Q1-Q4, incl. — Silicon npn switching transistor such as 2N1711, 2N1613, or 2N856.

Q5 — Silicon pnp switching transistor such as 2N1132, 2N722, or 2N2904.

Q6 — Germanium pnp high-voltage switching transistor such as 2N398 (any suffix) or 2N2043.

R1 — Linear taper, with spst push-pull switch.

R13 — Linear taper, with spst switch.

S1, S2, S3 — Spst toggle.

S4 — Spst push-pull (mounted on R1).

S5-S8, incl. — Spst push button.

U1 — Motorola IC.

U2-U5, incl. — Signetics IC.

U6 — 7495 IC.*

U7 — 7476 IC.*

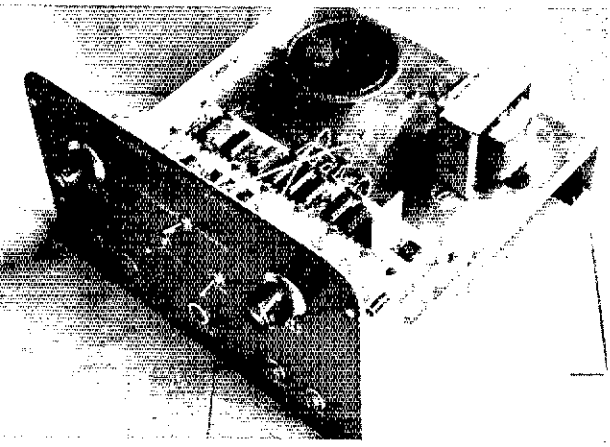
U8, U10, U13 — 7400 IC.*

U9 — 7420 IC.*

U11, U12 — 7404 IC; one section of U12 unused.

U14 — 7473 IC.*

* Note: Motorola part numbers are prefixed by "MC" and suffixed by "P." Texas Instruments parts have an "SN" prefix and "N" suffix. Signetics ICs have an "N" prefix and either an "A" suffix (14-pin IC) or a "B" suffix (16 pins). For example, Motorola's MC7400P is equivalent to Texas Instruments' SN7400N or Signetics' N7400A.



The WA1BYM memory keyer removed from its cabinet. The monitor speaker and power transformer are located on the rear of the chassis, with all ICs and most associated components mounted on Vectorbord.

TTL register, and the inverted ($\bar{Q}$) output to shift the MOS register.

The NAND gates of U8 and one inverter perform the function of S2 shown in the block diagram. A small time delay is incorporated into this circuit consisting of R4 and C6. This delay is in the recirculation path (i.e., shift-register output to input), and is necessary because the MOS shift register is relatively slow compared to the TTL register. Because of this speed difference, the TTL register shifts when a clock pulse is applied, and provides new data to the input of the MOS register before the MOS register has even begun to shift, thus entering the wrong data. The time delay corrects the problem by allowing sufficient time for the MOS device to shift before new data is presented to its input. An example might illustrate the problem more clearly. Assume that the register contains a single 1 located in the next-to-last bit. When a clock pulse is applied, the 1 immediately shifts to the last bit. A short time later (because of the slow speed of the MOS device) the MOS register then shifts. However, it now sees a 1 on at its input and loads this 1 into its first bit. Thus, a single 1 has been stretched out to two 1s. Incorporating the time delay in the feedback path assures that the 1 is not seen until after the MOS register shifts.

The relay and relay-driver circuitry are quite standard. Any 5-volt relay may be used provided it has mercury-wetted contacts or some other means of minimizing contact bounce. The device used in this circuit is housed in a dual in-line package, which reduces the size considerably and adds to the appearance of the circuit board. It costs $5.90 and has the advantage that it is an spdt device which may be used to mute the receiver in a full break-in keying system. Since the contacts of this relay are so small, they tend to stick together. Actually, they get welded together when the contacts attempt to open because a spark jumps across the contacts. This is corrected by the addition of R6 and R7. If the receiver-muting feature is not desired, an spst relay may be used which is available for $3.90.

For those who prefer solid-state switching, the relay and relay driver may be replaced by a single high-voltage pnp transistor, as shown in dashed lines in Fig. 5. This circuit can key negative voltages of up to 100 volts (grid-block keying) at currents up to 20 mA, which is suitable for most modern transmitters.

Motorola light-emitting diodes (LED) are used for the two front-panel indicators. Observe the polarity, as they can be damaged by a reversal because of the low reverse breakdown voltage associated with LEDs. They may be mounted in the front panel simply by drilling a suitable hole and cementing in place. They are relatively inexpensive and are considerably cheaper than the combined cost of a lamp driver, lamp, and socket.

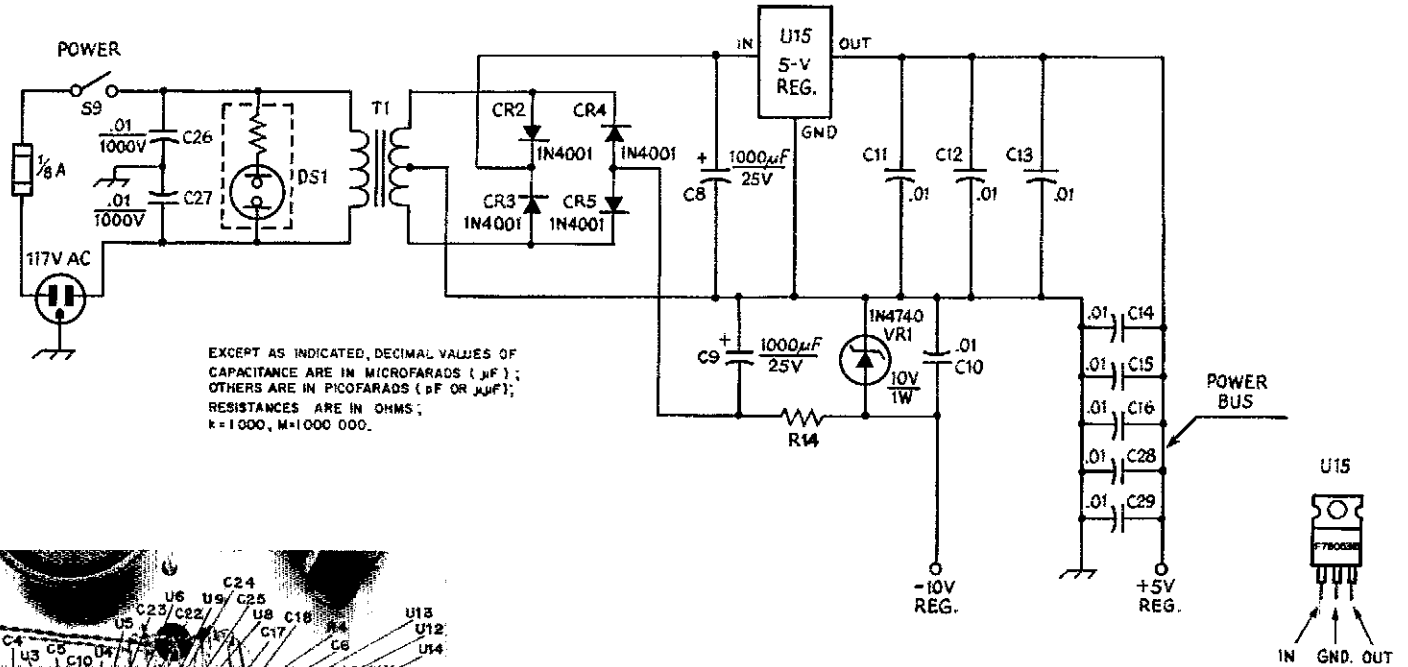
TTL devices have the characteristics that an open circuit on an input terminal behaves just as if the terminal were tied to a high (+5 V). This is the reason that all of the switches simply ground inputs rather than alternate between +5 V and ground. When open circuited, TTL devices offer a fairly high input impedance, which makes them susceptible to noise. The addition of a .01-μF disk-ceramic capacitor on each of the inputs insures that operation is not impaired by rf pickup. The capacitors should be placed close to the ICs and not near the switches.

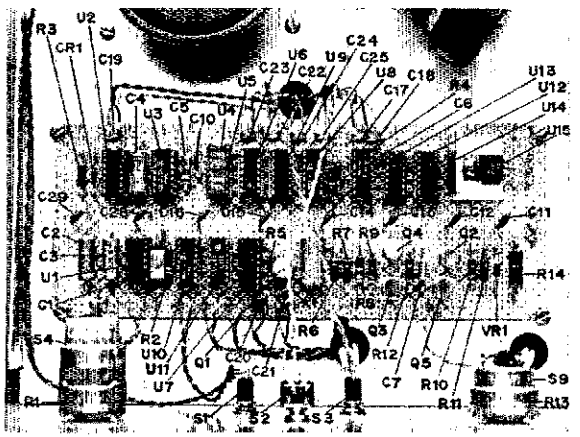
Power Supply

Power supply requirements are +5V at 250 mA and −10 V at 30 mA. If it is desired to expand the memory, additional MOS shift registers may be cascaded in series with the existing ones. Each MOS device adds an additional 15 mA load to both the +5-V and −10-V supplies. The power supply described here, Fig. 6, is capable of delivering about +5 V at 400 mA and -10 V at 70 mA. Therefore, two additional registers could be added (expanding the capacity to about 84 characters) without any changes to the supply.

The manufacturer suggests operating the MOS shift register from −12 V. However at −12 V, I noticed that when the unit was operated for long periods of time the shift register would occasionally lose its memory and be completely filled with 1s. Reducing the supply voltage to −10 V has corrected the problem and the unit has been operating dependably since.

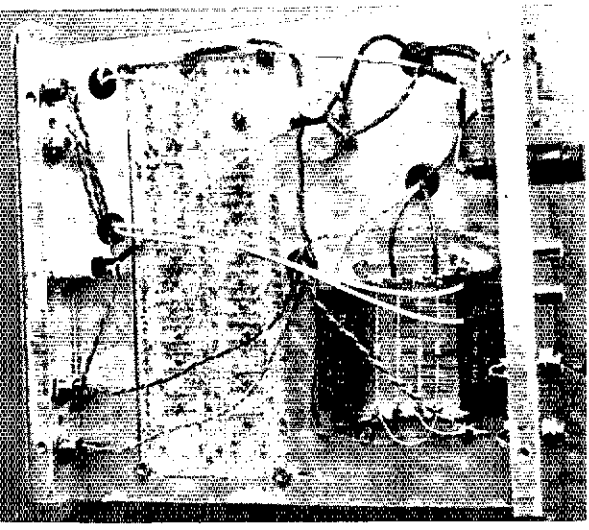
Dual-polarity outputs are obtained by using a full-wave bridge rectifier and using the center tap of the transformer for ground. A monolithic regulator is used for the +5 V output and should be





◄ Fig. 7 — The layout used by the author for his memory keyer. Although the layout is not particularly critical, following this general scheme will result in short leads between components. Point-to-point wiring, rather than construction with single-sided etched circuit-board material, was used because of the many interconnecting jumper wires which would have been required with the etched board.

▲ Fig. 6 — Power supply for the memory keyer. Parts not listed below are identified for parts callout (Fig. 7).
C8,C9 — Electrolytic.
DS1 — Neon-lamp indicator assembly, 120 V.
R14 — 82 ohms, 1 watt.
S9 — Spst (mounted on R13 of Fig. 5).
T1 — 117-V primary, 25.2-V ct secondary at 1 A (Chicago-Stancor P-8130 or equiv.).
U15 — 5-V regulator [Fairchild μGH7805 (available from Allied Electronics) or equiv.].



This view of the under side of the chassis shows the power-supply rectifiers and filter capacitors in the lower right corner of the chassis, the circuit board at their left, and a few of the front-panel-mounted components.

mounted on a heat sink. The heat sink shown in the photographs was fabricated from a piece of aluminum angle stock. A Zener diode is used to regulate the −10-V output.

Construction

Parts layout is not critical. However, if the layout shown in the photographs is followed, most of the interconnections will be short and neat. Sockets were used for all of the integrated circuits and the relay. The entire circuit was built on a piece of perforated Vectorbord. Use the type with a hole spacing of 0.2 inch as this works out nicely for mounting the IC sockets. IC pins are spaced at 0.1 inch so it will be necessary to drill additional holes between the existing ones in order to mount the sockets.[1]

Lay the sockets out in two rows as shown in the photographs and allow enough room between rows to run two pieces of bare bus wire for the power supply connections. When making connections from the ICs to +5 V and ground do not go from one IC to another. Run separate wires from each IC to the +5 V and ground bus. I used flea clips to hold the ground bus in place and also to mount discrete components. Connect a .01 μF capacitor across the +5 V and ground bus lines about every 1-1/2 inches. This can be done most easily by spacing the flea clips every 1-1/2 inches and mounting the capacitors on the top side of the board to the other end of the flea clips. These capacitors bypass any spikes that would appear on the power supply because of the fast switching times of the ICs.

Lay out the front panel so that the RANGE and MEMORY SPEED controls are physically close to their respective connections on the board (no greater than 6-inch leads). This assures proper operation of the VCMV. The RANGE switch I used was a push-pull type located on the MEMORY SPEED control. The POWER switch is located on the KEYER SPEED control. Both could be toggle types if so desired.

Inputs and outputs are made accessible by flea clips around the outside edge of the board. For each input and output pin, put another clip next to it and connect that clip to the ground bus. This provides a pair of terminals suitable to mount the .01 μF capacitors connected to each of the inputs. Use twisted wire to go from the flea clips to the front panel controls, indicator lamps and inputs. The transformer is mounted above the chassis while the rectifier diodes and filter capacitors are mounted underneath on terminal strips.

Assemble the memory keyer in any suitable cabinet. An rf-shielded assembly is not necessary. I assembled the device in a Heathkit cabinet and put matching knobs on it so that it would match my existing equipment. Heat is not a problem although some ventilation should be provided.

Operation

When the power switch is first turned on there is no way of telling what state the individual flip flops of the shift register will be in. Therefore, the shift register must first be emptied (cleared) in order to operate the device. Set S2 to PROGRAM, the SIDETONE switch on, and then depress the START button. The lamp indicating that the register is operating should come on but may shut off by itself after a short time. This is because it is very likely that a sequence of four or more 1s is contained in the register constituting a STOP code. Depress the START button each time the register stops by itself. When the register continues to operate and does not shut off by itself, it has been completely cleared. In the process of emptying the register a random sequence of 1s and 0s may have been heard from the sidetone oscillator. In order to make a quick check to see if the register is operating properly, do the following. Depress the START button, and then set the MEMORY KEYER SPEED to maximum. Send a string of a few dots on the paddle. A short time later the same thing should be heard as it emerges from the output of the register.

Programming is performed by setting the MEMORY KEYER SPEED to a reasonable speed that the operator can handle in the asynchronous mode. Key your message in the normal fashion and when the message is completed, immediately depress the STOP button. Set S2 to OPERATE and depress the START button. The message should be heard a short time later, then again and again until the STOP button is depressed.

To empty the memory, press the STOP button after the message goes through. Set S2 to

(Continued on page 43)

[1] **[EDITOR'S NOTE: Micro-Vectorbord is also available with 0.1-inch grid spacing of holes, designated as pattern P. Use of such board will eliminate the requirement for additional drilling.]**

The Folded Mini Quad

BY MAX BLUMER,* WA1MKP

A full-wavelength loop can take a variety of forms, and we're not sure what the best name would be for the author's version. Despite the shape suggested here, he claims good results.

AN UNUSUAL TYPE of full-wave-length wire-loop antenna is is use here on 2 and 15 meters. The design, which I have not seen previously, provides an antenna that occupies minimum space; the antenna is omnidirectional, vertically polarized, broad-banded and requires no ground plane.

It evolves from a full-wavelength loop.[1] The loop, if fed on the side (x-y) as in Fig. 1A, radiates a vertically polarized signal. The radiation pattern is bidirectional, with maximum radiation broadside to the plane of the loop and with the highest field strength in the plane A—A'.

The loop can be deformed into a square, such as in the elements of a quad, and without much loss of efficiency into a rectangle (Fig. 1C). Vertical polarization, bidirectional signal pattern and maximum radiation from the plane A—A' are retained.

A 90 degree bend at A—A' and two further right angle bends at B—B' and C—C' transforms the flat loop into a cube. The circumference is still a full wavelength and each side of the cube measures 1/10 wavelength. Again, vertical polarization is retained, but the appreciable bidirectional radiation from the sides of the cube adjacent to A---A' leads to a nearly omnidirectional radiation pattern.

* P.O. Box 446, Woods Hole, MA 02543.

1 *The ARRL Antenna Book*, 12th ed., 1970 p. 66.

My 2-meter antenna was constructed from aluminum clothesline wire; the length in feet was chosen by 1005/f MHz. It is fed with 50-ohm coaxial cable through a Pomona Electronics No. 1699 adapter and no matching device is used. The SWR is less than 1.2:1 from 144 to 146.5 MHz and climbs to 1.4:1 at 148 MHz. The radiation pattern was measured with a simple field-strength meter, using a half-wave dipole as pickup element and a 20,000-ohm resistance in series with the 20 μA meter to improve linearity.[2] The front-to-back ratio is 1.8 dB with no prominent sidelobes apparent, but a rather sharp 3-dB dip is caused by the "shadow" of the feed line and hardware.

Performance

Fed with 10-watts and used as an indoor antenna, it gives consistent communication with 2-meter fm base and mobile stations within a 10-15 mile radius. It performs better on receive and transmit than a 1/4-wave whip at the same location.

A 15-meter version of the antenna was then constructed and suspended in the attic with string and tacks. It is operated with 100 watts and the rig loads almost as well as the 2-meter version, but with a slightly higher SWR. The first contacts were with California and it has since given excellent performance to the West, Midwest and South as well as to South America and Europe.

The close proximity of antenna sections radiating out of phase may lower the efficiency over that of a loop, yet, in terms of space requirement, construction cost and ease of installation (no radials!) and tuning, the antenna is hard to beat. As a full-wave loop it should have a slight edge over a vertical. I recommend further experimentation and modification, e.g., into the even more space-saving configuration of a cylinder. QST

2 *The Radio Amateur's Handbook*, 46th ed., 1969 p. 553.

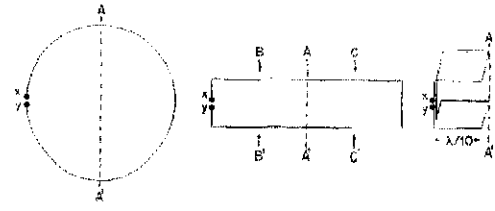


Fig. 1 Conversion of the full-wavelength loop to the space-saving cubical configuration. The length of the wire and the vertical polarization remain but the pattern changes from bidirectional to omnidirectional. The spacing between the feed point and the adjacent side is not critical. The spacing on 2 meters is about 1-1/2 inches, and on 15 meters is about 4 inches.

ATV with the Motorola T 44 UHF Transmitter

Part II

BY F. R. McLEOD, JR.,* WØMZL

THE POWER SUPPLY modification is the biggest job. Fig. 4 shows a partial schematic of the original circuitry, after the secondaries of the transformers. This will show how it works and indicates which parts can be kept and reused. There are two supplies; the lower supply always has its negative lead tied to ground, while the top supply has a floating negative lead, which is switched to ground through the relay contacts on *receive*. On *transmit*, that lead is connected to the plus lead of the lower supply, putting the two supplies in series to obtain the 480 volts for the plates of the 2C39s, V6 and V7. The lower supply furnishes 320 volts to the 6146, V5, and 250 volts (through a 1500-ohm, 5-watt resistor) to the rest of the transmitter stages. On receive, the lower supply is not used. The top supply is now connected to the receiver through another set of the relay contacts and delivers 200 volts for the receiver. Notice that when the two are connected in series, the top supply's negative lead is connected to the input of the choke-capacitor filter. This way, the choke in the lower supply has to handle only the 320- and 250-volt currents, and the upper choke handles only the 2C39 plate currents.

* 204 East Olive, Prospect Heights, IL 60070 (formerly of Minneapolis, MN)

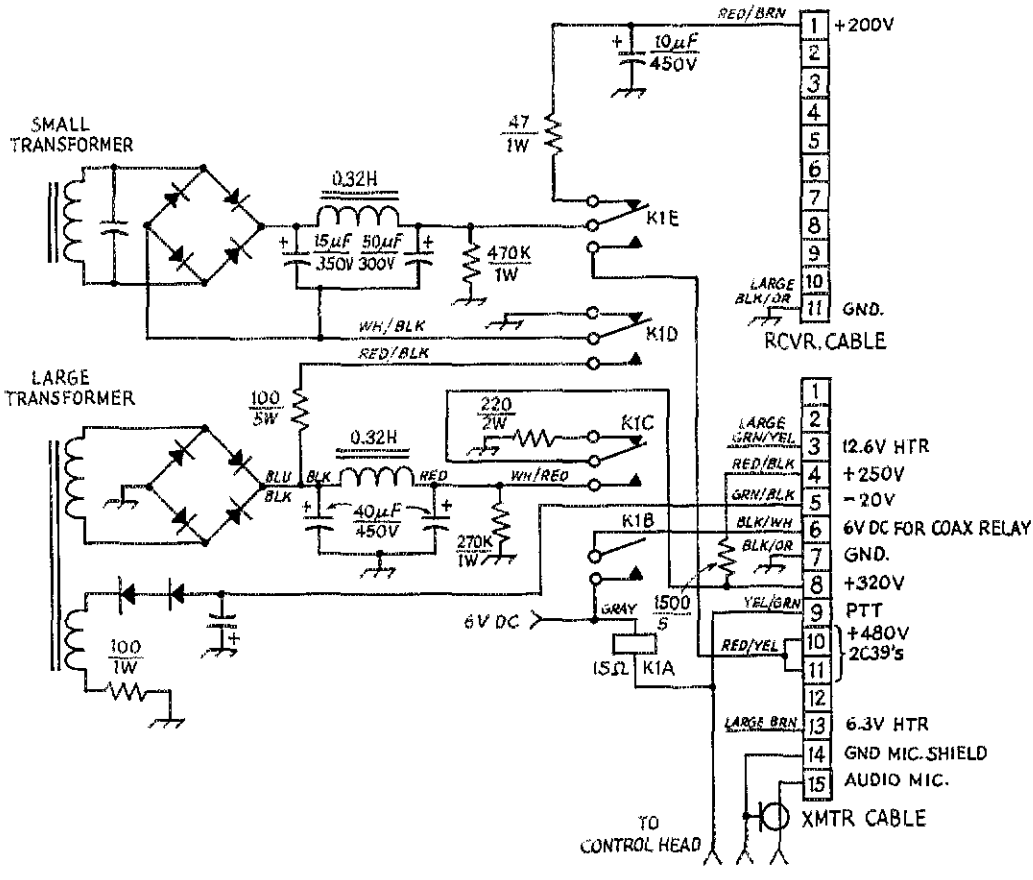


Fig. 4 — Partial schematic diagram of the original T44 6/12-volt power supply. Only the secondary circuits are shown. Relay contacts are in the *receive* position.

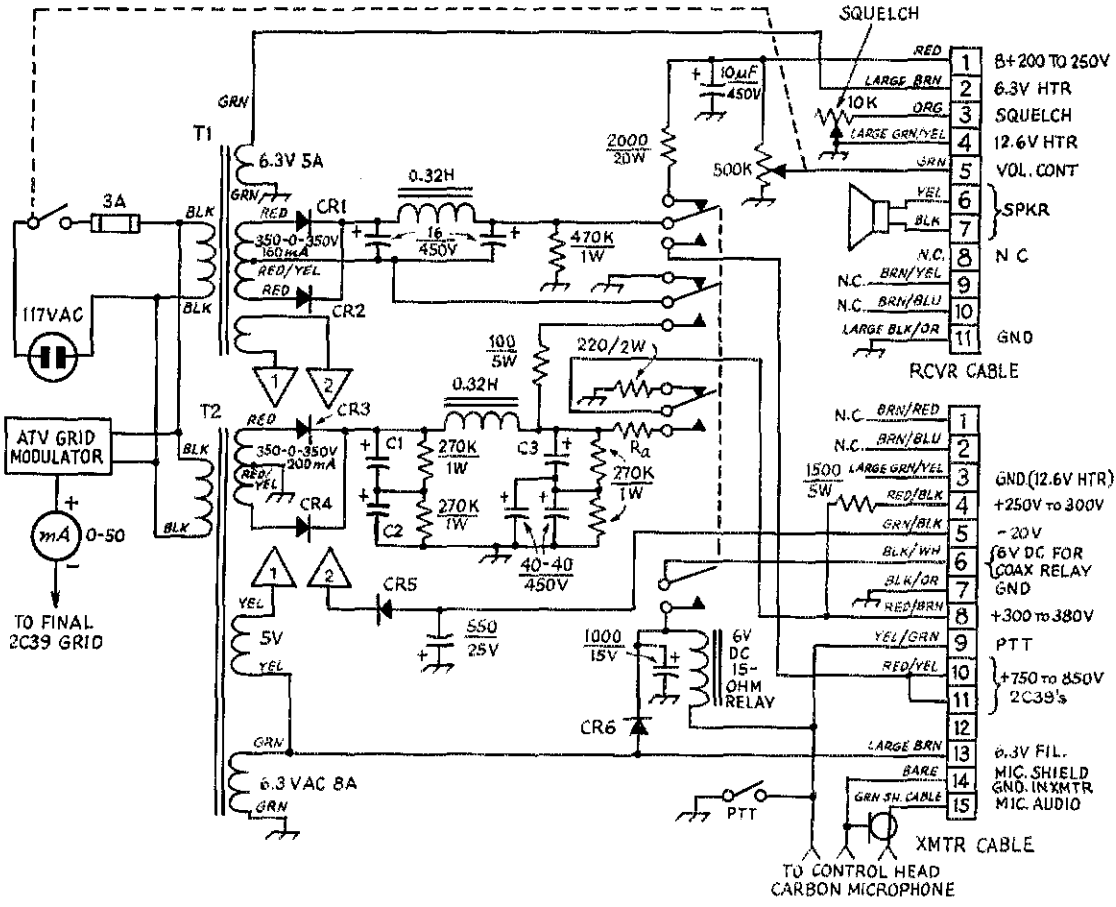


Fig. 5 — Schematic diagram of the power supply, as used for ATV. Where parts values duplicate those of Fig. 4, the original T44 components are used. Capacitors with polarity indicated are electrolytic.

C1, C2, C3 — 80-µF, 350-volt electrolytic.
CR1 through CR4 — 800-PIV, 1-A; 1N4006 or equiv.
CR5, CR6 — 200-PIV, 1-A; 1N4001 or equiv.
T1 — Triad R116A, or equivalent TV transformer.
T2 — Triad R129A, or equivalent TV transformer.

The revised power supply is shown in Fig. 5. Notice the reused components. By removing transformers from old TV sets, a large saving in the cost of the power supply changes can be realized. Check the 40-40-10-µF 450-volt original metal-can capacitor before using it. Some T44s may have been sitting too long without being turned on. In one case, the capacitor actually exploded, with enough force to rip the 50-mA grid-current meter from the front panel of the WAØMGY rig, while he was on the air with TV!

The 220-ohm, 2-watt resistor in Fig. 5 discharges the capacitors in the transmitter rapidly when going from transmit to receive. This kills the oscillator and driver stages before the receiver is energized, so that the receiver will not be momentarily overloaded and have feedback effects, causing a annoying "plop" in the speaker. The color code of the wires may not be entirely correct for all sets, and should be used mostly as a guide. In some units the volume control is not as shown. Some had the control-head volume control wired at the speaker circuit, using a low-resistance control instead of the voltage-controlled scheme as shown. If you plan to reuse this component, be sure to check its resistance to determine which control you have.

Notice the method used to obtain the minus 20 to 25-volt bias voltage for the 2C39s. The unused 5-volt filament windings on the transformers (for tube rectifiers) are series-connected in phase so that the voltages add. These are also in series with one of the 6.3-volt windings that has one lead going to ground. The value of the resistor marked Ra in Fig. 5 should be chosen so that the voltage to the driver stages (pin 4 of the transmitter plug) does not exceed 300. In most cases it is not needed and Ra equals 0.

The resulting power supply provides 250 to 300 volts to the initial driver stages, 320 to 380 volts to

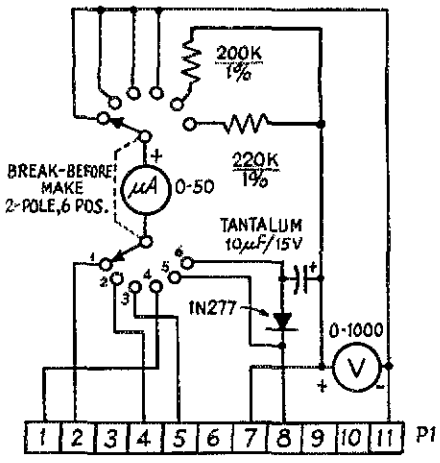


Fig. 6 — Metering circuit for the T44 ATV transmitter. P1 is an 11-pin plug to match the metering socket, J4 in Fig. 2. Switch positions: 1 — Osc. output, adj. L1; 2 — 2nd doubler, adj. L5, 6, 7; 3 — 6146 output, adj. L8, C26; 4 — Relative peak output power, adj. Z1, L11, Z3, L13; 5 — Final 2C39 peak plate current, full scale 200 mA.

the 6146 and 750 to 850 volts to the 2C39s, on transmit, and 200 volts to the receiver on receive. The 2000-ohm resistor from the upper supply to the receiver may have to be changed in value and wattage to get 200 to 250 volts at the receiver.

The metering circuitry shown in Fig. 6 is rather self-explanatory. A 50-μA meter is preferred over any less-sensitive scale. The "peak final plate current" position is for metering the peak input current, for computing peak-input power. The regular average plate current position and the peak current position should read the same with no video modulation. The circuit is a peak detector and functions similar to the one in the transmitter output circuitry in Fig. 3 of part I.

Video Modulator

The usual techniques employed to ATV modulate a uhf transmitter are plate modulation, using a series B-plus modulator tube, or grid modulation, using one of the various transistor modulators that have appeared in the ham magazines. The T44 is difficult to plate modulate at video frequencies without modification of the 2C39 final amplifier, because of the very large bypass capacitors in the

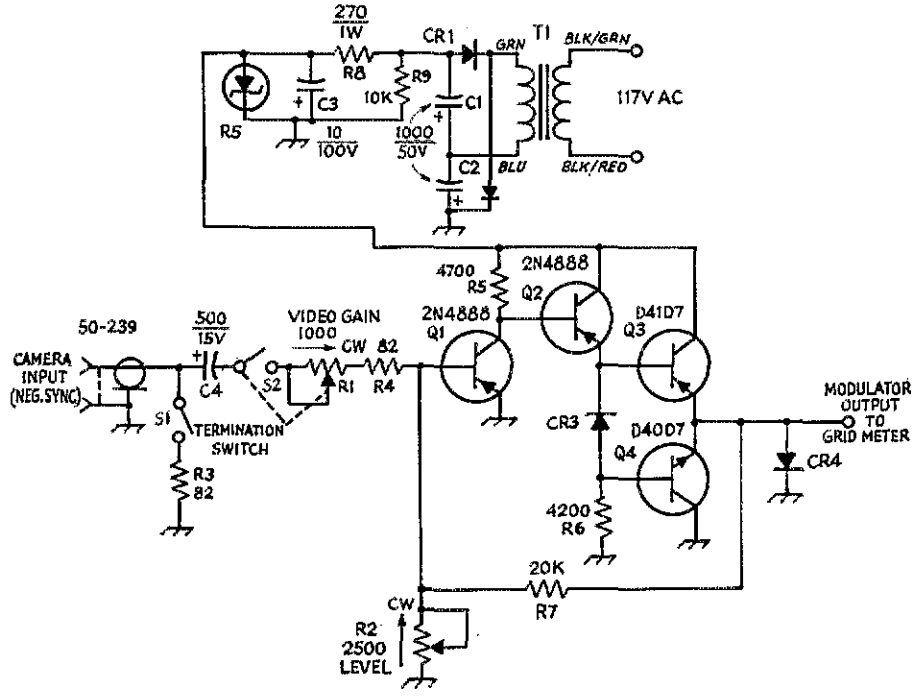


Fig. 7 — Schematic diagram of the WØMZL ATV modulator and its power supply. All capacitors are electrolytic, values in μf. Suggested components are as follows:

C1, C2 — CDE BR-1000-50
C3 — Sprague TE 1407.
C4 — CDE BR-500-15.
CR1-CR4, incl. — 100-PIV, 1-A; 1N4001 or equiv.
CR5 — 67-volt Zener diode (Sarkes-Tarzian VR-67).
Q1, Q2 — 2N4888 (Fairchild).
Q3, Q4 — D41D7 and D40D7, resp. (GE).
Filter chokes: 0.32-H, 600-mA (Triad C-400X).
T1 — Low-voltage rectifier transformer (Triad F-90X; use taps indicated by wire colors given).

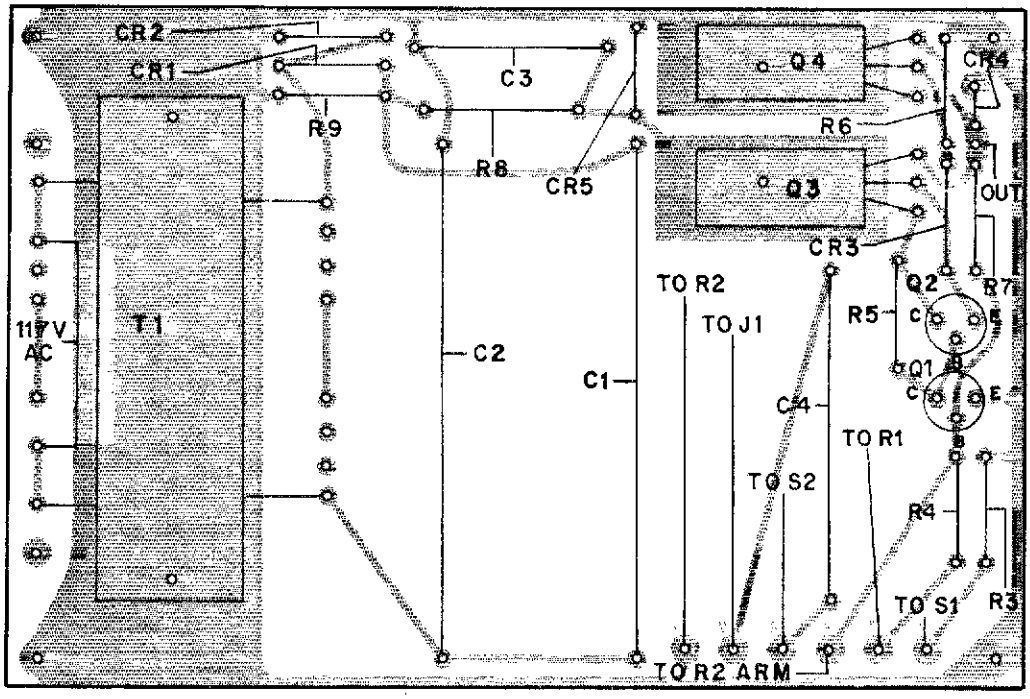


Fig. 8 — Printed-circuit-board layout for the video modulator, foil side. Components are on the far side, as shown. The board mounts inside a 5 × 7 × 2-inch box, on 3/16-inch metal spacers. Parts indicated are those of Fig. 7.

plate and grid circuits. At the end of the plate line, L14, there is a 3500-pF sheet-mica capacitor. In addition, there is C28, 500-pF, on the same circuit outside the assembly for bypassing; a total of 4000 pF on the plate high-voltage lead to contend with at video frequencies. Modifying the 3500-pF capacitor is not possible without degrading the efficiency noticeably. This much capacitance at such a high voltage makes the stage impossible to modulate at video frequencies with presently available techniques, with either tubes or transistors. The grid of the final 2C39 is rf-grounded by an identical 3500-pF capacitor. C27 is also 500 pF, for a total of 4000 pF to ground here also. The grid capacitor should not be changed for the same reasons. The grid voltage swing for full video modulation to zero watts output is 50 volts peak-to-peak. The requirement of output impedance of a grid modulator for a bandwidth of 2.5 MHz at the -6 dB point is 20 ohms, resistive, driving a 4000-pF load.

The above requirements are satisfied by the modulator shown in Fig. 7. It is constructed on a circuit board along with its power supply (short leads to the power supply are necessary) inside a 5 × 7 × 2-inch inverted aluminum chassis. The circuit-board layout is shown in Fig. 8, and the hole-drilling information for the aluminum chassis is shown in Fig. 9. The video modulator is a Class AB amplifier, using what is called a complementary pair of output transistors, operating as a direct-coupled output device. The output of the modulator is direct-coupled to the control grid of the final amplifier 2C39. The lead from the bias resistors to C27 is disconnected, and the lead from the modulator is connected in its place. This is one video modulator that does not have to be mounted close to the grid circuit, as can be seen in the photographs.

The modulator maintains excellent phase and bias stability so long as the unit and its power supply are enclosed as shown, with the short power supply leads. This pc board layout has been reproduced over 10 times, to my knowledge, with 100-percent success. Dc bias stability is established by negative feedback to the base of Q1, which ensures stability of the output operating point. This operating point, or average grid bias, is variable by R2, called the level-adjust control because it is used to set the average power output level, as will be seen later. R2 can vary the output resistance at video frequencies, low feedback-capacitance, Cob, (capacitance from collector to base) and high-Ft transistors must be used. Such devices are usually limited to a relatively low breakdown voltage. The Fairchild 2N4888 and the GE D40D7 and D41D7 have the necessary low capacitance and high breakdown voltage (-150 volts for the 2N4888, and 75 for the D40D7 and D41D7).

Cross-over distortion in the output transistors, Q3 and Q4, is minimized by maintaining a small

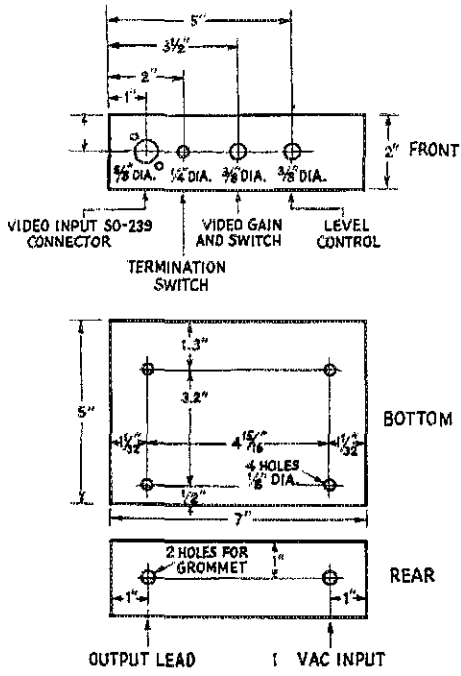


Fig. 9 — Hole-drilling information for the chassis housing the video modulator.

quiescent current of 15 mA with no video signal present. The overall amplifying voltage gain from the camera input to the output grid-modulating voltage is determined by the ratio of R7 to R1-plus-R4, as is the case with an operational amplifier.[8] The input ac-signal current and the feedback ac currents through R7 cancel at the base of Q1, so that this point is a virtual ground for ac. The gain of the modulator is adjustable by varying the ratio of R7 to R1-plus-R4 by making R1 the variable video-gain control. This modulator will fully modulate the T44 with as little as 0.3 volt from the camera.

There is no "dc restoration" to the video signal from the camera, since the input to the modulator is ac coupled and the modulator is dc coupled to the grid of the final 2C39. Do not mistake CR4 for a dc-restorer diode. It is installed as an arc-back protection device, in case the 2C39 has an internal discharge through the grid. These are always positive-going current pulses, hence the diode will normally be off and will turn on in case of arc-back and protect the output transistors, Q3 and Q4.

If one does dc-restore the composite video signal, maximum power output will always occur at the peak sync tips. It has been stated by some that dc restoration will always give a better-contrast picture. However, we have found that most vidicon cameras do not have the standard sync-to-video ratio of approximately 1:2. The best of them are more like 1:1 and some are around 1.5:1 or 2:1, and even lower, as the vidicon ages and looses sensitivity, or if you have poor lighting and no automatic-light-level circuitry. Without any dc restoration, the dc coupling to the grid allows the sync tips of the composite video signal to be clipped off at the peak power level as much as desired, using the "level" and "video gain" controls.

[8] Pike, "The Operational Amplifier," Part I, August, 1970, *QST*.

Adjustments

Tuning the T44 for normal fm operation only is straightforward. You should get familiar with the tuning adjustments and the magnitude of the various meter readings, using the original crystal, *before beginning new frequency operation. There* is one change in the procedure I would recommend for limiting the final plate current. In the original Motorola instructions, all the driver adjustments, L1, L5 thru L8, and C26, are peaked for maximum at their respective metering positions. Then the 2C39 tripler and final are tuned for maximum power output and the output coupling link, L13, is used to limit the plate current of the final 2C39 to no more than 80 mA, in the same manner that the familiar loading control of a pi network on most ham transmitters is used. Instead, continue to peak the final tuning, Z3, and coupling, L13, for maximum power output, and if the plate current of the final exceeds 80 mA, the 6146 output-coupling control, L8, should be decreased to limit the final current. A point will be reached while adjusting L13 where, if further increases in coupling are made (clockwise rotation), less output will be obtained with 80-mA plate current.

When the new crystals are installed, the 2C39 plate lines must be lengthened by the movable shorting bars. In Fig. 2, these are Z2 at the end of L12, in the tripler, and Z4 at the end of L14, in the final. They are accessible through the assembly tops, by the holes at the ends opposite from the coupling adjustments. They are adjusted after all the other driver adjustments are repeaked. The tripler is adjusted first, while metering at the grid of the final, and then the final is adjusted while monitoring the output power. Use an insulated tuning tool. The tuning adjustments, Z1 and Z3, should achieve maximum output when the screwdriver slot *on the top* of the assemblies are at the 45-degree position. Be careful when lengthening the shorting bars not to slide them all the way out, as they will touch the end of the assembly. Remember that the shorting bars are at the 2C39 plate potential! If you do happen to hit ground, R28 or R31 will act as a fuse, so you will know it![9]

Once the video modulator has been connected, the transmitter tuneup procedure for ATV is only slightly different than for fm operation alone. The video signal from a camera or other source with

[9] R28 or R31 will also blow if the tops of the 2C39 assemblies are accidentally put on backward, so that the plate tuning adjustments, Z1 or Z3, touch the tube anode.

negative-going sync is connected to the modulator input. The gain and level controls of the modulator are preset at minimum (fully ccw). After the transmitter is turned on, the gain and level controls are turned up until the peak-output power meter reading no longer increases. The peak sync tips will be slightly clipped at this point. Assuming all the driver adjustments are peaked up, the 2C39 tripler adjustments, Z1 and L11, and the final adjustments, Z4 and L13, are tuned for maximum peak-output power. Be certain during all of these adjustments that the final grid current does not exceed 50 mA. Preferably it should be held around 30 MA. The level control of the modulator is used to keep the grid current down.

After peaking the above four adjustments, turn the level control down (ccw) so that the output signal reads a minimum on the meter. If the signal does not go all the way to zero, adjust the tripler coupling, L11, clockwise (increasing coupling) until the output just reads zero. Turn up the level control on the modulator to bring the output power reading up to maximum again. Readjust the three other 2C39 adjustments, Z1, Z4, and L13, for maximum once again. From here on, the procedure is to repeat the above two steps alternately peaking Z1, Z4, and L13 with the level control turned up, and then turning the level control to minimum and adjusting L11 so that the output just reads zero.

The above procedure can best be seen using an oscilloscope monitor. The photographs in Fig. 10 show the results. Fig. 10A shows the zero-output line at the top of the picture and the adjustments peaked, but the tripler coupling, L11, is not properly adjusted for ATV when peaked. Under this condition, the most negative video signal voltages (corresponding to white) at the final grid will not fully cut off the output power, resulting in less then 100-percent modulation. In Fig. 10B, the L11 adjustment has been turned clockwise to the point where the grid voltage will cut the power output to zero. Now the modulating voltage will 100-percent modulate the output power for the best possible ATV picture. Notice that this adjustment of L11 has not varied the peak-power level of the signal. If you have a normal rf power meter in the coax line to the load, you will see a reduction in the average output power, but the peak-output meter will not vary.

Use the 6146 output coupling adjustment, L8, as discussed above, to limit the final 2C39 average plate current (which will vary with the video signal content) to the desired value of under 100 mA. The peak plate current will run around 175 mA. With 800 volts on the plate of the final, this is 140 watts of peak input power. The measured output power on most converted T44s indicates approximately 45-percent efficiency. This results in a healthy 63 watts of peak power output. The only thing you can do now for more output is to build a linear amplifier with external-anode tubes. When you do, provide a means of reading peak power output – and best of all – the output waveform, as was done here, to tune up the amplifier properly for ATV.

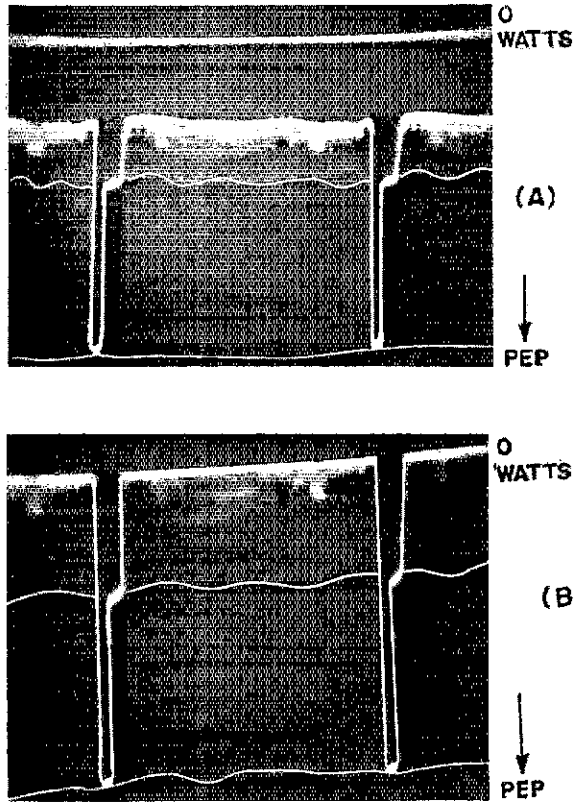


Fig. 10 — Oscilloscope waveforms showing the effects of 2C39 tripler coupling adjustment on modulation percentage. The coupling is adjusted for maximum amplifier output in A. In B, the tripler coupling is adjusted clockwise so that modulation will be 100 percent. Peak power is the same in both cases. Increasing power downward, with zero watts at the top.

Operation

Try to run as high a video gain setting as possible without appreciable "hooking", "bending" or "whiting out". The ATV operator at the other end of the transmission path can observe for you, if your own set gives a false picture because of overloading. To understand what these terms mean, turn the level and gain controls of the modulator down while transmitting a picture. Now increase the level control and observe that you first get a synchronized picture without any video information. Then, slowly, the blackest portions of the picture will be seen, with the rest of the picture a white area. This white area is clipping at the zero-power level and is called "whiting out." Increase the level control until there is no whiting out, and then increase the gain control. You may get some more whiting out, but now notice the top of the picture and the straightness of the picture in the vertical direction. If you have sufficient gain and run the level control up high enough, the top of the picture will first start to bend right or left.

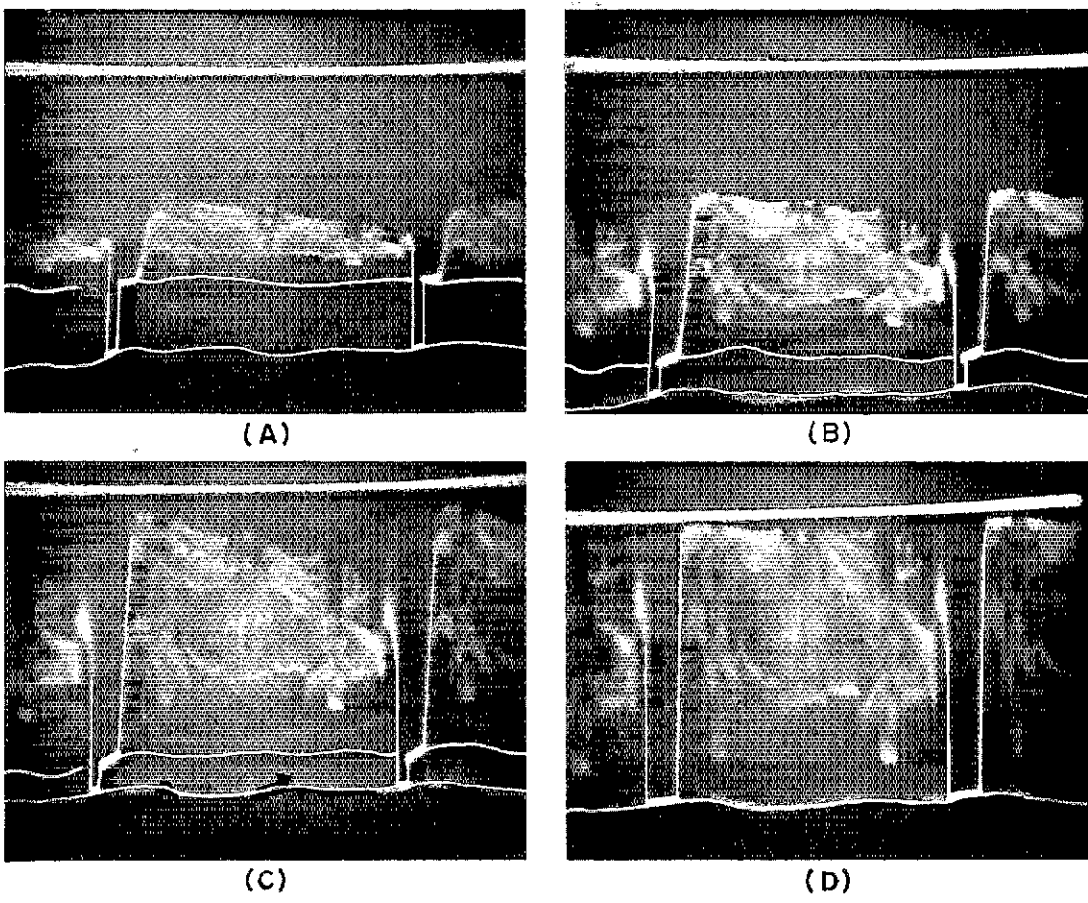


Fig. 11 — Oscilloscope patterns with various modulator gain and level settings. Increasing power is downward, with zero watts at the top. Whites are at the top; blacks are lowest in the video waveform. Sync pulses are at the bottom (peak power level).

This is "hooking"; when the sync pulses are beginning to be almost all clipped off. Further increase in the level control will cause vertical lines to wrinkle. The video information is getting into the sync circuitry because of lack of enough sync-pulse amplitude. This is a form of bending. The optimum operating point is found when the level control cannot be turned either up or down without observing either hooking or whiting out.

The above procedure is best followed while observing a dc-coupled oscilloscope connected to the waveform monitor BNC connector on the transmitter module. Fig. 11 shows some of the various waveforms obtained with a variety of level and gain settings. A low gain setting with the level up fairly high is shown in Fig. 11A. Notice the sync-to-video ratio. This waveform produced a washed-out picture, as the signal was riding up around the high-power level. If the level control is turned down so that the percentage of modulation is increased, even though the actual power level has diminished, the observer at the receiving end will comment that the quality is better and that there is actually less snow in the picture! Fig. 11B shows a higher gain setting over Fig. 11A, and the level is turned down slightly for less average-power output. This improves the received picture, but further decreasing the level control and increasing the gain will produce the picture you desire, and this waveform is shown in Fig. 11C. Notice how the sync is compressed. No sync instability will be noticed with this waveform, and this includes some very old TV sets.

The waveform shown in Fig. 11D is one that should be noted carefully. Notice how the whites come all the way to zero watts (top line). The sync information is completely gone. Notice, however, that no video information at the black level extends more than 90-percent of the way down the waveform, so there is a 10-percent margin of blanking pulses left for the receiver to sync its horizontal and vertical circuits. We have found that most TV sets will have no problem displaying a steady picture with this type of waveform (10-percent margin of sync). A little hooking noticed on some sets was not objectionable. This was also a

snow-free picture. Compare this with the one in Fig. 11B, which was not entirely snow-free, even though both are at the same peak-power level. For ATV DX-ing, you may even want to increase the gain to a higher setting and allow the picture to bend somewhat, as a trade-off for the ability to see large-lettered signs.

Stimulating Interest

Small pockets of ATV interest often appear sporadically but never grow with on-the-air activity, and so may disappear or grow dormant, waiting for a new generation of enthusiasts before awakening for another brief spurt of activity. One reason for this self-defeating situation is poor organization for actual communication, especially in the matter of choice of an audio channel. On-the-air discussion, even in the earliest stages, is a great interest builder for any group project.

In the Twin Cities area, 15 meters is popular for local rag-chewing, after the band goes dead for skip propagation, usually in the early evening hours, when hams are likely to have the most time for such things. When the first two of the ATV group, WAØPFP and myself, began ATV transmissions, we decided to stay on our original rag-chewing frequency, 21.405 MHz, and use it for the audio channel. This stirred up interest even before we had pictures on the air, and were merely trying to get the 0.1-watt signals from our 6J6 oscillators into converted TV sets at the other end of our 7-mile path. Enthusiastic chatter about our minor successes had the desired effect, and in about a year and a half ATV activity grew to about 20 fully equipped stations, with about an equal number showing half-hearted interest. Such growth is probably typical of ATV in metropolitan areas, once a few fellows get started on a frequency others can hear.

There are still many such areas where ATV interest is low or nonexistent, and there is much room for growth. Even if this push-to-look use of TV and fm on the same carrier is used, do not abandon the old rag-chewing frequency, whatever it may be in your locality. Unless there is large-scale use of the 420-MHz band in your locality already, putting both picture and sound in this band at the start will isolate your group, and stifle interest, stimulation and growth. I hope that this article will help to rectify this situation which has limited ATV interest over many years, and help to get some of those dusty CCTV cameras on the air!

I would like to thank Bill Elkin, WAØPFP, and Bruce Thiede, WAØQGL, who stuck with our ATV activity in our darkest hours, and assisted through many hours at a time to overcome vast technical problems that had to be solved, before this article could have been started. Additional thanks goes to Ed Tilton, W1HDQ, who gave me the incentive to begin this article. QST

An IC Keyer

(Continued from page 34)

PROGRAM, then press the START button. The message will be heard once more, but after it goes through this time it will not have recirculated and the memory will be clear.

Programming a STOP code requires a two-fisted operation. Clear the memory, then depress the STOP button. While holding the 1/0 button in, press S5 four times, allowing sufficient time for the indicator lamp to go out each time. Release the 1/0 switch. Depress the START button and immediately start keying the desired message. After completing the message, immediately press the STOP button. Set S2 to OPERATE then press the START button. The message will not be heard, as the STOP code will come through first and shut the register off. Once the indicator lamp goes off, the message has just reached the end of the register. Depressing the START button now will send the message once. More than one STOP code may be programmed into a single message. Whenever the register is manually stopped or reaches a STOP code, the normal synchronous keyer is enabled.

One may be tempted to substitute a toggle switch for the push-button type used with the 1/0 switch. This would work fine except that if the switch is inadvertently left in the 1 position, this would override the keyer and all 1s would be entered during programming operations.

Conclusions

The *new* component cost of the device runs around $80. However, this may be reduced considerably by utilizing many parts from your "junk" box, especially in the area of capacitors, diodes, transistors, potentiometers, and switches. All of the TTL integrated circuits are available through many of the "bargain" distributors who advertise in some of the amateur publications. In most cases they are available at less than the manufacturers' retail price. The MOS shift registers are available from Hamilton/Avnet, 185 Cambridge St., Burlington, MA 01803 at $6.75 each.

On one occasion I programmed a directional CQ with no stop codes so that it would repeat continuously. Since my rig has semi-break-in (VOX-type), the entire system works completely automatically. I was able to eat a sandwich and read the local newspaper while my keyer did all the work. How lazy can we hams get!

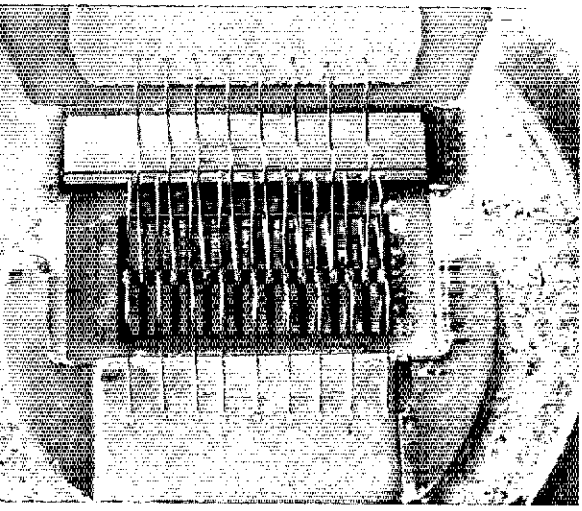
Addendum

Since the project was completed, Signetics has introduced a new shift register. It is the 2527V, which is a dual 256-bit unit with a price very close to that of the 2521V. They are compatible pin for pin, so no wiring changes are necessary. Therefore, the two 2521Vs may be replaced by a single 2527V to obtain the same capacity (42 characters) at a cost saving of about $7.00. Or two 2527Vs may be used to expand the memory to about 84 characters. QST

• Technical Topics

New VHF RF Transistor Provides 70-Watt Output

COMMUNICATIONS Transistor Corporation (CTC) has recently introduced its BM70-12 bipolar transistor, which is intended for rugged operation in the land-mobile services. This transistor appears to be a "natural" for use in 2-meter applications which require high rf output from the transmitter. A single BM70-12 will provide 70 watts of rf output when operated from a 12.5-volt dc supply. An excitation power of 12 watts is needed to drive the BM70-12 to its rated output level. With four watts of driving power the output is approximately 38 watts, and at the 8-watt rf-input level the power output is approximately 58 watts. The new device is intended for operation from 132 to 174 MHz, thus including the amateur 2-meter band. A pair of the transistors can be used to provide 140 watts of rf output. Unit price is $39.



Internal view of the BM70-12 transistor. The exposed chip has been magnified many times to show the complex structure of the device. There are approximately 1200 bipolar transistors contained on the substrate. The collectors are in parallel and the emitters are individually ballasted (each with its own built-in series resistor), then connected in parallel. The numerous tiny wires visible at the center of the photograph are input-matching inductors. They connect to a 2000-pF MOS capacitor (dark rectangular structure at center). The inductors and the capacitor form an L network within the transistor, thus minimizing reactive components in the base circuit.

Some Features

The manufacturer's data sheet (2.1.8.3D) states that because of a new design technique, called "internal matching," the complications resulting from low input impedance and high input Q – common to the more conventional rf power transistors – are practically eliminated with the BM70-12. The internal-matching concept results in an input impedance with a higher real part and a

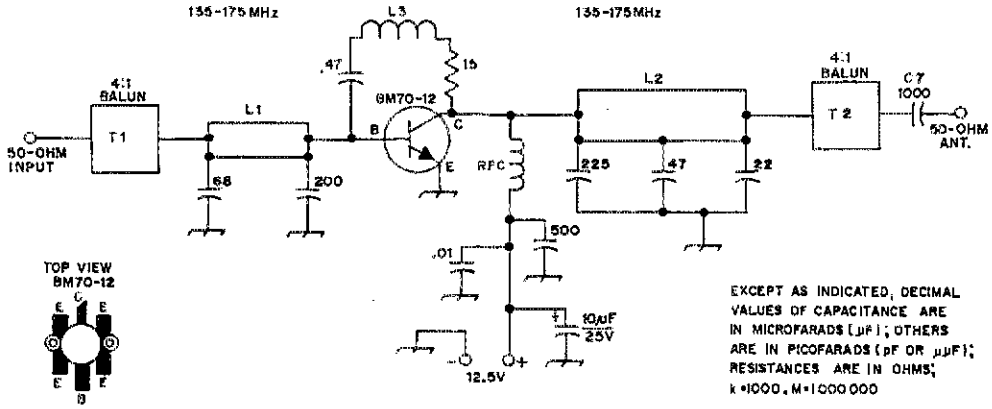
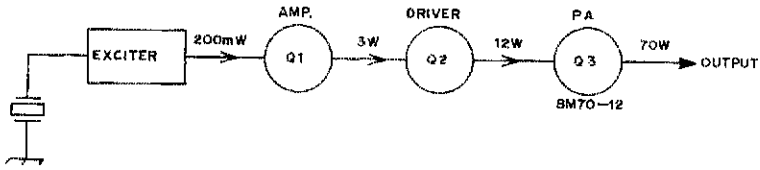


Fig. 1 – Schematic diagram of a vhf amplifier using the BM70-12 transistor. Capacitance is in pF unless otherwise indicated. Network capacitors in the base and collector circuits are low-inductance Underwood type. L1 is a 0.2 × 0.8 × .01-inch strap. L2 is a 0.2 × 1.3 × .01-inch strap. L3 is a 0.15-μH inductor. RFC1 consists of 5 turns No. 18 bus, 1/2 inch ID.



lower *Q*. The photo shows a view of the internal structure of the transistor, magnified many times.

The transistor is guaranteed to withstand SWR conditions from open to short when operated at rated power with a dc supply voltage as high as 16. The power-dissipation rating (maximum) is 220 W at a case temperature of 25°C. Input impedance at rated power is $1 + j\ 1$. Output load impedance is $1.2 + j\ 0$. Both values are almost constant from 130 to 180 MHz.

Amateur Application

It is unlikely that mobile operators using the fm/repeater mode will normally need 70 or 140 watts of power at 146 MHz. However, the QRO approach has its merits when the mobile operator is a long way from a repeater, and if the mobile receiver is capable of receiving the repeater signal so as to assure perfect readability. The higher power levels are useful for fixed-station operation over long paths for simplex operation, and for cw DXing at the low end of the 2-meter band.

The block diagram illustrates how to increase the power level from 200 mW to 70 watts. A circuit for a 70-watt amplifier, showing ball-park values, is given schematically in Fig. 1. Additional information on vhf solid-state power-amplifier design was given in *QST*[1]. More data on the BM70-12 can be obtained by writing to CTC, 301 Industrial Way, San Carlos, CA 94070. — *W1CER*

[1] Johnson and Artigo, "Fundamentals of Solid-State Power-Amplifier Design," parts I and II. See *QST* for September and November of 1972.

February 1923

. . . Three hundred and fifteen different U.S. and Canadian amateurs were logged in Europe during the transatlantic tests last December. Those who had qualified in the preliminaries were given special transmitting times and code identifications for verification; but there were also free-for-all periods where the several call areas took turns firing all the energy they could muster toward listeners in France, Britain and Switzerland. While acclaiming the event a triumph, the editor and some correspondents voice a not-unfamiliar lament — lack of full cooperation by all amateurs in observing "westbound" schedules for listening instead of transmitting. Yet several Europeans were heard here, and it is only a question of time now before the first two-way across the pond will take place.

. . . ARRL President Hiram Percy Maxim and colleagues have been hard at work studying the White bill in Congress, drawn as a result of the national radio conference called last year by Secretary of Commerce Hoover. "TQM" gave extensive testimony at the committee hearings to protect the interests of a growing amateur radio.

. . . Synchronous rectifiers for plate supply are discussed in a symposium coordinated by Technical Editor Kruse. Two input (ac) and two output (dc) brushes (of copper gauze; carbon spreads graphite and eventually causes arcing) ride on commutator rings to keep the electrons all going in one direction. 7BK says he now has 3.5 amps antenna current, compared with 2.8 when he was using straight ac on his transmitting tube plates. Squaring those two figures shows the real improvement.

February 1948

. . . For ubf amateur activity, mechanical problems are often more difficult to solve than electrical ones, and W2RMA of GE shows us how to fabricate some plumbing suitable to attain 2300 Mc. output from the 2C40 "lighthouse" tubes.

. . . Narrow-band fm comes in for double attention this month. W1ONG describes a reactance modulator small enough (by dimensions of those days) to mount inside a VFO cabinet. W4IZH tells us how to revamp a typical second detector setup to adopt a ratio detector circuit switchable between a-m and fm reception.

. . . The editor hails an important change of amateur attitude he senses — a realization that worrying about such things as BCL quality audio in receivers and S-meter calibration won't pull a signal through today's QRM, and we'd all better pay a lot more attention to i-f selectivity, Q5ers and such. He calls it a "new look" — the fashion is longer and slimmer skirts in our selectivity curves.

. . . W6NRM, pointing out that CR tubes on the surplus market bring the price within reach of the average ham, gives us construction dope on a versatile 3-inch scope for use in the ham shack.

. . . For the first time we have an amateur as a member of the Federal Communications Commission, George E. Sterling, W3DF, FCC chief engineer, is elevated to a commissionership.

. . . Several thousand amateurs took to the open spaces last June for some field day operating, and this issue reports ARRL's 1947 FD as "top operating activity of all time." The Simulated Emergency Test, however, has not yet come into its own. — *W1RW*

Hints and Kinks For the Experimenter

KNOB FOR TRIMMER CAPACITORS

Here is a simple method for attaching a knob to the screw-type trimmer capacitors. It should work well with either the ceramic or mica type. Get a small washer whose thickness is close to that of the screw slot, and file it to fit, as shown for the ceramic type (not necessary for the mica type). Slot a short section of 1/4-inch diameter copper tubing and solder the combination as shown in Fig. 1. – *George Leininger, W8QZF*

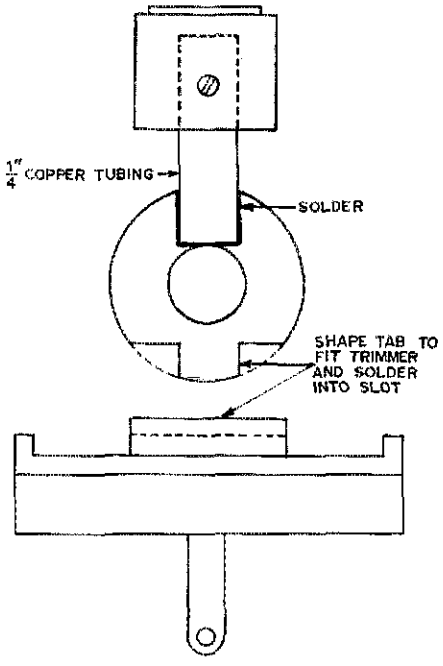


Fig. 1 – Knob attachment for ceramic and mica trimmer capacitors.

AN ATTRACTIVE FINISH FOR ALUMINUM

Homemade aluminum panels look bland, and here is a way to brighten them up a bit. If you have a bench-mounted drill press, get a short pencil with an eraser, and put it in the chuck with the eraser down. Just go along in rows until you have an attractive pattern of small circular decorations (jewel-case finish). Remember to change pencils before the eraser wears completely down, to prevent scratching by the metal casing that holds the eraser on the pencil. – *Gregg Pittenger, WN8JDJ*

[EDITOR'S NOTE: Steel wool affixed to the end of a drill bit or rod will provide similar results.]

FORMS FOR ANTENNA LOADING COILS

When the OM (WN5EAM) was trying to put the rig on the 80-meter Novice band, he was able to stretch the possible antenna length to 88 feet. He needed loading coils to bring this short antenna to resonance, but it was the XYL that thought of a source for the coil forms – the dime store.

I found plastic hair rollers almost 3 inches in diameter. These had numerous holes in them, which made them handy for winding and removing experimental half-turns. They also had a series of little bumps with a spacing of approximately 1/8 inch, which gave a nicely spaced coil of 25 turns.

After unwinding a few turns, and extending the wire so that there was approximately 6 feet of it to the end of the antenna, the SWR was 1 on our favorite frequency, and 1.2:1 20 kHz higher. The only drawback: the rollers were *pink*! The OM wrapped them in black plastic tape! – *Mrs. W. T. Tilton, WN5EDL*

EASY METHOD OF MOUNTING QSL CARDS ON WALL WITHOUT CAUSING MARKS

Here is something members may be interested in. For pasting QSL cards on any smooth surface, Magic Board plastic-foam squares (made by the Holes-Webway Co.) provide an easy solution. It comes in 12 × 12-inch squares with adhesive on both sides. If at any time you wish to change cards, simply lift them off, without any damage to either the wall or the card. – *Joseph E. Vucco, W8HCL*

TWO METHODS FOR TIGHTENING LOOSE SLUG-TUNED COILS

Here is a way to solve a minor problem. If you should have a loose iron core in a coil, two methods for tightening it again are shown in Fig. 2. I have used both methods and it saves a lot of trouble when critical tuning is necessary. *One word of caution*; use the glue carefully and avoid getting any on the coil turns; it may affect coil *Q*. – *Franklin Rosenberg, W6NYG*

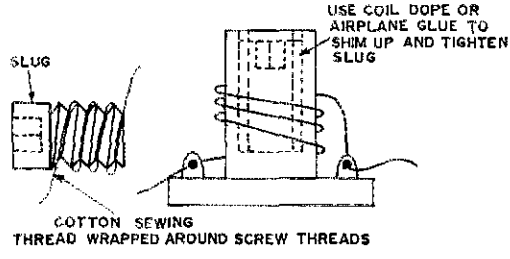


Fig. 2 – Two methods for tightening up loose slug cores.

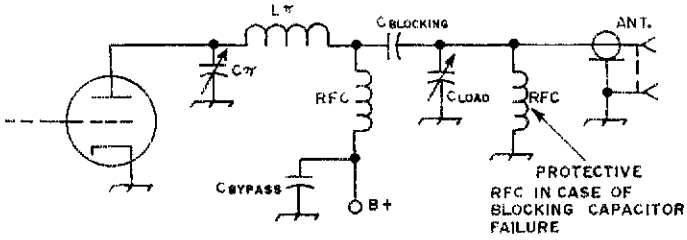


Fig. 3 – A different pi-section tank feed system.

SIMPLIFIED PI-NETWORK DC FEED

When designing or building pi-network plate circuits, it is not necessary to adhere to the common system of feeding the dc source to the plate side of the coil. Quite often, the arrangement shown in Fig. 3 will result in an improved mechanical and electrical layout. Also, since the B+ is fed at the cold end of the tank coil, better rf decoupling is attained because of the lower impedance at this point. – *Bud V. Freitag, W8EC*

[EDITOR'S NOTE: *Caution:* **Make certain the plate spacing of the variable capacitors is adequate for the operating voltage.**]

PREVENTING TRANSISTOR FAILURE IN THE COLLINS MP-1 MOBILE POWER SUPPLY

MP-1 mobile power supply owners are requested to make the following modifications to *Power Switching Relay K1*, in order to prevent ruining one or both of the oscillator transistors, because of high-voltage, short-duration, pulses generated by this relay. This modification applies to all supplies with serial numbers *below 30332*.

Select a solid-state diode having at least a 200 PIV rating, with a forward-current rating of 400 mA or more. Then proceed with the following steps:

1) Remove the four cover screws, lift the cover and slide it back along the power cable.

Caution: When installing a diode, carefully observe proper polarity. To prevent heat damage, use a heat sink on the leads while soldering the diode in place.

2) Locate relay K1. Solder a diode (such as a 1N645 or equivalent) across the relay coil (cathode to the grey wire, anode to the yellow wire). Check that the cathode of the new diode, and the cathode of CR1 are wired together. In some power supplies, CR1 is a stud mounted type 1N1115 located next to fuse F1, in other supplies, CR1 is a small 1N4005 soldered between the coil and a contact on K1.

3) Add the modification to the MP-1 Mobile Power Supply schematic diagram.

4) Replace the cover, and cover screws.

This information is being published in order to reach owners of the MP-1, who might not be on the records at the Collins Radio Co. – *Arnold Verdow, WØLIJ, Collins Radio Co.*

GMT "HOUR HAND"

A homemade "hour hand" of thin sheet metal affixed to the same shaft as the hour hand of your clock, and set to the proper number of hours ahead (or behind) will show GMT, while the original hand will show local time. – *Tom Chaudou, WN9FLD*

ANTENNA INSULATORS AND SPREADERS FROM PLASTIC CLOROX BOTTLES

The tough plastic from discarded Clorox bottles can be used for antenna insulators and spreaders for open-wire feed line. The antenna shown in Fig. 4 has withstood five years of use, with no breakage or deterioration of the plastic.

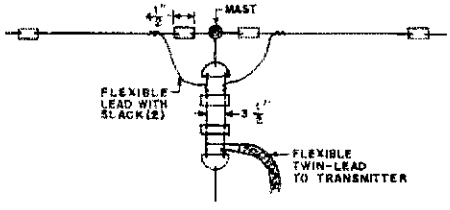
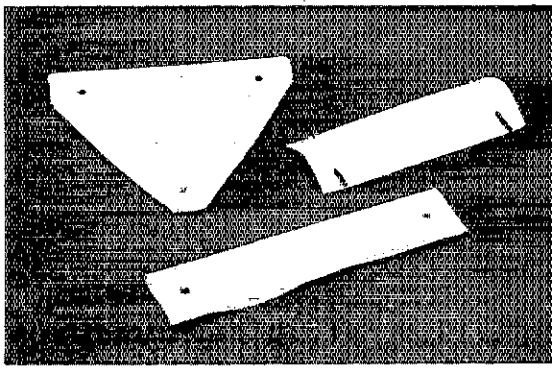
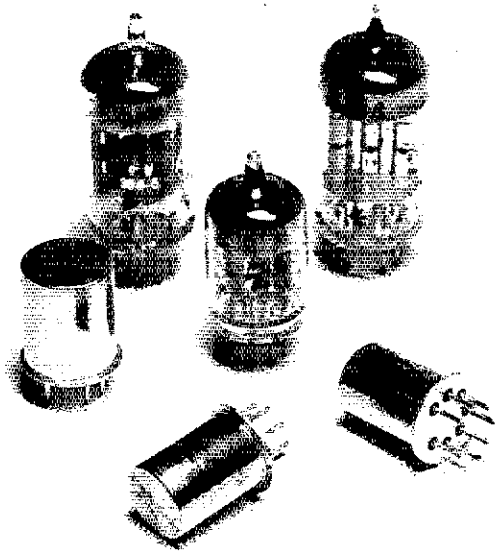


Fig. 4 – Clorox bottle antenna insulators.

The triangular plastic insulators were used to anchor each end of the feed line so that it would swing as a unit in high winds. Even though the material is extremely tough, eyelets must be used in order to keep the wire from cutting through the plastic. The plastic is folded double, for maximum strength, and more thicknesses could be used if large tent grommets are available. The material is polyethelene, so it is a first grade insulator. In making the feeder spreaders, a piece of plastic is cut to the desired width and creased. The holes are then drilled (about the same diameter as the wire), and the wire is fed through the two holes until the spreader is moved to the desired location. – *A.P. Marsh, W3MJ*





The Fetron — A Solid-State Tube

WHILE MOST NEW amateur equipment uses solid-state devices, ham shacks around the world are filled with tube gear. A transmitter or receiver often becomes a member of a ham's family after several years of use, cherished by the owner even if the unit is somewhat obsolete. Test equipment, older fm rigs, and surplus gear obtained through MARS channels are usually tube designs. It seemed that tube gear was headed for the junk yard or museum — at least until Teledyne developed the Fetron. Semiconductor rectifiers packaged as plug-in replacements for vacuum-tube units have been popular for several years. Teledyne Semiconductor has recently introduced a line of solid-state plug-in replacements for triode and pentode receiving tubes. Called Fetrons, the solid-state devices are directly interchangeable with the tubes they replace. Fetrons offer improved performance almost unlimited life expectancy, and low heat generation. A Fetron is an integrated circuit consisting of a high-performance input FET, cascode-connected with a high-voltage FET. The cascode connection is used so that the device has a low input-capacitance variation (Miller effect), similar to that found in tubes. A typical Fetron is shown in Fig. 1. The filament terminals of the device have no internal connection, as no filament power is needed.

The first solid-state tube replacement produced by Teledyne was the TS6AK5, a device interchangeable with the popular 6AK5. The 6AK5 was chosen as a first model because millions are used by telephone companies — a large potential market for a high-reliability device. Two versions of the TS6AK5 are being produced, one for amplifier circuits and one with a built-in feedback network connected to the screen terminal for oscillator service. A 12AT7 substitute is now in production, and work is going forward on solid-state 6BA6s, 6CB6s, 6AQ5s, and 6V6s. Table 1 shows equivalent parameters for the 6AK5 and TS6AK5. Expected life time for the tube is typically 1000 to 10,000 hours, while the FET version is rated for a minimum life of 100,000 hours. The Fetron also has the advantage of low distortion which is common to all FET devices.

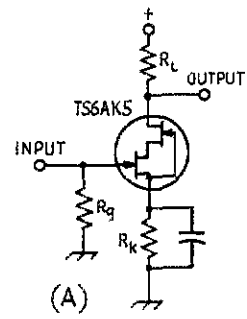
Some substitution tests in the ARRL lab using samples of the TS6AK5 and TS12AT7 produced interesting results. The TS6AK5 proved to be an excellent replacement for the 6BH6 second limiter in an fm receiver. As an rf amplifier at vhf, the solid-state model provided excellent sensitivity but didn't deliver as much gain as obtained using a tube. The differences, slight as they are, between the tube and the Fetron, are manifest at vhf; for operation above 50 MHz some circuits may have to be optimized for the TS6AK5. The solid-state 12AT7 performed well as an audio amplifier and rf oscillator. For some reason (as yet unexplained) the device did not work well as an rf frequency multiplier.

Prices for the Teledyne devices are relatively high — $12.50 for a sample TS6AK5. As production is increased, the manufacturer expects to achieve prices equivalent to the better grade of tubes. An information package on the TS devices is

TABLE 1: TYPICAL PENTODE DEVICE CHARACTERISTICS — R_K = 200 ohms E_b = 120 V

PARAMETER	*UNITS*	*6AK5 VACUUM*	*TS6AK5 SOLID-STATE*
Plate voltage breakdown	V	350	350
Plate resistance	megohms	0.5	5.0
Transconductance	μmhos	5,000	4,500
Plate current (R_K = 200 ohms)	mA	7.5	7.0
Grid voltage for I_b = 10 μA	V	—8.5	—5.0
Amplification factor	—	2,500	22,500
Input capacitance	pF	4.0	6.5
Output capacitance	pF	0.02	0.02
Useful frequency limit	MHz	400	600

Fig. 1 — Internal elements of the TS6AK5.



available from Teledyne Semiconductor, 1300 Terra Bella Ave., Mountain View, CA 94040, attention Richard Kors, Product Marketing Manager. Additional research and development work will be needed to perfect a complete line of Fetrons. This writer hopes Teledyne will carry on, as a lot of used-but-usable amateur equipment could use a plug-in conversion to solid-state active devices. — *WIKLK*

A Dual-Polarity IC Regulator

MANY OP-AMP CIRCUITS require power sources that deliver plus and minus 15 volts. Often complex designs using several ICs are employed to achieve the voltage stability and degree of filtering needed. Silicon General has recently introduced a unique dual-voltage IC regulator, the SG3501, which will greatly simplify the construction of an op-amp supply. The device contains two error amplifiers, two pass transistors, two current-limiting circuits, and two voltage-reference elements. One section is connected to act as a complete positive regulator while the other section regulates negative voltage.

High stability is achieved in the SG3501 by use of an FET connected as a constant-current reference element. Also, the error amplifiers are driven by the regulated output voltage, rather than the input potential, which further enhances voltage stability. By itself the '3501 will provide plus and minus 15 volts output at up to 50 mA. The addition of external pass transistors will allow higher output current, and an external control can be attached to vary the output potential from 10 to 23 volts. A sample circuit is shown in Fig. 2. The output voltage tolerance of the SG3501 is plus or minus 0.5 with a maximum input voltage of 50. For exacting applications the SG1501 may be employed for a maximum variation of 0.2 volt.

The SG3501 is available in either a can (TO-100) or dual-in-line package (TO-116). Readers wishing additional information should request Technical Bulletin 1501 and Applications Bulletin No. 1 from Silicon General, Inc., 7383 Bolsa Ave., Westminster, CA 92683. A list of representatives and dealers for Silicon General devices is available from the same source. The single-unit price for an SG3501 is $6.95. — *WIKLK*

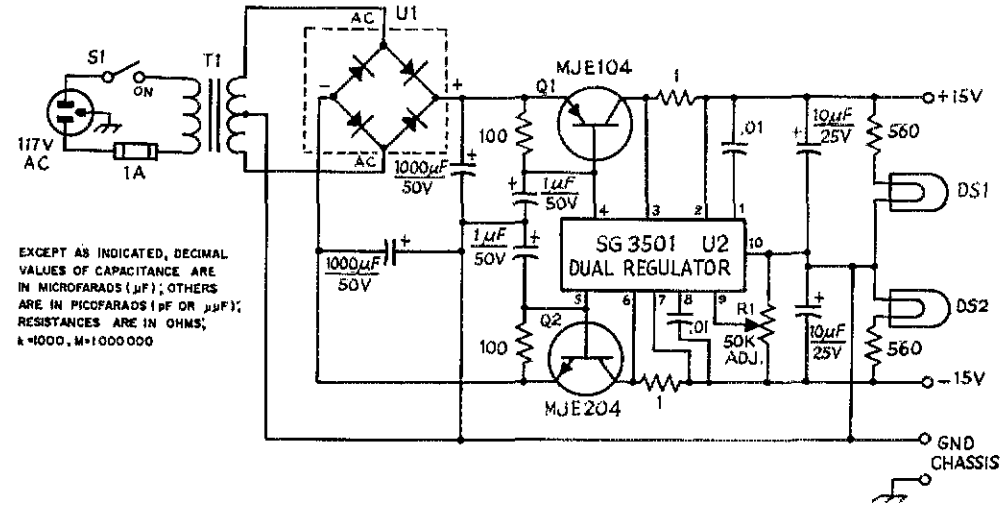


Fig. 2 — Schematic diagram of the dual-voltage power supply. Unless otherwise noted, resistors are 1/2-watt composition and capacitors are disk ceramic, except those with polarity marked which are electrolytic.
DS1, DS2 — LED pilot lamp.
Q1, Q2 — Motorola power transistor fitted with a small heat sink.
R1 — Linear-taper composition control, 1/2 watt, pc mount.
S1 — Spst toggle.
T1 — Control transformer, 117-V primary, 36-V c.t. secondary, 550 mA (Essex/Stancor P-8613).
U1 — Diode bridge rectifier, 200 PRV, 550 mA.
U2 — Silicon General IC (see text).

Silent Keys

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

K1DVS, Charles L. Kelley, Sr., Bangor, ME
W1FIA, Peter C. Houskeeper, Pawlet, VT
W1GED, Steve J. Boyko, Leominster, MA
W1IKR, Kurt E. Stempner, Melrose, MA
W1JUO, Walter F. Linden, Riverside, RI
W2BET, Thomas J. Kelly, Villas, NJ
WB2DOO, Robert L. Kane, Bronx, NY
W2EGE, William S. Griffith, Trenton, NJ
W2FI, Everett D. Gibbs, Wantagh, NY
W2GMN, Fred C. Read, Woodbridge, NJ
WA2HKL, John B. Norton, Orange, NJ
W2MLW, Francis T. Burke, Roselle, NJ
WA2OVQ, Howard B. Carter, Pitman, NJ
WA2RNP, Robert W. Tanner, Schenectady, NY
K2TR, Carol V. Fischer, Sr., Paterson, NJ
W3CTN, Lawrence K. Jones, Pittsburgh, PA
W3EOS, *Walter C. Lindsly, Maple Glen, PA
W3GVE, Myron R. Ross, Washington, DC
W3KPR, A. Lee Litsinger, Baltimore, MD
Ex-W3LEO, Elvyn M. Sollie, Saxonburg, PA
K3OBC, Peter Fries, Pittsburgh, PA
W3QEU, Earl C. Ringler, Scottdale, PA
Ex-3SH, Walter R. Kenyon, Scotia, NY
K3TJR, Martin J. Marcinek, Johnstown, PA
W3UDG, Elmo E. Lingley, Titusville, PA
W4JA, Gilbert L. Countryman, Charleston, SC
K4RRG, Burdett P. Cottrell, Winston-Salem, NC
Ex-WSCQA, Louis S. Hicks, Albuquerque, NM
WA5MJA, Carl R. Brough, Oklahoma City, OK
K5VUZ, Larry L. Kipfer, Maplewood, LA
W6DHM, Vincent W. Berry, Los Angeles, CA
W6EOP, Harry A. Ambler, San Diego, CA
K6FM, Howard F. Topping, Berkeley, CA
K6KHF, Ralph R. Harvestine, Los Angeles, CA
K6KLH, Ralph R. Allred, Fresno, CA
WA6OLY, John D. Printz, San Luis Obispo, CA
W7GUA., Howard C. Reeks, Carson City, NV
K7IAI, Wayne H. Flanders, Seattle, WA
WA7KFC, John S. Norman, Scottsdale, AZ
W7MOC, A. Duke Arriola, Miami, AZ
W7OE, Howard S. Pyle, Lacey, WA
W7UPM, Joseph W. Roth, Douglas, AZ
K7WIU, Riley W. Smith, Fruitland, ID
WA8ACF, Raymond W. Geouge, Huntington, WV
WA8DFU, Jim Miller, Allegan, MI
W8HNK, Roy R. Hawkins, Bluefield, WV
K8IVG, Wallace C. White, Jr., Marion, OH
W8KZ/Ex-W8MOA, Michael Kantor, Elyria, OH
K8OHD, Luther G. Adkins, Hinton, WV
W8QAD, Harding B. Van Fleet, Cincinnati, OH
Ex-8ZK, Elmer W. Reeve, Ann Arbor, MI
W9HPZ, Anthony M. Barszcz, Milwaukee, WI
W9ILV, Alfred B. "Pete" Lowe, Crawfordsville, IN
WN9KRQ, Paul Dahlke, Jr., Oshkosh, WI
W9LJZ, John C. Maxworthy, Beloit, WI
W9YEG, Frederick R. Lambrecht, Milwaukee, WI
WØDI, William J. Bamer, Milford, NE
WNØFCV, Frank C. Rodman, Wichita, KS
WØIEV, Paul M. Carpenter, Kansas City, MO
WAØJTM, Floyd J. Phillips, Hays, KS
WØOOQ, James F. Lund, Minneapolis, MN
WØQPE, Clyde N. Smith, Seymour, IA
WAØQVS, Raymond R. Nelson, Essex, IA
KØTKF, Wayne R. Starr, Hiawatha, KS
KØVWK, Thomas R. Clifton, Greeley, CO
VE3WP, Hector W. Bishop, Ancaster, ON
VE7BVU, M. L. Allan, N. Vancouver, BC
DL8ST, Helmut Hochberg, Stuttgart, W. Germany
G2MR, W. Thompson, Surbiton, Surrey, England
JH1MEL, Yasu, Nojima, Tokyo, Japan
KH6AEQ, Richard E. Carter, Honolulu, HI
XE1SSY, Edward Sunderland, Mexico, DF, Mexico
VE1NO, D. M. Copp, Halifax, NS
ZL3LE, W. C. Baird, Christchurch, New Zealand
*Life Member

ARRL QSL Bureau

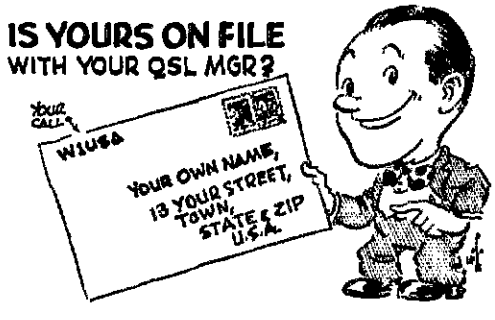
The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, 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[1] – 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 19355.
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[1] – 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.
WØ – Reggie Hoare, WØOYP, P.O. Box 115, Mitchellville, IA 50169.
KØ,WAØ,WBØ,WNØ – Dr. Phillip D. Rowley, KØZFL, Route 1, Box 455, Alamosa, CO 81101.
KP4,WP4[1] – 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[1] – 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, VE1FQ, 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 OE8, MB.
VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK. S4S 5E5.
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[1] – Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.
SWL – Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

[1]These 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*.



Technical Correspondence

DETERMINING DC-MILLIAMMETER INTERNAL RESISTANCE

Technical Editor, *QST*:

With reference to WB9DWP's letter of November 1972 Technical Correspondence,[1] he would tend to oversimplify the problem at hand. His method would be practical if rough approximations were usable, but in the case of meter resistance, accuracy is all important.

With a 1.5-volt battery, a typical meter, as W8NN's 1-mA 100-ohm unit,[2] would yield values of 1400 ohms for R1 and 2900 ohms for R2. WB9DWP's equation is X = R2 − 2R1. Even assuming the battery internal resistance is zero, which it is not, we encounter the practical problem of ohmmeter accuracy. If our ohmmeter is accurate to one percent, and that is an exceptional meter indeed, our measurement for R1 can be anywhere from 1386 ohms to 1414 ohms, while R2 may be from 2871 ohms to 2929 ohms.

The X becomes possibly 2929 − 2 × 1386, or *157* ohms! The other possible extreme yields 2871 − 2 × 1414, or 43 ohms. Thus, we could not guarantee better than a 57-percent accuracy.[3] — *David S. Powell, WA4BRI, A-111 Cooperstown Apts., Lexington, Ky 40508.*

REFLECTED POWER

Technical Editor, *QST*:

It was with mild distress that I read a letter in the Technical Correspondence section in November, 1972, *QST*, by G. T. DeLaMatyr, W5GO, concerning reflected power.[4] I take issue with the statement, "There is no such thing as reflected power," which was printed in that article.

The existence of reflected power has a strong mathematical and physical basis. If one is interested in a rigorous proof of its existence, he should be referred to a good advanced textbook on the subject of waves. This, unfortunately, will be a very disheartening experience for most amateurs, since most of these books do not mention voltage standing waves. Hence the reader will be forced to make mental analogies between vibrating strings and standing waves of voltage.

The concept of reflected voltage can be better understood if one knows exactly what is meant by the term, "voltage standing wave." This term is applied to any wave form which is the sum of two component wave forms described as follows. The first wave form is generated by the transmitter and travels down the transmission line toward the load (antenna). This is usually called the incident wave. The second wave form is generated at the antenna or load and travels the transmission line toward the transmitter. This wave form is called the reflected voltage wave form. The following question might now be asked of the reflected voltage wave: "How can a reflected wave exist if there is only a load at the far end of the transmission line?" The answer is not obvious. It turns out that when the impedance of the load (Z_L) exactly matches the impedance of the transmission line (Z_O), the incident wave is entirely absorbed by the load. For this case, *and this case only*, there is no reflected voltage wave. For any other value of load impedance $Z_L \neq Z_O$, there is an impedance mismatch and the load will not absorb all the power which is delivered to it. It absorbs only a fraction of the power in the incident voltage wave and reflects the rest back toward the transmitter in the form of the reflected voltage wave form.

With the occurrence of this reflected wave, all the necessary ingredients for a standing wave are present; namely (1) the incident voltage wave — *Ei* and (2) the reflected voltage wave — *Er*. Finally, at any point on the transmission line it is possible to define the powers associated with these voltages as

$$P_{\text{incident}} = \frac{Ei^2}{Zo} \text{ and } P_{\text{reflected}} = \frac{Er^2}{Zo}$$

Hence if one believes that standing waves exist, (and there is much evidence that they do) it appears as though both incident and reflected powers are valid concepts. It is recommended that ARRL do some serious thinking and research before discarding the reflected power concept as was requested in November *QST*. The concept is extremely useful and has a very sound theoretical background.[5] — *Paul W. Pellegrini, WA1LZA, 79 South Rd., Bedford, MA 01730.*

RESISTIVE LOAD FOR THE SIMPLE FUNCTION GENERATOR

Technical Editor, *QST*:

This letter is in regard to your cover article in *QST* for September, 1972.[6] The "load resistor" for

(Continued on page 55)

[1] Long, "More on Finding DC-Milliammeter Internal Resistance," Technical Correspondence, *QST*, November, 1972, p. 46.

[2] Mason, "Finding the Internal Resistance of a DC Milliammeter, "Technical Correspondence, *QST*, June, 1972.

[3] [EDITOR'S NOTE: It may be unlikely, although not impossible, that a practical ohmmeter will read in one tolerance direction for one measurement and in the opposite direction for a second measurement *on the same ohmmeter range*, as Powell uses in his examples here. However, even if both ohmmeter readings err in the same tolerance direction, the resulting resistance value obtained from calculations with the above equation can be no more accurate than that of the ohmmeter in use, assuming perfect linearity of the meter movement under test and no internal test-circuit battery resistance.]

[4] DeLaMatyr, "Reflections on Reflected Power," Technical Correspondence, *QST*, November, 1972, p. 46.

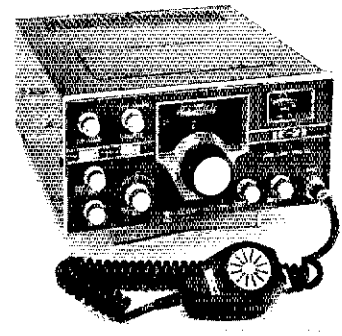
[5] [EDITOR'S NOTE: Our intent in publishing DeLaMatyr's letter (see footnote 4) was to stimulate thinking by radio amateurs on the subject; judging by the large volume of mail received subsequently, we've succeeded admirably! A forthcoming series of *QST* articles will explore fully the subject of transmission-line reflections.

[6] Blakeslee, "A Simple Function Generator," *QST*, September, 1972, p. 11.

Recent Equipment

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

Inoue Icom IC-21 Two-Meter FM Transceiver



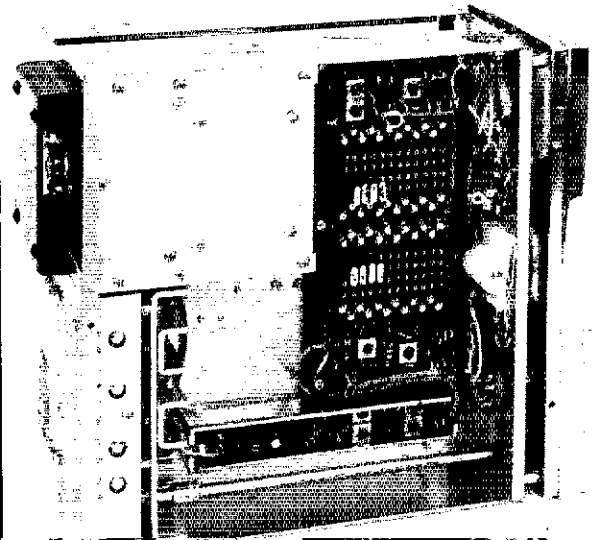
Front view of the IC-21. The large center knob is the crystal switch, and just above it is the zero-reading meter which indicates whether or not the receiver is tuned correctly. The meter at the upper right indicates either SWR or incoming signal strength along with relative rf output. That COURSE switch works in conjunction with the center CRYSTAL switch, which has 12-positions. You operate either on Course 1-12 or Course 13-24, to give you the 24 channels. You'll note that the controls are arranged conveniently for most mobile operators (except in the U.K.) since the most-often used controls are at the center and left on the panel.

WE'RE SUPPOSED to be objective about write-ups of recent equipment, but it's pretty hard not to be enthusiastic about a unit like the IC-21, which has a number of intriguing features and so few marks against it.

Let's take the minus side first. The dial lights are too bright. No kidding! Driving down a dark road, their glare is a bit overpowering and, since there is no dimming rheostat built into the unit, we found a simple solution to be the draping of a handkerchief over the front of it. Not a very grand solution, but certainly effective.

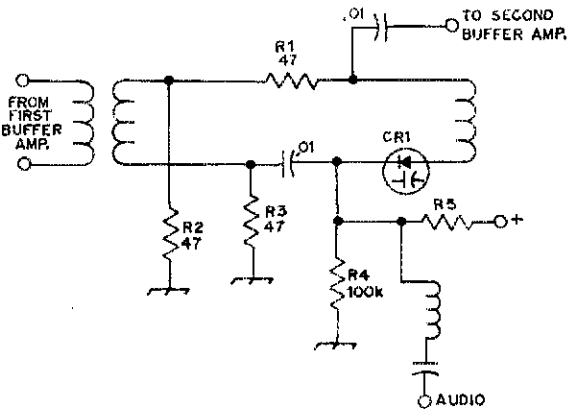
One other thing. If you get involved in the instruction book, it takes a little bit of study to get squared away on the various circuit symbols that are used. The Japanese do things differently. For instance, variable controls have two kinds of symbols. On one, the oblique bar has an arrow at its upper end this indicates that it is a panel control. On the other type, instead of an arrow there is a shorter bar at right angles – this indicates that the control is mounted on the circuit board and can be adjusted only by opening the cabinet. Each of the ten circuit boards has its own sequence of R1 through R20 or whatever and this is slightly confusing when you're puzzling out the circuits. But, these are all relatively minor points, and it takes only a modest amount of effort to make the translation.

Everything else is positive. Among the features which we found especially attractive were the built-in SWR indicator, the receiver incremental tuning control, a meter which indicates when the receiver is tuned to the center of the incoming carrier, the automatic transistor-protection circuits which disable the transmitter if the VSWR becomes too high (or there's a shorted connector or some other antenna foul-up), and the great audio quality on both receive and transmit modes. All of this comes with ten watts output and a 24-channel



Top view of the IC-21. There are sockets for 24 transmit and receive channels, each with its individual trimmer capacitor which is easily accessible through a 3 X 6-inch plate at the top of the unit. This model is delivered with crystals for 34-94, 94-34, 76 simplex, and 56 simplex.

Fig. 1 – Circuit diagram giving details of the modulation system used in the IC-21 transceiver. Component designations are those listed by the manufacturer.



crystal switch in a package that occupies less than one quarter of a cubic foot and weighs 14 pounds.

The IC-21 is completely solid state, with a built-in power supply which works either from 117- (or 235) volts ac, or from 13.5 volts dc. Separate power cords make the switch from ac to dc an easy one.

The transmitter is straightforward in its basic design. The crystals oscillate at 18 MHz. This energy is buffered and multiplied eight times through eight stages before reaching the final amplifier which is followed by a low-pass filter and the SWR indicator. On ac power, the output was measured at 13 watts; on dc it was 10 watts. A front-panel switch permits reducing the power output to one watt when higher output is not necessary to maintain communication.

The Circuit

A tuning diode is used to modulate the signal. With reference to Fig. 1, resistors R4 and R5 apply a reverse bias to CR1. Audio is applied at the junction of these two resistors, overcoming the bias and phase modulating the signal. A potentiometer at the input of the first audio amplifier controls the amount of modulation.

The SWR indicator at the output of the transmitter senses a high-reflected power and uses this energy to reduce the voltage applied to the driver and output transistors, protecting them from damage.

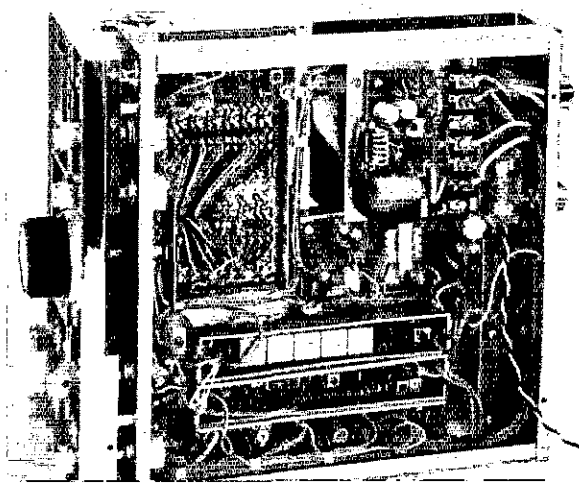
The receiver is similarly straightforward. Incoming signals pass through two rf amplifier stages and a filter to the first mixer, and then to the first i-f amplifier at 10.7 MHz. Then conversion to the second i-f at 455 kHz takes place. Incremental tuning is accomplished by means of a diode at the second local oscillator, 10.245 MHz.

If this unit is to be operated for home-station use it can be wired to operate from either 117 V or 235 V ac. There is provision for plugging in an external VFO in the receive mode.

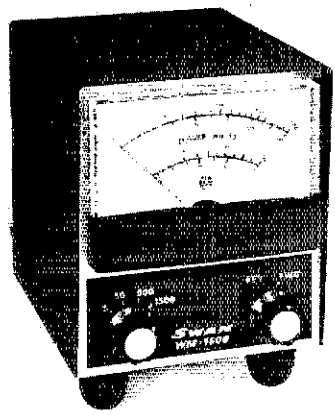
This transceiver has been in daily use for a couple of months, both during the rush-hour rally between home and office, and on the weekend jaunts to the great state of Maine. The operation has been faultless and, with a 5/8 wavelength antenna mounted on the hood, the author has been able to key every repeater that can be heard. Perhaps, because our hearing is not quite as good as it used to be (too many years of copying cw?) we're a bit more critical of audio quality and clarity than some of our friends. But the IC-21 has the sort of audio that *this* operator finds easy to copy, even under difficult ambient noise conditions. – *WIRU*

ICOM IC-21 FM Transceiver

Dimensions (HWD) and Weight: 4-1/2 × 9 × 10-inches, 14 pounds.*
Power requirements: 13.5 V dc, or 117 (or 235 V) ac.
Price class: $400.
U.S. distributor: Adirondack Radio Supply Co., Amsterdam, NY 12010.
Power Output: 13 watts for ac operation, 10 watts on dc.*
Sensitivity: 0.3 μV for 20 dB of quieting.*
Channel Capability: 24 channel positions.
* Measurements made in ARRL lab.



A bottom view of the ICOM IC-21. The various sections of the transceiver are built on separate circuit boards, and mounted on a metal framework or chassis. Should a fuse blow out it is accessible by removing the base plate (four screws). The leads at the right in the photo go to the 2-1/2-inch speaker, which is mounted on the base plate. There's a jack on the rear panel for connecting an 8-ohm external speaker.



The Swan Wattmeter has four ranges for reading transmitter power output. The QRP operator will find the five-watt full-scale range to be very useful.

The Swan Model WM-1500 RF Wattmeter

ONE OF THE MOST useful accessories in the ham shack is a device to measure transmitter output power in watts. A forward- and reflected-power meter differs from the more common SWR meter (Monimatch) circuit in that readings with the former are not materially affected by frequency or line impedance. For this reason, relatively accurate measurements can be made of transmitter power output on various bands and under different antenna or load conditions. The frequency range of the WM-1500 is 2 to 30 MHz with an accuracy of better than 10 percent at full scale. The device may be used up to 50 MHz, but, according to the manufacturer, accuracy is reduced somewhat at that end of the useful range. No tests of the unit were made at six meters in the ARRL laboratory.

The Circuit

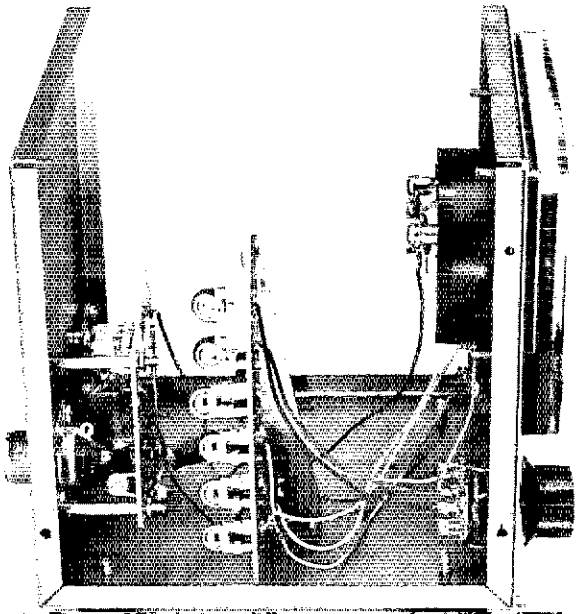
The principle upon which this unit operates was described in April, 1959, *QST*, by Warren Bruene. A toroidal inductor is used to sample current on the transmission line, see Fig. 1. Rectified rf voltage from either set of diodes is selectable by S1, located on the front panel of the unit. S2 allows the choice of one power range for a full-scale reading of 5, 50, 500, or 1500 watts.

Station Interconnection

Interconnecting the WM-1500 with the amateur station is quite simple. Two coaxial UHF connectors are located on the rear panel of the wattmeter. A cable should be connected between the OUTPUT connector and the station antenna (or antenna switch if one is used) and another cable connected from the station transmitter to the wattmeter INPUT connector. Any form of 50-ohm coaxial cable may be used, provided it will handle the transmitter output power. The power-sensing circuitry is mounted permanently inside a heavy-duty cabinet.

Swan warns the operator (and rightly so!) against applying more power to the input connector than the range selector indicates. Damage could occur to the sensitive meter movement. Since two switches are incorporated to allow the selection of power level and forward or reverse watts, care must be taken *not* to check the reflected power using a sensitive range (assuming a near perfect match is observed while applying high power to the antenna) without resetting the power selector to a higher range before switching to forward power. "Programming" this operator not to make that mistake was not difficult.

Perhaps the most unique feature of the wattmeter is the actual meter itself. A very large meter face (4-1/4 inches wide) containing four ranges labeled in bold numerals makes reading the power very easy from a distance of several feet. In fact, this bifocaled writer has no difficulty reading the meter even through the "wrong" portions of his spectacles! – *W1FBY*



Inside view of the Swan Wattmeter WM-1500. The calibration potentiometers are mounted on a circuit board shown at the center of the U-shaped chassis.

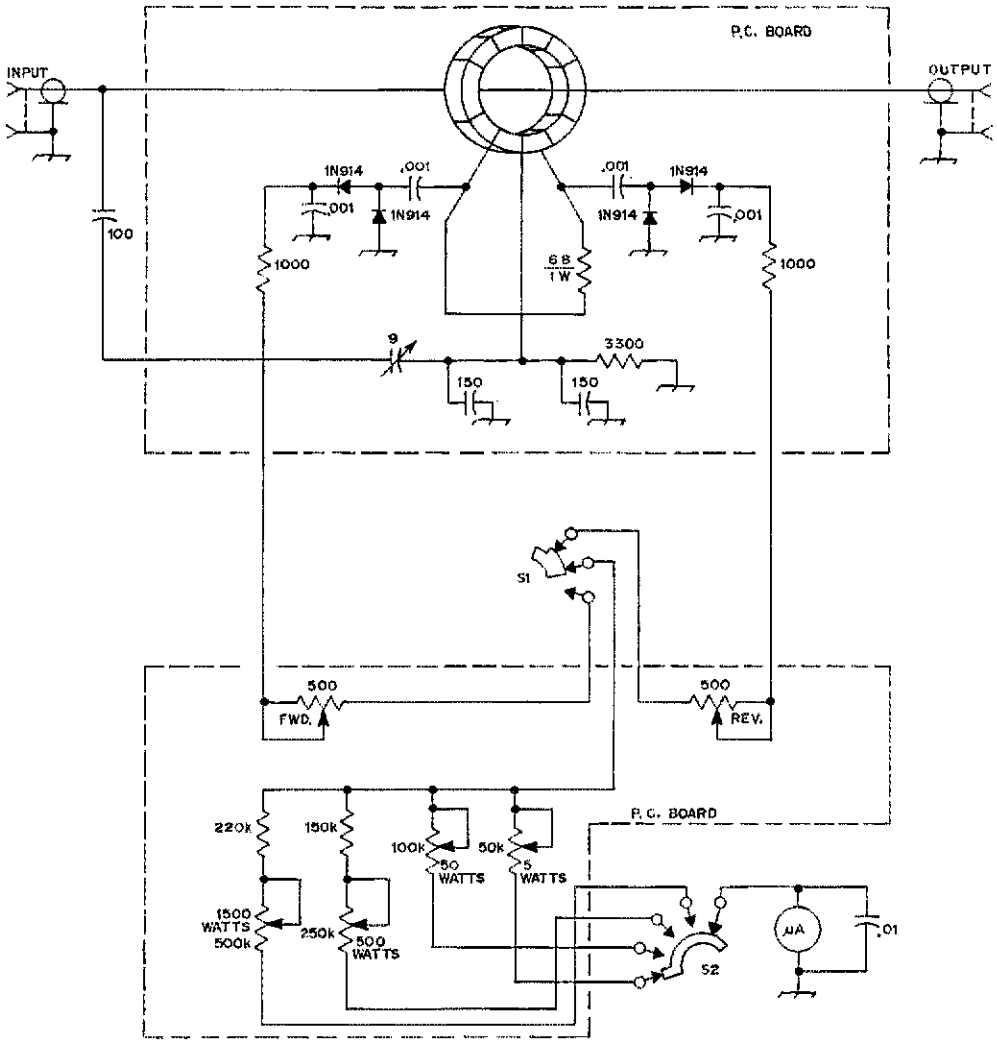


Fig. 1 — Circuit diagram of the WM-1500 wattmeter. Component designations are those given by the manufacturer.

Swan Model WM-1500 Wattmeter

Power range: 0-5, 0-50, 0-500, 0-1500 watts.
Frequency range: 2-30 MHz, and up to 50 MHz at reduced accuracy.
Accuracy: ± 10 percent at full scale.
Impedance: 50 ohms.
Dimensions (HWD) and Weight: 6-1/2 × 4-3/4 × 6-3/4 inches, 2-3/4 pounds.
Price Class: $50.
Manufacturer: Swan Electronics, Oceanside, CA 92054.

Technical Correspondence

(Continued from page 51)

the XR-205 IC has been omitted from both the schematic diagram and the printed circuit board.

A 3000- to 5000-ohm resistor *must* be connected from pin 11 of the XR-205 to ground in order to have any output of a sine wave. The internal circuitry of the IC has an emitter connected to pin 11, and to make the circuit work it must have this resistor, which then makes it an emitter follower. The circuit board has no pad to which the resistor may be connected, but one may be included if the builder is laying out his own art work. – *F. Everett Emerson, W6PBC, Box 153, Tahoma, CA 95733.*

Notes on the Extra Class Examination

BY J. M. SMITH,* W4BP

WE HAVE HAD the Extra Class license with us in its present form for some years and around 10,000 hams have swapped in their old General or Advanced licenses for a nice new Extra with its increased frequency privileges. If you are not in that group, perhaps you have never had a chance to make the trip to an examining city without too much inconvenience. Perhaps you took one look at the Extra questions and decided that they were too tough, or perhaps 20 wpm seemed rather fast if you haven't hit a key in ten years. Actually, it's not all that bad if you will just look into it carefully and check your abilities against the points mentioned in the following paragraphs.

Receiving

Generally, the receiving test comes first. To check yourself, copy the code practice transmissions from W1AW, starting at a speed that you can copy solid, then attempt the next higher speed. Each segment will be about ten minutes. Two segments, or about 20 minutes, will be enough for one sitting. You start to slow down after extreme concentration for more than 20 minutes. The W1AW transmissions have several advantages. The tapes are changed frequently enough so that there is no tendency to memorize, the speed is increased in small steps, the mechanical sending is perfect, and the text is taken from recent *QST* articles, so that it is easy to check your copy for accuracy. The only disadvantage is that there will be occasional QRM. In this regard, the morning transmissions are preferable. Complete schedules are in every *QST*.

You should be able to copy W1AW at 25 wpm before attempting the Extra test at 20. Everyone loses 2 to 5 wpm when copying under pressure. You must be able to read the code easily, keeping a few letters behind the sending, and coordinate the reading with the manipulation of a pen or pencil. This coordination is not automatic, particularly if you have been a confirmed rag-chewer, reading the code in your head and only noting down an occasional question or call sign. The FCC regulations specify that the test must be hand written and legible. For ease of writing, probably the ball point pen is best, but take along an extra one and have it handy. They can fail at the wrong time! While the code test is in plain language, it is not necessarily a continuous story or in complete sentences. Possibly there will be a rather awkward call sign inserted in the middle of a sentence and transmitted one time only — no repetition.

Increasing your code speed a few words per minute is not nearly as tough as learning code from scratch. You will be pleasantly surprised at how quickly your speed will increase with regular, daily practice.

* 1270 Sheridan Road, Mount Dora, FL 32757.

Sending

You have probably heard some ham say, "If I can receive it, it's no trouble to send it." This is a tremendous fallacy. Really good sending is probably harder than receiving. You have the copy before you and know what you are trying to send, so it sounds O.K. to you. Most operators never hear their own sending errors. In some FCC offices it would seem that more emphasis is being put on correct sending than in the past. The person taking the sending test is at something of a disadvantage. There is nothing written or recorded; it is entirely up to the judgment of the examiner. Your only protection is to be practically perfect at the required speed, which takes practice. If you have a good key which you are accustomed to using, take it along. Most FCC keys have seen better days. Bugs or other semi-automatic keys must be properly adjusted and controlled to avoid skips or over-dotting. For sending practice, count off your copy in blocks of 100 characters and time yourself to send each block in just under 1 minute. There is no credit for extra speed over the requirement, and any increase in speed will add to the chances for error.

What constitutes a sending error? Some examiners will pass you if the sending is at all readable or at least translatable into something that makes sense; others will not. Again, it is a matter of the examiner's judgment and how he happens to feel that morning! He may be critical according to his own code ability. He may be an expert cw man; again he may not, and you have no way to judge. If you need to improve your sending, get hold of a tape recorder and make a practice tape about ten minutes long, including in your copy all the letters and numerals plus commas, periods, slant bars, and question marks. You may be shocked when you copy this tape for the first time, but it will probably show up errors that you didn't know you were making. List your errors and concentrate on correcting them, making additional tapes at intervals and comparing them with the original one to determine your progress. Incidentally, the old-fashioned ink-line tape recorder is ideal for this use. It draws a picture of your errors as well as sending them back to you. If no tape machine is available, try to imitate W1AW, using your audio oscillator.

Some common sending errors: 6E for THE, PD for AND, OF sent with no space between letters, any four-part letter split into two parts, NN for C, MA for Q, MI for Z, etc.; also no spacing between words. One perfect minute out of the 5-minute test will pass you.

The Written Examination

If you have been away from the school books for some years or if you have never developed a routine of systematic study, it might save time and

lost motion to re-read the article, "Study Techniques," by Prof. Robert W. Wood, KØHUD, in the June, 1971, issue of *QST*. Obviously, the Extra covers quite a bit of ground so it helps to classify and arrange the material into logical categories and to utilize your study time to the best advantage.

Most candidates for the Extra have been in hamming long enough to be able to answer quickly the scattering of easy questions; most of them are taken from General or Advanced examinations, including a few on regulations. However, it would be well to review the formulae for resistance, capacitance, inductance, and VSWR. In case you are not too sharp on transistors, be sure you know the basic principles and how to substitute them for tubes in standard circuits such as power supplies, oscillators, etc. You will find many questions taken from the Commercial Telegraph and Telephone examinations, either lifted whole or paraphrased.

When you start the written examination, read through the entire list and answer the questions which you can handle quickly and surely. Make a list of those you have skipped and return to them later. *Take your time*. Don't be trapped into an incorrect answer by jumping to conclusions. Be sure that the answer you select covers all the points asked for in the question, not just part of them. Be careful with questions which have long, involved, wordy answers. Analyze such questions and their answers word by word. A difference of one word may make your answer right or wrong. In Chapter 1 of the ARRL *License Manual* and repeated again in the Extra questions, is a warning on the paraphrasing of questions. To handle this type of question you must have a thorough understanding of the circuit concerned and how it operates, not just the answer in the study guide. An example of paraphrasing: The low-pass filter tends to prevent harmonics from reaching the antenna and being radiated. What becomes of this harmonic energy? Another question of the same type involves the squelch circuit. This circuit appears in every study guide although it has almost no application in amateur gear. Be able to recognize this circuit even if drawn differently from the one in the *License Manual*. You should know how the bias voltage is obtained and where it is applied to produce the squelch action. From these examples of paraphrasing, it is readily apparent why *you must not depend on memorizing* the answers to the questions in the study guides. You should know, in detail, how every circuit in the *License Manual* operates. This writer had quite a few of these paraphrased questions.

When you have completed the examination, re-check each question and answer for possible careless mistakes in reading or interpretation. Take your time – don't rush because the lunch hour is coming up. A few minutes spent here might mean the difference between passing and having to spend another $9. The FCC office will be open most of the afternoon and there is no time limit on the examination, just so you finish before closing time.

Difficulty of the Examination

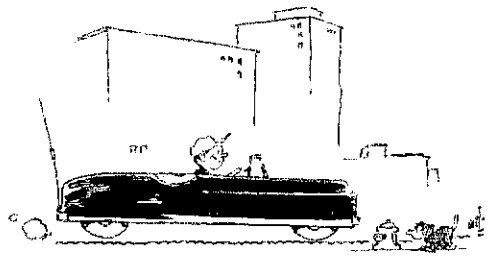
The written examination is comparable to elements 3 and 4 of the Commercial Telephone – certainly no harder. The code test is about equal to the 16 coded groups per minute of the Second Telegraph. For some, the 20 wpm plain language will be easier than the 16 coded groups. Study for the Extra is excellent preparation for the commercial exams, if you are interested in them.

The Extra is perfectly feasible for anyone who will devote a reasonable time to study. However, you can't guess your way through it! The writer, who makes no claim to brilliance and is not a hot-shot technician, passed the exam on the first try soon after his 70th birthday. So age is no bar, as some seem to think. Actually, this examination is a fine project for retirees who have sufficient time to invest in it. Many old timers, who were raised on cw, would need little or no code practice to make the 20 wpm requirement.

You will need the ARRL *License Manual*, the ARRL *Handbook*, and at least one general reference text. The Navy's text, "Basic Electronics," is recommended. It can be had from the Government Printing Office, Catalog No. D208.11, price $3. If you need to read up on transistors, the reprint of the Stoffels series in *QST* is excellent and can be had for $1 from the League.

Grading Procedures

IBM numbered sheets are used. They are graded by laying a perforated grid over the answers you have marked. If all the holes in the grid are filled, you have 100 percent. You have already done most of the work on the Form 610. The examiner makes a few check marks to indicate what you have passed and initials and dates it. It then goes to Gettysburg for processing of the license. Gettysburg forwards the records to Washington, where the computer is, and then the license is mailed to you. This process should take a week at most, instead of the 4 to 8 weeks frequently required. Certainly the FCC doesn't work very hard or very fast for the $9 you pay them!



"THOSE WHO LIVE IN A CITY WITH AN FCC OFFICE ARE FORTUNATE"

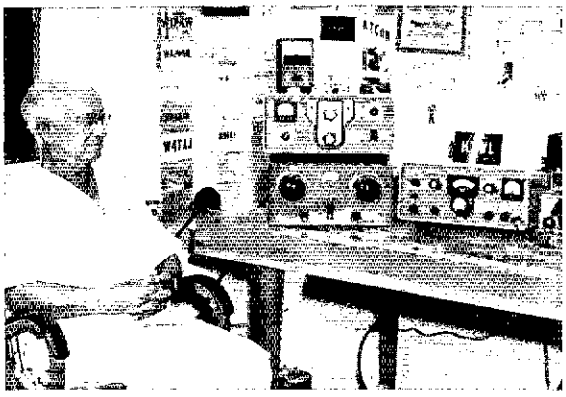
Expense

Those who live in or near a city with an FCC office are fortunate. In the writer's case, taking the Extra involved travel of over 100 miles and, because of the early hour at which the examination was scheduled, included a motel bill and meals plus loss of time for parts of two days. This represented an outlay of between $35 and $50. A considerable portion of this expense could have been avoided by scheduling the exam a bit later in the morning. There is not much consideration for the candidate or his pocketbook. It would seem fairer if the $9 fee was for issuing the license rather than for taking the test, always assuming that the FCC can't struggle along without the nine bucks!

Best way to cut down on these expensive trips is to make one trip for the General, then two years later take the Advanced and Extra at one time. You will have studied the Advanced questions anyway in getting ready for the Extra.

There is nothing impossible about this Extra license. Give it a try, but do some studying and code practice first. Good luck!

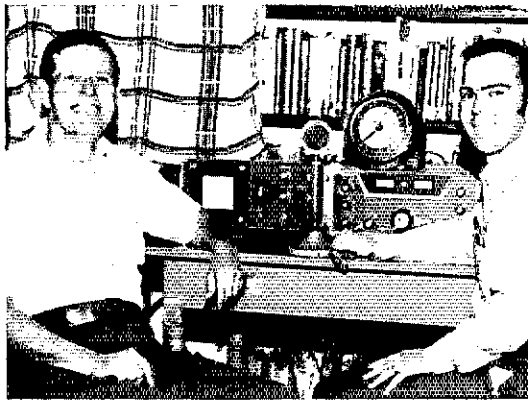
Strays



K7WL recently was presented with a certificate of recognition as a radio pioneer from the Sun City-Youngtown Amateur Radio Club. Wally was first licensed as 6WL while an elementary school student in Berkeley, California, in 1913.

For the Hudson Division Convention at Tarrytown, N.Y., the Hilton Inn appeared to have extended a special welcome to ARRL President Dannals, W2TUK (center), here photographed with Vice Director Diehl (l.), W2IHA, and Director Zak, K2SJO. (If the welcome was really for a campaigning Nixon, who cares?!) *(W1FXK photo)*

WAØQIT (left), and WAØLMT, put on a demonstration of amateur radio and slow scan television during Amateur Radio Week at the Lincoln Library in Duluth, Minnesota. With this and three field day stations operating during the final days of Amateur Radio Week, greater news coverage of amateur radio was given by the media than ever before. Four radio stations carried numerous public service announcements daily for one week; a total of twelve articles was carried by the news publications; and all three of the area's commercial television stations carried sound-on-film coverage of the events in a total of four newscasts. *(WAØWOV photo)*



The Edgewood High School ARC is active on 15 and 20 meters from its fine club station, WA6KIT. Shown here operating the station are club trustee WA6IVO, WN6KFO, SWL Mike Englebrecht, WA6CTE, and WN6KFV. If you have an active high school club or are trying to organize one, why not let ARRL Headquarters know about it?

QST for

Have You Forgotten the Radio Telegraph Code?

BY I. KAZANSKY, UA3FT

Translated from Russian by
William J. Sampar,* K3UTH

IT IS POSSIBLE that this question sounds rather strange. However, there is a basis for such a question. Try to imagine a normal day when you are not trying to work a contest: You turn on your receiver and tune in the code section of an amateur band where, it seems, only the beginning operators of club stations or owners of individual stations of the second and third-class are struggling. The amateur only has to receive permission for a radio station in the first-class, frequently called "the main road," and then he forgets the telegraphic part of the band and makes contacts only on ssb. Several amateurs even have frankly prided themselves with this by stating that "five years have passed since I've made a contact with a cw station."

There is the paradox: the beginning amateur spends time and energy in the study of the code, but upon obtaining experience and a sporting classification, he quickly rushes to forget it.

Such an obvious preference for ssb results because there it is possible to contact many rare DX stations. This is explained, in part, by the fact that many foreign amateur stations simply have not mastered the radio telegraphic code. As a result, there is a large number of radio amateurs who use the airways to discuss various abstract themes. Often these conversations take place as instruction, but border on being an infringement on the registration of the amateur's station "to the point of exploitation." Such radio amateurs seldom work cw since, to pound out the open text is long and many consider it somehow "out of phase." But suddenly they think a bit about it and realize that they don't have their first-class license any more.

In addition, among radio amateurs, there exists the opinion that to find something new and interesting one has to explore regions that are barely known in radio hamdom. For example, in the article "Has Everything Been Done in Shortwave?", published several years ago in the journal *Radio*, the well known shortwave enthusiast S. Bunemovich, UN5UN, tells about the most advanced developments of the radio amateur's art, and about creative progress toward answers to various questions of radio communications on the ham bands. In the article he also speaks about investigations of conditions in the ionosphere, radio teletype, slow-scan television receivers, and other broad-band systems.The author also said several words in connection with ssb. However, there was nothing said about cw and the view was taken as if it did not exist at all.

Of course, on ssb, one can rather easily work new stations, one after the other on DX expeditions and in the course of an hour one could work 50 to 60 stations. But, nevertheless, it is still too

* 5903 John Adams Drive, Camp Springs, MD 20031.

[EDITOR'S NOTE: Original article appeared in the Soviet journal *Radio*. This version published with permission of the Radio Sports Federation of the USSR.]

Natasha Yashchik, active in amateur radio since 1965, has attained a code proficiency of 220 characters per minute.

early to place the telegraph key into the archives of amateur radio. I know that there are many radio amateurs who, with their whole hearts, are more soft spoken and clear-cut using cw than the extensive vocabulary of correspondents who use ssb.

Not long ago, I had the occasion to become acquainted with the operators of the club station at the Lvov Polytechnic Institute (UK5WAZ), who work cw with enthusiasm. There more interesting contacts are made on 80-meter cw. I know still another students' club, the operators of the radio station UK2ABC of the Minsk Radio Technical Institute. My acquaintance with them again has convinced me of the fact that there is still much to be found that is new and interesting in the course of a contact using the radio telegraphic code. Among the many ideas of the operators of UK2ABC, there was this one: The use of an electronic computer in the capacity of a controller (ECC) while working in a cw contest. This machine could translate rather easily and organize the three types of telegraphic signals (dot, dash, space) into an understandable machine language of two codes. Imagine the possibilities of this for yourself. Normally, during a contest, the operator hears the call sign of a station. In order to determine whether to work this station in a QSO, he would have to rummage through his log. But, with the computer, it is sufficient that the station's call sign is taken into the memory of the machine. If it is a new contact, and if sufficient time has passed since the previous contact, the machine would then inform him that this is a "valid station."

Thus, the simple decision can be made with the help of the ECC. The operators of UK2ABC consider that even in this simple case the efficiency would be increased rather handily by 30 percent. The automation of the calculation of points is a follow-up step of ECC application. If in a contest a possible record is anticipated, the machine will define its optimum span. Finally, in these circumstances when the total result has been defined, according to the number of stations, the machine can as a matter of fact list out to the operator the call signs of stations which should be worked, and in which order they should be worked, and also who of the two remaining call signs would give the greatest value of points.

Working with the telegraphic code in such a manner, in combination with automation and computer technology, a completely new possibility is revealed to the ham.

In addition to all that has been said, there is still something to add concerning the telegraphic code. It has great applied military use in today's world, and is widely used in the Army. Furthermore, according to the opinion of many specialists, this method of communication in general will not be forced out by other means due to its inherrent advantages.

It follows to note that the telegraphic code remains the most effective method of a communication in the presence of a weak signal and in the presence of noise. I have been convinced many times that, under these conditions, telegraphic signals come out better than ssb.

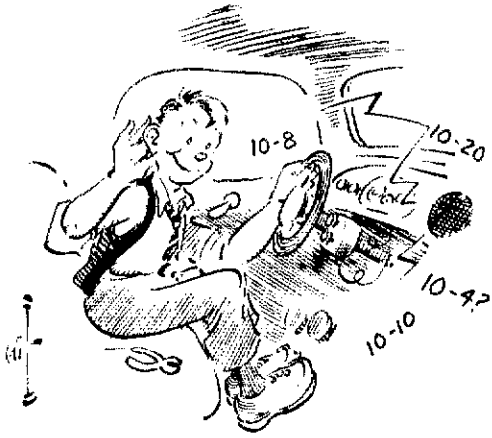
And what about DX contacts on uhf? Of course, they only appear under separate, rather rare circumstances. For example, during tropospheric phenomena when reflections of radio waves from the *E* layer, can only be realized with cw. However, there are still other possibilities. For example, there is opportunity for a telegraphic contact with the help of Aurora, reflections from the trails of meteors, EME QSOs.

The advantages of the telegraphic code, which have been mentioned are minimal in comparison with other aspects – the bandwidth of the receiver – and this is of no small importance considering the "over population" of the ham bands.

It seems to me that in our time, as we are rushing to develop new methods of communication, i.e., ssb, we have completely and undeservably buried cw in oblivion. It is time to correct this mistake. 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 and/or the class of operator license held, that we may verify your classification.



New on Two?

An Introduction to Two-Meter Fm from an Old-Timer with a Month's Experience

BY DAVE BELL,* W6BVN

I BOUGHT A NEW CAR a few months ago and just couldn't face the chore of reinstalling my Swan 400. The fact of the matter is that I was intrigued by two-meter fm.

"The repeaters are great," I heard. "It's the new radio." I was also told (warned) that two-meter fm was "different." Could a twenty-meter sideband devotee find happiness on a repeater? Time would tell.

I should explain that my wife and I have a deal. I take care of the ham radio and she takes care of the house, the yard, and the kids. She recently bought a hundred pounds of steer manure and I bought a little black box. She didn't tell me what she spent on the steer manure and I didn't tell her what I spent on the little black box.

Being a trifle conservative and timorous about being branded a Novice after more than twenty years of hamming, I decided to listen for a couple of days before attempting a contact. At first it sounded as if my crystals were on the wrong frequencies and I had tuned in the audio portion of an old "Highway Patrol" television show.

A voice would come on and say his station was "ten-eight."

When conversations were in progress, you'd hear "ten-four", which I remember Broderick Crawford growling into the microphone when he understood what he had just heard. But *I* didn't understand.

Just before the audio output transistor quit in my "J.A.Pan", as little black boxes such as mine are caustically called, I heard the expression "ten-ten". Getting no noise from my radio (and they're radios, not rigs) and sensing that it had gone west (or perhaps east in the case of my J.A.Pan), I decided that Ten-Ten must be the Chinese coolie the Japanese had hired to wire my rig. Excuse me, my radio.

"Ten-seven" is also oft-heard, and while I have no idea of what it means, it always reminds me of my dice sequence at the crap tables and therefore conjures up unhappy memories.

*1011 No. Cole Ave., Hollywood, CA, 90038

I have made light of Ten signals in a couple of recent ham club speeches and have been told that I, of course, don't have to use them, which is true. Unfortunately, I have to understand them or I won't know whether the guy I'm listening to is standing by for a call or signing off. Excuse me, going "ten-ten". Or is it "ten-eight"?

I have heard, incidentally, that Ten signals are only big in Southern California. You non-Californians could take heart in the localized nature of the Ten phenomenon, except history has it that this year's fad in Los Angeles is next year's nationwide paranoia. So I suggest you consult with your local CBer for the meaning of the new language.

No Monologues

But that's only part of my new dilemma. Time now for a word about – repeaters. Much has been written about them, and I have even read a fair amount of it myself. "Timing out", for example, has to be experienced before the magnitude of your transgression can be clear to you. At least one repeater in Los Angeles stops repeating after thirty seconds or so, requiring you to have your verbal wits about you at all times. If you have a multi-syllable name, forget it. Use your initials. Or better yet, don't give your name at all. Veteran two-meter fmers don't volunteer their names. It's a bit like some of the sacrosanct frequencies on 75. I hear that in San Francisco some of the repeaters are so exclusive that the complex tone burst sequence has to come from heaven (or that direction, anyway) and even then, not many of the members will acknowledge an unfamiliar voice. Too bad. They might meet somebody interesting.

But wherever you are, if you don't want to sound like a newcomer, don't make the mistake of using phonetics on your call. Keep your station identification as ambiguous as possible. You're especially lucky if you have a call as rhymy as WB6BEP. Practice saying it fast and slurry. There are almost an infinite number of confusions possi-

ble to the interlopers who don't recognize your voice, your excess deviation, and your lightning-quick drawl.

And particularly if you're in L.A. or some other city two or three hundred miles from another amateur call area, be sure you always follow your slurred call with a very clear "mobile six". This is for the FCC. They want to be sure that no mobiles in Arizona or Alabama or Afghanistan are tripping the Los Angeles repeaters. Citations have actually been issued for saying "mobile, Los Angeles" or "on the Hollywood freeway", instead of "mobile six". Probably, the FCC's slavish devotion to this rule is a direct result of their spectacular success in cleaning up the mess on what used to be eleven meters.

Breaking the Barrier

Anyway, after learning all of this while listening on two for a couple of days, I decided to mix into the fracas. I had listened to one of the popular "open" repeaters for a few minutes and, not hearing anyone, asked "Is anyone around this morning?"

A voice, unmistakably bored, said, "There's always someone around." Though I hadn't called CQ or even QRZ, I'd evidently committed a faux pas, albeit minor. Only a novice would not have known that "there's always someone around."

So I said, "Hi . . . this is W6BVN . ." then added hastily and clearly, "mobile six. Name is Dave. How do you copy?"

"Okay," came the laconic response.

There was silence for ten or fifteen seconds. I figured the voice figured it was my turn. I said, "Ya wanna talk?"

Another long pause, then the voice turned me down. "I'm listening," it said.

Allowing a similar pause, I finally said, "To what?"

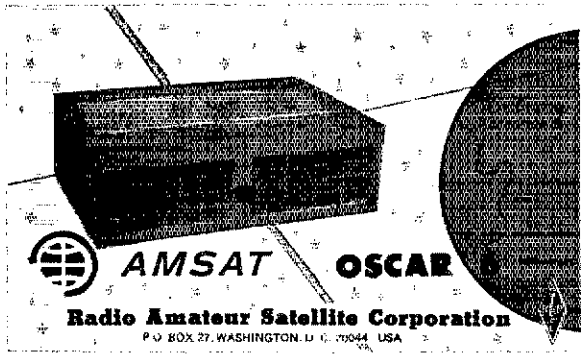
In a few seconds the voice said, "Aaah . . . y'gotta point there."

We had a quite a nice little QSO, though much of it consisted of apologizing to unseen listeners for taking so much time on the repeater.

And you don't have to be on too long to know that the same sick guy who jams Westcars, Midcars and Eastcars is a rich sick guy who jams two-meter repeaters as well – or at least tries to. I turned the rig on once and heard what sounded like a dog barking. Was the Novice test really that easy? The dog timed out the repeater, and I knew he wasn't as smart a dog as I'd thought. Even *I* didn't time out the repeater anymore. The dog came back on again. Or maybe it was a different dog, it's hard for me to tell. When the dog went off, a voice came on calling, "K9DOG, K9DOG, this is . . . "

One thing I've noticed about two-meter fm is that a number of clubs are using it as a rallying point. They build a repeater and triple their membership, mostly with new, younger hams.

Before I got on two-meter fm, several of its big boosters even predicted I'd "never be on the low bands again." I'll admit that two-meter mobile is fun, and I'll admit that it should be unbeatable in an emergency. But I have to confess that a couple of weeks ago I finally got my new tower up. My trusty ol' twenty-forty beam is now sixty-seven feet in the air – and working better than ever. To each his own. QRZ? QST



Strays

This full-color Oscar 6 QSL is available to anyone who has received signals from the satellite. Send reports, including the calls of stations heard, time, date, and approximate frequency, to Amsat, P.O. Box 27, Washington, DC 20044.

Regular 3-5/8" × 6-1/2" envelopes are too small to hold some of the larger DX QSLs. Also, regular envelopes will not conveniently hold more than about 10 QSLs. The 5" × 7-1/2" manila envelope is stronger, will hold more regular and "jumbo"-sized cards and may possibly be reused several times. *(W6ISQ photo)*

The ARRL QSL Bureau System

BY JOHN G. TROSTER,* W6ISQ AND ROSS W. FORBES,** WB6GFJ

THURSDAY NIGHT. A bunch of the boys sitting around the table. Everybody with a fist-full of cards. Not much talk. Could be the weekly poker club. But hold on . . . . couple of things wrong here. For one, there are ladies present. Then too, there are no chips on the table . . . only cards. Stacks and stacks of cards. And the conversation isn't the familiar, "gimme t'ree" or, "I'll call ya."

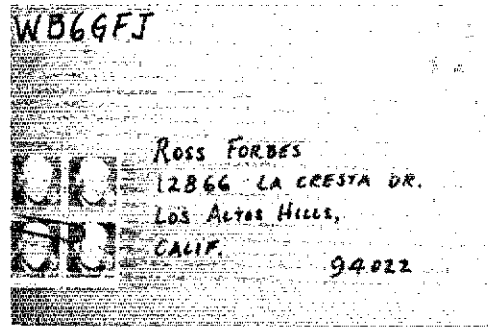
No, this is definitely a more sophisticated operation. Listen to this cultured lingo . . . "How come everybody in W6 but me gets a UL7 card?" or "That K6AHV must a worked a million JAs to win that last contest." Or another poetic line. "Does this bureau handle cards for K4BVD/6?" And if you were to kibitz long enough you might even hear the man at the head of the table read a letter which might paraphrase like this . . . "How come you jerks don't send me my cards? I *know* I got at least 50 rare cards there, and I know you refuse to send them to me on purpose. I seen lousy service, but you guys is the worst overpaid bunch a crumbs I ever seen."

"What should I reply to that? I have to answer all letters, you know!" So asks the fella at the head of the table, now identified as Ross Forbes, WB6GFJ, chief of the ARRL W6 QSL Bureau. Inasmuch as this is a family magazine, some of the instantaneous answers proposed by several of the "overpaid bunch a crumbs" shall not be reprinted here. Needless to say, the writer of the letter had no appreciation of how a QSL Bureau works, or he could have saved himself a quart of adrenalin and spared the volunteers around the table.

This same scene is repeated almost weekly at the W6 bureau headquarters and, in greater or lesser degree, in all twenty seven ARRL QSL bureaus. (Although, happily, the vitriolic missives are not as numerous as the "thank yous".) At the present time, bureaus are located in all call areas of Canada and the United States plus KG6, KH6, KL7, KP4 and KZ5.

First of all, what is a QSL bureau? It is a distribution point within a call area where QSLs may be sent for distribution to stations within that area. Exception: cards for portable stations go to the station's home call area bureau, not the bureau where the portable operation took place. An amateur does *not* have to be an ARRL member to receive cards through the bureau, even though the

*82 Belbrook Way, Atherton, CA 94025.
**12866 La Cresta Dr. Los Altos Hills, CA 94022.



Proper way to prepare 5" × 7-1/2" manila envelope (for the W6 Bureau). Frank with one stamp and paper clip on several more. Use curent postage rates. No air mail. Put your call in upper left hand corner. *(W6ISQ photo)*

TABLE I

Bureau	*Cards Rec'd Each Month (Average)*	*Number of People Working at the Bureau*	*Man-hours per Month (Average)*	*Bureau Manager*	*Club in Charge of Bureau*
W1	25-30,000	15	160	W1UKR	Hampden Co. AR Assoc.
W2	25,000	32	300-400	WA2DIG	North Jersey DX Assoc.
W3	25,000	2	150	W3KT	–
W/K4	35-40,000	12	150	WN4RIT	North Alabama DX Club
WA/WB/WN4	35-40,000	2	160	W4LR	–
W5	40,000	12	120	W5QMJ	–
W6	50,000	32	–	WB6GFJ	No. Calif. DX Club
W7	10,000	14	120	W7MVC	Willamette Valley DX Club
W8	40,000	24	200	W8CFG	Columbus AR Assoc.
W9	35-40,000	15	200	W9OHH	No. Illinois DX Assoc.
K/WA/WB/WNØ	16-19,000	2	25-30	KØZFL	–
WØ	5,000	1	30	WØOYP	–
KG6	600	1	10	KG6APP	Marianas AR Club
KH6	3,000	1	25	KH6DQ	–
KL7	3,000	2	10	KL7BJD	–
KP4	3,000	1	30	KP4CL	–
KZ5	300	1	12	KZ5OD	–
VE1	3,500-4,000	1	15-20	VE1FQ	–
VE2	2,000	4	15-20	VE2IJ	–
VE3	2,500	5	–	VE3UW	–
VE4	600-700	1	6-7	VE4OX	–
VE5	500	1	4-8	VE5JI	–
VE6	1,500	1	–	VE6TK	–
VE7	2,500-3,000	1	10-16	VE7HR	–
VE8	300	1	6	VE8HH	Yellowknite Centennial RC
VO1	900	1	60	VO1AA	–
VO2	250	1	8-10	VO2AF	–

League pays the costs of operating the bureaus. To get his cards, the amateur need only keep an sase on file with the bureau. Refer to Table II on procedure for your area.

Now, what a bureau is *not*. It is *not* a QSL forwarding agency. Some countries have national radio clubs which both receive and send QSLs. The U.S. and Canadian Bureaus, however, do *not* send cards overseas; they only receive and distribute them. Anyone not wishing to send his own QSL direct or via overseas QSL Bureau addresses may use the services of several QSL forwarding services which advertise regularly in *QST* or are listed in the back of a U. S. Call Book.

An entire bureau operation may be handled by one person or there may be several people who sort, file, stuff cards in envelopes and mail them. See Table I to find who the volunteers are who do the bureau work for you. The individual championship goes to Jesse Bieberman, W3KT, who with his XYL has run the large W3 Bureau for 23 years . . . a truly remarkable example of dedication and determination, as anyone who has ever sorted QSLs can testify.

Most of the larger bureaus, however, are handled by groups or clubs. This allows the chores to be spread out and handled in various stages of sorting by different individuals or small groups. Figure 1 shows the flow sheet of the W6 QSL Bureau which is typical of a larger operation. Mail is received at the bureau address (listed in *QST* nearly every month) and taken to WB6GFJ's house for a "first sorting." This mail consists of incoming DX QSL cards from various sources together with

Weekly primary sorting. L-r around table WB6CAB, K6WD, WB6QDC (father of Bureau Chief WB6GFJ), W6OAT, WA6BVY. *(W6NLG photo)*

sases being sent in by W6 amateurs to claim their cards. At this point the cards are sorted into W, WA, WB, K and Novice prefix categories, time-stamped and boxed preparatory to delivery to the next stage of sorting. Incoming W6 envelopes are handled likewise. Also, letters of inquiry are received and answered by the bureau chief at this level.

The boxes containing the various W, WA, etc. prefix categories are delivered to a different group which will further subdivide that category. This group alphabetizes the cards and files them in cabinets. In some cases, where the load is great, these individual prefixes are further broken down to contain, say, W6A-E, W6F-L, etc. These sub-groups are likewise handled by another individual or small group. All envelopes are passed along with their respective card groups. The envelopes are filled with cards and mailed about once a month.

The important fact to grasp is that this is a very time-consuming exercise which usually requires much volunteer labor. Regardless of whether your bureau is a one-man operation or a large multi-group outfit, please be alert to the fact that these people are doing their conscientious best to service your cards in the speediest manner they can. Nobody in the bureau is holding your cards back from you. Quite the contrary; the people in the bureau wish that you, and everybody else, would claim your cards monthly so they could unload the horrendous pile of cards that they have to sort and file. Remember, those cards keep coming

TABLE II

Bureau	No. Years Bureau Operated by This Group	Does Bureau Accept Money for: Envelopes?	Postage?	How Often Are Cards Mailed Out?:	Envelope Size Requested	Bureau Notifies Card Recipients By:	Specific Requests
W1	4	yes	yes	Every 2 weeks	5 × 7-1/2	postcards, traffic nets	Send envelope directly to P.O. Box
W2	12	yes	yes	monthly	4-1/2 × 9-1/2	letters	Prefers $$ for envelope and postage
W3	23	yes	yes	monthly	5 × 7-1/2	postcards	Prefers $$ for envelope and postage
W/K4	1	yes	yes	monthly	—	not notified	—
WA/WB/ WN4	3	yes	yes	weekly	5 × 8 clasp	postcards	Minimum 3 envelopes
W5	2	yes	yes	monthly	No. 10	postcards, traffic nets	Stamped envelopes -- 6 for $1.00
W6	2	no	yes	monthly	No. 35 manila (5 × 7-1/2)	traffic nets	Read article
W7	10	no	no	monthly	5 × 8 manila	postcards	Send properly filled-out SASE
W8	2	no	no	monthly (max. 3 mos.)	5 × 8 manila	letters, traffic nets	Prefers 3 envelopes with 8¢ postage to one with 24¢
W9 K/WA/ WB/WN0	1	no	yes	monthly	5 × 8 manila	postcards	—
W0	2	no	no	monthly	5 × 8 manila	postcards, letters	Do not send money or loose postage
KG6	2	no	yes	monthly	5 × 7-1/2	not notified	Prefers envelope and postage
	23	no	no	monthly	—	newspaper, radio station	Pick up cards personally
KH6	11	yes	yes	as requested	4 × 9-1/2	postcards	Do not "overstamp" envelope
KL7	4	yes	yes	2 months	—	traffic nets	Prefers $$ for envelope and postage
KP4	4	no	no	monthly	4-1/4 × 9-1/2	club newspaper, notes	Prefers SASE
KZ5	1	no	yes	monthly	—	telephone	Prefers money for postage
VE1	34	yes	yes	monthly	4 × 7 or 5 × 8	not notified	Send $$ or SASEs
VE2	1	no	yes	monthly	any	traffic nets	Prefers SASE
VE3	8	yes	yes	Every 3 weeks	5-1/2 × 7-1/2	traffic nets	Prefers stamps
VE4	10	no	yes	monthly	5 × 7	personal notes	SAE and postage or money
VE5	3	yes	yes	monthly	No. 10 or larger	on the air, ham publication	Prefers SASE
VE6	1	yes	yes	monthly	any size	not notified	—
VE7	35	no	yes	as often as possible	—	not notified	—
VE8	1	yes	yes	at least monthly	4 × 6	sends cards, asks for reimbursement	Prefers $$ for envelope and postage
VO1	23	yes	yes	monthly	4-1/2 × 6-1/4	telephone, club, nets	Prefers $$ for envelope and postage
VO2	5	no	yes	as requested	Business	nets, club bulletin, letters	Keep bureau informed of address changes!

. . . and coming . . . and the bureau wants to get rid of them.

With an operation the size of a large bureau, some rules must be followed to make things easier on the volunteers as well as to maintain what experience has proven to be the best way to do things. Table II lists specific requests which your own bureau asks you to follow.

In general, however, your W/VE bureaus would appreciate your compliance with the following instructions:

IF YOU ARE WITHIN THE CONTINENTAL W/VE QSL BUREAU SYSTEM

1) Keep envelope on file with your bureau at all times. Prepare envelopes as shown. Your particular bureau may accept or prefer a money deposit rather than envelopes and postage. Refer to Table II.
2) Do *not* send your own W/K QSLs to another W/K bureau for distribution (Exception: a QSL manager distributing DXpedition QSLs). VE stations do *not* send your cards to another VE bureau. W/K stations may *not* send cards to VE Bureaus or vice versa.
3) Do *not* send your QSL cards for overseas destinations to your bureau. W/VE bureaus do *not* handle outgoing cards. Note: See *QST* advertisements for QSL forwarding services which will forward your cards both overseas and within the W/VE areas for a fee.
4) If you do *not* want your cards, advise your bureau.
5) When writing your bureau, enclose sase if you expect a reply.

Ross Forbes has lectured about operation of the W6 Bureau to clubs and conventions all over California. After his slide talk, the question and answer period produces the same questions time and again. The most frequent questions are answered here in the knowledge that others will surely share some of the same uncertainties.

1) *Q.* Why don't you send me my rare cards? I worked lots of DX and I *know* I must have a lot of cards there.

A. Do you have a sase on file with your Bureau? Also, maybe your cards are not in the bureau yet. Some cards take a year or more in transit.

2) *Q.* What is a sase? sae?

A. Self-addressed stamped envelope. Self-addressed envelope.

3) *Q.* What do I have to do to sign up with the bureau?

A. Send a sase as described in Table II to your bureau.

4) *Q.* How many envelopes should I send?

A. Three or four at a time.

5) *Q.* Why do you want a 5 × 7-1/2 inch manila envelope (at W6 Bureau)?

A. This envelope is stronger and can take oversized QSLs. For example, many DX cards are 4 × 6-inches. Also, this envelope can take more abuse and you may be able to reuse it several times.

6) *Q.* Why not use just one stamp and mail fat envelopes as "postage due"?

A. Postal regulations say that USPD must return envelopes for proper postage if they catch the overage. At W6, if there is insufficient postage for the weight of cards on hand, only the number of cards will be sent that the postage will bear. A note will be enclosed saying the rest will be sent when you send the next envelope.

7) *Q.* How can I get my cards right away when they come in?

A. Write out specific instructions on your envelope, i.e. "Mail every month," "Hold for weight," "Mail whatever you have now," etc.

8) *Q.* Should I send money?

A. See Table II for your bureau's wishes.

9) *Q.* My call is K4BVD/6. What bureau do I get my cards from?

A. The K4 Bureau. Cards are always sent to your "home call" Bureau.

10) *Q.* My call is G8KL/W6. Can I receive cards in the U.S.?

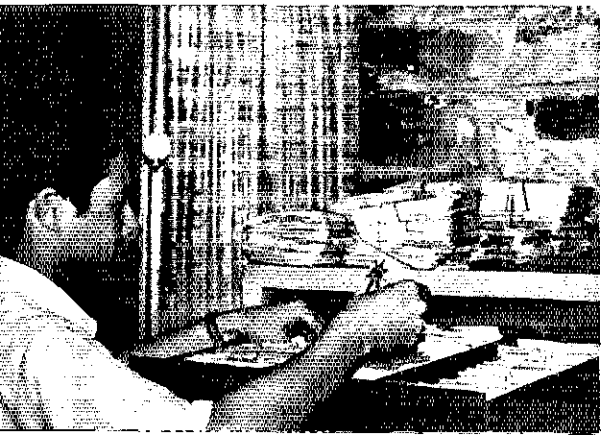
A. Yes, at the W6 Bureau. This is a convenience for foreign operators in the U.S. to save the cost of sending cards to and from their home country.

11) *Q.* I used to have a Novice license and now have a General. How do I get my Novice cards?

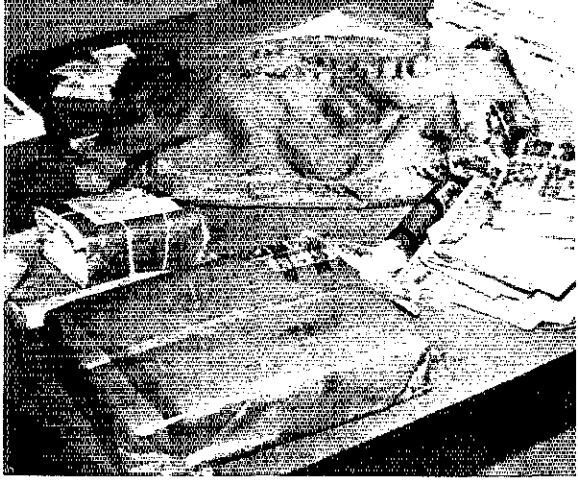
A. Notify the bureau of your change of call and your Novice cards will be forwarded.

12) *Q.* What is a QSL manager?

A. Many DX stations are often overwhelmed by requests for QSLs. To relieve the DX operator of the burden of filling out and mailing his own cards, and to give him more time to operate, another person may volunteer to be his "manager." The manager will receive the DX station's logs either over the air or by mail, and will answer all QSLs. Always send sase to a QSL manager. But remember, if the manager is in Canada or overseas, don't frank your sase with U.S. postage. Use international reply coupons or send recent postage stamps of his country.



W6NLG files alphabetically in WB6 drawer. It takes 9 drawers to house WB6 cards.



One day's mail at W6 Bureau. *(W6NLG photo)*

13) *Q.* Who gets the most cards – W, WA, K, or who?

A. At the W6 Bureau it breaks down: W6 = 47%, WB6 = 18%, WA6 = 16%, K6 = 13%, WN6 = 6%. Don't ask for an explanation of why it works out like that. We don't know.

14) *Q.* Suppose I don't want my cards?

A. Tell your bureau. Some bureaus will destroy your cards if you write that you don't want them. At the W6 Bureau, the cards are kept for at least a year before they are destroyed whether you want them or not. It happens that sometimes people have a change of heart and want them after all.

15) *Q.* What can I do if I have a complaint with the bureau?

A. Write your complaint to the chairman of the bureau. Enclose sase if you expect a reply. All bureaus appreciate sincere statements on how to improve service. But be kind. The bureau people are volunteers and they are giving up a lot of operating time to help you. And remember, the prices you pay to get your cards from the bureau is about as cheap as you're going to get anything these days.

16) *Q.* How much do people who work in the bureau get paid?

A. Nothing. It is volunteer labor. However, the ARRL does reimburse the manager for out-of-pocket expenses for operating the bureau such as postage, P.O.box expense, etc.

17) *Q.* How long does it take for a card to get from a DX station to me?

A. Average time is perhaps 6 months plus, although many take a year or more. Seldom is transit time less than 3-4 months. So don't expect a QSL from that UG6 you worked last night to be in your next batch of cards from the bureau. In some cases 7 or 8 different people may handle your cards enroute.

18) *Q.* Where are the QSL Bureau addresses listed?

A. U.S. and Canadian bureaus are listed in nearly every issue of *QST*. Foreign bureaus are usually listed in the June and December issues in the "IARU News" section. Bureaus are also listed in the Callbook.

19) *Q.* How do I know that you won't steal the stamps if I just paperclip them onto the envelope?

A. You don't. But for 8 cents, take a chance. QST

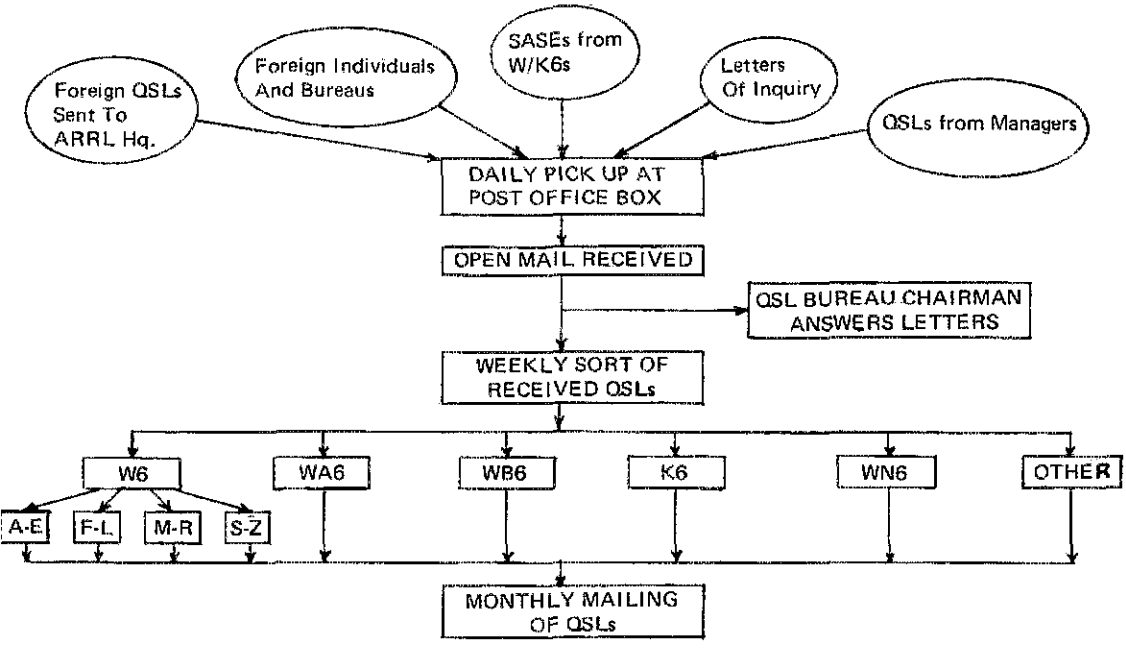


Fig. 1 – Flow Sheet – W6 QSL Bureau

CONDUCTED BY GEORGE HART,* W1NJM

THE REAL WINNERS

IN THE *QST* WRITEUP on the Agnes Floods of 1972 (Nov. '72 *QST*, page 68), mention was made of some clubs who gave up their Field Day activity entirely so that they could devote all their energies to participation in Agnes emergency communications. Other clubs cut their FD short for this purpose. Still others curtailed their activities to a greater or lesser extent so that they might assist the amateur effort in Agnes, which was considerable, by the way, and is still being reported (see "Public Service Diary").

Since a major purpose of Field Day is emergency preparedness, it seemed then and it still seems now that those clubs whose FD scores suffered or were nonexistent because their full energies were devoted to emergency *operation* were the REAL WINNERS OF FIELD DAY. It is the intention of this column, at this time, to do them honor and to reaffirm our traditional attitude on emergency preparedness as a major purpose of Field Day and as a *raison d'etre* for the Amateur Service. These clubs are known to have cancelled their scheduled Field Day operations and devoted their energies toward participating in Agnes flood communications:

- Abington Amateur Radio Club, K3CSG, Clarks Summit, Pa.
- Albany Amateur Radio Assn., K2CT, Albany, N.Y.
- Auburn Amateur Radio Assn., Auburn, N.Y.
- Chautauqua County Amateur FM Assn., WA2UWK, Jamestown, N.Y.
- North Pocono Radio Club, Moscow, Pa.
- Philmont Amateur Mobile Radio Club, W3QV, Glenside, Pa.
- Radio Assn. of Erie, W3GV, Erie, Pa.
- Richmond Amateur Radio Club, W4ZA, Richmond, Va.
- Schenectady Amateur Radio Assn., K2AE, Schenectady, N.Y.*
- Tamaqua Area Sideband Amateur Radio Assn., Tamaqua, Pa.
- Warminster Amateur Radio Club, WA3DFU, Warminster, Pa.*

*Cut FD activities short.

We are sure there must be other clubs eligible for this Honor Roll listing, and invite them to advise us so they can also be listed. Only those clubs who curtailed or cancelled Field Day Plans for the purpose of assisting with Agnes emergency operation and *who actually did so* are eligible. ARRL membership or affiliation is not required. Public Service by amateur radio is one thing your League recognizes and credits no matter who does it.

*Communications Manager, ARRL.

BEACHHEAD NETS

A few years ago, when FCC first implemented its incentive licensing program by banishing general class licensees from the lower 100 kHz of the 75 meter (and other) band, this column commented at length and offered several possible solutions for public service nets which stood to suffer through crowding into the upper 100 kHz. Among the suggestions, in review[1], were the following:

1) Make the best of a bad situation.

2) Go to another, less crowded band.

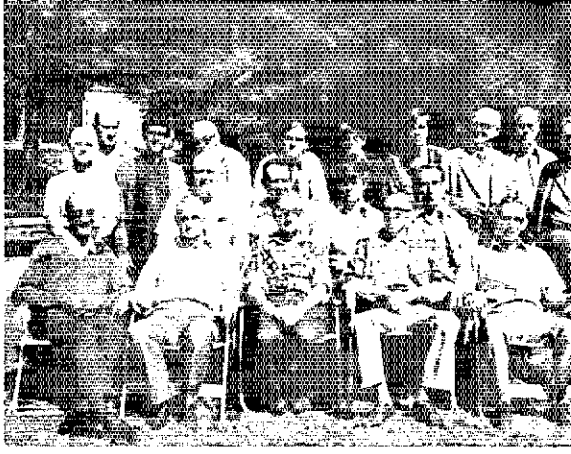
3) Upgrade! That's what it's all about.

4) Petition FCC to permit General Class operation in public service nets in the restricted portion.

5) An ARRL-sponsored overall frequency plan to make the most of what is available.

Since then, there have been those who have felt that the third and fifth suggestions should have been followed by a concerted League-sponsored program aimed at the upgrading of the licenses of all amateurs interested in public service operation *so that they could establish their nets in the* restricted parts of the band – and also by a coordinated frequency plan aimed at making best possible use of 3900-4000 for those nets which feel they must remain there (most of 'em). The practicality of both these ideas is highly debatable. Of course the ultimate aim of incentive licensing is for most amateurs to possess the higher grades of license (Advanced and Extra). On the other hand, a continuous flow of amateurs coming in at the bottom is also desirable. Isn't it also desirable for them to participate in the No. 1 objective of 97.1 – to provide a public communications service? But of course! Then how can one justify restricting the frequencies on which they might do so, and clamping strict interpretations on the kinds of communications they might conduct? They may have an incentive to upgrade their licenses, but why restrict their ability to comply with 97.1(a) while doing so?

[1]"The Frequency Squeeze," Aug. '69 *QST*, p. 60.



The Western PA Net gang held a picnic and meeting at Cooks Forest State Park, PA on Sept. 10. Attendants (front row, left to right): W3SIJ, W3IYI, W3LOS, W3MFB, W3KUN; (2nd row): W3IDO W3NEM WA3QQR W3OEO; (3rd row): K3VQV W3ELZ WA3LDA W3MJ K3EXE WA3RIZ WA3MDY W3SN WA3NRT K3HCT.

Both the questions and the answers are academic, unless FCC acts affirmatively on the League's petition for reconsideration and/or changes its mind about traffic-handling privileges. For the sake of this discussion, let's assume we are stuck with the present regulations. What's to do about it?

One thing *not* to do is moan and groan and beat our breasts and give up. Making the best of a bad situation has a lot to be said for it. Moving to other bands where more room is available is also worth considering, but not everybody is going to do this and *we want everybody we can get* in public service communication. So that might help overall, but it wouldn't change anything on 75 meters. A frequency plan might help a great deal if it were observed. If one were set up, would *you* observe it if it required some changes in your present procedures? Glad to hear it; not everybody would.

No, the only approach left is to set up public service nets in the advanced and extra portions of 75 meters, and to do that we are going to have to attack the problem using our advanced and extra class licensees to establish satellite nets in those parts of the band. We call them "Beachhead" Nets. The main net would operate in the General Class portion of the band, and check-ins would be accomplished there; but as each station checks in, he indicates his class of license (unless he's a "regular" in which case the NCS will already know this).

Whenever two stations having the appropriate licenses can be paired off, they will be sent to the "Beachhead" to clear their traffic, phone patch or whatever. A sub-NCS will be on the job at the Beachhead to receive such check-ins and control their operation. In this way, some of the congestion can be relieved on the main net frequency, and the desirability for upgrading will always be squarely before all concerned. Thus, a dual purpose will be served. Perhaps eventually the Beachhead will become the primary net and the old primary will be maintained as a recruiting net. For the time being at least, however, we feel that the frequency that is the lowest common denominator should remain the basic net frequency.

Many variations and ramifications of the idea come to mind, the more you think about it. What say, public service net operators? Shall we attack the problem and set up beachheads, or shall we lie down? Shall we accept the challenge, or squirm and wilt under it? Foolish questions, both! Those of us who can, let's get out of the morass, to give those who must remain it it more room to do what we amateurs are supposed to be doing. And let's bend our efforts to helping those still restricted to acquire the wherewithal to join us as unrestricted (as far as which amateur frequencies can be used, anyway) amateurs for best accomplishment of our public service objectives. — *WINJM.*

Hurricane Agnes Supplement

Here's the anticipated supplement to the account on amateur activities during the Agnes disaster which appeared in November *QST* beginning on page 68). As explained in the article, our report was based on reports we received. Thus, any "omissions" are probably a result of not having the information at the time the article was written. Here is a summary of reports received after the November deadline.

Pennsylvania. Activity at the Avoca Airport is reported by WA3HGX. After some preliminary emergency operations in the Philadelphia area, and upon the request of WA3RCN on June 26, WA3HGX, WB2YEH and WA3JGA departed for Hazleton, PA. Upon arrival, the group was assigned to set up a station at the raceway. A 6-meter station had already been established, but low-band communications were needed with Philadelphia. While returning home to get equipment, WA3HGX requested additional VHF gear. W3CQC supplied a 6-meter transceiver which was dropped off to K3KPV at Gaffney Hill, on the return trip. Once operative from Hazelton on 40 and 75, word was received from W4TCE and K3PFW that they were undermanned at the Scranton-Wilkes-Barre (Avoca) airport. Since the group at the raceway found they were interfering with the PA system, they decided to go to the Avoca airport as relief operators.

At Avoca, 40-meter military liaison was established to coordinate relief shipments to the airport. As shipments arrived volunteers unloaded the planes and disbursed the supplies. On June 29, W4TCE and K3PFW had to return home and WA3HGX took over direction of the communications center. When local c.d. ceased operations on June 30, the amateur group was left without communications into Wilkes-Barre. W3MFY, W3DYR and WA3CAG arranged to have a portable repeater flown in and K3ZFF maintained the repeater. As conditions became more desperate, K3TUF arranged to have several more 2-meter rigs brought into the area. An official declaration of a

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, as reported to their SCM. 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 45 points are listed with point totals only.

Category	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	
Max. Pts.	*10*	*10*	*12*	*12*	*12*	*20*	*3*	*—*	*5*	*Totals*
WA8ETX	10	10	12	12	12	6	3		5	70
WB4SVH	10	10	12	12	12	5			5	66
WA3QOZ	10	10	12	12	12	8				64
WA8UPI	10	10	12	12	12	3			5	64
WA3GSM	10	10	12	12	12	1		1	5	63
W3FCS	5	10	12	12	12	6			5	62
W4OGG	10	10		12	12	18				62
WAØVAS		10		12	12	20	3		5	62
WA1MSK	10	10	12	12	12				5	61
WB8BMV	10	10	12	12	12				5	61
KØBAD/4	10	10	12	12	12				5	61
WØLRW	10	10	12	12	12				5	61
WA7JQS		10		12	12	20			5	59
WA3OGM	10	10	12	12	12	2				58
WB4SQA	10	10	9	12	12				5	58
W7BQ	10	10	12	12	9				5	58
WB5AMN	10	10		6	12	19				57
WA2AFL/4	10	10	12	12	12					56
WA2CLB	10	10	12	12	12					56
WA2ICU	10	10	12	12	12					56
W5S8M	10	10	12	12	12					56
W7LBK	10	10	12	12	12					56
WB9AHJ	10	10	12	12	12					56
WB9FST	10	10	12	12	12					56
WAØSIG	10	10	12	12	12					56
K8NOW	10	10		12	12	2	3		5	54
WB2CST	10	10	12	6	12		3			53
WB2NRK	10	10	3	12	3	12	3			53
WB4RUA	10	10	12	9	12					53
WBØAXW	10	10	12	9	12					53
WA2UOO	10	10	12	3	12				5	52
W7OCX	10	10	3	12	12				5	52
KØBIX	10	10	12	3	12				5	52
WAØMLE	10	10	12		12		3		5	52
WA2AYC	10	10	6	12	9		3			50
WB2OYV	10	10	12	6	12					50
K3KAJ	10	10	12	6	12					50
WB4VZQ	10	10	9	12	9					50
WBØCCB	10	10	6	12	12					50
W2OE	10	10	12	12					5	49
W2RQF	10	10	12	12					5	49
W2TPV/Ø	10	10	12		12				5	49
WA3LOV	10	10	12	12					5	49
WA5UIH	10	10	12	12					5	49
W6LRU	10	10	12		12				5	49
WA9EED	10	10	12		12				5	49
KØMRI	10	10	12		12				5	49
WB2CHY	10	8	12	6	12					48
W5ABQ	10	9	12		12				5	48
WBØCNM		10		6	12	20				48
WA6DFI	10	10	12	3	12					47
WBØBIY	10	10	12		12	3				47
VE3SB	10	10	12	3	12					47
WA3QOR	10	10	12		12	2				46
WA6TVA	10	10		12	9				5	46
WA8NOQ*	10	10		12	12	1				45
WAØYVT	10	10		12		5	3		5	45

WB2CFT	44	W1UBG	39	W4UO	34			
WA2CNE	44	W2FR	39	W4ZJY	34			
WB2EEX	44	W2RUF	39	WB6VKV	34			
WA2ELD	44	W3LOS	39	W6YBV	34			
WB2IKL	44	W3NEM	39	W7WAH/5	34			
K3OIO	44	K5MAT	39	WA8BCX	34			
WB4CKJ	44	W8GLC	39	WA8ETW	34			
K5ROZ	44	WB8KZD	39	WA8PIM	34			
WA5YEA	44	KØAEM	39	W9QLW	34			
W6BGF	44	WØHI	39	KØECG/4	34			
W7GHT	44	VE3AWE	39	VE3DBG	34			
WB8JAD	44	VE3EWD	39	W6DEF	33			
WB8KXV	44	VE4EA	39	WA3QLG	32			
VE3FRG	44	K8MLO	38	W7PI	32			
VE3GBR	44	W3TN	37	WB8CWD	32			
VE3GFN	44	K4UNW	37	W9HRY	32			
WAØVYB	43	WØBV	36	K4KNP	31			
WB4PNG	42	VE3AIA	36	W6RFF	31			
WB8KKI	42	WB6AKR	35	WBØFDT	31			
WA8VKF	42	K1SXF	34	W2GLB	30			
WA2MPC	40	W2MTA	34	WN3RCI	30			
W7KZ	40	W3YA	34	W6AUC	30			
VE3DPO	40							

*Denotes multioperator 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.

state of communications emergency was issued. K3s CTS JH JPB KPV coordinated the solicitation of volunteers in Philadelphia. With the help of K3TUF and an Army helicopter, more 2-meter rigs were taken into the area on July 1. K2IEZ and several friends joined the group on July 2 and lent excellent assistance. Operations ended on July 5.

WA3MCT also reports activity in the network set up at the Avoca Airport and notes that the network tied in the airport with the Wilkes-Barre General Hospital, G.A.R. High School Evacuation Center and emergency points in Forty-Fort, Dallas and Kingston, PA.

New York. W2GOR relates some additional station locations and liaisons in the Southern Tier. WA2TCZ took over communications at Broadway School when K2DNN took over at St. Joseph's Hospital in Elmira. W2GOR was at the Elmira Free Academy with 6-meters and a link with the Air Force MARS 2-meter repeater to Rochester and Binghamton. K2s HNL MCK TXM and WB2HSR were stationed at various other Elmira schools. WA2URX was at a school in Horseheads. WA2FJJ/mobile operated 2 meters and MARS at the Chemung Co. Airport linking CAP, Army helicopter officials and NY Public Health Dept. officials. He was relieved by WB2NHB and K2OAR.

NY State AF-MARS Dir. K2RRM was the link in Binghamton with the Red Cross and Air Force. WA2ZLL, Dir. Binghamton Red Cross, ordered many life-sustaining supplies through K2RRM. WB2VAR activated the communications in Cayuga Co. C.D. Headquarters in Auburn when flooding threatened that community. Working with a sheriff, WA2ARI, Steuben Co. RO, obtained helicopters through his AF-MARS link to W2RTW and WA2DJE.

The entire local AF-MARS net in the Elmira area worked with the AREC to set up stations in key locations for the disaster communications or to act as relief operators where they were needed. Because of their services and actions taken, the net was presented with a NY State AF MARS award.

K2CXO, EC Rockland Co., forwarded a report on the activities of K2PQZ. K2PQZ began operations at Elmira's City Hall, then returned home to Horseheads where he had partial telephone service. With the help of K2POX, WA2CJA and WB2FXJ, 2-meter links were established between Cortland

and Tompkins County and traffic for food, water, beds, etc. was handled. K2PQZ was active in emergency work for over six days.

In an Empire Slow Speed Net Bulletin, ENY SCM K2SJN highlights the activity of WA2HBS in processing health and welfare messages in Elmira. Special mention was made of help by WA1OFP, W2APF, K1EIC and WB2HLV (K2SJN should be included, too) for keeping things going.

We also acknowledge a report from WA2CNE relating his supportive activities in handling disaster-related traffic.

Traffic Talk

As warmer weather approaches, there will be an increasing number of chances to promote amateur radio by means of an exhibit station. Let's review a few points on exhibit-station traffic.

A poster or information sheet is a must to present the "rules" to the public. Indicate that delivery or speed of delivery of messages cannot be guaranteed. Request complete addresses, (with telephone numbers whenever possible). Provide ARRL Numbered Radiograms and limit the text to 20 words. Do not accept messages going to someone within the local telephone exchange or outside the U.S. or Canada (unless you have made special arrangements to clear legal foreign traffic). Also, explain that no messages can be accepted having a business or commercial connotation or involving material compensation to any person.

The poster is up, the "crowd" has gathered, questions have been answered and messages have been accepted. Now, what are you going to do with the messages? Well, you have a few alternatives. You can hold all traffic until net time. But this will deprive most of the originators of the chance to see their messages being sent and may also overload the net. Another possibility is to establish schedules with other amateurs operating from their home stations. They can be monitoring to receive any traffic, while the originator watches at the exhibit station, and then report into the section net. In all cases, warn the net manager so he can assign extra liaison stations to handle the traffic.

You, at the originating end, are the only one who can keep the traffic from being the kind of "junk" that tempts relaying operators to file it in the wastebasket. While you cannot tell the originator what to say, he will usually be receptive to suggestion. Once the message gets on the air it cannot be changed.

As a further aid in preparing for exhibit traffic handling our newly revised Handling Radiograms at Exhibit Stations (CD-26) is available free of charge. We ask that you include a stamped self-addressed envelope with your request.

The above are but a few of the aspects to be considered regarding exhibit stations. Emergency-preparedness, technical and "routine-operating" aspects should also be presented. Remember, planning is of utmost importance. The image you present of amateur radio will largely determine what *they* think of *us*. – WA1ECM

National Traffic System. The Pacific Area Staff of NTS held a meeting in San Diego, CA on Nov. 11. The meeting began at 0915 and lasted until 1630 PST with a break for lunch. All members were in attendance: W6BGF, Chairman; W6LRU, RN6 Mgr.; W7KZ, RN7 Mgr.; K7NHL, TWN Mgr.; W6BNX, PAN Mgr.; K5MAT, TCC Pacific Dir.; and W6IPW, W7DZX, Members-at-Large. Observers present were: W6SRS, WA6DEI and WA6TVA. Some of the topics discussed and actions taken:

1) W6BGF was elected to continue as chairman of PAS for another two-year term. K7NHL announced his intention of resigning as TWN Mgr.

2) A proposal was introduced to hold second sessions of the section nets following the first session of the region net rather than after the second session of the region net. The PAS appreciated the merit of the proposal, but also recognized that practical problems may make it difficult to execute and recommended that the proposed second session be held when feasible.

3) The Staff recommended that the Pacific TCC Dir., PAN Mgr, and region net mgrs. in the Pacific Area be appointed for two-year terms in each case and that reappointment or new appointment be made at two-year intervals. Current appointments of incumbents who have been in office for more than two years should be ended at the next anniversary of the appointment and that reappointment or new appointment be made at that time.

4) Discussion of the Simulated Emergency Test indicated general agreement that the SET should be more impromptu in nature. The Staff recommended that in future SETs no extra sessions of NTS nets be specified in the announcement and schedule of the SET, but that NTS personnel be advised to contact AREC officials, primarily on the local level, to work out NTS participation as needed.

5) The PAS commended W7BQ and W6VNQ for their excellent dedication and contribution to the NTS as RN7 Mgr. and TCC-Pacific Dir., respectively.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for October Traffic

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	574	980	887	69	2510
WAØVAS	119	452	68	384	1023
KØZSQ	1	495	–	498	994
WA4UH	12	380	324	23	739
W3VR	115	276	253	12	656
WB4WCM	97	277	226	44	644
W6BGF	11	294	284	14	603
K4SCL	108	273	188	26	595
W1OJM	6	294	294	–	594
K5TEY	1	265	265	–	531
K7NHL	29	235	141	22	527
KØZSQ(Oct.)		488	–	476	964

BPL for 100 or more originations-plus-deliveries

WB6VTK	310	WA8HQO	142	WB4SON	118
K4EVY	262	W1PLX	140	WN@GQL	110
KØYFK	216	WAØAUX	140	WA@MLE	110
WØWYX	194	W4BAZ	138	WB4MWC	108
WAØTFC	173	K8ONA	132	WN3SZX	106
WA1ECM	172	W3TN	129	WA8ETX	105
WB2CST	170	W8QCU	128	WB8KZD	102
K8NQW	165	W5SBM	127	WN3SWC	101
KP4WT	150	WN3RCJ	125	WA5ZZA	101
WB5CIC	144	WAØYVT	125	WA6BYZ	101
WA3QOZ	143	W5TI	122	KØYFK(Oct.)	206

More-Than-One Operator Station

VE2UN 102

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 ARRL form.

6) The relationship between PAS and NTS officials with section and local needs was discussed and a recommendation made that the minutes of PAS meetings be sent to all Directors, SCMs and managers of traffic nets within the Pacific Area.

7) The Staff recommended K7IFG for Continental Traffic Net Mgr. from the Pacific Area and W7AXT as DRN7 Mgr. It was requested that CTN be scheduled to start no earlier than 1830 GMT.

8) Other topics discussed include net statistics, recent FCC rule changes regarding traffic handling, possibility of a Traffic Advisory Committee and a possible article on message handling.

Many thanks to W6BGF for his complete *minutes of the meeting from which this information* was obtained.

November reports. W9QLW is back in the harness on CAN and 9RN after recovering from a heart attack. More 2RN certificates issued: 1st timers to K2UYK and WB2s CST SLI; 2nd annual *to WA2ELD and WB2AEH; and 5th annual (with* special kudos) to W2s FEB RUF and WB2VEJ. W2FR also reports 100% representation again. WA2ICU, K4KNP, W8PMJ, K8KMQ and WA8PIM visited 3RN's W3NEM during Nov. Poor conditions have prompted W7KZ to ponder a session time change. W9HRY sez: amazing what a little traffic does for representation, rate and average. Longer skip being noticed on 9RN. K7NHL notes TWN statistics are improving. He has issued certificates to W2TPV/Ø, W5UH, K7s HLR MTZ, WØs IW LQ, KØOTH and WAØNZA.

Net	*Sessions*	*Traffic*	*Rate*	*Avg.*	*%Rep.*
EAN	30	1551	1.271	51.7	99.5
CAN	30	1169	1.091	39.0	100.0
PAN	30	1058	.881	35.3	100.0
1RN	60	514	.361	8.6	92.8
2RN	60	500	.716	8.3	100.0
3RN	60	441	.443	7.4	99.4
4RN	46	443	.419	9.6	70.9
RN5	60	891	.476	14.6	93.8
RN6	60	702	.451	11.7	100.0
RN7	60	264	.268	4.4	58.7
8RN	60	603	.447	10.1	85.6
9RN	60	408	.456	6.8	96.7
TEN	60	692	.617	11.5	91.3
ECN	59	186	.263	3.2	83.3
TWN	60	462	.290	7.7	79.0
TCC Eastern	120[1]	679			
TCC Central	90[1]	714			
TCC Pacific	120[1]	868			
Sections[2]	2535	11569		4.6	
Summary	*3330*	*23714*	*EAN*	*7.1*	
Record	*3471*	*30541*	*1.571*	*18.4*	

[1]TCC functions not counted as net sessions.

[2]Section and local nets reporting (71): AENB, AEND, AENO, AENT (AL); ATEN (AZ); OZK (AR); NCN, SCN (CA); CCN (CO); CN, CPN, Nutmeg VHF (CT); DEPN, DTN (DE); EAST, EMTN, EPTN, GN, QFN, QFTN, TPTN, VEN, WFPN (FL); GSN (GA); ILN (IL); QKS, QKS-SS, (KS); KNTN, KTN (KY); PTN, SGN (ME); EMN, EMPN, WMN (MA); MNN (MI); MJN, MSPN, PAW (MN); MSN, WEN (MO); MTN (MT); NHVT (NH, VT); NJEPTN, NJN, NJSN (NJ); NLI, NYS (NY); NCNN (NC); BNR, OSSBN (OH); OLZ (OK); EPA, WPA (PA); TN, TNN (TN); TEX, TTN (TX); BUN (UT); VN, VSBN (VA); NSN, WSN (WA); WVPN (WV); BEN (WI); APSN (AB); BCEN (BC); MTN (MB); GBN (ON); OQN, WQV/UHF (PQ); SATN (SK).

Transcontinental Corps.

K5MAT has issued a TCC-Pacific certificate to WB6VKV. TCC Directors have assigned extra stations to help with the holiday traffic.

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	112	93.0	1891	679
Central	87	96.6	1452	714
Pacific	111	92.5	1743	868
Summary	*310*	*92.0*	*5086*	*2261*

The TCC roster (Nov.): Eastern Area (W3EML, Dir.) – WIs *BJG EJI NJM QYY YNE*, K1GNW, W2s FR GKZ, WA2s ELD ICU UWA, W3s CB EML, K3MVO, WA3OGM, W4s SQQ UQ, K4s FAC KNP, WB4OMG, W8s IBX PMJ RTN VDA/4, K8KMQ, WA8PIM. Central Area (WØLCX, Dir.) – W4OGG, WB4s KPE YCV, W5s MI QU SBM, WB5CIC/5, K6KCB/5, W9s CXY DND YB, WØs HI INH LCX ZHN, KØs AEM DDA, WAØIAW. Pacific Area (K5MAT, Dir.) – W5RE, K5MAT, W6s BGF EOT IPW MLF VNQ VZT, WA6DEI, WB6VKV, W7s BQ EKB EM GHT KZ PI, K7NHL, WØLQ, KØOTH, WBØAXW.

Independent Net Reports (November)

Net	*Sessions*	*Traffic*	*Check-ins*
North American Traffic	26	302	549
20 Meter ISSB	23	1135	260
7290 Traffic	42	535	1861
Ohio Valley Teenage	29	96	250
Mike Farad	26	191	267
75 Meter ISSB	30	304	1515
IMRA	37	497	1362
Clearing House	26	348	291
Hit & Bounce/MW	30	866	352

Public Service Diary

A recent copy of the Mt. Tom Amateur Repeater Assoc.'s *Intermod* lists six accidents and one fire which were reported through the WA1KGR repeater, Holyoke, MA, between Oct. 6 and Nov. 28. At least 10 different amateurs were *involved. – (Intermod)*

— . . . —

While mobiling in Lynchburg, VA at 1200 Oct. 9, WB4MBO noticed rising water levels in the James River and smaller streams. At 1230, an emergency net was called on 2 meters using the WB4HCX repeater. Nine stations were standing by. By 1245, contacts were established with stations within a 100-mile radius of Lynchburg and river level and road condition information was passed through the net to a local broadcast station with the help of WB4JBI. Later, at 1659, K4ARH called through the repeater reporting that the City Manager of Waynesboro had placed the city in a state of emergency. At 1715, the Lynchburg 2-Meter Emergency Net went to a full emergency status and minimum use of the WB4HCX repeater was requested. WB4MBO, NCS, notified state e.d. headquarters of the situation in Waynesboro. Conditions were continually monitored until WB4KIT reported that the situation was well in hand. The net was closed at 1900. Twenty-five amateur participated. – (WB4MBO)

— . . . —

During an outing in the DeSoto National Forest near Saucier, MS, on Nov. 4, W5PDG, WB5GOI and WB5AHL received a plea for help from the parents of 4 children lost in the forest on a hiking trail. The amateurs set to work with the mobile rigs and soon reunited the parents and children, who when found, were nearly 5 miles from each other. – (W5NCB, SCM MS)

— . . . —

On Nov. 8, Neshaminy Creek overflowed its banks during heavy rainfall in Bucks Co., PA.

WA3KTK, Bucks Co. EC, and WA3KVN were notified and WA3KVN activated Penn Wireless Club Station, W3SK, at 1700 using 10 meters and the WA3CAG repeater. Club EC, WA3IWX, arrived at 2100 and later K3ZQN and K3HNP joined the group. K3MWV and a Red Cross volunteer were sent to the Penniwinkle area about 2130. Several people were forced to evacuate and W3SK called the rescue squad. While amateurs were helping with supplies, K3ZQN maintained a 2-meter link with W3SK. By 0100, all evacuees had gone with friends or relatives for the evening and W3SK secured operations. – (Penn Wireless' *X-MITTER*)

– . . . –

On Nov. 9, a car ahead of K4QDC/mobile hit a bridge abutment on the NH Turnpike. K4QDC called through the K1MNS repeater and contacted WA1JNF who called the state police. K4QDC directed traffic until police arrived. – (W1WQH)

– . . . –

While golfing near Biloxi, MS, on Nov. 11, W5UOO observed a golfer in severe physical distress. The ill golfer was put in W5UOO's car. Enroute to the hospital, WA5KYB, via 2 meters, was asked to alert the emergency room for an apparent cardiac case. Upon arrival, the emergency room acted swiftly and efficiently to perhaps save the patient's life. – (W5NCB, SCM MS)

– . . . –

On Nov. 22, HR1JMZ checked into the Intercontinental Traffic Net, reporting that nine children had been exposed to rabies. Arrangements were made for immediate air shipment of an initial supply of rabies vaccine from Miami, FL to Tegucigalpa, Honduras, to be followed by additional supplies from Indianapolis, IN. The vaccines all arrived in time for the children to get the vaccinations. Numerous phone patches over a period of several days, were involved. Stations participating were: HR1JMZ, HR1LM, HR1ERB, W4RFA and W4BOZ. – (W4BOZ)

– . . . –

At 2225Z on Nov. 26, WA7UPI/mobile broke into a QSO with W7s GRS IOK, K7UIT and WA7PHD to report an auto accident near Stanford, MT. An effort to contact a Mont. station was unsuccessful. K7UIT called the Wash. State Patrol who in turn called the Mont. State Patrol and relayed the information. – (W7GRS via W7IEU, EC Snohomish Co. WA)

– . . . –

While mobile near Heflin, AL on Dec. 1, WB4OII spotted a forest fire in the Talladega National Forest. His 2-meter call was answered by K4AOZ who notified the Forestry Service in Birmingham. The Forestry Service immediately called Heflin and dispatched firefighters to the scene within a matter of minutes. – (K4AOZ)

– . . . –

On Nov. 15 at 0245, a station using the call K6AMG/6 called QRRR on the Great Lakes Net (3932 kHz) using cw. W8ISC contacted the station who said he was camping 30 miles NNE of French Gulch, CA, and his wife had been caught in a landslide. He added that he was operating on battery power and was loosing power fast. W8ISC placed a long distance call to the Shasta County sheriff advising him of the situation. WB8DRT, wondering how a low-powered battery rig in Calif. could be copied at that time, called W8MPD, who called the FCC monitoring station. They monitored one transmission and agreed that it was unlikely that the station was in Calif. W8ISC placed a second call to Shasta Co. with late developments. Later check indicated that the call K6AMG/6 had not been officially active for 14 years. – (W8MPD, SEC MI)

– . . . –

The Central Ohio AREC provided communications for a road rally sponsored by the Ohio State Univ. Sports Car Club, Oct. 21-22. Headquarters for the event was in Grove City, OH. The 20 checkpoints were linked to headquarters by 80-meter cw, 10 meter cw/ssb, 6 meter AM and 2-meter fm. Twenty eight amateurs participated. – (W8ERD, EC Central OH)

– . . . –

On Oct. 31, 25 members of the Mt. Baker ARC, Bellingham, WA put together a communications system on 75 and 2 meters to assist the local law enforcement agencies in patrolling Whatcom Co. for Halloween. – (K7VNI, EC Whatcom Co.)

– . . . –

Okaloosa Co., FL, amateurs garnered county election returns on Nov. 7. Mobiles collected the returns and the results were relayed to the c.d. EOC which was used as Election Central. Approximately 45 amateurs participated supplying all returns in less than two hours after the polls closed. – (W4RKH, SCM NFla)

– . . . –

On Nov. 18, six Mt. Baker ARC members furnished communications between all checkpoints of a car rally covering parts of Whatcom and Skagit Co., Wash. Two-meter communications were used. – (K7VNI, EC Whatcom Co.)

– . . . –

Over 20 members of the Central Florida Repeater Assoc. took part in a Central Florida Cerebal Palsy Walkathon on Dec. 11. Communications were furnished by using the WB4QEL repeater in Orlando. – (W4UJL, EC Orange Co.)

– . . . –

Thirty-four SEC reports were received for Nov. representing ONLY 10,767 members! That's the lowest of the year. Last Nov. (1971), saw 37 SEC reports but the number of AREC members was down then, too. Is Nov. a bad month? Sections reporting: Alta, Ariz, Conn, Del, EBay, ENY, EMass, Ind, Iowa, Ky, Mar, Mich, Miss, Mont, Nebr, Nev, NC, NNJ, NTex, Ohio, Okla, SV, SDgo, Sask, SDak, Tenn, Utah, Va, Wash, WVa, WFla, WMass, WNY, WPa. QST

Strays

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30 on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U.S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule in "Operating News.") QST

1971 VE/W Contest Results

THE MEMBERS OF THE Montreal Amateur Radio Club VE/W contest committee are pleased to submit the following results for the 1971 VE/W contest. (Sept. 25-26, 1971) The results were compiled by D. Weiner, VE2DCW and submitted by L. Dobby, VE2YU and D. Steventon, VE2BGF.*

On cw Lee, VE7BDJ, is the Canadian Trophy Winner and W4YWX is the American Trophy Winner. Phone honors go to WB2RLK/VE1 and WA5WQF.

Canadian scores were generally up from last year while American scores showed a slight decline.

Soapbox

Seems we were running competition to the Scandinavians & the Dakotas during the contest weekend. – VE1IN. It is very disheartening to hear WWV forecasting U4 or W4 with several hours left in the contest. – VE5US. About the 6th year, but not necessarily the best, hi. – VO2AF. Activity was greater than I'd anticipated. – VE6YL. Worked 12 new states which made it all worthwhile. – VE3BVD. Worked W4YWX, W5SBX, W6MAR, WB6VZI, W6DQ, W7NQ on six bands. – VE7BDJ. How about sending something other than the (redundant) area such as the operator's initials? – K1UCA. I would suggest to change code in the contest to 599001ONT. – VE3BMV. Bring back the power multipliers! – VE3GFN. Good contest-log sheets were a big help. – W8GOC. Like the time limit as you can get some sleep. – VE7HQ. Where was the Yukon? – K4LDR. I was amazed at the number of U.S. stations asking VE2s and VE3s to repeat their sections. – K1GMW. Where were the Ws on 15? – VE3GHL. I am most upset that there is no category for mixed phone/cw. – VE1AL. We thoroughly enjoyed our first contest. – VE3BRJ. We claim most for removed station at Shemya Is. – 52 degrees 42 minutes N & 174 degrees 7 minutes E. – KL7FBI. Had planned multi but things did not work out. – VE1ASJ. Why were there not more VE/VO to work? – WA9LUD. Rig blew up after 2½ hours into the contest. – K4PUZ. I've worked most of the fellows before as W7CFJ or W6GEN. – W7NQ. After having won the 1965 trophy, thought I would get back in the mad "fray." – W9LNQ. Where oh where were those VE8s-must be an early winter in the N.W. – W5BWM. Aurora effects quite apparent here with VE4 and 5 rigs on 15 meters sounding like buzz saws at times. – WØAW. I wish something could be devised to provide us Ws with more QSOs per hour. – WØTDR. I want to say I really enjoyed the W/VE contest. It's a good one to start on. I do think the people with a low power should be given a multiplier. See ya next year. – WB9DTU.

*Address all correspondence to 195 Hampshire Rd, Beaconsfield, Quebec.

HIGH SCORES

VE

CW		PHONE	
VE7BDJ	455,534	WB2RLK/VE1	348,840
VE3BMV	302,640	VE4FU	262,752
VE5US	299,484	VE5NW	240,900
VE2NE	244,156	VE6ANR	175,388
VE1ASJ	240,064	VE2ACP	112,064

W/K

CW		PHONE	
W4YWX	35,100	WA5WQF	7808
W7NQ	21,672	W4ORT	7344
WA6DKF	20,412	WA5UGF	7176
W5WMU/5	19,762	WA3BZA/5	6734
WA3ATX	17,958	W6HX	6440

Scores are grouped by divisions and sections. The station first listed in each section is the certificate winner for that section. Multi-operator entries are listed below single operator entries.

Example of listings: VO1HP 135,512-486-136-15; or, final score of 135,512 points, 486 contacts, 136 sections worked, total operating time of 15 hours, no power notation.

CW RESULTS

Canada

Newfoundland

VO1HH 135,512-486-136-15

New Brunswick

VE1ASJ 240,064-676-182-19
VE1IN 480- 20- 12- 3

Prince Edward Is.

W1ZJJ/VE1 9576-126- 38-13

Labrador

VO2AF 108,876-422-129-
VO2GD 13,344-139- 48- 5
VO2PB 4160- 80- 26-

Quebec

VE2NE 244,156-682-179-18
VE2BCB 106,750-427-125-
VE2BZD 95,676-359-134-
VE2ASO 81,540-379-108-
VE2WP 32,785-208- 79-
VE2AOQ 26,864-184- 73-11
VE2DLG 17,940-138- 65-
VE2BGF 12,960-136- 48-
VE2CP 2340- 45- 26- 4

Ontario

VE3BMV 302,640-780-194-20
VE1AL/3 168,662-499-169-20
VE3EEW 108,864-432-126-17
VE3BVD 92,106-357-129-19
VE3DZV 59,572-283-106- 9
VE3BHZ 59,202-294- 99-12
VE3ADA 54,054-297- 91-
VE3GFN 43,632-303- 72-14
VE3BUK 19,734-217- 46- 8
VE3AXV 18,576-172- 54- 6
VE3BNQ 18,096-232- 39-
VE3DGL 16,560-207- 40-12
VE3AR 10,658-127- 42- 4
VE3FDP 4332- 57- 38- 3
VE3DLS 468- 18- 3- 3
VE3BRJ (+VE3CJZ) 44,100-245- 90-19

Manitoba

VE4SW 109,626-453-121-16
VE4ZS 65,540-290-113-
VE4OM 840- 28- 15- 3

Saskatchewan

VE5US (VE5UF, opr.) 299,484-798-188-20
VE5RA 103,458-401-129-19
VE5NCI 73,920-308-120-17
VE5SC 47,502-261- 91-12
VE5XC 16,884-126- 67-16
VE5TT 9984- 96- 52- 5

Alberta

VE6YL 175,854-553-159-19
VE6AXH 62,460-350- 90-
VE2API 7700-110- 35-

British Columbia

VE7BDJ 455,534-953-239-20
VE7ZZ 218,244-704-156-20
VE7HQ 110,352-418-132-20
VE7QO 79,170-377-105-16
VE7BZY 24,492-157- 78-
VE7TO 17,272-127- 68-13
VE7AZL 10,332-123- 42- 6
VE7IQ 4958- 67- 37-
VE7AZG 32- 4- 4- 1

Yukon

VE8CE 1728- 36- 24- 4

USA

Alabama

WB4SPK 10,230-155- 33-18
K4ZGB 5292- 99- 27-16
W4YOK 1548- 43- 18-

Alaska

KL7EBI (K7ILO WA0s GLV ZEB) 252- 21- 6-

Arizona

W7NQ (W7CFJ, opr.) 21,672-252- 43-20
W7AYY 3080- 77- 20- 5
W7GAF 676- 26- 13- 3

Connecticut

W1TS 7076-122- 29-11
K1GUD 1800- 50- 18- 3
W1ACR 1340- 67- 10- 7
WA1KMP 580- 29- 10- 6

Colorado

WBØCGJ (+WAØZWA) 1054- 31- 17- 3

East Bay

W6RQZ 5150-103- 25-
W6UZX 4550- 91- 25-11

East Florida

K4IQJ 3780- 70- 27- 8
W4ILE 1980- 45- 22- 5
K4FAC 1560- 39- 20- 3
WB4TON/4 (+W4OZF) 1664- 52- 16-

E. Massachusetts

K1UCA 4108- 79- 26-15
W1FJN 1394- 41- 17- 3
WA1KSF 550- 25- 11- 3
WA1MYK 438- 38- 6-

East New York

W2EY 4560- 96- 24-10
K2EKM 3634- 79- 23-
WA2HLH 3136- 56- 28-
W2SZ (WA2RAL, opr.) 1300- 50- 13- 3

E. Pennsylvania

WA3ATX 17,958-219- 41-20
K3ONW 11,268-162- 36-18
W3ADE 4140- 90- 23-
W3HMR 341- 16- 11-
K3OIO 132- 66- 18- 4

Georgia

W4YWX 35,100-251- 50-20

Hawaii

KH6RS (K2SIL, opr.) 1560- 39- 20-
KH6IJ 1376- 43- 16-

Idaho

W7GHT 980- 49- 10- 5

Illinois

WA9LUD 17,716-216- 41-20
W9LNQ 13,440-210- 32-14
K9IOZ 10,692-162- 33-20
W9LVT 9672-156- 31-13
K9UIY 2880- 72- 20- 8
W9EFO 1944- 54- 18- 6
W9HVP 1442- 52- 14-13
W9WR 1144- 44- 13-
K9TPC 637- 35- 13- 4
K9BQL 364- 26- 7- 3
W9JWC (WA9s TXL WZZ WB9GWD) 462- 21- 11- 3

Iowa

WØHZC 3335- 73- 23- 5
WAØHIK 1600- 50- 16- 8

Kansas

WRØCCW 1656- 46- 18- 6
WØCHJ 224- 16- 7- 1

Kentucky

K4BAM 2880-146- 20- 8

Los Angeles

K6QPH 13,986-189- 37-14
W6DGH 10,434-141- 37- 7
WB6VZI 9310-133- 35-12
W6ZOL 864- 54- 8- 6

Louisiana

W5WMU/5 19,762-241- 41-20
W5OB 6048-112- 27-12
K5WG 3920- 70- 28-20
K5LVZ 1980- 45- 22-

Maryland-D.C.

WA3NQJ 9216-144- 32-17
WA3PKY 2159- 64- 17-15
W3FA 1485- 56- 15- 5
WA3LIO 266- 19- 7- 4

Maine

W1GKJ 2470- 65- 19-10

Michigan

W8TZZ 5940-110- 27-
W2GAO/8 2880- 72- 20-14
WA8VNZ 1740- 58- 15- 7
WB8ICU 928- 58- 8-10
WB8FEZ 476- 34- 7- 3

Minnesota

WØOAW 16,000-200- 40-18
KØZXE 13,912-189- 37-18
WAØRBW 8874-131- 34-12
WØKMH 4752-108- 22-10

Mississippi

W5AMZ 3384- 71- 21- 8

Missouri

WØTDR 15,840-198- 40-16
WØOWS 8160-120- 34-
WBØAEW 4368- 84- 26-14
WAØYEF 3318- 79- 21-
WBØAVR 1786- 40- 19

North Carolina

WB4SXX/4 3444- 82- 21- 7
K4CAX 1540- 55- 14- 3
W4VON 1296- 54- 12-
K4KH 396- 36- 11- 2

Nevada

K1AGB/7 11,270-161- 35-17
WA2MEQ/7 4692-102- 23-12

New Hampshire

K1GMW 11,690-168- 35-19

New Mexico

WB5BHN 8320-130- 32-13

North New Jersey

W2GBY 3294- 61- 27- 8
WB2FUE 3276- 78- 21-11
K2UOT 580- 29- 10- 5
W2MPP 66- 11- 3- 2

N.Y.C.-L.I.

W2FVS 8928-144- 31-10
WA2LLF 1792- 64- 14- 7
WA2LOM 544- 34- 8- 5

North Texas

W5LUU 16,416-216- 38-17
W5FC (W5QGZ WA5s HSL UQT ZSL) 14,832-206- 36-20

Ohio

WA8DXA 13,098-177- 37-19
W8GOC 6642-123- 27-
WB8EAS 6318-118- 27-
W8JFQ 3552- 74- 24-

Oklahoma

K5OCX 3498- 80- 22- 5
K5DEC 154- 11- 7- 7

Oregon

W7LT 2480- 62- 20-14

Orange

WB6IFX 2394- 57- 21-
W6LQO 1760- 40- 22- 4

Santa Barbara

W6MQF 845- 33- 13- 4

South Carolina

WA4LBO/4 1110- 37- 15-

Santa Clara Valley

WA6DKF 20,412-243- 42-18
W6GJV 6136-118- 26-11
WB6DVI 5096- 98- 26-
K6JQV 2142- 51- 21- 7
WA6AQY 1640- 82- 10-11
WA6GZG 70- 7- 5-
WA6QKU 56- 7- 4- 1

San Diego

W6MAR 3200- 64- 25-25
WA6BJO 810- 41- 10- 5
K6SK 546- 39- 7-

San Joaquin Valley

K6OZL 9000-125- 36-
K6TG 2204- 58- 19-15

South Texas

W5SPX 6262-101- 31- 7
W5RWM 820- 44- 10- 7
WA5WQF 48- 8- 3- 1

Sacramento Valley

WA6JDT 2688- 64- 21- 7

Tennessee

K4PUZ 1652- 59- 14- 3
W4PHW 1387- 37- 19-15

Utah

WA7KZP 1612- 62- 13- 4

Virginia

W4CAW 10,878-147- 36-14
K4LDR 8052-122- 33-10
K4OD 2438- 53- 23- 6
W4ZC 1760- 44- 20-
WB4TEL 1080- 45- 12-
W4YZC 726- 33- 11- 2
W4DIW 704- 32- 11- 6

Washington

WA7KYZ 7168-112- 32-14
K7JRE 4816- 86- 28-13
K7UWT 90- 9- 5- 1

West Florida

K4VFY 5656-101- 28- 7

W. Massachusetts

W1EZD 2478- 59- 21- 5
W1TM 1118- 43- 13- 7

Wisconsin

W9HE 9360-156- 30-14
WB9BJO 3572- 94- 19-10
W9NLJ 2040- 68- 15- 3
WB9DRE 1560- 40- 20-
WB9FTC 432- 27- 8- 5

West New York

W2ECW 1628- 75- 11-14
WB2PNN/2 1020- 35- 15- 9
K2FJ 576- 36- 8-

W. Pennsylvania

K3HZL 14,555-178- 41-13
WA3KYC 1224- 68- 9-16
WA3ONZ 380- 19- 10- 4

West Virginia

WA8RDW 935- 44- 11- 5
WA8CNN 840- 32- 14- 5

PHONE RESULTS

Canada

Nova Scotia

WB2R1-K/VE1 348,840-850-204-18

New Brunswick

VE1RQ 11,808-164- 36-13
VE1IN 6264- 87- 36- 7

Prince Edward Is.

VE1ATR 5565- 80- 35-

Labrador

VO2GD 9200-100- 46- 3

Quebec

VE2ACP 112,064-412-136-18
VE2AJU 45,756-246- 93-
VE2AQY 16,016-143- 56-

Ontario

VE3GHL 84,568-341-124-
VE3AXV 12,880-140- 46-10
VE3SLC (VE3DXY, opr.) 6364- 74- 43-10
VE3FFX 3132- 58- 27- 3
VE3GT 1140- 30- 19- 7
VE3DLS 72- 6- 6- 2

Manitoba

VE4EU 262,752-714-184-20
VE4AR 504- 18- 14- 2
VE4QD (VE4s OM OP) 28,160-176- 80-

Saskatchewan

VE5NW 240,900-930-165-

Alberta

VE6ANR (VE6AMR, opr.) 175,388-538-163-19
VE6AUH 33,792-192- 88-10

British Columbia

VE7BLO 37,496-218- 86-14
VE7IQ 17,236-139- 62-
VE7AZG 11,760- 98- 60- 5

N.W.T.

KL7HOM/VE8 2496- 52- 24- 4

USA

Arizona

WA7KLK 812- 29- 14- 6
W7NQ 80- 8- 5- 1

Colorado

K6HPZ/Ø 3600- 75- 24-
WØLSK 3432- 66- 26- 8
WØMAI 2816-128- 22-12
WBØCQJ 864- 27- 16- 8

East Florida

W4ORT 7344-102- 36-19
W4ZTW 5236- 77- 34-15
WB4FSG 1024- 32- 16- 8
WB4TON/4 (+W4OZH) 1344- 42- 16-

East New York

W2SZ (WA2RAL, opr.) 1170- 39- 15- 9

Georgia

W4HGH 324- 18- 9-

Idaho

K7RLS 600- 25- 12- 4

Illinois

WA9CIO 2040- 51- 20-10
K9RJD 504- 18- 14-

Kansas

WBØCCW 60- 12- 5- 1

Kentucky

WB4TTB 992- 31- 16- 6

Louisiana

W5JJB 728- 28- 13-

Los Angeles

W6HX 6440- 92- 35-

Maryland-D.C.

W3AZD 2100- 50- 21-
WA3EOP/3 552- 23- 12-

Minnesota

WAØMUD 600- 30- 10- 7

Mississippi

K5SVC 5400-100- 27-15
WA5BNH 756- 27- 14- 6

Missouri

KØSGJ 4864- 76- 32-10
KØZHD 1520- 40- 19-
KØCMF 216- 12- 9- 3

New Hampshire

K1ATL 728- 26- 14-10

North Carolina

WB4FEV 3944- 68- 29-
WB4MPZ 1836- 44- 22

North New Jersey

W2FCR 1152- 36- 16-
WA3LKG/2 572- 23- 13- 7

New Mexico

W5RSZ 1360- 29- 20- 2

North Texas

WA3BZA/5 6734- 91- 37-20
WB5CKH 1520- 35- 20-

Oklahoma

K5CYK 1950- 39- 25- 7

Santa Clara Valley

WA6OKU 2200- 50- 23- 9
W6NJR/6 98- 14- 7-

San Diego

W6CHV 1158- 41- 19- 8

San Joaquin Valley

WB6RKH 3456- 72- 74-10
WA6CXP 1224- 34- 18- 8

South Texas

WA5WQF 1808-103- 38-16
WA5IGF 3176- 92- 39-13
WA5YSC 1450- 69- 25-11

Utah

WA7KZP 8- 2- 2- 1

Virginia

W4WSI 4698- 81- 29-14
W4KMS 832- 26- 16- 5
K4ZD 784- 28- 14- 5
W4UPJ 676- 26- 13- 4

Vermont

WA1GXJ 552 23- 12-

Washington

K7AWB 2024- 44- 23- 8
K7UWT 112- 8- 7- 2

W. Pennsylvania

WA3GJU 2640- 60- 22- 5
K3LWM 1260- 35- 18-11

Wisconsin

W9RKP 294- 21- 6-

West New York

K2FJ 370- 37- 9-

Check Logs

VE2AKI, WDX2POA. QST

NEW BOOKS

Commercial Radio Operator Theory Course, by Martin Schwartz, Ameco Publishing Corp., Williston Park, NY 11596. Paperback, 6 × 9 inches, 448 pages including index. $5.95.

Commercial FCC License Handbook, by Harvey F. Swearer, Tab Books, Blue Ridge Summit PA 17214. Paperback, 5-1/2 × 8-1/2 inches, 432 pages including index, $5.95.

In various surveys to determine which publications are most used by newly-licensed amateurs, ARRL's get a rating of 96%, the second highest runs 25%, and the third is so far down we can't recall the percentage (much less the name of the publisher). That strong No. 2 is Ameco, and the expertise of author W2OSH which brought it to that position is apparent again in this study material for a commercial phone ticket. The approach is textbook style, and twenty readable chapters cover the range of electrons up through TV. Self-test quizzes at the end of each, plus sample FCC exams, total 500 questions to check your progress (answers in the back).

Another new entry in the field is Tab's effort by W3EZY. The approach here is primarily example questions, with extensive answers in essay form. Multiple-choice self-testing is also included, tho not so extensively as in the Ameco text. On the other hand, it contains study material on basic law and operating practices, plus the radar and be endorsements, whereas Ameco's does not.

The price of each is identical. So we conclude that if you just want to get by the exam, Tab's will do; if you want to have plenty of margin by going more deeply into the technical subjects, Ameco is the choice. Neither, however, contains material on exam elements 5 and 6, which cover the radiotelegraph license, perhaps a sign of the times.

We felt some surprise at the minimal updating of the exam as we remember it from 25 years ago. With the exception of use of a few unfamiliar items such as the Foster-Seeley discriminator and field excitation of motor-generator sets, the technical level seems to be somewhere between the amateur General and Advanced. A competent Extra Class should be able to handle the technical questions in commercial phone exams without any refresher course. Maybe a touch of amateur-style incentive licensing is in order! — *WIRW.*

Radio Control for Model Builders, Revised 2nd Edition, 1972, published by Hayden Book Company, Inc., New York. 5-3/4 × 8-7/8 inches, 150 pages, paperback. Price: $4.45.

Radio control and the literature concerning it started with amateur radio and *QST*, but in recent years we have had no more than casual interest in this fast-growing game. When FCC opened CB frequencies to RC, permitting nonham control, amateur interest waned. Now, however, the overcrowding of the frequencies other than amateur has led to a revival of interest in the high end of our 50-MHz band and a swing back to a combination of ham radio and modeling.

Anyone away from RC for some time will do well to start reading this book at the back, with the glossary of terms. Otherwise he is sure to be lost quickly in a verbal maze of clock-pulses, bang-bangs, galloping ghosts, and the like. RC, like other technical arts, has developed its own language. The RC neophyte will probably need something simpler than this work, too, for it covers a lot of ground, much of it technical. Boats and ground vehicles are treated, along with aircraft, and all entail considerable sophistication in techniques and application.

The authors, Marks and Winter, associated with *American Aircraft Modeler* magazine, appear to have only a nodding acquaintance with radio theory, and the critical reader will find numerous errors (none of them vital to the purpose of the work) in parts relating to radio history and principles. (Hertz is renamed Gustav, and the amateur Novice Class license is dismissed because of its "one-year" tenure, without mention of the fact that it is unusable for 53-MHz work — to mention a few more obvious goofs.)

Despite these minor lapses, the book should be very useful to the technically minded amateur who wants to see what has happened in the RC field in recent years. — *W1HDQ*

OSCAR NEWS

WHEN HAM SATELLITES became everyday affairs instead of short-term novelties, interest would slacken and activity would sag; or so the story went. But there has been no such downward trend with Oscar 6! New stations are being heard every day, and those who have been pumping two-meter rf spaceward since the first orbit are still going strong. As reports filter in from all continents it becomes clear that thousands of amateurs are taking part in this adventure.

While most contacts are over distances of a thousand miles or so, more and more DX is appearing in people's logs. JA8PL and K7BBO made what is probably the first North America – Asia satellite QSO on December 8 at 2225 GMT; for an encore, Dave worked JA8ARS the next day. JAs 1ATL 1VDV 7ABQ 7AKB and 7BZC are also active. JA8 stations are located on the northern Japanese island of Hokkaido, and thus have the best opportunities for European and North American DX.

VE2BYG worked UA1DZ on cw, December 11 at 2015 GMT. Interestingly, this is *not* the first North America – USSR satellite contact; that was accomplished by UP2ON (a recent Silent Key) and K2GUN through Oscar 4 on December 22, 1965 (*QST* for August 1966, p. 72). K2GUN is now W2WD and has been quite active through Oscar 6. Other stations in the USSR who have been widely worked in Europe are UG6AD, UT5DL, and UW6MA.

Other DX worked from Europe includes 4X4MH, ZE1RR, and ZE7JX. ZE1DC tells us that he, ZE1DK, ZS2GH, ZS5CG, and CR6FY are all active from Africa. Reports from Oceania are sparse, but VKs and ZLs are known to have worked one another and a contact with VKØ (Australia) has taken place. Since our last report, VP2VL and KL7DJI have shown up in U.S. logbooks.

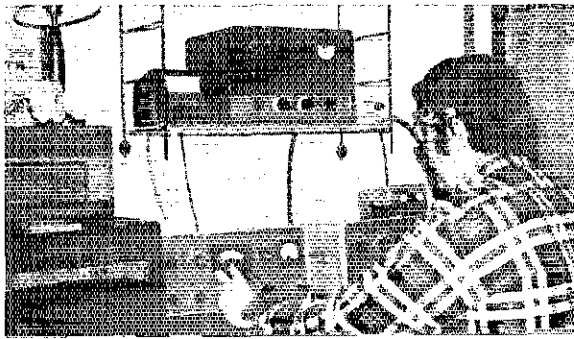
From Sao Paulo, Brazil, PY2CSS has worked W4CKB, WA4JID, LU1DMA, and LU9MA and has heard W3LUL, K3PGP, W4LSQ, W4VHH, and W9YYG. Ricardo would appreciate reports from anyone hearing his signals; he has excellent equipment, but few stations to work!

OH2RK observes signals in the downlink about 6 kHz lower than calculations would indicate, correcting of course for Doppler shift. He reportedly has been heard by JA8PL and is looking for KL7 and JA contacts. The SK4MPI beacon runs continuously on 145.960 MHz, transmitting its call sign and a long dash. This beacon can be heard through the satellite when it is over Scandanavia and is a useful indicator of whether the transponder is on.

PAØWLB has made measurements with a dipole receiving antenna, of the strength of signals returning from the satellite on 10 meters. The strongest signal he has measured was .7μV, with .2μV a typical value. (Tnx VERON *DXpress*) K7BBO has conducted a transmitting experiment with power inputs of from one watt to one kW to a circularly polarized 20-element antenna. The difference in returning signal strength for a 20 dB increase in power (10 watts to 1,000) was less than an S unit, and even one watt was plainly audible. This points up again that 100 watts erp is plenty!

The most convenient way for many stations to use Oscar 6 is to run 50 to 100 watts to an omnidirectional antenna. This procedure eliminates the problem of pointing the two meter antenna, which is more difficult than orienting the typical ten-meter array. Many contacts have been made by stations using as little as 40 watts and no-gain vertical antennas. On the other hand, a large receiving antenna is a definite asset. F9FT uses a full-sized 5-element yagi for 10 meters and is able to hear the satellite for an additional 10 minutes beyond the "theoretical" limits.

We're looking for totals of states, countries and continents worked through Oscar 6 for future columns. Have you worked or heard any interesting DX, or conducted any educational projects or experiments through the satellite? Tell us about it! – *K1ZND*



Pioneer Oscar 6 DXpeditioner K2OJD operates St. Pierre's first communication satellite ground station (of any kind, not just amateur!) under the call of FP8AA.

Correspondence From Members-

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

AIRLINE SAFETY

● Your advice (League Lines, in December) to "leave the equipment in its case" is sound. The applicable Federal Air Regulation, which is Federal Law, is as follows:

FAR 91.19 Portable Electronic Devices

(a) Except as provided in paragraph (b) of this section, no person may operate, nor may any operator or pilot in command of an aircraft allow the operation of, any portable electronic device on any of the following U. S. registered aircraft. (1) Aircraft operated by an air carrier or commercial operator; or (2) Any other aircraft while it is operated under Instrument Flight Rules

(b) Paragraph (a) of this section does not apply to: (1) Portable voice recorders; (2) Hearing aids; (3) Heart pacemakers; (4) Electric shavers; or (5) Any other portable electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used.

(c) In the case of an aircraft operated by an air carrier or commercial operator, the determination required by paragraph (b) (5) of this section shall be made by the air carrier or the commercial operator of the aircraft on which the particular device is to be used. In the case of other aircraft, the determination may be made by the pilot in command or other operator of the aircraft.

Subsequent interpretations of this law have also brought forth the following facts: Aircraft, as used in the first sentence of paragraph (c) means a specific aircraft, and does not include other aircraft of the same type (such as B-727) operated by that carrier. In other words, you must check out each and every aircraft, and not just one of its type; "particular device," as used in paragraph (c) means the same thing. In other words, Regency HR-2 *Serial Number 000000 could be used only aboard* B-727 Registry Number 000000. (Assuming you could get the airline involved to check out your equipment aboard that aircraft in the first place, and were then lucky enough to fly aboard that particular plane.) I might add that "operate" or "operation" as it is used, is interpreted to mean that the equipment is merely turned on. The oscillators in the equipment are what bother us.

While the odds that the equipment being operated would cause an undetected malfunction are most likely very slight, the consequences are indeed too horrible to warrant taking such risks. In this regard, it is not enough to caution that our reputation might be stained. It is damned small consolation to know what caused an accident. That information is useful only in making sure that it never happens again. The best solution, which we are constantly striving toward, and which you have aided, is to prevent it in the first place. — *Edward W. Sleight, K4DJC, First Officer, Eastern Airlines, College Park, GA*

● During the crash of a United Airlines 737 at Chicago Midway Airport, it was reported a "ham operator" revealed information to the press on certain matters. If this did in fact occur, it was a violation of the Communications Act of 1934, as amended.

I have actively been engaged in attempting to prevent revelation of airline/FAA/ARINC communications for over a year. I can assure you this practice will stop. I would strongly suggest you spread the word and help keep ham operators out of this area of communications. They should not have to be told. I do not want to help prosecute a fellow ham, but I can assure you, I will use every means at my disposal to attempt prosecution of anyone who violates these communications. Lives are at stake, mine included.

I am proud to be a ham and lets not dirty our name any worse than it is now. Our public relations has left *a lot* to be desired and a prosecution of this type will not help. — *Charles G. Yess, Captain, American Airlines, K5DNH, Mansfield, TX*

CONTEST QUANDARY

● When I read on page 87 of October *QST* the announcement of the 39th ARRL November Sweepstakes in which you suggested certain operating frequencies so as to minimize QRM to non-contest stations, I thought at last I will be permitted to pursue my hobby weekends, which by the way, amounts to only 15 minutes each Saturday and Sunday, and not a whole 48 hour period! But alas, this was not to be for when the contest opened up, the contestants took the whole hog and occupied the whole amateur spectrum.

Then came November 25 and 26 when the *CQ* contest took over with the same result. The whole amateur spectrum from the low end to the high end was devoted entirely to the contestants.

I see in the not too distant future when every weekend will be devoted to contests and keeping skeds and rag-chewing will be outlawed. What is the answer? — *Charles W. Coote, W2OHF ex-W2HF, Princeton, NJ*

● I must tell you how delighted I am in the way you have handled the SS Contest. I was most happy to see it recommended that only certain contest frequencies be used so all could enjoy their own type of operating.

It appeared to be succesful on the morning of November 19th when I decided to work some 40-meter cw. At first, much to my displeasure, I heard the SS going on. I figured that about wiped out any casual cw work on any band. However, I recalled reading something in *QST* on SS frequencies to be used. Yes indeed, there it was on page 87 of October *QST* so I went up the band to about 7070 kHz, called *CQ* and had very pleasant *QSO* with many stations all morning long.

This is another way in which all types of operating can be done by all at the same time. — *Steve Hacku, W1PXA, Wallingford, CT*

● I don't believe I've heard as much criticism on the bands as during this year's phone Sweepstakes contest.

I'd like to pass along my apologies to the gentlemen who felt their special frequencies were being infringed upon for one weekend.

Fellows, if we cut back on the yearly Sweepstakes schedule there would be no Sweepstakes at all.

I'm sure there are other individuals like myself whose operating during the year is limited to the various ARRL organized contests. I can't get myself to operate unless my competitive urge is being satisfied. I guess my time seems to be somewhat constructively spent.

Your patience once a year would be appreciated when some of us wish to operate Sweepstakes. – *Bill Graf, Jr., W9MTN, Riverside, IL*

COVER STORY

● You can imagine our surprise and delight when, on unwrapping the November issue of *QST*, we discovered that the 20-meter cw antenna raising at W6VB/6 had been selected for the cover! I thought, for the record, you should have the following additional facts:

1) The antenna is "A Compact 14-Mc. 3-Element Beam" from the 1968 *Handbook*, page 376. It was tuned to 14,050 kHz, and when measured with a Bird meter, showed virtually no reflected voltage. From the contacts made (about 300), it works!

2) We didn't really leave it up with the "tipsy" reflector. Right after the picture was taken, I realized we had goofed, so we brought it down and straightened it.

3) The picture was taken, developed, enlarged and printed by our versatile Club President, Paul Weisz, K6PSE.

4) Those in the picture, from left, are W6FTQ, WB6WDS, WA6FFU, WN6SMS (both back to camera), WA6IFW (behind ladder) and WA6IEZ.

5) The VW bus, as it has for 5 years, made a comfortable 20-meter cw operating position. Very popular on cold, windy nights!

Now, if we'd only placed 1st in 6A again, instead of 3rd! Thanks anyway for the thrill of seeing ourselves on the cover of *QST*. – *Doug Heydon, WB6WDS, TRW Amateur Radio Club, Rolling Hills Estates, CA*

A MATTER OF DEGREE?

● OK, OK, so here's my $7.50 – renew already! Although God knows why! About all I'm getting out of *QST* is a more and more painful realization of how much I don't know. The only thing I really enjoyed in the September issue was the article "7031 kHz," and that only because I fully, soulfully agree with Old Al that Hertzes hurtses. My family and my office pamper me with a dual standard – Never say Hertz to Father/Boss! And just what *are* those funny circuit symbols with the arrows in them? And why aren't there anymore good transmitters built with a 47-46-10 lineup?

Somehow amateur radio isn't amateur anymore when it seems to take an MS, and a current MS at that, to work at it. Tell me, is transistor theory, logical design, modern technology, circuit etching, etc. taught in grade school these days? Along with it, perhaps finance, accounting and successful investing should be taught, to enable the "amateur" to take advantage of the fantastic bargains that all seem to start at $200. Looks like my little 8-watter that's been working reliably on 7 MHz for 15 years will be working for another 15.

Oh well, I feel better for having blown off some steam, and it's hard to stay mad on a beautiful sunny day in Santa Barbara, the start of a week-long vacation; oranges on the tree in the backyard; my own version of TOM's cat snoozing on his pillow; and only three pages of things to do on behalf of the XYL. Hope the Mosley up on the roof didn't get flooded like the living room rug, 'cause I would like to fire up the little 8-watter and see if I can still pound that old Marconi Flameproof Telegraph Key alongside the dusty 75A3. I do enjoy reading *QST*, and I can't think of a better way to keep up with what's really going on in the present day world of ham radio, regardless of fond memories. Perhaps things aren't as bad as they seem: I should be worrying more about finance, accounting and investing than how to master digitalogicalegerdemain; and my real concern both at home and at the office is to understand my fellow man and myself, and find ways to bring us *together* on a common path. And that takes more than my antiquated MS! – *A. J. Rudnicki, K6IA, Santa Barbara, CA*

SOUTHERN CAL's OLDEST?

● I note with interest the claim on page 58 of November *QST* of the United Radio Amateur Club (K6AA) to the title of oldest club in Southern California. It is with the greatest reluctance that I damp their oscillations. In the fall of 1919 the Caltech Amateur Radio Club was organized and station 6UE assaulted the ether with both radiotelegraph and radiotelephone transmissions shortly following the September 26 removal of transmitting restrictions.

While not wishing to turn these hallowed pages into a battleground, we at W6UE will consider ourselves the oldest ham club in Southern California until someone else proves otherwise. – *Bob Palitz, WB2FEH/WB6MIU, Secy/treas., W6UE Pasadena, CA*

PHONE EXPANSION

● I wish to express my wholehearted support for the League's Petition for Reconsideration of actions ordered on FCC Docket 19162 with respect to expanding the General and Conditional phone allocation by 75 kHz to 3825-4000 kHz vice the Docket's 3890-4000 kHz. I would urge fellow amateurs to supply supporting examples of the degrading effects encountered with the former 3900-4000 kHz allocation, particularly with respect to net operations and emergency preparedness.

Now is the time for concerned amateurs to speak up. Write to the League and/or FCC – but do it now.

Let's have Seventy Five for Seventy Five! – *Dave Stamps, W1FUF, Groton, CT*

"DTL"

● Dear *QST* Subscription Computer: The fact that I read that you have begun operations at ARRL headquarters and are helping to keep subscriptions and membership lists is of great significance to me. Even more pregnant is the fact

that I read this in a borrowed *QST*. You should have some insight by now into my problem - a smart computer such as you.

In September, I renewed my *QST* subscription. You sent me my certificate immediately. I have yet to receive my *QST*s which were to start with the October, 1972 issue. This is obviously DTL (darn terrible logic). So, if you will re-open your circuits and begin to send me my *QST*s I would be very much happier than I am now. – *David R. Cartlidge, WB4PHC, Maryville, TN.*

[EDITOR'S NOTE: We haven't put the computer into service yet – so blame us, or the post office.]

● I have just received my October copy of *QST* and read the editorial with interest re the computer – a firm in England has done away with its computer and employed seventeen people to do the job more efficiently! I hope you fare better. – *R. J. Batters, Lincoln, England*

ENVIRONMENTAL POLICY

● With reference to ARRL's opposition to the FCC's Notice of Proposed Rule Making Docket No. 19555, Environmental Policy, (page 78, December *QST*), you state that "no responsible person ever has contended that . . . signals have any effect whatsoever upon . . . the environment." Very high powered radiations in various parts of the spectrum *can* cause changes in the environment: soil heating, ionosphere heating, etc. For the rest, I personally think your case was well stated. Having been through the trials of dealing with neighbors in my youth who blamed every scratching sound on my ham rig (even when I wasn't home), I can appreciate how the young ham and the FCC itself could be overwhelmed with a sea of paper, costs and nuisance only to care for people's vindictiveness rather than to satisfy any informed or enlightened concern for the environment. – *David Davidson, W1GKM, Belmont, MA*

A-M: THREAT OR THREATENED?

● Buried in the small type on page 80 of November *QST*, at the end of section 7, is something that I think deserves more mention: ". . . We strongly urge . . . that full carrier double sideband emission not be used in the lower four HF bands except in an emergency . . ."

I get the feeling that we are being asked to voluntarily restrict our a-m operation before FCC voluntarily restricts it. What do you think? – *Thomas F. Carten, WA1DJC, No. Dartmouth, MA*

● . . . In the past few years I've read in one amateur journal or another proposals from some hams to do away with the mode of a-m. Surely the small amount of a-m remaining is no threat to anyone! . . . – *David L. Hays, WØFCL, Great Bend, KS*

MIND BOGGLING

● It has been some time since a technical article in *QST* on a developmental electronic circuit has excited me. As I remember, the last was the Tri-tet with the type 59 tube about 1934 or '35.

The phase lock synthesizer described by Derwin H. Stevens, W1UYK/WA2DHA in September *QST* is one of the most challenging and finest circuits in our publication. Its application to all types of frequency control circuits, not only in fm gear, but also in ssb, cw, RTTY, and a-m equipment, both for transmitting and receiving boggles the imagination.

It is far reaching and of almost universal application, while remaining simple of contruction by the rest of us. – *Tom Monroe, W6GGR, Eureka, CA*

[EDITOR'S NOTE: WA2DHA was chosen for the September "Cover Plaque" best article award.]

LOCAL LIMITATIONS?

● Reference "League Lines," page 10, November *QST*, under "another last-minute item . . ." And there is another new section prohibiting radiocommunications in connection with any activity which is contrary to Federal, State or *local* law . . ."

This troubles me since it appears that insofar as Federal law is concerned this prohibition already applies. Local laws can easily be passed including zoning regulations and other arbitrary ordinances specifically designed to discourage or prohibit amateur radio activity. Even if after long litigation we may overcome any restrictions imposed upon amateur operation at the local level, our position would be considerably weakened.

I am not a lawyer, but I foresee danger in this and hope sincerely that your legal staff will investigate it thoroughly. – *Andy Thompson, W4PP, Cochran, GA*

LONG DELAY ECHOES

● Most long delay echoes reported by radio amateurs occur from 3 to 30 seconds after the original signal has ceased. And I've read of a San Antonio newspaper account of a telephone conversation which was heard again several hours later. But was I surprised to find that *QST* historical lexicographers were also victims of the strange and omni-evasive LDE bug.

In September *QST*, page 41, is the monthly column of "50 Years Ago this month," which 50 years ago, was September 1922. This was the original transmission of the written message. But under the heading of "25 years ago," I was surprised to again see September 1922. This was the written LDE and it was 25 years in transit!

Once again *QST* establishes a record which is not likely to be broken until the "75 years ago" column appears in the September 1997 issue of *QST*. Mark my echoes! . . . mark my echoes! – *Calvin R. Graf, W5LFM, San Antonio, TX*

TNX

● *The Radio Amateur's License Manual* leaves no stone unturned and takes the mystery out of getting a ham license. – *Bill Piazza, Jr., Southview, PA*

● Many thanks for helping me get my ticket. I always try not to miss W1AW, and the *License Manual* is excellent for studying for the written. – *Jeff K. June, WN8NOI, Weston, OH*

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

Van Lear and the Khmer Reyublic

BY JOHN VAN LEAR, VE7IR

MY FIRST CONTACT with Cambodia was a two-day transit stop in 1969, enroute to Singapore. In July, 1971, I revisited Cambodia on a business trip. This time I made some inquiries about operating an amateur radio station in the Khmer Republic, as it was now known, and I was told that a letter of application would be considered. This was a rather vague promise, but enough to start me daydreaming!

In September of 1971 I made another trip to Phnom Penh, after some prior consultation with XV4AL and 3W8D, both of whom had a lot of practical advice and encouragement to give me.

My hand luggage into Phnom Penh included a photographic accessory case which contains a Yaesu FT-100. This rig only weighs 40 lbs., and I have carried it all over S. E. Asia with me on my various business trips. Fortunately, customs paid no attention to my hand luggage, and so there was no hassle there. However, when I arrived in the city I found that the business contact who had promised to get an operating permit for me had done nothing. It turned out that he apparently didn't even know what amateur radio was.

Anyway, I got on the phone and contacted the Minister of Telecommunications at his home, it being a Saturday, and he promised to process my application on the following Monday. Sure enough, Monday I was set to go, and so I put up my ever-present dipole and checked into the SEA Net, signing VE7IR/XU. I had expected to work only my friends on that net, to let them know how I was doing, but the Net very soon became a mass of pile-ups as the DXers got wind of my presence. For the next few nights I had a busy time of it between 1400-1600Z (I operated during those hours in order to avoid TVI, and so that I would have an opportunity to sample the local beer.) On September 23rd Don, 3W8D, arrived on the scene and gave me a hand with the operating.

On Monday, September 27, I had my first meeting with Vong Sarin, the Deputy Chief of the International Telecommunications Division of the PTT. Vong had known about my operating from the beginning, and was interested in getting amateur radio reestablished in the Khmer Republic.

John Van Lear, VE7IR/9M2IR, and Don Riebhoff, 3W8D/HS3DR/K7CBZ.

This was the beginning of XU1AA. I showed Vong the rig and had him make a few QSOs. The next day he came around again at SEA Net time to check in.

Vong set up a meeting with the Director of the PTT and the Assistant Dean of the Engineering Faculty at the University, with the intention of getting support to establish a radio club at the University. At this meeting, which included 9M2AA and several others, the University Radio Club was born. To give it an additional boost, I donated my FT-100 to the cause. And on the afternoon of September 30 a working party set up XU1AA in the Dean's office at the University. At 1200 that day it made its first official transmission by checking into the SEA Net at 1200Z.

The credit for getting the Khmer Republic back on the air goes to the Cambodians themselves — the Director of the PTT, who authorized the operation; Vong Sarin, who stuck his neck out to convince government officials that amateur radio was a good thing; the Dean of Engineering, who donated his office as the QTH for XU1AA; and the students who helped put up the antennas.

I shall always have a soft spot in my heart for my friends in Phnom Penh. QST

Working party entering the University at Phnom Penh to install XU1AA. L. to r., Lance, 9M2AA; Vong, XU1VS; John, VE7IR,; Dave Kedwell; and two students.

Happenings of the Month

LEAGUE FILES ON COMPENSATION DOCKET

In December, this column reported a Notice of Proposed Rulemaking by FCC, Docket 19605, which would allow compensation of control operators at club stations where substantial services to the amateur body are routinely provided. Comments were due by December 20, with reply comment by January 3.

The ARRL Executive Committee authorized a filing by General Counsel Booth supporting the proposed rules of Docket 19605, which of course affect stations such as W1AW. The text follows:

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

In the Matter of
Amendment of Part 97 to allow the compensation in certain instances of control operators of stations operating in the Amateur Radio Service and modification of the logging requirements regarding third party communications — Docket 19605

To: The Commission

Comments in Support of Proposed Rule Making

The American Radio Relay League, Incorporated, by its General Counsel, submits the following comments in support of the proposal to amend Section 97.112 of the Commission's Rules and Regulations as set forth in the Notice of Proposed Rule Making released October 11, 1972, 37 FCC 2d 496.

1. Until the adoption on October 5, 1972 of Section 97.114 of the Rules relating to third party traffic by the Report and Order in Docket No. 19245, 37 FCC 2d 492, the devoting of a substantial amount of time each week by a League employee to the maintenance and operation of Station W1AW did not violate any rules or policies of the Commission. However, that Report and Order included a statement to the effect that "[t]he provisions of 97.114(b) and 97.112 will clearly prohibit the . . . League's long standing practice of providing compensation to the control operators of W1AW" (Para. 10). In recognition of the valuable and unique contribution to the enhancement of the Amateur Radio Service by the comprehensive schedule of Morse Code practice and amateur radio bulletin transmissions of W1AW for more than 25 years, the Commission not only waived the provisions of Sections 97.114(b) and 97.112, but also issued the above-entitled notice of proposed rule making to add the following to Section 97.112:

97.112 No remuneration for use of station

* * * *

(b) Control operators of a Club station may be compensated when the club station is operated primarily for the purpose of conducting amateur radiocommunication to provide code practice transmission intended for persons learning or improving proficiency in the International Morse Code, or to disseminate information bulletins consisting solely of subject matter having direct interest to the Amateur Radio Service provided:

(1) The station is operated weekly for a period of at least 40 hours;

(2) The station schedules operations on all allocated high frequency amateur bands using reasonable measures to maximize coverage;

(3) The schedule of normal operating times and frequencies is published at least 30 days in advance of the actual transmissions;

2. Without conceding the desirability or necessity for the restrictive definitions of third party traffic appearing for the very first time in Section 97.114, the League supports the proposed adoption of Section 97.112(b) with but one minor change.

3. One of the most important amateur bands is the medium frequency 1.8 to 2.0 MHz band. For many years, the League has been urging that the sharing of the band with the government's loran service be discontinued and that the band revert to its pre-World War II status as an exclusive amateur band. Some progress has been made in increasing amateur privileges in that band. Additional privileges and the eventual discontinuance of the loran operations will restore the band to its rightful role as a most valuable band for short and medium distance amateur communications. W1AW has been transmitting code practice and bulletins in this band for many years. The continued operation of W1AW and similar stations in the band will do much to increase amateur activity in the band and, when the loran operations are shifted to other frequencies in accordance with a long range plan

Ed Raser, W2ZI, left, here receives the Houck Award for preservation of historical equipment from the Antique Wireless Association. A. Prose Walker, W4BW, Chief, Amateur and Citizens Division, FCC "does the honors."

At the National Historical Radio Conference, sponsored by the Antique Wireless Association and held at the Smithsonian Institution, September 22-23, the group's longtime secretary Bruce Kelley, W2ICE, received the Houck Award plaque for Historical documentation. Presentation was by Dr. George Brittain, right, of the Smithsonian. Incidentally, AWA is interested in having more young collectors and ham history buffs as members. Write to W2ICE for info.

adopted by the government many years ago, should help relieve the present overloading of other amateur bands. For these reasons, the League recommends and requests that proposed Section 97.112(b) (2) be enlarged to read as follows:

(2) The station schedules operations on all allocated medium and high frequency amateur bands using reasonable measures to maximize coverage.

Respectfully submitted,
THE AMERICAN RADIO RELAY LEAGUE

By Robert M. Booth, Jr.
Its General Counsel

December 20, 1972

FCC DENIES THREE PETITIONS

Continuing its charge through the accumulated petitions for rulemaking, FCC has denied three more.

RM-1670, by Aaron C. Self, would have amended Part 95, Citizens Radio Service rules, to increase authorized power, change the penalty for improper operation, and establish a code and theory examination. Noting that the essence of the proposals was to create a quasi-amateur license and to allow hobby-type activities in the frequency band allocated to the Class D Citizens Radio Service, the FCC said the Class D category of operations was created by the Commission to meet the needs of individuals and business requiring low-cost short-distance radiocommunications facilities. It was not, the Commission said, created to provide an additional medium for those seeking a hobby in radio.

A request for rulemaking to outlaw double sideband a-m on amateur frequencies below 32 MHz, filed by Kurtz A. Fichthorn, W1FK, and Dr. Peter Iaccarino, W1KVP, in November 1970, has also been turned down by the Chief, Safety and Special Radio Services Bureau, under delegated authority. The Order noted that use of double sideband does not represent sound conservation or wise use of the amateur frequency bands; in fact, FCC urged in its Report and Order in Docket 19162 (Phone Expansion) that full-carrier double-sideband emissions not be used in the lower four high-frequency bands except in an emergency. However, the Commission finds that it is not necessary to begin rulemaking proceeding to eliminate this use, since it does not present a significant problem. "As the request for rulemaking itself said, double sideband is steadily decreasing to the point where very few amateurs now use it," the FCC said, and therefore the petition was denied.

Richard Ebeling, K2UTC, in June 1971 had asked for almost the opposite, in RM-1804 – exclusive subbands for a-m telephony on 21,425-21,450; 14,325-14,350; 7275-7300 and 3975-4000 kHz, 250 watts maximum, open to all classes. In denying the petition, FCC said, "It represents neither efficient utilization of the amateur frequency spectrum nor sound conservation of the already crowded amateur bands." And again, FCC cited its earlier urging that double-sideband full-carrier be used on these bands only in emergency.

AMATEUR RADIO WEEK, ALABAMA

Amateur Radio Week was held in Alabama the week of November 6-10, 1972, by proclamation of Governor George Wallace. The paper said in part, "Developing character in individuals, and mobilizing it through community actions remains a most vital work. Over past decades, the amateur radio operator, more fondly referred to as the ham, has contributed splendidly to this idea. Hundreds and thousands of people have been helped in time of great stress and disaster, such as Hurricanes Camille and Agnes . . ."

The standard Amateur Radio Week for 1973, as sponsored by ARRL and set forth in *Chases' Calendar of Annual Events*, is June 17-23, the week which ends with Field Day, our best exercise for local pictorial publicity. More than half the states have observed amateur radio week at least once, though not all have used the standard week nor repeated the event annually. If your state or community issues such a proclamation, please report it to use for inclusion in this column.

CHICAGO PUBLIC RELATIONS IDEA

The Chicago Area Radio Club Council, Inc., to provide information to the general public and improve relations between the public and the amateur, has established a local phone number, 764-3572, which may be called for information. Subjects to be covered include: local club addresses and meeting schedules; locations for free license instruction; TVI assistance; assistance in emergency, public service or special events communications; and lists of speakers on amateur radio topics. It's an idea worth trying in other metropolitan areas.

REPEATER RULES AFFIRMED

The rules adopted by FCC in Docket 18803 (*QST* for October, 1972, beginning on page 100), which among other things provide for the licensing of repeaters, have been affirmed; numerous petitions for reconsideration, stay or changes have been denied by the Commissioner. FCC said that the petitions added nothing to the information considered in adopting the Report and Order. "Operation of a repeater station in the Amateur Radio Service could present unique problems not comparable to other radio services such as Land Mobile or Citizens Class A," the Commission concluded. Stating that the ingenuity of amateurs could eventually "develop the techniques, technical and operation" that would permit the adoption of rules for automatically controlled repeater stations and that it was conceivable that automatic and reliable means could be developed to perform "all of the supervisory functions of repeater station control operator under certain specific conditions," the Commission said provisions for automatic control were not warranted at this time.

There remain many points about recent rulemaking which are unclear or which set unwise new courses of regulations; ARRL continues to seek solutions to these problems. QST

Hamfest Calendar

California — Foothill High Amateur Radio Club's 1st Annual Swapmeet and Hamfest is Saturday, February 3, at Foothill High School, 19251 Dodge Ave., Santa Ana (corner of Dodge and Newport Ave). Hours 9 A.M. to 5 P.M. Tickets, 35¢ for adults, 25¢ for children. Booths, $5. For info call (714) 838-7385 from 7 A.M. to 2:30 P.M. Mon. – Fri. or write G. B. Ward at above address.

Illinois — The Wheaton Community Radio Amateur Club advises that tickets for their February 11 Swap and Shop are $1.50 advance and $2.00 at the door. See *QST* for January, page 71, for other details.

Indiana — February 18 is the Grant County Amateur Radio Club Swap and Shop at Jonesboro Park Shelter House, Jonesboro, from 10 A.M. to 4 P.M.

Indiana — Lake County Amateur Radio Club, Inc. is holding the 20th Annual Radio Club Banquet at the Scherwood Club, 600 East Joliet St., Scherville. The date is February 10 at 6:30 sharp. Awards, music, speeches, food — all you can eat — entertainment and good fellowship. Guests welcome. Tickets in advance only at $5 from Herbert S. Brier, W9EGQ, 385 Johnson St., Gary, IN 46402 or from other club members.

Indiana — LaPorte Amateur Radio Club's Annual Swapfest and Auction is Sunday, February 4th, starting at noon at the Civic Auditorium. A talk-in station on 94 and the LaPorte Repeater, 22-82 on tm and 3910 kHz ssb. 250 amateurs from 4 states attended last year.

Iowa — Davenport RAC 2nd Annual Hamfest is February 25 at the Danceland Ballroom, Fourth and Scott St. in Davenport. Plenty of parking. Free coffee and doughnuts 9:00-9:30 A.M. Talk-in on 146.94 and 3.975 MHz. Advance registration $1.50; $2 at the door. For more info write, Ken Caldwell, 1412 14th St., Davenport IA 52804.

Louisiana — Lafayette Amateur Radio Club, Inc. Annual LARC Banquet is Saturday, March 10 at 7:30 P.M. at the American Legion Home, Surry St., Lafayette. Trophies for 1973 Louisiana QSO Party, the famous "E" awards and the annual "Cajun Award" will be presented. The food will be a Cajun's Delight prepared by Marshall Dallas Broussard. Happy Hour at 6:30 P.M. Talk-in on 146.94 simplex. Advance registration until Feb. 28 is $5, at the door $7. Send reservations to LARC Banquet 1973, P.O. Box 345, New Iberia, LA 70560.

Michigan — Livonia Amateur Radio Club's Annual Swap and Shop is Sunday, February 25, at the Franklin High School, Joy Rd. and Merriman Rd., 10 A.M. to 4 P.M. For more info write Joseph A. Keller, 29680 Wentworth, Livonia, MI 48154.

Texas — Annual St. Patrick's Day Swapfest is Sunday March 18 by the Midland Amateur Radio Club, Midland. Usual social events will preceed the Swapfest on March 17th.

Texas — The Texas VHF-FM Society's Winter '73 meeting is February 24 and 25. The place is Fort Brown Hotel, Brownsville.

GREAT LAKES DIVISION CONVENTION

Muskegon, Michigan **March 23-24, 1973**

The 1973 ARRL Great Lakes Division Convention-Hamfest, sponsored by the Muskegon Area Amateur Radio Council, will be held in Muskegon, Michigan, March 23-24, 1973. Friday evening, March 23, the Ramada Inn in Muskegon will be the headquarters for a real old-fashioned ham-hospitality session, with a Wouff Hong initiation ceremony at midnight. The fifth such event to be held in Muskegon will open at 8 A.M., Saturday morning, at Muskegon Community College, with technical sessions, swap and shop, commercial exhibitors and net meetings. There will be parking for 1500 cars. All registration tickets are $2.25. Saturday evening dinner, dancing and libation at the Ramada Inn is separate. For information and reservations contact Hank Riekels, WA8GVK, Convention Coordinator, Muskegon Area Amateur Radio Council, P. O. Box 691, Muskegon, Michigan 49443. QST

COMING ARRL CONVENTIONS

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

April 27-28-29 – West Gulf Division, Euless, Texas.

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.

IARU 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

"RAEM" AWARD

The *Radio Sports Federation* and the Central Radio Club of the USSR have announced an award in memory of noted Polar explorer Ernst Krenkl, RAEM (February 1972 *QST*, p. 72). This award is available to all radio amateurs who accumulate 68 points by making confirmed contacts with amateur stations as follows:

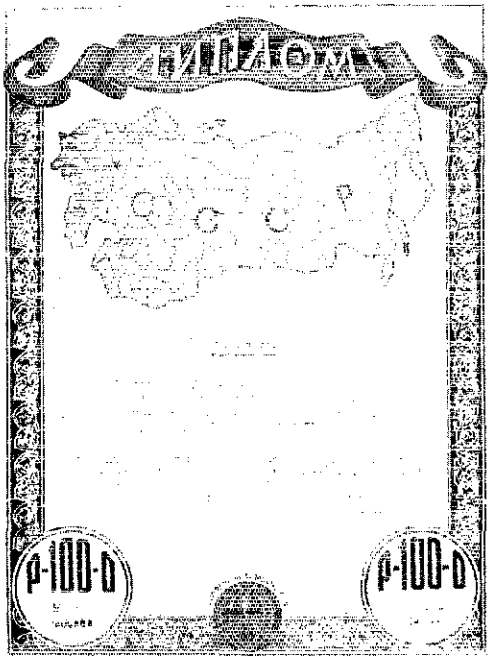
1. A contact with RAEM – 15 points.

2. Contacts with Soviet stations in the Antarctic and on floating ice islands in the Arctic – 10 points.

3. Contacts with the following locations along the northern coast of Siberia – 5 points: Ambarchik, Cape Chelyuskin, Cape Schmidt, Dickson, Pevek, Tiksi, Ust Olenek, Yankarem. These points are doubled for stations in South America, Oceania, and Africa.

4. Contacts with other Soviet amateur stations north of the Arctic circle – 2 points.

All contacts must be on cw, and all (except with RAEM) must be after December 23, 1972 – the 69th anniversary of Ernst Krenkl's birth.



Applications must include a list of contacts, including date, call sign, and frequency. QSL cards are also required for checking. The cost of the award is 1 rouble or 14 International Reply Coupons and covers the cost of return postage. Send to Central Radio Club, P.O. Box 88, Moscow, USSR.

WIJNAND J. L. DALMIJN, PAØDD

With deep regret we record the passing of Win Dalmijn, PAØDD. Win's devotion to amateur radio was illustrated by the variety of offices in which he served, both in the Netherlands and internationally. From 1950 to 1962 he was vice-president of *VERON*, subsequently serving for five years as president and thereafter as a council member. He was active on the Executive Committee of the IARU Region 1 Division first as a member and later as treasurer. The confidence in Win's leadership felt by his fellow amateurs was illustrated by the unanimous election of PAØDD as chairman of the Region 1 Division a scant four months before his death.

The passing of such a dedicated and unselfish servant of amateur radio is a loss to all amateurs. Per-Anders Kinnman, SM5ZD, who retired as Region 1 Division chairman in May 1972, has agreed to serve again on the Region 1 Executive Committee to fill the vacancy created by this tragedy.

INTERNATIONAL SYMPOSIUM TO BE HELD IN ISRAEL

An International Symposium of Radio Hams in the Satellite Era will be held in Netanya, Israel between June 24 and 29, 1973. Sponsored by the *Israel Amateur Radio Club*, the symposium will cover the following topics: amateur satellite communication, slow-scan television, international contests, vhf fm, and third-party traffic.

Additional information is available from the organizing committee in care of Eastours, Inc., 1140 Ave. of the Americas, New York, NY 10036.

Another popular and difficult award available from the Central Radio Club of the USSR is the R-100-O. Contacts with 100 of the 173 regions (oblasts) of the Soviet Union are required. Details may be obtained from the Central Radio Club, P.O. Box 88, Moscow, USSR.

CONDUCTED BY BILL SMITH,* K1OCER

FREQUENTLY WE ARE asked "What kind of commercial antenna is best?" This question cannot be answered for several reasons, not the least important being that there is no one *best* antenna. Also critical is what the inquirer means by "best." Usually he means "What commercial antenna has the highest gain?" And along with this he may want to know why gain figures on commercial antennas are not ordinarily found in our reports of amateur antenna measuring parties.

The answer to the latter is that antennas designed for the objective of providing the highest possible gain on a specific frequency have pretty well eliminated manufactured antennas from such contests. This is not to say that there is necessarily anything wrong with the commercial products that lose out so often in these affairs. A manufacturer may not know, for example, whether his 2-meter antenna is going to be used at 144.1 or 147 MHz. He is not likely to know with any certainty what part of the 420-MHz band will be used, or whether the purchaser will want wideband coverage or narrow.

There are various ways of building in some degree of bandwidth into a vhf or uhf array. In the absence of any specific information as to what frequency the array will be used on, the manufacturer will probably use some method of broadbanding that will almost certainly keep his product from winning a typical amateur antenna-measuring contest.

QST has a policy of discouraging antenna gain claims in advertising. One reason for this is the lack of any industry standard as to whether the gain is to be expressed in terms of the isotropic radiator or in reference to a half-wave dipole, which is the more common interpretation of "gain" in amateur circles. With the former we have the problem that such an antenna exists in theory only. With the latter there is the considerable difficulty of establishing that a comparison dipole actually works like a dipole in free space. It almost never does.

Ed Tilton's information in Chapters 8 and 9 of *The Radio Amateur's VHF Manual* takes these matters up in some detail, and is an excellent source of practical design and construction information. It is worth a thorough reading, whether you buy or build your antennas. But is still leaves you to make the ultimate choice.

We are also asked frequently about deadlines, and when activity reports should be sent in. Because of the required publication time, a column like this is written at least one month ahead. What you are reading now was prepared in the middle of December. My deadline for finished copy at Headquarters is the 22nd of the month, or so Managing Editor WA2INB hopes, which means that I must have the raw material no later than the 18th (18th of December, for the February issue). Late-breaking news items are inserted into the column by the "retired" W1HDQ, provided that they arrive in Newington before copy goes to press. To keep the news that eventually appears in print reasonably current, it is important to report as soon as possible after the event, especially with events in the latter half of the month.

What to report? If a contact made or an experiment concluded was interesting or useful to you, others will enjoy reading about it. When the column is short, as it is this month, maybe *you* could have made it longer, and more interesting.

*Send reports and correspondence to Bill Smith, K1OCER, ARRL, 225 Main St., Newington CT 06111.

OVS and Operating News

50-MHz DXers were awaiting the winter minor E_s season at this writing. Early indications were that nothing spectacular was in store, but then one never knows about six. In Phoenix, WA7FPO reported several minor *E* events in December and he heard LUs via *TE* December 18.

Earlier, WA1OUB near Manchester, N.H. reported phenomenal scatter the evening of November 17 during the Leonids meteor shower. Bob says signal levels were S3-4 residual on 4s and 0s with S9 bursts lasting 30 and 60 seconds. Bob reports the apparent peak between 2100 and 2300 EST. He runs a 4CX250B to a 6-element wide-spaced Yagi at 70 feet. WA1DFL, Mass., indicated he was not impressed with early winter *E*.

WA5IYX, San Antonio, summarizes November *E* saying, "the month's low level was completely out of character with what the summer season was." An understatement from Pat? He recorded only 100 minutes of 50-MHz *E* during the entire month of November, and that on the 25th. Pat heard Arizona and California stations, but believes the major activity was south of San Antonio in Mexico and Central America. The opening had characteristics of the Thanksgiving 1968 surge into the Caribbean. Pat cautioned, however, that November has never been a reliable guide to December; e.g. a poor November and very good December in '69 and the converse in 1970.

December began well for WA5IYX, with 4s, 5s, 6s, 7s, 8s and 9s during a 4-hour opening on the 2nd, which also brought in Mexican Channel 3 TV. Pat noted *E* the following day to 4s, and December 5 brought a strong opening which apparently included most of the U.S. Pat recorded the *E* muf as high as 94.5 MHz and mixed with tropo.

WA5IYX says the December Geminid shower became active on the 12th and apparently peaked the following morning between 1730 and 1900 CST. As your writer drove across New Mexico that night I was entertained by the meteor streamers frequently seen in the black sky. Pat reports that

bursts in the fm broadcast band lasted 25 to 30 seconds. Later the 13th there was *E* spread generally throughout the country and peaking over 94 MHz at WA5IYX. Pat says, "Meteors are about the only thing that gives us a second propagation mode *(E)* long after their death."

WA6HXM says he and eight other Los Angeles area stations worked KH6EQI on F_2 the afternoon of October 31. Pete reported several scattered *E* openings that included a December 3 contact with K3IXQ in Maryland. WA6HXM reports WA6OZC has a new 50-MHz array operational consisting of four 6-element Yagis, with the bottom bay up 40 feet. W6DPD, Fresno, reports November 26 *E* to San Antonio. He also says that FCC "invited" him to take his Technician examination in person. He did — and passed. K7ICW noted a November 27 *E* break to San Antonio but says otherwise November was a bust.

W8UCI worked Oklahoma during a 45-minute E_S opening November 26, the only opening he observed during the month. The same opening was worked by WØPFP, Iowa, to the northeast, and WØMOQ, also in Iowa. December 2 WØPFP worked 4s.

W1HDQ, Canton, Conn., caught his first good winter E_S opening the morning of Dec. 9, as a result of his habit of checking 28 MHz frequently throughout the day. "Short skip" showed up on 10 around 1000 EST, after the band having been almost dead earlier. In minutes there was skip on 50 MHz, mostly in the form of enhanced scatter, at first. K8MMM was raised at 1030, with a signal more like scatter than Es, but by 1050 there were strong signals from Ohio and Kentucky. WB4YAB was worked at 1052, WA4KDF, near Bristol, Tenn., at 1130, and WØMOQ, Lisbon, Iowa, at 1210.

WØMOQ reported hearing TG9SO, Guatemala, on 50 MHz around 1900 CST, Dec. 5. There was E_S into the south and southwest at the time. TG9SO was in for about a half hour.

VE4MA, Winnipeg, reports that the Nov. 26 session lasted three hours, with signals from 4, 8, and 9 hitting the pin. VE4s AS and QL also enjoyed this one. Have you wondered about VE8BY, a former 50-MHz prize? VE4AS visited him, and found Pete playing with 2 meters, but planning resumption of activity on 6 again soon.

Finally, WBØBJN, Box 299, Adron, Iowa, would like contacts on 50-MHz Telefax. He and WAØSYM are ready.

144 MHz attention has turned mostly to Oscar 6. I agree with an editorial written in the *Northeast VHF Association Newsletter* that perhaps the most important accomplishment of Oscar 6 is proof that specialized equipment is not necessary for this kind of satellite communication. One hundred watts effective radiated power is *all* that is required. Those who insist on running excessive transmitter power, reportedly over 1000 watts input in some cases, and with high gain arrays, are handicapping other operators running the erp suggested by Amsat. The 100 watts erp may be generated by any combination of transmitter power and antenna gain, and transmitters running as little as 10 watts input have been used successfully.

Receiver performance at ten meters is one cause of a seeming need for more 2-meter transmitter power. Some Oscar 6 users crank up their two-meter output until they hear themselves on ten meters. If their ten-meter receivers are below par, the result is overloading the satellite's input. Preamplifiers will improve some ten-meter receivers, but if the receiving location is plagued by noise, little can be done except to experiment with antennas for better reception of the satellite's 10-meter signal.

Another receiving problem has been that many modern communication receivers cover ten meters in 500-kHz segments and that the Oscar 6 output bridges two of these segments. It is hoped that future Oscars will use vhf or uhf downlinks.

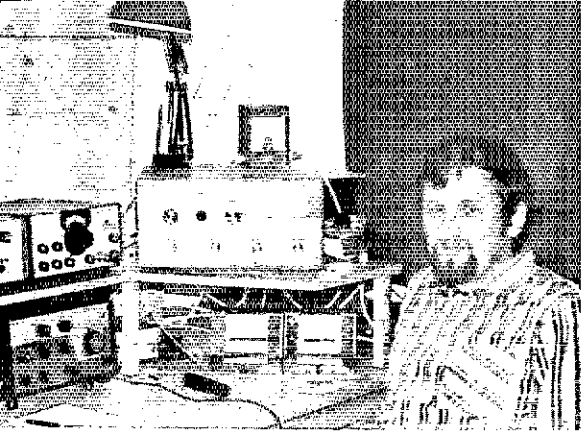
Remember to send your reports to Amsat, P.O. Box 27, Washington DC 10044. Headquarters is also interested in receiving reports of any unusual propagation noted, states and countries worked, and antenna systems found successful.

Speaking of contacts through Oscar 6, judging by his last report, K7BBO must be near 600 QSOs in 40 states, and who knows how many countries. In early December Dave had completed 480 contacts in 30 states and 6 countries. I'm certain others have topped that, but we've not heard from them.

In Minneapolis, WØs LER and MJS have observed an upward Doppler shift of 2 kHz, when Oscar 6 crosses the equator northbound between 65 and 90 degrees west longitude. Other equatorial crossings and southbound passes do not exhibit the upward Doppler shift. The frequency shift has been observed for 2 to 5 minutes after acquiring the satellite's signal. Ionospheric causes have been eliminated. The theory is that there is a sphere of influence approximately 25 degrees wide, probably in the northwest Caribbean, affecting the signal's forward travel until the satellite rises above or passes over the area. WØs LER and MJS have not determined if the effect is present on all such passes, but do know that it does peak. WØMJS says Amsat officials are likewise puzzled.

WØRLI, also in Minneapolis, finds that aurora predictions apparently can be made from the 435-MHz beacon *two days* in advance. The 435 signal sounds rough, with holes in it. WØRLI has verified aurora in the 66-MHz region each time within 48 hours. Apparently the 435 signal is a very sensitive indicator, because only once has the phenomenon produced aurora intense enough to be workable at 144 MHz. Anyone with observations of like interest?

More 50 MHz activity is promised by XE2AB, left, from Puerto Penasco, Sonora, Mexico located some 200 miles southwest of Phoenix. Luis runs about 75 watts ssb and cw to a 3-element Yagi. Left to right; XE2AB, his wife Carmelita, WA7FPO and KØCER. Picture was taken during a December visit to XE2AB by WA7FPO and KØCER.



DK2ZF enjoyed seven weeks of nearly-constant Oscar 6 activity before resuming work as a radio officer aboard the German tanker ESSO Muenchen. Rolf made 319 QSOs with 169 different stations in 30 countries, about one-third on ssb and the rest on cw. Largely homebrew, his station is fully equipped for ssb on 144 and 432 MHz — a not uncommon feature of European installations!

Before leaving the topic of satellite communication, we note the passing of UP2ON, a long-time active vhfer in the Soviet Union. In 1965 he worked K2GUN via Oscar 4, to establish the first direct satellite contact between the United States and USSR of any kind, not just amateur.

K5BXG, Tulsa, caught aurora November 1, working stations in Ohio, Illinois, Indiana, Iowa, and South Dakota, beginning around 1330 GMT. Charlie reports the Leonids poor in Oklahoma (and apparently everywhere else) but he did manage a contact with W4VHH, South Carolina, for state No. 35. His state No. 36 was W5LO, New Mexico, a 587-mile path, during the Geminids, December 14. Three other schedules were unsuccessful. Charlie says both W5ORH and K5PJR, Oklahoma, worked W7JRG in Montana on the evening of the 12th. K5BXG has a new antenna system on the drawing board — an array of 88 elements consisting of eight 11-element Yagis stacked two wide and four high. Good luck!

That November 1 aurora permitted K8HWW, Michigan, to work stations from New England to Iowa between 0240 and 0440 GMT. Clem added state No. 31 via an October 26 tropo to W5RCI, Mississippi. W8YIO, near Detroit, also worked Rex.

Additional Geminids reports, received at Headquarters: W2FWM, Flanders, N.J., worked KØWLU, Wagner, S.D., mostly on a 10-second burst at 0151 GMT, Dec. 14. WØRLI, Minneapolis, was worked between 0300 and 0330 on several bursts. The KØWLU QSO was on ssb, the latter on cw.

WAØCHK, Bowling Green, Mo., added WA7BBM, Arizona, for state No. 41, at 1212 GMT Dec. 11. This 1200-mile QSO was made on 145-MHz ssb, on a 30-second burst.

220 MHz is ready for a spurt of activity now that another manufacturer has announced an fm transceiver for 1-1/4 meters. Incidentally, ARRL's Technical Department has called upon fm manufacturers in the US and elsewhere to tighten performance standards, in the interest of reduced cochannel interference and TVI. But even with 220 fm likely to become increasingly popular, DXing has caused considerable growth of activity on the band this past year.

K1PXE, Milford, Conn., running 80 watts, has worked 13 states and as far west as K9HMB, Illinois. In the Pensacola area, WB4KGW writes that several stations are active including WB4s BSZ, DHL, KGW, ZPC and WA4JNA. Most all are using low-power a-m and small Yagis, but they are upgrading their equipment. Let us know, Ron, when you fellows are ready for schedules.

In Southern California, WB6FSE advises activity is centered around 222 MHz, with 15 stations checking into a Monday net at 0400 GMT. Lyle says there is also nightly activity on 222, and 400-mile contacts were common during '72. K6IBY, K6YNB, W6CFC, WA6JIC, WA6OZC, WA6VQJ, WB6RIV and WB6FSE all have kilowatts ready for schedules, as does WB6RAL/6 at Stanford University. At Havasu City, Arizona, WA7NGK sports 100 watts, a-m.

In Tacoma, Washington, K7BBO used the November Leonids to work W6PO on the 16th. The m.s.QSO was made on a 50-second burst.

420 and up finds increasing interest in tropo and moonbounce. K1PXE has worked seven states on 1296 with equipment supplied by K2JNG and WA2LTM. Pete runs 25 watts to a 29-inch dish. K2UYH, Trenton, worked VE7BBG October 28 for their third moonbounce contact on 432. Al is also scheduling W9WCD, Illinois. Three days earlier K2UYH worked K9UIF, Indiana, on tropo for state number 19. K5UGM, Dallas, says fall tropo on TV channel 16 indicated frequent 432 openings to Mississippi, Missouri and Kansas, but he heard no amateur activity. Bill offers tropo or meteor schedules and says he and W5LDV, Houston, are active nightly at 0300 GMT. Bill is nearing completion of a kilowatt and an array of sixteen 15-element Yagis, with moonbounce in mind.

Among a bevy of experiments at WA6EXV is one using a weak-signal integrator for schedules with W6FZJ. Joe, W6FZJ, worked K2UYH November 21 via the moon for state number 3. A Leonids meteor schedule run with W7JRG produced nil, and Joe is not impressed with meteor potential at 432.

K7BBO, Tacoma, is working on a 432 kilowatt, so Washington state will soon be offered by a most capable DXer. In Ohio, K8UQA advises he has 19 states on 432, after fall tropo contacts with WAØCHK and WØYZS, Missouri, and W8QOB, W. Va. He says Ohio 1296-MHz activity is growing with W8DGF, near Cleveland, running 100 watts into a 6-foot dish. K8UQA has a 7-foot dish and receiving chain working; now to the transmitter.

W3BLC wrote from Denmark while visiting OZ9CR that Hans has now heard his own moonbounce signal although he had previously worked W2NFA. This on 1296. On October 5, OZ9FR heard G8AZM on 1296 after first establishing contact on 432, but a transmitter failure at G8AZM prevented a likely QSO. But 45 minutes later OZ9FR worked G4BEL followed by G8BYV, both England, before the band closed. The best DX worked that night was some 450 miles and both OZ9CR and OZ9FR hope the contacts will foster more 1296 interest in Europe.

The Crawford Hill VHF Club has added another European country on 1296 MHz, via the EME route. On Dec. 3, W2NFA worked PAØSSB, between 1100 and 1200 GMT. The moon was about 10 degrees above the horizon, to the south, from both locations. The W2NFA signal (400 watts output, 60-foot dish) was running some 12 dB above the noise at the Netherlands end. PAØSSB runs 150 watts, to a homebuilt 20-foot dish. Operators at W2NFA were WA2HVA and W2IMU.

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

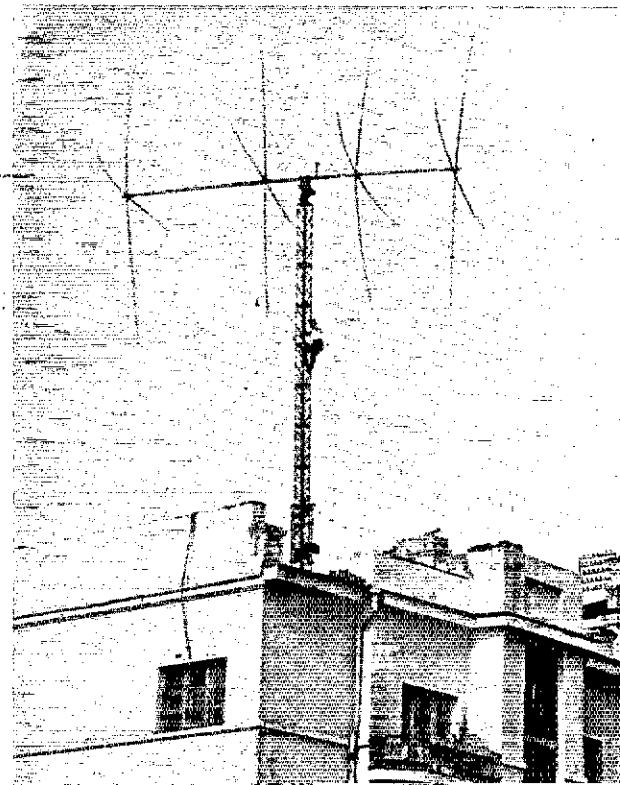
W h o :

January's rather sorrowful intro re ARRL QSL Bureau functionings didn't sufficiently salute the many hams who forgo on-the-air DX time to volunteer for tedious clerical tasks at local bureau branches. For example, W6s AFI CUF DPK GFS ITD JZU LQC NTQ OKK OL RGG, K6s DC TWT UJS YGS, WA6s AHF CXK COB YXP, WB6s BGQ INV and others chipped in to keep Northern California DX Club's Sixland Bureau franchise humming in November. Their efforts surely make them "QSLers of the Month" and we'll be pleased to acknowledge similar Elmer-like labors at other bureau branches.

Which reminds us that it's time again to excerpt from the "How's" Elmer file (March '71 *QST* and thereafter) testimony that our Old Ham Spirit still stalks the land and beyond. . . .

Since reading about others' Elmers I'd like to record mine of many years ago. He was then 3VW, now active as K2BG. Poor Herb couldn't press his key without me ringing his doorbell. What patience he had! He introduced me to my first sounds of DX on his Schnell tuner, slop-jar rectifiers and UV-202 with ribbon-brass pancake helix. Old 3VW tutored me on the intricacies of the Hartley oscillator and gave me confidence enough to go for my own license in 1925. Many years later he recommended me for my ARRL A-1 Operator certification, as much a credit to him as it was to me. (W3LC) . . . A fairly new amateur at 13, I am enjoying ham radio thoroughly as a Technician after much Novice fun. Hope to join General ranks in the near future. I would never have progressed to my present status without the help of W4s DQS SLD, WA4KJV and WB4MPK. (WB4YIX) . . . I'm interested in those "Elmer" jottings and hereby nominate my own. W9NFT did the job almost 20 years ago. Lyman provided the spark to get me going with my first homebuilt rig, a 6AG7-807 outfit for 80 and 40. W9NFT always had an interesting Command set or something perking on some band, never much for fancy gear. I've lost touch with this fine Elmer but I'm sure he's still an enthusiastic ham wherever he may be. (W9ZTK) . . . Let me express my appreciation and thanks to WØPUO for helping me discover and enjoy amateur radio. This couldn't have happened without the kindness of David Bridges. (WNØIBR) . . . My two old classmates, 3QB and 3QC, interested me in this great avocation 'way back in 1920. They kept me running between their shacks trying to figure out the respective virtues of Grebe, Paragon, Acme, Thordarson, etc. I finally settled on a Chambers loose-coupler and Acme quarter-kW which I still treasure. With the wonderful help of these Elmers I became 3BOX in January of '22. Night school and the future XYL caused my ticket to expire in 1924 but I rejoined hamdom seven years later under my present call. Those two are still on-the-air, ham spirit glowing brightly after half a century in the game. Hooray for Elmers! (W3AJF) . . . I'm another "Elmeree" who wants to put into your record his thanks to benefactors K9RPX, WB9GAG, WN9s HSQ and JFD. They really applied the inspiration. (WN9JTC) . . . The Elmer I'm saluting is W5RSZ who also happens to be my dad. Anyone whose father is an avid ham probably gets more than the average amount of assistance. Dad drilled me on code and theory for my General. I'll be counting on him to help with my Extra in a year or so. I sure hope to follow in W5RSZ's Elmer footsteps when I grow up. (WB5BHN) . . . My Elmer, VE3FMN, gave up many a Monday night to instruct me, and his help deserves a special thank-you. As one result my station is completely homebrew and solid state, capable of fully portable operation. Next step? Advanced! (VE3FFO) . . . WB4JTT introduced me to the wonderful world of hamdom three years

*c/o ARRL, 225 Main St., Newington, CT 06111.



UA9OH displays an impressive four-element 20-meter quad at our QTH of the Month, a Novosibirsk apartment complex. Vlad, slightly visible on the tower, tells W1YL his current DX kick is single-sideband QRP with a homegrown transceiver. One wonders if UA9OH will stick to low power in the brawling ARRL DX Contest this month and next!

SY1MA is the big DX news out of Greece lately thanks to SV1DB, SVØs WII and WJJ. Din, Bill and Vince overcame numerous obstacles to activate the Mount Athos religious autonomy in October. At left SV1DB and SVØWJJ battle generator difficulties. Mule driver Angelos, his sturdy conveyance and SVØWII set

ago. Through David's boundless enthusiasm and patient explanations I found myself becoming more and more involved in his pursuit. At the height of my interest he suggested that I try for my own ticket. Success! Without WB4JTT it wouldn't have happened. I wish all prospective radio amateurs could find Elmers as intelligent and helpful as my own. (Judy Nixon, WN4---) . . . I was interested in ham radio for ten years but never found the opportunity to study for my license, usually being stationed in countries where Americans could not operate. Arriving in Lebanon I soon found two Elmers, OD5s EP and FB. Thanks to help from Raja and George, both native Lebanese amateurs, I finally passed the PTT exam. I enjoy my new hobby tremendously. It's clear to me that the U.S.A. has no Elmer monopoly! (OD5GT)

That last one *is* a switch, all right. W/Ks tend to think of Uncle Sam as a sort of exclusive international Elmer. But ham spirit knows no boundaries and flows in all directions. May we hear about *your* Elmer(s)?

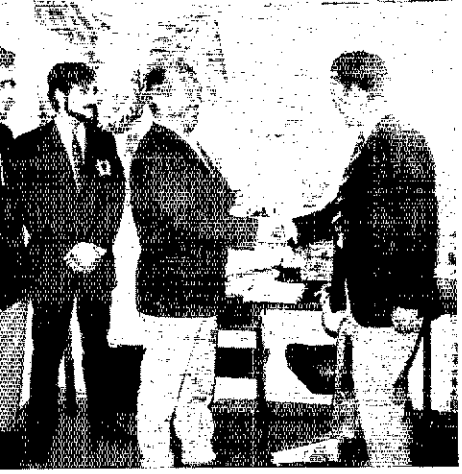
† † †

Where:

NORTH AMERICA – Sorry about the QSLing delay for the T19C Cocos DXpedition of a year ago. T12CAP has given me the logs and all is in order. (TI2GI) . . . Reminder: The foreign mint postage concession formerly administered by W2SAW now is handled by W2AZX. It can be very effective in boosting one's DX QSL receipts. (WWDXC) . . . DXpedition of the Month's W2GHK estimates his group's DX QSL output as now having passed the million mark (SCDXC) . . . International DX Association's K3RLY reports their 100,000th QSL in the mails. (NTDXN) . . . VE7BEF offers to help with outstanding VE2DHF/YV QSL debts if any. (WCDXB) . . . ZF1SB warns of unauthorized use of his call for fall QSOs. (DXNS) . . . One PZ1 tells me that the Surinam bureau is bottlenecked these days. Best to go direct if possible. (VO1KE) . . . Still have a bunch of Bahamas QSLs available to those who still need confirmations for K6LZQ/VP7 QSOs. (K6LZQ) . . . My liaison with HI8LC has lapsed from his end so please pass the word that I no longer manage Luis's QSLs. (W2OFB) . . . I'll be happy to lend a hand as QSL manager for some DX station in need. (WA7RKA) . . . Help! The following parenthesized pen pals hunt hints, clues and any other encouragements toward nabbing wallpaper from holdouts mentioned: (WA6ZKI) CE2RF, CP6FG, CX1JM, SP8CUJ, SV4RP; (WA7RKA) OA4CBZ, VR6TC, YN4ICC, ZD8FM, ZE1CU; (WB2NLM) CP5AK, CX3BR, W3DQD/YV1, 5N2AAE, 5V4JS, 8QAYL; and (VO1KE) 5X5NA. Any 'alp? . . . "QSLers of the Month" EL2DG, ET3JH, KA2DX, KC4USP, KR8GV, OX3HV, PAØSOM, PJØFC, PY7SR, TG9NJ, VE3FVV, VP7CQ, ZL1AMO and 7P8AC, plus QSL tenders Ws 2LGU 6KNH, K2BPP, WBs 4SRX and 8ICV responded to "How's" correspondents WA7RKA, WB4IUX, WN9IWY and VE7BAF with DXtraordinary speed. Any particular pasteboard punctuality you'd like to reward with mention here?

EUROPE – Russia's CRC bureau figures its 1972 outgoing QSL total at about three million, twenty percent heading Statesward. (CARA) . . . In addition to his 13,000-QSL task for UK1ZFI Franz Josef fun, UR2AR must answer

WA3SMN/TF likes 21,375-21,425 kHz at 1500-1800 GMT, also tries 20 at times, and has QRP DX fun with a one-watter on 15 cw. W3KHL, Chris's dad, does WA3SMN/TF's QSLing from Pittsburgh.



forth on the 2-1/2-hour return trek. In the third photo SV1s GO GA, DL1CU/SV and SV1DB participate in DL1CU's ceremonial receipt of honorary membership in Greece's NARUG at the society's club station. At far right SVØs WII and WJJ, who sign WA6BWB and WB4USR back home, relax in their Athens hamshack after DXpeditionary success.

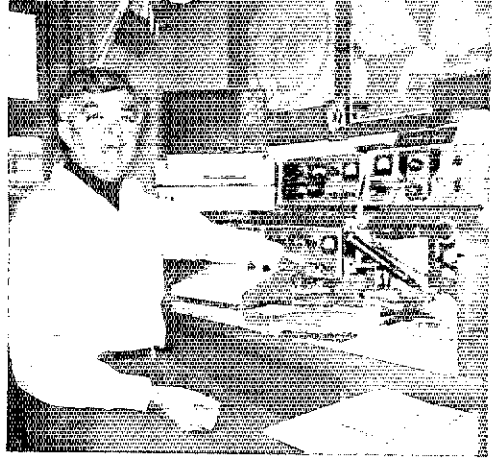
2000 short-wave listener reports. SWLing is a big thing in the U.S.S.R. (WCDXB) . . . After working about a hundred Russians UK1AAG came through in five months for my first U.S.S.R. QSO confirmed. Not so slow according to what I've been hearing. (WB5AHX) . . . No apparent problem receiving Russian QSLs here. Perhaps they like the "/mm" on my call. By the way, there seems to be a lack of originality and pride in QSLs of late. Addition of photostamps, notes on operator interests, occupation, etc., make worth-while improvement. (WØTUT/mm) . . . My old TF2WJA logs are still on hand if anyone still needs a card. (W6NHX) . . . SY1MA's QSLs for European contacts are reported managed by DJ6TK. (VERON) . . . Yes, those Swiss visitors' calls are valid for three months, are not renewable and are immediately reissued to new licensees, hence the confusion indicated by GM4AVR. I held suffixes XID XJG XKW and XMA during my three years in Europe, also the calls DL4VA, FØUG and 3AØFN. (WA4WME/Ø)

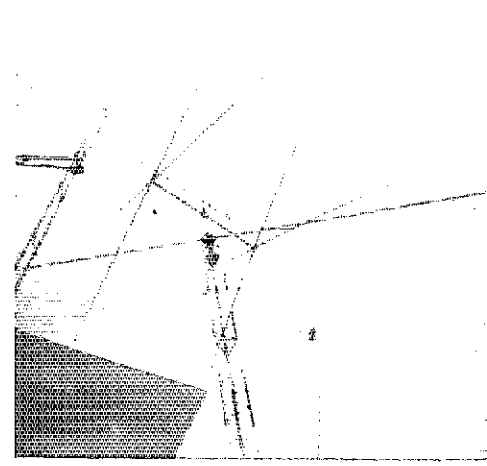
AFRICA – Due to my new overseas assignment I ceased managing 9J2XZ's QSLs in December after more than three years and some five kilo QSLs. Many thanks to all who QSLd promptly and properly! (WB5DRU-WA9PRE) . . . VQ9DW will clear up QSL matters on return home to G4BFZ shortly. (DXNS) . . . WB4SRX started handling my QSLs as of September 1, 1972, those for EL2DS on December 1st. (EL2DG) . . . SU1MA says many QSLs come through for SUs 1AS 1AZ 1EP ØTT, etc., but only SU1s IM MI and he were legitimately active in Egypt as of last October. (K6KA)

OCEANIA – VE8RA suggests another consultation with VE6TP if you still need your deserved FK8CD and/or FWØAB confirmations for spring '72 DXpeditionary doings. (WCDXB) . . . KS6DY barely missed *QST*'s most recent "IARU News" listings deadline and wants it known that he now acts as QSL bureau for American Samoa. (W1UED) . . . My 5W1 suffix was AE, not AU, and I continue to welcome 5W1AE QSL inquiries. (WB8MZN)

ASIA – That Canadian-sponsored DXpeditionary jaunt to Bhutan, etc., led by VE6s TP and BAA will receive QSLs via the latter's Alberta QTH. (SCDXC) . . . More than 10,000 QSLs were dispatched during my thirty months as KR6IX-KA6IX. (W4NXD) . . . Here's our monthly QTH grab bag but keep in mind that each possibility is necessarily neither "official," complete nor accurate. Might be well worth your postage, though. . . .

EL2CQ, Box 192, Monrovia, Liberia
FL8NA, P.O. Box 268, Djibouti, T.F.A.I.
HH2JT, P.O. Box 586, Port-au-Prince, Haiti
HP2DS, P.O. Box 882, Colon, R.P.
HS4AHQ, F&M Systems, P.O. Box 844, APO, San Francisco, CA 96386
HS5AFJ, c/o U.S. Embassy, APO, San Francisco, CA 96386
JA1MWI/BY (via JA1ZZ)
JD1ABZ, Ryu Okabe, Weather Stn., Chichijima, Ogasawara, Japan
JT1AA, Box 708, Ulan Bator, M.P.R.
JY6s UHA UMM UMS UNM, P.O. Box 13016, Amman, Jordan
JY9GR, P.O. Box 565, Amman, Jordan (or via DK4PP)
K4II/KG6/KH6/KL7 (to K4II)
ex-K6LZQ/VP7, C. Touw, 1541 Sunrise Rd., Barstow, CA 92311
ex-KA61X-KR6IX, Dr. J. Blasi, W4NXD, U.S. Army Hospital, Ft. Gordon, GA 30905
KX6KL, Box 2272, APO, San Francisco, CA 96555
LU1ZR, M. Reynaldo, 341 Villa Atuel, Mendoza, Argentina
OX3HV, H. Rasmussen, Daneborg Telestation, 3983 Daneborg, Greenland
PY7ZAH/Ø, Box 91, Recife, Brazil
PZJDR, Box 396, Paramaribo, Surinam
VP2DND, GPO, Roseau, Dominica, W.I.
VP2SBH, P.O. Box 603, St. Vincent, W.I.
VP2VPI, Box 411, Portola, B.V.I.
VP5LD, L. DeSoto, Western Electric, Dept. 9463, 2400 Reynolds Rd., Winston-Salem, NC 27106
VR4CC, H. Cannon, P.O. Box 1, Honiara, Solomons
WA4KPH/HKØ (via W4CPX)
WA7JID/KM6, Box 43, FPO, San Francisco, CA 96614
WA8FMA/KB6 (to WB8FMA)
WB4KGF/KL7, A. Anderson, USCG Loran Stn., FPO, Seattle, WA 98798
XT2AG, P.O. Box 98, Ouagadougou, Upper Volta (or via F6AJO)
ZF1s JB SB, Box 800, Grand Caymans
ZF1WB, Box 701, Grand Caymans
3V8BB, J. Sorenson, 106 Eyre Ct., St. Johns Wood, London NW8, England
5R8s BF CO CS (via F6AZN)
5U7AZ, Box 309, Niamey, Niger
8R1N, L. Kunar, P.O. Box 841, Georgetown, Guayana
8R1UGF, Box 841, Georgetown, Guayana
9H5C, Sgt. T. Harris, Sgts. Mess, RAF, Luca, Malta
ex-9V1QJ, J. Daugherty (WB5HQY), USAD PO, Poro Pt. Br., c/o 848th AC&W Sqdn., APO, San Francisco, CA 96277
9Y4MH/8R1 (via VE3FLE)

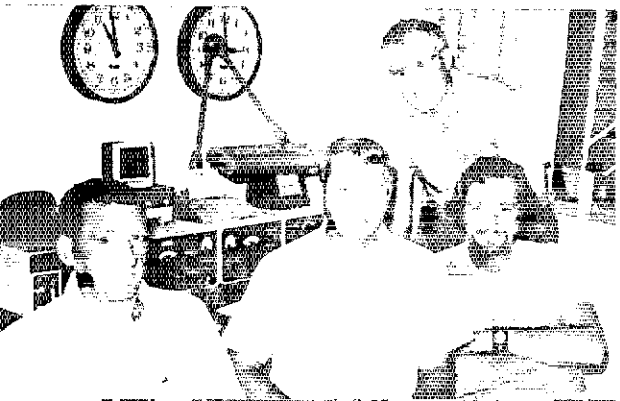




HV3SJ spreads DX cheer and world-wide good will with his consistent contacts from Vatican City. Brother Edwin's QSLing is expedited by W6KNH and I1PQ. These photos come courtesy K3RPY and HB9P, recent Vatican visitors, and the latter brought gear along to surprise the RTTY DX crowd with rare HV3SJ teleprinter QSOs.

A4FA (via G3LQP)
CT2AZ (to W0JHY)
DL2ZT (via DARC)
DX4PAR (to DU1EJ)
EL2DS (via WB4SRX)
FO8DG (via KH6HHI)
GW6GW (via RSGB)
HS4AGY (via WA4PUC)
HS4AHX (via K4VOX)
JX6VO (via LA1RQ)
JY9FOC (via G2IO)
KG6JBD (via K6PWX)
OK5SZM (to OK3TFM)
PJ8DX (to K2EJ)
TF2WJA (to W6NHX)
TI9C (via TI2GI)
TJ1AX (via W6KTE)
TY5ABK (via W8CNL)
VP2AZA (to G4AMD)
VP2VAN (to K2EJ)
VP2VAV (via K4CDZ)
VP9AF (via RSGB)
VQ9DJ (to W4DJ)
VQ9DW (see text)
VQ9HCS (via WA1HAA)
VQ9SX (to DJ9SX)
VR4AA (via ZL4NH)
WA1RDH/VQ9 (via W4WFL)
XE2NHX (to W6NHX)
ZB2CN (via DK1PG)
ZD9GG (via SARL)
ZF1PL (to W1RFW)
ZF1RL (to K9RJP)
ZF1SF (to WB4SHB)
ZF1VD (to W4HAW)
3A0GH (via F5ZY)
3A0GK (via F8OM)
4W1AE (via G3PQA)
4Z4JC (via WB2WOU)
5V8WS (to DJ6QT)
5W1AQ (via K3KLY)
8R1M (via WA3HUP)
8R1MD (via VE3FLE)
ex-9V1QD (to W2MIG)

For the preceding suggestions we thank Ws 1CT 1CW 1YL 4WFL/1 6AM 6GSV 0KUM, Ks 2YFE 3RPY 7LUH, WA6ZKT, WB5AHX, KH6BZF, VE7BAF, VO1KE, 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* (WSSZ), Northern California DX Club *DXer* (Box 608, Menlo Park, CA 94025), Southern California DX Club *Bulletin* (W6EJJ), VERON's *DXpress* (PA0s INA TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Any postal patter for us from your log?



XV5AC statters Dave, Chester, Fred and Don recently posed for the birdy in Saigon. They and other volunteers are issuing the first substantial batch of Vietnam DXCC credits in many a year. *(Photo via W1YRC)*

W h e n c e :

AFRICA — In April four EA8s have scheduled a Spanish Sahara DXpedition with enough gear for two complete stations. I recently visited the Canaries where EA8GK and friends were most hospitable. (VE3AGC) . . . EA9EJ will be transferred to EA8-land in a year or so which will leave Spanish Sahara hamless. On my autumn visit to El Aaiun I was told by the telecommunications chief there that no future amateur authorizations are in prospect. (W5LZW) . . . 9Q5EP, UZRA president, confirms that all Zaire amateur licenses were canceled in July. (K1ZND) . . . Three cheers for 6W8AL who not only QSLs reliably but who handles pile-ups with great skill and patience. (WA3SRY) . . . SU1MA, whose ssb signal is handicapped here by a dipole end-on to the U.S., says SU1s IM and MI usually work their W/Ks on cw via the 14-MHz long path. (K6KA) . . . I was lucky enough to be selected to represent Swaziland among a group of world-wide teen-agers invited to attend the Apollo-17 launching. My Stateside shopping list immediately included a preselector, cw audio filter, calibrator and mint U.S. postage for W/K QSL managers! (K. Muller, Mbabane) . . . 3B8s CZ and DG, very active on 28 MHz, are five miles apart but local QRM is minimized by rotating work shifts. Former VQ8BY now signs G4ALY in Plymouth. (K2YFE) . . . A fresh batch of imported TV sets with 30-MHz i-f circuitry has severely hampered hamming in Zambia according to 9I2XZ. (WB5DRU) . . . 5X5NK expects a one-year Uganda stay, 40 and 80 preferred. (DXNS) . . . CR5AJ, with a new five-band transceiver courtesy IDXA, should be available from Sao Thome for years to come. (NTDXN) . . . VE1AST reportedly takes up Tristan da Cunha residence as ZD9BP, multiband action anticipated. (WCDXB) . . . TJ1AX, formerly SW8AX, pops up near 14,235 or 21,315 kHz around 2030 GMT. (LIDXA) . . . Three fresh operators headed for FB8WW from France in December, two being avid radiotelegraphers, so

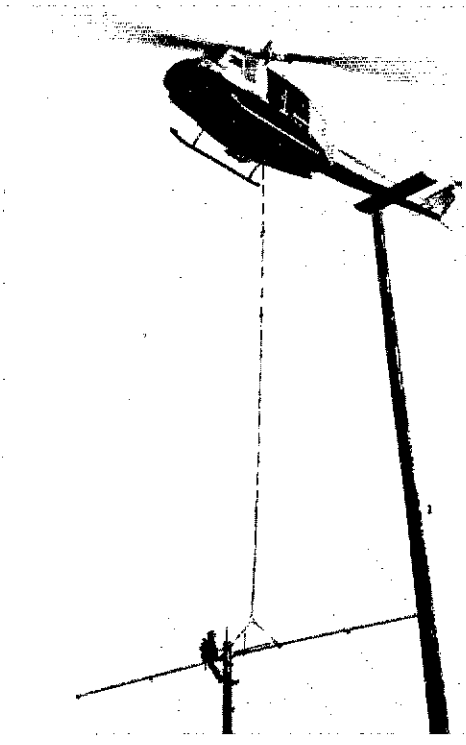
CPs 1EU and 6FG, left and right, keep plugging away from one of South America's not-easy-to-catch countries. Max and Willy are especially appreciated by the Five-Band DXCC throng on lower frequencies.

Crozet should continue extremely workable. (VERON)

ASIA — Our current global DXpedition intends to include stops in Tibet, Sikkim, Muscat, Burma and Syria. Watch (ssb) 3770, 7080, 14,190, 21,245, 28,550; and (cw) 3505, 7004, 14,025, 21,025 and 28,025 kHz. (VE6s BAA TP) . . . 9K2BQ is workable on 10 cw at 1300 GMT or so. (K3CL) . . . On my second stint with this same call I'm using a KWM-2, 30L-1 and a TH-3 atop a 40-foot telephone pole. (HL9VL-WA7ESD) . . . HL9WI is on almost daily, 21,290 kHz at 2130 GMT and 14,290 at 0800. (WA5ZWC) . . . HL9TV likes 20 sideband and 15 cw and may be active at Tongduchon until June. Andy had a lot of fun rounding up local material for his homebuilt quad. (K5HWO) . . . 4S7EA is particularly eager for contacts with U.S. Sevens on 14,024 kHz at 0000-0100 GMT. W7YB caught him at 2015 one afternoon. (W7LR) . . . Thanks to JH1WIX our Novices should have little difficulty working Japan on 21 MHz. Taroh, one of Japan's pioneer amateurs, is celebrating his 10,000th DX contact by appearing daily around 2200-2300 GMT in the 15-meter Novice subband. Some 800 WNs have worked JH1WIX during the past several months. (WN4VXG) . . . I'm intrigued by RTTY and SSTV possibilities on 15 and 20 meters. Used to sign KP4DHV and WB5EVV. (9K2CA) . . . My ticket is currently the senior license issued by the Republic of Cyprus and I'm a member of CARS and RSGB. (5B4KP) . . . As a future amateur I'd like to correspond with U.S. hams-to-be (K. Ohtsuka, P.O. Box 007, East Funabashi, Japan 274) . . . One interesting QSO last fall was a contact with PAØTCA's mobile while I was aeromobile. (YA1AB) . . . When visiting Kabul recently I was delighted to be elected an honorary member of Camel Drivers Radio Club. My son, K2GRV, signs YA1RA with a Cygnet and I was briefly active as YA1GTZ. (K2GTZ) . . . JTØAE expects to be active in Ulan Bator at least three more years before returning to Czechoslovakia. (W1CT) . . . In addition to their previous small 3890-3900-kHz allocation, India's amateurs now are authorized 3650-3700-kHz. (K1ZND) . . . Worked 230 countries before closing down KR6IX-KA6IX but my biggest kick while hamming from Okinawa was becoming the first non-ZL to work all 112 New Zealand counties. (W4NXD) . . . EP2BQ's November contact with VK6HD on 160 may have clinched the first Asian top-band DXCC. (DXNS) . . . 4W1s AF and BC evidently prefer 20 phone but 4W1AE is reported busy working Europe on 160. (VERON) . . . Japanese DXpeditioners intend a Bhutan blast next month. Their equipment is already there. (JDXRC) . . . Nearly a hundred choice calls showed up at Southeast Asia Net's Bangkok banquet in November. Next year's gathering is slated for Singapore. (WCDXB)

EUROPE — WAs 1NRV 5ZWS, K1OME and W4WSF led U.S. entrants in that order in the 1972 OZ-CCA DX Contest. VE1AE won for Canada. Other single-operator highs per country were turned in by DM3XHF, G2NSY, HA5JI, JA1NPV, JTØAE, LA2Q, LZ2RF, OH2LU, OK3CCK, OZ8HC, PAØVB, SP4FNW, SM7EAN, UAs 2DZ 3RH 9TS, UC2OAA, UD6DG, UF6AS, UG6EA, UH8DP, UJ8AB, UL7GW, UK1NAG, UO5AP, UP2CY, UQ2ON, UR2RX, YO8AGZ and YU3TYX. (OZ2NU, EDR) . . . The DLØIGI beacon on 28,195 kHz is an excellent 10-meter propagation indicator. I4VN's 15 watts and the 5-watter of LZ2OM radiate fine QRP signals on 28 MHz. (K2YFE) . . . Hope to be able to help 5BDXCCers from Iceland where I'll be sporting extreme QRP. (WA3GHC/TF) . . . Great to hear HBØUE answer a casual CQ on 10 sideband — mine! (W8UUM/4) . . . According to Radio Moscow there are 18,000 amateur stations in Russia, 50,000 licensed operators. (K3CL) . . . I am in correspondence with 65 old-time ex-HA hams throughout the world while working on my

(Continued on page 96)



HL9TY held an interesting antenna-raising party at Uijongbu last November. The chopper greatly facilitated installation of a six-element spinner for 21 MHz, just what many of us could have used in readying for this month's ARRL DX Test! HL9TY is operated by the 51st Signal Battalion, HL9TT (WB4RSA) commanding, and in the pole position is HL9TY's chief operator, HL9UP. *(WA7HXS)*

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

The Check List

EVERY YEAR about this time we begin to make all sorts of lists. There are plans for the new spring wardrobe, vacation, where we'll go, and all the coming major events of commencements, coming conventions, hamfests, weddings, or who will be arriving for a brief stop during a trip. Then there is the new furniture, or indoor paint job, the garden and always the imminent spring cleaning. The lists grow as we begin to slip out of the winter doldrums, and look forward to the coming freedom from the grime of heating units and the closed house. Another list includes the shack, not as it exists, but the new equipment we are going to get, or have received for Christmas, and a full renovation and changes to make it just as attractive as possible.

We take a lot for granted in this most hazardous of all rooms in the house. We make sure that there is a grab bar, and a non-slip bottom in the bathtub, and keep harmful cleaning supplies, and dangerous equipment out of the reach of children. Our insurance policies make sure that we are covered if our dog bites a neighbor, or a visitor slips on the front steps; but when was the last time we checked on safety in the shack?

We may find to our horror that we are enjoying radio with a lethal atmosphere around us, for it is a potential menace. There are all those wires that are a veritable spider web behind the desk leading from the lamp, keyer, low band equipment, vhf, and what else? RTTY? ATV? Monitoring gear? Are there sufficient outlets for these, or are they, the clock, the bc set, and/or portable TV (just to check TVI) all tied into a couple receptacles and a lot of extensions behind the desk?

Assuming that is all we do have in the shack, and there are enough outlets for them, how about the wiring? Do we ever remember to check their condition (because insulation does deteriorate and dry out after a while)?

We might have the place so spic and span that it is a showcase and the envy of our acquaintances with all the gear, and extra comforts. But what about those circuits? Is the air conditioner, making operating in the sticky summer months so pleasant, on the same circuit as the transmitter? And when did we last check the fusing? Everything may have been perfectly correct a few years ago when we set it up but we tend to forget that more equipment, all of it electrical, all of it drawing current, has been added since then.

The major heavy work is usually done by the OM in our lives. Few of us tackle those tough jobs of putting in the base of a tower and getting it assembled and going. For the most part, we gals aren't electrical contractors, able to fuss with installation of wiring; but we can check on the possible hazards that can – and often do – exist out of oversight, or neglect. We can make sure of the safety of this potentially hazardous hobby and see that as few as possible danger points are present before we ask the OM to tackle the hard labor types of jobs.

While we are making the list to check about fuses, grounding, insulation, wiring and outlets, we might also make a note to check on the fire insurance regulations, and the coverage of our policy to make sure that it is adequate.

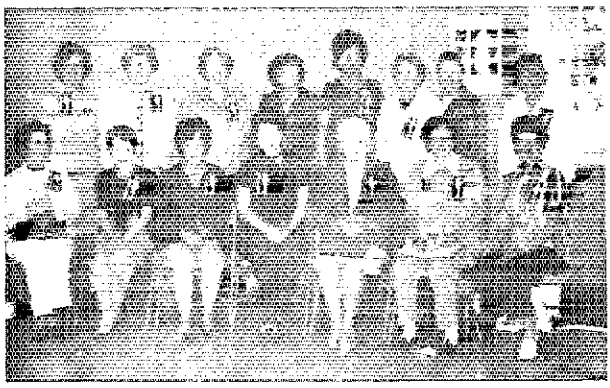
We women are proud of our homes. Our many lists of "things to do today" should cover the shack as well as everyday living so that we can be safe instead of sorry.

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

1973 YLRL Activities

Eila Russell, WA8EBS, YLRL Vice-President, has announced the dates for the major YLRL on-the-air activities for the year.

The annual YL-OM begins this month with the phone portion on February 24-25, and cw on March 10-11, 1973. (For the rules, see this column in *QST*, December 1972.)



MINOW Gals at the Walla Walla Hamfest 1972. L-R Back row: WA7ROS, W7FDE, WA7DXI, K7NZO, WA7IRD, W7JRB, K7PVG, K7RAM. Front row: K7TWQ, WA7LOQ, WA7BDD, K7UBC.

YLRL "Howdy Days," that informal, get-acquainted activity in the form of a contest, will be September 19-21, 1973.

YLAP, the "Anniversary Party," celebrating YLRL's 34th year, schedules cw, October 17-18, and phone November 1-2, 1973.

The plans for the coming DX YL Contest have not yet been completed, other than the fact that it will be held in January, 1974. The idea of the DX YL Contest was first announced at the International YLRL Convention at Long Beach, in May 1972. With a plan to encourage working women operators in foreign countries, participation will be limited to women operators only as is the YLAP. Dates, rules, and plans will be announced as soon as they have received final approval from the YLRL officers.

VE YL Certificates

There are two certificates available from the two major YL Clubs in Canada. For purposes of information the rules are:

Trillium Award

Issued by the Ontario Trilliums (TOTs). Requirements: Work club members only. One (1) point for each member, two (2) points for contact with the club station, VE3TOT. Total points required for eligibility W/VE – 6 points; DX – 3 points; Members – 12 points. SWLs are eligible under the above rules. Band and mode endorsements are required. Seals are issued for each additional W/VE – 6, DX – 3, Members – 12 points. Fee $1.00, or 10 IRCs (for DX only), a self-addressed stamped (or IRC for DX) envelope for endorsement seals.

Send list of calls, TOT membership number, full log data and fee to the custodian Mrs. Marion Course, VE3CLP, Osford Ranch, R.R. 1, Welland, Ontario, Canada. GCR rules apply, and the QSLs must be in the applicants possession.

CLARA Certificate

Issued by Canadian Ladies Amateur Radio Association (CLARA). Requirements: For CLARA members, work 12 YLs in six call areas with no more than 5 VE3 prefixes). Other YLs and OMs in Canada and U.S.A. work 6 – 10 YLs with no more than 4 VE3s. DX stations work YLs in 5 call areas, with no more than 2 VE3s. All bands, all modes may be used. No cross band contacts permitted. Seal endorsements are issued for each 12, 10, or 5 additional contacts.

All contacts and QSLs must be dated after September 12, 1972. Fee $1.00, or IRC equivalent. Self-addressed, stamped envelope is required for the endorsement seals. Send list of calls, log data and fee (or sase for seals) to the custodian, Cathy Hrischenko, VE3GJH, 30 Lisburn Crescent, Willowdale, Ontario, Canada. Note: Contacts must be made off the net frequency during net sessions. GCR rules apply, QSLs must be in possession of the applicant.

1973 YLRL Certificate Custodians

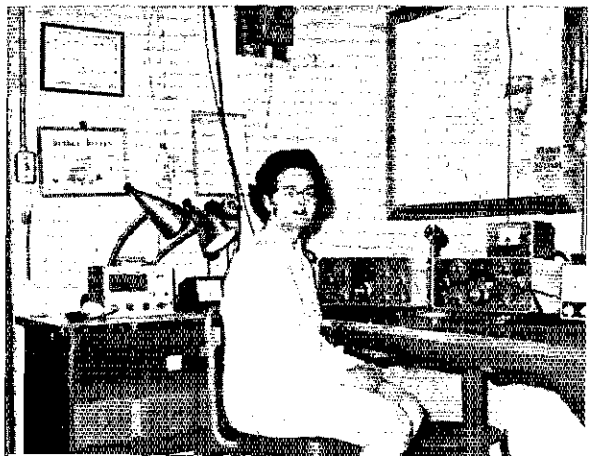
YLRL has announced the following women who will act as custodians for the certificates offered by the club. *YLCC* – Onie Woodward, W1ZEN, 14 Emmett Street, Marlboro, MA 07152. *WAC-YL* – Miriam Blackburn, W3UUG, Box 2, Ingomar, PA 16127. *DX-YL* – Emma Berg, WØJUV, RFD 2, Box 171, Lawrence, KS 66044. *WAS-YL* – Christine Harcock, WB2YBA, 361 Roseville Avenue, Newark, NJ 07017. *Continuous*

K8ITF, Marge Farnet

WA8KMT, Edie Best

These gals are the regular Net Controls of the Buckeye Belle Net sessions each week.

WA8EKQ, Beulah Shelly



Frieda, K7PVG, and Joan, WA7BDD, were presented awards for faithful service to the MINOW Net at their annual meeting. Frieda is permanent Bazaar chairman, and has been an officer of the club since the beginning of the organization. Joan's award was for her service as secretary-treasurer for the past four years.

Membership – Ruth Siegelman, W2OWL, 100-11 67th Road, Forest Hills, N.Y. 11375.

YLCC, WAS-YL, WAC-YL are available to all licensed amateur radio operators. DX-YL is limited to women operators only, and the Continuous Membership Certificate is issued automatically to YLRL members for unbroken membership record in the club.

All requests for these certificates should be addressed to the custodian, and not to this column. YL News and Views does not issue any of these certificates.

YL Hunting?

The annual YL-OM contest that begins this month is the best answer that this column can give to the number of requests regarding how to find YLs. Should phone be the preference, look for that "CQ OM" on most bands on February 24-25 beginning at 1900 GMT. For cw, try again in the March contest because the gals are there.

There is no way for "YL News and Views" to answer the requests for calls and frequencies and the times that the YLs in those needed states for WAS will be on the air. As with all the certificates, there is no easy way other than the YL-OM.

Meet the Net – The Buckeye Belles

It's a club, but most of all that name, "The Buckeye Belles," identifies the women radio operators in Ohio who, because of the state-wide coverage of the membership, are held together by the bond of amateur radio.

The net began, as so many do, by a suggestion of K8MXT, Shirley Rex, during a contact on 40-meters in 1961, and was followed by an informal gathering to discuss a possible on-the-air club at the Dayton Hamvention that year. The club was formally organized at a meeting early in 1962 in Worthington, Ohio, but the Belles were already most active on-the-air without benefit of the gavel and business meeting part of organization.

A net, and on-the-air club, the Buckeye Belles' many efforts in the public interest have been twice honored by the State of Ohio through an official proclamation recognizing their service and declaring "Buckeye Belle Week" in the State of Ohio by the Governor of the State.

The net meets Mondays at 8:00 A.M. on 3.960 MHz, with WA8EKQ as MCS. Tuesday evenings at 8:00 P.M. on 3.970 MHz, WA8KMT NCS.

Certificate custodian is Marge Farnet, K8ITF. The certificate requirements include: log data showing confirmed contacts with members of the Buckeye Belles, 12 for Belle members, and Ohio Stations; 8 for other U.S. stations; 4 confirmed contacts for DX stations. Log data plus the membership number of the YL worked, plus 25 cents to cover mailing should be sent to the custodian. QST

How's DX

(Continued from page 93)

history of Hungarian amateur radio (1924-'44). I'd like to exchange literature of my country for radio publications from abroad. (Janos Ersek, Toth L.U. 5, Komarom, Hungary) . . . Enjoyable visit with VE2s AB AFC AFX and friends on my recent trip to Quebec. (F6AZT) . . . Glad to be the first W/K to qualify for East Germany's DMCA-5 certification which requires eighty QSLs from fifteen DM districts. (WB4MHK) . . . Interesting mid-October operation as OK1GT/W1RAN, catching buddies back home on five bands. Fine visit with OK1s BB GT NR ZL and others. Amateur radio is alive and well in Czechoslovakia. (W1RAN) . . . I'm especially active on 21,340 kHz at 1800 each Wednesday and Thursday with a homebuilt station, G2DAF's design from the *RSGB Handbook*. Our Wolverhampton Amateur Radio Society celebrates its 50th anniversary this year. Send sase to G8TA for information on the new WARS Black Country certification. We also have in print *Wireless in Wolverhampton*, an historical booklet recounting radio activity in this district as far back as 1910. (G3CAQ, ex-VU2AQ) . . . We welcome inquiries on REF's *Diplome de Nancy* certification, sase to my address. (F6BPH) . . . HA3MB, formerly HA6N, is an old friend and former schoolmate of mine. Zoli and I keep weekly schedules thanks to his HT-44, homebrew receiver and various skywires. (K4UQ) . . . I'm setting up Stateside once again after that Mt. Athos fun with friend WA6BWB. I also look forward to more DXpeditions some day. (WB4USR, ex-SVØWJJ) . . . Recent RTTY contest activity while visiting HV3SJ showed almost universal use of narrow-shift emission. We worked 79 stations using 170-Hz, only one with the old 850. We favor somewhat shorter contest periods. (HB9s P HK, DJ9TT, WA7IIC) . . . UR2AR of UK1ZFI fame solicits ideas and encouragement toward future U.S.S.R.-style DXpeditions. (LIDXA) . . . DXers around the globe will miss old-timer PAØWWP, recently a Silent Key and a past editor of our *DXpress*. (VERON) . . . OHØNJ concentrates on 10 meters with his 12-wavelength NW-SE vee beam and SB-101/SB-220. The Oscar translator continues to regale the European 28-MHz crowd. By mid-November DJ2RE had logged 81 contacts with many European countries and Canada. Walt runs 50-90 watts with a 10-element Yagi on 144-MHz and a 3-element rotary on 28-MHz. (G3DME, QUAX) QST

Operating Events

de W1YL

FEBRUARY

3-4 *DX Competition* phone, p. 55 Dec. *Ten-Ten International Net Contest, VHF Space Net Contest*, p. 99 Jan.

3-11 *Novice Roundup*, p. 72 Jan.

7 *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 Feb. 6. Underline one minute of highest speed copied, certify copy made without aid and send to ARRL for grading.

10-11 *QCWA QSO Party, WA2DNR's Operations Day, John Moyle Memorial National FD (VK event)*, p. 99 Jan.

11 *Frequency Measuring Test*, p. 99 Jan.

15 *W1AW 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 Feb. 14. 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.

17-18 *DX Competition* cw, p. 55 Dec.

17-25 *IARC Propagation Research Competition*, cw/RTTY, the full GMT period. Single and all-band as well as SWL categories. Mobiles will be listed separately if 3 or more entries are received. The goal is to work as many countries and different CPR zones as possible. (ITU zone map appears on page 87 of the April issue.) Count 1 point per QSO (you may work stations in your own zone for multiplier, not contact, credit). Exchange report plus zone. The multiplier is the sum of the zones and countries worked on each band (160-10 meters). The same station may be worked as many times and as frequently as desired. Contacts lasting more than 6 minutes with the same station may be counted as separate contacts for each 6 minutes or fraction therof (it must appear as a separate log entry to count thusly). Multiplier credit may be claimed only once. Score is total points multiplied by the sum of the zones and countries worked on all bands. Contacts with those not in the contest may be scored by supplying the proper zone number. Use official IARC log sheets or a facsimile with 40 QSOs per page. Fill in every line. If you void an entry, draw a line across the entire page. Enter your own zone only once per page. Enter the other station's zone each time and enter in appropriate column each NEW zone as worked the first time only on each band/mode. Enter claimed contact credit in each column. Use separate log sheets for each mode and each band. Log in GMT only. Appropriate awards. Mail logs to L. M. Rundlett, 2001 Eye St., N.W., Washington, D.C. 20006, U.S.A.

24-25 *YL/OM Contest phone*, p. 99 Dec. *French Contest phone*, p. 69 Dec.

24-26 *Vermont QSO Party* sponsored by the Central Vt. ARC, from 2300 GMT Feb. 24 to 0300 GMT Feb. 26. Vt. stations score 1 point per QSO times total no. of ARRL sections and countries. Outside stations score 3 points per Vt. station worked times the sum of Vt. counties worked on all bands. No power multipliers and repeat contacts are permitted on different bands/modes. Exchange QSO no., RS(T) and county (Vt.) or section/country (outside Vt.). Suggested freqs.: 3685 3909 3932 7060 7265 7290 14060 14290 14325 21060 21375 28100 28600 50.260 50.360 144-144.5 145.8 and Novice frequencies. Logs must be postmarked by March 31 and sent to the CVARC c/o Peter Kragh W1AYK (K2UPD), 170 Summit Ave., Ramsey, N.J. 07446. Stations sending an s.a.s.e. will receive a copy of the contest results.

MARCH

1 *W6OWP Qualifying Run.*

3-4 *DX Competition* phone, p. 55 Dec.

10-11 *YL/OM Contest* cw, p. 99 Dec. *Worldwide VHF Activity* sponsored by the Itchycoo Park VHF Amateur Radio Society, 3 pm local time the 10th to 10 pm local time the 11th. Purpose to keep vhf bands active, allow rig testing, allo hams to become acquainted with fellow vhfers. Exchange call, county and state. Count contacts with mobiles in each county worked. Mobiles can work a station once from each county of mobile or portable operation. To score, multiply number of contacts times number of counties worked times number of states. Awards to each station scoring 100 points on 6 or 50 points on 2 meters. Certificates to the top station in each state, each band. Logs should show time, band, mode, exchanges. Mail logs by April 15 to WA3NUL, Box 1062, Hagerstown, MD 21740. *Virginia QSO Party*, sponsored by the Sterling Park ARC from 1800Z March 10 through 0200Z March 12. The same station may be worked on each band and mode. VA stations may work each other. Exchange report, plus QSO number and QTH (county for VA stations, state/province/country for others). Score 1 point per QSO. VA stations multiply by total states/provinces/countries worked. Outside stations use VA counties for multiplier. Note, independent cities in VA will assume a neighboring county for identification purposes during this contest. Suggested freqs.: cw, 3560 7060 14060 21060 28060; phone, 3930 7230 14285 21375 28575. Check phone on the even hours. Appropriate awards. When reporting, indicate each new multiplier. Summary sheets and check list also requested. Logs must be received no later than April 15. Send to Pete Raymond, K4EKJ, 804 South Alter Ave., Sterling Park, VA 22170. S.a.s.e. for results. *4X4 Contest*, commemorating the 25th anniversary of Israel and Israel Amateur Radio. The contest runs the full 48-hour period GMT. Phone and cw, but only cw to cw and phone to phone QSOs count. Only one QSO per mode, per band. All bands 80-10 meters, single operator only. Thirty-six hours of operation permitted out of the 48 hours, the 12 hours of non-operation may be taken in one but not more than 3 periods anytime during the contest. Rest periods must be indicated in the log. Exchange a report plus consecutive serial number starting with 001. Each continental QSO counts 1 point, intercontinental QSOs count 5 points. QSOs with one's own country are allowed just for a multiplier. The sum of all bands will be the final multiplier. The ARRL DXCC list will be the official countries list for the contest. Continental prizes and a special major grand prize to the top scorer whose log must include at least 25 different 4X or 4Z calls. Reciprocal calls issued by Israel count as 4X4. The final score is total of QSO points (minus dupes) times final multiplier. Particulars of the contest, including details on the special grand prize, may be obtained from Herman Rugoff, WB2WOU, 306 Hooper Ave., Toms River NJ 08753. (Please include an s.a.s.e. Rules violations or logging dupes in excess of 3% will be cause for disqualification. Log 40 QSOs per page, separate logs per band. Indicate mode and band changes. Show date, time, stations, exchanges, mode, multiplier and points. A summary sheet is necessary and should contain the band breakdown of points. Also include a separate sheet indicating the log extract for the 25 4X or 4Z QSOs. Logs must be in Israel no later than April 30. Send to the 25h Anniversary of Israel Radio Contest c/o 4Z4HF, Joseph Lieberson, Kibbutz SASA, Israel.

16 *W1AW Qualifying Run.*

17-18 *DX Competition* cw, p. 55 Dec.

19 *High Speed Code Test*, sponsored by the Conn. Wireless Assn. and transmitted over W1EIA simultaneously on 3636 and 7085 kHz (approx.). Takes up where W1AW leaves off, at 40, 45, 50, 55 and 60 wpm, five minute transmission at each speed, plain English text. Copy one minute consecutively solid to qualify for certificate showing speed. Transmission starts at 0115 GMT, important instructions at 0130, first speed transmission is 0150. Listen during 0115-0130 call-up period for identity and frequency of other participation stations. Send copy with s.a.s.e to George Hart, W1NJM, 66 Highland St., Newington, CT 06111.

24-26 *BARTG Spring RTTY Contest* frpm 0200Z March 24 until 0200Z March 28, 80-10 meters. No more than 36 hours of operation permitted. Times spend in listening count as operating time. The 12-hour non-operating period can be taken at any time but off-periods may not be less than 2 hours at a time (these must be indicated in the log). Contest open to SWLs. Stations may not be contacted more than once on any one band. Additional band contacts permitted. Use ARRL DXCC list for country determinations (note KH6, KL7 and VO are all separate for this contest). Exchange time, message number and RST. All two-way RTTY contacts within one's own country earn 2 points, outside one's country 10 points. A bonus of 200 points per country worked, including your own. Note any country may be counted again if worked on another band but continents are only counted once. To score: two-way exchange points times total countries worked, total country points times number of continents worked, add both figures together to obtain final score. Use one log for each band and indicate rest periods. Logs must contain date, time in GMT, message and reports exchanged plus exchange points claimed. Logs must be received by May 31 to qualify. Appropriate certificates. If an entrant contacts 25 or more different countries during the contest, a claim may be made for the Quarter Center Award issued by the BARTG group (charge of $2, U.S. or 8 IRCs). If a contestant works stations on all six continents and logs are received from all, a claim may be made for the special WAC issued by RTTY Journal. BARTG will furnish the appropriate info. to the magazine who will issue this WAC free pf charge. Send logs to: Ted Double G8CDW, 89 Linden Gardens, Enfield, Middlesex, England, EN1 4DX.

24-April 1 *IARC* phone from 0001Z Mar. 24 to 2400Z Apr. 1. Same rules as under the Feb. 17-25 listing.

26 *W1AW Morning Qualifying Run.*

APRIL

4 *W6OWP Qualifying Run.*

7-8 *CD Party, cw.*

(Continued on page 101)

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.

Help the Beginner. In nearly every mail we get letters complaining about QRM to W1AW during its code practice and bulletins. Some ask simply if we can do anything about it; others make specific suggestions, the most common of which is to shift frequency (again) to a less used part of the band. Often we are asked if FCC wouldn't consider clearing a channel for W1AW during its code practice and bulletin periods, or assign us a channel outside the amateur bands where there is no QRM to contend with (oh, yeah?). A different time slot would seem to solve the difficulty for some.

There is no doubt that each of W1AW's transmissions is monitored by literally thousands of amateurs and would-be amateurs for one purpose or another, and that the code practice transmissions particularly have become a well-known and much-used service for amateurs and non-amateurs alike, which can be depended on to be where the schedule says it will be when the schedule says it will be there.

One frequent request is that we implore other amateurs to keep off W1AW. This we have done many times, but the headquarters (and we believe FCC too) has always regarded W1AW the same as any other amateur station, with the same rights and privileges and no more. True, we have asked other amateurs' indulgence when W1AW comes on with a scheduled bulletin or code practice on the scheduled frequency at the scheduled time without finding a clear frequency first; but by and large, W1AW must take its chances with QRM as we all must and most of us do, even though some of us do an awful lot of moaning and groaning about it.

But which of you is without sympathy for the struggling young beginner or upgrader trying to copy through the hash some of you make? Oh, we know none of it (well, not much, anyway), is intentional, but there it is, and the beginner appeals to us for help. What can we do but relay the appeal to you? You may think you are far enough from W1AW to avoid interference but don't forget that many of those copying are youngsters who picked up cast-off receivers for little or no money — receivers of a vintage 20, sometimes 30 or more years ago (surprising how many of them are still around!), with passband selectivity so broad you wouldn't believe it. A strong signal as much as 5 kHz away can wreak havoc, even on W1AW.

Are we asking that everybody clear a 10-kHz segment around W1AW every time it comes on the air? We are asking only that you consider the beginner and give him a break. Elsewhere on these pages you will find the W1AW schedule, and if you will study it you will note that code practice is sent three times on most days, simultaneously on eight frequencies. On some of the higher frequencies (e.g., 40, 20, 15 and 10 meters) you may not be able to hear it, but someone far away is hearing it, and if you get on there he'll hear you, too — loud and clear. The day is gone when W1AW can

DXCC Notes

Official announcement is hereby made of the addition to the ARRL Countries List of *Mt. Athos*. Located on the eastern peninsula of Halkidiki, Greece, Mt. Athos is a community devoted to religion and nothing else. It is considered to be a Theocratic State within Greece and is unique in its distinctively separate administration with relation to the rest of Greece. Consideration as a separate entity on the ARRL Countries List is therefore made under Point 1 of the Criteria (see page 131, October, 1972 *QST*).

Submission of confirmations for DXCC credits for contacts with Mt. Athos may be made starting March 1, 1972. Confirmations for Mt. Athos submitted before March 1, 1972, will be returned without credit.

Announcement is hereby made of the deletion from the ARRL Countries List of *SWAN ISLAND (KS4)*. This deletion is made in view of treaty agreements between Honduras and the United States recognizing the sovereignty of Honduras over the Swan Islands. The treaty was ratified September 1, 1972.

Swan Island DXCC credits may be claimed for contacts made with FCC authorized stations through August 31, 1972. Contacts with stations operating from Swan Islands under authorization by Honduras, made September 1, 1972 and after, will be considered the same as contacts with Honduras.

Deletion of Honor Roll credits for Swan Islands will be effective as of February 1, 1973.

out-power most competing signals; it is now just another signal, no stronger than a great many, less so than some. During code practice and bulletin times, give the W1AW frequencies at least a 5-kHz channel – not to help ARRL, but to help the many beginners who copy it every day, not to mention those trying to get their speed up to the extra-class requirement. It won't hurt you, and it will help many.

And to those very few who deliberately camp on W1AW thinking that in some perverse way you are "getting even" with ARRL for some fancied wrong – please seek medical help. You need it!

Promotions. Your ARRL Communications Department has six "branches," each one of which has an assistant communications manager in charge of it when a fully qualified person is available. Last spring and summer we found ourselves with only two of the four with qualified persons in charge. Now we take pleasure in announcing that the young men who undertook the functions in two of

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W1AW CODE PRACTICE

W1AW 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
35-30-25-20-15	9:00 AM EST TTh 6:00 AM PST	1400 TTh

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 W1AW (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.

Feb. 9:	It Seems to Us
Feb. 13:	Correspondence
Feb. 19:	League Lines
Feb. 27:	ARPS
Mar. 2:	World Above
Mar. 7:	YL News

W1AW 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[1] 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[1] (35-15 wpm TThSat, 5-25 wpm MWFSn)**					→
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]	.....	.....	7.290	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]	.....	.....
2200–2230	.....	7.150 Novice	21.125 Novice[6]	7.150 Novice	21.125 Novice[6]	7.150 Novice	.....
2230	.....	.....	RTTY Bulletin[3]	.....	RTTY Bulletin[3]	.....	.....
2300	.....	CPN[6]	7.095 RTTY[4]	3.625 RTTY	14.095 RTTY[4]	CPN[6]	.....
2345	.....	.....	CN[6]	.....	CN[6]	.....	.....

[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, 3.990, 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] W1AW 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.

these branches at that time have succeeded in performing to everyone's satisfaction and have earned promotions as assistant communications managers in charge of the Contest and Public Service Branches: Rick Niswander, WA1PID, and Bill Mann, WA1FCM, respectively. Rick hails originally from Michigan (WA8VRB) and spent some time on the staff as assistant to W1CW on DXCC before he got a crack at the contest job. Bill comes from the Great State of Maine with some high recommendations for public service work and has proved they were well deserved.

. . . **and a Retirement.** As of the last day of 1972, Murray Powell, W1QIS, retired from the headquarters staff as a W1AW attendant. "MP"

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings – *November 1-30, 1972*

New Members

W2OJ	299	DK3ZF	137	I5MMC	112	WB9CEP	108	WA9USE	103	OK1AUG	100
W7GRH	289	W61UV	137	WB2GUB	112	I7CZI	107	IS1PZR	102	WA1KVC	100
PY2BZD	252	DK9WB	133	DK4NU	111	HK3BAE	106	K7NTW	102	WA1NHZ	100
K4BHG	233	EA9JD	133	JR1HUA	110	W1DKU	105	WA1MPP	102	WA2AAW	100
WA2FLA	220	HP2MD	123	WA4ULL	110	W6OVO	105	W3CDN	102	W4WXZ	100
DK3GI	202	HK4CJB	120	W7IJI	110	WB8IEY	105	WA5YMZ	102	WA4VKR	100
DJ3PY	201	EA5BS	119	WA0PFV	100	YU2NU	105	W0MLN	102	W6ABP	100
VE3CSZ	154	W6ABP	119	YV1AQF	110	HB9AJI	103	YO9APJ	102	WA6BNZ	100
DJ8SI	153	DL4IO	115	WA9IAA	109	VE4IU	103	WA2CDV	101	WA7DED	100
W3WK	153	WA9RJI	113	K5KLA	108	WA8FKQ/2	103	W9MLG	101	W8IBU	100
YU4AVW	143	WA0ECB	113	W2ABY	108	WB4RUA	103	W9MYG	101	WA0TIL	100
W9YYF	139			WB2AFS	108			W0IS	101		

W7GRH	268	DK3ZF	134	W4GEO	117	I5MMC	110	I1CYJ	107	W9AMO	102
K2LGJ	233	DK9WB	133	W9QQI	116	JR1HUA	110	VO1CV	106	WB8IAY	101
PY2BZD	217	W4RUN	128	W2FVJ	115	IG9KE	110	I7CZI	104	W9MLG	101
K4BHG	175	WB4PLV	124	W6YCP	113	VE3DSW	110	K4HHA	104	W0WAM	101
HR9QC	158	W6KYA	121	WA1QQC	111	WB2GUB	108	W1UYL	104	W2AI	100
EA3JK	154	HK4CJB	120	YV4AGP	111	WB9CFP	108	W6MFC	104	WB9DRE	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.

W8QJR	340	OZ3PO	300	W9YYG	270	W2HC	220	W5HIC	180	PY2FWZ	140
W4EEE	335	WA4LXX	300	DJ4HR	260	W3YHR	220	W9LJL	180	VE6VV	140
W9FKV	335	W6ANB	300	W2MB	260	W7FBD	220	W9OFQ	180	WA2FUE	140
ZL3IS	335	W6BIL	300	W3OLW	260	JA1SJV	200	WB9CBY	180	W6EOL	140
G2FYT	325	WA6GFF	300	WA4YVQ	260	K3CNN	200	W0SQD	180	W6KYA	140
SM5BPJ	320	K6SDR	290	W5QBM	260	K6UWD	200	JA2AHR	160	WB6ZHD	140
W6EUF	320	K9PPY	290	W8CC	260	K9JDV	200	K8EJN	160	WB9DRE	140
W6MUR	320	W5DRW	290	CT3AN	250	OH8SR	200	KP4DLW	160	WA8MHW	140
I7ZPB	315	W6CS	290	W2GA	250	W2FCR	200	OK1DH	160	W0FZO	140
W3GE	315	DL1YA	280	W3BBO	250	W2ZO	200	VE2ADZ	160	YU4AAW	140
W4HOS	315	K4RCS	280	W3POE	250	W4QZF	200	WB2AQC	160	K4HQI	120
DL8NU	310	K5HYB	280	W4VIH	250	WA4KYR	200	W4UPI	160	KH6GJY	120
SM6CKU	310	ON4PA	280	WA4MSU	250	YU1AHI	200	W4VSV	160	VE4OP	120
W9FD	310	SM6AFH	280	KP4DJE	240	DJ1IK	180	W3ZBW/4	160	W2DPL	120
W1AA	305	SM6CVX	280	W1SG	240	DJ4FT	180	WB4OGW	160	W2EVI	120
W4BRF	305	WA1HFN	280	WA5ALB	240	EA3NA	180	W6GEB	160	WA2CWX	120
W4NO	305	WB2PGM	280	W9LVT/6	240	FM7WN	180	WA9MAG	160	WA2KWB	120
W8GHN	305	JH1CJO	270	WB6WIW	240	I1CCZ	180	DJ2YE	140	WA2RAZ	120
W9AG	305	K6OJO	270	DL7NJ	220	JA3BIP	180	K6JAN	140	WA5HNK	120
HB9AHA	300	W1DXB	270	EA6BN	220	K6MT	180	K8TMK	140	WA5YFL	120
K3ILI	300	WA4HHW	270	F9TE	220	W2RSO	180	K0IKZ	140	WB6ZPO	120
K6ZIF	300	W8OA	270	K6TWT	220	W4GEO	180	K0SGJ	140	WB0BQG	120
K9YXA	300										

W8QJR	340	W8GHN	300	WA4YVQ	260	KP4DJE	220	W0UCK	180	VE3AJY	140
W4EEE	335	EA7IR	290	WB4BAP	260	WA1KYW	220	G3YJI	160	W4VSV	140
W5IO	335	F5IA	290	W6AXH	260	W3YHR	220	K2AAC	160	W4VSV	140
I6FLD	320	K9WEH	290	I1BGJ	250	WB4JLO	220	W2HC	160	WB4TPU	140
VE3MR	320	W2QT	290	JH1CJQ	250	DK2MO	200	WA2DHF	160	W6GTL	140
W8ZOK	315	W3GE	290	W6LQC	250	HP1JI	200	WA4HHW	160	WA8MHW	140
EA4JL	310	W4BBL	290	K6RXZ	240	PY2DLC	200	WA4NRE	160	W9QEQ	140
K2JMY	310	SM5BPJ	280	WA1HFN	240	VE6AGV	200	WB5DJA	160	WA9YEW	140
W5KC	310	W2PDB	280	WB6WIW	240	W7HSE	200	WA7BPS	160	K3NEZ	120
W6PT	310	CR7IK	270	CE3GE	220	DJ4FT	180	W0MAN	160	K6JAN	120
DL8NU	305	K4BYM	270	CP1EW	220	FM7WN	180	JA3FD	140	SM5ZZ	120
PY3APH	305	K9PPY	270	EA6BN	220	K4BNC	180	K2HER	140	WB2NRU	120
W0SFU	305	W0BN	270	I2PHN	220	VE3EWR	180	K3CNN	140	W4REV	120
YV5EC	305	K2ANT	260	K3GZE	220	WA4YJI	180	K0IUC	140	W0YVA/4	120
SM6CKU	300	K6OJO	260	K5UKN	220	W5HCJ	180	K0SGJ	140	Wb4TPU	120
W7QK	300									WA7HCQ	120
										WA0ELW	120

On the left K3LFD, SEC MDC, joins section SCM W3FA at the ARRL booth at the Gaithersburg Hamfest last October.

first joined the staff in 1949 as a contest checker, later was transferred to W1AW at his own request, and has been there ever since, quietly and efficiently contributing to the running of the headquarters station – usually on the late-evening shift when most of the operating is done. It may sound odd, since Murray is so quiet one usually forgets he is around, but we'll miss him.

Incidentally, two new communications assistants were added to the W1AW staff recently to "take up the slack" partially left by Murray's retirement: Al Bloom, WA3JSU, from down Pa.-way (Gettysburg) and Al La Placa, formerly K2DDK from Manhasset, N.Y., now W1GRE from Hartford, Conn. Two "Als" at W1AW makes things confusing, so you'll hear "Alan" (WA3JSU) and "Al" (W1GRE). – *W1NJM.*

Sac. V.	3/9/73	J.F. Minke, III, W6KYA	5/6/73
N. Mex.	3/9/73	J.R. Prine, W5NUI	5/9/73
Alaska	3/9/73	K.R. Klopf, KL7EVO	5/11/73
L.A.	3/9/73	E.H. Violino, W6INH	5/19/73
Nev.	3/9/73	L.M. Norman, W7PBV (resigned	12/22/72) 10/22/74

*Acting SCM.

SCM ELECTION RESULTS

Valid petitions nominating a single candidate were filed by members in the following sections, completing their election in accordance with applicable rules, each term of office starting on the date given.

S.F.	T.A. Gallagher, W6NUT	11/11/72
Md-DC	K.R. Medrow, W3FA	1/1/73
N.J.	R. Mitchell, W1SWX	1/2/73
Alberta	D. Sutherland, VE6EK	1/10/73
Colo.	C.O. Penney, WA0s,HLQ	2/14/73

In the Northern New Jersey Section, Mr. John M. Crovelli, WA2UOO and Mr. Christopher J. Daly, WA2BAN were nominated. Mr. Crovelli received 512 votes and Mr. Daly received 347 votes. Mr. Crovelli's term of office began December 10, 1972.

In the Southern Texas Section, Mr. Robert A. Balusek, K5OZF, Mr. W. Edward Campbell, Jr., K5SBR, Mr. Van Brian Donohoo, W5JVR and Mr. Arthur R. Ross, W5KR, were nominated. Mr. Ross received 373 votes, Mr. Campbell received 172 votes, Mr. Balusek received 160 votes and Mr. Donohoo received 133 votes. Mr. Ross's term of office began January 27, 1973.

SCM ELECTION NOTICE

To all ARRL members in the Sections listed below.

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

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

Each candidate for Section Communications Manager must have been both the holder of amateur Conditional Class license or higher (Canadian Advanced Amateur Certificate) and an ARRL full member for at least two years immediately prior to receipt of petition at headquarters. Petitions must be received on or before 4:30 PM Eastern local time on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, Zip code of the candidate and signers should be included with the petition. It is advisable that a few extra full-member signatures be obtained, to insure that it will be valid.

Elections will take place as soon after the closing dates specified as full information on the candidates can be obtained. Candidates' names will be listed on the ballot in alphabetical order.

The following nominating form is suggested (Signers should be sure to give city, street address and Zip code.)

Communications Manager, ARRL (Place and date)
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the . . . . . ARRL Section of the . . . . Division, hereby nominate . . . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.

You are urged to take the initiative and file nominating petitions immediately.

George Hart, W1NJM, Communications Manager

Section	*Closing Date*	*Current SCM*	*Present Term Ends*
Miss.	3/9/73	W. Coffey, W5NCB	1/2/73
Ark.	3/9/73	J.N. Lowrey, WA5VWH	1/11/73
Ala.	3/9/73	J.A. Brashear, Jr., WB4EKJ	1628/73
Sask.	3/9/73	*W.J. Parker, VE5CU	
B.C.	3/9/73	H.F. Savage, VE7FB	5/1/73
Wash.	3/9/73	A. Henning, W7PI	5/3/73

IN A COMMUNICATIONS EMERGENCY, MONITOR W1AW FOR SPECIAL BULLETINS AS FOLLOWS:

Phone: On the hour GMT
RTTY: at 15 minutes past the hour GMT
CW: on the half hour GMT

Operating Events

(Continued from page 97)

10 ***W1AW Qualifying Run.***
13-16 ***County Hunters SSB Contest.***
14-15 ***CD Party, phone.***
28-29 ***5th RTTY WAEDC.***
30 ***W1AW Special Qualifying Run.***

June 9-10, VHF QSO Party.
June 23-24, Field Day.
Sep. 8-9, VHF QSO Party.
Nov. 10-11, SS phone.
Nov. 17-18, SS cw.

QST

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. PAM: WA3GSM. RM: W3EEM. PSHR: WA3GSM 63, K3KAJ 50. All Del. hams were saddened to learn that W3GFZ became a Silent Key Nov. 18. Congratulations to WA3PCC on making DXCC with 204 countries on phone. K3YHR having problems with the New Castle County Zoning Board with his tower "flagpole." WA3KXH, Wilmington Repeater – 13-73 has increased its coverage from Philadelphia to Lewes and from Lancaster, Pa. well into NJ as a result of its new duplexer. K3KET was coordinator of the project with significant contributions by WA3LZS, K3VWP, W3GL, K3GUW and WA3QID among many others. WA3KWE repeater at Delmar 22-82 left the air in Sept. but is back in operation as we go to press. "Squelch," printed and edited by W3ZNF continues to be Delaware's top ham newsletter. DTN: QNI 132, QTC 36/35, 30 different stations. DEPN: QNI 29, 19 different stations. Traffic: K3KAJ 100, WA3GSM 88, W3EEB 48, W3DKX 26, WA3DUM 9.

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK – SEC: W3HBF. RMs: W3EML, K3BR, K3MVO, K3PIE, W3CDB, WA3AFI. PAMs: K3BHU, WA3PLP. OBS reports received from WA3GYT, W3MFY, WA3AFI, W3CBH, WA3LWR. OVS reports from W3CL, WA3MCK. OO reports from W3KFK, K3OIO, W3MFY. PSHR: K3OIO, WA3OLG, WA3OGM, WA3QOZ. BPL: WA3QOZ, W3CUL, W3VR. Short report this month due to early cut off, SCM went to Jamaica to visit K3WEU/6Y5H for Dec.!

Net	*kHz*	*Operates*	*QNI*	*QTC*	*RM/PAM*
PFN	3960	5:30 P M-F	534	450	K3BHU
EPAEP&TN	3917	6:00 P Dy	426	184	WA3PLP

W3BNR says QRP is real fun and more stations should try it. QRP sure would be a boon to ssb! OOs report the last FMT was nearly washed out by poor band conditions. Hope everyone had a Merry Christmas and that Santa brought you all the ham gear you asked for! The guys on vhf are really taking the Jan. VHF sweepstakes very seriously. Anyone handling traffic via RTTY?How about a report, SSTV, anyone doing anything special, let us hear from you. If your net or individual report is not in the column this month it will be picked up for next month. 73 & CU soon. Traffic: (Nov.) W3CUL 2510, W3VR 656, WA3QOZ 423, WA3OGM 359, WA3MQP 171, K3BHU 73, W3MFY 59, K3OIO 57, WA3LWR 37, W3ADE 27, WA3PHQ 27, WA3QLG 24, WA3CFU/3 22, W3VAP 22, W3HK 21, W3BNR 13, W3BUR 10, W3LC 10, W3CL 8, K3KNL 8, WA3MCK 5, W3VA 5, WA3SPI 3, WA3BJQ 2, WA3KWU 2, W3GMK 1, W3KCM 1, W3KEK 1. (Oct.) K3KFK 1. (Sept.) K3KEK 1.

MARYLAND-DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – SEC: K3LFD. MDD/RM: W3EZT. MDCTN/PAM: W3FCS. MEPN/NCM: W3LDD. Nov. BPL men are W3TN and WN3RCI who makes it seven in a row. MEPN met 23 times QTC 58 and QNI average of 18, with 57 informals handled. The MDCTN reports 40 sessions QTC of 49 and average QNI of 9.4; long skip caught up with their 2nd session now suspended until further notice. W3EZT found it exciting when an HC1 reported into the net. WA3GXN visiting around the eastern shore while WA3IIV is preparing to embark on a trip to Ariz. WN3RCI runs the MHEN and publishes the information bulletin. W3QU takes over the record keeping for MDD. Quite a chore with two sessions a night. He still finds time to bang away at Oscar 6 successfully. Despite his active NJ net coverage W3OKN says life is tedious. W3BHE joined MEPN after all these years. He even stirred up brother W3PHW after 22 years. W3TN covered MDD like a blanket this month. WA3RDU says his work keeps him mobile. W3CDQ plans that outdoor antenna while the rig is a patient at the factory. W3JZY came down from the mountain for the annual Hagerstown dinner featuring W3SW. W3ZNW keeps skeds on 10 and 6 meters. W3EOV has a hand in all the 40-meter fone nets and took time off to see Apollo go from Fla. W3ABC is a well travelled gentleman and an MDD regular. W3FCI is home and renews activity previously done from W. Pa. The Mayor of Bushwood W3ADQ covers the southern section at home or portable. MEPN toppers were W3ADQ, WA3IIV, W3LDD and WA3GXN. WA3CUC took some fine photos at the hamfest. W3LBC publishes the Termite log and K3VRS edits. WA3AFQ covers the contest front on all bands. WA3LQV having a ball as new OBS. WA3EHK likes those quiet daytime conditions. W3FZV runs a mean net. K3BA ran out of solder room with all those dipoles on one balun. K3GZK has the new keyer mastered and the new rig performing splendidly. WA3SWS takes pen in hand as well as key. W3FCS hard at that job of earning a living. W3ZSR and K1LPL/3 inspected W3FA's diggings. Traffic: W3TN 272, WN3RCI 242, W3QU 150, W3FCS 84, W3OKN 53, W3FA 52, WA3LQV 50, WA3AFQ 42, WA3IIV 29, W3LDD 29, W3FZV 26, WA3EHK 24, K3GZK 24, WA3ABC 17, K3BA 16, W3EOV 10, W3ZNW 6. W3ADQ 5, WA3RDU 4, WA3SWS 3, W3JZY 2.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – SEC: W2LVW. PAM: WB2FJE. RM: W2JL.

Net	*Freq.*	*Time(PM)*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJPON	3930	Su 6	4	66	39	WB2FJE
NJEPTN	3980	M-S 6	30	543	181	WA2FVH
NJSN	3740	S 8	21	19	13	WA2RYD

WA2ALN is now a student at Rider College. WA2WLN is approaching the final steps in setting up his station at new QTH. He also is setting up for the 160-meter contest. WA2KWB reports having completed his USAF tour. We may hear Frank occasionally on mobile with his recently acquired Swan 500. WA2RYD manages NJSN on 3740 kHz and doing a fine job. W2ORS reports two occasions for suggesting improvement in operating. WB2VEJ continues to lead the group. WB2FNK is a recent OBS appointee. We hope you have contacted your SEC or EC prior to the SET and plan on taking an active part in the amateur emergency program; your help may be needed without warning. This is your opportunity to render an excellent public service. Try to swell the traffic flow; originate one message each month. Traffic: WB2VEJ 231, WB2GBR 52, WA2CZA 41, WA2FGS 35, WA2ALN 24, WB2FJE 14, W2YPZ 12, WB2SFX 11, W2JI 10, WA2WLN 7, W2IU 5.

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2KTK – Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2CEP. A reminder: ALL traffic and PSHR reports originated on the air should be sent to W2PVI. If you mail your report, send it to me. Renewals: WA2LUF, WB2VND as OPSs; W2FXA as OO; WB2VVZ as OO and OVS; K2CC as ORS. New appointments are WB2LVW as OPS and WB2DMU as OVS. Remember, it is no longer necessary to mail your certificate in for renewal. All you need do is notify me that your appointment needs renewing. WB2PMI reports a tremendous upsurge in ham radio in the Corning area after the disastrous floods. WB2PMI edits a nifty bulletin "Carrier Corner" which has some nice technical gadgets described. WA2ELD has been appointed Asst Mgr of NYS, in addition to W2RUF, W2FZK, W2FEB and W2WS. NYS handled 342 messages with 840 check-ins in Nov. STARRS elected W2EUQ, pres.; W2PVG, vecp; WB2PMI secy.-treas.; W2DIQ, trustee; WA2KTJ, chief engr.; W2HFL, K2HWM, WA2BPF, WA2GCU and WB2BMM, board members. K2SPO and WA2KFV each have new positions in Rochester. WB2NJE discovered that shipping costs for antennas sometimes exceed the cost of the antenna. K2LZL displayed excellent prowess as NCS of the WNY Net while mobile. W2ROF has constructed an antenna to allow him to work through the Buffalo repeater. W2GBI and W2GTX are building a new SB-102 and have a 3 kw generator for emergencies. Ex-K2QJE now is W4HJL in Va. WN2AEY passed his General Class exam. WB2KNJ now is WA3LTW working 3920 kHz at noon. WA2YPW busily constructing a counter. Thanks for an FB job to '72 NYSPTEN officers K2VCZ, W2DBU, WB2VBK and WB2OKO. This year the "bees" have it in the form of WB2QAF, WB2VJB, WB2HLV and WB2LXC. BPL: WA2AYC, WB2NRR. W2QBB performs superbly as an OVS. Your SCM's 15 watt managed 15 QSOs through Oscar VI, the farthest being a couple o

TOTAL

Get total 146-148 MHz coverage without buying a crystal!

The modified Clegg FM 27B transceiver now covers the entire range of 146-148 MHz . . . and needs NO additional crystals. It's the only 2 meter rig *available now* with built-in total coverage that also offers greater than 25 watts output power, uses 10 IC devices, and has Teflon* wiring throughout. Not a single bi-polar device is in the RF path in transmitter or receiver . . . ensuring greater reliability. Accessory power supply and sub-audible tone on transmit are available too. At home or in your car, the FM 27B gives you the ultimate in total 2 meter performance. See your Clegg Dealer NOW or write or phone us today for detailed data sheet on our 2 meter leader.

CHECK THESE SPECIFICATIONS

GENERAL

POWER REQUIREMENTS: 12 to 14 VDC
Current Consumption at 13.5 VDC:
Receive: 4 amps squelched, 1.2 amps unsquelched.
Transmit: 6 amps max.

DIMENSIONS: 7⅜" x 3½" x 9¼" deep; 4 lbs. net weight.

RECEIVER

TUNING RANGE: 146.00 to 148.00 MHz, continuously tuneable with reset capability of approx. 1 KHz to any frequency in range.

SENSITIVITY: .35 μv max. for 20 db quieting; .1 μv for reliable squelch action.

SELECTIVITY: 11 KHz at 3 db; Less than 30 KHz at 70 db. Adjacent (30 KHz spaced) channel rejection more than 70 db.

AUDIO OUTPUT: 2.0 watts (min.) at less than 10% THD into internal or external ohm speaker.

TRANSMITTER

TUNING RANGE AND CONTROLS: Same as RECEIVER.

POWER OUTPUT: 25 watts Min. into 50 ohm load. P/A transistor protected for infinite VSWR.

MODULATION: Internally adjustable up to 10 KHz deviation and up to 12 db peak clipping.

*DuPont trademark

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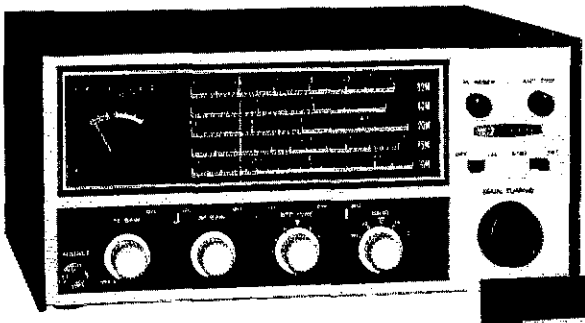
7C-2109

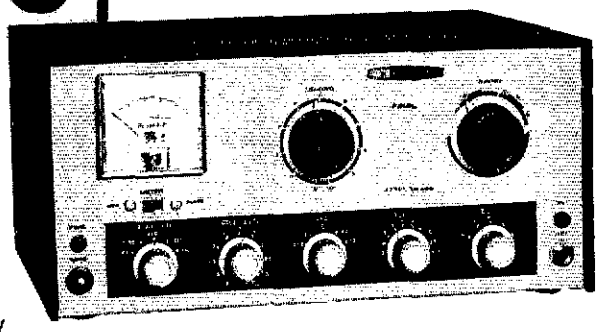
Heathkit® goodies for the novice



The HR-10B 5-Band Receiver... 79.95*

Top performance, low price. The HR-10B is the receiver for novice or beginning general class hams. Tunes AM, CW & SSB with excellent stability for CW and sideband. Covers 80 through 10 meters with each band separately displayed on the accurately calibrated illuminated slide-rule dial. Separate RF and AF gain controls provide extra convenience and the BFO permits quick and easy sideband tuning. A high quality crystal lattice filter delivers sharp 3 kHz selectivity. 1 uV sensitivity provides capability that puts many more expensive receivers out of the QSO. Built-in "S" meter, switchable AVC and automatic limiter provide the versatility you expect in a first-rate communications receiver. Provision for the optional HRA-10-1 kHz crystal calibrator. Alignment requires an RF signal generator and VTVM. **Kit HR-10B,** less speaker, 20 lbs. **Kit HRA-10-1,** plug-in 100 kHz crystal calibrator, 1 lb. . . . **9.95***

HR-10B SPECIFICATIONS — Frequency coverage: 80 Meter Band, 3.5 to 4.0 MHz; 40 Meter Band, 7.0 to 7.3 MHz; 20 Meter Band, 14.0 to 14.35 MHz; 15 Meter Band, 21.0 to 21.5 MHz; 10 Meter Band, 28.0 to 29.7 MHz. **Intermediate frequency (IF):** 1681.0 KHz. **Sensitivity:** 1 microvolt for a 10 dB signal plus noise-to-noise ratio. **Selectivity:** 3 KHz at 6 dB down, 9 KHz at 40 dB down. **Image rejection:** 40 dB or better. **Input impedance:** 50 to 75 Ω, coaxial. **Audio output impedance:** 8 Ω, or 500 Ω. **Panel controls:** AF GAIN, AC OFF-ON; RF GAIN; BFO TUNE; BAND Switch; MAIN TUNING; CALibrate ANTenna TRIMmer; REC-STBY Switch; CALibrate ON-OFF; BFO On-OFF; ANL On-OFF. **Tube complement:** 6BZ6 RF Amplifier; 6EA8 Mixer Oscillator; 6BA6 1st IF Amplifier; 6EA8 2nd IF Amplifier-BFO; 6BJ7 Detector-AVC-ANL; 6EB8 1st Audio-Audio Output; 6X4 Rectifier. **Power requirements:** 120/240 VAC, 50/60 Hz, 50 watts. **Cabinet size:** 6½" H x 13¾" W x 11½" D.



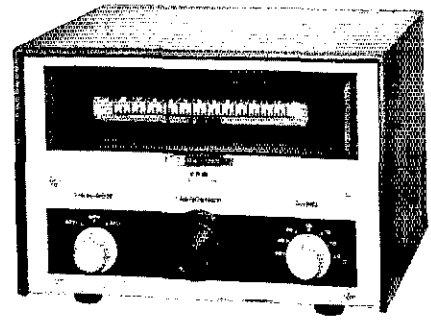
DX-60B Phone & CW Transmitter... 79.95*

Run 75 watts CW input for novice operation — a full 90 watts phone or CW when you move up to general. Pi output provides fast, easy tuneup into any 50-75 ohm resistive load. Drive Level control, grid/plate current meter and Drive Tune control enable proper tune-up for maximum output, minimum harmonics, best quality audio. Four crystal sockets and provision for operation with external VFO such as the HG-10B below provide maximum operating versatility. Easy assembly...requires only a VTVM for alignment. **Kit DX-60B,** 24 lbs., less crystals.

DX-60B SPECIFICATIONS — Power input: 90 watts, peak; controlled carrier phone, or CW. **Output impedance:** 50-75 ohm (coaxial). **Output coupling:** Pi-network. **Operation:** CW or AM phone — crystal or VFO control. **Band coverage:** 80 through 10 meters. **Power requirements:** 120/240 VAC, 50/60 Hz, 225 watts. **Dimensions:** 6½" H x 13¾" W x 11½" D.

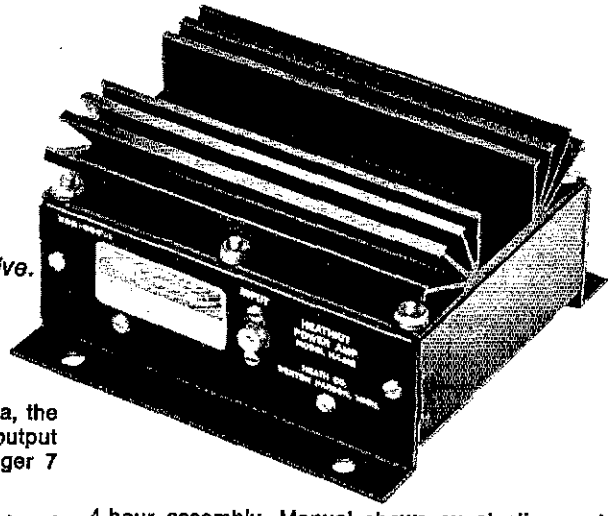
HG-10B 80-2 Meter VFO... 47.50*

Our HG-10B VFO covers 80 through 2 meters with separate calibrated scales for each band. Has smooth 28:1 vernier tuning; temperature compensated circuitry for drift free tuning. Provides 5 V rms in the 3.4-4, 7-7.425 and 8-9 MHz ranges. Compatible with virtually all grid-block keyed, transmitters and most cathode-keyed transmitters. Alignment requires receiver of known accuracy covering either the 80-2 meter bands or 3.5 to 8.222 MHz range. **Kit HG-10B,** 12 lbs.



and 2-Meter fans too

NEW Heathkit 2-Meter Amplifier for cleaner FM copy on the fringe... 69.95*



40 watts nominal out for 10 watts in — *requires only 12 VDC supply.*

Fully automatic operation — *with any 2-meter exciter delivering 5-15 watts drive.*

Solid-state design — *all components mount on single board for fast, easy assembly.*

If you're regularly working from a fringe area, the new Heathkit HA-202 can boost your mobile output to 40 watts (nominal), while pulling a meager 7 amps from your car's 12-volt battery.

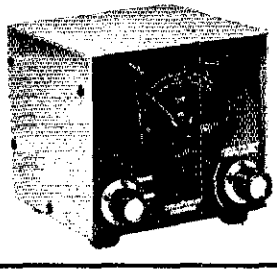
Install it anywhere...in the trunk, under the hood or dashboard. Use it with any 2-meter exciter delivering 5-15 watts drive. Features fully automatic operation. An internal relay automatically switches the antenna from transmit to receiver mode when you release the mike button.

All solid-state design features rugged, emitter-ballasted transistors, combined with a highly efficient heat sink, permitting high VSWR loads. Tuned input-output circuits offer low spurious output to cover the 1.5 MHz segment of the 2-meter band without periodic readjustment. All components mount on a single printed circuit board for easy, 4-hour assembly. Manual shows exact alignment procedures using either a VOM or VTVM. And installation is just as simple.

Kit includes transceiver connecting cable, antenna connector. Operates from any 12 VDC system — additional power supplies are not required. Add HA-202 power to your mobile 2-meter rig, and boom out of the fringe. **Kit HA-202,** 3 lbs.

HA-202 SPECIFICATIONS — Frequency range: 143-149 MHz. **Power output:** 20W @ 5 W in, 30W @ 7.5W in, 40W @ 10 W in, 50W @ 15 W in. **Power input (rf drive):** 5 to 15W. **Input/output impedance:** 50 ohms, nominal. **Input VSWR:** 1.5:1 max. **Load VSWR:** 3:1 max. **Power supply requirements:** 12 to 16 VDC, 7 amps max. **Operating temperature range:** −30° F. to +140° F. **Dimensions:** 3" H x 4¼" W x 5½" D.

New Heathkit VHF Wattmeter/SWR Bridge... 29.95*



Perfect tune-up tool for your 2-meter gear. Tests transmitter output in power ranges of 1 to 25 watts and 10 to 250 watts ±10% of full scale. 50 ohm nominal impedance permits placement in transmission line permanently with little or no loss. Built-in SWR bridge for tuning 2-meter antenna for proper match, has less than 10-watt sensitivity. **Kit HM-2102,** 4 lbs.

HM-2102 SPECIFICATIONS — Frequency range: 50 MHz to 160 MHz. **Wattmeter accuracy:** ±10% of full-scale reading.* **Power capability:** To 250 W. **SWR sensitivity:** less than 10 W. **Impedance:** 50 ohms nominal. **SWR bridge:** Continuous to 250 W. **Connectors:** UHF type SO-239. **Dimensions:** 5¼" W, 5⅛" H and 6½" D, assembled as one unit.
*Using a 50 Ω noninductive load.

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W6s and the closest being WNY OVS K2GUG. W2DSS received over fifty cards from hams on his 80th birthday with a card from W2SZ bearing 42 signatures! EC K2DUB is now Extra Class. WA2AOG's Tempo 1 and TA-33 jr. has 110 countries in 3 months. WB2NRK is the first asst. mgr. for the NYSPON. K2DNN has a new standard rig complete with mobile antenna and AC/DC supplies. The Oswego County ARA elected W2QZW, pres.; WN2SPD, veep; WA2LOW, secy.-treas. Traffic with * indicating PSHR: W2OE 343, WA2ICU* 296, WA2ELD* 253, K2KQC 252, W2RUF* 232, WB2NRK* 193, WA2AYC* 188, W2FR* 174, WA2HSB 143, WB2EEX* 97, W2MTA* 78, W2RUT 77, W2MSM 73, W2ROF* 63, W2EAF 60, W2FFB 54, WB2ADW 43, W2HYM 41, WB2VND 41, WA2PUU 40, WA2TLB 31, K2JBX 29, K2OFV 23, WA2MPC* 21, K2CC 20, W2PVI 20, W2PZL 19, W2DBU 18, W2GLB* 12, K2IMI 11, WA2ABL 10, WN2AEY 10, K2DNN 7, WA2AOG 6, K2KTK 6, WA2QAP 5, WB2FPG 4, W2AET 3, WA2LUF 2, WA2SMQ 2, WA2AIV 1.

WESTERN PENNSYLVANIA – SCM, Robert E. Gawryla, W3NEM – SEC: W3KPJ. 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 W3TOC. The Skyview Radio Society has new officers for the coming year with W3QUL; pres.; WA3EJO, vice-pres.; K3VRV, secy.; W3GVL, treas. The Radio Association of Erie announced their RAT Patrol was a big success this year on Halloween. WA3OSG has Advanced to General Class and WN3THY is a new Novice. The Novices are in the news this month. WN3PUJ was four states short of Novice WAS during the recent local contest in the Erie area. She took top honors and received a nice plaque for her efforts. WN3SWC had a good month of Nov. He made BPL as a Novice and passed his General Class exam. WN3SZX also made BPL as a Novice. Both SWC and SZX are from Sharon, Pa. Congrats men. The Nittany ARC repeater has been shut down pending application and receipt of their new license under the new FCC regulations. The NARC has been very active in Oscar 6 activities with over 12 QSOs logged. They are trying for the Satellite DX Achievement Award "1000." Good luck gang. It is with deep regret to hear that the "Oscillator," newsletter of the Etna RC is being put to rest. I believe it is one of the oldest newsletters in WPA. PSHR for Nov.: WA3QOR 46, W3LOS 39, W3NEM 39, W3YA 34. WPA had 30 sessions, 414 stations QNI, handled 263 messages. Traffic: WA3QOR 220, W3YA 183, WN3SZX 142, WN3SWC 133, W3NEM 124, W3KUN 114, K3CR 88, W3MJ 85, WA3PXA 57, W3LOS 46, WA3IYA 41, K3ZNP 27, K3HCT 20, WA3LDA 20, WA3MDY 16, K3VQV 16, W3ATQ 13, W3IDO 12, W3SAY 12, WA3EJO 7, K3SJN 7, W3SN 7, W3ELZ 4, WA3PMI 3, WA3LJW 1.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – SEC: W9RYU. PAMs: WA9CCP and WA9PDI (vhf). RM: WA9ZUE. Cook County EC: W9IPG.

Net	*Freq.*	*GMT/Days*	*Tfc.*
IEN	3940	1400 Su	no report
ILN	3690	0300/2300 Dy	113
NCPN	3915	1300/1800 M-S	129
Ill PON	3915	2245/1430 M-F	614
Ill PON	145.5	0200 MWF	18
Ill PON	50.28	0200 M	0
Ill Novice			19

K9ZWU, K9DKI, WA9RIJ, K9ZWV, WA9TWW, WA9RER and WA9BWB were elected officers for the coming year of the Six Meter Club of Chicago, Inc. WA9ZUE, RM of the Ill. section now is W9MUC. New Novices heard in the NW side of the Chicago area are WN9LAO and WN9LAV, grandsons of the late W9DA. WA9QNM's new QTH is Virden, Ill. WN9IUR passed his General Class exam. W9NPB has been coming up with conversions for FAX which is getting popular in the Chicago area. W9UHD and XYL are vacationing in a new motor home. New officers of the Northwest ARC (Chicago) are K9GDI, WB9DVV, WB9FTC and WA9OYD. All Ill. repeaters are encouraged to join the Ill. Repeaters Council. Contact K9EUI, 528 McKinley, Batavia, Ill. 60510 for details. Two new hams heard on 2 meters are WB9KZV and WB9LAP. The Chicago FM Club worked on election day with "Project Leap" investigating over 200 complaints of vote fraud in the city of Chicago. W9BFH is a new ham in Carmi. The Chicago Radio Club Council elected the following officers for the new season: K9DQU/WB9AIE, pres.; K9AQJ, vice-pres.; WB9BDP, secy.; W9YMF, treas. W9LYK reports that a repeater society for Southern Ill. and Southeastern Mo. has been initiated by 75 amateurs in that area. If interested contact him at Mt. Ava Repeater Assn. at Rt 1,

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PS-1 AC supply 9
TX-62 VHF Xmtr 89

B T I
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22'er FM series 25 249
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Interceptor B Rec. 289

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Speaker (A1, A2, A3) 9
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75S-3B Receiver 595
R-388 Receiver 495
R-390A Receiver 995
R-390A Receiver 895
32V-1 Transmitter 99
32S-1 Transmitter 349
32S-3 Transmitter 695
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R-4 Receiver 275
MS-4 Speaker 15
SC-2 2m converter 59
SC-6 6m converter 59
CC-1 conv. console 39
CPS-1 supply 12
SCC-1 VHF calib. 19
2NT Transmitter 109
TR-3 Transceiver 369
AC-3 AC supply 65
DC-3 DC supply 85
TR-4 w blanker 495
TR-4 Transceiver 439
DC-4 DC supply 95
TC-6 6m xmt. conv. 179
TC-6 (DEMO) 225
MN-4 Matcher 69
W-4 Wattmeter 45
Hybrid phone patch 19
SNB Noise Blanker 49

EICO
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752 DC supply 49
717 Keyer 49

GLOBE/GALAXY/WRL
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DC-35 DC supply 69
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VX-35 Vox 15
CAL-35 calibrator 12
SC-35 speaker 15
F-3 300 cy. filter 24
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G-76 DC supply 49
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973-A Comtron 180w 2m mobile Amp. 169

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S-108 Receiver 74
SX-110 Receiver 99
SX-111 Receiver 129
SX-117 Receiver 189
S-120 Receiver 39
SX-130 Receiver 139
SX-140 Receiver 69
SX-146 Receiver 175
S-200 Receiver 69
R-50 Speaker 15
HT-32 Transmitter 209
HT-32A Transmitter 225
HT-37 Transmitter 189
HT-44 Transmitter 189
HT-46 Transmitter 219
SR-150 Xcvr 275
PS-150-120 AC sup. 75
PS-150-12 DC sup. 75
MR-150 Rack 19
P-500DC DC supply 95
SR-2000 Xcvr AC 995
P-26 AC supply 45
SR-34 AC DC Xcvr 199
SR-46A 6m Xcvr 109
HA-4 T.O. Keyer 39
HA-20 VFO SWR 149
HA-16 VOX unit 15

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HQ-110A Receiver 159
HQ-110AC Rec. 169
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HQ-140X Receiver 119
HQ-145XC Rec. 179
HQ-145AC Rec. 199
HQ-170 Receiver 159
HQ-170C Receiver 169
HQ-170A Receiver 209
HQ-170AC Rec. 219
HQ-170A/VHF Rec. 259
HQ-180 Receiver 229
HQ-180AC Rec. 339
HQ-215 Receiver 249
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S-200 Speaker 15
100kc Calibrator 9
HX-50 Transmitter 195

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XC-6 6m converter 25
SB-600 Speaker 15
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DX-60 Transmitter 59
DX-100 Transmitter 89
DX-100B Transmitter 99
TX-1 Transmitter 99
HX-20 Transmitter 125
HX-30 6m Xmtr 149
HA-20 6m Linear 75
HW-10 6m Xcvr 129
HW-12 75m Xcvr 75
HW-12A 75m Xcvr 89
HW-20 2m AM Xcvr 159
HW-22A 40m Xcvr 89
HW-32 20m Xcvr 75
HW-32A 20m Xcvr 89
HW-17A 2m Xcvr 119
SB-101 Xcvr 349
HW-101 80-10m 275
SB-400 Transmitter 275
SB-620 Scanalyzer 119
VF-1 VFO 19
HG-10B VFO 39
HW-30 (Two'er) 45
VHF-1 Seneca 129
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HP-23 AC supply 49
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6N2 converter 39

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V-107 VFO (VHF) 19
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XCU-109 calibrator 9
NCX-3 Xcvr 169
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PC-62B 6-2m Xcvr 149

RAYTRACK
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DX-150A Receiver $ 89

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SB3-XC Calibrator 12

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TCU Control unit 69
1200-W Linear Amp 179
117B AC supply 65
TV-2 2m Xverter 189
350 Xcvr (early) 249
350 Xcvr (late) 289
SW-117C AC supply 69
500CX Xcvr 399
500 Transceiver 339
500C Transceiver 369
117XC AC supply 85
117X Basic AC sup. 65
270B Transceiver 349
410C VFO 89
22B VFO adaptor 19
210 VFO 89
AF-800 Audio filter 19
Mark II Linear 479
600T Transmitter 395

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650A 6m Xcvr VFO 79

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Thor DC Supply Modulator	159	80
FM-27A 2m FM xcvr.	479	379
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32S3 Xmtr - New display	1330	1064
351D-2 mobile mt. - New disp	337	187
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AM-6 6m halo less mast	$ 10	$ 6
AM-6M 6m halo with mast	14	9
AM-22 2m stacked halo w mast	17	12
AM-26 2 & 6m halo w/mast	19	14
DRAKE		
TR-4 Transceiver	$599	$499
L-4B Linear - New display	825	675
TC-6 6m xmt. converter	278	248
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PA-70V Linear w 160m	$1875	1495
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AC-210 AC supply booster	49	39
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GT-550A New display	595	475
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Haverick II 6m Filter	$ 34	$ 17
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SO-150B 159-174Mc 1-pole	125	49
HB2S4 4 stacked 2m halos	54	22
400 Rotor New display	229	199
JOHNSON		
6N2 Converter (26-30Mc I.F.)	$ 89	$ 59
LINEAR SYSTEMS (ADCOM)		
350-6 6v DC Supply	$125	$ 25
12-150 12-110v 150w inverter	60	29
PEARCE SIMPSON		
GLADDING 25 2m FM Xcvr WITH matching AC supply	$299	$239
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CB Autolevel	$ 69	$ 29
REGENCY		
HR-2A 2m fm - New display	$229	$199
HR-212 2m fm - New display	259	229
S & E		
SB-36 Xcvr - New display	$969	$769
SB-SV Television Monitor and Camera - New display	399	299
SB-144 2m FM - New display	259	229
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SB2-MIC Mike (dynamic)	16	12
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22 Adaptor	32	22
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FR-2515 Hi-band Scanner	189	119
FR-2514 Low-band Scanner	189	119
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FM-20BM Base Amp. supply	235	89*
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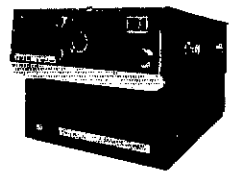

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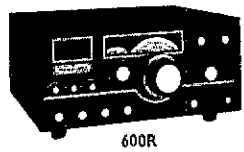

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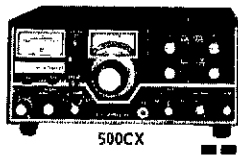

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Carbondale, Ill. W9KV has been presenting popular lectures on antennas at the regular meetings of the Northwest Amateur Radio Club. The Cenois ARC, (Decatur) helped with the Salvation Army Marathon during the Christmas holiday season. ARRL Director Phil Haller spoke at the Dec. meeting of the Tri-Town ARC. The QCWA has been reactivated in Chicagoland and information can be secured from W9RC. Traffic: WA9ZLN 212, W9AES 178, W9NXG 163, W9MUC 141, W9OYL 96, W9IXV 84, K9KHI 82, WB9FHI 76, W9LNQ 74, WB9FLP 73, WA9OBR 72, WA9LDC 66, WB9FVG 58, K9IJD 50, W9TAL 49, WB9JTK 40, WA9LHU 22, W9KRR 19, WB9EBX 12, W9PRN 10, W9KV 8, WA9OBP 3.

INDIANA – SCM, William C. Johnson, W9BUQ – SEC: W9HC. RMs: WA9EED, WB9EAY, W9FC, W9HRY. PAMs: K9KTB (vhf), W9HWR, W9PMT.

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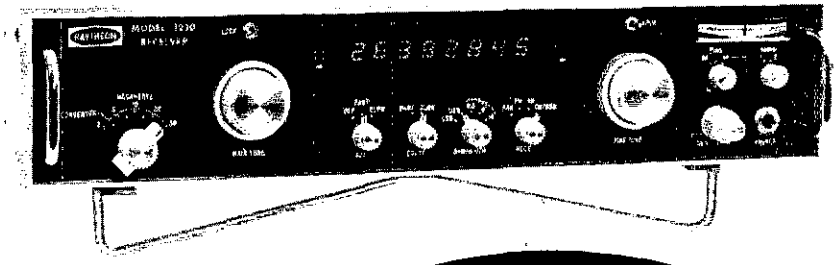
IPON CW	3740	0000 Dy	23	WB9AHJ
IPONVHF	50.7	0100 MWTh 0200 Dy	21	WA9ULH
IPONSSB	50.2	0200 Dy		W9MHZ
Hoosier VHF			12	W9PMT

With deep regret I report the passing of W9JLV, WA9YHB and K9PPP. WN9IHH checked into 4 Novice nets IPON 3740, ILNN 3720, KNTN 3725, MSN 3703. Editor for the IRCC publication "Bison" is WB9AHJ. At the Indianapolis RC Annual Award Dinner on Nov. 10 W9BUQ received the "Appreciation Plaque." W9KTP, WB9AHJ are new OOs. 146.52 is becoming the Simplex frequency in this area. 45 counties are represented by ECs which leaves 47 counties without any. The Bison will have all counties listed. W9IZA received his 40-year award from ARRL. Ind. Repeater Council Nov. Newsletter has all information in it about the repeater in Ind. at present. For more information contact K9LSB, Jack Forbing 1416 Lakwood Drive, Fort Wayne, Ind. 46819. QIN Honor Roll: W9IH, W9QLW, K9HDP, K9HYV, WA9EED. New officers Clark County ARC WA9BUP, pres.; W9IRJ, vice-pres.; W9HRY, secy.: W9FCM, treas. Amateur radio exists because of the service it renders. Traffic: (Nov.) WA9EED 229, W9QLW 156, K9KTB 137, *K9FZX 103, WB9AHJ 89, WA8FKQ/9 87, K9HDP 73, K9HYV 73,* WB9FOT 52, W9FWH 46, W9BUQ 45, WA9OHX 42, WB9FST 40, K9YBM 28, W9HRY 26, K9RPZ 24, WA9TJS 24, W9KWB 22, K9JQY 20, W9PMT 20, W9JBQ 19, WA9ULH 18, WA9AXF 14, K9RWQ 14, W9DZC 12, K9ILK 12, W9RTH 10, WB9BAP 9, K9CBY 9, WA9OKK 9, W9CQU 8, K9DIY 7, W9UEM 7, WA9WJA 7, WN9IHH 6, K9EQT 5, WB9EJO 5, W9CMT 4, W9HWR 4, WA9OAD 4, WB9KVN 2, W9BDP 1. (Oct.) WA9TJS 41.

WISCONSIN – SCM, Joseph A. Taylor, W9OMT – SEC: W9NGT. PAMs: K9FHI, WA9OAY, WA9QKP. RMs: W9UCR, K9KSA.

Net	*kHz*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
WSBN	3985	2300 Dy	1257	153	K9FHI
WIN(early)	3662	0000 Dy	304	114	W9UCR
WIN(late)	3662	0400 Dy	117	69	WB9HLM
BEN	3985	1700 Dy	667	94	WA9QKP
BWN	3985	1145 M-S	437	306	WA9OAY
WSSN	3662	2330 MWF	37	5	K9KSA
WI-PON	3925	1801 M-F	587	73	W9EMC
WI-PON	3697	2330 W	21	–	W9EMC

WA9NIX is the new mgr. of the WI-PON. The Wisc. Repeater Assn. now has By-Laws; K9ZYS in charge of organization. New Novices in Stevens Point area WN9LBU, WN9LCP. The Green Bay Novice class is over with five prospects waiting for licenses. W9MFG wants to set up a Novice Net for on the air practice. W9UCR back on the air *after being QRT with an operation. W9LME is interested in getting a* ham club started in South East Wisc. Let him know if you are interested. WB9KSL is new in the Lake Geneva area. K9UTQ is the new prexy of the WNA; the WNA picnic will be held this year at Hartford, Wisc. on July 12. Make plans now to attend. The ew men have promised revenge in the ball game. Congrats to your SEC, PAMs and RM on being awarded ARRL lapel pins for a fine job done in 1972, also to the following for new or renewal of appointments: W9KXK OPS, K9FHI PAM, W9SZL EC. Look over your net certificates, if the date is more than a year old and you are still active send them in to your SCM for endorsement. Traffic: K9CPM 367, W9CXY 311, W9DND 247, W9ESJ 100, W9MFG 93, WB9HLM 66, W9UCR 57, WB9ABF 45, W9CTI 38, WA9MCC 33, K9LGU 29, W9IHW 28, W9KRO 28, K9KSA 18, WA9BZW 17, W9DXV 11, WB9GGL 11, W9AOW 9, W9ERW 4, K9UTQ 4.



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DAKOTA DIVISION

MINNESOTA – SCM, Casper H. Schroeder, WAØVAS – Minn. section net reports: MSN (Minn. Sr. CW Net) – No report: MJN (Minn. Jr. Net CW) sessions 25, QNI 192, QTC 29, high 15, high 5, low 3, low 0, average 7.6, average 1.0, NCS – WAØYAH, WAØYWA, WAØTFC, WAØRRA, WBØCNM, WBØDSJ, WBØFMR, KØVMF. Novices – WNØFNA, WNØGKH, WNØEYW, WNØIBO, WN9JXT, Sta. QNI Ten Net WAØRRA, WBØCNM, WØZHN. MSPN (Minn. section phone net) Noon Net KØFLT PAM - sessions 30, QNI 1024, QTC 155, high 48, high 23, low 25, low 0, average 34.1, average 34.1. Evening Net WAØHRM PAM – sessions 30, QNI 1226, QTC 143, high 56, high 12, low 23, low 0, average 40.9, average 4.8. PAW (Piconet all day watch) WAØYVT (Mgr.) QNI 3746, QTC 300, hours 166, patches 119, average 22.6. RTTY Net, KØVPM (Mgr.) QNI 9. Ten Certificates of Merit were awarded by the SCM to folks in the handi-ham system – WAØYVT, WAØTFC, WBØFMI, WAØVTZ, WAØCCA, WAØIIB, WAØYAH, WAØRRA, WØTLE, WAØEPX. We regret the passing of WØOOQ. Traffic: WAØVAS 1023, KØCSE 287, WAØTFC 214, WAØYVT 170, WØBUC 169, WAØGRX 160, WBØHOX 151, KØGNI 135, WAØRRA 129, WAØVYB 117, WAØYWA 91, WAØONE 86, WAØVTZ 77, WBØDZA 59, WAØIAW 56, KØZRD 54, WAØCCA 50, WAØIIB 44, KØZBI 40, WAØNLT 38, KØFLT 37, WØWFA 37, WAØKQU 35, WAØURW 35, WAØYAH 30, WAØVUP 27, WBØFMR 24, WAØYGF 23, WAØRKV 21, KØPIZ 19, WAØHRM 18, WBØFMI 17, KØJTW 14, KØSXQ 11, WØFDM 10, WØOBB 10, WBØCNB 8, WØNO 8, WAØVHX 8, KØWXH 8, KØEDS 7, WBØFNK 7, KØICG 7, WAØJPR 7, KØMVF 7, WAØATX 6, WB8FBN/Ø 5, WØPAN 2, WØUMX 2, WAØYER 2, WNØGKH 1/.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – SEC: WAØAYL. OBS: KØPVG. RM: WAØMLE. OO: WØBF. We regret to report the passing of WØBZZ an OT from Minot. Our sympathy to his brother WØGNS and families. WBØBMG and WBØBMH plan to attend the wedding of a son in sunny Calif. WAØDLB is working away on the SB-101. WØEFJ is on 160 with a vertical. WØCGM solved his problem too by moving and putting up a vertical. KØPYZ has gone to Chicago for the winter. WBØGFZ received his General Class ticket. Also WØKXP received his Advanced ticket while WNØETR is waiting for her conditional. Congrats! WBØAUM and WBØGFZ have some 2-meter activity going. WAØMLE and WAØELO still keeping N.D. on TEN. WAØMLE made BPL and PSHR for Nov. WBØFDT qualifies for PSHR too. Congrats.

Net	*kHz*	*CDT/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
Goose River	1990	0900 S	4	64	3	WØCDO
YL Weather	3994.0	0730 M-F	22	341	337	WAØGRX
RACES	3996.5	1830 M-F	44	1006	61	WBØATJ
PON	3996.5	0900 S 1830 S-S	12	368	14	WAØSJB
CW	3748	2150 M-F	19	80	30	WAØMLE WAØELO

Traffic: WAØMLE 234, WAØELO 196, WAØRWM 168, WAØCSL/Ø 63, WØWWL 54, WBØFDT 31, WAØSUF 31, WØCDO 26, WAØHUD 18, WØDM 15, WBØCCA 8, WAØJPT 6, WØMXF 4, WBØGFZ 1.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – SEC: WAØOVR. RM: WAØTNM. PAM: WAØYAK. WBØEPY, WBØEKL and WBØDRO are on 2-meter fm, along with WAØZXV, WAØSBT, WBØDAH, KØCRD, WØYOB, WØUZA, WØJLS, WØOQQ and KØCXK. There are others who have just gotten on 2 meters fm and it would be appreciated if they would let the SCM know so it may be reported. Repeater informational and organizational meetings have been reported in Mitchell, Pierre, Rapid City and Yankton. If you are interested in 2 meter fm and live in one of these areas or if you live in the northern Black Hills, Huron, Watertown, Brookings, Aberdeen or Sioux Falls contact amateurs in your area for more information or your SCM. All these areas have 2-meter fm activity. The WX Net is active at 8:00 A.M. CST Mon.-Sat. on 3955 kHz during the winter months. Traffic: WØZWL 329, WAØROK/Ø 112, WØIG 45, WØCLS 27, KØAIE 26, WØDVB 26, KØGSY 26, WØMZI 24, WAØNZA 13, WBØNZA 13, WBØDAH 8, WØSMV 3.

DELTA DIVISION

ARKANSAS – SCM, Jimmie N. Lowrey, WA5VWH – SEC: WB5CEL. PAM: WB5FDP. RM: W5EIJ. WB5EWH and K5BOC both have new standard HTs. WA5EJH and WA5VNU have standard SRC-846As. The Fort Smith VHF Repeater Society has now installed new homemade 6 db antennas on WA5YUT. K6KCB/5 now is W5TFT and very active on OZK. W5PBZ suffered ice damage to his quad but should be back with a new one shortly. WB5FOW now has a new Drake TR-4C. K5BOC has a new XYL!

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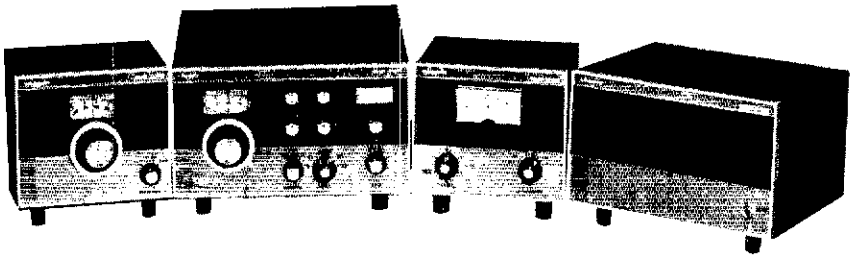

The Hy-Gain 550A is the complete amateur system. Designed from the ground up to work together for total performance. Each element is matched to the system, for simple, plug-in expansion of your capabilities.

GT-550A Transceiver The matchless heart of the 550A System. No other transceiver can give you this performance for the price. Operating fixed station or mobile, the GT-550A is guaranteed to have top frequency stability after warm-up. A graph showing stability during final check-out is included with each unit. 25 KHz calibrator and VOX, optional.

Frequency Coverage—3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-29.0 MHz crystals supplied. Other 10 meter coverage optional. Power Output—300 watts PEP (nominal) on SSB, 180 watts on CW and RTTY, into 50 ohm resistive load.

Harmonic and Spurious Radiation—Carrier suppression in excess of 45 db down, unwanted side bands minus 55 db oscillator feed through and mixer spurious products down 50 db. Second harmonic minus 40 db and third order distortion in excess of minus 45 db.

Noise Level—In excess of 40 db below single tone carrier.

Audio Frequency Response—Minus 6 db approximately 300/2400 Hz determined by side band filter.

RF Compression Characteristics—Up to 10 db RF compression without distortion.

Receiver Sensitivity—Better than .5 uv for 10 db S+N/n ratio.

Receiver Selectivity—2.1 KHz with 1.8 shape factor for SSB or 300 Hz sharp selectivity with optional CW filter.

Receiver Spurious Response—Image rejection better than 40 db down. Internal spurious below 1 uv equivalent input.

Frequency Calibration—Interpolation to 1 KHz in 5 KHz increments.

Frequency Stability—Within 10 Hz during any 30 minute warm-up period, less than 100 Hz in any 15 minute warm-up period, not more than 100 Hz with a plus or minus 10% line voltage variation.

Calibration Accuracy—Interpolation to 1 KHz after calibration.

Back Lash—Not more than 50 Hz.

Output Impedance—Variable 50 ohms nominal capable of matching up to 2-1 SWR (30-100 Ohms).

Automatic Volume Control—Fast attack, slow release on all receiver modes.

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RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales, switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

RV550A is a solid state VFO. Function switch selects the remote unit to control Receive-Transceive-Transmit frequency independently. Order No. 856 Ham Net $95.00

SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95

G-1000 12V D C Mobile power supply with cables. Order No. 802 Ham Net $129.95

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Net	*GMT/Day*	*Freq.*	*Mgr.*
Razorback	0030 Dy	3945	WB5FDP
OZK	0100 Dy	3765	W5EIJ
Teenage	2330 Dy	3995	WB5DWH
Ark P.O.	2130 M-F	3925	W5OEO
Ark Phone	1200 M-S	3937	W5LRA
DX Info	0045 F	3995	WA5YMW
CAREN	0200 Th	146.34/94	W5RXU

Repeaters: WA5SNO Fayetteville, 146.16/76; WA5YUT Fort Smith, 146.34/94; WB5FKF Forrest City, 146.16/76; W5DI Little Rock, 146.34/94; W5RHL, Jonesboro, 146.34/94. Traffic: (Nov.) WB5FDP 193, W5EIJ 40, W5MYZ 31, W5BED 2. (Oct.) WA5EVW 50.

LOUISIANA – SCM, John R. Rivoire, K5AGI – Asst. SCM: Louis A. Muhleisen, Jr., WB5AEH. RM: W5GHP. Your SCM recovering from surgery. Sorry to report WA5OLU has resigned as SEC to accept position as pres. of BRARC. Congrats to newly-elected BRARC – WA5OLU, pres.; WB5CIQ, vice-pres.; W5DPM, treas.; WB5CNM, secy.; WB5COO, hamfest chmn.; WA5TXA, hamfest treas.; WA5MBL and WA5RRO, board. CARC recently honored the SCM with a "Hamfeast" in Houma. Congrats to WA5ZZA and WB5CIC for first BPL awards during my term. Congrats to GNOARC electees WB5AEH, pres.; WA5VCF, vice-pres.; K5GKK, treas.; K5YMM, secy.; W5CZJ, club EC; WA5KND, board. Make your reservations now to attend LARC Lafayette Banquet coming up Mar. 10. Contact K5DPG for information. WB5GKT and W5QEI set up license classes for the VA Hospital personnel in Shreveport and W5WE organized a 7th grade Novice class. On Dec. 9 ARCSWL, BRARC, JARC and CCOL all hosted banquets. W5OB is newly-elected vice-pres. N.O. Chapter OOTC. W5VAQ and W5EXI are new members OCWA. WA5ATM and XYL spent Dec. and Jan. in Europe. W5KPK now back from Nigeria. Congrats to K5GPF on his recent marriage. Recent visits OARC, ODXA and RAT printing, and CARC. New "Dots-n-Dashes" editor is WA5YYG. La. section welcomes W6DAZ/5. Sorry to hear W5SWS's home was destroyed by fire. W5CEZ attended Zone 3 MARS meeting in Norco. Rayville welcomes WB5ICJ to 2 meters. K5TAD enjoying his new 2-meter handi-talkie. W5JG now on 2-meter fm. W5OUD has 2-meter fm rig in new station wagon. WA5ZDZ and friends provided W5OCN with a small poodle. Look for W5EA with new gear on ssb. WA5QVN enjoying new ML-2. Traffic: WB5CIC 289, W5GHP 194, WA5ZZA 131, W5MI 109, WA5WBZ 41, WB5FRQ 22, W5CEZ 17, WA5QVN 16.

MISSISSIPPI – SCM, Walker S. Coffey, W5NCB – Asst. SCM: Gene McGahey, WA5JWD. SEC: WA5FII. PAMs: W5JHS, WA5KLY, K5MDX. RMs: WA5YZW, WB5DEK. New officers of MCARA are WA5KYB, pres.; WB5DDQ, vice-pres.; WB5GOI, secy.; WB5CPF, treas.; K5QBU, act. chmn. The club has run two license classes netting 3 Advanced, 2 General, 1 Tech. and 8 Novices. A third class is in progress with 10 members. New officers of TARC are WA5TWI, pres.; K5QXH, secy.-treas. DXCC Honor Roll included W5AQ, W5PWW, W5MUG, K5SSZ, W5RUB, W5RY, WA5SUE, K5AYA, W5NCB. K5TYT and W5AMZ. See you in the DX Contest in Feb. and Mar. Welcome to new hams: WB5HSX, WB5HTT, WB5HTS and WB5HUN. WA5SUE has new digital frequency display. WB5BUE putting up a quad. Again please help us get more Novices on the net which meets at 7 P.M. local time MWF on 3733 kHz.

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
MTN	3665	0045 Dy	105	106	WA5YZW
MNN	3733	0100 TTS	–	–	WB5DEK
GCSBN	3928	0030 Dy	–	–	W5JHS
CGCHN	3935	0100 Dy	1598	139	WA5ZOP
MSPON	3970	2345 MS	379	64	WAØGVO/5
MSBN	3987.5	0015 Dy	971	131	WA5UIH

Traffic: W5SBM 368, WA5YZW 149, K5YTA 84, W5EDT 81, W5NCB 77, W5WZ 64, W5AMZ 63, WA5UIH 34, WAØGVO/5 26, WA5CAC 19, WB5BUE 18, W5BW 11, WB5AHY 8, WA5NWZ 7, K5YPR 7.

TENNESSEE – SCM, O.D. Keaton, WA4GLS – SEC: WB4ANX. PAMs: W4PFP, K4MQI, WA4EWW, WA4NEC. RM: W4ZJY.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TPN	3980	1245 M-F 1400 SSu& Hol.	30	1380	31	W4PFP
TSSBN	3980	0030 T-Su	26	1407	68	K4MQI
ETPN	3980	1140 M-F	22	577	20	WA4EWW
TCN	3980	0200 Th	4	35	0	W4CYL
TPON	3980	0030 M				WB4BHZ
TN	3635	0000 Dy				WB4YCV
TNN	3720	0000 Dy	31	172	68	WB4USG
ETVHFN	50.4	0000 ThS	12	110	0	WB4IOB
ETVHFN	145.2	0000 WF	9	41	0	WB4DZG

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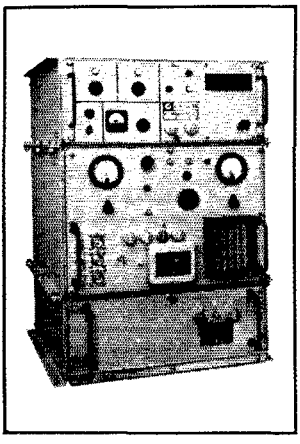


When you get right down to it in tactical communications . . . the need to know and the need to tell . . . what do you really need?

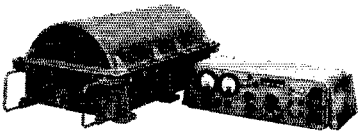
You need narrow-band secure voice and high speed data capabilities. You need rapid automatic tuning, power source flexibility, full remote control capability, and *dependability.* In short, you need the best the state-of-the-art has to offer: the *versatility* of the RF-130 1 KW HF/ISB Transmitter.

The RF-130 has exactly what you need . . . and more! Modes of operation include USB, LSB, AME (compatible AM), CW, and 2 or 4 channel ISB (DCA or CCIR compatible). Plus solid-state design, modular construction offering ease of maintenance, and much more. *Give yourself the tactical advantage transmitter.*

Plus

RF-601A AUTOMATIC ANTENNA COUPLER

If you don't have a broadband antenna available, the advantage you gain from an auto-tune transmitter can easily be lost. The RF-601A Automatic Antenna Coupler was designed to tune whip and long-wire antennas up to 500 feet away. Its accurate and reliable tuning assures frequency changes in less than ten seconds anywhere in the HF band.



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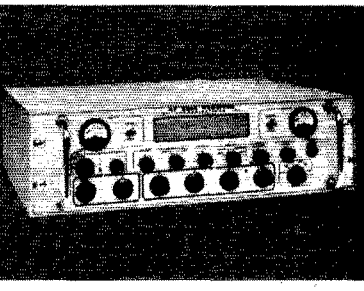

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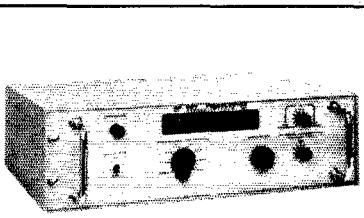
RF-507 PRESELECTOR and PROTECTION UNIT

Critical communications often require transmitting and receiving at the same time, often at relatively close frequencies. This leads to a drop in receiver performance from blocking, intermodulation and cross-modulation, and can even lead to permanent receiver damage. The RF-507 Preselector and Protection Unit is designed to eliminate these problems and increase overall receiver sensitivity and selectivity.

The RF-507 is completely self-contained, including power supply, and is a perfect companion to the RF-505A Receiver/RF-130 Transmitter, permitting full duplex operation.



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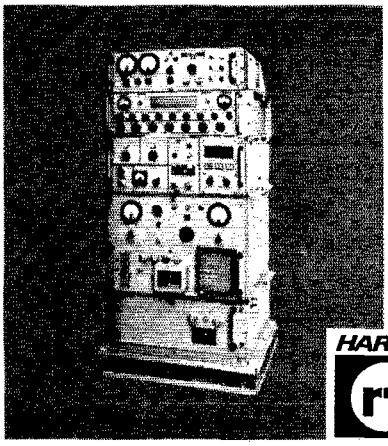

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KVHFN	50.7	0100 T	5	28	0	WB4MPJ
MTTMN	28.8	0200 TF	9	60	0	W4PSN
ETTMN	28.7	0100 WF	9	47	0	WB4NFT
ACAREC	146.28 146.88	0100 M	5	70	0	WB4DYJ

The CW Net Honor Roll for Nov. WB4YCV, WN4YDY, W4ZJY, K4CNY, WB4USG. The FM Advisory Committee of the Tenn. Council of Radio Clubs is now ready to assist those who are interested in placing repeaters on the air; I suggest you use their services. Meet the TCN on 3980 kHz every Wed. night at 9:00 P.M. EST to keep informed. The CW net is awarding a nice certificate to those who meet honor roll requirements; get in there and win this award. Traffic: K4CNY 185, W4ZJY 71, WB4DJU 57, W4WBK 57, K4AMC 42, K4VVE 40, WB4NIR 38, WB4USG 34, WB4ANX 27, WA4GLS 24, K4PUZ 12, WB4BZC 9, W4CYL 6, WB4MPJ 6, WB4TPS 6, WA4EWW 3, W4SGI 3, K4UMW 1.

GREAT LAKES DIVISION

KENTUCKY SCM, Ted H. Huddle, W4CID – SEC: WA4GHQ. Appointed WB4ZSA as ORS. Endorsements: W4BAZ as RM; WB4CTV as EC; W4CDA and W4CID as ORSs; W4OTP and W4TOY as OVSs; WB4GCV and WB4ILF as OPSs. BPL: WB4WCM and W4BAZ.

Net	*QNI*	*QTC*	*Net*	*QNI*	*QTC*
KRN	354	30			
MKPN	803	47	KNTN	229	76
KTN	1455	205	KPON	84	42

There will be 472 amateur call letter license plates for this first year of issue. Not a bad showing! WB4ZSA has a new SB-102 and 2-meter rig. WB4IEA and K4AVX have started Novice classes in the Hazard area. WB4WCM continues to roll along with a tremendous traffic count. New Novices are WN4CDB in Ashland and WN4CII in Louisville. WN4TNZ passed his General and Advanced in one fell swoop! We welcome WB4BYV who moved to Ky. from Ohio and WS1GZ/4 who has decided to retire here. WB4HUS has a new beam. Traffic: WB4WCM 644, W4BAZ 319, WA4JOS 236, WB4ZSA 181, WB4AIN 77, K4MAN 73, WB4EOR 72, K4UNW 68, W4CID 67, WB4AUN 56, WA4GHQ 43, WA4AVV 34, K4TXJ 30, WA4VZZ 27, WB4EQY 26, WA4ENH 25, W4IQZ 22, WA4DYL 19, WA4FAF 19, WB4REN 17, WA4AGH 15, W4CDA 13, WN4ANN 12, K4LOL 9, K4QHZ 9, W4OYI 7, K4AVX 6, WB4GCV 4, K4HOE 2.

MICHIGAN – SCM, Ivory J. Olinghouse, W8ZBT – Asst. SCM: B. Peter Tremi, W8KBZ. SEC: W8MPD. RMs: W8JYA, W8WVL, W8RTN, K8KMQ, W8GLC. PAMs: K8PVC, WA8KHB, WB8HQS. VHF PAMs: K8AEM, WA8WVV.

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Sess*	*Mgr.*
QMN	3663	2300 Dy	1120	437	90	W8JYA
WSSB	3935	0000 Dy	754	106	30	K8PVC
BR/MEN	3930	2230 S/F	808	106	26	WA8KHB
OPEN	3920	2230 Dy	681	56	34	WB8HQS
GLETN	3932	0230 Dy	733	82	30	WB8AXI
PON	3955	1600 Dy	888	349	30	K8LNE
PON/CW	3645	2400 M/S	140	26	26	VE3DPO
MI.6M	50.7	0000 M-S	207	14	20	WA8VXE
MI.Nov	3720	2230 Dy	74	4	26	WB8JAD

SW Mi. 2-meter net had 53 QNI, 4 QTC and 4 sesstons, W8CVO as mgr. SW Mi. 6-meter weather net held 4 drills, QNI 54. K8ZWR mgr. I regret to report as Silent Keys: W8MPY, K8BMC, K8WSK and WA8DFU. UPARRA elected the following officers: WA8VCB, pres.; K8ABS, vice-pres.; WA8OIK, secy.-treas.; W8ZUL, W8FGB and K8SWJ, dir. Twin Sault ARC elected W8JZG, pres.; K8MXC, vice-pres.; WB8IQM, secy.; WA8IXD, treas.; K8ZSM, act. mgr. Code classes are held at the club house. Kalamazoo Central HS ARC elected WN8MJI, pres.; WN8KEW, vice-pres. Blossom-Land ARS now has a 2 fm net, using their repeater every night at 0030Z. CMARC elected W8TXM, K8HXW and WB8AAX as dir. WB8IMI is now Extra Class. W8IBX can now be heard on 160 as well as the higher bands. P.O. Net Amateur of the Month is WB8FYM and their Special Award goes to WB8DTJ. WB8IJI worked Hawaii SSTV from W9EWC. WB8DZR has a new HW-7. 1973 officers of SEMARA are WA8BIW, pres.; W8KAZ, vice-pres.; WB8IDZ, secy.; K8HWW, treas. SSRARS mobileers were busy in the Spook Patrol in Plymouth with 14 hams participating, club station W8NJH was control station. K8MXC has Tribander and dipoles and WA8ZPF has a 2 FM and TV antennas up as a result of an antenna party. WN8LRJ has 71 contacts in ten states and Canada using an HW-16. W8GB is also WB4BSG in Fla. Traffic: (Nov.) K8KMQ 367, WA8WZF 330, WA8PIM 323, WB8JAD 215, W8IBX 143, K8LNE 124, WB8IMI 98, W8TZZ 86, K8DYI 80, K8PVC 80, WB8NOH 79, W8GLC 74, WB8BYB 72, W8IZ 70, WB8FBG 67, K8WRJ 58, WB8BPY 57, W8MO 57, WB8HQS 46, W8RTN 45, WB8KWI 42, WA8KHB 37, K8ACO 36, WA8ENW 35, W8LXY 35, WA8OJI 35,

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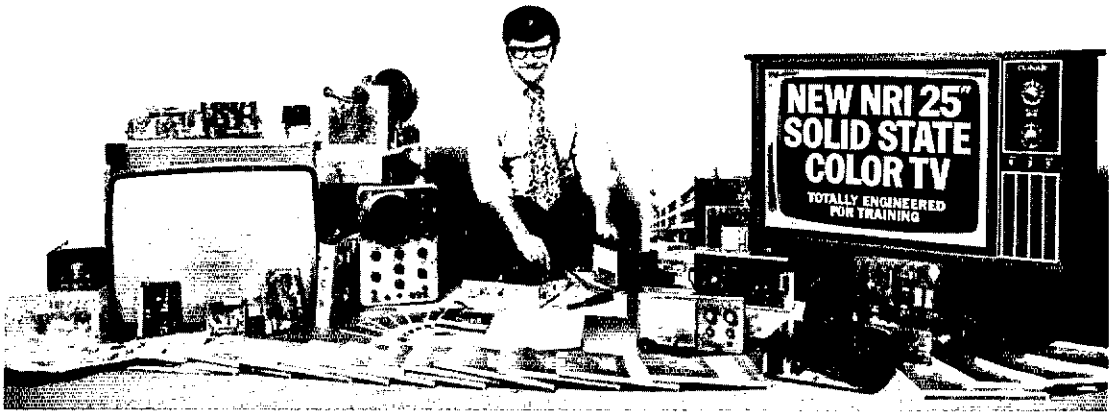

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OHIO – SCM, William E. Clausen, W8IMI – Asst. SCM: Kenneth L. Simpson, WA8EFX. SEC: W8OUU. RM: WA8WAK. PAM: K8UBK. VHF PAM: WA8ADU.

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time(Z)*	*Mgr.*
OSSBTN	2874	1134	81	3972.5	1530/2100/2345	K8UBK
BN	650	443	60	3577	0000/0300	WA8WAK
O6MtrN	452	56	30	50.16	0200	WA8ADU
OSN	281	119	30	3577	2325	WA8WAK
BN RTTY	136	64	25	3605	2300	W8SZU

BPL: WB8KZD, K8ONA, WA8HQO, W8QCU, K8NQW and WA8ETX. New appointees: W8KOI, W8VWX, OOs; WB8KXV, OPS. W8ERD has been appointed EC for Union Co. Welcome to the Youngstown State Univ. ARC, a new ARRL affiliate. The Ohio Novice Net has disbanded, lack of participation – our thanks to WB8KKI, WN8KEO, WN8MGW and WB8JAY. K8ONA reports WA8QFK and W8GRT handled health and welfare traffic following flooding in Port Clinton. OOs K8DHJ, W8BU, W8ZCQ, W8DPW and WA8MCR were active during Nov. WB8KZD reports the Eastern Region Slow Net meets daily at 2200Z on 3720. Congrats to WB8FOS, new Extra Class; to WB8DNZ, new first phone. W8VYU reports the Massillon Flea Market and Auction was a success with 500 attending. Daytime NTS nets now operating on phone. Contact WA8MCR for details. At the Apricot Net's Christmas party, WB8JEL was named Man-of-the-Year and K8ONA was presented with ARRL Merit Award for traffic handling and public relations. New officers of Columbus ARA are W8KO, pres.; WB8ACK, vice-pres.; W8ZCQ, secy.; WA8VVP, treas.; W8ZCK and WA8BJQ, dir. EC W8OE reports a recent exercise in flood communications involved members of the Mahoning Valley RC, Warren RC, CD, AREC, REACT and Red Cross. WA2ASM/8, in the Buckeye Net Bulletin, proposes a new BPL award based on a yearly total traffic count of 1200. The Buckeye Belles bulletin reports membership is 112 and K8ONV busy signing up new members. New officers of the Critical Bias RC are W8DQR, pres.; W8VKR, vice-pres.; W8TKS, secy.; W8GRT, treas. Ham Shack Gossip reports the Toledo TVI committee received 14 complaints during a recent 30 day period. Toledo Mobile RA new officers: W8STA, pres.; WA8UZI, vice-pres.; W8SYW, treas.; WB8JJU, secy. W8BF guest of honor spoke on DX at the 25th anniversary dinner of the Westpark Radiops. The Lancaster and Fairfield Co. ARC newsletter reports WB8FCK and seven others on 2-meter fm assisted the State Highway Patrol at Halloween. The Dayton Hamvention scheduled for Apr. 27 and 28 with K8BSC general chmn. The Spring meeting of the Ohio Council of ARCs will be held on Mar. 10 at the Columbus YMCA. All clubs in Ohio are invited to join and to present their views. Contact W8OUU for a copy of the constitution and the minutes of the last meeting. Traffic: WA8ETX 455, K8NQW 378, W8CUT 323, WA8MCR 302, W8PMJ 283, WB8KKI 215, W8OCU 210, WA8HQO 202, WB8JEL 178, K8PBJ 176, K8ONA 175, WA8YLW 175, WB8MKZ 174, WA8UPI 167, WA8HGH 161, WA8WAK 160, K8MLO 156, WA8ITW 151, WB8KZD 150, W8SUS 129, WB8ALU 125, W8GVX 122, WA8DWL 109, W8OE 105, K8UBK 93, WA2ASM/8 92, W8VIT 84, WA8YIB 75, W8CHT 74, W8JD 74, WB8FXD 72, W8ENI 68, WA8NOQ 60, WA8VKF 55, WB8JGW 52, W8QZK 52, W8MOK 47, WA8ETW 46, WB8CWD 45, WA8VWH 44, WB8KXV 42, W8DYF 39, W8FGD 39, W8DDG 38, WB8LEZ 38, WB8CSH 37, W8WEG 37, WA8BCX 35, WB8FCT 35, WB8IBZ 33, WA8YXB 33, WB8NRC 32, WB8HUP 31, K8QYR 31, WA8SED 31, WB8AYC 29, K8JDI 28, W8GOE 27, WA8ADU 24, W8LZE 23, WA8KPN 20, W8BHL 19, K8ZYX 16, WB8GGR 15, WB8HWF 14, WA8SSI 14, K8LTG 13, K8DHJ 10, WA8MHO 10, W8PBS 10, WB8GFD 9, W8NAL 9, K8BYR 8, W8MGC 8, WA8FCQ 7, WA8ZYE 7, K8CKY 6, WB8DNZ 5, WB8FWF 5, W8LAG 5, WN8MRF 4, W8VYU 4, WA3BGE/8 3, W8ETU 3, WA8LAM 3, W8OUU 3, WA8HVR 2, K8RXD 2, WA8FSX 1.

HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJN – Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2URP. RMs: WA2VYS, WA2FBI. VHF PAM: WA2YOU. New RM for RTTY: K2DN. Nets: NYS daily at 0001Z and 0300Z on 3.675 MHz; Empire Slow Speed (ESS) daily at 2300Z on 3.590 MHz at 10 wpm;

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NYSPTEN daily at 2300Z on 3.925 MHz; Novice Traffic Training Net Mon. on 3.677 MHz at 7:45 P.M. local time (0045Z Tue.); NYRTTY daily at 0030Z on 3.613 MHz. Regarding all nets – with the long winter skip "in", tune either side of listed frequencies in case QRM causes a move up or down. Emergency Corps members – check Dec. and Jan. columns for name and call of your county coordinator who is looking for active participants, or contact W2URP. Please note that business trip out of section at month-end means this column produced by WB2VJB as Asst. SCM. Thanks, Ken. Around the club circuit: Westchester Amateur Radio Assn. heard K1ZDN from ARRL Hq. on new FCC regulations. Schenectady ARA heard W1ICP, on Transmatch design and theory. Albany ARA held its annual auction in Nov. and in Dec. elected the following new officers: W2ANB, pres.; W2KZN, vice-pres.; W2CDQ, secy.; WB2BDX, treas. Overlook Mt. ARC held annual elections – K2HA (ex-W2NFI), pres.; WA2RUW, vice-pres.; WA2SUH, secy.; WA2WGS, treas. Communications Club of New Rochelle heard W2OMM on electronic security devices. Individual station activities: WN2EOO trying to start radio club at his school. K2BK was ENY winner in ARRL DX phone contest as multi-op station aided by WB2BXL, W2DXL and WA2SUH. WN2EOO looking for any Novice nets on 15 or 40. WB2JLR back on bands while recouping. Traffic: WA2CNE 141, W2URP 23, WB2DXM 9, WB2VJB 7, WB2CUH 6, K2DN 6, WA2LIK 4.

NEW YORK CITY AND LONG ISLAND – SCM, Fred J. Brunjes, K2DGI – SEC: K2HTX. RM/PAM: WA2UWA. RM NLI: WB2LZN. VHF PAM: WB2RQF.

NLI*	3630 kHz	1915/2200 Dy	WB2LZN RM
NLS*	3730	1830 Dy	WA2CXY Mgr.
VHF*	146.8 MHz	1930 Dy	WB2RQF PAM
NLI Phone*	3932 kHz	1600 Dy	WA2CXY Mgr.
Clear House	3925 kHz	1900 Dy	WA2VYT Mgr.
All Svc.	3925 kHz	1300 Dy	W2OF Mgr.
Mic Farad	3925 kHz	1100 Dy	W2OE Mgr.
NYSTPEN	3925 kHz	1800 Dy	K2VCZ Mgr.

Section nets; all times are local. With the new year under way it is inevitable that changes in administration of our radio clubs take place. In this light I submit the following: Rockaway Amateur RC – WA2ZHA, pres.; WB2UDD, vice-pres.; W2AHV, secy.; W2VZQ, treas. Long Island Mobile ARC (LIMARC) – WA2RCE, pres.; W2COR, vice-pres.; W2VBJ, secy.; K2CQM, treas. Brooklyn College ARS – WB2HYW, pres.; WA2IZQ, vice-pres.; WB2PVC, secy.-treas. An invitation is extended to all local and prospective Brooklyn College students to attend the BCARS club meetings held every Mon. at 12:30 P.M. in room 3207 of Boylan Hall on the campus. Other items in the "new" department: WA2FAK has been appointed asst. EC for the Western Suffolk County VHF nets, and 'ol K2AAS has reported in with his new "lost wages," Nev. call W7ILX. WB2BYY has just beaten the snows in erecting his new quad antenna. WA2PLI is working on an audio filter for all the QRM (RTTY) on 3630 NLI Net. It seems 'Ol Murphy has been making his rounds of the section. He made a long stop at OTH of WB2LGA and won a couple of rounds at K2DGI's QTH; lost the fight as the 18-AVTWB went up anyway (that's one excuse for non-operation out the window!). Speaking of the impossible, W2TUK has worked 5 states and Canada via Oscar VI and is still going strong, along with others in the area. Have you tried it yet? You don't need fancy equipment to do it. CW or ssb is recommended for efficient operation. See Nov. QST for operating details. W2PF reports a well attended banquet of the Radio Club of America at which Prose Walker, W4BW (FCC chief, Amateur Division) was guest speaker. 1973 appears to be a lucky year for this section. In the past I usually report the section losing experienced amateurs to other areas; now I would like to report the acquisition of an experienced amateur K2HK, former SCM, RM, OBS and all around amateur. Formally licensed as W1EOB "Vic" now lives in Northport, L.I. My thanks to all of you who have participated in the SET. I hope some of the enthusiasm will stay with you enough to join in our regular ARPSC activities, either participating in our various traffic nets or as a regular attendie of our AREC/RACES nets and activities. We also would like teletype operators to get involved with our various systems. Teletype links are already in existence in Nassau and Suffolk AREC both on low band vhf (fm). A complete section wide network is hoped for to assist both AREC/RACES and NTS in emergency situations. Interested? Drop me a line (page 6 QST) on your thoughts and facilities! Traffic: WB2LZN 298, WA2CLB 177, WB2CHY 68, WB2OYV 65, W2EC 62, WB2LGA 56, K2JFE 20, WB2BYY 14, WA2PLI 14, W2PF 9, W2DBQ 7, K2HK 5.

NORTHERN NEW JERSEY – SCM, Louis J. Amoroso, W2ZZ. SEC: K2KDQ. RMs: WA2UOO and WA2BAN. PAMs: K2KDQ and WA2FVH.

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Net	*kHz*	*Time(PM)*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695	7:00	Dy	30	483	186	WA2UOO
NJN	3695	10:00	Dy	30	228	95	WA2UOO
NJSN	3740	8:15	Dy	21	19	13	WA2RYD
NJEPTN	3950	6:00	Dy	30	543	140	WA2FVH
PVTEN	145710	7:30	Dy	22	89	22	K2KDO

New appointment: WA2FVH as OBS. Renewals: WB2AEH as EC for Holmdel and vicinity, WB2WNZ as OPS. New club officers for the K2DEL group are K2KDQ, pres.; WB2VLC, vice-pres.; WN2DEP, secy.; K2KDQ, treas.; WA2NLP, trustee. I suggest to all groups who are planning 2-meter fm repeater stations to check the RACES frequency bands before deciding on their input and output frequencies. RACES frequencies are listed in the rear of the License Manual. WB2CST made BPL a third time and moved to SNJ. Good luck on the new job, K2SJO and W2ZZ spoke before the K2DFL group. WA2UDT put up a new thirteen-element Yagi on 144 MHz. WB2LDE has a new SX-101 Mk II. WB2RIJ has new ML-2. WB2HGV lost his quad when the mast collapsed in a windstorm. WN2JVN is the newest member of K2OQJ. WN2DVE has 13 countries worked. WN2JPI is a new ham in Ridgewood. WB2KHB joined the K2DEL group. The Garden State ARA holding code classes on the 1st and 3rd Tue. of every month at 7 P.M. in the Red Cross Bldg., Shrewsbury. The Ridgewood ARC meet the 2nd Wed. of the month in the local Red Cross Bldg. K2MFF, WB2YPS, WB2KHB and WA2RYD joined Navy MARS. WB2IWH is back on with a new TR-4. WA2CRF is on 15 and 20 from Maywood. WB2JSX passed the General and has a KWM-1. WB2JLW now is WB9KWR. WA2CXS graduated FDU. The K2DEL auction will be held on Mar. 25 at the Passaic YMCA. WB2BLK received his General and was appointed trustee for the Cresskill High School RC. WN2BYX now is WA2BYX. WA2AJN has a new SB-102. WN2JGP and WN2GWC are a new father/daughter team. Congratulations to WA2UOO upon being elected SCM of NNJ for the next two years. I wish him the best of luck and ask everyone to continue to give him the fine cooperation we ex-SCMs received. It has been a real pleasure serving as your SCM and I thank all for the help I received. It was great. I leave one suggestion – join and help out in your local radio club. Good luck to all. 73. Traffic: (Nov.) WB2CST 362, WB2DDQ 287, WA2EPI 239, WA2RYD 151, WA2SRQ 114, WA2UOO 89, K2OQJ 68, W2ZEP 60, WB2JWM 52, WB2IKL 41, K2KDQ 32, W2CU 28, WA2FVH 21, WB2CFT 14, K2DEL 12, W2ZZ 12, WA2QJU 10, WA2QNT 10, WB2KNS 9, WA2CAK 8, WB2HGV 6, WB2NOM 6, WA2CCF 4, W2WOJ 2. (Oct.) WN2DGY 124, WA2RYD 120, K2OQJ 42, W2CVW 13.

MIDWEST DIVISION

IOWA – SCM, Al Culbert, KØYVU – SEC: KØLVB. Congratulations to the Goldfield ARC on their 100% ARRL status. Novice classes at Ames are in full swing with a 9 year-old YL leading the pack. WØFZO reports the 3900 Club has grown to over 120 members and says there is room for more. Because of the phone band revision, they have moved back to their original roosting spot of 3900 kHz. KØCLI has moved back to Ames. With winter having us firmly in its grip, and the DX plentiful, the true test of the tall antenna tune up is at hand. Speaking of DX, I was pleased to note the high standing of fellow Iowan, WØBW in the DXCC Honor Roll. WØNFL is looking forward to the 160-meter tests using his new inverted "L".

Net	*GMT*	*kHz*	*QNI*	*QTC*
Iowa 75 fone	1830	3970	1495	118
Iowa 75 fone	0000	3970	1081	28
TLCN (cw)	0030	3560	155	81

Traffic: (Nov.) WØLCX 449, KØDDA 201, KØAZJ 171, WAØAUX 179, WØMOO 40, WAØODB 12, KØYVU 11, WAØNJS 9, WBØDBG 7, WBØAVW 6, WNØFNA 6, WAØOTQ 5, KØCNM 4, KØLKH 2. (Oct.) WBØGGT 2.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØJMF. RM: KØMRI. PAM: WBØBCL. VHF PAM: WAØTRO. All Kans. amateurs join me in wishing our deepest sympathy to the families of Silent Keys WØBGX and KØTKF. KØJMF will fill the vacant SEC spot. I hope all will give the same support in SET and other AREC activities as was given in the past. Kans. Slow Speed Net QNI 186, QTC 198 in 30 sessions for Nov.! KSBN reports QNI 1051 and QTC 116 in 27 sessions. KPN had QNI 235 with QTC 31 in 17 sessions and QKS QNI 503, QTC 312 in 60 sessions. Mid State Mobile Monitor Service QNI 2405 including 112 mobiles, QTC 173 and handled 126 phone calls or patches in 92 hours. A new 2-meter repeater organization is the NW Kansas Repeater Society with KØRXT as treas. and WØVDF as consultant. New officers of the South Kans. DX Assn. are WAØVIO, pres.; WØAKT, vice-pres.;

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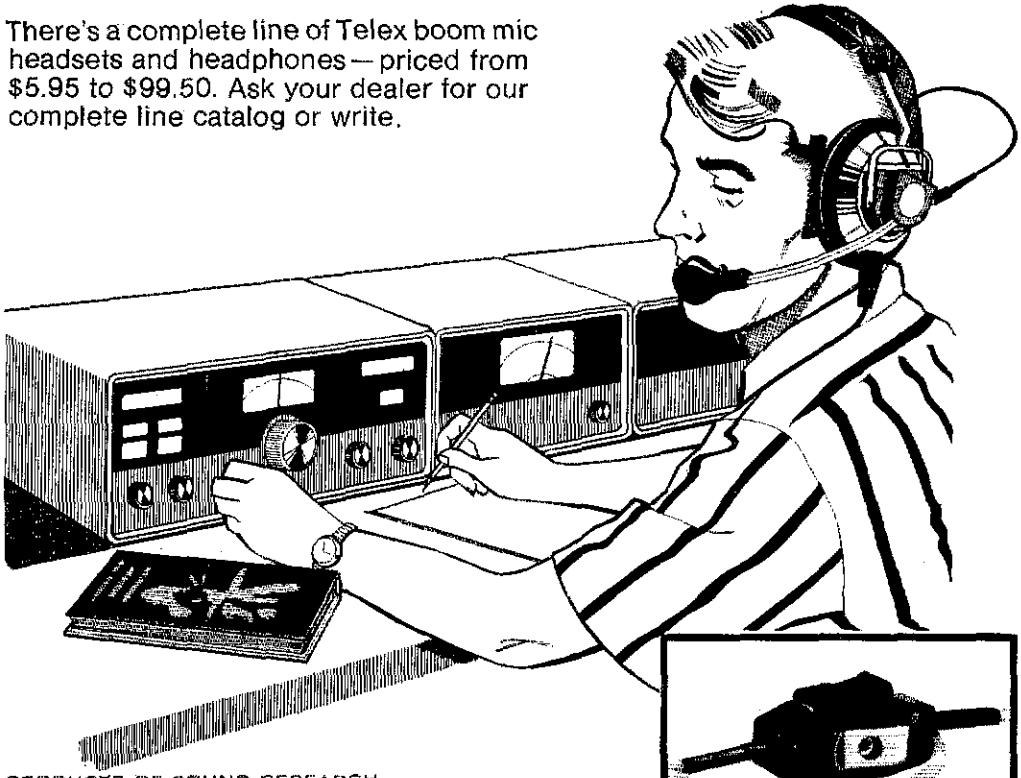

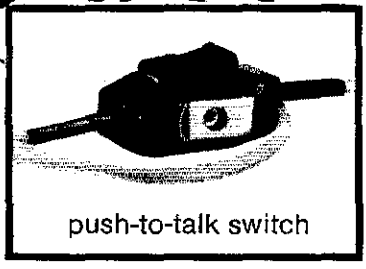

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WØIUB, secy.-treas.; WNØDPR, editor of Newsletter. Traffic:(Nov.) WØIII 257, KØMRI 252, WNØGOL 125, WØMA 91, WØINH 85, WBØEAF 82, KØJME 82, KØBXF 80, WNØGVR 76, WAØVIR 72, WØBCI 59, WNØFSL 57, WBØBIY 55, WØPB 53, WØCIU 52, WAØLLC 50, WØGCI 31, KØZHO 24, WØRBO 21, WAØUXI 21, WNØHTR 58, WNØITH 14, KØJDD 12, WAØZTW 11, WAØOWH 4, KØLPE 3, WAØWJX 2, WAØTKJ 1. (Oct.) WAØZTW 10, WAØYMK 9.

MISSOURI – SCM, Robert J. Peavler, WØBV – SEC: WØFNW.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MNN	7040	1900 Dy	30	85	49	WØGBJ
HBN(Oct)	7280	1805 M-F	22	536	47	WAØUPA
HBN(Nov)	7280	1805 M-F	22	528	33	WAØUPA
MON	3585	0100 Dy	30	180	131	KØAEM
MON2	3585	0345 Dy	28	110	57	KØAEM
MoSSB	3963	2400 M-S	26	1197	83	KØHNE
MoPON	3963	2300 M-S	26	453	34	WAØTAA
MSN	3703	1600 Su	4	16	7	KØBIX
WEN	28.6	0130 M	4	15	1	KØBIX
PHD	50.45	0130 T	4	93	11	WAØKUH

MSN now operates seven days a week as of Dec. 1, with MWF sessions at 5:45 P.M. local time; TTS sessions at 7:30 P.M. local *time; and Sun. session at same time as before. WAØHQR gave a* seminar on holography at Northeast State Univ. Congratulations to KØRPH, who won both cw and ssb portions of the Sweepstakes for competition within the Mid-Mo Amateur Radio Club; and to KØAEM, who was named 10C director. WBØBZP reports the Jefferson Barracks Club auction will be held at 8 P.M. Feb. 23 at Mosley's Auditorium in St. Louis. Traffic: KØAEM 386, KØBIX 117, WØBV 111, WØOUD 93, KØPUK 84, WØGBJ 72, WBØFOM 58, KØLNH 35, WAØKUH 13.

NEBRASKA – SCM, V.A. Cashon, KØOAL – Asst. SCM: Velma Sayer, WAØGHZ. SEC: KØODF. Appointments: WBØHYR as EC; KØIFN as OO; WAØCBJ, KØPTK, WAØJKN, KØMUF, KØODF as OPSs. Endorsements: WAØBHM, WAØJKN, WØAGK, KØWPF and WAØCBJ as ECs; WAØCBJ as PAM; WØVEA and WØAGK as ORSs; WØVEA as OBS.

Net	*Freq.*	*GMT/Days*	*QNI*	*QTC*	*Mgr.*
NSN I	3982	0030 Dy	1504	9	WAØLOY
NSN II	3982	0130 Dy	1198	19	WAØLOY
Neb 160	1995	0130 Dy	469	215	WAØCBJ
NEB	3590	0315 Dy			WØTOD
NMN	3982	1330 Dy	1262	25	WAØJDF
WNN	3950	1400 Dy	549	18	WØNIK
AREC	3982	1430 Su	202	2	WØIRZ
CHN	3980	1830 Dy	1290	53	WAØGHZ
SHN	3950	1930 M-F	226	16	WØDJO
DHN	3980	2100 M-F	434	5	WAØAUX

Nebr. Sandhills Net recently organized. Congratulations to: WØIFQB on QCWA Golden Anniversary Award for 50 years as ham; WAØYPY and XYL on new harmonic. WAØEUM moved to Kans. City, Mo. KØERU and WAØGHZ provided communications for power company when power and phone lines went out near Maywood because of ice storm Nov. WØEWZ lost trailer home and rig in fire. WNØILO working for higher class license. Douglas Co. *2-meter net active*, QNI 105. Box Butte Co. 2-meter AREC net QNI 17. OTC 2. Speedy recovery to WØIXZ, WAØOEJ, WAØLRK. 1973 PRARC officers: WAØBHT, pres., KØODH, vice-pres.; WBØCAU, secy.-treas. WØGEQ advised Keith Co. 2 meters will soon be active. Traffic: WAØSCP 89, WØLOD 63, WAØCBJ 62, WBØCAU 41, WØIAY 27, WAØQLX 25, WØHOP 24, KØODF 22, KØIFU 21, WAØIXD 18, WØNIK 16, WØDMY 15, WØMW 14, WAØPCC 14, WAØBOK 12, WØDJO 12, WAØGHZ 12, WØRJA 12, WØLJO 10, WØVYX 10, WAØYGZ 9, WBØGWT 7, WAØFEI 4, KØHNT 4, WØLWS 4, KØMUF 4, KØOAL 4, WØGEQ 3, KØIFN 3, WAØLOY 3, WØWZR 3, WAØHQQ 2, WØIRZ 2, WØYTR 2, WØZNI 2, WAØJKN 1, WAØJDF 1.

NEW ENGLAND DIVISION

CONNECTICUT – SCM, John McNassor, W1GVT – SEC: W1HHR. RM: K1FIR. PAM: K1YGS. VHF PAM: K1SXF.

Net	*Freq.*	*Time/Days*	*Sess*	*QNI*	*QTC*
CN	3640	1900 Dy 2200	60	661	481
CPN	3965	1800 M-S 1000 Su	30	679	224
VHF 2	145.98	2200 M-S	22	69	19
VHF 6	50.6	2100 M-S	22	84	6

High QNI: CN – W1BYW, W1MPW, W1KV, WA1FCM and WA1NLD. CPN – W1BEY, W1GVT, W1MPW, WA1NLD, W1NQO and K1SXF. We are pleased that W1HHR has been elected N.E. Vice

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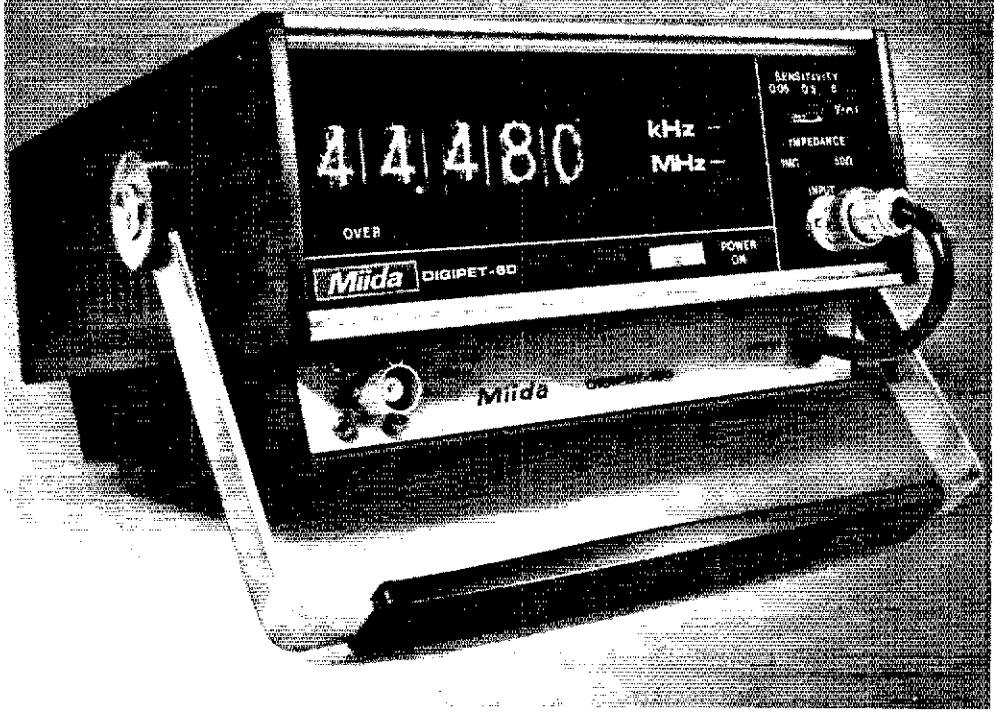

Director and honored that he also will continue as Conn. SEC Monthly reports from all ECs are needed and will be appreciated W1QV requests Asst. Dir. *nominees from all clubs – please circulat* info in Nov. Directors letter to club members. W1RW remind affiliated clubs that Annual Reports on ARRL are available i requests to Hq. are in by Feb. 15. All OOs are requested to reread the Nov. *OO bulletin* and to learn all the new FCC regs. This helpfu service must be intensified – be sure of the station call letters Congratulations to: W1QV for another term as N.E. Director W1HHR elected N.E. Vice Director; W1QIS on retirement from W1AW/ARRL; WA1FCM for Nov. BPL; WA1PHJ for General Class and Bloomfield High School ARC for ARRL affiliation! If you missed New Year's Resolutions or have broken them, why no consider checking in to one of the many fine traffic nets listed above. Your traffic and company will be appreciated – you meet some of the nicest people in amateur radio! Please try it – thanks! Traffic: WA1FCM 297, W1EJI 279, WA1GFH 256, W1EFW 235 W1MPW 182, WA1OPG 174, WA1NBS 161, WA1NLD 115, W1CTI 107, WA1NYU 89, K1YGS 47, K1SXF 46, K1EPW 45, WA1GGN 45, W1FUF 42, W1KV 41, W1AW 33, W1GVT 31, WA1NES 30 *WA1OII 29, WA1PHJ 21, W1DQJ 16, WA1KID 16, W1RML 15* W1QV 11, WA1HYN 10, W1HHR 9, W1CUH 7, WA1MTZ 5 W1BDI 4.

EASTERN MASSACHUSETTS – SCM, Frank L. Baker, W1ALE – SEC W1AOG received reports from ECs. W1s BAB, LE; K1s DZG, ZUP. NFW; WA1s DXI, MYK. W1AMK, ex-W1NFX are Silent Keys. W1HY/1 in Wareham for winter. W1AUQ doing OO work and trying for DXCC. KØGFN/1 now in Burlington; visited W1NF WA1MYA has his Advanced. WA1MSK his Extra. WA1OWQ is new RO and EC for Weymouth. W1UIR in ME says he is soon going to be on 3960. K1EPL is the new secy.-treas. of Barnstable County *RC, which,* along with the Cape Cod and Islands ARA, held their Ladies Night with W1ICP as speaker. WA2GGN/1 is secy. of W1KBN Radio Club. W1DAL putting up an 80-ft. tower. WA1GZQ has a TR-22. W1AEC a new Drake 2-meter fm transceiver. WA1APX back Vietnam, has his Navy Wings and will be in MD. FB. WA1MPP working on DXCC. WA1REG/WB2JYM, WA7CRE, WN2KLE are in the same apartment while at MIT. W1s OJM, PEX made BPL. *WA1FNM wants a schematic for Sylvania Scope, type 108.* WA1MYA is new PAM for 75. W1REP is new EC for Canton. Endorsements: W1s PL, KBN, QYY, MX as ORSs; W1s PL, BGW as OOs; WA1IFE, W1AAI, W1MX, K9AQP/1 as OVSs; WA1IFE, WA1MPP, W1MX as OPSs; W1KBN, WA1MGQ as OBSs; WA1MPP as EC. New officers of Somerville ARC: K1YUB, pres.; WA1LSD, vice-pres.; WA1PQE, secy.; WA1MNJ, treas. W1EQH is on 15 and 20 *with a TH3-MK3 beam. A nice bulletin "Zero Beat" covering E.Mass.* Nets is being put out. Our E.Mass. Phone Net on 3985 meets daily at 6 P.M. WA1MYA, WA1OML as directors. W1DFS in the hospital and improving each day. W1JKR in the Bedford VA hospital. K4GGI gave a talk on Oscar 6 at the Whitman ARC. Capeway RC met at WA1NLX's QTH. Quannapowitt RA held a "Past Presidents Night." W2NSD/1 spoke at the Middlesex ARC. WA1NLC gave a talk on homebrew rigs at the Framingham RC. W1WLZ *originated* an electronic quiz, which was held at the Massasoit ARA; they also held their annual banquet. WA1KGS Repeater group's 450 MHz gear again working and they are holding a raffle and an election for their advisory comm.

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Mgr.*
EM2MN	145.8	2000 M-F	147	105	WA1OWQ
NEEPN	3945	0830 Su	88	7	K1EPL
6MCBN	50.85*	1930 M-F	50		K1OKI
EMN	3660	1900/2200 Dy	359	270	WA1MSK
EMPN	3985	1800 Dy	180	84	WA1MYA

*Oct. New checkins EM2MN: WA1OAM, WA1BMY, K1PRB, W1UAX WA1RFK; W1DOM back as NCS. Norwood ARC took part in Pumpkin Patrol on Halloween. W1AJH is a Silent Key. WA1MSK made PSHR. Traffic: W1OJM 594, W1PEX 480, WA1MSK 256 WA1NNL 224, WA1MYA 128, WA1OWQ 126, W1CE 110 *WA1OML 106, WA1DJC 50, WA1MXV 44, WA1IFE 29, W1AOC* 14, WA1OZI 12, WA1OLV 9, W1DOM 6, WA1FNM 6.

MAINE – SCM, Peter E. Sterling, K1TEV – SEC: K1CLF PAM: WA1PEN. RM: W1BJG. The OOTC luncheon of Nov. 11 at Wakefield, Mass. was attended by W1BHA, W1SFS, W1GCB and W1CTR. On the way to the luncheon they stopped at W1LUE's and presented him with a certificate making him Honorary Chief Operator of the Northeast Area Barnyard Net. K1IVJ is making rapid progress from surgery. W1AE slipped on the ice and ruptured a muscle. W1VXV moved back to Maine and is active on 80-meter *RTTY;* hopes to be on 2-meter phone soon. K1SGU completed WAC on RTTY. K1YXO and WA1JZP are living in Auburn, not active as yet. New hams in Maine are WN1RDO, WN1RDS WA1RER, WA1REQ. WA1FCM is using WA1RDX at his cam

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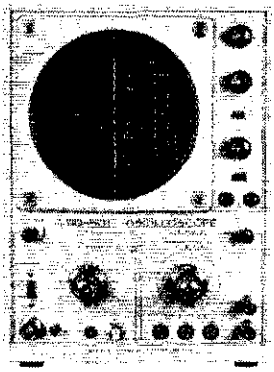

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SINE/SQUARE WAVE GENERATOR

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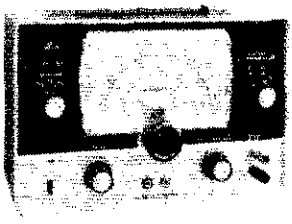

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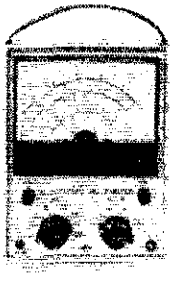

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when he comes up. K1VHH spending the winter in Fla. K1RES now has a CX-7. WA1LHJ now in the Navy. Traffic: WA1QHU 67, WA1JHT 19, K1TEV 9, WA1RDX 6.

NEW HAMPSHIRE – SCM, Robert C. Mitchell, W1SWX. SEC: K1RSC. RM: W1UBG. Endorsements: K1AC, K1GMW, K1YMH, WA1MXT and W1AIJ as ORSs; K1RSC and K1VXX as ECs; W1BXM and W1JY as OVSs; WA1JSD as OBS; W1AIJ as OPS. Welcome back gentlemen. OO reports were received from W7TML/1 and W1SWX. We need more OOs. Anyone interested? K4QDC now is W1GQV. The faithful E. Mass. SCM W1ALP listings shows WA1RFI and WN1RFG as new hams. Congratulations to W1QV on his reelection as our New England Director. K1RSC is the supply officer for Army MARS. W1JY and W7TML/1 were active in the SS Contest. Don't forget the NH PON meets Tue. through Sat. at 0200Z on 50.7 MHz. K1GMW sends reminder that WA1KGM Mt. Ascutney Repeater on 16-76 is open 24 hours a day but emergency traffic only during the quiet hours of midnight and 7 A.M. W1WQH has moved to N.H. and is on 160 through 2 meters. W1UBG's NHVT Net report shows 113 traffic and 157 check-ins for last month compared with 90 and 167 for this month. K1RSC reports 63 check-ins, 4 traffic for the NH-AREC Net and 40 check-ins, 2 traffic for the NH Phone Net. Traffic: W1UBG 106, WA1MXT 38, K1POV 36, K1RSC 12, W1EVN 7, WA1JSD 2, W1BYS 1.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – RISPN reports 30 sessions, 359 QNI, 39 traffic. The R.I. Slow Net now meets daily at 0300Z on 3.715 kHz. Present for the first session of the Net were WN1PWA, W1YKQ, WN1QOG and WN1POJ. It was the first session of the Net and all interested in cw are invited to join them in the future. Traffic reports did not arrive in time to be published in this month's QST, all stations are reminded to get their traffic to the SCM as soon as possible. Several clubs have special events in the near future and club secretaries are reminded to get their notification in advance to the SCM. Traffic: WN1POJ 51, WA3GGC/1 1.

VERMONT – SCM, James H. Viele, W1BRG – SEC: W1VSA.

Net	*Freq.*	*Time(Z)/Day*	*QNI*	*QTC*	*Mgr.*
VTSB	3909	2300 M-S 1230 Su	605	133	W1ZCJ
VTPO	3909	2200 Su	69	38	K1BQB
Carrier	3932	1400 M-S	509	52	W2QWP
Gr.Mt.	3932	2200 M-S			
VT Phone	3932	1430 Su			
NHVT	3685	2400 Dy	167	90	W1UBG

Welcome new amateurs WN1RED, WA1REL and WA1REY. K1AUE has moved to Utica. New Vt. ham WA6JBZ/1 bought a home in Warren. Carlton Univ. Ham Radio Club, VE3DCU looking for 6-meter ssb-cw contacts. W1KOO now has the highest two-way radio antenna in Vt. on channel 33 TV tower. W1EFN is new components mgr. of Carrier Net. Contact him with equipment listings. Traffic: K1BQB 278, WA2DGZ/1 18.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVR – SEC: WA1DNB. CW RM: W1DVW. PAM: WA1ITL. UHF VHF PAM: W1KZS. The Sun. morning WMEN held 4 sessions with QNI of 53 (NCSs WA1DNB and W1DVW). WMN held 30 sessions with a QNI of 176 and traffic total of 124. Top five in attendance were W1BVR, W1DVW, W1ZPB, W1TM, WA1LNF. The new WMFN (4:30 P.M. 3935 plus or minus 5) is going quite well with our new PAM. WA1ITL as NCS (we are sorry to limit attendance by having it that early, but our former one at 6:30 never worked out because of QRM). The Sun. afternoon NOBARC AREC net (thru K1FFK) is also going well with average attendance of 10. WA1RFA (XYL of W1KZS) and WN1RHQ are new hams in the Berkshires. W1OBA is building nuvistor preamps for K1FFK Greylock repeater. K1VHO is a new OO. The WNs are happy to be able to use VFO! W1ZPB QSO'd XVSAC Saigon on SSB. Mt. Hermon Radio Club is now reactivated. W1CTK hospitalized and temporarily off the air. CMARA says W1AET providing phone patch for the military stationed in Antarctica. HCRA speaker of the month – George Townsend. New member WA1KQL. MARC says WA1JBI now has his General. Mt. Tom ARA new members are WA1RBH, W1BFY, WA1DNB, WBØILB/1. Guest speaker W1NHK. NOBARC: W1KSD, pres.; WA1NXJ, vice-pres.-secy.; W1YBT, treas.; WA1KJI, tech. WM AREC new members are WA1JOU, K1FUL, WA1RBH, W1DVW, WA1DNB. Traffic: W1BVR 96, W1DVW 69, WA1LNF 65, W1TM 42, WA1LPJ 37, W1KK 32, W1ZPB 30, W1STR 28, WA1QUZ 11, W1NLE 5, W1KZS 4, WN1QHR 1.

NORTHWESTERN DIVISION

ALASKA – SCM, Kenneth R. Klopf, KL7EVO – KL7DG is active on 20 with a QRP Ten-Tec. He has checked in with Pacific

WHICH ANTENNA WINS THE CONTEST ?

In open competition against thousands of commercial and home-brew antennas, WA1JFG won the New England championship with a Gotham beam, by a margin of 5,982 points! WB2JAM won the sectional award for the Sweepstake contest in 1969 and 1970 with a Gotham 4-element 15-meter beam! Hundreds of unsolicited testimonials from grateful hams are our proof that Gotham antennas give you the best design, and the best materials. Forget our low prices — rely on the results op open, competitive contest. Ask yourself: Why do Gotham antennas win?

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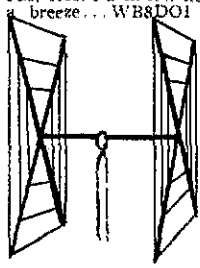
QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze . . . WB8DOI



CUBICAL QUAD ANTENNAS— these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof 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' × 1¼" 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' × 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞" 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.

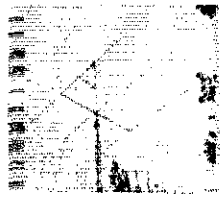
Now check these startling prices — note that they are much lower than even the bamboo-type:

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-El. 15 Beam got me R1 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; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20. . . .	$25	4 El 10. . . .	$24
3 El 20. . . .	31*	7 El 10. . . .	38*
4 El 20. . . .	38*	4 El 6.	24
2 El 15. . . .	21	8 El 6.	34*
3 El 15. . . .	25	12 El 2. . . .	31*
4 El 15. . . .	31*	*20-ft. boom	
5 El 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, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

***FLASH!* Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN,FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!**

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V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $20.95

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Amateur Radio Guild (PARG) 2230Z Sun. 14070. KL7HKH says 2-meters has come to Adak, had his first QSO with K3YWJ/KL7 on 146.94. The Northern Lites Net meets on 3735 at 0700Z daily. KL7HMU (Fairbanks) is busy with KL7GDO(Nome) and KL7HIY(Sitka) testing frequencies and times for a section net to work with the NTS. Amateurs wishing to participate in cw traffic handling please contact KL7HMU through the SCM. Stations in the major cities are urgently needed and also the smaller towns and villages. Your community may need communications sometime so now is the time to get it set up. 80 meters seems to be working best right now (around 3620) but the time is being juggled (0400Z-0700Z is the range at present). Any ideas? Send them to us.

IDAHO – SCM, Donald A. Crisp, W7ZNN – SEC: WA7EWV. The FARM Net meets at 0200 GMT each day on 3935 kHz. The Idaho RACES Net week days on 3990.5 kHz at 2015 MST. The Idaho P.O. Net Mon., Wed. and Fri. on 3930 kHz at 1830 MST. Congratulations are in order to K7JWZ who completed working all 3077 U.S. counties. K7NHV received an OO appointment. The Garns Mountain repeater frequencies are 146.34 in and 146.94 out. The repeater covers a large portion of SE Idaho. The evening Idaho RACES Net meets Mon. at 0130 GMT on 3990.5 kHz. The Idaho Falls gang are using 146.76 for local contacts. FARM Net check-ins are needed from many Idaho cities. Interested in participating in a Montana-Idaho CW net? If so contact K7NHV. FARM Net report for Nov.: 27 sessions, 1001 check-ins, 52 traffic handled. Traffic: W7GHT 262, WA7BDD 71, W7AXL 41, W7ZNN 10.

MONTANA – SCM, Harry A. Roylance, W7RZY – Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. Lots of hamming being done, WX too cold to get outside. New officers for the Yellowstone Radio Club are K7GHK, pres.; K7LTV, vice-pres.; W7BMT, secy.-treas. Eastern Mont. Sparkgap Society officers are K7TQM, pres.; WN7SXE, vice-pres.; WN7UNB, secy.; K7LTV, treas. W7DXQ has a new FT-101, K7AER moving to St. Paul. WA7KMP has a Mini Beam and planning an assault on 10-15 and 20 meters. K7RRS and WA7OBH are busy working the 10-10 net. WA7OZD trying for WAS on a QRP tig. K7ECF has a new R4B. On two meters W7GWW and W7RZY have new HR-212s. Mont. Traffic net had 1093 check-ins, 46 formal traffic and 21 sessions. Mont. PON had 431 check-ins, 29 formal traffic and 29 sessions. RACES has changed frequency and Mont. is on 3999.5 kHz. Some telephone surplus two meter rigs are being issued. The Butte gang is building the 2-meter receivers as per Aug. QST. Several clubs are conducting classes in code and theory. W7LBK was reappointed ORS, OO and EC. Traffic: W7LBK 132, WA7JQS 58, WA7KMP 21, WA7OBH 17, WA7IZR 11, K7EGJ 4.

OREGON – SCM, Dale T. Justice, K7WWR – SEC: W7HLF. RM: K7GGQ. PAM: K7RQZ. Section net reports – WA7GTX reports for the AREC net sessions 28, check-ins 381, traffic 6, contacts 34, maximum number of counties 12. WA7NWV reports for the BSN sessions 60, check-ins 1016, traffic 114, contacts 207. W7DAN got his feet wet in the SS 9 times. W7QF is in Yma, and contacts WA7OQC regularly to keep in touch. Traffic: (Nov.) K7NTS 130, K7QFG 130, K7OUF 116, WA7NWV 55, W7ZB 30, W7HLF 22, K7WWR 15, W7DAN 10, WA7QAU 9, WA7KRH 7, W7MLJ 3, W7LT 2. (Oct.) WA7QAU 18.

WASHINGTON – SCM, Arthur Henning, W7PI – SEC: W7UWT. RM: K7OZA. PAMs: W7GVC, W7MCW. VHF PAMs: K7BBO, K7LRD. New appointee: W7JFR as ORS. Regret to report W7OE, W7LOF, K7DPO and W7DLO became Silent Keys.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	*Sess.*	*Mgr.*
WSN	3590	0245	346	224	30	K7OZA
NSN	3700	0300	237	86	30	WA7OCV
NWSSB	3948	0230	902	47	30	W7SVV
NTN	3970	1930	1061	46	30	W7PWP

West Seattle Radio Club is being reactivated – call W7GLC Phn. 938 1586. WA7KNW has beam up. WA7KPB passed his General Class exam. K4ZDK/7 needs Zone 34 for WAZ. Mt. Baker ARC furnished communications for Sports Car Rally. Radio Club of Tacoma very QRL making improvements to club house building. Bawbaw Repeater now in operation for 1 ½ years is working well and contemplating change to transistorized repeater when funds are secured. W7IEU EC for Snohomish Co. and WA7HSX, RO for Office of Emergency Services for the Co. are setting up 2-Meter RACES frequency; will use same frequency for AREC activity in the area. K7BBO and K7MWC gave a demonstration on the Oscar 6 Satellite to the Mike and Key Club. K7OXL hardworking recorder for WSN also working overtime for Forks P.O. Traffic: (Nov.) W7PI 331, W7KZ 211, W7AXT 94, K7OZA 73, WA7OCV 68, W7GYF 56, W7JEY 48, W7MCW 41, K7OXL 38, W7BQ 32, W7BUN 26, W7PWP 25, W7IEU 20, W7APS 19, WA7KNW 18, W7AIB 9, W7LG

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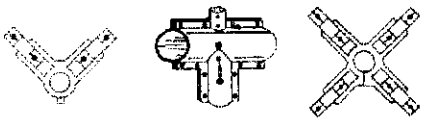

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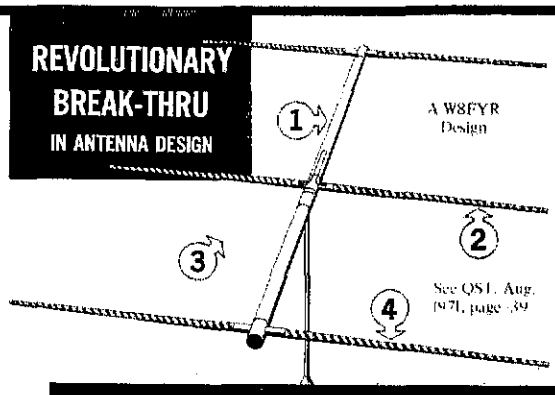

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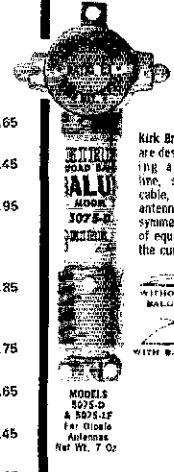

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5075-LF	Dipole	1.7-10 mcs	2K PEP

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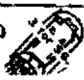

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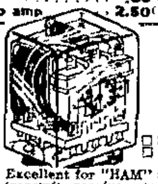

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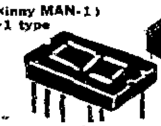

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Same as above, except no AM radio section. Completely wired! With built-in preamp, mike, phono and tape inputs. Color-coded wires with diagram and hookups. Works off 9VDC transistor battery. Excellent fidelity.

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100	☐ .35	☐ .52	☐ .64	☐ .85	☐ 1.05
200	☐ .65	☐ .72	☐ .88	☐ 1.25	☐ 1.45
300	☐ .79	☐ .89	☐ 1.10	☐ 1.45	☐ 1.65
400	☐ .92	☐ 1.15	☐ 1.35	☐ 1.85	☐ 1.95
500	☐ 1.25	☐ 1.39	—	☐ 2.55	☐ 2.25
600	☐ 1.50	☐ 1.69	—	—	☐ 2.65

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Type TK, Metal Case!

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9.1	13.	

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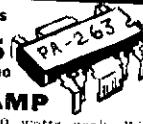

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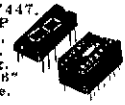

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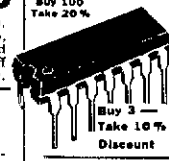

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- ☐ DM946 Quad 2 Input Gate
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- ☐ DM9093 Dual J-K Flip Flop*

*2 for $1.00

NATIONAL REGISTERS $2.95 3 for $6.00

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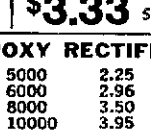

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800	.15	.15	.39
1000	.18	.18	.45

EPOXY RECTIFIER SPECIAL

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☐ 1 AMP 1000 PIV

8, WA7LOV 6, WA7LQQ 4, K7VNI 3, K7BBO 1, K7VAS 1. (Oct.) W7QCV 15.

PACIFIC DIVISION

EAST BAY – SCM, Paul J. Parker, WB6DHH – RMs: WA6DIL, W6IPW. I am looking for a Phone Activities Manager, only qualification is League membership and active on phone. New officers in SARO are W6GIP, pres.; W6LCG, vice-pres.; WA6OLA, secy.; W6CMZ, treas.; W6CBX, comm. mgr. New officers in MDARC are VE6AQV/W6, pres.; C.Haynes, vice-pres.; W6CU, secy.; WA6CGS, treas.; W6HSY, emerg. coord.; WB6BBC, board. Remember, your reports are needed to help this column grow. Send in news each month. Traffic: (Nov.) W6IPW 236. (Oct.) W6IPW 217, WA6IYB 5, WB6VEW 5.

HAWAII – SCM, Lee R. Wical, KH6BZF – SEC: KH6BZF. RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. SRC: KH6FOX. QSL Mgr.: KH6DQ. ECs: KH6s GPQ, BAS, HHG and BZF.

Nets	*MHz*	*Time(GMT)/Days*
Confusion(Patches)	21.400	0300 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

W7PVB/KH6 and XYL returned from a vacation in VS6-Land. KH6BWT has new HP-35 pocket calculator. KH6GMM is on cw with his 20 year old 40-watt rig to a dipole. WA3AAJ/KH6 is active from the islands. VR1PA also active with his KB6 call. KH6HLK has applied for OBS. He has his FLDX 400 to a homebrew 4CX1000 final. Looks like the Honolulu DX Club did better in this year's CW WW Test. Last year's total was 10 megapoints. Numerous number of new stations and Old Timers on the 2-meter repeaters. KH6KH recently got his towers up at new QTH. Both the Honolulu ARC and the HARC's enjoyed holiday parties. The Nov. CD exercise went off as planned. Remember, it's been wisely written that preparedness is something no emergency should be without. KH6IAR applied for membership in AREC. For those VHF beacon freaks look for KH6EQI on 50.1045 MHz for openings. KH6GRU coordinates the action there.

NEVADA – SCM, Leonard M. Norman, W7PBV – W7TVF will schedule anyone needing a Nev. contact, DX or stateside. W7JUO one of the first amateur radio operators to settle in Boulder City during Hoover Dam construction days and the first known amateur to receive DXCC in Nev. is back on the air with a complete Drake station. W7CV parting with some WWII command gear for a new station. W7ILX busy handling traffic and has a new RTTY station. WA7JVT has a new tower and Quad. Reno and Carson City gang must be snowed in, no reports from up north. K7UGE RM repeater off the air. W7AKE repeater back on 34/94. K7ZOK is an orchid horticulturist and collects stamps when 6 meters is dead.

SACRAMENTO VALLEY – SCM, John F. Minke, III, W6KYA – SEC W6SMU and I visited the El Dorado ARC in Camino for their Nov. meeting to give talks on ARRL field organization and emergency communications. New officers for the club are WB6WBP, pres.; K6SJN, vice-pres.; W6JOJ, secy.-treas. WA5KUD from Ark. is stationed at Mather AFB and expects to be active in traffic nets and contests. W6KYA received his phone DXCC, which was processed in less than two weeks, from mailing of the QSLs to receiving the certificate. New appointee is WB6NKO as OVS in Carmichael. Those of you wishing to apply for an ARRL field appointment, such as ORS, OPS, PAM, etc., please contact me. My address can be found on page 6 of your current issue of QST. K6KWN Lake Almanor has installed an all-band dipole up 80-ft. New members to the North Hills RC are WA6TBU and WN6RDA. NHRC membership is now over 50. New Novice in Chico is WN6UDO. The section seems to be holding its own as far as traffic handling and AREC is concerned. There is room for improvement. If you handle written traffic report it to me. Traffic: K6KWN 43.

SAN FRANCISCO – SCM, Tom Gallagher, W6NUT – The SF Radio Club was awarded a silver dish by the Cancer Society for its work in the Bikeathon reported in last month's column. What can your club do as a public service? We are saddened to note the Silent Key of K6UBK (ex-W6BIO) a long time SF amateur. W6WB is a new OO appointee. Bud is well equipped even including SSTV. The Tel. Co. club's new officers are WB6ZVH, pres.; W6KXG, vice-pres.; W6GZC, secy.; W6ENA, treas.; W6AVX and W6BFZ, members-at-large. Congrats to WA6BYZ on another BPL. Remember our nets: NCN, 3630 daily at 0300Z; Cal. WX Net, 3954 daily except Sun. at 1330Z; NCEN, 3920 Sun. at 1800Z. W6GGR made 5000 miles mobiling 7 MHz ssb to Ark. W6RNL acted as

Test Equipment Sale

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	526B Time Interval Unit	85.00
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	200C Audio Oscillator	80.00
	200 CDR Audio Oscillator	185.00
	500 A Frequency Meter	75.00
	560A Digital Recorder	575.00
	561B Digital Recorder	685.00
	580A Digital Analog Converter	170.00
	X/Y Recorder	585.00
	526IA Video Amplifier	300.00
	606A Signal Generator	900.00
	410BR VTVM	115.00
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	410C VTVM	115.00
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	41A VTVM	225.00
	187C Probe Kit	515.00
Textronix	565 Dual Beam Scope	1,375.00
	2A60 Plug-in Amplifier	75.00
	3A3 Plug-in Amplifier	300.00
	545A Scope	875.00
	Type L Plug-in Amplifier	125.00
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alternate between NCN and RN6 in Nov. W6SLX continues active in the WX nets with 42 reports for Nov. Heard in the CW SS: W6BIP, *WA6ICQ, W6NUT, W6URA and W6WLV. In the phone SS:* WA2CJK/6, W6AKP, W6BIP, W6NUT, WA6RHJ, W6RJW and W6URA. Our reputation for being a predominantly CW section is in jeopardy! Am pleased to now be your elected two year term SCM. The effectiveness of our section will depend on your help, particularly in the area of emergency preparedness. Traffic: WA6BYZ 198, W6RNL 67, W6WLV 26.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – W6HAB heard on 2 meters regularly. W6RTZ is on Slo-Scan TV. WB6JQC also active on Slo-Scan TV on all bands. WB6VRJ moved to a new QTH and sporting an all band antenna on 2 meters fm, also active in MARS and NCN. The Delta Amateur Radio Club's annual installation of officers was held on Jan. 20, 1973. WA6BVC lost his antenna in a wind storm. WA6OSM and W6MN are active in Manteca. K6CZO has a Swan station on all bands running a kw. W6PSO has 91 countries confirmed on 15 and 20 meters. WA6WXP heard chasing DX. W6OWL working on his DXCC. W6GUZ donated a truck load of surplus to the Tulare County ARC to be auctioned off. W6ARE gave a talk on Docket 18803 at the TARC and W6MUV gave a talk on pulse transformers. The Fresno Amateur Radio Club held their Christmas Party on Dec. 14, 1972. *The Tulare Amateur Radio Club held their Christmas Party on Dec. 15, 1972.* WA6CPP is reconditioning everything, and is active on 40. K6QHC is completing his new ham shack and building a 6-meter kw amplifier. W6DPD has 46 states confirmed on 2 meters ssb and W6JUK has 45 stations confirmed on 2 meters ssb. Traffic: WA6SCE 31, WB6VRJ 7.

SANTA CLARA VALLEY – SCM, James A. Hauser, WA6LFA – SEC: WA6RXB. RMs: W6BVB, W6REF. The following reported activity in the traffic nets: W6BVB, W6DEF, WA6HAD, W6IQU, W6KZJ, W6NW, W6OII, W6REF, W6RSY, W6YBV and K6YKG. W6DEF helped provide communications for the Children's Day *Parade in Redwood City. W6NW reports that long skip on 80 is* making the traffic nets difficult. W6OII busy on the phone nets. W6AUC reports a daily schedule with his two brothers. All three received their licenses on the same day in June of 1926. WB6GFJ is getting his new beam up and reports hearing good European signals on 80; hope he works some of them. W6MMG reports his son now is WN6TPV. Congrats. WA6DFM built a new keyer. Bulletin *Schedules: W6ZRJ each Thur. evening as follows:* CW, 15 and 20 wpm, 7:30 local 3590 and 7129 kHz; SSB, 8:30 local 3815 kHz; RTTY, 850 Hz shift, 9:00 local 3615 kHz.
NCN, NTS, Dy 7:00 & 8:30 P local 3630;
SPECS, AREC, M 7:45 P local 146 MHz;
SCV, AREC, T 8:00 P local 146 MHz.
Traffic: W6YBV 189, W6NW 150, W6RSY 133, W6BVB 129, W6AUC 82, W6REF 65, W6KZJ 51, W6DEF 47, W6IQU 23, W6OII 15, WA6HAD 14, WB6GFJ 4.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ – SEC: W4FVN. PAM: WB4JMG. RMs: WB4ETF, WB4VBM. Remember the ARRL DX Test in Feb. and Mar. The Cary ARC new officers are K4BXY, pres.; K4SAN, vice-pres.; WB4ORT, secy.-treas. New OOs are K4KH, WB4TNC and WB4MLI. WB4UBA has 63 countries on dipole/100W. WA4JCS now in two-way servicing biz as is WB4UBA. New General is WB4UOU. WB4VSA has dipoles cooking on 3 bands. KØMSP/4 eyeballed FCC and received Advanced ticket. Look for the NC Post Office Net, Sun. mornings 8 A.M., on 3923. Net mgr. for NCPON is K4ANL. K4RJ claiming new UHF record on 2304 MHz Moonbounce with W6YFK a terrestial distance of 2080 miles. Congrats OM. The Carteret-Craven ARC paper "The Short Circuit" edited by k4JLW reports new Novice class run by JLW and WB4CIN. New Novice is WN4CFA. The Forsyth ARC, Winston-Salem, had fine two-part two-meeting program by W4CTS on the Mariner-9 mission to MARS. Winston-Salem Repeater WB4QGB perking on 25/85. Congrats to Franklin ARC, a new ARRL affiliate. A nice bulletin received from W4ATC, NC State Univ. club station. WA4WZQ has troubles with downed antennas and is making a comeback. Congrats to K4MSG on getting First Class ticket. Traffic: (Nov.) W4EVN 144, WB4VBM 76, K4MC 70, WB4TNC 58, W4WXZ 56, WB4MLI 48, W4OFO 42, WN4YMV 37, K4EZH 31, WB4VSA 30, K4VBG 19, WA4VNV 16, WB4JMG 12, WB4UOU 6, WB4CES 4, WB4HGS 3, WA4JCS 2, WB4UBA 2. (Oct.) WA4VNV 13, K4TTN 4, WB4HGS 3, WA4JCS 2.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A.L. Martin, Jr., W4THV. SEC: WA4PBG. Asst. SEC: WA4JJE. RMs:

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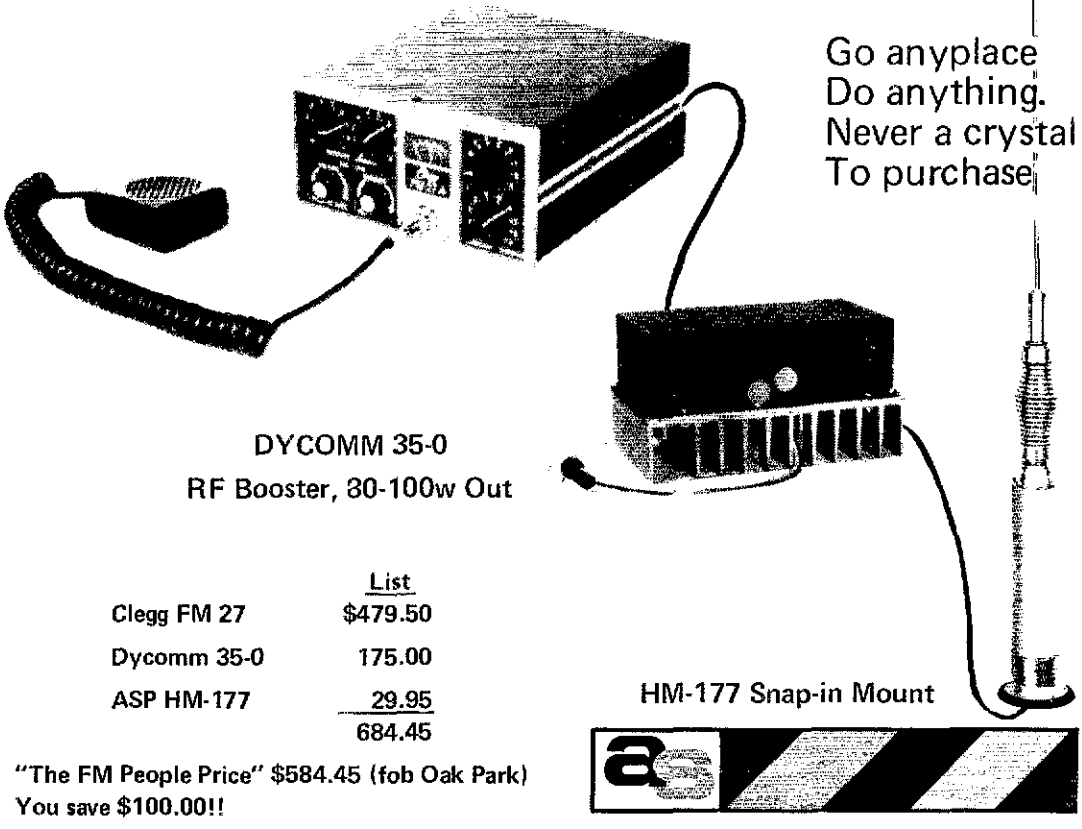

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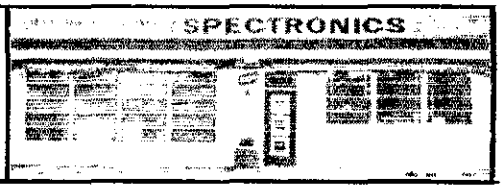

W4HJR, W4SOO, W4SHJ, KØPIV/4. PAM: WB4RZW. WA4EUL was presented with a certificate and a plaque at the Virginia Beach ARC annual banquet from all Va. hams for his many contributions to us. Congratulations to WB4MBO for organizing and NCSing an emergency net when high water threatened Lynchburg and other valley areas on Oct. 9 with liaison by WB4KIT in Fishersville. Congratulations to our new PAM, WB4RZW and our many thanks to WA4FGC for his splendid work as PAM. Tidewater ARC has a new home at Fort Norfolk; meets 2nd and 4th Sat. at 10 A.M.; W4NV will soon be on the air. 3AØFN is at Fort Lee during Feb. and will appreciate local contacts and invitations; write Hugh Vandegrift, AIMSM Class 73-3, USALMC, Fort Lee. Congratulations to our Director, W4KFC and our Vice Director W4ACY on their reelection. K4GTS spent most of Oct. at YU1TTU. KØPIV/4 put in RTTY patching system. W4LQO has a 20/40 ground plane going. Oct. VSN QNI 338 vs Sept. 194; good work, Carey! W4TJN back on strong after ten years – OPS and ORS already! W4YZC busy contesting. WB4FDT has 463 counties on CW! Work catching W4SQQ again. W4UQ transistorizing his Collins receiver. FCC commended OO K2HBA/4 to me for his IW work. W5VZO/4 has antenna problems. Football diverting WB4KBJ on week ends. Things are slow with K4MLC. K4JM also contesting. WB4DRB monitoring Oscar. K4FSS now is W1GRH in Conn. Counties: WA4EPH 921, WA4UNS 1318, W4JUJ 2748 and WA4WQG 3044. K4KX and K4LMB also reported. See last month for net listings. Traffic: (Nov.) W4SQQ 314, K4KNP 303, W4UQ 197, WB4KSG 153, WB4SGV 150, W8VDA/4 128, W4HIR 109, WB4KIT 76, WA4FGC/4 69, WB4PNY 67, W4TJN 48, K4GR 41, WA4PBG 40, W4KFC 39, WA4UNS 29, W4TE 24, WB4KBJ 23, WB4RZW 23, WA4JJF 21, WB4FDT 19, W4YZC 19, K4KA 18, W5VZU/4 17, W4FQV 16, WB4RDV 10, W4LQO 9, WA4WQG 8, K4IAF 7, W4MK 7, K4JM 6, K4MLC 6, K4VIG 3, W4JUJ 2. (Oct.) KØPIV/4 216, W4HIR 147, WB4KSG 129, W4TJN 27, WB4FDT 10, K4GTS 9, W4LQO 5, W4KX 3.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – SEC: WA8NDY. RM: W8BBG. PAMs: W8DUW, W8IYD, K8CHW. Phone Net Mgr.: WB8BMV. Correct frequency for the Mountain State Emergency Net is 3920 kHz. WA8WCK has been appointed to work with W8CHT, 8RN Mgr. on setting up the Daytime NTS. K8QEW, K8ZPR, WA8NDY and WA8WCK were active in CD RACES state workshop at Jackson's Mill. K8QYG and WA8DOY, husband and wife team, continue to increase their DX totals. WB8BMV is consistent in PSHR work. WA8NDY installed new vhf 2-meter beam. WVN Phone Net with 30 sessions, 379 stations handled 98 messages. MARA held annual Christmas Party and meeting in Fairmont. K8ECY, new trustee for CD station WB8ARY in Huntington. W8MIS and K8QYG active in ARRL 160-Meter contest. WVN Novice Net meets Sun. at 1930Z on 3730 kHz. Fairmont repeater on 28/88 and Morgantown on 16/76 have increased the vhf coverage in Northern West Va. W8DUV, gen chmn. for the 1973 State ARRL Convention to be held at Jackson's Mill, June 30 and July 1, visiting state clubs to promote the Convention. Traffic: W8JWX 64, WB4BMV 41, WN8MKL 37, WB8BMW 19, WA8LFW 14, WA8NDY 13, WA8WCK 6. W8JM 5, K8QEW 5, W8ETF 4, WB8DQX 3, W8DUV 3, WB8DXF 3, WB8EKG 3, W8AEC 2, WB8CYB 2, W8GDP 2, WA8YCD 2, WB8ADH 1, WB8AKR 1, K8CFT 1, WA8KCJ 1, WA8PFB 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – SEC: WAØQOY. RM: WØLRN. PAMs: KØCNV, WØLRW, WAØWYP. Congratulations to "Grid Leak" publication of the Pueblo Ham Club on winning first place in membership contribution and third place in Technical articles for 1971 in the Amateur Radio News Service Publication contest. WBØHCK is enjoying his new Galaxy V. Newly elected officers of the Denver Radio Club are KØEDG, pres.; WØETU, vice-president; WAØZYM, secretary; WBØBNP, treasurer. Congratulations to Denver Radio Club on their award winning "Round Table" publication, which won first place in Cover and Member contributions, and second place in General Format and Photos, and third place in USEEE activities and Technical articles, in multiple class A division of the ARNS publications contest for 1971. Newly elected officers of the Pikes Peak Radio Amateur Assn. are W2TPV/Ø elected vice-pres., and now pres. by virtue of resignation of WØLKD; WØKWV, secy. WØMDH is retiring and moving to Estes Park in Jan. 1973. Net traffic for Nov.: Columbine QNI 1147, QTC 62, informals 212, 26 sessions. CCN QNI 314, QTC 145, 30 sessions. SSN QNI 374, QTC 173, informals 56, 30 sessions, 940 minutes. Traffic: (Nov.) KØZSQ 994, WØWYX 492, KØYFK 432, WØLQ 260, WBØAXW 186, WØIW 148, WØLRN 129, WØLLA 116, KØOTH 108, WBØHCK 97, WØNGA 88, W2TPV/Ø 83,

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NEW MEXICO – SCM, James R. Prine, W5NUI – Roadrunner Net 21 sessions, QNI 563, QTC 62, QST 7. The deer hunters benefited by the availability of sked nets in handling health and welfare traffic. K5LMI moved to Raton and is back on the air after an extended absence. WA5JNC is enjoying the benefits of a good 75-meter dipole that outperforms the old vertical. In the absence of a section CW net K5MAT has suggested that New Mexico stations get together on 3570 at 0215Z prior to TWN. Regret to record W5YBI as Silent Key. Traffic: (Nov.) K5MAT 229, WB5BHN 144, *W5UH 86, W5MYM 56, W5PDY 44, W5NUT 32, WA5OHI 18,* W5DAD 10, WA5MIY 9, K5VXJ 6, W5YQ 5, W5NON 3, W5TLK 2. (Oct.) WB5BHN 15.

UTAH – SCM, John H. Sampson, Jr., W7OCX – SEC: W7GPN. RM: K7HLR. Vacancies exist in almost all appointive positions. If interested please contact your SCM. A new traffic net in Utah commenced operations the first of Jan. with K7HLR as net mgr. Operation is at 12 wpm on 3575 kHz at 0230 GMT (7:30 P.M. MST) daily. 1973 officers of the Ogden ARC are K7RGY, pres.; *K7NJY, vice-pres.;* WA7GTL, secy.-treas.; *WA7RXA, dir.; and* WA7FVQ as hold over dir. W7NIB moved to Salt Lake from Fremont. W7DHJ is on the air with his newly completed linear. He and his XYL will leave soon on their annual trip to Mexico. WA7DYH reports that Cedar City hams are getting good operation from their repeater atop Frisco Peak. WA7SKD setting up a new inverted Vee antenna. WA7PDU is a sought after man; he is the only ham in Kane Co. K7BNZ and WA7HCQ had a fine eyeball QSO in Richfield. Hams in Richfield have yet to set up their emergency communications in the basement of the new jail which will provide facilities for Sevier, Wayne and Piute counties. W7LLH modified his rig and is now making changes in his shack. Work is progressing on the Ogden repeater under the direction of W7GPN. W7HKC looking forward to the day when the new jr. op. will be banging on the key. *Traffic: W7EM 155, K7HLR 74, W7OCX 58, W7IQU 27,* K7CLO 22, W7EYR 20, WA7MEL 18, WA7LES 17, W7LLH 10.

WYOMING – SCM, Wayne M. Moore, W7CQL – SEC: K7NQX. K7UGQ, the VA hospital station in Cheyenne, now is off the air. K7NQX has a nice sounding new rig. W7TT is active again with a new rig. K7TXZ has a new antenna and a new set of twins – twins, mother and antenna doing well. If you are planning your vacation now, don't forget to set aside the third week end in July for the annual hamfest – to be held in Riverton this year. For information *or if you wish to offer help,* contact WA7OEC. WA7BFV is now settled in his new home in Casper. Anyone interested in a Wyoming ham directory? If so, let me know. Let's present a PICON award for a Wyoming ham for 1972 – send your nominations to me now. Traffic: K7NQX 239, W7SDA 117, K7VWA 95, W7BHH 55, W7HNI 39, WA7HAB 22, K7ITH 20, W7YWW 11, WA7NHP 10, K7SLM 8, WA7OEC 2, K7TXZ 2, K7TAL 1.

SOUTHEASTERN DIVISION

ALABAMA – SCM, James A. Brashear, Jr., WB4EKJ – SEC: W4DGH. RM: W4HFU. WA4RBH resigned as secy.-treas. of the Huntsville ARC moved to Va. WB4UHC will replace him. WB4IEY also has moved to Va. WB4KSL is NCS on AENB Sun. nights which meets on 3.575 at 0100Z. W4HFU, NM of AENB, needs help mostly on Fri. and Sat. nights. K4JK reports he missed on the last frequency check by 31 cycles. I understand some Novices of the section were not aware of recent band changes. WN4UNM building a new house in Mendanville. WB4SON back into net operations, made BPL – again! WB4SVH, NM of AEND, reports activity picking up. K4HJM reports some antenna trouble with a 2-meter station (relay). WB4WUS has NCX-3 on 40-meter ssb and cw. The Huntsville ARC set up and operated a 40-meter cw station in The Mall to originate Christmas traffic for the public. There were 147 messages listed, but only 103 were cleared – change in skip on 40 meters. Thanks to WB4SON, WB4KSL and his YL WB4JMH and WB4EKJ who assisted in antenna raising and working at the traffic booth. A special thanks to WB4SVH, WB4YCV and K4CNY who helped in clearing traffic. Endorsed K4AOZ and WB4JMH as OBSs. Welcome to WB4AW, WA4s BIM, BPG, BWN, BYW, BYX; WB4s BRG, BRX, BVS, BVU, BYY, BZD; WN4s BCN, BCO, BCR, BCV, BCY, BCZ, BDD, BDE, BDN, BDP, BEI, BFA, BFD, BFG, BFH, BFI, BFM, BFN, BFO, BFQ, BGV, BHP, BHQ, BHS, BIC, BIZ, BIY, *BIA, BJJ, BJP, BNU, BOA, BOB, BPK, BPL, BPS, BPU, BTH,* BTP, BTS, BTU, BTW, BTX, BYG, BYQ, CAX, CAY and CBF. Traffic: WB4SVH 267, WB4EKJ 144, WB4SON 125, WB4KDI 84, K4AOZ

40, WB4SVX 40, WN4ZQF 40, WB4KSL 12, WB4THU 8, WB4JMH 4, WN4ZOG 3, WB4WUS 2.

EASTERN FLORIDA – SCM, Regis K. Kramer, W4ILE – SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4FAC CW, WA4WIW RTTY. PAMs: W4SDR 40, W4OGX 75. As this is being read you may suddenly come to realize that Eastern and Western Fla. ARRL sections are past history. As of Jan. 1, 1973 it is Northern Fla. and Southern Fla. The following counties are SOUTHERN FLA.: Brevard, Broward, Charlotte, Collier, Dade, DeSoto, Glades, Hardee, Hendry, Highlands, Hillsborough, Indian River, Lee, Manatee, Martin, Monroe, Okeechobee, Osceola, Palm Beach, Pinellas, Polk, Sarasota and St. Lucie. Remaining counties are part of NORTHERN FLA. New appointees: WA4EYU OBS and the last EASTERN FLA. *appointment to be made goes to W4YSO OPS of Winter Park. To* K4FAC went the honor of being the first SOUTHERN FLA, LO appointee. FAST Net Certificates were issued to K4GDV, WA4PDM. Belated congratulations to the new Suwannee Chapter of QCWA. K4EVY is NCS of traffic net QSPg to 4x4 daily on 21360, 1330-1500Z, USB. WB4QFH came up with 50K in Oct. CD party, also made 200 W/K contacts from HKØBKX. WB4NCH has antenna up and operating from FSU. FAST Net has two sessions each evening, 6 and 10:30 P EST on 3940. K4SJH is getting squared away on RTTY and is monitoring for a net frequency? WB4RGQ modified a Twoer for fm. WN4UPJ QNIs the Gator Net 7115 kHz at 1330Z. Novices are encouraged to try their hand at this cw net each morning at 8:30 A EST. W4KQS acquired his Extra and will soon be on RTTY. DCARPSC had their first annual Christmas Officer Installation dinner Dec. 9. W4UJL reports over 20 members of the Central Fla. Repeater Assn. participated in furnishing communications for the Cerebral Palsy Walkathon. Traffic: WA4IJH 739, K4SCL 595, K4FAC 424, WA2AFL/4 399, WB4GHD 322, K4EVY 290, WB4OMG 281, W4IJK 277, WB4AIW 196, WA4SCK 159, W4SDR 154, WB4WYX 145, KØECG/4 139, W4ILE 103, WA4BGW 95, WB4PNG 95, W4YSO 94, WB4JSK 89, K4BLM 87, WB4HJW 87, WB4GMB 85, W4IYT 83, WB4SQA 82, WB4HKP 77, WB4OAA 70, W4DVO 58, W4TJM 58, WB4WHK 58, W4NGR 57, W4KRC 56, WB4NJI 53, WA4RUE 51, WB4AIK 49, K4GJ 47, K4HGG 44, W4BM 43, WA4EYU 43, K4NE 40, WA4PDM 38, W4EH 32, K4EBE 31, WB4WTL 30, W4LSR 29, WB4AID 25, W4DQS 23, WA4HJA 23, K4QG 23, WA4HDH 22, W4IAD 22, W4LDM 22, W4SMK 20, W4GUJ 18, WB4SKJ 17, W4OGX 15, W4RHA 15, W4DFP 14, K4SJH 14, WB4UNV 14, W4KGJ 11, K4OER 11, W4WZR 11, W4YPX 11, K4LPS 10, W4NTE 10, K4DVW 9, WA4EYY 8, K4GFW 8, WB4QID 8, W4DDW 6, W4IA 6, W4DTV 5, WN4ZZB 5, WB4RGQ 4, WB4QFH 2, WA4YRU 2, WA2HHO/4 1, WB4WIQ 1.

GEORGIA – SCM, A.J. Garrison, WA4WQU – Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4SPB. PAMs: K4HQI, W4LRR.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	*Mgr.*
GSN	3595	0000/0300/1150	514	254	K4BAI
Ga. SSB	3975	0100	958	61	K4VNV
GTN	3718	2300	—	—	WB4SPB

W4JM reports he has WAS (two letter) on 75 meters. New officers for the Savannah Radio Club for 1973 are W4ZLV, pres.; WB4SQJ, vice-pres.; WB4NTW, secy.; K4GCU, treas. A new organization, known as the Georgia Council of Amateur Radio Societies, to be abbreviated the "Georgia Council" recently held their organizational meeting in Warner Robins. Officers are W4BYG, chmn.; WB4SKO, vice-chmn.; WB4DYQ, secy.-treas. Congratulations to K4BAI on his recent appointment to the ARRL Contest Advisory Committee. W4RNL reports that about 35 hams now active in the Athens area on 2 meters. Traffic: WB4MWC 176, WB4RUA 125, W4EEP 95, K4BAI 85, W4CZN 79, W4AMB 67, W4RNL 59, WA4WOU 54, W4PIM 50, WA4RAV 36, WA4NMU 30, WB4WXX 20, K4FXU 13, W4JM 8, W4REI 5, W4ESP 3, K4NM 2.

WEST INDIES – SCM, Pedro J. Piza, Jr., KP4AST – SEC: KP4CB. Activity on 2-meter fm is increasing very rapidly. If you do not have a 2-meter fm rig in your plans for this year, I suggest you include one. Active stations on 2-meter fm are KP4s QM, DJE, AHQ, GN, DID, BIX, ANH, AJK, MO, CQC, BBI, CQM, AWM, ES and AST. VP2VAI/KP4 is running a sked with VP2VAM on 6 meters with the intention of establishing the first Tortola to KP4 QSO on 50 MHz. The PRARC started a net on 7250 every Sun. at 10:00 A.M. AST. 6-meter active stations are KP4s AAB, AHQ, CQM, BBU, DOT, DBK, AST and VP2VAI/KP4. Silent Key HI8MMN/KP4. Traffic: KP4WT 275.

WESTERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: WA4IZM. VHF: WB4KGW.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957	2300 Dy	30	649	58
QFN	3651	0000/0300 Dy	60	–	–

Pensacola: KØBAD/4 received A1 Op. award. New appointments: W4UC as OBS; WB4ZPC as OVS. WA4NAP putting up a two-element quad for 10, 15, 20 meters. WB4JHQ, WA3ODA/4 and WB4ZPC planning a VHF contest for local hams. WB4KGW and WA4JNA looking for contacts on 442 MHz. WN4CAZ a new ham in Gulf Breeze. WA4ECY active in last SS contest. W4NN has a new triband beam up 80-ft, thanks to efforts of W3ZBW/4, WB4VUP and K9PNT. W4PRV hospitalized with heart attack. New hams include WN4CBT, W1YFZ, WN5HDB and WA4NLZ. NLZ returned *here to retire from USAF. Over 40 local hams participated in* election night coverage on 2-meter fm. W3ZBW/4 had good score in the phone SS contest. New officers of PCARC are WB4VBV, WB4GAO, WB4IXK and WB4NEQ. WB4GAO building 20-ft. dish and equipment for Apollo tracking. WB4BYL has his Novice ticket, as does WN4CCZ in Quincy. WN4BSP starting out big in traffic handling. *WB4PSJ/WB4UGU are a father/son team on QFN.* WB4ZQC has his Advanced ticket. The Suwannee Chapter of QCWA has been formed in Gainesville, and invites all North Fla. eligible hams to join. Traffic: (Nov.) KØBAD/4 214, WA4IZM 41, WN4BSP 26, W4RKH 15, WA4NAP 12, WB4ZQC 11, WB4UGU 9, WB4NHH 5. (Oct.) WA4IZM 63.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – The annual Winter Hamfest sponsored by ARCA is Feb. 4 in Phoenix at Squaw Peak Park. The agenda includes pot-luck lunch, transmitter hunt, swap table and rag chewing. The Maricopa County 2-meter public service team continues to do a great job. Recent events of service were for the Phoenix Retriever Assn. Field Trials; opening of the Wickenburg Sportman Club shooting range, and the Fiesta Bowl Parade. The Ariz. ARC with its Explorer Post 710 set up a station at the Old Country Store in Phoenix and sent out Christmas messages. Newly elected officers are – Ariz. Repeater Assn. K7GHS, pres.; W7DOZ, vice-pres.; WA7SHH, secy.; K7ESA, treas.; W7WGW, custodian; K7JWB, WA7NMJ, K7QWR, WA7TGB, dir. Cochise FM Assn. W7AKU, pres.; W7RUC, vice-pres.; W7ACI, secy.; K3VXE, tech. dir.; W7FQW, K7LYA, WA7NYC, dir. Old Pueblo ARC W7IFG, pres.; W7FAH, vice-pres.; K7CRN, secy.-treas.; WA7JCK, comptroller; W7BM, trustee; W7LAH, editor. Scottsdale ARC W7FBU, pres.; W7IJP, vice-pres.; WA7UHP, secy.; W7UM, treas. New repeater frequencies are W7AJU 146.40 in, 147.00 out and K7VOR 146.04 in, 146.64 out. New appointment is WA7KQE as OPS. Section awards were earned by WA7HIT, WA7JCK, WA7KQE, K7MTZ, WA7NHQ, K7NTG, WA7QVN, K7RLT. ATEN: 666 QNI, 110 QTC, 864 mins., 30 sessions. Traffic: (Nov.) K7NHL 527, K7NTG 190, K7MTZ 147, WA7QVN 49, W7PG 24, W7CAF 23, K7GLA 15, K7RLT 12, W7DQS 9, WA7KQE 8, W7WGW 5, WA7JCK 3, WA7NHQ 2, W7LLO 1. (Oct.) K7NHL 251.

LOS ANGELES – SCM, Eugene H. Violino, W6INH – The PARC was believed to have the largest number of members attending the Santa Maria Convention. K6ICS reports all check points were manned by volunteers for the yearly Baja, Calif. 1000 mile races. Two meters was used between check points. The TRW Club Nov. Dinner meeting was attended by a very fine group. Slides were shown of the Mexican Road Races by WB6WDS – K6PDF was MC. W6BXR again among the top frequency measuring list; also helping local RTTY group adjust the shift. WA6CBJ back from vacation. W6FXN watched the lift-off of the Oscar satellite at Vanderberg. Santa Clarita Club had a T hunt and Christmas party. WA6FBA undertaking the complicated chore of obtaining repeater license for the Ramona Club. WB6HUZ says the 2-meter contacts while on a trip were helpful in finding directions and accomodations. *The Antelope Valley Club advises they have 19* members taking classes for higher licenses. Hope you didn't forget the SET Jan. 27 and 28. W6LAE recovering from illness. W6QIL says Long Beach Club QTH appeared in paper re TVI complaints. So far they have received complaints which should have gone to CBers. The members of AMT (Associated Mountain Toppers) are supporting the League 100%. They have six Life Members! WB6IDO headed the West Valley AREC group in the Arcadia invitational Band Tourney. I would like to encourage fellow hams who are interested in the AREC program to contact WA6QZY regarding appointments. We are in need of ECs, also OPS PAM stations. It seems we need more members in the San Fernando Valley. WB6KOL reports the Western Public Service System received eight requests for applications at Santa Maria Convention. The OOTC group had their Winter banquet at the Three Oaks, many old timers attended. Those interested in 220 MHz experiments and

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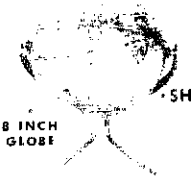

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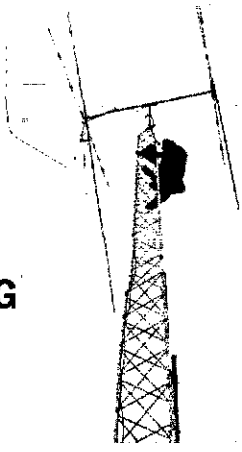

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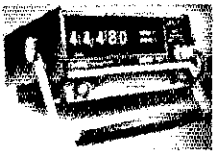

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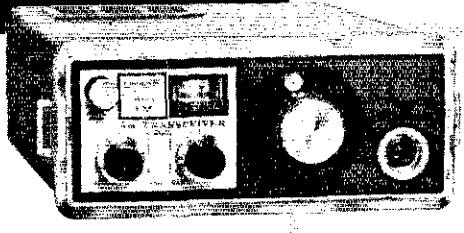

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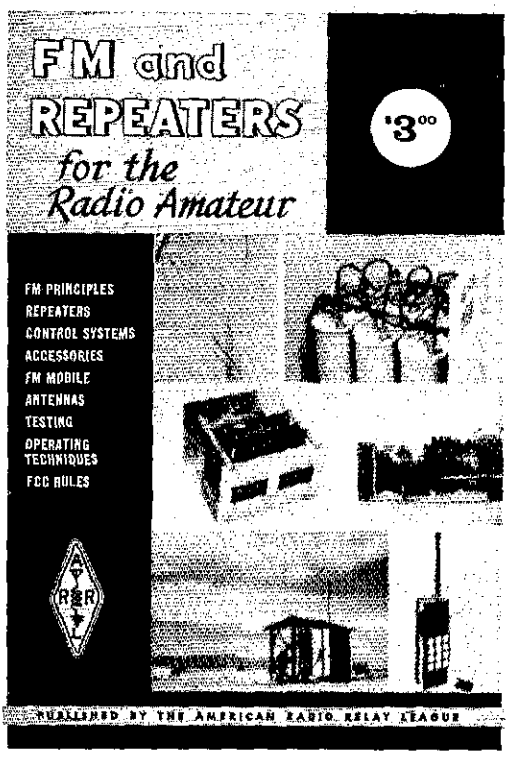
contacts should get in contact with WB6FSE in Lakewood. He and 8 other hams have 1 kw rigs on this band. W6BHG still on sick list but has made application for 50 year award, through QCWA and for 50-year pin with ARRL. W6IVC reports the Pacific Coast RTTY Net now meets on 7090 kHz at noon since change in 40-meter Novice band. WA6UOC is on Swapcars Net and Westcars. W6AGK still moving lots of used towers. Traffic: (Nov.) W6INH 341, K6UYK 122, W6LYY 55, WB6KGK 46, WB6KXC 44, WB6KJI 41, WA6ZKI 41, W6USY 20, W6IVC 14, WB6YIZ 13, W6DGH 10, W6HUJ 10, K6ASK 4, K6CL 2, W6FD 2, WA6IDN 2. (Oct.) WB6KGK 55, W6OEO 43, WB6TPO 2, WB6SSZ 1.

ORANGE — SCM, *William L. Weise, W6CPB* - Asst. SCM: Richard W. Birbeck, K6CID. SEC: WA6TVA. The Associated Mountain Toppers, Anaheim is probably the first affiliated club with 100 per cent ARRL Life Membership. Who can top them? WA6IYN worked Japan, So. America, So. Africa with new QRP Ten-tec Argonaut. Not bad for 5 watts. Sorry to report passing of WB6FLY Oct. 30. WB6JIL has become active on various nets from San Bernardino. Look for Marshall if you need help. W6NJU was elected new Vice Director SW Div. effective Jan. 1. New officers for Fullerton RC are W6KNE, pres.; K6JYO, vice-pres.; WB6LMC, secy.; K6AKT, treas. WB6QNU has overhauled his receiver and transmitter, look for big signal from Bob. Desert Rats RC had VE4CP as guest speaker 28th, VE4CP flew a load of gear down from Winnipeg in his own plane to demonstrate. Congrats to W6FB, he measured 2 parts per million in Nov. FMT using surplus frequency meter with calibration book. W6ISC has new Swan 600-T and Inverted Vee for 80 and 40. Bob says please check in on the new daytime NTN on 7070 kHz. New members are needed. WA6DBX reports he contacted 42 sections during SS week end. Congrats Greg. If sufficient interest is generated a Novice AREC Net will be established sometime in Feb. '73. Please inform your EC or write to the SEC if you intend to participate. Traffic: WB6VIK 364, W6ISC 161, WA6TVA 44, K6GGS 24, WB6AKR 17, W6WRJ 14, W6QBD 12, WA6YWS 12, WB6JIL 8, W6CPB 5, W6BUK 2.

SAN DIEGO — SCM, Paul C. Thompson, W6SRS — Asst. SCM: Art Smith, W6INL. SEC: W6UBF. RMs: W6LRU, W6BGF. With the Jan. SET behind us, a good effort I might add, we should be looking forward into the year with our emergency capabilities. The end of the month "Emergency Sun." should be a regular with you. We had a lot of fun at the AREC Pancake Breakfast. Assistance is needed on the Convention Committee. Contact WB6ODR, chmn. Reports are picking up. Thanks. If you desire monthly report cards drop me a line or phone. W6KSI and K6QM hosted Troop 879 for "On-The-Air Scout Jamboree." W6DEY reports new vhf gear on the bench. WA6DMB provides OBS service for the section. K6PM has been mobiling to Vt. K6BTO is modifying 432 gear. OO K6SDR is checking out new DX. RN6 liaison is WA6AMK. Holiday traffic gave BPL again to W6BGF. W6LRU is holding license classes again at Midway and Clairemont High evenings. K6QM handled phone patches with his old ship for Apollo 17 activities. W6MAR is back from KH6-Land. WA6BDW has recovered from his fall while putting up an antenna. W6FMZ filed his first report in 21 years. George indicates a lot of activity. PSHR: W6LRU 49, W6BGF 44, WB6VKV 34. Traffic: W6BGF 603, W6VNO 218, WB6VKV 200, W6LRU 137, WB6HMY 131, WA6AMK 62, W6DEY 37, WA6BDW 23, W6FMZ 11, W6SRS 10, K6CXR 7, WA6HLA 3, W6MAR 2, K6PM 1.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DEI — SEC: W6JTA. RM: W6UJ. PAM: K6EVQ. New OBS WA6IDQ sends RTTY bulletins on 3625 at 0230Z Thur. Bob also placed first in North America in the SARTG RTTY contest. W6CJS earned a Section Net Certificate for AREC Net activity. Join us on 3935 at 8 P.M. Wed. Congrats to W6KW on his reelection as Division Dir. The top section participants in the SS were K6QPH, W6GEB, W6UA, W6RFU and K6BCE. K6QPH has received 5BWAS plaque No. 133. New officers of the Santa Barbara RC are W6UEI, pres.; K6TZ, vice-pres.; W6AMI, treas. This club has recently reorganized. SEC W6JTA gave a talk on the section AREC organization to the Central Coast ARC. WA6DEI attended the Pacific Area Staff meeting in San Diego and has completed a digital message generator. WA6KRA now is K6YK. K6YLQ reports weekly Ventura Co. AREC Net active on WA6SIN repeater (28/88) Tue. at 2015. WA6ZRH remote base consistantly works the Bay Area on 2 meters from Santa Barbara. WB6DBD is active in Red Cross communication in Santa Barbara. An autostart RTTY 2-meter net is being formed in Ventura Co. Contact K6PYE. If you are interested in an official appointment let me know. *Several are available. Endorsements:* WB6BWZ OO; WA6JOX OVS; WB6MXM OPS; WA6WYD OBS; W6UJ RM; K6EVQ PAM; W6JTA SEC. New Novices are WN6s TDQ, THD, TGY, TTH, TPO, TGV, TFX, TPL, TNM and TRW. Send monthly report of your activities for inclusion in this column. Happy



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Valentine. PSHR: WA6DEI. Traffic: (Nov.) WA6DEI 162, WB6PGK 121, W6JTA 94, K6QPH 12, WA6WYD 12, W6MQF 2. (Oct.) WA6WYD 12.

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.E. Gene Harrison, W5LR – Asst. SCM: Frank A. Sewell, W5IZU. SEC: K5QKM. Asst. SEC: WA5KHE. RM: W5QU. Our mail is again on the increase. W5JAX read bulletins No. 397, 398, 399 and 400 on the air three times each in Nov. FB. WB5EII, secy.-treas. Key City ARC, reports new officers as follows: WB5BFF, pres.; WB5EII and WB5ASB, secy.-treas. Net meets 0100Z 3992 kHz Mon.-Tue. evenings, visitors welcome. Richardson WK annual auction TPL auditorium 2nd Mon. WB5DTK new addition to RWK. W5QGZ, DARC reports transmitter hunt Nov. winners include W5SFP, WA5HTT and WA5STR. Army MARS repeater on 148.01/143.99; WA5YKO has new FT-150 DX; K5YXO moved to Calif.; W5TEN new board member. K5RZW CRW council and 160 meters open for DX. WB4YCV and WB5EEE announce opening of Chick Watchers Net 3760 kHz, Thur. and Sun. 0030Z Dec. 4, 1972. A copy of the Okla. Emergency Communication Plan received. OO W5ARV back home after 6 month sea duty aboard USS Cossatot serving in Arctic. FB. W5NFO reports Brownfield Swapfest attendance 430 registered and many unregistered. Temple ARC Nov. meeting attended by 27 people. New members W5WDV and WB5GUZ. Thanks to Bill and Margaret for copy of Lone Star Bulletin. W5IZU says W5HT loading his trailer for trip to the land-of-spanish-speak- people. Good luck, Paul. The Arlington ARC closed its 1972 season with a dance and annual banquet on Dec. 9; election of officers, Ham-of-the-year award, etc. Doc Best was an invited guest. Attendance near 100. Latest announcement reports Dallas ARC conducting code and theory classes – started Jan. 5. WA5GXP trustee DARC repeater presented interesting trustee repeater report for updating present gear. Traffic: (Nov.) W5II 244, W5QU 129, W5SHN 27, W5IZU 15, W5LR 15, W5NFO 10, W5YK 6, W5QGZ 5. (Oct.) W5SHN 23.

OKLAHOMA – SCM, Cecil C. Cash; W5PML – SEC: WA5FSN. RM: W5RB. PAMs: W5MFX, WB5CWX and K5DLE. The Christmas season has come and gone and it will soon be spring. We try to open spring with the Lawton-Fort Sill hamfest on the second week end of Feb. which this year is Feb. 11 at the all new Montego Bay Motel and Convention Center located on the express way just east of Lawton. Hope to see you there. Others are coming up in Mar. and Apr. The 1973 officers of the Enid ARC: WA5FVI, pres.; WA5OUD, vice-pres.; WA5UIF, secy.-treas. Congrats to new Extra Class WB5FIK. I am happy to see that our nets are picking up. Now if you will send me your station activity reports I can report it.

Net	*kHz*	*Local Time/Days*	*Sess.*	*QNI*	*QTC*	*WX*
OPEN	3900	0800 Su	4	201	-	-
OPON	3900	1700 M-F	22	578	126	
STN	3850	1730 M-S	26	509	42	
OTWXN	3900	1745 M-S	25	438	17	238
OLZ	3682.5	1900 Dy	30	153	179	

K5TEY 531, W5RB 112, W5MFX 38, K5OTM 38, WB5BFX/5 33, WA5ZOO 30, W5PML 22, W5FW 17, WB5AZS 16, W5FKL 16, WA5CUU 13, W5SUG 9, WB5DRZ 8, WA5OUV 8, WA5FSN 6, K5OOV 5, WA5WRC 5, WB5FIK 3.

SOUTHERN TEXAS – SCM, E. Lee Ulrey, K5HZR – PAM: W5KLV. RM: W5ABQ. Congratulations to new OO WA5EEM; OPS WB5DBK; ORSs K5EJL, WB5DBK, WA5YEA and OVS WA5ZLJ. Renewed OBS and ORS for RM W5ABQ. ORS WB5DQL reports new antenna tuner for 80 meters. El Paso ARC contemplating addition to club house. ORS K5EJL demonstrated his new IGFET QSK device for DX-60 at Austin ARC meeting. Received OO reports from WA5MIN, W5NGW and W5SQW. W5ABQ, K5ROZ and W7WAH/5 are on PSHR.

Net	*kHz*	*Sess.*	*QNI*	*QTC*
TEX*	3770	59	538	284
TTN*	3961	30	1590	84
7290 Tfc	7290	42	1861	535

*NTS. Traffic: W5ABQ 178, W7WAH/5 145, WA5VBM 98, W5KLV 96, WB5BWV 86, WA5YXS 83, WA5ZBK 77, WB5CUR 70, WB5DBK 70, W5QO 58, K5ROZ 39, WA5JFZ 33, WA5FJN 32, WA5TJI 29, W5JVR 28, K5EJL 22, WA5LNV 22, W5TFW 20, W5AC 19, W5UKN 17, K5EFH 14, W5HWY 14, W5BHO 12, WB5EDS 6, WA5ZBJ 6, K5HUA 3, WA5CBT 2, WA5CTJ 2.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – Asst. SCM: Mrs. Donez Booth, VE6YL. SEC: VE6XC. Once again I will be your

SCM for another two years effective this past Jan. 10. I wish to thank all of you who have helped me in the past and look forward to working with you again. VE6YL will continue as my assistant. SEC VE6XC is running the Alberta Traffic Net (ATN) on 3680 kHz at 0200Z Tue., Thur., Sat. (1900 MST Mon., Wed., Fri.). VE6ARJ reports that VE6RCL, the Cold Lake Radio Club has 12 active members and are instructing a class of twelve. VE6EA wants information on the experimental type VHFer. VE6FK would also like to hear from them re OVS appointments. New pres. of CARA is VE6ABZ. Best wishes for a successfull year and the full cooperation of all members. At the CARA general meeting the following were honoured with Life Membership: VE6FK, ex-VE6JL and VE6SA. Traffic: VE6YL 52, VE6FK 42, VE6XC 39, VE6FS 25, VE6YW 22, VE6AVV 16, VE6BAT 16, VE6QN 16, VE6HN 15, VE6VF 10, VE6AXH 6, VE6FV 2, VE6KS 2.

BRITISH COLUMBIA – SCM, H.E. Savage, VE7FB – Vancouver EC's VE7AMW and VE7UM; The Island's VE7CB; Victoria Area VE7AXI; Kelowna VE7AAJ; Nanaimo VE7BXN. Salt Spring Island has gained another VE7ARJ. VE7GR broke his shoulder blade. Three times per week code session on 3755 doing well. VE7LL has retired to the cookie jar work. Point Grey ARC officers: VE7YF, pres.; VE7AXJ, secy.-treas. Vancouver ARC, VE7AGX, pres.; VE7API, secy. VE7NP is ready to test his construction project 80 to 10 meters ssb/cw rig. VE7AYS is still a patient at Rehabilitation Center, Nanaimo. Kamloops ARC's repeater is in action after blasting hole and using crane to fit 50-ft. by 22 inch butt pole in the hole. Traffic: VE7LL 91, VE7BLO 64, VE7AMW 10, VE7TT 9.

MANITOBA – SCM, Steve Fink, VE4FQ – Hopefully your activities should now be at a peak and also hope you got in on SET. We welcome VE4PG as a new ORS. When not on the nets, Pete is working some 20-meter DX or working into Winnipeg on the 2-meter repeater (146.34-.94). Getting away from the cold are VE4s OR and GB. VE4MA, VE4AS and VE4QL all took advantage of the Nov. 26 50 MHz opening to the Eastern U.S., and VE4MA reports 432 open daily to WØPHD and VE4CT. VE4DQ worked back home from VK5JI QTH during his Nov. visit. Keep an ear out for VE4JC, soon to be on from Zambia. MTN: 26 sessions, 108 QNI, 65 QTC. MEPN: 30 sessions, 1123 QNI, 25 QTC. Traffic: VE4RO 114, VE4FQ 53, VE4EA 33, VE4PG 19, VE4PA 10, VE4HR 7, VE4JA 6, VE4CR 4, VE4QJ 3, VE4SE 3, VE4AP 2, VE4FK 2, VE4LN 2, VE4NE 2, VE4RQ 2, VE4XN 2.

MARITIME – SCM, W.D. Jones, VE1AMR – RMs: VE1RO, VO1CA. PAMs: VO1FX, VE1YO. From all reports VE1AFG is doing a first class job as the Dartmouth Club's auctioneer. Have a listen for the 10-meter net each Sun. on 28.2 MHz at 1800 GMT with VE1AUA as net control. There are plans for a club station at The Halifax School for The Blind – pres. is VE1AIV. Amateur radio training at the school is still going strong with a class of 19 or so. Congratulations to VE1TG on winning the 14 MHz single band section of BERU. Looks like VE1 participation in BERU is increasing. The new executives for HUMBARS includes VO1GL, pres.; VO1MJ, vice-pres.; VO1JZ, secy.; VO1KB, treas. APN reports QNI 126, QTC 76, session 29. Traffic: VE1AMR 89, VE1ARB 56, VE1DB 21, VO1CA 10, VE1AFM 8, VE1AMB 4.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – The U.S. Band Expansion, in particular the 75 metre portion, seems to have brought out the best, and the worst, in some individuals, but this is "par" for nearly any subject one cares to bring to mind. I hope by the time this reaches you that Ont. will be represented on the daytime NTS. You may recall it was recommended that the NTS, normally held in the evenings, include a daytime setup to cater to those amateur traffic men who prefer to operate during the daytime hours. Both ssb and cw modes could be used and the net frequencies would be generally in the 15, 20 or 40 metre bands. SCMs were asked to make recommendations for RMs and/or NCSs and would you believe that not one of the 74 SCMs came up with a single specific recommendation? The Ont. holders of leadership appointments will now try their luck. I think it is a real toughie for us but I am sure that there are a goodly number of this rare breed around if we can only get their names. RMs and PAMs, and any of my readers also, please check your list of friends and acquaintances, who are retirees or who work at night. Let's get this thing off the ground, and now. RSO members are reminded that the new committee on Communications under VE3BC needs ideas and information on your "on-the-air" activities. Traffic: (Nov.)VE3SB 233, VE3DPO 144, VE3AWE 107, VE3DV 83, VE3FQZ 72, VE3GFN 70, VE3EHF 66, VE3AIA 59, VE3DBG 44, VE3EWD 43, VE3DOC 34, VE3CYR 31, VE3FRG 30, VE3ASZ 22, VE3GJG 21, VE3ATR 20, VE3EHL 15, VE3FAS 14, VE3DU 10, VE3VD 10, VE3DVE 3. (Oct.) VE3AIA 129.

QUEBEC – SCM, Joe Unsworth, VE2ALE – SEC: VE2BDM. AREC interest very low in the section, please contact your local EC and register with him. VE2AW now in 9G1-Land. VE2BU has returned to old QTH after the fire. VE2DHI now is VE3FWD in Bramalee and Bruce former VE2BQM now VE3BSL. VE2UN again made BPL for Nov. VE2DR tries for BPL. The QR net 3.775 MHz 1930 to 2030 Montreal local time needs more check-ins from the VE2s to help pass the traffic listed. VE2APT made PSHR with 25 points and doing great work as net mgr. for VE2RM AREC net; also VE2GA for QR net and VE2BIT skeds the monthly roster for NCS QR Net. VE2BHH in hospital for operation and VE2ZA waiting to go in for an operation. VE2AKM and VE2OJ committee for nominations directors election of officers VE2RM, Inc. Jan. '73. VE2BRW now Advanced ticket. VE2AQS now is VE3GNS. VE2AES/W6 heard often on 20 meters with VE2s of Montreal area. VE2AIK does wonderful job of maintenance on the VE2XW repeater. RAQI once again very late with license renewal forms and saying that they have received nothing from DOC. Traffic: VE2UN 104, VE2EC 50, VE2LV 22, VE2OJ 22, VE2BP 21, VE2AJD 17, VE2APT 16, VE2DLG 9, VE2ALE 4.

SASKATCHEWAN SCM, William H. Parker, VE5CU – ARRL evening net having a little difficulty on 3785 due to new American allocation for extras. Have patience I am sure it will work out all right. Saskatoon AREC supplies 2-meter back up Emergency Communications for all thre ee hospitals. New location of Regina Repeater doing great wor, some Saskatoon hams working Regina via repeater. There is no shortage of teletype equipment. I visited the Regina Club for their Dec. meeting. VE7AQ attended an EMO General Orientation Course at Saskatoon in Nov. VE7DN still travelling the tall timbers in the north. Try the AREC net Sun. mornings at 1530Z on 3780. Nice to see the CNIB boys on the air. Make your plans now for the Hamfest in Saskatoon the July 1st week end, enjoy a new type of get together. If you would like to take a more active part in amateur radio, talk to your EC or SCM there are many interesting positions open. Traffic: VE5DN 28, VE5GL 28, VE5BO 22, VE5CU 5. QST

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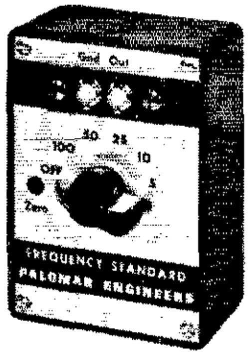

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QS-2-73

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ROCHESTER NY is the place to go for the largest Hamfest, VHF meet and flea market in the northeast, May 12th. Write WNY Hamfest, Box 1388, 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.

GREATER Baltimore Hamboree, Sunday April 8 at 10 AM Calvert Hall College, Goucher Blvd. and LaSalle Road, Towson MD 21204. (One mile south of Exit 28 Beltway-Sinterstate 695). Food Service, flea market, registration $2. No table charge or percentage. Info - Contact W3WVC at School Address.

1973 Hamburg International Hamfest near Buffalo and Niagara Falls on September 15. Details: Valerie Orgera K2KQC, 187 Main, Hamburg, NY 14075.

CANADIANS Free Surplus Parts Catalog ETCO Box 741 Montreal

COLLINS mechanical filters 455 kHz 2.4 kHz bandwidth $11 postpaid. V. Mozarowski VE3AIA, 1 Belgrove Dr., Islington Ont Canada

TOWER climbing safety belt/lanyard $21.50. Prop pitch rotor $65. T/S 175 frequency meters $45. 2M handitalki $50. Coax rf switches multiposition $16-$48. Free list. Link, 1000 Monroe Tpk. Monroe CT 06468.

WANTED: Galaxy III, Swan 260. WB6MNS.

QSLs?? "America's Finest." Samples 35c. Deluxe 50c. Religious 35c. (Deductable). Sakkers, W8DED, Box 218-A, Holland MI 49423.

TRAVEL-PAK QSL Kit — Send call and 10c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.50. 1000, $16.25. Also unusual non-picture designs. Generous sample pack 30c Half pound of samples 60c. Raum's, 4154 Fifth St. Philadelphia PA 19140.

QSLs, samples 10c. Fred Leyden W1NZJ 454 Proctor Av. Revere MA 02151.

CREATIVE QSL cards. Personal attention, imaginative new designs. Send 25c. Receive catalog, samples and refund coupon. Wilkins Printing Box 787-I, Atascadero CA 93422.

SAMPLES 20c. Harry Sims, 3227 Missouri Ave. St. Louis MO, 63118.

QSLs 300 for $4.65, samples dime, W9SKR, Ingleside IL 60041

RUBBER stamps $1.50 includes tax and postage. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona NJ 07044.

QSLs "Brownie," W3CJI, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

DELUXE QSLs. Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

COMPLETE QSL catalog, 300 cuts, 10 report forms, ink and stock samples, plus ten sample QSLs, 25c. Cornelison's Quality QSLs, 321 Warren St., N. Babylon, NY 11704

3-D QSLs — Far more spectacular, little more cost. Samples 25c (Refundable). 3-D QSL Co., Monson 2, Mass. 01057.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Rolles, Little Print Shop, Box 9848, Austin TX 78757.

QSL, SWL, WPE cards. Samples 25c. Log books, file cards, decals. Malgo Press, Box 375, Toledo OH 43601.

QSLs, SWLs, WPE samples 15c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 2 for $1, 7 for $3, prepaid and guaranteed. Tepabco Box 198T Gallatin TN 37066.

Excellent QSLs, reasonable, Samples 25c, W9CI. Press, R.R. 1 Box 811, Carmel IN 46032

QSLs, 3 color glossy, globe, eagle, straight key, ham with earphones on front, report form on back, 100 - $4.75 postpaid, Rusprint, Box 7575, Kansas City MO 64116

QSLs. Second to none. Same day service. Samples 25c. Ray, K7HLR, Box 331, Clearfield UT 84015.

QSL's 300 for $4.95! Samples 15c, Colourcard Box 326 Topanga CA 90290

QSLs — Dime or your present card brings samples. Alkanprint, Box 3494, Scottsdale AZ 85257.

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 Tonas Way, Carmichael, CA 95608.

PICTURE QSLs made from your photo. 1,000 $16 postpaid. Full color $35. Picture Cards, Box 5471, Amarillo TX 79107.

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 & Eimac. 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, WRUCG, 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. Heliarc welded aluminum. Al's Antennas, 1339 So. Washington St., Kennewick WA 99336

WANTED: Teletype machines, parts models No. 28, 32, 33, 35, 37. Cash or trade for Drake equipment. Alltronics-Howard Co., Box 19, Boston MA 02101. Tel: day or night 617-742-0048

VERY in-ter-est-ing! Next 6 big issues $1. "The Ham Trader," Sycamore IL 60178

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando FL 32806

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord NC 28025

KLEINSCHMIDT Manuals, Mite KSR, Teletypewriter supplies, gears, parts, toroids. SASE list. Typetronics, Box 8873, Ft. Lauderdale FL 33310. W4NYF. Teleprintronics, manuals bought.

NOVICES: Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, PO Box 6015, Norfolk VA 23508.

SELLING out. Send address for list. Cline WA7TMR, Box 216 Logan UT 84321

PREPARE for ham exams! Use Posi-Check. Original, expertly devised, multiple-choice questions and diagrams covering all areas tested in FCC exams. Keyed answers, explanations, IBM sheets for self-testing. All newly revised and up-dated. General Class $4.25, Advanced Class $4.50, Extra Class $4.75. Each applies to its own class only. First class mailing included. Add 25c per copy for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale, Des Moines IA 50322

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 ssb/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 372-8499, Home 372-8655.

NOVICE Crystals — new freqs. 24-hr shipment. Free flyer. Nat Stinnette Electronics, Tavares FL 32778.

SWAP Clegg Thor 6 with ac supply in good condition for Heath HW22A and ac supply. Frank McJannet, 11557 Evanston N, Seattle WA 98133.

SURPLUS to my needs. Mint HT32B $175, SP600JX good condx $125. Unused National fsk system SCR3B receiver, FSL1 limiter & fsk-1 keyer $35 ea, UTC C1338 filter $5. Bliley art xtal over $3. 5.6 to 10 and 9.4 to 16.5 Mc coil sets for Wilcox CW3 receiver $10 ea. Polar relay $3. 20 kv contactor w/120v ac coil $10. Pickup only. R. Enemark, W1EC, 2 Lyme St. Weymouth MA 02189.

WANTED UTC CG311 transformer, CG1C, CG109 chokes. F. Budavary, 285 Summit, St. Paul MN 55102.

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.

FIBREGLASS mast tubing for high frequency antennas. Outside diameters 1.0", 1.4", 1.5", 1.6", 1.4" telescopes inside 1.6". 1' to 10', $2 per foot, each additional foot $1.50, plus shipping. Lengths to 16'. Thermo-Flex, Inc., Box 1184, Salina KS 67401.

WILL trade Swan 350; power pack model 117XC; 3-Band directional antenna model TA33-Jr; P2SWR meter; model CDR rotor — All for a Parker Shot Gun. J. B. Williams, WA4HJZ, 615 Glendale Dr., Rock Hill SC 29730. Tel.(803)-327-7728.

SELL Collins 312B4 Console $150, NC200 transceiver with NCXA pwr supply $225. W9IY, 2285 Holly Court, Northbrook IL 60062. Foae (312) 272-2443.

ANTENNA King mail order sales — King-size antenna/radio packages, major brands, Save to 20%. Prompt service — P.O.Box A, Lomita, CA 90717.

BUYING QST magazines, interested in 1924 down to 1916. Willing to pay fair price. WA@LIB, 10417 Spring Garden, St.Louis MO 63137.

COLLINS R390A receiver $525. Want Model 32, 33, 28 teletype. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston MA 02108. (617) 742-0916.

FOR SALE: HQ170 $125, RTTY model 26 printer/keybd $75, Model 14 perforator $70, Model 12 paper tape reader $45, RTTY converter $35, BC348R ac supply $35. Plus assorted parts pwr xmtrs etc. List. W2UGM, 66 Columbus Ave., Closter NJ 07624. (201) 768-1884.

HAVE antenna problems? May 1973 I will go on a ninety day automobile trip through Texas, Oklahoma, Missouri, Iowa, Minnesota and South Dakota. Will operate SSB and two meter FM during trip and will carry a full set of tools and antenna supplies. Handicapped amateurs in these states who need dipole or inverted V antennas and are unable to put them up should contact Philip Rosenstein, WA5YRI, at 5426 Union St., Corpus Christi TX 78408. My services are free to handicapped people and it will be my pleasure to accomodate.

EQUIPMENT needed, for new club station. WB@DQI, 690 Fieldstone, Ballwin MO 63011.

SWAN 500CX, Vox, ac pwr; Galaxy V Mark II, Vox ac pwr; pwr supply for Swan Mark II linear, Mosley CM1 receiver; other gear and parts. W6ME, 4178 Chasin St., Oceanside CA 92054.

FOR SALE, Collins KWM-2 with ac and dc power supply, 30L1 amplifier. Mint condition; I'll pay postage. First check for $1200 gets it. Bill Hunt, Dept. Q, 3050 Hempland, Lancaster PA 17601.

NOVICE xmitter, 35 watts, 40 and 80, ARRL plan, factory enclosure. Sase for pic. BCAS230 $5, BCAR229 $5. Want Heath IG-72 audio osc. Bostwick, 2015 Va. Ave, McLean VA 22101.

TELREX A1312RISX rotator complete with indicator and 150' special cable cost new $620, only slightly used $320, CX7A $1395, Alpha 70 $1200, 7MH3 Kirk $225, 302C Collins wattmeter $75, Heath SB220 $250, B&W 425 low pass filters $15, Ten Tec PM3A $50, KR $25, AC4 $10, Galaxy SC550 speaker $10, Waters 374 Dummy wattmeter $80, Drake 2C with 2CQ $180, Galaxy R530 general coverage with speaker $500, AF800 Swan CW filter $12, Hallicrafter HA-1 keyer $50, New Minibeam B24 with RK3 $70, C4 Vertical $25. All items guaranteed. Douglas Electronics, 1118 South Staples, Corpus Christi TX 78404.

FOR SALE: Squire-Sanders SSIR, $450; Heathkit SB401, $250; Hallicrafters SX101A, $100. All in good working condition. Hopkins ARC, Johns Hopkins University, Box 2140, Baltimore MD 21218. Tel. (301) 243-6691.

NOVICE Special, Eico 720 and Heath HR-10B, both grt. cond. with dipole $130. All complete. WN2BXB, 5 Chester Dr, Great Neck NY 11021.

HALLICRAFTER HT-37 $145, Heath HW-12 $60. Both in good operating condition. WA1IRN, Bill Wrocklage, Box 12, Merrimack NH 03054, (603) 424-3305.

HEATH HW-29 6M Transceiver, mint $30, 12V supply $5. K1BOX, 23 Richards Rd., Southboro MA 01772.

WANTED: Racal RA17 receiver. Reika, WA6OWU, Box 268, Ventura CA 93001.

SO. CA: Wanted TR4 or R4, T4X and 3051 Linear. Write best pc and condx. Ralph Thomas WB6PCZ, 1100 Buena Vista St., Burbank CA 91505.

WANTED: Two Chicago-Standard R-105 chokes; two 10MFD, 6kV capacitors. WA6NPB, Bill, 9056 Willowgrove Ave., Santee CA 92071.

QST 1924 thru 1931 also random copies thru 1954. Send for list. John Donner, 15224 San Mateo, New Berlin WI 53151.

FOR SALE: 75-watt vhf fm base, remote manuals. Good condition, asking $125. Box 525, State College PA 16801.

NEED HRO-60 coils: A, B, C, AC. W5OE, 1721 Tierney Rd, Fort Worth TX 76112.

1973 Hobby Electronics Directory. Hundreds of companies, products, and services. Parts, surplus, test equipment, plans, kits and more. $1.50, Newcal Enterprises, Box 323-H, El Segundo CA 90245.

NCX5-Mark 2-outboard VFO power supply with speaker, calibrator- Manual $550. Galaxy GT 550 vox, calibrator-power supply with speaker-Manual $420. All look and perform like new. W5TCJ, D. M. Gallagher, Route 1, Box 338, McAllen TX 78501.

QST's for sale; 1939 to date. Many full years. 40c each ppd. First come first served. W1OP, Box 2903, Providence RI 02908.

SALE: Heath DX100B, SB1Q $120, 6 ft. rack P.S. Linear $50. Wash D.C. area, K4OMS, 361-5836.

COIL set wanted for Millen 90651 grid-dip meter at reasonable cost. Ed Gebelein WIYYY, Harwinton, CT 06790.

CONTACT us for new or reconditioned Collins, Kenwood Tempo-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler MO 64730.

SB-200 linear, mint condition, manual $180 fob. W7JKG, 103 E. Bartlett, Selah WA 98942.

HELP: Parts & equip. needed by High School Radio Club. Send anything!! Triton Regional High, c/o Mr. Freeman, Byfield MA 01922.

WANTED: Swan VFO model 410 with connector for Swan 500. Kent Ravenscroft, W@MU, 15 Brazilian, St. Louis MO 63124.

10 pin edge connector for p.c. board, card mount -- single readout — solder tab contacts. With or without polarizing key (specify) 3 @ $1. Ferroxcube No. 2616CA10003B7 Pot Cores $.75 each — postpaid. Sase for component list. CPO Surplus, Box 189, Braintree MA 02184.

PHOTOGRAPHS. Ham shack and hams, your B & W negative, 8 X 10's $.60 each. K1ZFN Lab, 210 Kulas Road, West Warwick RI 02893.

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. Donald Button, 58 Dale Drive, Chatham NJ 07928. (201) 377-7779.

FOR SALE: Brand new DX-150A with antenna and phones. $69.95. D.P. Terry, PO Box 306, Williston VT 05495.

NOVICE: Heath DX-60B, HG-10B VFO, xtals, HR-10, xtal cal. + HS-24 spkr. $100. Bob Ridpath, 401 Cheswick Rd., Rosemont PA 19010.

SELL: HyGain 153BA 15-meter beam $50, HyGain 12AVQ vertical $20. Both perfect and less than one year old — Heath VF-1 VFO less manual $10. Lyle Bickley, WB4VKW, Box 224, Tuscumbia Al 35674.

SELL: Heathkit DX-60B w/xtals $65, Drake 2C w/2CQ calib $175. Both excellent condx. and factory inspected/aligned. Prefer pick-up deal. Al Stiles, 56 Cambridge Ave., Garden City NY 11530.

HQ-110C with speaker, T-60 xmtr, SWR meter 80-40-6 meter xtals, tape recorder, all manuals. Excellent condition, $190. Will ship. Tommy Young, Box 56, Mt. Hope AL 35651.

SELLING: S-Line Drake 2a, HT-32, HW-16, HA-1 keyer, accessories. Sase for list. John Allen, Bowling Green MO 63334.

FOR SALE: Perfect HT32A, SX101A $175 each or best offer. WB2PMP/1, Tel: (617) 196-0284.

FOR SALE: Heath HM102 SWR meter $22, power meter GM Model 451 $20, Higain vertical all band antenna $45, all for $80. WA1ING, Saunderstown RI 02874.

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.

"SERVICE Manuals most Hammarlund equipment since 1930 $5, each postpaid. Will align your Hammarlund receiver to original specifications. 15 years factory experience. Wayne Cordell, K4HCS, Blue Ridge Communications, RT 3, Weaverville, NC 28787. (704) 645-7070."

Sil Thompson formerly W5BUF — QTH? de W5AAH.

SELL: National NCS-1000 80-10mtr xcvr w/built in 110/220 vac ps, xtal calb, sidetone osc, spkr, RF clipper, xtal xmit osc, SB selector. 1000W SB 1000W CW 500AM. Factory checked & recalb factory carton & manual $550. Also HQ-100 540kHz-30MHz gen cov rcvr w/spkr & man $95. Heath 80-10mtr VF-1 VFO w/man $12. SCR-522 surplus 2mtr am xcvr no p/s w/schematic & conv man $25, Tubes $122s 866s 807s etc. Write me. Going to Australia, must sell, W5RQF, W. Bixler, Box 242, Wisner LA 71378.

SALE: Brand new factory sealed Collins 75S-3B, sells for $1,161. Must sacrifice for $895. Need the money! W5WCB, Berk Davis, P.O. Box 16005, Jackson MS 39206.

SIGNAL/One CX7A new, never used. With tech. manual, CX7S Loudspeaker, CW filter, $1900 firm. Doug Beck, WA6QQI, 925 Redwood Ave., Sunnyvale CA 94086.

SELL: QST's and CQ's most issues 1953 to 1960. Sept. 1941 QST. Very good condx. Walker, 337 Simcox, Wadsworth OH 44281.

WANTED — Teletype FRXD typing or non-typing (Reperf — Dist.) 60 wpm. State cond & price. R. Dellinger, 1807 Brownstone, Apt. 421, Toledo OH 43614.

NOVICE Rig. Drake 2NT NC-183D rcvr, SWR-pwr mtr, key headset, 5xtals, coax $190 fob. J. Thomas 1414 Capetown, Grand Prairie TX 75050.

WANTED: Heathkit Model HA-14 with ac power supply. Will pay top price. Robert A. Harris WA6ZGQ, 5427 E. Buckingham Way, Fresno CA 93727.

FOR SALE: T4X, FR condx $310, SB33 FR condx. $198. Call Jerry (218) 751-3398, write: K6LHN/0, 2301 Birchmont Dr., Bemidji MN 56621.

WANTED: KWM-2, any condition. W2SK, Geo. Conn, 412 Old Boonton Rd, Boonton NJ 07005.

FOR SALE: Heathkit HX-20, pwr supply, excellent $110, Navigator $55, Courier 500 watt linear $80, B & W T-R switch $10. All with manuals. Franklin, 5931 Cherry Loop, Austin TX 78745.

COPY: Mint Heathkits prof wired SB401, SB303, SB220, SB600, SB610, Drake MN2000, Ameco PLF preamp, tymeter clock. First certified check $1600 takes all. WA3LSU, 319 Fawn Hill Lane, Nargerth PA 19072. (215) 667-3985.

DRAKE T4XB, R4B, AC-4, MS-4 $650; Hallicrafters Loudenboomer HT-45 $200; Heath SB 61- $70; SB-630 $55; MP-33 beam. All mint w/manuals. Consider offers. WB4LZK, 2320 N. W. 42 Avenue, Lauderhill Fl, 33313. (305) 731-4229.

TV camera for ATV CCTV. New in carton. All silicon transistorized, plug-in boards, high resolution vidicon, automatic light level control. 75 ohm and channel 5-6 outputs. With 12.5mm wide angle f1.9 lens, coax, TV switcher. Professionally prealigned ready to use. $175. R. Feingold, WA2JCS, 142-44 Bayside Ave., Flushing NY 11354.

JENNINGS Vacuum Variable, about 5 minimum to over 150μμF maximum, 23kV, new $27.50 with end clamps $31.50PPD, WA0TJR, 1490 Yaqui, Florissant MO 63031.

SEND money will ship Heath Twoer $18, Heath S1xer $15, Motorola 4IV 34-94, 94-94 $85. All excellent condition FOB. Des Moines IA 50310 WA0FUH 2200 40th Place.

TRADE 3251 xmtr on R4 HQ215 or 51J rcvr, or Swan 160 xcvr. W5BSU, 1210 So. 93 East, Tulsa OK 74112.

FTds560, CW filter, speaker mint $425; SX-100, speaker immaculate $135. Want HRO-60. W5GXH, 6 Maple St., Bedford MA 01730.

WANTED: Swan 500, New York City vicinity. Arthur Lukach, 295 Fifth Ave., New York City NY 10016.

SELL Apache with D104 mint condition $125. W1ANB, 48 Richmond, Weymouth MA 02188.

KWM-2AC6DC supplies, locking mobile mount, notch filter noise blanker, manuals $795; NC300 $95, free list. Dr. Perera, NYC NY 10025, 410 Riverside Drive.

"DON and Bob" guaranteed buys. Mosley CL33 $124, CL36 $149, MCQ3B quad $91, T-33 $114, HyGain TH6DXX $139, 204BA $129, Hyquad $109, TH3MK3 $114, Ham-M $99, TR-44 $59.95, Belden 8448 rotor cable 10¢/ft, 8314 RG8/U foam 16¢/ft, CDE rotor parts, Gladding 25 $212.50, with AC $255, SBE144 $209, SBE450 (List $399) $339, Mallory 2.5A/100PIV epoxy diode 29¢ Mot MC1709CG op amp TO5 39¢. Write Quote Triex, drake, Eimac, Leader, Clegg FM27B, Calrad, Tempo, Kenwood dealer. Late special: 21AWG hookup wire stranded, 50¢/100ft, $3/1000ft, TDK C60LN cassette $1.49, shipping charges collect, Mastercharge, Bac, warranty guaranteed. Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668.

SELL: Hammarlund SP-600JX-1 with cabinet and manual $200 plus shipping. "Rider (radio) Troubleshooter" volumes VI, VII, IX and XII through SVI $3 each plus shipping. C. Meyers, W3YS, Box 26, White Plains MD 20695.

DRAKE 2-C Calibrator, limiter $185, Johnson Ranger 1 $65. B. W. Looney 10234 Nevada Ave., Chatsworth CA 91311. (213) 341-5531.

BARGAINS: Eico No. 369 Sweep-generator, exc. $55, pair of unused 4X150A's $5 @, cartoned Westinghouse 0-300 V. Ac meter $3.50, Triplett (new) 0-4 RF amps w/bilt-in thermocouple $2.50. Various Klystrons. Sase for goodie listing. Want: Simpson No. 260, Polaroid. Samkofsky 4803 Brenda Drive, Orlando FL 32806.

QST about 125 issues, mostly early 1930's to late 1940's, a few late 1920's. Most with covers. Also pair 813, 832A, WE417A, 2C39WA, 12AP4, bezel, from 1939 TV. Trade, cash or guns. Make offer. Sam Bases, K2IUV, 19 Standish Avenue, Yonkers NY 10710.

WANTED: Good 6146a tubes — W1BB.

"LINEARS: Heath SB-200 $180, Yaesu FL2000B $250, both as new. You pay shipping. Would trade for good SSB Transceiver. James McClure, 3120-C Drake Ave. SW, Huntsville AL 35805. Phone days (205) 881-9561, nites (205) 852-5657."

"MEISSNER — Thordarson signal shifter coils or winding data desperately wanted. Any info greatly appreciated. Unit manufactured in 30's, coils in sets of 3's. Reply postage refunded. K4CFJ, 265 Kenlock, Lexington KY 40503.

FOR SALE: HW-100, SB-600, HP-23A & HM-15 SWR. Package deal, $259. Voice of music Mod. 1530 fm-am/stereo amplifier $100. Darell Heiselman, WA0TCM, Box 426, Holton KS 66436.

NATIONAL NCS-5 MK II rcvr digital readout, 5-bands and NCX-A ac-supply $320 NCL-2000 linear $325. All very nice. Ship anywhere collect. W3FOR D.G. Mello, Arnold MD 21012. (301) 757-4913.

SWAN 500C, 508 VFO, 117XC speaker/power supply for sale. All in excellent condition $550. W8NBO, 2218 River Road, Maumee OH 43537. Phone (419) 893-4095.

LAFAYETTE HA600A AM/CW/SSB Ham Receiver. Brand new condition, $75. You ship. WB2FIF, 303 Franklin Rd., Glassboro NJ 08028.

FOR SALE: Tempo FMP 2M. FM. With accessories $200. WB9IBE, Lee Harvey, 24 Concord, Janesville WI 53545.

WANTED: SB200, clean and reasonably priced. Also TA33-Jr. Beam. Marion Hill, Huxley IA 50124.

MANUALS for most ham gear made since 1950-some earlier $3 up. Send sase for quote. Hobby Industry, WØJJK, Box 864, Council Bluffs IA 51501.

DRAKE R4-B and MS-4 with extra xtals for most SWB. Like new in original cartons. All for $300. Cashiers check or money order. Call (413) 637-1366 eves. Charles Battig 6 Edgewood Drive, Lenox MA 01240.

FOR SALE: Knight T-60 xmtr, $40. Lafayette HA-350 rcvr $55. Hallicrafters HA-5 VFO $35. All in excellent condition, with manuals. You pay shipping. Steve, WA5WFU, 1207 Glencrest Lane, Longview TX 75601. (214) 753-5847.

WANTED: Model 525C freq. converter, 100mc-510mc. For Hewlett Packard 524D converter, state condition and price. W8ZFF, 26544 Sheahan, Dearborn Hgts MI 48127.

CX-7A $1395; 75S-1, W/Q-mult. $275; 32S-3 $475; SB-200, new tubes $180; Cliff-dweller CD-75 $45; Mosley CM-1 rcvr $65; K1VTM. (203) 224-4581.

COLLECTORS item old scanning disk television receiver built from manufactured kit in 1932. Complete with amplifier, Roye Hagerty, Housesdale PA 18431.

EYE-BALL QSL for less than 1c, stop giving away your expensive QSL's, KØOJW, 814 Riderwood, Hazelwood MO 63042.

WANTED: MN-2000, MC-4, MMK-3, Tristao CTL354 Tower, MCQ-3B Mosley Quad. H. Cushing, W6LXZ, 5224 Bobbie Ave., San Jose CA 95130. (408) 379-8562.

TRANSCEIVER Hallicrafter Hurricane SR 2000 with P.S. 2000 watts pip like new about $600. W2NHB — 67 Hunton St., Staten Island NY 10304.

HALLICRAFTERS SX-117, HT-44, PS-150-120 AC-supply $375, 75A2 $150. You ship. Mike Dopec, K8TLX, O-1223 North White St., Grand Rapids MI 49504.

FOR SALE: Swan 500C, 117XC power supply, 508 VFO $470. All units in very good condition. W.J. Mercer, 1075 Second, Troy MO 63379. WA0HKF.

SELL Apache DowKey Relay, Drake Low Pass Filter. All $80. Ken Cossette, 1613 Glenbrook, Irving TX 75061.

SELL: Heath DX-60A transmitter, HG-10B VFO, Lafayette HA-350 receiver. All cables and T-R switch, all for $150. Perfect for new novice rules. Mike, WA2IMC, 248 Bay Avenue, Patchogue NY 11772. Landline (516) 475-8454.

FOR SALE: Hammarlund HQ-215 solid-state receiver, with matching speaker. Excellent $260. Pick up only. J. Yoseloff, 14 Burlington Lane, East Brunswick NJ 08816.

HEATHKIT SB-303, cw filter $275; SB-650 digital display $150. Both mint, factory aligned 12/72. Both $400. K8PRZ/9, 683 Cherry, Lake Forest IL 60045.

WANTED: Collins mechanical filters for 75A4 — F455J-05, F455J-08, and F455J-21. J. S. Rosko, 901 Sixth St. SW, Apt. 217A, Washington DC 20024.

"WHAT am I offered for my almost complete back issue files QST since 1946 and CQ since 1948-write W8CIQ, 7750 Tecumseh Trail, Cincinnati OH 45243."

HYGAIN 3-element 20M monobander. Excellent pickup only, $60. WA2REQ (212) 763-8726.

HEATHKIT SB-300 & SB-401, all filters, mike, cables, manuals. Recently factory aligned. Mint cond. $500; Ten-Tec PM2B, new $60. WBØDHF, Mark Starkebaum, Box 297, Gunnison CO 81230. Phone 1-641-0460.

GPR-90 Receiver by Technical Materiel with manual. Too big for my shack. Too heavy to ship. Pick up or deal on delivery. Best offer. Frank Phillips, Box 183, Pittsford VT 05763. (802) 483-2294.

"WANTED, vernier dial or gearing for 75A4 knob, also repairable Eico 753 tribander. Sell twenty years QST, CQ magazines and excess gear and parts. Gene Hubbell, W7DI, 6633 E. Palo Verde, Scottsdale AZ 85253.

SELL: NCS-5 w/ac $200, Heath HP-23 ac $25, Alliance Tenna Rotor $25, Turner 454C mike $10, also have key, cables, Fall 1970 DX Callbook. Dave Wright, WA2FUA, P.O. 6375, U. of Rochester, Rochester NY 14627.

CRYSTALS Airmailed: Novice, Nets, MARS — Novice: All new and old frequencies, rock solid crystal signals, economical. Active FT-243, five/order, 40M-15M-10M — 99c each. 80M $1.50 Mix OK. Under five $1.50, 80M $1.75 each. Novice band calibrators: Two/band for QSO and edge markers, 40M-15M-10M $4.70, 80M $3.50. General purpose: FT-243, .01% 32pF, 3500-8600 $1.90 each (five $1.75), nets $1.45, 1700-3499, 9601-13000 fundamentals, 10,000-30,000 overtones $2.95. 50c each for .005%, 75c for HC-6/u above 2000. Free order listings. Bob Woods W0LPS. Since 1933. CW crystals, Marshfield MO 65706.

SALE: Solid oak speaker enclosure set, shelf size unfinished. Sase 2613 Mural Drive, Chamblee GA 30341.

SELL: Collins KWM-2 power supply and 30K-1 excellent condition. Pkg. deal, no trades, $925. WA4BJW, 4511A Patton Rd, Huntsville AL 35805.

ELCO 753 SSB transceiver and ac-power supply with manuals $140. James W. Collier, 3932 Sawtelle Blvd., Apt. 6, Los Angeles 90066. (213) 390-2790.

SB301 excellent condition with cw filter $180, 1938 to 1970 QST $50 or best offer. W9UDK, George Zurbuchen, 13631 S. Elm St., Orland Park IL 60462.

DRAKE TR-4, MS-4 and Waters No. 3001 phone patch & compreamp. Equipment in use now. WA1IVH, Steven Sayles, South Plains Rd., Litchfield CT 06759.

NC-303 $180; SX-111 with speaker $120; firm — both with manuals in excellent condition. WA2ZGE, Norm Palmer, 18 Turner Street, Eatontown NJ 07724. (201) 542-1504.

SELLING radio estate of the late W5SHX. 75S1, 32-S1, power supply, NCX-3, HW-12, SB-200 linear. Make us an offer. Hays Snead, W5RY, 4049 Berkley Drive, Jackson MS 39211.

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WANTED: RA-74 or RA84 series power supply working condition or better. H. Moorehouse KL7GMX, Box 92, Galena AK 99741.

WANT inexpensive Drake RV4 and Ham M Rotor. Edgar Semal, 10827 Vanderford, Houston TX 77072.

KELLOGG 401 tube or similar wanted for my collection. Also Daven MU20 or MU6. Walter Lehnert, 5209 Minnehaha Blvd., Minneapolis MN 55424.

"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! New Galaxy GT-550A transceiver, factory sealed carton, reg. $595, cash price $389; New Rohn 50 ft. foldover tower, prepaid $239; New Mosley CL-33 and demo Ham-M rotor $215; Factory authorized dealer for the new Drake, Collins, Hallicrafters, Regency, and others: write for quote! New Drake TR-4 transceiver $495; Used equipment: Demonstrator L4-B linear with warranty $549; R4-B $349; T4-XB $375; Ham-M $85; 2B $175. Moory Electronics Co. P.O. Box 506, DeWitt AR 72042. Tel: (501) 946-2820.

WANT to buy all band transceiver with matching ac, any kind just so is clean and priced right. Sell mint Hammarlund 2-meter fm transceiver with built-in ac and dc, 35-wattout, also have matching Hammarlund Linear 150-wattout both for $250, or trade for Heath counter ans sealer. Richard Schark, 417 North Perry, Ottumwa IA 52501. Phone (515) 682-5741.

SELL: Mint TR4 (under warranty) $450, Heath Twoer $35, Johnson 275-watt matchbox $40, Elmex CB antenna new $20, VM tape recorder $55. WB9BQV (312) 969-3883.

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ANTIQUE radio tubes, Type 01A, unused, $5 each, postpaid. Limited quantity. Stephens Stamp Co., Box 587A, Botsford CT 06404.

QST collection for sale, essentially complete 1964 through 1970. Also more than 90 issues of CQ magazine for period '53-'69. All issues loose, no binders. Your best offer? Jerry Hall, K1PLP, 181 Brimfield Rd., Wethersfield CT 06109.

HEATH SB-300, SB-401, SB-200, SB-620, SB-630, SB-600. All below kit price. 50' Aluminum Tower, TR-44, Mosely Quar, *misc. Mint condition. Manuals and connecting cables. Will ship.* Send or call for prices and picture. John G. Mathias W9FMW, 721 S. Meadow Road, Evansville IN 47715. Area Code (812) 477-2516.

HEATH HW-100 transceiver with HP-23A ac-power supply, $235. Heath SB-200 linear, $205. Drake TR-22 fm transceiver with following xtals supplied: 34-94, 94-94, 16-76, 13-73, 46-46, $200. Pick-up or shipping charges extra. WA3IID, 2405 Greendale Road, Wilmington DE 19810.

DRAKE TR4, factory installed blanker, RV4, AC4, absolutely new, perfect condition $685. 4CX1500B $65, Yaesu FT101 $500, new Collins SM1 $28. Postpaid selling much miscellaneous. Send sase. K8YVA, 2901 Cricket Lane, Wichliffe OH 44092.

SELLING out complete Heath SB-line. Includes 303, 401, 200 and much more. Sacrifice prices. Call or write for inventory. James Summers, W5MVP, 915 Cerrillos Road, Santa Fe NM 87501. (505) 988-3776.

SWAN 500CX with SS-16 filter, 117XC power supply, VX-2 vox, and 508 remote VFO. One year old, $525 takes all. WA8KBL, Paul Lange, 715 W. Jackson, Flint MI 48504 (313) 238-5939.

COLLINS S/line 32S-2 mint condition $350. Same circuit as 32S-1, except has auxiliary band switch with double crystal bank. Luther Lester, W5MIR, 3347 East Virgin Street, Tulsa OK 74115.

WANTED: Kilowatt linear for 80-10 meters. Send particulars (condition, price, delivery). Sell¾ Johnson Challenger $45, Heath HG-10 VFO $25. Both for $60. WA1LZA, 79 South Rd., Bedford MA 01730.

JOHNSON SSB adapter W/PS $139, Collins 75A1 receiver $145, National *NCL 2000 $325, HQ170 $150, HT32 $175, HT37* $145, HW16 $90, Drake TR3 AC4 $385, Drake RV3 $48, Johnson KW Matchbox, W/SWR $120. John Kakstys, 18 Hillcrest Ter., Linden NJ 07036.

DRAKE r-4B, T-4XB, AC-4, MS-4 patch cords and manuals, new condx. $750. FOB origin. Ken Booher, 1421 Williamsburg Rd., Flint MI 48507.

GOOD Bandit 2000B linear $200, or trade for receiver. K4ENP, N. R. Thornton, 58 Ft. King Hwy., Zephyrhills FL 33599.

SB-220 amplifier, new, immaculate $375 FOB. Certified check, money order. Grady Waggener, 514 Tidecrest, San Antonio TX 78239 (512) 655-8111.

SELL Motorola portable test set TU546. Excellent condition, complete $150. WA6EDQ, 19725 Ave. 300, Exeter CA 93221.

WANTED: 2k pep linear SB220 or equivalent. K6HER, 575 Grand Ave., Colton CA 92324.

WANTED: 9 MHz SSB crystal filter. Jim Davey, WA8NLC, 1801-E Woodmar, Houghton MI 49931.

WANTED: Johnson T-R switches 250-39, A-1 condx, top dollar & shipping. WA8SRM, 6958 Burnly, Garden City MI 48135.

HAVE RCA WO-88A Oscilloscope; precision E-400 Sweep Generator; Hallicrafters SX-110 Receiver. All excellent condition. Will trade for all-band linear amplifier with power supply. Lester Spear, Box 501, Lincoln AR 72744.

SELL Kenwood (trio) R-599 w/50 & 144 Mc preamps, T-599 w/MC-50 dynamic mike, SP-599 spkr., two months old original cartons $650 total. Sell Yaesu FT-200 w/AC supply-spkr. plus DC supply. Excellent condition complete $375. W7UR, Tel: (503) 643-1460.

"CW tape — Wheatstone perforator, Boehme keyer, power supplies, manuals, blank tape; sell $450. Transmitter-Technical Radio Co. Model T350-XM, 2-20 mo., 600 watts cw-am, many spare parts, 1945 classic construction; sell $750. Huntley, W6RNC P.O. Box 558, Berkeley CA 94701.

SELL like new: Swan 500C $329; 117XC A/C supply $70; Swan 350 $229; Hallicrafter PS-150-12 $55; MR 150 rack $14. W9HF, 5005 Indiana, Ft. Wayne IN 46807.

SPECTRA-Physics Model 112 gas laser and other used laser and optical equipment for sale. Details. Jesse Carr, 4588 Mimosa Street, Baton Rouge LA 70808.

SELL: Mint SSB receiver. Circuit similar to 75S1. Designer W8MQU, author "Electronic Construction Practices." $150. K7YBF, 1325 Avenida Regulo, Tucson AZ 85710.

WANTED: Used Bibroplex mechanical key in good condition. Robert Cox, 215 River Court, Jensen Beach FL 33457.

HEATHKIT HW-12, HP-23, HRA-10-1 Calibrator, GH-12A Microphone, good condition. All manuals. $92.50, FOB Blair Tubes, WA3BSV, 532 Locust, Hazleton PA 18201.

FOR sale or trade in very good condition Model 19 teletype with extra Model 14 TD and Model 14 typing reperforator. Also Model 15 teletype average condition. Gonset GSB 100 transmitter, good condition but needs filter capacitor and dial cord. Pickup or local delivery preferred. Want SSB for all or part. Can add cash with partial trade. Would consider photographic equipment in trade. Frank Hope, K5CEF, 13627 Rolling Hills Lane, Dallas TX 75240. (214) 233-3876.

FOR sale: PMR-8, AF-68, M-1070 (6, 12, 110-volt power supply) — $100. DX-35 and VF-1 — $25. 6-meter halo — $5. Lafayette 6-meter transceiver HE-35 — $20. All in excellent condition. W3DLW, Warren Isman; 12912 Twinbrook Pkwy; Rockville MD 20851.

SELL: Drake R4A, T4X, MS4, & AC3, complete in original cartons, excellent, $600, Motorola 80-D 150 MHz. Draw, $50. QST back to 1923, $5 per year. W2AAF, 20 Midwood, Stonybrook NY 11790. (516) 751-8236.

SELL: Heathkit HX-30 $105; Vanguard 2 mtr converter $20, 432 MHz varactor trplr $10, all good cond. FOB K2ARO, Edns Drive., Hyde Park NY 12538.

SELL: Heath HW-32A, xtal calib, mint $90, RME Model 4300 ham band receiver, speaker $35. K3RWU, M. Davis, 1521 Pennsylvania Ave., Paoli PA 19301.

WANTED: Radio control outfit, four channel 53 mc. Boye Hagerty, Honesdale PA 18431.

SELL: HT-37 $120, 2-B with 2BQ & 2BC $150, both with manuals, good condition. You pay shipping. WB4PLI, 1837 Flintwood Rd., Macon GA 31201.

SELL: Hallicrafters SR-400 xcvr and ac-supply. Best offer. Mint John WA0MMT, 1130 Oak St., Fargo ND 58102 (701) 232-1668.

SALE: HW-16 $80, Johnson Pacemaker $125, plus shipping. Buy T4XB, AC4 Widmann, Main St., Kirkville NY 13082.

SALE: Heath HW-12A, HP-13, HW-32A, Linear systems 350-12 dc supply, best offer. Drake TR-4, less N.B. near-new $400. All excellent. WB2STM, 118 Torrance Pl., Gowanda NY 14070. Te (716) 532-2608.

HAM Radio Counsellor for Boy's Summer Camp in Maine. Camp *Cedar 1758 Beacon Street, Brookline MA 02146.*

WANTED: tubes, transistors, equipment, what have you? Bernard Goldstein, W2MNP, Box 257, Canal Station, New York, NY 10013.

SOS Mayday CQD: Have old Collins 32V-2 Model amateur transmitter with power transformer missing. Need used or faulty transformer to rewind, primary 115-volt, secondary side 850-V CT No. 25-Volt 4 Amp No. 3 5-Volt 4 Amp No. 4 6.3-Volt 9 Amp 60 cycle small space. Any suggestions for solid state diagram etc. will be appreciated. Will pay for same. Want to get back on air soon as possible so please help write Collins out of stock. A. K. Green, W5GAJ, P.O. Box 901, Brookhaven MS 39601.

SENECA VHF-1, 2 and 6-meter $119.95. Wanted Ameco CH220, $20, W6RQZ, 1330 Curtis, Berkeley CA 94702 (415) 526-7345.

GE-TI table-top base station. Hi-band, very clean, plus 2-transistorized 30W TPL mobiles complete w/new 3dB ants, plus split mount kids, one unit is channelguard, other is 2 freq. xmt-rcv. New 3dB base ant. Several AC lo-band monitor revrs complete on 39.42, GE-Prog. line lo-band portable, solid state revr, xmtr complete but never checked $50, 2-clean 30-50 MC T51GGV mobiles w/accessories & new antennas, checked out. Any reasonable offer all or part. Need 500 kc 2.1 mechanical filter. Diesel pwr-plant, 17-1/2 kW 110/220, fully metered, automatic shutdown case of failure. Like new, 1200 RPM industrial unit, perfect for BC stn standby. W9DSV, Bx 87, Webster WI 54893.

WANTED: Electronic Instructor, minimum 20, General, theory, workshops science camp, Lake Placid NY. Write: Eppstein, 4B Westend Ave., New York NY 10024.

HAM with general class license, high school graduate minimum. To teach radio to campers at outstanding co-ed camp. Write for application to New Jersey YMHA-YWHA Camps, 589 Central Avenue, East Orange NJ 07018. Phone: (201) 673-7070.

COUNSELLOR: Penna. Brother-Sister Camp seeks ham radio college man with a General License. David Blumstein, 1410 East 24 St., Brooklyn NY 11210.

HEATH HA10-1000-watt linear and external coax relay, mint condition $160. Schwarta, 1183 Southeast St., Amherst MA 01002.

FOR SALE: Telrex 4-element-wide spaced 20-meter monobander, $250. Irving Glassman, M.D. K1SEO 186 Sherman Avenue, New Haven CT 06511.

HW100 with Swan dial and 6M rec. mod, HP23A, TA31 Tri-Bander, EV719 Mic. All in excellent condition. Must sell complete station for only $250. David Reeder, WA1HCE, 40 Meadowbrook Rd., Carlisle MA 01741 (617) 369-5327.

SELL Heathkit DX-60 $50, with VFO HG-10 $30. Both with manuals. Kenwood R-599 Receiver with manual and factory carton, mint $300. Ed Jerome, 1832 So. 50th, Lincoln NB 68506. (402) 488-0077.

SELL: Drake TR4, AC4, new condition. Used only few hours $450. Tektronix 310 3" 5Mc scope, excellent condition $200. K2APL, Stan Buckwalter, 139-18 Pershing Crescent, Briarwood Queens NY 11435. (212) 297-7525.

AUDIO level meter — Weston Type 301 meter — 10/0 +6 dB scale, panel mounted with switch and resistor network in mahogany case. Provides -10 to +40 dB readings $25. F. Thiede, W2EC, 8 Nathan Hale Dr., Setauket NY 11733.

COLLINS KWM-1 with Noise Blanker and Ac supply. Sell or swap for all band rig. Peter Brandenberg K2MMT, 43 Canterbury Road, White Plains NY 10607. 946-8253.

HEATH — SB-303 (cw filter) $295, SB-401 (crystal pack) $275, SB-600 $75, SB-600 $15, all mint. Mike, (215) RA2-8863, 917 Glenview St., Phila. PA 19111.

TELETYPE — Model 19, good condition $50. You pick up. Francis Sutton, W3SNN, 1018 Club Drive, Johnstown PA 15905.

75A-4 $295, KWS-1 $495, excellent. Jack, WA6ZML, 1204 Lanterman Lane, LaCanada CA 91011. Tel: (213) 790-1300.

WANTED: Hallicrafters ST-42. Charles Crothers, 60 Meriam St., Lexington MA 02173.

BEAM headings computed for your exact QTH! Azimuthal bearings covering all world's callsign areas giving prefix, time difference, exact return bearings, distance (choose miles or kilometers). $4.95 price includes surface postpaid; airmail add cost of 3 ounces. If latitude, longitude not given add 50c location fee; for double U.S. coverage add 50c. Montgomery Geodetic Services, 26 North Summit, Gaithersburg MD 20760.

HEATHKIT SB-101, HP-23, GH-12 $300. SB-301 $180. WB6SCM, 656 High, Santa Cruz CA 95060.

MOTOROLA: T53GAD unconverted with accessories $65, transmitter and receiver strip from above $25 each, 60-watt dynamotor $3, TR22 with eveready nicads rubber wipe, 6 channels $225. Pick up or you ship. WA2VLF, David Kuramer, 1570 Schenectady Ave, Brooklyn NY 11234. (212) 253-0524.

SALE: brand new, full warranty SR400 $497, HA20 $149, PS500AC $97.50, MR400 $67.50, used Collins 75A3 spkr. 800 & 3.1 filters all for $175, 32V3 $100, HR2 $150, SX101 $100, Longs Elect., Box 6742, Bham, Al 35210.

WANTED Drake TR6 — please state serial number, age, condition, accessories, asking price, preferred shipping method, phone number, etc, in a letter to WA2PGI, 52 Hanes Street, Albany NY 12203.

SELL: Estate W8LRJ. Collins station 75S-1, 32S-1, 32L-1, 312B-4, 312B-5, manuals and instruction book, mint condition complete $1570 or best offer. NCX-3 and NCXA supply, mint condition $400 or best offer. QSTs 1933-1971; CQs 1945-1968; 73s 1963-1967; Radios 1936-1941. Other test equipment. Inquire: W9CI, 527 Spring Creek Rd., Washington IL 61571.

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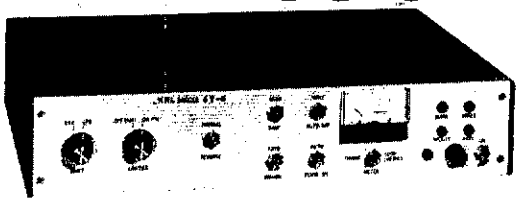

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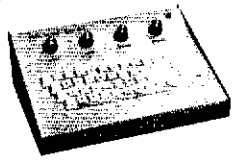

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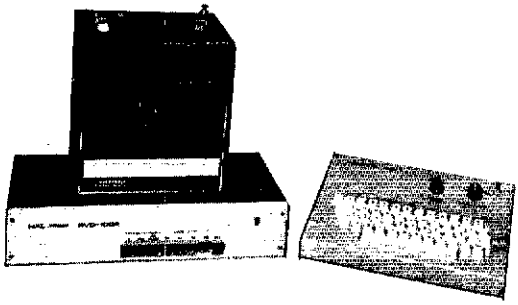

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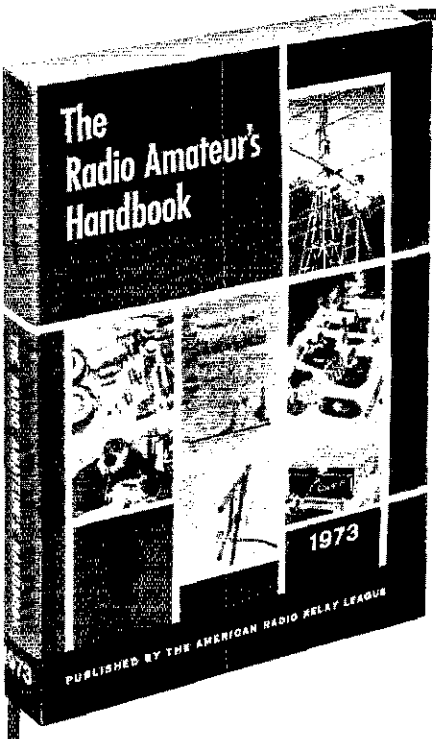

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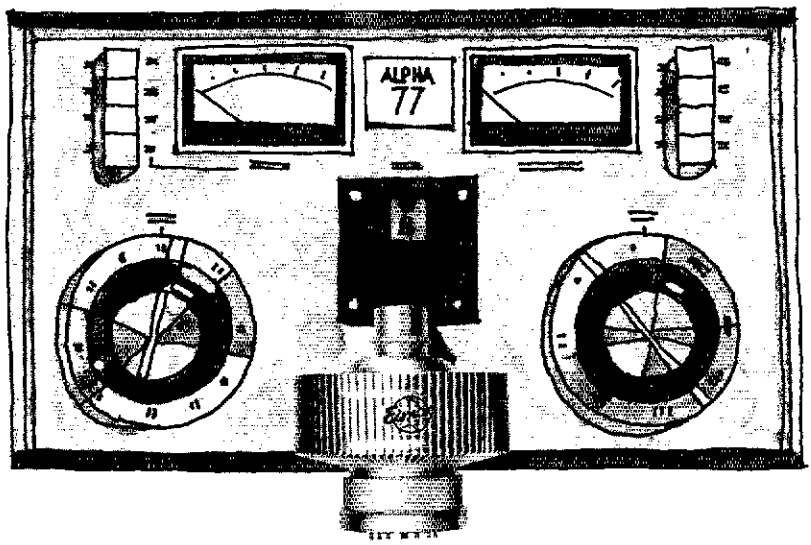

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No corners were cut in designing the rugged Alpha 77 amplifier. Rated for continuous commercial service, it loafs along at the maximum legal amateur power limit.

And, no corners were cut in designing EIMAC's air-cooled 8877 ceramic/metal, high-mu triode, the Alpha 77 power tube. The 8877 is conservatively rated at 1500 watts plate dissipation up to 250 MHz and requires less than 65 watts PEP drive signal for the legal power input limit. This impressive power gain is achieved with 3rd order intermodulation distortion products −38 decibels below one tone of a two equal-tone drive signal.

This compact, rugged, high-mu power triode has a maximum plate voltage rating of 4000 and a maximum plate current rating of one ampere in commercial service. While the 8877 is primarily designed for superlative linear amplifier service demanding low intermodulation distortion, its high efficiency also permits excellent operation as a class C power amplifier, oscillator, or as a plate modulated amplifier. The zero bias characteristic is useful for these services, as plate dissipation is held to a safe level if drive power fails, up to a plate potential of 3 kV.

The Alpha 77 is the ultimate power amplifier for the 70's. That's proven by the choice of the 8877, another example of EIMAC's ability to provide tomorrow's tubes today. For additional information on this tube or other products, contact EIMAC Division of Varian, 301 Industrial Way, San Carlos, California 94070. Phone (415) 592-1221. Or contact any of the more than 30 Varian/EIMAC Electron Tube and Device Group Sales Offices throughout the world.

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