

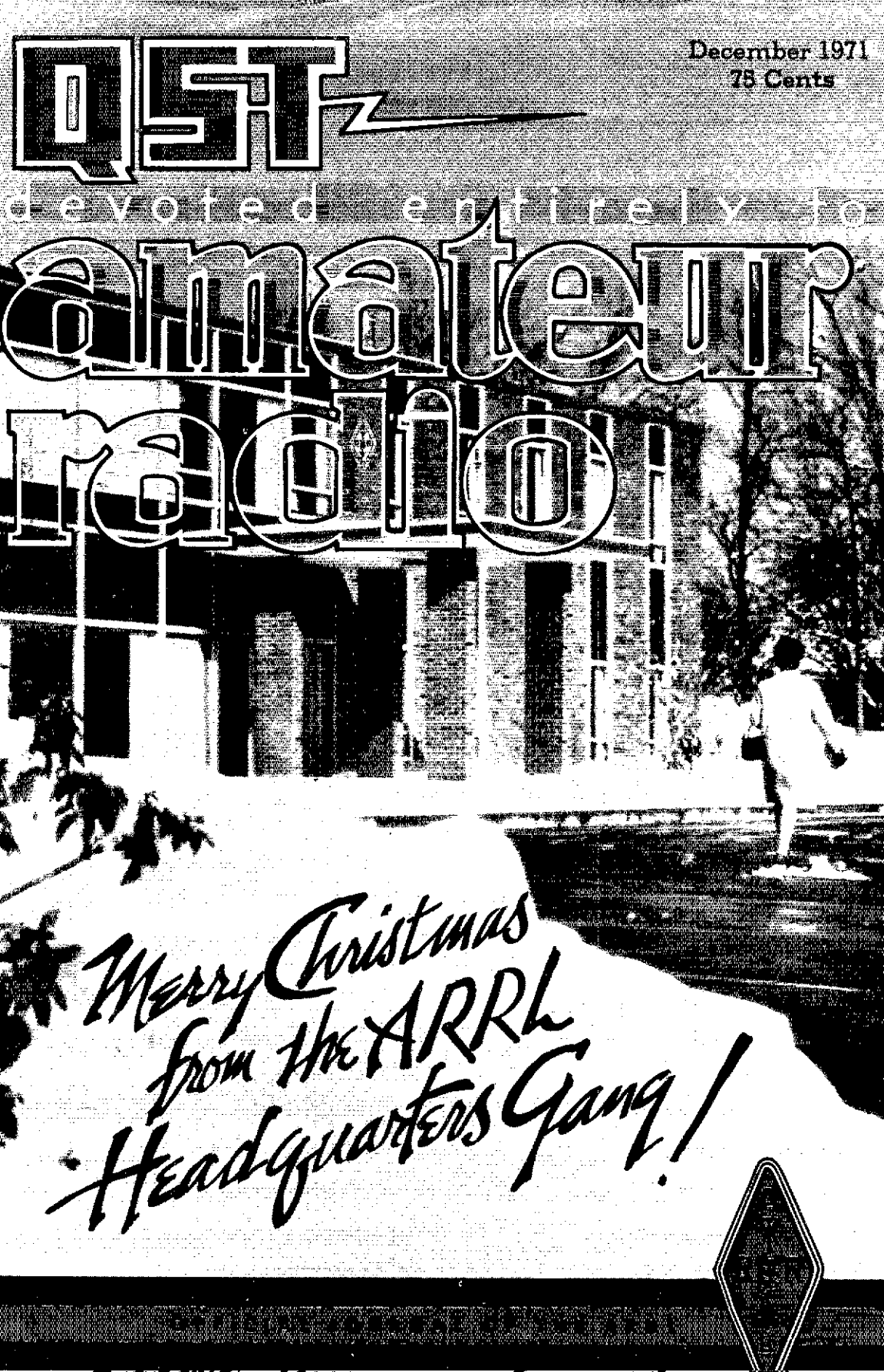
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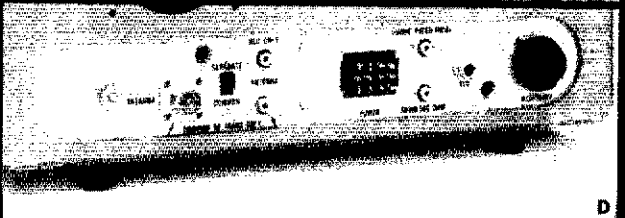
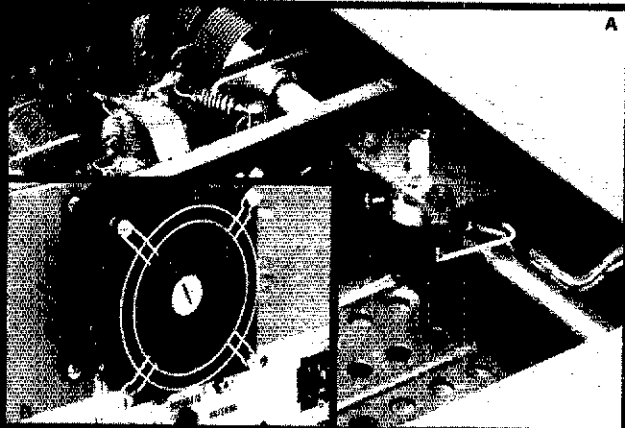
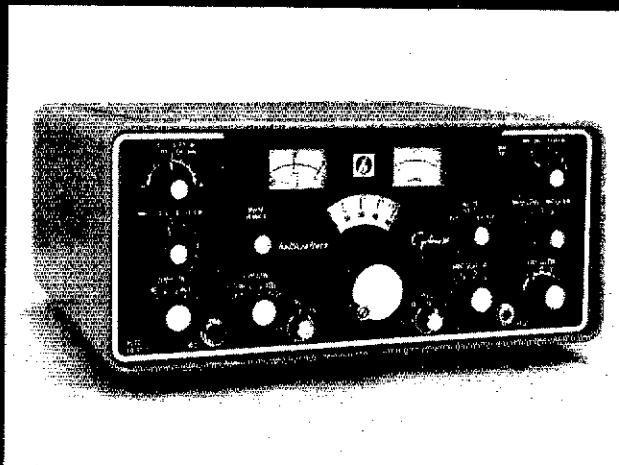
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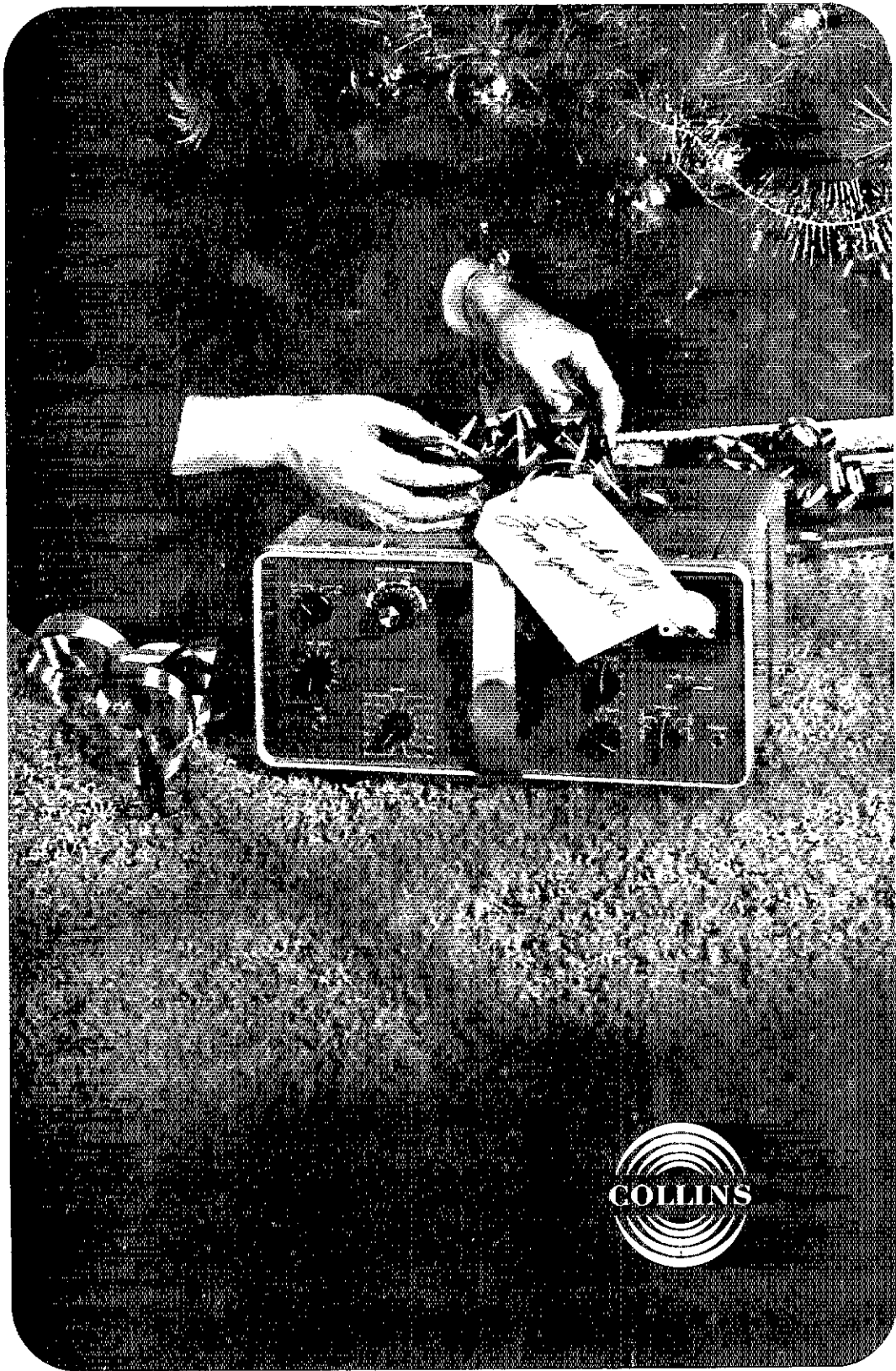
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OUR COVER
As it says,
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from the
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QST

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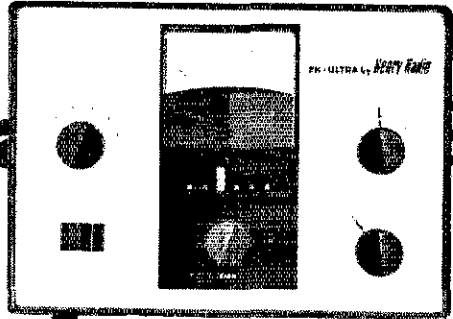


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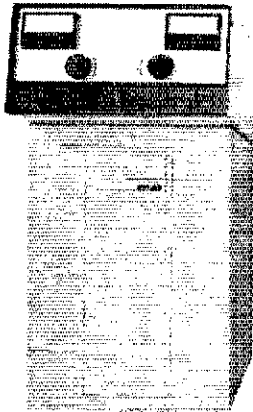


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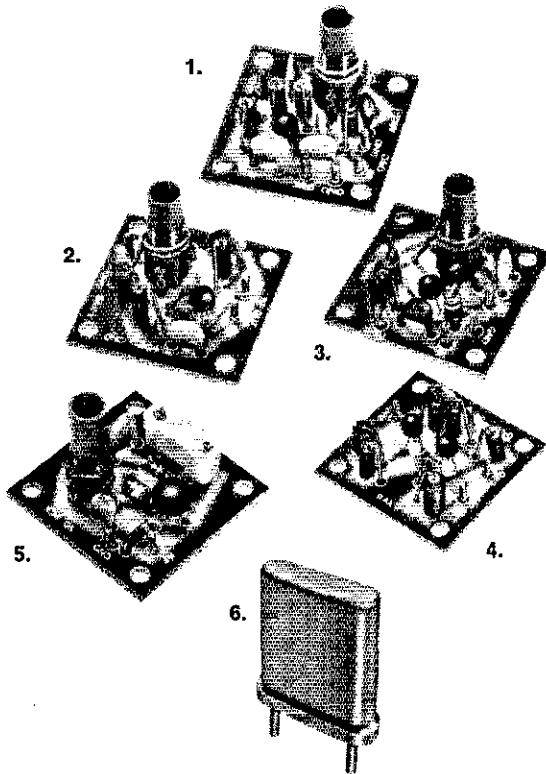
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* Member Executive Committee

"It Seems to Us..."

TRANSATLANTICS - 1921



A YEAR AFTER the end of World War I, when ARRL finally broke the Navy ban on private communications, amateurs came back on the air with a bang. As gear was reassembled, or newly installed, manufacturers were hard put to supply apparatus fast enough. There was strong rivalry between old-time spark and the newer tube (cw) modes. Message-relaying across the continent became an every night occurrence, often beating the commercial services in elapsed time. Always questing for greater and greater distances, hams talked of spanning the continent - maybe even getting a signal across the ocean, as some visionaries (including Hiram Percy Maxim) had earlier dared to predict.

Among various efforts, one initiated by Milton B. Sleeper was destined to succeed. Editor of *Everyday Engineering*, in 1920 he proposed in the magazine a system of tests in which U.S. hams would fire up their gear on prearranged schedules, with British amateurs straining their ears to catch the signals. Unfortunately, the magazine suddenly folded. Sleeper appealed to ARRL not to let his scheme die. The request to take over the project was granted, but the tests flopped - perhaps because of the last-minute switch of responsibility.

Yet the objective seemed within reach; ship operators in European waters had occasionally heard what they believed were weak ham signals. So a second set of tests was set up by the League, announced in September, 1921, *QST* and scheduled for early December. Part of the organized project included preliminary domestic tests early in November. Any amateur was eligible to enter, and if he could prove his station's transmissions were heard at least 1,000 miles away, he qualified for the "finals." Of 78 attempts, about 27 made the grade. They were issued individual sealed instructions with 5-letter cipher groups, known only to ARRL and to Philip Coursey, assistant editor of London's *Radio Review*, who coordinated British participation.

At our first national convention, held in Chicago that autumn, ARRL Traffic (Communications) Manager Fred Schnell, now W4CF, proposed that the League send a qualified American ham overseas to listen for our stations on American gear, to supplement efforts of British amateurs. The idea was approved and funds provided by the

Board of Direction. There was immediate agreement on the choice of Paul F. Godley, originator of the three-circuit tuner for amateurs and the best available authority on receiving.

After several days in London, Godley found the city location unsuitable (noise, smog) and chose to move to Ardrossan, Scotland - where in cold, rainy weather he and a couple of British assistants (one held the required receiving license) set up tents, a stove, tables assembled from boards, and the gear - a Paragon receiver of Paul's special design, and a superhet with 100 kc. i-f. The antenna was designed by H. H. Beverage, an RCA engineer; it was a 1300-foot-long wire, strung on a line of poles 12 feet high extending toward the ocean, and grounded at the far end through a resistor.

For ten chilly, rainy days and nights, Paul Godley and an observer/assistant, Mr. Pearson, huddled over their gear in that dreary tent, carefully tuning and listening for DX signals. The stateside schedule called for ten periods of 15 minutes each, occupying 7 to 9:30 P.M. our time, as a nightly free-for-all, used in rotation by amateurs in the nine call districts and Canada. The remainder of the night was reserved, also on a detailed schedule, for the varsity squad of qualifiers to fire up, transmitting singly or in pairs.

More than 30 U.S. and Canadian call signs were in Godley's log at the end of the project. For one thing, the tests proved that the 200-meter wavelength was not the vast wasteland the commercials and long-hair scientists had thought, when it could support 3500-mile communication with the limited amateur power of one kilowatt. From our point of view, the real message came from a tabulation by modes of stations heard - nine spark transmitters, but *eighteen* cw rigs. The superiority of tube transmission was affirmed, and spark, with all its glamour and glory, was on its way out. And amateur thought turned toward *two-way* contact across the ocean.

On this page we have hit only the highlights. A more detailed recounting of the event, compiled by W3CU, begins on page 54, preceded by some fascinating reminiscing by Paul himself.

League Lines . . .

A revised directory of repeaters, to include extensive material gathered by the VHF Repeater Advisory Committee, is in process and should be ready by the time you receive this issue. Send us a #10 or larger self-addressed envelope with (it's a big one!) 24 cents postage.

More than 20 members of a CB club in Des Moines were indicted by a federal grand jury for extensive violations of FCC rules. Such scofflaw activity is duplicated nationally hundreds of times, but it is seldom the authorities are equipped, or inspired, to take such drastic action. If there were more prosecution, the claimed need for additional CB channels would likely fall apart.

An informal "hand plan" for 420 MHz has been fairly well observed for some years by users of various modes of emission, but with the international conference designation of a satellite subband, a new look becomes necessary. See "World Above" this month for some comment; then let us know your views.

The Callbook is switching to one major volume per year, the first under the new system being the Winter edition, which you should find in the stores now. Quarterly supplements will be published, by subscription only, containing new licensees, address and call sign changes, etc.

With dock strikes first on the West Coast and later on the East and Gulf Coasts, bulk surface mail (including QSL cards being shipped between bureaus overseas and ours here) has been tied up. Thus, if your QSL input through the bureau has dropped sharply in the past three months or so, mail delays are probably at fault, rather than your volunteer QSL bureau. And when the logjam does break, the bureaus likely will be overloaded for a time -- patience, please!

An anonymous note to Hq. included the remarks, "Your restrictive policies and lack of reasonable leadership . . . have contributed to the steady decrease in licensed hams." The sender is entitled to his opinion, but not to spreading of misinformation: there has been no decrease in the ham license total, and it is currently the highest in our history.

Help us to help you -- please put each separate question area for League Hq. on a separate piece of paper. This way less delay will occur in getting answers, and there's less danger that a "P.S." for another department will be overlooked.

If you missed it last year, try our "straight key" night party on New Year's Eve. See "Operating Events" this issue for details.

Meanwhile, with the passage of another year, our sincere wishes for a Merry Christmas and a Happy and Rewarding 1972 from the Hq. crew, which includes:

Roland B. Bourne	W1ANA	Murray Powell	W1QIS
Doug DeMaw	W1CER	R. L. Baldwin	W1RU
Jean DeMaw	W1CKK	John Huntoon	W1RW
Laird Campbell	W1CUT	Tom McMullen	W1SL
R. L. White	W1CW	Perry F. Williams	W1UED
George Grammer	W1DF	C. R. Bender	W1WPR
Bob Myers	W1FBY	Ellen White	W1YL
Mark Dane	W1FXJ	Tony Dorbuck	W1YNC
E. P. Tilton	W1HDQ	Bill Dunkerley	WA2INB
Lewis G. McCoy	W1ICP	Morgan Godwin	W4WFL
J. A. Moskey	W1JMY	Louise Moreau	WB6BBO
Doug Blakeslee	W1KLK	John Troster	W6ISQ
Al Noone	W1KOM	Frank Connelly	WA7GWL
George Hart	W1NJM	Rick Niswander	WA8VRB
A. M. Wilson	W1NPG	Rod Newkirk	W9BRD
Walter Wooten	W1NIH	Bill Smith	K0CER
Ramona Williams	WN1OGW	John Nelson	W0DRE
Liliana Vitols	WN1OYD	Maxim Memorial Station	W1AW
Jerry Hall	K1PLP	ARRL Hq. Operators Club	W1INF

A 15-Watt-Output Solid-State Linear Amplifier for 3.5 to 30 MHz

BY BEN LOWE,* K4VOW/WASUVM

SOME ARTICLES have been written on the design and construction of solid-state, single-sideband exciters. But when it comes to the final amplifier stage for solid-state transmitters, either a vacuum tube or a low-power (1 to 2 watts), Class A solid-state circuit has been employed.

In this article a 15-watt solid-state linear amplifier for 3.5 to 30 MHz is described. A filter at the amplifier output attenuates the harmonic energy. With the proper filter in place, no tuning is necessary for complete coverage of each band. The circuit utilizes two transistors that are available surplus for \$2.99 each.¹ The amplifier delivers 15-watts peak power for ssb operation, or 15 watts on cw. The collector efficiency from 3.5 to 30 MHz is no lower than 50 percent, but is approximately 57 percent on 80 meters. Intermodulation distortion products for a two-tone test signal are down 30 dB from pep at all frequencies of operation (see Fig. 5). The minimum amplifier gain is 16 dB. A maximum power of 375 mW is required to drive the amplifier to 15-watts output. This excitation power is easily obtainable with a Class A driver.

Circuit Description

A push-pull amplifier circuit is employed with suitable forward base bias to eliminate cross-over distortion (see Fig. 1). The input and output transformers are designed to match the base

impedance to a 50-ohm input impedance, and the collector load impedance to the 50-ohm output impedance. Since the gain of the transistors decreases as the frequency of operation increases, a compensating network is placed at the amplifier input to attenuate the drive to the transistors as the operating frequency is lowered. The maximum SWR looking into the compensating circuit is 1.2:1, providing a constant 50-ohm load for the exciter.

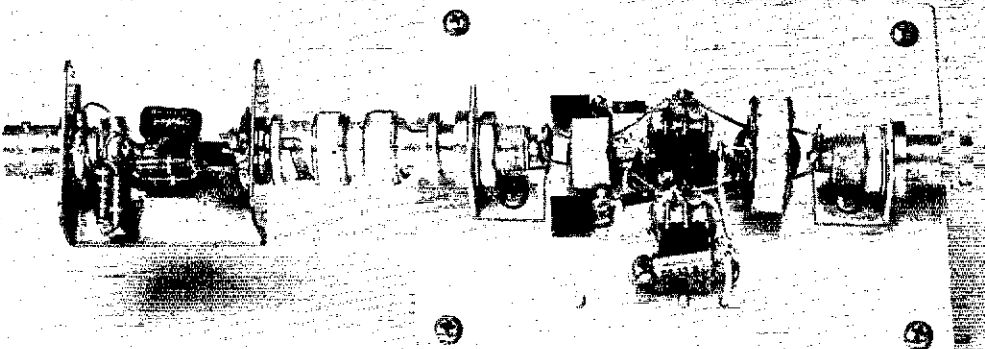
In a push-pull circuit there is inherent cancelation of the even harmonics. Laboratory measurements for the circuit in Fig. 1 show that all harmonics are in excess of 20 dB below the fundamental signal. This figure is not acceptable for harmonic rejection, so a low-pass filter design (Fig. 2) is shown that does provide sufficient attenuation of the harmonics. As long as the filter output is terminated by a 50-ohm load, the filter input looks like 50-ohms below the filter cutoff frequency. No tuning is necessary when changing frequency within any given band. A bank of four filters can be constructed to cover the 80- through 10-meter ham bands. (Only one filter is needed for both the 10- and 15-meter bands.) Band changing is accomplished simply by switching in the appropriate filter for the band of operation. If the builder is interested in only one band the remaining filters need not be constructed.

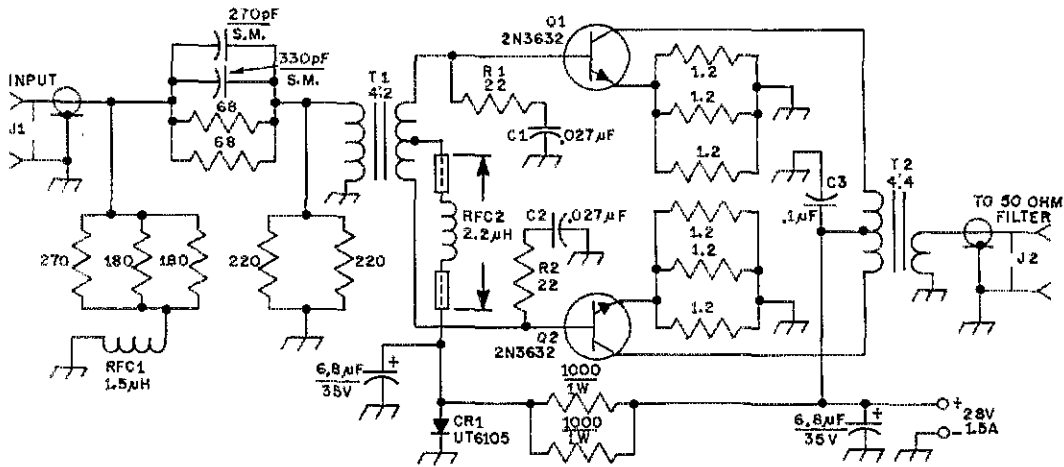
One important point about the amplifier in Fig. 1 should be pointed out: the center tap of the input transformer is *not* bypassed to ground with a capacitor. With the input transformer not center tapped to ground for the ac (rf) signal, the current which drives one transistor to the *on* state is forced to flow through the other transistor's base-emitter junction capacitance. The current flow through the

* 14027 Gatehouse Drive, Dallas, TX 75240.

¹ Poly Paks, P.O. Box 942M, Lynnfield, MA 01940.

Topside view of the linear amplifier with the compensating network attached by means of BNC hardware.





latter's reverse-biased base-emitter junction forces the stored charge in that base to dissipate at a faster rate than in a conventional grounded center-tap push-pull circuit. If the center tap is bypassed to ground, the stored charge present in the reverse-biased emitter-base junction maintains collector current conduction for a longer portion of the operating cycle than is desirable for Class AB operation, yielding poor efficiency.

Decreasing the bias to reduce the conduction angle results in decreased linearity (increased cross-over distortion). The circuit of Fig. 1 allows the base bias to be set at the correct level to obtain the desired linearity and efficiency. An rf choke is connected from the center tap to the biasing diode to provide a high impedance ac path but allow the dc base-bias current to flow. Conventional diode biasing (CR1) is provided for temperature stabilization of the Q point.

Construction Details

Construction of the input and output transformers is somewhat unconventional although not too difficult. The transformers are built by placing two cylinders of 3F2A ferrite material side by side and running the wires for the windings through the two holes in the cylinders as shown in Fig. 3. The wire running from A to A' would be one turn on the primary with the wire from B to B' being one

Fig. 1 - Schematic diagram of the amplifier. Resistance is in ohms, resistors are 1/2 watt unless otherwise indicated, except for R1 and R2 which are 1/4 watt. SM = silver mica. Polarized capacitors are electrolytic. C1, C2, and C3 are Aerovox Hi-Q units, type CK05 (available from Newark Electronics, Chicago, IL, catalog No. 101). RFC1 and RFC 2 are small encapsulated chokes. See text for discussion of other components shown here.

turn on the secondary. Since the ferrite cylinders aren't available at a reasonable price, they can be constructed by stacking two toroids together for each cylinder of the output transformer and four toroids together for the input transformer. The Ferroxcube series 266 toroids are used for the output transformer, and the series 1041 toroids are used for the input transformer.² In order to reduce flux leakage the center winding of the primary of the output transformer (and the secondary of the input transformer) should be made of braid similar to the shield-diameter of small coaxial cable. A broadband match to a low-impedance termination is readily achieved with these transformers.

Following is a step-by-step procedure for fabricating the output transformer. First, slip a

² Ferroxcube Corp., 5635 Yale Blvd., Dallas, TX.

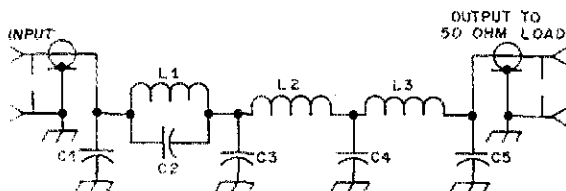


Fig. 2 - Schematic diagram of the filter. See Table I for parts values versus frequency of operation.

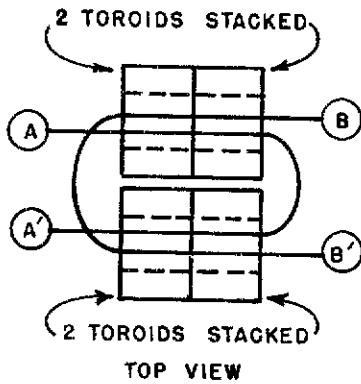


Fig. 3 - Illustration of how the broadband transformers are assembled.

1-inch-long piece of braid over a 2-inch-long 10-32 screw, preferably one that does not take solder easily. Next, place two of the cores over the braid, pushing the cores tightly against each other. Now, flare out the ends of the braid on each end of the cores and flow solder in the flared portions of the braid as shown in Fig. 4. After this step is completed the excess braid can be clipped close to the edge of the cylinders at one end. When both cylinders are constructed they can be individually wrapped with tape and then taped together side by side. On the end where the braid was left extending over the edge of the core, a solder connection is made to join the two cylinders electrically. Of course, some pruning is necessary in order to get the two cylinders mechanically close to each other. When this step is completed, the point where the braid from the two cylinders is joined is the center tap of the transformer primary. If a total of 2 turns is required on each side of the center tap, the braid from the center tap to one end of one of the cylinders is a half a turn. Therefore, 1 1/2 more turns of No. 22 enameled wire must be added by tacking the wire with solder to the end of the braid and running the wire through the holes left in the cylinders after removing the 10-32 screws. Similarly, 1 1/2 turns are added from the other cylinder end. Fig. 6 shows the transformer. The secondary is wound by running 4 turns of wire through the same two holes in the cylinders but with the leads extending out the opposite side of the transformer.

The transformer at the input of the amplifier is constructed in a similar manner with a 4:2 turns ratio. In this case the smaller Ferroxcube toroid core, series 1041, can be used. These cylinders are made by stacking 4 cores on top of each other. With a total of two turns required on the

Fig. 5 - Spectral display of the amplifier output during two-tone testing. The third- and fifth-order products are down in accordance with the author's figures. (This analysis performed by W1KLLK in the ARRL lab.)

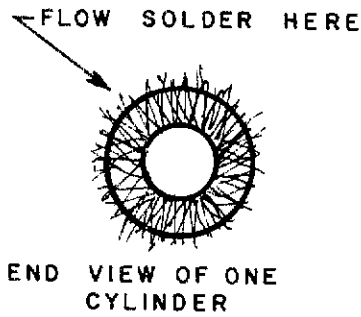


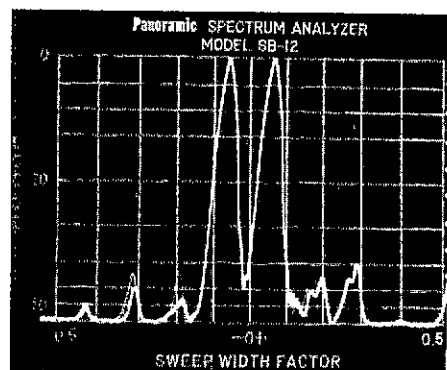
Fig. 4 - Drawing of end view of one cylinder of the broadband transformers.

secondary, only 1/2 turn of enameled wire is needed to complete the winding once the braid is through the cylinders. No. 28 wire is used on the input transformer. Four more turns of wire (with the leads extending out the other end of the transformer) make up the primary winding of the input transformer.

The amplifier is constructed on a 1/8-inch-thick aluminum plate, 4 inches long by 3 inches wide. This plate should provide an adequate heat sink for the duty cycle incurred with ssb or cw operation. The transistors are mounted 2 inches from the end of the plate and 3/8 inch off the center line running the length of the plate. Very short leads are maintained for the emitter resistors to minimize lead inductance. The two 1000-ohm biasing resistors, the biasing diode, and the 6.8- μ F capacitor are located on the bottom side of the plate. The biasing diode used in the original circuit is a Unitoro UT6105 rectifier diode. This diode is fairly expensive, but any silicon rectifier diode rated at 3 A and 50 volts PRV should work. Fig. 7 shows the parts placement.

A circuit diagram of the filters is shown in Fig. 2, and component values are given in Table I. L1 and C2 should be resonated at the proper frequency before being placed in the rest of the circuit. L1, L2, and L3 can be wound on toroid cores available from Amidon³ when the inductance values are too large for convenient air coils.

³ Amidon Associates, 12033 Otsego Street, North Hollywood, CA 91607.



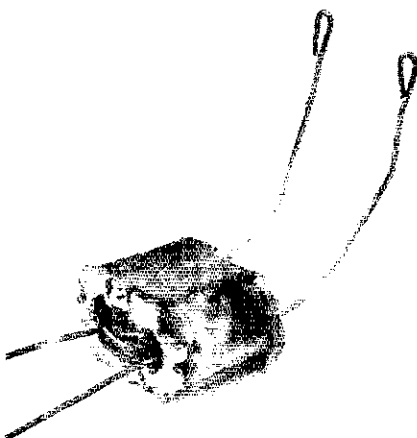


Fig. 6 — Close-up view of the input transformer used in the circuit of Fig. 1.

Amplifier Operation and Performance

Before applying voltage to the amplifier, a check should be made with an ohmmeter to insure there are no shorts between the primary and secondary of the transformer. If all looks well at that step, connect a 50-ohm load and apply dc voltage. Always terminate the amplifier output with a 50-ohm load before applying voltage, otherwise instability may result. The amplifier *idling current, with no drive applied, should be approximately 100 mA.* If this value is not obtained, there is probably a short in one of the transformers. If the correct idling current is present, apply drive (375 mW cw or peak ssb), and 15 watts of rf power should appear at the output.



If a two-tone signal is used for ssb tests, the output level will indicate only 7.5 watts on an averaging-type wattmeter. Now, the amplifier is ready to connect to the antenna (one with an SWR below 1.5:1). Operation in any part of any band is acceptable, as long as the filter for that band is used and the SWR is low.

Collector efficiency is measured by driving the amplifier with a cw signal, reading the dc input power and rf output power, then subtracting the dc power required for the biasing components. Linearity is measured by feeding two rf signals, 1 kHz apart, into the amplifier. The two signals are kept at the same magnitude and increased in level until 7.5 watts (15 watts peak) is indicated on a wattmeter. With the output observed on a spectrum analyzer, intermodulation distortion products are down 30 dB or more from one of the two tones. Input impedance to the compensating network is measured by connecting a bi-directional coupler in the line with the drive signal and measuring the forward and reverse voltage difference and phase at the two coupler outputs. These values are converted to useful information and plotted on a Smith Chart as a magnitude and phase angle. From this procedure the maximum SWR looking into the compensating network is 1.2:1 at any frequency from 3.5 to 30 MHz. The performance obtained with this amplifier should meet the requirements for a driver amplifier or a low-power portable transmitter. Similar design techniques, along with power combining techniques, have produced a transmitter (all solid-state) with comparable performance, and over 400 watts output, from 2 to 30 MHz.

QST

Bottom view of the amplifier. The large bolts at the center of the heat sink are the studs for the two transistors. Standoff posts are used as feet for the assembly.

TABLE I

Impedance at f_u	50M $f_u = 4 \text{ MHz}$	40M $f_u = 8 \text{ MHz}$	20M $f_u = 15 \text{ MHz}$	15M & 10M $f_u = 30 \text{ MHz}$
C1 -j50	800 pF	400 pF	210 pF	105 pF
C2 -j60	680 pF	340 pF	180 pF	90 pF
C3 -j18	2200 pF	1100 pF	590 pF	300 pF
C4 -j14	2800 pF	1400 pF	750 pF	380 pF
C5 -j35	1150 pF	575 pF	300 pF	150 pF
L1 +j30	1.2 μH	0.59 μH	0.32 μH	0.16 μH
L2 +j42	1.6 μH	0.80 μH	0.45 μH	0.23 μH
L3 +j50	2.0 μH	1.0 μH	0.52 μH	0.26 μH
Resonant Frequency for L1 & C2	5.55 MHz	11.1 MHz	20.8 MHz	41.6 MHz

Table of values for the filter shown schematically in Fig. 2.

A CW Man's S-9er Kilowatt

Part II

BY ROBERT M. MYERS,* W1FBY

CIRCUIT DESIGN for high-power amplifiers is relatively straightforward. The differences between various types of grounded-grid units are usually more mechanical than electrical. The degree of complexity is determined primarily by the number of features desired and whether or not the power supply and control circuits are to be included on the same chassis. Described here is an amplifier built with several objectives in mind:

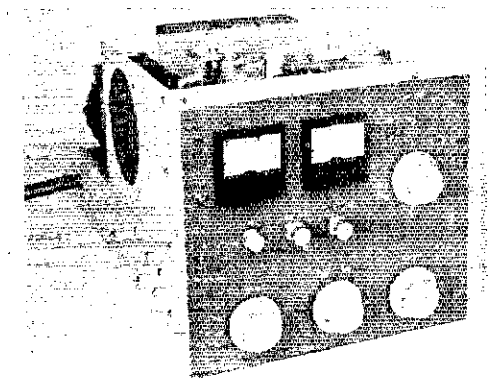
- 1) Full break-in capability when used with the T-9er.
- 2) Built-in power supply.
- 3) Separate inputs for cw and ssb exciter.
- 4) Provision for exciter-only (low power) operation.

Operational Considerations

Most commercially made linear amplifiers are designed to function on both ssb and cw. Likewise, transceivers and separate transmitter-receiver combinations are built for both modes. A simple circuit, called a VOX, handles all of the switching requirements. In the interest of economy, this VOX circuit is used for phone and semibreak-in cw.

There are several differences between an amplifier built for cw and one designed for ssb phone. A zero-bias triode, such as the 3-500Z or the 3-1000Z, must be completely cut off during key-up periods; otherwise "hash" will be generated, creating receiving difficulties. Complete cutoff is accomplished by placing a 27-volt Zener diode in the cathode circuit. Linearity diminishes sharply with the bias increased toward cutoff; therefore this voltage must be changed for phone operation. The standby "hash" generated as a result of reduced bias (higher idling plate current) is eliminated by opening the cathode lead with one set of contacts on the antenna relay.

When using an ssb transceiver with a linear amplifier it is necessary to bypass the amplifier during standby periods, thus allowing the incoming



signal to reach the receiver. This function is accomplished by a relay in the amplifier. The relay is controlled by the transceiver VOX circuit. On cw, however, this bypass relay must be actuated continuously since the break-in operation of the T-9er has no VOX provisions. An electronic I-R switch (built into the amplifier) is necessary to handle the antenna changeover for the receiver. For the sake of convenience and ease of operation, an amplifier should have built-in circuits to handle both modes . . . this is what makes the S-9er a simple grounded-grid circuit, but with a complicated switching network.

The Power Supply

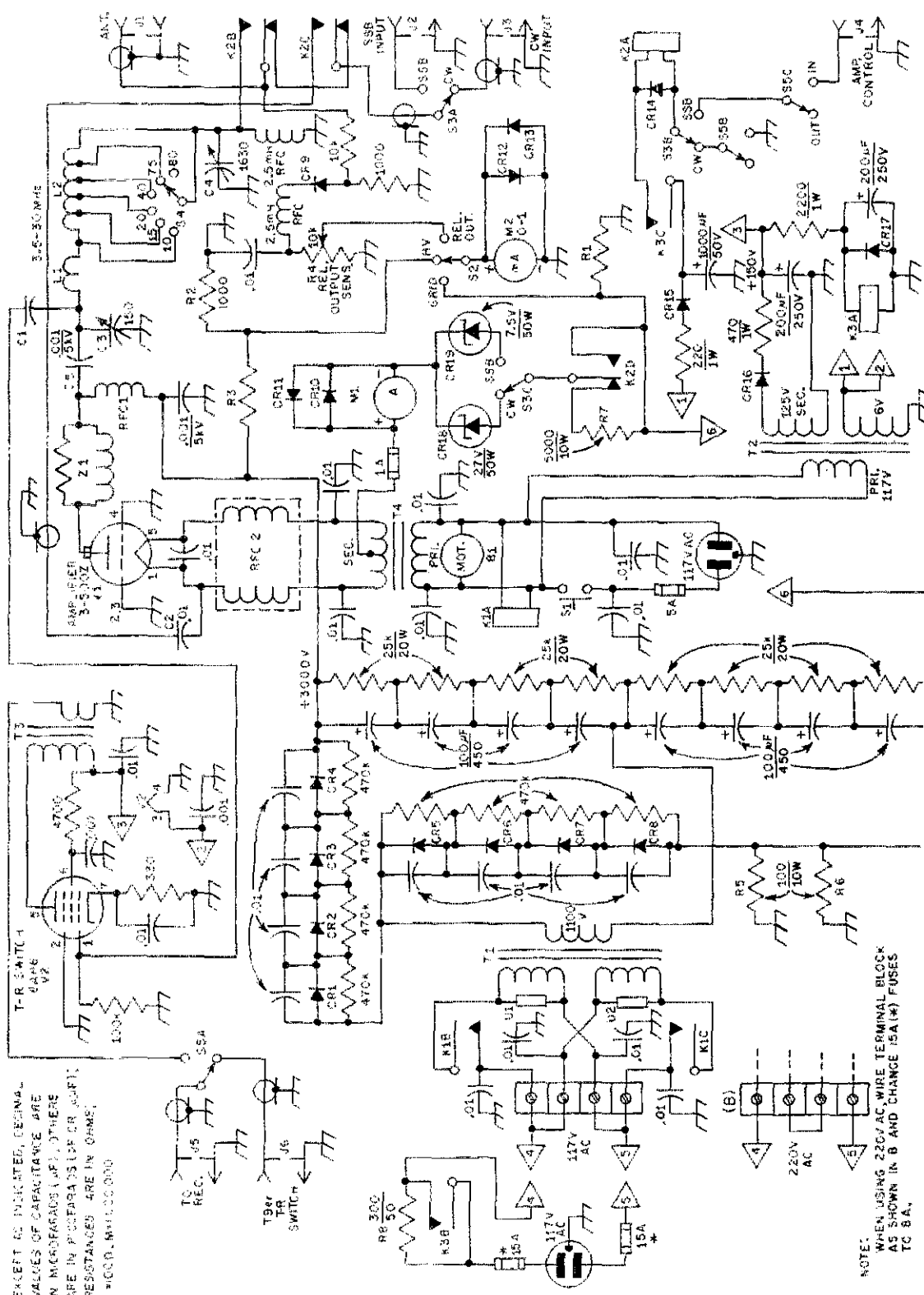
A voltage-doubler circuit connected to the secondary of T1 provides approximately 2600-volts dc for the plate circuit (Fig. 3). The primary of T1 can be operated from either a 117- or 220-volt source; the latter is preferred. U1 and U2 are suppressors to prevent line transients from damaging the capacitor bank or the diodes. Since T1 has two 117-volt primary windings, a suppressor is connected across each one. The windings and suppressors are connected in parallel for 117-volt operation, or are series connected for a 220-volt line.

A relay (K1) is necessary to handle the high current of the T1 primary. Ordinary toggle switches cannot be used to activate the power supply directly. Surge protection is accomplished by placing R8 in series with one lead of the ac line. K3B shorts out this resistor a few seconds after the

Part I of "The CW Man's Kilowatt" was presented in October, 1971, QST. In Part II, a final amplifier, called the S-9er, is described in detail. When the S-9er is used in conjunction with the T-9er, the advantages of complete break-in are retained. As an added feature, a separate input jack on the S-9er is provided for an ssb transceiver or exciter. Several hookup combinations are shown.

* Asst. Technical Editor, QST.

EXCEPT AS INDICATED, TERMINAL VALUES OF CAPACITANCE ARE IN MICROFARADS (UF), OTHERWISE IN PICOFARADS (PF) OR (PPT); RESISTANCES ARE IN OHMS, K=1000, M=1,000,000.



NOTE:
WHEN USING 220V AC WIRE TERMINAL BLOCK AS SHOWN IN B AND CHANGE 15A (*) FUSES TO 5A.

Fig. 3 — Circuit diagram for the S-9er. Component designations not listed below are for text reference only. Polarized capacitors are electrolytic.

- B1 — 117-volt ac fan (Rotron Whisper Fan or equiv.).
- C3 — 180-pF air variable, .077-inch air gap (Millen 16250 with 4 stator plates removed). The right-angle drive used with this capacitor is Millen part No. 10012.
- C4 — 1630-pF maximum, receiving-type air variable. (Available from R. W. Electronics, 4005 W. Belmont Ave., Chicago, IL 60641.)
- C5 — Transmitting capacitor, 1000-pF ceramic (Centralab 858S-1000 or equiv.).
- CR1-CR17, incl. — 1000-PRV, 2.5-A (Mallory M2.5A or equiv.).
- CR18 — Zener, 27-V, 50 watt.
- CR19 — Zener, 7.5-V, 50 watt.
- J1 — Coax chassis-mount connector, type SO-239.
- J2-J6, incl. — Phone jack, single-hole mount.

- K1 — Power relay, dpdt, 117-volt coil (Potter and Brumfield PR-11AY or equiv.).
- K2 — 4pdt, 5-A, 6-V dc coil (Potter and Brumfield GPD coil and GP-17 contact arrangement or equiv.).
- K3 — Dpdt, 10-A, 120-V dc coil (Potter and Brumfield KA11DG or equiv.).
- L1 — 7 turns, 1/8-inch copper tubing, 1 1/4-inch dia, tapped at 3 turns from the tube end.
- L2 — 23 turns, No. 14, 2 1/2-inch dia, tapped at 10 3/4 turns for 40 meters, 17 1/2 turns for 20 meters, as measured from the C4 end. (Coil stock: Barker and Williamson 3029.)
- M1 — 1-A dc (Simpson model 2122-17400 or equiv.).
- M2 — 1-mA dc (Simpson model 2122-17430 or equiv.).
- RFC1 — Transmitting rf choke (Barker and Williamson model 800 or equiv.).
- RFC2 — Bifilar-wound filament choke (Amidon 10-A choke kit).
- S1 — Spst push button (Calectro E2-144 or equiv.).

- S2 — Single-pole, 3-position rotary (Calectro E2-161 or equiv.).
- S3 — 3-pole, 2-position, 2-section, rotary (Centralab 2515 or equiv.).
- S4 — Rf switch, single-pole, 6-position (Millen 51001).
- S5 — 3-pole, 2-position, rotary (Calectro E2-165 or equiv.).
- T1 — Dual 117-volt primary, 1100-V secondary, 600 VA (Berkshire BTC 6181 or equiv.).
- T2 — 117-volt primary; secondary 125 volts at 50 mA; 6.3-V at 2-A (Stancor PA-8421 or equiv.).
- T3 — See text and Fig. 2 (Part I).
- T4 — 117-volt primary; secondary 5.0 volts at 15 A (Stancor P-6433 or equiv.).
- U1, U2 — Transient voltage suppressor, 120-volt (General Electric 6RS20SP4B4).
- Z1 — Parasitic suppressor, 3 turns No. 12 copper wire, 1 1/4-inch dia wound over three 150-ohm, 2-watt composition resistors connected in parallel.

main power switch (S1) is actuated. A separate power cord for the high-voltage supply allows this section to operate on 220 volts while permitting other circuits in the amplifier to operate on 117 volts.

The Amplifier Circuit

A single 3-500Z triode tube develops 1-kW dc input on cw and 1-kW PEP input on ssb. The output circuit is a pi network which tunes the amateur bands from 3.5 to 30 MHz. A T-R switch, similar to the one used in the T-9er, is coupled to the tank circuit via C1. Capacitor C1 is constructed of RG-8A/U to the dimensions shown in Fig. 2 (Part I).

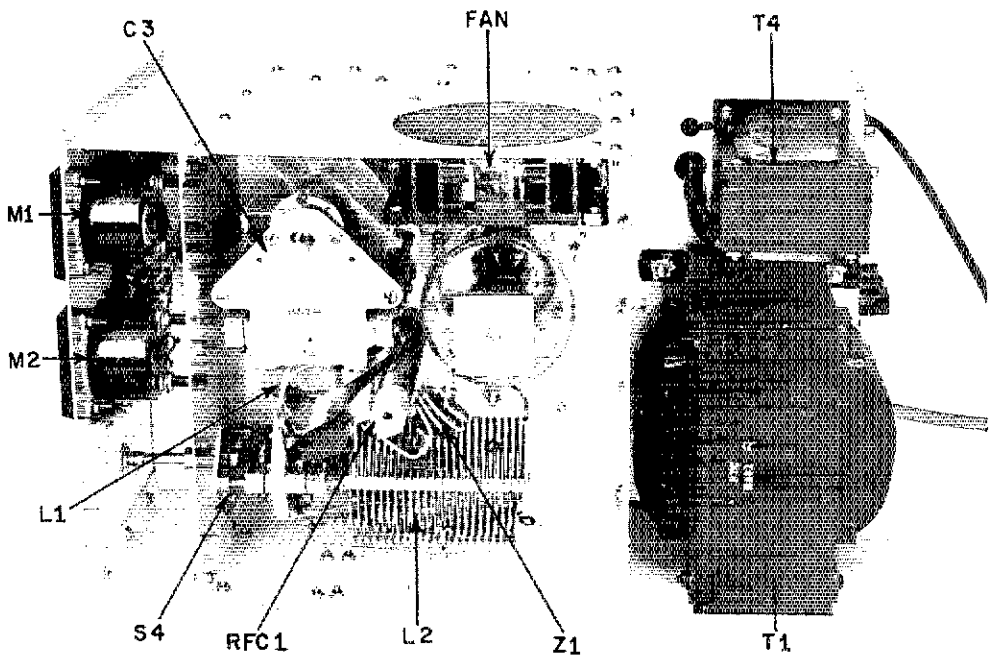
Filament voltage is applied to the 3-500Z through a bifilar-wound rf choke. Although the commercially manufactured unit mentioned in Fig. 3 runs a bit warm, no problems have resulted. Drive power is coupled to the filament circuit through C2, a disk-ceramic capacitor. The untuned input circuit used here is satisfactory since the T-9er is capable of providing plenty of drive. The IMD during ssb operation is well within acceptable limits.

Two Zener diodes are used to develop the operating bias. S3C selects either CR18 for 27 volts (cw) or CR19 for a 7.5-volt bias (ssb). Since the lower bias voltage increases the resting plate current to approximately 80 mA, R7 is placed in series with the cathode-return lead to cut off the tube during standby periods. Protection for the power supply is assured by the placement of a 1-ampere fuse in series with the Zener diodes. This procedure could save a tube or a meter (not to mention power supply components!) in the event a high current surge or arc occurs in the output circuit.

The Multimeter

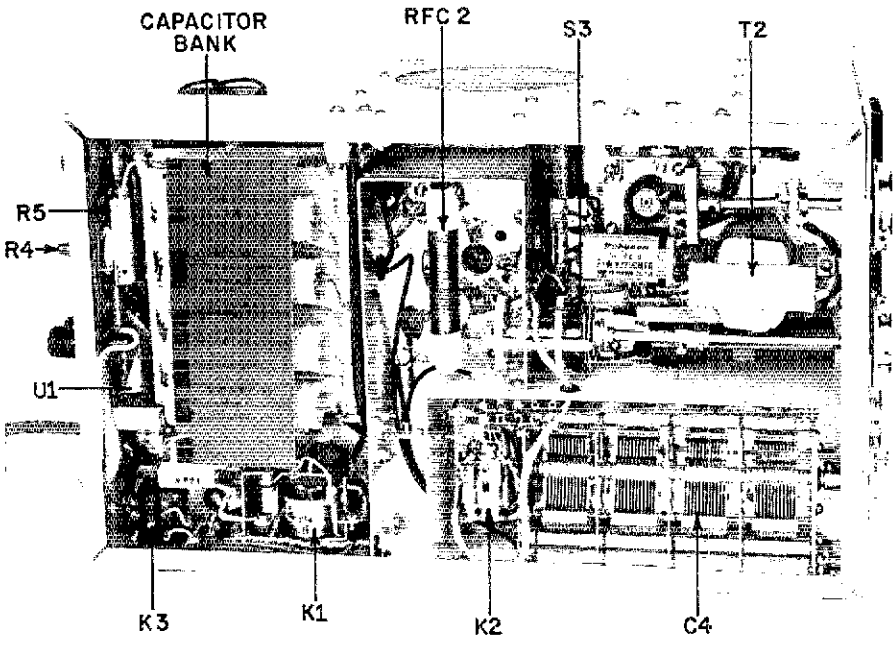
A 1-mA meter is used to measure grid current, plate voltage, and relative power output. R4, mounted on the rear chassis apron, allows adjustment of the power-output circuit sensitivity. A voltage-dropping resistor network, R3, provides a full-scale reading of 5 kV. R2 maintains a load at the meter end of R3 to prevent full B+ from appearing across S2 when it is in one of the two other positions. R3 consists of five 1-megohm, 1-watt composition resistors connected in series, thereby limiting the voltage across any one resistor to less than 600.

Grid current is measured by placing the meter in series with the grid (ground) and the cathode. The meter shunt, R1, provides a full-scale reading of 200 mA. R1 is equal to the internal resistance of the meter divided by 200. The resistance of M1 is 43 ohms; therefore R1 is 0.21 ohms. The shunt is made by winding 24 1/4 inches of No. 30 enameled wire on a 1-megohm, 2-watt composition resistor. The resistance of various wire sizes can be found in *The Radio Amateur's Handbook*. R1 is in the primary path between the high-voltage negative lead and chassis ground. R5 and R6 provide protection in the event the meter shunt opens.



▲ Top View

▼ Bottom View



Construction

The amplifier, including the power supply, is built on a 10 × 17 × 3-inch aluminum chassis. It matches the size of the T-9er. All of the high-voltage power-supply components are mounted at the rear of the chassis. Location of the various parts is shown in the photographs. The circuits carrying rf are shielded to reduce TVI or instability. The input-circuit shield is mounted between wafers of S3 to keep the rf wiring inside the compartment.

Care must be exercised to keep high-voltage components from coming in contact with primary wiring. The power-supply section of the amplifier is quite crowded. A sheet of 1/16-inch-thick phenolic insulation is placed between the capacitor bank and the chassis. The electrolytic capacitors, along with their equalizing resistors, are mounted on a piece of etched-circuit board. This board is suspended between several solder lugs attached to ceramic standoff insulators. Rubber cement is used to hold a 1/2-inch-thick piece of phenolic board to the capacitors which prevents them from contacting the bottom plate when it is installed. The rf output circuit is completely shielded in a compartment of perforated and sheet aluminum. The perforated material is needed to allow adequate air flow around the tube. The tube socket is mounted 1/2 inch above the chassis, allowing air to circulate around the base connections and seal. The grid pins of the socket are soldered to lugs which are mounted on the chassis.

When an Eimac plate cap is used with the 3-500Z, the cap extends above the edge of the cabinet. Therefore a homemade cap (1/4-inch-thick aluminum plate, 1 3/4 inches square) is used in place of the Eimac unit.

The plate-tuning capacitor, C3, is mounted vertically and is adjusted from the front panel by means of a surplus right-angle drive. The Millen drive mentioned in the parts list performs equally well. C4 has a shaft diameter of 3/8 inch, therefore it requires special attention. A standard 1/4-inch coupling, with one end drilled out to slightly over 3/8 inch, is used as an adapter. The inconvenience of fabricating a coupling is outweighed by the low cost of the capacitor; it sells for \$3. Fine-mesh screen is placed between the cabinet wall and the fan to maintain an rf-tight enclosure. The screen does not reduce the air flow appreciably.

Operation

A useful method for determining the correct tank-coil taps is discussed in detail by Parten.¹ Once these positions have been determined, the relative-output sensitivity control, R4, can be adjusted for 3/4 scale meter reading at full power input.

In order to determine the plate current, the grid current must be subtracted from the cathode current. When the amplifier is driven to a grid current of 120 mA and the tuning controls are adjusted for maximum power output, the cathode

¹Parten, "Custom Design and Construction Techniques for Linear Amplifiers," *QST*, September, 1971.

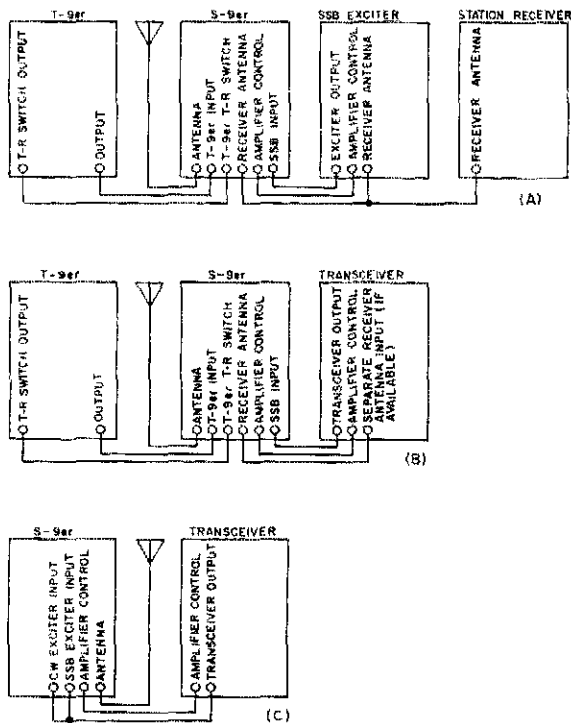


Fig. 4 — There are several ways to interconnect the S-9er with other station equipment. At A is shown the connections when a separate ssb transmitter and receiver are used. B shows connections for a transceiver and the T-9er. An independent receiver antenna jack on the transceiver is required. At C, connections are given for transceiver ssb and cw operation. Complete break-in is not possible with this setup.

current will be approximately 500 mA and the plate voltage will be slightly over 2500. This represents an input power of nearly 950 watts. After extended periods of operating or tuning, the power should be left on for a few minutes to allow the tube to cool.

Hookup and Switch Functions

Fig. 4 shows several methods for interconnecting the station equipment. The exciter IN/OUT feature is performed by S5B which deenergizes K2 to allow the exciter to feed through to the antenna. S5C disconnects the transceiver VOX relay from K2, permitting low-power phone operation. The appropriate T-R-switch output (either from the T-9er or the S-9er) is routed to the receiver by S5A. *Caution:* When S3 is in the cw position, there is no load connected to the ssb exciter input terminal! Likewise, there is no load at the cw input connector when S3 is in the ssb position.

(Continued on page 37)

Threshold Detectors in a CW

Audio Filter

BY CHARLES B. ANDES,* WB2VXR

THE AUTHOR'S IDEA to improve the performance of an audio filter for cw is to establish a voltage threshold, a level where switching occurs. Above that level, the audio signal is passed; but, below the threshold, no output will occur. When the threshold detector is combined with a selective filter, the filter skirts are made extremely sharp. A second smoothing filter is needed to eliminate the harmonics and discontinuities caused by the threshold switching. Fig. 1 shows a block diagram of such a filter.

Circuit

The input and output stages function as active filters providing good selectivity; any conventional design may be employed. The particular filter design used is essentially a high-gain operational amplifier with a notch filter located in a feedback loop.¹ The closed-loop gain is very high (close to open-loop gain) at the notch frequency but nearly unity at all other frequencies. An attenuator is used at the input of each amplifier section to reduce the overall gain. In addition, the inverting terminal of the op amp is loaded to ground to prevent oscillation at the notch frequency.

Following the first filter section, the audio signal passes to series-connected silicon diodes which conduct only the signals which produce peak voltages higher than the conduction level of the diodes (approximately 0.6 volt). By setting the input audio level so that the first active-filter section has an output of 2 volts pk-pk at resonance, the diodes will conduct. However, the

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¹ The notch network should not be confused with the twin T, although both are similar in appearance.

This audio filter incorporates a new twist to improve selectivity. The innovation is a threshold detector — series-connected diode switches in the signal path.

voltage output of the active filter will fall quickly only a few cycles off resonance, and the threshold diodes will cut off. Then, the audio output from the diodes will drop to nearly zero. In a practical cw filter, the output is still noticeable even though it is nearly 60 dB down. Fig. 2 shows the schematic diagram of the complete filter, which has a voltage gain of approximately 5. Total gain depends on the open-loop gain of the op amps used. To adjust the overall gain up or down, vary the value of either or both of the resistors in the input attenuators, R1 or R2.

A 3-pole double-throw switch is used to apply power and to switch the headset connection from the input to the output. Power is obtained from a pair of 9-volt transistor-radio batteries. However, any voltage up to 15 can be used. The current drain is 5 mA; batteries will last about 100 hours.

The selectivity characteristic of the filter is illustrated in Fig. 3. The 6-dB bandwidth is only 6.2 Hz with a selectivity ratio (60 dB:6 dB) of 6.56. The operating frequency is 1.1 kHz, but can be easily changed using values calculated from the equations given in Fig. 4.



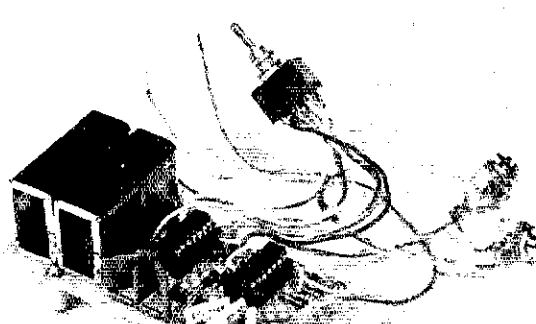
Fig. 1 — Block diagram of the filter.

Results

This writer uses an inexpensive stereo headset for cw operation (it performs very well for phone signals, too). If a telegrapher's headset is employed, the filter should be designed to have the same resonant frequency as the phones, usually about 800 Hz.

The two active filters provide an extremely sharp response; therefore, the components used in

The audio filter is constructed on a small piece of electronic pegboard. The completed unit is mounted inside a communications receiver.



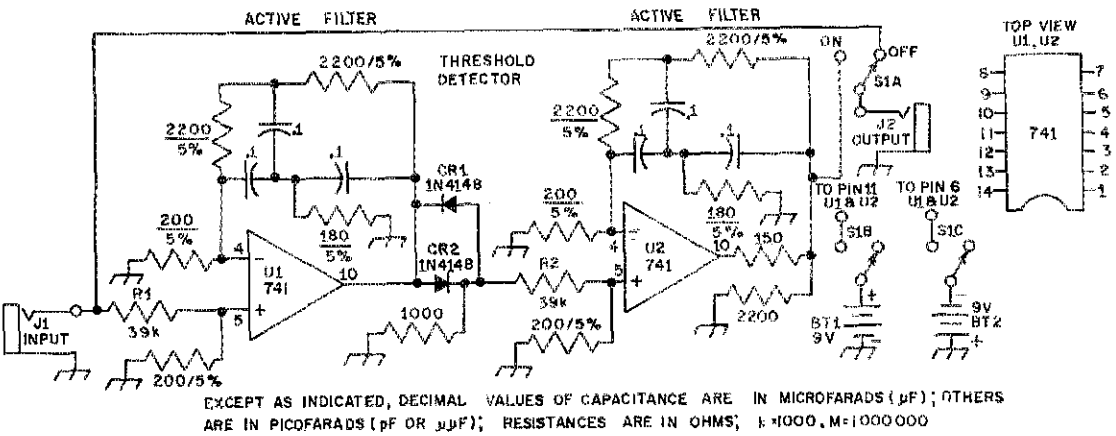


Fig. 2 — Schematic diagram. Resistors are 1/2-watt composition, 5-percent tolerance. Capacitors may be ceramic or mylar, using matched values in each filter section (see text). Pin numbers given are for the 741 op amp in a 14-lead flat pack. BT1, BT2 — Transistor-radio battery, 9 V.

J1, J2 — Miniature phone jack, panel mount.
 R1, R2 — Designated for text reference.
 S1 — 3pdt toggle.
 U1, U2 — 741 compensated op amp (Motorola MC1741, Fairchild $\mu\text{A}741$, Signetics N5741, or equiv.).

both filter sections must be identical. Use 1-percent tolerance resistors and select the capacitors so they are very close to being identical in value. Even with these precautions, the author's filter has two separate peaks in the response, which appears as a single flattened peak in Fig. 5. This effect is caused by the slight difference in capacitor values. The two peaks are actually 39 Hz apart at 1.1 kHz, or about 3.5 percent from each other. However, the effect of the flattened peak is desirable in this application.

R2 (Fig. 4) has a profound effect on the notch depth of the feedback network. When setting up one of the active filters for the first time, adjust the notch network by itself first for a good null. Then, connect it into the amplifier circuit and measure the peak characteristic. A little "tweaking" of the network values helps to improve performance of any high-selectivity filter.

If one already owns a multifunction audio filter, he can add the threshold diodes to it. Simply locate a point at the end of a filter section where the audio level is approximately 2 volts pk-pk and insert the series diodes. An output load of less than 1000 ohms should be used to assure a sharp threshold switching characteristic.

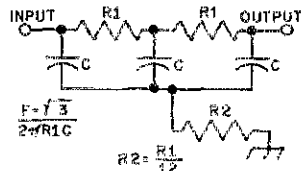


Fig. 4 — Circuit and design equations for the notch network.

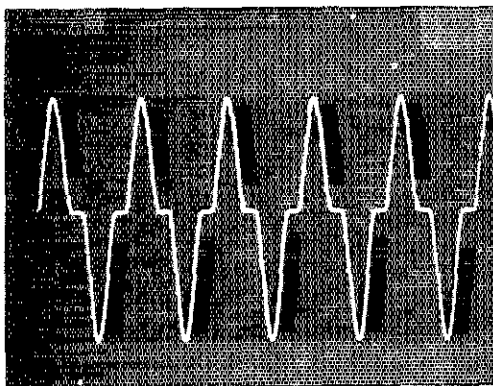


Fig. 3 — An oscilloscope photograph shows the switching action of the threshold detector.

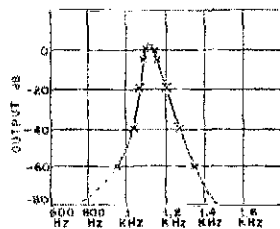


Fig. 5 — Selectivity characteristic of the audio filter.

**SWITCH
TO SAFETY!**



Would-be builders of vhf arrays are often deterred by difficulties in obtaining the necessary hardware, and by fear of the problems involved in adjustment. Both tasks are made fairly simple in the array described here. One bay may be used alone, or the pair stacked, for greater effectiveness. Matching and adjustment ideas detailed are useful with other antenna projects, too.

A 5-Over-5 Stacked-Yagi Array for 50 MHz

BY EDWARD P. TILTON,* W1HDO

ANY 50-MHZ DX enthusiast who has enjoyed the unique properties of a stacked-Yagi array is not likely to be satisfied with less, for long. By concentrating radiation at a lower angle than is possible with a single Yagi at the same height above ground, a stacked pair often gives its owner an exciting edge on paths he most wants to be able to cover. In long-haul tropospheric communication, and especially when the band is only marginally open for ionospheric propagation, the stacked array is worth all it costs, and more.

The 5-over-5 shown here was designed to make construction and adjustment fairly easy, even for the fellow who has not had extensive experience with antenna projects. Using commercially available components throughout helps in this, but various points in the design can be adapted to other uses. The method of phasing and feeding, for example, can be used with any pair of Yagis having impedances of 50 or 200 ohms each.

* VHF Editor, QST.

Element spacing and bay spacing are not particularly critical. Though 16-foot booms are used, element spacings could be pulled in to use booms as short as 14 feet, with only minor loss in gain. The bay spacing of $5/8$ wavelength (12 feet) could be reduced to half-wave spacing, or extended to full-wave (10 or 20 feet), depending on the space and structural materials available. Closer spacing than 12 feet sacrifices some gain, and going to wider spacing picks up some, but the $5/8$ figure is a very good compromise. The stacking, with resultant lowering of the radiation angle, is what makes this kind of thing pay off so handsomely.

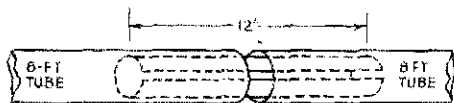
The Yagis are gamma-matched individually for 50-ohm feed, using ready-made adjustable matching devices by Kirk Electronics, 525 E. Stroop Rd., Dayton, Ohio 45429. Elements are mounted to the booms, and the booms fastened to the vertical support, using aluminum castings from the same supplier. Booms are Reynolds Aluminum, found in many hardware stores. The phasing harness is inexpensive coaxial line, with fittings at both ends, for easy assembling and dissembling, on the ground or at the tower level.

Construction

The 16-foot 1 1/4-inch aluminum booms are made from two 8-foot pieces each, permitting hardware-store purchase and easy carrying. Reynolds has a fitting for splicing lengths together, but it was not stocked by any of five suppliers in the Hartford area that we checked by telephone. Splicing was done with the aid of a piece of tubing, slotted 3/8 inch wide and forced into the tubing ends.

Use 12 inches or more for the splice. Be sure that there are no burrs on the ends, or along the slot. The slotted tubing is compressed by squeezing it carefully in a vise. Do not bend it out of true round any more than you can avoid. Hold the tubing in the compressed position, and slide one

The 5-over-5 for 50 MHz, as seen mounted some 60 feet above ground, presents a clean silhouette. Construction, adjustment, and erection is a fairly simple one-man job.



8-foot section of the boom onto it. Large pipe pliers are handy for holding the splice diameter down. Repeat the process at the other end of the splice, with the other 8-foot tube. Pin the tubes and splice together with self-tapping screws, using at least two on each side of the junction, 4 to 5 inches apart. The result is a 16-foot boom, almost as solid and rigid as a single piece of the same material.

The 1/2-inch elements (Alcoa aluminum alloy 6061-T6) are fastened to the boom with Kirk castings (Yagi Clamps, 1/2 to 1 1/4 inch). Boom-to-Mast T Mounts (1 1/4 to 1 1/4) are used at the ends of the 1/4-inch anodized-steel TV masting, which comprises the vertical member.

We learned something about the TV antenna business in shopping for masting. Most TV antennas being put up today are big ones, and the TV people have given up on thin galvanized steel or lightweight aluminum, formerly used in TV work. The thick-wall anodized steel is widely used for TV installations today, and we found it in stock at three local distributors. It comes in 10-foot lengths, so two are needed here, to make a 12-foot support.

The full 20 feet could have been used, with the extra 8 feet running down inside the tower, into the rotator, but we preferred something stronger. The most satisfactory material we've found for this job over the years is "1-inch water pipe," actually iron, about 1 3/8-inch outside diameter. This extends about 8 feet out of the tower. It is heavy, but it will stand high wind loading. It has never let us down when used with vhf arrays or combinations thereof, extending up to 15 feet above the tower bearing. The 12-foot steel mast is U-clamped to this iron pipe at four points.

The array was reassembled piece by piece on the tower, after thorough testing on the ground. It will be seen that each boom is sway-braced to the support — a precaution against the whipping that can raise havoc with an otherwise well-designed structure. The braces are made from the element stock, using the longest pieces left when the directors are cut from the purchased 12-foot lengths. The ends are hammered flat, and bent to the desired angle. Those that attach to the boom are drilled for two self-tapping screws, about 1/2 inch apart. The other ends attach to the vertical member with TV-type U-clamps, one at each pair of braces.

Phasing and Matching

Two 50-ohm loads can be fed from a main run of 50-ohm line through the use of two Q sections of 75-ohm coax. These can be any odd multiple of a quarter-wavelength each, and two 3/4-wavelength pieces made a convenient arrangement for this pair of Yagis and 12-foot spacing. The lines can be wrapped around the booms and vertical mast a few

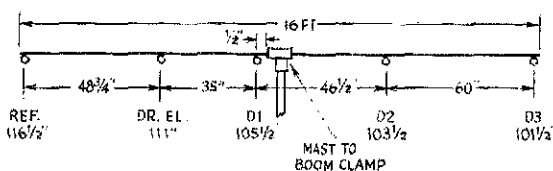
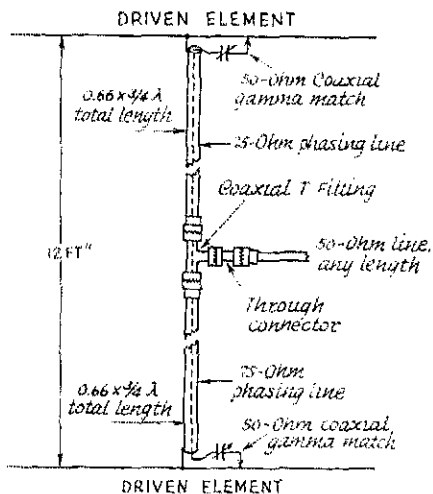


Fig. 1 — Principal dimensions and phasing-harness details for the 50-MHz 5-over-5. Phasing line length depends on the propagation factor of the coaxial line, and should be checked with a dip meter for resonance in the desired operating frequency range. Lines can be wrapped around the booms and vertical support, to use up excess length. The position of the mast-to-boom T clamps, shown in the lower drawing, is near the mechanical balance point of the array. Element lengths are given for operation in the first megahertz of the band. Coaxial fittings at the element ends of the phasing lines are omitted, and the coaxial gamma matches are shown schematically, in the interest of clarity.

times, and they will just meet at the coaxial T fitting used to connect them to the main line.

The Kirk coaxial gamma-match assemblies (Type C6M) are equipped with SO-239 "uhf" coaxial fittings, so PL-259 coaxial connectors are used at both ends of the phasing lines, and a uhf T connector at the center. When the assembly is complete and adjusted, it is well to wrap all the connectors tightly with plastic tape, and spray with Krylon. The 6- and 2-meter beams taken down when this array was erected¹ were treated in this way, and all connections were still in excellent condition, after several years of service.

The phasing-line length can be "guessed" by formula, but there's a better way to assure the correct length for your particular batch of coax. If it is the solid-dielectric variety, cut it several inches longer than $0.66 \times 3/4\lambda$. If you have foam-dielectric line, use the propagation factor given by the maker, for the first figure of the above. Now

¹ Tilton, "Building Your Own Arrays for 50 and 144 Mc.," October, 1966, *QST*.

install the coaxial fitting at one end. Using a matching coaxial jack, solder a small loop from its center pin to the mounting flange. Scribe this into the coaxial plug, and grid-dip the line by coupling to the loop. You'll probably find resonance around 49 MHz. Trim the other end an inch or so at a time, until resonance is found just above 50 MHz — if you're a low-ender, and who isn't? Of course, if you're an fm-er, you will modify the entire design for about 52.6 MHz. Having found scores of examples where "formula length" turned out to be inches off, the writer always dips any line that must be resonant to work properly.

The line used here is RG-59A/U. If you're intending to run the legal limit most of the time, we recommend RG-11, or other half-inch 75-ohm line. The small coax will stand several hundred watts, if the match is good, but anything over 2:1 SWR on the main run of line is likely to cause smoke up on the tower, as the SWR on the matching sections may be high enough to make losses rise steeply.

Our RG-59 was fresh from the radio store, and a name brand, but the formula-length matching sections were three inches too long. Without the dip check, we'd have used just under 117 inches; instead, we ended up with about 113.5 inches each. Don't skip the dip!

Some Hints on Adjustment and Testing

Visions of hanging from a safety belt, 50 feet or more in the air, with arms outstretched to the limit but still a foot away from the matching adjustment, have deterred many a would-be antenna builder. It is well known that the effects of ground and nearby reflecting objects can foul up tuning and matching severely. There are simple ways to avoid risking life and limb, and still get your 9ft beam "on the nose." It's an interesting and rewarding business, and we recommend it for any beam-installing job. Take no maker's word for anything, when it comes to preset matching.

If you're fortunate to have a large flat open area where you can adjust a single Yagi with its boom a half-wavelength above ground, try it this way. The impedance will be practically the same at this height as when the array is in free space (hopefully!) on the tower. Trees, wires, buildings, and other reflecting objects will spoil this game, however. Any rf power reflected back into the array is going to show up on your SWR bridge, and if you "tune it out" in any way, the adjustment will be that much wrong when the beam goes up in the air.

An effective alternative is to aim the array straight up. We've been touting this method for years, but surprisingly few antenna workers seem to have heard of it. This dodge is mainly for adjustment of the matching, where you have taken element lengths and spacings "on faith" — which is usually safe to do. If you do want to fiddle with these factors, put the antenna at least a half-wavelength above ground, and tilt the boom upward enough so that the ground-reflected component doesn't show on your field-strength meter. This means putting the meter pickup

antenna higher up than the boom, but this is not a difficult thing to do, ordinarily.

A single bay of this array was checked by the tilting method, for matching and gain. Then the complete array was assembled with the reflectors resting on flat ground. A 6-foot aluminum step-ladder was fitted with U clamps, to hold the 12-foot steel "vertical" support in a horizontal position. The positions of the mast-to-boom T clamps were adjusted temporarily to allow the reflectors to rest on the ground.

Checking one bay in this position showed that the 50-ohm match originally made with the boom horizontal was still correct. (A reflector has only a minor effect on feed impedance, so ground has very nearly the same effect.) Next the gamma match on the other bay was adjusted for zero reflected power, with direct 50-ohm feed. The positions of the coaxial capacitor and the connection to the driven element came out identical to those on the other Yagi.

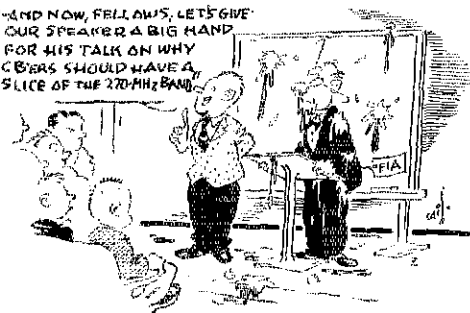
Next, the 75-ohm phasing-matching sections were connected, and the whole array fed with the 50-ohm line and SWR bridge at the T connector at the center of the array. Optimum match was found between 50.3 and 50.4 MHz, with reflected power just showing at 50.2 and 50.5 MHz. At 50.0 there was 0.12 watt reflected, with 10 forward, or an SWR of 1.25:1, an inconsequential rise. When the array was finally in place on the tower, with the bottom bay 62 feet above ground, results were practically identical. The only measurable change was a rise of about 50 kHz in the frequency of closest match.

Just out of curiosity, each bay was fed temporarily through its own 75-ohm Γ section, and it showed the expected mismatch this way. We wondered about coupling between the bays. With both connected through the phasing lines in the proper manner, moving near the driven element of either Yagi caused sharp rises in reflected power. But when a single bay was fed directly with 50-ohm line, even taking hold of the driven element of the other showed no change in the matching to the driven bay. And moving about in the middle of the system produced only a barely perceptible rise in reflected power, with both bays fed properly.

At this point an antenna story should be brought to a climactic end with tales of new DX worked, and "only signal on the band" reports received from amazed operators on the West Coast. From past experience with stacked systems, we know that there will be some of both, in time, but we'll save them for bragging sessions at the local radio club. Meanwhile, we can say only that results show up well in comparison with our local competition on 6. The pattern is nice and clean, and the attenuation off the sides is satisfyingly high. This helps, what with high power and big antennas in use all around us, and "civilization" encroaching on our once-isolated suburban home-site, in the form of an S7 line noise that now is seen to come from a narrow segment of the horizon to the northeast.

(Continued on page 39)

AND NOW, FELLOWS, LET'S GIVE
OUR SPEAKER A BIG HAND
FOR HIS TALK ON WHY
CBERS SHOULD HAVE A
SLICE OF THE 220-MHz BAND.



Some Thoughts About 220-MHz Operation

BY DOUG DeMAW,* WICER

MANY PARTS of the USA are saturated with 2-meter repeaters, making it nearly impossible for a new club or repeater group to select a frequency that will not interfere with other repeaters nearby (spillover), or with repeaters operating on the same frequency within the proposed coverage area. The same problem now exists in the 3/4-meter band (420-450 MHz) in some areas.

It is an unfortunate fact that the parts of the vhf and uhf bands used by most FMers are dictated by the frequency-coverage characteristics of surplus two-way fm radiotelephone transceivers.¹ Thus, the 2-meter operation is confined to a narrow slice of the band — 146 to 147 MHz for the most part, and the 3/4-meter occupancy is found in the uppermost sector of that band. Operation on fm may never be commonplace below 146 MHz, by way of gentleman's agreement with the amateurs who hold forth on a-m, cw, and ssb. Operation above 147 MHz may never become popular because technicians aren't allowed to use the upper part of the 2-meter band. The matter of gentleman's agreement affects the 3/4-meter band too, because of the Oscar ATV, a-m, ubfm, ssb, and cw operation in specific parts of that band. So, where does this leave us? Hopefully, looking toward the 220-MHz band!

* Technical Editor, QNT.

¹ Most low-cost commercial 2- and 3/4-meter fm gear will operate in the high end of each of the bands mentioned by simply retuning the equipment. However, to operate lower in the bands it is necessary to physically modify the tuned circuits.

With the increased band occupancy on 2 and 3/4 meters resulting from the interest in fm and repeater operation, more space is needed to provide elbow room for new repeaters. The 220-MHz band is the logical place to set up camp if adjacent-channel interference is a problem in your area. Five MHz of frequency spectrum — one MHz more than the 2-meter band offers — is available. Propagation on the 220-MHz band is practically the same as it is on 2 meters, the antennas needed are just as easy to build and adjust, and homemade equipment is not difficult to assemble and get working. It's time we utilized the 220-MHz band more fully for fm and repeater work! Here are some ideas for getting tooled up for "220."

Equipment Availability

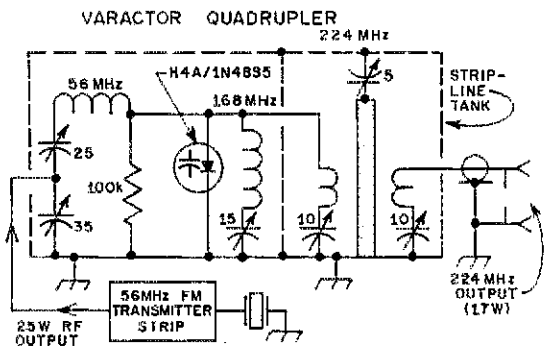
Maybe it's time we amateurs cast aside our lassitude and stopped hoping for some two-way equipment manufacturer to provide us with tailor-made 220-MHz fm transceivers. Admittedly, it would be great if some manufacturer of amateur equipment would realize the usefulness of 220 gear for fm, but so far this has not happened. Since we licensed amateurs are assumed to be technically qualified to build and maintain our own station equipment, it should not be a Herculean task to get something operating on 220 MHz.

Any vhf-oriented amateur can modify existing 2-meter fm equipment for use on 220 MHz — that is, if he's not willing to start from scratch with the project.² Alternatively, low-band surplus fm gear can be modified to hit, say, 56 MHz (and many units already work at that frequency), then used to drive a varactor quadrupler to 224 MHz. With 25 watts of driving power at 56 MHz, an Amperex H4A/1N4885 varactor diode, or equivalent, will

² Kretzman, "The Motorola 80D on 220 MHz FM," *CQ*, Oct., 1971, p. 16.

I SURE WISH THEY'D
MANUFACTURE A COMMERCIAL
220-MHz FM TRANSCIVER...





provide 17 or 18 watts of output at 224 MHz, and no power supply is required for the varactor.³ Low-band fm gear is very inexpensive compared to some of the high-band equipment . . . a bonus feature! Fig. 1 shows a suggested arrangement for getting fm on 220 MHz by the foregoing method.

Other Transmitter Ideas

It would not be a particularly difficult chore to modify a 2-meter fm transmitter strip to hit 112 MHz. If this were done, the 112-MHz energy could be used to drive a varactor doubler as illustrated in Fig. 2.

Of course, one could really get down to the matter at hand and actually *build* a piece of transmitting equipment from the first bolt upward. Those who may care to take that approach could modify the FM Pip-Squeak⁴ for 220-MHz work. WIICP and WISL have both reported success in the venture, still using crystals in the 18-MHz range as was done on 2 meters.

Another means by which to get on 220-MHz fm is shown in Fig. 3. This technique illustrates the use of an existing 2-meter fm transceiver as the

³ Varactor frequency multipliers are described in the vhf transmitting chapter of the past few editions of *The ARRL Radio Amateur's Handbook*. Also, see DeMaw, "Varactor Diodes in Theory and Practice," *QST*, March, 1966, p. 11, and Blakeslee, "Practical Tripler Circuits," *QST*, March, 1966, p. 14. A 220-MHz varactor tripler was described by W1QWJ in his May, 1969, *QST* article, "A 500-Watt FM and CW Transmitter for 220 MHz."

⁴ DeMaw, "An FM Pip-Squeak for 2 Meters," *QST*, March, 1971, p. 21.

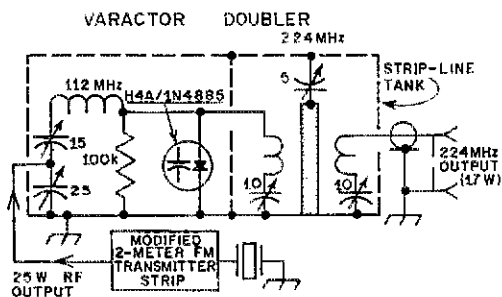


Fig. 1 — Suggested method for generating a 224-MHz signal with a varactor quadrupler. The 56-MHz exciter could be one of the commercial two-way fm-radio strips which are currently available at low cost.

heart of a 222-MHz transceiving package. In the example we will use the national frequency pairing of 146.34/146.94 MHz since most rigs are set up for that channel. A high-level mixer is used to beat a 75.66-MHz local-oscillator frequency with 146.34 MHz to provide the sum frequency of 222 MHz. The difference frequency, 70.68 MHz, can be suppressed by means of bandpass tuned circuits and a parallel or series trap. (This mixing technique would also be applicable when using a 2-meter transceiver to drive a 440-MHz transmitting converter.)

What About Receiving?

One solution to receiving 220-MHz fm is given in Fig. 3. There are a number of alternatives for those wishing to try them. First, and probably the most logical technique would be to purchase an fm receiver strip for 10 or 6 meters, then use a crystal-controlled 220-MHz converter ahead of it.⁵ A converter used with a 2-meter fm receiver strip would, of course, serve equally well. The ambitious and enterprising constructor could modify the front end of a commercial low- or high-band receiver strip to cover 220 MHz, or might wish to disable the existing front-end section and go directly into the first i-f stage of the receiver with a crystal-controlled converter of his choice.

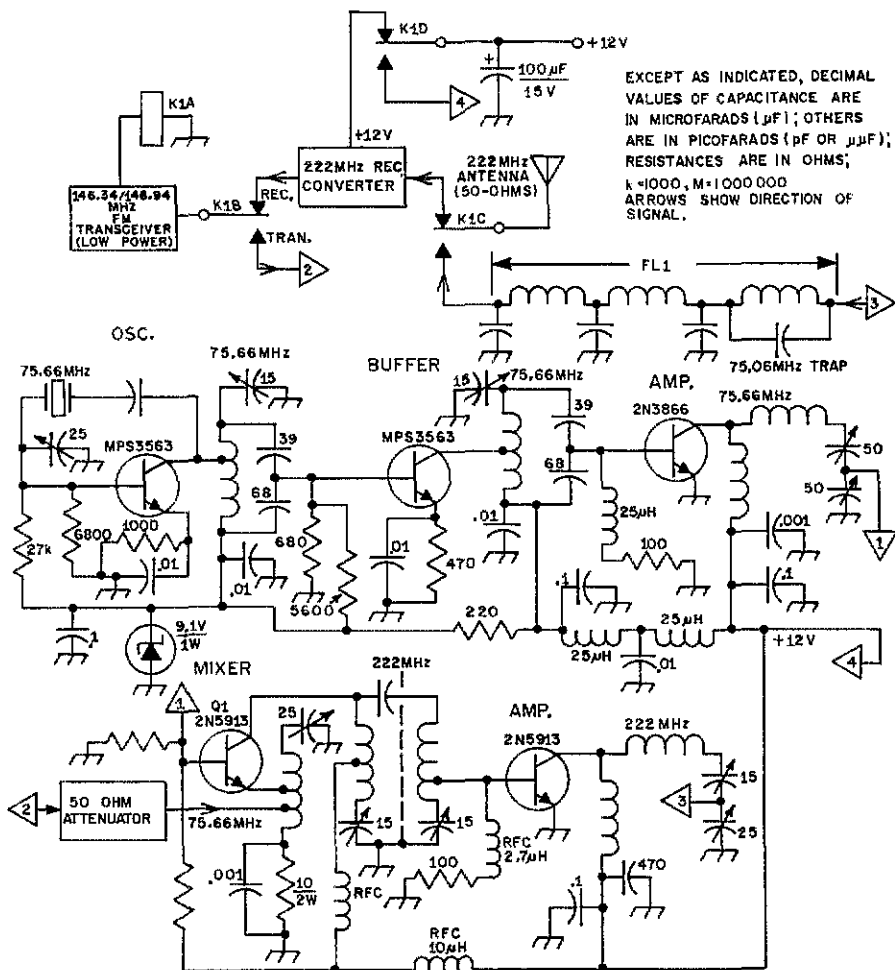
Another Approach

For point-to-point communication on 220-MHz fm one could run a wide-band system with deviation amounts up to 100 kHz or greater. If this were done it would then become practical to feed a converter into the home-entertainment fm tuner for receiving purposes. With the wide-band signal concept the audio recovery from an fm broadcast-band receiver would be quite good. Similarly, many of the low-cost imported hand-held fm receivers could be used in the same manner. Some of these little fm receivers cover the 2-meter band⁶ and could be used in combination with a converter to receive 220 MHz. Squelch is not included in most of the low-cost imported commercial-service receivers (144 to 175 MHz) but can be added if the operator so desires.

⁵ Used fm transmitting and receiving equipment is available from Gregory Electronics, 249 Rt. 46, Saddlebrook, NJ 07662. A catalog is available.

⁶ The Hallicrafters CRX-107 hand-held fm receiver tunes from 144 to 174 MHz and has a squelch circuit. The unit sells for approximately \$35. Other portable receivers of this kind were described in *QST*, March, 1970, pp. 47-49.

Fig. 2 — Method of operating a 224-MHz varactor doubler in combination with a 30-watt 2-meter fm transmitter strip (Motorola 41V, G.E. Progress Line, etc.) which has been modified for operation at 112 MHz.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μpF); RESISTANCES ARE IN OHMS; $k=1000, M=1000000$ ARROWS SHOW DIRECTION OF SIGNAL.

Fig. 3 - Suggested method of using an available low-power 2-meter fm transceiver to operate in the 220-MHz band. Relay K1A would be operated by the push-to-talk circuit in the 2-meter equipment, and would place the receiving converter in the line during receive. When the microphone button was pushed for transmitting, the transmitting converter would be activated. The power from the 2-meter transceiver would need to be greatly reduced by an attenuator, as shown, or a drive control could be installed in the 2-meter transmitter to lower the output power to prevent excessive drive to the transmitting mixer, Q1. The values given are suggested but not proven. Filter FL1 is composed of a parallel-tuned trap to remove the difference frequency of the mixer, 70.68 MHz, from the output of the transmitting converter. It would also attenuate the 75.66-MHz local oscillator energy to some extent. The remainder of the filter is a half-wave section (low pass) with a Q of 1, and is designed for an impedance of 50 ohms. This part of the filter will suppress harmonics of the 222-MHz output. Output from the 222-MHz transmitting converter would be approximately 2 watts with the circuit shown. Additional amplifiers could be used to increase the power output.

Slope detection of 220-MHz fm signals should not be ruled out as a means to get more action started on the band. Amateurs who are equipped with conventional receivers and 220-MHz converters can use slope detection effectively if the i-f passband of the station receiver is fairly broad. A 40-meter Command receiver would work nicely as a tunable i-f receiver for fm reception because it has a very broad i-f characteristic.⁷

⁷ The 40-meter Command receiver (WW-II vintage) uses single-tuned i-f transformers and has a suitable i-f bandwidth for 15-kHz deviation fm signals. W1CP described a limiter/discriminator for use with the Command receiver in September, 1971, *QST*, p. 37.

In Summary

It's time we relieved the crowded 2- and 3/4-meter bands of congestion and put some of our proposed new repeater and fm activity on 220 MHz. And what about ssb, cw, a-m, and all of the other modes permitted on 220 MHz? There's a lot of room between 220 and 225 for that kind of operation too. QST

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.

• *Beginner and Novice*

A 40-Meter DDRR Antenna

BY W. E. ENGLISH,* W6WYQ

SHORTLY AFTER my article on a practical DDRR Antenna appeared,¹ I received a number of inquiries regarding low-frequency versions of this antenna for operation at ground level. After a little experimenting I came up with this version of a 40-meter DDRR which works quite well. In early tests very fine QSOs were held with stations as far away as Phoenix, while the antenna was located inside the garage and surrounded by myriad metallic objects. When the antenna was relocated to the back yard, marked improvement was noted even though this antenna site was marred by a sharp rise of 4 feet in ground elevation, plus close proximity to house wiring and power lines. In spite of these obstacles solid contact was easily achieved with stations up and down the West Coast. Encouraged by these results, we moved the antenna to a roof-top location which put it well in the clear insofar as metallic objects above the ground plane were concerned. In this location the DDRR really proved its worth. In spite of its low profile, a little over one foot, and its very small span, a few inches over nine feet, it was more than adequate when competing with any signal on the band. The obvious conclusion from my experiments is that the 40-Meter DDRR is the apartment dweller's dream. It is principally for that group that this article is prepared. Other interested amateurs might be those who are limited, as I am, by too much house on too little real estate; or those who for other reasons cannot cope with high towers, masts, and guy wires.

Before my enthusiasm sends you out to rip down your inverted V or to dismantle your beam, remember this: the DDRR for all of its capabilities

* 1841 Pinecove Dr., San Luis Obispo, CA 93401.

¹ English, "A Practical DDRR Antenna," 73, June, 1970.

will not supplant a full-size single-frequency antenna which is properly erected over clear terrain. What it will do is provide an antenna which will enable communications of respectable quality, where heretofore it has been impossible because of inadequate space to erect a 40-meter antenna.

Some consideration should also be given to the fact that the high-*Q* nature of the DDRR and its resultant narrow-band characteristics serve to reduce the noise level. Boyer^{2,3} reports that in the initial experiments it was found that DX stations which could copy signals from either a vertical or a DDRR could only be heard on the DDRR due to the reduction in background noise. So if you have a noisy location, it might be to your benefit to try the DDRR, regardless of what antenna you are presently using.

Constructing the 40-Meter DDRR

In this application, 2-inch diameter automobile exhaust pipe was used as the radiating element. The local muffler shop not only supplied the material, but also undertook to bend it to specifications. This was an obvious course since the material and the power bender were right at hand.

The dimensions for 40 meters are:

Ring - 9 foot diameter, center to center.

Height - 12 inches from ground plane to element center.

Gap - 6 inches from upright post center to open end of ring.

In forming the ring to these dimensions, we used four 10-foot lengths of tubing. A 10-degree bend was made at 9-inch intervals in three of the lengths. The fourth length was similarly treated except for the last 18 inches which were bent at right angles to form the upright leg of the ring. One

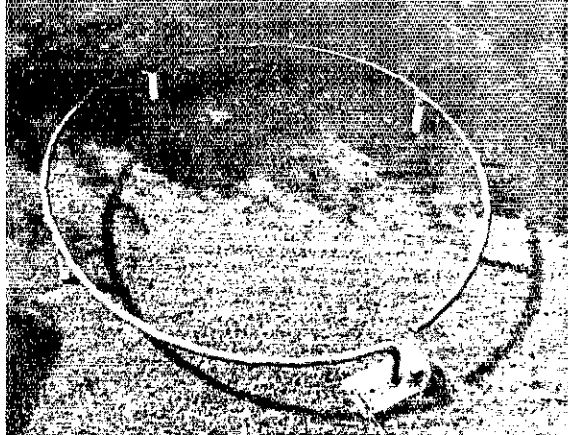
² Boyer, U.S. Patent Nos. RD 26196, RE 3,151,328 (All rights assigned to the Northrop Corporation).

³ Boyer, "Hula-Hoop Antennas: A Coming Trend?" *Electronics*, January 11, 1963.

About the DDRR

For those who might not be familiar with the DDRR Antenna, a few words of explanation are in order. This antenna, dubbed the Directional Discontinuity Ring Radiator by its inventor, J. M. Boyer, was devised to satisfy a need for very low frequency antennas on ship board. Basically the antenna consists of a 1/4-wavelength element grounded at one end and wound into a single turn coil, a few conductor diameters above the ground (see Fig. 1). Dimensions for resonance are affected by conductor diameter, ring radius, gap separation, and height above ground.

The chicken-wire ground plane is evident in the background. The base plate can be seen at lower right. Note the relative positions of the 52-ohm coaxial feed at the left end of the plate, the flange on the foot of the post, and the tuning unit at the right hand end of the plate.



Making the Mounting Plate

The mounting plate is required to provide good mechanical and electrical connections for the grounded leg of the radiator, the coaxial feed-line connection, and the tuning mechanism. If you are using aluminum tubing, you should use an aluminum plate, and for steel tubing, a steel plate to lessen corrosion from the contacting of dissimilar metals. Dimensions for the plate are shown in Fig. 2. The important consideration here is that good, solid mechanical and electrical connections are made between the ground side at the coaxial connector, the ring base, and the tuning capacitor.

The Tuning Unit

We found that the 9-foot ring resonated easily with approximately 20 pF of capacitance between the high end of the ring and the base plate or ground. A 35-pF double-spaced variable from the junk box was pressed into service here (Cardwell

end of each section was flared so that the sections could be coupled together by slipping the end of one into the flare of its mate.

The required flares are easily made at the muffler shop with the aid of the forming tools. Another task which can best be completed at the shop is to weld a flange onto the end of the upright leg. This flange is to facilitate attaching the leg to the mounting plate which provides a chassis for the tuning mechanism and the coaxial-feed coupler. After bending and flaring is complete, the ring is assembled and minor adjustments made to bring it into round and to the proper dimensions. This can best be done by drawing a circle on the floor with chalk and fitting the ring inside the circle. The circle must be slightly larger than the center-to-center diameter so that the reference line can be seen easily. For example, with two-inch tubing the actual diameter of the reference circle must be 9 feet, 2 inches. When you have a satisfactory fit between the tubing ring and the chalk ring, drill a 1/4-inch hole through each of the joints to accept a 1/4-inch bolt. These bolts will clamp the sections together. Also, they can be used to attach the insulators which support the ring at a fixed height above the ground plane.

Making and Attaching the Insulators

Insulators for the antenna were made from 11-inch lengths of 2-inch PVC pipe inserted into a standard cap of the same material. The PVC caps are first drilled through the center to accept the 1/4-inch bolt previously installed at the joints. The caps are then slipped onto the bolts and nuts are installed and tightened to secure the caps in place. The 11-inch length of pipe, when inserted into the cap and pressed firmly until it touches bottom, results in a total insulator length of 12 inches. Four insulators are required: one at each of the joints and one near the open end of the ring for support. It is wise to locate this insulator as far back from the end of the ring as possible because of the increasing high rf voltage that develops as the end of the ring is approached.⁴ As a final measure, the bottom ends of the insulators were sealed to prevent moisture from forming on the inside surfaces. Standard PVC caps could be used here, but we found that plastic caps from 15-ounce aerosol cans fit well.

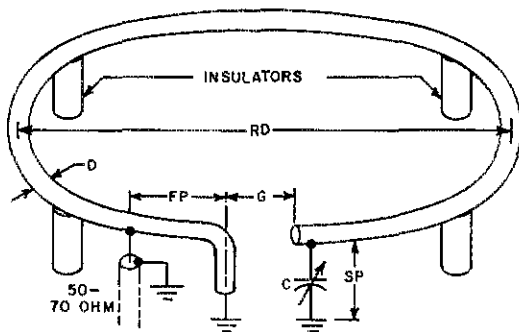


Fig. 1

RD = 0.078λ (28⁴)
 SP = $0.11D$ (2.5⁴)
 FP = $0.25h$ (See Note 1)
 C = (See Note 2)
 D = (See Note 3)
 G = (See Table 1)

Notes: (1) Actual dimension must be found experimentally. (2) Value to resonate the antenna to the operating freq. (3) d ranges upward from 1/2". The larger "d" is the higher efficiency is. Use largest practical size, e.g. 1/2" for 10 meters, 5" or 6" for 80 or 160 meters.

⁴ [EDITOR'S NOTE: Because of the danger of rf burns, in the event of accidental contact with the antenna, precautions should be taken to prevent random access to the completed installation.]

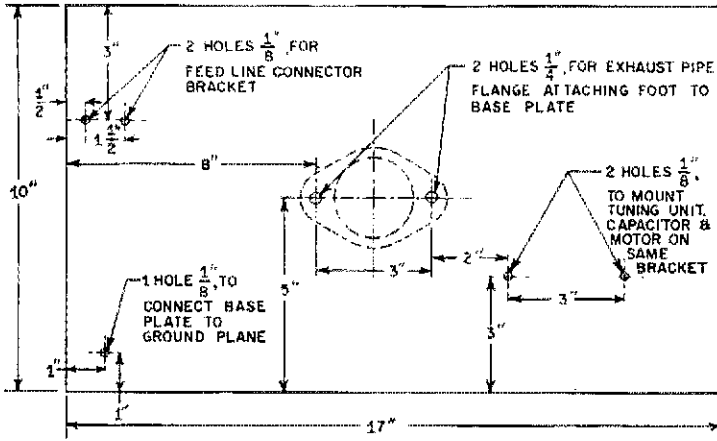


Fig. 2 — Drawing of the base plate which can be made from either steel or aluminum, as described in the text.

NG-35-DS). Any variable which will tune the system to resonance and which will not arc under full power should be satisfactory. Remember, the rf voltage at the high impedance end of this antenna can reach 20 to 30 kV with high power, so if you are using the maximum legal limit, you would do well to consider using a vacuum variable capacitor. Since we limited our power to 500-watts PEP, the double-spaced Cardwell unit was satisfactory. To provide for full band coverage, the capacitor was coupled to a reversible, slow-speed motor which enabled the antenna to be remotely tuned from the operating position. An indicated SWR of 1.1 to 1 was easily achieved over the entire 40-meter band. The motor used was a surplus item made by Globe Industries of Dayton, Ohio.⁵ At 20 volts dc the shaft of this motor turns at about 1 rpm which is ideal for DRRR tuning. The gears used were surplus items. If you cannot obtain gears, string and pulley drive will do almost as well, or you can mount both the motor and the capacitor in line and use direct coupling. Of course, if you operate on a fixed frequency or within a 40- to 50-kHz segment of the band, you can dispense with the motor entirely and simply tune the capacitor manually. In any case, the tuning unit must be protected from the weather. We used a plastic refrigerator box to house the tuning capacitor and its drive motor.

⁵Globe C-5A-1106 (available from Electronic Research Labs Inc., 75 Arch Street, Philadelphia, PA).

Fig. 3 shows the electrical connection for the motor. A small train transformer or power supply for toy slot-cars will work admirably as a tuning motor power source. Standard ac zip cord was used for the connection between the control unit and the motor.

Electrical Connections and the Ground-Plane

The connection between the open end of the ring and the tuning capacitor is made with No. 12 wire or larger. On the end of the base plate opposite the tuning unit, and directly under the ring about 8 inches from the grounded post, install a bracket for a coaxial connector. The connector should be oriented so that the feed line will lead away from the ring at close to 90 degrees. Install a clamp on the ring directly above the coaxial connector. Connect a lead of No. 12 or larger wire from the coaxial connector to the clamp. This wire must have a certain amount of flexibility to accommodate the movement necessary when adjusting the match. The matching point must be found by experimentation. It will be affected by the nature and quality of the ground plane over which the antenna is operating. The antenna will function over earth ground; however, in our location we found the electrical ground to be unpredictable. A ground-plane surface of chicken wire (laid under the antenna and bonded to the base plate) provided a constant ground reference and improved performance. In a roof-top location

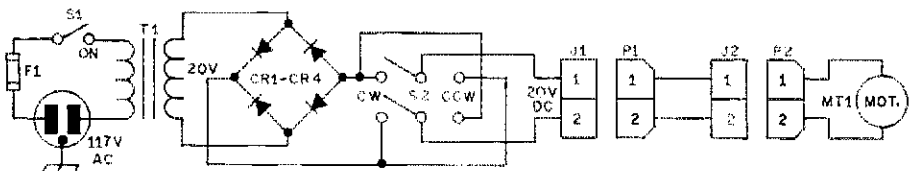


Fig. 3 — Circuit diagram of the power supply and control motor.

CR1 through CR4 — 1 A, 50 PRV, or equiv.
 F1 — Fuse, 1 A.
 J1, J2 — Two-terminal jack.
 MT1 — Motor (see text).

P1, P2 — Two-terminal plug.
 S1 — Spst.
 S2 — Dpdt, center off.
 T1 — Transformer (see text).

TABLE I

	Dimensions for 1/4 Wavelength DDRR Elements							
<i>Band (Meters)</i>	160	80	40	20	15	10	6	2
<i>Feed Point (FP)*</i>	12"	6"	6"	2"	1.5"	3"	1"	1/2"
<i>Gap (G)</i>	16"	7"	5"	3"	2.5"	2"	1.5"	1"
<i>Capacitor, pf (C)</i>	150	100	70	35	15	15	10	5
<i>Spacing (Height) (SP)</i>	48"	24"	11"	6"	4 3/4"	3"	1 1/2"	1"
<i>Tubing Diameter (D)</i>	5"	4"	2"	1"	3/4"	3/4"	1/2"	1/4"
<i>Ring Diameter (RD)</i>	36'	18'	9'	4.5'	3'4"	2'4"	16 1/4"	6"

* See Fig. 1 for explanation of designations.

sheet metal roofing should provide an excellent ground-plane. A poor ground usually results in a matching point for the feed line far out along the circumference of the circle. In our installation a near-perfect match was obtained with the feed line connected to the ring about 12 inches from the grounded post. During testing, when the antenna was set up on a concrete surface without the ground plane, a match was found when the feed line was connected nearly 7 feet from the post!

As shown in photos, the compactness of the antenna is readily apparent. The ground plane is made up of three 12-foot lengths of chicken wire, each 4 feet wide, which are bonded along the edges at about 6-inch intervals. In our installation the antenna, with the ground plane, could be dismantled in about 30 minutes. If portability is not important, it is best to bond all of the joints in the tubing so that good electrical continuity is assured.

After all construction is completed, the antenna should be given a coat of primer paint to minimize rust. If it suits you, there is no reason why a final coat of enamel could not be applied.

Tuning Procedures

Once the mechanical construction is completed, the antenna should be erected in its intended operating location. Coupling to the station may be accomplished with either 52-ohm or 72-ohm

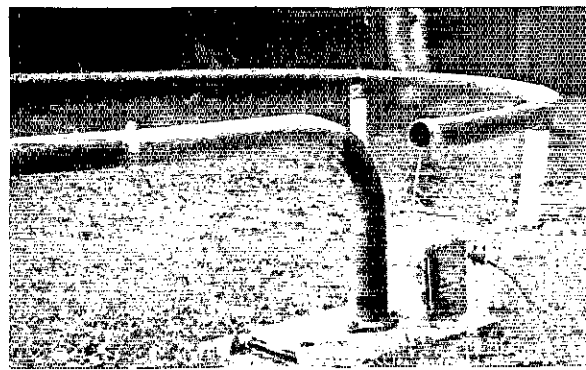
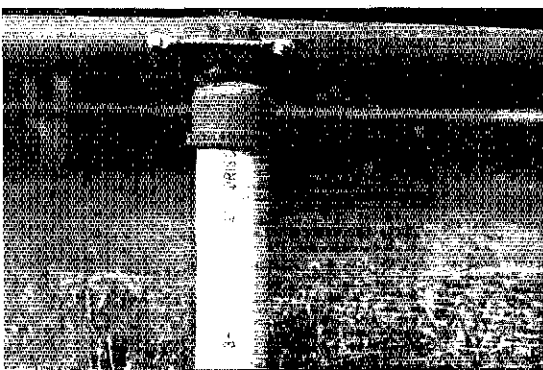
coaxial cable. Tune and load the transmitter as with any antenna. While observing an SWR meter in the line, operate the tuning motor. Indication of resonance is the noticeable decrease in indicated reflected power. At this point, note the loading of the transmitter; it will probably increase markedly as antenna resonance is approached. Retune the transmitter and move the feed-point tap on the antenna for a further reduction in indicated reflected power. There is interaction between the movement at the feed tap and the resonance point; therefore, it will be necessary to operate the tuning motor each time the tap is adjusted until the lowest SWR is achieved. Don't settle for anything less than 1.1 to 1. With a good ground and proper tuning and matching, this ratio can be achieved and maintained over the entire band. Once the proper feed point has been located, the only adjustment necessary when changing frequency is retuning the antenna to resonance by means of the motor. If the antenna is to be fixed tuned, provide an insulated shaft extension of 18 inches or so to the tuning-capacitor shaft for manual adjustment. This not only provides insulation from the high rf voltage but also minimizes body-capacitance effects during the tuning process.

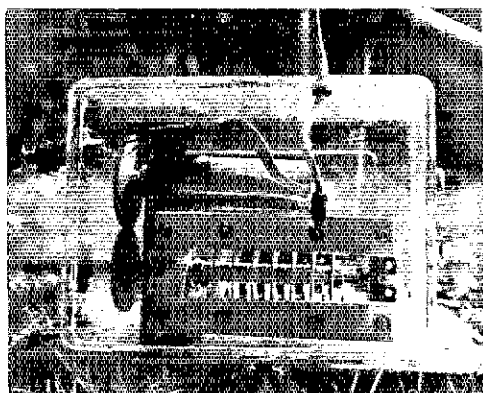
Alternatives

A number of materials other than the steel tubing used here are well suited for the ring

The braided lead across the flared joint is to assure electrical continuity. The screws used are self-tapping sheet-metal screws. The top end of the insulator (2-inch diameter PVC pipe) is a standard PVC pipe cap; the bottom is closed off with a cap from an aerosol can (2-inch ID).

Clamps used to connect the feed line and the open end to the capacitor are standard hose clamps. The heavy black lead, center to lower right, is the 52-ohm feed line. The smaller line coming from the plastic housing is the motor control line.





element. Standard E.M.T. or electrical conduit would work as well with a slight increase in weight. One advantage to be gained through the use of conduit is the elimination of the flaring operation since standard couplings would serve to connect each segment of the ring to its adjacent member. Another suitable material is copper tubing. This material is superior to either exhaust pipe or conduit in terms of its conductivity characteristics. Another advantage of copper is that it is available in continuous lengths and the joints could be omitted entirely.

The 2-inch dimension is by no means mandatory. Smaller diameter tubing has been used with satisfactory results.⁶ In fact, DDRR antennas have been fabricated with wire elements. But, if the element diameter is reduced, the antenna tunes more *sharply*. Some experimenters may wish to go in the other direction and use a larger element diameter. I recommend the use of aluminum downspout with a diameter of about 4 inches. This material does not lend itself to bending, however, and the ring must be configured as a regular polygon of eight or more sides. Because of the large number of joints involved, welding is about the only practical means of joining the segments. Unless you are equipped to do this work yourself, the cost of welding might be prohibitive. Anyone who undertakes to make a DDRR antenna of a large element diameter will be rewarded in terms of improved performance.

Performance

Results have been quite encouraging, and it is hoped that more and more hams will equip themselves with the DDRR in the future. The antenna has proved its worth and deserves more investigation by the amateur fraternity than it has been given in the past. No intensive efforts have been made to work DX with the antenna described here; however, a low angle of radiation is conducive to DX, and this antenna demonstrates a low radiation angle. We have found that distant areas, such as the East Coast, are more easily contacted than are stations nearby. All of the results could be attributed to peculiarities of individual stations or skip conditions, but since

⁶ See footnote 1.

The tuning motor, above the capacitor, couples to the capacitor shaft through the gears at left. Both the motor and the capacitor are mounted on a common bracket which attaches to the base plate by two bolts through the weatherproof housing. The lead passing upward through the grommet connects the stator of the capacitor to the open end of the ring.


they are characteristics which can be anticipated with high-efficiency antennas having low radiation angle, we prefer that interpretation. Besides, where else will you find an antenna for 40 meters that is small enough to fit into a corner of the back yard and not protrude above the fence; or for that matter, which could be mounted on the roof of an apartment building or even a ranch-type house and not be visible from the street?

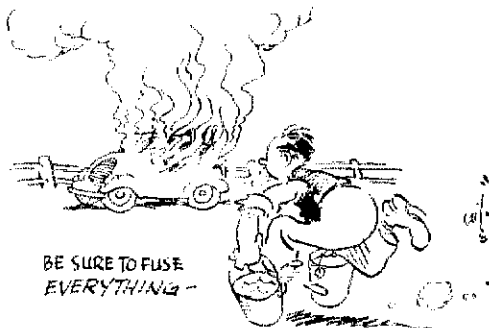
Nearly everyone who listened to the description of this new antenna was enthusiastic. I hope to hear many hams on the air working with the DDRR in the near future.

Parts List

- 4 - 10-ft lengths of 2-inch tubing, exhaust pipe, conduit or copper tubing.
- 1 - base plate 7 1/2 x 19 x 1/8 inches, steel, aluminum, or copper to match tubing.
- 4 - PVC pipe caps for 2-inch pipe.
- 4 feet of 2-inch PVC pipe.
- 2 clamps for 2-inch tubing.
- 4 - 1/4 x 4-inch bolts with nuts.
- 1 reversible motor with 1-rpm shaft output.
- 1 wide spaced variable capacitor, 5 to 35 pF (Millen 16550 or equiv.).
- 1 coaxial connector SO-239.
- 2 sets 2-connector plug and socket for motor control.
- 36 feet of 4-foot chicken wire or equivalent.
- 1 flange to attach tube to base plate.
- 2 - 1/2 x 1-inch bolts with nuts (flange mounting).
- 8 - 3-inch bonding strips No. 8 braided wire.
- 4 plugs 2-inch ID for insulator bases.

Bibliography

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- Horn, "The Half Wavelength DDRR Antenna," *CQ*, September, 1967.
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Simple Integrated-Circuit Square-Wave Source

BY LARRY NICKEL,* K3VKC

AMONG THE various linear integrated circuits on the market today, the RCA "CA" series includes many versatile and inexpensive units. At \$3.71 the CA3002 amplifier is quite a bargain. The multitude of uses for the CA3002 includes amplifier, detector, mixer, modulator, Schmitt trigger, and oscillator. One of the most simple arrangements seems to be that of a square-wave oscillator. In addition to the IC, only three parts are required (see Fig. 1). The input bias resistors are not of a critical value. The value of C1 will determine the square-wave frequency. A capacitor as small as 12 pF produces a frequency of approximately 200 kHz. A small lamp blinker was assembled to demonstrate the low-frequency capability of this circuit. The CA3002 feeds two transistors connected in the familiar Darlington arrangement. A lamp drawing up to approximately a half ampere (or a relay) can be driven. See Fig. 2.

RCA lists the maximum output of the CA3002 as 5.5 V peak-to-peak (pk-pk). I was able to get almost an eight-volt pk-pk square wave. The output impedance is less than 100 ohms, so you can load it pretty heavily. For additional information on the RCA CA series ICs, refer to their manual *Linear Integrated Circuits* (\$2.50). It's packed full of interesting circuits and applications.

QST

* 118 W. Louthier St., Carlisle, PA 17013.

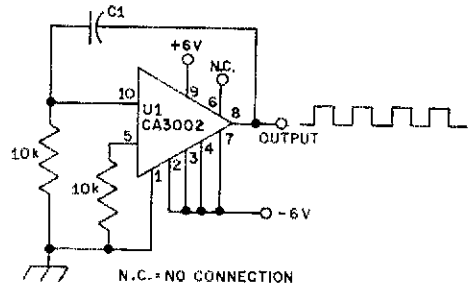


Fig. 1 — Basic square-wave oscillator circuit. Resistances are in ohms.

C1 — See text.

U1 — RCA IC. As an alternative to the connection shown, pin 7 may be grounded.

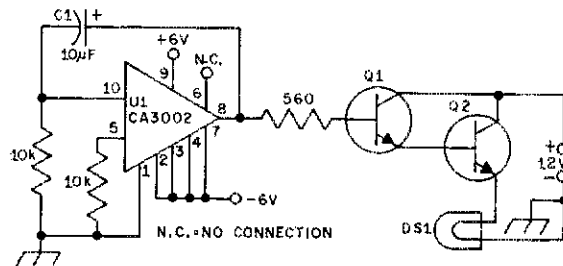


Fig. 2 — Lamp-flasher circuit to demonstrate the low-frequency capability of the square-wave generator. Resistances are in ohms; capacitance is in microfarads. With circuit values shown, the frequency of oscillation is approximately 1 Hz.

C1 — Electrolytic.

DS1 — No. 76 pilot lamp.

Q1 — Silicon npn audio or general-purpose transistor, 150 mW, 2N333 or equiv.

Q2 — Silicon npn power transistor, 2N1485 or 2N3766 or equiv.

U1 — RCA IC.

Strays

The 1971 John Gore Memorial Scholarship was awarded September 23 by Commissioner Bartley of the FCC to Alan Garrett Scott, WB2TCZ, of Painted Post, N.Y. Alan, on the dean's list three times as an EE major at the U. of Cincinnati, obtained his Advanced ticket three years ago.

Each year the Foundation for Amateur Radio awards the \$500 scholarship to the amateur judged to be the most scholarly and deserving from among nationwide applicants. Gore was an outstanding past president of the Foundation, composed of 27 clubs in the Washington, D.C. area.

December 1971

Recent recipient of 5BWAS No. 55, Jerry Fiore, K4HPR, turned the brick in just five months with his TR-3 and a combination of TA-33 and dipoles. An old hand at collecting certificates, Jerry has garnered more than 500 awards.



Pi and Pi-L Network Design for Amplifiers

BY IRVIN M. HOFF,* W6FFC

ALTHOUGH FEW PEOPLE construct their own receivers and ssb transmitters, quite a number still build their own final amplifiers. This area remains of great interest to the average radio amateur. Until the advent of the ssb mode of operation, most amplifiers were operated Class C. Many of the transmitters were constructed to work into open-wire transmission lines using link-coupled outputs. Today nearly all transmitters used by radio amateurs are designed for low-impedance coaxial output, typically 50 ohms.

Now that ssb has become so popular, certain problems arise that many amateurs either overlook or are uncertain about how to handle. These problems stem from the desire to use the same amplifier at one power level for voice operation and a different level for cw and RTTY operation.

Determination of Plate-Load Impedance

Since the amplifier will be called upon to operate as either a linear or a saturated amplifier, the plate-load impedance Z_P , will vary. Because we are dealing primarily with an ac circuit, it is the plate-load impedance, not the plate resistance, that is to be used. Table I gives the approximate formulas to calculate Class A, B, and C plate-load impedances.

Matching Networks

The first type of network to consider is the L . A typical step-down L network is shown in Fig.

* 12130 Foothill Lane, Los Altos Hills, CA 94022.

TABLE I

CLASS A	$Z_P = \frac{E}{1.3I}$
CLASS B	$Z_P = \frac{E}{1.57I}$
CLASS C	$Z_P = \frac{E}{2I}$
where Z_P = plate-load impedance in ohms E = plate voltage in volts I = plate current in amperes	

Table I — Calculation of plate-load impedances for different classes of amplifier service.

1A. This network can transform a high input impedance to a lower output impedance. The Q in this circuit is entirely dependent upon the ratio of the two impedances. Although the L network is extremely efficient (97 to 98 percent being typical), it does not allow the designer sufficient latitude to obtain a realistic loaded Q as a function of impedances.

The second type of matching network to be considered is the pi. Fig. 1B shows the network as it would be used in a typical transmitter. The antenna provides the output load impedance, Z_L , and the tube provides the input load impedance, Z_P . The antenna load is typically 50 ohms and the plate load is usually in the 1500- to 5000-ohm range. The pi network is a matching device that transforms the higher impedance of the amplifying device to that of the antenna impedance. It does this quite efficiently and with predictable results. The pi network has virtually replaced the older link-coupled networks. The latter were used as rf transformers prior to moderate-cost coaxial feed line becoming available in the years following World War II.

A third type of network is a combination of the pi and L networks referred to as the pi- L network. The capacitor, C_2 , in the network shown in Fig. 1C is the parallel combination of the output capacitor in the pi network and the input capacitor in the L network. The pi- L network gives some improvement in harmonic attenuation over the pi network. Some further advantages of the pi- L network are greater bandwidth for a given variation in Q , less output tuning capacitance needed, and lower Q possible at very high plate-load impedances.

Since Q goes up as the frequency goes down, it is an excellent idea to choose a Q and start the calculations at the highest frequency in the band to be used.¹ When the same inductor is used for frequencies lower in the band, the Q will go up somewhat, which is better with respect to harmonic attenuation, but causes losses to increase.

Network Design

The design will be limited to the pi and pi- L networks, since these are the more commonly used networks in amplifiers. The pi network can be separated into two L sections. The first L section steps down the plate-load impedance to a lower impedance often called the "virtual impedance." The second L section steps up the virtual impedance to 50 ohms to match the antenna

¹ Grammer, "Simplified Design of Impedance Matching Networks," Part II, QST, April, 1957.

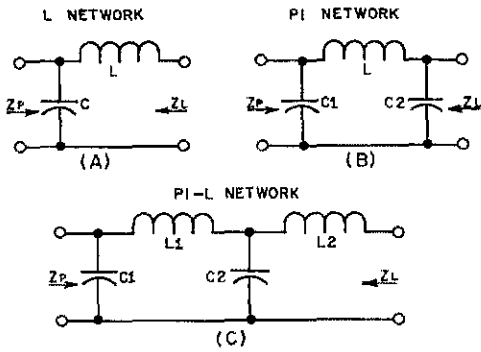


Fig. 1 - Basic networks used in tank-circuit design.

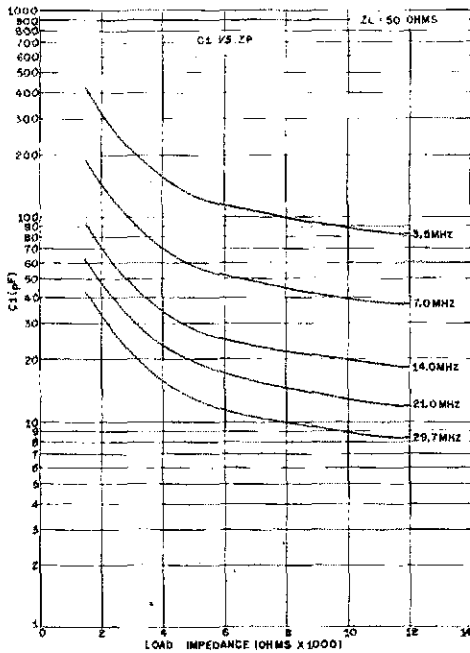


Fig. 2 - Tuning capacitance, C_1 vs plate-load impedance, Z_p , for a pi network.

TABLE II

Band	Inductance (μH)
80 meters	4.45
40 meters	2.44
20 meters	1.24
15 meters	0.83
10 meters	0.60

Table II - Inductance values for L_2 in the pi-L network design shown in Figs. 6 through 8.

Fig. 5 - A pi-L network made up of a pi network and an L network.

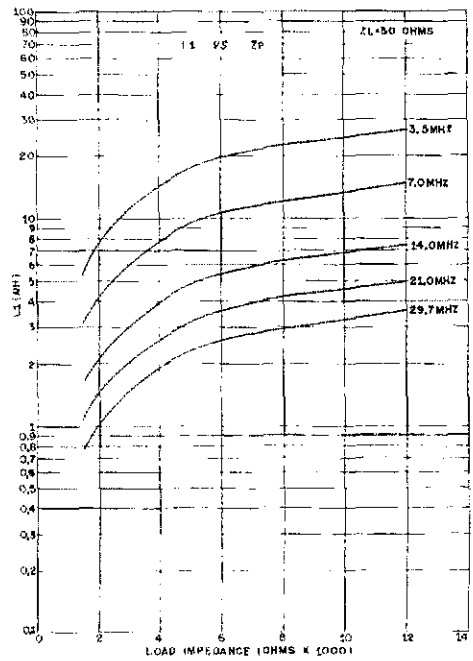


Fig. 3 - Inductance, L_1 vs plate-load impedance, Z_p , for a pi network.

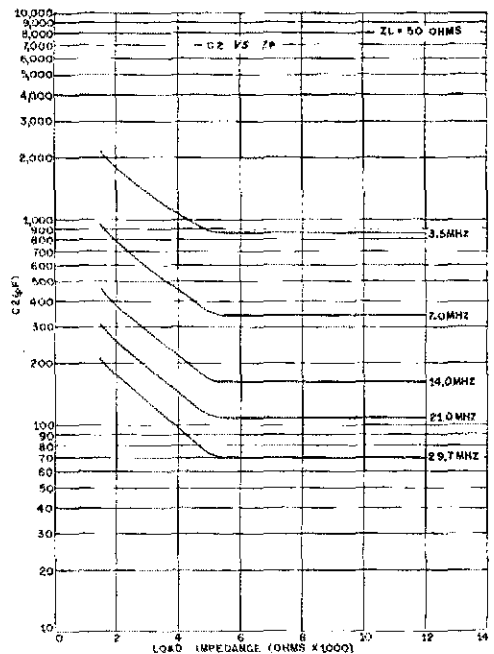
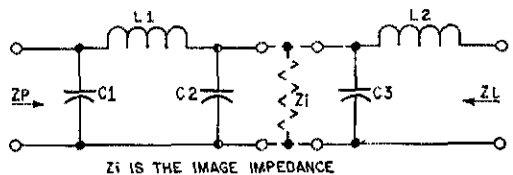


Fig. 4 - Loading capacitance, C_2 vs plate-load impedance, Z_p , for a pi network.



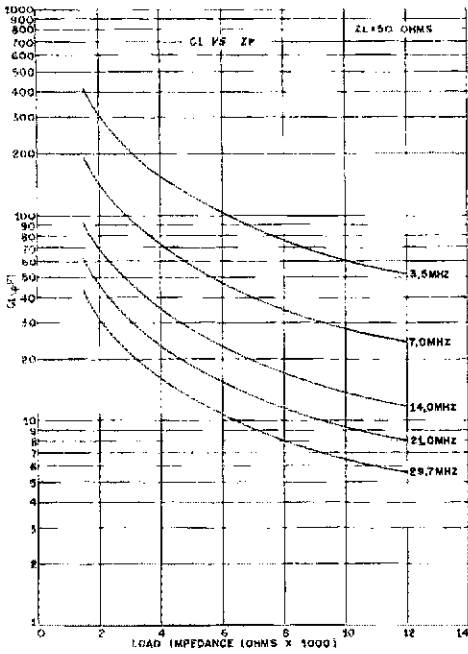


Fig. 6 - Tuning capacitance, C_1 vs plate-load impedance, Z_P , for a π - L network.

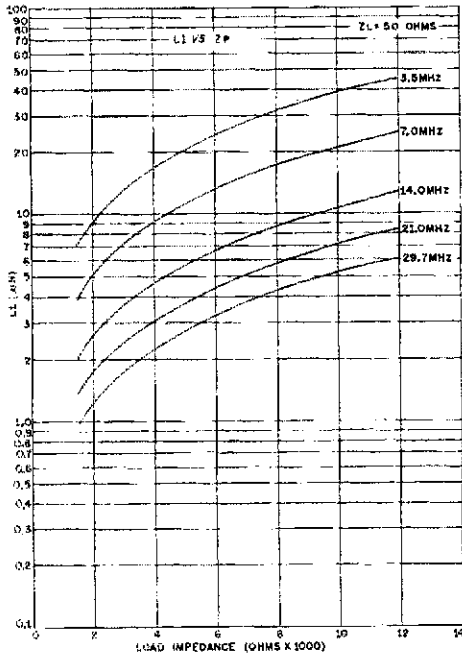


Fig. 7 - Inductance, L_1 vs plate-load impedance, Z_P , for a π - L network.

Fig. 8 - Loading capacitance, C_2 vs plate-load impedance, Z_P , for a π - L network.

impedance. The Q of the second L section is quite low and is usually around 1.5.

When the plate-load impedance goes much higher than 7250 ohms for a Q of 12, the π network reverts to an L network. If a limit of 70 percent of the maximum transformation is used, then for a Q of 12 and a 50-ohm load impedance, the maximum plate-load impedance would be 5075 ohms. This value represents a practical limit of impedance transformation of the π network for a Q of 12.

Figs. 2, 3, and 4 give the design information for determining the values of the components as a function of the plate-load impedance while looking into a 50-ohm load impedance. The frequency at the top of the 10-meter band was chosen to give a minimum value of the tuning capacitance, C_1 , needed for resonance.

Fig. 5 shows how another L network can be added to the π network for additional harmonic attenuation. In practice, C_3 becomes part of C_2 so the actual circuit used in the amplifier becomes the one shown in Fig. 1C. In the case of the π - L network, the π section would transform the plate-load impedance to some intermediate impedance such as 300 ohms. This impedance is often called the "image" impedance, Z_1 . The L section steps down the 300-ohm image impedance to match the 50-ohm load impedance.

The image impedance is usually chosen to be between 200 to 400 ohms. It is selected to give good harmonic attenuation, some balance in the T section of the π - L network, and parts values for capacitors and inductors which are available. If too high an image impedance is used, the tuning capacitor, C_1 , will be too small on 10 and 15 meters and the two inductors will be physically

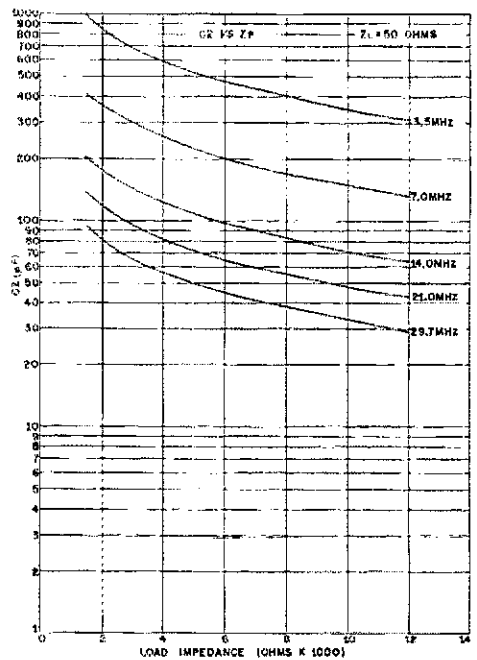


TABLE III

F MHz	C1 pF	L1 μH	C2 pF	Q Qual.
3.0	433	7.34	2878	20.4
3.5	317	7.34	1053	17.4
4.0	242	7.34	1517	15.2
5.0	153	7.34	878	12.0
5.0	265	4.32	1764	20.8
7.0	134	4.32	834	14.7
7.3	123	4.32	755	14.1
8.5	90	4.32	516	12.0
8.5	155	2.55	1034	20.8
14.0	56	2.55	327	12.4
14.35	54	2.55	308	12.1
14.4	53	2.55	305	12.0
13.5	94	1.67	621	19.9
21.0	38	1.67	225	12.6
21.45	37	1.67	212	12.3
22.0	35	1.67	199	12.0
20.0	59	1.22	383	18.4
28.0	30	1.22	176	13.0
29.7	26	1.22	151	12.2
30.0	25	1.22	146	12.0

Table III - Component values for a pi network design covering frequencies from 3 to 30 MHz in five band-switched steps. Plate-load impedance is chosen at 2500 ohms and the load impedance is 50 ohms. A minimum Q is used at the top end of each band.

large. If we choose an image impedance of 300 ohms, a Q of 12, and a load impedance of 50 ohms, the maximum plate-load impedance limit would be 43,500 ohms. Above this impedance value, the network ceases to perform as a pi-L network. Taking the practical limit of 70 percent of the maximum plate-load impedance, or 30,500 ohms, this represents a figure which is far in excess of what will ever be encountered in a 1-kW input amplifier.

Figs. 6, 7, and 8 give the design information to determine the values of the components in a pi-L network. Since an image impedance of 300 ohms was chosen, the L section has a Q of 2.2 working into a 50-ohm load impedance. The values of L2 calculated for the data in Figs. 6 through 8 are tabulated in Table II.

S9er

(Continued from page 19)

Some Afterthoughts

Looking back over the project, certain things stand out and may deserve some more thought: The amplifier could be built on a larger chassis and the cabinet could be a couple of inches taller to accommodate the Eimac hardware. The right-angle drive used to rotate the plate-tuning capacitor contributes significantly to the stiffness in operation. Therefore, the plate-tuning capacitor could be mounted in a horizontal position with its shaft passing through the front panel, thus

TABLE IV

F MHz	C1 pF	L1 μH	C2 pF	L2 μH	Z1 Ohms	Q Qual.
3.0	388	9.00	1510	3.90	158	18.3
3.5	292	9.00	1015	3.90	197	16.0
4.0	228	9.00	717	3.90	242	14.4
5.0	153	9.00	400	3.90	350	12.0
5.0	237	5.29	935	2.29	154	18.6
7.0	127	5.29	391	2.29	253	14.0
7.3	118	5.29	351	2.29	270	13.5
8.5	90	5.29	235	2.29	350	12.0
8.5	139	3.12	549	1.35	154	18.6
14.0	56	3.12	150	1.35	330	12.3
14.35	54	3.12	141	1.35	345	12.1
14.4	52	3.12	139	1.35	350	12.0
13.5	85	2.04	323	.89	165	18.0
21.0	38	2.04	103	.89	325	12.5
21.45	36	2.04	97	.89	335	12.3
22.0	35	2.04	91	.89	350	12.0
20.0	53	1.50	192	.65	183	16.7
28.0	29	1.50	80	.65	315	12.7
29.7	26	1.50	68	.65	345	12.1
30.0	25	1.50	67	.65	350	12.0

Table IV - Component values for a pi-L network design covering frequencies from 3 to 30 MHz in five band-switched steps. Plate-load impedance is chosen at 2500 ohms and the load impedance is 50 ohms. A minimum Q is used at the top of each band.

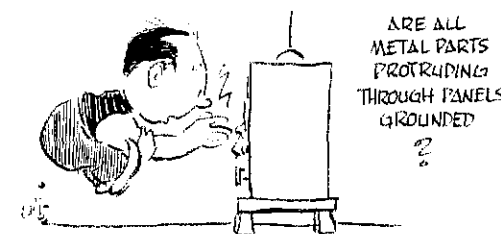
Two examples of amplifier output-network design are tabulated in Tables III and IV. The output networks cover a frequency range from 3 to 30 MHz in five switched positions. They both transform a plate-load impedance from 2500 ohms down to the antenna load impedance of 50 ohms.

Acknowledgements

The author wishes to thank Bob Sutherland, W6UOV, of the Eimac Division of Varian Associates, Bill Craig, WB4FPK, Garey Barell, K4OAH, and Bill Carver, K6OLG. The author also wishes to thank the Computer Terminal Corporation of San Antonio for providing him with over 100 hours time which was invaluable in this project.



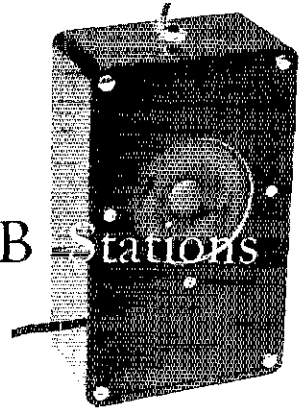
eliminating the need for a drive mechanism. It might be better to use only one panel meter; a fourth position on S2 could be used to provide monitoring of cathode current on the multimeter.



A Tone Generator for

Netting of SSB Stations

BY STAN OEHMEN,* W2HG



NET OPERATION requires that all of the participating ssb stations be on frequency, preferably within 20 Hz. The operator usually tunes his receiver for a normal-sounding voice quality. Carrier insertion is used occasionally for netting, but at best, this is crude. The passbands of the ssb filter and the audio system restrict the response below 300 Hz. This makes it very difficult to hear the low-frequency note when zero beating. Some years ago it was suggested that a small amount of carrier be transmitted (30 dB below the

output signal) for the receiver to lock on. The system required an extensive amount of equipment at the receiving station and proved to be impractical.

A Better System

It is easy to set two suppressed carriers to the same frequency when they are both modulated by

* 1387 Potters Blvd., Bay Shore, NY 11706.

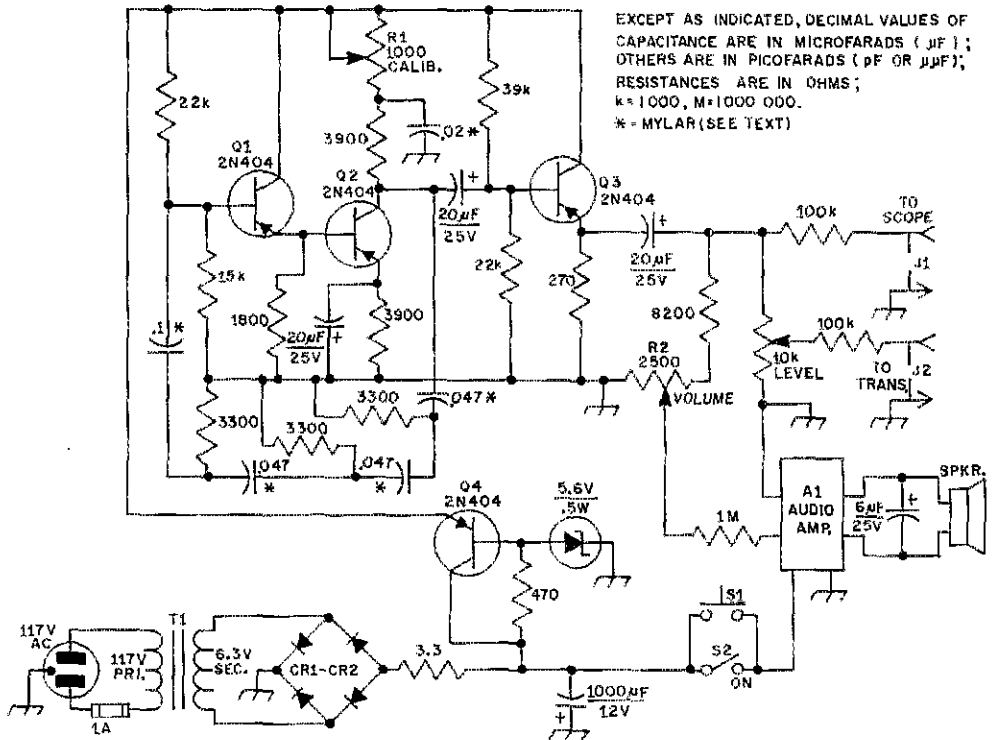


Fig. 1 - Circuit diagram of the tone generator. Capacitors are disk ceramic or Mylar (except those marked with polarity, electrolytic). Resistors are 1/2-watt, 10-percent-tolerance, composition. Component designations not listed below are for text reference.

A1 - Audio amplifier module (RCA KD2115 or equiv.).

CR1-CR4, incl. - 100-PRV, 1-A, silicon diode.

J1, J2 - Phono jack, panel mount.

R1 - 1000-ohm, linear-taper, 1/2-watt control.

R2 - 2500-ohm, linear-taper, 1/2-watt control.

S1 - Spst push button.

S2 - Spst toggle.

T1 - Filament type, 6.3 V (Stancor P-8389 or equiv.).

identical audio oscillators. An audio tone, when transmitted, will appear as a single carrier. While listening to the tone being transmitted, the transceiver VFO is adjusted so that the received note is the same as a "standard." The frequency of the transceiver-transmitted signal then will be the same as the one being received.

The Tone Generator

There are several reasons for selecting a musical note for a standard. First, a 440-Hz tone can be calibrated against WWV transmissions. Additionally, the generator can be checked by comparing it with a musical instrument.

A two-stage phase-shift oscillator is used to produce a sine wave at the proper frequency. See Fig. 1. The tone can be varied by altering the amount of phase shift in the last stage. R1 serves as the calibration control. Mylar capacitors should be used in the phase-shift circuit. The power supply consists of a silicon-rectifier bridge circuit connected to the secondary of T1 — a 6-volt filament transformer. The series regulator and Zener diode provide 5.4 volts for the oscillator and emitter-follower stage. A 6- μ F capacitor is connected across the speaker voice coil to reduce its high-frequency response. S1 allows the operator to listen to the tone momentarily, and S2 is used for longer calibration periods. The power requirement is so low that the unit can be left on continuously.

The oscillator output is coupled to an emitter-follower stage which drives the internal audio amplifier (A1) for speaker operation. A phono jack permits connection to a monitor scope (such as the Heath SB-610) and the station transmitter. Fig. 2 shows how this equipment is interconnected with the existing station components. While the monitor scope allows visual display, aural zero beating is just as accurate.

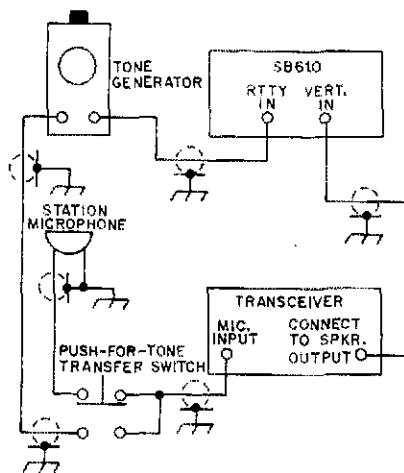


Fig. 2 — Connections between station equipment and the tone generator should be made with shielded wire. A push-button switch can be included to select either the station microphone or the tone generator.

Operation

Some operators may mistakenly zero against 220 Hz or 880 Hz. This can occur if there is an unusually high amount of distortion in the receiver or generator output. As soon as speech is applied to the transmitter however, the mistake will be immediately apparent. The accuracy of this zero-beating technique is dependent on the VFO remaining stable between the transmit and receive modes. Since the calibrator does not rely on the ac line for determining its frequency, it can be adapted to mobile use by powering it from a battery supply. QST

50 MHz Yagi

(Continued from page 24)

Miscellaneous Ideas

You don't have to build your own antennas to use the ideas set forth here. The matching system is good for any pair of Yagis intended for 50-ohm feed. Just be sure that they do present 50-ohm loads, though, if you want to match them nicely with the double-Q system using 75-ohm lines.

Maybe you like Yagis having balanced feed systems. If so, be sure that each can be fed with a balun and 50-ohm line (50- to 200-ohm impedance step-up). Then make the phasing lines of 75-ohm coax.

Maybe your bay spacing and mounting methods will make a different length of phasing line desirable. You can use any combination of odd multiples of quarter-wave phasing line length, as, for example three quarters on one side and five on the other. If this is done, the gamma matching arms should be connected on opposite sides of the center of the driven elements, to keep the bays in phase. If dissimilar line lengths are used, dipping

for resonance is even more important than with arrays fed at the electrical center.

If you can't quite make 12 feet of separation, get all you can, and use phasing lines of the same length as described here. The spacing is not a life-or-death matter. A graph in our *Radio Amateur's VHF Manual*, Fig. 8-11, though made with two collinears, shows what happens as bay spacing is varied. Close spacing gives clean patterns, with somewhat lower gain. Wider spacing beefs up the main lobe, and sharpens it, but at the expense of larger minor lobes. QST

Strays

Read recently where some fellow legally changed his name to "Z." Wonder if I could change mine to WA4WME — but how would I pronounce it? — WA4WME

While serving with the Air Force at Luke AFB, Arizona, WA3AGD shared a Phoenix, Arizona QTH with K7AGD and W7AGD.



Hints and Kinks

For the Experimenter



INEXPENSIVE OPERATING TABLE

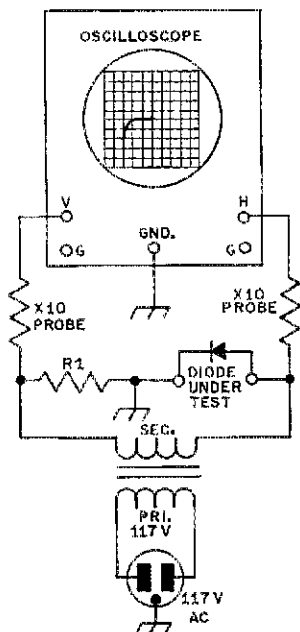
A large but inexpensive operating table for the ham shack can be made by putting four hairpin-shaped iron legs on a surplus door. I got both the legs and a door at a local hardware store for five dollars.

Starter holes are drilled close to the edge of the door (most doors have only about 1 inch of solid wood around the outside), then the legs are screwed in place. The table is easy to cut through to install a power socket. — *James L. Upham, WNØEOV*

MEASURING SURPLUS DIODES

Shown in the diagram is a method I use for measuring the PRV of unknown diodes. R1 is a 2-megohm resistor which limits the current through a diode under test to less than 1 mA. This prevents junction damage and reduces shock hazard.

Two times-ten probes are used to reduce the voltage to a level within the range of my scope. The horizontal gain is adjusted for full-scale deflection with the checker disconnected from the



Circuit diagram and oscilloscope connection for checking PRV of unknown diodes.

R1 — Selected to limit current through diode to 100 microamperes.

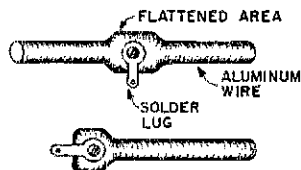
T1 — Transformer secondary voltage in excess of PRV of diode under test.

oscilloscope (about 500 V per division). With the checker connected, the test leads to the diode are shorted together and the vertical trace is adjusted for full-scale deflection (about 200 microamperes per division).

To test a diode, connect it to the clip leads. An L-shaped trace indicates that the diode PRV is greater than the supply voltage. But, if the trace bends as shown in the diagram, the point of the bend indicates the value of the PRV. In this case the 100-microampere point indicates the diode is useful to 1000 PRV. — *Edward A. Ganshirt, WA1AI*

MAKING CONNECTIONS TO ALUMINUM WIRE

Vhf enthusiasts often use large-diameter aluminum clothesline wire for Yagi or quad antenna elements. Making a secure solder connection to this type of wire is a difficult task, even when using Sal-Met or other aluminum flux material.



An easy solution, used many times by this writer and her OM, is to place the aluminum wire (at the point where an electrical connection is to be made) on an anvil or other hard surface, then flatten the wire to a width of approximately 1/4 inch. The flattened area then can be center punched and drilled to accommodate a No. 4 bolt. Then, a No. 4 solder lug can be installed on the wire (use a lock washer), and the feeder or other copper conductor can be soldered to the lug.

If the antenna is to be used out of doors, coat the soldered area with epoxy cement or Silastic compound to prevent oxidation caused by weathering and the union of dissimilar metals. — *WICKK*

EASY VOX ADJUSTMENT FOR THE SB-401

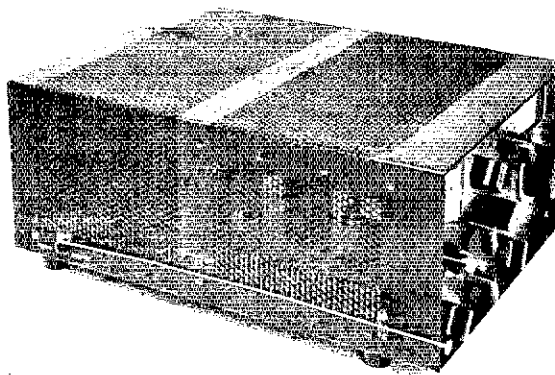
Using the Heath SB-401 on both phone andew nets in the same evening presents a minor inconvenience in changing the setting of the VOX adjustment between the two modes. I personally keep the VOX set for cw so that it drops between words. This is too fast for phone-net operation. Ordinarily, adjustment requires using a screw driver to change the VOX setting, which is both time consuming and difficult to do while trying to test the setting.

My simple way to overcome the problem is to slip the plastic nut starter that Heath supplies with its kits over the potentiometer shaft until it fits tightly. Adjustments of the delay entails only lifting the lid and turning the nut starter. It is easy to make these adjustments even in the middle of a sentence. The nut starter is long enough that it is easy to reach, but short enough that the lid closes over it. — *Paul Hurm, WB8CLF*

CODE-PRACTICE OSCILLATOR AND MONITOR

Shown is the circuit of my code-practice oscillator which I modified to act as a transmitter monitor. Parts layout is not critical, but a three-wire jack will be necessary if the oscillator is built into a metal enclosure. R1 was chosen to give proper bias using the 150-mV keying circuit in my transmitter. R1 is 10 ohms, which is sufficient to forward bias Q1 and close the circuit to the code oscillator.

The oscillator requires 3 volts which can be supplied by two size-D cells, but provides increased volume when using a 4.5-volt supply. S1 provides code-practice-oscillator operation in one position, and both transmitter and oscillator in the other. I have used this scheme with three transmitters and find it satisfactory. — *Alex Bremner, Jr., WN7QQQ*



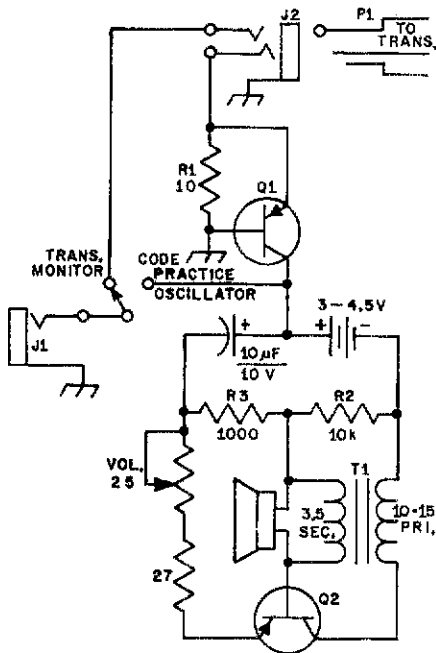
Shown is the method of securing the knitting needle to the side of the Drake TR-4 to operate the RCVR/TCVR switch from the front panel.

EASY TRANSCEIVE/RECEIVE SWITCHING FOR THE TR-4

In my station setup I have a Drake TR-4 transceiver and a Heath SB-301 as my second receiver. The antenna switch and muting circuit built into the TR-4 worked perfectly with the SB-301 for split-frequency operation. However, one problem always came up. The RCVR/TCVR switch is mounted on the left side panel near the rear of the TR-4. This is not a very handy place for a control that I use frequently. Although it's very Heath Robinson (the G-land equivalent of Rube Goldberg), my modification performs well and allows instant switching of the RCVR/TCVR switch on the TR-4 from the front panel without the disadvantage common to remote VFOs — the ease of transmitting on the forbidden portion of the band.

My solution, shown in the photograph, was to secure two solder lugs, one under each lower left case-securing screw, and bribe the XYL to let me have one of her thin metal knitting needles. Hold the blunt end of the knitting needle about 1/4 inch in front of the left-hand side of the transceiver case and gently bend the pointed end of the needle around the RCVR/TCVR switch. Secure the needle in place by bending the solder lugs around the needle.

You may now place other gear next to the TR-4 without having to fumble for the side switch. This modification needs no holes drilled in the cabinet. When trade-in time comes you still have a mint rig. — *Richard E. Tinson, G3XPM/W1*



Circuit for a code-practice oscillator and transmitter monitor.

J1 — Two-circuit jack.

J2 — Three-circuit jack.

Q1, Q2 — Silicon transistor (Sylvania ECG-104 or General Electric GE-3).

R1 — See text.

T1 — Audio transformer 10,000- to 15,000-ohm primary, 3.5-ohm secondary.

AN EFFECTIVE ERROR PREVENTER

When constructing equipment described in *QST* and other League publications, I photocopy all the schematics, pictures, and construction notes. While building, a felt marker is used to cross out components which have been installed. This assures accuracy in the project and leaves the original article intact for future reference. — *Dave Hughes, WA3NEN*



Recent Equipment



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

The Gladding 25 FM Transceiver

PEARCE-SIMPSON, a division of Gladding Corporation, has proved that big things can come in small packages. The Gladding 25 fm transceiver is scarcely larger than a cigar box, yet delivers a minimum of 25 watts rf output. It is small enough to be installed under the dashboard of most cars (even in VWs), and should complement the decor of most automobile interiors with its light- and dark-gray colors.

The transceiver provides multichannel operation by means of two 6-position switch wafers which are controlled by concentrically operated shafts. The arrangement permits the use of any six receive or transmit channels. Netting trimmers are provided for the transmit crystals. No crystal trimmers are included for the receiver oscillator. Ovens are not used for either the transmitter or receiver oscillators.

The Gladding 25 is American-made and is a spin-off of the Pearce-Simpson marine two-way radio line. The tuned circuits have been modified to cover the 2-meter amateur band, and the handset used in the marine version has been replaced by a push-to-talk microphone with a rugged coil cord.

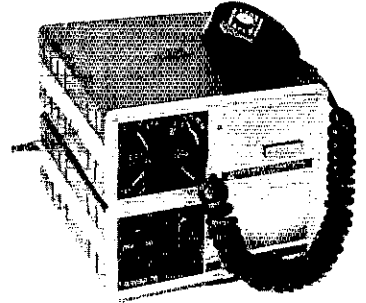
A Rundown of the Circuit

This unit should appeal to those who prefer tubes and also to amateurs who are fond of solid-state circuits; the Gladding has both! A practical hybrid arrangement utilizes transistors and one IC in the receiver section, and transistors, one IC, and two vacuum tubes in the transmitter portion of the equipment. A 12BY7A doubler drives a 6883A (12-volt 6146) in the last two stages of the transmitter.

All of the stages in the receiver use bipolar transistors except the mixer, which is a JFET, and the limiter, which employs an RCA CA3011 IC. The receiver rf amplifier is an MPS3563 uhf transistor with low-noise characteristics at 144 MHz. This stage is connected for common-base operation, and is protected from large-signal damage by a silicon diode which is bridged between the emitter (input port) and ground. A band-pass tuned circuit is used between the antenna and rf amplifier, and another between the rf amplifier and mixer to reject out-of-band signals.

The receiver is a double-conversion type, using a 10.7-MHz first i-f (and crystal filter), followed by a second mixer to provide a lower i-f of 455 kHz. Additional filtering is not used at the second i-f.

The squelch operates from rf, sampling i-f voltage at the output of the limiter. Squelch action is smooth and without noticeable drift under varying conditions of temperature.



One unusual feature found in the receiver circuit is Gladding's use of a slope detector in preference to the more conventional discriminator. Reception with the slope detector is good, and outwardly, at least, compares favorably with reception from other types of fm detectors, though this may be a moot point. A unique audio amplifier is used to drive the speaker. More on this later.

A speech amplifier and clipper, plus audio filter, are used ahead of the MPS706 phase modulator. (No varactor diodes are used in the modulator.) A CA3011 IC limiter follows the modulator and suppresses amplitude variations in the fm signal. The order of frequency multiplication is from 12-MHz (transmitter oscillator frequency) to 36.5 MHz, to 73 MHz, then to 146 MHz. A pi-section filter is used in the antenna lead (inside the transceiver) to suppress harmonics of 146 MHz during transmit, and to help reject out-of-band signals above 148 MHz while receiving. The antenna and some of the operating voltages are transferred between the transmitter and receiver portions of the circuit by means of a relay, K101, Fig. 1.

Some Unusual Features

The transmitter can be disabled by means of a front-panel switch to permit minimum dc current drain during long periods of monitoring. Normal standby current drain is 1.2 amperes because of the power consumed by the tube filaments. In the receive-only mode the current taken by the transceiver is reduced to 0.4 amperes. Also, the same panel switch can be used to select a 1-watt output level from the transmitter. The switch places a low value of resistance (1200 ohms) in shunt with the PA screen supply — between the screen-voltage dropping resistor (10,800 ohms) and ground. This reduces the screen voltage, and lowers the output power. A greater reduction in overall current drain could be effected by modifying this part of the circuit to lower the screen voltage for the 12BY7A doubler/driver, thus reducing the plate current of both the driver and PA stages. The

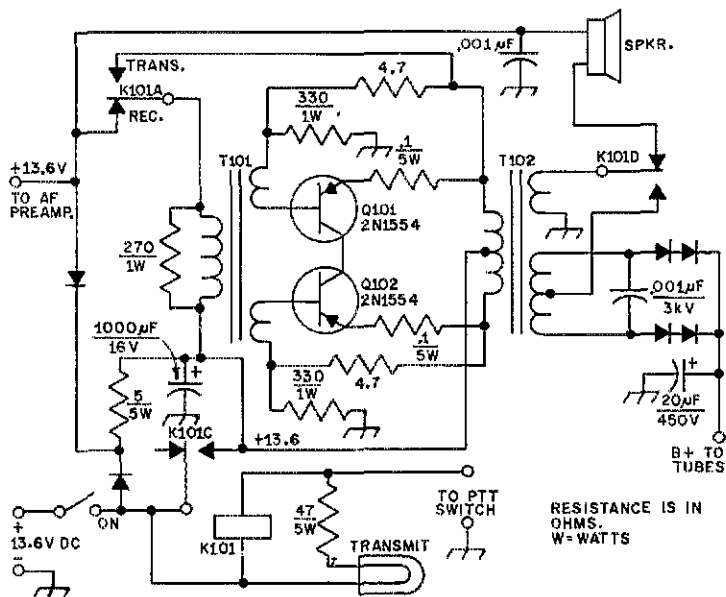


Fig. 1 — Circuit of the combination audio amplifier/dc-to-dc converter showing how the critical portions of the circuit are switched during the receive and transmit modes.

PA screen voltage would remain at its normal level, but some form of protective bias would be required for the PA stage — possibly a Zener diode installed in the cathode return of the 6883A.

This writer nearly surrendered himself to the mental-health authorities after trying to locate the source of the high voltage for the tube stages. Finally, after much more than a cursory study of the schematic diagram, the not-so-obvious technique used by Gladding was detected. The dc-to-dc converter serves double duty by becoming the *audio amplifier* during receive! The circuit is shown in Fig. 1. If this doesn't represent real American ingenuity the writer will be happy to ingest his best fedora! How clever the circuit is! During receive the feedback winding of the dc-to-dc converter is disabled by the mode-switching relay, and an additional transformer winding is connected to the loudspeaker by means of another set of relay contacts. In this state the switching transistors function as audio amplifiers. What's more, the audio-output level and signal quality are excellent.

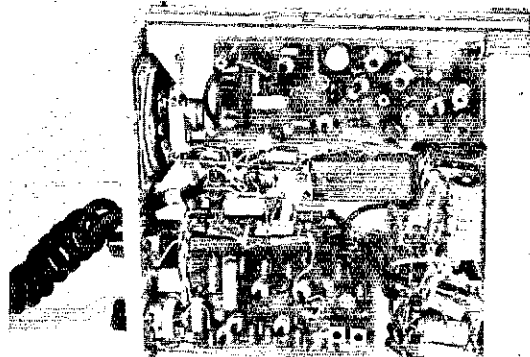
Closing Comments

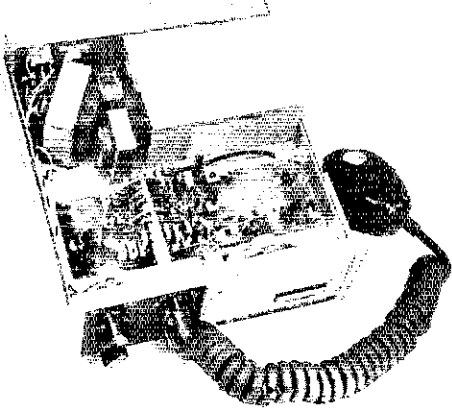
Sensitivity checks of the receiver show that a 0.4- μ V signal is needed to provide 20 dB of quieting. Power output from the transmitter (13.6 volts primary) was 30 watts from two units tested. A third Gladding 25 delivered 35 watts of output. Tests were made while using a recently calibrated Bird Thruline wattmeter and a Heath Antenna.

The manufacturer rates the receiver selectivity at ± 7.5 kHz at 6 dB down, and ± 15 kHz at 60 dB down. Maximum audio power for the receiver is rated at 2 watts with 10-percent distortion. Frequency tolerance is listed as $\pm .001$ percent over a temperature range of -30 to $+60$ degrees C. Current taken by the transmitter at full output power is 10 amperes. The power bandwidth of the transmitter is rated at 1 MHz between 145 and 148 MHz.

The i-f filter is an 8-pole crystal-lattice type. Crystals for the receiver are in the 78-MHz range.

Bottom view of the transceiver chassis. The covers have been removed from the circuit boards. An 8-pole crystal filter determines the selectivity of the receiver and is visible at the center of the chassis. The pc board at the upper side of the chassis contains the speech amplifier and clipper, plus the exciter section of the transmitter. The lower pc board contains most of the receiver rf circuitry.





Interior view of the top chassis area. The circuit board in the foreground is the oscillator deck for the transmitter and receiver. The two transformers visible at the left rear of the chassis are those used in the dc-to-dc converter, and in the audio amplifier during receive (see text). The driver and output tubes are housed in the shield compartment at the rear right of this photo.

and are third-overtone in mode. The transmitter uses fundamental-type 12-MHz crystals. Crystals can be ordered from Pearce-Simpson, or from the manufacturers of commercial-standard crystals.¹

A mating ac-operated 13.6-volt dc supply is available from the manufacturer. It consists of a transformer, a full-wave bridge rectifier, and an 18,000- μ F filter capacitor. No ripple could be detected on the transmitted or received signals during base-station operation with this supply. The power supply is housed in a cabinet which is identical in size and decor to the transceiver, as shown in the title photo of this review.

The equipment is supplied with crystals for operation on 146.34/146.94 MHz, 146.94/146.94 MHz, and 146.34/146.76 MHz. The package also includes a mounting bracket for mobile operation. The operating manual is very complete, and contains a large easy-to-read schematic diagram.

Pearce-Simpson Gladding 25 FM Transceiver

Height: 3 1/2 inches.

Width: 8 1/2 inches.

Depth: 10 inches.

Weight: 8 1/2 pounds.

Freq. Range: 145 to 148 MHz.

Receiver I-f Bandwidth: 7.5 kHz.

Deviation: 5 kHz.

Power Requirements: 13.6 volts dc, 10 A (see text).

Power Output: 25 watts minimum at 13.6 volts dc.

Price Class: \$250.

Manufacturer: Pearce-Simpson, P.O. Box 800, Biscayne Annex, Miami, FL 33152.

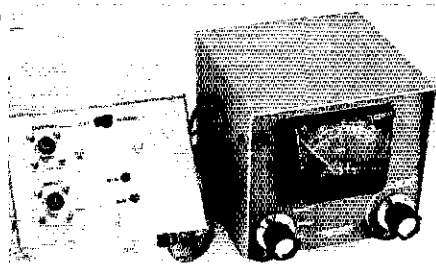
Those wishing to purchase an American-made medium-power fm transceiver in the moderate price bracket may be wise to consider the Gladding 25 when "shelling out" at the local equipment emporium. What's more, the Gladding is probably the most compact amateur unit available in its power class. — *W1CER*

QST ————— QST ————— QST

Heath HM-102 RF Power Meter

ACCURATE MEASUREMENT of rf power is, at best, a difficult task. When Heath introduced their budget-priced HM-102 power meter, a number of amateurs were overheard expressing doubt about how such a unit might perform. After calibration, the HM-102 was checked against two standards in the ARRL lab and the results correlated within plus or minus seven percent — excellent accuracy for any simple form of power-measuring instrument. For most amateurs, calibrating the Heath power meter will be a problem. A VTVM or rf ammeter used with a 50-ohm dummy load, such as Heath's Cantenna, will do, although more accurate results will be achieved if a bolometer or calibrated wattmeter can be borrowed for an evening.

¹ A set of crystals was ordered from International Crystal Company, specifying that they were for the Gladding 25. Both crystals have given good service in the unit, and no difficulty was encountered in netting the transmit crystal. In-service stability for both crystals has been excellent.



The circuit used in the HM-102 is similar to that described by DeMaw,² and readers are referred to the original article for a complete description of the "works." Heath has provided two forward-power ranges, 0 to 200 and 0 to 2000 watts. The circuit is designed for use with 50-ohm transmission lines; a small sample of the power flowing in the feeder supplies energy for the metering circuit. Unlike most power meters, reflected power is not measured directly in watts, but, instead, a calibration which shows standing-

² DeMaw, "In-line RF Power Metering," *QST*, December, 1969.

Heath HM-102 Power Meter

Height: 5 1/16 inches.
Width: 5 1/4 inches.
Depth: 6 1/4 inches.
Weight: 2 1/2 pounds.
Frequency Range: 1.8 to 30 MHz.
Price Class: \$30.
Manufacturer: Heath Company, Benton Harbor, MI 49022.



wave ratio is used. Thus, there is no need to use a formula or nomograph to convert power readings to equivalent SWR.

The HM-102 is built in two sections, an indicator assembly and a bridge circuit. The two sections may be bolted together to form a single unit, or a five-foot connecting cord allows the bridge section to be "remoted." The color styling, meter case, and knobs have all been chosen to match other items in Heath's SB line. — WIKLK

Inside view of the power meter. The bridge-circuit components are mounted on a small pc board. The lead from the input to the output connectors passes through the center of a toroid transformer, which is mounted on the bottom side of the board.

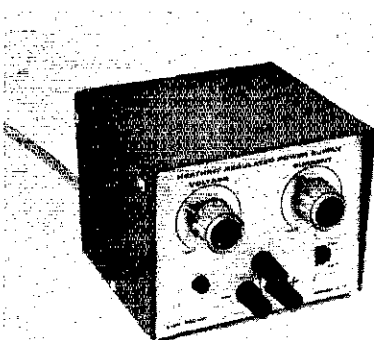
QST ————— QST ————— QST

Heath IP-18 Regulated Power Supply

THE HEATH IP-18 power supply provides a continuously adjustable output voltage in the 1 to 15 range, at currents up to 500 mA. The IP-18 might be considered as a "little brother" of the IP-27³ and IP-28⁴ power supplies. Compared to these other models, the IP-18 can also be called Heath's "economy" model. By eliminating a front-panel meter for monitoring voltage and current, and by using a smaller transformer with a lower current rating, Heath is able to offer this supply at a substantially lower price than those of the other two models, without scrimping on other component costs or degrading circuit performance.

The Circuit

The schematic diagram of the regulator section is shown in Fig. 1. Two independent secondary windings are provided in the power transformer, one to supply 29 V dc and the other to supply 16 V dc. The 16-V output is Zener-diode regulated. Q1, an n-channel JFET, works in conjunction with R5 as a constant-current source. Q2 and Q3, connected as a Darlington pair, act as the pass-current elements, with Q4 providing the reference voltage. Q5 is a current-sensing transistor, and it works with R6, which is an adjustable front-panel control. With a dead short across the output terminals, the supply delivers 5 mA with R6 set for minimum current, and 700 mA with R6 set for maximum. These currents are independent

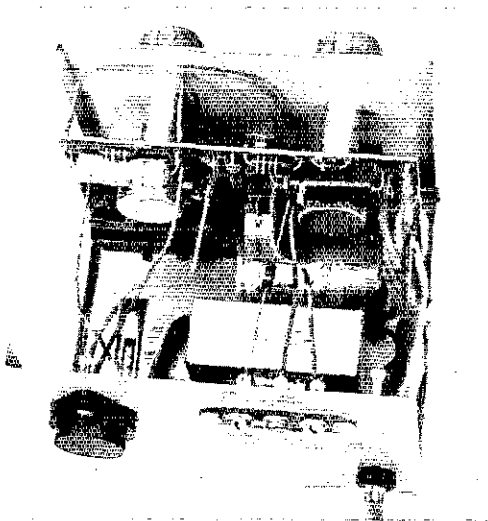


of the setting of the voltage control, R4, when the supply output is short circuited. This portion of the circuit is quite similar to that of the IP-28, and the reader is referred to QST for May, 1970, for a more detailed analysis of its operation.

In addition to excellent voltage regulation and current limiting, the IP series of supplies contains provisions for external programming of the output voltage. Refer to the lower portion of Fig. 1. In normal operation of the IP-18, a jumper lug is connected between terminals 2 and 3 of the PROGRAMMING terminal strip, which is located on the rear of the supply. This applies the regulated 16-V potential across R4, which is used to adjust the output voltage of the supply by varying the bias on Q4. D5 is a germanium diode, included to protect Q4 from inverse base-emitter voltage.

³"Heathkit IP-27 Low-Voltage Power Supply," Recent Equipment, QST, May, 1968.

⁴"Heath IP-28 Regulated DC Supply," Recent Equipment, QST, May, 1970.



For external programming from a dc source, the jumper is removed from between terminals 2 and 3, and the external source is connected between terminals 1 and 2, observing the indicated polarity. R4 is set for maximum voltage output, with its wiper at the terminal-2 end. With these connections, Q4 is biased directly from the external voltage source, and any changes in that voltage will be reflected as changes in the output of the IP-18. Current limiting remains under the control of R6 and Q5.

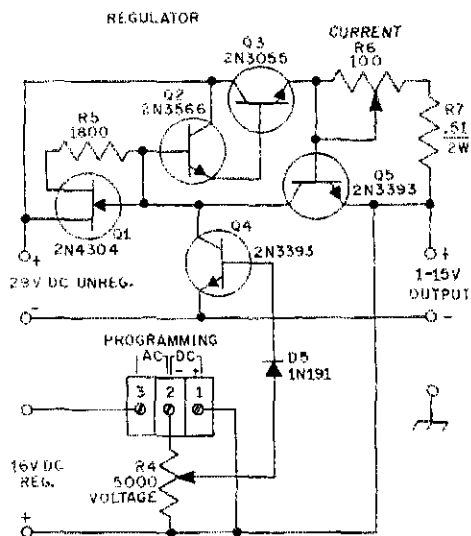


Fig. 1 - Regulator section of the Heath IP-18 supply. Resistances are in ohms. Component reference numbers are those assigned by Heath; semiconductor types are those listed as equivalent to Heath's part numbers.

The Heath IP-18 regulated supply, available in kit form, can be constructed in just a few hours' time. Most components are mounted on an etched circuit board, which is mounted vertically. The 2N3055 pass transistor uses the rear panel as its heat sink, and is located in the lower left corner in this view. A plastic case encloses this transistor, as its collector is connected to its case and operates at a different potential than that of the metal chassis. The terminal strip for external programming is visible to the right of the transistor.

For programming from an ac source, connection is made between terminals 2 and 3. The source must have a low value of dc resistance, such as the secondary winding of a transformer. With this programming, the output from the IP-18 is pulsating dc, with a modulation component following the applied ac wave form. The voltage control sets the average value of the pulsating output, and the current control functions normally.

Operation

The output terminals are isolated from the chassis, so that either a negative-ground or a positive-ground configuration may be used. In addition to the external programming, two other modes of operation may be used, depending on the particular settings of the front-panel controls. With the current control set for maximum, the output voltage is continuously adjustable up to 15 volts, and constant-voltage operation results. Voltage regulation at 15-V output, when going from no-load to full-load (500 mA) conditions, is 0.167 percent, as determined with a digital voltmeter. The resulting change in voltage cannot be read on an analog meter. If the setting of the current control is decreased, limited-current operation results. This feature is very convenient for use when excessive current might damage circuit components under test. For the experimenter who wants a small, inexpensive, adjustable regulated bench supply, the IP-18 is one that is certainly worth considering. — K1PLP

Heath IP-18 Regulated Power Supply

Height: 4 3/8 inches.

Width: 5 1/4 inches.

Depth: 6 inches overall.

Weight: 3 pounds.

Power Requirements: 105 to 125 or 210 to 250 V ac, 50 to 60 Hz, 15 watts at full load.

Price Class: \$22.

Manufacturer: Heath Company, Benton Harbor, MI 49022.

FEEDBACK

The base and emitter terminals are interchanged in Fig. 6A (at Q4) in "The Pip-Squawk MK-II," August *QST*, p. 16. The schematic diagram, Fig. 2, is correct.

In September *QST* a minus sign got lost in one of the equations in the article, "Low-Loss Passive Bandpass CW Filters." In Fig. 4C, p. 43, the equation for C3 should be:

$$C3 = \frac{C2 - (n-1)(C1 + C2)}{n^2}$$

A lot of gremlins got into the October issue.

In "Voltage Multipliers," p. 32-33, the following errors should be corrected. In Fig. 2D, capacitor C3 should return to the lead running to the top of the transformer winding. The starting point for the C scale of Fig. 5 was omitted; it should be marked 100 μ F. In Fig. 4F, the polarity of C5 should be reversed, and the voltage rating of C5 increased to 3E plus C8 increased to 5E. Also, capacitor C9 of Fig. 4F is wrongly referred to as C4 in the text. Thanks to A. Nekut, W1DL, and WB2LGA for the corrections.

W2YM reports that the RCA diagram of the CA3089E used on page 38 of October *QST* has pins 6 and 7 interchanged through an error in their drafting department. He adds that the age on the CA3088E can be disabled by simply grounding pin 11 of the chip. When this is done, however, the usual overloading problems can occur, and thus some form of rf or i-f gain control should be included in the receiver ahead of the IC.

W7YGN points out several errors in the complex schematic of his contest keyer, p. 50-51, October *QST*. In Fig. 5, the resistor in the emitter lead of Q1 should be 270k ohms, and not 270 ohms as shown. Pin 2 as shown on U14D should be shown as pin 12. The "1" and "2" lamp identifications for CR20 and CR21 are shown reversed; CR20 should be shown as the "2" lamp and CR21 as the "1" lamp.

In what has turned out to be almost a comedy of errors, published misinformation has been piling up on W6HDO's RTTY autostart circuit. The original item by Buttschardt appeared as "Technical Correspondence" in *QST* for December, 1968,

"RTTY Autostart." The circuit was a novel one using an FET and a bipolar transistor, and interest developed among active RTTYers. There were errors in the schematic diagram as well as in the parts list, however, which created confusion among potential users of the circuit. In an effort to quell the correspondence which resulted, Buttschardt sent us another letter which was published as "Technical Correspondence" in October, 1971, *QST*. We managed to do a better job of botching up the second letter than we did the first when preparing it for print. The title for Buttschardt's letter appearing on page 54 of *QST* for October, 1971, should have been, "More on RTTY Autostart," and the opening line and footnote 1 should have referred to the December, 1968, issue of *QST*, as given above. In addition, two of the resistors shown in the gate circuit of Q1 in Fig. 1 in the October issue have incorrect values. The resistor connected from the gate to ground should be 1 megohm, and the value for the series-connected resistor between the gate and the input dc-blocking capacitor should be 600k ohms. Further, the resistor in series between the drain of Q1 and the base of Q2 should be 18k ohms, rather than 1800 ohms.

In the schematic diagram for the "TTL Crystal Oscillator," p. 55, October *QST*, the power supply connections for U1 were inadvertently omitted. Pin 7 of the 7400N IC should be connected to ground, and +5 V should be applied to pin 14. The correct nomenclature for this IC is "Quadruple 2-input positive NAND gate."

W3QY points out that in Fig. 4 of his article, "A WWVL Receiver," p. 37, November *QST*, a connection should be shown from the top end of the LC combination to the plate of V1. Also in Fig. 1, C1 and C2 should be shown as variable capacitors. Adjustment is made for maximum gain without having the amplifier break into oscillation.

Circuit boards for the QRP transmitter in November *QST* are available from Bert Adams, W4JTU, for \$2.75 ea. Write to APCA, P.O. Box 536, Miami, FL 33165. The boards are drilled, and the quality appears to be excellent.

In the 1971 DX Test results in September *QST*, K8NMG was inadvertently omitted from the CW Band Box; he had 38 multipliers on 3.5 MHz.

Strays

The amateur radio club of the Applied Physics Laboratory of the Johns Hopkins University, Silver Spring, Maryland, recently held an exhibit of old and new amateur radio equipment. The display included an operable spark gap transmitter, a lineup of vintage National receivers, and a replica of W3NPS's historic "Rudder Bug" radio controlled aircraft. Early radio catalogs, ARRL Handbooks, and *QST*s from 1917 were also on display.



"Prof. Katashi Nose fiddled with some knobs, picked up the microphone, and said, 'One.' A third of a second later, he heard his voice come back on a small speaker, loud and clear. Nose had just sent his voice on a 46,000-mile trip to a satellite out in space and back. He did it on equipment that cost less than \$1,200 to assemble and build . . . Commercially built gear could have cost \$2 million." (From the Honolulu Advertiser, March 11, 1971.) ATS-1, launched on December 7, 1966, was designed for weather work. In early 1971, as the culmination of an idea of Dr. John W. Bystrom, professor of speech communications, the University of Hawaii was granted NASA and FCC permission to use a daily block of satellite time for experimental communications. This article presents a few of the technical aspects of the project which are of interest to amateurs.

Using the ATS-1 Weather Satellite for Communications

BY KATASHI NOSE,* KH6IJ

APLICATIONS TECHNOLOGY SATELLITE (ATS-1) is a geosynchronous satellite positioned at 149 degrees W, approximately 200 miles south of Hawaii, 23,500 miles in space. On board this spacecraft is a hard-limiting frequency translator receiving on 149.22 MHz and retransmitting at 135.6 MHz. The final power amplifier operates in the Class-C mode and is suitable for fm up to 100 kHz in bandwidth.

The illumination extends from Chicago to eastern Australia. In Hawaii the elevation is approximately 72 degrees and from the Philippines the elevation is approximately grazing angle. As the positioning capability deteriorates, the satellite will drift from this position.

Authorization for experimentation with this satellite must be obtained through NASA and FCC. Operational matters are handled by the Goddard Space Flight Center at Greenbelt, Maryland. The primary mission of this spacecraft is to send cloud-cover information on command from the ground. Many amateurs and meteorological stations within the illuminated area of the earth intercept this information as a readout on facsimile machines.

Experimental License

An opportunity to participate in space communications presented itself when another department of the University of Hawaii asked the Physics Department to build a ground station capable of using the transponder on board this spacecraft. This crash project called for building

three ground stations within two months, a formidable logistics problem.

An experimental and research station license was obtained after clearance from NASA and FCC and the call signs KB2XXK and KB2XXL were assigned to two stations 200 miles apart in Hawaii. One is at the Department of Physics at the University of Hawaii in Honolulu, and the other was assigned to Hilo College on the island of Hawaii. Further expansion is contemplated for experimental and research purposes. This article dwells on the technical aspects of interest to hams and how ham techniques can be applied to space-age communications.

The Amplifier

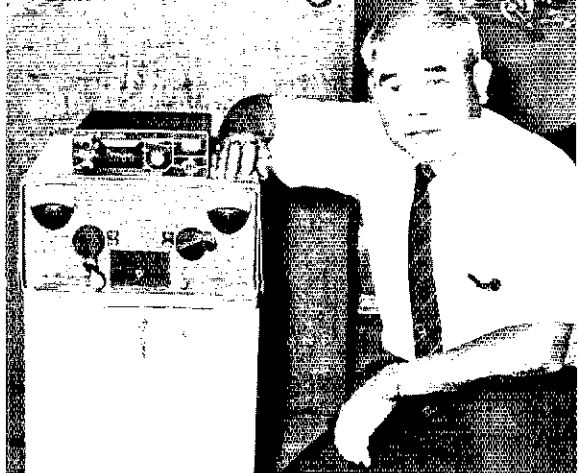
Fig. 1 shows the well-known Henry 2K amplifier and a Drake Marker Luxury 2-meter transceiver, which are the main ingredients of the station. The external appearance is deceiving because the rf deck bears no resemblance to the usual 2K. Henry Radio kindly provided their 2K cabinets for the rf decks, which were built as strip-line amplifiers for 149 MHz using Eimac 5CX1500A pentodes. The basic physical design is from previously published information,^{1,2} but there are several circuit innovations which make this amplifier different from those designs.

Fig. 2 shows the internal construction of the unit. The strip-line tank is of 1/8-in. brass, silver plated, and is tuned by a two-plate tank capacitor. The output coupling shown in detail in Fig. 3 is a five-wire 50-ohm transmission line which is collapsible so that a finger stock will make contact with the strip-line underside, which is at ground

¹ Sutherland, Rinaldo, and Parten, "Two-Kilowatt Linear for Two Meters," *Ham Radio*, April, 1970.

² Wolfe, "Low-Drive Kilowatt Linear for Two Meters," *Ham Radio*, July, 1970.

Fig. 1 — The author with the main components of the experimental satellite-communications station.



potential. Output is varied by turning a crank through a lever arm which moves the finger stock.

Fig. 4 shows the under side of the transmitter. As may be seen, the transmitter is characterized by lack of clutter. There are a 3/8-in.-dia coil, two small padding capacitors, three two-watt resistors, and 3 disk ceramic capacitors.

The plate tank presented no great problem. Strip-line technique results in clean lines and broad tuning. The tank capacitor is used only to touch up the tuning. One precaution not mentioned in most articles using strip-line technique is that there is an intense rf field in the vicinity of the strip line. If you are accustomed to lumped circuits (especially toroidal) you will be impressed by the amount of rf floating around. Any loose metal becomes hot with rf.

Don't use any phenolic or other lossy material in the vicinity of the tank because you are liable to have it cook, much the same way as in a microwave oven. The lid of the cabinet should be buttoned up tightly and tuning should be done with the cover in place.

The Grid Circuit

The grid circuit caused many sleepless nights of work and frustration. The input capacitance of the 5CX1500A is extremely high (75 pF). At 150 MHz a 1/2-in. strap of copper directly from the grid terminal of the socket to ground is enough to resonate the grid. This means that the internal grid inductance (4.5 nanohenrys) and capacitance (75 picofarads), plus socket capacitance and inductance, are such that the grid circuit appears within the socket and tube.

Bill Orr, W6SAL, of Eimac, suggested a full-wave strip line. This was tried with success but the amplifier had a tendency to oscillate. Fig. 5A shows a quarter-wave line attached to the grid. The voltage distribution is shown as a dotted line. Grid bias is fed at a point of low voltage, which, fortunately for this tube at 150 MHz, occurs right at the terminal of the socket. Changing to the equivalent lumped-component circuit of Fig. 5B cured the oscillation and at the same time simplified construction. Efficiency with the strip-line grid was slightly higher than with the lumped circuit but the strip-line circuit was discarded because of the tendency to oscillate.

Gain of the Amplifier

The expected gain of this tube at 150 MHz is about 17 dB. You can expect to get 500 watts output (not input) with a ten-watt-output exciter

in use. If you want more power output you must increase the drive. Efficiency in the order of 42 percent is realized. A strip-line grid results in an efficiency of about 46 percent. Increasing the drive to 25 watts results in an efficiency of 57 percent.

Neutralization is a nuisance and should be avoided if possible. The popular notion that one can get unlimited power output with little drive by using a conventional grid circuit is a myth. One commercial manufacturer uses a 4CX150 to drive the 5CX1500A in a conventional grid circuit. Low drive, high gain, and no neutralization are not compatible.

The Exciter

The exciter could have been any of the commercially available units (Motorola, G.E., etc.) but one of the objectives of this project was a feasibility study of using readily available standard items of low cost. A standard ham transceiver for

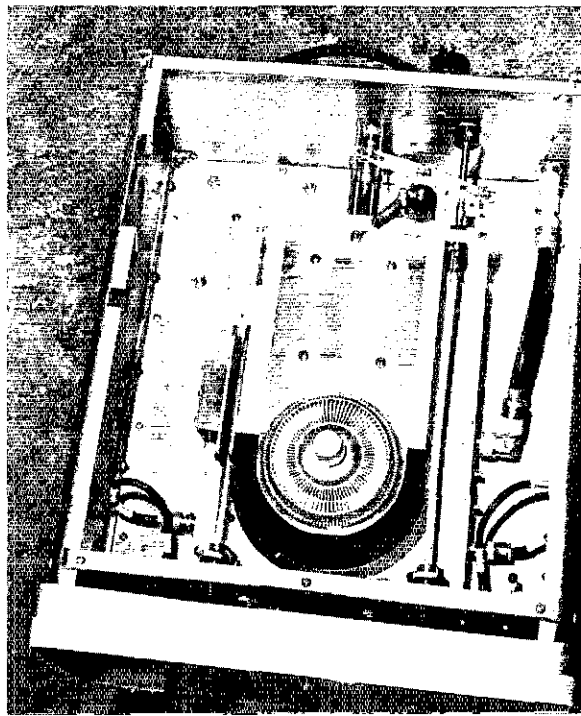


Fig. 2 — Internal construction of the amplifier.

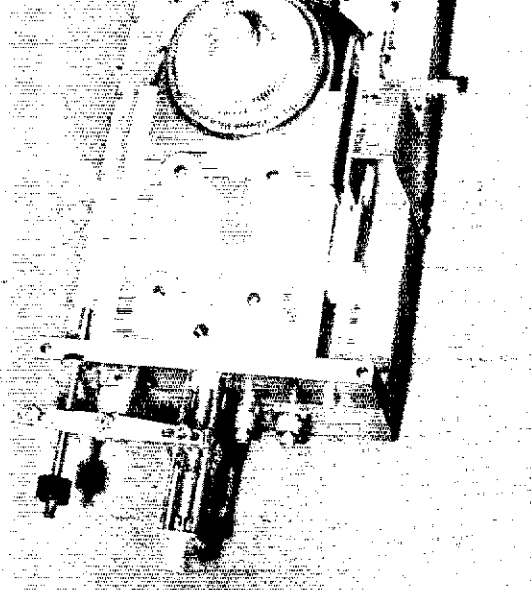


Fig. 3.

2-meter fm was used as an exciter and receiver. Ham experience showed that the Drake Marker Luxury 2-meter transceiver had good stability and sensitivity and we have not regretted the choice. An oversize fan (not whisper) is used to suck air out of the exciter, since a continuous duty cycle is anticipated. The fan for the transmitter is also oversize and should be of the type which will stand considerable back pressure.

The Antenna

The crash nature of the program dictated that the antenna be fabricated. A prototype ten-element crossed Yagi for uplink and another for downlink were made from aluminum tubing and pipe. Measurements indicated approximately 10-dB gain in the circular mode and 13 dB in the linear mode. Circularity is maintained to within 1 dB. A quarter-wave phasing line provides the necessary phase delay for either right, left, or linear polarization. The normal mode of reception is

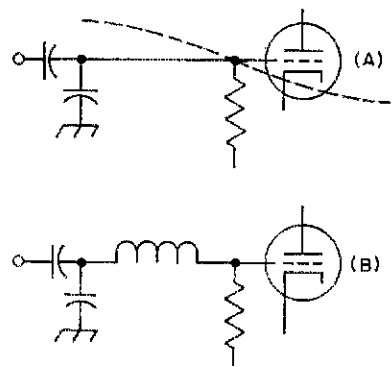


Fig. 5 - The resonant line can be any multiple of a quarter wave length, as shown at A, or lumped inductance as shown at B may be used.

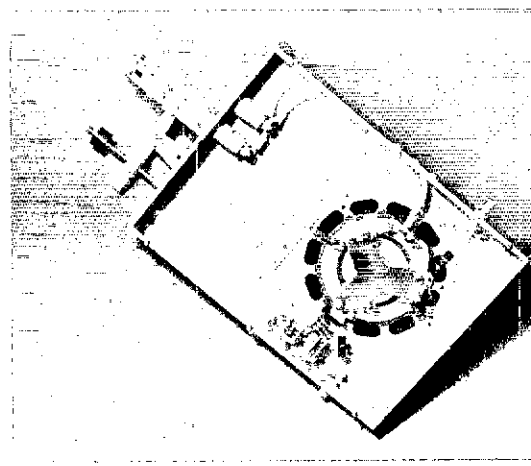


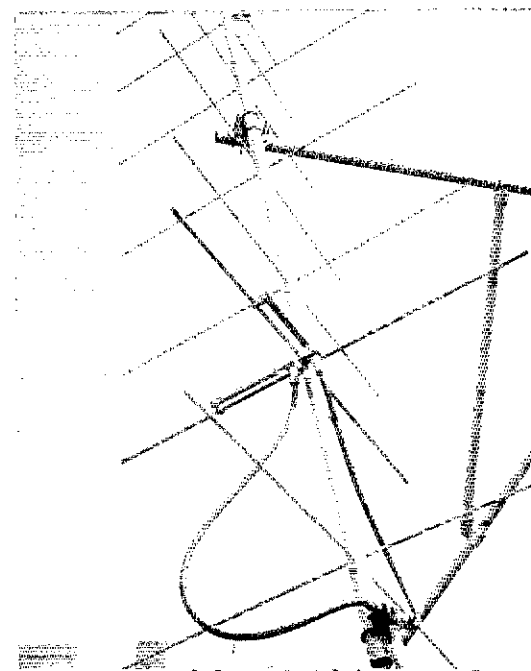
Fig. 4.

circular, with its inherent 3-dB loss as a result of phasing the crossed Yagis. The supporting structure was designed for portability and lightness of weight. It is standard aluminum TV masting, connected with aluminum-fence swivel joints.

Fig. 6 shows a view looking up at one of the phasing sections. A four-bay 80-element crossed-Yagi array is employed as a backup receiving antenna. Normally a ten-element crossed Yagi suffices. For monitoring purposes a three-element linear Yagi works well and is the simplest to construct. However, due to Faraday rotation, these must be repolarized at intervals, a nuisance when long periods of communication must be maintained.

A single-stage 2N5397 preamp. can be cut into the antenna but is not used most of the time since it interferes with downlink monitoring. The

Fig. 6.



radiator from a 1.6-kilowatt transmitter is only a few feet away. There has not been time to make filters, but this is the next phase of the building program.

Fig. 7 shows the uplink signal and downlink signal displayed simultaneously on a dual-beam scope. Note the delay of 300 milliseconds and the transient response from a fast switching cycle.

The Shape of Things to Come

ATS-1 is not spin stabilized and therefore the signal on the downlink sometimes is spin modulated depending on the attitude of the spacecraft. Spin modulation is sometimes pronounced on facsimile hard copy, especially under low-deviation (fm) conditions.

Fig. 8 shows ATS-1 transponder power output versus ground-station power. This immediately brings to mind duplexing possibilities. One bonus immediately apparent is that a sending station can be interrupted by another if the power of the transmitting station is reduced. This has worked out well in hard-copy transmission wherein the receiving station can break in on a transmission already in progress for corrective measures.

How do you like a system capable of covering approximately half of the earth with no fading? Working with ATS-1 has revealed the shape of things to come for the ham.

QST

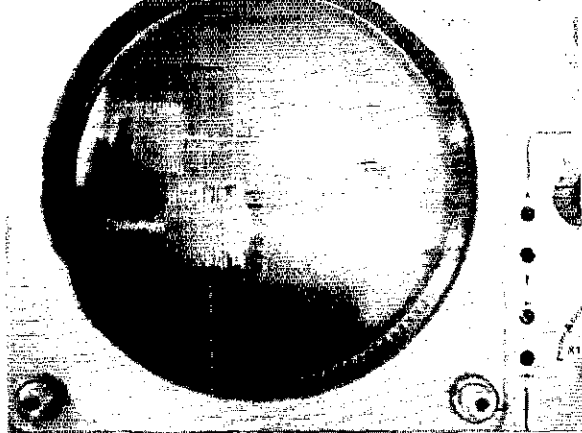


Fig. 7 — The upper trace displays the uplink signal, the lower trace the downlink signal.

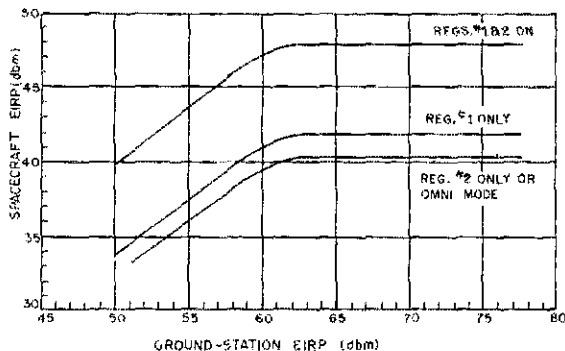


Fig. 8 — ATS-1 vhf transponder output power vs. ground-station transmitted power.

Strays

To commemorate the 70th anniversary of Marconi's triumph in bridging the Atlantic by wireless for the first time on December 12, 1901, the Society of Newfoundland Radio Amateurs has obtained the special call, VB1MSA, which will be activated periodically by VO1FX on all bands through December 31.

In conjunction with the Cornish Radio Amateur Club, which will be operating GB3MSA during the same period from Marconi's transmitting point at Poldhu, Cornwall, members of SONRA will operate VB1MSA continuously on 80 through 15 meters from December 11 to 16 from Cabot's Tower on Signal Hill, St. John's, site of the Marconi receiving station.

Commemorative QSLs will go to all who, having made contact, QSL via VO1FX or the VO1 bureau. In addition, SONRA will issue special certificates to amateurs who contact both VB1MSA and GB3MSA between December 11 and 16.

Stolen Equipment

A National HRO-50, serial 2800019, with "F" coil and speaker, was recently stolen from the home of WA5DQF. A quantity of Hi-Fi equipment and a TV set were also taken. Anyone with information contact William M. Vance, 410 Lakeside, Channelview, TX 77530.

A Hallicrafters SR-160 transceiver, serial 416000-108039, was stolen recently from the automobile of K9YVA. Anyone with information contact Michael P. O'Grady, 4611 N. Kenton Avenue, Chicago, IL 60630. Telephone 312-736-2824.

On September 22, a Drake TR-3 transceiver, serial 3858, was stolen from WA9EYL's automobile. Anyone with information concerning the above contact Virginia Voyles, East Main Street, Petersburg, IN 47567.

A Collins KWM-2A transceiver, serial 13815, was stolen from Sheppard AFB, Texas, in early September. Anyone with information contact Morgan W. Godwin, ARRL Headquarters.

The following equipment was stolen from the Delaware National Guard: Collins speaker console Model 312B-4, SN 59920; 30L-1 amplifier, SN 40084; mobile power supply MP-1, SN 44507; mobile microphone MM-1 (no SN); Misco mini-speaker MS3BB (no SN). Anyone with information on this should contact detective Sgt. W. A. Hopkins, Wilmington Delaware police, telephone 302-654-5628.

Stolen in Minneapolis, Minn., on September 26: Swan SW-175, SN 426-S. Roger E. Sawyer, W0AXT, 186 Lakeview Dr., Mason City, IA 50401.



December 1921

... The Transatlantic! This is what we've been waiting for. Great cover by Clyde Darr, 8ZZ. When he did this cover, he must have had a great premonition of success, for it shows Uncle Sam with head phones standing by and watching a typical ham transmitting his code group, hopefully, to Godley in Scotland while John Bull watches with critical skepticism. Paragon Paul, with his Baldies clamped to his head, an unnecessary precaution, as it turned out, is listening. Judging from his facial expression, he's probably just picked up JBCG. Incidentally, Darr has the QRM babies securely lashed to the (north) pole. We know now that Armstrong's professional reputation is safe, he having bet the same on Godley!

... The leading article, of course, is about the tests. Picture shows Warner, Godley, and Schnell on the deck of the *Aquitania* at sailing time. It turned out that H. H. Beverage, 2BML, of antenna fame was also aboard. The two had never met before. Bet there were some interesting discussions during the voyage, for Paul was to use the Beverage antenna for reception. The choice of this unusual antenna was fully justified by the results. It was, of course, a little long for the average ham to cope with. And let's not forget that a tremendous amount of work had to be done on the other side, as well as over here. RCA and the various Marconi interests abroad extended their fullest cooperation. These were truly great times.



December, 1946

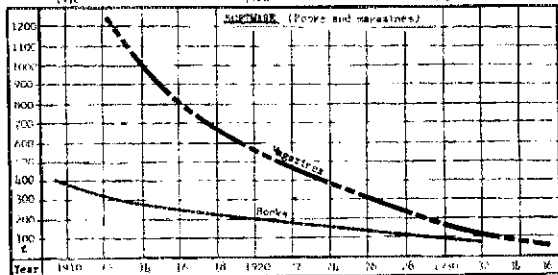
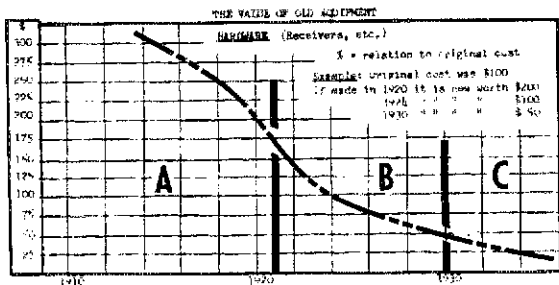
... The boys are grumbling about the presence of foreign broadcasters in our forty-meter band. It appears that the whole business started with the Cairo conference in 1938. We had to accept a compromise at that time in order to preserve this band, even though some foreign countries were permitted to operate there. It was a complicated mess. Some foreign broadcasters operated in portions of the band they weren't supposed to under the guise that a war was still going on.

... Joseph H. Harms, W2JME, appears to have solved the problem of single control in bandswitching transmitters. The photographs make it appear to be more horrendous than it really is. Complete dope.

... Byron Goodman, WIDX, in response to complaints that *QST* is full of too complicated rigs for the beginner, describes his most inexpensive transmitter. This uses a single 6V6 or 6F6, crystal controlled, all for \$3.95! The inductances are wound with ordinary old-fashioned bell wire with the waxed cotton insulation left on. This rig originated with R. O. Deck, Jr., W9JVI.

... A lot of surplus BC375-E transmitters are on the market for about fifty dollars and we have an article by "R.M.S." of the Hq. Staff telling about it, how to modify it, etc. As I recall it, I don't think I ever heard one at that period which was really good. A lot of guys spent a lot of time wrasslin' with it, but not I. - WIANA

Strays



Bruce Kelley, W2ICE, came up with the adjacent rough curves which show the relationship between original purchase and current sale prices of antique receivers, books, and magazines. The point is made that obviously, the curve is an approximation and in some instances may vary over 100 percent depending on rarity and condition of product. Items in Range "A" (hardware) have a very high ratio for three reasons: age, low production (rarity), and original low selling price. Equipment in "B" levels off and it is now common to pay about the same as the original sale price. Mass production, less interest, and low prices in the 1930s bring the curve down in Range "C." Software products have a much higher ratio since early magazines sold for only 10 or 15 cents.

As expected, certain items don't follow Kelley's Curve. He points out some pre-war 1 mint *QST*'s have been sold for astronomical sums because of rarity and the desire on the part of some collectors to have a complete set. Variables affecting the curve are: condition of product, bulk sale, and how badly the purchaser wants a certain item. The seller will naturally work to whatever the traffic will bear. (from the September, 1971, *Program Annual Radio Conference*, The Antique Wireless Association)

Premier Stateside Super-heterodyne (as it came to be called), triggered late 1918 by E. H. Armstrong's cryptic letter from Paris to Paul Godley; the latter's then Adams-Morgan Co. partner, Adams, is shown copying. Beneath the megaphone (r.) the cylindrical tube houses a small, pioneer cone-type speaker (a la Pathe phonograph *Actuelle*) driven by a modified Baldwin balanced-armature head-phone unit. Four years earlier, on this table, the pioneer short-wave regenerative receivers, *PARAGON*, were born.



Back-Scanning

BY PAUL F. GODLEY,* Ex-2ZE

FROM A PURELY personal point of view, fate would seem to have had a hand in the T-A Tests of '21. Early in 1896, I with mastery of Morse and founded in electro-magnetics, heard the report from Italy of a telegraph without wires. By virtue of a philosophical boyhood environment, an amorphous dream was born. Our continent, within the vivid memory of my elders, had been bound coast-to-coast by rail and telegraph. The impact upon the Great Plains and a burgeoning nation was profound. Perhaps "wireless" could bind the world's disparate peoples together sometime. When, in December, 1901, Marconi got the trans-Atlantic "S" in Newfoundland, the dream was held.

Much later, Dean Berg, E.E., Univ. of Illinois, earnestly assured me nothing lay in store for Wireless during my lifetime! Incisive observations of long-wave trans-Atlantic efforts — plus two years dealing with equatorial static in the Amazon basin — made Berg look good. However, I had met deForest on the Lakes in 1909 and acquired two of his hush-hush Audions. Before leaving Brazil in '14, I had determined to explore the "useless" portion of the spectrum. Something might come of it.

Stateside, Armstrong demonstrated regeneration at his Yonkers, N.Y. home. What had he done with it on the short waves? Nothing, because of "... the inherent characteristics of the VTs I have been able to get. In any case I am only interested in commercial possibilities..." At my home, Leonia, N.J., he was soon given a demonstration of regeneration down to 35 meters. It was there that *PARAGON* short-wave receivers were born (1914-15).

A War-I Commission under Carty of Bell Labs., annulled by hand-delivered letter over the signature

* The Tarn, Houston Road, Great Notch, NJ 07424.

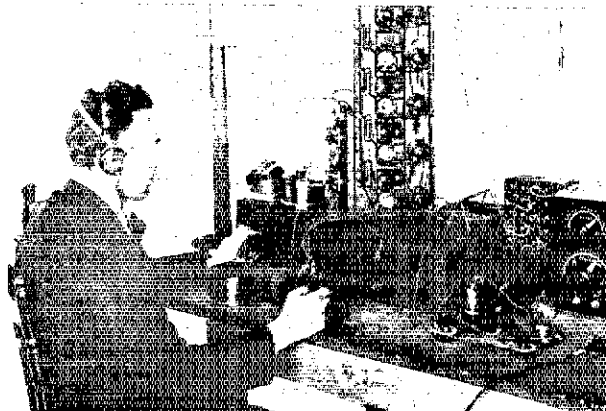
Quickly taking form here (late 1918), the Super-het is basically as used in Ardrossan during the historic short-wave T-A Tests of 1921. Paul Godley is at the equipment in his Montclair, N.J., home. The vertically-positioned unit is the multi-stage 100,000-cycle resistance-coupled amplifier. On the table at left is one form of the pre-war-I *PARAGON RA-6* short-wave regenerative receiver.

of the Secretary of War, held me Stateside to break radio production bottlenecks. Some time before the Armistice, at the request of American Marconi Company's Weagant, I designed a multi-stage, distortion-free audio amplifier for his experiments in talking-pictures. It was feed-back free to 20,000 cycles (and, as it proved, far above). The week of its completion and tests, a letter arrived from Armstrong, still in Paris with Carty, cryptically reporting high rf amplification *sans* feed-back. Upon a second reading of this letter some hours later, a bell rang! — and within a couple hours more, Weagant's resistance-coupled audio amplifier was functioning within the amazing Super-het, as it came to be called. Within the week the circuit was in operation in my Montclair home, breadboard fashioned; and within 10 days in a form very close to that used on the T-A Tests of '21. (1918-19).

When, to my complete surprise and somewhat consternation, ARRL called upon me, I felt it strange in a sense. Yet, I was psychologically ready, and with the know-how. It has seemed strange as well that the break-through at Ardrossan came 20 years to the day after that Morse "S" reached Marconi in Newfoundland. As, years later, Armstrong wrote, this "... marked a turning point in radio history. . . the so-called knowledge of the art had been disproved . . ." Strangely, the dream of a small boy on the Plains had come true.

All credit goes to the American amateur, to ARRL's Schnell, Deloy, *et al* for their ensuing pioneer 2-way communication on 100 meters — Hartford-Nice; and to the "I too am but an amateur," Marconi, for whom, poetically it seems to me, came the final touch.

QST



QST
 PUBLISHED IN THE INTERESTS OF PUBLISHED WIRELESS
 BY THE AMERICAN RADIO RELEY LEAGUE, INC.

TRANSATLANTIC TESTS SUCCEED!

The Atlantic Ocean has been bridged by the signals of American amateur stations. Not one of dozens of them! Paul F. Godley sent overseas with American equipment by the ARRL set up his station at Adrossan, Scotland, and there copied the signals of the following stations:

SPARK	1RKA	Glenbrook, Conn.
1ARY	1RM	Cambridge, Mass.
1AAW	1RK	Worcester, Mass.
1BDT	2EH	Riverhead, N.Y.
2BK	2FD	New York City
2CN	2FP	Brooklyn, N.Y.
3AN	2ARY	Brooklyn, N.Y.
	2AW	Babylon, N.Y.
	2AW	Riverhead, N.Y.
C.W.	2BHL	Princeton, N.J.
1RU	2OH	Atlantic City, N.J.
1FZ	2BU	Cleveland, Ohio
1ARY	2BU	Washington, Pa.
1BGS	2ALP	Pittsburgh, Pa.
1BDT	2AV	
1BGF		

This accomplishment is epoch making and opens the door to unimagined possibilities in private radio communication. We publish the COMPLETE STORY IN OUR NEXT ISSUE - DON'T MISS IT!

January 1922 70 Cents

"We Got Across . . ."

A Little Nostalgia from the Transatlantic Tests, 1922

BY ROYAL MUMFORD,* W3CU

"Paragon Paul" who had masterminded the most sensitive receiver ever designed for use on 200 meters. His two-variometer, tuned-plate tuned-grid, regenerative detector was used almost universally by American amateurs. Soaring optimism knew no bounds. Even H. P. Maxim himself was carried away to such heights as to address the National Convention as follows:

How much further our indomitable American Spirit shall carry us remains to be seen. Already is our Traffic Department at work upon transatlantic tests. Who shall say they shall not succeed, and before we realize it, the continent of Europe be linked to North America? Indeed impressive will be the day when private citizens may communicate without cost from the shores of the great far-flung Pacific on the west to the limits of civilized co-operation and good government in Europe's east. I hope I may live to see the day.

A testimonial banquet was given in Paul's honor in New York City just before he sailed on the *Aquitania* on November 15. A host of old timers, most of whom had known Godley for years, all expressed utmost confidence in the famous designer of the Paragon receiver. Major Edwin H. Armstrong said, "I'll stake my scientific reputation on Paul Godley." So many others echoed these sentiments that Major J. Andrew White finally commented, "Paul, it looks like a cinch!"

All this happened before Paul had left our shores, but among the insiders there was reason for this headlong confidence. Paul was planning some startling innovations. For the first time in amateur history he was going to employ directive DX antenna. He was also going to use a new receiver which most amateurs had never heard about. It was at least as sensitive as the Paragon Receiver, but it was also highly selective and very stable. It would not be "pulled off frequency" by nearby oscillating detectors or other QRM. It was called a "super heterodyne." Furthermore, it was common knowledge that European amateurs had heard

"Oh, Mr. Printer, how many exclamation points have you got? Trot 'em all out, as we're going to need them badly, because WE GOT ACROSS!!!!!!" ran the editorial lead in January, 1922, *QST*.

TRANSATLANTIC SENDING tests were the talk of the day. The first scheduled attempt having failed, the ARRL Operating Department announced that a second attempt would be made on December 8, 1921. "The tests will start about 8 P.M. Eastern Standard Time," they announced, "and continue until about midnight, giving each transmitter a fair chance to accomplish this almost unbelievable feat. In order to have only the very best and most far-reaching transmitters in the test, preliminary tests will be held . . . 1000 miles air-line must be covered in order to qualify for the finals."

When Paul F. Godley accepted the invitation of the League to go to England as an American representative in the second series of tests, their success seemed assured. We all knew him as

* Rt. 1, Box 397, Annapolis, MD 21401. Quoted portions are largely from February 1922 *QST* or *Two Hundred Meters and Down*.

Sometime prior to 1919 I had an idea that we could get over on 200 meters, because I had been observing this waveband for several years. So it occurred to me the best way to find out what we could do would be to set up some special tests for every station that wanted to enter the contest. This was done. It was very exciting and so far as I was concerned, not much time was taken for eating and sleeping. - F. H. Schnell, W4CF

Inspector D. E. Pearson, British Checking operator, inside the tent at Ardrossan.



weak signals which they were absolutely sure were of American origin but were unable to identify them through QRM.

Thus Paul Godley might be said to lead the first DXpedition ever staged. But no thought whatever was given to a transmitter. The amateur world was not yet ready for two-way communication across the Atlantic.

"Field Day" Hardships

After spending five days trying to copy signals through the interference of heterodynes from oscillating receivers, strong atmospherics, and harmonics from Poulsen arcs and single-circuit tube transmitters in London, Paul decided at about the last minute to move to a remote location near Ardrossan, Scotland. It proved to be a field covered with slippery seaweed which was used as a fertilizer. The one-horse wagon hauling in supplies, which included heavy storage batteries, stalled repeatedly. The tent was carried away with a gust of wind as soon as it was erected. Aerial supporting poles were blown down repeatedly until strong guy wires were brought in.

The aerial was supported only 12 feet above the earth, but it was 1300 feet long. In comparison with the 120-foot limit then imposed by law upon U.S. 200-meter aerials which were all quarter-wave grounded, Marconi type, it seemed very long indeed, but it was actually two wavelengths long at about 220 meters. It was designed by H. H. Beverage to pick up signals rather than static and was terminated at the far end in a noninductive resistance. He calculated that the effective height was 65 or 70 feet.

A keen type of British humor was recorded in Paul's log. C. F. Phillips, who held the license for the receiving station Paul used, heard the amplifier squeal vigorously during tune-up. He immediately procured an oil can and proceeded to oil the bearings on the tuning shaft. He claimed there was no connection between the squeals and the oil can, but Paul got a big kick out of it.

Following the failure of the earlier attempted transatlantics, K. B. Warner had been so bold as to "boast in print that if a dyed-in-the-wool American ham could be sent across the water with a good American regenerator he knew signals could be copied." In fact, he bet his new spring hat on it! Ever since then *QST* had been "answering inquiries from England as to just what a 'ham' is, particularly one who has been dyed while still in the wool." The British magazines thereupon christened Paul "the hard-boiled ham from America." Whatever differences we might have had in our adjectives, both British and American amateurs agreed that a "ham" was a radio amateur of exceptional ability.

Elaborate preparations were made to make sure that the tests had every chance for success. For ten successive nights each district and Canada in turn

was allocated 15 minutes in a free-for-all while Godley listened. And some twenty cw and 7-spark stations that qualified in a 1000-mile overland preliminary were allocated individual times with secret code groups. Each night the schedule rotated to give everyone an equal chance. Arrangements were made for the British Marconi company high power station, MUU, Camarvon, to transmit a message from Paul to ARRL daily at 2:00 A.M. EST and send it slowly by hand on a wavelength of 14,200 meters. It was to be a "PC" message (repeated back for verification) so the Radio Corporation station WIL, New Brunswick, would repeat it back, slowly by hand, on 13,600 meters. Thus all amateurs with long wavelength receivers could copy one or the other, and the League ran up a transatlantic message bill of \$1900.00.

U.S. Hams Get Ready

While Paul Godley was on his way to Europe, feverish activity prevailed among amateur stations trying to tune up for peak performance during the transatlantic tests. The fever peaked at 1BCG, a new station erected by Major Armstrong and five other members of the Radio Club of America, for the express purpose of transmitting signals across the Atlantic. A motor generator was used to supply plate voltage. The 230-meter wavelength, deliberately chosen for transmitting, was an attempt to use as long a wavelength as might be prudently permitted by the Bureau of Navigation of the Department of Commerce, which then controlled amateur radio. The transmitter was a startling innovation in amateur circles, a master-oscillator power-amplifier type. Designed for permissible limits of variation in frequency of less than 100 cycles, it was the most stable amateur transmitter on the air. Little did they realize that this station was destined not only to shatter all existing amateur records, but also to set the trend for future amateur stations for years to come.

The impulsive optimism racing throughout amateur ranks over the transatlantic tests was not shared by everyone. One eminent radio engineer said the tests were foolish because "it couldn't be done." Holding his vest-pocket slide rule in hand, he said, "The number of amperes that, with a kilowatt input, can be expected, at the base of a 200-meter transmitting aerial of optimum effective height, simply isn't capable of inducing the minimum required microvolts per centimeter of receiving aerial length to produce a signal of unit audibility at anything like that distance!"



By dint of hard work, long hours, and help from a crew of assistants, Paul was ready for business on schedule. He was assisted in Ardrossan by Inspector D. E. Pearson, of the Marconi Marine Communication Co., Ltd., who was checking operator throughout the test. His log reads in part:

At 1:33 A.M. (8:30 EST) Dec. 8, 1921 picked up a 60-cycle synchronous spark at about 270 meters, chewing rag. Adjusted for him, and was able to hear him say, "C U L" and sign off what we took to be IAAE; but atmospheric made sign doubtful . . . Chill winds and cold rains, wet clothes . . . were forgotten amidst the overwhelming joy of the moment. At 1:42 A.M. our welcome American friend was at it again with a short call for an eighth district station! His signal had doubled in strength and he was booming through the heavy static, and signed off clearly IAAW! Pearson only in time to get the AW on the tail end.

Paul's reporting message: "Rains, winds, atmospheric heavy. Working under tent. Beverage antenna, which fell during night. Heard IAAW calling eights 1:42 Greenwich, 270 meters, fading, sink gap. Ask him continue same time nightly. Keep all signals coming. Happy."

A Rootlegger!

This message started one of the wildest escapades in amateur history. Kenneth B. Warner, in writing of it, said,

IAAW was originally reported as IAAE, thru a mix-up in the separate code used between Messrs. Godley and Coursey, and was later corrected by cable to us. When the report of the first night came thru, advising that IAAE had been heard, excitement reigned supreme at Hartford headquarters. Shown by our call-book to be in Bridgeport, Conn., he could not be located by telephone nor could any other Bridgeport amateurs. So we got F. H. Armstrong, from IBCG, to drive there in an effort to locate him, which Mr. Armstrong did in the wee small hours of that same morning, only to find that IAAE had moved to New Jersey. Radio Inspector Kolster was routed out and advised us that the call had been reassigned to Fitchburg, Mass. Later that day the Chief of Police of Fitchburg, whose name incidentally also was Godley, and whose people are from New Jersey (wonder if he's red-headed?), located the Fitchburg lad and got him on the telephone wire for us, but he had only a quarter-inch coil and no aerial. With what fear and trembling he must have answered the summons to report to the Chief of Police! Then

At the 1971 National Historical Radio Conference of the Antique Wireless Association, Paul Godley was the honored guest speaker (on his 83rd birthday, too!). Here he points out a feature of the famous Paragon receiver, designed by him and manufactured by the Adams Morgan Company, to AWA Secretary Bruce Kelley, W2ICE. At left is Jim Russell, W8BU, one of the few living participants in the 1921 Transatlantics; he made the trip to the conference to meet Godley for the first time.

the correction came from Godley and we were off again, this time after Roxbury, Mass., with Mr. Entwistle doing the Sherlock act. Meanwhile former IAAE from Bridgeport comes in with the dope that he has moved to Belleville, N.J., where, altho it is the Second District, he operated on that test night with four amps in the aerial and signed IAAE. But in view of Mr. Godley's correction he was very QRZ hr. And IAAW in Roxbury hadn't operated a transmitter for six months! We that we were up a tree at first but IAAW and numerous Boston amateurs advise that the call has been heard on the air around there and that somebody else has appropriated the call. Whoever the would-be IAAW is, he is sticking tight under cover now, as he knows he is a law-breaker, and to date he has not been located. It is a pity, too, for if he were within the law he could claim the honor of being the first station heard overseas in the tests.

December 9th the log reads as follows:

Weather again wet and boisterous and at midnight on cutting in, find atmospheric very heavy, but wind dies away by 2 A.M.; rain continuing to fall, and atmospheric falling off to moderate strength.

At 12:50, after listening some time for free-for-all sparks, we swing over to C.W. and it is indeed a thrill we get when IBCG is picked up on 230 to 235 meters. A harmonic from Clifden is jamming but after some adjustment this is partially nullified. Signals from IBCG very steady and reliable. Remarkable performance and I wonder what power he is using. Lose him many times in an effort to 'feel out' the Beverage wire, but get him much better after adjustments terminated at 1:33. He is calling 'PF test' and signing. (PF was Paul's initials and personal sign.) Sweetest song I have ever heard. He fades out for 30 seconds every 3 or 4 minutes, but always comes back strong and steady.

At 1:59 A.M. he calls 2BGM and says "Phone us now," then shuts off. Measures between 230 and 235 meters on little General Radio meter.

Pearson and I relax, laugh with glee, and start looking for something to eat and drink.

Continue through night to hunt for more, but without avail. Static fairly bothersome, and Clifden is sending a great deal, and am unable to shake him.

It comes home to me that ours is a history making set of tests — that American amateur radio has the world by the ears. I would give a year of my life for a 1-KW tube transmitter, a nice, upstanding aerial and a British Post Office license to operate it on 200 meters. To be forced to listen to a Yankee ham and *only* listen is a hard blow.

Wired Coursey: "Burnham owes Warner new hat. Warm rains, calm, decreased atmospheric. IBCG calling me ending two Greenwich. Un-damped two thirty, strong, steady. Congratulations."

Message Traffic Attempts

Godley's report later in *QST* added:

The performance of 1BCG had filled me with a lot of very wonderful feelings. I then decided that no one thing would forever redound to the credit of amateur radio more than the transmission and successful reception of a complete message and I wired Armstrong direct as follows: "Signals wonderful send messages starting one Greenwich" and went to bed with a singing heart and thoughts of the coming night when we would be copying (perhaps) messages via 1BCG from Hartford, and my home, and even from President Warren G. Harding himself - who could say.

This message initiated another fiasco more disappointing to Godley than the IAAW affair. His log describes it thusly:

Signals were there! But, alas, I had not counted correctly on the vagaries of men's minds! Some British telegrapher against whom I shall carry a grudge to my grave had "bulled" my cable, for it reached Armstrong reading "SEND MGES"; and he did! He sent "MGES" over, and over, and over until I was sick! He kept it up the entire night, regardless of schedule, and no earthly way of stopping him! I remember getting a laugh out of it by conjuring up pictures of the "Old Man" spitting on the cat, but I could not forgive myself for exercising so much thrift. I wished that I had sent cables to Hartford and home and to Warren G. himself, apprising them of the facilities available, for then I am quite sure my ideas on the subject would have been, finally, correctly interpreted.

But his log of Dec. 11 indicates the startling magnitude of this history-making event.

1:53 - Long, unsteady, bubbling dash, and immediately much stronger than at any other time. Can read him throughout tent with 'phones on table, and wind howling outside. "Tests VV Mges de 1BCG," etc.

3:49 - Pick up IARY, saying "QRV."

3:53 - 1BCG comes in again. Also following from IARY: "From IARY to 2VA - we will play again at football next fall. No sig." "2AJF from IARY no sig. HW 2AJF de IARY ar."

3:55 - IARY very slowly: "next fall no sig. 2AJF de IARY." Very steady.

3:57 - 1BCG still going *strong*, steady, and sharply, says "30" at exactly 4 A.M.

4:05 - Getting colder. Clears up a bit, but begins raining again about 4 A.M.

4:19 - IARY calling IUN (CW) weak.

4:21 - IARY still calling IUN

4:23 - 1BCG still in; sends few V's.

4:26 - IARY calling 9BBF. "Here msg."

4:30 - 1BCG says "Three minutes AS." Some spark in too, but unreadable.

4:35 - Several CW's and spark in, one CW quite loud but jammed. He is saying something about a message from "Richmond for West Palm Beach." From his fist suspect it is 4GL.

4:37 - "R R Hello, Godley de 1BCG." Still very steady and fine. IARY calling 9BBF again, *seems fully as strong and steady now as 1BCG.*

4:43 - "Hello Paul de 1BCG."

4:49 - 2FD calling 9XAH (CW). Fine, clear and strong. Pearson marvels at proficiency of amateur operators.

4:53 - 8ACF calling CQ (CW).

4:54 - 2FD calling 9XAH, says "GE."

4:58 - 1BCG still *very steady*. "Bi."

5:03 - 1BDT (spk) calling 20M says: "GF 73 QTC." IARY (now spk) calls 1BIS, both above fading.

5:09 - Several sparks in too faint to read.

Godley's Comments

In commenting upon the tests Paul continues:

I cannot at this time too heartily condemn the practice of stations working locally without using their call letters. On at least a dozen occasions I very carefully tuned in stations to listen to them for periods ranging between one and three minutes, to find that my effort had gone for naught, since the stations in question suddenly stopped working without using their station calls.

Between 4:30 and 6:00 there were times when so many stations came in that it was impossible to read any. At such times as these I was very strongly reminded of the interference conditions near New York City. These conditions were duplicated exactly, excepting that the strength of signals was not as great. The number of stations audible; however, was fully equal to the number audible when listening in, in the vicinity of New York.

And K. B. Warner wrote:

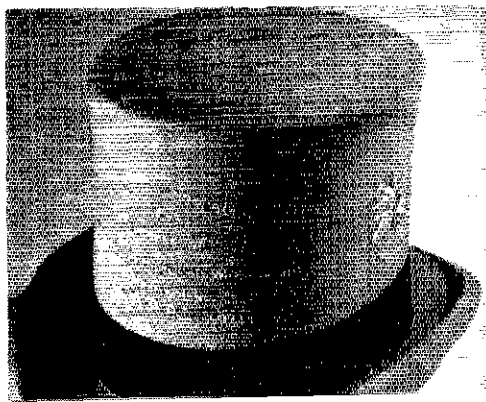
1BCG seems an easy winner as the star station. In addition to being heard all over the map they got thru a coherent message in broadcast, at 3 A.M. GMT on Dec. 12th, which was acknowledged by Godley by cable to this office. The first amateur transatlantic message ever sent read as follows:

"Nr 1 NY ck 12 to Paul Godley, Ardrossan, Scotland. Hearty congratulations. Burghard Inman Grinan Armstrong Amy Cronkhite."

Speaking of results of the tests, another result was that we won a perfectly nice spring hat from W. W. Burnham, of London, who took us up on our editorial bet before referred to, that a good U.S. ham could get signals over there. When the tests were over, Burnham wired us:

"Congratulations Cable size of hat."

Paul copied 9 spark and 19 CW amateurs. British amateurs heard a dozen or so, 1BCG was copied in Britain by five different stations and was also copied in Holland and Germany. All this on 200 meters or a little bit more. No one thought of going down - yet! So was ushered into being a new era in amateur transmission, and this was just the start. Yes, 1921 was a big year for amateurs on both sides of the Atlantic. QST



The "Trans-Atlantic Derby" won by ARRL Secretary K. B. Warner, who bet "a new spring hat" that American signals would be heard in Europe by Godley. British hatmakers didn't know what a derby was (it's called a "bowler" there), so sent this topper, traditional headwear at the Derby races.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity NRN

CONDUCTED BY GEORGE HART, WINJM

SET CONSIDERATIONS

WHAT DOES SET stand for? Why, Simulated Emergency Test, of course. It used to take place every October, but there were so many diversions then (World Series, football games, etc.) that in 1967 the SET was changed from October to January. Thus, the 1967 SET was held in 1968, and was called the 1968 SET; so although it may seem that we skipped a year, the process was continuous, and if we can be considered to have skipped anything it was only four months.

The SET has been a bone of contention each year for quite a few years. It started out as a "live" test of our emergency communications facilities, with all stations using the National Calling and Emergency Frequencies (now obsolete) to report their results to headquarters for the analysis and writeup. Most SET activities were local in nature. All that occurred at national level was the reporting of results to national headquarters, both of ARRL and American National Red Cross. In the fifties, civil defense and RACES (Radio Amateur Civil Emergency Service) were brought strongly into the picture, and have remained a part of the SET ever since.

Various methods have been used to arouse interest in this annual national emergency test which, unlike the Field Day, was not a contest. In one, a Test Emergency Alert (TEA) was transmitted over WIAW on an unscheduled basis. In another (two or three times, in fact), test emergency messages were "planted" with unlikely stations to be originated and their progress through channels to destination followed and analyzed.

* Communications Manager, ARRL.

After the NCEF concept was abandoned, the long-haul traffic flowed through the National Traffic System, and in recent years NTS has turned itself inside out to conduct a useful and meaningful test of its facilities under simulated emergency conditions.

Still more recently, much study has been given the question of just what we are trying to prove, or show, or do, in the SET. How far can we simulate, and how realistic can we make such a test?

Some years ago, many of you will remember, the FCDA, OCDM or whatever the federal civil defense agency used for initials then, attempted to conduct an "Operation Alert" during which all RACES facilities were alerted throughout the nation to supply emergency communications under simulated atomic attack. One year, the last year OPAL was conducted if our memory serves correctly, an actual "scenario" was written simulating assumed attacks on certain key target cities, with details down to the last nit. Here was something to go on, a simulation that came as close as you can come to the real thing, complete with damage figures, wind directions, fallout intensities, fatality assumptions — everything! It was a masterpiece of detailed planning, and it fell flat on its face.

Why? Well, this is a matter of opinion that still can arouse debate, but we believe that the main cause was the expectation that participants in a realistic simulated emergency will behave exactly as they would in a real emergency — an expectation that was not in consonance with the results. After extensive experience, two things become apparent about simulations versus the real thing: (1) in a simulated emergency, there is

Both Novices. Both made Brass Pounders League in May. Both named Jim. Both 15 years old. Both operate the Minnesota Junior Net. And, obviously, both making a good start in traffic handling. Left, WN9FBG. Right, WN0CGT.





Twenty-one members of the Kansas QKS Net gathered for this photograph at the Central Kansas ARC annual hamfest on June 13. Pictured from left to right standing: W0ZJY, WB0BFI, W0HI, W0CHJ, WB0BIY, W0BLI, WA0ZYW, W0FCL, K0BXF, WA0TAS, W0INH, WA0TAD, W0FDJ, K0FPC, and WA0SXR. Front row kneeling: WA0JFC, W0NEE, W0RBO, WA0TZK, WA0UTT, and K0MRI. (Photo by WA0SXR and W0NEE)

nowhere near the confusion and consequent disorganization that results from a real emergency; (2) in a real emergency, participation is far greater than in any simulated emergency — including hordes of amateurs eager to assist who have little or no experience or qualifications and who often succeed only in getting in the way. Both of these factors make the real thing tougher, not easier, than the simulation, no matter how well thought out the latter may be.

The question then is: If nothing we can simulate will prepare us for the real thing, what's the sense of going to all this trouble every year? This is the question about which all the annual hassling takes place. And it's a good question. The only fallacy in it is that it ignores the matter of *degree* — that is, to what *degree* can a simulation prepare us for the real thing, and is *this* worth the annual effort? We have already demonstrated to ourselves that you can't be 100% prepared on the basis of planning. Is the amount of planning practical worth the effort, time and money it costs?

Well, we think it most definitely is, and that's why we have an annual Simulated Emergency Test or one of the principal reasons, anyway. A detailed scenario, suggested by many each year, sounds like a lot of fun, but it's also a lot of work and often greatly taxes the imagination of sometimes-unimaginative participants. If you ask someone to assume that his house is destroyed by an earthquake, he will do so in a calm, unemotional manner, quite unlike the anguished concern he would feel if faced with the real thing, and the effect this anguish would have on his efficiency as a communicator. But still, there is a great deal of preparation that can be made for emergencies that will put you in good stead

whether the operation be real or simulated, and this is the type of thing we should be concentrating on rather than in making the simulation "unrealistically real" to the extent it detracts from the effectiveness of the overall operation; because no matter how hard we try to make it realistic, we aren't going to succeed in doing so if at the same time we try to make it a nationwide test and give everybody a good workout.

It's easy enough for local AREC groups to simulate a local emergency, such as a fire, a riot or the effects of an assumed natural disaster affecting only one community. It's a bit more difficult to assume a statewide or sectionwide emergency, but this can be done without *too* much difficulty. When it comes to simulating a national emergency, this is well-nigh impossible; and so at national level we try to simulate an overload of traffic on our NIS nets. How? By originating all kinds of messages going in all different directions and to widely scattered destinations and seeing how the system fares in handling them and getting them delivered in jig time.

This has both good and bad results. If we discount the dearth of participation caused by the fact of simulation and balance it with the increase of efficiency for the same cause, we might assume that this is approximately the performance we could expect in a real emergency situation — except that most likely such a situation would be regional at most and the rest of the organization would merely be in support, as has been the case in several recent widespread emergencies. The only trouble is that an increasing number of NTSers are beginning to question the need for knocking themselves out every year doing the same thing in pretty much the same way, then finding the nets the following week loaded down with the traffic

Public Service Diary

On Aug. 23, Daviess County, Ky. c.d. requested amateur radio communications in searching for an elderly man who was missing from his home. A portable two meter base station was established and the communications center manned. Amateurs assisted in organizing search teams and accompanied them with portable equipment. The search was ended the following morning when the body was found. The following amateurs participated, W4s EWM OYI TOY YOK ZGK, K4UDZ, WA4s FAG FMY, WB4s FAY PVC. - WA0YI

On Sept. 12, the Howard County, Md. RACES group had 34 members respond to emergency net operations caused by flooding. Under the control of K3FUL, mobile units were dispatched throughout the county. These units assisted county government and police in verifying road conditions. Operation took place on six meter fm and lasted for six hours. - W3FA SCM MDC.

On Sept. 3, Tenn. SEC WB4ANX was requested to provide communications for a search for a local woman who had wandered off. Three mobile units and two base stations were made available to provide communications for the search. The woman was found alive the following morning after being missing for nearly three days. WB4ANX/mobile broke into the Tenn. Phone Net and had W4TYV summon an ambulance. The stations were secured at 10 a.m. and moved on to set up a "Take Five" rest stop on the highway for the Labor Day Weekend. Other amateurs participating were WA4s BXZ JNW/J4, WB4s MPJ OAG. - WB4ANX SEC Tenn.

On Sept. 25, K0MMS, Woodbury Co., Iowa EC, was asked to provide communications for a search of a drowning victim in the Missouri River. Two-meter walkie-talkies were used between the boats and officials on the shore. A c.d. communications truck was located on one of the higher bluffs in Sioux City and was instrumental in relaying the walkie-talkies to the c.d. Emergency Operations Center. The operations were secured the next morning when the victim's body was found. Amateurs participating in the operation included K0s HFT MMS, WA0s PGO PHO PHU UBP, WB0s EGI EGK. - K0MMS

The Trenton (N.J.) c.d. was activated from Aug. 27 to Aug. 29 because of Hurricane Doria. High winds downed power lines and sent trees crashing into homes and streets. Flooding was also extensive. Mobile radio teams furnished communications between emergency shelters, flood stricken residents, and the Emergency Operations Center. Communications were also provided for the auxiliary police. The following amateurs are known to have participated: W2s EQF HCR, K2y CDH SHT TLE, WA2s BKE HGW SWH TNS, WB2s BPN PBV, K3CPE.

With the approach of Hurricane Ginger, the Norfolk (Va.) RACES was activated on Sept. 29. Contact was maintained with the N.C. Hurricane

Here's Don, W4YDF, operating the six-meter position at Norva, Va. c.d. headquarters during Hurricane Ginger. Amateur operations were very successful in providing communications during the hurricane. (Photo by WA4BUE)

QST for

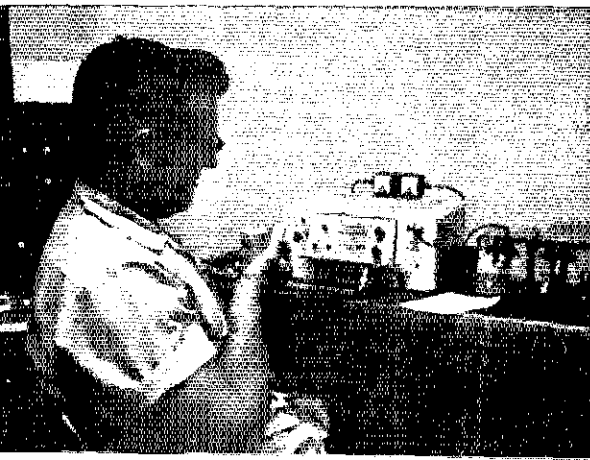


Here is TN SEC WB4ANX operating mobile during the search for a missing housewife as reported in this month's Diary.

that didn't get cleared during the SET weekend. One proposal extant is that all SET messages on anybody's hook be cancelled at the conclusion of the exercise on Sunday, to avoid the "hangover." Another is that emphasis be returned to the local drill, where capabilities are more in doubt than in the NTS, which already knows what it can do. Still another is that we conduct several SETs each year, simulating an emergency situation in each region, thus giving that region an annual workout while the rest of the system merely operates in support.

And so it goes, the constant skirmishing for the best possible posture in testing our emergency communications capability - testing which has both a practical breakdown-determining purpose and a public relations purpose. The SET this year (1972) is scheduled for January 29-30. AREC and RACES groups, along with the NTS, will be in there, hard at it, with perhaps some still-undetermined (at this writing) changes from procedures of previous years. The announcement will appear in the January issue of QST. Prior to that time, the usual SET Bulletin will have been sent to ARPSC leadership officials.

The SET, decidedly less popular as an operating activity than contests and DX, is just as decidedly one of the most important annual activities sponsored by the League. How's to get in it yourself this year? - WINJAM.



Network and the East Coast Hurricane Network. Local six and two meter fm facilities were also activated. Reports about the hurricane's position, weather and flood reports, and other information were relayed to the American Red Cross and the local c.d. office. Many amateurs participated in this highly successful operation by the time it had secured on Oct. 1. — *WA4BUE*.

Another Hurricane Ginger report comes from N.C. SEC W4EVN. On the morning of Sept. 29, a call was received from Governor Robert Scott's office requesting that a radio link be provided to the Governor's office to keep him informed of beach erosion, weather reports, damage reports, and other pertinent information. Amateurs from many parts of the stricken area relayed weather and damage reports to the Governor and also to the U.S. Weather Bureau, which had also requested assistance from amateur radio operators. Over thirty-five amateurs participated in this activity, which concluded on Oct. 1. — *W4EVN SEC N.C.*

Owensboro (Ky.) AREC was requested to provide communications for the search of a handicapped girl on Aug. 25. EC W4EWM and RO W4OYI immediately drove to the rural home to meet the sheriff and the c.d. director, meanwhile alerting Asst. EC WA4FMY through the aid of WB4OWM. WA4FMY and WB4FAY activated club station K4HY. The girl was found within a few hours, drowned. The operation was secured a few minutes after the body was discovered. — *W4OYI*.

On Sept. 25 a Mexican cattleman had what was presumed to be a heart attack while at an isolated cabin in the rugged San Pedro Martir Mountains of Baja Calif. The next morning XE1PAM reported the emergency to W6NPP, K6MVF, K6SMT, and others on 75 meters. W6YSP was alerted and activated the San Diego Mountain Rescue Team and the Flying Samaritans. It was arranged to have a doctor flown to the cabin while at the same time a rescue team was enroute in a four-wheel-drive vehicle. The victim was flown to a hospital in Ensenada. Other amateurs participating in the rescue were W6HCD, WA6SNE, WB6s OIX YFT, KE2BY.

On Oct. 2, members of the Tusco Radio Club, Ohio set up portable and mobile equipment to supply communications for the annual Swiss Festival in Sugarcreek, Ohio. W8LVW was master of ceremonies with W8MVX assisting. K8ZJK manned the net control position at the Red Cross shelter. Mobile and portable units were stationed at key points throughout the town. More than 75,000 people attended the celebration. Other amateurs participating were K8KSN, W8GVX, WA8s HQO HTR SHP YEG and WB8DMF. — *WA8SHP A3st, EC Tuscarawas Co.*

On Sept. 25 and 26, members of the Ottawa ARC and the Ottawa Valley Mobile Radio Club provided communications for 250 students of the U. of Ottawa in their annual drive to collect money for the Canadian Cystic Fibrosis Foundation. Over \$16,000 was collected enabling the University to take the trophy for collecting more than any other participating school. VE3ADM had thirty mobiles working three shifts through the facilities of the OARC repeater. — *VE3DV SCM Ont.*

Thirty-four SEC reports were received for the month of September representing 10,682 mem-

Public Service Honor Roll September, 1971

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category. Those making fewer than 45 points are listed with point totals only.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
	10	10	12	12	12	20	3	5	5	
WB6ZVC	10	10	12	12	12	7			5	68
K7CTP	10	10	12	12	12	10				66
W3E2T	10	10	12	9	12	7			5	65
W3FCS	10	10	12	12	12	2			5	63
WB2AEH	10	10	12	12	12				5	61
WB4KDI	10	10	12	12	12				5	61
WB4MCG	10	10	12	12	12			5		61
WB8CYB	10	10	12	12	12				5	61
WA8ETX	10	10	12	12	12				5	61
WB8HMV	10	10	12	12	12				4	60
W1YNF	10	10	12	12	12			2		58
WA4VAS	10	10	12	12	12	20	3			57
WA2ICU	10	10	12	12	12					56
W40GG	10	10	12	12	12					56
W0LRX	10	5	12	6	12			3	4	55
WA306M	10	10	12	6	12					54
K3JNP	10	10	12	9	12	1				54
W88UP	10	10	12	12	12	4				53
W0IRW	8	10	6	12	12					53
W20F	10	10	12	12				3		52
W7MCW	10	10	12			20				52
W8IMI	10	10	12	3	12					52
WB4DAJ	10	10	12	12	12					54
WB4OKT	10	10	12	12					2	49
W5EDT	10	10	12	12						49
WB4ANT	10	10	12	12						49
WB4DAJ	10	10	12	12						49
K9MRI	10	10	12	12						49
WA4VYV	10	10	12	8	9					49
K1YIR	5	5	12	9	12					48
W7BQ	10	10	12	9	12					48
W70CX	10	5	4	12	12					48
WA3NAZ	10	10	12	3	12					47
W4NOG	10	10	12	12	20				3	47
W7M	10	10	12	12						47
WA3TMC/545										
W2BU	...	...	...	...	...	...	...	...	...	...
W2VLS	...	...	...	...	...	...	...	...	...	...
W3MPX	...	...	...	...	...	...	...	...	...	...
K30IQ	...	...	...	...	...	...	...	...	...	...
K3ORW	...	...	...	...	...	...	...	...	...	...
WB4JMH	...	...	...	...	...	...	...	...	...	...
W4SRD	...	...	...	...	...	...	...	...	...	...
W5HSD/K	...	...	...	...	...	...	...	...	...	...
K5ROZ	...	...	...	...	...	...	...	...	...	...
W5SBM	...	...	...	...	...	...	...	...	...	...
W6BGF	...	...	...	...	...	...	...	...	...	...
W6LRU	...	...	...	...	...	...	...	...	...	...
WB8CWD	...	...	...	...	...	...	...	...	...	...
W8RNOQ	...	...	...	...	...	...	...	...	...	...
K8BAD/J	...	...	...	...	...	...	...	...	...	...
W0BV	...	...	...	...	...	...	...	...	...	...
WA0JFC	...	...	...	...	...	...	...	...	...	...
W6LY	...	...	...	...	...	...	...	...	...	...
W2NFP	...	...	...	...	...	...	...	...	...	...
WB8CLF	...	...	...	...	...	...	...	...	...	...
WA8VKF	...	...	...	...	...	...	...	...	...	...
W2CU	...	...	...	...	...	...	...	...	...	...
W2ER	...	...	...	...	...	...	...	...	...	...
W2RUF	...	...	...	...	...	...	...	...	...	...
WA3IPU	...	...	...	...	...	...	...	...	...	...
W3LOS	...	...	...	...	...	...	...	...	...	...
W3NEM	...	...	...	...	...	...	...	...	...	...
W4UQ	...	...	...	...	...	...	...	...	...	...
W4ZJY	...	...	...	...	...	...	...	...	...	...
W5RBB	...	...	...	...	...	...	...	...	...	...
W6AAAW	...	...	...	...	...	...	...	...	...	...
W6DEI	...	...	...	...	...	...	...	...	...	...
W6INH	...	...	...	...	...	...	...	...	...	...
W7LKB	...	...	...	...	...	...	...	...	...	...
W9RTB	...	...	...	...	...	...	...	...	...	...
W0PH	...	...	...	...	...	...	...	...	...	...
VE3AKS	...	...	...	...	...	...	...	...	...	...
W60AV	...	...	...	...	...	...	...	...	...	...
W64KJ	...	...	...	...	...	...	...	...	...	...
I4UNW	...	...	...	...	...	...	...	...	...	...
K3MVO	...	...	...	...	...	...	...	...	...	...
WA7MAD	...	...	...	...	...	...	...	...	...	...
W68ALU	...	...	...	...	...	...	...	...	...	...
646AC	...	...	...	...	...	...	...	...	...	...
W6LRY	...	...	...	...	...	...	...	...	...	...
WA1JTM	...	...	...	...	...	...	...	...	...	...
K1SXF	...	...	...	...	...	...	...	...	...	...
W2FEL	...	...	...	...	...	...	...	...	...	...
K2KFK	...	...	...	...	...	...	...	...	...	...
W3VA	...	...	...	...	...	...	...	...	...	...
W3OKN	...	...	...	...	...	...	...	...	...	...
W3IN	...	...	...	...	...	...	...	...	...	...
W4KSL	...	...	...	...	...	...	...	...	...	...
W8VJW	...	...	...	...	...	...	...	...	...	...
K8LGY	...	...	...	...	...	...	...	...	...	...
W9HRY	...	...	...	...	...	...	...	...	...	...
WA9VZM	...	...	...	...	...	...	...	...	...	...
WA0HTN	...	...	...	...	...	...	...	...	...	...
VE3JWE	...	...	...	...	...	...	...	...	...	...
VE3DV	...	...	...	...	...	...	...	...	...	...
VE3GFN	...	...	...	...	...	...	...	...	...	...
VE3LK	...	...	...	...	...	...	...	...	...	...
W4LLE	...	...	...	...	...	...	...	...	...	...
W60BRG	...	...	...	...	...	...	...	...	...	...
VE3FQZ	...	...	...	...	...	...	...	...	...	...
VE3NO	...	...	...	...	...	...	...	...	...	...
W2MTA	...	...	...	...	...	...	...	...	...	...
VE2APT	...	...	...	...	...	...	...	...	...	...

* 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.

bers. SEC reports are continuing to drop as is indicated AREC membership. This trend must be reversed. ECs are urged to report to their SEC's monthly and in turn SEC's are urged to report to their SCMs and headquarters. It only takes a few minutes and it would put you on the map. Sections reporting: Ala., Alta., Colo., Conn., E. Fla., E. Mass., E.N.Y., E. Pa., Ind., Iowa, Kan., Ky., Mar., Mich., Mont., Nebr., Nev., N.C., Ohio, Okla., Ont., Oreg., San D., Sask., S. Dak., S.N.J., Tenn., Utah, Va., Wash., W. Fla., W. Mass., W. Pa., W. Va.

BRASS POUNDERS LEAGUE

winners of BPL Certificates for Sept. Traffic

Call	Calls	Rec'd	Est.	Del.	Total
W9RDI	1249	1295	1166	114	2824
W9VAS	1193	364	104	460	1231
W9JCA	1111	330	419	37	918
W9VLC	1059	297	231	—	739
N9DZD	1013	277	—	351	715
W0LCK	1012	261	305	5	708
W0MIL	1011	334	213	—	629
W0GOF	1000	—	—	—	608
W7PIL	1000	266	174	17	511
W0MPX	1000	493	134	—	501
W0Z9U	1000	444	—	444	888

BPL for 100 or more originals-plus deliveries

W0YK	1233	K8SH	1136	9R4GH	1110
W0RLL	1217	W4S0L	1131	EA2IG	1109
W3QUT	1150	W0TCA	1125	W440L	1105
W0W8A	1148	W485X	1115	W4BY2	1105
W4KSO	1147	W6LFW	1110	W0L	1104

More-Than-One Operator Station

W0M27 341, K8NYS 292

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: W9APB.

The BPL is open to all stations in the United States, Canada and H.S. possessions who report to their SCM a message total of 500 or a sum of originals 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.

Traffic Talk

WA4HOW in the *Vezina* HAM writes an amusing little ditty entitled "How to Make a Name for Yourself in Traffic Handling." This kind of writing has been overdone in the past, but we haven't run one for a long time, so here goes:

1. Originate traffic with as many long, unnecessary words as possible, so the receiving operator can get the most practice.
 2. Don't be afraid of originating "junk" traffic. Handling operators really get a kick out of "Poo-poo waves you, See you soon, Punkin."
 3. Don't bother with a number or station of origin; this way, no one can trace it.
 4. Don't bother with a "check," either. No one ever counts the words anyway.
 5. Omit all street addresses and telephone numbers. Let the delivering operator work for his delivery credit.
 6. On phone, send the text at normal reading speed. Anyone who can't "copy" at this speed isn't much of an operator.
 7. If conditions are not perfect, spell out *all* words phonetically. The other operator will appreciate your concern about his copying ability.
 8. If conditions are perfect, don't spell out anything. If a word is unusual, just say "common spelling."
 9. When spelling, don't use the same, tired old phonemes. Demonstrate your command of the English language.
 10. If a text doesn't make sense, go ahead and change it — a little transmuting it, preferably, so the net will see that you are on the ball.
 11. *Never* let anyone correct your procedure. Just tell 'em you know you're right and that's it.
- Like promises that if you follow these suggestions faithfully, you'll surely make a name for yourself on the traffic nets — but not one that can be transmitted over the air.

National Traffic System. We have another Area Staff meeting to report. This one was the Central

Area Staff and took place immediately following the Dakota Division Convention in Sioux Falls, S.D., on Oct. 9. All members were present except the RNS manager; this position was vacant, and a recommendation for replacement was one of the items on the agenda. The Central Area Staff consists of the Area Net manager (W0INH), the three Region Net managers (W9HRY for 9RN and W0HI for TEN, with RNS vacant at present), the Area TCC director (W0LCK) and three members-at-large (MAL): W5MI, W9QLW and W0ZHN. W1NIM and WA0IAW attended as participating observers. Following a few between-times bull sessions during the convention activities, Chairman W0INH called the meeting to order at approximately 8 P.M. and they got down to business.

While the official minutes are not yet available, here is a summary of the agenda items and recommendations which resulted prior to the break-up about midnight:

1. Discussion of the PAS proposal for an American Traffic Net (NTS) to operate during the day, and counter-proposals by WIDGL for a Continental Traffic Net along the same order resulted in a recommendation that the WIDGL proposal be used as a guideline for trying out the new system.

2. After lengthy discussion, the staff recommended that W5SBM be appointed RNS manager to replace K5IBZ, resigned. A number of other candidates' qualifications were discussed in detail.

3. The Central Area Staff will generate a brochure on Central Area NTS to be sent to all leadership appointees and elected officials in the Central Area. WA0MUE has offered to draft such a document. Principal objective is to keep all leadership people informed of NTS and its status. W1NIM expressed possibility that any such brochure may be rewritten to apply to entire NTS and circulated nationwide.

4. The Staff recommended that the ARRL communications manager seek liberalization of the NTS travel rules to permit attendance by staff members at section net meetings, so that much-needed contact with section net people can be established with the object of extending system consciousness. The possibility of providing reimbursement for travel to SCM-called meetings was also discussed, but no specific recommendation made.

5. The role of NTS in the Simulated Emergency Test was discussed at some length, culminating in the recommendation that HXB be used by all stations originating S&E test traffic, permitting handling stations to cancel such messages if not delivered prior to the end of the text.

6. TEN Manager W0HI asked the Staff for assistance and advice in coping with some problems peculiar to the Tenth Region. During this discussion the matter of the possible transfer of Saskatchewan from RN7 in the Pacific Area to TEN in the Central Area also was considered. W0HI was advised by the Staff to work through SCMs (possibly their RMs and PAMs, if any) for solution to representation difficulties in Manitoba, North and South Dakota; if no or unsatisfactory response, then through the Staff or the communications manager.

7. The CAS noted that the communications manager was in receipt of a letter from the Saskatchewan SCM expressing a preference to be in TEN, whereupon, after discussion, both the Staff and the TEN manager expressed "no objection."

The Southern California Net meeting in June found these dignitaries present (left to right): W6INH, SCM Los Angeles; WA6DEI, SCM Santa Barbara; WB6BBO, *QST* YL Editor; W6LYY, SCN Manager; WB6ZVC, Asst. SCN Manager. (Photo by WB6ZAK)



8. The Staff voted a resolution of support for the Pacific Area Staff philosophy of emergency operation by NIS (see Sept. *QST*, p. 72).

This Area Staff meeting was perhaps the most orderly we have attended, kudos to Chairman W6INH for being primarily responsible for making it so. All recommendations will be studied, taken under advisement and where feasible acted upon by your CD Public Service staff. - WINJM.

September reports: Section and local net reports were up again; almost double from last month. Let's keep up the trend! A report from IWN Manager K7NHL indicates that the experimental ssb late session was a failure. Poor band conditions and extensive QRM contributed to the problem. Bob says that he will try again however, probably in January. RN7 manager W7BQ reports that traffic was up a bit from last month due mostly to some fair activity. Bill is still looking for more stations to go on RTTY. Generally speaking, traffic was up in the month of September indicating, perhaps, that the summer slump is over and brighter days are ahead. An annual 9RN certificate went to WA9KAG. The new RN5 manager is Jack Yundt, W5SBM. Good luck to you, Jack.

Transcontinental Corps. W3FMI reports this September the best since 1968 with traffic totals and percentage of successful functions up. W6VNO notes that W7BQ is a welcome addition to the roster. W0LCX also reports an increase in traffic with two new stations on the roster.

September		Out-of-Net Traffic	
Area	Functions % Successful	Traffic	Traffic
Eastern	120 95.0	1982	744
Central	90 95.5	1010	491
Pacific	120 96.0	1816	908
Summary	330 95.5	4808	2143

The FCC Roster - Eastern Area (W3FMI, Dir.) - W1S BGI, IJ, NJM, QYY, YNF, R1SSH, W4LJM, W2s ER, GKZ, K2KTK, WA2, ICI, UWA, WB2RKK, W3LMI, K3MVO, W4s NLC, SOU, UQ, K4KNP, WB4NNO, W8s PMJ, RYP, K8KMO, WARPIM, Central Area (W0LCX Dir.) - W4s OGG, ZJY, W5s MI, OU, W9s CXY, DNB, YR, WA9VZM, W6s DI, INH, LCX, ZHN, WA0IAW, K0AEM, Pacific Area (W6VNO Dir.) - WSRL, K5MAT, K6DYX, W6s BGE, EGT, IPW, MUF, MNY, VNO, VZT, WA6s DEI, EJA, W7s BQ, FM, KZ, PI, DZX, FKB, GFI, K0JSP.

September

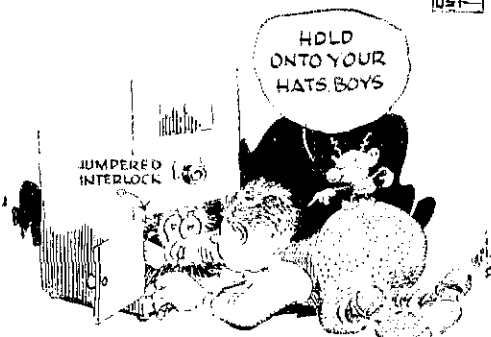
Net	Sessions	Traffic	Rate	Avg. Rep. (%)
1AN	30	1665	1,357	55.5 98.3
CAN	30	900	883	30.0 100
PAN	30	1149	924	38.3 90
1RN	60	550	391	9.16 95.5
2RN	60	692	839	11.5 100
3RN	60	439	381	7.16 98.9
4RN	56	506	412	9.04 91.4
RN5	58	465	270	8.0 76.2
RN6	60	846	497	14.1 100
RN7	59	361	370	6.1 48
8RN	57	461	420	7.7 92.8
9RN	60	412	409	6.9 93.8
TEN	60	469	526	7.8 77.7
ECN	54	101	165	1.8 76.1
IWN	25	84	366	3.4 24.3
TCC Eastern	7441	1982		
TCC Central	4911	1010		
TCC Pacific	9081	1816		
Sections ²	3219	13581		
Summary	3975	27459	EAN	14.4 78.9
Record	2866	27764	1,309	15.4

Independent Net Reports (Sept.)

Net	Sessions	Traffic	Check-Ins
20 Meter ISSB	26	212	470
Clearing House	26	186	473
7290	33	410	1915
H & B Morning Watch	30	233	324
Eastern Area Slow Net	26	70	191
North American Traffic	26	212	470
Mike Farad Net	26	205	399
All Service Net	4	20	50

ITCC functions, not counted as net sessions.

2-Section Nets reporting (93): AENI, AENB, AEND (Ara.); AFEN (Ariz.); OZK (Ark.); SCN, SONT (Calif.); CN, SSN, CHN, CEN (Colo.); CN, CPN, NEFN, NVHFIR (Conn.); DEPN (Del.); QFN, INN, PMTN, WFPN, GN, IPTN (Fla.); GSN, GTN (Ga.); ILN (Ill.); CCEN (Ind.); TLEN (Iowa); OKS (Kan.); KTN, KYN (Ky.); SAN, LAN (La.); SGN (Maine); WMFN, GNBEN, WMN, EMN (Mass.); FANN, MDD (Md.); MJN, PAW, MSN, MSPN (Minn.); MSN, WEN (Mo.); MPON (Mont.); ECTN, NIN, NIEFTN, NISN (N.J.); NMRTN (N.M.); NYS, MFN, ASN, NLI (N.Y.); AMN, SCEN, SSEN, BN, SCTM; MFEN, OSBEN, BNR (Ohio); OPEN (Okla.); BSN (Ore.); BUN (Utah); VSN, VN, VSNB (Va.); WSN, NSN, PSEM (Wash.); WVPN, WVN (W. Va.); BEN, BWN, WSNB, SW2RN, SW6RN, WLN (W. Va.); WCN (N.C., S.C.); TEX, TTN (Tex.); RISPEN (R.I.); PFTN, EPA, WPA, KSSN (Pa.); APN (Mary.); WQ V/UHF N (Quebec); GUN (Ont.); SATN (Sask.); BCAPPSCN (B.C.).



Switch to Safety

25th VHF Sweepstakes Announcement

WANT TO start the New Year off right? Then how about spending a couple of hours operating in the January VHF Sweepstakes, Jan 8-9, 1972. I'm sure you'll find it well worthwhile.

The contest begins at 2 P.M. Saturday and continues to midnight Sunday your local time (a 34-hour period).

To calculate your score, take the sum of your QSO points (at 2 points per complete two-way exchange) and multiply by total ARRL sections worked plus ten.

Be sure to send in your logs, regardless of score. They are always of interest in preparing the contest summary for *QST*. Don't forget to include your comments on conditions, unusual occurrences or what-have-you plus some good action shots of your contest operation, antennas etc. Entries must be received at Hq. no later than February 15th, 1972.

Send now for your log forms: each sheet has space for 50 contacts plus a section checkoff list and a summary. (Let us know how many you want).

ARRL-affiliated clubs, and clubs waiting approval of affiliation, are eligible to compete for an engraved gavel (see Rule 7). Club secretaries note: your entry letter must be received here at Hq. by March 3rd.

Awards will be mailed in early Spring following publication of the results in *QST*.

C U January 8! *W1KQM*.

Rules

1) **Eligibility:** Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable *under one call*, on or above 50 MHz, are invited to take part, Yukon-N.W.T. (VE8) counts as a separate multiplier.

2) **Object:** Participants will attempt to contact as many other stations in as many ARRL sections as possible.

3) **Contest Periods:** The contest starts at 2:00 P.M. your local time, Saturday, January 8, 1972 and ends at midnight, Sunday, January 9, 1972. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.

4) **Exchanges:** Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.

5) **Scoring:** (a) Contacts count *one point* when the required exchange information has been re-

Sample Log Sheet

ceived and acknowledged, a *second point* when exchange has been completed in both directions. A section counts only once for multiplier credit regardless of band.

(b) **Foreign Entries:** All contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together as one, and a section multiplier of *no more than one* may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

(c) **Final score** is obtained by multiplying total contact points by the sum of the different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.

6) **Conditions for Valid Contact:** (a) Repeat contacts on other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (Example: K6SSN works K7PXI on 50 and 144 MHz for complete exchanges of 2 points on each band; 2 X 2 = 4 points but only *one* section multiplier.)

(b) Cross-band work may not be counted.

EXPLANATION OF VHF SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the NR		Call	CK	Place	Time	Date
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of station worked)	Your ARRL section	Send GMT time of transmitting this NR	Send date of QSO
Sample	NR 1	W1KQM	59	CONN	1905	JAN 10

(c) Portable or mobile station operation under one call, from one location only, is permitted.

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

(e) Contacts with aircraft mobiles cannot be counted for section multipliers.

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

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

7) **Awards:** Entries will be classified as single- or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where at least three such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in *QST*.

When three or more individual ARRL-affiliated club members compete and submit logs naming the club with which they are identified, a certificate will be issued to the leading club member. A letter must be received from the club's secretary itemizing participating members and approximate claimed scores. When fewer than three individual

logs are received, there will be no club award or club mention.

A gavel with an engraved band will be offered the ARRL-affiliated club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL Hq. of the *individual contest logs* from such members. Only the score of a bona fide club member, operating a station in local club territory, may be included in club entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

8) **Conditions of entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

9) **Reporting:** Reports must be received at Hq. no later than February 15, 1972 to be considered for awards.

Log sheets are now available from your ARRL Hq. *Unless first-class postage is included with your request, log sheets will be sent by third-class mail.* To aid us in getting these forms to you as quickly as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with Zip code. We suggest a minimum of 8 cents postage attached. This will assure your receiving 5 log-sheets, enough for 400 contacts. Using this as a guide-line you can adjust the postage according to your needs.

QST

38th ARRL International DX Competition Announcement

THE ARRL Contest Advisory Committee has just completed an extensive study of the ARRL DX Competition rules with the finding that little, if any, changes are necessary for this popular activity. However, in the interest of further clarification/simplification, the following items are brought to your attention.

A) Multioperator single-transmitter category to prohibit the use of an octopus. (see Rule 4)

B) All completed two-way exchanges will count for 3 points. No partial contact credit will be allowed.

C) The rule against spotting nets (for single ops, of course) which has been in effect since 1948, is further clarified to avoid confusion. (see Rule 4)

D) A certificate will be awarded to the high Multi-Single and high Multi-Multi entry in each W/VE call area and DX country, regardless of the number of entries received.

And finally, as an aid to the reader, contest results will be changed so as to show final scores of W/K participants by sections within W/K call areas.

Be sure to send in your log, regardless of score. It will be of definite interest in preparing the contest summary for *QST*.

Don't forget to comment on conditions in your area, unusual occurrences, exceptional QSOs etc. and above all to send along some good action pictures of your operation, QTH, antennas or anything else you think will be of interest.

As far as reporting goes, here's how: W/K and VE/VO stations send signal report and state or province to DX; DX stations send signal report plus a 3-digit number indicating power input. Compute your score (see rules following) and send your entry to ARRL Communications Dept., 225 Main St., Newington, CT, 06111 U.S.A. These entries must be received at Hq. no later than May 1st,

CONTEST PERIODS

Phone		CW	
Starts	Ends	Starts	Ends
Feb. 5, 0001 GMT	Feb. 6, 2359 GMT	Feb. 19, 0001 GMT	Feb. 20, 2359 GMT
Mar. 4, 0001 GMT	Mar. 5, 2359 GMT	Mar. 18, 0001 GMT	Mar. 19, 2359 GMT

ARRL INTERNATIONAL DX COMPETITION
WBØZLM... N.Dakota

WBØs.zlm.zln.....

3	27	46	95	52	38	781
3	44	129	803	679	485	2149

1677989 261 2143 ABC 84

NDDXC.....

7553B 3253 3051

HILL WYAT. HØRZLM

59 FOX DR FARRØ N D

3/31/72

Sample summary sheet

WBØZLM N.D. 3-5

WBØZLM 3-5 NR OPERATORS 27 NR CONTACTS 44

Sample check sheet

Log sheets, summary sheets, and DX Checkoff sheets are now available from your ARRL Headquarters. Unless first-class postage is included with your request, log sheets will be sent by third-class mail.

1972; and remember, checkoff sheets must be attached.

The FCC has set forth some guidelines as to which forms of identification of an amateur station will be acceptable for short QSOs such as DX and contest exchanges.

Examples of acceptable end-of-exchange transmissions of less than 30 seconds are:

- "DX1DX de W6XYZ 589 CAL BK"
- "DX1DX W6XYZ 589 CAL K"
- "DX1DX 589 CAL de W6XYZ K"
- "DX1DX 589 CAL W6XYZ K"
- "589 CAL DX1DX W6XYZ K"

For telephony, the voice equivalent of the foregoing examples may be used, substituting "this is" or "from" for "de", etc.

Good luck in the pileups. — WAIKQM.

Rules

- 1) **Eligibility:** Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.
- 2) **Object:** Amateurs in the 48 continental United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.
- 3) **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.
- 4) **Entry Classifications:** Entry may be made in either or both the phone or cw sections; cw scores are independent of phone scores. Entries will be further classified as single or multiple-operator stations. Single-operator stations are those at which one person performs all the operating, logging and spotting functions. Multiple-operator stations are those obtaining assistance, such as from spotting or relief operators, or in keeping the station log and records. Single-transmitter multioperator entries will be recognized as a distinct category from multi-multi. The use of electronic or mechanical devices or other methods of simultaneous operation on two or more bands is prohibited. The use of spotting nets(operator arrangements involving assistance through DX alerting nets, etc.) places an entry in the multioperator category.

ARRL International DX Competition

WBØZLM N.D. 3-5

CW PHONE

WBØZLM 3-5 NR OPERATORS 27 NR CONTACTS 44

WBØZLM 3-5 NR OPERATORS 27 NR CONTACTS 44

Sample log sheet

5) **Contest Periods:** There are four weekends, each 48 hours long: two for phone work and two for cw.

6) **Valid Contacts:** In the phone section, all claimed credits must be made voice-to-voice. In the telegraphy section, only cw contacts count. Cross-band contacts may not be counted.

7) **Exchanges:**

a) **Amateurs in the 48 continental U.S. and Canada.** Cw participants will transmit a three-figure number, representing the RST report, plus their state or province. (The latter may consist of an appropriate abbreviation.) Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. Example: WA8VRB might transmit "579Mich" on cw, "57Mich" on phone.

b) **Amateurs outside the 48 continental U.S. and Canada** will transmit six-figure numbers, each consisting of the RST report, plus three "power" numbers; the power indicator will represent the approximate transmitter-power input. Phone contestants will transmit five-figure numbers, each consisting of a readability-strength report and the three "power" numbers. Example: OZ1LO, with 150 watts input, might transmit "569150" on cw, "56150" on phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly. (Note, KH6 and KL7 are considered as DX.)

8) **Scoring:**

a) **Points:** Three points are earned for each completed two-way exchange. Incomplete QSOs will not count for contest points or multipliers.

b) **Final Scores:** W/K and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of continental states and VE/VO licensing areas worked on one band plus the number of states and VE/VO licensing areas worked on each other band.

There are 48 continental states plus VO and VE1-VE8, a possible total of 57 multipliers per band.

9) **Repeat Contacts:** The same station may be worked again for additional points if the contact is made on a different frequency band.

10) **Reporting:** Contest work must be reported as shown in the sample forms. Each entry must include the signed statement.

To aid us in getting these forms to you as quickly as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with Zip code. We suggest a minimum of 16 cents postage attached. This will assure your receiving 2 Summary sheets, 2 DX checkoff sheets (required by USA entrants only) and 4 log sheets, enough for 400 contacts. Using this as a guideline, you can adjust the postage according to your needs.

Contest reports must be received at Hq, no later than May 1, 1972, to be eligible for QST listings and awards. All DX Competition logs become the property of the American Radio Relay League and none can be returned.

11) **Awards:** To document the performance of participants in the 38th ARRL International DX Competition, a full report will be carried in QST.

In addition, special recognition will be made as follows:

a) A Certificate will be awarded to the high-scoring single-operator phone and to the high-

scoring single-operator cw entrant in each country, in Alaska, Hawaii and in each of the continental U.S. and Canadian ARRL sections (see page 6, QST) from which valid entries are received. In addition, a certificate will be awarded to the high-scoring multi-single and multi-multi station in each W/VE call area and DX country, regardless of the number of entries received.

b) A suitable certificate will be awarded to the operator making the highest single-operator phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three phone entries by members of the club and that these scores are confirmed by receipt at ARRL of the individual contest logs from such members. The highest-single operator cw scorer in each club will be awarded a certificate under the same conditions. Only a bona fide resident member, operating a station (his or another club member's) in local club territory, may compete for club certificates. Secretary's letter must be received by June 9, 1972.

c) A personalized plaque will be awarded to the highest single-operator DX phone and cw station (non-W/VE) in Africa, Asia, Europe, North America, Oceania and South America.

d) ARRL will award a gavel to the ARRL-affiliated club submitting the greatest aggregate phone and cw score by its members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only scores of a bona fide resident member, operating a station (his or another club member's) in local club territory, may be included in club totals.

12) **Judges:** All entries will be passed upon the ARRL Awards Committee, whose decisions will be final. The committee will void or adjust entries as its interpretation of these rules may require.

13) **Disqualifications:** Each participant agrees to observe the contest rules as well as all regulations established for amateur radio in his country. Violation of any regulation as confirmed by a single FCC citation or advisory notice or two ARRL-accredited Official Observer reports, may constitute grounds for disqualification. Some examples of practices which can result in disqualification: off-frequency (out of band) operation, harmonics, spurious emissions, low tone reports in logs, key clicks splatter, excessive side-bands. US stations working banned countries, interfering with channels handling amateur emergency communication. [QST]

Strays

Louis A. Gebhard, the historian preparing the radio history of the Naval Research Laboratory (May QST, page 43), wishes to thank those amateurs who wrote him about early Navy radio and direction finding experience. The response far exceeded his expectations and with his part-time secretarial help he will be unable to acknowledge all of your contributions at this time. With the help of amateurs he has already cleared up several important points for the record in his history and located several key old-timers. This is just another example of the fine cooperation of the U.S. amateurs. — W3BLC

Use your Zip code when writing ARRL.



Paul, WA6UAM (above), much to the amazement of his neighbors, kept his 1296 MHz skeds atop his roof. Sure made aiming that corner reflector easier! And Jim, W3GJB/3 (below), ably assisted by Kerm, K9L10, managed 107 QSOs from high atop the Snowy Mt. Fire Tower near Waynesboro, PA.

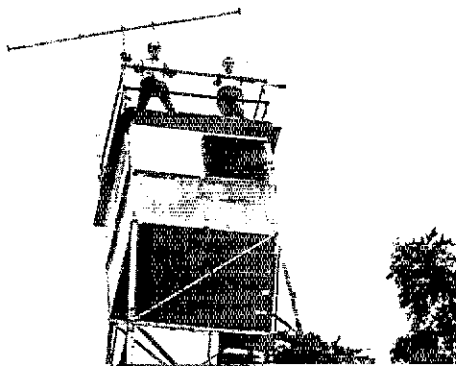
September VHF QSO Party Results

REPORTED BY AL NOONE,* WA1KQM/WB6SAZ

BAD WEATHER throughout most of the East, an almost total lack of *E* propagation, conflicting Hamfest dates and such, all combined on the weekend of September 11-13, 1971, to provide less than ideal conditions for the September VHF QSO Party.

Judging from the 259 entries received at Hq., reported activity (while seeming rather constant and certainly widespread throughout the USA and Canada) was at its lowest in many a year. Some

* Asst. Communications Mgr., ARRL.



have suggested that this might be a good time to consider replacing the September VHF QSO Party with a new activity, say a "220 MHz and Above" contest! What say? Let's get your ideas for Contest Advisory consideration.

Single-op multiband entries were led by K2OWR (NNJ) with a score of 25,984 (ABCD). Second place goes to K2RTH (NLI) with 21,350 (ABCD), third, to W2CRS (ENY) 13,716 (ABC). It is interesting to note that each of the above in addition to leading their sections are all located in the Hudson Division!

The remainder of the *TOP TEN* are as follows: WA1LNJ 11,115 (ABD); K3ZSG 10,208 (ABCD); W1E11 9900 (ABCD); W2EIF 9504 (ABCD); K1GYT 8832 (ABE); K6YNB/6 8217 (ABCD) and WB2YZV 7808 (ABCD).

Single band leaders were (50 MHz) WA2E1W 1616; WA1HGS 1350 and WA8PNR 1188. On (144 MHz) WA2DPF 2660; W2AQT 1717 and VE3DSS at 1615. K3IUU, operating only 220 MHz and above, takes honors with 2280.

Neither rain, nor sleet, nor September conditions appear to keep a good multiop down! Competition, as always, was keen. W1DC/1, the 1200 Radio Club, with an excellent score of 83,045 (ABCDE) managed to unseat their competition to the West, WA1MUG, the Mt. Greylock Expeditionary Force who registered a score of 72,000 (ABCD). The battle for third was close but WB2GKE/2, the Interstate VHF Society, claimed victory with 33,701 (ABCD). Other excellent scores were submitted by WA8PLZ/8 33,069 (ABCD); WB2QOQ/2 30,632 (ABCD); WA110X 18,228 (ABD); K1DOV/1 15,752 (ABCD); W2RAK/2 13,407 (ABD); W2OW 13,260 (ABCD) and W8CCI 11,868 (ABD).

Section totals continue to rise, particularly on 220 MHz and above, where increasing interest is evidenced by the number of sections active. Some of the more notable returns were: K1GYT with 35 on 50 MHz; K2RTH - 21 on 144 MHz; K2RTH again, with 14 on 220 MHz; W2OMS and W4FJ tied with 14 on 432 MHz; K2RIW and K3IUU tied with 3 sections on 1215 MHz and above. High multioperator returns were as follows: W8CCI and WA8PLZ/8 tied with 32 on 50 MHz; WA8PLZ/8 again, with 22 on 144 MHz; WA1MUG - 17 on 220 MHz; WA1MUG again, 15 - 432 MHz and W1DC/1 - 10 on 1215 MHz and above.

Certificate awards are scheduled for a mid-December mailing. In the meantime, why not send now for your free, newly-revised VHF Sweepstakes forms! (See Rules, elsewhere in this issue) A stamped self-addressed envelope will bring you a set of the entry forms.

Soapbox

No special propagation on either 50 or 144 MHz. The "Chief Engineer in the Sky" must have forgotten the date of the contest! - WA8JXE/8. Most of our contacts for the contest were ground wave. Some scatter from Canada and the North East was heard but not good enough for contacts. - K4BPY/4. Many ssb stations lose points as well as the am stations when they will not work each other. My frequency right up close to ssb stations and only two worked me. - W9DJ, WB2LZD/3

QST for

Min. Sections	30	15	4	3	1			
MHz.	50	144	220	432	1215			
K1DQV/1*		16		7				
K1GYT	35							
K1JIX				9	1			
K9AQP/1			4	9	2			
W1DC/1*		21	13	13	10			
W1EUI			7	3				
W1YTW			4	4				
WA1FFO	18							
WA1FSZ				3				
WA1IOX*	19			3				
WA1LNJ				7				
WA1MHN*				3				
WA1MUG*	20	17	15					
K2ARO				12				
K2BWR			8					
K2DEL/2*			5	3				
K2OVS				6				
K2OWR	18	10	8					
K2RIW				13	3			
K2RTH	21	14	11					
K2YRZ	16		3					
W2AQT	17							
W2BLV				12				
W2CRS	20	13						
W2CVW				3				
W2EIF		11	7					
W2OMS			14	2				
W2OW*	15	11	9					
W2RAK/2*	16							
WA2FUS			4	2				
WA2UDT*	18							
WA2ZPX	19							
WA2ZZF				7				
WB2GKE/2*	19	8	11					
WB2HXZ	16							
WB2IRX							10	
WB2QQQ/2*	18	9	8					
WB2YZV							4	
K3HKK*	15	6	5					
K3IUV								3
K3ZSG						8	8	
W3ARW*	19	8	6					
W3BHG	16							
W3CGV			5	3				
W3LUL	15							
W3TMZ	18							
W4AAU							5	2
W4FJ							14	
W4UCH			7	4				
W4WQZ*							5	
WA4WZQ/4*							3	
K6YNB/6			8	6				
W6FEE			4					
W6FZJ							4	
W6QED							3	
WA6GYD			6					
WA6HPJ/6*			4	4	3			
WA6UAM								2
WA6UAP							5	
WB6KBZ/6*			6	6				
WB6NMT				7				
W8CCI*	32						4	
WA8PLZ*	32	22	10	9				
K9HMB							5	
W0LER							3	
VE3DKW							6	
VE3DSS	19							

* Multioperator station.

was consistently heard on scatter but line noise prevented contact. - K0LCB. Contest conditions poor due to weather. - WA2SLY. Worked my first scatter on 50 MHz. W8CCI had an outstanding scatter signal here but heavy powerline noise kept us from working. - WA0VJF. Seemed to be a lull in activity this time, nice outing and beautiful weather at 8837 feet on Mt. Pinos. - W7HAR/6. Lots of East Coast scatter signals but only able to get a couple. - WA0ZWF. Activity on 144 MHz was exceptional. Next year, January, I must add 432 MHz to the shack. - WB2LAL/1. My first attempt to operate on 432 MHz with reasonably good gear. I am running at my station a 9-element yagi, 50 feet of RGS, 12 watts at the antenna and a

homebrew converter. Heard Ohio, Maine, N. Carolina and Canada but couldn't raise them. - WB2IRX. WA1MUG was the most regularly heard signal on 432 MHz. - W4FJ. The 550 ARC will be highly active in all vhf contests. Our contest location is on top of a 1635 foot mountain and we have 5 towers ranging from 60 to 140 feet high. - WB2QQQ/2. I would like to see shorter operating periods like two 10-hour periods. - WA8HZK. Scatter on 50 MHz was better than ever. - WB9EDP. All contacts here in West Florida were on ground wave. Wish the band would have opened. - WB4BSZ. Hope I can get on 144 MHz am/fm for next contest and with a little luck will be on 220. - WB4KGW. How about that. QRM on 144 MHz! - WB9AOU. This was the first effort of the Meriden Mt. VHF Club. Conditions were very poor, lots of rain static. Will be back in January! - K1DQV/1.

DIVISION LEADERS

Single Op.	Division	Multiop.
K3ZSG	Atlantic	W2OW
K9HMB	Central	WB8HUC/9
W0LER	Dakota	.....
WA2FYH/4	Delta	WB4HEL/4
WB8BGY	Gr. Lakes	W8CCI
K2OWR	Hudson	WB2GKE/2
WA0ZWF	Midwest	.....
WA1LNJ	New Eng.	W1DC/1
W7FN	Northwestern	K7AUO
WA6GYD	Pacific	.....
W4AAU	Roanoke	WA8PLZ
WB5HNN	Rocky Mt.	.....
K4FRH	Southeastern	K4BPY/4
K6YNB/6	Southwestern	WB6KBZ/6
K5UGM	West Gulf	W5WAX
VE3DSS	Canadian	.....

SCORES

In the following tabulation, scores are listed by ARRL divisions and sections. The top single-operator scorer in each section receives a certificate award. Multiple-operator scores are shown at the end of each section tabulation; in sections where at least three such entries were received, the top multioperator scorer receives a certificate award. A single asterisk indicates a Hq staff member, ineligible for an award; a double asterisk indicates a Novice award winner.

Columns show final score, total number of contacts, section multiplier, and bands used. A represents 50 MHz; B, 144 MHz; C, 220 MHz; D, 432 MHz; E, 1215 MHz and above.

ATLANTIC DIVISION

Delaware
W3CGV 1836-60-27-ABCD
W3BHG 1344-84-16-B
WA3OYA 516-43-12-B

Eastern Pennsylvania

K12SG 11,208-200-44-ABCD
K3IUV 2280-59-19-CD
W3E1B 1260-78-15-ABC
WA3HIF 4916-70-7-AB
W3GOA 350-35-10-A
WA3MHF 266-38-7-AB
WA3PCS 126-21-6-AB
W3K1T 80-20-4-A
WB2LDM (11 ops.)
10,161-20-40-ABCD
W3ARW (+K3SOX, W3UJ)
7632-138-48-ABCD
WA3PR (4 ops.)
4342-167-26-AB
K3YFD (4 ops.)
3740-170-27-AB

Maryland-D.C.

WAANL 3148-156-11-AB
W3TMT 4587-139-13-AB
WA3APO 4396-157-28-AB
K3PHB/3 1309-77-17-AB
W3HH 705-47-15-A
W3BH 696-38-12-AB
W3LUL 495-53-15-B
W3OU 160-33-9-ABCD
WA3LOS (K2ODL, op.)
736-28-12-AB
K3MWO 333-37-9-B
W3PZK 280-32-8-ABCD
W3AJAN (W3HFX, op.)
78-26-3-B
K3IVO (+W3WRM, W3BKG)
2420-121-20-AB
WA3NUL (WA3LFO, FYZ)
1862-98-19-AB

Southern New Jersey

W2FIT 9504-164-48-ABCD
K2BWR 2754-67-34-ABC
WB2LGG 910-68-14-AB
W2BLV 728-22-12-D
Western New York
K3YRZ 4135-114-15-ABD
WA2EY 918-51-18-AB
W2WGL 364-28-13-B
WA2TU 315-35-9-A
WA2HYK 44-11-4-B
W2OW (11 ops.)
13,260-230-52-ABCD
WB2MXS/2 (+WB2KJ)
1296-72-18-AB

Western Pennsylvania

WA3BNQ/3 2054-108-19-AB
W3RWU 1232-76-16-AB
W3JIM 175-25-7-A
WA3ODQ 95-19-5-AB
WA2RE/RJ 14-7-2-A
K3HKK (2 ops.)
7869-169-43-ABCD
W3GBJ/3 (+K9LJ)
1177-107-11-AB

CENTRAL DIVISION

K9HMB 6779-150-39-ABCD
WB9LDP 270-60-12-AB
W3V1 423-47-9-AB
W3AOPM 416-87-5-AB
K3HVC/R 770-44-5-B
K9DWB 195-38-5-AB
W3YAXH 120-24-8-B
W3JZ 39-13-4-B
W3HGX (3 ops.)
2912-208-14-AB
Indiana
K9ZNX 448-64-7-B
W3PACD 210-42-5-B
WB8HUC/9 (6 ops.)
6,900-200-31-AB
Wisconsin
W3NSDC 1005-67-15-AB
W3HJ 290-45-6-AB
W3DI 36-16-6-AB
W3YT (+K9DX, Y, W3ATGD)
2886-131-26-AB

DAKOTA DIVISION

W3SQRX 189-27-7-AB
W3LQK 72-18-4-B
Mississippi
W5AO 60-12-5-B

DELTA DIVISION

Louisiana
W3SQRX 189-27-7-AB
W3LQK 72-18-4-B
Mississippi
W5AO 60-12-5-B

MINNESOTA DIVISION

W3SQRX 189-27-7-AB
W3LQK 72-18-4-B
Mississippi
W5AO 60-12-5-B

MISSISSIPPI DIVISION

W3SQRX 189-27-7-AB
W3LQK 72-18-4-B
Mississippi
W5AO 60-12-5-B

MISSOURI DIVISION

W3SQRX 189-27-7-AB
W3LQK 72-18-4-B
Mississippi
W5AO 60-12-5-B

NEW ENGLAND DIVISION

Connecticut
WA11NJ 11,115-265-39-ABD
WA11LD 6186-111-36-AB
WA11FD 5976-162-30-ABD
W10H 385-15-11-AB
W10AK 324-36-4-B
W10DO* 600-35-9-AD
W10WH 798-36-6-A
WB2CRO/H 30-10-6-A
W10E1 30-15-8-B
W10KH 15-5-3-A
WA10X (10 ops.)
18,224-429-47-ABD
W10YV1 (7 ops.)
25,752-336-44-ABCD
Eastern Massachusetts
W311H 6909-200-45-ABCD
W311CS 1380-90-15-A
WA11LD 1020-27-18-AB
K3AOP/1 930-36-15-CD
WA11LD 312-53-6-A
WA11OR 300-30-10-AB
W10O 106-31-6-A
W3MKN/1 182-17-6-AB
WA1117 80-20-4-A
W3AMHN (11 ops.)
4914-177-26-ABD
W3MHL/1 (5 ops.)
5132-168-18-ABC
Maine
W1YTW 3465-75-29-ABCD
W1CJZ 846-38-17-AB
K10OY/1 (+W1CPL)
52-13-4-B
New Hampshire
WA11SZ 1178-57-19-ABD
W1JNM 41-41-11-B
K1NOZ 200-40-5-A
WA11SD 96-16-6-A
W1DCM (24 ops.)
8304-881-85-ABCD
Rhode Island
W321AU 4004-182-22-AB
WA1KUU 150-50-3-A
Vermont
K1G5T 883-184-28-AB
Western Massachusetts
WA11MZ 800-100-8-A
E1UK (+WB2V, op.)
663-25-4-CD
W1HR 66-3-5-ACD
WA1MUG (10 ops.)
72,000-812-80-ABCD
NORTHWESTERN DIVISION
Oregon
W3CYR 450-41-9-AB/DF
K2HNI 36-13-4-ABC
K7AUD (7 ops.)
1060-97-10-AB/DE
Washington
W3FM 1044-88-1-AB
K2IDN/7 290-58-8-AB
W7ZSE 175-35-3-AB
WA70E1 100-50-3-A
WA707 50-25-2-AB
W7OCV 34-17-2-AB
PACIFIC DIVISION
Last Bay
W36NMT 1380-49-20-ABC
Sacramento Valley
W36NKG 308-27-11-ABC
W361P 85-17-5-B
W360FM 36-14-4-A
San Francisco
W36AW 150-25-6-AB
W36W1 124-51-4-B
W36PVN 120-30-6-A
San Joaquin Valley
W36YK 1008-45-21-ABD
W361E 208-17-8-ABC
Santa Clara Valley
W36GYD 1800-72-18-AB/CD
W36MY 1308-95-7-AB/CD
W36LDM 1140-105-10-AB/CD
W36KUG 924-77-12-A
W361T 492-82-6-AB
W36AP 407-27-11-ABD
K6PAX 307-36-9-ABC
W36V1 312-78-4-B
W36VJ 204-25-6-AC

Tennessee
WA2FYH/4 432-54-8-A
WB4HLD 252-29-8-A
WB4H1/4 14 ops.)
3822-182-21-AB
W4WOZ (4 ops.)
(771-69-14-ABD)
W4GXZ/4 (4 ops.)
405-43-9-A
KANSAS
W36H 333-37-9-AB
W36CTO 10-5-2-B
Missouri
K9LBC 171-19-9-AB

GREAT LAKES DIVISION

Kentucky
WA4CQG/4 1698-106-16-AB
Michigan
WBKBY 4200-168-28-AB
K3HWW 1751-103-17-AB
W3AKH 150-135-10-B
W3ARX/E/R 460-46-10-AB
W3DBI 448-50-8-A
W3AYYW 348-58-6-AB
WB8ALZ 200-50-4-B
E3A1C 66-22-6-AB
W3R1NG 6-7-1-B
W3ARGLS (+W3ARL)
152-58-4-AB
Ohio
W3APNR 1188-66-18-A
K3YK 353-39-9-AB
W3WMP 240-70-6-A
W3WMT 54-18-3-A
W3RQV 2-1-1-C
W3RCY (7 ops.)
11,868-253-46-ABD
W3RHZK (+W3R1G)
1728-108-16-AB

HUDSON DIVISION

Eastern New York
W2CRS 11,716-255-54-ABC
WB21KZ 1440-51-20-BCD
K23AD 888-37-12-B
WA11LG/2 700-70-10-B
WA2RUW 600-40-15-AB
E2G5F 558-62-9-B
W3ZNR 462-38-11-ABD
W3EYV/2 28-7-4-B
WA2YOV/2 (12 ops.)
682-62-11-AB
New York City Long Island
K2RTH 21,350-245-70-ABCD
W3EZYV 7908-214-32-ABD
WA2ZPX 4814-166-29-AB
K20V5 0024-97-27-ABD
W31D9 2660-190-14-B
K2R1W 1648-48-16-DE
WA21US 1638-57-21-ABCD
WA281Y 1510-104-12-B
W3E1F/2 871-67-1-ABD
W31TH 820-82-10-B
W3KKL 260-76-10-B
W3KKG 413-89-7-B
WB2TUT 264-44-6-B
W3AMZLH 254-39-8-A
K3H1 198-22-9-B
WA2MJK 95-31-3-A
W3RAK/2 (11 ops.)
13,497-300-41-ABD
WB21AE (4 ops.)
1578-105-15-AB
WA2ELB (+W32LOM)
888-34-12-B
Northern New Jersey
E2DWR 25,984-394-58-ABCD
W3A03 1171-101-1-AB
WA21W 1816-181-16-A
W3OMS 1320-46-16-D
WA21U1 1236-104-12-B
W3CVW 1128-54-19-ABCD
W3E1W 1012-44-23-AB
W3R1RX 440-27-10-D
W3EZF 219-17-7-D
W3E2MB 100-20-5-AB
WB2GKE/2 (9 ops.)
33,701-453-67-ABCD
WB200Q/2 (7 ops.)
0032481-56-AB/1
K2D1E (27 ops.)
9690-254-34-ABCD
WA20D1 (+W32PKY, QK, R)
5472-184-18-B
W32OLA/2 (+W32H)
2502-139-18-AB
WA2PCS/2 (+WB21Z)
1476-123-12-AB
W3E2N1 (+W3E21H, Y, K)
72-24-1-A

MIDWEST DIVISION

Iowa
WA0ZWF 800-80-10-AB
W361P 736-46-16-AB
W36UN 676-52-13-AB
W360N 228-38-8-AB

KANSAS
W36H 333-37-9-AB
W36CTO 10-5-2-B
Missouri
K9LBC 171-19-9-AB

NEW ENGLAND DIVISION

Connecticut
WA11NJ 11,115-265-39-ABD
WA11LD 6186-111-36-AB
WA11FD 5976-162-30-ABD
W10H 385-15-11-AB
W10AK 324-36-4-B
W10DO* 600-35-9-AD
W10WH 798-36-6-A
WB2CRO/H 30-10-6-A
W10E1 30-15-8-B
W10KH 15-5-3-A
WA10X (10 ops.)
18,224-429-47-ABD
W10YV1 (7 ops.)
25,752-336-44-ABCD
Eastern Massachusetts
W311H 6909-200-45-ABCD
W311CS 1380-90-15-A
WA11LD 1020-27-18-AB
K3AOP/1 930-36-15-CD
WA11LD 312-53-6-A
WA11OR 300-30-10-AB
W10O 106-31-6-A
W3MKN/1 182-17-6-AB
WA1117 80-20-4-A
W3AMHN (11 ops.)
4914-177-26-ABD
W3MHL/1 (5 ops.)
5132-168-18-ABC
Maine
W1YTW 3465-75-29-ABCD
W1CJZ 846-38-17-AB
K10OY/1 (+W1CPL)
52-13-4-B
New Hampshire
WA11SZ 1178-57-19-ABD
W1JNM 41-41-11-B
K1NOZ 200-40-5-A
WA11SD 96-16-6-A
W1DCM (24 ops.)
8304-881-85-ABCD
Rhode Island
W321AU 4004-182-22-AB
WA1KUU 150-50-3-A
Vermont
K1G5T 883-184-28-AB
Western Massachusetts
WA11MZ 800-100-8-A
E1UK (+WB2V, op.)
663-25-4-CD
W1HR 66-3-5-ACD
WA1MUG (10 ops.)
72,000-812-80-ABCD
NORTHWESTERN DIVISION
Oregon
W3CYR 450-41-9-AB/DF
K2HNI 36-13-4-ABC
K7AUD (7 ops.)
1060-97-10-AB/DE
Washington
W3FM 1044-88-1-AB
K2IDN/7 290-58-8-AB
W7ZSE 175-35-3-AB
WA70E1 100-50-3-A
WA707 50-25-2-AB
W7OCV 34-17-2-AB
PACIFIC DIVISION
Last Bay
W36NMT 1380-49-20-ABC
Sacramento Valley
W36NKG 308-27-11-ABC
W361P 85-17-5-B
W360FM 36-14-4-A
San Francisco
W36AW 150-25-6-AB
W36W1 124-51-4-B
W36PVN 120-30-6-A
San Joaquin Valley
W36YK 1008-45-21-ABD
W361E 208-17-8-ABC
Santa Clara Valley
W36GYD 1800-72-18-AB/CD
W36MY 1308-95-7-AB/CD
W36LDM 1140-105-10-AB/CD
W36KUG 924-77-12-A
W361T 492-82-6-AB
W36AP 407-27-11-ABD
K6PAX 307-36-9-ABC
W36V1 312-78-4-B
W36VJ 204-25-6-AC

W36Z1 304-21-6-BC
W360WL 117-34-3-B
W36KZ/6 (+K6GSS)
1290-214-30-ABCD

ROANOKE DIVISION

North Carolina
WB4LD/4 1176-60-16-AB
K3RDM 708-59-12-A
WA4WZ/4 13 ops.)
1286-87-14-ABD
South Carolina
K4PKV 312-74-12-ABD
Virginia
W4AAU 3846-147-37-ABD
W4UCH 2265-118-39-ABCD
K2UDP/4 2400-100-24-AB
K4PC1/4 2132-81-26-ABD
W41J 765-24-17-ABD
K4110 84-21-4-B
West Virginia
W4RUUY/B 1620-81-20-AB
W3BPLZ/B (12 ops.)
3300-422-73-ABCD
W3K1R/8 (+W3BWL)
2260-113-20-A
ROCKY MT. DIVISION
New Mexico
W3SBHN 7-7-1-B
SOUTHEASTERN DIVISION
Alabama
K4HPY/4 (+W3B4, NFN, NFA)
360-86-10-AB
Eastern Florida
W4OJU 215-43-5-AB
Georgia
K4FRH 407-37-11-AB
W4AOSR 108-26-8-AB
W4WDH 74-9-6-B
Western Florida
W3B4SR 68-36-2-AB
W3KGTW 7-7-1-A
W3GSS 1-1-1-A
SOUTHWESTERN DIVISION
Arizona
K4PFI 154-22-7-A
Los Angeles
W3SSN 2310-142-15-ABCD
W36FVU 72-18-4-A
W3HPI/6 (3 ops.)
4076-158-22-ABCD
Orange
W30M1E 72-18-4-AB
San Diego
W36UD 2032-123-16-ABD
Santa Barbara
K6YNB/6 8217-228-33-ABD
W3HAK/6 (5 ops.)
768-64-12-AB
WEST GULF DIVISION
Northern Texas
K5UCM 1131-79-13-ABD
W3AZUC 83-21-3-A
Oklahoma
W3SVHN 224-32-7-A
W3FMY 8-8-1-A
W3WAX (+K55, BKG, WXX)
3201-94-30-AB
Southern Texas
W3EAS/5 (4 ops.)
104-26-4-AB
CANADIAN DIVISION
Manitoba
V11AS1 33-7-5-A
Quebec
VE2EDU 278-34-12-AB
VE2ALB 316-18-12-AB
Ontario
VE3DSS 1615-85-19-B
VE3CRU 825-54-15-ABD
VE3DSQ 654-47-12-B
VE3WL 243-27-9-A
VE3DKW 196-13-7-D
VE3GAI 86-14-4-A
VE3DNR 33-11-3-B
Alberta
V11AC 4-7-2-A
British Columbia
VE7ANP 120-24-5-A
VE7AZG/7 58-29-7-B



This past summer, *QST* Assistant Technical Editor W1KLLK had the opportunity to visit the Radio Club of St. Quentin, France, Organized by Father Jean Lollieux, F3GG, who serves as President, the club has a vigorous program to attract and train new amateurs. In recognition of the club's public service, the city of St. Quentin provides a meeting room and ham shack at the new city civic center. Shown here are F2BQ, F3AP, F1AOX, W1KLLK, F3GG, and a number of people currently studying code and radio theory. W1KLLK operated from this section of France from 1959 to 1964 as F7DB.

C. W. Wade, W01NH, was presented with the Raymond E. Baker "Kansas Ham of the Year" trophy at the Concordia hamfest for his work in the National Traffic System, the Midwest Division ARRL, a host of nets, and the Wheat Belt Amateur Radio Club, of which he's president. (Photo courtesy of WAQTAS)

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 4 1/4 by 9 1/2 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.WN1¹ - Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.
- W2.K2.WA2.WB2.WN2 - North Jersey DX Assn., P.O. Box 505, Ridgewood, NJ 07451.
- W3.K3.WA3.WN3 - Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
- W4.K4 - North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.
- WA4.WB4.WN4¹ - J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.
- W5.K5.WA5.WB5.WN5 - Kenneth F. Isbell, W5QMJ, 306 Kesterfield Blvd., Fnd, OK 73701.
- W6.K6.WA6.WB6.WN6¹ - 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.WN8¹ - 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.
- W#1 - Reggie Hoare, W00YP, P.O. Box 115, Mitchellville, IA 50169.
- WA0¹ - Lloyd Harvey, W0QGI, P.O. Box 7, Attica, IA 50024.
- K0.WB0.WN0¹ - Dr. Philip D. Rowley, K0ZE1, Route 1, Box 455, Alamosa, CO 81101.
- EP4 - Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.
- KZ5 - Canal Zone Amateur Radio Association, Box 407, Balboa, C.Z.
- KH6.WH6 - John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.
- KL7.WL7 - Alaska QSL Bureau, Star Route C, Wasilla, AK 99687.

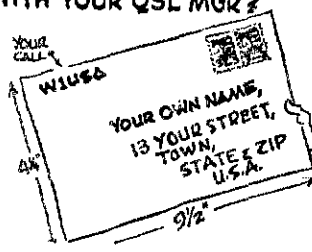
- VE1 - L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS
- VE2 - John Ravenscroft, VE2NV, 353 Thornecrest Ave., Montreal 780, PQ.
- VL3 - R. H. Buckley, VF3UW, 20 Almont Road, Downview, ON.
- VE4 - D. F. McVittie, VF4OX, 647 Academy Road, Winnipeg 9, MB.
- VE5 - A. Lloyd Jones, VE5IH, 2328 Grant Road, Regina, SK.
- VE6 - Karel Jettelaar, VE6AAV, Sub. Po 55, N. Edmonton, AB.
- VE7 - H. R. Hough, VE7HR, 1291 Simon Road., Victoria, BC.
- VE8 - George T. Kondo, c/o Ministry of Transport, Norman Wells, NT.
- VO1 - Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.
- VO2 - Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.
- SWL - Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

¹ These bureaus prefer 5 x 8 inch or No. 50 manda envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the June and December issues of *QST*.

Note: First Class mail in the U.S. is now 8¢ an ounce. QSL Bureau users should send their manager enough two-ounce stamps to cover the envelopes on file.

IS YOURS ON FILE WITH YOUR QSL MGR?





Correspondence From Members-

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

BACK TO BASICS

● The loss of frequency conference support for the Amateur Service ["It Seems to Us . . ." Oct. *QST*] because of the widespread operation of factory-built equipment by hams is a serious problem.

I do not think that it would be in the amateur spirit to force hams to homebrew through new regulations. Amateur radio is a voluntary service that rises to meet its problems without government intervention.

However, the League can encourage homebrew work. The Field Day contest encourages emergency communication projects and skills. A National Home Brew contest would encourage home brew projects. The contest would be announced one year before the judging would start. This would provide the time for complex projects to be built. The completed equipment would be judged at the division conventions. There would be many categories of competition such as Novice projects, ssb and cw transmitters, receivers, ATV and SSTV, fm equipment, RTTY, uhf equipment, keyers, and codetypers, etc. There would also be many criteria of competition such as best soldering, best metal work, best circuit board, best circuit design, smallest rig of a given power, best QRP project, youngest homebrewer, etc.

The best projects from the division conventions then would be judged at the National Convention for the national homebrew awards. It might take several years for the contest to be completed. It would be a large scale affair that would greatly increase the prestige and interest of homebrew efforts. To work well the contest would have to have a great deal of publicity. Furthermore, a great deal of attention should be paid to the winners of the contest. The purpose of the contest would be to reward homebrew efforts and to focus amateur attention on homebrew projects. It would be a fun way of doing our public service of homebrew construction.

It seems to me that Amateur Radio can show the conference members and everybody else that we can build good equipment and that we can build equipment that the commercial workers never thought of. - Nick Leggett, WA1PCM, Baltimore, MD

● After reading "It Seems to Us . . ." in October *QST*, I have been left feeling very distressed and discouraged. I guess I am as much at fault as anyone else. My own activities are on a par with the rest of the fraternity as far as the use of commercially built equipment goes. I can't help but feel as if we could do something about our problem of the commercialization of ham radio but I doubt if anything will be done, now or ever. Everytime someone tries to change things for the good of amateur radio someone thinks he is being deprived of his rights, for instance, incentive licensing and the proposed expansion of the phone bands.

For my own part, all my equipment is commercially made. However, this doesn't stop me

from experiments with the equipment in the spirit of amateur radio. I am trying to make some of the ssb modifications to my HRO-60 that appeared in *QST* several years ago. I am also trying to get up the courage to change the mixer on my HRO to a 6DI8 and add a Q-multiplier and an i-f noise blanker which should improve performance very much. A rundown of my equipment would tell that my newest piece of gear was manufactured about 1960, and many modifications could be made to improve performance. This is how I derive my pleasure from ham radio and I only wish more people thought the same as I do. I am sure people would say that they can't design their own equipment or don't have time to build their own gear. To that I say that the whole business of "rolling your own" is to learn isn't it? And as far as time is concerned, it isn't necessary to build a double conversion receiver in one day. The old saying about getting satisfaction from what you build is certainly true with me, and of course it is much cheaper to build if you scrounge the parts in the right places.

As to ideas to improve our international image in the view of the administrations whose comments prompted this letter, I have very few. Perhaps we could encourage the use of homebrew equipment in contests like Field Day. Perhaps in order to be the winner of any contest there should be at least one major piece of equipment that was homemade and used in the contest. Perhaps less attention to the score and more attention as to "how the game is played" would be in order. In some countries it is required to make some equipment yourself before a license is granted. Perhaps we could incorporate something like this into our laws. Those are my only suggestions, and rather poor ones at that, but I think the attitude of some foreign governments in this respect is most dangerous and corrective action should be taken now. Kurt F. Wehle, Jr., WA4SMI, Fairfax, VA

STILL LAUGHING

● Thanks for giving us "How to Make a Jewish Movie" in October *QST*. Am still laughing at W6VLH's antics. - Don Brooke, WA2ELD, Montour Falls, NY

● I enjoyed W6VLH's story more than anything I have read in *QST* for a long time! Mrs. Bieberman, who is not a ham, but who has been exposed to ham radio for 40 years, also enjoyed it very much. - Jesse Bieberman, W3KT, Malvern, PA

BREAKING THE RULES

● While waiting for a reciprocal license here in Chile I do a lot of listening. Now I can readily see why non-U.S. hams do not want phone band expansions. Not only are rules being broken, but laws as well. Some of the major offenses by Stateside hams are:

1. Using excessive power when not needed. I have heard many, many U.S. hams talking with

others in the next city and bragging about how good each other's 2,000 watts PEP sounds when 20 or 30 watts would be satisfactory if they were good operators. FCC says power should be the minimum required to effect communications. If they want to gab or have a roundtable, why can't they go to a better band where a few watts will do just as fine a job? The Stateside phone bands are a maze of kilowatts.

2. Bad manners are prevalent. A lot of Stateside hams knowingly talk-over a low powered station and force him to move because most foreign hams cannot compete with the so-called full gallon. It's no wonder that foreign hams shy away from U.S. phone bands.

3. The operating habits of a lot of U.S. hams are bad. Making *Operating an Amateur Radio Station* or the ARRL's *Operating Manual* required reading may help.

Most flagrant violations are not committed by new operators but by holders of two and three letter calls. And to think that I read a petition to FCC that asks for 1000 watts *output* for Extra Class license holders! Novices are the most polite and have better operating habits than most other hams! Maybe if each person tried to clean up the air a little and use good operating procedures, foreign hams might accept an expansion of the phone bands. — *Steven C. Roth, WA3PMS, Santiago, Chile*

FINAL WORD

● It won't accomplish anything to beat a dead horse but, because I have had several letters pro and con Phillips Code (*QST*, August, page 74), let me have one final word.

Being biased, I won't comment on the pro's; however, all objections to using Phillips seem to originate from a point of view that some work or effort is involved in learning the contractions. I must agree that this is the case. A gourmet is not satisfied with TV dinners. A good operator is not happy with a diet of mediocre code, Phillips or no Phillips. For those who enjoy a challenge this shorthand method is most rewarding in a sense of accomplishment, not to mention its practical advantages. However, ham radio is its own reward and the use or non-use of Phillips code is simply a personal matter and not worthy of controversy. — *Raymond Brightman, W6MIN, Placentia, CA*

NEWCOMERS

● Before I read your editorial "Newcomer Propagation" in June *QST*, I had laid the groundwork for a licensing class along those lines in my area. It is to be given in the adult evening school program this fall at the Lebanon (Pa.) County Area Vocational-Technical School. Approval has been given to hold the course on the basis of sufficient applicants to meet State reimbursement requirements.

While I am only a Novice, I can fully appreciate the intent of your June editorial. I share your belief that interest in amateur radio should be encouraged. — *Richard M. Harris, WN3PKK, Annville, PA*

● Thank you for your assistance in obtaining my amateur radio licenses. Your publications are directly responsible for providing the knowledge I needed to pass the Novice Class test last September, and more recently, the Advanced Class test at the end of July. Then too, the code practice sessions on WIAW were invaluable, since a person

tends to memorize code records and their real value is soon lost.

I must say that I don't understand a lot of the bickering and quarrelling going on — much of it directed at you by others in some of the ham radio publications. I cannot see that they are making a greater effort than you are to make ham radio available to newcomers. . . . — *John R. Waltner, WN0CRE, Freeman, SD*

● Some of the loudest protesters blame the static character of the ham population over the last 8 or 9 years on incentive licensing. Personally, I am convinced that this issue is mostly "noise" and has neither impeded the rate of growth nor provided up-grading of the technical ability of hamdom.

Think back to how you or most of the amateurs you know got your initial interest aroused. Nearly all began as short wave listeners, tuning a-m sets with short wave bands. It was a thrill to hear distant stations and to explore the geography of distance. Sooner or later one stumbled onto some amateur phones (a-m variety). It was this romance of personal radio contacts that aroused our interests.

With the advent of commercial sideband equipment and the disappearance of a-m phone, the SWL's fascinating entree to the wonderful world of amateur radio vanished and, perhaps, so did our greatest source of recruitment. Could this be the true reason for our stunted growth? Did amateur radio outsmart itself in its modernization process? If so, then how does one restore the growth rate by providing easily received QSOs without again filling our bands with excessive heterodynes?

Perhaps *QST* should cautiously make an effort to point out that a-m is still a legitimate mode of operation in spite of its faults. It causes no more TVI, BCI, or Hi-Fi-itis than does sideband or cw. It's just that a-m can be more easily recognized when interfering. Couldn't a-m just as adequately serve many of the needs of amateurs as does sideband during the daytime, or other periods of lower band activity, and again provide a recruiting force for our ranks? It is a more tolerant technique for both tuning and for the avid home brewer. It is compatible with low-cost receivers. Many a-m rigs are rusting away in attics and basements. Maybe they should be dusted off for occasional local QSOs, especially on 160-meters, and perhaps also on the 40-meter band to compete with the SW broadcast stations. Then the diminishing SWL ranks might have an opportunity to again learn firsthand about amateurs. — *Carl W. Brown, W3LUL, Burtonsville, MD*

OUTSTANDING

● My congratulations to Mr. R. V. McGraw, W2LYH, for a very fine and interesting article on his homebrew Franklin VFO (August, *QST*). I think the outstanding aspect of his achievement is certainly in oscillator stability. The ability to detect a change of "a fraction of a Hertz on 10 meters" caused by loading, keying, etc., is certainly worthy of further recognition. Consider, for the sake of discussion, that the fraction is about 1/3 Hertz. One-third Hertz at 30 MHz is about 1 part in 10⁸. In order to detect this change, one assumes the reference oscillator stability to be several fold better, say 5 times. This suggests a short term stability of the oscillator of about 2 parts in 10⁹. . . an outstanding achievement for a non-crystal-controlled generator. — *Ken Archbold, K3RDF, Mechanicsburg, PA*

I.A.R.U. News



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

QSL BUREAUS OF THE WORLD

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

Algeria: ARA QSL Service, P.O. Box 2, Algier R.P.
Angola: LARA, P.O. Box 484, Luanda
Antarctica: Dave Porter, K2BPP, Mountainside Rd., Mendham, NJ 07945
Argentina: RUA, Carlos Calvo 1424, Buenos Aires, BA
Austral/French Antarctic Lands: via Malagasy Republic
Australia: VK1, VK2 QSL Bureau, WIA Box 1734, GPO Sydney, N.S.W. 2001; VK3 QSL Bureau, E. Trebilcock, 340 Gillies Street, Thornbury, Vic. 3071; VK4 QSL Bureau, H. Scholz, 95 Stephens St., Morningside, Brisbane, Qld., 4170; VK5, VK8, QSL Bureau, Mr. Geo. Luxon, VK5RX, 27 Belair Road, West Mitcham, S. Aust. 5062; VK6 QSL Bureau, Mr. J. Rumble, VK6RU, Box F319, GPO Perth, W.A. 6001; VK7 QSL Bureau, Mr. J. Batchelor, VK7JB, 39 Willowdene Avenue, Lower Sandy Bay, TAS.; VK9, VKØ, Federal QSL Bureau, 23 Landale Street, Box Hill, 11 Victoria.
Austria: ÖFVSV, Box 999, A-1014 Vienna
Azores: via Portugal
Bahama Islands: BARS, Box 6004, Nassau
Bahrain: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awah
Barbados: ARSB, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: UBA, Postbox 634, 1000 Brussels
Bermuda: RSB, Box 275, Hamilton
Bolivia: RCB, Casilla 2111, La Paz
Brazil: LABRE, P.O. Box 2353-ZC OO, Rio de Janeiro/GB
Bulgaria: CRCB, Box 830, Sofia
Burundi: via Congo (9Q5) QSL Bureau
Canada: See *ARRL* QSL Bureau in this issue
Canal Zone: Gloria N. Spears, K25GS, Box 407, Balboa
Cape Verde Island: RCCV, CR4AA, Praia, Sao Tiago

Ceylon: RSC, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: RCC, P.O. Box 13630, Santiago
Colombia: LCRA, P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) UCAR, QSL Bureau, P.O. Box 1459, Kinshasa, Elizabethville
Cook Island: ZK1 QSL Bureau, %Radio Station Karotonga, Karotonga
Costa Rica: RCCR, Box 2412, San Jose
Cuba: ANRAU QSL Bureau, P.O. Box 6996, Havana
Cyprus: CARS QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: CRC, Box 69, Prague 1
Denmark: EDR QSL-Central, Harry Sorensen, ØZ6HS, Ingstrup-9480-Lokken
Dominican Republic: RCD, P.O. Box 1157, Santo Domingo
Ecuador: GRC, P.O. Box 5757, Guayaquil
El Salvador: CRAES, P.O. Box 517, San Salvador
Faeroe Islands: OY-QSL Bureau, Sofus Rubeksen, OY3B, P.O. Box 228, Udir Savartafossi, DK-3800 Torshavn
Fiji Islands: QSL Bureau, P.O. Box 184, Suva
Finland: SRAL, Box 10306, Helsinki 10
France: REF, Boite Postale 70,75 Paris 12
French Oceania: RCC, P.O. Box 374, Papeete, Tahiti
Germany: DARC, Box 86-03-20, D8000 Munich 86
Germany: (DL2, DL5, DA1, DCØ, DC4) J. T. Worrall, 3090 Verden Aller, Am Alten Pulverschupen 80
Ghana: GARS QSL Bureau, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Great Britain: (and British Commonwealth): RSGB QSL Bureau, G2MJ, 29 Kechill Gardens Bromley, Kent BR2-7NH
Greece: RAAG, P.O. Box 564, Athens
Greece: (SVØ only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, NY 09223
Greenland: via Denmark
Greenland: (U.S. Personnel) OX5A-E via MARS Director, XPIAA, 1983 Comm. SQ., APO New York 09023, OX4F-H via MARS Director, XPIAB, 2004 Comm. Sq. APO NY 09121
Guam: MARC, Box 445, Agana, USPO 96910
Guantanamo Bay: GARC, Box 12, FPO, New York, NY 09593



Amid photographers and newsmen, JA11OC begins operation from Sapporo, Japan, site of the 11th Winter Olympic Games. The special station sponsored by the *Japan Amateur Radio League* will be on all bands 160-2 meters until February 13, 1972. By advance arrangement, visiting foreign amateurs may apply to operate this station. If interested, contact the *Japan Amateur Radio League*, P.O. Box 377, Tokyo.

QST for

DARC official DJ1GE (left) confers with Hq. staffers W1RU, W1CER, W1RW, and W1CUT on QST production routine. Gerhard is the ARRL/QST liaison for the Deutscher Amateur Radio Club.



Guatemala: CRAG, P.O. Box 115, Guatemala City
Haiti: RCH, Box 943, Port-au-Prince
Honduras: RCH, Apartado 17, San Pedro Sula
Hong Kong: HARTS, P.O. Box 541
Hungary: HSRL, P.O. Box 214, Budapest 5
Iceland: IRA, Box 1058, Reykjavik
India: ARSI, QSL Bureau, P.O. Box 534, New Delhi 1
Iran: ARSI, APO New York NY 09205
Ireland: IRTS, QSL Bureau, P.O. Box 462, Dublin 9
Israel: IARC QSL Bureau, P.O. Box 65, Herzlia
Italy: ARI, Via Scarlatti, 31, I-20124 Milan
Ivory Coast: ARAI, B.P. 20036, Abidjan
Jamaica: JARA, Red Cross Bldg., 76 Arnold Rd., Kingston 5
Japan: (JA): JARL, Box 377, Tokyo Central
Japan: (KA only): FEARL-M, HQ 5AF, Box 1414 APO, San Francisco, 96525
Johnston Island: KJ6BZ, 7/8 MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco 96305
Kenya: RSEA QSL Bureau, A. H. Sanders, Box 30035, Nairobi
Korea: KARL, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USEK/USA, APO, San Francisco 96301
Kuwait: Alhalf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: RAL QSL Bureau, P.O. Box 1202, Beirut
Liberia: LRAA, Post Box 1477, Monrovia
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber Esch-Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): QSL Bureau, P.O. Box 587, Tananarive
Malawi: P. A. Conway, 7Q7BC, Police Hq., P.O. Box 10, Lilongwe
Malaysia: QSL Manager, MARTS, Box 777, Kuala Lumpur
Malta: R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, APO, San Francisco 96555
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: LMRE, P.O. Box 907, Mexico, D.F.
Midway Island: KM6BI, Box 14, FPO, San Francisco 96614
Monaco: ARM QSL Bureau, Pierre Anderhalt, 3A2CN, 41 Bd du Jardin Exotique
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: AAEM, P.O. Box 299 Rabat
Mozambique: LREM QSL Bureau, P.O. Box 812, Laurencio Marques
Netherlands: VERON, Postbox 400, Rotterdam
Netherlands Antilles: VERONA, P.O. Box 383, Willemstad, Curacao
New Zealand: NZART, P.O. Box 489, Wellington
Nicaragua: Mike Murciano YN1MO/W4, Box 902, Coral Gables, FL 33134, U.S.A.
Nigeria: NARS QSL Bureau P.O. Box 2873, Lagos

Northern Ireland: via Great Britain
Northern Rhodesia: see Zambia
Norway: NRRL, P.O. Box 21, Refstad, Oslo 5
Nyasaland: see Malawi
Okinawa: OARC, P.O. Box 465, APO San Francisco 96331
Pakistan (East): Mohd, AP5CP, TARC, Dacca Signals, Dacca 6
Pakistan (West): LARS, P.O. Box 65, Lahore
Panama, Republic of: LPRA, P.O. Box 9A-175, Panama 9-A
Papua: Via VK9 QSL Bureau.
Paraguay: RCP, P.O. Box 512, Asuncion
Peru: RCP, Box 538, Lima
Philippine Islands: PARA QSL Bureau, P.O. Box 4083, Manila
Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
Portugal: REP, Rua de D. Pedro V., 7-4, Lisbon
Puerto Rico: Alicia Rodriguez, P.O. Box 1061, San Juan 00902
Rhodesia: RSSR, P.O. Box 2377, Salisbury
Romania: CRC, P.O. Box 1395, Bucharest 5
Rwanda: via Congo (9Q5) QSL Bureau
Samoa (American): Utulei High School Amateur Radio Club, 7/8 Director, Pago Pago, Titiula, 96920
Samoa (Western): Director of Post Office and Radio, Post Office, Apia
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8Bf, P.O. Box 971, Dakar
Sierra Leone: RSSL, P.O. Box 907, Freetown
Singapore: SARTS, P.O. Box 2728, Singapore 1
South Africa: SARL, P.O. Box 3037, Cape Town
Spain: URE, P.O. Box 220, Madrid
St. Vincent: QSL Bureau, P.O. Box 142, St. Vincent, West Indies
Surinam: QSL Manager (PZ1AR), SARL, P.O. Box 240, Paramaribo
Sweden: SSA, Fack, S-12207 Enskede 7
Switzerland: USKA, Sonnenrain 188, 6233 Bueron/LU
Syria: TIR, P.O. Box 35, Damascus
Tanzania: Via Kenya
Trinidad and Tobago: T&TARS, P.O. Box 1167, Port of Spain
Uganda: Via Kenya
United States: See ARRL QSL Bureau in this issue
Uruguay: RCU, P.O. Box 37, Montevideo
U.S.S.R.: CRC, Box 88, Moscow
Vatican: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: RCV, P.O. Box 2285, Caracas
Virgin Islands: Graciano Belardo, KV4UF, P.O. Box 572, Christiansted, St. Croix, V.I. 00820
Wake Island: Jack A. Chalk, KWGEJ, P.O. Box 7, Wake Island 96930
Wales: via Great Britain
Yugoslavia: SRJ, P.O. Box 48, Belgrade
Zambia: RSZ, P.O. Box 332, Kitwe

QST

Happenings of the Month

GOLDWATER HEADS QCWA

Senator Barry Goldwater, K7UGA/K3UIG, has been elected president of the Quarter Century Wireless Association, Inc. In balloting by members, the Senator polled 1916 votes to 1469 for Frank A. Gunther, W2ALS, a past president who has just completed a term as vice president of the group. Other officers elected are Harry S. Gartsman, W6ATC, vice president; Mark J. Devaney, W2NQR, treasurer; A. G. Wentzel, W2HX, secretary; and George W. Bailey, W2KH (past president, ARRL); J. R. David, W4YK; Art F. Miligan, W8KW; H. H. Robinson, W3RE; and outgoing president Clarence Seid, W2KW, all directors.

David Talley, W2PF, who has been a director and officer of QCWA since its founding nearly 25 years ago, declined to run again as secretary because of similar positions in the oldest radio organization in the country, the Radio Club of America, Inc.

QCWA welcomes as members amateurs who were first on the air at least twenty-five years ago. Information can be obtained from A. J. Gironda, W2JE, general manager of QCWA, Box 394, Mamaroneck, NY 10543.

CANADA EASES REPEATER RULES

The interim guidelines for repeaters, established by the Canadian Department of Communications two years ago, were revised earlier this year. The licensee may now designate up to three qualified persons to share the responsibility of controlling the amateur automatic repeater. Automatic shut-off is required after five minutes of continuous transmission, rather than after three. Repeaters in the 50-54- and 144-148-MHz bands have to be identified by a keyed-tone transmission at reduced amplitude at two-minute intervals, instead of every minute as before.

The full text follows:

(11/171 Interim Licensing Policy - Amateur Automatic Repeaters.

1. General.

As a result of a review of policy concerning the operation of repeaters in the amateur experimental



Nevada's Amateur Radio Week will be held January 3-9, 1972, in connection with the SAROC hamfest the last four of those days. At the signing: Governor Mike O'Callaghan, seated; ARRL SCM Len Norman, W7PBV, left; and Herbert L. McCann, WA7ESM.

service including point-to-point tandem operation, it was decided to permit the development of such repeater systems on a trial basis with the object of developing a firm policy at a later date. On the basis of experience and comments received to date and pending the incorporation into the regulations, the interim guidelines are revised to read as follows.

2. Definition.

1) An amateur automatic repeater is a station in the amateur experimental service providing for the automatic reception and retransmission of amateur radiocommunications.

2) For the purposes of these guidelines, the term amateur automatic repeater refers to "terrestrial" repeaters only and does not include "satellite" repeaters or "remotely controlled base stations."

3. Responsibility of the licensee.

1) Responsibility for the technical operation of an amateur automatic repeater lies with the licensee and shall include the maintenance of a technical log showing malfunctions, servicing and on-the-air tests, etc.

2) For purposes of continuity of operation and maintenance of more effective control over the repeater, the licensee may, in consultation with



The ARRL Technical Merit Award for 1971 went to Louis N. Anceaux, WB6NMT; Paul J. Snyder, K2CBA; and Lester L. Whitaker, W7CNK, for their 220 MHz earth-moon-earth work. Louis, left, and Lester, right, collect plaques from Doc Gmelin, W6ZRJ, Pacific Division director of ARRL.

September 11-17 was Amateur Radio Week in Pennsylvania. At proclamation ceremonies: seated, from left, Elna Hoagland (who handles call letter license plates in the Motor Vehicle department); Governor Milton Shapp; W3HK, SCM East Pennsylvania. Standing left to right, K3OMK; W3ICC; "Miss, Mrs. and Mr. K3HNP"; another K3HNP daughter; K3JQH; K3BNS.



the local Telecommunications Regulation office, designate not more than three qualified persons to share with him the responsibility of controlling the amateur automatic repeater.

3) The licensee, or persons so designated by him, shall provide a means to automatically disable any repeater transmitter, regardless of frequency, when on-the-air time exceeds five minutes and shall be responsible for its reactivation by physical or remote control means.

4) Unless specifically authorized by the Department of Communications, the licensee of the amateur automatic repeater shall not permit the repeater to be used for the delivery of traffic to or the acceptance of traffic from external points by means other than radio.

5) Amateur automatic repeaters may be controlled by means other than radio where it is practical to do so.

4. Identification

1) All emissions from amateur automatic repeaters on 50-54 Mc/s or 144-148 Mc/s shall be identified by a keyed tone transmission of the station call sign at reduced amplitude at intervals not exceeding two minutes. Such identification is not required on point-to-point circuits between repeaters (above 220 Mc/s).

2) Users of the repeater shall continue to identify their respective stations in the usual manner.

5. Frequency Bands Available.

1) Amateur automatic repeaters shall transmit in the 50-54 Mc/s or higher frequency amateur bands.

2) Remote control emissions shall be within the 50-54 Mc/s or higher bands.

3) Point-to-point circuits between repeaters

Behind the Diamond

No. 30 of a Series



We've often pointed out that members of the League headquarters staff come from all over, despite the fact that most of the hams here masquerade as Yankees under WI call signs. But the Diamond Spotlight earns a DX

award this month: our subject, Miss Doreen Cromarty, was born in Gateshead, England.

Doreen has just been promoted to supervisor of the Membership Records Section at ARRL Hq., where she keeps about ten women busy issuing certificates of membership, record-keeping, stencil typing, filing and printing of address labels for each month's *QST*. There's always work being done at her desk, too. She pitches in with her share of the routine, and handles all the sticky wickets besides.

A past president of the ARRL Girls Club, "DC" spends part of her spare time with duckpin bowling; her high score of 156 is very respectable in that small-ball game. Knitting is another leisure activity. When longer blocks of time are available, as for instance during vacation, she's apt to go back to England for a visit, or go downeast to Maine, where her brother and four nephews live.

Doreen began her career at Hq. as a very VI. in February, 1947 -- with 24 years under her belt she has nearly that long to retirement. Which is a good thing for the League, since we'll have her quizzical smile and her efficient way of going about the members' business for many more years.



Washington State's Ham of the Year is Jim Grinton, K7VNI, right, here receiving a plaque from Don Ashley, W7HMJ, president of the Puget Sound Council of Amateur Radio Clubs.

shall use the frequency bands 220-225 Mc/s, 420-450 Mc/s or higher frequency bands.

6. The Department of Communications will apply these guidelines to all automatic repeaters authorized after February 1, 1971 but will exercise discretion in applying them to repeaters authorized before that date.

CANADIAN RULES FOR SPECIAL STATIONS

The Canadian Department of Communications will issue special call signs to recognized amateur club or society stations to commemorate special events, on a case by case basis, through regional offices. The significance of the occasion will be taken into account; e.g., anniversaries of less than 25 years will not be approved.

VA calls will be used for VE stations; VB calls for VO stations. No fee will be charged. This policy is considered temporary, and will be reviewed in two years.

KENNETH T. HILL, W2AHC

We regret to report the death of Kenneth T. Hill, W2AHC, of Bayside, N.Y., who was director of the Hudson Division from 1935 through 1940. A retired engineer of the American Telephone and Telegraph Company, he was operator for the community ambulance service for several years. He leaves two sons, Richard and Martin.

R. E. COWAN, W5CF

R. E. "Dad" Cowan, W5CF, director from the West Gulf Division in 1955-1956, died recently in Shreveport at the age of 81. Until his retirement, Dad had been general manager of the Ralston-Purina plant in Fort Worth and had served on the Fort Worth City Council. W5CF had a fascinating side "hobby" - he remembered the birthdays of some 700 friends around the world with useful little gifts, rainhats, key rings, memo pads. Purchased in bulk every summer, the gifts were personally packaged and placed in the mail so as to arrive right on the recipient's birthday. He was also a private pilot (qualifying for his license when past 65) and an enthusiastic gardener. He leaves a daughter, June Ann Anderson, and two sons, James T. and R. E., Jr. QST



ARRL's youngest life member at the moment is Miss Stacey Smith, WA2010, elected to the ranks on September 25, 1971, at the ripe old age of 12. She was first licensed as a Novice in June, 1970, passed the General Class test on August 4 this year, and three weeks later, successfully tackled the Advanced. Other hobbies: piano, cycling, horse-back riding, and the collecting of shells and rocks.



Amateur Radio Week in North Carolina was the first week in November. Lt. Governor Pat Taylor here chats about the proclamation from a station set up in the Capitol. (UPI photo)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How :

After you've raised your beam another hundred feet, signed a new nonaggression pact with the XYL, and caught up with other slighted chores, the question arises: How to pass the time between DX contests and DXpeditions? You can join the rumor nets for a while but pretty soon your own clever speculations start coming back to you the long way 'round with distorted punch lines. There *must* be other diversions. VK5MF, a ham for forty years, has one to recommend. Nothing very new, really, but something that gets more interesting all the time because it's developing a definite DX flavor. OM Smythe pens,

I am finally writing to you after so many years in answer to your nagging question, "How's DX?" Enjoy those stories but I do puzzle over chowder, marching, hog-calling, etc.

A tonamateur friend and I recently built the MacDonald TV monitor in March, 1964, *QST* after being intrigued by W9LQO's solid-state job in the March '71 issue. (We felt we had a better chance with the all-tube version but now we are under way with newer circuits.) Slow-scan pictures from the U.S.A.!

Naturally we rushed to get our own SSTV signal on the air, building Hutton's generator from 73 for October, 1967. Most construction was by my nonham friend of many years, Les Sherringham. After a few weeks we had the equipment operational and were ready to try it on the air.

K4JPE, at 0505 GMT, July 17, 1971, was the first contact to give us the almost unimaginable thrill of recognizing and des-

cribing our picture, then transmitting his own in return. We then worked VK6ES for our second two-way, a QSO complicated by sync incompatibility which we finally resolved. By the end of July we had exchanged images with Ws 2BKU 4MS 4TB 4YHC 6KZL 7GGH 8YEK, Ks 4FFW 4JPZ 6STI 7YZZ 8LUI 9BTU, WAx SYAS 6RNG 0VZF, WBs 6LXS 6QWC 6VPC 9BKW, KL7DRZ, VE7JA, VK6ES, ZL1s AOY and DW. As you can see, only the first and third U.S. call areas were missed. There were other one-way SSTV contacts as well, all this on 14 MHz.

ARRL Communications Manager WINJM, in case you missed it, discusses amateur slow-scan TV communications possibilities on page 107 of this year's May *QST*. Its bibliography is enlarging steadily. We term the mode a diversion but it's full-time fun for a growing core of devotees. Now if that next DXpedition to Clipperton Island should just happen to concentrate on SSTV. . . .

† † †

What :

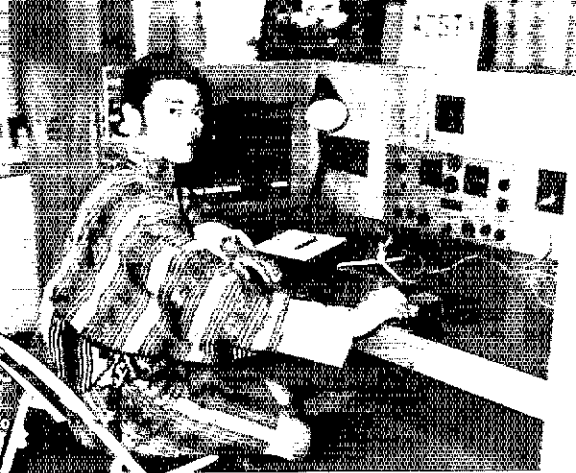
Off we go to the DX forum once again, word from the long-haul herd hither and yon. First let's lower the angle for reception from members of the "How's" round-table 'way out

YON - Hope to visit Navassa again before leaving KG4CS. Bad weather cut short my last trip. - K4CSY/KC4. . . . Last wrote you when I visited Pitcairn as W6HUQ/mm. - KS6DY. . . . First licensed back in '89. - GC5ANX-WA2MEQ/7. . . . Thanks for those informative Intruder Watch memos. - VS6CZ (KJKZB). . . . Suffixes must determine the necessary five contacts for our Persian Empire award because, for example, EP2DX and 9C9DX are one and the same station. - EP2DX. . . . On 75 we are authorized to transmit no higher than 3.8 MHz. - 9G1WW.

* 7862-B West Lawrence Ave., Chicago, IL 60656.

KC6RM, who likes voice QSOs on 20 and 75 meters from the Truk group, has another of those QTHs of the Month in the tropical paradise category. Mike teaches high school English with the Peace Corps on Moen Island. (Photos via W6DOR)





AC5TY, Bhutan's director of wireless, likes to shake up the DX world from remote Thimpu. First temporarily signing AC5PN, Yonten started his EX career this summer with 400 watts of cw and a dipole near 14,030 kHz, usually active at 1300-1500 GMT. Additional AC5TY phone action is imminent. (Photo via K9KDI, Northern Illinois DX Association)

The original memorial cross from Cape Cross, QTH of 7S3CUE, can be seen in the Berlin Oceanographic Museum. - *SARL*. . . I hear U.S. signals on 80 but few W/Ks seem to tune below 3.8 MHz for my calls. - *Q1ZED*. . . One-sixty interests me but Ioran QRN out here may be a burden. - *KB6CT-3WIAT*. . . Our September Sark plans stressed cw, 160 through 10. - *CSATJ (K2MH)*. . . HB0XTO (DK3ST) tried voice and code on all DX bands but 15. - *DK2PN*. . . The 1972 Scandinavian Activity Contest will be arranged by SSA of Sweden. - *SRAL*. . . Our Radio Club of Belgrade has more than 50 licensed YU members. - *RCB*. . . Here's a list of blatant DX lids I hope you'll find space to publish. - *SP6DR*. . . SWL cards seem to pour out of Russia much faster than QSLs. - *K4BZH/VP7*. . . Victoria Falls continues to bring jet tourists to Zambia. - *9J2PM*. . . Our QTH, Caprera Island, is the resting place of patriot Garibaldi and countless pirate ghosts. *1M0KH*. . . Please ship me ARRL's *Antenna Book*. - *EL7D*. . . Want to get back to Ohio to try my trusty old DX-100 on 160. *WB8JN/mm, USS Saratoga*. . . Too many fellows do not seem to know the meaning of KN. - *JA1RRU*. . . I will be attending the Phillips Exeter Academy in New Hampshire for almost a year, possibly signing EU105/W1. *0J1US*. . . Still catching a few Novices on 15 with my ten-watter. - *TA5ZH*. . . I'm interested in that portable 144-MHz transceiver in the '71 ARRL *Handbook*. - *XW8CY*. . . Got my Korean call just ten days after filing the necessary paperwork. *HL9WU (WA9QVT)*. . . If a DX station has a QSL manager let's give the latter sufficient time to do the job before bothering the DX station direct. - *9G1WW*. . . Traffic work must be given priority over DX contacts during W7UXP/KH6's Kure visits. - *KH6BZF*. . . SMS 3AKN 3ANA 50KC 5ERP SEUL 6AKH and 0DYF are new members of our Brollnas Radio Amateurs Club. - *SM3AIR*. . . I operate DL3NOA from my school QTH. - *DL3NO*. . . My DL2QBL operation takes place at a holidays location mostly on weekends. - *DL2QB*. . . Good to hear W/K/VES daily on 15 and 20 so far from home. - *WA2WYR/CE2*. . . Very difficult to get cards from KC6 KG6 ER6 and KX6. *HPLAC*. . . All amateurs should realize there is continued terrific pressure from outside interests who would rob us of our frequencies. - *5N2ABG, NARS*. . . I'll be active on 75 and 80 depending on the antenna situation. - *HL9VK (WB6HDI)*. . . The alligator on my QSLs was designed by a pre-Columbian Nicaraguan artist. *HR1RTS*. . . Keeping busy as DX editor of our *Radio Revista* amateur journal. *1128Q*. . . I'm also licensed as VP1EK. - *KZSEK (WA7ARU)*. . . Our TOPS C.W. Club's 80-meter contest is scheduled for the 4th-5th of this month. - *G3IRM*. . . Moving back into 9X, especially 160, after a few years off due to

business pressures. - *ZL3OX*. . . Met fellow 5B-DXCC members DL7s AA4HZ and PR at a radio exhibition in Berlin. - *OH2YV*. . . We YVs aren't doing too badly with seven of Venezuela's 3240 hams on the DXCC Honor Roll. - *YV3AIP*. . . After two years on the air in Greece I still haven't worked or even heard North Dakota. - *SV0WO (WJCOI)*. . . Please make sure QSTs are forwarded to my new Minnesota QTH. - *HCIWZ (K0LUX)*. . . I've been licensed since '68 but DXing is limited by inadequate equipment. - *VP2KF*. . . HK0AA was inaudible here so I will have to wait till next time. - *VU2KT*. . . Thanks for passing along word on our Auckland centennial and ZL1AA. - *ZL1TB*. And next, as space allows, we hear from lads

EITHER - All those JAs! Remember how hard it was to find one J-station in the '30s? *W3TV*. . . K6UFT sometimes assists Manhiki's ZK1MA net on 14,202 around 0400 GMT. - *WA2LWA*. . . I'd like to skel remote Canadian areas on 7155 or 7175 kHz. - *WN0EJL*. . . My fist must be awful. Many DX ops say "HI ELLEN" despite a new call. *W1YL*. . . Enjoy operating from 3A HB0, etc., in DX tests. - *WA4WME*. . . FPSAP's boat *Attaboy* survived 145 voyages in Newfoundland waters. - *VE1AII*. . . How about some info on the VK0BAE active last spring? - *WA7MUJ*. . . That may have been UK0RAE on Cape Chelyuskin, Gary. *W9BRD*. . . Now stationed in Korea and I intend to look up some of the HMs listed in the *Callbook*. - *K3ILC*. . . The 120-foot boom of my 9-element 14-MHz beam (also 14 elements on 21, 7 elements on 28 MHz) is a fine 75-meter rotary dipole. - *K4SKI*. . . Wish more DXers would keep things going on 10. - *K4ELV*. . . After a year at Penn State I got in some good DX licks in late summer with my 8B-401. - *WA3HEU*. . . Back in Seattle now after 101/87 as a Massachusetts "11." Forty cw is very big out west. - *K7JRE*. . . An old straight key, 13-foot vertical and 120 watts got me 68 fast countries. - *WA7OUB*. . . Twenty's EB, 15 ragged down Carolina way. - *W2DY/4*. . . Just confirmed No. 100! - *W9OQI*. . . Forty cw is outstanding at times. - *W9EY*. . . Our 75-meter Field Day dipole, supported at the center by a balloon at 300 feet, gave me some ideas for 160. - *W4YOK*. . . It's infuriating to tune across 11 meters packed with CBers DXing short skip and then to find 10 practically deserted, DX or no DX, we had better use 28 MHz. - *VE3CUI*. . . With the demise of 15's skip VE7BAE and I prowled 20 cw like hungry wolves. - *EE7BZ*. . . Mailed out 565 West Coast *DX Bulletins* recently while hobbling around in an ankle cast. - *WA6AUD*. . . Really enjoying DX again after a three-year layoff. - *WA3RDU*. . . W0HJ's recent QST quad article gave me DXceptational results. - *WA0GQI*. . . Correspondent WA2FOS may find Asia easier from Arizona but Europe is no cinch here on lower frequencies and during contests. - *WA7MMK*. . . A mobile whip mounted on my apartment balcony was good enough for 30 countries. - *W9LEX*. . . I've quit living out of a seabag as K5UDA/mm after pounding brass pro-

professionally for 33 years. CU from my Arkansas land-lubber hamshack! — *K5CDA*. . . . I'd like to see "How's" covering more band-by-band DX activity as before. — *K4PRE*. . . . Been running regular skeeds with a former neighbor, now *CX1CF*. — *WA6CPP*. . . . The XYL kept reminding me that my *F00TG* trip was a vacation, not a DXpedition. — *WA6IVM*. . . . Good to have my 265-foot-high dipole back in service on 160. — *W1BB*. . . . *VK2ADE* tells of the passing of transpacific DX pioneer *ZL4AA*. — *WSACL*. . . . I sometimes obtain log transcripts on schedules with QSL client *F0WJ*. — *K5MAT*. . . . Fourteen-year-old *JA6IIT*'s father and mother are *JA6s NEO* and *QHB*. — *W8KZO*. . . . Took me two years to work twenty-one 160-meter countries from California. — *W6NUT*. . . . May be in the Army soon. How about more Jeevesie reruns? — *W4ZZU*. . . . A new quad should have me burning the midnight DX oil. — *WB0AZK*. . . . Passed the 100-mark again since returning from Vietnam. — *W3JZJ/9*. . . . Sorting calls in 20-over-S9 contest pile-ups taught me much about DXing while operating at *HR2GK*. — *WA8VRR*. . . . Fifteen's slowing down but 20 makes up for it. — *W8TDY*. . . . Stressed 40 and 80 cw in August portable-VP7 doings. — *K2YGM*. . . . Your closest BC station or local airport may be quick sources of longitude and latitude if needed. — *W6FFC*. . . . A successful springtime *ZF1WF* visit encouraged us to try a three-rig multiplieroperator encore in October. — *W4GIW*. . . . *ZE1CY*'s sister graduated from high school in Virginia as an exchange student. — *W4JUK*. . . . Recently worked *ZL1AAP* of Silverdale, N.Z., a town with about the same population as the Silverdale I live in. — *WA7LMZ*. . . . An 8-to-4 workday is rough on 21-MHz Novice DX. — *WN2SX*. . . . Here's a QSL I received from old *9BRD* in 1926. — *W8HA*. . . . My 66-year-old eyes would like "How's" in larger type. — *W3KT*. . . . Too many mistakes to risk that. — *WB9CJS*. . . . Keeping in touch with DX friends on the low ends of 20 cw and ssb. — *W5NW*. . . . *KY4CP*'s main operation was on 20 code and phone. — *W4DQD*. . . . We worked 80 through 10 at *WS9UC1*. — *W9LVH*. . . . Twin-City DX Association completed its first year, electing *W0YDB*, *K0VWX*, and myself president, secretary-treasurer, and publicity chairman. *W0s ELA HP* and *PAN* are among many prominent *TCDXA* members. — *W0MYK*. . . . Say, what's with this *M1AP*? — *W4LXA*.

† † †

Where:

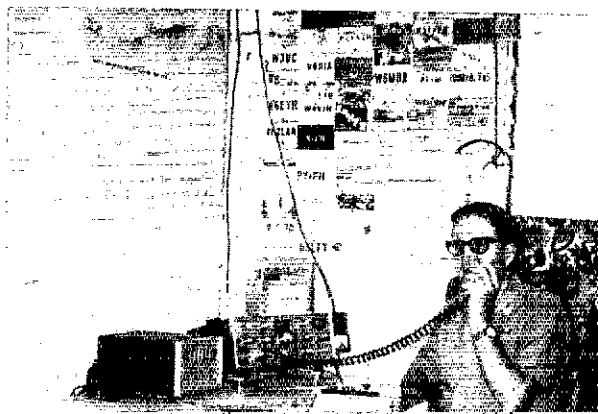
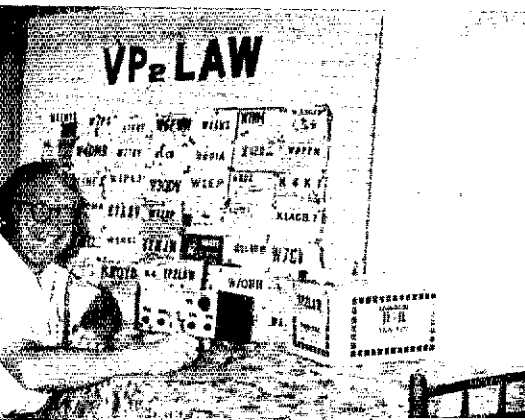
HEREABOUTS — It should be called to the attention of QSLers that even when only a single International Reply Coupon is sent, sufficient return postage has been supplied by the sender. It is printed on each IRC that it provides

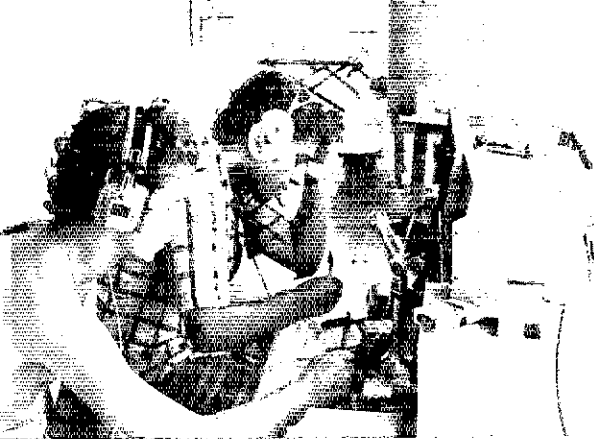


CN8GG entertains visiting VE2IJ during the latter's June jaunt to Morocco. George is one of the more widely worked members of the CN DX gang.

postage payment for one ordinary letter of the first step via surface mail to any foreign country. Therefore, if only one Coupon is received a QSL should at least be returned via surface mail. — *W3LB*. . . . Sixland's ARRL Bureau chairman *WB6GFJ* reports that the dock strike has really slowed incoming QSLs. Patience, please. — *W1YL*. . . . Since 1967 my mail to various *FG7XF* addresses has been returned "inconnu" but I note *FG7XF* contest results listed in September's *QST*. What gives? — *VE7BAF*. . . . Other brethren seeking similar scoop on holdouts mentioned: *W1CTW*, *TU2BW*; *W5IB*, *AX0KW*; *W5WJQ*, *FF8AP '58*, *FL8DG '69*, *JX4GM '70*, *XF4KS '70*; *W9CRO*, *VP2AZ*, *VR2AG*; *WA3RPL*, *VP4TK '63*, *VR4AO '64*, *ZP5AY '65*, *9G1FF '64*; *WA7JBE*, *JW2DSQ*; *WA8LUC*, *PY0s APS* and *BLR* of '68. Any 'alp? . . . Overseas ops needing QSL managerial help, we volunteer. — *WBs 2ZHM 9ACR*. . . . Re "different" QSLs, I recall sending out confirmations imprinted on silk handkerchiefs when I was operating in the Philippines as *KAIAC* many years ago. — *K6IBI*. . . . My QSL manager *DL1HH* receives cards direct or via *DARC*. — *KZ5EK*. . . . For about a year I've been receiving cards for *FM7AA* which should go via *W8TDY*. Can you help straighten this out? — *W8TDY*. . . . Costa Rican IIs are signing their *TE* prefix now and then. — *L1DXA*. . . . We are changing to one major edition per year with no change in price. Publication date is December 1st. A "New information service" in *Callbook* form will be initiated on a quarterly basis to be available by

VP2s LAW and *LK* enthusiastically represent St. Lucia on a residential basis. John prefers QRP cw around 14,025 kHz, also 7 MHz at times, and needs only Alaska for *WAS*. Lee, quite active in *ISSB* 14,332-kHz doings, plans increased 40- and 75-meter activity.





subscription only. - *Radio Amateur Callbook Magazine*. . . . Commendably prompt QSL response earns "QSLer of the Month" status for CR8AG, FM7WN, FQ8BO, Gls 2D1B 3D1J 6TK, GW6YQ, HKs 1CIW 0AI, HL91I, HRs 2WTA 0FA, JWSNM, K8EY, KR6 6KQ 8BY, LX2CQ, M1R, 0E2EGL, ON8FC, OX4AL, PW1JZ, PX2PH, SP0KEN, T1ZAP, T1Y1ABE, UA0ZI, UD6DGA, YKs 3UX 7SM 9NP, VO2AF, XE1DE, Y88AAP, YN1HF, YS2CFN, YU3FY, YV5s BPG CKR, ZF1WE, ZK1S CD MA, ZM7AG, 3B9DK, 5U7AS, 5Z4LW, 6Y5CM, and 9M6HM, plus QSL tenders Ws 3HNK 91HN 9WHM, Ds 2KGB 3RLY 4CDZ 67E 7ABV 8UDJ 0BLT, WAs 3HUP 8FDY 8UHI, W88FUO, KH6GLU, VE6AKV, 1A7RB, ZL2s FA and AFZ, all sponsored in "How's" correspondence from Ws 1SWX 51B, Ks 2QHT 71RF 8ZBY, WAs 2BAV 2EAH 3HGV 0V1E, W8s 2AQC 2ZHM 4KZG 5EU 9CJS and VF7BAF. Got some more quickies for these kudos?

THEREABOUTS - All cards from W/K/VE stations for my son, HS4AFT, may be sent to me for handling. Others should QSL via STAR. - *W5WJQ*. . . . QSLing for 4W1AF was under way by October after a two-week wait for printing. - *DJ9ZB* via *K4AEB*. . . . FPs are signing EQ commemorative calls, suffixes the same. - *FDYC*. . . . G82SM hopes to catch up with ZD9BF QSLing after relocating station equipment at the Science Museum. Also WA6OFT holds 1U2CY logs only for September 14 through October 24, 1970. *WCDAB*. . . . CR61A sometimes signs NX6LA, an additional Angola prefix. - *FERON*. . . . Former ZD5s of Swaziland now sign 3D6 calls. FX-ZDSK, for example, is 3D6AX. - *NTDAA*. . . . QSLs for my contacts from KB6DA and VR1W should go via W6UDF. Incidentally, anyone still needing cards for my ZD8Z and/or 9Y4AA QSOs can also consult W6CUE, self-addressed stamped envelopes or s.a.e. with IRCs required. *W6BHY*. . . . Be advised that VK3UV/9 blacklists ill-mannered pursuers. - *NTDAA*. . . . Many of my 2018 PA9QX contacts seemed amazed that every Netherlands station does not sign PA0. No need for s.a.e. or IRCs, please, as all my QSLs go out via bureau. *ON4QX*. . . . Late logs from QSL client OY9LV give me fits. Please, men, be patient. - *B3HNK*. . . . WA3UTV, QSL aide to VQ9WFS, also will handle Wes's card when the latter fires up in Northern Ireland. - *WA3HGV*. . . . I don't feel obliged to pay postage in answer to W/K QSLs except for shipments to the ARRL QSL Bureau. Direct reply requires s.a.e. - *SVQWO* (*W4CQI*). . . . OKs will be signing their OM prefix in conjunction with a Czech anniversary, probably through December. - *DVNS*. . . . New DXers will find that U.S.S.R. stations do QSL after five to six months or longer. - *K4PR*. . . . Try these suggested specific items now but be aware that each is necessarily neither accurate, complete, nor "official":
 BY1BA, c/o Radio Focchow, P.R.C.
 D07MC, P.O. Box 273, Bacolod City, P.I.

ET3ZU/a's September DXpeditionary encore from Jabal at Tair turned out some 7000 QSOs, 3000 with W/Ks, thanks to adventurous ET3ZU, 111J, Fs 2QQ 5QQ and K3BSY. Here F2QQ and 111J, left and right, furiously fatten the log while ship stays in. K3BSY handled radiotelegraphy chores.

- FP2JH, G. Holmes, PAFB, Box 2600, APO, New York, NY 09205
- ET3USF, W. Johnson, WA1KSL, 54 Westernview Cir., E. Longmeadow, MA 01028
- FM7AJ, J. Pistre, Box 662, Fort de France, Martinique
- FR7AL, Box 1050, St. Denis, Reunion Island
- G3BD/DL/LX (via W2GHK)
- HC1WZ, W. Funk, 1003 Eighth Av. N., St. Cloud, MN 56301
- ex-HS1ADX - W4VEP (to K4SF)
- ex-HS4AFG, W. Callanan, WA7QFW/7, P.O. Box 114, Indian Springs AFAE, NV 89018
- 12XAK, A. Bovio, via Panizzi 10, I-20146, Milan, Italy
- JYs 1JH 9AC (to FP2JH)
- JY6AAM, P.O. Box 2353, Amman, Jordan
- JY9s FB YL (to W3EMH)
- K9Y1J/4X, J. Weitzman, K9Y1J, Box 123, Madison, WI 53701
- ex-KC6s WS YL, Wm. & Helen Sedore, W3FDP/5 & WA7SFA/5, Box 950, Denton, TX 76201
- KX6LH, Box 878, APO, San Francisco, CA 96555
- ex-MP4BFH - MP4MAW (to G3RWU or via RSGB)
- PZ1DX, P.O. Box 902, Paramaribo, Surinam
- SV0WW, U.S. Embassy, APO, New York, NY 09253
- 1E2CF, Box 4300, San Jose, C.R.
- VP5RF, R. Francis, Box 878, Grand Turk, W.I. (or to G3RWU via RSGB)
- W7UXP/KH6/KM6 (to KH6BZF)
- W9WBE/KV4, P. Shuman, Box 115, Frederiksted, St. Croix, VI 00840
- WA2FDG/4X (to WA2FDG)
- WA2WYR/CE2 (to WA2WYR)
- WB4RQG/KL7, B. Fucker, Box 10-1268, FPO, Seattle, WA
- WB6KI/KB6, E. Dudek, Box 1248, APO, San Francisco, CA 96401
- WB9IAO/KB6, Box 1187, APO, San Francisco, CA 96401 (or via K3RLY)
- YV3NQ, Box 4, Guanare, Venezuela
- 3F1BR (to FP1BR or via LPRA)
- 9J2LI, Box 1373, Kitwe, Zambia
- 9Q5DX, APO, New York, NY 09662
- 9Q5GJ, J. Jonson, 993 N. Cherry St., Galesburg, IL 61401
- 9Q5VM, Box 1407, Kinshasa, R.C.
- 9X5EA, P.O. Box 30, Butare, Rwanda
- BV1USE (to JH1HWN)
- DF01FA (to DARC)
- DL6AK/W7 (via WA7JRL)
- EL0K/mm (to DL8UJ)
- EQ2Y1 (to K3ZZS)
- F0ACG (to K11KG)
- F0GF (to WASZWC)
- FM7AA (see text)
- FY0GW (to DJ5SM)
- G5AQJ (to PA0LUF)
- G6SAWQ (to DJ5PN)
- GD5AVR/p (to DJ51AC)
- HB90XHR (via W2GHK)
- HB0XUA (to DK1U)
- HK0AA (via W9HID)
- HS4AFT (see text)
- IC8KAW (to 11TR)
- 117XAK (to 12XAK)
- JW6AN (via NRRL)
- JY8BI (to DK2BI)
- K2LQQ/JF (to K2LQQ)
- KB6DA (via W6CUE)
- KH6HAM (to W6LFB)
- KS4DX (via K3RLY)
- KV4EN (via W3HNK)
- KW0SUF (via W0HBB)
- KZ5EK (via DL1HH)
- SM5EAC/JY (to SM5EAC)
- SZ0FEZ (to SV1FZ)
- TA2BK (to DJ0UJ)

VE7IR/XU (via VF7BWG) YB0AAO (via DJ0RR)
 VK9JV (via JA2KLT) ZH3Q (via OZ3PO)
 VP21AM (via W7VRO) ZP2AN (via DE2JN)
 VP2LAR (to VE3FWO) 3D6AX (via WA5IEV)
 VP2VAD (via W3HFK) ex-5N2AAC (to G3PCY)
 VP8LE (via G3NOM) ex-5N2LKZ (to 0A4MS)
 VP8ME (to WA5FWC) SU7AS (via WA8UHD)
 VQ9WES (via WA3OTV) 5VZJS (via 5N2AAJ)
 VR1AB (via KJRLY) 5VZYH (via VE3GHL)
 VR1AC (to WB6IKI/KB6) 6Y0JMA (via 6Y5RA)
 VR1W (via W6CUE) 8P6CX (via WA3HGV)
 VS9AWR (to G3SUQ) ex-9M2WJ (to WA1KSL)
 WD6WD (via K6VDP) 9M2WM (via WA6AHE)
 W08HIO (via WB8CWD) 9N1JK (to DJ9KR)
 XU1VS (via JA1KSO) 9Q5KP (via K2QHT)
 XX6FI (to CR6LA)

A tip of your "How's" topper to QTH donors
 Ws 1AM 1SWK 1YL 4VPD 5BZK 5IB 5QPX 5WJO
 6GSV 9CRO 9EY, Ks 2QHT 3YVN 4SD 8PYD,
 WAs 2BAV 2FAH 2KWB 5ZWC 0VJF, WBS 2ACC
 4KZG 5FIU 9CUS, WN0BAV, VE7BAE, OH2YV,
 Columbus Amateur Radio Association *CARAScope*
 (WSZCO), *DX News-Sheet* (G. Watts, 62 Bellmore
 Rd., Norwich, N.72 T., England), Far East Aux-
 iliary Radio League (M) *News* (KA2LL), Florida
 DX Club *DX Report* (W4FRO), Japan DX Radio
 Club *Bulletin* (JA3UI), Long Island DX Associa-
 tion *DX Bulletin* (W2GKZ), Newark News Radio
 Club *Bulletin* (J. H0ieq, 3822 Marshall Ct., Bell-
 wood, IL 60104), Nigerian Amateur Radio Society
News (5N2ABG), North Texas DX Association
Bulletin (W5SZ), Northern California DX Club
DXer (Box 608, Menlo Park, CA 94025), Southern
 California DX Club *Bulletin* (W6EIJ), VERON's
DXpress (PA0s FX LOU to VDV WWP), and West
 Coast *DX Bulletin* (WA6AUS). Got some "wheres"
 to share, OM?

† † †

Where:

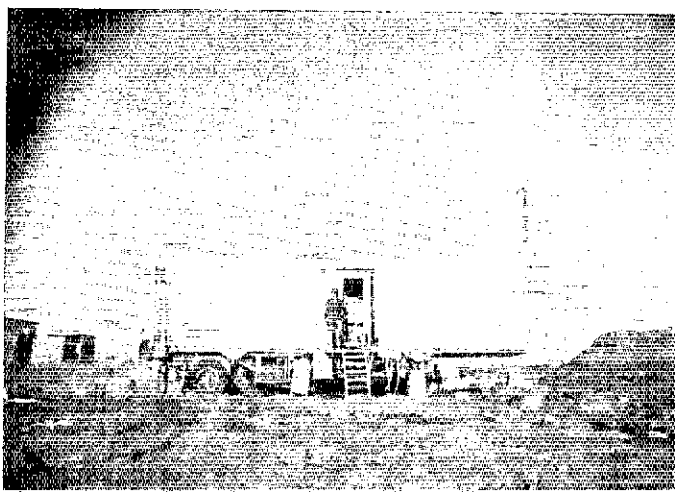
160 meters gets varied spotlights this month. On
 the DX front it's time for the annual
 Transatlantic & World-Wide Tests, an activity
 pushed by W1BB and associates since 1932. Test
 sessions will be held this 1971-'72 season at
 0500-0730 GMT on November 28th, December
 26th, January 9th and 23rd, and February 13th.
 W1K/VEs are urged to call CQ DX TEST the first
 five minutes of each hour, listen the next five
 minutes, call again during the third 5-minute
 period, etc., until contacts begin. Clock accuracy is
 a must. Europeans are expected to congregate as
 usual in the 1823-1830 kHz slot, JAs between
 1907.5 and 1912.5, ZLs near 1876 kHz, and VKs
 at 1802-1805 kHz. Remember, these tests are *not*

meant to be contests. . . . Western lads will
 exercise their latest 1.8-MHz weapons in another
 batch of 160-Meter Transpacific DX Tests at
 1330-1600 GMT on December 4th and 18th,
 January 1st and 15th, February 5th and 19th. On
 those same dates at 0730-1000 GMT there will be
 Japanese Sunset Tests wherein JA/JH/JRs will dig
 hard for the U.S.A. plus other DX and vice versa.
 "Please report results to your favorite DX news
 media and/or W1BB," requests Stew. . . . As
 detailed on page 68, October '71 QST, the 2nd
 ARRL 160-Meter Contest explodes on the second
 week end of this month. See WA1KQM's bright
 write-up of last year's affair (page 58, April '71
 QST) for flavor, also to ease local competition
 likely to reappear in your ARRL Section. Top
 band, here we come!

Other odds and ends before we adjourn another
 DXceptional year: VE7IR and fellow ham ambas-
 sadors of good will pitched in to help begin the
 removal of Cambodia from the ITU/ITU Ban List
 in early October. Auditors of WIAW bulletin
 transmissions got the news fast. Multioperated
 XU1AA was the first station authorized to QSO
 FCC licensees with more calls reported issued or
 about to be issued. Good news from Ceylon, too,
 around the same time. The local ban on hamming
 in 4S-band relaxed enough to permit 4S7PB and
 colleagues to resume operation. Ill tidings from
 Turkey, though; most 1As are still off the air,
 amateur privileges suspended. . . . K3BSY,
 EI3ZU, JHJ, and cohorts are said to be consider-
 ing a Kamarin Island thing for next month. . .
NTDXA. . . ZM7AG expects to QRT this
 month with an eventual ham replacement possible.

DXNS. . . HK0AA scored 400 Bajo Nuevo
 QSOs before unfriendly Edith's proximity pulled
 the switch in September. Another three kiloQSOs
 ensued from Serrana Bank as KS4DX before the
 gang returned to Colombia. - *WCDXB*. . . The
 SV0WXX combine managed two Crete kiloQSOs
 and yearn to return. *W3HAK*. . . WWV's
 format for transmission of propagation data
 doesn't appear as clear as the old sequencing. -
SCDXC. . . One of the many DX potentates
 expected to attend next month's International DX
 Meeting at Fresno is YL WA6FSC, fresh from
 African and European DX trails. - *WCDXB*. . .
 OZ1LO and I will operate in the Gambia until
 December 8th on (cw) 5503, 7003, 14,030,
 21,030, 28,030 kHz; (phone) 3798, 7080, 14,190,
 21,290, and 28,590 kHz. - *OZ3DY*. . . A
 group of us are planning a DXpedition to the
 British West Indies operating VP2VA1 from 0005Z
 Dec. 4 through 0400Z Dec. 6. Frequencies shown
 are both primary and secondary ones: 3845, 3940,
 7204, 7295, 14,210, 14,295, 21,280, 21,350,
 28,600; 50,110, 50,200. QSL via the KP4 Bureau.
 - *KP4DFH*. QST

WA2WYR/CE2 sandwiches 14,330-kHz and 21-MHz DX patrols between satellite-tracking duty tours
 in this rolling communications complex near La Serena. John will close down shortly for home,
 doubtless wishing he could take this 7100-foot-high Andes location back to New Jersey.



The World Above 50 Mc.

115-1308 2100-2450 5300-5700 Hz 5650-5925 12,000-18500 21000-27000 30,000-9

CONDUCTED BY BILL SMITH,* KØCER

New Gentlemen's Agreement for 420 MHz?

WITH 30 MHz in which to get lost, early experimenters in the 420-MHz band worried mainly about finding each other. That there might ever be a QRM problem here seemed almost beyond comprehension. Some early activity was built around war-surplus radar-type transceivers, easily modified for voice communication. Tuning a 30-MHz band presented few problems with a receiver having a bandwidth of 5 MHz or more. Other uhf workers built modulated-oscillator transmitters and superregenerative receivers. These, too, could use a lot of band. For a while, communication was carried out wherever the transmitters happened to work best.

In the late 1940s tripling from 144 began to come into play, naturally enough at 432 MHz and up, since a transmitter on 144 MHz supplied an easily recognized marker frequency with its third harmonic. "The band" thus became a few hundred kHz beginning at 432 MHz, for the advanced uhf amateur, and so it has largely remained, quite logically, ever since.

Meanwhile, a new kind of hamming was taking hold. After more than 20 years of almost no interest, amateur television experimentation began

* Send reports and correspondence to Bill Smith, KØCER, ARRL, 225 Main St., Newington, CT 06111.

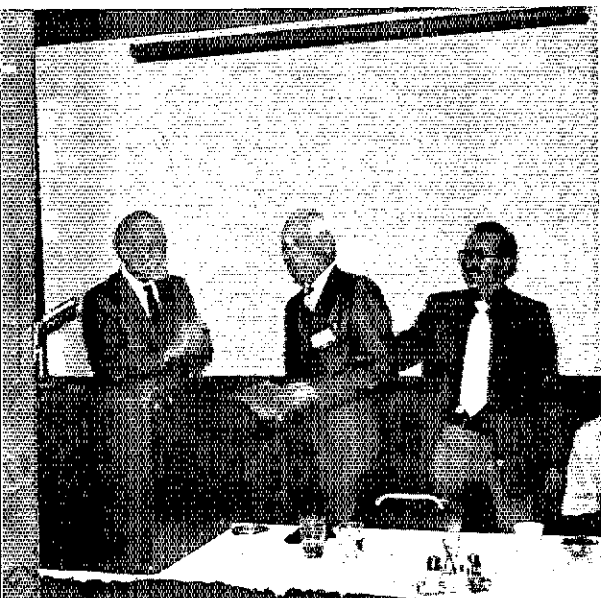
to boom in the early days of home TV. There was not much agreement on frequencies to be used for ATV at first, but the power levels and working ranges were not such as to pose problems for the 432-MHz narrow-band operators, even when ATV stations happened to move down that low in frequency.

But there was obviously a need for some standardization regarding who does what, and where. This was settled by a largely uncontroversial "gentlemen's agreement," proposed in *QST* in the early 1950s. Thus, 420 to 432 MHz would be set aside for simple transmitters and wideband receivers. Weak-signal communication, using only narrow-band modes and transmitters of suitable stability, would be done between 432 and 436 MHz. ATV would have 436 to 450 MHz.

But early in the 1960s, a modifying factor appeared in the form of a boom in fm and repeaters, triggered by the sudden availability of thousands of discarded commercial fm transceivers. FCC rules call for remote-control circuits to operate on 220 MHz or higher. There was no ready source of fm gear for 220, but by now uhf mobile units for 470 MHz were showing up on the surplus market in great numbers. Two-meter repeater operators made good use of these for control circuits. The high end of the 420-MHz band began to fill up with fm, first mainly as control links, but more recently for uhf repeaters as well. This new use and the increasing interest in ATV made more channels for the latter a necessity. The ATV people could move only down, and when their video signals got down near 432, they began ripping up the weak-signal DX communications in fine style. Result: no little strife, over utilization of a band wider than the whole radio spectrum, from dc to the top of the 10-meter band!

Obviously a new band plan was called for, and the time to get about it ripened with the conclusion of the international conference on space communication, held last summer in Geneva.

An emotion-choked Mel Wilson, W2BOC (center), was the recipient of the Central States VHF Society's first annual John T. Chambers, W6NLZ, Memorial Award presented at the Society's recent meeting in Sioux Falls. Wilson received the award for his many years studying and reporting on 50-MHz propagation. Sam Harris, KP4DJN (W1FZJ) left, presented the award on behalf of the Society. On the right is vhf column editor, KØCER. (WØJHS photo)



This earmarked 435 to 438 MHz for amateur transmitting satellites, thereby giving us a new base on which to build.

If you are interested in the 420-MHz band, ARRL invites you to participate in the preparation of a voluntary plan to coordinate use of the various specialized modes and techniques used by amateurs in uhf communication. All modes — channelized fm (both uhf repeaters and control links for vhf repeaters); weak-signal DX communication with narrow-band techniques, covering distances up to world-wide in the case of moonbounce; interference-free reception of amateur transmitting satellites; and the wide-band needs of amateur television — demand consideration. Perhaps we still need a place for wide-band simple-gear experimentation too.

Several factors tend to limit flexibility in determining which modes go where in the band. Converted fm equipment is most readily adapted to use in the high end of the band — but so is a modified uhf TV converter. The frequencies for satellite use have now been fixed by international agreement. Narrow-band a-m, cw, ssb, and fm have logical claim to 432 and up — but how far up?

ARRL is a logical vehicle for agreements among amateurs. Thus, Headquarters is asking for your comments and suggestions for a comprehensive 420-MHz band plan. Tell us how much spectrum space you think should be set aside for your mode or modes. In what portion of the band is it logical (and possible) for this activity to take place? Can other modes use the same frequencies all or part of the time without causing harmful interference? Any ideas that will help in developing a useful overall plan will be welcome. Send your suggestions to ARRL 420 Band Plan, 225 Main Street, Newington, CT 06111.

Several plans, obviously the result of much thought and discussion, are already in. Notable contributors include the Texas VHF FM Society, Southern California ATV Club, and Central States VHF Society. Let's have yours, individual or group, without delay.

OVS and Operating News

50-MHz DXers will soon get a taste of the winter *F* season, but *F*-layer prospects are not good as *Cycle 20* continues downhill. *F*-layer interest continues, however, with memories fresh of the past several seasons. KH6GRU reports from Hawaii that the KH6EQI beacon now has a programmed antenna rotor automatically directed at four compass points daily. The schedule calls for beaming on the U.S. mainland from 1400 to 2330, on South America from 2330 to 0230, west from 0230 to 0700, and south between 0700 and 1400, all times GMT. Earlier we reported KH6GRU's telephone numbers, but they were printed incorrectly. For the record, they are 808-689-0111, home, and 808-432-5132 at work, if the beacon is heard. During September and early October, Bert heard the KX6HK and ZK1AA beacons several times and says the east-west muf was showing signs of approaching 40 MHz in mid October.

Closer to the mainland, and within *F* distance, W2MPK reports that Paul, K3WEU, is active from



South Dakota's most recent vhf enthusiast is K0WLU. Bill's Valley Springs location is but a few miles from the Iowa-Minnesota border. Bill is active on 144 and promises future activity on higher bands.

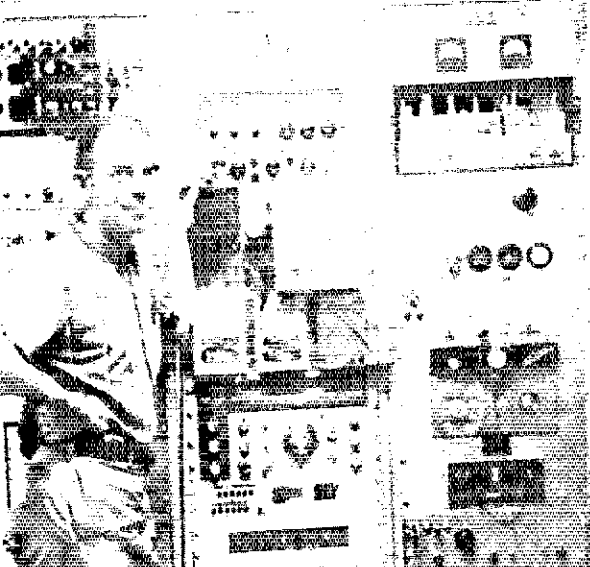
Montego Bay, Jamaica, under the new reciprocal licensing agreement. K3WEU/6Y5L is using a Drake TR-6 and 6-element Yagi 45 feet high.

From G5UM's vhf column in the RSCB magazine *Radio Communication* we read that Richard Limebear, Cable and Wireless Ltd., P.O. Box 614, Bridgetown, Barbados is new on six meters in the southeastern Caribbean. Signing 8P6DR, Richard may be available for schedules. He is ex-G3RWL, where he operated 2 meters from North London. Also on Barbados is ex-G8AWB now signing 8P6DS, and he and Richard have expressed interest in 432 moonbounce.

Late news: KP4DFH (ex-WA8SVK) will be on 50.11 and 50.2 from Tortola, BWT, Dec. 4-6, as VP2VAL. QSL via KP4 Bureau.

Pat, WA5IYX, has returned to San Antonio and has resumed close monitoring of the 50-MHz band. Pat says on October 6 the north-south (TE) muf was near 50 MHz between 1900 and 2000 GMT, and he heard Spanish commercial stations near 49.99, *E* activity observed at WA5IYX was spotty during September and early October with September 29 and October 8 and 9 being the better days.

From elsewhere around the country we have these notes. WA1MUG found the September contest spotty, but did manage several scatter contacts, including VE1ASJ, Georgia, and Illinois, and caught brief *E* to Wisconsin and Iowa. WA1DFL says, "September was dull except for an aurora on the 26th." Steven worked stations west to Michigan and south to Virginia. KIPLX says he is frustrated at the lack of cw on 50 MHz. Dennis is



John Fox, W0LER, is Minnesota's most active 144-MHz DXer. Also active on 432, John's station is nearly fully automated, with push-button control. John is one of the pioneers in the OSCAR/AMSAT program.

offering a certificate to anyone who can prove 10 or more cw contacts on the band.

K4LHB, Va., reported the September 26 aurora. He worked from Indiana and Tennessee to New Hampshire. In Houston, WASHNK observed no September openings and still needs only Alaska and Hawaii for WAS. Only WBSDSH, Oklahoma City, caught October 8-9 E to Florida and North Carolina. K7BBO and K7QFW, both of Washington, agree, "no E in September." K7ICW, Las Vegas, says conditions have been poor, with scatter providing his only recent contacts. Al says the September contest was a real struggle in Nevada without a band opening.

Aurora September 18 and 26 provided WB9EDP, Chicago, a log of interesting contacts with 2s, Js, 8s, 9s, and 0s. Harry says WA9UBI, Ill., and WA1NGR, Ct., have a scatter pipeline going, with more than 40 consecutive contacts. W0PFP, Iowa, says that September propagation was poor, except during the contest. (It wasn't the activity, Jim?) WA0UPS, also Iowa, did well during the contest despite conditions. Mac had 52 contacts in 11 sections, with scatter bolstering the total. In Des Moines, WB0AAM caught the September 26 aurora, working 8s, and an apparent tropo opening on the 5th to Oklahoma.

144-MHz DXers are learning to appreciate hurricanes, at least for the tropo-producing ability. As Hurricane Ginger moved along the Atlantic Coast, another good tropo formed September 30 and in some areas lasted three days. K1PXE worked 8s and VE3s on the 30th and October 1, with the second evening having the better signals. K2I2K pipelined into Ohio, Michigan, western New York, and Ontario finding signals strong and steady. WA2UDT's results were similar, including ssb contacts with K8HWW, Mich., and VE3DSS. WA2ZPX filled a log page with Michigan and Ohio calls plus VE3s TC and DSS. K3ASI, Pa., worked stations from N.J. to Ohio while WA3OYA, Delaware, was working into Detroit and VE3.

From Michigan, WA8NBD comments, "very good opening." He said it extended from Indiana to Virginia, and north into New England. VE3DSS worked 40 stations from New England to W9, including his state number 27, WA4ELA, in Kentucky.

WA1FO says a group of New Englanders have organized the Northeast Vhf Association, electing K1HTV president, K4GGI/1 vice president, and K1ABR secretary-treasurer. The group has a Sunday net at 8 P.M. on 144.12, and listens also on 145.12.

On September 16, K1FJM/4 was flying at 1,500 feet near Miami when he heard some Caribbean tropo on the 128.1 aircraft channel. Pete logged another aircraft on approach to the Kingston, Jamaica airport, a path of some 700 miles. Pete hopes to become active this winter on 2 from Miami.

K4EJQ, who made Tennessee so workable on 2, says he is building 50-MHz gear. So far it is low power, but Bunky is threatening high power by summer. K9KOR, near Chicago, reports good 400-mile tropo September 11 and 12, and aurora on the 20th, to 0s. Dick is working on a pair of 4CX250Rs to beef-up his signal for winter meteor showers.

From Des Moines, K0LUX, K0OOD, WA0SWJ, and WB0AAM report tropo openings September 5, 27, and 28, observed on fm. On the 5th, stations from Wisconsin to Oklahoma were worked. On the 27th, sixteen Denver stations and W7BET, Cheyenne, Wyoming were workable for nearly six hours - and the following day, Des Moines stations worked through repeaters in Oklahoma and the Texas Panhandle.

220-MHz news this month comes from several sources. WA1MUG took advantage of the September contest to come closer to leading the first call area for 220 states worked. John had contacts with WA8PLZ/8, W, Va., and W4UCH, Va., to reach 15 worked. K4GGI/1 says W8IDU, Mich., worked W1YTW, Maine, during the September 30 tropo for apparently the first 220 work between their respective states. W1QXX, Mass., worked W8IDU also.

Although overseas with the Navy and inactive, K4MSG is using the time to build several solid-state projects for planned 220 activity when Paul returns stateside. K7BBO, Wash., is building a new kilowatt final using a pair of 4CX300s. Dave hopes to complete it in time for the December Geminids shower. He says Lucky, W7CNK, has resumed activity and is scheduling WB6NMT. WBBIDD, Mich., continues to write his 220 newsletter and says previous mention in this column brought support for the publication.

432-MHz states-worked totals climbed, the result of the September 30 tropo opening. K1JIX reached 12 by contacting W8HVX, Mich. John also worked VE3s DSE and DKW, K9AQP/1 worked W8YIO, Mich., and K8DFO, Ohio, for two new ones, bringing Bob to 13 states. He says the opening lasted through October 2, and he had contacts also with W8HVX, VE3s DSE, DKW, VE2LI, and K2YCO. K4GGI/1, operating W1QXX, near Boston, worked W8YIO, Mich., over an approximately 650-mile path. K2OVS added Ohio and Michigan, to reach 13 states - all with 3 watts output! Ohio and Michigan were worked September 30. Then with his final still under construction, Jay added W1YTW, Maine, for number 14, as Hurricane Ginger lingered along the Atlantic Coast

October 4, W8YIO reported the September tropo, saying his contact with W1YTW was his state number 22. Lew also worked many W2s plus K1HTV and K1PXE, Ct., and K9AQP/1, Mass. VE3DSS says VE3s DKW, EVW, and FKX were widely worked during the opening.

Another item from G5UM's previously mentioned writings tell us that Australians VK2ALU and VK2BHL, near Sydney, are running echo tests on 432 moonbounce. They have 700 watts output to a 30-foot dish. It would be interesting to hear how they get all that output at 432!

1296 MHz and Up reports are encouraging this month. K4QIE, Va., running 200 watts output and receiving with a less-than-2-dB paramp on 1296 is working WA2LTM almost nightly over a 265-mile path. On September 28, Rusty worked W2DWJ at 300 miles and K3IUV, and heard K2JNG and W2OMS. Nice work, Rusty! W8YIO, Mich., got off to a good start October 3rd hours after erecting his antenna. He worked W9WCD and WA9HUV, both Illinois, for the first reported 1296 contacts between those states. K9AQP/1 is working toward 1296, with 16 watts output and a 4-foot dish.

VE2LI, Montreal, reports working K2YCO, Rochester, NY, on 1296 Oct. 20 and 21, with signals stronger (S7-8) the first night. This 250-mile path has been covered previously by VE2HW, but George, VE2LI, hopes that the repeat will encourage others in that direction to try 1296. Southwest, toward Rochester and Western NY, is the best path from Montreal. VE2LI has 70 to 100 watts output on 1296, feeding a 4-foot dish at 50 feet. His converter is the K6AXN design, with a transistor preamp using Japanese V776B transistors. An 8-foot dish is a winter project for VE2LI.

George emphasizes the worth of close observation of barometric pressure trends in looking for 1296 DX opportunities. Also, he observes that strong signals on 432 seem to be a must for a circuit to K2YCO. He and Chuck have tried 1296 several times when 432 was fairly good, and have heard nothing on the higher band. When 432 is really hot, 1296 is also good, in their experience. Using the same frequency source for both 432 and 1296 (or 144 and 1296) is also a great aid in spotting.

K2YCO is reported to have worked W8YIO, 350 miles, on Oct. 21. Is this a home-station best on 1296?

Paul, W4HHK, is pleased with NASA's confirmation of his Apollo 15 reception while the mission was circling the moon. The Apollo 15 crew signed the confirmation for 2200 MHz. W4HHK is now scheduling DJ4AU and DJ8QL. Germany, and F3FC, France, on 2304 moonbounce, as well as WA9HUV, near Chicago, on tropo-scatter, HB9RG was a recent visitor in the W4HHK shack. K2RIW, who has some excellent voice tapes of Astronaut Worden as evidence, also has official recognition from NASA. They paid him the high compliment of acknowledging that his best reception is considerably better than their poorest! □

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.

Silent Keys

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

W1A1Y, Alfred M Winchell, Wolcott, CT
 W1GDU/W1GE, Herbert A. Beering, West Roxbury, MA
 W1JRN, Morton B. Rowe, Needham, MA
 W1KJC, Luther Edward Allen, Sr., Deep River, CT
 W1LHR, Stephen S. Stefanowicz, So. Weymouth, MA
 W1RWV, Irving Fisher, West Hartford, CT
 W2AHC, Kenneth T. Hill, Bayside, NY
 W2DFG, Richard E. Hartman, Union, NJ
 W2DPS, Charles F. H. Miller, Utica, NY
 W2FYV, Frederick Maass, Oaklyn, NJ
 W2LGG, Joseph J. Kosina, Jamaica, NY
 W2NOL, Peter Tierney, Patchogue, NY
 W2SJR, Robert Connelly, Tuckerton, NJ
 W2ZYMP, John J. Wilker, Brooklyn, NY
 W3FD, James M. Tisdale, Chester, PA
 W3FXT, Frank M. Headman, Philadelphia, PA
 W3JDU, Lester N. Fettermen, Lewisberry, PA
 W3KSO, Elwood B. Smith, Secane, PA
 W3SOIS, Larry L. Gibble, Myerstown, PA
 W3PCP, Dan C. Yurcis, Timonium, MD
 W3TS, Joseph M. Cudrey, Baltimore, MD
 K3IYU, Charles L. Smith, Easton, PA
 K4EJ, Jay C. Merchant, Salem, VA
 W4GJL, Guernsey "Tip" Currau, Palm Beach, FL
 K4GT, Frank J. Shannon, Sr., Tampa, FL
 W4HFFV, Larry I. Inmon, Greensboro, NC
 W4LR, Delisle E. Heisler, Tampa, FL
 W4KX1, David R. Austin, Peachland, NC
 W4LFO, Cecil W. Guyatt, Richmond, VA
 W4PIV, Bruce O. Cline, Beechgrove, TN
 WA4QWQ, Eddie S. Corley, Greensboro, NC
 WB4RBV, James C. Baird, Dothan, AL
 K4RDT, James M. "Jim" Evans, Roanoke, VA
 WN4RHR, Charles L. Good, Kingsport, TN
 W5AL, Cecil E. Butcher, Denison, TX
 WN5CL, Elmer E. McDonald, Wichita Falls, TX
 W5CF, Robert E. Cowan, Sr., Ft. Worth, TX
 WA5GOF, Arthur B. Fowler, New Boston, TX
 W5IKR/KH6FRE, John H. Weaver, Oklahoma City, OK
 K5MDS, Hubert L. Jannet, San Antonio, TX
 W5OH, John L. Puckett, New Orleans, LA
 K5SPQ, Howard Black, San Antonio, TX
 W5TSC, Haydel J. Boudreaux, Thibodaux, LA
 WB6BZR, ex-W1QOL, Byron C. Grant, Anaheim, CA
 WN6CNI, Lloyd A. Milton, Lemon Grove, CA
 WA6DSX, George B. McConnell, Orangevale, CA
 WA6FHV, Marvin R. Clay, Morro Bay, CA
 W6LIP, Tim Huntley, Woodland Hills, CA
 W6MMW, Fred W. Itner, Van Nuys, CA
 K6OWP, Ernest H. S. Rees, Mission Viejo, CA
 W7BHA, George E. Itus, Renton, WA
 W7CRD, Eugene B. Bunker, Great Falls, MT
 W7HJM, Norman A. Welte, Hamilton, MT
 K7ZFR, Albert Jason, Whitefish, MT
 WA8YVW, Roy Sees, Jr., West Lafayette, OH
 W8DUH, Carroll L. Kinyon, Coldwater, MI
 W8BEQH, Ronald G. Ball, Shively, WV
 W8EOC, Allan H. Scherer, Abtson, MI
 W8GT, Carl W. Johnson, Ishpeming, MI
 K8GWV, Claude W. Basham, Peterstown, WV
 K8RDG, William J. Groves, Barberton, OH
 WA9LSE, Kenneth E. Boesen, Rock Falls, IL
 W9TE, Arthur L. Braun, Ft. Wayne, IN
 W9BMJ, Theodore L. Graffunder, Marshall, MN
 W9BMO, William H. Andersen, Grand Marais, MN
 W9FER, Rutus Evans, Hays, KS
 W9FNR, Charles V. Brown, Newton, IA
 W9GOK, Robert L. Bolling, Bellevue, WA
 VE3CHE, A. C. Jones, Brantford, ON
 VE3BK, H. W. Crowder, Windsor, ON
 VE7APH, A. C. H. Neufeld, Nelson, BC
 VE7BOF, Alexander W. Bell, Victoria, BC
 VK2AGH, Graham G. Hall, So. Hurstville, NSW
 VK2RA, Raymond A. Priddle, Wahroonga, NSW
 VK3AIC/W3MRW, James A. Niedeck, Melbourne, Australia



YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Time

WE IN amateur radio are more time conscious than most people. We have to be because of the regulations that rigidly govern our activity. But, as we record those required numerals that are just so many numbers on a sheet of paper to the casual eye, they mean just about all the definitions of that four-letter word that everyone uses so often — time.

There is the quick-time of contest operation when every minute counts, when we buck the flood of hundreds of voices and fists and dive in head first to check off contact after contact. Then we take time off to grab a fast bite to eat, and back into those pile-ups timing our call to catch a rare one. And then comes the happy time when we log out and gloat a little at the pages that mark the interim between starting and ending times.

There is the slow time of certificate hunting, the painstaking pursuit of an elusive contact that takes months to catch on the air, and the long impatient wait for the QSLs, and the seemingly endless wait between the mailing of the proof of qualification and the day the coveted certificate arrives. Even if the time were only a day, it would seem like years.

Leisure time would describe those ragchews that begin as contacts and so often grow into friendships, just long easy chats with a friend half a town or half a world away with no worry about the time involved. This is the relaxing time when we can log easily, jot down notes, and discuss common interests, families, preparations for guests, how we dread house cleaning, or what the kids have been up to. From these we log out with regret and are amazed that the time has passed so swiftly.

Time, to use a cliché, literally flies when we are building. It seems as if we have only sat down at

* YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, CA 91001.

the bench and suddenly it is time to pick up the kids after school, start dinner, or do the dozen things we'd planned before we gave in to the lure of the soldering iron.

There are the tight time schedules of nets or that daily contact when we must be on the air at a stated time. For the busy YL operator there is the planning of on-the-air time to fit into and between the household jobs and family responsibilities; the hurried time to rush through the dishes in the evening, to arrange activities so that she can meet her MARS and traffic net schedules on time.

Our language is loaded with the word as we talk of GMT, time constant, time sequence, and the date time groups of messages. We discuss signals from WWV, and we are careful about the length of transmissions to remain within the legal requirement. Add our daily habit of using the word to designate all types of activity, meals, seasons, emotions, work, and we find that we use the word more than almost any other.

The briefest time of all is exactly five anguished minutes that flash by with jet speed for all of us in the FCC offices when we face the big test. For each of us it is remembered as the shortest five minutes in radio. It is followed by two of the longest waits we will ever know, the moments between handing in our copy and the nod that we passed the code, and the eternity until the license arrives. When it does we might say with T. S. Eliot: "Indeed there is time to wonder do I dare disturb the universe?" and every amateur worth the name will answer the beginner, "The time is now!"

1972 YL-OM Contest Rules

Phone: Starts: Saturday, February 26, 1972, 1800 GMT; Ends: Sunday, February 27, 1972, 1800 GMT.

Cw: Starts: Saturday, March 11, 1972, 1800 GMT; Ends Sunday, March 12, 1972, 1800 GMT.

Rules

Eligibility: All licensed OM, YL, and XYL operators throughout the world are invited to participate.

Operation: All bands may be used. Crossband operation is not permitted. Net contacts do not count.

WNSLAI, Dorothy Morris, decided that after 33 years of exposure to amateur radio, and assisting OM WBJM, SCM W. Va. section, with many amateur functions her best defense was to join the party.





YL Forum participants at the Southwestern Division ARRL Convention, at the Disneyland Hotel, were: K6CAL, Isabel Paul; W8CBA, Violet Barrett; WA6LWE, Madge Mason; W6JCA, Betty Ekstrand; K6ELO, Roxanna Griggs; W6NAZ, Lenore Jensen; W6CEE, Vada Letcher; W6NLM, Beulah Barrick; W6JOJ, Verna Cobb; WA6FHH, Louise Klarer; W6TDL, Clara Dishong; W6PJU, Mildred Maxon; K6IHD, Gwen Rudolph; WA6ZPX, Marge Smothers; WA6QKC, Joann McDonell; W6VDP, Mary Savage; WB6SSZ, Mary Lou Stockstill; WA6ZTW, Evie Brightman; WA6ERS, Ruth Schneider; WB6QMD, Linda Sumida; WB6BBO, Louise Moreau; and Karen Bennett, wife of WN7QLH. (Photo courtesy K6LHA)

Procedure. OMs call "CQ YL." YLs call "CQ OM."

Exchange: QSO number, RS, or RST report, ARRL section, or country. Entries in log should show band worked at time of contact, time, date, transmitter, and power. (ARRL section list may be found on page 6 of *QST* magazine. Also available for s.a.s.e. from YLRL vice president.)

Scoring: (A) Phone and cw contacts will be scored as separate contests. Please submit separate logs. (B) One point is earned for each station worked. YL to OM, or OM to YL. (C) A station may be contacted no more than once in each contest for credit. (D) Multiply the number of QSOs by the number of different ARRL sections and/or countries worked. (E) Contestants running 150-watts input or less at all times may multiply the results of D by 1.25 (low-power multiplier). Ssb contestants running 300 watts PEP or less at all times may multiply the result of D by 1.25 (low-power multiplier).

Logs: Copies of all phone and cw logs showing claimed scores, and signed by the operator, must be postmarked no later than April 2, 1972, and received by the Contest Manager. (YLRL vice president) no later than April 22, 1972, or they will be disqualified. Please remember to file separate logs for each section of the contest. Send copies of logs to: Betty Marsh, KI7FJW, 2411 King Road, Fairbanks, AK 99701.

Awards: 1st place phone: YL - Cup; OM - Cup. 1st place cw: YL - Cup; OM - Cup. Second and third place winners in each contest will receive a certificate. The winner of the phone cup is also eligible for the cw cup. Certificates will be awarded to the high place phone and cw winners of each U.S., VE call district and country. No logs will be returned. Be sure the copy of your log is legible. Please note postmark deadline no later than April 2, 1972.

1972 SAROC Ladies: Program

The first activity of the new year will be the annual SAROC event at the Flamingo Hotel

Convention Center, Las Vegas, Nevada, January 6-9, 1972.

The YLRL will have a booth there again this year to celebrate the 33rd anniversary of the club. Other plans include a shopping tour, ladies' luncheon, a "crazy hat" judging, and program at the new Union Plaza Hotel on Saturday. There will be a special workshop in the Ladies' Hospitality Room on Thursday and Friday for any of the ladies who want to use the facilities to create a hat for the contest.

WIYL, First U.S. YL Suffix

The United States for the first time has awarded the call letters YL as a suffix to a woman radio amateur, when Ellen White, Deputy Communications Manager at the ARRL, received the call WIYL this year.

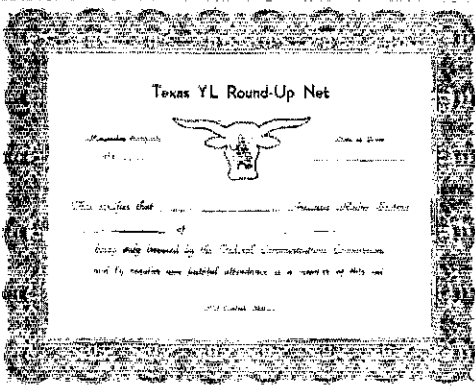
Ellen, who holds the Extra Class License, has held the calls W2RBU, KH6QI, W6YYM, and, until her present two-letter call, has been well known on the air as W1YYM.

Up to the present time the call YL has been issued only to stations in educational institutions and, occasionally, as a temporary call to be used at a YL convention.

CLARA Net Changes

Effective November 1, 1971, the CLARA net morning and evening sessions were combined into one session held Tuesday afternoons at 1900 GMT, on 14,160 MHz. CLARA business, traffic handling, DX-ing, and plain QSO-ing will be included in this session. Everyone is welcome to participate whether a member of CLARA or not.

For those who have written this column for information about YL Nets it is suggested that they check *QST*, April, 1971, "YL News and Views," for the list of nets. A current list is also to be found in the 1971 September-October "Directory Issue" of *YL Harmonics*, official publication of YLRL.



TYLRUN Net Certificate

TYLRUN

The Texas YL Round Up Net was organized in 1955, to foster, encourage, and advance amateur radio among women amateur radio operators. It is not a club, but a net.

TYLRUN meets on Thursdays at 8:00 A.M. EST, on 3,940 MHz. There is an additional meeting on the first Thursday of each month on 7,280 MHz, at 10:00 A.M. CST, after the earlier net session.

All YL radio amateur operators are welcome to join the net. A YL is qualified as a TYLRUN member after five consecutive check-ins, and payment of dues for a one-year period. YL visitors are welcome.

The TYLRUN YL-OM certificate is awarded for confirmed contacts with stations operated by licensed women amateur radio operators who are full members of the net. For complete rules contact the custodian, K5GBX.

The net also sponsors the YL-OM 1000 certificate awarded to YLs who submit proof of two-way contact with 1000 OM amateur operators. The custodian, W5RYX, will furnish full details for this certificate upon receipt of s.a.s.e.

VE3ASZ, Betty Peterson

Calling "CQ" on her cousin's rig resulted in a lot of contacts for him, and produced a "backlash," for Betty could call, but because she wasn't a licensed operator had to pass the mike over to VE3QF each time. So she acquired her first ticket in 1962, and recently qualified for advanced.

Betty Peterson, VE3ASZ, editor TOT Topics, the bulletin of the Ontario Trilliums.



A member of ARRL, Ontario Trilliums, CLARA, Scarboro ARC, Radio Society of Ontario. Betty has recently been appointed the new editor of TOT Topics, the club bulletin of the Ontario Trilliums. When she isn't wrapped up in getting the paper out on time, club duties, and occasional teaching, she may be found on 80, 40, or 20 meters working either cw, or ssb. Of all the many facets radio offers, Betty enjoys just plain ragchewing with friends she has met at conventions or on the air, more than anything else.

Betty and OM, Cliff, VE3AST, also enjoy the lapidary angle of rockhounding and have made lovely jade and tigereye jewelry as a result of their hobby.

When she isn't on the air, collecting rocks, or busy with their home, or clubwork, her hobby is horses, and riding English style.

Feedback

Error in the identification of two pictures in "YL News and Views," QST, October, 1971. The captions of the two DX YLs, EA8GZ and YV5CKR, have been reversed. 1057-1

RULES FOR LIFE MEMBERSHIP

1. A paid-up Life Membership in the League shall be available to any Full or Associate Member, other than a Family Member, upon payment of a fee twenty times the annual dues rate, and upon approval of the application by the League's Executive Committee.
2. The Life Membership fee for U.S. and Canadian applicants is currently \$130, and for other applicants is currently \$140.
3. An applicant may choose an alternative time-payment plan of 8 quarterly installments (\$16.25 each for U.S./Canadian applicants, \$17.50 each for other applicants). In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
4. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the installment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of \$2, but without receipt of QST. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
6. Life Membership is also available to blind amateurs upon payment of a fee of \$40, without the receipt of QST.

Operating Events

de W1YL

DECEMBER

4-5 Telephone Pioneers QSO Party, p. 105 Nov.

4-6 Indiana QSO Party, sponsored by the I.U.P.U.L. ARC, from 1900 GMT Dec. 4 to 0600 GMT Dec. 5, open to all. The same station may be worked on different modes/bands. Exchange QSO number, report and state/province/country (Ind. send county). Indiana stations may work other Indiana stations. Suggested frequencies: cw, 3535 7035 14035 21035 28035; phone, 3910 7265 14295 21395 28600 50400 kHz. Score one point per QSO and multiply by the number of states, provinces or countries. Non-Ind. stations use Ind. counties for Multiplier. Appropriate awards. Mailing deadline Dec. 31, send logs to the contest chairman, Thomas J. Thammann, WA9MXG, 5013 Nowland Ave., Indianapolis, Indiana 46201. For contest results, please include an s.a.s.e.

6-12 VBIASA, commemorating 70th anniversary of Marconi's transatlantic experiments, p. 105 Nov.

8 W6OWP Qualifying Run (W6ZKJ, alternate) at 0500 GMT on 3590/7129 kHz, 10-35 wpm. This is 2100 PST the night of Dec. 7. Underline contest minute of highest speed copied, certify copy made without aid and send to ARRL for grading.

11-12 Spanish Contest, R.I. QSO Party, p. 105 Nov. **100-Meter Contest**, p. 68 Nov.

14 WIAW Qualifying Run 10-35 wpm, at 0230 GMT on 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.588 MHz. This is 2130 EST the night of Dec. 13. 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.

18-20 National Award Hunters Club Contest, p. 105 Nov. **Delaware QSO Party**, sponsored by the Delaware ARC (W3SL1), from 2300 GMT Dec. 18 to 2300 GMT Dec. 19. There are no power restrictions and the contest is open to all amateurs. Stations may be worked on more than one band, but no credit for contacts with the same station using two modes on the same band. Exchange QSO number, report and county (for Del.) or state, province or country to others. Freqs: cw, 3560 7060 14060 21060 28060; phone, 3975 7275 14325 21425 28650; vhf, 50.50.4 and 144 MHz. Novice spots 3710 and 7170. Del. stations score 1 point per QSO and multiply the total by the number of states, VE provinces and countries. Outside stations score 5 points per Del. QSO and multiply by the number of Delaware Counties (a total of 3, New Castle, Kent and Sussex). Appropriate awards. In addition, a W-DEL certificate will be sent to any station working all 3 Del. counties. Party logs showing required date will be accepted in lieu of QSL's. Mailing deadline Jan. 1. Send entries to Mark Augusta WA3QV-A, 2119 Barr Road, Wilmington, Del. 19808. (Apply to this address for the W-DEL certificate, no fee but s.a.s.e. required.)

30 WIAW Morning Qualifying Run, 1400 GMT (this is 9 am EST). Same frequencies as well as additional details under the Dec. 14 listing.

31 Straight-Key Nite (SKN) starts at 8 pm your local time on New Year's Eve, ends 3 am local time on New Year's day. Rules require use of a straight key. Aim at 7030 and 3530 kHz, but spread out as necessary! Call SKN and ragchew. Following SKN, we'd like a list of the calls of the stations you worked plus your "vote" for the best straight-key fist heard that night. Reports must be at Hq. by Jan. 17, please. CU SKN!

JANUARY

6 W6OWP Qualifying Run.

8-9 VHF SS, rules this issue. **Hollywood ARC Operation's Day**, celebrating the first anniversary of the club call WB4TON, Operation from 1700 on Sat. to 2300 Sun. Check 3570 7070 14070 21070 28070 cw and 3930 7230 14330 21430 and 28530 ssb. Exchange RS(1) and state/province/country plus name of operator. Certificates for those working WB4TON both modes and those working WB4TON on 5 bands (any modes). Send s.a.s.e. along with your QSL and a list of all contacts made with WB4TON to W4OZB, contest chairman, 2311 West Nassau Drive, Miramar, Fla. 33023.

12 WIAW Qualifying Run.

15-17 CD Party cw. This is a quarterly event for all League appointees and officials (notified separately by bulletin). Check with your SCM, page 6, to see if you can qualify for an appointment.

22-24 CD Party phone, Arkansas QSO Party, sponsored by the North Arkansas AR Soc., Inc., starts 2200 GMT Jan. 22 and ends 0400 GMT Jan. 24. Ark. stations score 1 point per contact and multiply by the number of states/VE provinces and foreign countries worked. Outside stations score 5 points per Ark. QSO and multiply by the nr. of Ark. counties worked. Stations may be worked once per band/mode. Appropriate certificates. Suggested frequencies,

plus or minus 5 kHz; 3560 7060 14060 21060 28060, 2960 7260 14300 21360 28560, novice 3735 7175 21110. Send QSO number, report and county (for Ark.), state/province/country for others. Logs and scores must be postmarked no later than Feb. 21 and sent to the club c/o Don Banta, W4SZKE, Route 1, Green Forest, Arkansas 72638.

29-30 Simulated Emergency Test (full details to appear in the January issue). **French Contest cw**, 1400 Jan. 29 to 2200 Jan. 30. Phone section next month. Exchange RST and QSO number. Score 3 points per QSO (with F or DUF countries, only). Multiplier per band; one point for each different "department" (2 figures sent) and each different DUF country (using as additional multipliers HB cantons. ON provinces, 4U1, LX, 9Q, 9U and 9X). Scoring based on total points times band multipliers. Logs go to the REF, bvd, de Bercy 60,75, Paris 12, France.

FEBRUARY			MARCH		
2	W6OWP	Qualifying Run	2	W6OWP	Qualifying Run
5-6	DX	Competition phone (rules this issue).	4-5	DX	Competition phone.
10	WIAW	Qualifying Run	10	WIAW	Qualifying Run
12	WAZDNR	"Operation's Day."	11-12	YL/QM	Contest, cw.
13	Frequency	Measuring Test.	14-16	Old Old Times	QSO Party.
19-20	DX	Competition cw.	18-19	DX	Competition, cw.
26-27	YL/QM	Contest phone, French Contest, phone (see Jan. 29 listing).	27	WIAW	Morning Qualifying Run.
			JUNE		
			24-25	Field	Day. <input type="checkbox"/>

Hamfest Calendar

DECEMBER

1971

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Michigan - The Lawrence Institute of Technology ARC Fifth Annual Swap and Shop is on Sunday, December 5, at the L.I.T. Campus located at Northwestern Highway (I-696) and Ten Mile Road in Southfield from 10 A.M. to 3 P.M. Donation is \$1. Tables and food will be available. For more information write to L.I.T. Ham Club, 21000 W. Ten Mile Road, Southfield, MI 48075.

Ohio - Auction and Flea Market: Massillon ARC, Friday, December 3, Amherst Park Shopping Center, 1527 Amherst NE, Massillon. Flea market, 6:30 P.M.; auction starts 7:30 P.M. Free details and map obtainable from W8YHU, Box 8711, Canton, OH 44711.

COMING A.R.R.L. CONVENTIONS

January 22-23 - Southeastern Division, Miami, Florida

March 17-18 - Great Lakes Division, Muskegon, Michigan

July 1-2 - West Virginia State, Jackson's Mill

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.

Operating News

GEORGE HART, WINJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.
ROBERT L. WHITE, W1CW; DXCC
GERALD PINARD, *Training Aids*
ALBERT M. NOONE, WA1KQM; *Contests*

WIAW Code Practice. This is one of the most popular of the League's on-the-air programs — some say *the* most popular. Nearly every day brings letters thanking us for the code practice, complaining bitterly about "deliberate" QRM, telling us that without WIAW the novice, general or extra class license would never have been achieved, or making suggestions for improvements. The cries of "keep it up" and "More! More!" are many. A number of telephone inquiries from League members have also indicated that many are not completely aware of the code practice schedule, which is, some have said, too complicated.

Complications always arise when you try to please everybody, and this is what we always try to do. It's impossible, of course, but the aim is to comply with whatever requests are feasible and will serve the greatest number of amateurs or would-be amateurs. Those boning for an amateur license or upgrading of same naturally would like to have WIAW sending code practice 24 hours a day — in fact, one even suggested this, that a separate station be established and operated around the clock with nothing but code practice. The audience drops off sharply above about 25 wpm, since no license at present requires this codespeed and the number of those who copy code for the love of it seems to have diminished.

At present, WIAW transmits code practice simultaneously on eight amateur bands three times each day, Monday thru Friday local Eastern Time, and twice on each weekend day, for a total of approximately 2½ hours each day. Look for us 20 kHz inside the low end of most cw bands. One session is in the morning, one in early evening, one in mid-evening — speaking in eastern terms, of course, although the times are not designed to serve eastern listeners alone. (The GMT times are 0030, 0230 and 1400, the latter session being omitted on weekends. During "daylight saving" time periods all these transmissions are an hour earlier, although in most places the *clock* time remains the same. What makes the schedule seem

so complicated is the differences in local times and the need for serving so many different speed requirements. The chart elsewhere on these pages is intended to simplify the code practice schedule.

Speaking of speed requirements, listeners to the WIAW code practice are sometimes "thrown" by the change in tempo between 10 and 13 wpm. What brings this about is the fact that at 5, 7½ and 10 wpm the characters themselves are sent at a speed of 16 wpm, with spacing between them sufficient to bring the resultant speed down to 5, 7½ or 10 as the case may be. Both practical and mechanical considerations are involved, but the real reason for this procedure is to prevent beginners from learning the code by counting "dots" and "dashes." At the slower speeds, if sent with normal spacing, this is readily possible, and it's not a good way to learn. In fact, if you learn this way your progress terminates at that speed at which you can no longer count — usually about ten wpm, although it varies with individuals. Then you have to start over again, learning by *sound*. So we use 16 wpm to make sure that no one (well, hardly anyone) can identify characters by counting, and therefore must identify them by sound.

When the speed shifts from 10 to 13 wpm, normal spacing is used between characters, and the actual speed at which the characters are transmitted is slower than at the three lower speeds. This is what causes some difficulty in making the transition from exaggerated to normal spacing. But FCC transmits the 13 wpm code test at normal speed, so this is the point at which WIAW reverts to normal in its practice. Once you have mastered the change in spacing and speed which makes 13 wpm sound so different at first, you're all set. Having learned to recognize characters instantly by their sound, all you need is practice to increase your speed to 15, 18 (all bulletins are transmitted at this speed), 20 and as far above this as you care to go.

Meet Your SCM

One of the liveliest SCMs you'll ever meet is Hawaii's Lee Wical, KH6BZF. SCM (since 1963), this ARRL Life Member also finds time for just about every kind of club, contest and DX activity. Lee was first licensed in 1955 and finds particular pleasure in promoting person-to-person contacts with foreign amateurs. He holds a number of ARRL appointments and is active in the Intruder Watch. His job as senior circuit engineer for the Defense Communications Agency keeps him on the move throughout the Pacific. During this particular holiday season you're apt to hear KH6BZF on phone with a *Mele Kalikimaka* along with his sincere *aloha*.



QST for

WIAW FALL-WINTER SCHEDULE (Oct. 31, 1971-April 30, 1972)

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. 25, Dec. 24-25, Dec. 31, 1971; Jan. 1, Feb. 21, Mar. 31, 1972. 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 ^a		
0030	←	CODE PRACTICE DAILY ¹ 10-13-15 wpm					→
0100		←	CW BULLETIN ¹				
0120-0130 ^d			3.7 Novice ^b	14.020	7.020	7.15 Novice ^b	3.520
0130-0200			3.7 Novice ^b	14.100	7.080	7.15 Novice ^b	3.555
0200		←	PHONE BULLETIN ²				→
0205-0230 ^d			3.820	30.120	145.588	1.820	21.270
0230	←	CODE PRACTICE DAILY ¹ (35-15 wpm TThSat, 5-25 wpm MWFSn)					→
0330-0400 ^d			3.535		1.805		3.555
0400	RTTY Bulletin ^a	←	RTTY BULLETIN ^a				→
0430	Phone Bulletin ^a	←	PHONE BULLETIN ^a				→
0435-0500 ^d			7.220	3.820	7.220	3.820	7.220
0500	CW Bulletin ¹	←	CW BULLETIN ¹				→
0520-0530 ^d			3.7 Novice ^b	7.020	3.945	7.15 Novice ^b	3.520
0530-0600			3.7 Novice ^b	7.090	3.945	7.15 Novice ^b	3.555
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		14.280	14.050	14.280	14.050	14.280	
2000-2100		7.080	7.255	14.095 RTTY ⁹	7.255	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 ¹	7.150 Novice	21.125 Novice ¹	7.150 Novice	
2230			RTTY Bulletin ^a		RTTY Bulletin ^a		
2300		CPN ⁶	7.095 RTTY ¹	3.625 RTTY	14.095 RTTY ¹	CPN ⁶	
2345			CN ⁹		CN ⁹		

¹ CW Bulletins (18 wpm) and code practice on 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.588 MHz.

² Phone Bulletins on 1.82 3.82 7.22 14.22 21.27 28.52 50.12 and 145.588 MHz.

³ RTTY Bulletins sent at 850-Hertz shift, repeated with 170-Hertz shift; frequencies 3.625 7.095 14.095 21.095 and 28.095 MHz.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ WIAW will tune the indicated bands for novice calls, returning the call on the frequency on which called.

⁶ Participation in section traffic nets.

⁷ Operation will be on one of the following frequencies: 21.02, 21.08, 28.02 MHz.

⁸ Operation will be on one of the following frequencies: 21.270, 21.410, 28.520 MHz.

Maintenance Staff: Wis QIS WPR YNC.

WIAW CODE PRACTICE

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.488 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
5-7 1/2-10-13-20-25	9:30 PM EST SnTThS 6:30 PM PST	0230 MWFSn
5-7 1/2-10-13-20-25	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 permit improving your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and QST practice text (from the issue 2 months previous) to be sent in the 0230 GMT practice on the following dates.

- Dec. 8: It Seems to Us
- Dec. 12: Correspondence
- Dec. 18: League Lines
- Dec. 28: ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio*, First Edition.

- Jan. 5: Modulators and Speech Amplifiers, p. 236
- Jan. 10: Building Speech-Amplifier Modulators, p. 238

Do You Know How to Operate? An editorial by W5JJ in *Collector and Emitter*, bulletin of the Aeronautical Center Amateur Radio Club of Oklahoma City, asks this question and provides some food for thought in fabricating an answer devoid of consideration of how much or what kind of equipment you own and FCC regulations. "Let's," says Carl, "just consider what it takes to put your station on the air in a manner that

doesn't leave you just a bit ashamed of what you've done."

How long it takes to put a ready-to-go signal on a certain frequency "varies inversely (according to W5JJ) with the extent of gray matter between the ears of the operator. Anyone requiring over ten seconds should give serious consideration to surrendering his amateur license and retreating to the Citizens Band."

ARRL AFFILIATED CLUB HONOR ROLL

In these days of raising requirements in one place and lowering them in another, the affiliated club that can maintain its ARRL membership at 100% deserves some special recognition. Headquarters bestows such recognition twice a year in the form of an honorary listing in *QST* and a special certificate.

Each year, as annual affiliated club questionnaires are received, those showing that all their members are also ARRL members are noted and put aside for this special honor. The list below are clubs who are 100% ARRL according to questionnaires so far received. If your club is 100% ARRL, is not listed below and was not listed in June *QST* (p. 10n), it means we did not receive your 1971 questionnaire form. Be sure to complete your 1972 questionnaire when received with the January Affiliated Club Bulletin. Ladies and gentlemen, our Affiliated Club Honor Roll!

Arcatautical Center ARC; Oklahoma City, Okla.
 Amateur Radio Tech. Soc. of St. Louis; St. Charles, Mo.
 Anderson Radio Club; Anderson, S.C.
 Handhoppers RC; Ferguson, Mo.
 Binghamton AR Assn.; Binghamton, N.Y.
 Bronx AR Telephone Org.; Bronx, N.Y.
 Central Kansas ARC, Inc.; Salina, Kas.
 Daviding Ridge ARC; Carrollton, Pa.
 East Kootenay ARC; Cranbrook, B.C., Canada
 Earl Hays QSO'ers; Hays, Kas.
 Fountain City RC; Knoxville, Tenn.
 Friendship AR; Jessup, Md.
 Golden Triangle DX Club; Harbor Hills, Largo, Fla.
 Kings County RC; Brooklyn, N.Y.
 Long Island DX Assn.; Freeport, N.Y.
 Miami Valley AR Contest Soc.; Kettering, Ohio
 Minnesota Wireless Assn.; Long Lake, Minn.
 North Alabama DX Club; Huntsville, Ala.
 North Augusta-Bulverde RC; Augusta, Ga.
 North Jersey DX Assn.; Paramus, N.J.
 128 Contest Club; Merrimack, N.H.
 Radio Amateur Transmitting Soc.; Nashville, Tenn.
 Radions; Canastota, N.Y.
 St. Louis ARC, Inc.; Glendale, Mo.
 St. Mary's County AR Assn.; Hollywood, Md.
 San Diego DX Club; El Caim, Calif.
 Sarasota AR Assn.; Sarasota, Fla.
 Seabrook ARC; West Hill, Ontario, Canada
 So. Cal. VHF RC; The San Pedro, Cal.
 Triangle ARC; Durham, N.C.
 Wichita ARC, Inc.; Wichita, Kas.
 Worthington ARC; Worthington, Minn.

Carl then goes on to describe the procedure by which a "complex" operator would go about it. How does this compare with *your* procedure, OM? "First he'd set his dials to the approximate positions, basing this on previous deliberate operations. Then he'd switch to his dummy antenna, completely tune his transmitter, adjust his external antenna matching network to the previously noted and logged approximate settings needed to present a 52-ohm nonreactive load to his transmitter, then switch to the 'live' antenna. He'd be on frequency, properly tuned, properly loaded - a clean, ethical bit of operation." *WINJM*.

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 (Canadian Advanced Amateur Certificate) or higher 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 assure a valid petition.

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)
 222 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, WINJM, Communications Manager

Section	Closing Date	Current SCM	Present Term Ends
S.N.J.	12/10/71	C.E. Travers, W2YPZ	2/4/72
VI	1/10/72	T.H.A. Preston, W1VSA	10/17/71
Ind.	1/10/72	W.C. Johnson, W9BUQ	1/11/71
S.C.	1/10/72	R.S. McFargart, K6ZRM	5/10/72
Cal.	1/10/72	A.J. Garrison, W4WQU	5/26/72
Ohio	1/10/72	R.A. Eybert, W8FTU	3/28/72
Conn.	2/10/72	J.H. McNessor, W1GVT	1/11/72
Ont.	3/10/72	B.H. Shepherd, VE3JW	5/11/72
Mich.	5/10/72	V.L. Cushman, K8OAT	5/29/72

Closing 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.

Cal.	J.L. McMillen, KZ5ZZ	9/10/71
Montme	W.D. Jones, VE1AMR	9/10/71
N.C.	C.H. Dryden, W4WXZ	9/13/71
Del.	R.E. Cole, W4BRK	10/10/71
Ka.	J.B. Johnson, K1AAV	10/12/71
S.Dak.	C.C. Gray, W4GPK	1/11/71
Orange	H.C. Dorfert, W8MNY	1/10/71
Hawaii	L.H. Wical, KH6RF	1/11/71
Fla.	R.K. Kramer, W4LE	1/28/71
Okla.	C.C. Cash, W5PML	12/11/71
Ill.	R.A. Metzger, W9PRN	12/18/71

Reminders: Dec. 8, W6OWP Qualifying Run; Dec. 11-12, ARRL 160-Meter Contest (hope you have your entry forms in hand!); Dec. 14, W1AW Qualifying Run; Dec. 30, W1AW morning Qualifying Run; Dec. 31, Straight-Key Nite. By now you should have also placed your request for VHF SS logs for the Jan. 8-9 event.

CLUB COUNCILS AND FEDERATIONS

Amateur Radio Council of Arizona, Inc., Mr. Jim Sublett, WNTOKL, Secy., 605 E. Balboa, Tempe, Ariz. 85281.
 British Columbia Amateur Radio Assn., Mr. Leon Raitner, VE7MI, Secy., 8772 SW Marine Drive, Vancouver, B.C., Canada.
 Canadian Amateur Radio Federation, Mr. K. Robison, VE4RI, Secy., 53 Westglen Cres., Kingston, Ont., Canada.
 Central California Radio Council, Mr. Hensley "John" Morehen, WA6DH, Secy., 81 Clebto Drive, San Francisco, Calif. 94134.
 Council of Connecticut Amateur Radio Clubs, Mr. James W. Parker, K1VII, Secy., 17 West Main Street, Niantic, Conn. 06357.
 Federation of Eastern Massachusetts Amateur Radio Associations, Mr. Eugene H. Hastings, W1VRK, Secy., 28 Forest Avenue, Swampscott, Mass. 01907.
 Foundation for Amateur Radio, Ethel Smith, K4LMB, Secy., 2017 Rockingham Street, McLean, Virginia 22101.
 Ohio Council of Amateur Radio Clubs, Mr. James W. Benson, W8QUD, Secy., 2463 Kingspath Drive, Cincinnati, Ohio 45231.
 Puget Sound Council of Amateur Radio Clubs, Mr. Jerry Selgman, W7BUN, Secy., 12306 80th Avenue, East Puyallup, Washington 98371.
 Hudson AR Council, Inc., Mr. Stan Zak, K2SJO, Secy., 13 Jennifer Ln., Port Chester, NY 10573.

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Back copies of *QST* referred to in *QST* issues are available when in print from our Circulation Department. Please send money order or check - 75¢ for each copy - with your order. We cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (only) can be furnished at \$2.00 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order - we do not bill or ship c.o.d.

Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless specifically mentioned in the article.

WB4KWT	VE55C	W6RXW	4X4KM	144	K381P	PY3DRP	12R	KR8BU	W4UJ	JA4DWC	CP1GF
W61TD	W2ELW	WA6G0I		146	K3LXY	SP5BAJ	K4FC1	OK3CU	WA47WX	OKNSGT	DJ4AV
169	W2MU	WR6FR	152	DL8XA	K4LYY	UB5KLD	OK30T	OK30T	WA4DGU	PY2LWZ	DJ6VY
ES0YG	W3NM	WA7CGR	DI60Z	K2P1U	K4FN	WB2SI Q	WA2MID	PJ2AR	WB4FJ	SP3AUC	DJ9L1
OH6NH	WA3UFW	WA7FFS	DI8EQ	W11AA	K4MRZ	W3YU	W4VE	SP18QD	WB40N	VF1RHZ	DL1YB
VE1GHL	W0CWS	WR8JF	DI8TG	W11ZJ	K4JAJ	W51JW	WB4FOD	W1YK	WB45PG	WB1UT	DL7DO
WDAL	WR8XO	WR8XO	K9MMH	WA1CQW	K5WJG	WB5JW	W6WQD	W3JZ1/S	W3JZ1/S	W8WTA	DL9KM
W3ML	W91PZ	W91PZ	QH2BCV	WA5W0F	K6MG	WB8GR	W6WGF	W3BZN	WA50NV	WA50NV	G3JFC
W4RKT	W91L	ON5AK	WB6KH	WB6KH	E7AHO	WB91B	W7HLU	W4DWK	WA55UE	WA55UE	GM3UC
WA9FCG	I61	W9PC	W9PGD	WA9LZY	K8NOJ	K9WB	YU2DI	W4LXK	WA5YGV	113	HR2GC
YU4HA	DI7HT	W9RCZ	W9S2K					WA5DGS	W64GX	DL40F	JX30J
	DL9XX	WA9QAI	WA8SNA	143	K0CML	DL7BJ	127	WB6UX	WA6TAX	LABE1	S6UTW
168	E5WV	WA9TBA	W08AS	145	K1ASJ	K0ZUL	DJ4OI	WB6ONX	W7FTM	JA2DXZ	K8WTF
13ECF	ICXZ	WA9YLE			K1LXP	K6PAGQ	G3HDB	WA0UAV	WA7CWM	JARAUS	K0MCD
JA4DGG	IP1CT	W0DIA	151	P40RB	K6PDCR	KP4DW	W6RO	K0ONU	WA7ICB	K1DPB	OH5VS
K3AMI	JA8ON	W0GKS	DL4VI	W1ZJJ	KP4DW	KP4DW	WA8LVH	VE3GHZ	WA7K1F	OD5AF	PA0AB
K6UWD	K9GZS	WA0PRS	DL4V	W3ZGDN	KR6KQ	KR6KQ	W1DRN/P	WA8PRR	WB1R1	PA0IWA	UQ1GW
	K0PZD	WA0VYI	JA4FM	WA4SPC	KZ5TK	KZ5TK	W491VF	W0BHC	W8DKL	WB2VXN	UW3EC
	K9ZXE	YU2ACD	JA6ANT	E7E1F	LA8TK	LA8TK	WA0YAW	W0CYY	WB0EM	WA3NNA	VE1AMJ
167	OK1AOR	YU2IA	HHHVN	W9H1	OH71U	OH71U		K3RDT	WB1M1	W0KH	VE3HD
K0EA	GZ2NU		SM7CGY	W9ZFN	PY40G	PY40G	137	K9BIV	WBKYD	WB0JDU	Y01DF
WA1ANR	AZSVT	159	UW9WB		PY3AMB	PY3AMB	OWWKE	KZ5L	WB0VQ	WB0VQ	WB2TFC
W2QHP	SP6AFG	DI4JL	WA2HCL	142	SMSAQZ	SMSAQZ		K25B	WA8XU	WA8XU	WB3H1
WA4VU	WIARR	DI8Y1	W4IA	DI4E1	SM0BTS	SM0BTS	136	K25L	WA81OP	WA81OP	WB4MAI
WA5LMG	W1LMZ	DI9KH	W6ONG	DK4CT	DA6BT	DA6BT	136	K25L	WA81OP	WA81OP	WB4MAI
W6ZYC	WA11DA	ERVO	WA0WZ	IA1KYV	DL8LS	DL8LS	136	K25L	WA81OP	WA81OP	WB4MAI
	W2HWA	K3DGC	ZP9AY	E4KA	YB1ZT	YB1ZT		W99WB	WB8XU	WB8XU	WB60L2
166	WB2DIM	HB9AW	150	K4LRL	YL3CO	YL3CO	135	W1ND	WA9UW	WA9UW	W87V1
D9AJ	W3RZ	K3PDI	ZF0	YL3ZR	YV2RIQ	YV2RIQ		W1ND	WA9UW	WA9UW	W87V1
IYU	W6SO	K4PLK	DLPHI	SM5ZJ	W1HM	W1HM		W1ND	WA9UW	WA9UW	W87V1
SM5U	W6SPGK	OH1NY	P6KAW	DL2LS	W1HV	W1HV		W1ND	WA9UW	WA9UW	W87V1
WASHS	W7FOI	SM0BWM	ICNL	VI6ARG	WA1YC	WA1YC		W1ND	WA9UW	WA9UW	W87V1
165	WA0BU	W7KI	W1BSN	JA1AKH	WA1JL	WA1JL		W1ND	WA9UW	WA9UW	W87V1
K2IKR	WA0BU	W3DNI	W3DNI	JA1KRN	R2CGW	R2CGW		W1ND	WA9UW	WA9UW	W87V1
K4VZL	YU3PQ	W4NG	W4NG	K4PPI	WB2DRK	WB2DRK		W1ND	WA9UW	WA9UW	W87V1
K8YDR	W6BXX	WA4CZM	OH2NU	WB2NDS	W251G	W251G		W1ND	WA9UW	WA9UW	W87V1
K84DS		WA5QJF	V3P9K	W3PHI	F3VNW2	F3VNW2		W1ND	WA9UW	WA9UW	W87V1
OH9P	DI1OI	W6SS1A	W1JN	W4CJW	WA2ARM	WA2ARM		W1ND	WA9UW	WA9UW	W87V1
VE2BPN	ELBZB	W6KCI	WA2YDA	W4HU	WA2J0F	WA2J0F		W1ND	WA9UW	WA9UW	W87V1
WA1FBX	G3UZZ	W81KM	BR2JYM	W4VZL	W4VZL	W4VZL		W1ND	WA9UW	WA9UW	W87V1
W4GFO	H8ZLF	WA8WMI	W344	W44DM	WB2NLM	WB2NLM		W1ND	WA9UW	WA9UW	W87V1
WA4LCO	K2BHI	W0NAR	W0NAR	W41KO	W6OXS	W6OXS		W1ND	WA9UW	WA9UW	W87V1
W0H1	K2JTF	ZL1DS	WA9YZN	W41YH	W71VH	W71VH		W1ND	WA9UW	WA9UW	W87V1
	K3YKA		W4KLA	W8DOI	W90YJ	W90YJ		W1ND	WA9UW	WA9UW	W87V1
	K3YKA		W4KLA	WA9FWY				W1ND	WA9UW	WA9UW	W87V1
164	HASDA	K4LDR	158	149	147	147		W1ND	WA9UW	WA9UW	W87V1
JA0GRF	K4GRF	K4NI	DX9HI	13KW	147	147		W1ND	WA9UW	WA9UW	W87V1
K3JYZ	K5MYI	K6AJ	EA90I	G3COE	DI3YU	DI3YU		W1ND	WA9UW	WA9UW	W87V1
PY2YC	K6AJ	K6MP	VE3PAA	VE3PAA	DL2GV	DL2GV		W1ND	WA9UW	WA9UW	W87V1
W2EG1	K6MP	K6MT	VE3ZZ	IA0WF	DL5OO	DL5OO		W1ND	WA9UW	WA9UW	W87V1
WA2BHI	K6MT	K6TWT	WA3CFA	PY4ABH	UW3TN	UW3TN		W1ND	WA9UW	WA9UW	W87V1
W3GHD	K6TWT	K6TWT	W4DMS	WB4HIN	E671D	E671D		W1ND	WA9UW	WA9UW	W87V1
W3YX	K4ULE/6				G3ISX	G3ISX		W1ND	WA9UW	WA9UW	W87V1
W55MW	K8LSL	157			J4FLRB	W5NR1		W1ND	WA9UW	WA9UW	W87V1
W6CUM	K9LH	DI0WV	148	148	IATMUZ	W5Z1B		W1ND	WA9UW	WA9UW	W87V1
W8YFW	K9ZPJ	K4ZA	K6BR	JA3BP	JA3BP	JA3BP		W1ND	WA9UW	WA9UW	W87V1
W9AEM	K0HR	DL3MAG	SM2JBI	I48KB	W6CZP	W6CZP		W1ND	WA9UW	WA9UW	W87V1
WA9S1U	LA8CJ	PY2DRU	W3CGJ	K2BLG	W6GMA	W6GMA		W1ND	WA9UW	WA9UW	W87V1
W0YJE	DL3HOW	W20ZY	W550FQ	K4NT	WA6C3H	WA6C3H		W1ND	WA9UW	WA9UW	W87V1
	P1ZPS	W6WVD	WBK7G	E47BN	W6G11	W6G11		W1ND	WA9UW	WA9UW	W87V1
	PY2PH	W5HF	WA0FTC	K6KUK	WA6G0R	WA6G0R		W1ND	WA9UW	WA9UW	W87V1
	SM6CZU		Z56AJQ	K6NL	WA6NK	WA6NK		W1ND	WA9UW	WA9UW	W87V1
	SP8ABO	156			W6V2I	W6V2I		W1ND	WA9UW	WA9UW	W87V1
OK1HP	SP8R	JA1KZD	147	147	UA3GO	WB6WV		W1ND	WA9UW	WA9UW	W87V1
DL9OP	K2LQJ/TF	ER8ZG	DL8RC	VE1AI	WB6WV	WB6WV		W1ND	WA9UW	WA9UW	W87V1
K19YC	VE3PN	K9YRT	K4HK	VE10U	WB6WV	WB6WV		W1ND	WA9UW	WA9UW	W87V1
K1ZND	VL3XQ	YU2VZJ	K7CT	W1AGA	W7EXM	W7EXM		W1ND	WA9UW	WA9UW	W87V1
K4BV/D6	W1EQV	WA8TNG	K7HYR	W2COT	W77CT	W77CT		W1ND	WA9UW	WA9UW	W87V1
K0P11	W1HTT		U1SKTH	WA2DZH	WA7MLK	WA7MLK		W1ND	WA9UW	WA9UW	W87V1
KRRDF	W1PLG	155	UW9QV	WA2LQZ	WB8AA	WB8AA		W1ND	WA9UW	WA9UW	W87V1
UA9AB	W1STW	DI8LU	WAKTYF	WB70T	W8KOS	W8KOS		W1ND	WA9UW	WA9UW	W87V1
K1C1W	W2AQT	DK3SD		WA3FH	WB9QJ	WB9QJ		W1ND	WA9UW	WA9UW	W87V1
W2D1Y	W2FCR	HB9AOU	146	146	WB4LXF	W8RXC		W1ND	WA9UW	WA9UW	W87V1
W2NMJ	W2NYU	WA3DI V	ICPD	W6MP	W6MP	W6MP		W1ND	WA9UW	WA9UW	W87V1
WA2EBJ	W2RSO	W6RWP	W1BQL	W6CMX	W9H1F	W9H1F		W1ND	WA9UW	WA9UW	W87V1
W6P1T	W2SE	W6W1Y	W1PL	W710	W9H1U	W9H1U		W1ND	WA9UW	WA9UW	W87V1
W7DYQ	WA2BHK	W0MNR	WA3DWF	W9R	W9R	W9R		W1ND	WA9UW	WA9UW	W87V1
W7ET	WA2SDH		W3YT	W0NZY	W0NZY	W0NZY		W1ND	WA9UW	WA9UW	W87V1
WA8RXX	WA2VSO	154		WA0VKI	WA95MM	WA95MM		W1ND	WA9UW	WA9UW	W87V1
	WR2VET	C1TBB	5A1LY	ZC4CM	WA9VY	WA9VY		W1ND	WA9UW	WA9UW	W87V1
	W3MNE	LA4LG						W1ND	WA9UW	WA9UW	W87V1
162	DL7NS	W3NNX	145	145	DL8DC	DL8DC		W1ND	WA9UW	WA9UW	W87V1
DL80H	W3SDY	DL1KPG	DL9ND	DL9ND	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
HB9ZV	W3YHR	153			DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
JA110N	W4HE	DL9SAE1	DL8AA	VE13U	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
K4ORQ	W4LXA	JA1LGB	SP9YP	G3FVW	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
K4TJW	W4MGL	E4M1S	VE1CJF	HH9DL	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
K6KGP	W4PVB	PY1MC7	W3U1	HBK1	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
K6ZMZ	WA4FZA	PY2DGB	W6YRA	JH1WTX	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
K8AVR	WB4MKR	VF7HQ	WA4JIR/6	K1WJB	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
OZ8JD	W0H1B	W81H	W91A	K1WJB	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1
UA41N	W601U	W911Q	YU2OB	K21WV	DI9WD	DI9WD		W1ND	WA9UW	WA9UW	W87V1

W0PGI XEIFE YV5BBU ZL30Y	K3HHY K4GXO W6QOG W6RCD	W0MYN WA0KDI	274 JA1BWT W2SIC W8GUZ W8MB W9MWO	K3PDC W43IUV WA9IVL YV5CIL	5Z4KL 6Y5DW	XE2IH 240 11ANE 11BUP K2AB K4BKF K4VKB OF3WBW W1BAB W1COA W1WKO 224 K4SKI K4TTA W8LAX W6CDJ W7GOC W7MVC W8PFG W9KXK 9K1DY	W8JXM 217 F5RV 11ZPT JA3RQ	W2WNW WB2MWW W5KGJ WA4LMD WB6WV WA8OSE W9DDL W9DF ZP5GS	196 H9BMD 11C7L K2JUNY	WB2GQK W8SH W9WCE			
304 G3JEC SMAZU W4QBK W6ZKM W9TKD	293 DL1JW 119GAI JA6AD K4HJF SMSFC W1CGX W21XE W8ZOK	284 DL7FN K3GKU W3DRD W9BGX	273 DL1MD 11Z5Q JA1OCA W4TRG	261 110PN FO0BS JA1BN K1QMV K4SPX OF3SAA VF3OD W1HOO W5EDX W6JKJ W6ZC W0BL YV4QQ	251 CR6CA CX2CN DL6KG EA8GZ K6BTT OARV PY1MB VE3DBT W2ESC W82FMK WB2ZVW WB4BAP W6CDJ W7GOC W7MVC W8PFG W9KXK 9K1DY	225 111PL ON4PL PA0DFC PA0XPQ W1HFN W4LXL	217 F5RV 11ZPT JA3RQ	W2WNW WB2MWW W5KGJ WA4LMD WB6WV WA8OSE W9DDL W9DF ZP5GS	196 H9BMD 11C7L K2JUNY	WB2GQK W8SH W9WCE			
303 K5OHS W4PJG	292 11LAG JA8ADQ K2ISF O4AOS PY3APH W1JMT W6KNY 6W8DY	284 DL7FN K3GKU W3DRD W9BGX	273 DL1MD 11Z5Q JA1OCA W4TRG	261 110PN FO0BS JA1BN K1QMV K4SPX OF3SAA VF3OD W1HOO W5EDX W6JKJ W6ZC W0BL YV4QQ	251 CR6CA CX2CN DL6KG EA8GZ K6BTT OARV PY1MB VE3DBT W2ESC W82FMK WB2ZVW WB4BAP W6CDJ W7GOC W7MVC W8PFG W9KXK 9K1DY	225 111PL ON4PL PA0DFC PA0XPQ W1HFN W4LXL	217 F5RV 11ZPT JA3RQ	W2WNW WB2MWW W5KGJ WA4LMD WB6WV WA8OSE W9DDL W9DF ZP5GS	196 H9BMD 11C7L K2JUNY	WB2GQK W8SH W9WCE			
302 HR1KAS JA4BJO K8LSG SMS5H YV4IQ	292 11LAG JA8ADQ K2ISF O4AOS PY3APH W1JMT W6KNY 6W8DY	284 DL7FN K3GKU W3DRD W9BGX	273 DL1MD 11Z5Q JA1OCA W4TRG	261 110PN FO0BS JA1BN K1QMV K4SPX OF3SAA VF3OD W1HOO W5EDX W6JKJ W6ZC W0BL YV4QQ	251 CR6CA CX2CN DL6KG EA8GZ K6BTT OARV PY1MB VE3DBT W2ESC W82FMK WB2ZVW WB4BAP W6CDJ W7GOC W7MVC W8PFG W9KXK 9K1DY	225 111PL ON4PL PA0DFC PA0XPQ W1HFN W4LXL	217 F5RV 11ZPT JA3RQ	W2WNW WB2MWW W5KGJ WA4LMD WB6WV WA8OSE W9DDL W9DF ZP5GS	196 H9BMD 11C7L K2JUNY	WB2GQK W8SH W9WCE			
301 G3NLY HAT 11LLZ ON4SZ W4F1U W51PH W51ZL W6KNH W6KZS W6WNZ W9HPS	291 11KN K4OEL K0BUR OZ3Y W1FXD WB2UKP W4AOU W4F0 WA4MUB WA6AHF W6GBF W9QLD W9ZRX	282 PY3APH JA1HBX K91KA W43HUP W5OKZ W8GHN W81O XE3EB	270 DK1BI F5JA F8CV F8CV G5AFA H5CA K1UDP K2QOU OK1MP VF3AAZ W2GRY W4RRF WA6BA WA6EPO W81UZ Z13ON	260 C11HF DL8NU L9MD HK3WO 11YRK K2BKS K9WFH VF3VU VE7SB W1HGA W2CJ W3COR W3CO W3PN W43HCV WA4GJK W56DR W7DOM W7EPA W9WKU 5H3LV	239 K4DJC K94COB K93BAD W1EJ W4WVF ZL1ARY Z12ACP	222 DL5GJ K9CUY W4PLM W6HBR WA9UGI WA9UMH	211 F3KE W3KEK W4PLM W4HUB W4RKN WA4QBX W6QJW W8WRP W0BA W0YYS YV3KV	W2WNW WB2MWW W5KGJ WA4LMD WB6WV WA8OSE W9DDL W9DF ZP5GS	196 H9BMD 11C7L K2JUNY	WB2GQK W8SH W9WCE			
300 DL3RK EA4L FK4XL HK3AFB H1COD JA1MIN K4CAH LA7Y PY2ASO PY3AHJ VF3CTX WB1UH WB2WOU W3EYV WA4TSP W5K6X W61V W6KUT W8ARH W8GMF W9DNE W0CPM W0NVZ W0FOAH XFIKS AE2YP	290 G3JML HB9AH HB9AH H1JIC 11WT JA1ADN K1LHT K4H6B PY2DSC PY3BXW VE3NE WA4TSP W5K6X W61V W6KUT W8ARH W8GMF W9DNE W0CPM W0NVZ W0FOAH XFIKS AE2YP	280 DL5LA G3WV G6LK 11AJ 11LCK K1DRN K4BFB K4JET K9WYS W2CNS W2Q1 W2YLL W2FXA WA2POG WA0A W4TUC W5KTW W5Q1G W6FZJ W9ABM	269 DJ1CG K4JET K9WYS W2CNS W2Q1 W2YLL W2FXA WA2POG WA0A W4TUC W5KTW W5Q1G W6FZJ W9ABM	258 D14PT W2GT 257 DJ3CP DJ7CX VE3UR XE1YG	247 11CWN K1ZSI PY2AQQ	238 VF2DCY WA4LSK WA8OGR	221 K4R4C K94BC K0BF1 L36RL OF1PC V69K W1PCD W2EV W3KJ W4BK WANPYL WA9SLD	209 DU1FH W1ESN W5RDA GWNVW 11BRN JH1GGV K2RAP K4RAP K4BMS K4HMX YU3OV	200 DJ4XA DL3BA DL3OM DL7FP GWNVW 11BRN JH1GGV K2RAP K4RAP K4BMS K4HMX YU3OV	189 K2EUR K7AXF K6G1U WA2TIF GWNVW 11BRN JH1GGV K2RAP K4RAP K4BMS K4HMX YU3OV	188 DL1BS DL1QG H1YV K4BBK W3ATO WA5VDH YASRG	187 K3OE DJ3OS WA2FCA W3NNK	179 CO2FA OZ3KE W2CCS WA5VAQ W7MS1 WA8ASV
299 K2JMY W4DRK YV4QG YV4UA	288 W6DQ	277 11JX OJ7UD W4NBV 9M21DQ	266 K6JR	255 AP2MR DL6NX WB2UZY W9KAS	245 W4UF W8YGR	228 K9PQG WB6RMZ VE3FBL W7VRO W4DRP W8WUO W9AG W9DOR W9YGN W9ZWH ZL1AAS	219 DL8OA G2MI W82BEE VE7HP W4DFC W4W5F YV5BPJ ZF1GC	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			
298 CT1BH TG9AD WA9NUQ	289 F3PRK W2GBC W6BUDC	278 W3MP WA5REU	265 K1OZR K4BVO O4AHS OF1MEW OH2BAD W1MLM	254 EAIY PY1JR VE6AP VP7NH WB2UZU W9KAS	244 W2ONK W86VCM	228 K9PQG WB6RMZ VE3FBL W7VRO W4DRP W8WUO W9AG W9DOR W9YGN W9ZWH ZL1AAS	219 DL8OA G2MI W82BEE VE7HP W4DFC W4W5F YV5BPJ ZF1GC	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			
297 VK4QM VP7DL WB2VAE	288 W6DQ	277 11JX OJ7UD W4NBV 9M21DQ	266 K6JR	255 AP2MR DL6NX WB2UZY W9KAS	245 W4UF W8YGR	228 K9PQG WB6RMZ VE3FBL W7VRO W4DRP W8WUO W9AG W9DOR W9YGN W9ZWH ZL1AAS	219 DL8OA G2MI W82BEE VE7HP W4DFC W4W5F YV5BPJ ZF1GC	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			
296 K5DFZ W3AATP W6ZBS W8ROC	286 VE3GMT WA3IKK WA4JVU	276 HB9AAA OH5VY W4R1J	266 K6JR	255 AP2MR DL6NX WB2UZY W9KAS	245 W4UF W8YGR	228 K9PQG WB6RMZ VE3FBL W7VRO W4DRP W8WUO W9AG W9DOR W9YGN W9ZWH ZL1AAS	219 DL8OA G2MI W82BEE VE7HP W4DFC W4W5F YV5BPJ ZF1GC	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			
295 W4HA W6CCB W6DZZ W8GKM	285 OE2EGL W2LEC W9JQD W91TR	275 11BAF K2JGG W1QQO W2CYX W4EAL WA6MVG ZL1AH	263 DK3PO F8RU	252 K2DJD W1AB W2GHR/4	241 DL9C W3U W4PGZ WB41FM W6AQI WA6RTA	227 K6AHV WA8VFK	218 11PHN JA81F 1URDB VE3JN W5MUG	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			
294 EA7GF	284 W91TR	274 11BAF K2JGG W1QQO W2CYX W4EAL WA6MVG ZL1AH	263 DK3PO F8RU	252 K2DJD W1AB W2GHR/4	241 DL9C W3U W4PGZ WB41FM W6AQI WA6RTA	227 K6AHV WA8VFK	218 11PHN JA81F 1URDB VE3JN W5MUG	203 DJ2MM 116VM DK1JG DL7OD K4VAM VE3WO VE7BXG VE7HP W4DFC W4W5F YV5BPJ ZF1GC	176 W1MDO W5RDO	174 DL7BQ JA2LA PY2DLC SMSBFC YV5CMO			

0H3NY VK9BS W5AC	WA8PWF ZDBAB	154 WB6NRK W7LOI W8ZCQ W9UX	WB2BDH W3YX	PY1MHB PY7ASQ W4CHC W4GHW W4FBL W9YRM WA9VZF	W5MIG WB6YLG	121 CJ7DW D12MB H14NI H89VJ H1LU K41KZ K4TEHU K4VJH K5BBA K9BWQ K0PW L2BK L0ZSK L1DH L12VYK W42YVK W4LXK W6UNF W6QNU W6SQU W9AI W9NCN W9OPM W9R0U W9UGF	WAIJQC 116 W3TBP W4FCJ W8ISD W0GL	ZNSLB 108 LA1M JA1N/Z K36GX OZ1PD G2BBB H12H VE2CN VE76S VK5ZB WA1ZP W45CBV W45CQW W8VPW W8ZTU W4R1 W9CJO	104 D16BV D18BQ D15ST D18HD G2BWN G1HGN VE2CN VE76S VK5ZB WA1ZP W45CBV W45CQW W8VPW W8ZTU W4R1 W9CJO	D16BV D18BQ D15ST D18HD G2BWN G1HGN VE2CN VE76S VK5ZB WA1ZP W45CBV W45CQW W8VPW W8ZTU W4R1 W9CJO	VE3FOY VE7TL W2KJA W2ITG W2UCV W2AGV W3CKU W3OJQ W43LX W4LMP W4PJL W64NE W64ST W64YX W64SD VE3CHG VE3FHG VE6HN VE7NO W2YRK W3FSK W3TL W43UD W45ST W46CQ W7DQZ W7FXL W7LZL W7HOY W8CQ W9KDX W9AND W9ANN W51LB W5FRM W7AVS W8DKJ W8MBB W9Q8X YNIAMV	11YD JA2KPR K4RSB K5YRK K5ZRV K61PV K7PMT K8AKV K8AKL K8KSO K8KRO K9HOD K9IHP K9IHT K9IUD K9IUR K97M K97AG K97GJ L92PC L92PM P12AK K1DYA VE3CL VE3AL VK5FL W1UTK W1SWD W1LAC W1D1D W2M5V W2AKR K2AKR K3HFF K91HL K25HJ L1URF RP2PAW W2YVK W3UZX W3YQ W3ZR W43AZ W43LR W43LO W44PL W44VY W44NI W44RC W44ZL W44ACR L17AW L1EAY L1A3M W44CM W44YK W44YA W44A W44W W44R W44N W44E W44G W44H W44I W44J W44K W44L W44M W44N W44O W44P W44Q W44R W44S W44T W44U W44V W44W W44X W44Y W44Z
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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 Cole, W3DKX RM: W3FBF. Please check page 6 of current QST for SCM's address. WA3RAP is now an Advanced Class licensee. FM is clubbing in Delaware. W3ZNF and K3FPB are officers in the Delaware FM Repeater Assn. K3KAJ is fm mobile. WA3DUM has a new antenna system. The Delaware Ham picnic put on by the U. of Del. ARC was a success. With great hope, perhaps we can have our hamfest again for the '72 season. This is the last report written by K3NYG and I wish to thank those amateurs who have helped my job seem very easy for the last five years. I will continue to keep in contact with you via CD and RALES. Traffic: W3FBF 71, WA3QUJ 68, K3TVV 60, W3DKX 27, WA3GAY 20, WA3DUM 6, WA3GSM 5.

EASTERN PENNSYLVANIA — SCM, George S. Van Dyke, Jr., W3HK — SEC: W3FBF. RMs: W3FML, W3MPX, K3MVO, WA3AFI, K3PHL, W3CDB. PAMs: K3BHU, WA3PLP. OO reports were received from K3NSN, K3RDT, W3NNC. OBS reports from WA3AFI, W3CBH, K3BHU. OVS reports from WA3MCK, W3ZRR, W3CL, W3KEK/K3TXG. BPLs: W3FML, W3MPX, W3CUI, W3VR. PSHR: WA3OGM, W3MPX, K3MVO, K3HO.

Net	kHz	Operates	QNI	QTC	Mgr.
PTTN	3610	6:00 P Dy	153	153	WA3AFI
EPA/PTTN	3917	6:00 P Dy	298	65	WA3PLP
PFN	3960	5:30 P-M-F	628	463	K3BHU
EPA	3619	6:45 P Dy	281	316	W3MPX
EASN	3726	2:30 L Dy	191	70	WA3OGM

Activity seems to be picking up a little. W3CUL says the fairs did it! W3FML still is looking for good ops. for liaison duties in TCC. W3MPX, RM for EPA announces the late session is now in full swing. Note our new SEC is W3FBF. Many thanks for a job well done by W3ICC. If you are an early bird the PPTN on 3733 at 1015Z is for you. WA3ATQ should be in the Poconos by now. W3ADE is assembling an SB-102! W3BNR now has an SB-200 and no one mentioned his new signal! Thanks to WA3EBX for helping a wheel chair dad to become a ham. K3KNE and K3HXS did yeoman work in PA QSO Party. W3PST, as Phila. Co. RU, reports RACES activity now daily thanks to WA3JZB and WA3CLZ. WA3HQ doing his share by working Novices whenever he can and help them get their Advanced tickets. If you need Jamaica K3WU/6Y5L is on all bands. WA2AFI would like to see more QNLs both Novice and higher to the middle Atlantic RN at 2100Z on 3715 kHz. WA3OGM puts a lot of effort into his EASN Bulletin. W3FBF taught at Camp Emerson, Hinsdale, Mass., result, 9 new Novices. The station there passed over 2000 messages via Mass. cw and sbb Clearing House nets. The Penn ARC club station picked up 21 new states on their last try. WA3AGD is looking for an old VN buddy on-the-air K3QCQ. WA3PQA has rig trouble. K3KHL made WAS and WAC, now working on DXCC. He has a complete collection of QSTs from 1928 and looking for older copies. New officers of the Central Penn ARC are: WA3ONG, pres.; WN3QMK, vice-pres.; WN3OXO, secy.; W3AVI, treas.; WN3QPW, trustee. Novices are being encouraged to hold office to bring new blood into club and hold younger hams interest. K3TKZ is running for pres. of the Phil-Mont Mobile Radio Club. He lost last year by two votes and this year he hopes to win. Merry Christmas and a Happy New Year. Traffic: (5Sept.) W3CUL 2824, W3VR 739, W3FML 629, W3MPX 501, WA3OGM 236, K3OIO 165, WA3OVZ 162, WA3AFI 126, W3FBF 98, WA3QOZ 97, W3CDB 93, K3MVO 94, WA3ATO 70, W3VAP 36, K3BHU 28, WA3LVU 26, K3NSN 26, WA3YC 23, W3VA 22, W3ADE 20, W3HK 19, W3CBH 16, WA3JRY 14, WA3RIC 9, WA3PQA 8, W3BNR 7, W3BUR 6, WA3CUI 6, K3KNE 4, K3KTH 4, WA3MCK 4, WA3IAZ 3, WA3BJO 2, WA3EJ 2, W3HD 2, WA3MOP 2, W3OY

2, W3PST 2, W3EU 1, W3GMK 1, WA3IUV 1, W3KEK 1, K3VAX 1, W3YFP 1. (Aug.) W3VA 17, W3VAP 17, K3KTH 7, WA3MCK 1.

MARYLAND-DISTRICT OF COLUMBIA — SCM, Karl R. Medrow, W3FA — Novices and would-be amateurs need help. How about you? Good work in building replacements for us old retracts is being done by W3MVB, an extra curricular activity supported by his church and boy scout unit. The Randallstown Senior High School has 9 raw recruits that WA3MSW hopes to make into Novices soon. PSHR for Sept.: W3FZT, W3FCS, K3ORW, W3OKN and W3TN. K3ORW a late reported winner last month. Recent renewals and new appointees are: W3LDD as OPS; K3KMO, W3QU, W3ECP and W3GRM as ORSs; W3FCS as PAM. W3BOV and K3OAE have taken that fateful step of matrimony. WA3EHK reports the Howard County RACES was out in force during the heavy Sept. rains. K4UFI, as NCS covered 38 closed roads in the county. The Baltimore Amateur Radio Club had a good set up at the City Fair this year. Publicity to get new members and also free classes for budding amateurs. W3RUN says the club is becoming engrossed in 2-meter activity. Welcome to the Gouddard Amateur Radio Club a new affiliate of the ARRL. W3ABC has finally discovered WN3RMI is a new neighbor. W3LXF got his 2-meter gear from an ad in Auto-Cad. W3CDQ vows to be on for the CD party. W3EOV has fun on EASTCARS. W3TN gets his kicks net hopping. WA3MJF and K3RUQ are back home and ready for the winter season. W3ZNW is back with the return of standard time. W3ECP is a long time ORS, since 1934. W3JPT keeps us posted on the AMSAT Net on 3855. WA3APQ found the VHF QSO Party somewhat frustrating this time. In Hagerstown K3BA keeps kids on both tone and cw. WA3OP keeps the Holyoke Park VHF Society in the forefront. W3LOY must relinquish her SEC appointment because of just too many things. W3FCS reports MDCTN had 17 sessions, handled 43 pieces of traffic and an average attendance of 16.7. W3FZT had MDD in 30 sessions, a QNI average of 10.7, handled 177 messages. Sept. standings for MDD are K3BA, K3GZK, W3QU, W3FA, W3FCS, W3FZV, W3TN, WA3MSW, WA3QUJ, K3RUQ, K3ORW, W3EZT, W3LBC, K3KMO and W3FBF. K3QDC passed his Advanced Class exam. Traffic: (Sept.) W3TN 141, W3OKN 120, W3FCS 91, W3QU 91, W3FA 70, W3FZV 70, K3BA 66, WA3MSW 61, K3PLD 36, K3ORW 26, W3EOV 16, WA3MJF 11, K3RUQ 11, W3HXF 4. (Aug.) K3ORW 10.

SOUTHERN NEW JERSEY — SCM, Charles E. Travers, W2YPZ — SEC: W2LYV. PAMs: WB2JH, W2YPZ, RM: W2JI, MCQ VHF. Fri. 8 P.M., 145.9 MHz, W2YPZ, ngr. reports 2 sessions. The summer slump is disappearing very rapidly as evidenced by the increased activity and general interest. WB2VEJ is scouting much traffic through EAN and has sent in a tremendous record for the month. WA2KWB is back at college. Rutgers Engr. and has received the 1st place Mercer County Certificate for his activity in the N.J. QSO Party. WA2GAS has again made BPL for the second consecutive month. W2QWC and XYI with W2CDZ and his XYI, WA2FGS attended the RACES meeting in Las Vegas. W2QWC is RU for Salem County, N.J. RACES and doing an excellent piece of work with WA2GAS and W2CDZ assisting. W2ZI attended the Antique Wireless Assn. meeting in Canandaigua, New York. W2FBF reports the Gloucester County ARC began another code class. As we approach the fall and winter seasons, the likelihood of emergencies of one kind or another is to be expected. This also is the time to align one's self with an emergency group that is active and make ready for any eventuality, on short notice. Begin by being sure that your appointment is in effect. If not submit them to your SCM or FC for endorsement. If conditions are such that you cannot make yourself available, notify your group so that needed standby operators may be secured. WA2TNS has installed a new 2-meter beam. Bob is a regular member of the Mercer County VHF Emergency Phone and Traffic Net. Traffic: WB2VEJ 315, WA2GAS 131, W2ZQ 82, W2JI 20, WA2KAP 18, W2IU 12, WA2KWB 7, WB2SFX 5, WA2BLV 4, WB2HMI 4, W2YPZ 3.

WESTERN NEW YORK SCM, Richard M. Pitzer, K2KTK Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. Section net listing appears in Apr. QST. Got your new ARRL Net Directory yet? — 'tis worth having. K2CC has a new HW-16 installed at the Clarkson Club for the Novices. They hope to have a TA-33 up by

the time you read this, The NYPO CW net is reactivated on 3698 kHz daily at 2330, SUNY at Buffalo now is WA2NPO (35 members) and has started a college net that meets at 11 A.M. local time on 7275 kHz Mon. through Fri. NYS reports 692 check-ins with 380 messages handled in Sept. A new training net is the Middle Atlantic Regional Net (MARN) which meets daily at 2100 GMT on 3715 kHz. W2CFP reports two repeaters active near Ft. Hager, W2CKM with input/output of 146.34/146.94 and W2CFP/2 146.28/146.88 outside Cortland. K2IOH visited with ex-WA2RBN, now WB4TCR at Raleigh. WA2DHS is a new Extra Class licensee. WA2OKR and K2HYQ have new harmonics. W2TGY will be mobile for five months through W4-Land. W2PHQ and W2RKL celebrate 50 years of hamming! Congratulations fellas. W2HLI QSY's to somewhere in W7-Land. W2WRR has a digital proportional 6 foot plane on 53.3 MHz, whatever that is. WB2WGF is asst. mgr. of the NYPON. K2UCF now holds Extra Class license. K2KOC recently operated as DX from G-Land. Your SCM finally collected the necessary pasteboards and was awarded 5BDXCC No. 120, the sixth from WNY, three from the Buffalo area and three from the Syracuse area. W2TIO is back on the air from Syracuse U. He has an SB-102 and full size two-element wire beam on 40. New officers for the Chenung County AREC Assn. are WA2URX, pres.; K2PIT, veep; WA2ZBD, secy.-treas.; K2I0NN as IC-trustee. W2RUT has a new Gotham vertical up. Some of the fellows seem to have a misunderstanding about this column's deadline. Material must be received by me by the 15th of the month in order to appear in QST TWO months from then, i.e. material received by me before Dec. 10 will be in Feb. OST. BPLs: W2OE and K2FNYS. Traffic with the * indicating ARFSC Honor Roll: (Sept.) W2FR* 458, W2OE* 401, K2FNYS 353, WA2ICU* 220, W2RUF* 214, K2KTK* 109, WA2ELD* 90, W2BU* 88, W2MSM 82, K2KOC 75, W2MTA* 70, W2FEB 63, K2C 57, W2ROF 53, K2JBX 46, WA2MPC 44, WB2VND 43, WB2HLV 40, K2UR 40, WB2IKL 39, W2HYM 31, WA2LLE 29, K2OFV 26, WN2AOG 23, W2DBU 19, K2IMI 12, WA2NPO* 12, WA2KAT 8, WN2OMN 8, WN2SIR 8, W2PVI 6, W2PNW 4, WB2FPG 3, W2CFP 1. (Aug.) WA2ELD 49, K2CC 11, WN2OMN 4.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEP - SEC: W3KPI. PAM: K3ZNP. RMS: W3LOS, W3KUN, WA3IPU. WPA CW net meets daily 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. 3585 kHz at 6:30 P.M. All times local. It is with deepest regret that we announce the Silent Keys of W3SIN and K3IXN. Two Rivers ARC reports WA3QJT is a new General Class and WN3PUD is a new Novice Class licensee. The Nittany ARC says the Pennsylvania QSO Party held in Sept. was a success and that they are going to try for all 67 county representation for next Sept. The NARC also advises they are compiling a directory of Centre County hams (7 years ago there were over 200 hams in the county with many inactive.) The NARC also viewed a slide show "The Amateur Radio Public Service Corps" and the film "Ham's Wide World." Presque Isle ARC reports K3TJM is a new Advanced Class licensee and that WA3NCC and WA3PWL are new General Class ops in the Erie area. PARC also reports W3WZ has returned from another trip to VP7-Land and that K3KRA operated VE3CNE at the Exhibition in Toronto. The Radio Assn. of Erie reports they were treated to a slide and talk show given by K3NAU on his recent trip to the Galapagos Islands. RAE also say they are still conducting their monthly 6- and 10-meter transmitter hunts. The Etna RC lost one of their young spark plugs, WA3JH, to the Nittany ARC for a few years while he attends Penn State University. WPA traffic report for Sept.: 30 sessions, 252 messages, 359 QNT. KSSN: 9 sessions, 9 messages, 19 QNT. Traffic: K3ZNP 27, W3NEP 182, WA3IPU 163, W3LOS 119, WA3NAZ 118, WA3MDY 88, W3KUN 80, W3MJ 64, W3YA 48, K3ASI 26, K3SM 23, K3HCT 19, W3ATO 16, K3SUN 9, W3IDO 8, W3SN 8, WA3JH 6, W3LOD 2. Total traffic 1216.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v/h). RM: WA9ZUL. Cook County IC: W9HPC.

Net	Freq.	GMT/Days	Tfc.
ILN	3940	1400 Su	2
ILN	5690	0030 Dy	194
NCPN	3915	1300 M-S	58
III PON	3915	2245 M-F	176
		1800	
		1430	
III PON	145.5	0200 MWF	16
III PON	50.28	0200 M	4

Lew McCoy, W1ICP and W9PRN were guests at the Oct. 11 meeting of the Quad City Amateur Radio Club held in Mohne. W9LNO is finally using a new keyer after many years of "bugging" Governor

Richard B. Ogilvie received an amateur radiogram from Governor Daniel Evans, state of Washington, informing him of Washington's radio week proclamation. W9FY is working EB with the VKs and ZLs. The McHenry County Amateur Radio Club and the Elk Grove Amateur Radio Club are now officially ARRL affiliated. WB9CJH, W9RML, WA9TXW and W9SLV are the new officers for the coming year for the Kishwaukee Radio Club. W9HRY, net mgr. for the Ninth Region Net (9RN) reports a traffic count of 314. The Champaign Central High School Radio Club has a new HW-101 and a trap antenna and licensed members are WB9CXZ, WA9ZXV and WN9GOE. WN9ICA is a new Novice in the Springfield area. A new call in Mackinaw is WN9HXX, XYI of WA9GCG. WN9HBD is a new Novice, son of WN9HXX. This column's sympathy to the family and friends of W9BPV, (who had worked 22 states on 2 meters) and WA9BXT. We also were saddened to hear of the passing of Lottie Bidgood, wife of Pappy Bidgood who was always a top traffic handler and an ARPS booster. WA9AJF passed away a few years ago. Due to a typographical error W9VD was reported as a Silent Key. It should have been W9JD as reported in Aug. QST. WB9CYO has a new Swan 500. New officers of the Crawford County ARC are K9CGC and K9CSL. Traffic: WA9RTB 203, WA9ZUE 171, W9NKG 146, WB9AWY 143, W9FLF 119, W9FHI 65, W9HOT 41, WA9NZF 40, K9AVQ 29, W9JKV 29, WA9LDC 20, W9PRN 18, W9LNO 16, W9FLP 9, W9HJM 9, W9LDU 8, W9EY 3.

INDIANA - SCM, William C. Johnson, W9BLU - SEC: W9FC. RMS: WB9ANT, W9FC, W9HRY, WA9ZKX. PAMs: K9CRS, WA9OHX, (v/h) W9PMT.

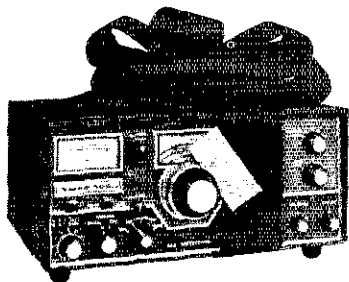
Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
QIN	3656	0000 Dy	175	WB9ANT
		0300		
HfCN	3910	1330 Dy	287	WA9OHX
		2300 Dy		
		2130 M-S		
PON	3910	1245 Su	19	WA9UMH
		1830 S-S		
PON VHF	50.7	0200 Sa-Th	50	K9APH
Hoosier VHF				W9PMT

With deep regret I report W9TE as a Silent Key. 9RN frequency 3640 kHz (alt. 7085 kHz) time 0045Z-0230Z Dy. W9VW is back with us again. WA9HIA/M has 100-watts on 2. KC6CT is returning to LaPorte from Caroline Island. The IUPUL ARC will hold the annual Ind. QSO Party Dec. 4 to 5 (see Operating Events). IRCC held their fall meeting at the Indiana School for the Blind. New officers are W9ILS, chmn.; WA9OJK, vice-chmn.; WB9ANT, secy.; W9IMU, treas.; K9HYV, WA9QEQ, dir. Those present were WA9QEQ, W9IMU, K9LQK, W9RTH, WA9OHX, WB9CCO, K9YBM, W9ZZR, W9HWK, W9BUQ, W9KMY, WA9YA, WA9RNT, WA9EHU, W9ILS, K9HYV, WA9ZHU, WB9ANT, WA9ZJ, WA9KWH, W9HPG, W9DNO and Steve Allen a member of the ARC at the Blind School. Also Mrs. Margaret King, mother of WB9CCO, W9HPG, Central Div. Dir. gave a talk on ARRL. The IRCC needs the support of all amateur radio clubs in the state to help make this state one of the leaders in amateur radio. For more details contact W9ILS, William O. Cannon 205 N. Roesske Ave. Michigan City, Ind. 46360. Amateur radio exists because of the service it renders. QIN Honor Roll: W9ILS 25/24, W9EI 25/24, WB9ANT 15/19, W9HS 24, W9QX 22, W9BDP 18, WA9KAG 15. Traffic: (Sept.) WA9WJA 164, WB9ANT 140, W9HRY 130, WA9VZJ 100, WA9OHX 97, W9EI 54, W9PMT 33, W9LWH 32, K9KWO 30, W9BUQ 29, K9DIY 29, K9YBM 26, W9KWB 22, K9RPZ 16, K9ILK 12, WA9NYU 12, W9RTH 12, W9YTX 9, W9LWI 8, WA9CHY 7, W9HWR 7, W9ENU 6, K9IOY 4, WB9BAP 3, W9BDP 3, W9BVL 2, WA9YA 1. (Aug.) W9ILS 58, WA9VZJ 45, W9PMT 35, W9QLW 29, W9EI 28, K9CUB 22, WA9GJZ 11, WA9BVL 1, W9BDP 1.

WISCONSIN - SCM, S.M. Pokorny, W9NRP - Asst. SCM: Joseph A. Taylor, W9OMT. SEC: W9NGT. PAMs: WB9CKL, K9FHI, WA9OAY, WA9PKM, WA9OKP. RMS: WB9BJR, K9KSA.

Net	Freq.	Time/Days	QNT	QTC	Mgr.
WSSN	1662	0200 TTS			K9KSA
WIN	4662	0115 Dy	199	(27)	WB9BJR
SW2KN	145.35	0230 Dy	161	2	WA9PKM
SW6RN	50.4	0300 M-S	185	6	WB9CKL
BWN	3985	1245 M-S	424	25*	WA9OAY
WI-RACES	3993.5	1400 Su	55		W9NRP/IANC
WI-QCWA	3987	1500 Su	76		W9NRP
BEH	3985	1800 Dy	742	82	WA9OKP
WI PON	3925	1801 M-F	511	51	W9IMU
WBSN	3985	2300 Dy	1365	147	K9FHI

Come on fellows get your station activity reports in to your SCM not later than 5th of the month. The newly-formed Wisc. Chapter of QCWA held their charter meeting and banquet, Sept. 25 at Green



hint list for your XYL or YL

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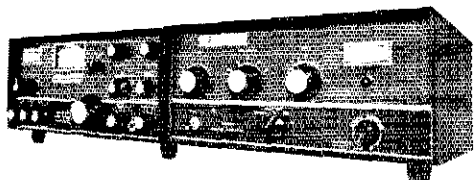
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Thought you might like to know that I still have plenty of the shaving lotion and talcum left over from last Christmas, I really prefer to pick out my own shirts, and neckties, and what I would really like to have is the Swan equipment I have checked below. OK?



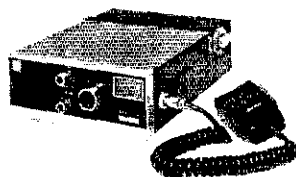
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Model 444 \$ 25
- Swan Hand Microphone,
Model 404 \$ 18
- External Crystal Oscillator,
Model 510X \$ 49

- VOX Accessory, Model VX-2 \$ 35
- I.F. Noise Blanker, Model NB500 .. \$ 89
- Audio Notcher Peaker Accessory,
Model ICAF \$ 59
- External VFO, Model 508 \$129
- Mobile Mounting Bracket for
mobile installation of Swan
Transceivers, Model MTK \$ 9
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volts 50-60 cps in matching
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- Complete 12-14 volt DC Power
Supply, Model 14-117 \$129
- DC Converter that converts the
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Model 14-C \$ 65
- 1200 Watt Linear Amplifier.
Has built-in 117 AC power
supply. Model 1200W \$219



- Swan 500CX, 550 watt 5 band
transceiver \$489
- Swan 270B, 5 band 260 watt
portable transceiver with built-in
AC supply and loudspeaker \$429
- Swan 600R, receiver \$395
- Swan 600T, 600 watt transmitter
for 10-80 meters \$535

- 2000 Watt Linear Amplifier.
Price includes tubes and power
supply. Mark II \$599
- FM-2X two-meter FM Transceiver .. \$259



- VHF-150. 150 watt 2-meter
Amplifier. Built-in 117 volt
AC power supply \$279
- 14C DC Converter for VHF 150 ... \$ 65
- Swan 4 element heavy-duty
multiband beam antenna.
Model TB-4H \$129
- Our 3 element multiband beam
antenna, TB-3 \$ 94
- TB-3H (heavy-duty) \$109
- Two element multiband beam
antenna, Model TB-2 \$ 79
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Model 1040V \$ 49
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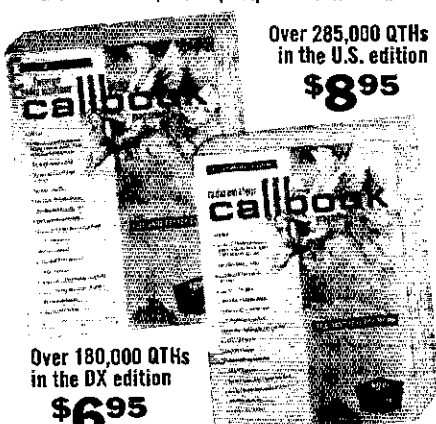
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Ray with 35 members and 22 XYIs in attendance. The following officers were elected: W9NRP, chmn.; W9BKD, vice-chmn.; W9CTI, secy.; W9VQD, treas.; W9CUA, W9USJ, W9EWC, dir. K9FHI now has new TH-4 and an eleven-element 2-meter on a 40-ft tower. K9PKQ renewed his EC appointment. W9CTI and XYI left Oct. 3rd for a three-week tour of Japan. With regret we report WA9GJT as a Silent Key and offer our sympathy to his family. W9NLI renewed as ORS. New Novice at Waupaca is WN9ICH. W5000, formerly W9CPL, visited with W9KCK. Traffic: W9CXY 444, K9CPM 232, W99FE 75, W9DXK 70, W99ABF 64, K9FHI 64, W9ESJ 53, W99CH 39, W9KRO 32, W9IHW 26, K9JPS 25, WA9OAY 23, K9KSA 19, W9CMD 17, W9RTP 16, W9DXV 14, W9NRP 12, W9OMT 9, K9UTO 9, WA9BZW 7, WA9PKM 1.

DAKOTA DIVISION

MINNESOTA — SCM, John H. Halstead, K0MVF — Asst. SCM: Edna M. Thorson, WA0RRA. SEC: K0LAV. RMs: W0ZHN, WA0YAH. PAMs: WA0HRM, K0FI T. The Twin City DX Assn. celebrated their first anniversary and reelected W0YDB as pres. and K0WXX as secy. treas. W0MYK is the new publicity chmn. Don reports that W0PAN, Dakota Div. Director, W0ELA, ARRL DX Advisory Committee and W0HP, ARRL Contest Advisory Committee are on their membership rolls. Their first try at a contest was the 1971 ARRL DX contest. They placed 13th nationally. Watch for some new awards of a unique nature. Minimum requirements for membership is 100 countries or 40 zones confirmed. WA0JPK has a new Kenwood rig. W0AIR passed his Advanced Class exam. WA0PDH was honored as one of the Outstanding Young Women of America. Bill Simpson, a kidney transplant patient at Univ. Hospital in Minneapolis, was honored by his home town football team in Mitchell, S.D. After a game in Mitchell he was patched into the locker room to visit with his team mates via WA0VAS in Minneapolis and WA0AOY and W0GWW in Mitchell for 1½ hours. Some of our net members have been extremely critical of the way BPLs have been earned by our Novices. We wish to give our unqualified endorsement to this program. Any comments or criticism should be directed to your SCM. Traffic: (Sept.) WA0VAS 1231, K0CSE 278, W0ZHN 269, WA0YVT 105, W0BRG 84, WA0BZ 71, WA0IAW 70, W0BC 69, W0BDYZ 57, WA0TFC 51, WA0YAH 40, WA0YWA 32, K0ELT 30, K0FTI 25, K0MVF 24, K0RKE 24, W0BATR 23, WA0HRM 23, WA0SGJ 22, W0WIA 19, WA0YER 19, WA0YV 18, K0ZBI 18, WA0VP 17, K0ETG 16, WA0UWT 13, K0ZXE 12, WA0JPR 11, W0BCGT 8, WA0VHX 8, W0WAS 8, WA0TQT 7, WA0KX 6, W0UMX 6, W0KLG 4, W0PAN 4, K0JTA 1, (July) W0CAP 1K.

NORTH DAKOTA — SCM, Harold L. Sheets, W0DM — SEC: WA0AYL. OBS: W0ATB. PAM: W0CAQ. RM: WA0RSR. OY: W0BE. The North Dakota QSO party was very successful. Be sure to get your logs in, fellows. The 2-meter fellows in the Red River Valley will be glad to know that the N.D. REA has donated a complete repeater station for use by amateurs in Grand Forks. The Red River Valley Repeater Assn. is in the process of formation and hopes for operation by Christmas. WA0RWR is going to a rare county — McIntosh, as a medical secretary in the hospital in Wishek. W0CAQ made first place in the recent ARRL DX contest for N. Dak. WA0GOI is out of the Navy. WN0FAY and WN0FBI are new Novice licensees in Grand Forks from the Valley Jr. HS classes. K0CN, ex-0BVP, in the old days, stopped at Jamestown to visit old ham friends en route home from a Coast Guard reunion on the East Coast. W0DM missed the meeting with W0AZV and W0FOZ by one day. W0AUM reports the radio club is setting up emergency work with the CD in Dickinson. W0DXC thinks he has the right antenna now, before the snow comes! The Bismarck Radio Club will have Novice classes. "Prof" has started his classes for both Novice and Conditional at Valley Jr. High in Grand Forks. W0BATJ state RO of the RACES Net has appointed WA0AYL as training officer of the net with WA0WLP as assistant in an effort to improve the net operation efficiency. We need cw operators!

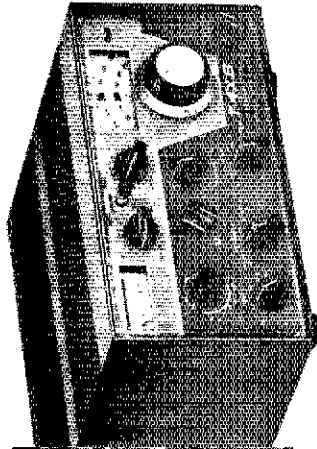
Net	kHz	CDT/Days	Sess.	QNT	QTC
Goose River	1990	0900	4	74	
PON	3996.5	0900 Su	12	330	4
		1830 S-Su			
RACES	3996.5	1830	22	791	64

Traffic: WA0SUF 150, WA0AYL 130, K0PPY 43, WA0AUM 26, WA0ELO 21, W0DM 15, WA0SJB 14, W0BUBU 10, W0DXC 4, W0CDO 2.

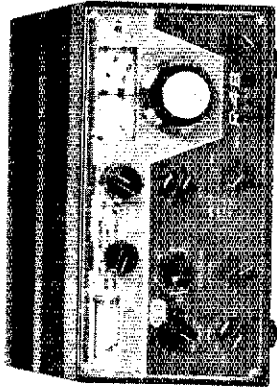
SOUTH DAKOTA — SCM, Ed Gray, WA0CPX — WHCP spok to the Black Hills ARC and also showed some slides. Lewis is th Beginner and Novice Ldtr for QST. Norma Van Heuveln from Springfield, XYI of WA0NUX recently received her General Class

(continued on page 108)

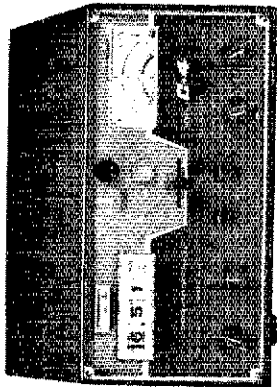
T-4XB Transmitter



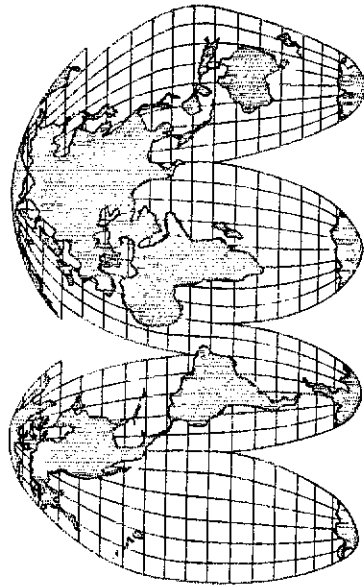
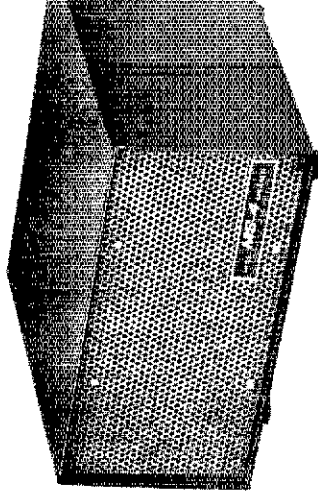
R-4B Receiver



C-4 Station Console



MS-4 Speaker

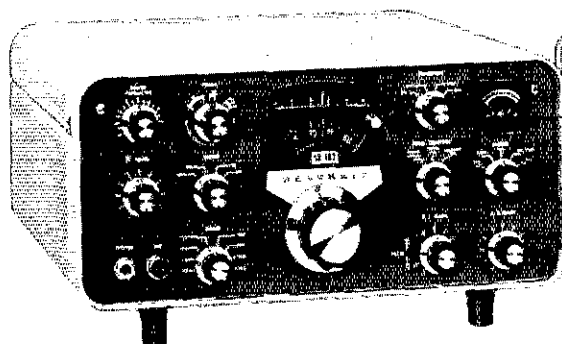


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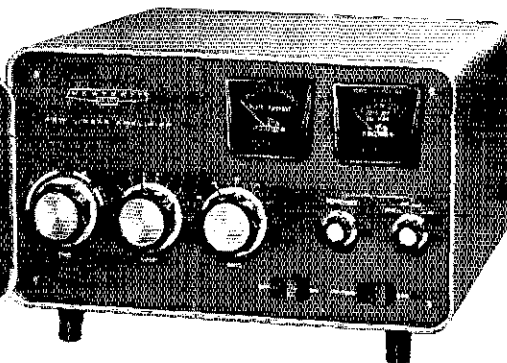
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- Kit HP-23A, AC supply, 19 lbs. 51.95*
- Kit HP-13A, DC supply, 7 lbs. 69.95*
- SBA-100-1, mobile mount, 6 lbs. 14.95*

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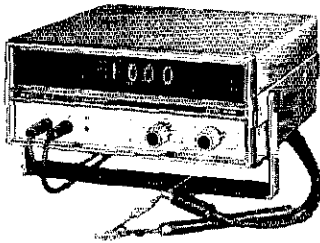
SB-220 features include a built-in solid-state 120/240 V power supply; circuit breaker protection; zener diode regulating operating bias to reduce idling current for cooler running and extended tube life; a large quiet fan; ALC to the driving unit to prevent over-driving; front panel switch selected monitoring of grid current; relative power and high voltage. The SB-220 offers a clean, compact design with the liberal use of internal shielding for extra strength and component isolation. Its green table-top cabinet complements all your SB-series gear.

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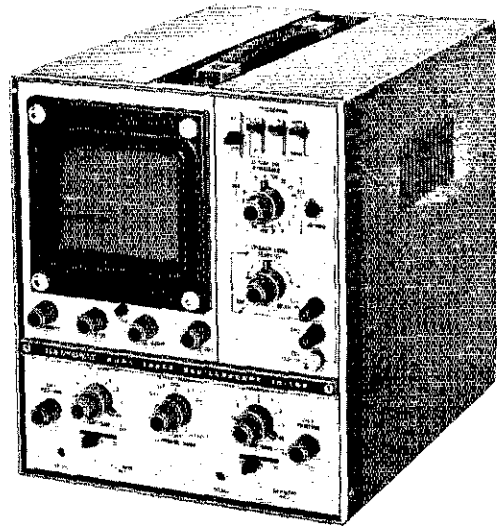
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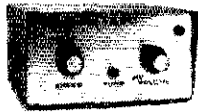
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license. A good time was had by the hams that attended the Dakota Convention at Sioux Falls. I enjoyed meeting many of you. Ne reports: Morning Net - QNL 566, QTC 16; NJQ - QNL 372, QTC 12; Early Evening - QNL 491, QTC 7; Late Evening - QTC 978; QNL 37. Traffic: W0H0I 101, W0CAS 26, K0AIL 25, W0A0EN 9, W0DVB 7, W0BDG/0 5.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WA5VWH - SEC, W5RXU. PAM: WASQMQ. RM: WAS7LS, WASKJT, WA5ATW, W5RXU and W5KL have new 2-meter fm rigs. WASQMO is the new PAM for Ark. and is working on new 4-1000As. The gang on OZM appreciate the planning and support that made the fall picnic a success in North Little Rock. Everyone had a fine time. A new certificate is available for anyone who checks into the Razorback sub Net 16 times during one month. Welcome new ham W5SFKF. XVI of WASKJT, 146.46 has been set up as a DX information frequency in Little Rock by the Ark. DX Assn.

Net	Time(Z)/Days	Freq.	Mgr.
Razorback	0200 Dy	3995	WASQMQ
OZK	0100 Dy	3790	WAS7LS
Hillbilly	0030 Dy	3985	WASZKF
Post Office	2130 M-F	3925	W5MJO
Ark Phone	1200 M-S	3937	W5VFW
CARLEN	0200 Th	146.34/94	W5ODF
DX Info	0045 M	3995	W5OYH

Repeaters: Little Rock W5DI 146.34/94; Fort Smith WA5YU 146.34/94; Fayetteville WASSNO 52.551/53.020. Traffic: (Sept. WSNN 55, WAS7LS 2K, W5SOQ 1, (Aug.) W5SOQ 18.

MISSISSIPPI - SCM, Walker J. Coffey, W5NCB - SEC, WA5JWD. RMs: WASTMC, WASYZW. PAMS: W5JHS, WASKLY, K5MDX. Appointments: WASYZW as RM, W5SCKK, K8YUW/S as OPSs. Endorsements: W5JHS as PAM; WASSUH as FC; W5TAD, WA55UF as OPS; W5IAD as OO; WA55UF as OVS. Glad to have WASYZW as RM and Net Mgr. for MTTN. Our sincere thanks to W5SBB for all his work on MTTN. A Gulfcoast group of 27 members Sept. 15 for the purpose of forming an ARC. The Jackson ARC Novice class is going strong with more than 50 members. W5SCHI has a new ID wpm code certificate. Nice job by the CGCH membership during Hurricane Lili. The net was in session for 10 hours. Congrats to W5SAHM with his first harmonic. Let's all help the SEC with his S.I.P. run in Jan. PSRR: W5SBB, WA5TMC, W5BDEK.

Net	Freq.	Time(Z)/Days	QNL	QTC	Mgr.
MTTN	3665	2345 Dy	155	83	WASYZW
MNN	3733	2300 MWF	39	12	WASTMC
GUSHN	3925	2330 Dy	-	-	W5JHS
CGCHN	3938	0100 Dy	1785	117	K5MOJ
MSBN	3990	0015 Dy	1151	110	WASFCW

Traffic: WASYZW 272, W5SBB 234, W5EDT 100, W5NCB 50, W5RUB 50, W5WZ 40, W5DQK 28, WASTMC 17, W5SCKK 17, K8YUW/S 13, WASKTY 10, W5BNH 3, W5ASE 3.

TENNESSEE - SCM, O.D. Keaton, WA4GLS - SEC: WB4AND, PAMS: W4FPP, WA4FWM, K4MOJ. RM: WB4DAJ. The following a cumulative report for Aug. and Sept.

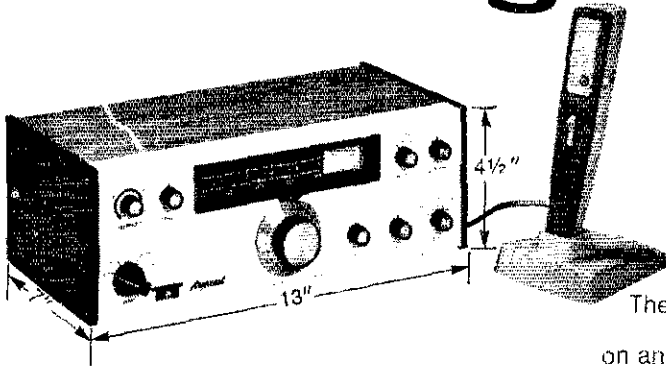
Net	Freq.	Time(Z)/Days	Sec.	QNL	QTC	Mgr.
FN	3635	0000 Dy	61	421	158	WB4DA
FNPN	3980	1040 M-F	44	956	36	WA4EY
TPN	3980	1145 M-F	61	3120	148	W4FPP
		(300 S-Su)				
TSSBN	3980	2330 M-S	52	3273	279	K4MC
MTTMN	28.8	0200 T-F	17	163	0	WA4GL
E1TMN	28.7	0200 W-F	17	115	0	WA4OQ
FTVH	50.4		26	294	1	WB4IC
ETVHF	145.2		18	67	0	WB4FC
TPON	3980	2330 S				WB4BE
TCN	3980	0200 Th				WB4BJD

Memfest '71 was a success with WASUYW the first prize winner. W4SQJ, WA4WBU, WB4CPU and W4OGG attended the Cincinnati Stagfest. The Tenn. Amateur Radio Ten-Meter Operator Society sponsored the second annual QSO party from Dec. 23, 1971 through Jan. 4, 1972. Traffic: WB4DAJ 177, W4ZYJ 168, W4WBK 8, W4SOF 63, WA4UAZ 51, WA4GLS 47, W4RUW 34, WB4LHV 2, W4OGG 31, WB4HSS 16, WB4ANX 13, W4P-P 13, WB4DYJ 1, WB4BRV 11, W4CYL 11, W4YAU 11, WB4MPJ 10, WB4MY 1, K4JLV 7, W4UWM 7, WB4VYM 6, WA4CGR 5, W4LBD 3.

GREAT LAKES DIVISION

KENTUCKY - SCM, Ted H. Huddle, W4CID - SEC: K4YZ. Appointments: K4TXJ, WA4JQS and WA4WSW as OOs. Endorse WA4TA, K4HOL, WB4EQY and WB4NQZ as OOSs. K4MAN, PAM K4TN and K4IRT as PAM MKPN. K4TRT as OPS.

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The Argonaut is for every ham.
A transceiver that operates
on an AC pack or lantern battery.
Covers Amateur bands 80-10, SSB and CW.

A little bored with high power? Substitute skill for brute force and thrill to the challenge of conquering distance with a few but potent watts.

Operate the Argonaut anywhere. Slip it into a suitcase when traveling (it occupies less than 1/5 cubic foot). Enjoy it in a motel, campgrounds, on the beach or patio, or carry it as a backpack when hiking.

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The Argonaut is more than just fun. It is always ready for the serious business of providing emergency communication when commercial power fails. It augments one of the great public services of Amateur Radio.

The Argonaut is for every ham.

The Argonaut is for you.

Argonaut Price	\$288.00
AC Power Supply	\$ 24.95
Microphone, EV PTT	\$ 17.00

SPECIFICATIONS

GENERAL: Frequency range in MHz: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-30.0. 9 MHz crystal filter. 2.5 kHz bandwidth 1.7 shape factor at 6/50 dB. Automatic side-band selection, reversible. Completely solid state. All circuits permeability tuned. Tuning rate approximately 25 kHz per revolution. Size: HWD 4 1/2" x 13" x 7". Weight approximately 5 lbs.

RECEIVER: Sensitivity less than 1/2 uv for 10 dB S + N/N. Backlash less than 50 Hz. S-meter. AGC fast attack, slow delay. CW side tone. Incremental tuning. Separate af and rf gain controls. Frequency response 300-3000 Hz. Distortion less than 2%. Built-in speaker. Drift less than 100 Hz. Dial accuracy ±5 kHz (slightly more in 28 MHz).

TRANSMITTER: Power input: 5 watts PEP SSB, 5 watts CW. Output circuit: broad band 50-75 ohm impedance. Actuation: Press-to-talk. Full break-in for CW. Built-in SWR bridge. Integral TVI filter. Drift less than 100 Hz.

TEN-TEC dealers will have Argonauts in stock soon. If there is no dealer in your area, order direct and include \$2.00 for shipping. Tennessee residents, add 3 1/2% sales tax).

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You've probably heard that it's very difficult to pass the FCC License exam. For un-trained men, it is hard. In fact, an average of two out of every three men who take the FCC exam fail.

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Net	QNI	QTC	Net	QNI	QTC
KRN	356	26	KYN	303	271
MKPN	322	84	FCATN	70	5
KTN	1192	172	KPJN	63	27
KRTN	38	9	KNTN	222	126

Kentucky has had good response to ARRL's request for more QOs. The three appointed this month represent a 150% increase. Our nets are doing an FB job on QNI but we need more traffic. This is especially true if we are to be in practice for the upcoming SLET. Don't forget to attend the SLET net meeting in Louisville in Jan. K4YCB has a new SB-200, WA4AGH has new SB-300/SB-400. KA4VX has a new mobile and W4BTA has new 2-meter IRL. W4OXM and WA4MEX are building new linears. WA4JQS has been running phone patches for the Maritime mobile boys WA4MEX has been out beating the bushes for ARRL members and came back with eight. The Lexington Blue Grass ARC will sponsor a "Ham of the Year" award for some deserving Kentucky amateur. Many Kentucky hams received Public Service Awards for their work in the CD/CAP exercise back in July. Traffic: WB4PVC 194, W4BAZ 137, W4OY1 116, W4CID 85, WB4PS1 84, WN4UGU 82, WA4JQS 79, K4MAN 79, K4TRT 75, WA4VZ7 75, WA4AGH 69, K4UNW 67, K4TXJ 58, W4BQR 55, WB4AJN 44, WA4NH 41, K4LUL 39, WA4DYL 35, W4OXM 31, WN4PW 27, WA4MXD 24, K4YZU 23, K4VA1 15, WA4AF 13, WA4GHQ 13, WB4KFR 10, WA4AVV 9, W4BTA 5, K4FPW 5, K4HOE 4, K4AVX 3, WA4WVA 1. Total reports 32, Traffic: 1613.

MICHIGAN - SCM, Ivory J. Olinehouse, WRZBT Asst. SCM; R. Peter Tremi, WRKZ. SEC: W8MPD. RMs: W81YA, WRKTN, W8WVL, K8KMQ, W8BDT. PAMS: WA8TAN, K8MJK, K8PVC. VHF PAMS: K8AFM, WA8WV.

Net	Freq.	Time/Days	QNI	QTC	Sex.	Mgr.
QMN	366.3	2300 Dv	473	258	59	W81YA
WSSB	39.55	0000 Dv	754	87	50	K8PVC
BR/MEN	39.30	2230 S-F	845	69	26	WA8TAN
OPEN	39.20	2230 Dv	365	33	50	K8MJK
GLETCN	39.12	0130 Dv	726	61	30	W8KFR
PON	39.55	1600 Dv	831	505	30	K8LNF
PON/CW	3645	2400 M-S	163	22	26	VE3JPC
Mt.6M	50.7	0000 M-S	156	16	18	WA8LRC

Oakland Co. ARRL net reports QNI 52, QTC 5 in 5 sessions. Calhoun County reports 2 ARRL net drills. Silent keys: W8DLP, W8LUD, W8ZOW, W8NWZ and W8SOF. New officers for QMN are W81YA, gen. mgr.; W8PIM, sec.; treas.; and W8LXY, editor of the Bulletin. New officers for CARS are W8DT, pres.; K8PNZ, vice-pres.; K8CVV, secy.; W8PO, treas. Motor City ARC elects W8SFE, pres.; W8NHIA, vice-pres.; W8SYPY, secy.; K8HFN, treas. W8LCC is new at Hillsdale and W8N8 KQX, KOY, KRI are new at Onnaco. W8N8 GKB, HIF and IH are now General Class licensees. K8FQO and W8LAD are hospitalized. W8DTH is sporting a new wheelchair. The tower at K8CJO is a good lightning rod; tower and antenna were damaged but the station equipment escaped. GCRG hams furnished communication for the Linden Fire Dept. during a storm with 2-meter gear. W8LRB has new Regency on 2-meter fm. W8RDU is adding height and beams to his tower. W8CRP has a new rotor and control for his beam. W8RMI upgrades from Ten-Tec 2-watt to SB-100. PON Amateur of the Month is W8DCN. W8ZHZ is now stationed in Adana, Turkey with the call sign 3Z and is on 14 and 21 MHz bands cw and is looking for Mch contacts. W8CVO worked Minn. on 432 MHz in Sept. Traffic (Sept.) W8WZI 281, W8PIM 162, K8LNI 150, K8ZJU 135, W8NSQ 107, W8LXY 106, K8DYI 105, W81YA 81, W8ZBI 60, W8BDU 57, W8LZ 53, K8PVC 49, W8BBJ 57, W8L 53, K8ZDF 36, W8MO 30, W8NOH 28, W8RONZ 27, K8FD 20, W8SHYB 23, W8KXR 22, W8QJ 22, K8CPW 18, W8BLU 13, W8DCN 15, K8IAK 15, W8IRG 14, W8PK 14, W8KBZ 14, W8TBP 14, W8BEZ 13, W8LNU 12, W8WVL 12, W8BCW 10, W8LUC 10, W8L 10, W8VXM 10, K8UHA 9, W8SWI 9, K8AC 8, K8GDU 8, W8KUP 6, W8H17 5, W8BIM 6, K8AFM 6, W8WV 5, W8RANR 3, W8BRYX 3, W8BDKQ 3, K8TY 2, W8WQ 2, W8WYI/8 2, K8KCD 1, W8RHZ 1, (Aug.) W81YA 6, K8MJK 53, W8RHZ 48, W8VBY 50, W8NOH 17, W8BHPY 10.

OHIO - SCM, Richard A. Lgbert, W8L1U - SEC: W8OU, RME: W8IMI, PAM: K8UBK, VHF PAM: W8ADU.

Net	QNI	QTC	Sex.	Freq.	Time(Z)	Mgr.
OSSBN	2452	1015	62	3972.5	15.30/2345	K8UR
06M	758	488	64	3580	0000/0300	W8L
06MTrN	441	58	60	50.61	0000	WA8AD
				50.16	0200	
OSN	218	61	30	3580	2325	WA8WA
BN RITY	202	68	30	3605	2300	W8BYU

W8CRJ and K8ONA made BPL for Sept. The first certificate recipients of the BN RITY Net are K8NCV, W8WVS, W8YX

(continued on page 114)

INTRODUCING:

TRANSCEIVER

FROM



Introductory Price ... \$895.00 including matching speaker and AC power supply as shown. Optional DC supply available.

SSB TRANSCEIVER DIGITAL 500

A new all band SSB/CW transceiver featuring digital frequency read-out and 500 W. PEP SSB input. This sophisticated hybrid transceiver uses 49 silicon transistors, 6 FET's, 42 diodes, 30 IC's and 6 tubes to provide smooth, high quality performance over all of the 3.5, 7.0, 14.0, 21.0 and 28.0 MHz bands. The Digital 500 measures only 13 1/4" x 7" x 12 1/2" deep; power supply/speaker measures 6" x 7" x 12 1/2".

FEATURING:

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- 500 W. PEP SSB; 400 W. CW.
- Built-in Noise Blanker.
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A true value in 2 meter FM, the Tempo fmv is the father of the Tempo VHF line. This small package offers operation at 12 volts, or with the accessory power supply, at 110 volts, for 10 watts output. An unmatched design at any price, the fmv offers high quality and top performance at a reasonable cost: The Tempo fmv... \$245.00

TEMPO fma



The Tempo fma is the top of the Tempo VHF line. This transceiver offers all of the famous Tempo quality and performance at 25 watts of power output. The unit also features a low power position for 10 watts output to conserve battery power. Here is a true value... \$345.00

TEMPO CT220 TR



The Tempo CT220 TR FM/AM transceiver is a truly unique, top quality little giant offering features never before offered in any unit at this price.

TEMPO fmp



Truly mobile, the Tempo fmp-3 watt portable gives amateurs 3 watts, or a battery saving 1/2 watt, FM talk power anywhere at anytime. With a leather carrying case included, this little transceiver will operate in the field, in a car, or at home with an accessory AC power supply. The battery pack is of course included only \$221.00

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Tempo also offers a full line of 2 meter FM amplifiers for mobile or base station operation. Output ranges from 25 to 120 watts for drive power of 1, 5, or 10 watts. Tempo CT1002 10/120 VHF Amplifier \$220. Tempo CT802 10/80 VHF Amplifier \$160. Tempo CT252A 1/25 VHF Amplifier \$85. Plus six other amplifiers

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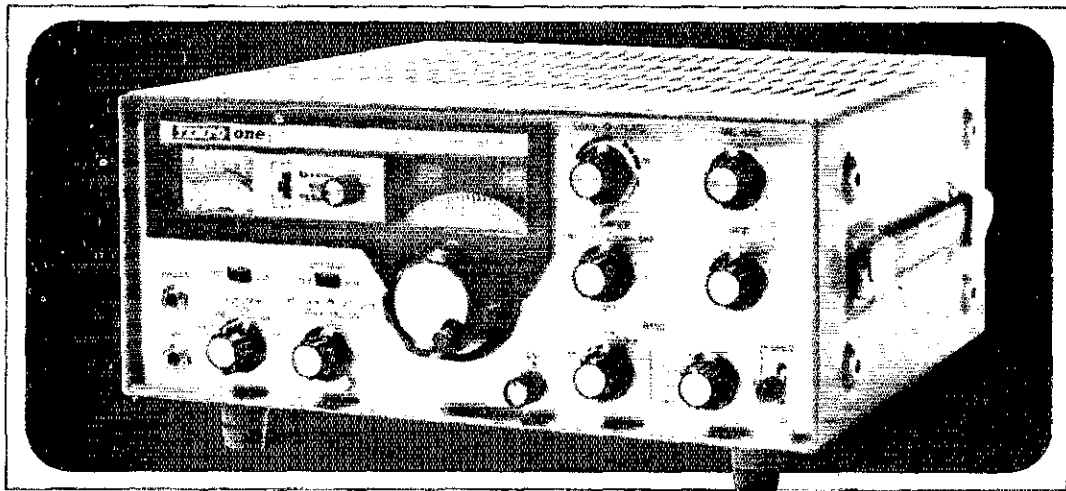
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SPECIFICATIONS

FREQUENCY RANGE: All amateur bands 80 through 10 meters, in five 500 khz. ranges: 3.5-4 mhz., 7-7.5 mhz., 14-14.5 mhz., 21-21.5 mhz., 28.5-29 mhz. (Crystals optionally available for ranges 28-28.5, 29-29.5, 29.5-30 mhz.)

SOLID STATE VFO: Very stable Colpitts circuit with transistor buffer provides linear tuning over the range 5-5.5 mhz. A passband filter at output is tuned to pass the 5-5.5 mhz. range.

RECEIVER OFFSET TUNING (CLARIFIER): Provides \pm 5khz variation of receiver tuning when switched ON.

DIAL CALIBRATION: Vernier scale marked with one kilohertz divisions. Main tuning dial calibrated 0-500 with 50 khz. points. Each revolution of tuning knob covers approximately 15 khz.

FREQUENCY STABILITY: Less than 100 cycles after warm-up, and less than 100 cycles for plus or minus 10% line voltage change.

MODES OF OPERATION: SSB upper and lower sideband, CW and AM.

INPUT POWER: 300 watts PEP, 240 watts CW

ANTENNA IMPEDANCE: 50-75 ohms

CARRIER SUPPRESSION: -40 dB or better

SIDE BAND SUPPRESSION: -50 dB at 1000 CPS

THIRD ORDER INTERMODULATION PRODUCTS: -30 dB (PEP)

AF BANDWIDTH: 300-2700 cps

RECEIVER SENSITIVITY: 1/2 μ v input S/N 10 dB

AGC: Fast attack slow decay for SSB and CW.

SELECTIVITY: 2.3 khz (-6dB), 4 khz (-60dB)

IMAGE REJECTION: More than 50 dB.

AUDIO OUTPUT: 1 watt at 10% distortion.

AUDIO OUTPUT IMPEDANCE: 8 ohms and 600 ohms

POWER SUPPLY: Separate AC or DC required. See AC "ONE" and DC "ONE" below.

TUBES AND SEMICONDUCTORS: 16 tubes, 15 diodes, 7 transistors

DIMENSIONS: 13 1/4"W, 5 1/2"H, 11"D

WEIGHT: 17.5 lbs.

TEMPO "ONE" TRANSCEIVER

\$315.00*

AC/ONE POWER SUPPLY

117/230 volt 50/60 cycle . . .

\$104.00*

DC/1-A POWER SUPPLY 12 volts DC

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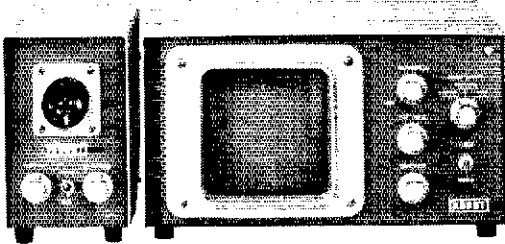
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I have the following to trade: (what's your deal?)

Ship me the following New Equipment.

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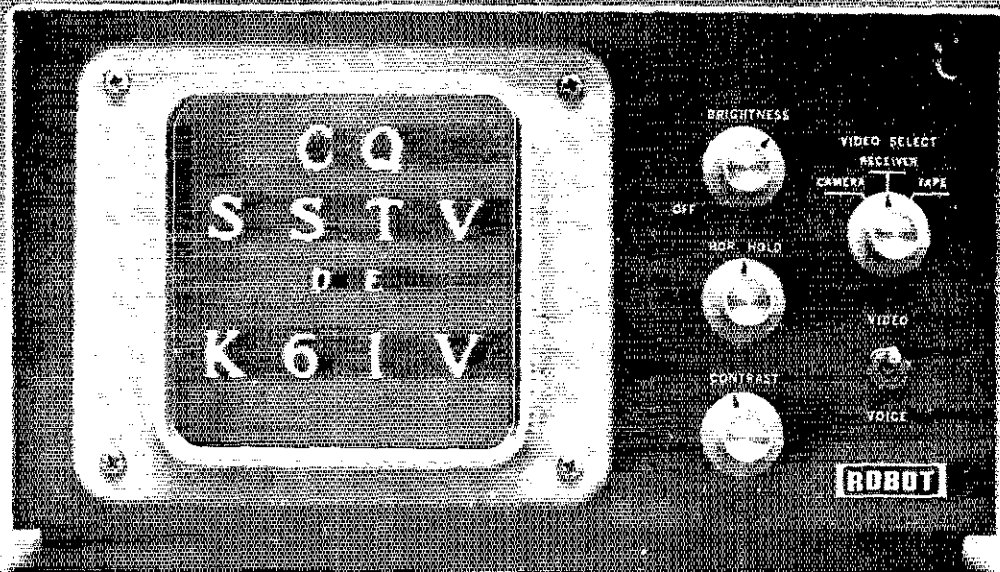
Send Reconditioned Equipment Bulletin

WARAYS, W8ORL, and W8UPA. Regular participation in the Ohio Slow Net earned certificates W8ENI, W8BIUK and W8BAYC. OSSBN hosted a traffic net meeting at the Findlay Hamfest. All our section nets were represented, as was 8RN and a number of ARIC nets. New appointees: WA8QLL as OQ/OPS/ORS, and WA8RSP as ORS. The annual ARPC & I.O Bulletin which reports the section standings in ARIC and traffic activities each year shows Ohio pretty much at the top of the pile. During 1970 we had both the highest traffic totals and the highest number of traffic reports. We also made it to the top of our category ARIC-wise. OVS WA8YFV reports poor conditions during the VHF QSO party and says that propagation was better on 220 MHz than on the other bands. WA8STX reports on the dedication of Queen City Emergency Net's new station with Red Cross VIP's in attendance. The Greater Cincinnati ARA Stagfest was a big success. Canton ARC's new officers are: WA8GSV, pres.; W8DGO, vice-pres.; W8GYR, secy.; treas. SFC W8DUU reports a total ARIC membership of 1374 members operating 40 local nets, 42 of which have NIS liaison. The Toledo area Ham Shack Gossip editors W8RZM and W8RZN celebrate their eighth anniversary with the publication. Springfield ARC re-elected W8RAJC, pres.; WA8HDF, secy.; WA8IKN, treas. New vice-pres. is W8DUI. Dayton ARA makes a transmitter and receiver available to Novices for a two month period for a modest fee. Beginners need to have an antenna installed and gear is on a first come first served basis. Welcome to newly-affiliated Roger Bacon ARC (Cincinnati). W8GDQ was a participant in a panel discussion on amateur radio over W8RO in Lorain. We regret to report the following Silent Keys: W8DN, WA8MRW and W88GJA, LC W8OF. reports that the ARIC-CD Radio Club operated a traffic demonstration booth at the St. Patrick Festival in Youngstown. W8BKM has been transferred to Boulder, Colo. Best wishes for a Happy Holiday season. Traffic: WA8FTX 349, W8RCD 287, WA8YUB 281, W8QUU 277, K8ONA 265, WA8QJK 234, WA8DWL 203, W8MOK 196, W8IMI 178, W8PMJ 164, W8RAL 157, WA8WPO 149, W8CU 148, WA8WAK 147, W8IMD 138, W8CFL 125, WA8UPI 114, W8CJT 112, K8RPX 107, WA8ND 106, WA8ZTV 101, W8RCWD 90, WA8LW 78, WA8NOQ 78, W8BIOK 77, W8GVX 75, W8RCV 74, K8LMO 72, WA8YFV 70, WA8CQ 61, WA8VWH 61, WA8HGH 58, W8OZK 56, W8ID 51, K8LGA 48, W8GRT 47, W8ETU 45, W8OF 40, W8BHL 39, WA8SI 37, W8RAJC 31, W8BAYC 31, W8OUH 31, W8UX 30, W8VND 30, W8LKY 29, W8NSD 29, K8LXA 28, W8HGG 28, W8BNC 26, WA8MH 26, WA8YB 26, WA8VKF 24, WA8ADU 23, W8BRIH 22, W8GNL 22, W8GCE 20, K8OYR 19, WA8RW 16, W8BFF 15, W8IRD 14, W8BND 14, WA8MBV 14, WA8RUO 14, WA8SH 14, WA8LAM 13, WA8STX 12, W8GTS 11, W8GRG 9, WA8COA 8, W8MCC 8, K8DUI 7, WA8IH 7, WA8EBS 5, W8RCK 4, W8DYF 4, W8LZL 4, WA8JSW 2, WA8MCR 2, WA8ZNC 2, W8NAL 18.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2SJM - Asst. SCM/PAM: Kenneth Kroth, WR2VJB. SFC: W2URP. RM: WA2VYS. VHF PAM: WB2YOU. Best holiday wishes from all of us. Nets: See last month's column for times and frequencies. FM repeaters covering FNY now include K2AYP, W2CVT, WB2NNZ and WB2BLQ. For details send an SASE to ARRI III, and ask for the Repeater Directory. While you're at it, ask also for the new Net Directory. On the club circuit: In Sept. the Communications Club of New Rochelle heard WB2WWD on new Kirk antennas. WB2ZQV is pres. of the Crystal Valley RC in Valley Cottage. Harmonic Hills now operating repeater under WA2KXM's call. The Schenectady ARA heard a tape and color slide talk on ZA operation arranged for by W2PV through DI 7FT and group. The Schenectady Museum is now the permanent site for W2IR. Youkers is well under way on second season since reorganization. Individual station activities: WB2JLR made 5BWA5. Congrats. New calls in Schenectady area reported by instructor W2AMM are WN2s AXR, AXS, AXV and WN4UZG. More classes already under way - details from WB2RDB. WB2AJD is back after coast guard hitch. WB2IAW joined the fm actives. K2RKS reports summer vandalism to coax now repaired. At RPI, WA2HIV reports new Swan 600 setup waiting at home and DX40/BC454 at school. Congrats to Asst. SCM and XYL on new harmonic, K2SJM and WA2QLG to Kansas City to visit harmonic K2RRZ and bride, WA2RAU getting ready for Africa trip next month. K2CSO activated ARIC along with RACES during floods in Rockland county, with 7 members assisting. Noted presence of 12 CB units, too. "Not said"? Other "hot" ICs are WA2JWL in Westchester, WA2LAH Albany, W2PKY in Schenectady. Rensselaer going in with Albany needs own IC. Candidates please contact W2URP. Where are the other counties in FNY? Reminder to all appointees: regardless of expiration date, please apply for renewal NOW so all appointments will renew automatically!!!

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qualified) at start of year. New sticker endorsement plan of CD makes this a real time-saver. Send yours in! Traffic: (Sept.) WA2VLS 207, WA2HBI 90, W2URP 48, WB2IXW 33, WB2LXC 27, WA2SVH 23, K2JSN 17, WB2KDC 12, WA2JLV 11, WB2AJD 9, WA2JHO 7, WA2EAH 6, WA2QCY 6, K2RKS 3. (Aug.) WA2VLS 36S, WB2VJB 56, WA2VYS 45, WB2JLR 92.

NEW YORK CITY AND LONG ISLAND - SCM, Fred J. Brunjes, K2DGI. SEC, KEOVN. RM, K2UAT. HF, PAM: WA2UWA. VHF, PAM: WB2ROF.

NLI*	3630 kHz	1945/2200 Nightly	WB21GI Mgr.
NLI VHF*	145.8 MHz	1900 MTWTF	WB2ROF PAM
NLI Phone*	9925 kHz	1600 Dy	WA2UWA PAM
Clear House	3925 kHz	1100 Dy	WA2VYT Mgr.
Mac Harad	3925 kHz	1100 P.A. Su	
East U.S.	3685 kHz	0900 Nightly	
All Svc.	9925 kHz	1300 Dy	W2OE Mgr.
NYSPTEN	3925 kHz	1800 Dy	WB2HLV Mgr.

*Section nets: All times are local. Best Wishes to all for the holiday season! Items this month worth noting: New meeting place for the New York Radio Club, The Williams Club, 24 East 39th St., New York, 2nd. Moa. of the month, in the Gov. Lehman Room, The American Red Cross Emergency RC Net on Fri. 7000 local 28,835 MHz. Our NLI cw and phone nets are looking for help for outlets into Nassau County. How about giving the NLI people a hand in delivering their traffic. Check in once in a while at least (twice a week would be great) to possibly help out. WB2OYV is really shaming away these days with a new Heath keyer! W2DBQ is active on 2 meters with a new ho transceiver. W2PF is the fellow to contact for tickets to the 62nd. Annual Banquet of the Radio Club of America, to be held on Fri. Dec. 3, 1971, at the Belmont Plaza, N.Y.C. Congratulations to WB2AXZ, jr. op of W2JTP, who has up-graded to General Class from Tech. WN2ABN is hard at work making those contacts for WAS and DXCC since obtaining his license. He and WNIMYA are looking for support in a Rag Chewing Net for high school students. Anyone interested can contact them. WA2OUB is now active from the Bronx with an H1-37 on all bands. WB2AQC was visited by JA2LOP and PZ1AC. WA2BAV put together a Heath SB-200 which recently survived the "smoke test" and she is now burning up the ether in all kinds of DX contests. By the way, for those not aware of it, WB2AQC is the chap who for at least 6 years had pushed for the "now law" document that gives newly arrived "ham" immigrants the privilege of obtaining a license. Thanks George! Those of you who may be interested in a 15-meter Slow Speed Net, should contact Dave Granoff, WN2BYV, 31 Crossbow Lane, Commack, N.Y. 11725, WA2YMP of QRP Int'l. is a Silent Key. We lost another chap to Fla., WB2FDH! Often requests arrive for publication, announcing a scheduled activity. In most cases I cannot include it in this column because of the fact that the column appears 2 months after the activity is over (this column written in Oct. If at all possible forward material as early as possible so it may be published before, not after the fact! WB2QNZ is a new General Class licensee! That's it for this year, the best to all in '72, Traffic: WB2LZN 389, WB2LGA 303, W2EC 94, WB2OYV 93, W2GKZ 83, K2JFE 13, W2DBQ 11, W2BCB 10, WA2MDX 8, W2PF 6.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZZ - SEC - K2KDO, RMs: WA2BAN and WA2TAF, PAMS: K2KDO and WA2TAF.

Net	kHz/Time (PM)	Days	Sess.	QMI	T/jc.	Mgr.
NIN	3695	7:00 Dy	50	477	347	WA2BAN
NIN	3695	10:00 Dy	50	234	134	WA2BAN
NIN	3740	8:00 Dy	15	39	14	WA2FVH
NYSPTEN	3950	6:00 Dy	30	470	119	WA2TAF
PVLEN	145710	7:30 Dy	30	176	48	WA2JIM
EACTN	145800	8:30 Dy	25	135	58	WB2LW

WA2BAN reports that NIN needs help in Bergen, Sussex and Warren counties. WA2PLU received his Extra Class ticket. W2CU reports he has 98 countries confirmed for his DXCC. WB2KNS has a new EA-33 for chasing DX and a Ringo for his 2-meter fm. WB2ALH, WA2JNO and WA2JNO all joined Navy MARS. WA2FVO moved to Sussex County. WA2CRF will spend the winter in 4X4-Land. WA2PCS has a new Galaxy V. WB2LW is looking for donations for the Adams School RC. He has many interested Novices in the group. K2OWR is moving to Mt. Olive and is planning a tower raising party. The K2DEL group were washed off their mountain top location during the Sept. VHF roufest. WB2OUZ put up a new EA-33. We are still looking for news from the clubs in the section. This is your column. Hope we can hear from more of you. We wish everyone a very Merry Christmas and a Happy New Year. I hope Santa can put this QM back on a thirty-five hour week. Traffic: WB2TUL 335, WA2BAN 298, WB2RKK 270, WB2DIX 187, WB2LW 172, WB2AFH 112, W2CU 99, WB2KNS 74, K2RXQ 48, WB2NOM 45, WB2JAE 42, WA2JNO 42, W2ZTP 38, WA2NLP 31, WA2PL 29,

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MIDWEST DIVISION

IOWA — SCM, Al Culbert, K0YVU — SEC: K0LVB. Guess I will have to recruit a new "informant" on the results of the quarterly FCC exams in Des Moines. W0SFI has retired from Des Moines Tech., and now is on the staff of the Area Community School at Ankeny. WN0FL and WN0EM are a new father and son Novice team from Elgin. WA0YJW now has a Drake 4-line and is a regular on TLCN. New appointees are W0FZO as OBS; WB0AAM and WA0UPS (XYI) of WA0JCL as OVSS. K0LKH has moved to a new location at Ames. WA0PJ had quite a summer, 6 weeks at Air Force ROTC summer training plus 6 weeks as a Forest Fire fighter in Boise National Forest. The never ending battle on 160 between W0NEL and W0KUS is taging as fierce as ever, with W0KUS recently working a VK. WA0UAY/J at Osage is faced with that age old problem of making an antenna fit a too small lot. Your net managers would like to see a larger source in the QTC column, and I would like to make special plea for greater participation in our section cw net.

Net	GMT	KHz	QNI	QTC
Iowa fone	1830	3970	1436	102
Iowa fone	0000	3970	1657	52
TLCN cw	0030	3560	124	51

Traffic: W0LCX 708, K0DDA 110, K0AZJ 91, W0MOQ 73, WA0AUX 65, WA0UB 61, WA0VZH 52, K0MST 14, K0YVU 14, K0OOD 12, WA0PTX 10, W0BW 8, WA0YJW 5, WA0PJ 4, K0LKH 1.

KANSAS — SCM, Robert M. Summers, K0BXF — SEC: K0LPE. PAMS: K0JME, K0FNU. RMS: K0MRI, WA0TZK. VHF PAMS: WA0UCW, WA0TRO. Reports came in rather slow this month. We will all miss W0FER, who passed away Sept. 11. WA0NXD reports the Salina group still working on 2-meter autopatch. W0FCL reports 21 years (Oct. 1971) operating under same call. MMM Sept. report QNI 1299 including 115 mobiles, handling 140 QTC and 94 phone patches or calls. K0OWW was 10,000th QNI. Ks Wx Net, QNI 674, QTC 14 in 30 sessions. Ks EC Net, QNI 37, QTC 1, 20 sessions. QKS, QNI 553, QTC 170, 60 sessions. Ks SB Net, QNI 1141, QTC 113, 25 sessions. Ks P. Net, QNI 266, QTC 23, 16 sessions. Zone 1 AREC Nets — 75-meter net, QNI 69, QTC 3, 4 sessions. 2-meter net, QNI 100, QTC 1, 4 sessions. Zone 3 — AREC 75-meter net, QNI 75, QTC 9, 4 sessions. Zone 4 — AREC 2-meter net, QNI 34, QTC 1, 4 sessions. Zone 5 — AREC net, 75-meter, QNI 32, 4 sessions. Zone 5 — 2-meter fm AREC net, QNI 21, QTC 0, 4 sessions. Zone 7 — AREC nets, 75-meter, QNI 57, QTC 4, 4 sessions; 2-meter, QNI 37, QTC 0, 4 sessions; 2-meter AREC net, QNI 28, QTC 0, 3 sessions. Zone 9 — 2-meter un AREC net, QNI 19, QTC 0, 4 sessions. Zone 12 — AREC, QNI 57, 9 sessions. Zone 13 — 75-meter AREC net, QNI 62, QTC 2, 1 phone call, 4 sessions. Zone 15-A 75-meter AREC net, QNI 50, QTC 0, 4 sessions. Traffic: K0MRI 181, W0HI 180, W0CHI 74, K0BXF 69, K0JME 66, WA0JEC 44, WA0LL 30, W0PB 30, WA0TAS 24, W0FCL 23, WA0LB 22, W0GJ 19, K0LPE 19, W0CZR 15, WA0YJW 15, K0GI 14, W0BGX 10, W0NYG 8, WA0SE V B, W0GUR 6, W0BCL 5, WA0OZP 5, W0FJ 4, W0BSRQ 4, W0BOWH 2, K0ZHO 2, WA0UT 1.

MISSOURI — SCM, Robert J. Peavler, W0BV — SEC: W0ENW. Appointment renewed: W0GJ as ORS, W0GJ and W0GCL have held continuous ORS appointments for as far back as my records go, and then some.

Net	Freq.	Time(Z)Days	Sevs.	QNI	QTC	Mgr.
HBN	7280	1805 M-F	22	400	32	WA0UFA
MOFON	3963	2400 M-S	26	659	66	WA0TAA
MOSSB	3963	2400 M-S	26	637	42	K0RPH
MSN	3703	2700 Su	3	18	3	K0BHX
MON	3583	0100 Dy	30	191	122	W0HI
MON 2	3583	0245 Dy	30	157	74	W0HI
PHD	5045	0130 F	4	96	7	WA0KUH

The St. Louis Amateur Radio Club named the Station W0C 1/0 at the Spirit of St. Louis Airport during the Powder Puff Derby; a large amount of traffic was handled. Congratulations to WA0VBG, who became the father of a boy; to K0SGJ, who received Advanced Class; and to new Novice WN0FKY (ex-WN0SBI). The Mules Amateur Radio Club (WA0WQA) in Warrensburg has 14 in a Novice class and 9 in the General class with WA0KDI, WA0ZES, K0LJH and K0BIX as instructors. Traffic: (Sept.) W0HI 238, K0YBD 152, W0BV 141, K0AEM 69, W0GUD 52, WA0HFN 37, K0BHX 27, K0SGJ 24, WA0KUH 13, W0GJ 9, WN0FKY 2. (Aug.) K0AEM 215.

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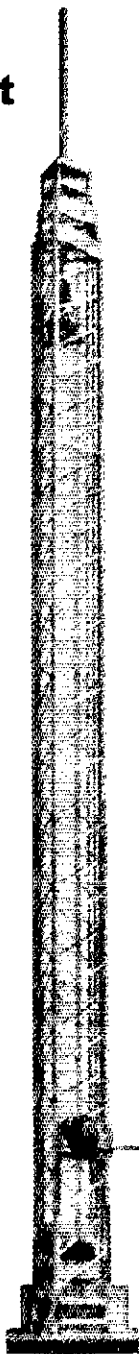
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NEBRASKA - SCM, V. A. Cashion, K00AL - Asst. SCM: Velma Sayer, WA0GHZ, SEC: K00DF. Appointments: WA00QX as EC; K00HT and WB0DTH as OPSs. Renewed appointments: WA0BOK as EC; WA0ORQ and WA0BOK as OPSs.

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NSN 1	3982	0030 Dy	1024	49	WA0LOY
NMN	3982	1230 Dy	1229	60	WA0JUF
WNN	3950	1300 M-S	612	30	W0NTK
AREC	3982	1330 Su	207	14	W0IR7
CHN	3980	1730 Dy	1110	30	WA0GHZ
DEN	3980	2000 M-F	196	6	WA0AUX
NSN 11	3982	2300 Dy	1020	60	WA0LOY

With regret it is reported that W0BM has joined Silent Keys. The West Nebr. Tech ARC will soon start a radio theory and code class. Ak-Sar-Ben ARC held their Hamtest and Steak Fry Sept. 12. WNBHT recently moved to Morrill from Chadron. Congratulations to W0CVC into the Nebraska Hall of Fame. Several candidates were running for Midwest Division Director and Vice-Director. Box Battle Co. 2-meter AREC net reports QNI 18 and QTC 1. WNBFBJ is a new Novice in Chadron. Traffic: W0LOD 222, WA0SCP 86, WA0VCN 32, K0TUH 29, WA0CJ 28, WA0HW 25, W0DMY 20, W0POB 20, WA00QX 20, WA0GHZ 19, W0CAU 18, W0HOP 18, K00DF 16, WB0DTH 13, W0NIK 13, WA0QEX 13, WA0BOK 12, K00AL 12, WA0PC 12, WA0YG 12, W0KPA 10, K0SEA 9, WA0LE 8, WA0YGZ 7, WA0LOY 6, WA0PIF 6, WA0JH 5, W0YFR 5, WB0CBI 4, W0DJO 4, WA0HQ 4, W0HTA 4, W0LJO 4, W0SWG 4, W0AGK 3, K0FEN 3, WA0CKC 3, W0RJA 3, W0VYX 3, W0ATU 2, WA0EEI 2, WA0IUF 1, WA0RZF 1, W0VEA 1.

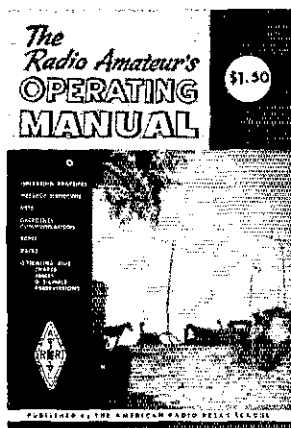
NEW ENGLAND DIVISION

CONNECTICUT					
Net	Freq.	Time/Days	Sess.	QNI	QTC
W1IHR	RM: K1EIR, PAM: K1YGS, VHF PAM: K1SXF				
CN	3640	1845 Dy	60	40.3	350
		2200			
CPN	3965	1800 M-S	30	5.30	207
		1000 Su			
VHF 2	145.96	2200 M-S	22	121	20
VHF 6	50.6	2100 M-S	22	111	11

High QNI: CN - W1CTI, W1KQY, W1MPW and WA1GFH. CPN - K1EFC, W1MPW, WA1NMZ and K1SXF. SEC W1IHR is considering changes in EC area coverage. You can be sure of the latest information on EC work by inviting him to your next club meeting. Director W1QV had very successful LO meeting at ARRL - many topics of interest covered ending with dinner party and tour of Hq.

W1NJM was the perfect host! Our thanks to RM K1EIR and CN members for the Memorial to honor a deceased net member. All cw operators are invited to QXL CN to provide statewide outlets - a fine CN Bulletin goes to all members! The Insurance City Repeater Club is very active and promotes high standards for the benefit of all interested in repeater work. The Hamden HARASCOPF and Danbury CARA Bulletin continue to be outstanding! Murphy's Marauders are a MUST for contest operators - join NOW! Congratulations to: WA0ZVF/1 for Advanced Class; W1M1YX for General and 20 wpm sticker; WA100U for Tech.; W1N1PE for Novice; Insurance City RC for ARRL affiliation; and to W1QV for completing 7 years as N. E. Director! The ideal Christmas present for all amateurs is LIFE MEMBERSHIP in ARRL. My sincere thanks and appreciation to all for making this another wonderful year. Merry Christmas to All! Traffic: (Sept.) W1EJ 276, WA1NMZ 178, W1E1W 169, WA1GFH 114, W1MPW 107, WA1MOW 99, WA1NTR 88, K1SXF 83, W1CTI 81, W1GVT 51, W1AW 50, W1EY 49, K1YGS 48, WA1NES 44, W1QV 43, WA1JSU/1 27, WA10FP 20, WA1KYI 19, WB2CHO/1 14, W1DQJ 10, WA10PR 10, W1YRH 10, W1RDI 6, W1C1H 4, G3XPM/W1 4, (Aug.) W1E1W 256, (July) W1E1W 223.

EASTERN MASSACHUSETTS - SCM, Frank L. Baker, W1AIE. Nets: New England Novice Net on 3720 Mon., Wed., Fri., 2330 to 2400 GMT with K1PNB as RM. Eastern Mass. CW Net, 3660 daily 0000 GMT with W1QYY as RM. Eastern Mass. 2-Meter Net, 145.5 MHz, Mon.-Fri. 0100 GMT, WA1E1F as PAM. 6-Meter Crossband Net, 50.85 MHz, Mon.-Fri. 0030 GMT, E1ORLE as PAM. SEC WA1AOG received reports from ECs: W1s L1, H1G, K1s N1W, Z1P, WA1s DM1, D1L. Your SCM has retired. Silent Keys: W1GE, W1G1DY, W1E1R, W1N1NDP, K1C1MS, W0J1, ex-1BVY/W1Z1H. Our K1MN needs outlets on Cape Cod. W1AAR is on the Barnyard Net daily 3960 from 48 to 9 A.M. W1NE reports some strong sun flare this month affecting all signals. W1RS is now in Sudbury on 6 W2CQX/1 Framingham is on 75. K1EPL reports the NE EPN had sessions, 99 QNIs, 6 traffic. W1BVV RO/EC had a nice writeup in the local paper. W1GDP is new in Quincy. WA1MJD is now in Holliston. W1MD was visited by T12WTC and T12DR. W1CE



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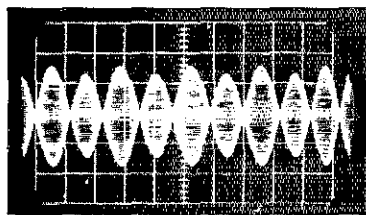
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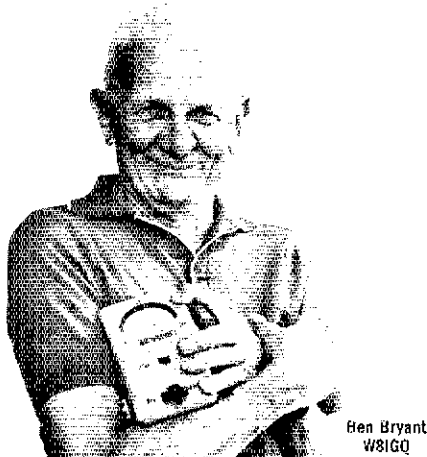
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W8IGQ

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Frequency Range	1.8-30 MHz	
Forward Power	2000/200W	1000/700W
Reflected Power	2000/200W	1000/200W
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Insertion VSWR	less than 1.10 (50 ohms)	
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Asst. RM in EMN. WAIRG moved down South. W1FOH is on 75. WNIPDM has an HW-16. K1WVW is on several nets on 6. K1CLM reports Intruders all over the place. EM2MN had 22 sessions, 61 traffic. 142 QNL. WA1MSB reports Early Eighty Free Net on 3833 at 6:30 A.M. had 245 QNL, 161 traffic. WA3QOZ is the brother of WA1NKL. Asst. Net Mgr. WA1NJI has a new TA-33 Jr. K1RAK is in the hospital. WIPI is doing some Intruder Watch. WA1MWN is active on 1.5. WB1CN is on a trip to Mexico. W1s AOF, BCN, QYY, AX, NEW, IPZ, LE, ALP, K1PNB were at the 10 meeting at ARRI called by our Director W1QV. W1EUJ worked FPBCA on 2 in Aug. W1BVI has weekly sked with W8AQ on 40 cw and also works K4JBU and W4IA. K1AXB, W1TZ's XYL was in the hospital but is now home. WA1NPV is an Advanced Class licensee. Many from this section attended the UNFN tune in NH honoring WA1CII. The Capeway RC met at QTH of W1QD. The OOTC held a luncheon in Hyannis. The QXWA met in Plainville. New appointees: WA1LXE as IC for Station, WA1MYK as ORS. Endorsements: W1s PJ, QMN, WA1DXI as IC's, W1TZ as OO and OBS; W1EUJ as OVS; W1SMO as ORS. WA1MWN reports working all 7 Whitman ARC Hilltoppers and is on the Rooster Net on 50.4. WA1HF has the Motorola hand-walkie for 2-meter fm. The Mast chapter NAHC is 6 years old (Dec.). K1UAF now in Lexington. W1JN home from VI. The 6-Meter Cross Band Net had 13 sessions. 55 QNL. WA1PEI is on 80 cw. WA1PCM ex-WB9BVI is on 40 cw. K1VHZ has Extra Class. K1LKM visited K7UGA's QTH. WA1OWQ is in the Weymouth CD Net. All N.E. states amateurs should monitor 3945. Chelmsford ARC held their first meeting. W1QYY sends out the EMN bulletin, which shows quite a few new NCS's. Traffic: (Sept.) W1QY 351, W1PEL 218, W1OJM 1206, WA1EYY 168, W1CE 145, W1EMG 109, W1ABC 102, WA1HF 93, K1PRB 41, WA1MYK 37, WA1WE 26, W1DAL 18, K1UAF 16, W1PJ 14, WA1DIC 13, WA1FM 13, W1MNK 12, W1AOG 11, W1EIN 8, W1ATX 7, WA1MWN 5. (Aug.) WA1MSB 94, W1EMG 71, K1PRB 32, WA1NJI 24, WA1MSK 17, W1ABC 12, K1LCO 8.

NEW HAMPSHIRE -- SCM, Robert C. Mitchell, W1SWX RM: WA1GCE. Acting RM: W1UBG. NH was well represented at the annual New England DXCC meeting by W1CLS, W1ACC, W1DXB, W1DYC, W1HTF, W1NHIF, W1HRI, W1FAM and W1SWX. New appointees: W1JY and W1BXM as OVS's; WA1JSD as OBS, K1RSC endorsed as IC for Rockingham County W7ZT and D15JL were recent visitors to K1HCS. W1CTW and W1CMV operated 6 and 2 atop Mt. Keagsage. Welcome to DJIUS, an exchange student, to Phillips Exeter Academy. W1UBG received a QSL from VP2AAA. W1MIX is again active on the net after a busy summer. W3ODV has moved to Bow from Md. Welcome. WA2CAK and family have left summer vacation at Lake Winnquam for NJ. W1UBG sent out an excellent bulletin about the NHVT Net. Welcome to new hams: WA1PJH, WA1PEI, WA1PEI, WA1PGW and W1N1PGX. The activity on the NHVT Net is increasing. W1NHIF is now W1N1PGC. Traffic: WA1FM 404, K1YMH 177, W1UBG 173, WA1MXT 122, K1RCS 90, W1LVN 8, W1SWX 5, W1MIX 4, WA2PEK 12.

RHODE ISLAND -- SCM, John F. Junson, K1AAV SEC: W1YNE, RM: W1YKO. PAM: W1TKL, VHE PAM: K1IFK. Appointments: W1YKO as RM, K1JYN as OO. Endorsement: K1QFD as ORS. R1SPN reports 30 sessions, 465 QNL, 47 traffic. The Fidelity Amateur Radio Club elected the following officers: WA1NOI, pres.; W1N1MU, vice-pres.; W1N1MOT, secy.; W1N1NSM, treas. The club has planned the following activities for the year: a trip to League Headquarters, one to the New England Wireless Museum and a local radio or TV station. The club also will hold its Annual Exhibit at the Shoppers Mall and will set up a working station to take messages for servicemen. W1QLD has started a class on general theory to help Novices upgrade their license. W1YNT is now operating on 6 meters. W1OP held their fifty-year affiliation with ARRI by holding a successful dinner dance and were presented a certificate from the League by W1QV. Traffic: W1YNE 193, K1QFD 9, K1VYC 4.

WESTERN MASSACHUSETTS -- SCM, Percy C. Noble, W1BVR SEC: WA1DNB, CW RM: W1DVW, PAM: WA1MFB, VHE PAM: W1KZS (Berkshire County). Western Mass. has approximately 550 ARRI members. We have 84 stations in the ARCC. Of these, 40 are full members and 40 limited. If you are interested in public service please drop a line or radiogram to our SEC, Robert Phoenix, WA1DNB, N. WASHINGTON ST., BELCHERTOWN, MASS. 01007. Our West. Mass. CW Traffic Net is in the doldrums. WMN welcomes traffic to any point in the country, and with its tie in with higher nets, we can deliver. Our West. Mass. Fone Net also needs more participating stations. Following are the W. Mass nets you are welcome on any or all: Emergency Net, Sun. 9:00 A.M. 3938; CW Traffic Net, Daily 7:00 P.M. 3560; Fone Net, Mon.-Fri. 6:30 P.M. 3915. RM W1DVW reports that WMN had 148 QNL and handled 107 messages. Top 5 in attendance were: W1BVR, W1DVW, WA1LNF, WA1FBE.

AHA! YOU THOUGHT GOTHAM

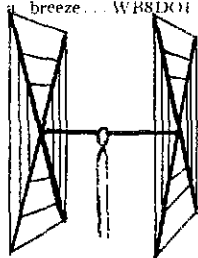
made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AR, DM4SEE, FL8SR, F6AUM, HK7VB in few hours. Instructions a breeze... WR8DO!

CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 7/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD.....	\$37.00
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BEAMS

"Just a note to let you know that as a Novice, your 3-EI, 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/4" 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 EI 20.....	\$21	4 EI 10.....	\$20
3 EI 20.....	27*	7 EI 10.....	34*
4 EI 20.....	34*	4 EI 6.....	20
2 EI 15.....	17	8 EI 6.....	30*
3 EI 15.....	21	12 EI 2.....	27*
4 EI 15.....	27*		
5 EI 15.....	30*		

*20-ft. boom

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, W43DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, W4LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWI, 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!

V40 vertical for 40, 20, 15,	
10, 6 meters.....	\$14.95
V80 vertical for 80, 75, 40,	
20, 15, 10, 6 meters....	\$16.95
V160 vertical for 160, 80, 75,	
40, 20, 15, 10, 6 meters...	\$18.95

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WA1LPI. The vhf PAM reports that K1EKK on Mt. Greylock is now on with 6-meter repeater on 52.76 in and 52.56 out. He also reports a great increase in the number of 2-meter fm stations. WA1KFN is now an Advanced Class licensee. WA1GPP (XYL of WA1LYX) is a new Tech. WA1MFB now has 92 countries worked with 62 confirmed. FB. During your SCMs confinement at the hospital he had the company for several days of K1PYX in the same room. Again this year CMARA is conducting classes for novice, technician and general. WA1MUH is this year's editor of HORA's Zero Beat. Speakers at their Sept. meeting were: WA1LPI, WA1DNB, W1CSF, WA1GOD and K1NGL. New officers at MARC are W1QKX, pres.; WA1JCK, 1st vice-pres.; WA1MWF, 2nd vice-pres.; W1GUL, secy-treas. At its Sept. meeting VARC enjoyed Ed Martinat's slides and Jack Dumont's video tape of Field Day. Traffic: K1SSH 175, WA1LPI 102, W1BVR 80, W1DVW 77, WA1LNF 39, W1KK 29, W1KZS 6, WA1MFB 4.

NORTHWESTERN DIVISION

ALASKA - SCM, Kenneth R. Klopff, KL7FVO KU7HAO has left the interior for a nice position in Juneau. Russ still has time to keep cw skeels on 40 with his Heath cw transceiver. He's been doing a lot of listening on 80 too, KL7DG and XYI participated in the Equinox Marathon at College. John's XYI finished first in her event. KL7DG is now on a low power kick and is operating a 5-watt Ten Tec on 40 and 20. His best DX so far has been with W7NS in Everett, Wash. KL7AEQ has been doing a lot of local work up here on 80 with an assortment of one and two transistor transmitters he has built up. Al may yet teach me cw. Talk about an active Novice! W17HFL has started a ham club at Main Jr. Hl. in Fairbanks. At his first session about 15 showed up. The word must have got around however, since 30 went to work at the second meeting. A great bunch of students, they've already had a bake sale to get equipment. The Arctic ARC has instituted the buddy system for helping neophyte hams as an experiment compared to formal classes. Media coverage is used to inform the potential hams who to contact.

IDAHO - SCM, Donald A. Crisp, W7ZNN - The FARM Net meets at 0200 GMT on 3935 kHz each day. The Idaho RACES Net meets week days on 3990.5 kHz at 1515 GMT. The Northwest Slow Speed Net meets on 3700 kHz each day at 0200 GMT. The Post Office Net meets at 0130 GMT on 3930 kHz on Tue., Thurs. and Sat. W7FTN is building an emergency power supply using an automobile alternator. A Spokane VHF group plans to move the 2-meter repeater from Mt. Spokane to Mica Peak which is located South East of Spokane. The new location is expected to give better coverage into North Central Idaho. P.O. Net reports 12 sessions, 7 check-ins, 21 traffic handled. FARM Net: 31 sessions, 91 check-ins, 29 traffic handled. Traffic: W7GHT 111, WA7BDD 43, W71Y 41, W7ZNN 23.

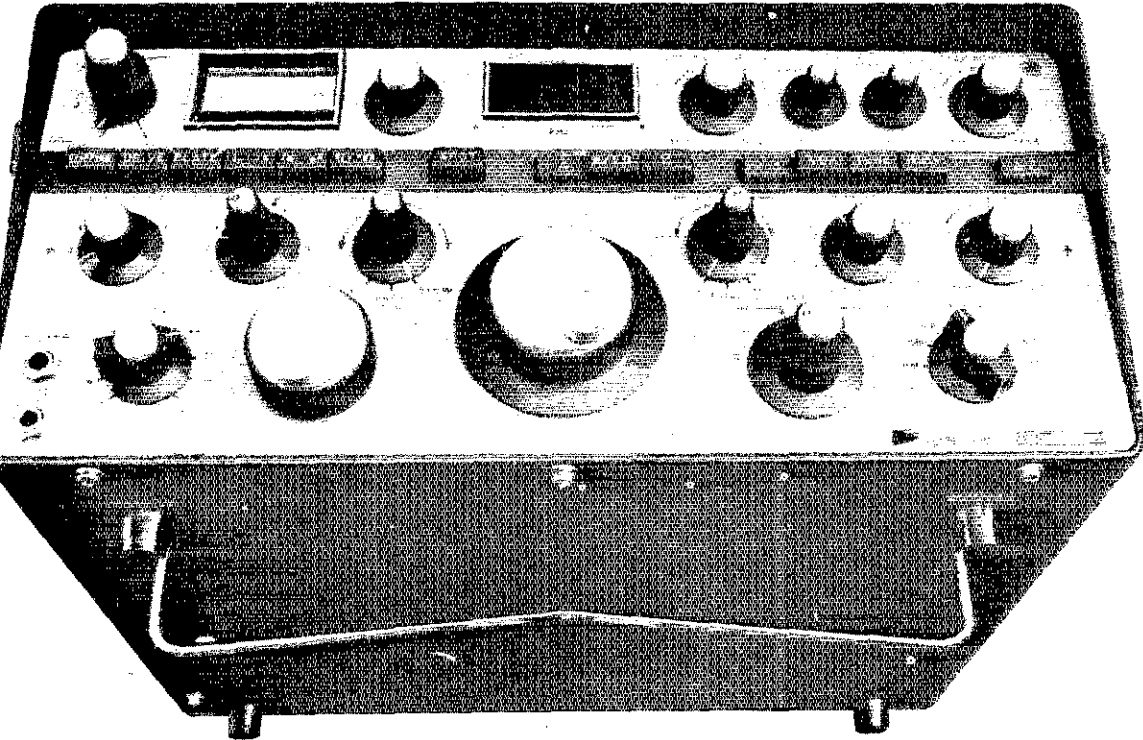
MONTANA - SCM, Harry A. Roylance, W7RZY - Asst. SCM Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. WA7KST took first place in the ARRL DX Contest for the Montana section. Pat and Owen, WA7IZR have a new girl. K7SIK can be heard daily on 2 meters between records from the KANA radio station. W7TYN and W7RZY attended the Northwest Director meeting in Seattle. Butte Amateur Radio Club again is sponsoring code and theory classes. The Post Office Net had 460 check-ins and 57 formal traffic and the Montana Traffic Net had 796 check-ins, 2 sessions and 50 formal traffic. More new calls appearing on two meters. FCC reissued a repeater call to Missoula which is WA7KZA. The Anaconda club held a county hunters day and worked many stations needing Granite and Deer Lodge county. WA7IZR has been appointed EC for Livingston and Park county. WA7OBH earned the Washington Amateur Radio Week award and also WAS on 1 meters. DJ2UU earned a Harjo award. Traffic: (Sept.) WA7JQS 11, W7LRK 40, WA7OBH 25, WA7IZR 15, K7BMT 11. (Aug.) W7LKK 130.

OREGON - SCM, Dale T. Justice, K7WWR - SEC: W7HL. RM: K7GGQ. PAM: K7ROZ. Section nets: WA7KIU reports for the Oregon State Net for Sept., sessions 22, check-ins 94, traffic 4. WA7BYP is active again and a regular on the OSN. New appointee K7HSJ as QVS. WB6KBI is attending school in Portland.

Net	kHz	Time (Z.) Daily
HSN	3908	2000-0130 Dy
OSN	3588	0245 1-8
ARFC	3998	0300 Dy
OEN	3980	0200-0300 Dy

Anyone interested in an appointment please contact your SCM or the above officials for information. Traffic: K7ROZ 166, K7N 153, K7OEG 140, K7OBF 121, WA7IES 61, WA7BYP 3, WA7MOK 18, K7WWR 18, W7LT 17, WA7KRH 14, W7HLE 1, W7MLJ 10.

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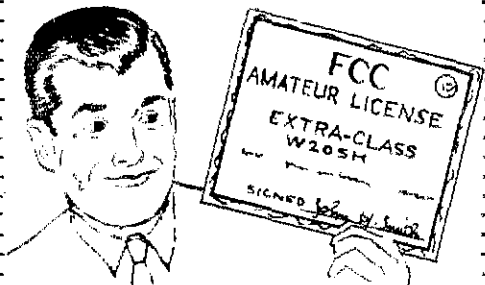
But in the CX7A, it's . . . all together. Affording you your finest hour as an amateur. And most any serious amateur can afford that when he wants the best . . . and wants to be the best.

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WASHINGTON - SCM, Arthur Henning, W7PI - SEC: W7UWT, RM: W7GYF, PAMS: W7GVC, W7MCW, VHF PAMS: K7BBO, K7LRD. New appointments: K7OZA as ORN; K7QSE, WA7OBC as OVS; W7GRS as ORS and ORS.

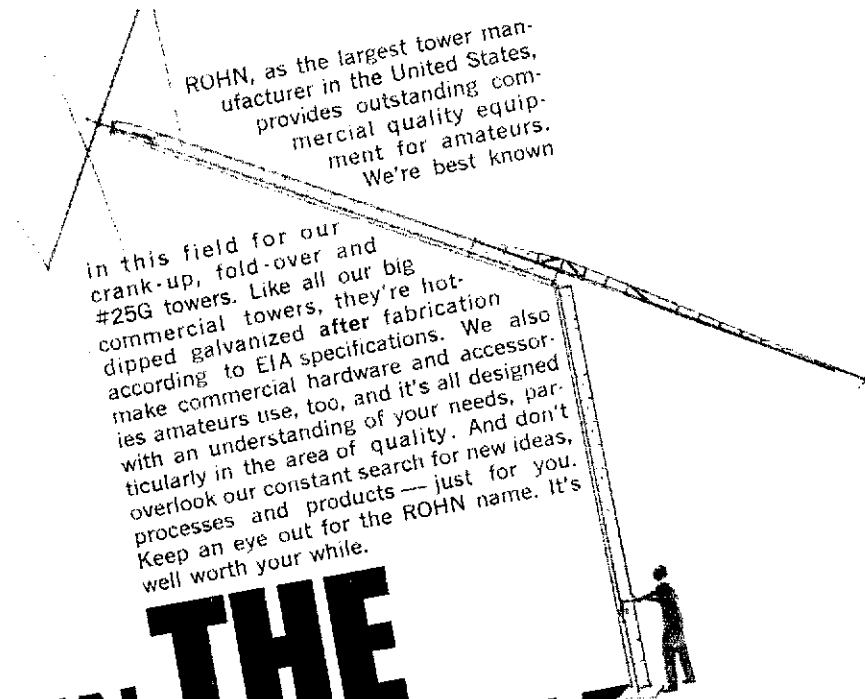
Net	Freq.	Time(Z)	QNT	QTC	Sec.	Mgr.
WSN	5500	0145	307	227	33	W7GYF
NSN	3700	0200	358	96	30	WA7HCL
NWSSB	3945	0130	974	140	30	K7KFC
NTN	3970	1840	1074	136	30	WA7HCR

The Walla Walla Silver Anniversary Hamfest had 472 registrants from 102 cities and 9 states, W7DK77, Puyallup Fair station made BPL with 340 originsations. Other BPLers W7BA and W7PI, W7BA has one more month to go for 20 years (240 times) continuous BPL, an outstanding record. W7GRS had hard week relaying Puyallup Fair traffic and says great bunch of ops at W7DK. W7CNK of Tacoma received the ARRL Technical Merit Award for his work on 220 MHz Moon Bounce. Western Wash. DX Club has dinner meeting second Tue. each month at Royal Fork, Mercer Island at 1900 local time. OO W7EXM is on leave of absence spending next year in England. K7IRI completed WAC. W7GYF now has DXCC total 208/197 and taking on Wed. night QNB spot to PAN. W7BQ is hitting ICC sled with model 28 RTTY and now in 10th year as RN7 mgr. PAN certificate received by WA7HCL. W7SAB reports activity is increasing on Slow-Scan TV WESTV Net at 7220 kHz 9:30 P.M., 8845 kHz at 9:00 P.M. W7IU traveled 1000 miles through 8 counties for county hunters. Refitting this Dec. is W7AXT. WA7LMO is now "GRID" with no traffic" on 6 meters, too. K7NZV is mgr. ARCC 2 Meter Net. New officers Spokane Amateur Radio Club are W7KTL, pres: K7BFL, vice-pres., WA7ROS, secy.: WA7NDY, treas. K7OKC in the Wash. QSO party with 2 watts sabb worked 22 contacts in one hour on 75 meters with an FB signal. Traffic: (Sept.) W7BA 918, W7PI 511, W7IKJ7 348, W7GRS 284, W7KZ 221, W7AXT 213, WA7HCR 195, W7BQ 125, WA7HCL 124, K7CTP 72, W7GVC 63, W7BUN 61, WA7OCV 60, W7GYF 59, W7MVC 59, K7OXL 52, WA7EDQ 48, W7APS 24, W7ZHJ 12, K7OKC 10, W7RXH 10, WA7LOV 9, WA7AVI 5, W7BTB 5, W7AIB 4, K7BBO 3, WA7GWL 2, K7NZV 1. (Aug) WA7LMO 9.

PACIFIC DIVISION

EAST BAY - SCM, Paul J. Parker, WB6DHH. W6FIS finally got new sabb gear and the new antenna up. All works fine for him now. WB6VLW reports activity in NCN. How many others can say they too belong to NCN? W6IPW reports that some state bars are getting special calls to handle public interest traffic. W6AKB reports working new DX on 20 cw. W6RQJ recently was appointed vice-chairman on the DX Advisory Committee. Congrats. Welcome to WN6NDR, a new Novice in Walnut Creek. Others in the section would like to hear what you are up to, so let me know. Traffic: W6IPW 327, WB6VH W 52.

HAWAII - SCM, Lee R. Wical, KH6BZE - Asst. SEC: KH6BZE, RM: KH6AD, PAM: KH6GJN, VHF PAM: KH6GRU, QSI Mgr.: KH6DO. ICs: KH6S GPQ, BAS, GKU and GLU, RACES Nets: Coordinate with Dick Hamada, Radio Officer. I wish to thank all of you for your continued support as your SCM for another term. I also wish to express my appreciation for your support in the recent Vice-Director, Pacific Div. race. May I further extend to all of you and your families the Best of Holiday Wishes from the entire Hawaii section staff. Mele Kelikimaka. KH6BJ and XYL did the fall Europe scene visiting PA0 and HB0 to name a few. KH6HJ and his XYL went through the Pacific Northwest. KH6HHD has a new Heath line with SB-220 linear and SB-610 and SB-620 outboard. KH6HJ visited KH6HDM/WA7NI W. KH6HJL reports he recently returned from the hospital and is feeling fine. KH6DBL left for the Mainland. WH6H7 serves as the local point for ham gear sales for the Honolulu ARC. The Honolulu DX Club demonstrated great expertise in last fall's WW DX contests. W6DAD/KH6, presy. of Honolulu DX Club will be attending commanders school. KH6HKH has been making the 40-meter cw scene quite often. KH6GDR reports that WB6IDR resupplied his solid state rectifier supply! Ditho reports KH6BZE. KH6HIG is the electronics instructor at Kauiha High and reports that their club station KH6GTT is again active. KH6GRC was home on leave from his USCG electronics instructor job in NY. KH6HGP made 5BWAS certificate No. 71. New pong. V60BF recently passed through the islands. KH6GOW also reports that XW8AX passed through KH6 recently on his way back to Laos. I received a nice note from JA1ADN. JA1DJV recently visited the Honolulu ARC. KH6GLU moved from the Wahiawa to the Makiki area. KH6I visited KH6BZE for an eyeball. KH6BB's XYL recently returned from the hospital and feels fine. KH6GOW is on the Diamond Head repeater with a 2-meter Standard 811-SH. KH6HICM and KH6GMP have new YAESU FT-21 2 meter 12-channel mobiles. KH6HIC is back on-the-air with a new YAESU FT-101. KH6RBI has a



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new FT-101. After beacon signals sent by KH6BZF on 40 and 80 meters cw to LA0AD and vice versa the 5BWAS watch by KH6BZF, HCM, CHC and RS was completed by KH6RS/LA0AD. Don't forget the 1972 ARRL SFT Jan. 29 through 30 '72. What can you do? Contact your acting SEC for details. Traffic: KH6BZF 16, WH6HJ 12, KH6HG1 4, KH6GOW 2, KH6BB 1, KH6BJ 1, KH6GDR 1, KH6GRU 1, KH6HGL 1, KH6HGP 1, KH6HHG 1.

NEVADA - SCM, Leonard M. Norman, W7PBV - SEC: L.L. Lewis Blain, WA7BEU/W6LBS, 560 Cherry St., Boulder City, NV 89005. WA2MEQ/7 still has GC5ANX QSL cards for those he worked QSL to 2522 Statz St., Apt. 1, N. Las Vegas, NV 89030. W7HW, Reno, is working in Las Vegas, and is active on 2-meter fm. WA7KZB has new wheels for his mobile. K7UGT, Reno 2-meter fm repeater rebuilt by WA7QQH, results in FB coverage. W7DFT had open house party. 450 seems to be getting popular in Las Vegas area. W7PBV enjoyed the SW Division AKKL convention. Mobilizing in the west remember WCARS-7255 daylight hours and WPSS-3952 at night. The Reno and Las Vegas repeaters provide good coverage on 34/94. WA7BAV gave examinations to 20 prospective novices. W7PKM and XY1 vacationed in Kt.-land. K7ZOK and XYL vacationing in the Ore. and Wash. area report lots of 2-meter fm activity. W7VYC and W7YNE moved into a new QTH. K7RBM on his second trip to K1.7-land. WN7QZB active at Viko and looking for many contacts. Traffic: WA2MEQ/7 8.

SACRAMENTO VALLEY - SCM, John F. Minke, W6KYA - The North Hills Radio Club is sponsoring a boy scout explorer post specializing in amateur radio. Those of you who are interested, (YLs included), contact W6KYA. The Golden Empire ARS started off their fall season with their annual steak-bake. Those of you in the Chico area interested in joining a club, contact WA6KVX, the GEARS pres. WB6ATM of Shasta County has been out of the country operating as XW8RC, H81AUM and now H8XJK. W6KYA needs HIR, so I'll be looking for you, Jack. The Calif. OSO Party was another success. Some of the SV counties heard were Del Norte, Modoc, Lassen, Plumas, Yuba, Sierra, El Dorado, Sacramento and Yolo. County hunters who missed these, try again next year. W6RFI is the newly-elected chairman of the California Amateur Relay Council and XY1. WA6KHD received her Technician ticket. Lonely? Join a club. Word is out that Japan has 200 thousand radio amateurs, which is almost as much as the U.S. Traffic: W6NKR 26.

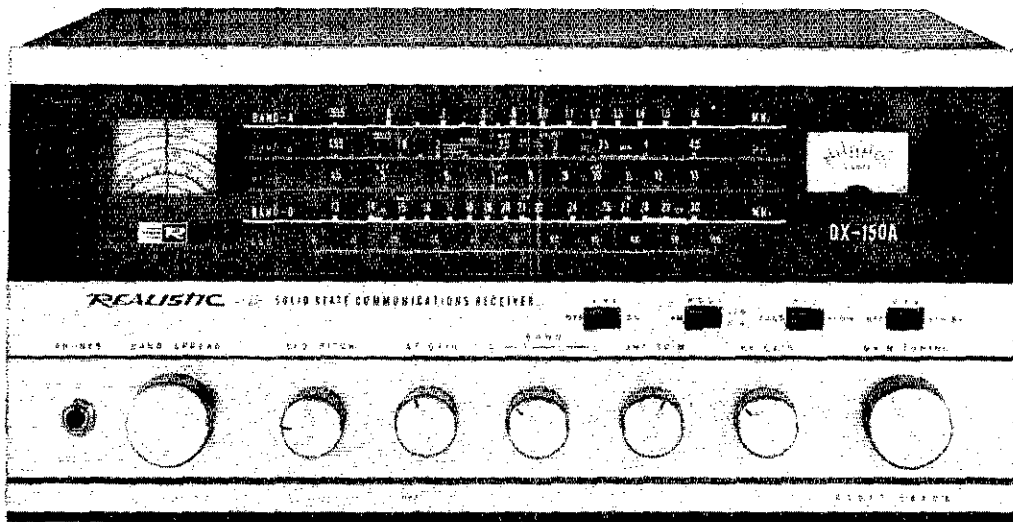
SAN FRANCISCO - SCM, Kenneth S. McTaggart, K6SRM - W6WLV is now NCN asst. mgr. for RN6 Hanson. W6GGK reports his homebrew transistor curve tracer gives some very revealing results. W6RQ, up to his usual frequency measuring antics, came up with 0.1 parts-per-million in the Sept. FMT. WB6JOP operated in northern Calif. for the OSO Party. The Valley of the Moon Club sent 110 messages from the annual Vantage festival in Sonoma Valley. W6SLX reports that the Humfoldt Club had a successful picnic at Trinidad. W6RWV adds that members of the Far West Repeater Assn. from Del Norte also attended. Anyone interested in nets should send to Hq. for the new net directory...zerry interesting! Enclose an SASE legal-size envelope with your request. W6SLX went to the SW Division Convention and bumped into W6W5X, ex-W9GCM, who started him in "ham" radio in Colorado in 1930. W6KVO remains busy with various nets on 20, 40 and 80 meters. K6UGS needs only New Hampshire for his WAS and is using a new quad to try and snag that last state. Happy to report that the latest Amateur Radio Public Service Corps bulletin indicates that the SE section was first among the sections in the Pacific Division in EC/SEC reports for 1970 and second in the Division for traffic activity, topped by Santa Clara Valley section. The section was 43rd among all ARRL sections in traffic handling, up from 44th in 1969. Redwood Empire Net meets on 3960 kHz, Mon. at 0130Z. NCN meets on 3630 kHz at 1900 local and again at 2030 local. Traffic: WB6JQP 54, W6KVO 54, W6BWV 15, W6GGR 5, K6VES 2, W6BYZ 243.

SAN JOAQUIN VALLEY - SCM, Ralph Santosan, W6JPU - A Very Merry Christmas to all. K6OZL worked 303 countries, retired from DX chasing, and has joined the Coast Guard as a radio operator. WA6JDB is back to teaching. WA6CP made 5BWAS on sb. W6DPD, K6ZJ, WA6WXP, K6RPH, WB6JRL, K6OPI, WA6EMI, W6UHN, WA6DI A, WA6ONZ, W6WZM, WB6QMD and WA6LDQ attended the ARRL Convention in Disneyland over Labor Day. The Tri-Two net meets at 8 P.M. on 145.30 MHz every Thurs. The Southern San Joaquin Valley Net meets on the W6OPG repeater. WB6BBS and WB6WKC are attending Fresno State College and would like to start a Fresno State College Radio Club. If interested, call 487-3335. WB6WKC is on 2 meters with a Communicator 1. WB6RNS made WAS after 5 years. W6WBZ is heard on 75 ssb. WB6JAX is the new 1VI chmn. K6PKO has started a 6-meter net at 8 P.M. every Mon. on 50.25 MHz. W6NRO and

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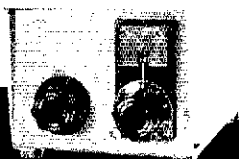
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WB6FYS are on 220, K6PKO has a YAESU FTV-650. WA6FXV is reroofing his ham shack. WB6DNG is in the Philippines. Traffic: WB6RSS 4J, WA6CPP 4, WA6JDB 4.

SANTA CLARA VALLEY — SCM, Albert F. Gaetano, W6VZT — RM: WA6LVA. W6BVR had a busy month filling for WA6LFA and keeping his normal schedules too. Night school has cut down WA6DRF's week day activity but still manages a few QNTs on the net. WB6GFJ has been heard recently on 2-meter fm. W6NLG has completed a Heath SB-220 linear. W6QII has been rebuilding his operating position. WA6NHD has been experimenting with a three-element 15-meter delta loop five feet above the ground and S9 reports from the East Coast. What happened to the high tower requirement? W6ZRJ has his new shack completed and is again back on the air. Some fellows in the section are starting to get interested in the 1296 band. More power to you guys. Those of you who need code practice don't forget that W6QIE is on every night except Mon. beginning at 8 P.M. local time on 3590 kHz starting with five words per minute and going to 30 wpm. Traffic: W6BVB 459, W6RSY 320, W6YBV 314, W6NLG 207, W6NW 172, W6DEF 92, W6VZT 44, WA6DKF 40, WB6GFJ 34, WA6NHD 4, W6ZRJ 2.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Chuck Brydges, W4WXZ — SEC: W4E-VN. PAM: WB4JMG. My appreciation to those who nominated me for SCM. Congrats to WB4JMG as PAM. Congrats to the Roanoke Division Service Award winner for '71, W4FJ, which was received at the very successful '71 State Convention in Raleigh attended by about 350. The ARRL Executive Committee attended for their session and appeared at an open forum. On Sept. 29, 30 N.C. amateurs again proved their worth fighting Hurricane Ginger. A separate report on Ginger will be forwarded based on information received. W4KFC and W4ACY, Dir. and Vice-Dir. were busy at Raleigh. All of us are saddened at the passing of WB4KXL on Sept. 27. K4LND, Columbia, S.C. continues doing a fine job on our two-section cw Net, CN, WB4TOP is the Holding Tech. Club station. W4CQJ is an OBS on 28.540. The Southeastern Radio Net meets daily on 3945 at 9 P.M. Nets:

Net	Freq.	Time(Z)	Mgr.
THEN	3923	2330 Dy	K4ODX
JFK	3923	2330 Dy	WB4JMG
NCSSBN	3938	2330 Dy	WA4DPI
CCN	3907	2300 Dy	W4YBH
CN(F)	3573	2300 Dy	K4LND
CN(L)	3573	0200 Dy	WB4ETF

A very Merry Christmas and Happy New Year to all. Traffic: (Sept.) W4E-VN 221, W4PCN 81, WB4PNY 81, K4MC 73, WB4OZL 69, W4RWL 41, W4IRE 37, WB4JGM 24, K4VBG 18, WB4PWZ 11, W4WXZ 10, K4EZH 9, K4TJN 9, WB4HGS 7, WA4UQC 7, WA4KWC 4, K4BE 2, WB4OIP 2. (Aug.) W4RWL 28, WB4JMG 25.

SOUTH CAROLINA — SCM, Mrs. Elizabeth Y. Miller, WA4LFP — SEC: WA4FCL. Asst. SEC: W4WQM. PAM: W4JSD. RM: K4LND. This confirms the malicious rumor that W4NTO possesses a vfo. WB4MCI is still recuperating from the results of an auto accident, and still is looking for the right size hole to fit the base of her tower. By the time this is published we hope that the Novice training net will be a reality. The summer doldrums must have dried up most of our news sources. According to Gumperson's Law, *actio input equals zero output*. Come on, fellows and gals, include some N4WS along with your activity reports.

Net	kHz	Time(Z)/Days	Mgr.
SC SSBN	3915	2300 Dy	W4JSD
SCPN	3930	1600 MS	
		1230/1930 Su	
CN (early)	3573	2300 Dy	K4LND
CN (late)	3573	0200 Dy	WB4ETF

SSBN reports a total of 119. Traffic: W4MTK 52, W4NTO 40, K4RHU 12.

VIRGINIA — SCM, Robert J. Sagle, K4GR — Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4PG. Asst. SEC: WB4CVY. RMs: WA4EUL, WB4NNO, W4SHJ. PAMs: WA4FC, WA4YXK. A WELL DONE to WA4BUE for Hurricane Ginger alert, Eastern Shore ARFC, WB4MTN, pres. is now an ARRL affiliate. WB4FDI has Virginia Commonwealth University Club active. K4LHB reports 6-meter aurora opening Sept. 26. New OPNs are WA4NJG, WA4FGC. New OBS is WB4SGV, WB4SIK, WB4KSG and WB4RNT made BPL. W4UQ reports traffic picking up. W4TF reports good traffic month. WB4RMO now also AL4RMO. W4ZM attended the Antique Wireless Assn. in Caramatagua, N.Y. The XYI of WA4FCG is in the hospital. Director, W4KFC made the ARRL Convention in Raleigh and attended Executive Committee meeting; also made Shelby, N.C. hamfest; was visited by VE2DCW. W4GF vacationing

mobiling on 2 and 20 to Ore. and back. WA4WQG has 2789 counties. W4JU 2335. W4YZC is the new secy. of PVRC. K4JM still reports nothing new. K4GTS has 200 mile mobile to mobile 2-meter contact - record? W4LQO has 2-meter transmitter and receiver. WB4DRB going strong with WRM ARC. W4KX concentrating on VN. WN4PEI and WB4QMF passed Advanced. K4MSG returns to U.S. in Dec. WB4DRC back in school. The Lynchburg gang has a portable repeater in case of a Carmile revisit. Wonderful convention at Raleigh - I am told - I had to miss it.

VSNB	3935 kHz	1800 Dy
VSN	3860 kHz	1830 Dy
VN	3860 kHz	1900 Dy
VFN	3947 kHz	4930 Dy
VSNB	3935 kHz	2200 Dy

Traffic: (Sept.) W4SOQ 380, WB4KSG 323, K4KNP 272, WB4SIK 259, WB4RNT 210, W4LQ 201, W4TE 91, K4SS 75, WB4RMO 75, WB4SGV 62, W4IFGC 60, WB4KLI 54, W4ZM 54, WB4KBJ 49, W4AFL 48, W4APBG 45, W4AJF 45, K4KA 33, W4GEQ 30, W4OKN 21, W4HR 16, WB4JEZ 16, K4JYM 15, W4KFC 14, W4THV 14, W4ANJG 13, W4WQG 13, W4YZC 12, K4JM 7, W4MK 7, WB4FDT 6, K4GTS 6, W4KAO 6, W4LQO 5, WB4PWP 5, WB4DRB 4, WB4RDV 4, WB9DXX/4 3, W4KX 3, K4CGY 2. (Aug.) K4GTS 23, WB4FLT 6, WB4PWP 6.

WEST VIRGINIA - SCM, Donald B. Morris, W8JM - SEC: WA8NDY. RM: WB8BBG. PAMS: W8DUW, W8CYD, K8CFW. Phone Net Mgr.: WA8POS. CW Net Mgr.: WB8CYB, WA8WCK and WA8NDY attended the 5th Annual BRN ARPSU conference in Trenton, Mich. WB8FKG active in traffic work, finds time for DX on 10 and 15. It is with regret, I report W8LSG as a Silent Key. WB8BMV has increased power and is NCS on phone and cw nets. Congratulations to W4FJ on receiving the 1971 Roanoke Division Public Service Award. WN8AI and W8JM visited ARRL in Newtonington and also toured an old English mansion with W8CP. The State Radio Council held a successful organizational meeting in Charleston. The 1972 State ARRL Convention is to be held at Jackson's Mill, July 1, 2. WA8ART and New Martinsville area amateurs have a nice hilltop vhf repeater working. WA8PFB and Lewisburg amateurs are conducting code and theory classes. CW Net with 30 sessions, 126 stations passed 62 messages. Phone Net, 30 sessions, 359 stations, handled 80 messages. K8QEW conducts weekly code and theory classes in Weirton. Traffic: WB8CYB 169, WA8POS 122, WB8BMV 113, WA8NDY 26, W8JM 18, W8AFC 13, WB8FKG 9, WB8AKR 7, W8DUV 7, WA8OKG 7, W8DUW 6, WA8LF 4, WB8BHG 3, W8RDQX 3, W8QEC 3, W8CKX 2, WB8CPU 2, WB8DMS 2, W8FZP 2, W8AFB 1, W8BOK 1, W8GWR 1, W8KWL 1, W8LFP 1, W8THX 1, W8WCK 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde O. Penney, WA0HJQ - SEC: WA0QOY. RM: W0LRN. PAMS: W0AWG, W0CXW, K0IGA, W0LRW. W0ISL reports his code and theory classes, sponsored by the Denver Radio Club, are so well attended this year that he must move the class to larger quarters! This year's class attendance averages 75, which is almost three times as large as last year. Congratulations to WB2VYK/0 who just received her General Class license and is quite active on all the bands, running an SB-101 and SB-200. W4UDS/0 reports having added a couple of new countries to his list worked to date. Interest in repeater operation continues to grow in the Colo. section, with new repeaters being placed in operation this month in the Boulder area, and others planned for the very near future. W0SIN, Rocky Mountain Division Director, attended the New Mexico Hamvention and reports an excellent event, very well attended. Net traffic for Sept.: H-Noon QNI 918, QTC 36, informals 62, phone patches 12, with 29 sessions, CCN QNI 185, QYC 54, with 29 sessions, Silver State QNI 260, QTC 90, informals 40, time of 814 minutes for 30 sessions. Columbia QNI 943, QTC 38, informals 162, time of 1018 minutes. Traffic: (Sept.) K0ZSQ 715, W0WYX 379, W0CQJ 159, W0LQ 116, W0ZWA 99, W0LLA 53, K0JSP 48, W0SIN 45, W0LRW 33, W2TPV/0 22, W0KPH 16, W0NFO 12, K0IGA 6, W0LCE 5, W0WYD 4, W0SIG 3, WA0HJQ 1. (Aug.) K0ZSQ 888, W2TPV/0 1.

NEW MEXICO - SCM, James R. Prine, W5NU1 - The holiday season should afford an opportunity to explore new bands and modes of communication. The 161-Meter Contest is such an occasion to dust off that old rig and give the top band a try. K5MAT reports close to WAS on 160. W5TI finds mountain shadow requires driving a few blocks from the home QTH in Deming to reach the 2-meter fm repeater on Alamo Peak. The call LU3AHJ/5 on the Alamo repeater is not DX; he is on staff at the Wm. Beaumont Hospital, El Paso. W5NOC has a new HR-2A fm rig. W5KMC is now active on 75 meters from the Flying H Ranch.

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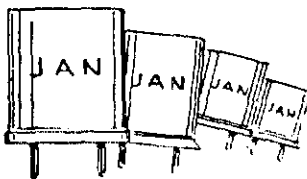
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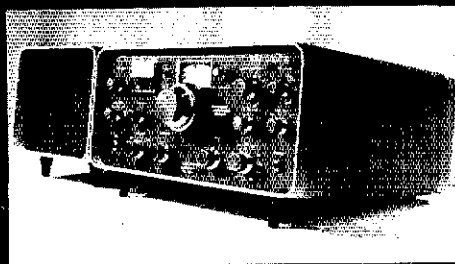
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WSNOC was portable 1X over the week end of Oct. 9, 10. New officers of the Alamogordo Radio Club are WN5BJG, pres.; WSPOR, vice-pres.; WSKDB, treas.; K0UAX/5, secy. Traffic: K5MAT 161, W5RE 122, K5DAB 27, W5SAXC 15, W5MYM 12, W5UNO 12, W5PDY 11, W5SOHI 5, W5DAD 2, W5ASMIY 2.

UTAH - SCM, Carroll F. Soper, K7SOT - SEC: W7WKF, RM: W7OCX. W7IFJ moved to Tempe, Ariz., where he is attending Arizona State Univ., working on his Masters Degree for the next 15 months. On Sept. 26, 1971 the VHF Society's 2-meter repeater was moved to the west side of the Salt Lake Valley, on the Oquirrh mountains at an elevation of approximately 7600 ft. The coverage north to south is from approximately the Idaho state line on the north to Levan on the south. The east to west coverage has not been established at this time. A 146.34 146.94 MHz repeater will be in operation in the Cedar City area shortly, due to the efforts of W7MUG and WA7GTU. Utah Beehive Net operates daily on 7272 MHz QNI 669, UTC 37, average time 1.343 minutes. Traffic: W7EM 107, K7HLR 93, W7OCX 49, K7SOT 20, K7CLO 5, WA7MEL 2.

WYOMING - SCM, Wayne M. Moore, W7CQL - SEC: K7NOX. Very sorry to report that W7CVY has joined Silent Keys. A new call in Cheyenne WA7SDO is the second call of W0KIB. Welcome to Wyoming, Jack. Also, WA7SFK now is back in Wyoming, located in Eibete. K7TXZ has a new 60-ft. tower and hopes to have something atop it soon. W7IDO vacationed in Denver in Sept. and now is back on the air after a short spell of illness. Ex-K7CRL who has been a KL7 for some time, has now transferred to Houma, Louisiana. The Casper Club started code and theory classes the first of Oct. under the direction of W7TVK who recently returned from a vacation in Texas. Traffic: W7SDA 24, W7TZK 21, W7YWW 17, WA7NHP 8, WA7SEO 8, K7BTE 3, K7WRS 3, K7TAL 2.

SOUTHEASTERN DIVISION

ALABAMA - SCM, James A. Brashear, Jr., WB4EKJ - SEC: W4DGH, RM: W4HFU, PAM: W4WLG. The Birmingham ARC keeps growing and W4FKG reports they average about 70 members at each meeting. They also have weekly classes of code and theory with about 50 students attending. BARES (the emergency segment of the BARC) also is growing and apparently receiving recognition and cooperation from local CD and law enforcement agencies. K4RY is the new call of the Auburn Univ. ARC with WB4ADT as pres.; WB4UQU, vice-pres.; WB2URF, secy.-treas. The Tuscaloosa ARC demonstrated ham radio to the public at the West Ala. Fair. WB4SVH hopes to be getting an HW-101 soon. K4JK says he did pretty good on the last FMT - 23 cycles on 80 meters. Regret to report the death of K4BEK. Congratulations to the North Ala. DX Club - now serving as the QSI. Bureau for the W4/K4 calls. AFND is gradually picking up new members. New calls heard recently include WN4WHA, WN4UMW, WN4VSW, WN4RDE and WN4PWO. The AFND which meets daily at 2330 GMT is a good place to learn traffic handling, net operation, etc. Although school activities have changed the operating times of some net members, participation is holding up very well. W4FVY moved to Chicago. Endorsed: W4HFU as RM. Traffic: 1 Sept. WB4SVX 224, WB4OKT 141, WB4SVH 92, WB4KSL 70, WB4EKJ 69, WB4IMH 65, K4OAZ 42, WB4IFB 39, WB4KDI 33, WN4TFC 18, WB4OVR 13, WB4NLK 10, K4RY 4, WB4VKW 3. (Aug.) WB4KDI 132.

EASTERN FLORIDA - SCM, John F. Porter, W4KGJ - Asst. SCM: Regis Kramer, W4ILE, SEC: W4IYT, Asst. SEC: W4SMK, RMs: K4EHY and W4ILE, PAMs: W4OGX 75 and W4SDR 40. Traffic is back up this month. WB4GHD made BPL. New appointments: K4C MJ as EC; W4VH as OVS. 93 persons, from babes in arms to octogenarians, enjoyed a chicken barbecue dinner Oct. 3 at the W. Palm Beach ARC club house. WB4NPN engineered the feast. WB4POB cooked for 5 hours with a few coffee breaks! On Oct. 16 the Club was open to the Boy Scout jamboree on-the-air. On Oct. 20, an ARRL film on the Transistor was shown in the Hostess Room of McArthur's Dairy. Sounds like a live wire club. WB4QFH spent 10 days in HK0-Land; participated in the Guatemala Independence Contest. K4FAC reports that the Atlantic Coast Net, which meets nightly at 0415Z, is back in service for the winter. Seen at the Melbourne Hamfest were WA4SCK, WB4PNG, WB4QVO, K4JWM, K4GI, W4DI, WB4QMG and W4IYT. WB4MIQ, K4FAC and W4ILE made PSHR in Sept. OO reports were received from W4FRL and W4OZF; OVS report from WN4RGO. Your new SCM for E. Fla. for the next two years beginning in Dec. will be Regis Kramer, W4ILE. I wish to thank each and everyone for the support given me during these past two years. I'm sure you will continue your support of Regis when he takes over. He is well qualified and has been a great help during my term of office. Let's not forget our Southeastern Convention next year in Miami Jan. 22 and 23. Hope to see you all then for a few eyeballs. Traffic: WB4AIV 278.

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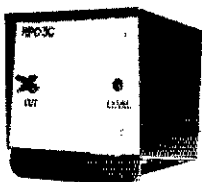


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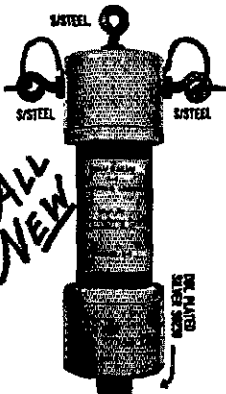


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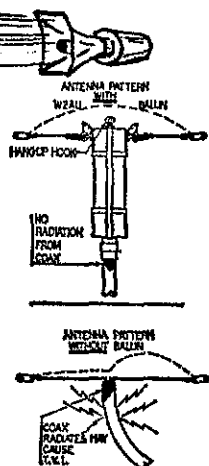
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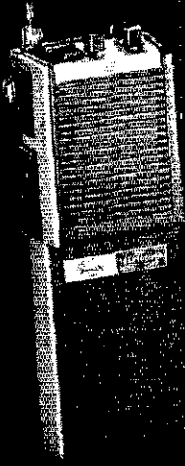


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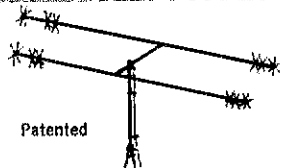
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GEORGIA - SCM, A.J. Garrison, WA4WQU - Asst. SCM: John T. Laney, III, K4BAL. St.C: WA4VWV. RMs: K4BAJ, WB4SPB. PAMS: K4HQI, W4LRR.

Net	Freq.	Time(Z)Days	QMI	QTC	Mgr.
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Shortly after the noon hour on Sat. Oct. 16, the Georgia SEC, WA4VWV was contacted by officials of the Civil Air Patrol seeking assistance in locating an overdue aircraft en route from Stone Mountain, Georgia to Chattanooga, Tenn. The search was centered in the vicinity of Rome, Georgia. The wreckage was finally located late Sun. afternoon. Both occupants of the six passenger craft were fatally injured in the crash. About 45 hams from the greater Atlanta and Rome areas participated in the search. Thanks to K4YRL for making a quick modification on the Rome 2-meter repeater, allowing access to the repeater by the participants of the search. Welcome to the Georgia section W1:1H/4 who operates 20 sdb with an HW-32A, also 10, 15 and 40 cw using a DX-35. Traffic: WB4RUA 189, W4ETP 122, K4BAI 111, WB4SPB 93, W4PIM 78, W4RNL 56, W4RAV 43, W4AMB 41, W4CZN 33, W0GXO/4 31, WA4WOU 24, WB4TAQ 23, WB4RMO 22, K4NM 11, W4JM 10, W4DOC 8, W4RF1 5, W4FDN 2.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH - SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: W4NOG. Pensacola: WB4SBD and K0BAD/4 joined W4NOG in the PSNR listing this month. Both are active on RN5. W4BIM, WA4IZM, WB4EQU and W4FDJ earned WFPN Section Net Certificates. New hams include WN4WNG and K8JEV/4. K4FKV was 6-meter NCS for Sept. WB4BSZ and K4FKV competed in the VHF QSO Party. The W4UC annual fish fry at W4ETP's QTH was a big success. New CD comm. officers are K4RVV, W4SRM, WA4IZM, WB4JCV and K4IVD. K4SVX upgraded to Advanced Class. Milton: WB4TZN is QRL with night classes at PIC. WN4WMD is a new ham in Jay. Port Walton: New officers of the NW Fla. EM Assn. are: W4UNV, pres.; W4RKH, vice-pres.; KRZXC, secy.; WB4TPR, treas. K0TRV, K4GBB and his XYL, WB4MTD, are new hams at Eglin AFB. Panama City: The WB4OER repeater now has its solid-state I.D. generator working. Chiplev: W4IKB set up a suitcase hf sdb station, complete with antenna, coax, mike and swr bridge, for emergency use. Blountstown: WB4UOH has a new base station 2-meter antenna. Fallahassee: WB4WKL is a new call in town. The WFPN and OFN need more check-ins, and an NCS. How about it, you traffic men? Traffic: K4VY 284, K0BAD/4 161, WB4LEL 57, WB4SBD 51, WB91U/4 24, W4RKH 14, WB4VUP 6, W4IKB 3.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - SEC: K7GPZ. PAM: W7UZX. RM: K7NHL. The new Explorer Post 710, sponsored by the Ariz. ARC, had their first outing by participating in the national Jamboree-On-The-Air Oct. 16 and 17. There were about fifteen people operating from the Heard Scout Pueblo in Phoenix with five rigs running under the club call of W7IC/7. W7CFJ and a few others have formed the Southern Ariz. DX Club and have W7NQ as the club call. New repeaters now in operation are WA7GWC on Porter Mountain near Show Low and WA7KYT on Juniper Flat near Bisbee. Both repeaters are open on 146.34/94 MHz. K7ZMA has put a 146.34/94 MHz repeater on Hualapai Mountain near Kingman. The City Council (Citizen of the Month) was W7HUI in recognition of his activities in Search and Rescue. W7ILO mobile reported a series of accidents along the Mt. Lemmon highway to the sheriff via the Ariz. PON. The new call for W7FEW is K6VK in San Diego. WA7ISP is a new QO. The Ariz. Traffic and Emergency Net on 3.992 MHz has moved its time up earlier to 1900 MST (0200Z) for the winter to avoid long skip difficulties. Section Net Certificates were earned by K7EMM, W7HIT, WA7IXC, WA7KOE, K7NTG, W7OUE, WA7QVN and K7RLT. PSNR: W7MAD 36, W7CAF 29. Season's Greetings to all. Traffic: (Sept.) K7NTG 148, K7NHL 90, WA7MAB 52, K7MTZ 50, K7EMM 24, W7CAF 24, WA7QVN 12, K7RLT 12, W7OUE 11, W7WGW 7, WA7IXC 4. (Aug.) WA7MAD 64.

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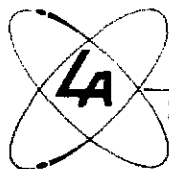
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T-80	.55	.60	.60	.80	.90		.795	.495	.250
T-68	.45	.50	.50	.65	.75		.690	.370	.190
T-50	.40	.45	.45	.50	.60	.65	.500	.303	.190
T-37	.30	.40	.40	.45	.45	.55	.370	.205	.128
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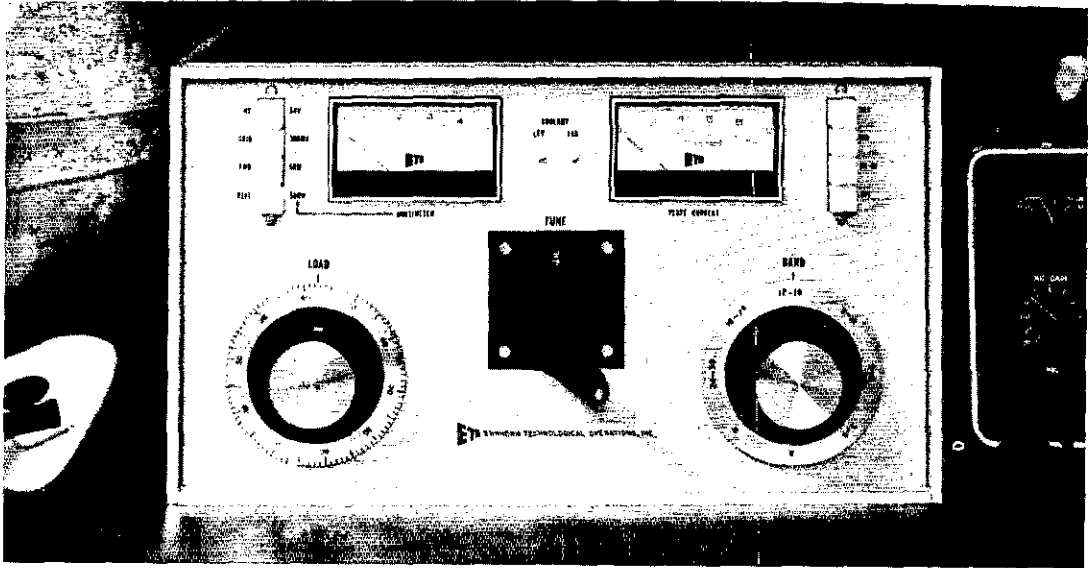
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LOS ANGELES - SCM, Eugene H. Vitolno, W6INH - Asst. SCM; Archie Willis, W6LPI. The holidays are again approaching and net traffic is starting to build up. The tagesses now have phone numbers in most part, thanks to WB6ZKK. Congrats to W6P1P on getting his Extra Class ticket. WA6PMP our local vhf expert is building vhf converters. W6LL returned from an extended vacation in New York. K6PG, W6CL, W6MLZ, W6LQ were all seen at the Disneyland Convention, as was many other QCWA members. K6PG still is going to build his linear. The Santa Clarita and the San Fernando Radio Club are both organizing ARRL groups, under the help and guidance of W6PJ. W6MST finally caught up with the slow boat and got his FT-101, K6BUU shooting for 150 countries. W6OAW spotting new big linear for Western Public Service Net operation. WA6AAW getting new FTDX-400 and receiver. WB6KOL has been active with new by-laws for WPSS. WB6TAY has been ORL playing in an orchestra. We need more members in the slow-speed traffic net on Sat. and Sun. K6BAZ keeps blowing up tubes in his SB-220. The Notre Dame Radio Club is a new club with 20 active members and they need parts for the club. Anyone having anything they can use contact WN6HOC, 13645 Riverside Drive, Sherman Oaks. WB6OLD is busy calibrating new frequency meter, so watch your frequency follows. W6BHG sporting an R-390 receiver. The Ramona Radio Club has elected new officers at their annual dinner, WA6GSV as the new pres., also WA6KAA has donated a number of radio items to the club. WB6NQS has been on the move lately and will operate for a while from Torrance. W6BXR is recovering from a heart attack. Total traffic for SCN in Sept. was 719 messages. WA6DHM is on 15-meter SSTV. WB6PKA going back to school and is now mobile. W6LYY and WB6ZVC doing a great job with local nets. WB6WFI and WA6BLK active on 2 meters with an eleven-element beam. The San Gabriel Valley Radio Club is having a dinner at 7:30 P.M. at the Bonnie Rae Restaurant Dec. 4. K6CDW busy job hunting and not very active. K6UYK finally made BPL after 37 years, congrats. WA6UQL is busy building antenna tuner and linear amplifier. WB6YZ still doing a good job on SCN. WB6WDS is real happy with new Kenwood Pair and is spending time on the phone bands. W6KW still doing great OO job. K6ASK reports that the JPL group is making preparations to make tests with 2- and 10-meter transponder. Traffic: (Sept.) W6INH 402, W6LYK 322, K6UYK 279, WB6ZVC 261, WA6UQL 215, WB6ZTI 40, WA6ZKI 31, W6USY 18, WA6DHM 15, W6OLO 15, W6BHG 14, WB6KGM 14, W6VIC 9, K6OPH 7, W6GDH 4, (Aug.) W6OAW 16, WA6DHM 13, K6CJ 7, WB6OLD 6.

ORANGE - SCM, Jerry L. Verduff, W6MNY - Asst. SCM; Richard W. Brubeck, K6CID, SEC; WB6COR, RM; WB6AKR. A new amateur in Orange is WA6HUK. WB5AYK/6 is now operating from Riverside. Congrats to W6FB who was awarded an ARRL 50-year membership pin by WIRW at the SW Division Convention in Anaheim. Fred made accuracy of .8 ppm in the Sept. EMT. K6YNB scored 8217 points from Mt. Pinos in the VHF QSO party. This appears to be the highest single score on the West Coast for a vhf contest. WB6AKR has a new hygain 12-AVQ vertical. W6BLK is chairman of the OUTC QSO Party to be held March 14, 16, 1972, start and end at 2300 GMT. WB6KAL has moved up north to attend Stanford University. EC WA6FVA says it took his 40-meter AREC net 2 minutes and 15 seconds to resume net control functions by W2MNN/6 after he purposely stopped transmitting during a drill as if to simulate a sudden NCS power failure. Not bad! WA6YWS reports the formation of a new Owens Valley Amateur Radio Club of Bishop with the following charter officers: W6FPT, pres.; W6APD, vice-pres.; WB6JMA, secy.-treas.; W6LDW, act. chm. The club will meet the 4th Wed. of each month in Bishop. K6ZUL is looking for liaison stations from SCN to 2-4-y net. If you can work 80-meter cw and 2-meter am, contact Barry Todd, 1820 Temescal, Norco 91760. WB6ASR is operating 6-meter mobile on 52.525 through WA6UJS and WA6ZOL repeaters. SIC WB6COR has moved. New address is 12152 Frask, Space 55, Garden Grove 92643. K6CID will soon be hi mobile. Thanks to those who nominated me for another term as SCM, I'll continue to do my best to represent the section at various clubs and amateur gatherings. Keep the reports coming. VSHR: W6MNY 40, WA6TVA 23, WB6AKR 21, WB6ASR 10, Traffic: W6MNY 94, W6QBD 59, WB6AKR 47, W6WRJ 17, K6GGS 12, WB6ASR 6, WA6YWS 4, WA6TVA 3, W6BBL 1, WB6ZOK 1.

SAN DIEGO - SCM, Paul C. Thompson, W6SRS - Asst. SCM; Art Smith, W6INF. Looking forward toward a New Year and back on a very successful past year I want to thank each of you for your assistance which has made my job of SCM such a pleasure. Members of the ARLC have no doubt noticed an increase in emergency preparedness activity. Please submit monthly report cards to me at the address shown on page 6. New appointees: K6PM and WA6HIA as OBS; WA6AMK as OBS; W6MAR as CO and K6CXR as asst. EC.

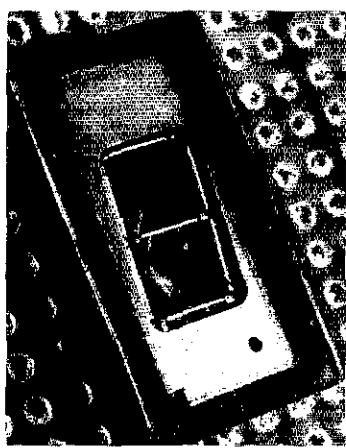
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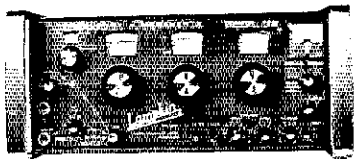
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The Oct. SET provided valuable information on the emergency capabilities of the section. Thanks to the many who participated. Club activities: North Shores hosted a picnic and transmitter hunt with WA6CVP as the rabbit and number one hunter W6SLF. El Cajon held their annual Auction Night. WA6IIP presented a program on semi-conductors to SOBARS. Palomar visited the electronics factory at Oceanside. SD OCWA, with W6BIG and W6MCR new members, total 98. SD fm has linked their 450 and 2-meter systems. SDDX held their meeting at the home of W6OVD. The SCM attended the IVARA meeting. New editors are WN6I-MO IVARA and WN6OJD SOBARS. Station activities: New Extra Class K6UV/W6IZW. WN6DUS has passed the Advanced Class exam. WB6EE is secy. of SD ARC. K6EC needs one more for DXCC clean sweep. W6DEY mobiled to Ohio, all bands. Traffic: W6VNO 412, W6BGF 408, W6JOU 324, W6LRU 196, WA6AMK 93, WB6HMY 92, K6HAV 75, K6KDE 74, W6JQT 24, W6YKT 24, WB6JQT 8, W6SRS 5, WB6LYG 4, W6MI 2, WN6HJW 1.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DEI — SEC; W6JTA. RM: W6UJ. PAM: K6EVO. The section winners in the July open-CD party are WA6DFI on cw and WB6PGK on ssb, WA6NFB has a new tribander and is working European DX with a DX-60. Karl also is a new member of SCNCT. WB6MXM is installing a Swan-350 in his new Datsun. WN6FDV passed his General Class exam and is working 14 MHz DX. WA6FUA, a new ORS appointee, is back with traffic-handling after six years. EC WB6PGK has obtained three generators from the Morro Bay C of C and allocated them to key points in his district. The SEC reports two new AREC members bringing the total to 40. Bob has a new emergency plan ready to put into action that will organize the section into an effective emergency unit. A new AREC member in Simi is WA6PIJ. WA6JOX is a new OVS in Port Huenehue. W1ICP from Hq. gave a talk to the Estero Radio Club during the Sept. meeting. K6SUA is a new life member of ARRL. Among the faces seen at the SW Division Convention Sept. 4 were K6PHT, K6SUA, WB6VGC, W6KW, W6PA, W6DOY, W6ITA. A 2 1/2 hour ARRL open forum was held with league officials. Many questions from the floor were answered. Traffic: (Sept.) WA6FUA 280, WA6DEI 218, W6JTA 43, WB6MXM 23, W6UJ 2, (Aug.) WA6FUA 77.

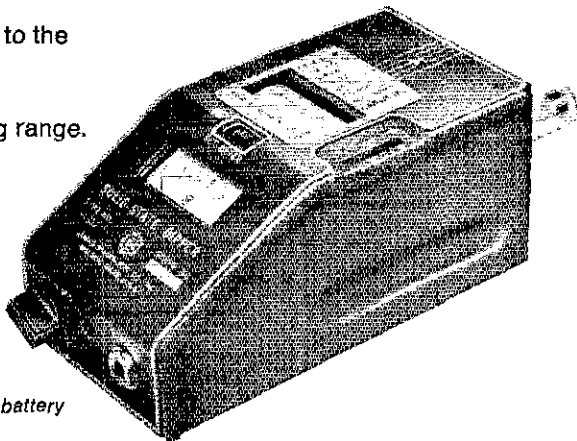
WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.L. Gene Harrison, W5LR — Asst. SCM: Gene Pool, W5NFO. PAM: W5BOO. RM: W5QZG. Arlington ARC says "lets get involved" with selection of new officers. Check-ins on 30.8 and 3.965 MHz are low. K5FOG is active in club work. W5QPX reports on OO activities. SCM "gooled" and extends apology to W5IZU. Tyler for FastTex inaccuracies over past several months. Appointments to SCM's committee include W5IWDW Temple, WA7PFR/5 Dallas ARC, W5QU Kilocyte ARC, K5ZSB Irving ARC. The ARPSC LO bulletin is good reading. The SET comes in Jan., no SEC as yet. Our sympathy to W5HVF whose dad W5SCEJ recently passed away. Many W.Tex hams attending Brownfield will have appointment updated. NTexDX News reports mailing cost increasing. W5TI appointed OO class 3 and 4. OVS W5SVJB inactive because of college problems. W5SCPG qualifies for OPS. NETEN active during Sept., 51 check-ins, per K5DOM new roster available. W5LR discussed the latest Comm. Dept. work at the Richardson WK and Kilocyte Club. Our Director is watching date QST is received in your area very closely, please help him by writing date you receive QST on wrapper and mail to him. Dallas ARC News officers are WA7PFR/5, vice-pres.; WA5YKO, secy.; WA5ZSL, treas.; WB5AKR, sgt.-at-arms. CW now includes W5VU and SCM's representative WA7PFR/5. K5UGM advises 2-meter tropo not good this month, looking for DX on 145.1. The Greater Dallas Fort Worth Amateur Radio Council met at Sammys, Loop 12 and So. Hampton in Westchiff Mall. K5WQ requests OVS appointment. Traffic: WA5VJW 150, W5QU 131, W5NFO 28, W5IAR 27, W5LR 10, WA5CJY/5 8, K5DOM 4, W5PBN 3.

OKLAHOMA — SCM, Cecil C. Cash, W5PML — As everyone in the section, who is active on the air, knows by now, I had a heart attack the first part of Sept. while on vacation. I spent two weeks in the hospital at Mountain Home, Ark., at which time my doctor said I could be moved only by air evacuation. Being retired Army, Fort Sill sent a Chopper over and air lifted me to Reynolds Army Hospital. I am now on house rest at home. I am going to use the rest of my column space to say thanks to those who sent cards, letters, flowers or telephoned (long distance) and in some cases all. Following is a list of call signs only in many cases includes their families too. The first flowers were from my radio club K5VOZ. The other list I hope I did not miss any one: WA5ACX, W5ADX, WNSAME, W5AY, K5AYD, K5BXX, W5BYC, K5CAY, W5ACUJ, W5DET, K5DLE, W5SECJ, W5TFO, W5EYB, K5EZG, W5FKL,

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SOUTHERN TEXAS - SCM, E. Lee Ulrey, K5HZR - SFC: K5HXR. PAMs: W5FUA, W5KLV. RM: W5EZY. Congratulations to new EC W5KYX. Welcome back to EC K5FPI. Endorsed OO W5RBB for another year. K5LWL is contemplating OPS. EC K5FPI reports Beeville ARC 2-meter fm repeater about complete and work begun on antenna for the county EOC. EC W5FBI rendezvous with amateur radio campers via local nets. PAM W5KLV reports STEN activated for hurricane Fern but was not needed. ECs W5ICL, W5ABA, W5TFW and W5TPY also report AREC and RACES units were active in their areas in preparation for both Edith and Fern. OBS W5OVH advises new AREC net at 2200Z Sun. on 3928 kHz. TUX Net emergency operating plan was distributed to all ECs, nets and key stations in the section. Thanks to RM W5EZY for a comprehensive plan. Welcome K6UBX/5, W5NDBK and W5NDLY to our AREC. W5RBB and K5ROZ again made PSHR. Congrats. W5NC and W5JKC attended the QCWA charter presentation at Tyler. New Houston ARC officers are W5BTO, pres.; W5BSB, vice-pres.; K5DFZ, secy.; W5BER, treas.; W5EKP, program; W5DWC, membership. EC W5KR reports Valley Novice Slow Speed Net on 3730 kHz at 0130Z Thurs. picking up participants. Austin ARC joined in Sept. VHF QSO part at estate of W5ZXC. OPS W5ZPD recuperating from illness but still active on 15 and 40 handling traffic. Regretfully we report the passing of a faithful 7290 Traffic Net member K5GTZ of Silsbee. Activity reports were received from W5IQV and K5TSR.

Net	KHz	Sess.	QNT	QTC
TEX*	3770	60	431	244
TTN*	3961	29	1372	97
7290 Tfc	7290	43	1915	410

*NTS. Traffic: W5SSE 145, K5HZR 114, W5EZY 109, W5ABO 108, W5RBB 73, W5SMXY 71, W5JFZ 66, K5ROZ 51, W5WV 44, W7WAH/5 34, W5BGE 23, K5RVF 18, W5TFW 12, W5BWBV 9, W5AGNZ 9, W5ASUZ 6, K5TSR 4, W5CBT 2, K5HUA 2, W5UKN 2.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - Asst. SCM: Donez Booth, VE6YL. SEC: VE6XC. ECs: VE6SS, VE6AZU. PAMs: APSN VE6ADS, VHF VE6AMC. NARC held their introduction to amateur radio at NAIT. The CARA amateur radio classes under VE6ALS were over subscribed before the deadline date. OO VE6MJ reports continued DX activity. Both he and OO VE6HM were not very pleased with their last FMT showing. VE6AW now has his tower replaced surmounted by a TH3. I enjoyed brief visits from Calgary Otis VE3CPA, ex-VE6KK and ex-VE6TM. VE6TM shows no inclination to become a W6. QNT on the APSN remains high. We certainly need more members who are willing to move traffic on other nets. The new format of the net should expedite net business, however, listing and bks out of turn disrupt efficiency. Congrats to VE6AMC on his appointment as VHF PAM. Traffic: VE6FK 22, VE6WG 7, VE6SS 5, VE6FS 4, VE6YL 4, VE6FV 2, VE6MJ 2, VE6XC 2.

BRITISH COLUMBIA - SCM, H.L. Savage, VE7FB - Sept. is the start of club activities for the winter. Code and theory classes are carried on by many of our clubs, plus good activities. Why not join a club? VE7KY is always looking for good technical books on Electronics and will return them. VE7BVU is back in the hospital. My XYL VE7SH has been in the hospital for three weeks is now home and taking it easy. VE7XF is back on the air after five years off, now ssb. VE7AEK has his class "A." VE7BMM was married in Sept. VE7GQ has restored an old HRO. VE7AP has retired from teaching. VE7AID was on the sick list. VE7TT visited VE3-Land with his new trailer. I am looking for those club papers again this winter, and also those letters of activity. Traffic: VE7BLO 59.

MANITOBA - SCM, Steven Fink, VE4FQ - This is my first report as SCM. With your reports we can fill this column, so let's see them. My address is on page 6 of QST or send word via the traffic nets. Nets are as follows: Manitoba Traffic Net at 0045Z on 3660 cw and the Manitoba Evening Phone Net at 0100Z on 3765 phone.

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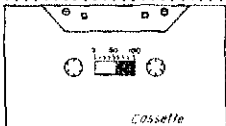
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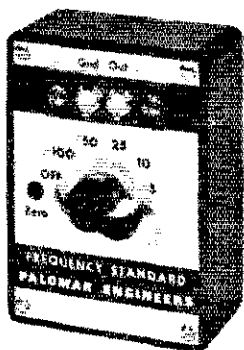
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The Univ. of Manitoba Club, VE4UM, is active for another season with about 15 operators including two White Caners. VE4SW and VE4VA are co-chm. VE4MA gave a very interesting talk on facsimile at the Sept. WARC meeting. MTN reports 4 sessions (summer schedule), QNI 9, QTC 5 and MEPN 30 sessions, QNI 861 and QTC 39. Traffic: VE4RO 29, VE4FU 14, VE4HR 11, VE4JA 10, VE4CR 9, VE4XN 7, VE4DI 6, VE4KE 6, VE4QJ 5, VE4LN 4, VE4NE 4, VE4QJ 3, VE4SE 3, VE4JF 2, VE4KS 2, VE4CI 1, VE4JK 1, VE4OL 1, VE4OM 1, VE4OP 1, VE4RV 1.

MARITIME - SCM, W.D. Jones, VE1AMR - Greetings to all from your new SCM. I welcome your comments, queries and news items both on the air and by mail. VE1VR operated portable from the Fredericton Exhibition, VE1YW has kw on ssb and VE1WZ has a new four-element 2D-meter beam up, good DX boys. VE1AMU is the new pres. of the Truro Club with VE1TK doing the paper work. Main activity in Truro these days is RTTY and 2-meter fm. VE1SR is attending college in Exeter, England. VE1EL is the new Moncton Club pres. and VE1APL still secy. VE1NZ is the new pres. for NSARA, with VE1AKO as secy. The Halifax and Dartmouth boys will have CNBARC code and theory classes this winter for at least 11 students. VE1AKO was awarded the NSARA president's Trophy. APN reports sessions 27, QNI 70, QTC 55. Traffic: VF1RO 74, VE1AMR 61, VF1ARB 30.

ONTARIO - SCM, Holland H. Shepherd, VE3DV -

Net	Freq.	Local Time/Day	Mgr./Dir.*
GBN	3645	1830 Dy	VE3DPO
*OTN	3700	1830 M-F	VE3CYR
OQN	3535	1900 Dy	VE3ARS
FCN	3542	1945/2130 Dy	VE3ERU
OPN	3750	1900 M-S	VE3CRW
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LN	3755	1845 M-S	VE3RLZ
CIN	3790	1830 M-S	VE3EQM

*Tentative designation of CW Net Training Net now being run on a trial basis. Most phone nets accept check-ins by cw stations. All Ont. amateurs are invited to develop their operating skills and versatility by learning how to handle traffic under net discipline. High costs of producing a club bulletin has led the Algoma ARC, VE3AYZ has been responsible over the years for the fine emergency organization of the Lakehead ARC and managing the affairs of the club and also the North West Ont. Net. While you are looking at the results of your efforts in Field Day check back and see if your group's score included that very easy 50 points for sending a formal message to the SEC or SCM. I was operating in FD and it was surprising the number of Ont. groups that had to be reminded of these bonus points. VE3JJ sends code practice 1230 local time every Tue, and Thurs. on the 11-meter band. CBERS use channel 2. Congratulations to VE3GUC as first YL delegate to RSO. SCM now sending personal bulletin to all ARRL field appointees. VE3ADO coordinated amateur efforts during search for crashed Cessna aircraft and its four occupants. Hamilton ARC is to be congratulated on its efforts to teach the basics of amateur radio to paraplegics, white caners and others. Please contact VE3GCP if you wish to assist in anyway. Congratulations to VE3EMR, VE3CLT and VE3DCH on getting their Advanced. Traffic: VE3DPO 95, VE3ERO 84, VE3FOZ 63, VE3BUR 38, VE3GPN 34, VE3DV 26, VE3DU 22, VE3HL 9, VE3FGV 3.

QUEBEC - SCM, Joe Unsworth, VF2ALE - SEC: VE2BTZ. Sorry to hear that VE2BU was having trouble with foreign matter in an eye. XYL VE2WM expected harmonic first part of Oct. Crystals arrived from J-Land and repeater VE2PY-WIKOO, VE2RM, VE2MT and 146.76 simplex now very active with units TRIC TR7-100. The QR Net 3,775 MHz at 2330 GMT very active from VO1- to VE3-L and average stations now over forty. VE5LD with QTH at Hudson, Quebec active on hi frequencies and will be on 2 meters shortly. Welcome to new SCM for Manitoba VE4FO. Ceux qui possèdent des revues Techniques, les envoyer a RAQI qui en fer le depouillement trv a VE2DBN. Objectif RAQI pour 1972 est: 1500 membres, VE2BTZ séjour en Europe. VE2BZL opere de Quebec. VE2NY est utilisée par plusieurs Ham de la région de Quebec. VE2EC tres actif reseauux-traffic. Réseau VE2QM tous les soirs 19:30. Ceux qui desrent la Mosque XYL-YL voir VE2DKC (1.25) VE2CTR started code and theory classes. VE2WM report that Aurora activity very high last couple of weeks and 2-meter antennas to be ready for the winter months. Merry Christmas and Happy New Year to all. PSHR: VE2APT 31. Traffic: (Sept. VE2DR 44, VE2DHY 37, VE2ALH 25, VE2DUG 23, VE2WM 19, VE2EC 18, VE2APT 16. (Aug.) VE2DR 37.

SASKATCHEWAN - SCM, Barry Ogden, VE5BO - NT5 RA VESGL and NM VE5SC have gone along with the suggestion the VE5-Land move from RNT, Pacific Area, to 1EN, (Tenth Regio:

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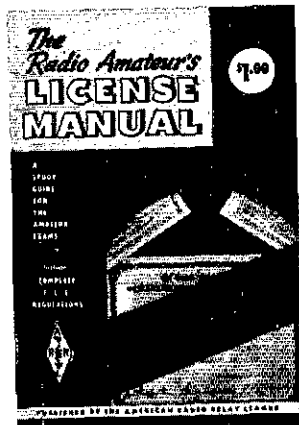
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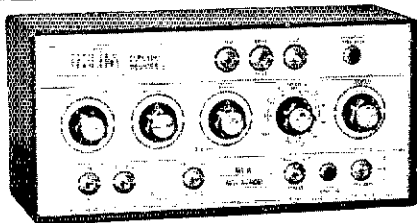
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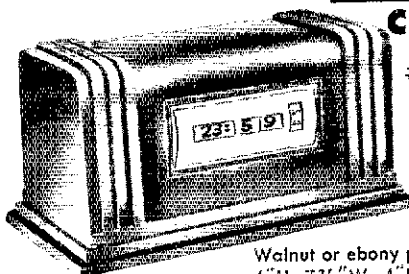
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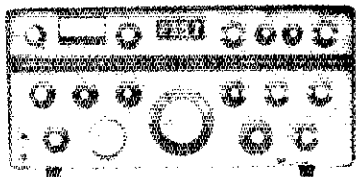
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Net), Central Area. This breaks our ties with both RN7 and the Central Area of NTS. With the change to 10, at least half of our section will be working into an accustomed time zone. To spark enthusiastic participation in NIS, and to improve efficiency, it is hoped that we soon will have an sub NTS Net in operation. More on this later. While on the subject of traffic handling, it has been suggested that we write down the gist of verbals, give them a number and priority classification, etc., and include everything else, such as addresser and originator, etc., with the only item possibly missing, that of a word count. In this way it will help greatly in retaining a filed record for future reference. Let's have those monthly traffic counts! Will all who hold appointments please check the date on your certificates and if dated prior to Jan. 1971, mail them to me for endorsement. The Boy Scout Jamboree on-the-air saw many shacks "invaded" by eager young men who enjoyed talking to scouts in other lands. SARC ham classes are once again in full swing under VESCU. Prince Albert NSARC reports ham classes operation, including the blind group of much note, Phil Lederhouse who hopes to talk his XYL into joining. Traffic: VESBO 20, VESBC 8, VESBD 2, VESPN 2, VESRF 2, VESR 2. [QST]

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Act of August 12, 1970; section 3685, title 39, United States Code). (1) Title of Publication - QST; (2) Date of Filing - September 29, 1971; (3) Frequency of Issue - Monthly; (4) Location of Known Office of Publication: 225 Main Street, Newington (Hartford County), Connecticut 06111; (5) Location of the Headquarters or General Business Offices of the Publishers: 225 Main Street, Newington (Hartford County), Connecticut 06111; (6) Names and Addresses of Publisher, Editor, and Managing Editor: Publisher - The American Radio Relay League, 225 Main Street, Newington, Connecticut; Editor - John Huntton, 574 Hills Street, East Hartford, Connecticut 06118; Managing Editor - Laird Campbell, 18 Mohawk Drive, Unionville, Connecticut 06085; (7) Owner (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given.) The American Radio Relay League, Inc., 225 Main Street, Newington, Connecticut 06111 (an association without capital stock); (8) Known Bondholders, Mortgagees, and other Security Holders Owning or Holding 1 percent or More of Total Amount of Bonds, Mortgages or other Securities - None; (9) For Completion by Nonprofit Organizations Authorized to Mail at Special Rates - The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes have not changed during preceding 12 months; (11) Extent and Nature of Circulation - Average No. Copies Each Issue During Preceding 12 - months - (A) Total No. Copies Printed (Net Press Run) 106,566; (B) Paid Circulation - 1. Sales Through Dealers and Carriers, Street Vendors and Counter Sales - 4,761; 2. Mail Subscriptions - 98,433; (C) Total Paid Circulation - 103,194; (D) Free Distribution by Mail, Carrier or Other Means: 1. Samples, Complimentary and Other Free Copies - 2,519; 2. Copies Distributed to News Agents, but not Sold - 155; (E) Total Distribution (Sum of C and D) - 105,713; (F) Office Use, Left-over, Unaccounted, Spoiled After Printing - 833; (G) Total (Sum of E & F - should equal net press run shown in A) - 106,566. Single Issue Nearest To Filing Date: (A) Total No. Copies Printed (Net Press Run) - 111,584; (B) Paid Circulation - 1. Sales Through Dealers and Carriers, Street Vendors and Counter Sales - 4,639; 2. Mail Subscriptions - 101,183; (C) Total Paid Circulation - 105,842; (D) Free Distribution by Mail, Carrier Or Other Means: 1. Samples, Complimentary and Other Free Copies - 2,550; 2. Copies Distributed to News Agents, but Not Sold - 150; (E) Total Distribution (Sum of C and D) - 108,392; (F) Office Use, Left-over, Unaccounted, Spoiled After Printing - 3,192; (G) Total (Sum of E & F - should equal net press run shown in A) - 111,584. I certify that the statements made by me above are correct and complete. (signed) John Huntton, Editor. [QST]

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WANTED: An opportunity to quote your ham needs. 32 years a ham gear dealer. Collins, Signal/One, Drake, Galaxy, Tempo, Kenwood, Henry 2-K, and all others. Also \$25,000 inventory used gear. Request list. Check W8UCG, Electronic Distributors, Inc. 1969 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.

RECEIVING & Industrial Tubes - Transistors, all brands - Biggest discounts. Technicians, Hobbyists, Experimenters -- Request Free Giant Catalog and save! Zalytron 469 Jericho Turnpike, Mineola, NY 11601

SPIDERS for boomless quads, Heliarc welded aluminum. Al's Antennas, 1339 So. Washington St., Kennebec, WSN 99336

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astzal Electronics, 150 Miller St., Elizabeth NJ 07207. Tel. 210-364-3141

TELETYPEWRITER machines, parts, bought-sold. S.a.s.e. list Typetronics, Box 8873, Ft. Lauderdale FL 33310

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)

WANTED - For personal collection. The Radio Amateur's License Manual, Edition 12. W1CUT, 18 Mohawk Dr., Unionville CT 06085

VERY inter-est-ing! Next 6 big issues \$1. "The Ham Trader," Sycamore, IL 60178

CLUBS: Send membership list for QSLs. World QSL Bureau, 6200 Panama Ave., Richmond, CA 94804

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando, FL 32806

DUMMY loads, 1 kw, \$9.95; phone patch, \$8.95. Wired, \$4.00. Ham-kits, Box 178, Cranford, NJ 07016

PRIVATE collector wants old wireless gear. Buy, trade. Dick Sepic, 1945 E. Orangegrove Blvd., Pasadena, CA 91104

HARDBOUND QSTs 1961-1970. K2GBH 12401

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer. 1025 Harrison St., Oakland CA 94607

GREENE - center insulator, with or without Balun - a tough number to beat - free flyer. Greene Insulator, 3 Pilgrim Dr., Bedford, NH 03102

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord, NC 28025

TOROIDs & teletype. Lowest prices anywhere. 40/\$10 postpaid. 3/2 KSR printer, reconditioned, \$225. Mite UGC 41, test Mode 19, 19, 28, 32, 33! Many more bargains. List, stamp please! Van, W2DLP, 302Z Passaic, Sirling, NJ 07980

NIXIE & Pixie tubes. New & used, with & w/o sockets. All sizes. Limited quantity. Shack clean-out. Low prices. Request list. WA2LJK, Box 85, Union, NJ 07083

COLLINS. Complete station, 758-1, 32S-1, 30L-1, 31Z, antenna, odds and ends, from the estate of K4IS. \$1000. See K4DAY.

SB-301 with am and cw filters; SB-401 with crystal pack for sale together or separately. Will consider selling SB-101 with SB-640 and HP-23 and cw filter. Any mature offer considered. Frank Williams, Box 19252, Washington, DC 20036

PREPARE for Amateur FCC exams! You need Post-Check. Original, expertly devised, multiple-choice questions, covering all areas tested in FCC exams. Same form as FCC exams. Over 300 questions and diagrams for each class. Keyed answers, explanations, 1B1 sheets for self-testing. Basic questions duplicated where they apply. General Class \$4.25, Advanced Class \$4.50, Extra Class \$4.75, including first class mailing. Add 25c each copy for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbandale Station, Des Moines, IA 50322

WANTED: socket and air chimney for PL6D22. K6HM

NOVICES: Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information, Amateur License, Box 6018, Norfolk, VA 23508

WANTED: GS-12 in Germany desires two year continuation anywhere overseas, career category GS-2010 inventory mgmt or 2003 supply systems analyst. Vandegriff, DL4VA, MATCOM-DSO, APO, NY 09052

FREE Electronics magazines, list \$1. Electronic Publications DEW25, Wainwright, AK 99782

6 and 2 meter HC-6/U xtras \$1. S.a.s.e. for list, Mac Robbins, WA3RJD, West Newton, PA 15089

NATIONAL HRO 500 for sale new condition less than fifty hours. \$1195. Dennis Dressler, Rt 7, Topeka, KS, fone 913-478-4751

MECHANICAL filters: 455 kHz, 2.1 kHz \$18.95. 300 Hz \$22.95. J. A. Fredricks, 214 South 13th Ave., Yakima, WA 98902

FOR SALE: SB-34 xcvr used only 15 hrs. \$289, +250 6M xcvr used only 4 hrs. \$249, WA4FEI, 61 Court Sq., Harrisonburg, VA 22801, 434-6767

FOR SALE: 32S-1 Collins 10796, 75S-1 Collins 2227, 516F-2 Collins power supply, Collins keying relay, HD-15 Heath phone patch, FT7-OZ Omega noise bridge, GB5 201 linear amplifier, low pass filter, head phones, mike, code key. All for \$1050. J. M. Guyton, 227 E. Main St., Uniontown, PA 1540

PROFESSIONAL service for your quality ham gear. For information send card to Dave, W1AA1, South Shore Radio Phone, Municipal Airport, Marshfield, MA 02050

YOUR call letters on attractive 3-D magnetic sign for your car. 3" x 10 1/2". Only \$4. Sanco Associates, Box S, Westfield, NJ 07090

WANTED: RR89, R390, R390A, R391, R220, Racial and 5151 receivers. SWRC, Box 10048, Kansas City, MO 64111

CASH for Collins, Drake, Swan gear in need of repair. State condition, price, in first letter. W9HF, 6005 Indiana, Ft. Wayne, IN 46807

WANTED: 432 500 watt amplifier; 1296 100 watt tripler and amplifier; HA-2 transverter. Six meter: 5000 watt amplifier with 35K 100A tubes; new tubes; \$2 photos; sacrifice \$495. All letters answered, WAUGH

WANTED: Heath keyer HD-10. Trade HW32A for HW 12 A. W2UGM, 66 Columbus Ave., Closter, NJ 07624

CASH paid for R390A receivers, 618T3 transceivers, and Eln/Varian tubes. The Ted Dames Co., 308 Hickory St., Arthington, NJ 07032

WANTED: tube-type im tuner, apr 813s and 10 volt 10 amp CT transformer. W4ZMR, T. E. Ramsay, 130 Neely Rd., Brevard, NC 28712

VALTEC-V5-II Speech integrators. Immediate delivery from factory. The price - \$44.50 complete. The results - fabulous. Send QSL card for free brochure or order direct; guaranteed. Valley Technics Inc., 2901 Sonora, Kalamazoo, MI 49004

FINE stainless steel, threaded, washer hardware! Guying accessories! Many ceramic insulators! Lists small charge or quote! Walt, W8B1R, 29716 Briarbank Ct., Southfield, Mich. 48076

NOVICE crystals: 40-15 M, \$1.50; 80M, \$2.10. Free flyer. Nat Stinette Electronics, Umattila, FL 32784

WANTED: Mobile transmitter, mobile supply, antenna, speaker, and mike. Jim Roberts, 509 Greenbriar Blvd., Auburn, IN 46706

WANTED: Northern radio model 115 oscillator. Also AN/JURA-6A group: two CV-87 converters and one CM-14 comparator. W. Pilon, Hemans Ct., Worcester, MA 01605

SB-220 linear, guaranteed excellent, sell \$350. F.O.B. QSTs, complete 1949 through 1970. Sell best offer. Wayne Hall, W3PEO, 1765 Ivy Oak Sq., Reston, VA 22070

PAIR of Eimac 4-400As with sockets and chimneys. Brand new never used. \$30 for one set, \$50 for both sets. Also SX-100 needs minor repair. \$75. HT-18 VFO \$10 with manual. Buy all 1 pay shipping and insurance. WB4VFW, Lt. David Strohm, 160 Katsas Cir., Jacksonville, AR 72076

CAPACITORS: brand new 275uf electrolytics at 500vdc, Ten for \$19.50. McHaffey, K4IHP, P.O. Box 28951, Atlanta, GA 30328

COLLINS 75S-1 w/500 Hz filter and 25 kHz calibrator \$295. Navigator \$85, 70E8A PFO \$40, FT2409 200 Hz cw audio filter \$13. Heath B-1 balun \$4. PR3 1755 attenuator no gauge \$4.50. Tubes - 80T 25c, 6146 \$1.25, 3629 with socket \$2. 16Z5 ten for \$1, 6X5 2500 volt oil \$4, Milen 3700V HF connector 35c, Dual 10 turn Helipot 25/2K ohms \$2, Heinemann circuit breakers 50c, other miscellaneous parts - Ask - W0KPK, Box 1038, Boulder, CO 80302

DX6D, HA10B, Lafayette HA90 VFO, 60.75, or HP23A power supply. Write to Curtis Blount, WB4SHX, Rt. 5, Box 288A, Dothan, AL 36301

BANDJ, Vega, Gibson, Bacon, trade for Collins gear. Richelieu, W9S, 215 S. Washington, Wheaton, IL 60187

WANTED: Heath SB-110 in good condition. WB4LOQ, P.O. Box 2563, Tallahassee, FL 32304

WANT: Heathkit antennascopes impedance bridge and manual. W8HXC, 198 Shipperd, Oberlin, OH 44074

SCOPE: Heathkit SB-620 Scanalyzer for sale, excellent condition \$85. Rosen, WA21TH, 5 Milburn St., Hicksville, NY 11801 (516-861-9161)

WANT original or Xerox copy of Multi-Eimac TA54H xmitr service manual. K9DHD, 1006 Wilson, Wheaton, IL 60187

GLOBE King 5000, good cond. 640 watts am/cw, 720 wsb, \$150 or best offer. W3FJL, 714 First Ave., Parkersburg, PA 19365

WANTED: KWS-1 - state cond. price, and serial number, Cash deal. K2AK, 1115 Willis Ave., Albertson, NY 11507. Telephone: 516-621-8181

SELL: Heathkit SB-301 revr with cw filter, \$240; 10-14 oscilloscope, \$250. Both brand new. WA6DJA, Darryl Rubin, 1915 Cada Ridge, Beverly Hills, CA 90210 (213) 273-3440

WANTED: Lafayette HA410. State price. WA2MDD/WA2PVN

SELL: SB634 w/mike \$130, HQ170 890. Also Vibroplex. W3GNG, 104 Quaker Ln., Villanova, PA 19085

WANTED: Yaesu FT-101 or Swan Cymet. Kurt Schulz, K9JNH, 800 Clinic Circle, Fairmont, MN 56031. Tel: 607-238-2560

SELL: Halliartles SX-122. Gen. coverage, w/cw, and speaker. \$200. R. C. Bernhardt, 4475 Henry Hudson Parkway, Bronx, NY 10471

SELL: HT-44, HT-41, SX-111, PS-150 AC, gw condx, \$475 or separately. Bert Carter, 1209 Logan Ct., Jacksonville, NC 28540

HEWLETT Packard 302A wave analyzer in absolutely mint condition; General Radio 1021AV vhf signal generator, excellent condition; Henry 2K amp s/n 685, S.a.s.e. to K4YYL, Box 1294, Jupiter, FL 33458

WANT: FR400dx or Kenwood receiver. Trade/sell Mint Bird #43 #75; 220 MHz circulator #15; Heath 6M sbb HX-30 #125; trade Automatic noise figure generator, TV & vhf/uhf gear, list s.u.s.e. W4API, Box 4095, Arlington, VA 22204

HOUSTON to be your next QTH? Self supporting tower, antennas that made top of the Honor Roll, all accepted by neighbors, 10'x18" hobby room along with 3 BR, 2 bath, LR, DR, Den, 13 closets. Available early 1972. W5ABY, 4808 Braeburn, Tellaire, TX 77401

ARRL Handbooks: 1st, 4th, 5th, 8th editions wanted. W6CZP, 550 Groff, Pomona, CA 91768

FOR SALE: ASR 28 fine condition \$500. ASR 32 nearly new \$500. R. Emerson, W7NQL, 1075 W. Hilliard Ln., Eugene, OR 97402

LAFAYETTE Comstat 23 MkV antenna, Turner microphone, all \$85; Heath HRO-B, factory checked and aligned \$55; HM-15 #12; 14 AVQ. Everything beautiful. WN2RIO, 5 Edgchill Close, Bronxville, NY 10708

DRAKE R-4B w/MS-4 spkr & 5 xtals. Excellent condition, \$380 plus free. WR2RXV, Ken Newman, 38 Rolling Ridge Rd., Saddle River, NJ 07458

HAMMARLUND HQ-110 \$85; HA-5 VFO \$30; MD-16 CPO \$5. F. Lampert, WA2DFC, 10 Greenview Dr., Pequannock, NJ 07440, 201-696-3385

CRYSTALS aimed: Novice FT-243, active, accurate, one to four - 40M \$1.75, 40M - 15M \$1.50, December QST Novice Special, five or more, (band mix OK) - Scattered frequencies, (our choice) - 80M \$1.59, 40M - 15M \$1.15 each. Your frequency choice, 80M \$1.65, 40M - 15M \$1.39. Postage/Crystal - airmail 12c. 1st-cl. 8c. General purpose FT-243, any frequency, 0.1M - 8600 kilocycles, \$1.99, (minimum five same or mixed \$1.75), (crystalize your net, ten same frequency \$1.45), 1700 - 3499 \$2.95, .005M add 50c/crystal. MARS, CD, etc. Free general frequency order-bulletin. Your crystal shop since 1933. Bob Woods, WB1PS, C-W Crystals, Marshfield, MO 65706

SELL: HA-14 & HP-24 supply Compact linear Price \$90. W4YPT, R. 3, Box 401, Charlottesville, VA 22901

DRAKE 2-NT transmitter, manual and cables. Original carton, perfect condition, \$110 shipped. WN4NCC, 196 Hallmark Estates, Athens, GA 30601

SELL: NCX-500, AC-500 perfect condition. \$285. W2GCW, 192-15A 69th Ave., Flushing, NYC 11365

HALLICRAFTERS HT-32B. Absolutely mint \$250. Millen oscilloscope, 90932Z, mint, \$75. F. Martin, 202 Kenny, Fayetteville, NY 13066

WANTED to buy - Ten meter am transmitter. F. F. Knapp, W7EQV, P.O. Box 854, Scottsdale, AZ 85252

HAMMARLUND HQ-215 recvr/spkr, brand new - never removed from box \$265. WB2ILB, Don, 8 Old Mill Dr., Poughkeepsie, NY 12603

COMPLETE station - mint condition - SB-301 with cw filter & 2 meter conv., SB-401, SB-600, FDP-21A, Hy-Gain 14AVQ with 80M coil - \$500. Will ship. Fred Ligan, WB9BOK, 245 W. Main St., Lake Zurich, IL 60047

VESTO 33 1/3 foot tower, 20 meter beam, Selkyns, prop-pitch motor, \$150. Amertran transformer, 110-3200 volt med-tap, \$14 amp \$50. Pick up only. Noble Watson, W9WE, Route 6, Box 179 Greenwood, IN 46142, 317-881-2215

COLLINS 51S-1 receiver general coverage, good condition \$600 or trade for good National HRO 500. \$125 speaker included. Hewlett Packard 200CD audio oscillator (new) \$100. H.P. 428B clamp on dc milliammeter (new) \$350. Will trade all for exceptional HRO 500. F. W. Adams, KH6GG, 1739C Ala Moana Blvd., Honolulu 96815, 946-2723

MAGAZINES: Bell System Technical Journals, 1922-1925 14 copies complete includes Vol. 1 and No. 2 1922. 1934-1939 24 copies complete, 1940-1956 50 copies, All 88 copies \$35; I.R.E. Proceedings 1924-1946 (some missing) 185 copies \$30; QST 1925-1937 11 years complete except 1927-1928, 1957-1963 7 years complete, All \$35; CQ 1957-1964 8 years \$10. Buyer pick up or pay shipping. Clair Lewis, W2CJL, 9 Conrad Pl., Dover, NJ 07801, 201-366-6089

All prices F.O.B. Collins KWM 2A Ser. 170 \$675; ac supply 4100; dc \$90; mobile mount \$75. SB3 dc supply \$100; Johnson standing wave indicator \$25; Waters dummy load model 334 \$100; Shure mobile mic. 508C \$15; BC 221 complete with book \$80; Dumont oscilloscope 274 \$80; Mosley TA 33 \$100; Ham-M 27 W mobile antenna 20 meter coil \$30; 80 meter \$20; Hustler mobile antenna 20-40 \$45; Millen grid dip meter \$65; Stimpson 250 \$40. William Kimball, 61 Hartford Ave., Hopedale, MA 01747

ELECTRON tubes 85% off! Wholesale and industrial users send for free catalog with your letterhead. CeCo Communications, 2624 Ave. V, Brooklyn, NY 11229

STEAL my factory aligned Heath HW-100 w/xtal finals, HP-23-A ac supply, SB-600 spkr, Drake TV-1000-LF filter, 14AVQ w/mounting kit, callbook, headphones, key, etc. - \$275. Also Hallcrafters SX-111 w/matching spkr, electrically & mechanically perfect, \$125. Have Bird model 8251 coaxial load, will accept best reasonable offer. WB2MZU, 14 Farmers Rd., Great Neck, NY 11024, Tel: 516-487-2744

HW-16, eleven 80, 40, 15 meter crystals, \$90 with manual. Hallcrafters S-120 revr, \$30 with manual. Matthew Grossman, 14499, 13 Stonehenge Rd., Montclair, NJ 07043. (201) 744-1895

GALAXY V, Mk 2, cal, vox, ac & dc supplies, \$350 or best offer. 1125 Red Mtin, Glenwood Springs, CO 81601

WANTED: SB610 mint. Fifi Lopez, Box 7565, Mexco City

HW-16 revr-factory aligned with xtals and manual. Excellent cond., \$100 or offer. John Williams, 48-575 Madison St., Indio, CA 92201

TREMEUDOUS assortment radio parts, test equipment, old tubes. Giveaway prices. Estate of PJ2AS. Mrs. Alfred Post, Box 65, Darlington, MD 21034

DRAKE TR-3/AC-4, excit condx, best offer over \$400. WB6CEP/J, 148 Adams St., Waltham, MA 02154

WANTED: KCU-27 crystal calibrator. Mel Malafa, 1451 Lawler Ave., Grafton, ND 58237

COLLEGE expenses: SX111, \$125, flexible. Good condition with manual. WB6VVS, 4384 Bel Air Dr., Lacanada, CA 91011

"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 Equipment; Factory warranty; Mosley MCQ-10 quad, \$49; Gonset 2000 watt linear Mark IV, reg. \$525, cash \$389. Call or write for "Xmas" specials on new TV-Meter clocks, 2 meter transceivers, antennas, rotors, and accessories. New, Rohn 60 ft. foldout tower, pre-paid, \$235. New Mosley Classic 33 and Gen Ham-M rotor, \$210. Used Equipment: GP-550, AC-400, & SC-550, \$399; Swan Mark I linear, \$365; Ham-M, \$85; R-4-B, \$349; TR-4, \$419. Moory Electronics Co., P.O. Box 506, DeWitt, AR 72042. Tel: 501-946-2820

VIKING Ranger - 10 through 160 meters - excellent condition - \$70 FOB. D-104 mike and few extra tubes included. J. J. Bresenhan, 111 Sherwood, Longview, TX 75601

BC-348 less power supply \$40; RME 4300 Ham receiver \$50; Heathkit GD-1A grid-dip meter \$15; Eico Model 450 F/W scope \$115; Eico 147A signal tracer \$35; Triplett 630-A VOM \$40; 1450 watt 350 MA transformer \$10; Lambda 200 volt regulated supply metered \$35; 829B \$4; 813 \$9; RK-65 \$50; UV-849 \$75; W2RUK, 7 Charles St., Auburn, NY 13021

HALLICRAFTERS SK122 general coverage recvr. With factory calibrator manual and speaker. Like new \$225. Pick up preferred. WA8MPP, 1445 St. Clair Ave., St. Paul, MN 55106, Tel: 699-0618

SP600-JX, \$275; HRO-50, \$125; NC-183D, \$60; Valiant-1, \$100. Will ship fob. Chris Wartes, K7DWT, 15419 20th Pl. W., Lynnwood, WA 98036, 206-743-9453

WANTED: Collins vernier knob for 75A4. VE3AJY, 555 Princess, Woodstock, ON

VARITRONICS IC-2F two meter fm transmitter in factory sealed carton \$210. Frank Connelly, WA7GWL/1, 2100 Stanley St., New Britain, CT 06053

FOR SALE: 2M station, 12 watts xmtr, BC312 revr. Techcraft converter nuvista preamp. 8 element Telerec beam wire - \$75. 500 watt homebrew final with power supply \$40. No shipping. S. Kaftan, 2729 Healy Ave., Far Rockaway 11691. 212-327-8751. K2JJC

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CONTACT us for new or reconditioned Collins, Kenwood, Two-One, Drake, Ixoy, Ixoy-3, Mosley, Henry Line, towers, antennas, rotors, other equipment. We try to meet and deal to and give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler, MO 64730

SB-600 spkr \$10; new HD-15 patch \$15; New EV 619-FR mike \$30. B. med. 426 Lo-P, \$17. All postal. B-24 Mini-beam free - U pick up. Frank Antal, K1ZCD, PO Box 404, West Springfield, MA 01089 (413) 733-8671

MUST sell KWM-2, ac & dc pwr supply, mobile mount + antenna, Ham-M, 40' crank tower, H D-15 lever, Sig. gen. 1.5 to 1500 V ohmstr. ART-13, S-27 revr - All kinds of goodies. (215) 616-0500. E. Wilson, Box 15, W. County Line, Waminstler, PA 18974. Call and bring money.

THOR, transmitter with modulator/power supply. Excellent condition, \$130. Frank McJannet, 11557 Evanston North, Seattle, WA 98133

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ELEXCO largest exclusive ham dealer in the Gulf South. All major product lines in stock. New and re-conditioned equipment. Before you buy, sell, or trade, check our low prices and high trades. ELEXCO, 608 Papworth Ave., Metairie, LA 70005, (504) 834-9000

AUTOMATIC Morse Code copying machine. Copy up to 120 wpm without knowing cw! Simply hook to your receiver's audio and read printout. Send \$14.95 for detailed construction plans. VMG Electronics, 2135Q West Sunnyside, Phoenix, AZ 85029

SELL best offer: Never used - E-Z Way RBX-60 tower, ground post, Ham-M, cables. Used - SX-101A, C.E.-MM-2 analyzer, Swan-350, ac supply, Johnson TR-R switch, Model 26 teletype, Lafayette KT-174 VTVM, Will ship. Bruce Kramer, WB4LLH, 9350 Gallardo St., Coral Gables, FL 33156, 305-665-2934

KWM-2, #11843 w/516F-2 - very good condition \$645. Like new Clegg Thru VI w/ps \$140., Eico 720 \$35., NCL-2000 w/new tubes \$285. WB2IEC

HEATH SB-301, cw filter, excellent condition, \$200. HM-15 SWR meter, \$10. Any offer considered. Bill Lowe, 900 Oakland, Ann Arbor, MI 48104. 313-761-4281

WANTED: QST magazines, 1928 or older. Give price. W3Q11, 5899 Barnes Ave., Bethel Park, PA 15102

WANTED: National HRO with round i-f cans and 2.5 volt tubes. Gene Blackburn, K4JUS, Route 4, Lilburn, GA 30247

SALE: NCX-3, xtal calibrator mint, \$195 or best offer. Bodin, 2111-15th Ave., So. Minneapolis, MN 55404, 1-612-336-7479 after 5:00 P.M.

SELL, local only: Drake 2-C, \$150; Heath DX60-B, \$50; Knight TR-10B with VFO, squalo, 3 el. beam, \$75; Terry Herbster, 39 Birchwood Ln., Willingboro, NJ 08046

FLAG pole type tower and Collins S-line equipment wanted. WBPNS, 5340 Franklin Rd., Bloomfield Hills, MI 48013. Telephone (313) 626-5319

SIGNAL-ONE CK7A, new; want Collins KWM2, s/line. Payne, 109 Black Patch, Springfield, TN

POWER plants: 10 kW 230/115 ac electric start with jeep engine, on steel skids, built in gas tank & starting batteries \$600 175w kw Onan driven by UD-4 International Diesel engine 230/115 1-phase both plants with automatic shut-down features, ranging time meters plus full metering. Perfect for emergency BC station power. Will ship. Reed type channel-guard unit for GE TPL mobile unit, 2-30 watt hi-band GE tpl mobile units with new 3dB gain antennas \$300 ea, 50 watt TI-GE hi-band base station w/new 3 db base antenna \$375, much Secode encoders & decoders, solid state, W9DSV Webster, WI 54893 Box 87, 715-866-2468 days.

FG7AC/FGADC wanted receiver Collins 75A4 in mint condx. Serial number more than 5000. If possible with 3 filters and receiver, Transport paid. Please apply to C. Curlet, Villa 46 Capitelles II Av, Kennedy 30, Nimes, France

FOR SALE or trade: DX-100 Eico 720 xmtrs Q multiplier, electronic keyer. All for \$100 or trade for what you have you. Steve Amros, WB8GUA, 1019 So. Weadock, Saginaw, MI 48601

SELL: Johnson matchbox, 275w, \$40, kilowatt, \$75, both with directional coupler and indicator, excellent condition, Hank Jordan, WB2IYO, 1 Laurel Hill Rd., Crogers, NY 10521

TELREX 4-36 twenty meter beam in good condition \$175. Will pay cash for unmodified prop pitch motor. W2AWK 11791

HW-16, homebrew transmatch/SWR indicator, electronic keyer. All excellent condition \$100. Robert Gibilisco, 327 W. Summit St., Mohnton, PA 19540

HW-100 with manual factory aligned \$220. WA9SHA, Ross Weber, 910 South First Ave., Sioux Falls, SD 57104

NEED ZAP-A crt. W5OE, 1721 N. Tiemev Rd., Fort Worth, TX 76112

CLEANING house. Have lots and lots of goodies to sell: Gout surplus, commercial, and test equipment, and parts. Got a little of just about everything. Send 25¢ (refund first purchase) for long list with detailed descriptions. Box next to Anthony Carson, WB4SR, 1309 Selwyn Dr., McLean, VA 22101

WANTED: Original Hallcrafters "Skyrider" T.R.F. Regen receiver. Also other early Hallcrafters receivers. Howard Hoagland, 639 North Sierra Bonita, Los Angeles, CA 90036

HQ 170 A with speaker and manual. Excellent condition \$150. Gordon Yams, 27 Marilyn Ln., Westbury, NY 11590, 516 ED 3-6822

GALAXY V MKIII, ac supply, VOX, cal, spkr console, \$370. WA9TYU, 1414 28th Ave., Greeley, CO 80631

QST's bound in red buckram for sale. Vol. 4, Aug 1920-July 1921, and all succeeding vols. as bound through Dec. 1969. All issues intact. Cannot break set or ship. Write Anne Fitz, Box 252, Lanesboro, MA 01237

SELL: B&W 5100 with exciter, 200 watts sbs/w/a-m, \$185. Hallcrafters SX99, \$75. K4GVW, 2816 Broadview, Huntsville, AL 35810

WANTED: Book "Practical Wireless Telegraphy" by Elmer Bucher (1917). Advise condition and price. W7MKW, 205 S.W. 102nd St., Seattle, WA 98146

WANTED: National Co. receiver model SRR (5 meter super-regenerative). Also McIntosh MI-75 audio amplifier. W. H. Martin, W4GLV, 139 Shenandoah St., Leesburg, VA 22075

SELL: Never opened Heathkits HW16 + HG10B both for \$115...new BUD low pass 1.6601 five tunable sections - \$15...Palomar TC keyer five hrs use - \$50...Ten-Tec SWR AC-4, tuner AC-5 and PM 2A transceiver one hr air time all for \$55. Dick Myers, Browning Rd., Hyde Park, NY 12538

FOR SALE: RTTY gear model 14 \$75, model 14 typing reperft. T.D. and p/s \$60, CV-89/A converter \$60. W7GRS, Box 357, Marysville, WA 98270

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WANTED: National SW-3, FB7A, W0KC, 10 Taylor Estates, Kirkwood, MO 63122

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HAMMARLUND HQ-215 for sale. Call at 32 Cumberland Ave., Verona, NJ for details. W2UD0

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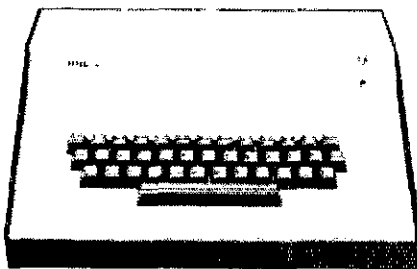
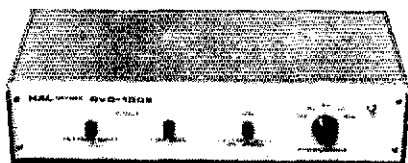
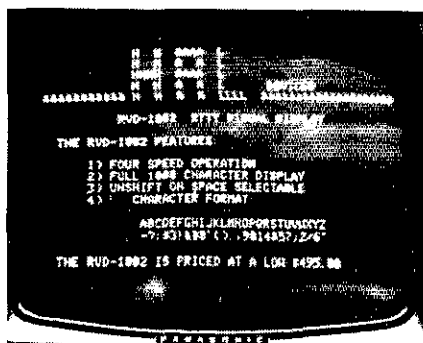
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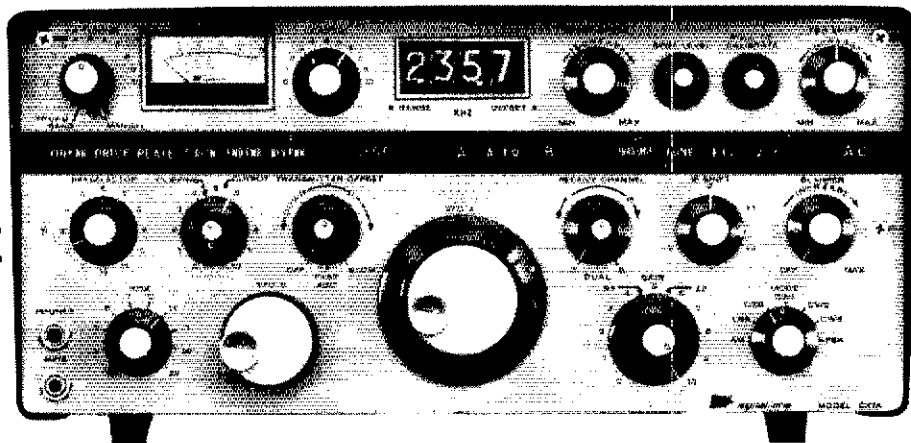
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Henry Retires from FCC	79, Apr.
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Kitts Gets MARS Trophy (photo)	85, Mar.
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Amateur Radio and the Press and You (Weaver)	64, Feb.
Antenna Case Won in Ohio	82, Aug.
Antenna Party for K3RIV (photo)	73, Jan.
Around the World in Five Steps	87, Apr.
ARRL Advisory Committees	68, Apr.
ARRL Visits Consumers Union	59, May
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Geneva - 1971 (Williams)	76, May;
Goldwater Heads QLWA	74, June
Ham Radio Broadens Horizons for Handicapped (Rohidoux)	52, Jan.
Homebrew DX Prediction (Moore)	52, Aug.
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Lightning Strikes! (Hammell)	59, Feb.
Local Nets Can Be Fun (Myers)	66, June
Medical Council Awards	86, Sept.
Nixon Commends Treadway	72, Jan.
Passing Examinations - Study Techniques Do Help! (Wood)	58, June
Phillips Who? (Brightman)	74, Aug.
Phone Patching and the Telephone Network (Schleicher)	36, May
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117-Vac Operation for Car Radios (H&K)	49, Mar.
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ATR-166, The - A Homemade Transceiver for the 6-Meter Bands - (Hall)	
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FM "Pip-Squawk," The 2-Meter (DeMaw)	11, July
FM Receiver, Pip-Squawk MK-II (DeMaw)	11, Aug.
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