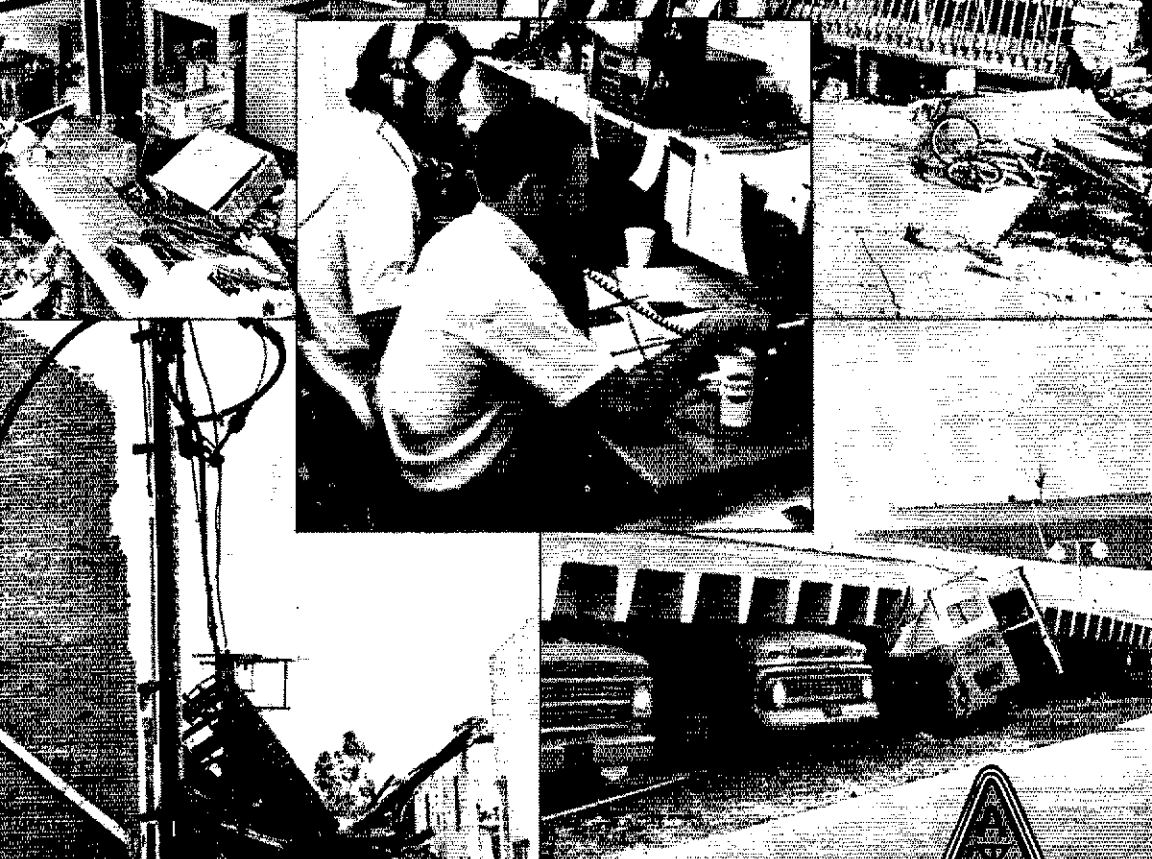


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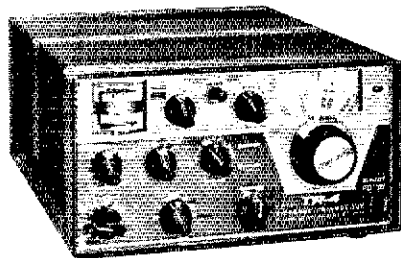
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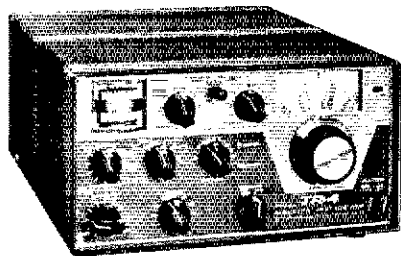
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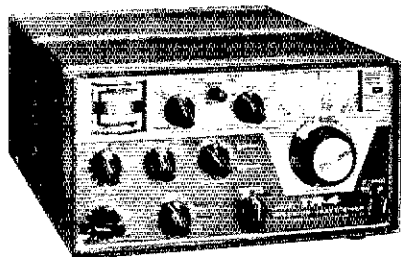
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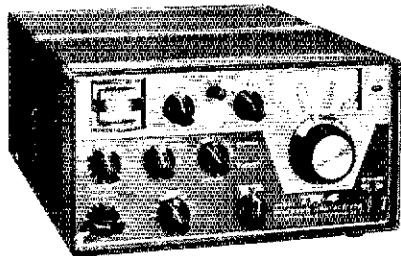
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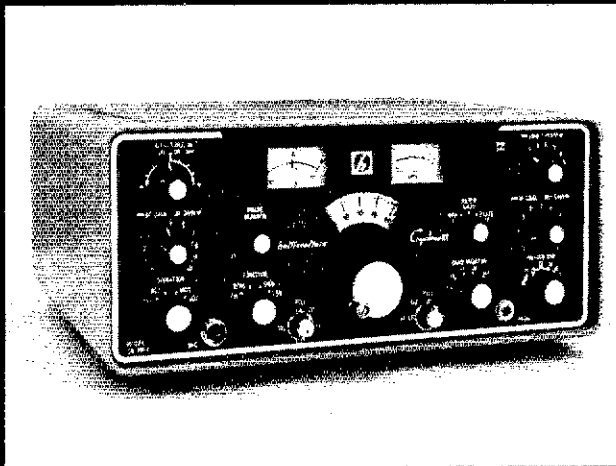


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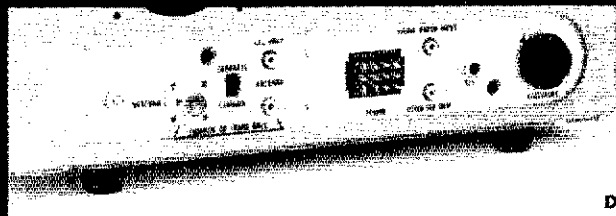
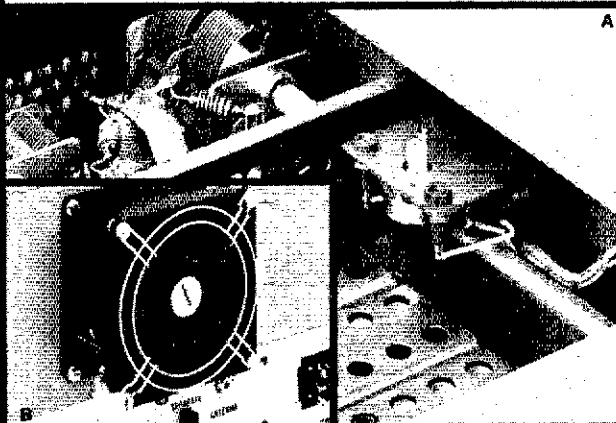
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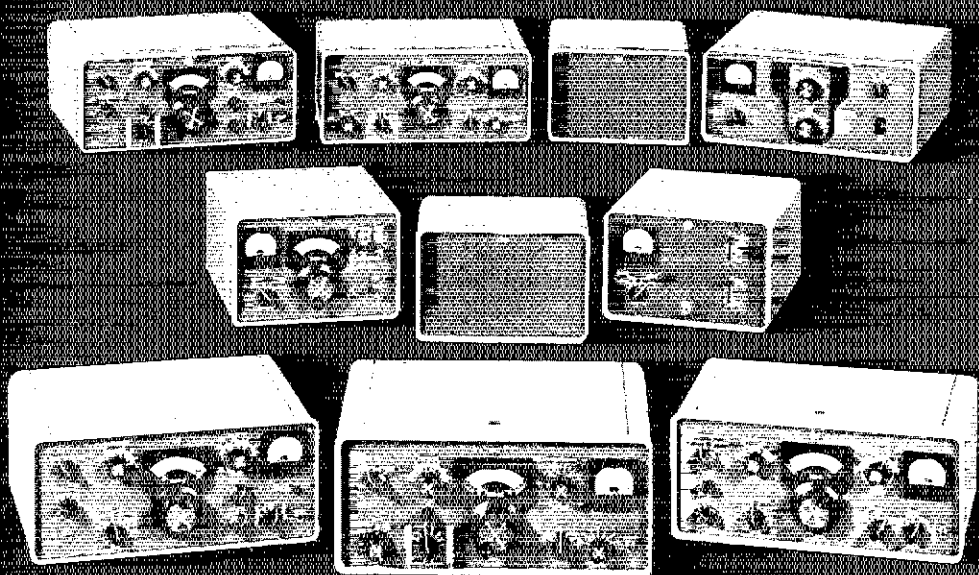
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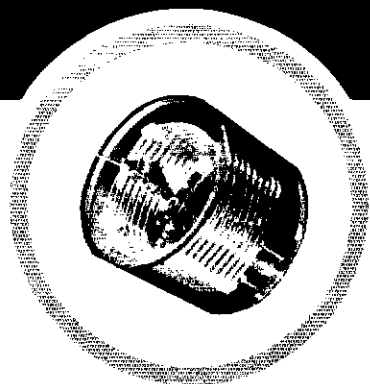
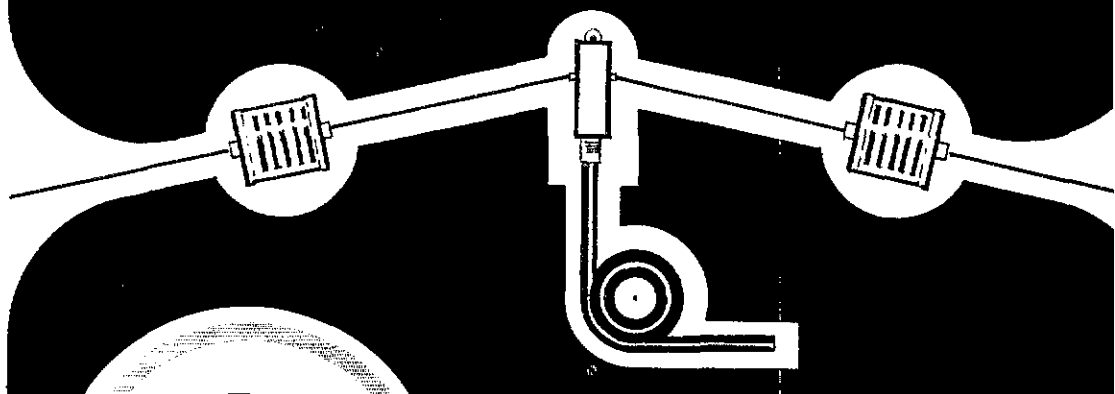
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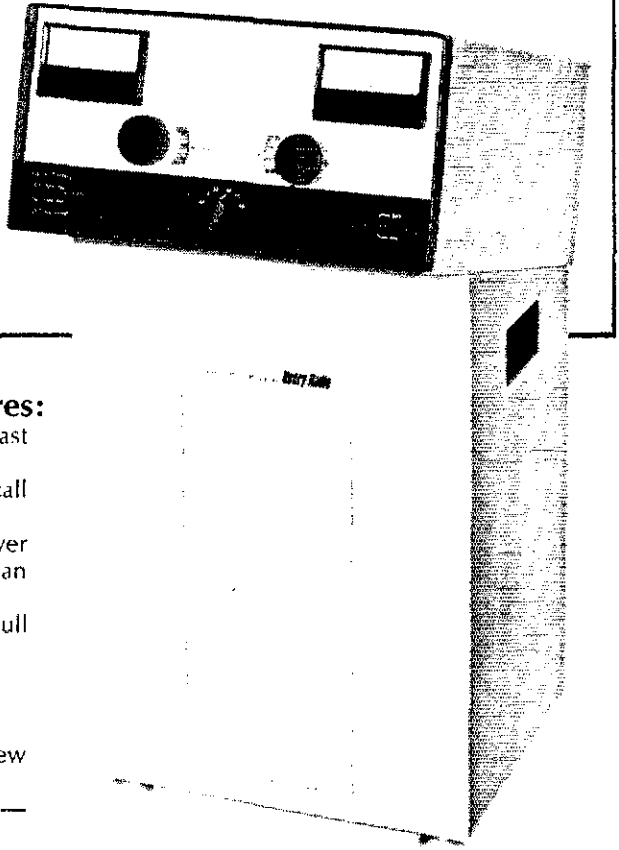
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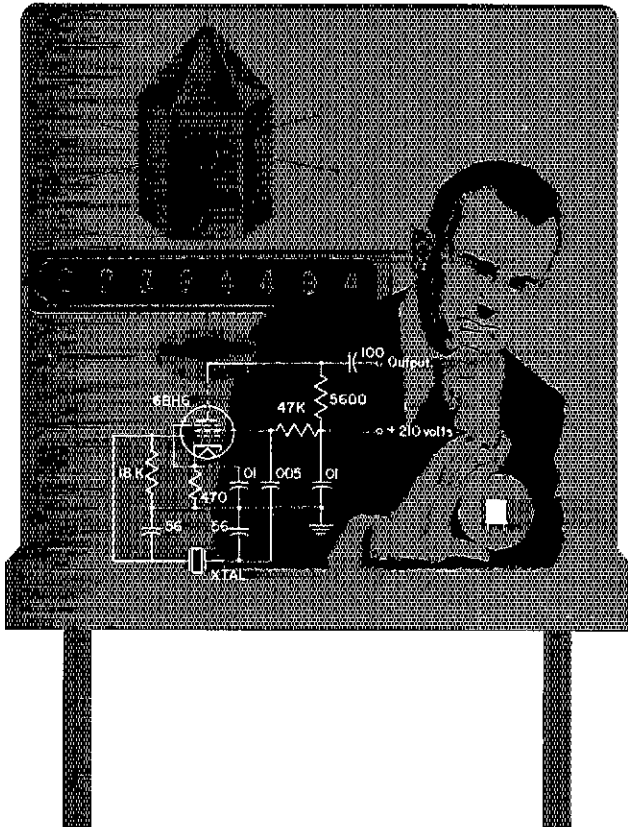
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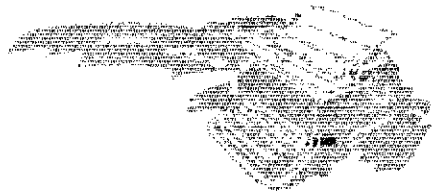
JOHN R. BRIGGS, W8KW
1273 13th St., Baywood Park, San Luis Obispo, Calif. 93401
Vice-Director: Arnold Dahlman, W6UEI
14940 Harland St., Van Nuys, Calif. 91405

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* Member Executive Committee

"It Seems to Us..."



NEWCOMER "PROPAGATION"

DURING THE twelve months of last year, some 17,000 persons newly joined the ranks of U.S. amateur radiomen (and women!). Yet the FCC total of operator licenses outstanding in December was almost precisely the same as a year earlier.

Howcum?

Assuming the computer didn't hiccup or otherwise drop a digit or two, it is obvious that 17,000 older license holders let their tickets lapse during the year. Just what caused this increased attrition, however, is *not* obvious. It could be a trend, a new "normal" erosion of interest. It could be caused by some quitting ham radio (as they threatened) in protest against incentive licensing. Our own view is that it represents long-inactive hams who kept renewing so long as it cost them nothing, but who have decided it is not now worth a \$9 fee to keep an unused call sign. If we are correct, then ham radio is actually growing, despite the figures — i.e., it is largely deadwood which is disappearing. However, the growth is certainly not spectacular. It should be stimulated.

So, ask yourself: how did *you* first get started in ham radio?

What sparked your initial interest? What was it that nurtured that spark and brought it to the burning desire to get a ticket?

Chances are, the experience that stimulated your interest in hamming and aided your entrance involved an already-licensed amateur who offered a helping hand. Our surveys and personal inquiries disclose that most of today's amateurs were first exposed — and later successfully licensed — as a result of voluntary encouragement and assistance from an "old timer."

Ever wonder who are these "old timers" responsible for guiding the newcomers into ham radio? Perhaps a more important question to ask is: are *you* helping the growth of our body by assisting newcomers? (Face it, OM — even with only a few years under your belt, you're getting into the OT class!)

There are a number of positive ways in which you may personally promote growth. A good and direct approach would be to offer assistance to someone who may have expressed an interest — perhaps a neighbor-

hood boy, a friend at work, etc. Invite him to see your layout and observe a few QSOs . . . a piece of modest DX, a snappy net, or a friendly ragchew. Water the seed!

License classes aimed at equipping individuals with enough knowledge to pass the Novice exam provide another means for attracting many persons. More radio clubs would like to set up classes, but need organizers and instructors. Volunteer? You could also set up a class for a local adult evening school, or a high school after hours.

The Boys Clubs of America is encouraging its local groups to institute an active ham radio program and on-the-air network. Volunteer assistance is needed in many communities. The Boy Scouts of America has long recognized amateur radio as an outstanding training avocation, with Jamborees, contests, etc., and Explorer Posts (older youth) have been set up in a few communities; again, more Scouting leaders are needed. With the promise of another Oscar soon, Amsat is encouraging schools and other educational institutions to set up relatively simple ham stations for space science instruction; thus Oscar can be exploited as a student laboratory tool in space science much in the same way as a microscope is used as a tool in biology classes. Once more: the program needs ham sponsorship (and modest expertise) at the local level.

If you'd like to participate in one of these special projects, but don't have local liaison, drop a line to Hq. and we'll put you in touch with the right people. If you want to set up a licensing class, as a club project or entirely on your own, we can send you a complete curriculum and list of available training aids.

To repeat: personal assistance from experienced amateurs is a vital factor in gaining new blood. Ergo, if each amateur who has received the benefit of guidance from others does not in turn pass along this experience to more than one other, then ham radio will not grow. An oversimplification, perhaps, but a true principle.

So, let's *propagate* amateur radio. **QST**

The proposed addition of 150 kHz for expanded voice communications in the amateur bands was a highlight of the annual meeting of the ARRL Board of Directors, held in Hartford, Conn., May 7-8. Because of international complications, the Board proposed extensions of the 75- and 20-meter bands smaller than those in FCC's Docket 19162. However, in the interest of facilitating public service accomplishments, directors proposed greater phone expansion in the 75-meter band for General (and Conditional) licensees than contemplated by FCC.

At the other ends of our bands, retention of the present 35 kHz segments was felt desirable. No change is proposed in the present 28-MHz setup. The ARRL recommendations are (E-Extra, A-Advanced, G-General, C-Conditional):

3775-3800	E	14,175-14,200	E
3800-3825	A,E	14,200-14,275	A,E
3825-4000	C,G,A,E	14,275-14,350	C,G,A,E
7150-7175	E	21,200-21,225	E
7175-7225	A,E	21,225-21,325	A,E
7225-7300	C,G,A,E	21,325-31,450	C,G,A,E

A special segment, 7075-7100 kHz, will be requested for voice but restricted to use by amateurs in the far Pacific possessions, currently denied 40-meter phone. The Novice segments would be moved to 7100-7150 and 21,100-21,200 kHz, reduced in the latter case.

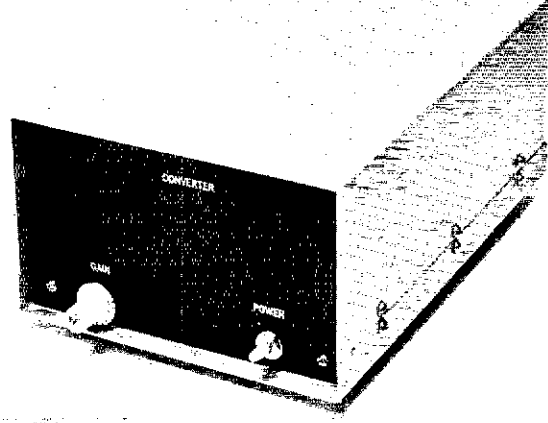
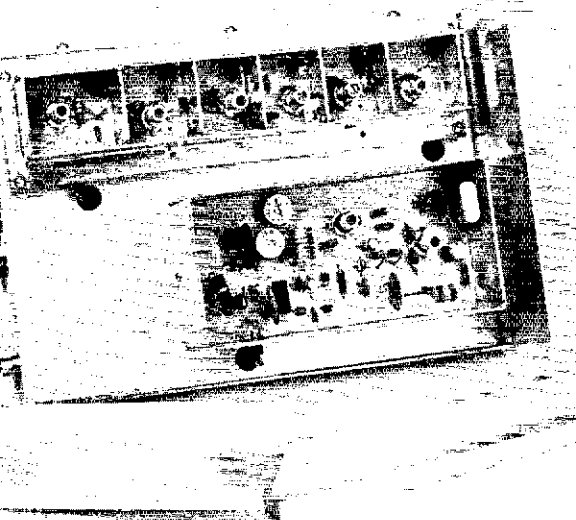
Other major actions in the regulatory field include instructions to the General Counsel to file comments in FCC Docket 19245 aimed at maintaining message-handling privileges of amateurs (so-called Eye-Bank problem); and to take action as appropriate to maintain the 220-MHz band for full amateur use.

Commencing in 1972, the Board will meet twice yearly -- January and July. Consideration of a rise in membership dues was deferred until the January meeting. Provision was made for filling a Vice Director vacancy through an appointment by the president. Life membership was made available to associate as well as full members. First-class mailing of QST will be made available to members willing to pay the extra postage costs. A national convention was approved for 1974, to be held in the Hudson Division (time and place later).

The Board authorized purchase of film rights to "This is Ham Radio," a youth-oriented version of "The Ham's Wide World," and its distribution thru loan as well as sale. A special techniques handbook (RTTY, TV, repeaters, space communications, etc.) is to be produced. A Legal Counsel Committee is to be formed to work with the General Counsel; particular attention was paid to a difficult situation in Chicago, and the Board directed that redoubled assistance be furnished by the League to the Council there.

Studies will be made by the Planning Committee of possible mobile awards for DXCC and WAS; of a 10-wpm requirement for General Class; of Technician privileges; of Board procedures; and of director election procedures. The Membership & Publications Committee was assigned the tasks of evaluating and making recommendations on newsstand distribution of QST, and the mailing of our journal first-class to SCMS.

Full minutes of the meeting will appear in July QST.



View of the assembled converter. The top half of the cabinet has been removed to show the placement of the modules on the main chassis. Two press-fit U-shaped module covers are visible in the

foreground. The long narrow assembly at the top of the photo is the rf and mixer portion of the converter. The oscillator chain is contained in the shielded box at the lower right. A 12-volt power supply or IC i-f amplifier (see text) can be built in the vacant space at the lower left of the chassis. The completely assembled unit is shown in the inset.

High Performance 2-Meter Converter

BY DOUG DEMAW,* WICER

HOW EFFECTIVE is your vhf converter? Experienced vhf operators know that good results in receiving weak signals are proportional to the performance of the converter being used. A mediocre-quality vhf receiving setup will almost always negate the good features of the rest of the station equipment.

Unfortunately, many homemade converters are poor performers at best. Some are simply of inferior design, while others are so touchy that they will not maintain alignment from day to day. Thoughtful design can serve to eliminate most of the performance problems common to vhf converters, and the measures that need to be taken are not expensive or difficult. This article describes a smooth-performing solid-state 144-MHz converter that is free of spurious responses, is unconditionally stable, and has a low noise figure plus considerable overall gain. Construction and alignment should be within the capability of anyone who has had a moderate amount of experience in assembling ham equipment.

Design Philosophy

This writer tends to agree with a friend, W1QWJ, who has been heard to say, "After designing a piece of high-performance receiving gear it would be easier to write an article on what *not* to do!" During the course of testing, debugging, evaluating, then redesigning, most of the

wrong solid-state design approaches become rather apparent. This converter is the end product of such an exercise in home construction. The techniques used in the circuit of Fig. 1 should be useful in the design of any vhf or uhf converter that is to be free of the unfavorable performance characteristics exhibited by most "gimmicky" or ultrasimple converters. The writer listed some common failings and faults of run-of-the-mill vhf converters, then established the guidelines needed to avoid the following ailments: (1) instability of the rf amplifier stage (2) spurious output from the oscillator strip (which causes birdies in the i-f tuning range) (3) insufficient oscillator injection to the mixer (4) poor overload and cross-modulation immunity (5) instability of the oscillator frequency (6) likelihood of damage to the transistors from excessive levels of rf at the converter input (7) poor noise figure (8) low overall gain. This 8-point critique was used as a reminder of "what not to do" when designing the circuit offered here. The good results were worth the effort.

Rf and Mixer Circuits

Junction FETs are used in a cascaded common-gate rf amplifier, Fig. 1. Source bias (R1 and R2) is used in each rf stage to reduce overloading in the presence of strong signals. The JFETs are able to sustain up to 80 volts pk-pk from gate to source before junction damage occurs. Therefore, protective diodes aren't needed at the antenna input if a good changeover relay is used for antenna switch-

* Technical Editor, *QST*.

ing.¹ The rf stages, as stated earlier, are unconditionally stable in the common-gate mode, thus eliminating the need for neutralization circuits. A properly-adjusted common-gate rf amplifier (one stage) can provide up to 16 dB of gain and have a low noise figure.

The antenna is tapped down on L1 for lowest noise figure. The source of Q1 is tapped near the center of L1 to effect an impedance match. A 3-section bandpass tuned circuit, lightly coupled, is used between Q1 and Q2 to establish a 2-MHz passband (144 to 146 MHz). Inductors L1 through L5 are stagger-tuned to provide a uniform response across that range. Shield compartments separate the tuned circuits to prevent mutual coupling, and to discourage input-output coupling at Q1 and Q2. The latter condition could cause instability of the rf amplifiers. Networks R2-C4 and R4-C12 prevent

¹ Leaf-type relays should be avoided in vhf work where power levels exceed a few watts. A good-quality coaxial relay will provide sufficient transmitter-receiver isolation to prevent damage to Q1. A coaxial relay with a built-in shorting contact for receiver protection is preferable.

unwanted ac coupling between the stages via the 12-volt line. The combined gain of the rf amplifiers (after coupling losses through the tuned circuits) is approximately 18 dB.

The mixer circuit, Q3, is by no means unique. It employs an RCA 40673 dual-gate MOSFET (metal-oxide silicon field-effect transistor) with built-in gate-protection Zener diodes. Either gate will handle up to 10 volts pk-pk (gate to source) before damage occurs. Other MOSFETs, such as the 3N200 (uhf type), 3N187, or MFE3008, can be used at Q3. The 40673 proved to be a good performer at 144 MHz, so it was used in this unit.

FETs, when compared to bipolar transistors, offer superior overload and cross-modulation characteristics and perform almost as well as do the best vacuum tubes. A number of papers are available on this subject; the designer may wish to study them to learn how the parameters are set up.² Gate 2 of Q3 is connected to its source through R6 to obtain its bias. A separate resistive divider can be used across the 12-volt line to obtain a more specific and stable bias voltage, but the method used here proved adequate for the performance characteristics desired. Low-impedance output to the tunable i-f receiver is provided by means of a capacitive divider across L6. Conversion gain of this mixer is approximately 12 dB.

Oscillator Strip

The sticky-wicket of converter design usually centers in the oscillator strip. This part of the circuit can make or break an otherwise good converter. Injection to the mixer should be provided by a single path — the intended one. The wave form being supplied to the mixer should be pure, Fig. 2B. Many converters rely on a diode multiplier after the oscillator, and output from the multiplier is fed to the mixer without benefit of selective circuits. Other circuits feed the oscillator output into a transistor multiplier, and then to the mixer . . . again without filtering. When this is done many frequencies are contained in the mixer injection voltage. This can result in birdies and poor mixer performance. Furthermore, when the injection is taken from a doubler or tripler it is often too low in level (at the desired frequency) to provide suitable mixer performance.

The oscillator chain in Fig. 1 was designed for high performance. It has more output capability than is needed, the output waveform is pure, and there are no spurious oscillations in the circuit. The strip is contained in its own shielded enclosure to prevent coupling to the rf and mixer stages of the converter by stray paths.

Oscillator Q4 operates in the third-overtone mode. An optional frequency-trimmer capacitor, C36, is shown in dashed lines. Those wishing to place the oscillator dead on frequency may add

² RCA Application Notes AN3341, AN3435, AN4018, AN4431, ST3233, ST3529, ST3703, and ST4125 cover MOSFET design and applications in detail. These notes are available from RCA, Commercial Engineering, Harrison, NJ 07029. A useful booklet, *RCA MOSFET Product Guide*, contains complete parameters for all RCA MOSFET devices, plus numerous practical circuits. Send 25 cents for this book. Also see, Reich, "Field-Effect Transistor Biasing Techniques," *EEF*, Sept. 1970.

- Miller 46A336CPC).
- L7 — 7 1/2 turns No. 26 enam. wire, close-wound at base end of Miller 46A013-4 form.
- L8 — 4 1/2 turns No. 22 enam., close-wound at base end of Miller 46A013-4 form.
- L9 — 16 turns No. 22 enam., close-wound, self-supporting, 3/16-in. dia.
- L10 — 6 turns No. 20 tinned copper wire, 3/8-in. dia x 5/8 in. long.
- L11 — 6 turns No. 22 enam., 3/16-in. dia, close-wound. See text.
- L12, L13 — 4 turns No. 22 enam., 3/16-in. dia, close-wound. See text.
- R13 — Select value to provide required output from Q6. See text.
- RFC1, RFC2 — 8.2- μ H rf choke (James Millen J308-8.2 or equiv.).
- RFC3-RFC5, incl. — 10- μ H rf choke, 4 turns No. 30 enam. wire looped through Amidon ferrite bead (Amidon Assoc., 12033 Otsego St., N. Hollywood, CA 91607).
- S1 — Spst toggle.
- Y1 — 58-MHz 3rd-overtone crystal. (International Crystal type GP.) Case style F-605. International Crystal PC-board socket F-605.
- Fig. 1 — Schematic diagram of the high-performance converter. Numbered components not appearing below are so designated for pc-board layout purposes. Other fixed-value capacitors are disk ceramic. Resistors, unless noted otherwise, are 1/2-watt carbon. Dashed lines denote shielding.
- C5, C7, C31 — Silver-mica type.
- C29, C30 — 5-tp 25-pF ceramic trimmer (Eire 557 with phenolic flange trimmed off).
- C35 — .001- μ F feedthrough capacitor mounted on wall of shield compartment.
- C36 — 25-pF miniature air variable or ceramic trimmer (Eire 557 NP0 suitable).
- CR1 — 9-1-watt 1-watt Zener diode.
- J1 — Chassis-mount coax fitting, type BNC.
- J2 — Single-hole-mount phono jack.
- J3, J4 — Binding post, one red, one black.
- L1-L5, incl. — 4 1/2 turns No. 22 tinned-copper wire. Space one wire dia between turns. Wind on 1/4-in. dia ceramic form with brass slug (J. W. Miller 46A013-5 form. Address: 19070 Reyes Ave., Compton, CA 90224). L1 tapped at 1 (ant.) and 2 (source) turns above ground. L4 tapped at 2 turns. See text.

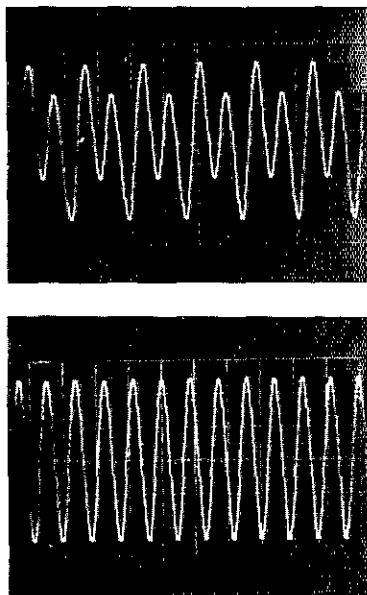


Fig. 2 -- Waveforms of the output of Q6 ahead of and after the filter section. The display at A was taken at the input of the 58-MHz trap. The pure sine wave at B was obtained after filtering, across terminating resistor R 14.

this component. The crystal should be a high-accuracy commercial-standard type if this is done, and should be ground for a load capacitance of 20 pF. Capacitor C36 can be an NPO ceramic trimmer, mounted on the side wall of the oscillator box near Y1.

Zener-diode regulation of the oscillator supply voltage is provided by CR1. The forward bias to Q5 is also regulated by CR1. Regulation of this part of the supply is desirable if the main 12-volt source is unregulated. This will help to keep the oscillator on frequency.

Low-cost 40637 (careful, *not* 40673) bipolar transistors are used at Q5 and Q6. Other types can be substituted if necessary, and performance should be about the same with the component values shown. Likely substitutes can include types 2N4124, MPS3563, and HEP-53.

The output level from the strip can be varied by changing the value of R13. With the 470-ohm

resistor shown, in excess of 100 mW can be taken from amplifier Q6. In fact, this strip will work nicely as a transmitter or exciter by changing R13 to 100 ohms. With that value of resistance the output was measured at 0.5 watt!

Output stage Q6 operates Class C. A 58-MHz parallel trap is used to filter out the oscillator energy which feeds through the doubler and amplifier stages. Following the trap is a half-wave low-pass filter whose center frequency is 116 MHz. This filter removes any harmonic energy that is present in the output of Q6. The waveform, after adjustment of the trap and filter, is shown in Fig. 2 at B. The half-wave filter is terminated in its characteristic impedance by R14, a 36-ohm 1-watt resistor.

Construction Technique

Modular construction assures proper isolation between the two sections of the converter. Each piece is assembled on an etched-circuit board, and both units are enclosed in boxes made from double-sided circuit board. The modules can be mounted on a U-shaped piece of aluminum plate, or a chassis and cabinet arrangement of the type shown here can be used. The esthetic qualities of the converter are of secondary importance, and can best be decided by the constructor.

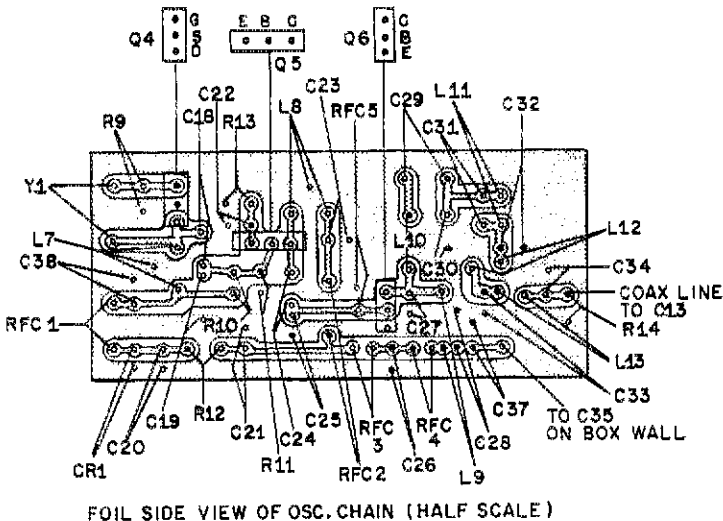
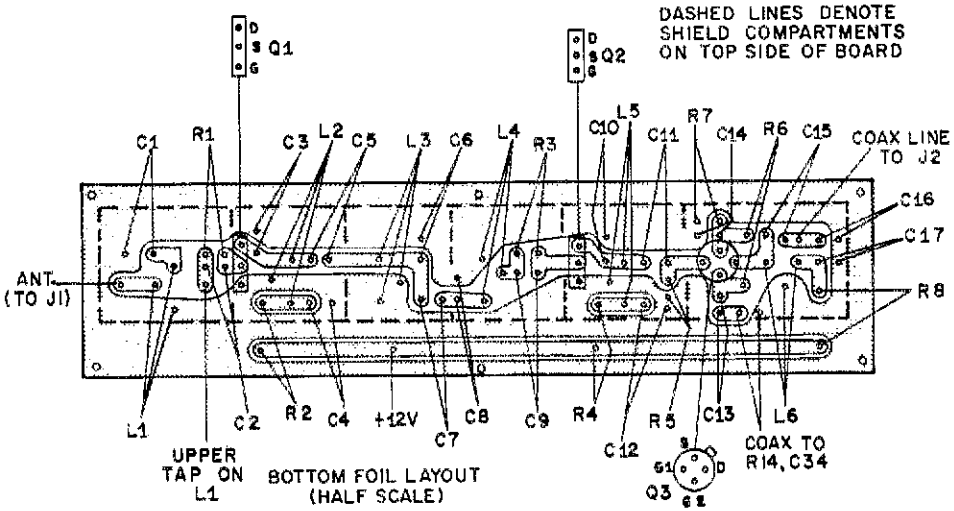
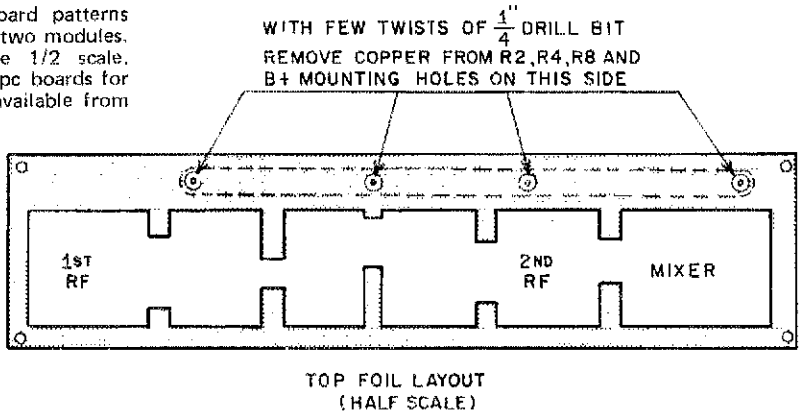
The oscillator section is contained in a box which measures $2\frac{1}{2} \times 5\frac{1}{4} \times 1\frac{3}{4}$ inches. The pc board is recessed into the compartment $1\frac{1}{4}$ inches. No. 6 spade bolts, 6 each, secure the box to the chassis. The corners of the box are soldered together by means of a 100-watt iron with a slender tip. The bottom (foil side) of the pc board is soldered to the box walls on all four sides. Capacitor C35 is mounted on the box wall just above L13.

The rf amplifiers and mixer are contained in a long shield box which measures $7\frac{3}{4} \times 1\frac{3}{8} \times 7/8$ inches. The main pc board is slightly longer and wider than the box to provide a base on which to solder the upper shield compartment. The main pc board for this module is double-sided, as is the material used for the shield box. The layout patterns of Fig. 3 show both sides of the board. The top foil provides copper segments to which the walls of the box and the internal dividers can be soldered. It is suggested that the compartment and its dividers be soldered in place prior to parts installation. The completed assembly is mounted

Interior view of the rf amplifier and mixer section. The input stage is at the far left, and the mixer compartment is at the extreme right. Double-sided pc board is used to make the shield box and its compartment dividers. The main pc board is also double-sided.



Fig. 3 — Circuit-board patterns and layout for the two modules. These drawings are 1/2 scale. Etched and drilled pc boards for this converter are available from Stafford Electronics, Inc., 427 S. Benbow Rd., Greensboro, NC 24701.



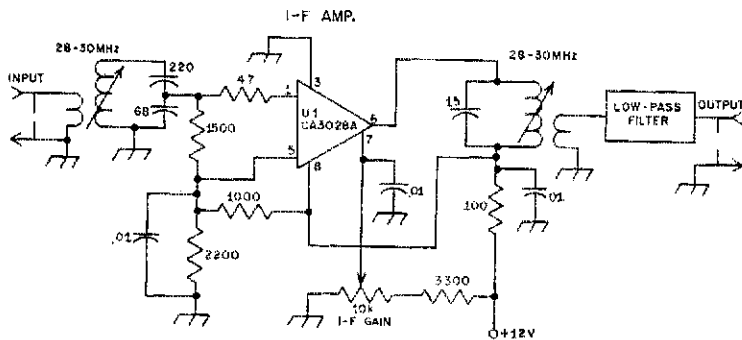


Fig. 4 — Circuit for an IC i-f amplifier that has manual gain control, and which can be used between the converter of Fig. 1 and the tunable i-f receiver. See the text for a discussion of this circuit. This amplifier can provide an additional 25 dB of gain.

above the main chassis on four 1/4-inch metal spacers.

Both shield boxes have their top openings enclosed by press-fit U-shaped aluminum covers. The supply-voltage terminals and the input and output connectors are mounted on the rear lip of the main chassis. The shield boxes shown here were silver plated to prevent tarnishing and to make soldering easier. This step, however, is not necessary.

Converter Alignment

This converter draws 100 mA when connected to a 12-volt dc supply. The supply should be reasonably free from hum to prevent the oscillator strip from being modulated by ripple.

With operating voltage applied to the converter, couple a wavemeter to L7 and adjust the tuned circuit for maximum output. Turn the supply on and off a few times to make sure the oscillator starts rapidly each time. If not, choose a slug setting for L7 that allows fast starts. Next, couple the wavemeter to L8 and adjust its slug for maximum output at 116 MHz. Adjust C29 and C30 at Q6 for the same condition.

A grid-dip meter will be needed for adjustment of the 58-MHz trap. Spread or compress the turns of L11 for resonance at 58 MHz. In the same

manner adjust coils L12 and L13 for resonance at 116 MHz. Now, readjust C29 and C30 for maximum output. When the circuit is working properly there should be approximately 2.5 volts pk-pk at the junction of L13 and C34. If a high-frequency scope is available (Tektronix 453 or equivalent) examine the waveform at R14 and make sure it is a pure sine wave (Fig. 2B). If not, adjust trap coil L11 for a clean waveform. Coils L2 and L13 can be tweaked for maximum output at 116 MHz while observing the waveform. Should the particular set of transistors you install at Q5 and Q6 exhibit unusually high beta, you may have more than 2.5 volts pk-pk at R14. If so, select a value of resistance at R13 that will limit the output of Q6 to the value specified.

A signal generator will be helpful during alignment of the rf amplifiers and mixer. If one is not available, tune in a weak 2-meter signal and use it for tune-up purposes. Connect a receiver to J2 and set it up for tuning from 28 to 30 MHz. Apply a signal to J1 and adjust L1 for maximum response at 145 MHz. Then, adjust L2 for peak response at 144 MHz. Trim L3 for a peak at 146 MHz, L4 for 144 MHz, and L5 for 145 MHz. There will be some interaction, so repeat the process a couple of times. Set the slug in L6 for peak output at 29 MHz.

Optimization of the noise figure requires a noise generator and careful adjustment of the input circuit.³ The taps on L1 must be moved until the lowest noise figure is obtained. *Do not adjust the taps or the slugs of L1 and L2 for maximum sensitivity.* The lowest noise figure seldom coincides with maximum gain. If you do not have a noise generator, adjustment can be brought to a ball-park figure by adjusting the taps on L1 while listening to a weak signal.

This converter can be tuned up for a narrower segment of the 2-meter band if coverage of the full

(Continued on page 31)

³ Information on noise generators and how they are used is given in *The Radio Amateur's VHF Manual*.

Interior view of the oscillator strip. The crystal oscillator is at the far right. The output stage and harmonic filter are at the left. Double-sided pc board is used to form the shield box.

TELEPRINTER machines are available to amateurs on a low-cost basis from several sources.¹ The Model 15 machine is the "standard" of the business and is a "page" printer. The Model 19 is a composite 15 which also includes a tape puncher and a Model 14 transmitter-distributor, or "TD." "Strip" printers are occasionally available but are not as desirable as they print on a narrow continuous tape. (They would be OK for receiving use, though.)

Once you get your machine, the first step is to check the platen and then the gears to determine the speed rating. If you have a friction platen everything is FB. If the platen is a standard-width sprocket-drive type you will still be OK, but may have to tighten the spring tension on the side fingers. If your platen is narrower than standard paper width (8½ inches) it will be necessary to locate a suitable replacement.

First Steps in

RTTY

The Local-Loop Circuit

BY

CHARLES W. SCHECTER,* W8UCG

The motor gear will have to carry the number 74912, and the mating fiber gear the number 74913 and have 30 teeth, in order to operate at the required 60 wpm speed.² Gears are available from several sources if required.

The next step will be to prepare the machine for "local-loop" operation. A power supply capable of delivering approximately 130 volts dc at about 100 mA. will be required for the Model 15, and about 500 mA. for the Model 19. Some machines come with a power supply and many also have some sort of table with them. The machines are all very heavy, but fortunately they can be broken down into several component parts in a matter of two or three minutes.

It will now be necessary to locate the keyboard

* 630 Glenwood, Muskegon, MI 49445.

¹ Current information on sources of supply and a bibliography of QSTP articles may be obtained by sending a business-sized s.a.s.e. with 16¢ postage to ARRL Headquarters, Newington, Conn. 06111.

² Gear numbers given by the author are for use with 60-Hz 1800-rpm synchronous motors. For machines equipped with series-governed 2100-rpm motors, gear number 74151 (35 teeth) and pinion number 74505 (7 teeth) are required for 60-wpm operation.—Editor.

and selector magnet circuits. This is very easy, as the two keyboard contacts usually are brought out through a cord to a black telephone-type plug and the selector magnet is brought out through a cord to a red plug. These plug into jacks in the back of the table. The wiring to these jacks should be located and a pair of wires from each brought out to a barrier-type terminal strip with about a dozen terminals.

Next, connect the positive and negative dc power-supply output leads to a pair of terminals on the terminal strip. Connect one or more resistors to other unused terminals on this strip to provide about 1000 to 2000 ohms resistance at about 30 watts. Now by means of jumpers tie all of the above circuits into a series circuit. This will include the dc power-supply output, the resistors, the keyboard and the selector magnet. The extra terminals will provide for easy insertion of the TU or fsk polar relay, or TD unit, into this series loop circuit. An example of such a connection is shown in Fig. 1.

Use an ohmmeter to check the resistance of the selector magnet at the terminal strip. If the resistance is 180 ohms this will indicate that the dual coils are connected in series, and it will now be necessary to adjust the resistor values so that a current of 20 mA. will flow in the loop circuit. If the resistance of the selector magnet is 45 ohms, the coils are in parallel and the loop current will have to be adjusted for 60 mA. This latter is the more typical condition. It is easy, however, to provide for the current you prefer.

Now that the machine is set up to operate on its local loop circuit, it is necessary to provide for receiving and transmitting teleprinter signals via radio. For receiving, it will be necessary to provide a "converter" or "terminal unit." There

(Continued on page 53)

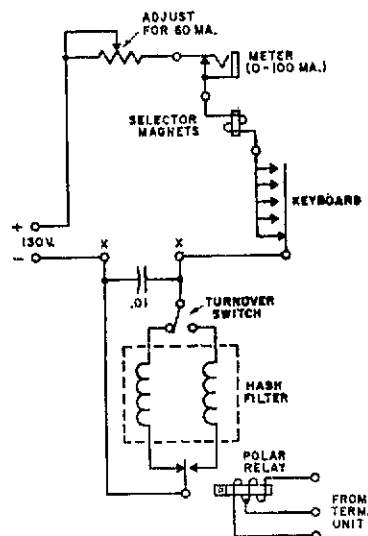


Fig. 1—The local loop circuit, showing how a polar relay would be inserted between the terminals X-X.

Putting a "Spark Plug" on Two Meters



BY GEORGE P. SCHLEICHER,* W9NLT

ONE OF THE most reliable and easiest to maintain tube-type mobile sets that was used by telephone companies is now becoming available to amateurs. It was designed by the AC Sparkplug Division of General Motors; after its introduction the manufacture was transferred to the Delco organization. Whether you call it an "AChievertone," a "Delco" or a "Spark Plug" set, it is a real dandy.¹

These units are rated for normal operation on frequencies from 144 to 174 MHz; up to four crystal-controlled channels may be used. The transmit and receive frequencies are completely independent, permitting the send and receive modes to be on the same frequency, as in mobile-to-mobile work, or they can be on different frequencies, as would be the case when working through a repeater. The set was designed for operation from 12-volt negative-ground automotive electrical systems. The Delco transceiver puts out a "healthy" 24 watts into a 52-ohm load, yet requires only 11.4 amperes from a 12-volt source when transmitting. During receive the power consumption is only 5.6 A at 12.5 volts. The receiver will quiet by 20 dB with a signal input of 0.5 μ V or less. Not a bad start for two-meter work!

Two models are available. CVT-1 designates the narrow-band units (5-kHz deviation) while CVT-2 indicates a wide-band set. Considering the years in which they were manufactured, this writer's guess is that most of the units were built for narrow-band standards. You might find a Delco arranged for one-, two-, or three-channel operation, but all can be made to operate on four channels by the replacement of the missing oscillator tubes and crystal ovens. The sockets and wiring for all four channels are in place.

These sets have a few characteristics that leave something to be desired for most ham operation, however. The audio system was de-

* 1535 Dartmouth Lane, Deerfield, IL 60015.

¹ The Delco transceivers are available from several surplus dealers including Spectronics, 1009 Garfield Ave., Oak Park, IL 60304. Also, check with local telephone company surplus disposal offices. — Editor

signed to work into a 150-ohm telephone handset. The 20 milliwatts of audio output power is not adequate for loudspeaker operation. The Delco transceiver was intended for selective signaling, rather than voice calling, so it is without a squelch circuit in the receiver. The transmitter channels must all be within a spread of only 300 kHz. The receiver is a little broader, permitting the top and bottom channels to be separated by up to 500 kHz. Most hams will be able to tolerate this limitation, however. In this writer's opinion, the control units used by the telephone companies are of no value for amateur work. The only reusable part is the plug that mates with the control cable.

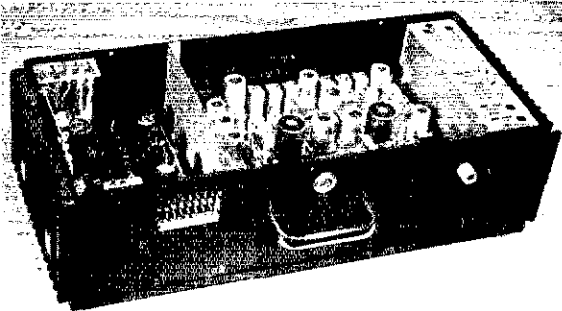
On the positive side, the set is light and compact, yet it is unusually easy to work on. Subassemblies are easy to remove. Installation is about as simple as possible in a mobile unit. Most important is that these sets are usually in excellent condition, as they are generally in working order when removed from vehicles. The reason for removal is that the mobile service area is being converted to full-dial operation.

The Conversion

One way to begin the conversion is to decide what frequency or frequencies you want to work on, and order new crystals. Most crystal

As telephone companies switch to solid-state direct-dial duplex equipment for their mobile telephone service, many used but very serviceable transceivers are being retired. The following two articles describe conversions to ready the Delco "Spark Plug" and GE Progress Line MTS rigs for amateur use in the two-meter band. The ideas and circuits presented here can be used in other units of similar vintage.

This is what the Delco set looks like with the top cover removed. Electrical connections consist of one main multiconductor plug and the coaxial antenna connector. The ribbed end panels of the case serve as heat sinks for the power supply and the transmitter final amplifier.



suppliers will be able to fill your order if you give them the operating frequency and the manufacturer's type designation of the set. If you want to grind your own crystals, you will need to know the following additional information: The crystal is parallel-resonant in a Colpitts oscillator; load capacity will be $32 \pm 0.5 \text{ pF}$. It should be an AT cut to oscillate on its fundamental frequency. If you use the ovens, the crystal will be operated at 85 ± 5 degrees C. If you control the upper temperature turning point at 70 degrees C you will find that your set is on frequency about as fast as the tube heaters can warm up. An operating temperature of 85 degrees C is hot; operation at this temperature will cause continued aging of the crystals. They will drift downward to the point where they are beyond the range of the corrector capacitors in the set after about two years of daily operation. If you decide to sacrifice stability for long crystal life, order your crystals for operation at 25 to 30 degrees C and expect longer warmup time to get on frequency.

The transmitter crystal frequency is multiplied by 24 to arrive at the channel frequency. If you want to operate on the national frequency of 146.940 MHz, your crystal will have to be 6.1225 MHz. The receiver is a double-conversion superhet with a first i-f of 13.455 MHz. The crystal oscillator triples in the plate circuit and is followed by two doublers. The resulting injection voltage is fed to the first mixer. To compute the crystal frequency, then, we start with the channel frequency (146.940 MHz) and subtract the first i-f (13.455 MHz). The remainder is 133.485. Dividing this last figure by 12 gives the operating frequency of the crystal; in this case, 11.12375 MHz.

Control Head

A new control unit can be put together using a Bud cowl-type Minibox measuring 3 x 8 x 5 inches. The only loudspeaker available to the author provided a tight fit and approximately 1/8 inch was ground off of two opposite edges of the frame to get it into the box. One or two points about the electrical circuit of the control head may be of interest. You will probably notice that the schematic diagram of the control unit (Fig. 1) shows no chassis ground. The ground side of the audio, if oscillator and low-voltage dc circuits is carried back to the main chassis by means of conductors in the control cable. That is done to avoid the introduction of noise or other problems that might result if the main set and the control unit were mounted on parts of the vehicle that were at

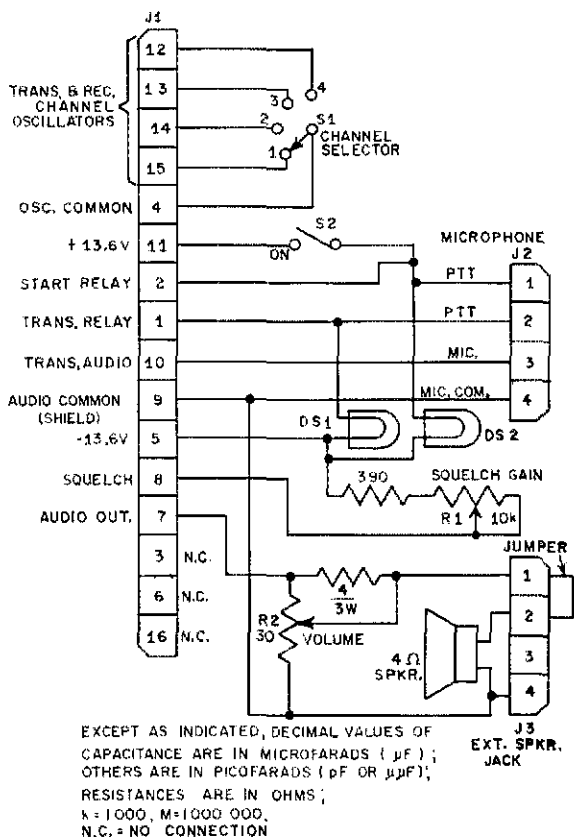
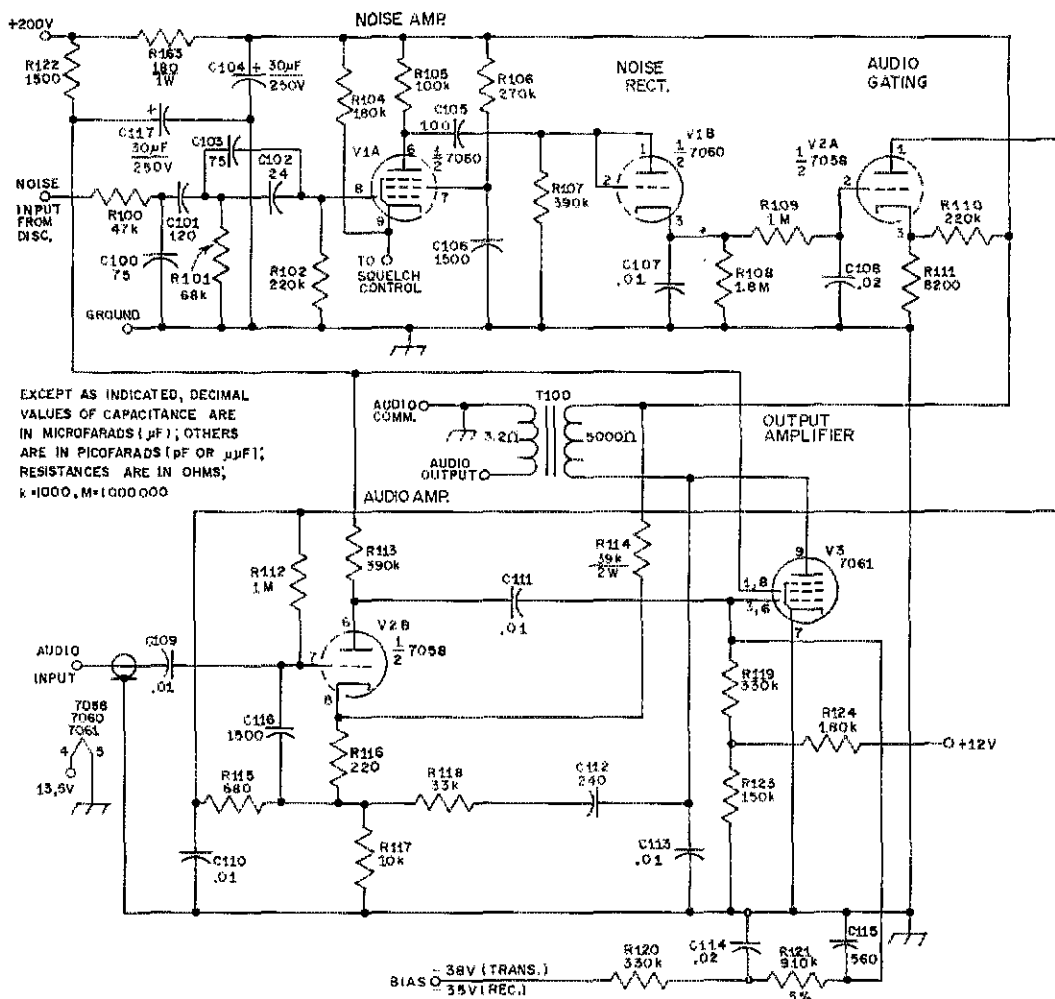


Fig. 1 - Diagram of the homemade control head. Resistances are given in ohms; K = 1000. DS1, DS2 - No. 1815 12-volt lamp. J1 - Elco Varicon 16-pin chassis-mount connector (see text). J2 - 4-conductor microphone jack, chassis mount. J3 - 4-conductor accessory jack, chassis mount. R1, R2 - Linear-taper composition control. S1 - Single-pole, four-position ceramic rotary switch, single wafer. S2 - Spst slide switch.



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

Fig. 2 - Schematic diagram of the audio/squelch adapter. Part numbers used are the manufacturer's. Resistors are 1/2-watt, five-percent tolerance composition, unless otherwise noted. Capacitors may be disk ceramic or paper, except those with polarity marked, which are electrolytic. T100 - Audio output type, 5000-ohm primary, 3.2-ohm secondary.

different potentials. The pin numbers shown on the schematic diagram refer to the numbering system of the Elco Varicon 16-pin connector. The main power switch could be made a part of one of the controls; alternatively, a switch with a key lock could be used. I chose a slide switch located on the bottom of the unit behind the microphone connector. It is easy to use but hard to find unless you know where to look.

You don't really have to do anything other than realign the set to put it on two meters, but it will be more enjoyable to use if you replace the audio decoder and selective-signaling unit with a squelch circuit and a more powerful

audio amplifier. The best way to do this is to disconnect the wiring harness leading to the audio decoder chassis and remove the decoder from the main chassis. You can then loosen the four screws that hold the chassis in the case and slide the decoder out through the bottom of the set. Strip all of the parts off of the audio chassis. You will be able to reuse one tube, the wiring harness, a few capacitors and resistors from the etched circuit board and the main chassis. Mount the new audio transformer and filter capacitor under the chassis and the new circuit board, Fig. 2, on top of it, interconnecting them as required before tightening the bolts and spacers holding the board. A con-

ductor with an insulated shield must be added to the wiring harness when using this circuit. Len Bateman, K9ZNE, drew the wiring mask and etched circuit boards for several of us who were making this conversion.²

The circuit function is fairly simple. Noise from the discriminator is fed to the pentode section of a 7060 tube (Fig. 2). The gain of this noise amplifier is controlled through the action of the squelch control. Amplified noise is detected in the other half of the 7060; the dc output is amplified by half of a 7058 tube, the output of which is connected to its other half in such a way that the second half can be electrically cut off. The second half is used as a switch in the audio path, turning off the audio output when the noise from the discriminator exceeds a preset level. The 7061 tube serves as an audio output stage. When this circuit is used in early models of the set, the lead that is shown connected to 12 V should, instead, be grounded. That is done so that the 7061 will operate with a negative bias of about 10 volts on its grid. (The early sets had a bias supply of only 22 V.) Insufficient bias on the 7061 will result in high tube current and low, distorted audio output.

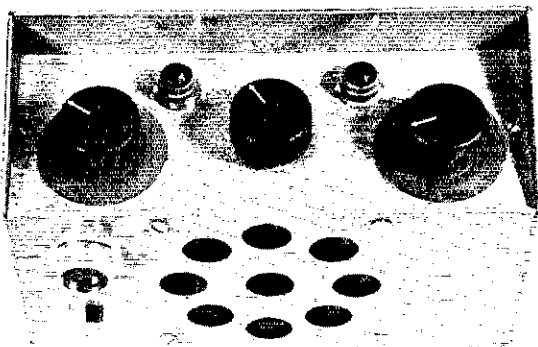
Alignment Tips

If you add or remove a tube from the receiver local oscillator when changing the number of working channels, realign Z450, the receiver oscillator tank circuit and Z460, the tripler tank. The plate capacitance of the tube affects the resonant frequency. Some local hams have reported being unable to get the second doubler in the transmitter to peak properly. They had to retune the two preceding stages to peaks found when the tuning slugs were moved farther down in the can toward the chassis. Some sets are reported to have been modified for private-system use by the addition of a single-tube squelch circuit. It can be removed easily. Some other sets were modified for full duplex operation. In these sets, the transmitter came on when the handset was removed from the cradle; push-to-talk operation was not required. Such modified sets have an rf duplexer network connecting the transmitter and the receiver to a common antenna. I recommend that if you have one of these sets you restore it to its original configuration for ham-band use.

When aligning the set for two-frequency operation, tune up the receiver and transmitter on the higher frequency. Use the most nearly centered channel if you plan to use three or more.

²A template and parts-layout diagram for the squelch/audio amplifier are available from ARRL for 50 cents and a business-size self-addressed stamped envelope. — Editor

The new audio amplifier and squelch circuit are placed on the left side of the unit. The etched circuit board is positioned so as to clear the main power plug.

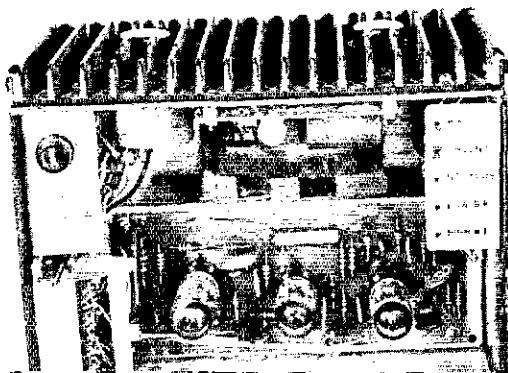


The volume and squelch controls, together with the channel switch and power and transmit lamps, are on the front panel of the homemade control unit. The microphone jack, power switch and loudspeaker are on the bottom panel.

After that has been done, go over them again and slightly stagger tune the front end for good sensitivity and maximum transmitter output on all channels. Being on the low end of the band for which the set was designed gives you a favorable *LC* ratio for broadbanding, although it results in somewhat less output power than these sets will furnish at 170 MHz.

Installation

Here are some pointers on installation. The set is connected to the auto battery by means of two No. 8 stranded conductors that are part of the standard cable assembly. The conductor with a ridge molded on the jacket is the positive lead. A cartridge fuse (Bussman BAF 20 A in a 4515 holder) should be connected in the positive lead close to the battery. Incorrect battery polarity could damage the power supply, so the designers provided a diode that will blow a fuse if battery polarity is wrong. If your set worked on the bench but seems dead in the car, check the 10-A fuse that is located in a phenolic holder just under the top cover of the set. If it is blown, check the polarity of the battery leads before replacing it.



Color	Old Use	New Use
Black	Ground	Ground
White/brown	Tube heaters	Tube heaters
White/orange	200 V	200 V
Blue	Audio output	Audio output
Orange	Ringing signal	250 V
White	13.6 V utility	Bias voltage
Slate	Selector reset	Squelch
Yellow	Audio input	Noise input
Shielded lead	(not used)	Audio input

Fig. 3 — Changes to the audio-chassis wiring harness.

If you have a cable kit but no control unit, you will need a 16-pin male chassis connector to mate with the one on the control cable. The 16-pin connector is available from the manufacturer. I got one quicker by ordering an 18-pin unit that was stocked locally (an Elco Varicon connector type 01-2118-111, Allied Radio No. 47D5567). It was a simple task to remove one spacer section and two contact fingers to make the 16-pin plug. If you have no cable kit, you will need a female connector to mate with the 28-pin male connector on the set. If you can't get one of the original models, you can assemble one by cutting down two of the female versions of the unit mentioned above. They are

the Elco 01-4118-111 and are available under Allied's number 47D5574. Of course, they will have to be rearranged to the 14-pin length and some sort of sheet-metal hood will be needed to hold them together to provide mechanical protection for the cables.

Future Improvements

My experience with the set to date has already started some considerations of new features. I plan to change the existing channel switch to one that has three poles and four positions. I want a one-shot oscillator in the control unit that will "whistle on" one or more of the repeaters in the area.³ One extra pole on the switch would energize or disable the oscillator on a particular channel; the other pole would be used to set the oscillator frequency to that required by the repeater. There are now three spare conductors in the control cable; they might be used to extend an SWR indicator reading to the control unit. Other possible uses include metering the discriminator or limiter circuits in the receiver.

All in all, the Spark Plug set promises to be a real "fun" piece of gear!

QST

³ See Gimmicks and Gadgets in *QST* for July, 1970, for a suitable circuit. — Editor

Converting the GE MTS Progress-Line Transceiver for Amateur Service

BY DOUGLAS A. BLAKESLEE,* W1K1K

GENERAL ELECTRIC'S Progress-Line transceivers have long been popular in commercial and amateur services. The excellent reputation that the "Progs" enjoy has kept the price of used units high, usually between 150 and 300 dollars. Recently, telephone companies have been releasing quantities of 5-channel, narrow-band MTS (mobile-telephone service) Progress-Line rigs, which have a number of features that make this unit an excellent choice for conversion to amateur service.

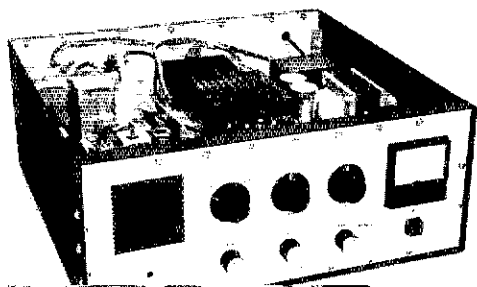
Telephone companies should not be overlooked as a source of well-maintained vhf gear. The changeover to 11-channel direct-dial mobile telephone service has rendered the 4- and 5-channel MTS transceivers obsolete. Many of the phone companies use Western Electric surplus disposal

* Assistant Technical Editor, *QST*.

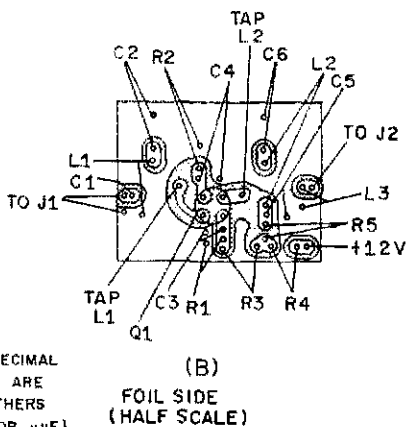
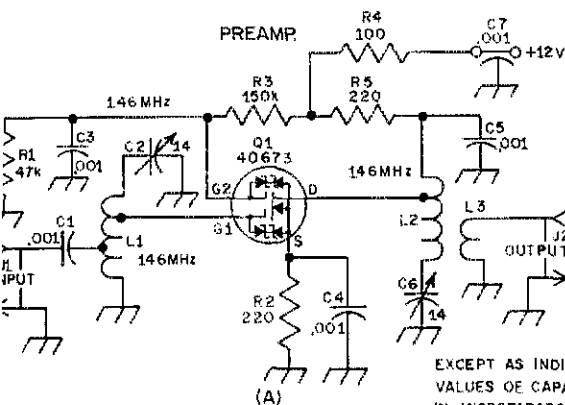
channels, some will sell direct to amateurs at bargain-basement prices (\$5 to \$10), while others take the sledgehammer to used gear and send the remains to the junk yard. Most of the Bell companies are somewhat public-spirited, so AREC or other emergency groups might find a source of low-cost gear as close as the local telephone office.

The MTS Progress-Line unit consists of 4 subassemblies: a 30-watt-output transmitter, a 2-channel receiver, a 4-frequency adapter, and a transistor power supply. The sensitivity of the receiver is typically 0.5 to 0.7 μV for 20 dB of quieting. As the GE units were used for full duplex operation (transmitting and receiving at the same time through a duplexer), the transmitter and receiver decks have the shielding and filtering necessary for repeater use, but the rig requires a number of simple modifications for push-to-talk (simplex) amateur service. These changes consist of the addition of two capacitors to the receiver front end, a change in the output

GE Progress Line decks are used in this station. A 50-0-50- μA meter (Simpson 2123-27507) is employed to monitor various stages in the transmitter and receiver. Sampling is done at the existing test jacks on the GE decks.



QST for



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

Fig. 1 - Circuit diagram (A) and pc-board layout (B) for the 2-meter preamplifier. Resistors are 1/4-watt composition and capacitors are disk ceramic unless otherwise noted. Components not listed below are given designators for circuit-board location purposes. A circuit board for the preamplifier is available from Stafford Electronics, 427 S. Benbow Road, Greensboro, NC 27401.

C2, C6 - Air variable (Johnson 189-506-5).

J1, J2 - Phono type, panel mount.

L1 - 5 turns, No. 5/16 inch dia, 1/2 inch long. Tapped at 2 turns for the antenna connection, and a 4 turns for G1.

L2 - 4 turns, No. 16, 5/16 inch dia, 3/8 inch long. Tapped at 2 turns.

L3 - 1 turn, plastic-covered hookup wire, 5/16 inch dia, placed between the first two turns of L2.

link in the transmitter, addition of a preamplifier and antenna relay, modification of the "busy" circuit to function as a squelch, and a wiring change in the power supply.

Receiver

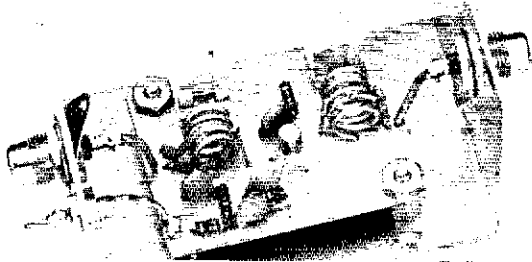
The rf input transformer on the receiver does not have sufficient range to tune the 2-meter band without modification. This transformer, T301, should be removed. Taking out the oven on one side of T301 and the tube on the other will make the job easier. A right-angle screwdriver with a small blade will help to loosen the mounting bolts. A 2-pF silver-mica capacitor should be added across the input tuned circuit (at the top of the can), and a 5-pF silver mica unit must be soldered across the transformer secondary. Then, the transformer can be reinstalled. With a 2-meter crystal in the oven set both air-variable capacitors in T301 for maximum 1st limiter current with a low-level signal input on the desired channel.

While the sensitivity of the "Prog" receiver is good, the addition of a solid-state preamplifier can produce a worthwhile increase in the signal-to-noise ratio of weak signals. The circuit shown in Fig. 1 was constructed and added to the MTS transceiver. A dual-gate diode-protected MOSFET was used (RCA 40673, 3N187 or 3N200). Input

and output to the amplifier stage are tapped down on the associated tuned circuits, producing unconditional stability without neutralization. The circuit exhibits about 13 dB of gain, and the preamplifier/receiver combination will give 20-dB quieting with 0.2 μV of input signal. Of course, the MOSFET preamplifier can be used with any 2-meter receiver needing better sensitivity.

The MTS receiver contains a carrier-operated relay (COR) which is used to illuminate a BUSY lamp in the control head when a signal is received. Because tone-coded calling was used by the phone companies, no squelch was included in the MTS units. The COR circuit can be used as a squelch with a simple modification. The existing connections to the relay contacts are removed. A normally-closed set of contacts is used to short out a low-level-audio lead with a capacitor when the relay is not activated (Fig. 2A). The BUSY lamp at the head is removed and replaced with a 2500-ohm miniature control, as shown in Fig. 2B, to provide remote control of the squelch sensitivity. The lead that formerly fed voltage to the BUSY lamp is used to connect the new control

The MOSFET preamp. is constructed on an etched circuit board, which is mounted inside a 3 1/4 x 2 1/8 x 1 5/8-inch aluminum box (Calectro J4-737). The two variable capacitors are adjusted for maximum current at the receiver first limiter while a weak signal is being received.



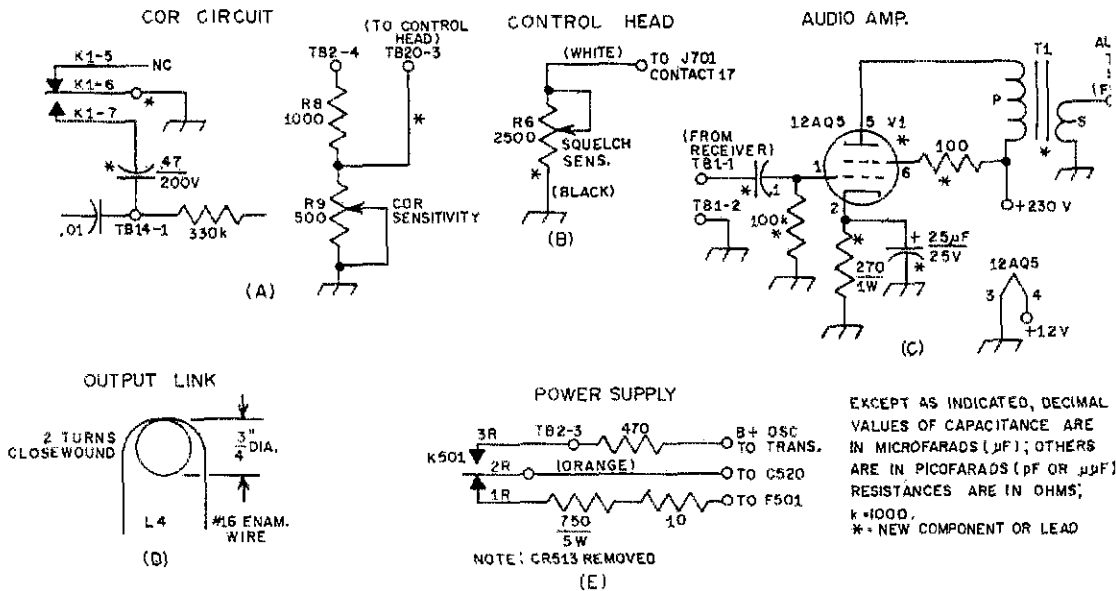


Fig. 2 - Modifications and additions to the GE MTS transceiver. Component numbers, except those listed below, are designators used by the manufacturer. An MTS manual will be necessary when accomplishing the changes described in this article - local GE service companies will usually have this manual in their files. Resistors are 1/2-watt composition and capacitors are disk ceramic or mylar, unless otherwise noted. (A) Changes to the COR circuit which is located on the receiver deck and (B) to the remote-control head. R6 is a miniature linear-taper composition control (Mallory type MLC). (C) The new audio stage uses a small output transformer, T1, which has a 5000-ohm primary and 3.2-ohm secondary (Stancor A3309). (D) The existing output link is removed from the transmitter final and replaced with 2 turns of No. 16 enam. wire, 3/4-inch dia with 3/4 inch pigtail leads. (E) Simpler operation of the receiver is accomplished by removing CR513 and connecting the orange wire from C520 to the 2R contact of relay K501.

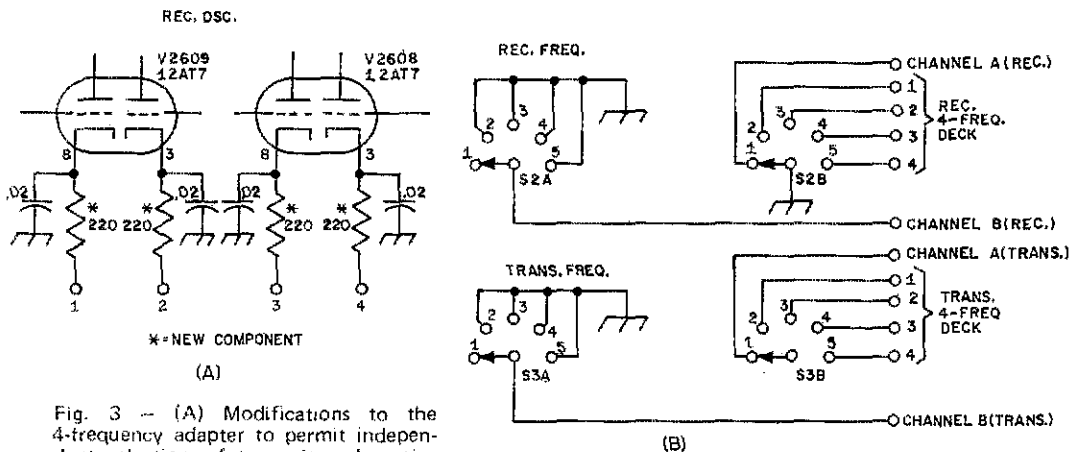


Fig. 3 - (A) Modifications to the 4-frequency adapter to permit independent selection of transmit and receive frequencies. The existing leads to the cathodes of V2609 and V2608 are cut and taped. The bypass capacitors at the cathode terminals are retained. A decoupling resistor is added to the cathode lead of each receiver oscillator. (B) Switch wiring to accomplish independent frequency selection. S2 and S3 are 2-pole, 5-position, single-wafer phenolic rotary switches (Centralab PA-1003).

to the COR circuit. As one side of the COR sensitivity control is grounded, only one lead is needed from the control head to the rig.

Audio from the MTS receiver powered a 150-ohm receiver element in a standard Bell handset. For loudspeaker use, additional amplifi-

cation is required. The circuit shown in Fig. 2C will provide sufficient output to drive a loudspeaker. The 12A05 amplifier stage is constructed on an etched-circuit board and is mounted on the open space at the front end of the 4-frequency deck.

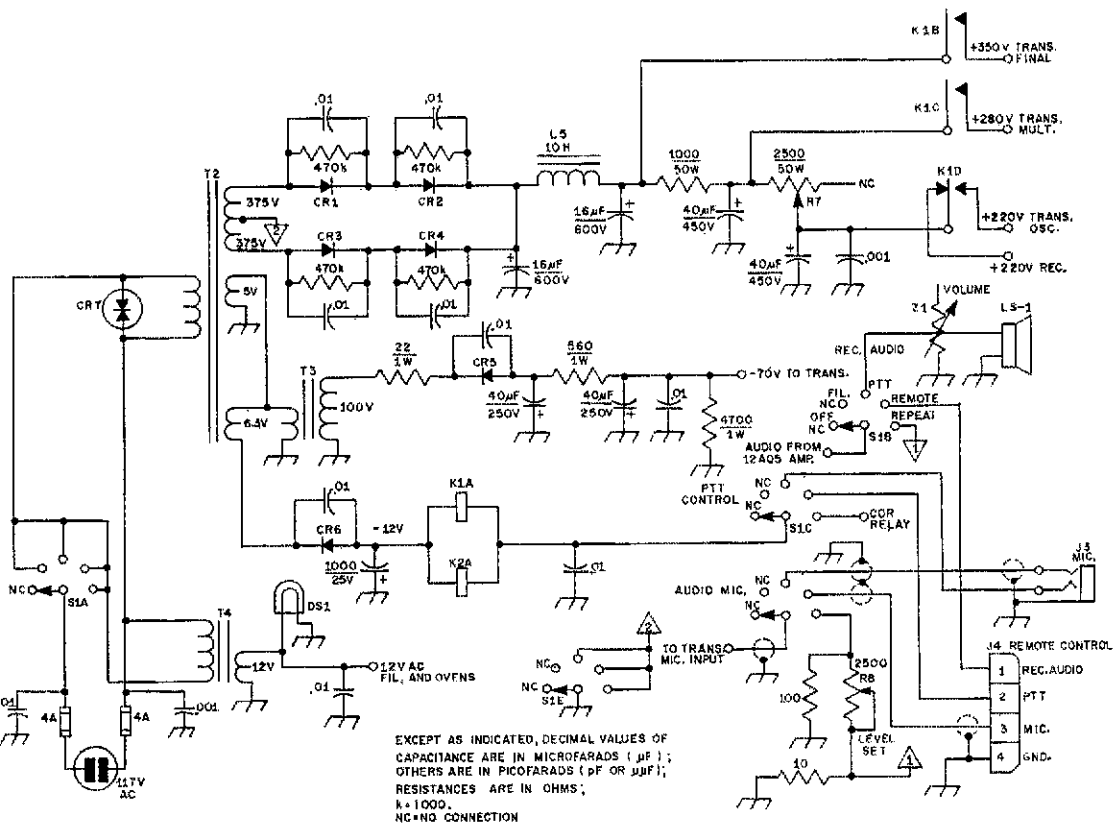


Fig. 4 — Homemade power supply for the GE transceiver, plus the audio and control switching. Unless otherwise noted, resistors are 1/2-watt composition and capacitors are disk ceramic, except those with polarity marked, which are electrolytic.

- CR1-CR5, incl. — Silicon rectifier, 1000 PRV, 1A.
- CR6 — Silicon rectifier, 200 PRV, 1.5 A.
- CR7 — Thyrector transient suppressor (GE 6RS20SP4B4).
- DS-1 — 12-volt lamp.
- J3 — Microphone jack, 3 circuit, nonshorting.
- J4 — 4-circuit jack, panel mount.
- K1 — 3-pole, double-throw relay, 12-volt coil, 2-A contacts (Potter & Brumfield KA14AY).
- K2 — Antenna relay (see footnote 1).
- L5 — Power choke, 10 H, 200 mA (Allied 6X37VG).

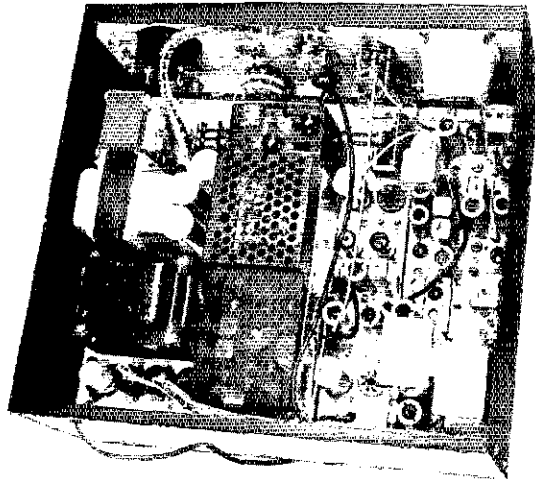
- R7 — Wire-wound adjustable-tap power resistor.
- R8 — Linear-taper composition control.
- S1 — 6-pole (5 used), 5-position, 3-wafer phenolic rotary switch (Centralab PA-1020).
- T2 — TV power transformer (Allied 6K91VG suitable substitute).
- T3 — Filament transformer, 6.3-V, 0.6-A secondary (Allied 6K32HF).
- T4 — Control transformer, 12-volt, 8-A secondary (Allied 6K80VBR).
- Z1 — L pad (Calectro S2-175).

Transmitter

The transmitter modification consists of replacing the final output tank coil, L116. The 1-turn output link will not tune to 146 MHz. A two-turn link, built to the specifications of Fig. 2D, must be substituted. The hardware holding the link-position control should be removed. With the 6146 tube out of the socket, the wooden shaft can be slid out, and the new link installed. With this change completed, the transmitter should deliver about 30 watts of output.

Power Supply

As mentioned above, the MTS Progress-Line transceiver is intended for duplex operation. The duplexer will not be usable at 146 MHz, so it can be removed and discarded. A small antenna-changeover relay should be substituted.¹ Operating voltage for the antenna relay may be obtained from the coil of K501, which is located inside the box on the rear of the power-supply deck. The two relay coils are connected in parallel.



Decks inside the rig (from l to r) are the homemade power supply, the transmitter, the 4-frequency adapter, and the receiver. The 12AQ5 audio stage is located at the top end of the 4-frequency deck. A baffle is employed around the monitor speaker (upper right) to improve its frequency response.

The receiver is left in operation during duplex service. When a speaker is employed, it is necessary to silence the receiver when transmitting. A wiring change on K501 is needed. Various models of the power supply have slightly different connections to the control relay. The modification shown in Fig. 2F will allow simplex operation with whatever model you have.

Fixed-Station Use

Subassemblies from the Progress-Line rigs are available as surplus.² These units can be assembled to provide a home station or repeater. A transmitter, receiver, and 4-frequency deck were collected by the author to be used as a fixed station, portable repeater, or remote-control transceiver. The unit is housed in a homemade cabinet. For extra versatility, the transmitter channel-selection function was separated from that of the receiver. As shown in Fig. 3, the A and B channel lines from the transmitter and receiver are brought out to front-panel switches. The 4-frequency deck is modified by adding separate selector lines for the receiver oscillators. Also, a panel switch was included to select local, remote, or repeater operation; the connections required are shown in Fig. 4. Antenna connections are changed manually before the rig is used as a repeater.

A heavy-duty homemade power supply provides the voltages required by the GE decks. The same circuit can be employed to power other retired mobile rigs. It has been tried with a Motorola 80D and a Motorola T44AAV, as well as the MTS transceiver. The large power trans-

former, T1, was garnered from an old TV set. T2 powers the bias circuit, while T3 supplies voltage to the tube filaments and oven heaters. R1 sets the receiver B plus at 220 V, and R2 adjusts the level of audio fed from the receiver to the transmitter when the REPEAT mode is selected.

As solid-state rigs continue to replace units using tubes in mobile telephone service, amateurs will have a chance to acquire some first-class gear. A few simple modifications are all that is required to ready a retired MTS unit for 2-meter fm use.

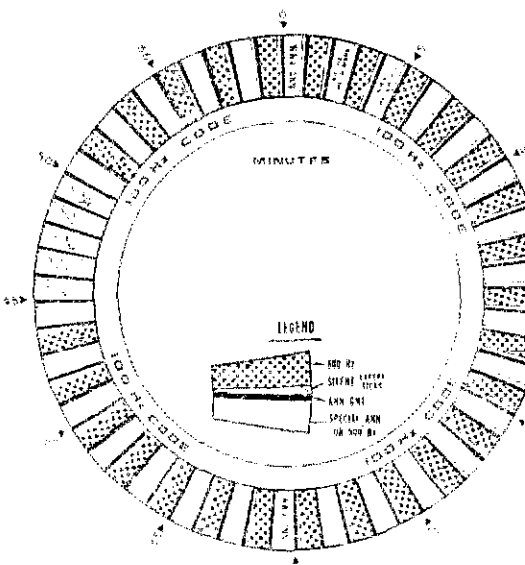
QST

Strays

W4RU recently received a QSL from W8AJ . . . for a contact made in 1931!

Standard time and frequency radio stations WWV and WWVH, operated by the National Bureau of Standards, plan to revise the formats of their broadcasts beginning at 0000 hours GMT on July 1, 1971. The most important features of the new format will be voice announcements of the time every minute instead of every five minutes, use of male and female voices to help distinguish between WWV and WWVH, and elimination of all cw signals from the transmissions. Only the content of the broadcasts will change; the carrier frequencies will remain the same.

The time and frequency signals broadcast by WWV may be heard now by telephone. Call 303-447-1192 to hear the broadcast as received by radio in Boulder. Given the instability of propagation both in the air and in the telephone system, the listener should not expect the accuracy of the time signals to be better than 10 ms (0.01 second). This service will continue as long as the demand for it exists. Diagrammatic representation of the new WWV format is shown below.



¹ A suitable surplus type is available for \$1.50 each from Sidney L. Emmons, K8ZES, Galion, OH 44833.

² From Gregory Electronics, 249 Route 46, Saddle Brook, NJ 07662.

● *Beginner and Novice*

New Life for the All-American Five

BY LARRY LISLE,* K9KZT

EVOLVING FROM the era of autodynes, neutrodyne, and trf receivers of the '20s and '30s, the "All-American Five's" tube lineup of converter, i-f amplifier, detector/first audio, power amplifier and rectifier remained the standard design in home radios for almost thirty years.

But time and technology move on, and the radio on the kitchen counter is now the "semiconductor six," and plays rock and roll instead of Ma Perkins. Thousands of little five-tube radios gather dust in attics and second-hand stores.

But dry your eyes, ye of the sweat and solder set — with just a little effort, what once echoed the sound of Glenn Miller and the creaking door of "Inner Sanctum" can be given new life — on the shortwaves.

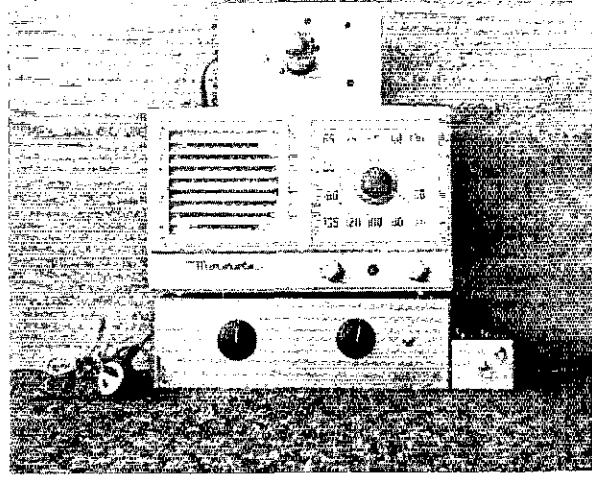
By substituting a shielded coil for the loop antenna, the receiver can be used behind a crystal-controlled converter to form a double-conversion shortwave receiver with pretty fair image rejection, bandspread, and stability. With just a little more effort, the selectivity can be improved considerably, and a BFO and tuning indicator added to form a receiving system that's hard to beat in performance or economy.

Modifications

Since the necessary modifications to the receiver are few and slight, almost any broadcast radio can be used, including those with an rf stage if you're lucky enough to find one. Sets with a transformer-type power supply can be used too — in fact they'll save an important step, which brings us to the subject of ac/dc radios and safety.

In home wiring, one terminal of the wall outlet is connected to the 117-volt ac source and the

* 326 N. 1st St., Rockford, IL 61107.



Here is the All-American Five with all the additions. At the top is the tuning indicator and on the bottom, the converter. The BFO is at the right. Visible between the two knobs on the receiver is the regeneration control.

other is connected to ground. In an ac/dc radio, one side of the line cord is connected to the circuit, while the other is connected to the chassis, usually through the ON-OFF switch. Thus, if the circuit side of the line cord is connected to the "hot" side of the wall outlet, the chassis will be connected to the grounded side. However, if the plug is reversed, the chassis will be "hot" in reference to the grounded side of the wall outlets, (and to radiators, plumbing fixtures, and damp basement floors!)

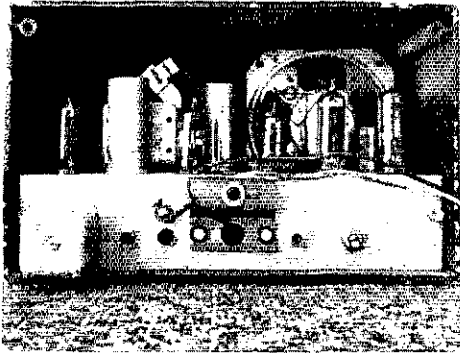
Normally, this doesn't matter because the chassis is enclosed in an insulated cabinet, but when the chassis is removed from the cabinet, or when other equipment is attached to it, this protection is missing, and a *very real* shock hazard may be present.

Fortunately, it's easy to overcome the danger by using an isolation transformer with two 117-volt windings. Just connect the primary to the wall outlet, the secondary to the receiver line cord, and the transformer case and receiver chassis to a good earth ground. This modification takes only a few minutes but makes an ac/dc receiver as safe to use as any piece of electronic equipment can be. See Fig. 1A.

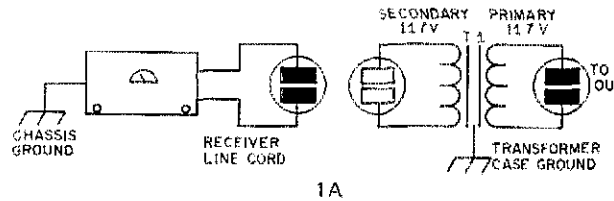
The next step in converting the broadcast receiver to short-wave operation is to replace the loop antenna (loopstick in later sets) with a shielded coil. Unless this is done, broadcast stations will continue to fill the dial.

The loop antenna is connected to the receiver with two wires, one attached to the antenna tuning capacitor and the other to the automatic-volume-control circuit. (Remember that avc line — we'll be

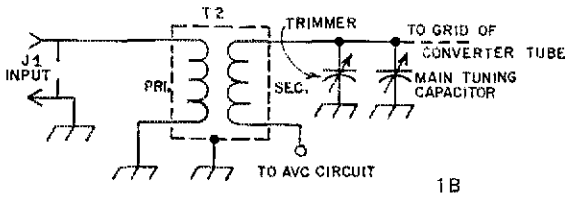
Every once in a while a device comes along that does its job so well that only a major advancement in technology makes improvement possible. One of these is the five-tube ac/dc radio.



From left to right in this rear view of the receiver are the shielded rf coil, the converter input jack, the avc connection terminal for magic eye indicator, ground wire and line cord, the BFO input jack and the avc switch.



1A



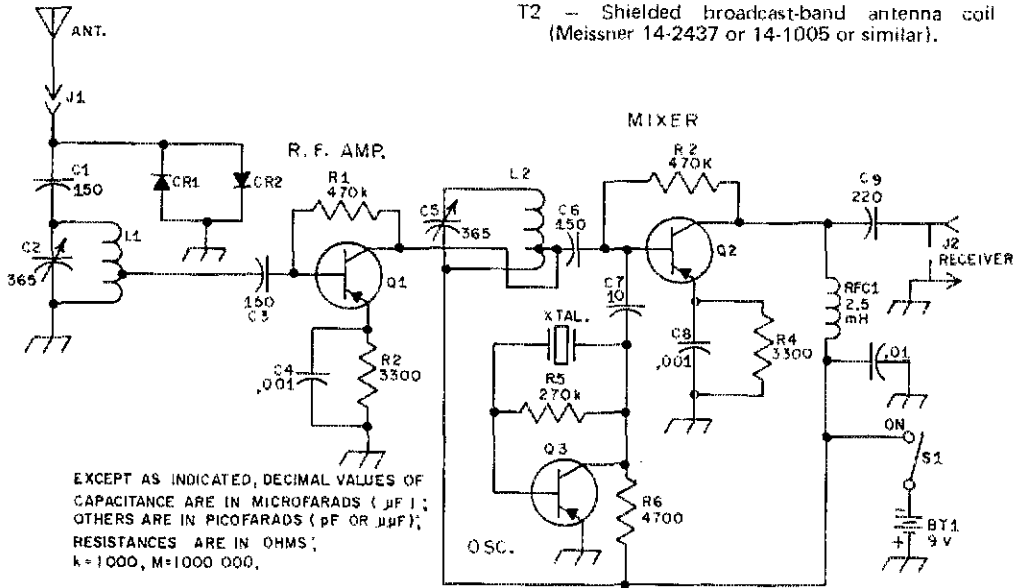
1B

Fig. 1 - Shown at A is the method for connecting an isolation transformer. At B is the circuit for adding the shielded antenna coil, T2.

J1 - Phono jack.

T1 - Isolation transformer, 117 V to 117 V, 35 watts capability or greater (Lafayette 33H7502 or similar).

T2 - Shielded broadcast-band antenna coil (Meissner 14-2437 or 14-1005 or similar).



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

Fig. 2 - Circuit diagram of the converter.

J2 - Phono jack.

L1, L2 - 16 turns of B&W 3011 coil stock (16 turns-per-inch, 3/4-inch dia, No. 20) tapped 6 turns from bottom end.

Q1, Q2, Q3 - TR-19 transistor (International Rectifier).

R1, R3 - 470,000 ohm, 1/2 watt.

R2, R4 - 3300 ohm, 1/2 watt.

R5 - 270,000 ohm, 1/2 watt.

R6 - 4700 ohm, 1/2 watt.

RFC1 - 2.5 mH rf choke.

S1 - Spst toggle switch.

Y1 - See text.

BT1 - 9-volt battery (Burgess 2U6 or equiv.).

C1, C3, C6 - 150-pF disk ceramic.

C2, C5 - 365-pF variable.

C4, C8 - .001- μF disk ceramic.

C7 - 10-pF disk ceramic.

C9 - 220-pF disk ceramic.

CR1, CR2 - 1N465A, 1N914 or equiv. (These are optional but should be installed when converter is used near a ham transmitter.)

J1 - Antenna jack (phone tip, phono jack or similar).

Fig. 3 — Circuit modification for making the i-f stage regenerative.

C1 — See text.

R1 — 5000-ohm composition control, linear taper.

R2 — 18,000 ohm, 2 watt.

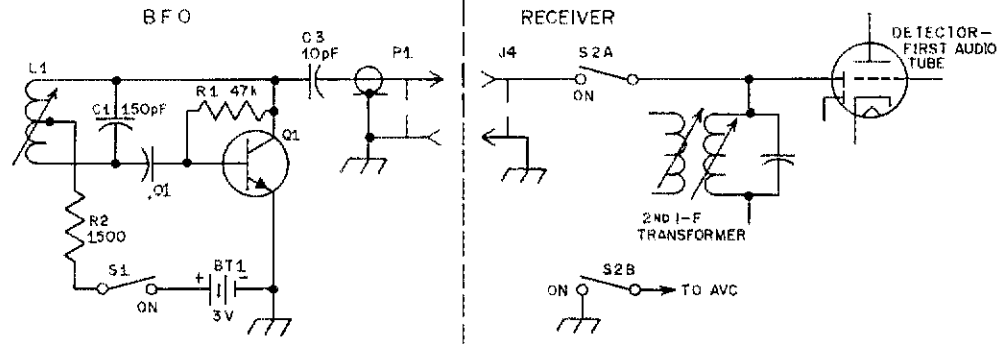
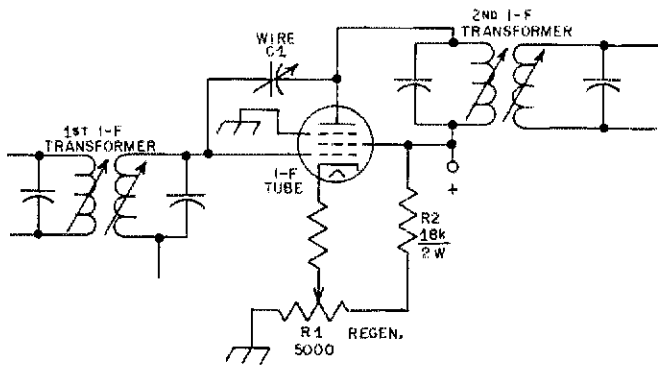


Fig. 4 — Circuit diagram of the beat-frequency oscillator.

BT1 — Two size AA 1 1/2-V batteries, connected in series.

C1 — 150 pF disk ceramic.

C2 — .01- μ F disk ceramic.

C3 — 10-pF disk ceramic.

J4 — Phono jack.

L1 — 0.5 to 2.3 mH center-tapped slug-tuned coil (Stanco WC-2 linearity control).

P1 — Phono plug.

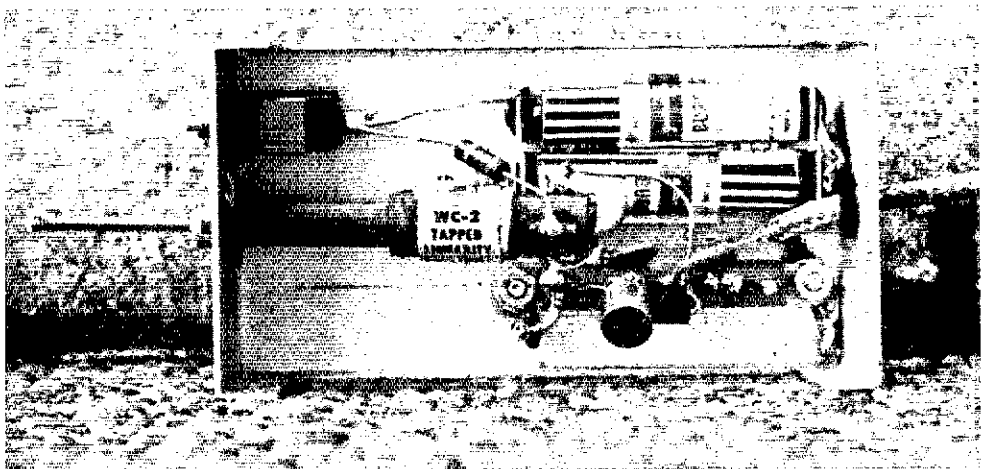
Q1 — TR-08 transistor (International Rectifier).

R1 — 47,000 ohm, 1/2 watt.

R2 — 1500 ohm, 1/2 watt.

S1 — Spst switch.

SW2 — Dpst switch.



This is an interior shot of the BFO. Any arrangement of parts can be used but the enclosure should be shielded from the converter and receiver.

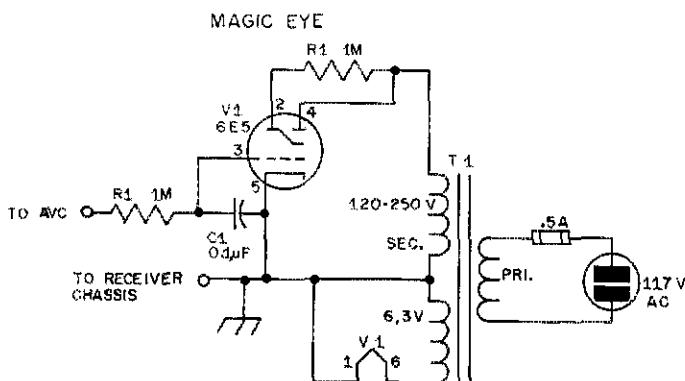


Fig. 5 — Circuit modifications for the addition of a "magic eye" tube.

C1 — 0.1 μ F disk ceramic
R1, R2 — 1 megohm, 1/2 watt.

T1 — Power transformer, 117 V pri., 120 to 250 sec., 6.3-V fil. winding.
V1 — 6E5 tube.

using it later.) Detach these wires from the loop and connect them to the secondary of the shielded rf coil, T2, Fig. 1B, which may be mounted on the rear chassis lip, or elsewhere near the tuning capacitor. Connect one side of the primary to the chassis and the other side to a phono jack. The latter will serve as the input connector.

The antenna tuning capacitor is shunted by a small trimmer capacitor, usually mounted on the tuning capacitor. With an insulated screwdriver, adjust this for best reception. In a few sets, the trimmer is mounted on the loop antenna instead of on the tuning capacitor. If so, it should be removed and attached across the secondary of the shielded rf coil. Incidentally, a circuit diagram and other servicing information for most American receivers and many foreign models may be purchased from suppliers of electronic parts.

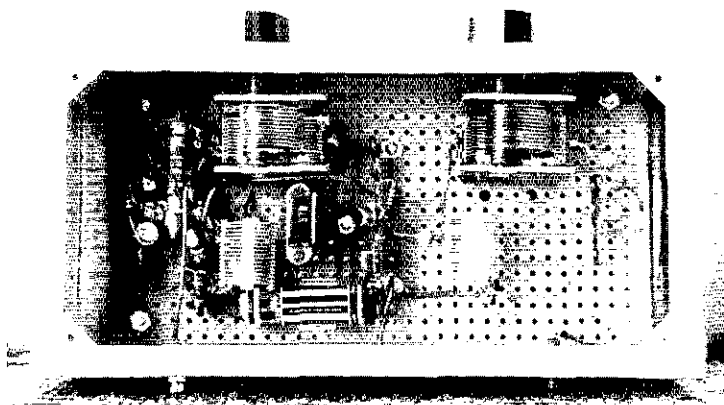
The Converter

A simple converter, illustrated in Fig. 2, may be used to cover any 1-MHz-wide band of frequencies between 5 and 15 MHz depending on the crystal used. (Crystal frequency equals the frequency of the signal you want to hear, plus or minus the frequency in the broadcast band you want the signal to be converted to.) For example, to tune the 7000 to 7300 kHz ham band, a converter with a 6-MHz crystal will produce an output of 1000 to 1300 kHz. Similarly, to tune the 9500 to 9775 kHz short-wave broadcast band, a crystal of 8900

kHz will produce an output of 600 to 875 kHz. The converter will also cover the 20-meter amateur band, the 49- and 19-meter broadcast bands, several aeronautical, mobile, and marine bands, and WWV on 5, 10, and 15 MHz with appropriate crystals. Before making a final choice of crystal frequency for the band you want to hear, take into consideration the frequency of any strong local stations on the broadcast band. Such stations might sneak past the converter and cause interference. Also about crystal choice, remember that the bandsread of most radios is better toward the 560-kHz end of the dial.

The circuitry of the converter is straightforward, with Q1 functioning as an rf amplifier, while Q2 serves as a mixer, and Q3 as the local oscillator. Exact component values and parts placement aren't critical, and any metal box of adequate size can be used as a chassis. The temptation to build the converter inside the receiver cabinet should be resisted though, because of the high temperatures and possibility of interference from the set's local oscillator.

To place the converter in operation, attach an antenna to J2 and connect J3 to J1 on the broadcast receiver with a short length of shielded cable. Turn on the receiver and converter and set the receiver to the proper frequency. Rotate C5 slowly to find the short-wave band, and peak C2 for maximum output. Once C2 and C5 are adjusted all tuning may be done with the dial of the broadcast set.



The converter could be built in a smaller space but a large chassis makes wiring easier. The rf amplifier, mixer, and local oscillator transistors are mounted on separate terminal strips. Most connecting wires run under the perforated circuit board. Parts placement is not critical.

The receiver can also be used with converters for the higher amateur frequencies, the Citizens Band, and police and fire-department frequencies as long as the converter output falls within the broadcast band.

Improving Selectivity

For some applications, such as tuning the crowded ham bands, the selectivity of the "All-American Five" may leave something to be desired. There are several ways to tighten up that 10 kHz bandpass, but the simplest is to make the i-f amplifier regenerative. The operation requires only three new components, and selectivity on the order of 1 kHz at 10 times down, and 5 kHz at 100 times down is easily possible.

The first step is to make the i-f stage oscillate. All that's required is to connect one end of a piece of insulated hookup wire about an inch long to the grid terminal and bend the free end near the plate terminal (no direct connection). This provides just enough capacitance between grid and plate to let the stage go into oscillation. Since we'll want to adjust the regeneration after the receiver is back in its cabinet, add a voltage divider consisting of a 5000-ohm control and an 18,000-ohm, 2-watt, fixed resistor to the cathode circuit, as shown in Fig. 3. Position the free end of the wire attached to the grid terminal so that adjustment of the regeneration control will make the i-f stage go into and out of oscillation smoothly. Maximum selectivity will be found at the point just before the stage goes into oscillation.

Beat-Frequency Oscillator

For casual listening to cw signals, the regeneration control can be advanced until the i-f stage oscillates. This will produce an audio beat note if the receiver is tuned slightly higher or lower than the incoming signal. Unfortunately, detuning the receiver even slightly will move the signal quite a way down the very steep selectivity curve. A better approach is to use a separate oscillator.

A BFO for use with receivers having an i-f of 455 kHz is illustrated in Fig. 4. Lead length and parts placement are not critical, but the circuit should be shielded and connected to the receiver with a short length of shielded cable to prevent harmonics from getting into the front end and causing interference.

A double-pole, single-throw switch should be added to the receiver as shown in Fig. 4 to short out the avc circuit. The avc will react to the BFO signal as though it were a strong incoming signal. This will reduce the receiver gain unless the avc is deactivated. S1 also disconnects the BFO from the diode detector when BFO operation is not desired.

Tuning Indicator

A useful addition to any receiver is a tuning indicator, and a simple circuit is illustrated in Fig. 5. A "magic-eye" tube was used instead of a more conventional S meter, as attachment to the receiver requires only a single connection to the avc line, plus ground. It's suggested that this connection be

made by means of a phone-tip jack, and the tuning indicator be built on a separate chassis since it will be found to be a useful instrument for many other purposes. Because the tube operates with ac as well as with dc, no rectifier or filter is needed. In operation, the shadow portion of the target will decrease in size as the strength of the signal reaching the diode detector increases.

When the modifications and additions to the "All-American Five" are completed, you'll have a receiving system that will compare favorably with many commercially-built receivers costing a great deal more. In fact, you'll have a darned good receiver — and the hardest part of the job might be wired and tested and waiting for you in your attic right now. QST

2-Meter Converter

(Continued from page 16)

2-MHz spread is not desired. When set for the 144 to 146-MHz range, overall gain of the converter is approximately 30 dB. The gain will increase somewhat if the bandpass is decreased. Full band coverage from 144 to 148 MHz can be had by stagger tuning the front-end circuits. However, the overall gain of the unit will drop to roughly 20 dB if this is done.

Some Closing Comments

This converter was tried with a Collins 51S1 receiver and an older Hallicrafters SX-71. No birdies could be detected in the 28 to 30-MHz tuning range. Some spurious responses were noted, however, when using the converter with some receivers whose i-f was 455 kHz. This resulted from the receiver local oscillator being relatively close (455 kHz) to the tunable i-f frequency. The local oscillator energy apparently reached the converter along the coupling cable and beat with the converter oscillator energy at the mixer. A cure for this resulted from the addition of an i-f amplifier stage at the converter output. Though the extra gain was not needed, the stage helped to isolate the receiver from the converter mixer. The circuit used is shown in Fig. 4. In some instances this effect can work in reverse. Energy from the converter oscillator strip can leak past the mixer and enter the tunable receiver front end to cause sum and difference frequencies when beating with the tunable oscillator in the receiver. An effective cure for this is the installation of a low-pass filter between the converter output and the receiver input.

The noise figure of this converter can be set for the lowest value obtainable with the transistor used at Q1. In this instance it is somewhere between 2 and 2.5 dB . . . more than adequate for work on 144 MHz. Though this circuit may seem somewhat more complex than need be, the performance realized is well worth the few extra parts used. If you do not have a modern converter in your receiving system, this equipment could bring your station up to date. QST

The Heli-Rope Antenna

A short section of the heli-rope antenna. The black vinyl-tape protective covering has been removed from the center portion of this section to permit viewing the wire turns. The core is polypropylene fiber-glass rope of 0.225-inch diameter. The No. 22 wire is wrapped with 68 turns per foot in this section.

BY JOHN TYSKEWICZ,* WIHXU

HOW DOES one fit a 3.5- through 28-MHz antenna wire, 138 feet long, into an 80 x 50-foot space, without resorting to a bat-trap layout? The accepted technique is to use some form of electrical loading to reduce the physical length of the radiator. To me, loading coils look like rf chokes when the system is harmonically operated. As for a trap type of antenna, just realize that on 10 meters only a 16.5-foot section of wire is working! Something is all wrong.

A good approach is to use a continuously-loaded configuration, a wire helically wound around a long form. This approach has been used before in mobile installations using whips. In our case, such drastic length reduction is not required, and therefore, the radiation efficiency is fairly good.

With no useful design data to be found, some high-frequency experiments were conducted. Short lengths of clothesline rope and plastic water hose, wound with various sizes of enamel wire, and using different turn spacings, put us in the ball park. The standard simple formula for determining the length of a straight-wire half-wave dipole is $L_{ft} = 468/F_{MHz}$. The object, in my case, was to come up with an antenna design having the conversion constant of 280, instead of 468. The primary determining factors are number of turns, diameter of the winding form, wire spacing and size, and dielectric of the form and outer sheath.

* 77 W. Euclid St., Hartford, CT 06112.

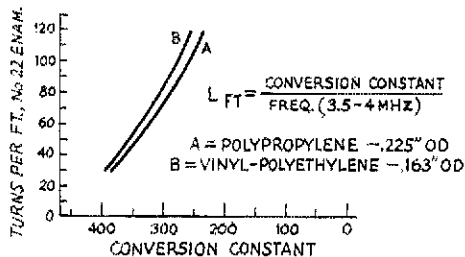


Fig. 1 — Conversion constant for various turns spacing, for 80-meter frequencies. See text.

Fig. 1 shows how the conversion constant varies as a function of coil diameter and wire spacing when No. 22 enamel-coated wire is used. Curve A applies to 0.225-inch OD polypropylene fiber-glass-core clothesline. Curve B is for a 0.163-inch OD vinyl-polyethylene-core line. Fig. 2 shows how the conversion constant is affected by frequency change for a fixed rope diameter and fixed wire size and spacing. At 3.5 MHz, an electrical half wavelength was 80 feet in physical length, and the conversion constant works out to be 280. At 28 MHz, the constant comes out as 252. The lower number indicates increased loading or length reduction. This is a desirable feature to have when the antenna is operated on its harmonics.

In choosing vinyl-plastic clothesline, avoid the type reinforced with wire. The rf losses are too high, causing enough heat to melt the line at high-power inputs. (Someone should manufacture a rope containing a "ferrite wire" core; the conversion constant obtainable would be fantastic.) Nylon rope is dimensionally unstable; it stretches too easily. Cotton, Manita hemp, and similar fiber ropes are hygroscopic, and will require weatherproofing.

Assembly

To those wishing to make such an antenna as this, the following tips are offered. Set up two large spools at least five feet apart, chair high, between two tables. Mount each spool with its axis vertical, so that the rims can be C-clamped to the table's edge. Being right handed, my right-side spool holds the stock rope, and the left spool is the take-up spool for the antenna. Prepare the rope with an antenna end insulator, then fasten it to the

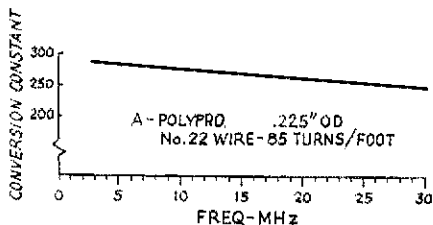


Fig. 2 — Conversion constant for various frequencies, for fixed turns spacing. See text.

take-up spool and clamp. Rotate the stock spool until the rope between the spools is taut, then clamp it. The wire should be on a half-pound-size spool for easy handling. You'll also need a supply of 1/2 x 1 1/2-inch masking-tape strips, a yard stick, and a chair with casters. After the wire is first anchored near the end insulator, the left hand holds the rope near the wire, and the right hand manipulates the spool of wire around the rope for most of a turn. Do some tricky hand juggling, and presto, one turn is completed. After fumbling around for the first six inches of wrapping, one begins to think about making some sort of a winding machine. Cheer up, only 6758 more turns to go!

During a trial run, you will get an idea as to what the spacing should look like. Production runs of three-foot lengths at a time work well. Use the tape strips for length markers. This makes it easy to count the number of turns. After a while one will become aware of a cross-eyed feeling. This is the time to relax for awhile. Make the complete antenna section a foot longer than you estimated. It is easier to unwind some turns than to patch more on. The heli-rope should then be stretched out and its resonant frequency checked. Use a grid-dip meter tightly coupled to a one-turn one-inch-diameter loop formed by coiling the heli-rope at the center, this being the current loop for the fundamental frequency and odd harmonics. The meter dips must be checked against a calibrated receiver when tight coupling is used, as the frequency calibration of the GDO will be upset.

If center feed is to be used for the antenna, each half of the dipole should be checked at a frequency which is somewhat lower than half of the fundamental. Remember from Fig. 2, the conversion constant becomes lower at higher frequencies. Half of a straight-wire dipole for 3.5 MHz is essentially a 7-MHz half wave. Half of a 3.5-MHz heli-rope looks like a 6.9-MHz half wave. When using tuned open-wire feeders, this correction can be overlooked. Those who use a coaxial feed line can leave some plain wire hanging down from the end insulators for precise tuning of the antenna.

After the section is adjusted to frequency, rewind it on the stock spool and start over again, this time using 7-mil-thick 3/4-inch-wide vinyl electrical tape. Spiral-wrap the tape, holding it to make a 30-degree angle with the heli-rope. This outer wrap helps to keep the wire turns in place and the inside clean. It also helps to reduce precipitation static.

The Q of a heli-rope dipole is probably lower than that of an ordinary dipole. Therefore, once a low SWR is obtained, it should be low over a considerable frequency range. To work the heli-rope on 80 through 10 meters, tuned feeders are necessary. I use 34 feet of open-wire line, end-feeding the antenna in Zepp fashion. In the shack I use the usual parallel-tuned type of Transmatch.

The maximum dc power input here is 500 watts. No antenna trouble has been observed after two years of operation — rain or shine. The

antenna loads up well, and works well as an all-around five-band antenna. It is a half-wave antenna on 80 meters, and becomes 8 1/2 wavelengths on ten meters, and is only 80-feet long! It beats all of my previously used sky wires.

As one can readily see, the choice of materials and desired length is practically unlimited, although a very short length will eventually break out with a beautiful corona "fireworks" display when the linear-amplifier switch is activated.

P.S. Who will be the first to hand-wind a heli-mini-quad, delta loop, or rhombic? QST

First Steps in RTTY

(Continued from page 17)

are many circuits available for TU construction.³

In order to transmit RTTY signals, a simple frequency-shift keyer will have to be connected between the machine and your transmitter VFO.⁴ Your keyboard will key a diode that will switch a small capacitor in and out of the VFO cathode circuit, thereby shifting its frequency. The value of this capacitor is adjusted so that the transmitter output frequency will be shifted less than the maximum 900 cycles allowed by the FCC. Most amateurs have standardized on 850 or 170 Hz. QST

³ *The Radio Amateur's Handbook*, Chapter 12.

Also see footnote 2.

⁴ *Ibid.*

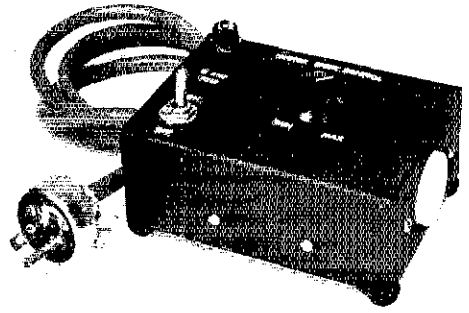
NEW BOOKS

Electronic Communication Systems, by George Kennedy. Published by McGraw-Hill Book Company, 330 West 42nd Street, New York, NY 10036. 9 1/4 x 6 1/4 inches, 743 pages, including index, illustrated. Price, \$13.95.

George Kennedy is a professor of engineering at an Australian technical school; his book is intended to be a study text for electronic technicians. The author's presentation is quite different in tone, choice of material and format from the textbooks used in this country. The outstanding feature of the book is that it is very readable. Clear explanations of basic principles abound, laced with circuit examples. Kennedy resorts to mathematics only to show the use of formulas that a technician will need to know in his work.

Perhaps by accident, or perhaps because Australian technicians must pass tests not too different from our FCC exams, the book covers in detail most of the technical subjects that an amateur needs to know as he climbs the license ladder. A-m, fm, ssb, and pulse communication systems are examined, as well as transmitters, receivers, antennas, and propagation. Tubes, transistors, and ICs are shown as the active elements in the circuit examples. The occasional use of electronic terms common in Australia, such as "crystal gate" for what we call a single-crystal filter, causes no problems, as R. W. Tinnell has edited such areas to insure that the vernacular popular in this country is included too. For an amateur looking for a study text to supplement his reading in the *License Manual*, or for a book to provide additional insight into the mysteries of electronics, *Electronic Communication Systems* will be a worthwhile investment. — WIKLA

Motor-Speed Control for Power Tools



A Triac Delivers Full-Wave Voltage to the Load

BY JERRY HALL,* KIPLP

PORTABLE ELECTRIC drills are now available with built-in provisions for continuously changing the motor speeds from fast to medium, to slow, to a dead stop. The medium and slow speeds are quite useful for drilling soft materials such as aluminum, brass and plastics, for drilling on surfaces where it is important that the drill bit doesn't slip, for stirring paint, and for many other applications. If you are the owner of a drill without this feature, this article is for you.

All of the conveniences of variable speeds are available with the motor-speed control described here. The instrument has a multiplicity of uses, not being limited to controlling electric drills. Other small power tools with wound-rotor motors such as saber saws, sanders, rotary-blade saws, even the XYL's food mixer, may be controlled with this device. The circuit may also be used to build a dimmer control for incandescent lamps. We even used the device successfully in the primary circuit of a power supply to vary the dc output voltage. However, the instrument cannot be used to control appliances with synchronous motors such as small electric fans, or heavy-duty motors requiring high starting currents.

The Circuit

The device controlling the power to the load is a silicon triac or bidirectional thyristor, Q1 of Fig.

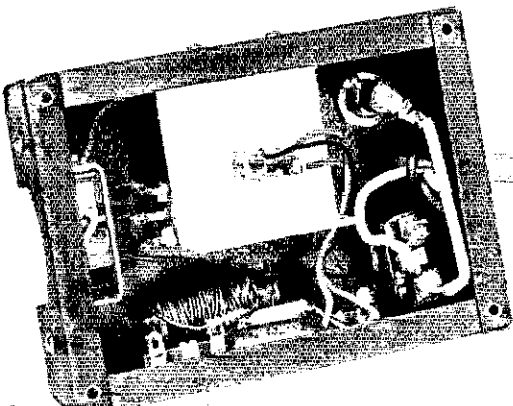
* Assistant Technical Editor, QST.

1. Its operation is somewhat like a silicon controlled rectifier (SCR) except that, whereas the SCR operates on only a single-polarity half cycle of the ac line voltage, the triac operates on both half cycles. To quote from the manufacturer's literature, "these devices switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering."

The triac operates like a switch on each half cycle of the ac wave form. When a voltage exists between anodes 1 and 2 and a triggering pulse is applied to the gate, the switch closes, permitting the load current to flow between the two anodes. Once the triac is triggered into conduction, the gate no longer has any control over the current flow. When the line voltage goes through zero (and consequently there is no anode-to-anode voltage), the switch opens, to close again when triggered on the next half cycle. The triac therefore does not control the peak-to-peak ac voltage applied to the load in the way that a variable autotransformer does, but instead controls the average power delivered to the load by removing the applied voltage during the early portion of each half cycle. This is portrayed visually in the oscillograms of Fig. 2.

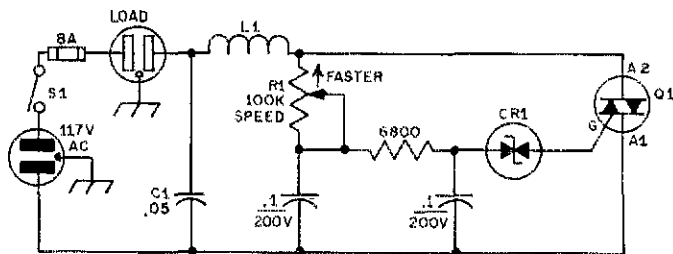
The gate voltage for Q1 is derived through the 100,000-ohm speed control, the 6800-ohm resistor, and CR1. The resistors and the two 0.1- μ F capacitors form a variable phase-shift network to delay the ac wave form applied to the diac trigger, CR1. The diac is a bidirectional avalanche-switching device which breaks into conduction at a potential of approximately 28 volts. This variable-

The working parts of the motor-speed control. The triac is centered on its aluminum heat sink, with the terminals of the speed-control resistor protruding from underneath. The rf-hash-suppression filter and components in the gate-triggering circuit are mounted on a tie-point strip, being visible at the bottom of the enclosure as shown in this view. The diac is barely discernable at the right end of the fixed resistor. Terminals of the strip which are associated with the mounting feet are unused, and are bent down to prevent accidental shorts to other parts of the circuit.



QST for

Fig. 1 — Schematic diagram of motor-speed control. Resistances are in ohms ($k = 1000$) and capacitances are in microfarads. Important note: The basing diagram for Q1 is correct as shown here. Some early literature accompanying the packaging of the HEP device appears to be in error.



C1 — .05- μ F, 600-V paper.

CR1 — Diac (silicon bilateral trigger), 2-A, 300-mW (Motorola MPT28 or HEP311 or equiv.).

L1 — Approx. 70 μ H; made with 18 ft No. 18 enam. wire scramble-wound on body of C1, or on a 1 1/2-inch length of 1/2-inch dia rod.

Q1 — Triac (silicon bidirectional thyristor), 8-A, 200-V (Motorola MAC2-4 or HEP340 or equiv.).

R1 — Linear-taper composition control, 2-W.

S1 — Spst toggle.

time-delay circuit permits the turn-on time for Q1 to be controlled over a full half cycle, so that the motor speed may be controlled from maximum to a full stop.

Some rf hash is generated by the control when it is in operation, which could create noise interference in nearby receivers. C1 and L1 form a suppression filter, greatly reducing such interference. What small amount of energy remains to be radiated is concentrated in the 2-MHz portion of the radio spectrum.

Construction

The speed control shown in the photographs was built into a 3 3/4 x 5 3/8 x 2-inch steel utility box. The steel provides rigidity and rf shielding not afforded by aluminum. During construction, much use was made of components from the surplus-parts box, so some differences appear in parts called for in Fig. 1 and those photographed. For S1, as an example, we had a spdt switch on hand which was substituted for the required spst switch. The 3-wire cord and the ac plug and receptacle were obtained from the corner hardware store.

When constructing this control, remember that it will handle nearly a full kilowatt of ac power — and use wiring techniques which are appropriate. A wire size no smaller than No. 18 should be used to carry current to the load and to the anodes of the triac. For safety reasons, the device should be constructed with a third-wire ground terminal on both the plug and the receptacle; the enclosure should be electrically connected to these terminals.

The triac requires a heat sink but must be insulated away from the grounded enclosure. In the instrument shown in the photographs, the heat sink was made by bending a piece of 1/16-inch aluminum stock and securing it to the enclosure. Insulating washers supplied with the triac were used in its mounting, and a coating of silicone grease on these washers provides a heat-transfer bond to the sink. With this arrangement, not even a slight warming of the triac can be detected during prolonged operation.

The rf-hash-suppression filter, L1-C1, may be made by winding turns of wire around the body of C1. A capacitor with a 600-V rating gives the
(Continued on page 55)

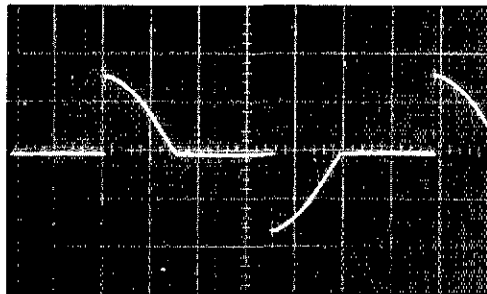
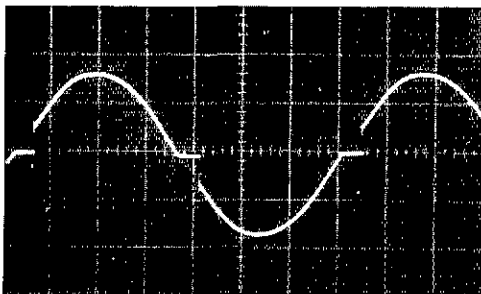


Fig. 2 — Voltage wave forms at the load for different settings of R1. Pictured at the left is the wave form resulting when R1 is set for maximum motor speed. The small steps at the beginning of each half cycle are caused by a slight time delay in the triggering of Q1. At the right is the wave form which produces a 50-volt-ac indication on a volt-ohmmeter. A motor operating from this voltage will run much slower than normal.

A 42-Foot Crank-U

BY GORDON H. WEILER,* W9ZQK

IF YOU TOLD a friend you were going to build a crank-up tower, you would probably get the same comments I did — "Oh yeah?" After buying some new gear recently, the thought of having to purchase a tower didn't settle too well with my budget. An article in an earlier *QST* showed a good basic design.¹ After discussing the project with my brother-in-law, we decided to undertake the construction job. He was able to borrow a welding machine and knew how to operate it.

Top-Section Construction

The plan of building the inside section first, as mentioned in the earlier article, was followed. Each leg was constructed from a 21-foot piece of 1 1/4-inch standard black pipe. Six wooden forms, made of 1/2-inch-thick plywood approximately 24 inches square, were used as spacers for the three legs. Each form had three holes, mutually spaced 13 inches apart, center to center.

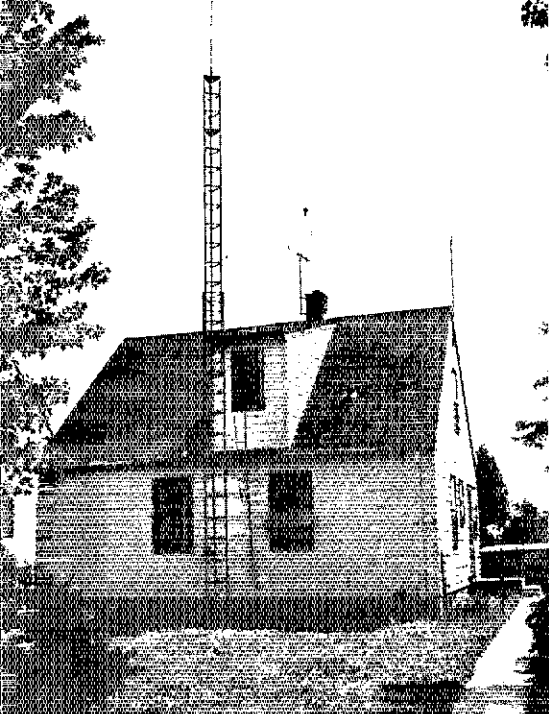
Steel cross braces were made from 1/4 x 1-inch bar stock cut to a length of 13 inches and placed at 16-inch intervals along the legs. The welds and cross pieces were kept on the inside of the legs to assure that the outer section, when completed, would slide freely over the inner section during the crank-up operation. Angle stock was used to check the position of each weld by sliding a short piece of it over the outside of the leg at the weld point. The angle stock must not touch the cross-brace or weld. Three guides, made from 3/4-inch angle iron, were welded to the bottom as shown in Fig. 1. The wooden forms were removed when all of the welding was completed.

Construction of the Outer Section

Before placing the outer-section legs in position, a guide, similar to the ones mentioned above, was welded to one end of each of the remaining 21-foot pipes. Then the pipes were fastened with rope to the already completed tower section. We assured sliding clearance for the inside section by placing 1/16-inch spacers between each guide and its associated leg. The cross section braces were carefully welded in place so that the distance between the inside and outside legs remained constant. When the welding work was finished, the spacers were removed. The final product seemed remarkably straight. Since the completed tower was a bit heavy to handle,

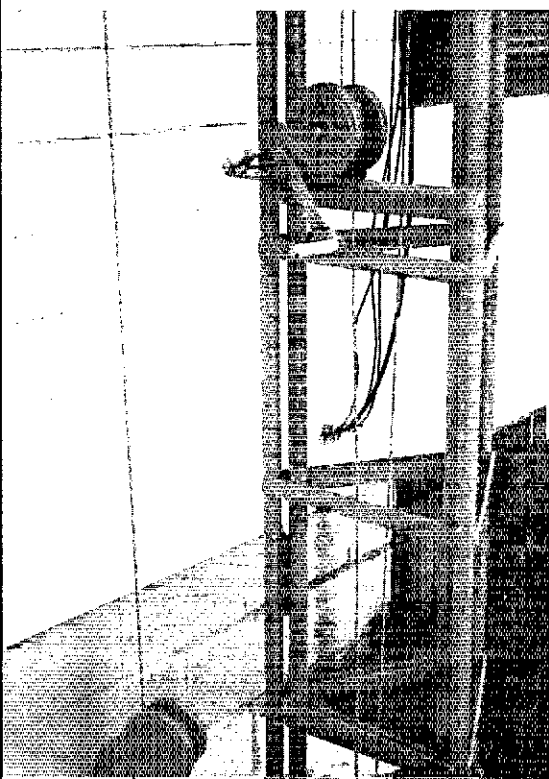
* 4843 N. 90th Street, Milwaukee, WI 53218.

¹ Filion, "A 65-Foot Crank-Up," *QST*, August, 1968.



A 42-foot crank-up fold-over tower.

Fig. 1 — The guides for the inside section are mounted about 15 inches from the bottom. The winch mounted on the side of the tower is used for crank-up. The other one is used to lower the tower to the ground.



Fold-Over Tower

even for two men, we disassembled the sections. An identification mark was placed on adjoining legs so that the sections could be reassembled with the same sides facing each other.

The Base Plate

A hinge on the base plate was needed to tilt the cranked-down tower to ground level. A 3-inch steel plate was welded across one side of the tower and 3 pairs of 1 1/4-inch OD (7/8-inch ID) mechanical tubing, 1 1/4 inches long, were attached to it. Similar pieces of tubing were welded at three places on the base plate. Then, a 1/2-inch pipe was inserted through the tubing to form the hinge. A photograph of this assembly is shown in Fig. 2. A second set of tubing was used to lock the tower when in the upright position.

Winches

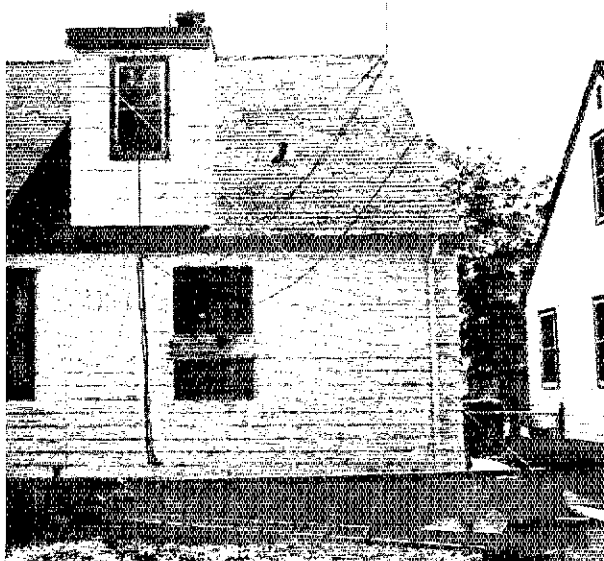
Two winches, each rated at 1000 pounds, were purchased from Sears, Roebuck and Company at a cost of \$9 apiece. A 3-inch-diameter pulley, sandwiched between two pieces of 1 1/4-inch bar stock, was welded to the top of the outside tower section and a similar assembly was welded to the bottom of the inside section. Fig. 3 shows the arrangement. The crank-up winch was mounted 4 feet from the bottom of the tower. The cable from this winch was strung through the top pulley, down between the sections, and through the bottom pulley. It was then fastened to the top of the outside tower. This arrangement provides a mechanical advantage factor of 2. The second winch, mounted on a small support near the base of the tower, has its cable fed through a pulley attached to the house, and connects to the top of the first section.

Final Thoughts

The tower was spray painted, first with a coat of zinc-oxide undercoat, and then with enamel. The lower section is supported by the house, so guy wires were not necessary. But if the builder were to place the tower away from any supporting structure, at least one set of guys should be used at the top of the first section.

I installed bicycle padlocks over the winch handles. This procedure keeps the neighborhood gang from "experimenting." I wish to thank my brother-in-law, Arnold Gross, for his help in accomplishing this project.

QST



The house serves as both an anchor point for the fold-over pulley and a supporting structure for the lower half of the tower.

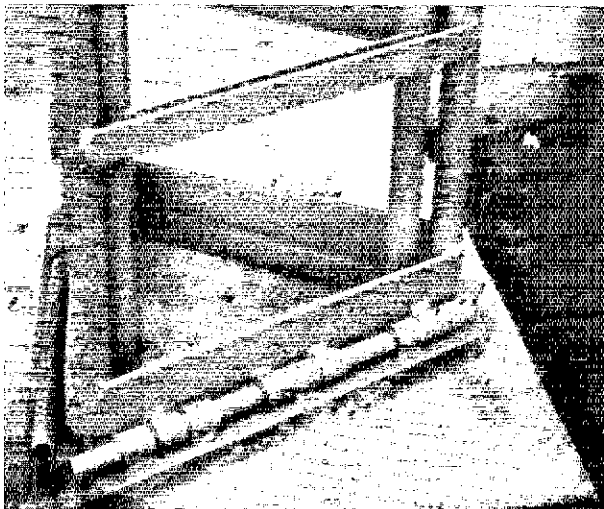


Fig. 2 — Hinge detail.

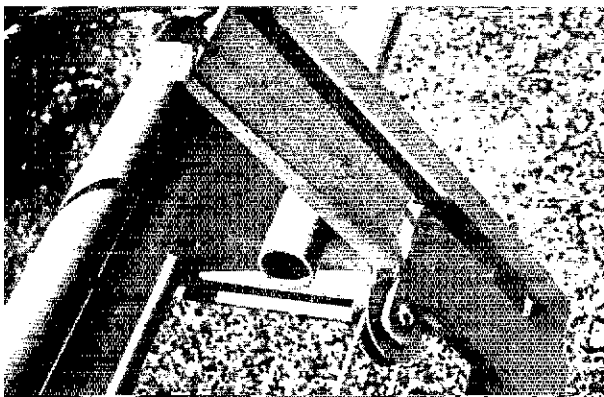


Fig. 3 — A pulley is sandwiched between two pieces of bar stock and welded to the top of the outside section.

Technical Correspondence

MORE ON THE REC/COUNTER

Technical Editor, *QST*:

The following information is directed to those who would like to build the Rec/Counter¹ for use with receivers other than the Collins 75S-3 series for which the device was originally designed. The components that need to be tailored to the specific receiver are C5, C6, C7, L1, L2, R7, R9, and R10.

We have collected data on several commercially built receivers and transceivers and have calculated corresponding values for the above components. These values are listed in Table 1, together with the J. W. Miller type numbers for L1 and L2.

Included in the table are the two receiver parameters that are of importance in this connection. One parameter, f , is the value of the first i-f, in MHz, when the tuning dial is at the middle of its range. The other parameter, w , is the width in MHz of the dial tuning range. If your equipment is not included in the table, you can calculate your own Rec/Counter circuit values provided you know f and w for your case. This is done by means of the following formulas:

$$Q = f/w$$

$$C5 = 159/w \text{ (picofarads)}$$

$$C6 = 58/f \text{ (picofarads)}$$

$$C7 = C5/7.6 \text{ (picofarads)}$$

$$L1 = C5/Q^2 \text{ (microhenries)}$$

$$L2 = 7.6 \times L1 \text{ (microhenries)}$$

$$R7 = 1.0/(1 - Q/40) \text{ (kilohms)}$$

$$R9 = 7.6/(1 - Q/40) \text{ (kilohms)}$$

$$R10 = R9 \text{ (kilohms)}$$

We have not built and tested any but the original Rec/Counter circuit, so we cannot guarantee satisfactory operation with the altered circuit constants. However, the values listed should furnish a good starting point for experimentation. When the circuit is working properly, the voltage at pin 4 of the second MC1496G mixer should be maximum at the center of the tuning range of the receiver dial, and the voltage should drop by about 1 dB (12%) at each end of the dial.

You will have to work out your own connections within your receiver, since we have no

¹ Macleish, Pattison, and Hejhall, "The Rec/Counter," *QST*, May, 1971.

reliable means of specifying these from published data alone. — Kenneth Macleish, W7TX, 740 E. Chula Vista Rd., Tucson, AZ 85718, and Henry O. Pattison, W7EFV, 9835 E. Morrill Way, Tucson, AZ 85715.

DIGITAL VS. SAMPLED-DATA FILTERS

Technical Editor, *QST*:

The article by Gibbs² on digital filtering may be somewhat misleading. In the current engineering usage, a "digital filter" is a device which applies a numerical transformation to a sequence of values quantized in both time and amplitude. That is, a continuous signal $x(t)$ is periodically sampled and digitized, and the resulting sequence x_1, x_2, \dots of (binary) numbers is subjected to a computation such that

$$y_l = \sum_{k=1}^m a_k x_{l-k} - \sum_{k=1}^n b_k y_{l-k}$$

where y_1, y_2, \dots is the output sequence and a_k, b_k are the filter coefficients. The storage of previous input values x_{l-k} and output values y_{l-k} is accomplished in a shift register, and the computations with digital adders and multipliers.³

Gibbs' circuit is more properly termed a sampled-data filter, because it only requires its inputs to be quantized in time. Its inventors, Franks and Sandberg,⁴ called it an N-path filter, and a comprehensive analysis of it has been published elsewhere.⁵ This latter paper computes the harmonic response of the filter, as well as the effect of switching-pulse rise time on Q . — Joseph P. Haggerty, WA2LOY, 4218 Snyder Ave., Brooklyn, NY 11203.

MORE ON PEP VS. AVERAGE POWER

Technical Editor, *QST*:

I read with great interest the article by James N. Thurston, W4PPB, on PEP and average power.⁶ This is a subject of great interest to me and, like Mr. Thurston, I feel there is much confusion among amateurs regarding these matters.

The 100-watt example in the third paragraph is written so that it can be easily misinterpreted to mean that a dc input of 100 watts with a two-tone signal corresponds to a PEP input of 100 watts. The exact relationship between input

² Gibbs, "Digital Filters," *QST*, April, 1971.

³ Moschytz, "Inductorless Filters: A Survey," *IEEE Spectrum*, September, 1970.

⁴ Franks and Sandberg, "An Alternative Approach to the Realization of Network Transfer Functions: The N-Path Filter," *Bell System Technical Journal*, September, 1960.

⁵ Harden, "Digital Filters with IC's Boost Q Without Inductors," *Electronics*, July 24, 1967.

⁶ Thurston, "PEP, Average Power, and Related Matters," *QST*, January, 1971.

Table 1

Equipment	f MHz	w MHz	C5 pF	C6 pF	C7 pF	L1 μ H (Miller No.)	L2 μ H (Miller No.)	R7 k Ω	R9,10 k Ω
Collins 75S-3 series, KWM-2 series	3.055	0.2	820	18	82	3.3 (4307)	25.0 (4311)	1.8	10
Heath SB series HW-100, HW-101	8.645	0.5	330	6.8*	39	1.1 (4305)	8.0 (4309)	1.8	12
Drake R4	10.85	0.5	330	5	39	0.7 (4303)	5.1 (4308)	2.2	15
Hallcrafters SR2000	6.250	0.5	330	10	39	2.0 (4306)	15.5 (4310)	1.5	10
Kenwood R599	8.595	0.6	270	6.8*	33	1.3 (4305)	9.8 (4309)	1.5	12

* ceramic

PEP and dc input power to an amplifier depends heavily upon the operating conditions of the stage. A pure Class-A stage is characterized by a continuous flow of current and for that case the PEP input capability is the same as the dc input power regardless of signal wave form.

On the other hand, a pure Class-B stage (seldom practical because of nonlinear distortion at low levels), carries plate-current pulses whose average value over each rf cycle is approximately proportional to the output current or voltage. For a two-tone signal, the average per-cycle current envelope will be a full-wave rectified sine wave with fundamental frequency equal to half the difference frequency between the two tones. The plate meter cannot follow these fluctuations, so the meter will read an average value of 63.7 percent of the peak value. Since the input power is simply the plate voltage times the plate current, the PEP input when an ideal Class-B stage is driven by a two-tone signal is 1.57 times the average dc input power.

Since most of us operate Class AB (as much B as the linearity of our tube will allow), a linear interpolation between Class B and Class A is usually used to estimate the input PEP. This well-known relationship is:

$$PEP \text{ input} \approx E_b [1.57 I_b - 0.57 I_o]$$

where I_o is the idling current, I_b the dc plate current (meter reading) and E_b the dc plate voltage.⁷

Output PEP is a completely different story. For a two-tone signal with no distortion, the average rf power output is exactly half the PEP output (this factor of two seems to get kicked around more than any others). Note that this factor is drastically different than the input-power case because both voltage and current envelopes vary at the output whereas only the current envelope varies at the input with constant supply voltage.

I would now like to explore the practical use of all of this. One might take issue with Mr. Thurston's contention that "dc input" is not of much use. Since it is the only power that we can easily measure under operating conditions and which must by law be measured as we approach a full gallon,⁸ I feel that peak dc input is the power to monitor and to log.

In tune-up, you want to apply a two-tone test signal to your transmitter and crank up power until flat-topping is observed on an oscilloscope at the output. Watch your dc input though — if it exceeds the rating of your transmitter before flat-topping occurs, you must use a pulsed two-tone source. Now note the peak output amplitude and remember that you must never allow your output to hit this "ceiling." This can be

⁷ The effects of idling current on input PEP and the value, 1.57, are discussed in earlier *QST* articles. See Wright, "Power and Meter Facts in S.S.B. Operation," *QST*, August, 1955; Goodman, "Linear Amplifiers and Power Ratings," *QST*, August, 1957; and Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959. Related information also appears in any edition of *Single Sideband for the Radio Amateur*, ARRL. — Editor

⁸ FCC regulation 97.67 limits maximum power to one kilowatt dc input and is interpreted to be the product of the dc plate voltage and the dc plate current during the largest modulation peaks as registered on a plate-current meter having a time constant of not more than 0.25 second. This limitation applies inclusively to all stages supplying power to the antenna and must be measured if we exceed 900 watts.

achieved in a number of ways — the most popular is to set an a/c threshold just below the flat-topping point. In all of this procedure, specific PEP input or output is *not* required to be known. In fact, the peak voltage observed on an oscilloscope at the output corresponds to a peak power equal to twice the PEP output regardless of modulating waveform. You can play to your heart's content with clippers, compressors, or any other speech processing to beef up your average power as long as the peaks never exceed the flat-topping point. I recommend continuous monitoring of the output voltage with a scope if you are doing any experimenting. The only power that you must keep your eye on and the one that must be logged is the dc input on peaks. This, of course, must never exceed a kilowatt. — Bob Buus, WA2HVA, 5 Donner St., Holmdel, NJ 07733.

FLIP-FLOP TERMINOLOGY

Technical Editor, *QST*:

Recent articles in *QST* and other ham magazines have exhibited confusion on the subject of flip-flops. In the interests of alleviating any possible misconceptions, please allow me to set the record straight. Flip-flop nomenclature has been firmly standardized for some time, although it is surprising how many IC users (engineers and amateurs alike) are often not aware of the proper terminology.

An R-S flip-flop is defined by the following truth table, where R and S are the inputs and Q is the (true) output:

R	S	Q
0	0	no change
0	1	0
1	0	1
1	1	undefined

An R-S flip-flop may or may not be clocked; the only difference is that the inputs to a clocked R-S flip-flop (sometimes called an RST flip-flop) do not affect the output until the clock signal occurs.

A J-K flip-flop is similar to an R-S flip-flop except that the 1-1 input condition is defined and causes the output to invert (toggle). A J-K flip-flop may or may not be clocked, but integrated circuit J-Ks usually are.

Another frequently encountered flip-flop is the D. A D flip-flop has only one input called D which is transferred to the output when the clock signal occurs. The D flip-flop is just an RST flip-flop with the D signal going directly to the R input and through an inverter to the S input. A less common flip-flop is the T which is a clocked J-K with both the J and K inputs internally tied to logic 1, thus causing the output to toggle at every clock signal.

There are many other important considerations (flip-flops vs. latches, master-slave vs. edge-triggered, leading-edge triggering vs. trailing-edge, clock skew, and one's-catching) but these are beyond the scope of this letter. I wish I could refer you to one comprehensive and authoritative discussion of all these factors in some book or magazine, but unfortunately no such single reference exists, even in the professional literature. Perhaps one of *QST*'s readers will alleviate this situation. — E. Douglas Jensen, W5OGJ/K4DAD, 14632 Del Prado, Dallas, TX 75240.



Hints and Kinks

For the Experimenter



AUDIO HUM IN THE HEATH SB-100

Over the past few months of operation with my SB-100, I noted the ac hum level in the receiver audio output had gradually increased. The hum was especially noticeable under no-signal conditions, or with the audio gain turned to minimum. At first, I considered the possibility of an inadequately-filtered power supply. Later checks, however, proved the problem to be a poor connection between the ground foil of the audio circuit board and the main chassis. Tightening the screws that secure the audio board to the chassis eliminated the problem. — *David E. Evans, K5SOR*

FINISHING ALUMINUM PANELS

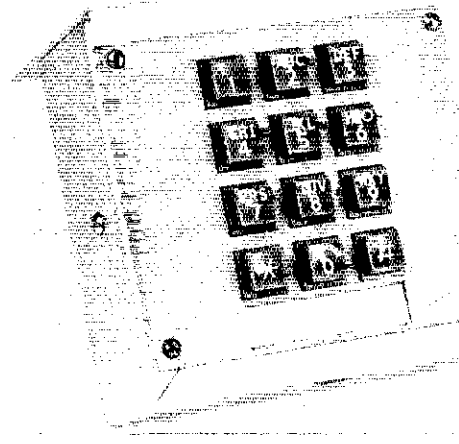
My junk box contained a few scratched panels which I wanted to use for my next 2-kW amplifier project. An orbital sander, fitted with a coarse grade of sandpaper, removed the scratches quite nicely and produced a velvet-like surface on the panels. Liquid dishwashing detergent and hot water were used to prepare the panels for painting. A double coat of clear glossy spray from a push-button can provided the panel with a remarkable finish. Lettering and numbers were applied in the usual manner. — *Sandy Morton, W6IAE*

TOBACCO POUCH FOR STORING SMALL PARTS

Many brands of pipe tobacco are now being sold in heat-sealed plastic pouches. They are normally opened by tearing them along the heat seal. If trimmed carefully, they provide a handy, durable storage container. I use one of these held shut by a rubber band, to weatherproof an outside-mounted coaxial connector. Another way to use these bags is to make a hole in the back surface with a paper punch, then hang them up on a pegboard. Here, they are used to keep parts for various projects from getting lost. Or the bags can be sealed with the tip of a soldering gun to provide long-term storage for valuable parts. If you are not a pipe smoker, you can probably find someone who will save the bags for you. — *Robert Burtis, WB2RJC*

USING THE TOUCHTONE PAD

Touchtone control of repeater functions and of autopatch facilities has many advantages. Surplus telephone company encoder pads are available in some areas, and *QST* Ham Ads have listed some imported units for sale. The Touchtone pad is intended to be mounted on brackets in a telephone instrument. For amateur mobile installations, a 4 x 4 x 2-inch utility box (Bud AU-1083) will do as a housing. The pad is held in place with a telephone-



An L-shaped piece of aluminum, bolted to the top of the utility box, provides a convenient under-the-dash mount for a mobile installation.

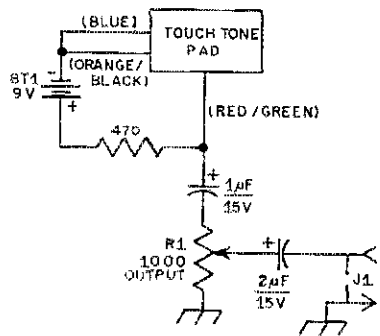


Fig. 1 — Typical connections to use a Touchtone pad for repeater control. Resistances are in ohms. R1 is a linear-taper composition control and J1 is a panel-mounted phono jack. Capacitors are electrolytic; color coding on the wire leads from the pad is shown in parentheses.

instrument front plate¹ and two bolts. A bolt is passed through either side of the cabinet into the threaded hole located on each side of the pad. A 9-volt transistor-radio battery can be used to power the pad oscillator, as current is only drawn when a button is depressed. Connections are shown in Fig. 1. — *WIKLK*

¹ Replacement parts for the Touchtone instrument, manufactured by the Telecommunications Division of IAT, are available through local Graybar outlets.

LOW-RANGE SCALE FOR OHMMETERS

A short time ago I needed to measure a current of 20 microamperes, but the lowest setting on my volt-ohmmeter was 10 mA. Like most 20,000 ohms-per-volt meters, mine had a 50- μ A movement. I simply opened up the case and clipped my test probes to the meter terminals and read the 20 μ A on the 0-to-5 scale. A week later I had a similar job to do so I drilled two small holes and mounted pilot jacks on the side of the plastic case. Now I can use the 50- μ A scale any time I need it. — *Harry E. Blomquist, K6JSS*

[EDITOR'S NOTE: Many manufacturer's meters have built-in provision for such measurements, which may not be immediately apparent from the outside of the case. The instruction book should be checked before drilling holes in the plastic case.]

FREQUENCY MEASUREMENT

There is a good chance you can achieve the Class-I Official Observer frequency-measurement requirement with your ham-band receiver. If you have a graduated tuning knob on your receiver, you can measure frequency accurately by determining the unknown-signal position between crystal-calibrator markers. The new 25-kHz-to-5-kHz frequency markers (such as those by Lab-1 and Paxitronics) can be used to improve your measurement by minimizing errors introduced by the nonlinearity of dial graduations. An average precision of 15.1 ppm was obtained for six observations in an ARRL Frequency-Measurement test. I used a 25-kHz marker with an SX-101A receiver, which has a cord-driven tuning capacitor.

After the receiver has warmed up and stabilized, I zero beat the crystal calibrator with WWV. In the ARRL Frequency-Measurement tests, the approximate frequency is specified. Tune in one direction to minimize backlash, then count the number of tuning-dial divisions between the calibrator points on each side of the specified frequency. Tune back past the first marker and count the graduations between this first marker and the zero-beat frequency of the unknown signal. In a test on 40 meters (with an announced frequency of about 7.027 MHz), I had 138 graduations between 7.025 MHz and 7.050 MHz. I measured the unknown signal to be 21 graduations past the 7.025 marker and set up the following proportion:

$$\frac{21}{138} = \frac{X}{7.050 - 7.025 \text{ MHz}}$$

$$X = 0.0038 \text{ MHz}$$

The unknown frequency is determined by adding .0038 MHz to the lower frequency of 7.025 MHz. The result, 7028.8 kHz, is quite close to the "official" reading of 7028.832 kHz.

A Class-I Official Observer must be able to measure frequency within 71.4 ppm of the test frequency. At 7.0288 MHz, an error of about 1/2 kHz is acceptable. A tuning dial with 5 graduations per kHz would allow the operator to estimate frequency to 0.2 kHz which should be good enough to pass the Class-I requirement. How close can you measure a test frequency? — *Clarence E. Albertson, WA9TLT*



June 1921

... The leading article this month describes the first version of the Reinartz Tuner. John made this one in a hurry, I think. His inductances were wound as a sort of spiderweb, though you'd hardly know it by looking at the photo. The performance of this rig was just great and it caught on like wildfire. Made one myself and it outperformed an experimental superhet made by Ernest Amy, one of the old IBCG gang. Obviously there were some hugs in Amy's rig.

... The Old Man's article on "Rotten Nerves" gives us a good look at "Final Authority" and "Radical." Of course, he doesn't tell us who they were and, even as I write this, the identity of these characters has never been irrefutably established. TOM appoints himself President of the Nervous Wreck Club. There is a strong hint that T.O.M. was really H. P. Maxim since the rotary gap running at 7000 rpm is part of the yarn.

... The League is sponsoring a "Static Puncturing Contest" to see if cw really has anything over spark during the summer months. Contestants are advised to have at least two witnesses when copying cw through summer static! Spark is not yet dead but feeling sick.



June 1946

... K. B. Warner notes that the QRM situation is bad and rapidly getting worse. He spells out some common sense ideas on what we may do about it, especially in the matter of QSOs wherein different frequencies are used. He goes into some detail about calling CQ when it appears that the answering station or stations should reply on a frequency near the caller but not exactly on him and subsequently moving to the caller's frequency. Good practice.

... Don Mix describes his compact, two-tube high-power transmitter, using a 250A driven to 600 or 800 watts by a single 6L6.

... There is a learned discussion by Van B. Roberts, W3CHO, on the matter of rhombic and V antennas. A little trig and vectors, but nothing that should frighten one away from this easily-read piece.

... I've sort of hinted lately that the opening of the 75-meter band a while ago was accompanied by a goodly number of hams, some very well known, who "jumped the gun." That they did, and this month we have a flock of letters from incensed hams who deplore the disgraceful performance. It was really sump'n. — *WIANA*



Recent Equipment



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

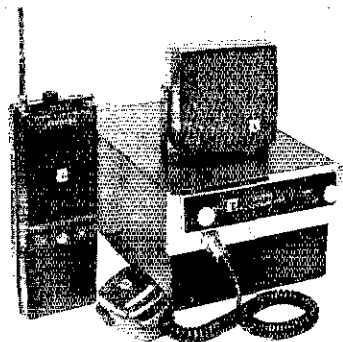
The Johnson 504 and 540 2-Meter Transceivers

A NUMBER OF rigs manufactured for the 150- to 174-MHz public-service band have been purchased by amateurs for use on the 2-meter band. Such fm transceivers usually cost two to three times as much as the units made specifically for ham use. To determine what, if any, improvements in performance and reliability could be obtained if one spent the extra money, the Johnson 504 and 540 were acquired and given extensive tests in the ARRL lab and afield.

The 504

Johnson has nicknamed their 504 series of transceivers the "Fleetcoms." A number of models, each with several optional features, is available with power outputs of 7, 25, and 60 watts. The 7- and 25-watt models are all solid state while the 60-watt version uses an instant-heating tube in the final. The receiver section is essentially the same in all models.

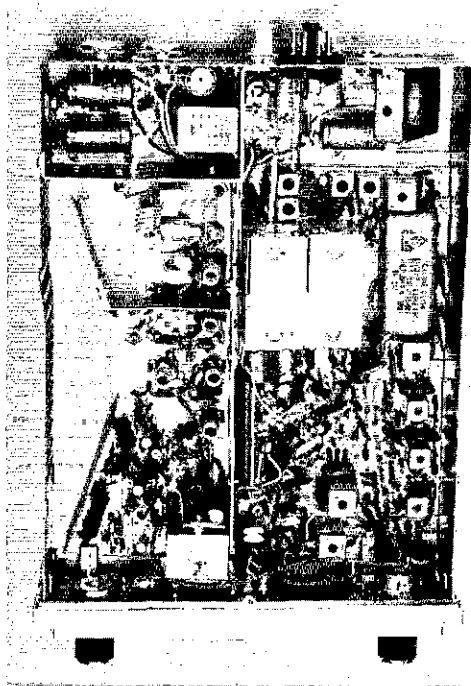
The 504 receiver can only be described as superb. Far better than the lower-priced com-



petitors, a 0.1- μ V signal will open the squelch gate while a 0.2- μ V signal will provide better than 20 dB of quieting. Limiting action is excellent; ignition noise is noticeable only on the weakest of signals when operating mobile. Image and spurious responses are better than 90 dB down and cross-modulation effects are similarly low. The front-end circuit that turns in such an impressive performance is shown in Fig. 1. A dual-gate, diode-protected MOSFET is employed as the rf amplifier, and a JFET functions as the first mixer. Coupling into the rf amplifier, and between it and the mixer, is accomplished with helical resonators.

The Helical Resonator

The unusual characteristics of the helical resonator haven't been covered in amateur literature, so a short explanation of this tuned circuit may be helpful to the reader. The manufacturers of two-way radio equipment have long searched for a circuit that would provide a high degree of rf selectivity while only taking up a small amount of chassis space. The helical resonator^{1,2} has proved to be an excellent choice. Basically, it is a high-impedance, low-*C* tuned circuit that consists of a coil and capacitor housed in a small cavity. The inductance value is made as



¹ McKee, "Receiver Intermodulation: Enforcing the Squax Law," *IEEE Transactions on Vehicular Technology*, November, 1970.

² Macalpine and Schildknecht, "Coaxial Resonators with Helical Inner Conductors," *Proceedings of the IRE*, December, 1959; Macalpine and Schildknecht, "Helical Resonator Design Chart," *Electronics*, August, 1960; *ITT Reference Data for Radio Engineers*, 5th edition, H. W. Sams and Co., 1968, Chapt. 22.

Inside view of the Johnson 504. The right-hand half contains the receiver section. To the left are the exciter (upper) and final-amplifier (middle) circuit boards. The input-voltage filter is contained in the compartment at the lower left. Every component can be reached easily, should maintenance ever be required.

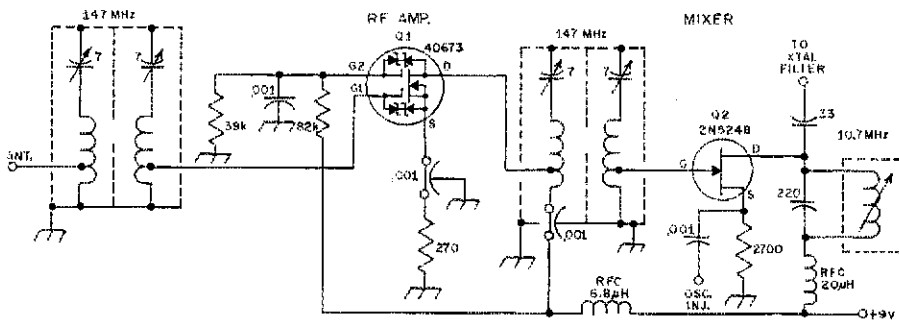


Fig. 1 — Schematic diagram of the Johnson 504 front-end circuit.

large as possible. The 504 resonators consist of 5 3/4 turns of No. 12 wire contained in a rectangular 1 x 1 x 2-inch cavity. Both the coil and enclosure are silver plated. The coil is 5/8 inch inside diameter and 5/8 inch long, tuned with a 7-pF miniature air-variable capacitor. The 50-ohm input tap is at 1/4 turn from the ground end of the coil, an indication of the high impedance achieved. Coupling between individual resonators is through a 1/2 x 1/4-inch aperture, or "window." Layout details can be seen in Fig. 2.

In addition to good rf selectivity, a "clean" injection voltage is needed for the first mixer if spurious responses are to be kept low. The injection oscillator in the 504 uses 45-MHz crystals. A low-level times-three multiplier, followed by a highly selective double-tuned circuit, produces the required injection frequency. A JFET mixer with source injection, such as shown in Fig. 1, requires some power from the injection chain if strong signals are to be handled without distortion. Thus, the multiplier stage is followed by an amplifier, the output of which is also passed through a double-tuned transformer.

A 10.7-MHz crystal filter with 13-kHz nominal bandwidth is located at the output of the first mixer. After passing through the filter, an incoming signal is heterodyned to 455 kHz for further amplification and limiting. The detector is a modified version of the Foster-Seeley circuit. The audio section provides a full 5 watts of power output, enough to overcome the ambient noise level of most mobile "shacks."

Transmitter Section

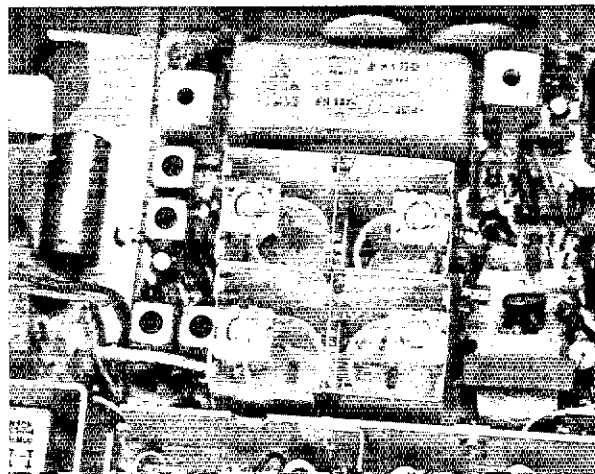
The transmitter tested was the 7-watt-output version. A varactor diode "swings" the frequency of a 24-MHz crystal-controlled oscillator to provide

5-kHz deviation of the output frequency. While the frequency stability of the receiver is rated at .001 percent for a temperature change from minus 30 degrees to plus 60 degrees Celsius, the transmitter is rated at .0005 percent over the same temperature range. The 504 was checked for operation at temperatures below 0 degrees Fahrenheit (where some of the low-priced solid-state transceivers malfunction or stop working altogether) and the only change in performance noted was that the power output went up by 0.5 watt. The receiver uses unheated crystals while the transmitter section employs a proportionally-controlled oven. A transistor controls the amount of voltage applied to the oven heater; see Fig. 3. The collector load for Q202 is the oven heating element. The current through Q202 is set by thermistor R11, which is attached to the oven wall. The resistance of the thermistor decreases as its temperature increases, decreasing the voltage at the base of Q202. After a short warm-up period, the oven temperature will be held constant.

One noteworthy feature of the transmitter is freedom from harmonic and spurious signals in the output, a requirement for FCC type acceptance, of course. Transistor final amplifiers almost invariably have "dirty" output signals, unless proper shielding and filtering measures are included. In the 504 a complex output filter network, Fig. 4, reduces all

3 Centigrade.

Fig. 2 — Close-up view of the helical resonators, with the covers removed. The rf amplifier stage is constructed on the outside wall of the upper-right-hand resonator. Details are given in the text.



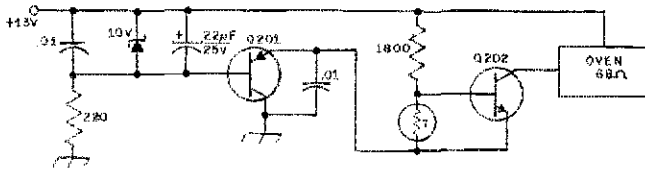


Fig. 3 - Oven circuit used in the 504.

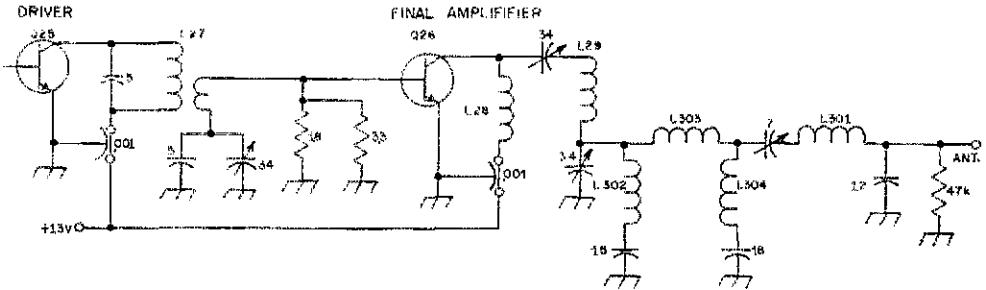


Fig. 4 - Diagram of the output filter network. L28 consists of 5 turns No. 22 wire, 3/16 inch long, 1/4 inch dia; L29, 5 turns No. 14 wire, 1/2 inch long, 3/16 inside dia; L301, 9 turns, No. 14, 3/4 inch long, 1/8 inch dia; L302, 3 turns No. 22 wire, 1/8 inch long, 1/8 inch dia; L303, 6 turns No. 22 wire, 3/4 inch long, 1/8 inch dia; L304, 1 1/2 turns No. 22, 1/8 inch long, 1/8 inch dia.

harmonic and spurious energy to a level 60 dB below the desired output signal.

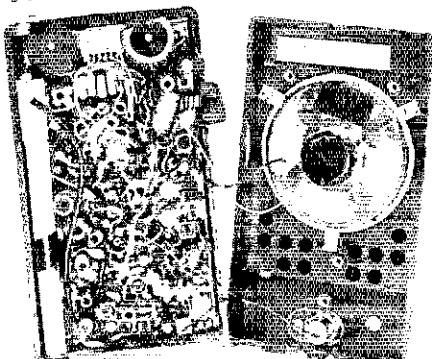
The 7-watt model was adequate for use within 25 miles of a repeater, but those living in the suburbs might find the 25-watt model useful, while the 60-watt version would be worth the added cost for those who live out in the "boonies." The 504 is supplied with one- or two-channel capability, which isn't enough in many areas. WIRYL and WIPYO have designed a modification to add 12 transmit and 12 receive channels to the 504, using two miniature channel-selector switches mounted on the front panel - an effective solution to the shortage of channels.

Only two minor points of criticism are worthy of mention. The SQUELCH GAIN control has a rather limited range. With any setting of the control, the sensitivity is always high, so it can be difficult in very noisy areas getting the squelch gate to engage. One cannot monitor just a local repeater, as even very weak signals on the frequency will open the audio channel. Also, the fixed-station power supply, while otherwise excellent, has insufficient baffling around the speaker.

Sound reproduction is "peaky." The excellent mobile speaker, a separate accessory, can be used in a fixed-station installation, eliminating the problem.

The 504

Repeaters have made the hand-held transceiver a practical device for amateur communications. Heretofore, any rig small enough to be held in one hand for any length of time lacked sufficient range (with a simple antenna) to be practical, except for mountaintop operation. While testing the 504, however, a number of contacts have been made over distances in excess of 100 miles through the K111G and K1ZJH repeaters. The ARRL Hq. staffers who have tried the unit have turned in some rather unusual reports. One noted that it was the only rig that he had ever used while riding the elevator of a high-rise apartment building, while another found it enjoyable to keep in touch with the local gang while languishing in the bathtub. (Good thing he didn't drop the rig, as Johnson doesn't rate it as waterproof!) Also, W1FXJ reported that the 504 worked well from inside a Greyhound bus on a trip from Hartford to Boston.



Upper section of the hand-held transceiver which contains the transmitter, receiver and voltage regulator. The thumb-wheel controls at the top of the unit are the VOLUME and SQUELCH. The slide switch between the two controls selects either of the two channels on which the unit will operate. Just below the switch are the four crystals used in the i-f filter.

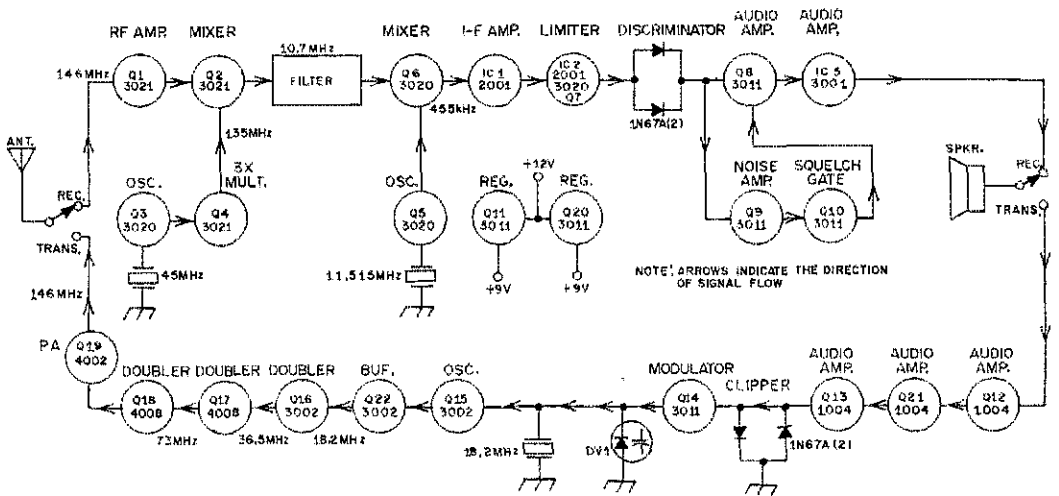


Fig. 5 - Block diagram of the Johnson 540.

The engineering feat needed to put a 25-stage rig into a package that will fit nicely into the palm of one's hand will be appreciated by those who have tried to build small portable gear. Yet, without a high-quality receiver, and a transmitter with a watt or more of output power, a hand-held unit will be only of novelty value. A block diagram of the 540 is shown in Fig. 5. A single-conversion receiver is employed, using a simple crystal filter with two half-lattice sections. A 0.5- μ V signal is needed to produce 20 dB of quieting. The squelch circuit used, shown in Fig. 6, is simple indeed. RC coupling components are chosen to pass only audio above 5 kHz, eliminating the need for a tuned noise-amplifier stage. The squelch is activated by applying collector voltage to Q9. The output of this stage is rectified and filtered, and the resulting dc voltage is fed to Q10, the squelch gate. When no signal is being received, Q10 is "on" which upsets

the biasing of the first audio amplifier, Q8, holding this stage "off." When an input signal quiets the receiver sufficiently, Q10 will turn "off," allowing Q8 to amplify the audio output from the discriminator.

The transmitter section is similar to the circuit of the 504, except that the output power is only 2 watts. The FCC requirements for hand-held units are considerably relaxed. Only an impedance-matching network is used at the output of the final amplifier, so it is not surprising that the 540 produced considerable TVI. The higher-power 504 caused no television interference, a good example of the value of an output filter.

The 540 includes a built-in rechargeable battery pack which is housed in the lower section of the unit. The supply may be disconnected and plugged into a 117-V ac outlet to recharge. An overnight charge will give up to 8 hours of use. A miniature

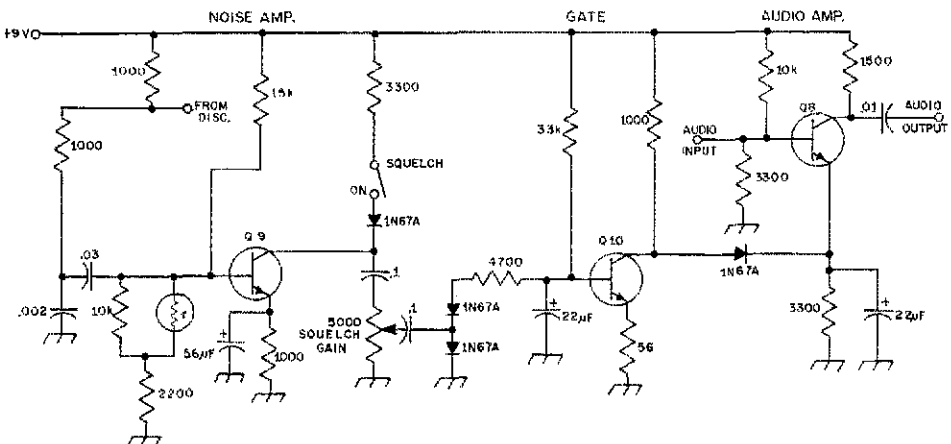


Fig. 6 - Squelch circuit used in the 540 hand-held portable.

Johnson 504 FM Transceiver

Height: 2 1/2 inches.
Width: 8 inches.
Depth: 11 1/2 inches.
Weight: 6 pounds.
Power Requirements: 13.5 V dc, 0.3 A receive, 1.8 A transmit.
Price Class: \$495.

Johnson 504 Base-Station Power Supply

Height: 2 1/2 inches.
Width: 7 1/2 inches.
Depth: 11 3/4 inches.
Weight: 8 pounds.
Power Requirements: 117 V ac, 50 to 60 Hz, 60 watts maximum.
Price Class: \$50.

Johnson 540 Hand-Held Transceiver

Height: 3 1/2 inches.
Width: 3 5/16 inches.
Depth: 1 13/16 inches.
Weight: 28 ounces.
Power Requirements: 12.6 V, .075 A receive, 0.45 A transmit (supplied by internal rechargeable battery).
Price Class: \$500.
Manufacturer: E. P. Johnson Company, Waseca, MN 56093.

meter monitors the condition of the battery. The evaluation of the 504 and 540 has given this writer the opinion that these rigs do indeed offer high performance; they should be considered by those who can afford an fm transceiver in the \$500 price class. — *WIKLK*

QST ————— QST ————— QST

The Henry Radio

Kenwood Pair

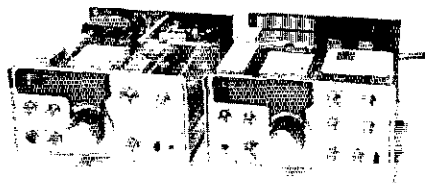
MANY IMPORTED amateur transmitters, receivers, and transceivers have recently made their way into the U.S. Among them are two new units, a transmitter and a receiver, being marketed by Henry Radio. This matched set, the R-599 and the T-599, offers unusual versatility along with features not often found in transmitter-receiver combinations. Either the transmitter or the receiver may be used independently. Since they may be operated as a compatible pair, however, they will be treated as a complete system in this review.

The Receiver

The R-599 is a completely solid-state amateur-band receiver covering 160 through 10 meters, plus WWV at 10 MHz, and it has space available within the cabinet to house both a 6-meter and a 2-meter converter. The band switch is a two-knob arrangement, one for 160 through 10 meters, and the other for selecting either of the vhf converters. The tuning range is 600 kHz, thereby allowing 10 meters to be covered in three segments instead of the four typically found on domestic units. Crystals are provided for full coverage of the hf amateur bands, plus WWV.

Sensitivity, Selectivity, and Stability

Sensitivity tests indicate the receiver is well within the manufacturer's specifications. The 10-meter band is least sensitive, requiring 0.1 μ V for a 10-dB signal-plus-noise-to-noise ratio. Since converters were not provided with the receiver, 2- and 6-meter operation was not checked. The if gain is controlled by a step attenuator which is mounted concentrically with the audio gain control. It is adjustable in four steps from 0 dB to



60 dB. Voltage measurements confirm that each time the switch is stepped one position, the signal level changes by 20 dB. The crystal calibrator is connected between the attenuator and the rf stage, allowing signals to be dropped by 20, 40, or 60 dB when looking for calibration markers.

Sensitivity is also controlled by an agc circuit having two recovery-time periods. Neither fast nor slow agc "pumps" on even the strongest of signals. When no signal appears at the front end, the gain is wide open. Dynamic range measurements indicate that the output at the speaker terminals increases only 3 dB for a change in signal strength from 0.7 μ V to 100,000 μ V. The agc cannot be turned off.

Included in the agc circuit is an S-meter. To show a meter reading of S-9, a 70- μ V signal is required on 160, 80, 40, and 20 meters. A 100- μ V signal is needed on 15 meters, and a 120- μ V input is necessary on all three 10-meter segments.

An interesting feature of the Kenwood receiver is the interaction between mode and selectivity. The bandwidth can be set at 25 kHz, 5 kHz, 2.5 kHz, 0.5 kHz, or AUTO. When the SELECTIVITY knob is set on AUTO, the bandwidth is determined by the position of the MODE selector. For example, either the LSB or the USB mode position provides a bandwidth of 2.5 kHz. When set for CW the selector decreases the bandpass to 0.5 kHz. The

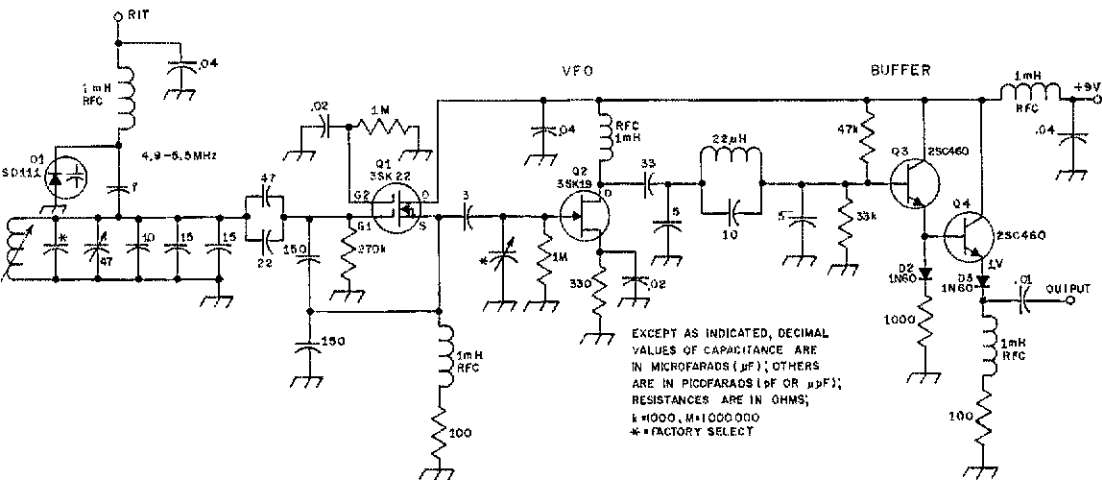


Fig 1 — Schematic diagram of the VFO subassembly.

A-M position opens it up to 5 kHz, and on FM, the response widens to 25 kHz. However, at the operator's option, the selectivity can be switched out of AUTO to some other desired bandwidth. Another position of the MODE switch, labeled AMN, activates a diode noise limiter circuit for use on a-m.

The VFO SELECT switch is part of a dual unit mounted in conjunction with the SELECTIVITY switch. At the flip of the paddle which is attached to the skirt of this knob, several combinations of frequency control are available, provided the T-599 transmitter is also being used. The operator can choose transceive operation controlled by the receiver or transmitter or independent operation. A fourth position, marked REV, is unique. It allows the transmitter to be controlled by the receiver and the receiver to be controlled by the transmitter.

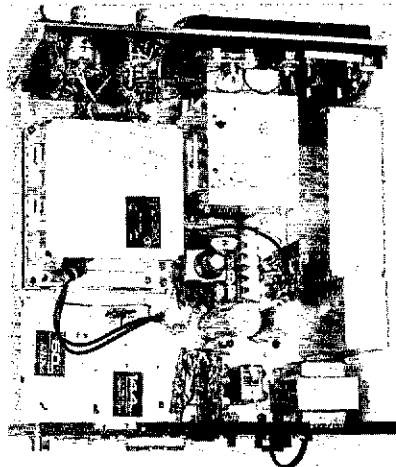
The schematic diagram of the VFO subassembly is shown in Fig. 1. A dual-gate MOSFET, Q1, is employed in a Colpitts circuit. A varactor diode, D1, changes the frequency of the VFO a total of 7 kHz, providing receiver incremental tuning (RIT) when the transceive mode is selected. The oscillator stage is lightly coupled to a JFET first buffer, Q2. The high impedance and low gate-to-drain capacitance of Q2 insures good isolation between the oscillator and the succeeding stages. A harmonic filter between Q2 and Q3 reduces the level of any spurious response above 6 MHz. Q3 and Q4 provide additional buffering action and a low output impedance.

The stability of the VFO is extremely good. Frequency drift from a cold start, for a 15-minute

period, measured less than 10 Hz. The manufacturer does not specify the calibration accuracy of the dial mechanism. Our tests showed the readout accuracy to be within 750 Hz when calibrated at the center of any 100-kHz segment, within 250 Hz for any 25 kHz section, and no more than 2 kHz off at either end of the range when set at the center of the dial. Mechanically, the dial has a very smooth feel. A heavy cast-aluminum tuning knob provides a fly-wheel effect. One sharp "flip" of the knob spins the dial from one end of the band to the other. Main dial calibration divisions occur every 25 kHz, while the skirt of the tuning knob has markings every 1/2 kHz.

Other Features

An "extra" incorporated in the receiver is provision for crystal control. Five crystal holders and a selector switch are conveniently located under the top lid. At first glance this feature doesn't seem necessary because of the stable VFO already in the box. But, let's examine the



The receiver crystal board is located in the center of the chassis. Up to five crystal-controlled frequencies can be selected by the switch. Space is available at the lower left to install vhf converters.

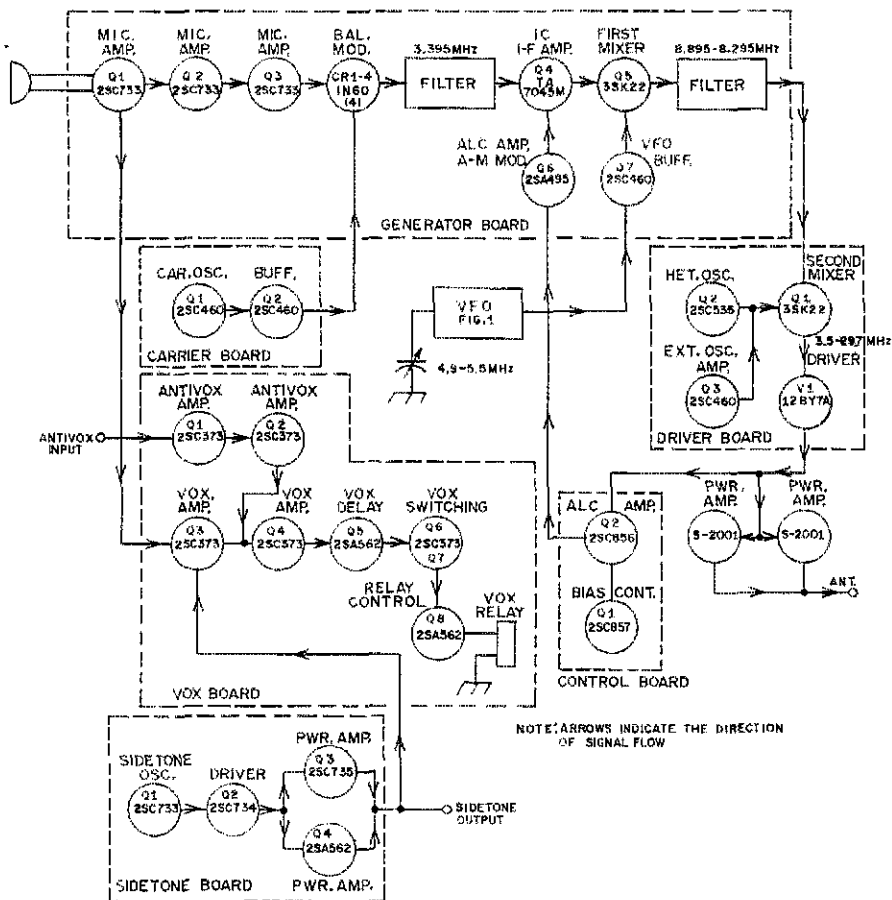


Fig. 2 - Block diagram of the T-599 transmitter.

possibilities. For the amateur interested in fixed-frequency operation, such as net operation, crystal control can be used on receive, or for transceiving with the receiver. But, with the availability of the REV position on the VFO SELECT, the transmitter can be made crystal controlled, and the receiver tuning can be done with the transmitter tuning dial. This arrangement is ideal for Novice operation.

The Kenwood is reasonably free from images and spurious responses. Two "birdies" showed up in the receiver tested. A spurious response appears at 3737 kHz, but cannot be heard when an antenna is connected. On the 160-meter band, a cross-over response occurs. A 50- μ V or more signal at 2.0 MHz, for example, can pass through the rf and mixer stages and beat with the LMO frequency when the receiver is tuned to 1.9 MHz. The difference frequency appears at the second i-f and is heard at a level 47 dB below the input. This is the only response that does not meet the -50 dB rating. One of the most useful features included in the R-599 is receiver incremental tuning (RIT). While operating transceive with the receiver VFO, RIT allows the operator to vary the received

frequency 3.5 kHz either side of the transmitted signal. The RIT does not function during crystal-control operation nor while transceiving with the transmitter VFO.

An adjustable-threshold squelch control is included for the vhf fm enthusiast. However, it works well with ssb, a-m, and cw as well, providing the signal-to-QRM ratio is high.

The crystal calibrator generates strong markers up to the high end of ten meters at both the 100-kHz and 25-kHz points. The 25-kHz divider circuitry loads the 100-kHz oscillator and there is a detectable shift in calibrator frequency when changing from one marker frequency to the other. This shift measures 40 Hz on 3.5 MHz and 320 Hz on 29.1 MHz.

Operation

The one missing item, considered essential, is an rf-gain control. A quick inspection of the circuit reveals a gain control *does* exist. It is factory adjusted, however, and is mounted on one of the circuit boards. The value is 100,000 ohms. Interestingly enough, the squelch control is of the same value. It is mounted within three inches of

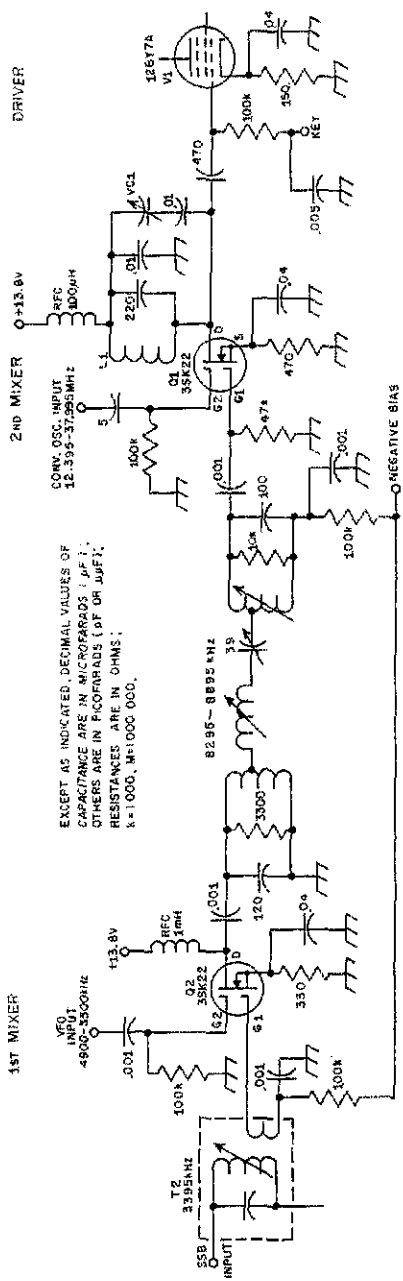


Fig. 3 — Simplified circuit diagram of the mixer stage used in the T-599.

Spectral analysis of the transmitter output under two-tone test conditions. The third-order distortion products are down 33 dB below the two-tone output. (The Panoramic scale is calibrated in dB below a single tone. To convert this scale for a two-tone test, subtract 6 dB from figures indicated at the left side of the scale.)

the rf gain control! If the owner does not intend to use the squelch, the two wires attached to it can be clipped, tacked together, then three short wires can be connected between the front-panel control and the adjacent rf circuit board. Since the modification appeared to be quite simple, it was tried. It worked! Of course an external control could be used to permit the squelch to be retained.

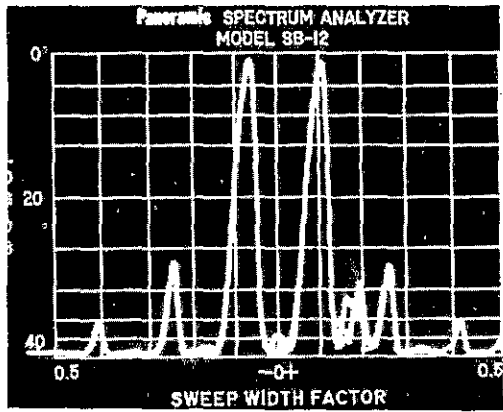
The Transmitter

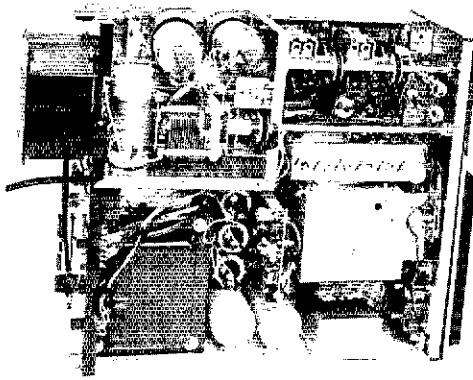
Kenwood's matching unit, the T-599, is a very compact transmitter. It contains almost every feature one could ask for. It even comes complete with built-in power supply and a full set of crystals. The transmitter operates at 200 watts input on ssb and cw from 3.5 MHz to 21 MHz, 160 watts on 28 MHz, and 80 watts input on a-m over the entire frequency range. At the rated power input, this transmitter produces in excess of 100 watts output (cw) on 80, 40, and 20 meters, and 90 watts on 15 and 10 meters.

The block diagram is shown in Fig. 2. The T-599 frequency-conversion scheme is identical to that of the receiver. When the two units are used together, the VFO is routed to the receiver for switching purposes, and the receiver HFO is cabled to the transmitter for transceiving. If the transmitter is used with some other model of receiver, the TRCV/SEP switch on the rear panel of the T-599 should be placed in SEP, which activates an internal HFO.

The mechanical and electrical stability of the VFO is excellent. Although not quite as good as found with the receiver, transmitter stability is well within the limits normally expected. Drift is less than 50 Hz during any 15-minute period. There is a noticeable shift between the CAL frequency and the actual transmitted cw frequency. This shift measures only 50 Hz, detectable only to a sharp ear. When operating ssb, there is no apparent change in transmitted frequency after zero heating a station.

The front-panel appearance of the T-599 reflects a scarcity of controls. Don't be fooled, however; this unit is packed with operating conveniences. For example, the cw sidetone from the transmitter is injected into the receiver's audio





The top view of the T-599 with the amplifier cover removed. The box protruding from the rear of the cabinet contains a small fan. The six internally-mounted controls are located at the center on the right side. The built-in power supply is at the lower left.

system ahead of the gain control, allowing easy adjustment of sidetone volume to be made. It appears at the speaker terminals or the headphone jack, depending on which is in use. The sidetone is also applied to the VOX circuitry, which provides semibreak-in cw operation. Truncation of the first element of any Morse-code character, caused by the time required for activation of the VOX relay, is undetectable.

The transmitter, Fig. 2, contains 4 FETs, 1 IC, 29 transistors, 36 diodes, and 3 vacuum tubes.

Henry Radio Kenwood Receiver

Height: 5 1/2 inches.

Width: 10 1/8 inches.

Depth: 12 1/4 inches.

Weight: 13 pounds.

Power Requirements: 100/117/220/240 V ac, 50/60 Hz, or 12-15 V dc, 15 watts.

Price Class: \$300.

Importer: Henry Radio, 11240 W. Olympic Blvd., Los Angeles, CA 90064.

Henry Radio Kenwood Transmitter

Height: 5 1/2 inches.

Width: 10 5/8 inches.

Depth: 12 3/4 inches.

Weight: 26 1/2 pounds.

Power Requirements: 100/117/220/240 V ac, 50/60 Hz, 350 watts max.

Price Class: \$350.

Importer: Henry Radio, 11240 W. Olympic Blvd., Los Angeles, CA 90064.

Solid-state devices are used in the sideband generator, oscillator stages, and the heterodyne mixers. A simplified diagram of the mixer section is shown in Fig. 3. The first mixer, a dual-gate MOSFET, combines the output of the sideband generator and the VFO, producing a signal between 8.295 and 8.895 MHz. A multipole LC handpass filter couples the signal to the input of the second mixer, also a dual-gate MOSFET. (The Japanese 3SK22 is similar to an RCA 3N140.) Gate 2 of the second mixer receives injection voltage from the crystal-controlled conversion oscillator. Crystal frequencies between 12.395 and 37.495 MHz are employed. Sufficient output is obtained from Q1 to drive the following 12BY7A stage directly. A 12BY7A is used to drive a pair of 6S2001 tubes in the final amplifier. The 6S2001 is identical in appearance to the popular 6146B. Curiosity prompted a substitution test. The 6146Bs operate the same as the imported tubes. The amplifier compartment is completely shielded and has an air-flow system a bit different than found on domestically manufactured gear. A fan protrudes from the rear of the cabinet and moves air past the tubes without generating significant noise. The exterior of the cabinet gets warm, but never hot, during operation. Although the manufacturer's instruction booklet warns about operating the transmitter with the key down for periods longer than 10 seconds, some of our tests required the key-down time to exceed this figure. Nothing became hot, not even the power transformer.

Distortion measurements showed the signal to be quite clean. At 80 watts PEP output, third-order products are down 33 dB and the second harmonic is down 47 dB. The final amplifier compartment is well shielded for TVI reduction.

Some other features in the Kenwood are a filtered ac line input, external outlet plug for the receiver ac cord, dual-primary, 110/220-volt power supply, push-to-talk, low- (600 ohm) or high- (50K-ohm) impedance microphone input switch, grid-block keying, and antivoX. Other features are a linear-amplifier control, ALC input, and a transverter on-off switch. When placed in the ON position, the transverter switch disables the final amplifier and routes the output of the driver stage to a pin jack on the rear panel.

Some Additional Comments

One of the most striking features of the pair is the brushed-aluminum panel. The aluminum knobs, and the multicolor red, blue, and black dial arrangement mounted behind a clear glass window add to the expensive look.

For those amateurs who move their stations from place to place, this setup is ideal. The receiver and transmitter are interconnected by one cable, plus an antenna connector. No jumble of wires behind this station! The cable, a microphone connector, plastic feet extenders, and an alignment tool all come as part of the package. The only optional items the amateur might want to consider are the matching speaker and the 6- and 2-meter converters, all of which are available from Henry Radio. — WIFBY



Results, 1971 ARRL VHF Sweepstakes

K2OWR

WB2WIK

REPORTED BY AL NOONE, *WA1KQM

TAKE 963 entries (up 10% from 1970), and add average January vhf/uhf conditions. The result adds up to a successful 24th VHF Sweepstakes (January 9-10, 1971).

As usual, conditions were nothing to brag about. Judging from the many reports received, W1s and W3s did experience brief E_g to Eastern Florida, W2s had good to excellent tropo, W5/6/7/8s managed fair to good scatter contacts while W9/0s netted their share of OSOs via groundwave.

Activity, as is evidenced by some of the outstanding scores to follow, certainly was plentiful. K3IPM, the high-scoring single-operator entry, managed 756 contacts in 24 sections for a score of 51,374. Not far behind ran W3MFY with 752 contacts, 17 sections, final score of 40,608. In a close race for third, WA3CAG comes out on top with 34,128 just beating W3KKN, at 33,240. Rounding out the Top Five is W3ZD with 32,100. Canadian high score, with 2112 points, goes to VE2DFO.

Multi-operator entries had a battle of their own with slightly over 5000 points separating 1st and 5th place! Here's how it went: W1JJO, 22,248 points, 412 contacts, 17 sections; W2PAU, 21,840-462-14; K3MTK, 19,116-354-17; WB2LZD/3, 18,112-285-22 and K8BBN, 17,064-237-26.

Competition on the section level was keen, close races for 1st place being recorded in West New York, Indiana, Ohio, East New York, Northern New Jersey and Connecticut.

Out west, where contacts are harder to come by, W0PPP took Iowa over WA0UPS, WA0SLM squeaked by W0AJY to lead Colorado, WA6GYD outclassed the competition in the Santa Clara Valley, K6SSN led the highly-competitive Los Angeles section and finally, K6YNB/6 took the Orange section by a wide margin.

A word of thanks for the many comments and suggestions received with your entries. These will be sent to the ARRL Contest Advisory Committee for their consideration in future contest planning. If you as an individual, or your

club as a whole, has any strong feelings on improving vhf/uhf contests, be sure to write your nearest CAC member today. They are: W1AX, K2KIR, W3GRP (chairman), W3WJD, W4UQ, W6DQX, KH6IJ, W0HP, and VE2NV.

CLUBS

When will it end? Probably never! For the 11th year in a row the MT. AIRY VHF RADIO CLUB takes undisputed possession of 1st place. In the continuing fight for 2nd, SOUTH JERSEY RADIO ASSOCIATION is back by a wide margin over ROCHESTER VHF GROUP, who takes third. The only other scores over 100K were submitted by HAMPDEN COUNTY RADIO ASSOCIATION in fourth place over the MOBILE SIXERS RADIO CLUB who had to settle for fifth.

AFFILIATED CLUB SCORES

Club-Score-Entries-Winner

Mt. Airy VHF RC (PA)	704,654	78	K3IPM
So. Jersey R Assoc.	397,810	53	W3MFY
Rochester VHF Group (NY)	315,216	142	W2UTH
Hampden Co. R Assoc. (MA)	123,898	53	K1ANE
Mobile Sixers RC (PA)	103,527	27	K3FYK*
Albany ARA (NY)	91,006	69	W2CRS
Talcoff Mt. UHF Soc. (CT)	83,230	23	WALLOX
Suburban ARC (PA)	59,330	8	WA3NVO
1200 Radio Club (MA)	52,567	17	K1MUC
So. Calif. VHF RC	52,320	20	K6YNB/6
Rock Creek ARA (MD)	49,057	28	W3KMV
Whitman ARC (MA)	45,194	30	WA1AGR
Six Meter Club of Chicago	36,794	21	WA9IH
York Radio Club (IL)	30,412	20	WA90PM
Greater Pittsburgh VHF Soc.	20,976	14	W3BWT
Norwood ARC (MA)	18,116	7	W1EXC
Warminster ARC (PA)	17,811	10	WA3JGX
West Park Radiops (OH)	17,642	9	WB8FII
Mid-Hudson VHF Soc. (NY)	14,198	4	K2BGU
Dayton ARA (OH)	13,926	9	W8ZOF
Gloverster Co. ARC (NJ)	9236	3	W2LVW
Queen City Emergency Net (OH)	8668	3	W8RTX
Dutchess Co. VHF Soc. (NY)	8136	4	W2HXZ
Scoto Valley ARC (OH)	7318	7	K8SUB
Lake Success RC (NY)	5970	3	W2YUK
Kanooas Valley ARA (ND)	5236	3	W8PZL
Anselam RA (MD)	5134	5	WA3NUJ
Vienna Wireless Soc. (VA)	4466	5	K4YCI
Parma RC (OH)	4432	5	K8NQW
Tu-Boro Radio Club (NY)	4346	6	K2HGR
Hampsters RC (IL)	3818	3	WA9FXH
Mid Island RC (NY)	3414	3	W2SEU
Delaware Valley RA (NJ)	2654	3	WB2LGF
Central Michigan ARC	2370	7	W8BDSV
Argonne ARC (IL)	2436	4	WA9KOD
Central Illinois ARC	594	3	K9ORP

*Tied with WA3NCW
 †Tied with WB2PWI

* Asst. Communications Mgr., ARRL.

1972 VHF SS

Jan. 8-9

SOAPBOX

Not much cw activity on 2 meters, I was disappointed. - K9UNM,IN. I enjoyed the January contest, but didn't have any help from skip conditions. - WA4WZQ,NC. Most consistently heard DX signals were K5WVX and W4GDS (scatter) and K9HMB (tropo). - K8BBN,OH. Believe hours worked should be included in QST listing—makes scores more interesting for low band contests, so why not VHF? - WA2BCT,MA. I worked Maine and Maryland for the first time. - WA2FUI,NJ. Tropo conditions during the contest were poor to average most of the time, with good to excellent on Saturday evening at about midnight local time. Meteor scatter was nonexistent here on 144 MHz, but we did work four or five scatter stations via ssb on 50 MHz. - WB2WIK,NJ. Plaudits to W2BV who had by far the loudest and best signal on 144 MHz. - W3HB,MD. No real DX heard here at all. - WB2HXZ,NY. I was extremely impressed by the high level of courtesy and good sportsmanship demonstrated by all stations heard. There was a great deal of competition between stations, yet those competing were bending over backwards not to ORM one another. A fine example of the first article of the Amateur's Code in action and a credit to all concerned. - WA6UAM,CA. Many operators participated and several contacts were made. - WA4VMF,GA. Thanks for another good contest, both of us had a real ball! - WA1MAG,VT. Contests are what make VHF, how about one or two more per year? - WB41,DO,NC. Activity, to my surprise and delight, was much heavier than anticipated. Possibly something could be done to encourage activity on the bands above 144 MHz. - WB2HEO,NJ. The only scatter was W0PFP at 1340 GMT on Sunday. A North Carolina station was heard but not worked. - WA3HUR,PA.

DIVISION LEADERS

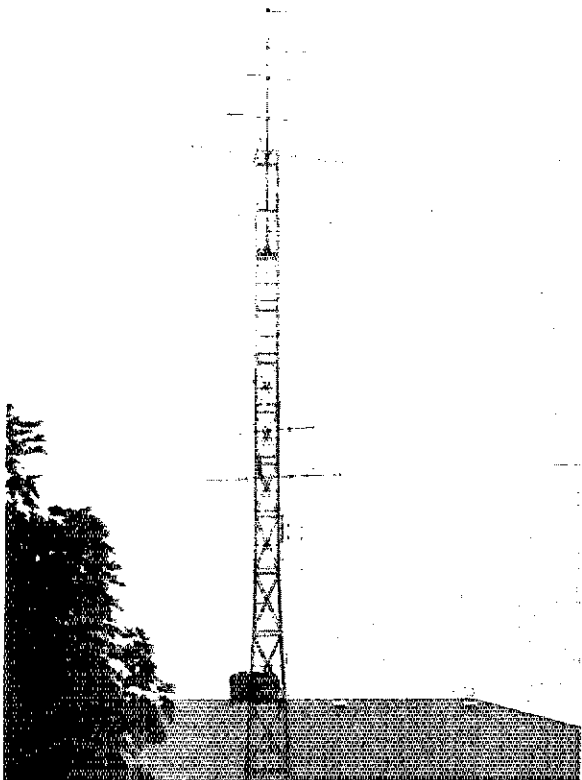
Single Op.		Multiop.
K3IPM	Atlantic	W2PATI
K9HMB	Central	K9YHB
WA0WZY	Dakota
WB4RHB	Delta
WB8BGY	Great Lakes	K8BBN
WB2SIH	Hudson	WB2YZV
W0PFP	Midwest	WA0ZWF
KIPXE	New England	W1JJO
K7WXW/7	Northwestern	K7BBO
WA6GYD	Pacific	W6PIY/6
K4LHB	Roanoke	WA4WZQ
WA0SLM	Rocky Mt.
W4GDS	Southeastern	WA4NJP/4
K6YNB/6	Southwestern	K6HXW/6
K5WVX	West Gulf	WA5HNK
VE2DEO	Canadian	VE3ASO

This was my first sweepstakes and I enjoyed it. - WB9EDP,IL. I wish the stations would be on the air at other times too, not only on contests. Almost every evening is CQ time with beams to the south from Montreal between 2000 and 2100 GMT. Stations to look for are VE2FF, VE2BHH and VE2AEB between 144.0 and 144.2 MHz. - VE2BHH. Good contest as far as it went. Too bad there wasn't a little skip to make it interesting. Good meteor scatter here in northern California. Worked K7OST in Seattle, WA7GCS in Oregon and VE7AEZ heard my CQ and called me but faded. - WB6JON,CA. The conditions into this area were very erratic, there was a lot of "shot effect", or scatter but not holding long enough to make the contact. - WA0ZWF,IA. I would like to see a scoring adjustment made so it would be more of a country-wide contest. - K8YYK,OH. Contest pretty slow here, good groundwave, some solid skip at times lasting for 10 minutes and very sporadic weak scatter from W1/2/3s. - K4BPY,AL. Activity was good but could still be a lot better. Conditions were fairly good for January. Lack of good 2 meter equipment held my score down but I hope to remedy this by June. - W3KMV,MD. Some consideration to a power multiplier should be made. In a ground-wave contest such as this was, without power and a good antenna system, it's impossible to win. I would be interested in the power levels used by the winners in the various sections. - WB8HXR,OH. Conditions were good for random scatter and ground wave, but no openings observed. K4PKV,SC. Really enjoyed the SS this year. Six meters was bedlam most of the time, including the "instant sporadic-E" to the East Florida section. - WB2LAI/1, RI.

SCORES

In the tabulation to follow, scores are listed by ARRL division and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. An asterisk denotes a Hq. staff member, ineligible for an award. Columns indicate final score, number of contacts, number of different sections worked, and bands used. A represents 50 MHz, B 144 MHz, C 220 MHz, D 420 MHz, E 1296 MHz and above. Multioperator stations are shown at the end of each section tabulation.

K9ZNK, sporting an impressive home-brew aluminum tower and stacked J-beams on 144 MHz, puts out a good signal from Indiana.



ATLANTIC DIVISION

Delaware

W3CGV 4284-102-11-ABC11
K3RHU 2412-67-8-AB

Eastern Pennsylvania

EJ3PM 51-374-756-24-ABC0
W3MVF 40-608-752-17-ABC0
W3KKN 33-740-854-20-ABC

W3AJJ 11-072-266-11-ABC
K3KFS 11-090-271-0-ABC11
K3SFFJ3 11-000-275-0-ABC11

W3JLX 9652-284-9-ABC
K3JEL 9252-257-8-AB
W3AII 9198-220-11-AB

W3JMM 5950-176-7-A
W3JPB 5936-212-4-ABC
W3JQD 5700-190-8-ABC
W3P81A 5516-097-4-AB

W3JYU 5460-195-4-AB
W3ABRQ 5388-191-4-AB
K3MNM 5236-187-4-AB

W3KSK 720-40-3-A
W3NDP 672-28-2-A
W3ANXL 624-26-2-A
W3AUVJ3 552-23-2-A

W3KJZ 384-16-2-A
K3J7L 288-12-2-A
K3ZAC 264-12-1-A
W3AHLI 240-10-2-A

W3KJL 18-311-236-17-AB
W3LWZ 8100-150-17-AB
W3LUL 726-14-16-B

W3LVC 1830-61-5-B
W3AFR 1620-54-5-B
W3SQA 1456-56-3-AB
K3JFHT 837-44-4-B

K3JMK 154-8-4-B
W3AFA 32-1-1-B
W3ANZI (K3JXQ) 11,596-223-16-AB
W3AMD (4 ops.) 11,440-220-16-AB

Southern New Jersey

W3WAG 44-128-642-17-ABC
W2BVV 26,474-627-21-AB
W3LFI 25,110-465-17-AB0D

W3FKB 4800-160-5-AB
W3ZNP 4740-158-5-AB
W3ZCF 4284-119-8-AB
W3AHDV 4148-122-7-AB

W3ZLJ 1080-36-5-B
W3ZPW 1080-36-5-B
W3ZQV 1080-36-5-B
W3ZRW 1080-36-5-B

W3ZTJ 1080-36-5-B
W3ZUJ 1080-36-5-B
W3ZVJ 1080-36-5-B
W3ZWJ 1080-36-5-B

W3ZXX 1080-36-5-B
W3ZYY 1080-36-5-B
W3ZZZ 1080-36-5-B
W3Z00 1080-36-5-B

W3Z01 1080-36-5-B
W3Z02 1080-36-5-B
W3Z03 1080-36-5-B
W3Z04 1080-36-5-B

W3Z05 1080-36-5-B
W3Z06 1080-36-5-B
W3Z07 1080-36-5-B
W3Z08 1080-36-5-B

W3Z09 1080-36-5-B
W3Z10 1080-36-5-B
W3Z11 1080-36-5-B
W3Z12 1080-36-5-B

W3ZMR 1680-36-2-AB
W3Z00 1672-36-4-AB
W3Z01 1672-36-4-AB
W3Z02 1672-36-4-AB

W3Z03 1672-36-4-AB
W3Z04 1672-36-4-AB
W3Z05 1672-36-4-AB
W3Z06 1672-36-4-AB

W3Z07 1672-36-4-AB
W3Z08 1672-36-4-AB
W3Z09 1672-36-4-AB
W3Z10 1672-36-4-AB

W3Z11 1672-36-4-AB
W3Z12 1672-36-4-AB
W3Z13 1672-36-4-AB
W3Z14 1672-36-4-AB

W3Z15 1672-36-4-AB
W3Z16 1672-36-4-AB
W3Z17 1672-36-4-AB
W3Z18 1672-36-4-AB

W3Z19 1672-36-4-AB
W3Z20 1672-36-4-AB
W3Z21 1672-36-4-AB
W3Z22 1672-36-4-AB

W3Z23 1672-36-4-AB
W3Z24 1672-36-4-AB
W3Z25 1672-36-4-AB
W3Z26 1672-36-4-AB

W1DC (3 oprs.)	1800-69-5	A
WA1EEC (+WA1EET)	1050-35-5	AB
<i>Maine</i>		
W1YTW	4872-102-14	ABC
W1ZKL	364-13-4	B
<i>New Hampshire</i>		
W1JSM	3172-61-26	B
W1BXM	2720-68-10	B
W1VXY	1734-51-7	AB
WA1FSZ	1152-32-8	ABD
W1UDB	312-13-2	A
WB2BMV/1	240-10-2	A
W11JO (6 oprs.)	22,248-412-17	ABC
WA1JSD (+WA1CFT)	1530-51-5	A
<i>Rhode Island</i>		
W1ANSI	9048-174-16	A
WB2LA/L/1	5377-143-9	AB
W1CPC	2550-85-5	AB
W1FFO	600-20-5	AB
WA1HEX	120-5-2	B
K1ZGH/1	48-2-2	A
<i>Vermont</i>		
K1GYT	2184-52-11	AB
K1LJG	1040-26-10	AB
WA1MAG/1 (+WA1JEX)	4750-125-9	AB
<i>Western Massachusetts</i>		
K1ANG	15,984-297-17	AB
K1ZGB	9890-215-13	AB
K1BNS	8142-177-13	AB
W1YK (WA2BCT, opr.)	7475-163-13	A
W1KZS	6760-130-16	A
WA1FCR	5082-121-11	AB
W1RNY	4334-15-9	AB
K1RFB	4200-100-11	AB
WA11UJ	4148-122-7	AB
W1KK	4074-97-11	AB
K1BZM	3740-94-10	B
W1UPH	3600-90-10	B
W1ALL	3582-111-6	AB
W1MDM	3276-78-11	AB
K1PYX	2898-68-11	A
W1IUB	2592-72-8	B
W1CJG	1920-61-6	AB
W1AICYK	1898-73-3	B
K1OCC	1802-53-7	B
WA1HPX	1800-75-2	AB
W1RUC	1534-59-3	AB
K1VNF	1482-57-3	B
K1LDT	1456-52-4	R
WB2PNB/1	1440-45-6	A
W1FAB	1378-53-3	B
W1WLF	1300-50-3	B
K1BUB	1196-46-3	AB
W1STR	1144-44-3	AB
K1HBA	1118-45-3	AB
K1EPI	1036-37-4	A
WA1GGK	1008-42-2	B
WA1LWC	990-33-5	A
W1UCB	936-36-3	AB
K1NJC/1	816-34-2	B
W1OHG	806-31-3	B
K1BZM/1	784-28-4	B
W1FZS	754-29-3	A
K1WXU	728-28-3	B
W1IUB/1	696-29-2	B
W1ALP/1	672-28-2	B
W1GOP	648-27-2	B
K1CEG	576-24-2	B
WA1GVV	578-22-2	B
WA1GZO	528-22-2	AB
K1NJC	420-15-4	AB
WA1MUH	408-17-2	B
WA1DNB	360-15-2	B
WA1HNN	270-9-5	A
K1ESN	242-11-1	B
W1QWJ	144-6-2	B
W1UPH/1	132-6-1	B
K1SJR	72-2	A
WA1BTU/1 (WA1JHNN LFR)	11,009-250-12	AB
W1UWX/1 (+W1EZD)	8090-184-12	AB
WA1KRJ (+K1KEC)	4080-102-10	AB
WA1KMP (+WA1FES)	2983-79-9	B
WA1LPT/1 (+WA1MUH)	528-22-2	B
WA1MUH/1 (+WA1LPT)	408-17-2	B

PACIFIC DIVISION

<i>East Bay</i>		
WA6JUD/6 (+W6YKM)	3276-182-8	AB
<i>Nevada</i>		
WB6RIV/7	532-19-4	A
<i>Sacramento Valley</i>		
WB6NKO	1770-59-5	AB
WB6NKM	675-24-5	B
W6LPL	336-14-2	B
<i>San Joaquin Valley</i>		
K6JKQ	782-23-7	AB
<i>Santa Clara Valley</i>		
WA6GYD	2850-95-5	ABC
WA6UAM	2296-82-4	B
WB6JON	1740-58-5	AB
K6DTR	1162-37-5	AB
W6RME	1020-34-5	BC
WB6LLD	926-38-3	B
W6BGI	572-22-3	B
K6GSS/6	420-15-4	AD
W6PIY/6 (5 oprs.)	3660-122-5	AB

WA6JSN	1170-39-5	A
WA6ZMP	876-31-3	A
WB6MWT	784-28-4	A
WA6OSD	672-24-4	A
K6HXW/6 (3 oprs.)	3400-100-7	ABC
W6VPZ (7 oprs.)	780-33-2	AB
<i>Orange</i>		
K6YNB/6	8464-265-6	AB
WA6AOX	6208-194-6	AB
WA6OZC	5440-170-6	AB
WB6RAL/6	3750-125-5	AB
WA6OLE	3720-124-5	AB
WB6ASR/6	2688-96-4	AB
WA6HFH/6	2340-90-3	AB
K6BYB	1024-32-6	AB
W6MHB (WB6QVY, opr.)	408-17-2	AB
<i>San Diego</i>		
W6QED	3162-93-7	AB

WA5ZUC	576-24-2	AB
W5RKC	264-11-2	A
<i>Oklahoma</i>		
K5WVX	3120-61-16	A
K5CBA	576-24-2	AB
W5FMX	242-11-1	A
<i>Southern Texas</i>		
WA5HNK (3 oprs.)	1300-35-10	AB
CANADIAN DIVISION		
<i>Quebec</i>		
VE2DFO	2112-44-14	B
VE2BHH	480-16-5	B
<i>Ontario</i>		
VE3DSS	1536-48-6	B
VE3FMS	1536-48-6	B
VE3WL	532-19-4	A
VE3ASO (+VE2BZD)	7800-150-16	ABD
<i>British Columbia</i>		
VE7ANP	264-11-2	A

ROANOKE DIVISION

<i>North Carolina</i>		
WB4LDO/4	2730-65-11	AB
WB4KIB	1710-57-5	AB
WB4CES	1386-50-4	AB
WA4WJP	540-18-5	B
WB4BXW	528-22-2	A
WB4LDP/4	504-18-4	AB
WAOTE	324-14-2	B
WA4DUR	288-12-2	B
K4DTO	154-7-1	B
WA4WZQ (+WA4WZP)	2720-85-6	AB
W4GG (7 oprs.)	600-25-2	AB
<i>South Carolina</i>		
K4PKV	1216-38-6	A
W4VHH	494-13-9	BD
WB4KOY	110-5-1	AB
<i>Virginia</i>		
K4LHH	8400-168-15	AB
K2UOP/4	6768-141-14	AB
K4SUM	6422-169-9	BCD
K4YCH	1666-49-7	A
K4PCL/4	1640-41-10	A
WB4BJ	1584-66-2	B
WB4QAX	1260-42-5	A
WA4AU	868-31-4	A
WB4EAB	480-29-2	A
WA4HQW	360-15-2	AB
WA4HIM	312-13-2	A
<i>West Virginia</i>		
WB8FOY	5520-120-13	AB
W8AEC	3504-73-14	AB
K8SDG	308-27-6	A
WA8YCD	240-10-2	B
WA8ESL/8 (6 oprs.)	2550-75-7	B

ROCKY MOUNTAIN DIVISION		
<i>Colorado</i>		
WA0SLM	990-45-1	AB
W0AJY	968-44-1	AB
K0GHC	858-33-3	AB
WB0ABS	550-25-1	AB
W0KJY	418-19-1	AB
W3GHZ/Ø	374-17-1	B

SOUTHEASTERN DIVISION		
<i>Alabama</i>		
K4BPV	1512-42-8	A
WB4FOW	520-22-3	A
W4GHV/4	234-9-3	B
<i>Eastern Florida</i>		
W4GDS	7888-116-24	A
K4BNC	5488-98-18	AB
W4OJU	4950-99-15	AB
<i>Georgia</i>		
W4ISS	312-12-3	BD
WB4DIX	308-11-4	A
WA4VMT	240-10-2	B
WA4NJP/4 (10 oprs.)	4360-109-10	AB

SOUTHWESTERN DIVISION		
<i>Los Angeles</i>		
K6SSN	5248-164-6	ABC
WB6FSE	3000-100-5	AE
K6BPH/6 (K6OPH, opr.)	2580-86-5	AB
WA6HOF	2256-94-2	A
WB6YVP/6	2080-80-3	AB
WA6KIK	2010-67-5	A
WB6IMV	1984-62-8	ABE
WA6ARC	1428-51-4	AB

NORTHWESTERN DIVISION		
<i>Oregon</i>		
K7WXW/7	2352-84-4	AB
WA7KAK	744-31-2	B
<i>Washington</i>		
W7GLS	418-19-1	AB
W7QCV	407-19-1	AB
K7BBO (5 oprs.)	3822-147-3	ABCD

Motor-Speed Control

(Continued from page 35)

proper-size coil form. The coil may be wound separately, however, and in this case a capacitor with a 200-V rating will be adequate for C1. These components, as well as the diac, the other capacitors and the fixed resistor, may be mounted by their leads on tie-point strips.

Checkout and Operation

Once construction is completed, there are no setup adjustments to be made, and no particular precautions need be observed during operation except that the case of the gadget should be grounded. If you wish to make some voltage checks with the circuit in operation, use *extreme* caution, to be sure that test leads don't become shorted together and that no unwanted contacts are made to a "hot" chassis. A load must be connected into the ac receptacle for these checks. Without such a load, there is no return path for current flow to the power line and no voltage can be developed across the triac - in other words, nothing happens. If you measure the voltage across the load, you'll likely get some surprising results if a VTVM is used. Most of these meters for general-purpose use are peak-reading instruments with scales calibrated in rms for a sine-wave voltage. The voltage you'll be measuring at slightly reduced motor speeds is not a sine wave, and although its power content is reduced from maximum, the peak value of the voltage remains the same or may increase slightly because of switching transients.

The writer wishes to acknowledge that some of the circuit ideas used in this device were obtained from RCA's *Solid-State Hobby Circuits Manual*, Technical Series HM-91, 1970, and Motorola's brochure, *Home Handyman's Construction Projects*, No. HMA 37, March, 1970.

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.

Dear Logbook



BY LYNDA CROWLEY,* KP4DIP

FIRST OF all, so you won't think I'm some kind of a nut, let me say that my mother and father are both hams. In fact, speaking of nuts, my mother . . . well, I'd better not go into that. Anyway, they are hams. My father is a part-time ham, and my mother is a full-time ham. By full-time I mean all the time, and part-time means when she is sick.

Anyway, this is not meant to be about them, except that they are the causes of all my troubles in school. By the way, my name is Brian and I'm 11 years old. I have a (yechh) sister named Christiane and she is a 9-year-old baby.

The first time I remember having any real trouble in school was the year my mom got the LICENSE. We were learning to tell time that year, and I already knew how, so I thought I could cruise through a few days, while everyone else learned how. I figured if I raised my hand during the first of the lesson and dazzled the teacher with my knowledge, she would recognize the fact that she didn't need to call on me again, because I already knew how to do it.

Soooo . . . right away when she asked, "What time is it when the big hand is on the 12 and the little hand is on the 12?" I raised my hand. My friends (and enemies) looked at me in awe! "It is 0400Z or 1600Z" I answered. "No, Brian, it is 12 o'clock noon or 12 o'clock midnight." Well, right then and there I felt like there was going to be trouble, but my dad is a teacher and I have learned that "one does not contradict a teacher" (or a father either!). So, I sat there looking like I believed her. I figured that she would get it right on the next go-round and then I could really impress her. Next she asked, "What time is it when the big hand is on the 12 and the little hand is on the 5?" I looked around and saw that everybody else looked kinda blank, so I raised my hand again.

Zulu Hours

"O.K., Brian," she said, "let's see if you can get it this time." So, naturally I said, "0900 Zulu (I thought I'd better spell it out for her this time) or 2100 Zulu." "Now, Brian, I think you had better listen more carefully next time. It is 5 o'clock in the morning or 5 o'clock in the afternoon," she said. Well, I could let her get by with one mistake, but not two; so you can guess what happened after that. The note read . . . "Dear Mr. and Mrs. Crowley, Although I have always believed Brian to be a truthful and respectful boy, I must ask you to speak to him about arguing with his teacher. Also, he needs to do quite a bit of studying on how to read a clock," signed, Mrs. Brown.

*Box 229, APO New York 09845.

After a long talk about causing QRM in the class room, Mom told me to QSY to the bedroom and think about what I had done, and about how impolite I was to "double" with my teacher.

The next week, in geography, I ran into more trouble when Mrs. Brown asked me what the people in Texas were called. I said that the ones who had been around for a long time were called WSs and the others were called K5s or WA5s, depending on how long they have had their licenses. She said that it had nothing to do with how long they had been driving and that they were called Texans. So, remembering the earlier QSO with my mom, I didn't say anything, but the zero I got on the outline map we had to fill in didn't do my grade any good. I can't understand why she gave me such a grade, since I had studied the big round map on the shack wall for hours the night before the test. I checked later and, sure enough, the island we live on is KP4, and I'm sure I got most of the others right too. But I didn't say anything.

For the next few days, I didn't raise my hand, but something had been bugging me for a long time, and I thought that my sex education teacher could help me out. He's real groovy most of the time, but when I asked him where "harmonics" came from he told me to ask the music teacher. I guess he is just like my mom and dad when it comes to talking about things like that. The music teacher said that they are called harmonics (she must be Italian) and that one kind of harmonica had been invented by Benjamin Franklin. I guess Dad was right when he said that they come in the doctor's black bag, but my history teacher never told me Mr. Franklin was a doctor! Those teachers don't know every thing!

Abstract Antennas

The only teacher that I could get any praise from was the art teacher, Miss James. The other day we were supposed to draw a picture of our homes so that when our parents came out for group conferences and open house, they could find our desks by finding our picture. Well, I knew my parents would recognize our house with our Quad on the tower and all the wires running all over the yard and into the house, so that was what I drew. Miss James just went into fits about my picture. She said I had a lot of talent for abstract art and that the emotions that I had radiating from my house must mean that it was "just filled with love." I don't know about love, but I do know it has lots of rf, especially when I want to watch Channel 2. I didn't try to explain about the antenna and wires, 'cause I figured it was hopeless, and why ruin a good thing?

The night of the open house and conferences came, and my mom and dad went to the school to talk to my teachers and I really looked forward to going back to school the next day. I figured that if my parents explained to them about how much I study and that I had been telling time since I was 5 years old and all that stuff, my problems would be over. I should have known that it wouldn't be all that easy!

What happened was this . . . Right away they found my desk, 'cause as I said before, they recognized our house by the antenna and wires. The art teacher came up to them and started telling how much promise I showed and that if I was bad sometimes, they must expect it; that anyone who could picture emotions like that must be a bit temperamental. Well, my father had to blow it all and say that I did a pretty good job on the Quad, but that he really didn't think that we had that much coax spread all over the house. My mom said that the teacher certainly was odd, because she got a very blank look on her face and walked away, mumbling about emotions and abstracts, and she didn't even tell them what kind of grade I was going to get!

During the conference with Mrs. Brown, my mom made a note to tell me to strive for 100% modulation, not to under- or over-modulate, because Mrs. Brown said that I was a bit hard to understand. Evidently, my mother was talking too much, because my father told her not to hog the QSO. Well, Mrs. Brown made a comment about "like father, like son" and my dad thanked her for thinking that I took after him. She said something about my dad not spending enough time with me; so little, in fact, that I couldn't carry on an understandable conversation. And he said, "What do you mean, don't spend enough time with him? Why, just last night I worked with him for an hour showing him how to install a female plug!" I guess that was the end of the conversation, because mom said Mrs. Brown got real red in the face and left the room.

The next morning, after getting all the reports from mom, I really didn't feel like going to school. So I decided to fake a stomach ache. After I finished breakfast and getting dressed, I went to the shack where mom was on the radio. I bent double and started moaning right in front of her. She turned to me and said, "Shhh, Brian, I'm trying to copy a YB9, and I can't hear with you making all that noise." I knew then that my timing was bad and so I gave up. Anyway you look at it, I

had to go back to school some time, so I might as well get it over with.

I got to my desk just as the bell rang, hoping to go unnoticed, but I wasn't that lucky. Mrs. Brown looked at me in a funny sort of way, and said that she would like to talk to me after class.

By keeping my mouth shut and my hand out of the air, I managed to get through the class. When she asked what countries one would have to cross to get to India, I was tempted to tell her that it depended on whether you were going long path or short path. But I kept quiet. See, I'm getting smarter.

As soon as the other kids left the room on their way to art, I went up to her desk, resigned to being misunderstood some more. She looked up kinda sad like and said, "Brian, I've scheduled you for a session with Mrs. Copper" (she's the school head shrinker) "and I want you to take this slip and go to her office now."

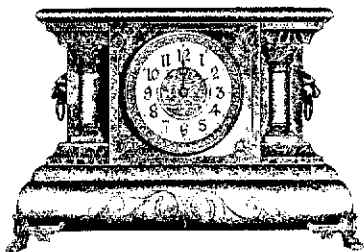
On the Couch

So, off I went to Mrs. Copper's office and after talking to her for half an hour, I didn't know what she said and she didn't know what I said. I did understand one thing. My problem was in "communicating," and I "must try to get rid of the habit of substituting imaginary terms for everyday things." I told her that QRM was definitely not imaginary and that if she didn't believe me she should try to carry on a QSO on 20 meters some Sunday morning. I also told her that I didn't think that I had any problem communicating at all; that at my house, we talked all over the world to lots of countries and never seemed to have any problem as long as the skip was into that area. Anyway, she gave me another note to take to my father and it said how I have this problem and that they were setting up appointments for me with the speech specialist, and the reading specialist, and the eye doctor, in hopes that one or the other of them could help me.

Boy, you should have heard the QRM in the shack that night! It's a good thing mom wasn't on VOX at the time. FCC would not like what she said about the "teachers of today." My dad said something about counselors and Cbers and a lot of other stuff about lids.

The next day, dad went over to my school to talk to the principal and the counselor and Mrs. Brown. He stayed there about an hour and when he left he told me that things were all straightened out. Then he said he had to go home and see if he could get into Wyoming, Connecticut, and Michigan.

So far, things seem to be going pretty good. Every now and then when I answer a question, I see Mrs. Brown looking at some kind of a list on her desk. And every Wednesday night, I get to hear Mrs. Brown's mother in Wyoming, and Mrs. Copper's son in Michigan, and the principal's mother in Connecticut. Just the other day, Mrs. Brown told me I could "QSY to the drinking fountain." You know, I think she is catching on and, someday, she may learn how to tell time! **QST**



It's 0200 Zulu!

Passing Examinations—Study Techniques Do Help!

BY ROBERT W. WOOD,* KØHUD

YOU CAN lead an amateur radio operator to the examination, but you can't make him pass. Is this true of you? Do you have the perseverance, tenacity, and most important, an interest and desire to pass the examination? Do you know how to plan an attack upon the seemingly endless stacks of materials, sample examinations, and books? If you have answered no to the above questions, then this article may be the key to your passing successfully the amateur radio examinations.

After viewing the incentive examination questions with sudden panic, I almost expired before I had the opportunity to settle down to a well-organized structured plan of studying. The various techniques that I followed are not new. They have been advocated by educators for many years and have proved to be beneficial to thousands of high school and college students. There is no guarantee that one will pass the examinations by faithfully following these techniques, but the probability will be greatly increased. Remember, learning is an individual matter. Only you can do the work, and only you can pass the examination. Try these techniques. Follow them to the tee. The key may be your mental discipline.

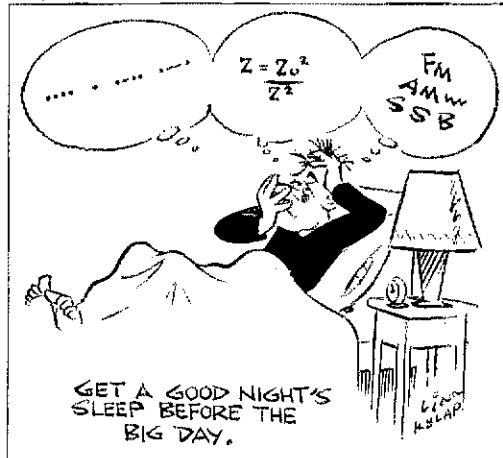
I. Factors determining examination success

- A. Intellectual ability
- B. Previous achievement level
- C. Academic attitude and interest
- D. Adjustment level (i.e., development of techniques and skills necessary for adequate adaptation to technical radio requirements)

II. Adjusting to technical requirements — skills and techniques

- A. Object of studying-learning. Study is a form of deliberate learning. Learning is acquiring new information, new understandings, and new responses.
- B. Study time, place, and motivation
 1. Time
 - a. There is no shortcut to learning; new learning takes time and work. But there are specific skills and techniques to enable you to make more efficient use of time. Only you can determine the amount of time needed for study.
 - b. Budget and plan your time
 - 1) Plan a weekly schedule including work hours, committee meeting hours, meal hours, and other inflexible hours; then plan and insert hours for study, recreation, sleep, etc. Include specific hours for studying related areas.
 - 2) Plan rest or recreation in late afternoon before dinner and briefly around meal hours.

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- 3) For each hour of study, plan 5 minutes of diversion (i.e., pause toward the end of each hour to stretch, close eyes to relax eye muscles, think of something else, etc.)
 - 4) Short, daily study periods are better than one long session. If studying for 3 straight hours, try to study 3 different, unrelated areas.
 - 5) Know each morning what is planned and stick to it.
2. Place
 - a. Study room — face blank wall, have good light, keep desk top clear of everything but the one book you are studying, remove pictures or other distracting objects from desk, keep room cool. If you must study at home with children around, put a friendly but determined sign on the outside to discourage visitors. Study, don't ham.
 - b. Background music — depends upon the individual, but it should not be distracting.
 - d. Try to study in same place each time so setting will act as a stimulus to study.
 3. Motivation
 - a. Concentrate
 - 1) Develop interest by surveying the material first, approaching it with the idea to find certain answers to basic questions.
 - 2) Set yourself a time limit and work under pressure; don't let yourself fall below your optimum efficiency level.
 - 3) Recall (mentally, orally, or in written form) what you have read at the end of each study session. Assume you will have to explain it to someone else as soon as you have finished it.
 - 4) Criticize and evaluate as you read.
 - 5) Study in conducive environment away from possible distractions; observe proper length of study period (i.e., rest toward end of each hour).
 - 6) Not interested? Should you be?
 - 7) Worried about other things? Can you do anything about them now?
 - C. Techniques of reading
 1. Major aim should be to develop flexibility in using various reading techniques depending

upon previous knowledge of subject and purpose of reading.

2. Brief description of various reading techniques.

a. Intensive reading

1) *Survey* - briefly note title, introduction, subhead, conclusions, tables, graphs, and schematics.

2) *Question* - on basis of survey, develop comprehensive questions over material and read with the intent of answering them.

3) *Read* - after surveying, and with comprehensive questions in mind, begin reading at optimum effective rate.

4) *Recall* - stop after reading major sections of material and recall, in organized fashion, what you have read. Immediate recall will aid retention. This can be a mental or written outline.

5) *Review* - what you have read and recall immediately and periodically for best retention. Underline at this point, if so desired.

b. Skimming - an extension of the survey process to include reading the introduction; each subhead; the first sentence, key ideas, and last sentence of each paragraph; and the conclusion. Can use within book or within one chapter or section.

c. Scanning - using zig-zag or circular motions to find one specific point, one number, etc., in a large body of material. Based on principle of selective perception, developing a mental set to look just for one thing, and using clues such as numbers and capital letters to locate the one thing.

d. Each of these techniques may be used within one book, one chapter, or one page depending upon your familiarity with the subject, time limits imposed, etc.

3. Vocabulary techniques

a. One will not learn and retain new words easily unless he has a need for them and uses them. Index cards, each with a new word, schematic diagram, or difficult problem, reviewed often and drilled repeatedly, will suffice if no other way is possible.

b. One should preferably attack a new word by determining its meaning from the context in which it is used or from the structure of the word itself.

c. One should not interrupt reading to look up a new word in the dictionary. Either scan and skim for new words before reading the chapter, then look them up and mark them or look them up when you finish the chapter.

D. Preparing for and taking examinations

1. How to remember

a. Understand the materials.

b. Organize the material so that you see meaningful patterns and relationships and so that the major concepts and sequence of events will stand out and bring lesser details to mind.

c. Visualize the material.

d. Associate difficult concepts by noting cause and effect, sequence of events, relationship to less difficult material.

e. Pick out and recall key ideas, key concepts, and key terminology.

f. Review frequently, especially if it is not the type of material that is in use every day. The best time for review is immediately after you have first learned or read it.

2. Preparing for examinations

a. Keep up with daily and weekly study schedule; have questions clarified as they arise.

b. Organize notes and reading into a condensed outline, noting overall perspective, relationships between major topics covered, etc.

c. Prepare for and practice written answers to probable questions. Several sample examinations are available commercially.

d. Note and be prepared to use new technical terminology.

e. Don't be afraid to ask friends for help. They'll be glad to help if you let them know you need it, providing you have made a determined self-effort first.

f. Care for your health; keep up with daily studies and use night before test for review; don't get less sleep than you're used to getting; excessive use of stimulants won't help anyone for long; avoid eating a heavy meal before the examination.

g. If emergency occasionally necessitates reduced sleep, it's best for most people to sleep at least two hours immediately prior to an examination. Again, this depends on the individual.

3. Taking the examination

a. Relax, it's too late to worry now. Don't try to recall everything you've learned in one 30-second panic before the tests are distributed.

b. Note time limit for test and general number of questions. Pace yourself.

c. Read directions carefully and follow them exactly. Be careful when answering on the IBM answer sheet.

d. Re-read paper to check careless errors.

(Continued on page 135)



The Southern California

EARTHQUAKE!



This kind of damage was typical to many residences in the harder-hit areas of Sylmar and San Fernando after the earthquake.

A Composite Exposition of Amateur Emergency Communications

TUESDAY, FEBRUARY 9, 1971, dawned much as any other day in Los Angeles. The first rays of sun were beginning to warm the earth when, at forty seconds past six A.M., that earth began to tremble and hundreds of thousands of Southern Californians were awakened from their sleep to a morning of grim prospect.

The shock was centered at the northwest edge of the San Fernando Valley, a 150-square-mile collection of bedroom communities, most actually a part of the City of Los Angeles. The quake was measured at an average intensity of 6.5 on the

Richter Scale with peaks as high as 8.0 in the more severely damaged areas. Fortunately, the epicenter was located on the edge, rather than in the center of the densely populated city.

Nevertheless, Sylmar and San Fernando suffered major damage, including disruption of all utilities and services. Four hospitals serving this area were evacuated, approximately 500 other buildings were declared unsafe and twenty freeway overpasses were destroyed or rendered unsafe, making travel difficult. In adjacent Granada Hills, 80,000 residents of a twelve square-mile area below the Van Norman Reservoir were evacuated because of fears that a weakened dam might burst, sending billions of gallons of water on the community. Sixty-two persons were killed, hundreds injured and property damage amounted to at least \$350 million.

Amateur radio assisted in two ways during the disaster: first, by providing emergency communications services for areas where normal communications were immobilized; second, by handling many thousands of health and welfare messages, both by regular traffic nets and by impromptu services established to assist with earthquake traffic. This report is an effort to document the role played by the various amateur groups participating in the disaster relief operation. Most of it was compiled by Harvey Hetland, WA6KZI, Los Angeles SCM.



WA6TIC at the remote radio control for the WB6TSK remote base station which Marty made available for use by AREC during the emergency. Located on a mountain-top, the remote station greatly enhanced communication effectiveness.

QST for

Checking out some of the portable units used by amateurs during the disaster is WA6ECK at the San Fernando EOC.

AREC

During the first few hours after the disaster, the emergency communications provided by amateur radio served to supplement, and in some cases replace, the necessary communication services for areas hard hit by the quake.

San Fernando Civil Defense is staffed by members of an ARRL affiliated club, the W6IN Society. The club station is permanently maintained in the Emergency Operating Center (EOC) along with the police department, across the street from City Hall. This later became the operations center for all amateur earthquake communications.

Using intermittent power at the EOC, W6IN issued a general call for mobiles on six meters. Los Angeles City RACES was called, but there was no response. The County RACES was also called, but in the confusion did not correctly perceive the assistance-needed message. W6IN's high frequency capability was initially impaired and consequently was not available until later.

About three hours after the quake, in attempting to determine if there were any severely damaged areas, the East San Gabriel Valley AREC (50 miles from San Fernando) contacted W6IN offering assistance. The San Gabriel Valley had been generally unaffected by the quake, but reports from news media were incomplete, incorrect or confusing as no definite disaster area had yet been defined. Upon the arrival of the East San Gabriel Valley group, a meeting was arranged in which the mayor, assistant c.d. director and representatives of the police and AREC delineated the city's requirements and the capabilities of the amateurs. Communications coordination responsibility for the city was placed in the hands of the AREC, a role that suited well their use of two-meter fm. WB6TXX was to be overall coordinator, with WB6VYX as his assistant.

The W6IN Society members continued to man the San Fernando EOC which was primarily engaged in handling health and welfare traffic. The emergency generator at the EOC had failed within the first twenty minutes of operation and another standby generator was also inoperative. W6IN members procured and installed a generator from a local rental agency to power the EOC and police station.

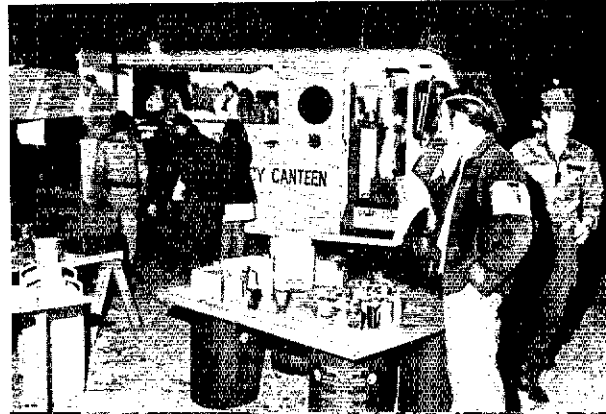


A command center was established in the City Hall. Power for this center was provided by the Edgewood Amateur Radio Society, which is largely composed of AREC members. Some telephone facilities were still operative and extra lines were obtained for use in the command center. Disaster assessments of the city were begun Tuesday evening to ascertain the extent of damage and provide information to relief agencies.

Additional equipment requirements prompted a request to Standard Communications, Inc., and Dynamic Communications, Inc., for VHF fm equipment. Both companies responded favorably, and additional units were airlifted to the area as well as being supplied from local stocks. A repeater was installed by the East San Gabriel AREC to improve their coverage area.

In addition to providing communications for the city, the AREC group provided two other services. Two-meter fm units were installed in makeshift ambulances when local ambulances were found to be lacking a common frequency, making

Some of the relief crew gathers around the Salvation Army's Mobile Canteen. In the foreground, WA6CYJ advises the command post of the van's location and the availability of supplies.





Here is a typical scene at the emergency command post three days after the earthquake. Numerous after-shocks were still being felt.

central dispatching impossible. The FCC was then requested to issue an emergency communication channel declaration for the ambulance frequency, since possible life and death communications could be involved. Spot frequencies of 146.7 and 146.82 MHz were declared. Additionally, communications assistance was provided to the Civil Air Patrol to aid in making damage assessments in Sylmar.

RACES

The City of Los Angeles RACES, K6ROC, of which San Fernando City RACES is a part, was not officially activated after the earthquake. The County of Los Angeles RACES, K6CPT, was activated on a limited basis. A county RACES van and caravan were dispatched into the Newhall and Saugus areas early Tuesday morning. At noon the same day it was routed to the San Fernando Veterans' Hospital, which had been severely damaged. After setting up a communications truck for the County Sheriff's Department, their role consisted mainly of monitoring.

Health and Welfare Traffic

Exaggerated reports of the damages reaching other parts of the country created a desire on the part of many to inquire as to the condition of friends and relatives in the Los Angeles area. Although telephone service was indeed out in areas directly affected by the quake, most parts of the area were really unaffected. The great volume of long distance telephone calls placed to and from Southern California overloaded the circuits with the result that many people could not get through. Thousands of health and welfare messages were then originated through amateur radio circuits.

Both late messages and inquiries into unaffected areas plagued the normal traffic systems. Some operators reported staying away from nets at times a week or two after the disaster to avoid being deluged with inquiry traffic more than a week old. Also other operators reported having to explain the messages to addressees who asked,

"Well, why couldn't you have just told them no one in this area had any damage?"

In addition to their time and efforts, public service performance resulted in financial expenditures being undertaken by amateurs. Reports have been received of telephone charges much greater than is usual, in addition to many hundreds of inquiry messages being mailed.

The largest single health and welfare operation was that of the W6IN Society at the San Fernando Police Department. Intermittent telephone service was regained at the EOC about noon on "quakeday" and two extra lines were installed to handle health and welfare messages. The operation was unique in that the main operation on twenty-meters consisted of receiving the inquiry, delivering it and originating a reply to the inquiring station within moments. Those disaster areas without telephones were covered by W6IN members who delivered inquiries by hand or posted them at telephone message centers within the affected areas.

With the exception of operation on the National Traffic System, all operation was carried out on voice. Messages to areas unaffected by the disaster were referred to groups specifically handling such traffic. Under the direction of WB6UZS and K6UMV, W6IN amassed a total of 4300 message handlings.

The League's National Traffic System is represented in Los Angeles by the Southern California Net, a section-level net operating on 80 meters. Although in some cases the messages were late in arriving and the addressee had already been in touch with the originating party, delivering stations' efforts were generally appreciated. SCN handled approximately 1000 messages in the ten days following the quake. Nearly all member stations participated in the disaster communication effort. Special thanks for large volumes of delivered traffic go to WA6QQL, W6OEO and W6INH, the latter being singled out by the SCN manager for yeoman service as net control as well.

The West Coast Amateur Radio Service, using 7255 kHz., was active in providing link-ups between originating and delivering stations with health and welfare traffic. WCARS also established sub-nets for the purpose of clearing traffic directly in and out of the disaster area. Many WCARS members operated mobile in the disaster areas and delivered a large number of messages.

The Western Public Service System (WPSS), on 3952 kHz., established several sub-nets to sort and expedite traffic. WPSS mobiles were also active in the disaster area originating and delivering traffic for areas with no telephone service. Normally WPSS is active only during evening and night hours, but with appropriate relays operation was maintained round-the-clock during the emergency. Fifty-eight regular participants handled an estimated 1300 messages during the disaster, with special commendations going to WA6AAW, WA6DIL and WA6HHH for their efforts.

During the evacuation of the area below the Van Norman Dam, evacuation centers were established at various points around the periphery

WA6TIC, in coat and glasses, discusses ambulance dispatching problems with rescue crew members and Civil Air Patrol Captain David Best.



of the area vacated. Many radio amateurs operating in Navy MARS helped to originate health and welfare messages from these evacuation centers. Most of these messages were routed to the Granada Hills High School where the accumulated traffic was cleared by high speed teletype circuits. As many as 2500 outbound messages were cleared in this manner.

Sixth Army MARS operated primarily ssb and RTTY and handled about 500 messages. Liaison was effected via common membership with the Metropolitan Traffic Net, a six meter amateur traffic net, and others, to clear outgoing, non-local traffic on to Army MARS circuits.

Miscellany

In all emergencies, each group or individual has a story to tell. Trying to correlate them all into a single, concise account is utterly impossible. So let's just hit the high spots of activities not covered in the foregoing.

K6OVJ, W6GQC, WA6IMU and W6DSQ activated the Litton Industries ARC, K6QYB, of Van Nuys, and handled 400 inquiry messages and replies for the Los Angeles area. W6SIG, club station of the Sacramento Army Depot employees, was activated by four members and handled 350 messages between the disaster area and local civil defense and Red Cross officials. In El Centro the Red Cross requested aid from Imperial Valley EC WA6MIW. Assisted by W6JHG, WB6RMG and WN6CDT, two stations were put into operation to help with the load of traffic.

The Linn County (Iowa) Red Cross was looking for help, too. It came in the person of RACES RO W0LIJ, who, with the help of K0AZJ, WA0QOX, and the Iowa Tall Corn Net, handled several dozen messages for local residents. Eight members of the Towers ARC and Friley Hall ARC at Iowa State University began setting up a message collection center immediately after hearing of the earthquake emergency. Some 1200 telephone calls, resulting in 500 formal message originations, were handled. Replies for most of the inquiries were received, among them several emergency death notifications.

Seven members of the IBM ARA of Gaithersburg, Md., manned club station WA3JZR and handled some traffic coming into the nation's capital. Around the Denver, Colo., area, the Red Cross was receiving a number of inquiries on the earthquake, but very little information was available. Officials contacted W0ECN, trustee of the Denver Radio Club's station W0OUL, which is located in the chapter house. Several stations in the

Amateurs worked in teams of two during damage assessment surveys conducted for Civil Defense authorities. WA6JXG checks a badly damaged building from atop a heap of rubble while WA6CYJ looks on from below.

disaster zone were found and information was obtained for the inquirers. Some five hundred messages were handled.

W6WIS reports contact by mobile rig to W6SMO in the Eastern part of LA inquiring as to damage in the Palos Verdes area. W6SMO was gathering damage reports from various areas about 40 minutes after the first shock. W6WIS also handled several inquiries and made phone calls for hams outside the LA area. Long distance lines into the LA area were virtually unavailable for several days.

An interesting report from W6ZOL relates some of the activity in handling personal inquiry, or "agony" traffic. John's house in the Newhall area itself got a good shaking and he left when it first started. About 0800 he went back in to get his little battery-operated 5-watt cw rig, but was unable to raise much on repeated QRRR calls. At about 1000 his power came back on and he fired up his sideband rig on 40 phone. One of the first dispatches he handled was traffic from the Ventura



Red Cross to the Newhall Sheriff, which was delivered by hand. Thereafter, for two days John and other stations in the area handled endless inquiry telephone calls from "outside." Many of the people called, although badly shaken, were relieved to hear from loved ones. However, calls for places outside the local area were out of the question. Sez W6ZOL: "It was the first time in 24 years as W6ZOL that I felt a real importance in having a hobby that could help others. My neighbors were happy to have a means of communicating with loved ones."

But the crux of John's account is that he was operating in violation of a local ordinance against outside antennas. A week after the quake he received a letter from the Homeowner's Assn. ordering him to dismantle his antenna!

W7BA reports the handling of "beaucoup" traffic on behalf of residents of the Northwest, principally through W6QAE in Venice, Calif. The Golden Bear and Mission Trail Nets also handled much of Loyd's traffic into the area.

Three members of the Whitman (Mass.) Amateur Radio Club made a Brockton paper for their services in obtaining information from the quake area. W1IAU was first to make contact with Hollywood and El Segundo. WA1EFR obtained information from Sylmar for the Greater Brockton Chapter of the American Red Cross. K1UMP later contacted San Fernando for information regarding the status of the Veteran's Hospital there. W1MD of Hingham also made early contact with W6PIF to handle some inquiry traffic.

The Georgetown and American University (D.C.) amateur stations originated over 1,000 messages over WA3IGQ and five other stations in the area. Not all were cleared, but K6CYP succeeded in delivering a few of them.

WB6ADQ was reported to have been super-active in the disaster area, handling phone patches with Costa Rica and Mexico as well as stateside stations.

In Detroit, WA8EMN stayed on the air for 18 hours handling phone patches into the LA area and otherwise giving local people assurances of the safety of their relatives near the quake.

In Cleveland, K8ONA and the Apricot Net set up to handle inquiry traffic and go-getter K8ONA appeared on national TV as a result.

In Reno, Nevada, a network of amateurs was set up to handle contacts between the Red Cross there and people in the LA area. WA7KQS at Red Cross headquarters was activated on 2 meters, making local contacts with W7YKN, WA7LEO, K7JYT, WA7DUL and WA7MOB. These stations maintained contact with the LA area on 40 or 75 meters. Red Cross had previously told W7YKN that LA Red Cross had asked them to stop calling, but the amateurs offered to handle the traffic direct to the individuals concerned.

W7BQ reports that RN7 assistance was received from W7KZ, W7EKB and W7GHT, in addition to their regular assignments.

Sixteen members of the Old Pueblo Radio Club of Tucson, Ariz., were active in handling traffic following the quake, 112 messages in all. Club station W7GV handled 28 of them.

W7EM of Salt Lake City, assisted by W7VTJ and WA7MEL, reports many hours of air-time recorded between Feb. 9 and Feb. 13 on both sideband and cw handling all kinds of traffic on WCARS and NTS. WCARS was in operation almost continuously and RN6 was operating on special schedules to serve in the emergency.

WA2UWA was in direct contact with W6BNX and W6IPW in handling much traffic with the disaster area on NTS.

On Feb. 9 the Imperial Valley Red Cross called on WA6MIW to handle inquiry messages into the earthquake area. Carol reported into West CARS, as radio stations and newspapers in the Imperial Valley referred residents to her for health-and-welfare messages. WN6CDT and WB6RMG lent a hand, the former handling the telephone, the latter on the air. Later, W6JHG activated another station at WA6MIW's QTH and operated into WPSS on 3955 kHz. The four of them were at it from 1402Z Feb. 9 until 2345Z Feb. 10.

The Worcester Polytechnic Institute Radio Club (W1YK) handled some traffic for the Worcester Chapter of the Red Cross on several different nets. WA2BCI did the operating.

W6NS is reported to have been one of the first to contact the disaster area after the quake. He was in QSO with a friend there when the quake occurred. He went immediately to the WCARS frequency and started handling traffic, a task that kept him busy all morning. Much of the early morning traffic had to be handled via midwestern stations, because the skip was too long.

WA6FUH says his clock stopped at 6:01 A.M. on Feb. 9, when all power and most telephones were lost. Those phones still working were immediately tied up with calls, and amateur radio was about the only way to communicate in Southern California. The bands were almost immediately deluged with "health and welfare" (inquiry) traffic. WA6FUH later went out in his mobile to assist in assessing damage in Newhall, taking a fine batch of pictures.

The Sacramento Army Depot MARS station was activated by employees soon after the disaster began. The station was manned 14 hours a day until operations secured.



Los Angeles Section Emergency Coordinator WA6QZY, standing, files traffic with K6DHN while W6NKW operates the second rig.

W0KB reports that the speed of reply to most of the Health & Welfare messages in his area had the local Red Cross amazed. One trick used by amateurs in the area was simply to give the inquirer an "out of area" reply, indicating that if there was anything wrong with the person being inquired about, it wasn't caused by the earthquake. (Some seem to think that San Diego is in Los Angeles.) Jerry also mentions W6LI who was on the air the first several hours giving news reports to many USA and foreign radio and TV stations. For the first few hours, his were the only detailed reports available and when the wire services caught up, it was found that all his reports were 100 percent accurate. Sez W0KB: "My hat is off to the '6' gang, but I'll wish all their antennas were buried when the next XW8 shows up!"

A clipping from the Woodbury (N. J.) *Daily Times* relates the experiences of WB2JZX and WB2FJE, along with W2LVW and Wayne Wood (call unknown) in handling traffic with the disaster area. Good publicity for amateur radio here.

Assistance to the Amateurs

The amateur groups operating in the disaster area couldn't have lasted for very long without aid from other service groups. It would be well to mention the efforts of the Salvation Army at this point. From early Tuesday afternoon until a period weeks later, they were on the scene with a mobile canteen parked near the command post. Not only amateur operators, but all disaster workers were provided with food, drink and other necessities.

A local Citizen's Radio Service group, the Citizen's Emergency Mobile Patrol, assisted amateurs as an auxiliary to handle legitimate non-third-party communications. CEMP was utilized subordinate to the local RACES/AREC organization established in the city. In particular, they provided the temporary ambulances and their first aid experience was of great value.

Credits and Conclusions

Unlike most emergencies, the LA earthquake was characterized by a wealth of talent in collecting and coordinating material for the writeup. This made the job a little easier, but more important, it made the result more complete. Usually a dearth of photographic material exists, but this time we had more than we could use, thanks principally to W6BVN, WA6QZY, WA6FUH and others. While the text used as a basis for the foregoing article was prepared by Los Angeles SCM WA6KZJ and edited by WA9HHH and WINJM at headquarters, additional material

WB6PQV and WA6TIC, seated, coordinate the changeover of ambulance dispatching duties to CAP personnel.



was supplied by K6UMV, WB6TXX and WR6UZZ in so much detail that it was impossible to use it all without devoting an entire issue of *QST* to it.

No doubt someone important has been overlooked. This is almost always the case, no reason why this time should be different.

There still remains, of course, the inevitable critique. Much of the material received contained comments evaluating the amateurs' performance, none of which was used in this article. This comes in the ARPS column, this issue. Later, perhaps, in field bulletins. There is no doubt in anyone's mind that the Southern California earthquake emergency is another example of what amateurs can do, proving once again that we are a valued and needed asset to the country. The news media have been generous in giving us the recognition we deserve; and the public in general once again has been reminded that amateurs are good for something other than TVI. While some amateurs "in the know" on amateur public service potential have reservations, the record shows another large "plus" on our public service chronicle.

QST



Local Nets Can Be Fun

BY ROBERT W. MYERS,* WA2JZX

MANY LOCAL CD-AREC type nets fail or have poor net attendance because they don't hold the interest of the local ham population. These nets often become boring, monotonous, once-a-week rituals, left only to the most "Public Spirited" types.

What can be done to help this situation? Well, nets don't really have to be this way. We can add a little sugar coating to make it a little more palatable for all concerned, and gain and hold more net members at the same time. In other words, we can make the net interesting by adding some activities.

Hidden Transmitter Hunts

In the summer months, hidden transmitter hunts often help. Most local nets are located on 10,

*317 Kensington Court, Copiague, NY 11726.



6, and 2 meters, which make ideal bands for that type of operation. These hunts can be held on the net night and frequency once a month or even every other net session depending on the wishes of the membership. This activity holds many advantages, such as giving the membership an incentive to set up a mobile station, a real advantage to CD-AREC nets. The hunt should be started after the net callup. Non-participating stations can move to the alternate net frequency while the hunt is in progress.

Picnics and QTH Meetings

Most hams enjoy getting together once in a while for a good eyeball QSO. You can do this by having the net members gather at each other's homes. Pick several tentative dates for these QTH meetings, and have some of the members volunteer to have gatherings at their homes on a particular date. Keep in mind that this is purely voluntary on the part of the membership and no member should be pressured into a QTH meeting at his home.

In large city areas where most people live in an apartment, a picnic can be arranged at a park in place of having a QTH meeting. If the QTH meeting is held on a net night, the hosting station will act as NCS to talk-in the mobiles, and check in the stations that cannot attend. Refreshments such as cake, coffee, soda, beer, etc. can be served, and the group can see what the other fellow's shack looks like.

Net Projects

In conjunction with the QTH meetings, a net project can be worked out. Things such as direction-finding loops can be built as a joint effort among the membership. If the project is a little more complicated, the work on it should be done at home, but the project at various stages of completion would be brought to the QTH meeting for debugging.

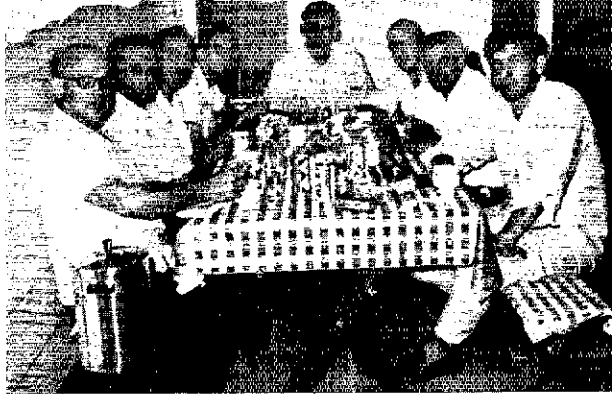
During regular net meetings, when there are no hunts or QTH meetings and no pressing official business, the NCS can hold a question and answer period with one or more of the more technically proficient hams, during which anyone with technical or operational problems might get help.

Contests

Another way to fill in slack time is to hold a net contest, such as a frequency measuring contest. A contest that has proved to be a lot of fun is the QRM contest, in which each station tries to work as many other stations as he can, on the net frequency at the same time. The exchange is made up of the number of letters in the operator's last name (e.g. Myers, 5 letters = 5 points). To get the total score, the number of points is multiplied by the number of stations worked. Set a time limit on the contest, possibly ten minutes or so. Bedlam will exist on the frequency but it is surprising the number of stations that can be worked with such a bad QRM situation. This activity provides a lot of

WA2SUH takes a bearing on the hidden "bunny."

Most hams enjoy getting together once in a while for a good "eyeball" QSO. (L to r) W2HAC, W2GPQ, W2ZYQ, K2DGI, WA2HUF, K2UPA, W2ZAI, and WA2SUH.



fun as well as good training under heavy (impossible) QRM conditions. This should be done only on VHF where mostly ground wave propagation exists. Doing it on the lower frequencies might cause undue QRM to other stations.

Taking Turns at NCS

Each station in the net should take a turn at being NCS. This does not mean that the regular NCS is out of a job but that every so often the job of NCS can be turned over to another station in the net, so that if in an emergency the regular NCS is not available, any station would be qualified to assume the position of the NCS. During a drill the regular NCS could stand by on frequency and give some coaching to the temporary NCS, but not a chewing out! No one enjoys being chewed out, especially when he is donating his time. Suggest, don't give orders!

Message Handling

Most test messages passed in an emergency net tend to be pretty serious. Well, in an emergency they *are* serious, but in a routine drill a little humor can be added. The NCS should have each station originate a piece of traffic to be sent to some other station in the net. The content of the message could include a small anecdote, riddle, or possibly some information of interest to the net. This helps every station in the net to become thoroughly familiar with traffic handling and net procedure. While we are on the subject of traffic passing, I would like to add that all local emergency nets should have a liaison with the National Traffic System for handling of long haul traffic. This has several advantages, especially on the vhf bands where it provides an opportunity for technician licensees or fellows with limited facilities to originate some long haul traffic. No special liaison with a particular net has to be kept, but one or more stations in the net should be capable of checking into a regular traffic net.

Aside from the interesting aspects of net operation, we can add some incentive in the form of recognition. This recognition can be given in the form of an award to stations who achieve exceptional net attendance. A certificate can be printed up for a small fee and issued to any ham who has more than fifty percent net attendance for a particular year. One credit is given each time a station checks into the net. If for personal reasons such as overtime at work or a temporary shift in working hours, an individual cannot check in, he can notify one of the net members to check him in for half credit. The awarding of the certificate can be given at a small ceremony at c.d. Headquarters or at a QTH meeting.

Once the net is made interesting, it can look forward to holding its present membership and adding more to the ranks. It must be noted that most of the activities are carried out with the full use of regular net procedure. It is not intended that the net become a free-for-all or rag chew session. The net control station must maintain control, and net procedure must be carried out at all times. Rag chewing should be held outside regular net hours, although it's not a bad idea to use the net frequency for local QSOs outside net hours. The net frequency could also be monitored and used as an intercom frequency between stations.

Most of the activities in this article are not new and have been tried and tested in the Nassau County 10-Meter CD-AREC Net under the direction of James Waite, W2ZAI. They have proven most successful as the net is one of the best that can be found in the country. Let's put some new life into our local nets and increase our enjoyment of ham radio all the more.

QST



Recognition can be given in the form of an award.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity NRH

CONDUCTED BY GEORGE HART,* WINJIM

AFTER SHOCKS

EVERY EARTHQUAKE has "after shocks," as many as a dozen or more, some of them almost as severe as the initial temblor. The recent Southern California quake was no exception in this respect, as any resident of the area can tell you. Also no exception were the aftershocks of the amateur communications efforts following the quake - for some were pleased, some skeptical, some displeased with our efforts - and *all* agree that despite all the good that was done, we could have done better. Thus, nearly all reports were accompanied by comments on what we did wrong, what we should have done, or what we should do in preparation for the next one.

'Tis ever thus. To quote them all would require an article as long as or longer than the article recording the factual amateur experiences which appears elsewhere in this issue (be the Good Editor willing!). Let us have a look at some of them, paraphrasing where necessary to keep them brief without losing coherence.

Let's begin with observations made by one who had the most to do with developing the final account of amateur operations - SCM WA6KZ1, who in turn received "input" from many amateurs in his section, especially WB6TXX and WB6UZS. Here are some of the composite observations and comments he gathered:

1) Operators for a particular Emergency Operating Center should be recruited from a diverse physical area. Too many of those in the immediate area have their own personal problems.

2) The "telephone tree" (also called the "fan out") was useless within the disaster area. A better method is a pre-planned reporting of persons to specific locations or gathering frequencies.

3) Amateurs should establish an emergency "kit" or list of required items to take along on an emergency operation. (See ARPS, Apr. '69 QST.)

4) Emergency power and equipment should be tested regularly at definite intervals and for substantial periods to insure its being in operating condition.

5) Remember that we amateurs are *communicators* supporting local government disaster efforts; we are not responsible for other services and should not take initiative therein. A single unpleasant confrontation with a local civic official can spoil the image presented by the entire operation.

6) Overall coordination with other amateur groups providing service is vital. Uncoordinated efforts can be tangential and diversive.

*Communications Manager, ARRL.

7) A universally-recognized ID of some kind should be established.

8) Volunteers should be established into "shifts" as rapidly as possible for operating continuity and efficiency.

9) A "quartermaster" for communications equipment should be designated and used to coordinate issuance. Inadequate control can result in lost equipment.

10) Pre-arranged contacts with business firms, establishing the need for equipment they can supply in times of disaster, will work to mutual benefit.

11) Strict control should be exercised over media news releases; speculation and rumors should be discouraged on amateur bands.

Health & Welfare (also called "inquiry" and "agony") messages were a big problem. This column has already commented (April issue), but here is another comment from an anonymous source: "When offering to send a message without a phone number to a person with either an unlisted number or a number listed under a different name, the originating station would be well advised to provide the originating party with a free postcard rather than effectively offering one at the expense of the station in the delivery area. Any message eventually mailed will probably reach its destination *later* than one mailed at the source. Especially in a disaster, the delivering stations are sufficiently overloaded with traffic to be justifiably annoyed at having to devote large efforts to researching phone numbers. Inclusion of phone numbers on messages cannot be overemphasized.

"In a disaster where 65 people die out of a population of over 7 million, it would seem that the answer to 'Are you OK?' would almost invariably be 'Yes.' However, the enhancement of the amateur's image was felt by (some) to justify the effort of inquiring.

"CW, although more efficient for exchange of message traffic between experienced operators, is a skill that has not been developed by enough amateurs to result in an effective disaster service. The ease of training operators, reorienting an operation and making large numbers of people aware of what's happening and capable of helping makes phone by far the more effective means of disaster communication."

From K6UMV, the following: "The ARRL's National Traffic System must be updated. It was ineffective, late and unreliable. Health and Welfare traffic was still being cleared on NTS circuits as late as February 22 and did not peak on NTS circuits until days after the quake. Most NTS messages did not reach Southern California until

Attending the Central Area Staff of NTS meeting in Des Moines, Iowa last November were, left to right, W0LCX, W9HRY, W0INH, WB9DPU (WA0MLE) and W5MT.



after the concerned parties had made contact via telephone."

From WA2UOO/3, who solicited inquiry traffic in the Washington, D.C., area: "The biggest problem was the inability to find California stations or any operators for that matter who would handle any volume of traffic. The stations I did hear in the LA area on 20 ssb were handling military or state government traffic. I checked in the Mike Farad Net on 3925 and K3PIE took a large volume, as did WB2WFJ/2 for later relay. At this point I realized there was no possible way I could handle all the traffic direct. Still later, I signed in to the NYC-LI Phone Net where WA2UWA took about 70 messages. By six o'clock I was no longer physically able to function so I went QRT. The traffic I was unable to handle was passed along to the Hyattsville, Md., Red Cross station K3CEZ."

From RN7 Manager W7BQ: "Expected traffic did not materialize at the RN7 level coming from California. If message centers were set up in Los Angeles, the traffic sure didn't get into NTS to any great degree. Many amateurs in other parts of the country were bugging LA amateurs for phone patches even though the telephone company and civil defense were asking all to stay off the phones, and many LA area hams were taking phone patches and using the phones contrary to the appeal. K6ZIP was giving out latest advisories, including the 'no phoning' appeal, but (this was mostly ignored). The amateur traffic encompassed a very small percentage of the population affected. In preparation for emergencies, one thought should be foremost: How can we serve the greatest number of people? Then, *prepare* for it."

From WB6BBO: "In time of emergency and extraordinary net operation we do not pick and choose. We clear the hooks. We cannot back-cancel traffic nor can we refuse; this is one time we do not stop to quibble. The traffic was coming in, it had to be cleared. It was impossible to clear it all at section level and the reason was that when two or three stations did go to rejoin, they returned with 50 to 100 messages apiece, along with TCC people who came directly to section in hopes of clearing

their huge loads. The role of any section net that is the center for delivery in a disaster situation is naturally vital. Greater representation on region level for better distribution of incoming traffic (is needed). The lack of representation caused a bottleneck at Region."

Any of this sound familiar? It should, because much of it bears a strong resemblance to critique comments which have been made after every emergency since the original flood. Why do we never learn? - WINJM.

Net Registration

We are now beginning to think about the production of the 1971-72 edition of the Net Directory, a new issue of which is prepared annually for release in late summer or early fall. This new edition stands to be one of the most useful aids to public service operating ever produced, since in addition to the usual listing of nets by name, location and frequency, the new directory will include a separate listing of vhf repeaters. See page 63, April, 1971, *QST*, for info on repeater registrations.

Any net must meet three simple requirements for inclusion in the directory: (1) frequencies must be within authorized amateur bands; (2) the primary function of the net must be some kind of public service activity; and (3) for continuous listing, each net must be re-registered at least annually.

The form used for registering nets is CD-85, which is recently revised to make its use easier. Appointees will have already received copies of this form (illustrated elsewhere in the column), or they may be obtained from headquarters, or we will accept facsimiles if all the necessary information is provided.

Here are the instructions, then, for filling out the CD-85:

Some of the attendants of the Northwest Weather Net Banquet held at Coeur d'Alene, Idaho, on Feb. 17, were, left to right, WA7HWD; K7LRD; Dolores, XYL of WA7HWD; and W7HCJ.



BRASS POUNDERS LEAGUE

Winners of BPL Certificates for March Traffic

Call	Orig.	Rec'd.	Ret.	Del.	Total
W3CJ/14	345	1236	1169	39	2789
K5TBY	1	810	772	0	1583
K3NSM	286	83	875	46	1290
W8NZJ	2	344	344	0	690
W9LX	33	345	262	9	639
W3FM	28	352	231	2	613
W7VJ/4	171	221	199	12	603
W4KW/1	23	272	242	28	565
W6HBO	27	271	223	36	557
W4ZFTS	29	243	235	37	544
W4BFLX	195	215	207	8	535
W1JDM	5	260	260	0	525
W0SE	43	293	20	165	521
W6ANN0	45	256	201	0	502
W2DSC	17	271	202	10	500
W1PAC/66	22	345	306	15	688

More-Than-One Operator Station

K8LME/8	499	10	0	10	519
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BPL for 100 or more originations-plus deliveries

E1BC5 261	KBONA 137	W6OHR 114
W9LYO 229	W4MKH 135	W49ORR 113
W4VAS 206	W9ESI 131	W4QCAP 112
W3MPX 164	W2CF 129	W4PIM 106
W8BCWD 163	W4JOGM 119	W4NSU/1 104
W3IN 153	W4BHP 119	W4ZEP 101
W6OCU 144	W8LW 115	W4DR0 101

More-Than-One Operator Station

W8SH 115

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: W82WNZ, W43MKQ, W44HKP, W8RCWD, K9MRI, K16HZE.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SGM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

1.) *Net Name.* Type or print the net's name exactly as it should appear in the directory. Generally, abbreviations should be avoided, except for commonly understood terms such as ARRL, RACFS, CD, etc.

2.) *Net Designation.* Many nets, especially those operating on cw, have combinations of letters used in call-ups, etc. Examples are PAN; RN6, HN, PYTEN. If your net is commonly known by such a designation, list it in this space.

3.) *Frequency.* List the net's frequency in kHz. If more than one frequency is used, list them all. Also list alternate frequencies used under abnormal circumstances.

4.) *Days per GMT.* This space is provided for listing the days the net operates, according to Greenwich Mean Time.

5.) *Starting time(s).* List the time net operation commences, in GMT. We take no responsibility for errors in directory listings which occur as a result of failure of the registrant to use GMT in items 4 and 5. If you are unable to convert local time to GMT, write HQ for a

NET REGISTRATION	
1. Net Name: _____	
2. Frequency: _____	
3. Days per GMT: _____	
4. Starting time(s): _____	
5. Net Designation: _____	
6. Net Type: _____	
7. Net Area: _____	
8. Net Manager: _____	
9. Net Address: _____	
10. Net Phone: _____	
11. Net Operator: _____	
12. Net Station: _____	
13. Net License: _____	
14. Net Class: _____	
15. Net Power: _____	
16. Net Mode: _____	
17. Net Band: _____	
18. Net Frequency: _____	
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98. Net Frequency: _____	
99. Net Frequency: _____	
100. Net Frequency: _____	

copy of Operating Aid 14, which contains a conversion chart.

6.) *Net meets earlier during DST?* If your net meets by local time, this results in a one hour shift in GMT during the periods in which "Daylight Saving" Time is observed. In this case, check the "yes" circle. If your net meets by the same GMT time regardless of DST, check the "no" circle. If you reside in one of the areas that does not observe DST, generally the "no" box should be checked. But be careful! Nets having wide coverage areas may have some members that observe DST and some members that don't. In this case, it is probably better to check the "yes" box since most of the country does observe DST.

7.) *Purpose.* Check the appropriate boxes, or write in your net's purpose in the blank provided. Remember! For registration, the net's primary activity must be a public service. Racehew, technical and discussion nets usually aren't eligible.

8.) *National Traffic System?* If your net meets the requirements (see the *Public Service Communications Manual*) for being a part of NTS, check "yes". If not, check "no". If you checked "yes", then indicate the level at which the net operates, either local, section, region or area.

9.) *Direct coverage.* Enter the area covered by members of the net. Nets claiming to be part of NTS, but listing excessive coverage, will not be registered as part of the system.

10.) *Liaison(s).* List any other nets with which your net has regularly scheduled liaisons. In the case of nets claiming to be part of NTS, the failure to list liaisons or the listing of improper liaisons may place your standing as part of the system in jeopardy.

11.) *Manager's Call.* Enter the net manager's call. If your net has no manager as such, enter the call of someone who can supply additional information about the net.

12.) *Date submitted.* Enter the date you send the info on your net to HQ.

13.) *Sender's Call.* Enter your own call. Nominal deadline for net registrations is July 15, 1971. Registrations received after that date may not be on time for inclusion in the 1971-72 edition of the Net Directory, in which case the registration will be held for the 1972-73 issue.

Copies of the new directory should be available from HQ about the end of August. The cost? It's free, but a large-sized s.a.s.e. containing at least two units of first class postage will help ensure speedy delivery to you. Without the s.a.s.e., the directory, which will likely have about 25 pages, will be sent via third class mail. **WA9HHH.**

Public Service Diary

While mobiling on I-75 north of Atlanta, Ga., on Mar. 27, W4REI discovered a serious automobile accident which was beginning to block traffic. He was already in contact with W4TJS on two-meter fm, so the Atlanta police were notified and help was sent to the scene of the accident. — **W4REI.**

On March 28, Houston, Texas, police officers arrested a narcotics peddler in Milby Park. Several thousand onlookers became unruly and soon a full scale riot was in progress involving 2000 civilians and 200 policemen. Five amateurs, led by Southern Texas SFC K5HXR, helped provide communications for Red Cross vehicles used in the strife-torn area. — **K5HXR, SEC'S, Tex.**

The same day, the Houston area AREC was again called out when a twin-engined light plane crashed several miles from Houston International Airport. Three Red Cross units, with amateurs

Public Service Honor Roll March, 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 to each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	12	20	3	5	5	
WA8FTX	10	10	12	12	12	1	3	5		65
WB4KDI	10	10	12	12	12	1		2	5	64
WA2EPI	10	10	12	12	12	3	3			62
K3ZNP	10	10	12	12	12	1			5	62
WA2BAN	10	10	12	12	12				5	61
W2OE	10	10	12	12	12				5	61
WB4SMA	10	10	12	12	12				5	61
W0LRW	10	10	12	12	12				8	61
WB2DLJ	10	10	12	12	12	1				57
WA6KUO	10	10	12	12	12	1				57
WA1LPJ	10	10	12	12	12					56
WA2ICU	10	10	12	12	12					56
WA2KHQ	10	10	12	12	12					56
W4OGG	10	10	12	12	12					56
W7L BK	10	10	12	12	12					56
WA8OPH	10	10	12	12	12	7			5	56
W3E2T	8	6	12	9	13				5	53
WA3LXF	10	10	12	9	12					53
W3MPX	10	10	12				3			52
WB4OKT	10	10	12	3	12					52
W6BNX	10		6	6	20			5	5	52
W0LCX	10	2	12		12		3	8	5	52
W7CAF	10	5		12	12	7				51
W9HRV	10	10	12		12				5	49
K0MRI	10	10	12		12				5	49
WA0ZIF	10	10	12		12				5	49
WB4JMH	10	5	12	9	12					48
W6RGF	10	9	12		12				5	48
WA0VAS	10		12	3	20	3				48
WA0YMU	10	10	12	12	4					48
WA1MFB	10	8		12	12				5	47
WB4NNO	10	5	12		12	3				47
W4NOG	10		12		20				5	47
W6MNY	10	5	12	3	12				5	47
WA0KUH	10		6	6	20				5	47
K7CPT	10	12	12		12					46
E7NHL	10	5	12		12	2				46
W8IMI	10	7	12		12					46
WB2LW	10	10		12		5	3			45
W0MEM	10		12		12	6				45
WA1GCE	10	5	12		12					44
WA1HOL	10	10	12	12						44
K4FAC	10	10	12		12					44
WB4OMG	10	10	12		12					44
K5ROZ	10	10	12		12					44
W6LRU	10	5	12		12				5	44
W7OCX	10	5	12	12					5	44
W7PI	10	10	12		12					44
K7UYW	10	5	12		12	5				44
WBRCWD	10	10	12		12					44
WA9WMT	10	5	12		12				5	44
W0BV	10	10	12		12					44
WA0JFC	10	10	12		12					44
WA0TZK	10	5	12		12				5	44
WA0VYV	10	10	6	6	12					44
W7BQ	2		12	12	12					43
WB2LGA	10	8	12		12					42
WA3IPU	10	3	12		12				5	42
WA3OGM	10	5	12		12			3		42
W7AXT	10	5	12		12			3		42

WA8WZF	10	5		12	12				3	42
WA0VYB	5	10		12	6	8				41
W1BYR	10	6	12		12					40
W2MTA	10	10	12		3					40
W6DEF	10	9	12	9						40
WA8VRF		10		12	12	1				40
V4LFO	10		12		12					39
W2FR	10		12		12					39
W2RU1	10		12		12					39
W3LOS	10		12		12					39
W3NEM	10		12		12					39
W5JSM	10	5	12		12					39
W5RBB	10	5	12		12					39
W4SVQE	10		12		12				5	39
W6VNO	10		12		12				5	39
WB8BPY	10	5	12		12					39
WA8LXY	10	5	12		12					39
W0HI	10		12		12				5	39
W4UQ	10	4		12						38
W4SVJW	10	2	12		12	2				38
W6FTF		10		9		19				38
W3FN	10		12		12			3		37
8R1Y/W4	10	3	12		12					37
WB2UFG	10	2	12		12					36
WB4KSL	10	2	12		12					36
WB8ALU	10	2	12		12					36
WB4KJ	10	2	12		6				5	35
WA0EBZ	10	10		12		13				35
W4TFSI	10		12		12					34
K3SKF	10	5	12		12				5	34
W1UBG	10		12		12					34
K2KTK	10		12		12					34
WA3CKA	10		12		12					34
WA3JYC	10		12		12					34
K3JOH	10		12		12					34
W3YA*	10		12		12					34
K4KNP	10		12		12					34
WB4QJD	10		12		12					34
W6INH	10		12		12					34
W6YBV	10		12		12					34
WA7MAD	10		12		12					34
W8I2	10		12		12					34
K8LGA	10		12		12					34
WA0HTN	10		12		12					34
W8L1*	4	5	5	8	10	1				33
WB0BRG	10	10		12	8	1				33
V2ZAPT	5		12	8						33
WA2CCP	8	10		6		3			2	32
WB4LAA	10	10		12						32
WB0BEI	10	10	12							32
WB2NOM	10		12		9					31
WB6ZVC	10		12		9					31
WA9UMI	10		12		9					31
WA3J8U	10		6	6		5			5	30
W6LYY	10		9		6				5	30
W6MMW		10			20					30
W8RCF	10	8		6						30
WA5PM	10		12			3			5	30
K0JSP	10		8		12					30

Category Key: (1) Checking into cw nets, 1 point each; (2) Checking into phone/R14Y nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/R14Y 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. * Denotes multipoint station.

aboard to provide communications, were dispatched to the crash site.

The exact location of the wreckage was not known exactly, but from the information available, WA5FJN, EC Montgomery Co., calculated an approximate position which later proved to be only one-quarter mile off. Amateurs stayed on duty until the wreckage was found in the San Jacinto River. Both persons aboard the small plane perished in the crash. — *KSHAR, SEC 5, Tex.*

On Jan. 16, members of the Brazoria County (Tex.) Amateur Club participated in a county-wide

March-of-Dimes fund drive. Students from seven local schools were stationed at busy street corners and shopping centers to make collections. Base stations were set up at each school and mobile units were used to relay the amounts of the collections to these base stations. The totals were then sent to the central collection point. — *WASMHD.*

Seven Edmonton, Alta., amateurs used two-meter fm equipment to furnish communications for the Kamotik Jamboree on March 6 and 7. Stations were set up in six locations at Edmonton Gardens with the central control point located



the press box where all controlling functions for the Boy Scout event were carried out.

The Licking Co. (Ohio) AREC/RACES operated a booth in conjunction with the Licking County Civil Defense at the Newark Home show March 24-27. The ARPSC portion of the booth featured an RFTY exhibit which proved to be a real attention-getter.

Traffic was accepted from the public and was sent via two meters to local stations who had outlets on the Ohio SSB Net, Buckeye Net and the Ohio Six Meter Net. WA8WCU organized the activity and did much of the operating while the show was open. Assisting him were W8s CGB DIB EOG, WA8s PBE FXD and WN8FWM. — W8EOG, RC Licking Co., Ohio.

Norfolk, Va., area amateurs were alerted on March 25 when high winds and snow were expected to cause flooding in low-lying areas. At 2130Z, the Tidewater Chapter of the Red Cross requested amateur assistance in surveying the area for flood damage. WA4BUE was contacted and, in turn, called up a number of the Norfolk ARPSC. Seventeen amateurs eventually participated. Some moderate flooding developed, but there was no severe emergency. The operation secured about 0300 the following morning. — WA4BUE.

Thirty-eight Section Emergency Coordinator's reports were received at headquarters for the month of February, 1971, thus continuing the rather low ebb of reporting we seem to be in at the moment. As a matter of fact, this is the fewest number of reports received since May, 1969. Number of members reported held up fairly well, with 14,516. A year ago, for the same period, we had 42 reports and 14,685 members. Sections reporting: Alta, Ariz, Ark, Colo, EFla, EMass, EPa, Ind, Iowa, Kans, Mar, Mich, Mont, Nebr, Nev, NLI, NC, NNJ, NTex, Ohio, Okla, Ont, Org, Que, SDgo, Sask, SDak, SNJ, STex, Tenn, Utah, Va, Wash, WV, WMass, WNY, WPa.

Traffic Talk

The subject this month is mailing messages, suggested by a letter from KSMAT. Oh yes, we have discussed it before, but with the probability of postal rates going up, mailing of traffic becomes a greater problem, especially for the younger people we are trying so hard to get into the game.

To further prove that Novices *can* handle traffic, here is a photo of WN0CAP who qualified for BPL during March. Randy, who is 13, had a total of 141 message handlings, mostly on Minnesota Junior Net.

What the letter from Bill suggests is a new HX prosign which stands for "Mail delivery is requested if no other means is available." Bill goes on to say, "I would be perfectly willing to mail a message if I was specifically requested to do so, but most of the trash we handle isn't worth a penny postcard, let alone a nickel or a dime's worth. It would be better, in my opinion, to have the above instruction rather than one which would mean 'Don't deliver if it will cost you.' Quite possibly the definition should be enlarged to ask for a service message back if delivery is not made, but it would seem obvious to me that that would only be common courtesy anyway."

Not only common courtesy, but proper procedure. We won't re-argue the point about judging the contents of messages (this has been argued many times, and it seems amateurs are going to do it anyway). The principal point to be discussed is whether or not there is any merit to mailing messages which cannot be delivered by other means. Most old-time traffic men throw up their hands in horror at the thought of *not* doing so; many of the newer hands feel there is little point to doing so, since in most cases a postcard mailed from the point of origin would have reached the recipient prior to the message.

As for a new HX prosign (G is the next in alphabetical sequence) perhaps, in view of the prospective "high cost" of mail delivery, it should read something like: "Postage reimbursement guaranteed if necessary to deliver by mail." Or would that be violating FCC rules (97.111)? If KSMAT's suggestion is followed, the implication is that we *don't* deliver by mail unless specifically requested to do so. This is contrary to generally accepted practice through the years, is it time for a change?

There is something basically obscene about any suggestion that we downgrade our message-handling service by making ultimate delivery anything other than a foregone conclusion — among ourselves, at least. Oh sure, it's proper to warn the public that the service is voluntary and delivery is not guaranteed, but it's morally wrong for our own procedural rules to accept anything other than ultimate delivery as the culmination of the handling of a message by amateur radio. If you accept the message, you either deliver it or pass it along to someone who can either deliver it or pass it along, etc. If you're in delivery range and can't deliver by telephone, you put it on a postcard. If you can't deliver it *now*, you advise the originating station and get his permission to cancel. These are the simple, straightforward rules under which we have operated for decades. Making things easier is fine, and the desire to do so natural enough, but doing so by lowering qualifications and downgrading service is unprogressive — indeed, it's retrogressive. No matter if it's the national trend, we amateurs should resist it, reverse it in the interest of maintaining the public service image so necessary to our continued existence.

All this is fine, some will say, but it doesn't alter the fact that it costs five times as much now to mail a message as it did when the so-fine rules were devised, and rather than pay the postage many younger amateurs will forego traffic handling. True, this is a problem. But the solution is at the originating end, not at the delivery end. Proper origination of traffic is as much a responsibility as ultimate delivery. Make sure, when you originate a message, that the addressee has a listed telephone. Include it if known (did you know that in most cases you can get out-of-state phone numbers free by dialing 1, plus the area code, plus 555-1212 in most U.S. locations?), otherwise include the name under which listed if other than the addressee. Don't figuratively provide the originator with a postcard at the expense of the delivering station. Make sure the message you originate is deliverable before you put it on the air. *That's* the solution to our delivery-expense problems! — WINJIM.

National Traffic System. W61RU has issued an RN6 certificate to W61NH. W7BQ reports RN7 is meeting at 0330 and 0530Z because of conditions. Bill is also considering the use of 40 meters later on. W8CHT says he doesn't want to complain about the great gobs of traffic 8RN has been blessed with. W9HRY has issued annual 9RN certificates to W9s CXY DND NXG QLW, W49s AUM VZM and WMT. ECN has moved up slightly to 3542 to avoid commercial RTTY on the old frequency. Beginning with the start of "Daylight Saving" Time, ECN's first session will be on 7042 kHz, with the second session returning to 3542. K2KIR reports a basically good month on EAN, but goes on to comment about the summer QRN starting early this year.

March Reports.

Net	Sessions	Traffic	Rate	Avg. Rep. (%)
1RN	.62	548	.386	8.8
2RN	.62	603	.855	9.7
3RN	.62	321	.293	5.2
4RN	.62	579	.404	9.3
5RN	.62	653	.394	10.5
6RN	.62	716	.474	11.6
7RN	.61	348	.351	5.7
8RN	.62	720	.553	11.6
9RN	.62	513	.579	8.3
TEN	.62	486	.427	7.8
ECN	.62	144	.194	2.3
TWN	.60	261	.233	4.4
PAN	.31	1707	1.345	55.1
CAN	.31	1601	1.005	32.3
PAN	.31	1058	.975	33.3
TCC Eastern	128 ¹	761		
TCC Central	93 ¹	563		
TCC Pacific	128 ¹	816		
Sections ²	214	12223		5.7
Summary	3037	25,124	FAN	11.5
Record	3219	33,737	1,420	15.8

¹TCC functions, not counted as net sessions.
²Section and local nets reporting (60): BUN (Utah); SCN, NCN (Cal.); TUN, TEX (Tex.); VEN, FMTA; QFN, FPN, NFN, TPN (Fla.); EPA, PTPN, WPA (Pa.); MTN (Mn.); LAN (La.); QMN (Mich.); WSN (Wash.); PVTN, NJN, NJPTN (N.J.); MDCTN (Md.-D.C.); VSBN, VJN, VSN (Va.); OZK (Ark.); W, Que, VHF, OQN, GBN Ont.-Que.); OSSB, BN, QCEN, SSEN (Ohio); WSSN, WSEB, WTN, REN, BWN (Wise.); CN, CPN (Conn.); GSN, GPN (Ga.); BSN (Ore.); NYS, NLI (N.Y.); SGN (Me.); GNS (N. & C.); WMN (Mass.); MSN, MJN, MSPN (Maine.); LLN (Ill.); AENB, AENI, AENM, AENO, AENR, AENT (Ala.); QKS (Kans.).

Transcontinental Corps. W3FMI reports the month of TCC Eastern was good from the performance angle, with a higher percentage of completed functions, but that traffic was down.

March Reports.

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	125	97.7	761	1989
Central	93	96.7	563	1166
Pacific	125	97.6	816	1632
Summary	343	97.3	2040	4787

The TCC Roster: Eastern Area (W3FMI, Dir.) — W1s BRJ, E1J, NJM, QYY, K1SSH, WA1JTM, W2s FR, GK7 QC, K2KTK, W2Ls ICU, UWA, W3FMI, K3MVO, W4s NLC, SQQ, UQ, K4KNP, W4s GTS, NNO, W5s PMJ, RYP, K8KMQ, W8BYR, W88ALU, VE3ERU. Central Area (W6LCX, Dir.) — W4OGG, W4s UQW, KPL, W5MI, W9s CXY, DND, WA9VZM, WB9DPU, W9s HI, INH, LCX, ZHN, K0A1-M, W10s DOU, IAW. Pacific Area (W6VNO, Dir.) — W5RI, K5MAT, W6s BGI, BNK, FOT, IPW, MIF, MNY, VZT, K6s DYX, KCB, W4A6, DFI, LFA, W7s DZX, EM, KZ, PL, K0JSP.

Independent Net Reports.

Net	Sessions	Check-ins	Traffic
ECTN	26	256	81
Clearing House	27	452	231
7290	46	2145	793
Northeast Traffic	31	300	408
Mike Farad F & T	27	388	199
20 Meter Interstate SSB	23	521	1656
20 Meter North American	27	520	461
FASN	31	239	206
All Service	4	76	19

QST

Strays

Feedback

SS Results, QST, March 1971 the entry of K4FAC, mistakenly placed in the Virginia section, should have been in Eastern Florida.

The log of WA7FHD/KH6 60,316-445-68-A23 should have been listed under the Hawaii section.

The triple spark gap shown on p. 21 of April QST now appears to be part of a diathermy machine rather than a component of a three-phase spark transmitter as stated. Our thanks to sharp-eyed Dallas Johnston, W9AAG, for the correct information. — W1ANA

The circuit diagram on page 12 of QST for April 1971 should show contacts 2 and 3 of S2A shorted together.

Lowell D. Fair, K4SZC (center) of the Computer Analysis Branch of Information Systems, Kennedy Space Center, Florida, has been named Handicapped Federal Employee of the year in a contest sponsored by the Florida Federal Management Association. The award was presented to K4SZC by Miles Ross (r), Deputy Director of the Space Center. (Spaceport News via K41JN)



Part 1 of this article appeared in the May issue of *QST*; it outlined the history of the international regulation of radio.

GENEVA—1971

BY PERRY F. WILLIAMS,* W1UED

WE HAVE now shown, very briefly, what has happened on the early days up to the present time in terms of international regulation. Let us go back now and see what the U.S. laws were and what kind of domestic treatment we got under them.

National Regulation

The outstanding thing about early radio law in this country is that it was an awfully long time before we got the first one.⁴

There was no United States radio law in 1903 at the time of the first Berlin international conference already mentioned, nor was there one in 1906, at the time of the second Berlin affair. It might be thought that this country was obligated to have some sort of national law or regulations after the 1906 conference, in order to carry out the agreements made there to which the U.S. had been a party. The reason there wasn't is that, although we had signed the treaty, we didn't ratify it until six years later; there had been quite a lot of squabbling and disagreement about that treaty, anyway.

So we see the years dragging on through 1906, '07, '08, '09 — and still no U.S. law on radio. This doesn't mean that no law was needed; indeed, by the latter part of this period "wireless" was assuming considerable proportions in the daily life of the world. But with no laws here amateurs could operate with whatever call, wavelength and power they wished, subject to no regulations whatsoever — and that is precisely what they all did!

In 1910, a very brief law was passed requiring ships of a certain size to carry radio equipment, but it said nothing more than that and has no real bearing in the present discussion. The Act was subsequently modified slightly by another similar act in 1912 but that, also, is of no concern to us.

The year 1912 is highly significant from our standpoint, for in that year three things happened: first, our Senate finally ratified the 1906 Berlin agreement; second, we participated in the 1912 London Radio Conference and signed the resulting treaty (it was promptly ratified early in 1913); third, the United States wrote its very first radio legislation. This was the so-called 1912 Law, under which we were to operate for the next fifteen years.

Now, we want to direct particular attention to this law because this is the one of which it has been said that it granted amateurs all the territory from 200 meters down, for their own exclusive use. Did it? Let us examine that law and see.

To begin with general considerations, it may be said that the law required that henceforth all transmitting stations in the United States must be licensed. Authority to issue licenses was delegated

to the Secretary of Commerce and Labor. There were sections calling for the use of a pure and sharp wave, etc., one requiring listeners to observe the secrecy of messages, provision for punishment of violation of the regulations or the transmission of false distress calls. No individual services were defined except our old familiar stand-bys from international treaties, the coastal stations and ship stations.

"200 Meters and Down"

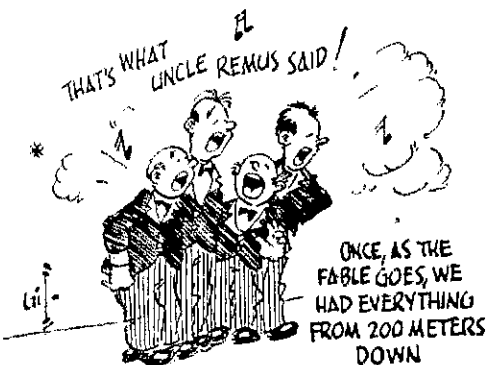
This is all fine, but what about wavelength assignments, and particularly that part of the law giving amateurs 200 meters and down? All right, here goes for the wavelength assignments: the 300-meter wavelength was specified for general public-service work, per the international agreements of 1906 and 1912. Furthermore, with one exception, all stations were authorized to use any wavelength they chose, provided they stayed below 600 or above 1600 meters — this again being simply a duplication of the international specification of the time. Now, some readers have by this time noticed that phrase "with one exception." Yes, that exception is the one that is supposed to have given hams everything from 200 meters down. We will quote that article in full. Here it is:

General Restrictions on Private Stations.

Fifteenth. No private or commercial station not engaged in the transaction of *bona fide* commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wavelength exceeding two hundred meters, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labor contained in the license of the station: *Provided:* That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third⁴ and fourth⁵ regulations to the penalties of one hundred dollars or twenty-five dollars, respectively, provided in this section, unless the person maintaining or operating such station shall

⁴ The third regulation required the use of a "pure wave."

⁵ The fourth regulation required the use of a "sharp wave."



*Senior Assistant Secretary, ARRL

have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

[Following this was regulation No. 16, stating that any station of the above class within 5 nautical miles of a naval or military station had to keep under 200 meters and under *one-half* kilowatt in power.]

It may be added, that's all that was said on the subject, in the 1912 law.

Now, did this grant amateurs the exclusive use of the territory below two hundred meters? Alas, it did not! To begin with, this was not a grant of privilege to certain classes of stations: it was, instead, a restriction. Unless certain stations were engaged in transacting business, or developing apparatus in that connection, they couldn't go above 200 meters.

Were amateurs the only ones so restricted? Not at all; as a matter of fact, amateurs are not even mentioned. Read the start of the quoted section; it will be seen that the restriction applies equally to private and commercial stations. If this section can be interpreted as granting amateurs "200 meters and down," it also grants certain classes of commercial stations precisely the same privilege. However, it is important to note at this time that "private station" and "amateur station" are not the same. As we have already pointed out, the section doesn't mention amateurs as such. To be sure, amateurs at that time were classified as "private stations" — but so were a number of other classes! School and training stations were "private stations." So were many of what we now think of as "experimental" stations. Stations set up by a firm to enable it to conduct its own business between its various branches were private stations. About this time, it becomes apparent that between the broad interpretation of "private station" and the inclusion of that "or commercial" the Fifteenth regulation was meant to apply to virtually every station unless it was conducting commercial business (or developing apparatus in that connection). Correct! It was!

Nor is that all; we point again to the fact that the section says only that the specified types of station cannot go above 200 meters (or over 1 kw.) without special authority. Well, how about the regular commercial stations that were allowed to operate above 200 meters; could they also go below 200 if they wished? The answer is that they could. The authority is contained in the second regulation, which we quote:

Second. In addition to the normal sending wavelengths, all stations, except as provided hereinafter in these regulations, may use other sending wavelengths: *Provided* that they do not exceed 600 meters or that they do exceed 1600 meters . . . [there then follows some dope on use of pure and sharp wave].

The only "except as provided hereinafter" contained in the law was the Fifteenth section already quoted.

Let this, then, be said: the 1912 law, to the extent that it gave amateurs the territory from 200 meters down, assigned precisely the same privileges, by law, to every other class of station in the country.

Except for a period during World War I, when all radio stations were closed down, this is the law

which we operated under for fifteen years. Incidentally, since another part of this law stated that stations should specify their operating wavelengths in their applications, practically all amateurs gave "200 meters" as their operating wavelength, and then tried to edge up higher than that if they could get away with it! As a matter of interest, no amateur license issued in the United States ever stated that the licensee was entitled to use all the territory from 200 meters down.

Although not affecting any very large group of amateurs, special arrangements were effected during this time between the ARRL and the Department of Commerce whereby certain "above-200" wavelengths were made available to outstanding amateur relay stations.

"The Hoover Conferences"

We have said that the 1912 law was the only one we had until the Communications Act of 1927 was passed. Now, it is apparent that nothing in the 1912 law creates special bands for the various services (we have quoted all the 1912 law which applied to wavelength grants or limitations), yet it is a fact that, three years before the 1927 international conference, amateurs in the U.S. were operating in specific bands of frequencies in the short-wave spectrum.

How come?

All right — brace yourself, for we suspect this will be news to many — those bands were not assigned under law, they had no legal standing, and we had them solely on the basis of temporary and informal agreement with the other radio services of the United States.

Here's the story:

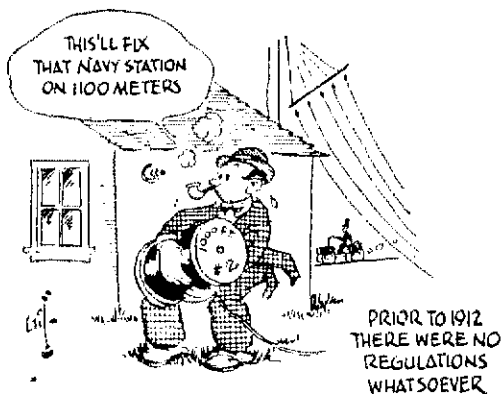
Following the 1912 law, nothing much happened to disturb the tranquility of two-hundred-meter operation until around 1923, when a small group of amateurs (and commercials, too, if we are to be truthful) began going to the wavelengths well below two hundred, to see if they were feasible for communicating purposes. As we now know, they most certainly were, but it took a transatlantic QSO⁶ to make the average ham believe it, at that time. An interesting sidelight here is that since all amateur stations at that time were required to specify their operating wavelengths, and since these were invariably of the order of 150, 175 or 200 meters, it was necessary for the first short-wavers to get special permission to operate on such wavelengths as 100, 90 and 60 meters — these not having been specified in the licenses!

At any rate, when the short waves began to demonstrate their worth around 1924, everybody in creation made a headlong rush for them. Remember: under the ancient 1912 law, still in effect at that time, every single service in the United States had equal rights with everyone else for the use of the short waves!

Now, keep a firm grip on everything up to this point while we backtrack a couple of years to 1922 to pick up some dope that is going to constitute part of our 1924 picture.

Around 1922 it was apparent to the then Secretary of Commerce (Herbert Hoover, Sr.), who was charged in the 1912 law with administering radio, that the law was hopelessly inadequate for existing conditions. A new law was badly needed, but Congress, with the same slowness which characterized its belated enactment of the original law, simply couldn't seem to get around to making

⁶ 1MO-XAM (U.S.) with 8AB (France), Nov. 27, 1923.



one. So Secretary Hoover called the first of what came to be known as the "Hoover Conferences" at Washington, participated in by representatives of all the radio interests in the country, to see if some mutual agreements couldn't be worked out and some recommendations for the legislators evolved. The League was in on them from the start.

The first of these advisory conferences, in 1922, didn't do very much as far as we are concerned, except that it recommended enactment of proper legislation to deal with radio, suggested certain amateur frequencies (of no interest to us, at the moment, since they were around 200 meters), suggested a definition for amateurs (the 1912 law had no such definition), and recommended that amateur status be defined by law and amateur wavelength assignments ditto. Another recommendation was for the creation of amateur deputy inspectors, possibly at a dollar a year, to help out in amateur regulation! Unfortunately, although a number of radio bills were subsequently introduced in Congress, nothing was actually done in the way of legislation to carry out any of these recommendations. Perhaps it was for this reason that the recommendations of the succeeding Hoover conferences actually became regulations by reason of their adoption as such by the Department of Commerce - not with authority of law, however, but purely on the basis of mutual agreement among services. This curious regulatory status lasted until the "blowup" of 1926, of which we shall speak shortly.

The second conference took place in 1923; the short waves had not yet opened up, and the conference recommendations for amateurs were all in the vicinity of 150-200 meters. Amateur radio would have kicked like the dickens if they had been anything else.

The third conference was in 1924; between it and the second the short-wave business had split radio wide open! The 1924 conference was tremendously important, therefore.⁷ However, bear in mind that nothing any of these Hoover conferences did had any actual legal status. The recommendations were nothing more than recommendations; such agreements as were reached were on the basis of mutual understandings between services, temporarily (and illegally) incorporated into the regulations by mutual consent and

⁷ Since the short waves "broke" several months before the conference, the ARRL had negotiated several special low-wave bands for amateurs, pending the decisions of the conference. The resulting conference agreements were considerable expansions over the space made available by these temporary assignments.

thereafter observed by all until a new law came along. Actually, by this time everyone in radio realized that the wording of the 1912 law was such that the Secretary of Commerce had been given no authority whatsoever to enforce any wavelength assignments other than those set forth in the law itself. When the short waves first opened up, every service in the country - Government, commercial and amateur - could operate anywhere it wanted to in the short-wave territory, and did, with increasingly chaotic results. The 1924 conference represented an attempt to solve an otherwise impossible situation by means of mutual agreements to be voluntarily respected by all services until the law could come along and catch up. Everybody was perfectly aware that the "regulations" resulting from these agreements were not binding, but everyone knew also that some sort of order was essential in order to continue operating at all.

In many respects, this 1924 Hoover Conference was a modern international radio gathering on a small scale. Every domestic service was present pushing for all the short-wave territory it could get. The "shorts" were so brand-new that nobody had a clear idea of which waves were good for what; for that reason, everyone was out to get all that could be got, from one end of the scale to the other. The outcome of the 1924 meeting was amateur bands as follows: 1500-2000 kc., 3500-4000 kc., 7000-8000 kc., 14,000-16,000 kc., 56,000-64,000 kc.

It was recommended that the Supervisor of Radio decide whether one license would permit the use of all these bands or whether multiple licenses would be necessary (it was later agreed that one would do the trick). Incidentally, it will be noticed that we were embarked on the idea of maintaining a harmonic relationship, so far as possible. The omission of any ten-meter assignment in the table, however, is not accidental; there was no assignment. The reason for this is that the Hoover series did not extend as far as the ten-meter territory. The 5-meter assignment was incorporated by special request solely because of the fact that a small group of experimenters wished to work there; the same reason applies to a subsequent 400-401-Mc. assignment for beam experiments, made shortly after the conference by the Department of Commerce at the special request of ARRL.

Other bands were assigned to the various other services which wanted space in the spectrum and which, remember, were just as much entitled to it as we were.

Since the 1925 conference did nothing to alter this general set-up we will skip over it and say that during 1924, '25, and '26 we here in the U.S. operated in the 1924 bands. By mutual agreement, of course.

The 1927 Law

In the meantime, Congress was being bombarded with requests and entreaties for a new law but was still doing nothing about it. How long this might have gone on no one knows had it not been that in 1926 the so-called "breakdown of the law" came about when a broadcast station which didn't like its assignment on the mutual-agreement basis made a test case resulting in a court opinion denying the Secretary of Commerce the authority to compel stations to observe any specified wavelength assignments (outside the very broad limits previously mentioned in the basic law).

Overnight, all the existing "regulations" which specified definite wavelength assignments were rendered inoperative. Any other service that wanted to could have started to operate in "our" bands, for instance. It was a tense moment! Would all the radio stations in the country jump their assignments? Well, they could have, but most of them didn't; almost unanimously, the radio world in this country sat tight on its Hoover agreements, one of the most remarkable spectacles radio regulation will probably ever see.

However, this upset of the 1912 law had the effect of spurring Congress to the realization of the absolute necessity for a new law and so in 1927, the same year when the Washington International Conference was held (but before that affair), Congress passed the Radio Act of 1927 which not only defined amateurs for the first time in any law, foreign or domestic, but set up a Federal Radio Commission to administer radio matters and gave it the necessary authority to make regulations that would stick. As soon as the commission was created, we got it to assign to us the same wave-bands that had been agreed upon at the 1924 Hoover Conference, except that we had a 10-meter band included.

We are now almost through with the story. Discerning readers may at this point ask how we could get the Hoover bands assigned to us under the 1927 U.S. radio law when our Government was a party to (and ratified) the 1927 international treaty which gave us somewhat different territory — specifically, narrower bands at 7 and 14 Mc.⁸ The answer is that the 1927 U.S. law went into effect before the Washington conference was held and, further, that the terms of the Washington conference did not go into effect until January 1, 1929. Until January of 1929, therefore, our Government let the wider-band specifications stand as U.S. law. On January 1, 1929, however, it immediately amended our amateur regulations to conform strictly to the international agreements.

From that time to the opening of the second World War, through both national and international regulations, we retained the bands first set up for amateur use in the Washington International Treaty of 1927.

This concludes a very rapid and rather brief resume of our amateur progress in terms of legislation. It is, needless to say, impossible in such an article as this to go into detail or to describe adequately the tremendous part played in all amateur matters by the ARRL ever since the League's formation.

The Coming Conference

And so on to Geneva, and the Space Conference opening in June. This time, we can go in confidence that our hf assignments are not in jeopardy. It would be folly to be overconfident on the vhf and uhf freqs. at the moment, and it's impossible to predict the outcome of the major

⁸ Although the U.S. government's proposals for amateurs at the 1927 international conference were for the same bands we were using domestically as a result of the Hoover agreements, practically every other nation was bitterly opposed to amateurs having any appreciable bands — or even any privileges at all in the high-frequency spectrum. The bands we got represented the only compromise our Government could secure in the face of an almost unanimous effort on the part of the other governments to bar amateurs from the hf spectrum entirely, or permit it only under the most restricted conditions, such as use of dummy antennas, etc.

questions, "May future Oscars operate only in worldwide exclusive amateur bands? Only vhf? How about the regional exclusive bands? How about ten meters? The uhf bands shared with radiolocation?"

The League, let it be said, knew this conference was likely back before the first official announcement of June 1968. When FCC established its Notice of Inquiry, Docket 18294, the League promptly registered its interest. As we have earlier said, the joint ARRL/Amsat filing in response to the Sixth Notice, has become part of the U.S. position. The League was in attendance at the meeting held by the Department of State a few months ago on remaining aspects of the U.S. position. The League, as headquarters for the International Amateur Radio Union, has been assisting other countries to get the strongest possible position taken by their governments. In short, U.S. amateurs are prepared for this conference, as they have been for every one since 1927 — and of course, that's the number 1 reason why we amateurs have united in a League in the first place.

The author has drawn heavily on earlier articles by the late ARRL General Manager A. L. Budlong, WIBUD, particularly for the historical material in this Part.

QST

Strays

When WA3MWM gets a new group of youngsters in his school radio club he asks them to answer a questionnaire on amateur radio. Here are some of his 7th graders' answers to the question, "What is an amateur radio operator?" Don't know. . . . A person who has a special transceiver and talks to people around the world. . . . Ham — a person that sends messages by radio to another person. . . . A person who uses short wave radios. . . . To be able to run ham radios and know how to use them. . . . nothing . . . it's a radio operator that does not know everything about radio operating. . . . it's a radio that picks up sound. . . . When you talk and listen to other countries in the world on a radio with a mike. . . . A person who owns a radio which he can talk to anyone he likes too. . . . A person who used walkie-talkies or a short wave radio to call in police for emergencies. . . . a person who has a license to own and operate a radio set.

It looks like Tiny, The Magical Musical Clown, (March QST) will have to move over and make room for a few additions to our growing roster of "ham clowns." Since W6JCR asked if there were any other hams professionally in the field, we've heard from Freddie the Clown, K4UGC, and Grover the Clown, WA8WPQ. Grover informs us that W8BCB is also a member of the fraternity.

Stolen Equipment

Stolen from WA6WDY's summer home in Sherwood, Oregon: Hallicrafters HT-37, serial 337002-213411. Anyone with information contact Albert M. Bojanower, 7519 East Fourth Place, Downey, CA 90241.

COMING A.R.R.L. CONVENTIONS

- June 12-13 - Georgia State, Atlanta
June 19-20 - Rocky Mountain Division,
Colorado Springs, Colorado
July 3-4 - West Virginia State, Jackson's
Mill
July 2-4 - Pacific Division, San Jose,
California
September 4-6 - Southwestern Division,
Anaheim, California
September 24-25 - North Carolina State,
Raleigh
October 9 - Dakota Division, Sioux Falls,
South Dakota

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.

ROCKY MOUNTAIN DIVISION CONVENTION Colorado Springs, Colo. June 19-20, 1971

The 1971 Rocky Mountain Division Convention is sponsored by the Pike's Peak Radio Amateur Association and will be held June 19-20 at the Antlers Plaza Hotel in Colorado Springs. Scheduled activities include DX, fm, vhf, RTTY, MARS, ARPS/RACES, YLs, traffic nets, and much more.

The ARRL Forum will be a convention highlight. Latest ham gear and the Pueblo Ham Club ARRL FM Repeater will be on display. A swap shop will be loaded for bargain seekers.

Advance registration is \$4 until June 1, \$5 at the door. Ladies' luncheon and fashion show Saturday noon, \$3.25. Saturday night "Garden of the Gods" Chuckwagon Steak Dinner, \$3.50. Sunday noon banquet with major awards presentations, \$3.75. Registrations to Bill King, W0LKD, 2916 North Institute, Colorado Springs, CO 80907.

PACIFIC DIVISION CONVENTION San Jose, California July 2-4, 1971

Continuous demonstrations coordinated with technical talks, together with a full operational program, will be a highlight of the 1971 Pacific Division Convention, July 2, 3, and 4, 1971, at the Hyatt House Hotel, Bayshore Highway and North First Streets, San Jose, California.

A continuous technical demonstration room area will be set up with demonstrations of many types of teleprinter machines, standard and slow-scan TV, and a working vhf fm repeater set-up. Technical talks will be coordinated with these demonstrations.

There will be a regular technical program featuring antennas, linear amplifiers, latest solid-state and integrated-circuit design and a special feature will be a talk on radio propagation by Mike Villard, W6QYT, and Jim Lomasney, WA6NIL.

A complete ladies' program is scheduled, including a series of bus tours through the Santa Clara Valley, stopping at points of interest including Mission Santa Clara and a winery, a ladies' luncheon, the YLRL Forum, and arts and crafts

demonstrations. There will be a ladies' hospitality room with coffee and donuts available. Caroline Gmelin, K6BCM, and Helen Gaetano are co-chairmen of the ladies' program.

Doug Blakeslee, W1KLK, Assistant Technical Editor, *QST*, will talk on recent amateur radio equipment designs and George Hart, WINJM, ARRL Communications Manager, will represent the operational aspects of the League with sessions on traffic and net operation, ARPS, and the National Traffic System.

First Vice President Charles G. Compton, W0BUO, will be present at the ARRL Open Forum, conducted by Pacific Division Director Jean A. (Doc) Gmelin, W6ZRJ, Ney Landry, K6RI, Engineer-in-Charge of the FCC San Francisco Field Office, will also be present to answer questions.

The Convention will be topped off with the traditional banquet activities Sunday evening, July 4. The banquet will be preceded by a no-host cocktail party on the patio of the Hyatt House Garden area.

While the Convention officially ends at the conclusion of the Banquet, July 5 has been set aside as a day for meetings and breakfasts or luncheons by amateur social or technical groups. Special arrangements have been made with the hotel, and rooms will be available. There will also be group breakfasts arranged by the convention committee for the various amateur organizations. For further information on arrangements, contact the committee.

Tickets for the Convention are \$12 before June 20 and \$14 thereafter. A special price for an OM and his XYL or YL has been set at \$20 per couple if tickets are purchased together and before June 20. For advance registration and information, write Associated Radio Clubs, P.O. Box 6, San Jose, CA. Rooms at the Hyatt House start at \$18, and reservation information is available through the Associated Radio Clubs.

WEST VIRGINIA STATE CONVENTION Jackson's Mill July 3-4, 1971

The Thirteenth Annual West Virginia State Convention will be held July 3 and 4 at Jackson's Mill. The Mill is located near Weston, W. Va. and is a natural for a family outing. Activities are planned for the whole family. Convention opens with lunch on Saturday. Presentation of the Outstanding West Virginia Amateur Award, MARS, code copying contest, swap and shop, flea market, radio controlled aircraft, special activities for the ladies, and much more. A highlight of this year's convention will be Lew McCoy, W1ICP, from League Headquarters, with his popular technical sessions.

Full registration tickets include lunch and dinner Saturday, dormitory lodgings, breakfast and lunch Sunday, and registration fee. Full registration is \$10.00 for adults and \$6.00 for children 12 and under. Tickets should be ordered from Vivian Kibler, WA8OKG, 182 Monterey Drive, St. Albans, WV 25177. Registration-only tickets are \$3.00 each or two for \$5.00. This fee entitles you to participate in the many activities of the convention but does not include any food or lodging. Registration-only tickets may be ordered from George Puzzuole, K8QEW, 3616 Morgan Drive, Weirton, WV 26062. Please make check or money order payable to West Virginia State Convention. An s.a.s.e. will be appreciated. Brochures are available from the convention secretary, Vivian Kibler, WA8OKG.

Hamfest Calendar

JUNE

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			

Florida - The third Annual Ham Camporee, sponsored by the Brandon ARS, will be held at Florida Camplands Camp Ground near Brooksville, Fla., on June 11, 12, and 13. Advance registrations are not required. Contact Gene Burton, Brandon, FL 33511.

Indiana - Indiana Radio Club Council's annual picnic is Sunday, July 11, at LaPorte County Fairgrounds, LaPorte, Ind. Large flea market with reserved locations available for large exhibitors and vendors on the Midway and in the Main Building. Mobile fm clinic. Write P.O. Box 272, LaPorte, IN 46350.

Manitoba - Eighth Annual International Hamfest, July 10 and 11 at the International Peace Garden, bordering North Dakota and Manitoba. Activities will include transmitter hunts, mobile displays, games, dancing, swap tables and fun for all. Good camping facilities, too. For more information, write Ron Samchuk, VE4SR, 834 9th St., Brandon, Man., Canada, or William T. Bosley, WB0ATJ, 514 South Main St., Rugby, ND 58368.

Missouri - Hambutchers Net Annual Picnic is June 19 and 20 at Swope Park, Kansas City. Bring dish - send and drinks furnished. Registration is \$1.50. Write to WA0BHG, Forsyth, MO 65653.

New Jersey - The Fifth Annual meeting of the Medical Amateur Radio Council will be held at the Traymore Hotel in Atlantic City, N.J. on Thursday, June 24, starting at 9:30 A.M. This will be an all day program featuring speakers on

subjects such as medical communications, bio-medical engineering, medical journalism and amateur radio, and reciprocal licensing. Dinner with an outstanding speaker will conclude the day. For information on registration and costs write to Joseph J. Boris, MARCO, P.O. Box 229, Manchester, CT 06040. You may also register at the hotel the day of the meeting.

North Dakota - See Manitoba.

Ohio - The Goodyear ARC will hold its 4th Annual Hamfest Picnic on Sunday June 20 at Goodyear Windfoot Lake Park, 1 mile west of Suffield, on County Rd. 87 near Ohio Rt. 43 (Waterloo Rd.) from 10 A.M. to 6 P.M. Mobile check-in on 50.4 a-m and 146.94 fm. Family tickets \$2 each. For tickets and more information, contact Paul M. Smith, WA8NRK, 1509 Hyde Park Ave., Akron OH 44310, telephone 216-633-5423.

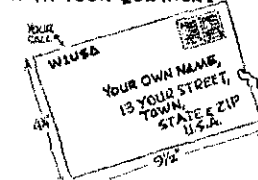
Pennsylvania - The Milton ARC and the West Branch ARA are jointly sponsoring the Penn Central Hamfest to be held Sunday, June 13. Write R. D. Baker, K3RCM, The Milton ARC, 708 N. Front St., Milton, PA 17847 for information.

Pennsylvania - The Foothills RC of Greensburg will hold its Fourth Annual Hamfest on July 11. For more details, write Ralph Nickols, K3SHU, 404 Huff Ave., Greensburg, PA 15601.

Tennessee - The Second Annual Music City Hamfest will be held in Nashville at Edwin Warner Park (Picnic Area No. 3) on Sunday, June 20 (Father's Day). There is ample parking space, shelter, and playground for the children. Bring a picnic lunch or purchase food and soft drinks which will be available at the Hamfest.

Texas - The Southwest Traffic Net get together will be held on June 19 at the Electric Living Center on West Loop 610 in Houston. This affair is open to all radio amateurs, especially net members. . . any net. Plan to spend the night. Coffee and donuts will be available Sunday morning. Registration is \$2 for adults, \$1 for children. Please direct all inquiries to WA5ZZT, Harold Rosee, 6530 Tulip Lane, Dallas, TX 75230.

IS YOURS ON FILE WITH YOUR QSL MGR?



A.R.R.L. 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 1/2 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, WN1 - Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.
- W2, K2, WA2, WN2 - North Jersey DX Assn., PO Box 505, Ridgewood, New Jersey 07451.
- W3, K3, WA3, WN3 - Jesse Bieberman, W3K1, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.
- W4, K4 - H. L. Parrish, K4HXE, RFD 5, Box 804, Hickory, North Carolina 28601.
- WA4, W4, WA4 - J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.
- W5, K5, WA5, WN5 - Kenneth F. Isbell, W5OM1, 306 Kesterfield Blvd., Emd, Oklahoma 74701.
- W6, K6, WA6, WN6 - No. California DX Club, Box 11, Los Altos, California 94022.
- W7, K7, WA7, WN7 - Willamette Valley DX Club, Inc., PO Box 585, Portland Oregon 97207.
- W8, K8, WA8, WN8 - Columbus Amateur Radio Assn.,

- Radio Room, 280 E. Broad St., Columbus, Ohio 43215.
- W9, K9, WA9, WN9 - ARRL 9th area QSL Bureau, Box 519, Urbana, Illinois 62526.
- W0 - Peggie Hoare, W0QYP, P.O. Box 115, Mitchellville, Iowa 50169.
- WA0 - Lloyd Harvey, W0QGL, P.O. Box 7, Atleta, Iowa 50124.
- K0, W0, WA0 - Dr. Philip D. Rowley, K0ZEL, Route 1, Box 455, Alamosa, Colorado, 81101.
- KP4 - Alicia Rodriguez, KP4L, PO Box 1061, San Juan, P.R. 00902.
- KZ5 - Canal Zone Amateur Radio Association, Box 407, Balboa, Canal Zone.
- KH6, W16 - John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.
- KL7, W17 - Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
- VE1 - L.L. Lader, VE1EO, PO Box 663, Halifax, N.S.
- VE2 - John Ravenscroft, AF2NV, 353 Hochcrest Ave., Montreal 780, Quebec.
- VE3 - R.H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario.
- VE4 - D.L. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5 - A. Lloyd Jones, VE5H, 2328 Grant Rd., Regina, Saskatchewan.
- VE6 - Karel Teitelhaar, VE6AAV, Sub. Po 55, N. Edmonton, Alberta.
- VE7 - H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.
- VE8 - George T. Kondo, c/o Ministry of Transport, Norman Wells, N.W.T.
- VO1 - Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland, land.
- VO2 - Goose Bay Amateur Radio Club, PO Box 237, Goose Bay, Labrador.
- SWL - Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

These bureaus prefer 5x8 inch or #50 manila envelopes.

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

Note: Stations operating portable should continue to receive their QSL cards at the bureau in their home call area; i.e., WA1QRX/VE8 gets his cards through the W1 Bureau.

Happenings of the Month

FEE SCHEDULE REMAINS

When FCC adopted higher fees effective August 1, 1970, ARRL filed a Petition for Reconsideration and Hearing (page 84, October 1970 *QST*). The Commission has now turned down a number of petitions for reconsideration and requests for review (including ours), making only relatively minor changes in a few services other than amateur. In doing so, the Commission reminded all hands that: "Congress, in considering FCC budgets, had earlier urged the Commission to increase its fees to fully support all its activities."

The Commission placed principal reliance on the fact that "the amateur fees are nominal and modest permitting an amateur to operate for five years." It did not, therefore, answer each point amateurs made in attempting to set aside the increases. The pertinent paragraph follows:

28. Three petitioners, the American Radio Relay League, Inc. (ARRL), Chicago Area Radio Club Council, Inc. (Chicago), and the PHD Amateur Radio Association, Inc. (PHD), were concerned with the amateur section of the fee schedule. The ARRL contends that the impact of the new fees may be so severe as to bring about a decrease in the number of amateur radio operators. ARRL also asserts that the "hundreds of comments" supplied by the amateurs were ignored because no mention was made of them in the report and order adopting the new schedule. The Commission is of the opinion that the ARRL has not demonstrated that the imposition of generally modest fees will have the impact predicted by the League. Concerning the complaint that the amateurs' comments were ignored, we can only reiterate that the comments were read and considered; notwithstanding that the text of the report and order failed to identify each and every comment, there is no reason to conclude that they were ignored. The Chicago and PHD petitions proposed exemptions for various categories of

amateur licensees. Chicago also proposed the waiving of fees for reexaminations for licenses in the Amateur Radio Service after failure to pass the examination on which the original fee had been paid. We believe that the fee exemptions and waiver proposed by Chicago and PHD are not adequately supported by factual showings. To carry out the requested exemptions and to provide for the waiver request would not be in the public interest, since the fees are nominal and modest permitting an amateur to operate for 5 years. We are, therefore, denying the petitions of the ARRL, Chicago, and PHD.

The Supreme Court six years ago refused to review the establishment of fees by FCC; thus, it appears that the matter is at an end.

The current fees, therefore, remain in force:

New, renewed, modified-and-renewed or up-graded licenses	\$9
Modified licenses	\$4
Special call signs, as per §97.51	\$25
Duplicate licenses	\$6

No fee is charged for military recreation licenses, RACES authorizations, or Novice tickets.

FUTURE CITIZENS BILL

The Goldwater bill, S-485, which would permit resident aliens (who have declared their intention of becoming citizens) to receive amateur licenses from FCC, has been introduced in identical form to the House of Representatives (HR-7343) by the Honorable John Kyl, of Iowa, at the request of ARRL President Robert W. Denniston, WØDX. In the last session of Congress, the bill passed the Senate and was favorably reported by a House subcommittee, but there wasn't time to complete action before adjournment.

An ironic note: George Pataki, ex-YO2RO, who was one of the first to seek the legislation, is now an American citizen and has passed his FCC examination!

FCC INQUIRES ABOUT TVI

The Federal Communications Commission has issued a Notice of Inquiry, Docket 19183, asking for comments on interference to television - primarily from fm broadcasting, but also from other sources. It also asks what sort of rejection performance can be expected from current TV receiving installations.

The February, 1971, *QST* Cover Plaque Award was won by William J. Hall, K1RPB, for his article, "The ATR-166." In the photo, left to right, are: Bill; his son, Tom; ARRL New England Director Robert York Chapman, W1QV; and William R. Ferry, K1BZM, president of the Hampton County ARA.



Individuals or groups may file comments until July 1; an original and 14 copies are asked for, and, since this is not primarily a docket in which private individuals are expected to comment, it might be well to meet the "original plus 14" stipulation if one is able to.

The timing was right on this docket for discussion at the ARRL Board of Directors meeting on May 7; see page 10 of this issue for highlights of the meeting and the complete minutes in the July number.

The text of the Inquiry follows:

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

In the Matter of

Inquiry into performance of television broadcast receivers and location of FM transmitters to alleviate interference to television reception.)

DOCKET NO.
19183

NOTICE OF INQUIRY

Adopted: March 24, 1971 Released: March 31, 1971
By the Commission: Commissioner Robert E. Lee absent.

1. The purpose of this Inquiry is to develop data and recommendations as to television receiver improvements and revised FM broadcast assignment principles which can be used to alleviate various kinds of interference to television reception.

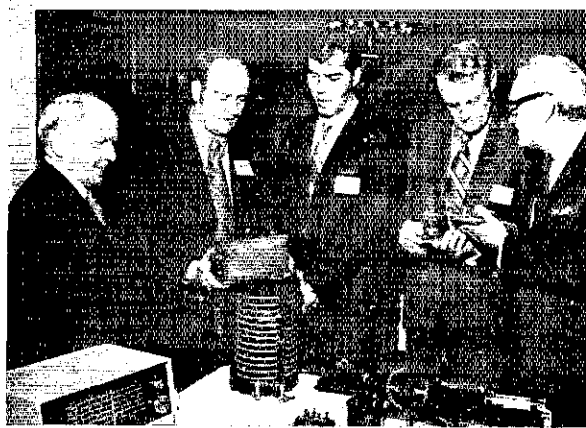
2. In March 1970 the Association of Maximum Service Telecasters (AMST) and the National Association of Educational Broadcasters (NAEB) began discussions with the Electronic Industries Association (EIA) concerning improvement of television receivers to obtain greater rejection of FM broadcast signals.

3. On September 10, 1970, a meeting was held between these parties on the Commission's premises and attended by members of the Commission's staff. The meeting also included representatives of the Corporation for Public Broadcasting (CPB). The discussion at this meeting indicated that remedial measures for the interference problem should include not only improved receiver performance, but that booster amplifiers, antennas and assignment principles are also involved.

4. The CPB and the NAEB were especially concerned about the number of applications for FM educational broadcast stations which are being held by the Commission because of potential interference to Channel 6 TV signals. At the same time, they were apprehensive of claims by WOW-TV, Omaha, Nebraska, that operation of an educational FM station in Omaha has caused considerable loss of audience to WOW-TV.

5. The AMST, by letter of October 12, 1970, requested that the Commission form an advisory committee, under the provisions of Executive Order 11007, to study this interference problem and to assist the Commission in solving it.

6. We are also concerned about susceptibility of TV receivers to interference from signals other than FM broadcasting. Accordingly, this inquiry is



The Presque Isle Amateur Radio Club had its annual banquet on February 27 in Erie, Pennsylvania. Here, examining early gear, are: George C. Stary, a radio historian; John Gebler, W3BRB; John A. Yokoff, K3AFO; Ernie Trant, Safety Director, General Telephone Company and guest speaker; and Connie-Mac McConaghy, W3EPC, ARRL Atlantic Division Director.

broader in scope than the FM interference problem. It encompasses interference from any source to TV reception, either off the air or by cable.

7. After consideration of this matter, we are of the opinion that an advisory committee on this subject would entail considerable expenditure of time without necessarily producing significantly useful data not otherwise available. Further, any conclusions of the proposed advisory committee would then be subject to formal consideration in rule making proceedings before they could be implemented.

8. In view of these considerations it, therefore, appears that the most expeditious approach to resolution of the matter is to initiate formal proceedings immediately through a Notice of Inquiry.

9. Accordingly, we are issuing this Notice of Inquiry directed specifically, but not exclusively, to the following issues:

- (a) What interference-rejection performance against FM broadcast and other signals can be expected of existing TV receiving installations?
- (b) What TV receiving system performance improvements can be achieved to reduce interference from FM broadcast and other signals? For example, should all TV receivers have coaxial antenna input terminals and should manufacturers provide optional coaxial filters for specific interference situations?
- (c) To what extent should TV receiving system characteristics be taken into account in establishing allocation and assignment standards to control interference from FM and other signals to TV broadcast reception? For example, should a "blanket contour" limitation be established for FM broadcast stations whereby they would be required to locate in less densely populated areas and thus reduce the magnitude of the problem?
- (d) In consideration of the foregoing issues, the following TV receiving system parameters appear relevant:



Raymond E. Spence, new FCC Chief Engineer, at the W4QAW rig.

W4QAW FCC CHIEF ENGINEER

Raymond E. Spence, W4QAW, of Vienna, Virginia has been appointed Chief Engineer of the Federal Communications Commission, filling the vacancy that resulted from the death of William H. Watkins. The new CE graduated from Ohio State in 1951 with a BS in physics. He served on active duty with the Army Signal Corps in 1952-1954, and now holds a commission as captain in the USAF Reserve. From 1954 to 1958, Ray was a field engineer with Philco and then spent two years as Chief, USAF Navigational Systems Branch, GEELA, at Oklahoma City. Next came eight years service as Chief, Voice Communications Systems Branch, R & D Service, Federal Aviation Agency. While with FAA, he served as a delegate to an International Civil Aviation Organization (ICAO) conference on space technology. In 1968, he was named Deputy Chief Engineer of FCC. His original amateur call was W8NVT, and he holds DXCC Phone from both DL4BY and KZ5DX.

- (1) Adjacent channel selectivity (RF and IF)
- (2) Intermodulation rejection
- (3) Cross modulation rejection
- (4) Dynamic range
- (5) Harmonic generation
- (6) Blanket signal level
- (7) Booster amplifier spurious responses
- (8) Direct signal pickup, other than through the antenna terminals.

What quantitative values should be assigned to or assumed for, the foregoing parameters?

10. Upon receipt and evaluation of the responses received to this Notice of Inquiry, it is expected that we may then be in a position to propose rules which could alleviate the interference problem under consideration.

11. Relevant comments in response to this Notice of Inquiry need not be limited to the specific issues set forth above. The Commission may also take into account relevant information available from other sources.

12. This action is taken pursuant to Section 403 of the Communications Act of 1934, as amended. Interested parties responding to this Inquiry shall furnish comments on or before July 1, 1971. An original and fourteen copies of each response shall be filed as required by Section 1.419 of the Commission's rules.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple
Secretary

TIME EXTENSION ON MAIL EXAMS

FCC has made a minor modification in its rules and procedures governing mail examinations supervised by volunteers; the net effect is to allow a bit more time for return of the written papers. The new text reads:

§97.29 Manner of conducting examinations.

... (b) (3) The examination papers, either completed or unopened in the event the examination is not taken, shall be returned by the volunteer examiner to the Commission's office at Gettysburg, Pennsylvania, no later than 30 days after the date the papers are mailed by the Commission (the date of mailing is normally stamped by the Commission on the outside of the examination envelope).

W4BW NOW FCC'S HAM CHIEF

A. Prose Walker, W4BW, of Fairfax, Virginia, has been named Chief of the Amateur and Citizens Radio Division of FCC, replacing Everett Henry, W3BG, who retired in February.

Earlier a professor of mathematics, Prose first joined FCC in 1940 and spent the war years in direction finding and radio intelligence, moving to the Broadcast Bureau in 1946. As chief of the TV Allocations Branch, he was a member of the U.S. delegation to the World Administrative Ra-



A. Prose Walker, W4BW

dio Conference at Atlantic City and later attended the High Frequency Broadcast Conferences. Since 1953, he has been Chairman of Study Group 10 (aural broadcasting) of the International Radio Consultative Committee (CCIR), a technical study arm of the International Telecommunication Union.

From 1953 to 1961, he was Manager of Engineering for National Association of Broadcasters and then joined Collins Radio, his latest assignment (ending 1968) being as Manager of Broadcast and General Communications at Washington. In 1968-1969, he was a consultant with Kear and Kennedy, an engineering group in Washington and since then has operated his own consulting firm.

Prose is a graduate of Denison University (Ohio) and did graduate work in physics at Ohio State. He's been on a number of government/industry committees including National Defense Executive Reserve; vice chairman, National Industry Advisory Committee (NIAC); National Stereophonic Radio Committee; chairman, NAB Disc Recording/Reproducing Committee; Television Allocation Study Organization; and associate member, Association of Federal Communications Consulting Engineers. He's a Fellow, IEEE (class of 1964), and has several times been a *QST* author. Prose has done nearly 50 years of hamming under such calls as W1NJA, W2BMX, W3BMX, W4CXA, W5KZA, K6UUT (Hawaii), n1AVQ, W8AII, W8SG, W0DCA, prior to holding W4BW, and has operated from 4U1TU, LA1TU, EA6ITU and VU2ITU.



At a retirement luncheon, Bill Grenfell, W4GF, gingerly tests the business end of a Wouff Hong replica presented by John Huntoon, W1RW, on behalf of ARRL members.

BILL GRENFELL, W4GF, RETIRES

William S. Grenfell, W4GF, retired April 2 as Chief, Rules and Legal Branch of FCC.

OM Grenfell was associated with the regulation of U.S. amateur radio perhaps longer than anyone else. A well-known figure at ham radio conventions and on the air, his effective representation of the Commission at our gatherings has been a strong reason for the prestige of the agency in amateur circles.

He started with the Commission as an assistant monitoring officer in the Radio Intelligence Division at Seattle in 1940 and was "RI" at Portland from 1941 to 1943. After some Navy

Behind the Diamond

Number 29 of a Series

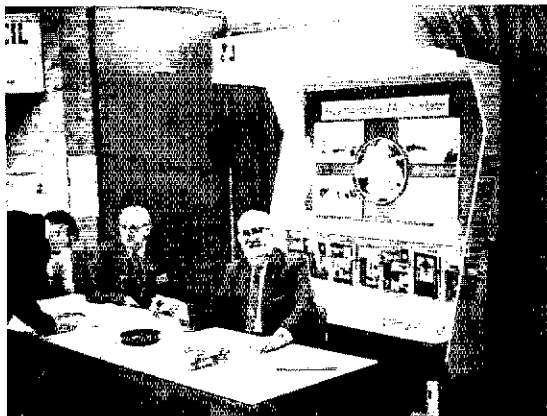


What a temptation it was to write a corny caption using some pun based on the word "corn" for this month's "Behind the Diamond" subject -- he hails from the "Tall Corn State" and works for a corn-processing company which makes corn syrup and corn starch.

Instead, retreating in some degree of confusion, we'll play it straight and introduce *Sumner H. Foster, W0GQ*, of Cedar Rapids, Iowa, director from the Midwest Division. W0GQ had been vice director for ten years when, on May 7, 1966, his predecessor, Robert W. Denniston, W0DX, was elected as president of ARRL, and thus Sum became director.

Despite the demands of the division job, he has also continued to serve amateur radio on the local level, currently as president of the Cedar Valley Amateur Radio Club, Inc.; as RACES Radio Officer for Iowa Area 2; and as a member of AREC. (He had earlier been Radio Officer for Linn County.) On the civic side, he's a member and past president of the Cedar Rapids Rotary Club, A Charter Life Member of ARRL. Sum has earlier held the calls 1GP (1926, near Boston), W2FJU, W9ZAS, and W1GP again.

About that "corny" job -- OM Foster is a vice president of the big corn refining outfit, Penick & Ford, Ltd., but he plans retirement later this year and a "QSY" to Denver, Colorado.



Alban A. Michel, W8WC, ARRL director from the Great Lakes Division, is on duty at the ARRL booth during his division convention at Muskegon on March 27.

duty, he returned to FCC, serving from 1946 until 1952 in the Frequency Allocation and Treaty Division, the last two-plus years as Assistant Branch Chief, Frequency Utilization and Requirements. From 1952 until 1961, Bill was Chief of the Amateur Branch and Chief of the Amateur Service Section. He went over to Land Transportation for a year or so as Chief of the Rules and Standards Branch, returning to the Amateur and Citizens Radio Division in 1962 with a similar title. The name of the branch was changed in 1966 to Rules and Legal Branch, and Bill has continued as its chief.

As an amateur W4GF is heard on 3.5 through 29.7 and on 144 MHz. His ham interest goes back to high-school days in McMinnville, Oregon; he has held "2nd Telegraph" and "1st Phone" tickets since 1930. He holds a BS in EE from Oregon State University, 1935.

MEMORIAL TO CROSSLEY

An amateur radio station has been established as a memorial to the late Gilbert L. Crossley.



The late Gilbert L. Crossley, W3YA

W3YA, by the Nittany Amateur Radio Club of State College, Pennsylvania. His former call has been assigned by FCC to the club (of which Gil had been a member) for its new station. Gil was a director of ARRL from the Atlantic Division from 1954 through 1969, vice president, 1966-1968, and honorary vice president at the time of his death late in 1970.


The club, founded in 1956, has another station, K3HKK, on Tussey Mountain.

AMATEUR RADIO WEEKS

Ohio Amateur Radio Week was April 18-24; Governor John J. Gilligan noted especially in his proclamation the emergency communications work of the Apricot Message Net in the Greater Cleveland area.

In Florida, Governor Reubin O'Donovan Askew set aside the week of June 21-27, mentioning emergency work, self-training, international good will, and rehabilitation of the handicapped as accomplishments of amateurs deserving of the special observance.

June 20-26 is amateur radio week in Englewood, N.J. as established by Mayor Ned Feldman, Field Day, the Englewood ARA, and Englewood Civil Defense/Disaster Control figure specifically in the proclamation.

The standard "national" date for amateur radio week this year is June 20-26. 

Stays

ON5LD lives in Ham, Belgium.

Several hundred hams are included in the total work force of 18,000 at McClellan Air Force Base, Sacramento, California. McClellan, like most military bases, uses alpha and/or number combinations to identify various functions. W6HTS is assigned to "DOR" and W6DOR is assigned to "HTS."

G3s 1KR, VPE, XIP, and ZXO will be operating GB3SKY from the Isle of Skye, off the west coast of Scotland, June 19-22, 1971. This rare spot will be available on all bands, 160-10 meters. All QSLs will be acknowledged with a special card. QSL to G31KR or via RSGB.

The callsign VE1AL was first issued to George Crowell before many of us knew what ham radio was all about. In 1958, I was a 12 year-old lad who wanted to know what VE1AL meant, so my father discovered who he was and I presented myself on his doorstep one day soon after. A great friendship developed between the little boy and the old timer, and his passing in 1969 was a great loss. I am very proud to have the call now and hope that when I am 62, some lad will knock on the door of my shack. - VE1AL via WINU



Correspondence From Members-

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

220 MHz "HOBBY CLASS"

● In his petition to the FCC (RM-1633), Wayne Green proposes that the middle of the 220 MHz band be opened to the people who do not care enough to get a license, but wish to "experiment." It appears to me that this proposal is similar in its pretenses to that of the CB radio service. It also would appear to me that the end result would be the same. I feel that amateur radio has enough to worry about without the added burden of a CB type band cluttering up the middle of 220 MHz. If these "experimenters" were truly interested in experimenting, then the class of license now required to operate on these frequencies would be no burden. — *Scott T. Taylor, WA3EKT, Catonsville, MD*

● Any achievement too easily won is of questionable value. Since the "Hobby Class" license will be so easy to obtain, it will not be sufficiently cherished to make enforceable the terms of its grant. The Commission must conclude that the current Class D Citizens' Band represents the best example of this principle. A large number of CBers operate without licenses.

The Technician Class license is simple enough to obtain that any serious hobbyist could obtain one. Many who would join amateur radio in the future may be likely to take the easy way out. Many CBers would be licensed hams today were it not for easy accessibility to Citizens' Band. It will do little to enhance the state of amateur radio by requiring no technical proficiency in joining the hobby. — *Roger W. Knipp, WA6JMF, Chief Engineer KTYM AM/FM, Los Angeles, CA*

● If the efforts of the CBER were put towards a Novice ticket there would not be such a bad 11-meter problem. Many of the CBERs that I know could pass the general test with ease if they wanted to. I think that if the ham radio world would take it upon themselves to introduce ham radio to the CBERs the action on 11 would drop like a bucket of bolts. When a CBER I knew heard a QSO between two hams that were thousands of miles apart without any 10-9s, he was sold then and there. I think if other hams would do this more CBERs would convert, and I should know, it worked on me! — *Jim Boos, WN9EVT, Milwaukee, WI*

● It is my feeling that the League should take immediate action to thwart this petition, including publicizing it, and filing comments in opposition to it. — *John D. Sybalsky, WA2YFI, Poughkeepsie, NY*

[EDITOR'S NOTE: In process, OM.]

POLY CW

● The polydimensional cw article in April *QST* sounds so good you hate to put it down. — *Franklin M. Cist, W7ARC, Scottsdale, AZ*

● After reading W6MUR's article on polydimensional cw, I realized that he had missed an important consequence of his discovery. By using

present technology he is able to vastly improve operation but at an increase in system cost. To the economy-minded ham this limits his utilization of the system. If, however, one is satisfied with present operating conditions a large saving is possible by using simpler components. Since spectrum space is multiplied by a factor of several hundred for present bands, very little selectivity will be needed, and since we can increase power by using multiple finals, sensitivity can be reduced. A crystal receiver has been determined to be more than sufficient to meet the needs. With bandwidth requirements reduced and chirp even desirable, the transmitter can be a simple keyed oscillator. — *Jim Escoffier, WB4GOU, Cape Canaveral, FL*

● I read the article on polydimensional cw and I think that I have a way to receive it. As you know, a superheterodyne receiver mixes the incoming rf signal with a signal from a high frequency oscillator to produce a signal at the intermediate frequency of the receiver. Instead of the hf oscillator and rf amplifier, why not have two rf amplifiers, one tuned to each signal, mixing together to produce a signal at the differences of the frequencies mixed? Since this frequency can vary, it would have to be mixed again with a tunable oscillator to produce a signal at the intermediate frequency of the receiver. I think this may be a solution to the problem of receiving polydimensional cw. — *Douglas A. Reneker, Damascus, MD*

● Isn't it about time *QST* grew up and stopped the April Fool nonsense? After all, you're 55 years old.

W6MUR's story was cute, and written by an active and technically sophisticated amateur. However, most of your readers are not technically sophisticated. They are inclined to believe everything they read in *QST*. For example: "... the most troublesome man-made noise is periodic in character. That is, it is usually in sync with the 60-Hz supply line, and sounds the same throughout the entire band."

Imagine if you will, a young Novice reading this nonsense and then spouting off at the first opportunity with his new knowledge — perhaps at a club meeting. After he is properly squelched, he may run home to discover that what he read was in the annual April issue. In any event, you lead him to an unnecessary embarrassment, as well as totally wrong technical information. And this need not be confined to Novices. I know hams who have been licensed for many years who would be easily taken in by this story. It takes something even more basic than technical knowledge to tumble to the fallacies contained in such stories. It takes an inquiring mind — a mind that challenges virtually everything. Some people have it — and some do not.

As a Life Member of the League, and an Extra Class licensee for 19 years (the hard way) I see no need to embarrass or alienate the young, the inexperienced, and the technically naive. We need them all, and if you truly wish to help increase the present percentage (50) of Novices who graduate

to permanent status, you might give some thought to the fact that not only are stories like this over the technical heads of most of your readers — they could be insulting as well. *Lee Aurtek, K3QAX/W2QEX, Lancaster, PA*

DEEP APPRECIATION

● Thank you for the life member pin. I fully understand that at 72 I have little chance of coming out even. The odds are all in your favor, but I made this investment, not for profit but in deep appreciation for all the efforts the League has made the last fifty years so that I will be able to enjoy amateur radio in the way I like a few more years anyway. I am sure that many of the "lifers" feel likewise. — *James L. Russell, W8BU, Cleveland, OH*

NOSTALGIA

● I enjoy the column "50 Years Ago This Month." Was active on spark in 1921 as 2HJ, Port Chester, N.Y. but started receiving earlier than that, before World War I, using a galena crystal detector. After the war I can remember, among other things, 2RK, in Brighton Beach on spark, and the Brooklyn Navy Yard, NAH telling him to shut up. I have the distinction (?) of having wired up the receivers and amplifiers used by Paul Godfrey when he heard the first amateur transatlantic transmissions to Scotland. Please keep the column alive. — *H. J. Hasbrouck, St. Petersburg, FL*

WINNER

● I purchased a copy of the 1971 Handbook last week and it is the best handbook that I have ever owned. Many thanks to Doug DeMaw and the rest of the staff for many improvements. *H. Yates Holleman, W4ZLH/PY1ZAC*

FOLKSY TRIVIA — continued

● I stand opposed to the points brought out in K3SVC and W2UN's letters in "Correspondence," March *QST*. I feel that Don and Ed display so well the main trouble that plagues amateur radio and the rest of the world today. Too many people want their own way and have no consideration for how the next guy might feel about the situation.

The fact is, a lot of people do read "Station Activities." I skim through parts of this column to see if there is something about someone whom I haven't heard from in a long time. And Don's remark about the ARRL promoting contests was way out of line. The beauty of amateur radio is that there is something for everybody, whether it be contests, traffic handling, construction, DX, or chewing the rag, using ssb, cw, RTTY, ATV, AM, or FM, 80 or 2 meters. Nobody can rightfully put down the next man's pleasure as it's all part of amateur radio. And there is certainly nothing wrong with letting everybody know the contest score that you've worked so hard for, or that you've made DXCC. If Don had bothered to check, he would have found in January *QST*, for example, there are about 80 pages devoted to construction, equipment, and operating, compared to about 20 pages of so-called "trivia." A bit different from his 20/20 figure.

Whether a person likes something written in *QST* or not, one page does not detract from another. The fact that the magazine is always jam-packed with just about everything you could write about amateur radio is good. It covers the

interests of so many people, there has got to be something there to please everybody. Fortunately, not many people are interested only in "useful" articles to develop technical and operating skills." *QST* is like the *New York Times*; "You don't have to read it all, but it's nice to know it's all there!" — *Steve M. Kirschner, WB2NKY, Cedar Grove, NJ*

● It's easy to see that K3SVC has missed the point for the existence of *QST*. The fact that it is a "family" publication, the amateur radio family magazine. *QST* is the only publication that even attempts to cover all phases of amateur radio although some of it may be of interest to only a limited number of us. If he wants a purely technical magazine he should either drop *QST* and subscribe to one of several others that are just that, or put out the dough for both as many of us now do.

Having been a loyal member of the ARRL since May 1922, I don't see how elimination of the "Station Activities" section would improve *QST*, in fact it would do just the opposite. This section keeps the family advised of what the various members are doing and in my own case helps me keep up with the many varied interests of my fellow hams, some of whom I have long since lost contact with.

For my money, you folks who run my family magazine are doing a hang up job and I want you to keep right on doing it. — *G. Graham McCconomy, W6BUB, Hemet, CA*

● I agree that columns of call letters serve little purpose, even to those listed. Certainly I appreciate some personal interest articles and photographs, but most of "Station Activities," as well as goodly parts of "How's DX?" "The World Above 50 Mc.," "Operating News," and "DX Century Club Awards," are a complete loss to me. Are these pages really serving the purposes and needs of the membership in the best way? — *Marvin Sherebrin, VE3FHX, London, Ont., Canada*

● A ham for some 15 years and a practicing electronics technician for 11, I personally am most interested in technical articles; I seldom operate, but I always build, test, adjust, etc., and so keep my license current in case I want to put one of my projects to the "acid test." I even subscribe to the other ham magazines so as not to miss any good technical info. Nevertheless, I still enjoy reading all the "trivia" and "drivel" about Field Day, Sweepstakes, Public Service, FMTs, DX, etc., since I occasionally see a familiar call, and thus can reminisce about my days on 75 phone, or 40 and 20 cw, or checking into the phone nets, or a Field Day or hamfest I once attended. It also keeps me abreast of changes in operating procedure, changes in frequency allocations, new contest rules, etc., etc. — all things that every ham should keep up with. To ignore all phases of the hobby but one is to stagnate oneself, wouldn't you say? — *P. H. Bock, Jr., USA, K4MSG, FPO, NY*

● A publication aimed at a large group of members must contain personal items, even if each one is of little interest to most readers. This is what adds the touch that "the league is interested in us" and "There is old Bill — WA?XYZ, I haven't heard him on — better give him a call." I don't read most of that stuff either, but I do appreciate its purpose and importance. It has to be there if *QST* is to be the publication of the League for benefit of its members. — *Edward A. Holyoke, M.D., WA0VSR, Omaha, NE*

• . . . During the past five years, the Section reports have been most helpful in determining local net frequencies, times, active stations, etc., since my wife and I are full time "trailerists," having covered most of the U.S. and Canada. I speak only for myself, but know from first-hand experience how difficult it is trying to satisfy 100,000 individuals thinking of only their own likes and dislikes. — *Kenneth E. Hughes, W6CIS, Merced, CA*

• In my opinion every part is as important as the next in producing the excellent magazine that *QST* is. In the past 6 years I have subscribed to *CQ*, *Ham Radio*, and *73* besides *QST* and dropped all of them after one year because they just did not come up to my idea of a good magazine. — *Harold J. Vincent, WA8PIM, Clio, MI*

DIVERSE HOBBY

• Certainly one magazine can't meet all the needs of such a diverse hobby as amateur radio. Although I read less than one-third of each issue of *QST*, I value the magazine because I believe it puts me in touch, albeit vicariously in some areas, with all operating facets of amateur radio as well as some reasonably up-to-date circuit and construction techniques. It's truly the journal of amateur radio.

But there's a lot missing, too. Particularly articles at various levels of technical competence on RTTY, SSTV, VHF/UHF, etc. To be sure, there are ARRL published "handbooks" on these subparts of the hobby, but the articles in these books are old *QST* articles, some of which have aged for nearly a decade before the accumulation had justified publication as a separate book. This guarantees about 60% obsolescence at the time of publication.

One method that could be used to provide the membership with a higher percentage of material of individual interest has proved effective in other professional societies. One magazine is published on a monthly basis with all the operating news, administrative matters and other items of general interest. The technical fields are split into various smaller journals with publication frequency dependent on the relative interest of the members. For example, the VHF journal might come out every other month, the HF journal every month. Perhaps SSTV once annually, RTTY three or four times per year.

Granted, this would be more expensive, but the advantages to the member in receiving articles appealing especially to his own interests may be worth a little extra money. And it may not cost some members any extra money. If the \$6.50 fee were to purchase ARRL membership, the monthly journal, and one technical journal of the member's choice for one year, perhaps some juggling of expenses here and there could allow for the separate magazines at no extra cost. Members with a broader technical interest would pay a nominal fee (depending on publication frequency) for technical journals in the other areas. The advantages of this system are mainly: (1) A member would receive technical articles in his own area of interest; (2) the articles, especially those in areas off the well-trodden path of HF, would be timely; (3) The operating problems in some areas of amateur radio differ significantly from those experienced in other areas. VHF repeater rules and informal "frequency assignments," RTTY operating procedures, and the like can be discussed in journals peculiar to a particular area of ham

activity by people with a personal interest in the problem.

Finally, there's the advertisers' viewpoint to consider since, after all, these people are subsidizing our magazine. As I see it, most advertisers should be interested in maintaining the status quo as far as the monthly journal is concerned. Furthermore, the opportunity to advertise in separate journals in addition to the general publication (journals which they know are being purchased at extra cost by tight-fisted hams with special interests) would not be overlooked and might help finance this scheme.

Allusions to a rate increase for *QST* have been coming from the editor's desk for a long time now. With this scheme, at least we would read all that we pay for. How about it? — *R. C. McFarland, W6GTQ14, Lorton, VA*

GREAT(?) JOB

• You sure are doing a great job there. First, the government raises the license fee to \$9. Question: What are you doing as such a powerful influence. Nothing is the answer. Second, I heard where the FCC is thinking about taking a good part of the 2-meter phone band away. That's great! Now all the hams in New Jersey, old timers who look forward to chats on 2 meters, will have to go off the air and throw out the only enjoyment they might have. You fellows are going backwards instead of forward. What's the matter with the ARRL?

I hold an Advanced license, was a WW II radio operator and refuse to join ARRL until you protect us as amateurs, not give the world away. You're slipping up there in Newington. — *John F. O'Connor, W2QOB, New Brunswick, NJ*

• As one of the "gainfully" unemployed I have had time to review in detail *QST* for the past fifteen years. Just about every question that I had or project that I have wanted to work on has been covered. The number of "black-box" projects that I have completed has improved my construction techniques, and the many excellent articles on antennas, feed lines, and antenna theory have "unfogged" some of my muddy thinking.

Those that would like to be super critical of ARRL and *QST* should sit down and review just the last ten years of activity and changes. It might be a real eye opener to see how far and fast things have happened. Keep up the good work. — *Henry Morrison, W5RIY, Houston, TX*

• Thank you for the prompt and helpful assistance you gave me in regard to my request for aid in setting up amateur code and theory classes for prospective hams. The material you sent me was quite helpful. It's good to know the ARRL is there whenever one needs assistance. Throughout the years you have proved that the League truly is "of, by, and for the amateur." Thanks again! — *Sy Balsenbaum, WA2CHE, Brooklyn, NY*

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

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 VP8s go to *RSGB* in Great Britain, W, K, VE and VO stations only may send foreign cards for which no bureau is listed to *ARRL*. See "How's DX?" for QSL information on specific stations. Bold face indicates new or changed listing.

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: RCA, Carlos Calvo 1424, Buenos Aires, BA

Austral/French Antarctic Lands: via Malagasy Republic

Australia: VK1 and VK2: P.O. Box 1734, G.P.O., Sydney, N.S.W. 2001; VK3: C/o Mr. E. Trebilcock, 340 Gillies Street, Thornbury, Vic. 3071; VK4: P.O. Box 638, G.P.O., Brisbane, Qld. 4001; VK5: C/o Mr. G. Luxon, 27 Belair Road, Torrens Park, S.A. 5062; VK6: C/o Mr. J. Rumble, P.O. Box F319, G.P.O., Perth, W.A. 6001; VK7: P.O. Box 371B, G.P.O., Hobart, Tas. 7001; VK8, VK9, VK0, SWL and unlisted calls only: C/o Mr. R. Jones, 23 Landale Street, Box Hill, Vic. 3128

Austria: OSVSV, Box 999, Vienna 1/9

Azores: via Portugal

Bahama Islands: BARS, Box 6004, Nassau

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

Barbados: ARSB, Highgate Signal Station, Flagstaff Road, St. Michael

Belgium: UBA, Postbox 634, Brussels 1

Bermuda: RSB, Box 275, Hamilton

Bolivia: UCB, 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

Canal Zone: Gloria N. Spears, KZ5GS, Box 407, Balboa

Cape Verde Island: RCCV, CR4AA, Praia, Sao Tiago



Officials of the *Liga Colombiana de Radioaficionados* present an *ARRL* 5-band DXCC plaque to HK3WO. Shown from left are HK3BL, HK3RQ, HK3WO, HK3GR, and HK3AVK.

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) UCRA, QSL Bureau, P.O. Box 1459, Kinshasa, Elizabethville

Cook Island: ZK1 QSL Bureau, Radio Station Rarotonga, Rarotonga

Costa Rica: RCCR, Box 2412, San Jose

Cuba: ANRAC 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, OZ6HS, Ingstrup-9480-Lokken

Dominican Republic: RCD, P.O. Box 1157, Santo Domingo

Ecuador: GRC, P.O. Box 5757, Guayaquil

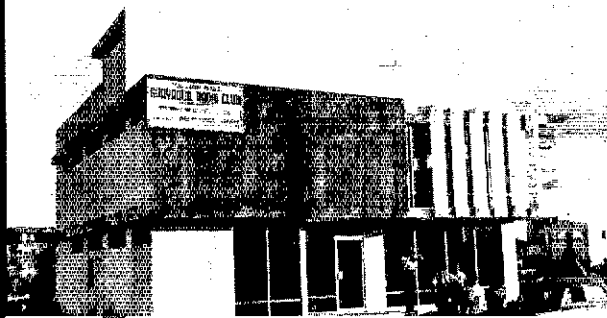
El Salvador: CRAES, P.O. Box 517, San Salvador

Ethiopia: KSARC, ET3USA, APO, New York, N.Y. 09843

Faeroe Islands: OY-QSL Bureau, Sofus Rubeksen, OY3B, Undir Savartafossi, DK-3800 Torshavn

Fiji Islands: QSL Bureau, P.O. Box 184, Suva

The new headquarters building of the *Guayaquil Radio Club*, now with a membership of 263. Five part-time employees and four volunteers handle the headquarters workload.



QST for

The Executive Committee of the *Union Interamericana de Radioaficionados* IARU Region II — representing amateur societies in North and South America, recently met in Guayaquil. From left, W0DX, HC2TN (GRC president), HP1CH, XE1CCP, VE3CJ, OA4AV, and LU3DCA.



Finland: SRAL, Box 10306, Helsinki 10
Formosa: QSL Bureau, CRA, Box 2007, Keelung, Taiwan, Rep. of China
France: REF, Boite Postale 70,75 Paris 12
French Oceania: RCO, P.O. Box 374, Papeete, Tahiti
Germany: (DL4 & DL5 only) DL4-DL5-DA QSL Bureau, 14 Aviation Co., ATC APO NY 09025
Germany: (Other than above) DARC, Box 86-0-3-20, D8 Munich 86
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, G2M1, 29 Kechill Gardens Bromley, Kent BR2-7NA
Greece: RAAG, P.O. Box 564, Athens
Greece: (SV0 only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N.Y. 09223
Greenland: via Denmark
Greenland: (U.S. Personnel) OX5A-E via MARS Director, KP1AA, 1983 Comm. Sq., APO New York 09023, OX4F-H via MARS Director, KP1AB, 2004 Comm. Sq. APO New York 09121
Guam: MARC, Box 445, Agana, USPO 96910
Guantanamo Bay: GARC, Box 12, FPO, New York, NY 09593
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 N.Y. 09205
Ireland: IRIS, QSL Bureau, PO Box 462, Stella Ave., Dublin 20124
Israel: IARC QSL Bureau, P.O. Box 65, Herzlia
Italy: ARI, Via Scarlatti, 31, 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, Calif. 96525
Johnston Island: KJ6BZ, % MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305
Kenya: RSEA QSL Bureau, A. H. Sanders, Box 30035, Nairobi
Korea: KARL, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhaff Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saigasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: RAL QSL Bureau, P.O. Box 1202, Beirut
Liberia: LRAA, Post Box, 1477, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
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: 7Q7RM, P.O. Box 472, Blantyre
Malaysia: QSL Manager, MARTS, Box 777, Kuala Lumpur
Malta: R. F. Galea, 9H1E, "Casa Galea," Old Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, APO, San Francisco, Calif. 96555
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: LMRE, P.O. Box 907, Mexico, D.F.
Midway Island: KM6BL, Box 14, FPO, San Francisco, Calif. 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, Laurenc 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 YNIMO/W4, Box 902, Coral Gables, Florida, 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, CA 96331
Pakistan (East): Mohd. AP5CP, FARC, Dacca Signals, Dacca 6
Pakistan (West): IARS, 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
Roumania: CRC, P.O. Box 1395, Bucharest 5
Rwanda: via Congo (9Q5) QSL Bureau

(Continued on page 148)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who:

Where's Elmer? all around you, OM. Our March remarks triggered numerous Elmer nominations and enough heart-warming testimonials to convince us that, though amateur radio's *modus operandi* may vary through the years, Elmer still lives. Here, read about him over our shoulder. . . .

My nomination for another super-Elmer is W9NVJ. Chris is an Extra, chief engineer at WHBL, ardent phone and code DXer, fisherman, family man, active in church work, etc., yet always finds time to coach a budding or established ham. If it hadn't been for him I most likely wouldn't be involved in amateur radio. He has a way of explaining theory in terms that stick, benefiting one long after the exams. Having taught code for many years he showed me the *right* way to operate a straight key. I know of at least a dozen fledglings (there must be dozens I don't know about) who received their Novice tests from Chris. At least six of these are now Advanced, and all but one still active. Where would Sheboygan county ham radio be without W9NVJ? — WA9UEK. . . . I was particularly impressed with that March "Elmer" article. I've been a ham for only two years, but the romance started five years earlier. The best man at the wedding, my Elmer, was W5EGH. It got to be a mutual thing with us — he taught, I learned, I inspired, he became more enthusiastic. Since then we've done many things together including four days of operating during the Camille disaster. When you make up that list of Elmers please include Chf. — 9G1WB. . . . There's an Elmer in my neighborhood who has taken a lot of time out of his own activities to help me get started in amateur radio. Following many evenings of code-oscillator work so I could master dit-dah intricacies, he was the volunteer examiner for my Novice ticket. Then he helped me fire up a cantankerous borrowed DX-40 and spent many evenings thereafter QSOing me for code practice sessions. Earphones, a 2-meter converter and debugged homebrew SP-50 came, thanks to him. My Elmer is K2HN, formerly W3FX, of Somerville, New Jersey. WN2YRU. . . . Thanks for the opportunity to say something about my Elmer, WA2EWB. Hugh has gotten many people going in ham radio — WN2s MEH MHJ MKM MMD MXW

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

NFK NHV NXT, WA2IVG, Extras WB2s SMO and SRV, to name a few — and there are others now awaiting licenses from FCC. Hugh is trustee for WB2KWT, Greece Olympia High School A.R.C. — WA2MXL. . . . I can never forget the fellow who helped me with code and theory for that push toward a ham ticket and this most rewarding hobby. Because of him I have hundreds of new friends. My hat is off to 100-percent cw operator W3TMO, the Elmer in my life. W3HNK. . . . Old W9NUF, the Elmer mentioned in your March editorial, was everything you say. I can recall very clearly walking miles to Bud's QTH thirty-five years ago to discuss ham radio. However, the fellow who really got me started in the game was W9DCX, then radio editor for *Popular Mechanics*. I was lucky enough to have Frank living next door. — W9FT. . . .

And so they go. A particularly interesting Elmer is mentioned by WA1OBL of ARRL. John must have figured he might as well start from the top. "Bob, W0DX, got me going ten years ago in Iowa where I sign W0DRE." Still remember your Elmer? How could you forget! Tell us about the Good radio Samaritan out your way.

When?

No DXer can have observed the People's Republic of China "table-tennis breakthrough" without deep wonder. All we radio amateurs have heard from the Chinese mainland for almost a quarter century is a scant handful of BY signals, origin mostly in doubt. If P.R.C. citizens ever claim their due share of avocational radio spectrum usage, with a population possibly four times our own, make way for 1,000,000 more hams. Speculative astronautics to be sure, but when friendly ping-pong comes, can amateur radio stay far behind?

+ + +

What:

Your "How's" roundtable grows relentlessly and it's a wonder we can tune *anybody* in, even without those million BYs. Continuing where we left off last month, then — to the forum! . . . It would be interesting to see a General make 5B-DXCC. — W1CW. . . . VE2BJI was a rare one on 80 for me. — WNAPFE. . . . Conditions spotty on old 40, — W6CTS. . . . Trying 10, 15, and 40 cw here but work and school hinders DX tremendously. — WA8OMF. . . . Got a little tired of those pile-ups in Puerto Rico. WP4DKA/8. . . . A fledgling law practice, XYL and four-year-old harmonic share my DX time. K4BYK. . . . An apartment in mid-Manhattan is not an ideal DX QTH. W2EUO. . . . Been

JD1ABO, pictured last month, radiates from symmetrically striking Minami Tori Shima, formerly Marcus Island, a most interesting QTH of the Month. (Photo via JA1s JSV KSO)

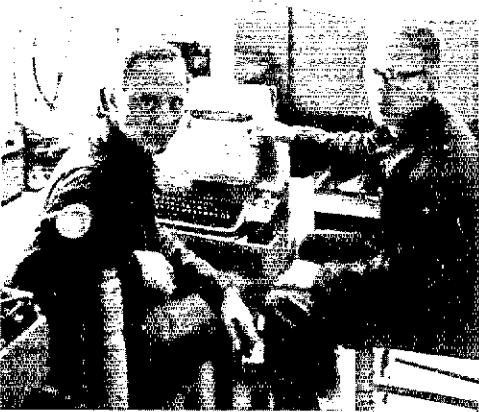
QST for

UA1JL, a stewardess with Aeroflot, shares this Leningrad pad with husband UW1BF, 200 watts on voice or code. OM Anatoly is an airlines radioman. Valentina really dresses up a DX column, doesn't she? (Photo via W2MLO)

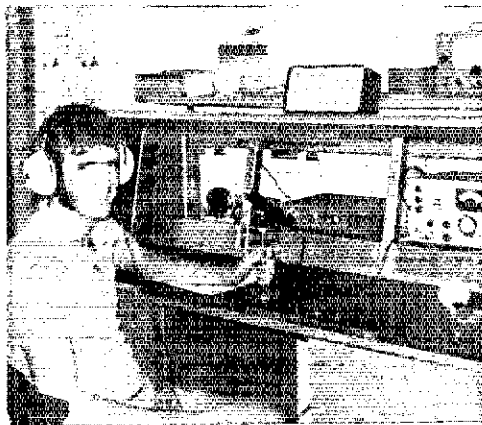


DXing under the same call since '32. - W2FCO. . . . Tons of cw JAs and Europeans roll through when 21 MHz is wide open. - WA9TZD. . . . Not too active lately but I'm still in there trying to confirm a few old rare ones. - K2HYM. . . . Doing a lot more DX chasing since I retired. - W0GBJ. . . . You should see the stuff in TJIAZ's logs! - K4ASI. . . . F2DE, ex-5T5BG, expects a Guadeloupe assignment. - W3QT. . . . MP4BHH's big signal creates quite a stir. - WA40WG. . . . When not DXing on 20 cw I get a kick out of 40-meter ssb. - W8BSS. . . . Here's another nomination for QSLers of the Month. - WA2GMD. . . . Listening to DX lurking in higher-class subbands is quite an incentive. - W8KAJ. . . . I shudder to think of what our bands would be like if there were no code test for amateurs. - W1FCC. . . . Haven't chased much DX lately, operating mostly maritime mobile aboard missile-tracking ships. - W6HUQ. . . . I've just retired but the XYL keeps me too busy to get that extra DXing in. - W3KZO. . . . I'll try to be a regular correspondent, 15 meters preferred. - WA7OCL. . . . Have a new home, tower and beam on the Wisconsin River near Stevens Point. - W9NN. . . . I usually head south from Chicago and WBBM on week ends. Reason? A 200-ft. tower with assorted beams. - W9CTY. . . . While visiting Poland I found radio club membership mandatory for SPs. - WA1DJG. . . . Worked about seven hundred Russian amateurs in the past three years and note that their mail is still strictly censored. - W2MLO. . . . I'm semi-active at U. of Washington's W7YD, studies permitting. Worked some 1700 JAs in a recent contest session from W5QQQ/7. - K7VPE. . . . 912XZ plans to visit the States with his family in September. - W85DRU. . . . W2TR-W2SMK, key now silent, worked his share of 40-meter DX over the years. - WA2JCI. . . . The homespun station of OK1ATP, outstanding 160-meter DXer, includes an 18-tube receiver. - W1BB. . . . Rather than throw away my accumulated radio literature I'm willing to ship it postpaid to needful overseas amateurs. - WA5WBC. . . . Former ops of PIs 3CC 9GF 9IT 0CC and 0CW were on our six-band PI0FC staff. - W4GF. . . . Your new "How's" format enables even more DX coverage in the allotted space. - WA4DWR. . . . Enjoying my 19th year of cw DX fun, mostly on 20. - K8KRK. . . . Sneaking through a huge pile-up to a rare one is still some thrill! - WA1JKZ. . . . Plenty of Europeans but I may need a better skywire for Africa and Asia. - WA2FOS. . . . I've gotten so much help from the "How's" gang I think it's time I started returning the favors.

- KIOME. . . . Ran off a 45-minute "WAC" recently. - WA3HGV. . . . I'm 300/299 and here's my vote against "lists." - W1OHA. . . . A weird TVI problem in my apartment building curtails hf DXing here. - WA9MYS. . . . Seventy-five watts got me 199 fast countries but I think I'll get to work on a linear. - W8FAP. . . . Twenty cw's the main thing here but I find 10-meter sidebanders hungry for South Carolina. - WB4QNP. . . . Unidentifying QRMers could do with a try at the Golden Rule. - W2CNQ. . . . My new delta loop only fifteen feet up gathers in plenty of DX with 90 watts. - WA9ZCP. . . . I'm rather new to 160 and find it very enjoyable, even hoping for a little top-band DX. - WA9UET. . . . My list of QSLers of the Month may be too big for one issue but they really came through fast and all at once. - WA2HIU. . . . On the air very little since I got engaged. Wish you would go back to the old format, listing more DX calls, frequencies and times. - W89BIV. . . . Still many juicy ones in the 10-meter bushes. Operated ssb at K8UDJ, cw at W8SH, in the ARRL Test. - WA8YRB. . . . Beam motor froze up in February. - W9LNO. . . . QSOs on 160 during January with DLs 1FF 9KRA, E19J, lots of Gs, G13SKH, GM3s IGW OXX YCB, GW3JXC, HB9CM, HR2HH, KV4FZ, seven OKs, OI 5A1Y, PA0PN, PJ2VD, PY1MGF, VPs 2AGA 9HO 9FW 9GR, Ws 4BRB/BP7 9UCW/HK0 and 9Y4NN. -



OA3Y (left) and OA3X, home calls SM0KV and SM6CSB, spent six arduous months in Peru assisting in earthquake relief efforts with a 75-man Swedish Army team working under United Nations auspices. Olle and Hal managed to squeeze in about eight thousand DX contacts while providing efficient communications for their toiling party. One of their favorite locations in Recuay was at the Andes 10,000-ft level. Regular liaison schedules were kept with OA4QL, operated by SM6APO at the Swedish embassy in Lima. (Photo via P. Kromayer)



ZE1DC is DXceedingly active from Bulawayo on 14, 21, and 28 MHz, mostly telegraphy with ssb on tap. Gordon especially enjoys contesting and watches for Alaska to complete his WAS. (Photo via WA9UES, WB9CIS, Newark News Radio Club)

WHGT. . . . Quad blew down so I was off for two months - W2DY. . . . 9Q5 and YH0 are new ones for me on 20. - VE6JW. . . . Not much DXing of late but I did catch HA3GF on 80 cw. - W4YOK. . . . Your lists of 21-MHz DX stations inspire Novices to keep digging for those good enough to take the extra time to work us. - WN4SLJ. . . . Yes, Novices look for the DX activity you mention. - WN7OLT. . . . I'd like to see active DX stations listed with frequencies and times. - WA0VJF. . . . Great to be back on the air from W4PKS at Camp Lejeune after two years QRT. - WA9SXQ. . . . DA1RN offers a new German prefix around 21.265 kHz. - WB2JYM. . . . Ten sure stays loaded with DX! - WA6PZL. . . . Twenty, 15 and 10 are all rather good here, 21 MHz holding up especially well. - VE7RAF. . . . My last contribution to "How's" was back in September of '48. - W3OPI. . . . FG7XE has been hanging around 7038 kHz regularly. - WA0UAV. . . . Still trying to trace VR3L operator Bud of '62. - K6UMV. . . . Keep up the good work, ARRL! - Ws 2ABL 40PM 4ZYT 5ILR1TF 8DPY, Ks 4ESA 4QG SNSA 9DKU, Was IUR 8JQF, WB6IXC, VE1OC. . . . 9M2DQ expects his new QTH to be permanent. - W8SWN. . . . Made first for Indiana in the '70 ISSB contest. - WA9YXA. . . . Juliet-Yankee-One is mentioned in *Time* magazine. - WB6BRM. . . . Worked W1AW on 15! - WN6GQR. . . . Here's that Anguilla photo I promised you a month ago. - W9ZRX. . . . How many microphones can you test consecutively? - WA3K7D. . . . I expect to be active from ZD8CS at least until '72. - K1BTD. . . . Fifteen's still hot! - WA5YLM. . . . 3B7DA, a stamp collector, would like to hear from radio clubs. - W1BV. . . . You can probably imagine what a great club station we had at MacArthur High School (WA2WJY) while W2DY was principal and I vice-principal. - A2QHT. . . . Reached 200 confirmed; now for the hard ones! - WA8TNJ. . . . Made about 12,000 QSOs from VE8ZZ. - VE2FU. . . . DXitis is a wonderfully incurable disease. - WB8ABN. . . . Feel sorry for the F9 incorrectly listed as FL8HM's QSL manager. - W9FN. . . . S.a.s.e. to Box 17316, Raleigh, N.C., will bring you the latest DXpedition of the Month *Bulletin*. - W2GHK. . . . Not much DX here lately but I do give the contests a try. - WA2MXL. . . . Off to a good start on my slow-scan-TV DXCC. - K4TWJ.

Where:

SOUTH AMERICA - OASX (SM6CSB) tells me there is a massive pile-up of QSLs for him in Sweden. Hal expects to answer all in due time. - P. Kromayer. . . . HC1WZ states he QSLs all Statesiders 100 percent on receipt. - WAIKQM. . . . I want to collect the many cards necessary for ARRL's Five-Band WAS certification. Please QSL! - YV5CVE. . . . The call 4M5BPG has been issued to me for work in major contests. I am not one of the non-QSLing YVs people complain about. - YV3BPG. . . . I have complete logs for 4M1A operation over October 25-26, 1969, courtesy W2GHK's DXotM. WSL requests may be sent direct to me. - WA2HZR. . . . Brazilian stations using prefixes PP PQ PR PS PV PX, etc., may be QSL'd to their PY counter calls. E.G., PP2AA equals PY2AA. - FERON.

ASIA - An BV1US on Taiwan in 1960-'61, I made several hundred cw QSOs. I QSL'd 100 percent but will be happy to do so again for those who failed to receive their cards. - K4YJQ. . . . Iranian amateurs expect to be authorized use of the old EQ prefix again in October. - EP2ER (WB4QBC). . . . I am QSL manager for 4X4TB. Use only my latest address as listed in the current *Callbook*. - K4EVY. . . . QSLs for all HL9s including myself may go via the *Callbook*-listed bureau QTH. - HL9TL (KIUJB). . . . CR9AK QSOs made on March 27-28, 1971, by JA1AFA & Co. may be confirmed through the latter's address. - DXNS. . . . 4S7PB plans to clear up a large QSL backlog shortly. - WCDXB.

EUROPE - Regarding March 16-24, 1971, operation from HV3SJ, tell the boys we are QSLing 100 percent, but it's a lot of work handling logs and filling out cards for 6500 QSOs. - DL1CU. . . . Finland authorities state that Market Reef henceforth will use the OH0 prefix. - WCDXB. . . . 12s were Milan commemorative specials. QSL 12s CJI KBW LAG SH, etc., to 11s of the same suffixes. - LIDXA. . . . QSLs for S. Pietro Island work by IC1s AA PUG SEZ and ZGY go via DXOTC, Box 143, Palermo, Sicily; likewise for Folie Island operation by IE1PUG. - DXNS.

AFRICA - I send out QSLs automatically via a bureau on first contact and naturally would appreciate cards in return. All contest QSOs are also confirmed via bureau. Being retired, I no longer mail cards direct unless International Reply Coupons are provided. - Z51BP. . . . The call 5Z4NB has never been issued and it must be assumed that the operator is a "pirate." - 5X5FB. . . . ZS3JJ is a stamp collector. - WA1HAA. . . . As of April 1, 1971, I am Stateside QSL manager for EL2CI. S.a.s.e. (self-addressed stamped envelopes) insure prompt direct reply. Others will be sent via bureau. - KSLUH. . . . I have ZS3KC's logs starting April 1, 1970, and will respond to the usual s.a.s.e., or s.a.e. plus IRCs (International Reply Coupons). - K4TXJ. . . . I have logs of the late CR6MT and am in process of QSLing 100 percent, replies unnecessary. Still handling cards for CR6s IK and YY as well. - W3CNI.

HEREABOUTS - "QSLers of the Month" recently responding with gracious punctuality are CR4BS, EA8BK, FL8HM, FM7WG, HI8KH, HL9WT, HV3SJ, JD1ABO, KH6J, KS6s DH DT, M1B, MP4TDT, PJ8AA, SU1HM, SV0WO, TF2WMB, TJ1AW, UL7CW, VK9LV, VP8 2FE 2ES 2IAW 7NA 8IV, VQ9TF, VR2EK, VU2JN, WA1ARF/KS4, ZE1DC, ZF1WP, ZK1s BM CD, ZL4OL, ZS2MI, 3B8CV, 5H3MM, 5R8BP, 6W8GE, 7P8AB, 7K0WW, 9E3USA, 9H1CH, 9Q5IA and 9XSAA, plus QSL tenders Ws 2CTN 2LGU 3DJZ 3H1Z 7VRO 9FN, K9GZK, Ws 3JHP 8HNM 9UES, VE3IG, JA1BA, SM6CEU, ZL2s FA GX and ZS6LW, all nominated in "How's" dispatches from Ws 1FTX 1SWX 4ZYT 8FTS, K0ZFL, Was 1HAA 2HZR, Wbs 2LYB 9BUV 9CJS and VE7BAK. Any other promptness

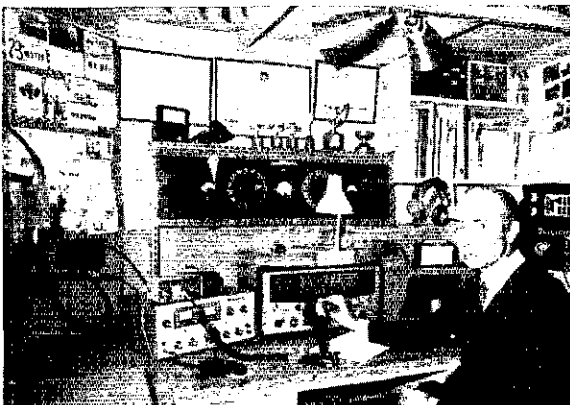
overlooked? . . . Halp! These italicized brethren are up tight about absent QSLs from holdouts mentioned: *W1FTX*, HB9YC/4W1, UJ8s AC AJ JA, VR4EZ: *W3GID*, YB0AAB: *W9EVA*, ZM1AAT/k: *WA2KHQ*, TF2WFI, VP1CP, ZP3AV; *ITDJ*, KM6s BI (oprs. Webb of 1963, Jim '68, Chuck '69), CE (Pat of '66) and W0ICJ/KM6 of '67. Any 'alp? Also, *ZSIDZ* is watching his mailbox for the pasteboards of Ws 6CLP 6CNA 6EBY 6HRE 7BE, Ks 4LW 6CQF 6GYS 6OS and WA7BLV. . . . W9FT, K4QFW, WA2s DHS MPC and WB2LYB announce their availability as QSL aides to needy overseas stations. . . . Regret QSL service has been discontinued for all stations. — *W2CTV*. . . . *W2CTN* is reported seriously ill. John's *XYL* notified his QSL clients that activity was being suspended. — *WCDXB*. . . . Foreign amateurs and shortwave listeners, please do not send cards to the W/K Outgoing QSL Bureau, only through proper ARRL Bureau routes. My service is only for cards from U.S. amateurs destined for foreign countries. — *W9RKP*. . . . After lengthy investigation I find that radiotelegraph stations QSL around 80 percent, radiotelephones only 51 percent. Not griping but I sure would like to help speed up both categories. — *WB4JYB*. . . . I no longer handle cards for VP1CP. — *WA4SBK* via *W9DY*. . . . Just ran my Indianapolis post office out of IRCs. They claim difficulty in ordering them. — *WB9BVU*. . . . ARRL's Sixland bureau reports 50,000 QSLs on hand for WB6s alone. — *WCDXB*. . . . The beautiful stamps on VP2LAW's QSL mesmerized the local postmistress. — *VE7BAF*. . . . Now a few individual specifications, but be mindful that each is necessarily neither accurate, complete, nor "official."

C21DC, Radio Station, Nauru Island
 CP6FE, Box 560, Santa Cruz, Bolivia
 CR3VV, P.O. Box 306, Bissau, Portuguese Guinea
 CR4AJ, J. da S. Barros, P.O. Box 8, Mindelo, Cape Verde Is.
 CR4BS, Box 101, Praia, Cape Verde Is.
 HBs 9XTK 0XTK, H. Vandegrift, MatCom-DSO, APO, New York, NY 09052
 HI8SAV, Box 155, Santo Domingo, D.R.
 HL9VE, J. Bregar (WA7CPM), Sig. Section, USEFK/EUSA, APO, San Francisco, CA 96305
 JY1-2-9AA-9AB (via WA3HUP)
 KC6BK, S. Kohn, P.O. Drawer C, Ponape, Caroline Is. 96941
 KC6LG, P.O. Box 156, Yap, W. Caroline Is. 96943
 KS6s DX XY, Dept. of Education, Pago Pago, U.S. Samoa 96920
 KX6IP, Box 1474, APO, San Francisco, CA 96555
 KZ5AZ, P.O. Box DX, Birmingham, AL 35213
 MP4TDM, K. Straw, Hq. BTS, RAF, Sharjah, Trucial Oman
 PJs 8CC 9CC, P.O. Box DX, Birmingham, AL 35213
 PZ2AB, Box 71, Nickerie, Surinam
 T12CF, Box 4300, San Jose, C.R.
 TR8MR, R. Marti, c/o SEEG, B.P. 82, Libreville, Gabon (or via VE2DCY)
 VP2s AZ EX MR, P.O. Box DX, Birmingham, AL 35213
 VR4EE, Box 236, Honiara, Solomon Is.
 WA4UTP/KP4 (to WA4UTP)
 WB6MQB/KJ6 (via WB6HDG)
 YO4s UJ WU (via WB2TSB)

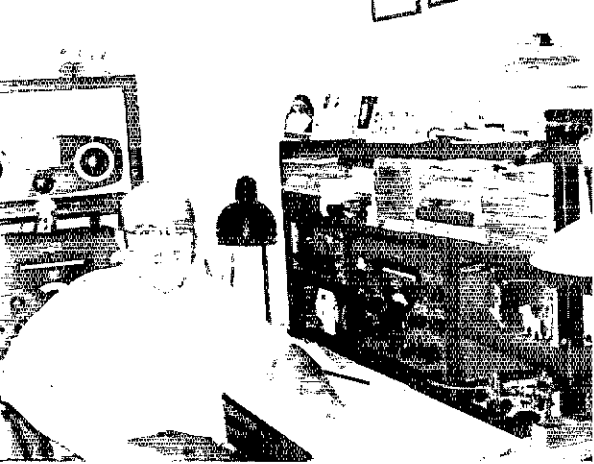
YV5CVE, M. Silva, P.O. Box 6547, Caracas, Venezuela
 ZF1CC, P.O. Box DX, Birmingham, AL 35213
 9G1DL, Box M-245, Accra, Ghana
 9G1s WW YA, E. Alline, Box 625, Tema, Ghana (or via W5EGH)
 9K2CW, P.O. Box 5979, Kuwait, Arabian Gulf
 9M2LP, J. McFegan (VE7LP), No. 7 Jalan 14/54, Petaling Jaya, Selangor, W. Malaysia
 9Y4CC, P.O. Box DX, Birmingham, AL 35213

BV1US (see text)	TC3CH (via LA3UF)
CR3DN (via CT1BH)	TT8AD (via F2MO)
CR6MT (see text)	TT8AF (to F2HF)
CR6YY (via W8CNL)	VK9NP (via K3RLY)
CR9AK (see text)	VK9YR (via VK6RU)
DL4LG (to WB9EAK)	VK0CC (via VK2BRK)
EL2CI (see text)	VK0TM (via K3RLY)
FG0MH (to WB8ABN)	VP1CP (see text)
FM0XF (via DL5RI)	VP1DK (via DL1HH)
FS0MH (to WB8ABN)	VP1EK (via DL1JW)
GM3SVK (to G3SVK)	VP2MY (via W1XL)
HB0XTI (via DK2DZ)	VP2SF (via K3RLY)
HI8XJH (via W3HIZ)	VR2FT (to G3HZG)
HL9TL (see text)	VR5DK (via WA6QWW)
HV3SJ (see text)	VS9MM (via G3LQP)
I1BUP/ID (to I1BGJ)	VU2OMR (via K5LIW)
I2LAG (see text)	VU9KV (via W6KNH)
IC1ZGY (see text)	ZD5E (via I1TQ)
IE1PUG (see text)	ZD8TS (via G3WDV)
JT1AM (via JT1KAA)	ZE1BL (to W0BL)
K6AZB/KB6 (to K6AZB)	ZM7AG (via K3RLY)
KC6WS (to W3FDP)	ZS3KC (via K4TXJ)
KC0KC (via WA0WOB)	3A0CZ (to ON4OQ)
KD2UMP (via W2RSJ)	4M5BPG (to YV5BPG)
MP4BIF (to G3XEC)	4X4TB (via K4EVY)
MP4TDM (via K1DRN)	5W1AH (via V67HWG)
OD5FB (via K5LIW)	8F6DR (via G3JUL)
OG2A (via OH2BAD)	9H1SWA (to 9H1BX)
OI1VR (to OH2VR)	9H1TR (via G3YRH)
PX1DEF (see text)	9N1JK (via D19KR)
SV0WBB (via K4YYL)	9Q5LS (via DL0SO)
TA6JB (via DJ9ZB)	

Your Elmers in the QTH-providing department this month are Ws 1CW 1FTX 1SWX 1YYM 3GID 8EFW 8FTS 8RTN, Ks 2BK 2OHT 3YVN 8L0H 8PYD 0ZFL, WAs 1HAA 1KOM 2HZR 2KHQ 2MPC 7MUU, WB9CJS, DL4VA, KZ5EK, J. Treesh, *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich N.72 T., England), Columbus Amateur Radio Association *CARAscope* (W8ZCQ), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), International Short Wave League *Monitor* (A. Miller, 62 Warward In., Selly Oak, Birmingham 20, England), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall Ct., Bellwood, Ill., 60104), Northern California DX Club *Bulletin* (W6EJJ), UBA's *On the Air* (ONS 4AH 5VA), VERON's



CT2AK fired up from the Azores in '59 and now sports FL-500, SX-101, TH2 and 5BDQ equipments. John is nearing the 200-country DXCC mark despite constant W/K/VE pile-up pressures.



DYpress (PAØ FX LOU TO VDV WWP), West Coast *DX Bulletin* (WA6AUD) and 3KM *DX Bulletin* (JA1KSO, JH1EXV). Any QTH hints in your log for the lads? The parenthesized calls and addresses are handy sources of information concerning the publications mentioned.

Whence:

ASIA - I never would have believed the number of hams active in the Far East. In Korea alone, where activity centers on 20 meters, there are about 150 stations on the air. With an FCC Conditional license or higher, becoming an HL9 is a painless procedure. Often did wonder what being real DX is like. It's great! - HL9TL (K1UJB). . . . Still no counterclaims to challenge my wet-string-antenna DX record, Japan from Sevensland. - K7VFF. . . . U.S. amateurs wishing to become associate members of our India society may arrange to do so through W6KNH. ARSL. . . . QSOs with Iran stations from March 21, 1971, through March 20, 1972, will count toward a special Radio Society of Iran certification commemorating the 25th Centennial of the Persian Empire. The award is in the planning stage. - EP2ER (WB4QBC). . . . ZC4CB completed a seven-week 80-meter cw "WAC" for my 75-watt Ranger.) WA2KWB. . . . Don't think I would have raised JT1AN so easily last night if I didn't already have a QSL from JT1KAA on the wall. W6FAY. . . . ARRL President WØDX, in Japan for the IARU meeting, joined in fun from CR9AK. - WC4XB. . . . UL7IG hunts Nevada and Wyoming for his full Fifty. - LIDXA. . . . King Hussein, JY1, sometimes is NCS of the Arabic Net on Fridays at 0630 GMT on 14.197 kHz. - FDXC. . . . HL9VQ (WB5CHK) needs only twenty more WSLs from Sixes to clinch our



SVØWP (W6CMH) keeps his KWS-1 and three-element tribander warm on 10, 15, and 20, mostly cw. Victor, a 40-year ham, has collected more than 11,000 QSOs during a three-year consulate tour near Thessaloniki.

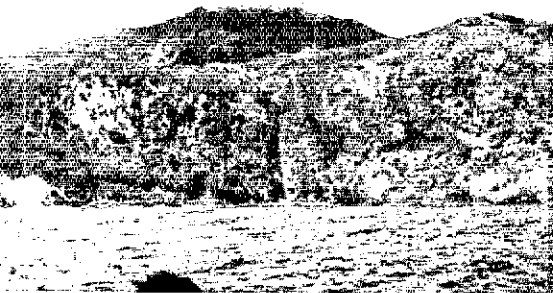
California Award. - NCDXC. . . . JA3UH works all continents easily with an all-solid-state 5-watt transceiver. - JDXRC. . . . KAs 2AB (WØEGD), 2AK (WA7MZV), 2AW (WA6DRZ), 2MU (W7CMU), 5AR (WA6CVG), 7GP (K4DKI) and 8AU (WB4RSC) hold new or renewed memberships. KA2MU was appointed society secretary on KA2RJ's departure from Japan. - FEARL.

AFRICA - My wife, 9G1YA, and I intend to help put Ghana back into the DX scene. After trials and tribulations we managed to make the DX Test. On Sundays I'll be on 15 phone around 1745 GMT, 10 meters about 1300, using 20 through 80 at other times. The number of 9G1s you report active puzzles me because I have heard only two. Phone on 80 here is a split-frequency affair. - 9G1WW. . . . EA8GZ appears regularly in the YL net on 14,332 kHz around 1600 GMT. TU2CW and I meet each Monday at 2200 GMT on 14,270 kHz. K2QHT. . . . FL2BA keeps active on several bands with a 350 and TA-33. - WA2DHF. . . . ZF4IS is getting back on the air after breaking his sending arm in a fall. Also watch for ZS3CJ at 1600 GMT Sundays near 28,540 kHz. - W3HNK. . . . It appears that an amateur licensed in Tanzania also will be cleared for Zanzibar upon request. Our licensing officer at Kampala is 5X5FB. Anyone needing 5H3 on 40 and/or 80 meters will find me available for skeeds. - 5H3LV. . . . The closing of 5N2AAF leaves Nigeria without an amateur particularly interested in the minor contests. - NARS News, 5N2ABG. . . . ZS3KC, a mining engineer with varying hours, is fairly active on 10 and 15 with Yaesu gear. We hold Sunday schedules on 28,600 or 21,365 kHz. - K47XJ.

OCEANIA - 5W1AM, who sets up vocational school programs for underdeveloped islands, has a dream job for a DX man. Fred roams from Cook to Ellice to West Samoa, etc., staying a month or so at each place. - K2QHT. . . . I'll be active on 80 through 10 with an FTdx560 on cw and phone. - K3ISV/KG6. . . . KC6SW is often found near 21,400 kHz around midnight GMT, weekends. - W7YBX. . . . I expect to sign KW6HA for a year or so and look forward to the contests. - KJ6CMP. . . . ZK1BM, KG6s, KR6s and many JAs are hitting 75 phone regularly. - W3TV. . . . I operate cw primarily, 14 and 21 MHz, with an FTdx560 and two-element quad. It's been twenty years since my photo was in QST as FP8AG. - KH6BC. . . . KC6SJ is busy teaching high school physics on Truk. W8RTN. . . . After a six-year absence I'm active again from Ponape. - KC6BK. . . . The story of raft *La Balsa* and the communications network established by amateurs on both sides of the Pacific during the craft's 8500-mile voyage from Ecuador to Australia is set out in detail in WIA's *Amateur Radio* for January, 1971. - C. Weller, *Brisbane DX Club*.

EUROPE - We expect to have ZA2RPS on the air again the last two weeks of this month near (cw) 14,030, 21,030, and 28,030 kHz, (phone) close to 14,108, 14,195, 21,235, 21,245, and 28,620 kHz. - DI7FT. . . . My Russian R-100-U and W-150 certifications arrived in four months, not too long a wait. - W6FAY. . . . Ten-meter conditions during the 1970 ARRL DX Contest,

CE7DW's popular signal from one of Chile's rarer regions goes QRT shortly when the OM moves to Switzerland. The remoteness of his cattle ranch location near Puerto Montt caused Ernesto to power his extensive 10- and 15-meter DX operation by 12-volt battery pack.



T19s J and CF, a four-day February DXtravaganza, poured forth 4158 QSO from rugged Cocos Island. Operators (l to r) W4VPD, T12CF, K7CBZ, and T12J included 43 QSOs on 160 meters when high tides weren't wetting the ends of their 1.8-MHz inverted vee. You'll be hearing Enos, Carlos, Don or Jose from other rare points anon. (Photos via W4VPD and K7CBZ)

when I worked 38 states while running less than 25 watts, are nice to remember. — YO7NA. . . . I'm teaching in Wiesbaden. — DL4LG (WB9FAK).

DL9PF and I will return to Rome in November for more HV3SJ radiotelegraphy. — DL1CU. . . . WPDNR (Worked Danish Post Numbers) is a new companion award to BIA (Bornholm Island Award), inquiries welcomed. — OZ4PM. . . . Amateurs in Odense, native town of Hans Christian Andersen, now offer the Fairytale Award based on cw QSOs with OZ stations including a certain minimum number of Odense's hundred hams. S.a.s.e., please, for details. — OZ7XG. . . . IIs BG1/ID and BUP/ID made 1285 QSOs from Tremiti Isle. — DXNS. . . . Don't pass up UK1s NAP and PAA as ordinary Russians. They're in Franz Josef Land. — FDXC. . . . OH0MA, who became intrigued with amateur radio through OJ0DX visitors, is half the permanent population of Market Reef. Karl should now be working 80, 40, and 15 with his crystal-controlled 40-watter. — WCDXB.

SOUTH AMERICA — There will be daily 160-meter transequatorial tests this month with Europeans transmitting on 1825-1835 kHz, southern hemisphere stations on 1800-1810 kHz between 0000 and 0300 GMT. Reports of results to my address will be disseminated. — R. Rasp, P.O. Box 51-ZC-00, Rio de Janeiro, Brazil. . . . Our 160-meter antenna on the northeasternmost point of San Andres, 40 feet from the Caribbean, was a 60-ft top-loaded vertical with a cut at 40 feet. The ground system consisted of forty radials of No. 18 aluminum each 30 to 60 feet long, some extending into salt water. A 250-ft long-wire for 80 through 10 meters also served as an alternate receiving antenna for 1.8 MHz. — W9UCW/HK0. . . . The first of OA3X's 3200 QSOs was with WA3FXB September 1st, the last with WA9CAT February 25th, OA3s X and Y used an R-4B/T-4XB/L-4B at one location, a TR-4 at the other, plus TH3, LP-1007 and 14AVQ radiators. — P. Kromayer. . . . HC6MJ is on assignment with the German equivalent to our Peace Corps. — K2QHT. . . . W9IGW/GE0's four-day Juan Fernandez effort in March amassed 4300 contacts. — WCDXB.

HEREABOUTS — Wyoming, North Dakota and Alaska will clinch my Antigua WAS. — VP2AAP. . . . I'm often available on 7050 kHz

6Y5GB's widely worked Kingston installation is as appealing to the eye as to the ear. George reports amateur radio high on the list of items featured in Jamaica Tourist Board promotions. (Photo by G. Allen)

in early morning and evening hours with a cw 10-watter. — KG4ET (WB2MIC). . . . HI0A operation comes courtesy YS2CEN. — WA8TDY. . . . What a vacation! Made 586 contacts with 35 countries using an HW-32 and six-ft-high dipole. The W/K gang's courtesy and cooperation made operating a real pleasure. — W0BL. . . . VP2AGA's 500 QSOs from Antigua included a 1.8-MHz contact with W1BB. Bob, G3RWL back home, now works cw on several bands as 8P6DR. — G3JUL. . . . My one-year remote Air Force tour means no XYL, no cars, no chocolate malts but plenty of DX. — WASEKI/KL7. . . . Was AXL FKG and I enjoyed more than 4000 DX fest QSOs from South Caicos as VP5CC. We later operated from several sites in the Bahamas but our Haiti efforts were frustrated. Wait 'til next year! — WB4MKU. . . . Fourteen-year-old WA2HSU, a 250-country DXer, already has his Extra. — WA3HUP. . . . I'll be portable-6 on cw from rare Alpine county on the 11th-13th of this month. Watch 7015, 14,020, and 21,030 kHz. — W6JXH. . . . Atmospherics are cutting into DX results around 3805 kHz. KP4AN's Caribbean net will resume in October. — W3TV. . . . Rare DX stations who announce operating ground rules and then proceed to break them only bring trouble on themselves. Those who expect everybody to stay "10-up" should never answer on-frequency callers. — K2QHT. . . . The cw week ends of this year's ARRL DX Contest convinced me that sound operating habits (No. 1, listen) can be as significantly advantageous as an 8-dB Yagi or a new 2-kw light-dimmer. JD OX SU TY ZD8 SW 7Q 9J and a Norfolk VK9 are just of few of the goodies that came back to my barefoot HW-100 and mere 80-meter wire situated in a gulchbottom. — W4GCB.





YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

"A Man's Hobby!"

IN THE correspondence section of April *QST*, WA0QEL, Helene Torhenson, asks "Can anyone help?" with the problem of answering an OM who confronted her with "Ham Radio is a man's hobby." True, the pronoun "he" is employed exclusively in the Amateur's Code. True, in the lace-bordered advertisement to YLs in *QST*, May, 1939, there is an apologetic paragraph that *Two Hundred Meters and Down* makes only a passing mention of YLs. We admit the evidence.

If we look at the record we must admit that Marconi listened to the letter "S" on December 12, 1901, without any feminine touch, for radio began in a strictly stag atmosphere. About five years later somebody goofed, because all of a sudden we find that Anna Nevins left Western Union in 1906 to become a wireless operator at the station NY, at 42 Broadway. Later she worked a regular trick at WA in the Waldorf Astoria.

To join the gals who sneaked in under the tent on the commercial wireless side when the OMs weren't looking, in 1910, a Miss Packer became this country's first YL to go to sea when United Wireless employed her as a ship's operator. In 1911, there was a Miss Tucker, and in 1912, a gal named Kelso, who were also operating aboard ships. Strangely enough, after 1913, when government licensing started, 30 women on the West Coast qualified as radio operators and had berths either at sea or on the Great Lakes or in coastal stations. The crisis of World War I did not stop the interest of radio-

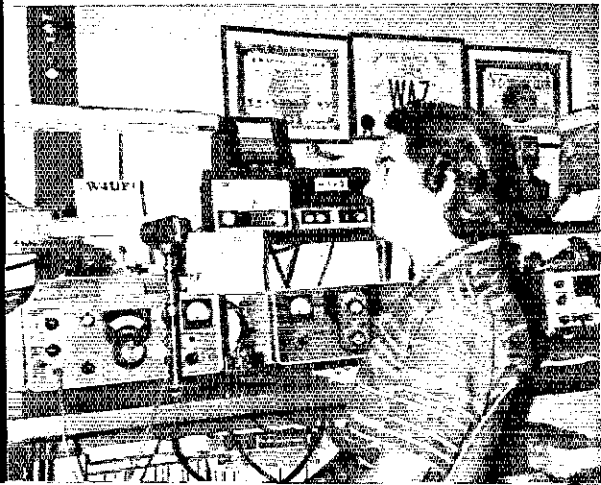
*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, CA 91001.

minded women. Many went to wireless school and from there into the Signal Corps as wireless operators.

It might be of some interest that on September 16, 1918, when the tanker *Tamesi* went aground off the Texas coast in a heavy fog, the radio operator who sent the SOS was Miss Lena Michelson, and NBK at Galveston received the call. She is the first and only YL on record to have sent the distress call from aboard ship. She was not only an excellent operator, highly respected by the OM wireless men, but later held a position ashore with Radiomarine corporation. Miss Michelson and Anna Nevins are the only women operators in VWOA.

So, that's the side of the commercial operators. "It's a man's hobby?" Could be, but some 14 YL members of OOTC never were told that they couldn't participate 40 years ago or more. In 1909, Miss Lillian Todd was adviser and sponsor of the Junior Wireless Club, now the Radio Club of America whose members, OMs true, have given so much to radio. In 1910, when FN, Miss Glass, and OHK, Olive Heartberg, fired up their spark rigs, no one mentioned that they weren't supposed to. The 13 gals who held amateur radio licenses by the beginning of World War I would have been surprised to hear that they were crashing a stag; just as surprised, no doubt, as the over 10,000 in the United States today are to learn about it; that OMs are hunting YL contacts for the certificates that are available from YLRL when nobody really wants them at all; that because of the use of a generic term as a pronoun, there is a "NO tables for ladies" sign.

For the crafty gentleman, we might have one more fragment of history. True, his argument stands, but there is a tradition that so far as we know three women started almost 100 years ago. Many stories of the dedication of radio operators, OMs all, who remained on duty in emergency at the risk, and often the cost of their lives, are a part of communications history, but until earlier documentation can be



W4UF, Dorothy Saunders, qualified as No. 49 to make 5BWAS. She is the first YL to do so. Dot admits it was a strenuous job, particularly obtaining those OSLs. Florida must be the place when chasing 5BWAS. Of the 11 W4 qualifiers to date, W4UF is the 7th Florida station.

QST for

uncovered, three women started this tradition on May 31, 1889, with their record in Johnstown, Pennsylvania.

We gals have a great heritage going back into history almost three thousand years. Maybe we did sneak in unnoticed, but we say with the late K. B. Warner, in a *QST* editorial of 40 years ago: "Hams we are, and proud of it."

YLRL Convention Plans Changed.

Due to the fact that the *Queen Mary* will not be available for conventions in the spring of 1972, the YLRL International Convention has had to be changed. The YLRC of Los Angeles, host club for the convention, has voted at their April meeting to have the convention on May 26-28, 1972 (Memorial Day weekend), at the Edgewater Hyatt House in Long Beach, California.

YLRL Certificate Custodians

There seems to be a misconception that "YL News and Views" issues the certificates that are sponsored by YLRL. This has also been the case with logs for the YLRL contests. While the club is an affiliate of ARRL, YLRL has its own certificate custodians and contest chairman. Submitting material to the YL editor only causes a delay in their receipt due to the forwarding time overlapping the deadline for the logs to be received.

Contests are always under the jurisdiction of the YLRL Vice president each year. For 1971, she is Mae Hipp, K7QGO, 5655 Yukon Drive, Sparks, Nevada 89431. All inquiries regarding any of the contests should be addressed to her.

For certificates:

WAS-YL, Irene Akers, W3RXJ, 5943 St. Clair Drive, Washington, DC 20031.
WAC-YL, Miriam Blackburn, W3UUG, Box 2, Ingomar, PA 16127.
YLCC, Onie Woodward, W1ZEN, 14 Emmett Street, Marlboro, MA 01752.
DX-YL, Emma Berg, W0JUV, RFD 2, Box 171, Lawrence, KS 66044.
Continuous Membership, Ruth Siegelman, W2OWL, 97-22 57th Avenue, Lefrak City, Queens, NY 11368.

First YL in SOWP, W6BDE

Esther Given, W6BDE, is the first YL to become affiliated with the Society of Wireless Pioneers. Esther was a member of the Women's Army Corps during WW2, trained for duty as a radio operator aboard an Army hospital ship. After her discharge from the Army, she served as a civilian operator on Civil Service status aboard a ship in the Army Transport Service.

A touch of this type of operation made Esther anxious to continue with radio, and this was the reason for her becoming an Amateur Radio Operator in 1952. A member of BAY-LARC, former 6th D/C YLRL, Esther is the originator of SWOOP.

While W6BDE is the first YL to become a member of this group, there are many other women who have commercial wireless/radio experience who are eligible to add a feminine touch to the club. The SOWP is anxious to have these gals as a part of the membership. W7GAQ/6 writes this column, "We would very much like to have members of the fairer sex in



K9LUI, Verna Franz

our organization, but guess the word hasn't filtered through."

YLs, if you were a wireless or radio operator in a commercial capacity, you are eligible for membership, and, what is more, you are going to be very welcome.

K9LUI, Verna Franz

When the radio bug bites, the reaction may be a long time in coming but sooner or later it does. A vacation in Hawaii was the place where the bug first nibbled in Verna's case, but, as with a lot of us, she never did anything about it until the OM showed some interest, and they both received their licenses about the same time in 1959. A local amateur pointed them in the direction of his particular interest, DX, and then they both were hooked.

The goal was DXCC, and now Verna has that comfortable total of 318/327 on the latest list with only three more countries needed to complete.

A lack of new DX put K9LUI into county-hunting, and now she has about 2200 confirmed towards that goal of "All Counties."

Most of us know her as one of the regular high-scoring calls in the YLAP and YL-OM annually, when it is almost an established fact that K9LUI is going to be among the top 10, if not among the first three.

A member of the Northern Illinois DX Association, LARKs, YLRL, YL-ISSB with the familiar number 6146, DXCC, and W9DXCC, Verna has a whole wall full of certificates from organizations YLAP, YL-OM, YL-ISSB, LARK, DX-YL, YLCC, WAC-YL, WAZ-2Way ssb as well as plaques, all evidence of her hard work. Travel with the OM has resulted in her being able to meet many of the people with whom she has been acquainted on the air in her DX pursuits.

Feedback

An error in a listing of DX YL calls in the February YLAP scores. The call should have been F2SQ/2, not F2QS as it was listed. **QST**

**SWITCH
TO SAFETY!**



CONDUCTED BY BILL SMITH,* KØCER

BY THE TIME this column reaches its readers, the 50-MHz band will be well into its major DX season. Two-meter men will be watching for E-layer skip opportunities, if they have not already caught one or more of them. Spring inversions will have stretched out the operating range on all the higher bands. Life in the world above 50 MHz will have gone through another reawakening. But as we compile this small contribution the vhf scene is quiet, indeed.

As we approach the June deadline, the vhf mailbag is far from bulging. This is no new phenomenon to the conductor, as the latter of the two signers, below, can testify, but reporting in recent months has been the lowest in years. Have conditions been that bad? Is the strong swing to 2-meter fm responsible, in part? Things will be looking up as regards activity and propagation conditions in the next few weeks, but if the drop in reporting results from a switch in operating modes, we need better liaison with the fm fraternity.

To this end, we stress the fact that vhf news is no respecter of modes. Interesting things happen every day, whether you modulate the frequency or the amplitude of the transmitter, or turn it on and off with a key. We invite our fm friends to report their activities for inclusion in these pages, so that the full above-50 story can be told.

Meanwhile, we use a slack news period to run interesting material of a kind that there might not be room for in a busier month. Which points to a use for this space that is not always exploited. If you have a new or better — or even just a different — way of accomplishing desirable ends in vhf communication, why not send in details for inclusion in the column? You'll be serving your fellow vhf enthusiasts in a most rewarding way, for them, and perhaps also for yourself. — KØCER & WHDQ

OVS and Operating News

50 MHz has had its periods of DX, but mostly not from the states. One of the more unusual reports came from W4FJ, Richmond, Va., who worked LU1MPJ, Argentina, at 2155 EST, April 14, as a rather good auroral opening was ending. Signals were strong and steady, with no auroral characteristics, leading to questions as to the mode. Signals were the same looking north or south from W4FJ as the magnetic storm ended. As a sidelight, W2BOC was correct again. Mel had predicted this aurora several months ago and his crystal ball average is getting even more impressive. Someone is going to investigate you, Mel!

Backscatter on the 21st was apparently more widespread. At 2007 GMT, W4GDS, near Miami,

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

worked WA7FPO, Arizona, followed by a host of 6s until 2117. K7ICW heard the contacts, but could not raise anyone himself. Al heard the signals between 2020 and 2130 GMT. WA6JRA noted the same opening and said careful beam heading and high power were necessary to work the weak signals. W5 WAX, Okla., worked stations from Florida to California between 2108 and 2150 GMT.

The last reported backscatter opening was March 24. WA5LYN, Cleveland, Texas, worked 5s beginning around 2100 GMT followed at 2205 by a contact with VP2MJ on Montserrat in the Caribbean. The opening ended at 2230.

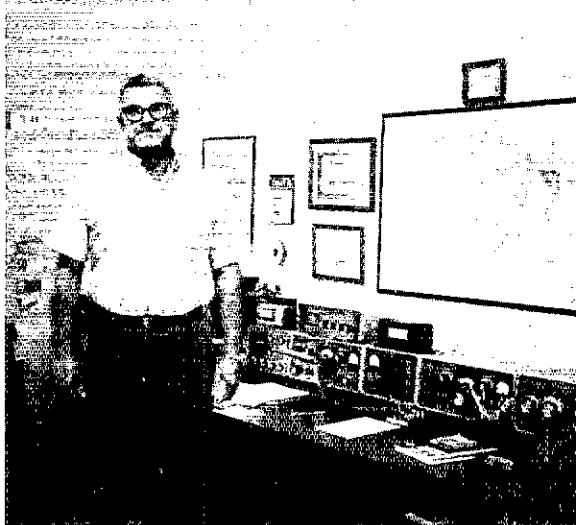
From Argentina, LU3EX writes that March was "good news on the 50-MHz band." Looking at extracts from his log, I'd have to agree. Alfredo enjoyed afternoon F2 and evening TE nearly every day of the month. Contacts included his 34th country on 50 MHz, VP2GCB, Nevis Island, being operated by WA1GPI. LU3EX logged many contacts with KP4s, PYs, XE1GE, XE1PY, YV4BE, K8REG/KV4 and single contacts with KH6IJ, K7ICW, and WA7IER. The better openings came on March 1, 5, 8, 14, 15, 20, and 26. The most frequently worked paths were to Puerto Rico and Mexico, where activity is high, likely explaining the contact volume.

Vince, K8REG, who operated from the Virgin Islands during March, with results reported last month, says he plans operation from other Caribbean Islands this summer. He will try to pick those which have had no previous six meter operation. Vince visited Helen and Sam Harris in Puerto Rico and says they are building a new home, which has cut into their operating time. Helen, W1HOY/KP4, hopes to be back on six this summer, but Sam will not likely resume his moonbounce activities until next summer.

In other 6-meter news, KL7GFB writes from Sitka that he expects to have high power and a long Yagi ready for summer E work. Bill has worked some W7 scatter and says KL7DJI, Fairbanks, was worked also. Bill, you'll be a popular fellow this summer on 6! WB9EDP, Chicago, seeks VE scatter schedules. WB4UCV, Goose Creek, S.C., also wants scatter schedules. He signed WB6HIL while on the west coast.

144 MHz is apparently more popular nowadays with the growing fm clan than it is with the DX group. From Bermuda, VP9BK wrote ARRL General Manager John Huntoon of a 146.94 fm net there, with plans being formulated for a repeater. W5FUA, Austin, Texas, says a March 28th tropo allowed many West-Texas contacts on fm channels. WA9QZE, near Chicago, caught several evenings of above-average tropo conditions in March. Al says there was an apparent duct from Iowa to Ohio on the 12th. KØMQS was working 8s, but WA9QZE couldn't couple into the duct. On the 13th, signals from central Iowa were well above normal and on the 20th a poor aurora was noted. Al says another Kentucky station active on 2 is WA4ELH. On nights of above-average conditions, Al has been hearing an unidentified carrier on 144.012 peaking

Joe Campa, TG9KM, made southern six-meter DXers happy recently by providing many "first Guatemala" contacts. At last report, Joe was in Louisiana, but expected to return to Guatemala sometime in June. This picture was taken at WA5HMK.



from the north. He wonders if anyone knows the origin of the signal. W9IFA reported the March 12 tropo. He says signals from Minneapolis to St. Louis and west to KØMQS were quite strong.

K4EJQ, Tenn., says "nothing unusual" during February or March and little activity was heard. Bunky is wondering if building a new 500-watt ssb rig was worth the effort — in two months he had one contact. He says WA4KDF is new on 2 from Tennessee and wonders what has happened to W4NUS in Charlotte, NC. That is the total 2-meter input this month.

Later Reports on April 14-15

Information received from many sources after the above paragraphs were set in type have helped to clarify the picture for the April 14-15 period. Bare details will follow; possibly an analysis can be made after all reports are in. A strong and widespread aurora developed during the evening, with interesting ramifications in the form of north-south DX and backscatter.

On 144, K4FKD, Fairfax, VA (ex-W5RAG) worked 38 stations from Maine to Missouri, in 12 states and 2 provinces, between 2330 and 0300 GMT. This was a treat for Dick, after 7 years south of the aurora belt. K8WKZ, Jackson, Mich., used 2-meter ssb successfully with WAØJBH, WA1HHN, WB2YPT, and others from Iowa to Massachusetts. Dave says ssb readability was better than normal. His fadeout time was 0250. WØLCN, Minneapolis, worked VE2DFO on both cw and ssb, but says the latter was marginal.

The LU QSO by W4FJ, reported in the 50-MHz news above, was not the isolated event it seemed, though a night contact with South America, this late in the solar cycle and as far north as Richmond, is certainly a rarity. Farther west, all manner of things were happening. Beginning at 0115, WA6HXM (Los Angeles area) heard the WB6KAP beacon (Bay area) on a 240-degree heading. The KH6EQI beacon was S9 soon after. KH6s, northern California, Oregon, Arizona, and Mexico were worked via backscatter, 0100 to 0330. WA6JRA, Orange, Calif., heard WB6KAP from 2238 to 0207, on a heading that moved from 210 to 240 degrees. Sam heard about the same territory as reported by WA6HXM.

432 and Up reports aren't much more plentiful and there were none on 220. During the April 14 aurora, W4FJ, Va., worked K8DEO, Ohio. K8DEO is being plagued by ATV activity around 432 and apparently the problem is becoming bothersome in the east. Previously there had been a gentleman's agreement that ATV would operate higher in the band, removed from the popular DXing frequen-

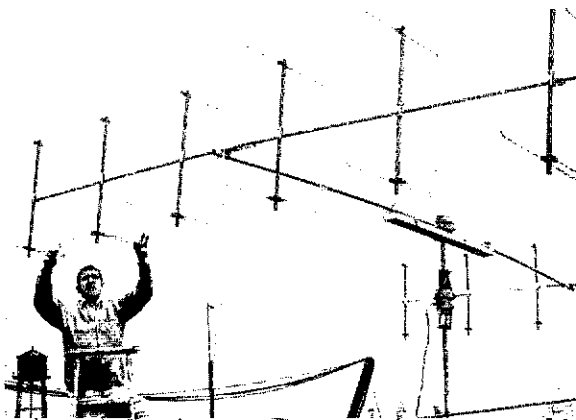
cies around 432.00. Certainly ATV operators have every right to operate wherever in the band they wish, but continued ATV operation near 432 may lead FCC to sub-divide the 420-MHz band. Such a proposal is reportedly being discussed, as wide-frequency ATV signals could interfere with the upcoming AMSAT OSCAR satellite frequencies.

In Oklahoma, W5WAX is waiting for 432 tropo with a 60-foot high 44-element array and 8-watt output varactor tripler. Sam's neighbor W5ORH is another waiting for summer DX to add to his 432 totals. WA5UVM, Dallas, has a 2N5637 solid-state amplifier, delivering 20 watts to a single long Yagi. Ben's rig is all solid state, beginning on 144. The tripler and amplifier, along with a receiving preamp, are mounted at the antenna to reduce feedline loss. Ben's first try with the new rig netted him a 200-mile contact with W5ORH, on an evening when conditions were "normal." W8FWF, near Detroit, says most activity in that area is 432.9 fm, with at least six stations operating mobile.

WA9HUV, Elmhurst, Illinois, seeks schedules on 432 and 1296, where he runs a kilowatt and 125 watts, respectively. During the winter, Norm built a solid-state 2304-MHz exciter producing 1/2 watt output, and a solid-state converter. He says the equipment appears to be working well, but summer tests are needed for full evaluation. For a 2304 antenna, Norm plans to add a third feed to his 12-foot homemade dish which has performed so well on 432 and 1296. By the way, Norm's vhf experience dates back more than 30 years!

Activity on 1296 MHz is reported by WA2SVG, Garden City, NY. Vince got on 1296 after being propagandized by WA2VTR and others at the

Bill, HL9WI, has been a popular catch for Pacific six-meter DXers. This picture was taken on the roof of his Seoul, Korea QTH as Bill tuned a 12-element cubical quad array for 50 MHz. Parts for the antenna were purchased in Tokyo. Bill says curious neighbors are told the antenna is for receiving Japanese television.



Hudson Division ARRL Convention last fall. Since Oct. 18, he has worked K2UYH, K2JNG, WA2LTM, WA2VTR, W2DWJ, K2DZM, K3IUV, K1SFF/3, WA2EUS, and WB2FPE. He started with a varactor tripler, and now is running a 3CX100A5 amplifier, delivering 15 watts output. He has a crystal-controlled converter with a V766A pre-amplifier. A 4-foot dish is up 50 feet. It will soon be replaced with an array for both 1296 and 2300 MHz, as a transmitter for the higher band is nearly ready to go.

WA9HUV 12-Foot Dish for 432 and 1296 MHz.

Many uhf enthusiasts ponder the advantages of parabolic antenna systems. They know that dishes can be used for work on two or more bands, and they are aware that, if properly designed and fed, parabolic systems provide cleaner and sharper patterns than are obtained with most Yagi or collinear arrays. But if they get as far as investigation of the electrical and structural problems, they usually give up the idea. Even putting a surplus dish to work, assuming that a suitable one can be located, turns out to be more than most of us can handle.

Fortunately a few hardy souls accept the challenge that construction of a sizeable dish represents. One such is Norm Foot, WA9HUV, an antenna professional who enjoys putting his many years of antenna experience to good use in amateur uhf communication. His 12-foot dish project described briefly here is a rare combination of sound design principles, novel mechanical ideas, and just plain hard work, that has produced an antenna system of exceptional merit. Only the principal features are given; if there is sufficient interest, a how-to-build-it treatment will be provided later.¹

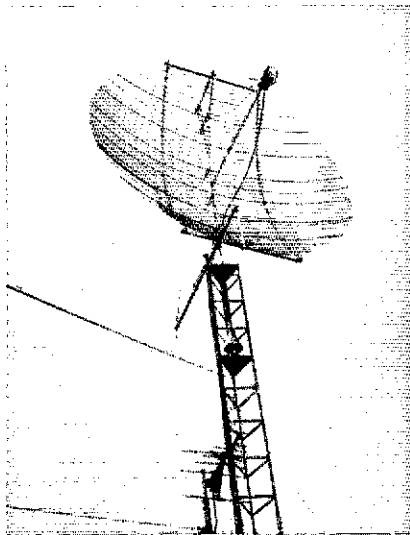
Norm had been thinking about eme communication, but this was abandoned in favor of concentration on over-land work, when the performance characteristics of a home-made dish of practical size were computed. Instead of shooting for the moon, the objective became a single array for 432 and 1296 MHz that would outperform the 64-element collinear and 7-foot dish formerly used on these two bands at WA9HUV.

Mechanical Design

The 12-foot dish is novel in that it is built almost entirely of tubing; aluminum for lightness where it can be used safely, and steel where structural strength is needed. The main vertical member is 10 1/2 feet of 2-inch tubing that formerly supported the collinear and 7-foot dish. Three short booms of aluminum and a 7-foot one of 1 3/4-inch steel are attached to the vertical support with U clamps. These serve as mounts for the dish, as can be seen in the photograph showing the back of the array.

Aircraft cable 3/16 inch in diameter is stretched between the top of the mast and the back end of the steel boom, making what is known in nautical

WA9HUV supplied many details, both theoretical and practical, that are not included in this condensation. If there is interest in this additional information the full story will be supplied, with drawings, on an individual basis. To get it, send \$1.00 and a request for the additional information on the WA9HUV parabolic antenna to ARRL Headquarters, Newington, CT 06111. Early requests may be slow in being filled, and we reserve the right to return money, if only a small volume of orders is received.



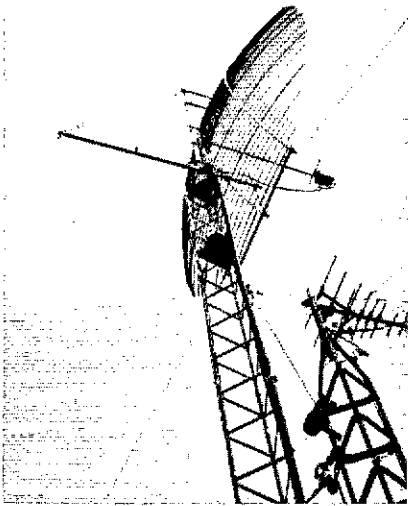
The 12-foot dish for 432 and 1296 MHz atop its 50-foot tower.

circles as a "mast spreader." Its purpose is to neutralize the unbalanced force of the dish with respect to the axis of the mast, and prevent the slight mast hending that would otherwise result from the type of mounting used. The mast spreader is also "storm insurance," as the result of a second cable that can be attached to a ground anchor west of the tower. When a storm threatens, or the antenna is to be left unattended for long periods, the cable is hooked to its anchor and drawn up tight with a turnbuckle. This guy, for all practical purposes attached to the top of the mast, prevents the nodding motion that is characteristic of unbalanced antenna arrays. The guy wire runs to the west, so prevailing winds bear against it. The system has ridden out several severe storms in two winters of use.

The main frame of the dish is 1 1/4-inch aluminum tubing. Two 12-foot lengths in the vertical plane are 30 inches out from the center of the top and bottom braces and 31 inches out on each side of the true center of the dish. The short top and bottom members are also 1 1/4-inch tubing. Eight horizontal elements of 0.083-inch wall 3/4-inch tubing are placed at strategic places in the reflector. The rest of the dish elements are 0.064-wall 7/16-inch tubing. Aluminum hardware is preferred for assembling the array. It is somewhat weaker than steel or brass, but the corrosive effects of dissimilar metals are avoided.

The two-band feed is mounted about 60 inches out in front of the parabola on a boom made of 1 1/8-inch pine dowel. A cylindrical horn is used for 1296 MHz. This is 6 inches in diameter and 7 inches long. The 1 1/4-inch probe is soldered to an N-type connector projecting into the can at a point 2 5/8 inches from the open end. The closed end of the can is stiffened with 3-inch aluminum washers on the inside and outside surfaces, and fastened to a 10-32 screw which is both tapped and cemented into the end of the dowel.

The 432 feed is a folded dipole, with a reflector whose position is adjusted for minimum SWR on the



View of the 12-foot dish, slightly from the rear, showing the method of supporting the assembly on the rotating mast.

50-ohm line. A 50-to-300-ohm beer-can balun² and the dipole and reflector are mounted just above the cylindrical horn, with the dipole just over the horn's open end. This brings the 432 feed a few inches above the focal point, but no effects of this are noticeable in the pattern of the array.

Three-point suspension of the dish is provided, using Nylon fishing line. The bottom line is in the vertical plane, and the other two are 60 degrees either side of the vertical line of the upper half of the dish. Three strands of 25-pound line are used in each support.

The feeds are connected to 7/8-inch low-loss main transmission lines on the tower through sections of RG-8/U coax about 9 feet long. These wrap around the tower sufficiently to permit rotation of the antenna through 360 degrees without pulling up tight.

Illumination and Element Spacing

Several factors affecting weight, wind resistance, and reflector efficiency were considered in designing the parabola. It will be seen that spacing between reflector elements is appreciable, and that not all the reflector area is "filled" with tubing. Would-be dish builders may not realize that, though the contour must be kept close to the ideal, the density of the reflector need not be high. Reduction of the density in the four areas around the outer portion of the dish has a negligible effect on the overall efficiency of the system.

The limit for spacing of reflector components has been shown by theoretical analysis and leakage-loss measurement to be greater than many readers might expect.³ The 3-inch spacing used in this array is closer than is needed for optimum results at 1296 MHz. Theory indicates that the dish will work at 2300 MHz with a loss of only 3 dB, compared to a solid reflector. If it were to be used

for 432 only, the spacing could be as much as 12 inches without appreciable loss.

Placement of the feed is determined mainly by the beamwidth of the feed antenna and the size and shape of the parabola. The pattern of the feed should be wide enough to cover the entire parabola, yet not so wide that appreciable power spills over the edges of the dish. Remembering the shape of the pattern of a dipole and reflector, and the way the power drops off beyond the 3-dB points, it can be seen having the 3-dB points just inside the edges is a fairly good approximation. It happens that the patterns of the dipole-and-reflector at 432 and the cylindrical horn at 1296 are quite similar, so one position is satisfactory for both. The feed assemblies are about 60 inches out from the dish center.

The curvature of the parabola is then determined by the optical requirement for beam-forming (collimation) that the distance from the source to any point on the reflector, and back out to an imaginary plane in front of the dish, be the same. All energy from the source must arrive at the imaginary plane simultaneously, producing what is known as a *plane phase front*, and the narrowest possible beam. The 60-inch focal length of this design is critical to about plus or minus one inch.

Bending the Metal

Reflector components of the WA9HUV dish were bent to the desired shape with the aid of a very simple "jig." Once the desired curve was determined, large nails were driven into the studding in a garage wall, and the dish elements bent so that they just touched each nail. This is done quite readily with the smaller sizes, and it is not too difficult with the larger sizes, if done a small amount at a time, and with great care. The garage studs in this instance are 16 inches apart center to center. This called for fixture nails at 1.07, 4.25, 9.6, 17, and 26.7 inches lower, progressively, for each nail out from the center point of the curve.

The curve should be smooth, and the final result should just touch each nail as the element rests on the jig. The shape of the dish can be controlled to some extent during assembly. Final positioning can be adjusted to match the curve of a test gauge at all points.

Performance

By the time this appears in print, the WA9HUV dish will have been in service for nearly two years. In that time, many hours have been spent in checking patterns, measuring losses, and calculating the performance of the system on both bands. The beam patterns are clean enough to justify gain calculations from them. On 432 the half-power beamwidth is 14 degrees, which should result in a gain of 21 dB over isotropic, assuming a 2-dB illumination loss. The gain on 1296 works out to 29 dB, with the same assumptions, based on its observed 6-degree beamwidth.

In more practical terms, the system has achieved its stated objective of improved performance over the separate arrays formerly used on both bands, as demonstrated by superior range and reliability over a long period of on-the-air use.

WA9HUV would be the first to emphasize that this is no project for the faint-hearted, nor is it inexpensive. Norm held his actual out-of-pocket

(Continued on page 107)

²Radio Amateur's VHF Manual, Chapter 8.

³Microwave Theory and Design, Vol. 12, MIT Radiation Laboratory Series, BTP Edition, p. 449.

Operating Events

de W1YYM

JUNE

- 2** W6OWP Qualifying Run (W6ZRJ, alternate) at 0400 GMT on 3590 and 7129 kHz, 10-35 wpm. This is 2100 PST the night of June 1. Copies to ARRL for grading.
- 5-6** Lambore-On-The-Air, JOTA, April page 104.
- 5-6** International I.U. DX Centenary Contest, full 48 hours GMT, phone and cw. Exchange report and number of years in amateur radio. See page 106 May.
- 6** Minnesota QSO Party, details p. 106 May.
- 10** WIAW Qualifying Run, 10-35 wpm, at 0130 GMT on 1,805 3,52 7,02 14,02 28,02 50,02 and 145,588 MHz. This is 2130 EDT the night of June 2. 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.
- 12-13** ARRL VHF QSO Party, p. 70 May.
- 12-14** Oregon QSO Party, rules p. 106 May.
- 13-19** Mass. Amateur Radio Week, p. 106 May.
- 15-19** Worked All Mass. Cities and Towns Contest, p. 106 May.
- 19-20** Call VI Panamerican Games, full 48 hours, phone only. See page 106 May.
- 20** Worked All Britain, vhf phone, p. 103 March.
- 26-27** ARRL Field Day, new rules p. 68 May.
- 30** WIAW Morning Qualifying Run, 1300Z (this is 9 am EDT June 30). Same frequencies and other details as under the June 10 listing.

JULY

1-5 Operation of K00KC by members of the Mobile Amateur Radio Awards Club Inc., and the Independent County Hunters Nets, during meetings in Kansas City. Operation on 10, 15 and 20 from around 1300Z until the band closes. Activity on 40 and 80 from 2300Z until 1300Z the following day. Frequencies 3550 3880 3910 7050 7205 7260 14050 14205 14285 21050 21280 21360 28050 and 28600. Log contacts in GMT. For special QSLs, send an s.a.s.e. or 2 IRCs to K00KC c/o P. O. Box 753, Shawnee Mission, Kansas 66201.

8 W6OWP Qualifying Run, see June 2 listing.

8-17 The Calgary AR Assn. will operate VE6NO from the grounds of the famous Calgary Stampede from 1900-0500 GMT daily. Frequencies on or near 3560 3780 3825 3900 3943 7060 7190 7225 7270 14060 14150 14250 14336 21060 21240 21300 28060 28500 28600 kHz. Special QSL cards. CARA will have a prominent exhibit displaying all modes of amateur radio communication, special emphasis on low-cost equipment within the reach of all. QSL via CARA, Box 592, Calgary 2, Alberta, Canada.

10-12 "Open CD Party" cw, starts 2300 July 10 and ends 0500 July 12. Operate any 20 hours out of the 30-hour period. Times out must be 15 minutes or more to count as off-time. ARRL appointees/officials send appointment plus section. Non-appointee members may transmit member (MHR), life member (LM) or charter life member (CLM) - whichever is applicable; plus ARRL section. Same station may be worked on additional bands for credit. Scoring: count 5 points per QSO, add your ARRL code proficiency credit, multiply this new sum by the number of different ARRL sections worked (see page 61). Suggested frequencies in past Parties go up from about 3535 7035 14035 21035 28035. Try 160 at 0530 GMT. Activity on 6 and 2 is welcomed. An s.a.s.e. will bring you the special forms which include a section check-off list. Entries must be received at Hq. by Aug. 16 to qualify. All participants will receive a copy of the CD (Communications Dept.) Bulletin with results.

16 WIAW Qualifying Run, see June 10 listing.

17-18 Ontario QSO Party, sponsored by the Radio Society of Ontario, Inc., from 1700Z July 17 to 2400Z July 18. No power restrictions, all bands may be used. Points for contact with the same station on different bands/modes. Ont. stations score 1 point per QSO and multiply by the number of ARRL sections and foreign countries worked. Outside stations score 3 points per Ontario QSO and multiply by the number of Ontario Counties worked on each band. Certificates to section high scorers and a trophy to the top VF3. Suggested frequencies are 3560 3685 3855 3909 7030 7240 7290 14040 14140 14225 14290 21050 21300 28100 28600 50,250 144,000-144,500 and 145,800 kHz. Ontario stations send QSO number, report and county. Others send number, report and section or country. Logs postmarked no later than Aug. 31 go to the Contest Chairman, RSO, Box 334, Toronto 18, Ontario, Canada. An s.a.s.e. will bring a copy of the results to you.

17-18 Independence of Colombia Contest, sponsored by the Liga Colombiana de Radio-Atencionados and the LCRA DX Club, full 48-hour period, 80-10 all modes but no cross-mode contacts. Exchange report and serial number (for non-HKs). HKs will send report plus the HK zone they're in. Stations outside the Americas score 5 points per HK QSO, stations within the Americas score 3 points per HK QSO. Non-HK QSOs count 1 point. Multiplier is the addition of the HK zones and countries worked on each band. Note that HK0 San Andres counts as San Andres, Colombia, AND an HK zone. Appropriate certificates. Competition may be single op, single transmitter, multiop, single transmitter or multi-multi. Logs must be sent before Sept. 30 to the LCRA, Ap. 584, Bogota, Colombia, S.A.

17-19 "Open CD Party" phone, same details as July 10-12 listing. Suggested frequencies up from 3905 7265 14280 21355 and 28600.

24-25 County Hunters cw contest, full 48-hour period. Stations may be worked once on each band and again if the station has changed counties. Portables/mobiles changing counties during the contest may repeat contacts for QSO points. Stations on county lines give/receive only one number per QSO but each county is valid for multiplier. Exchange QSO number, category (portable or mobile) and county (U.S. stations). QSOs with fixed stations count 1 point, with portables or mobiles 3 points. QSO points times the number of U.S. counties worked equals final score. Portables and mobiles calculate their score on the basis of total contacts within a state. Suggested frequencies are 3575 7055 14070 21070 and 28070 kHz. Appropriate awards. Logs must show category, date/time, stations, exchanges, bands, points, location and claimed score. If over 100 QSOs, include a check sheet of counties worked, S.a.s.e. for results. Postmark logs by Sept. 1 and send to J. P. Bechner, K0WNV, 42 East Signal Drive, Rapid City, S.D. 57701.

AUGUST

- 4** W6OWP Qualifying Run
- 7-8** Ohio Interstate QSO Party, rules July.
- 10** WIAW Qualifying Run
- 21-22** Scandinavian Amateur Radio Teleprinter Group world-wide rtty contest, rules July.
- 28-29** All Asian Contest, cw

SEPTEMBER

- 1-9** Nebraska State Fair operation of K0QNEB.
- 2** W6OWP Qualifying Run
- 11-12** VHF QSO Party
- 11-13** Washington State QSO Party
- 12** Frequency Measuring Test
- 15** WIAW Qualifying Run
- 22-24** YI Howdy Days
- 28** WIAW Morning Qualifying Run

OCTOBER

- 2-4** California QSO Party
- 6** W6OWP Qualifying Run
- 9-11** CD Party, phone
- 14** WIAW Qualifying Run
- 16-18** CD Party, cw
- 16-18** 11th World-Wide RTTY DX SS sponsored by the CARRG.
- 20-21** YI Anniversary Party, cw

NOVEMBER

- 4** W6OWP Qualifying Run
- 12** WIAW Qualifying Run
- 13** Frequency Measuring Test
- 13-14** SS, phone
- 20-21** SS, cw

DECEMBER

- 8** W6OWP Qualifying Run
- 11-12** 160-Meter Contest
- 14** WIAW Qualifying Run
- 30** WIAW Morning Qualifying Run

Operating News

GEORGE HART, WINJM
Communications Manager

ELLEN WHITE, WIYYM
Deputy Comms Mgr.

DXCC: ROBERT L. WHITE, WICW
Contests: ALBERT M. NOONE, WA1KQM

Training Aids: GERALD PINARD
Public Service: WILLIAM O. REICHERT, WA9HHH

Operating Skeds in Greek? Time was when life was simple, but that was quite some time back. Nowadays it is increasingly complex, and anyone trying to make it simple is just whistling in the dark. What occasions this outburst of philosophy is a recent letter, one among several, complaining that the WIAW schedule is so complicated that no one can understand it.

The only way to make a complicated arrangement of times, frequencies and types of operation simple is to explain it in terms of the person wishing to understand it. Unfortunately, this is not feasible when you are trying to serve so many different types of amateurs living in so many different places. Consequently, an attempt must be made to present it in a form using universal language insofar as possible, while at the same time conserving as much QST space as possible.

The letter mentioned above did, however, point out something we had perhaps overlooked, and that is the explanation for what is meant when just a frequency is entered, without any explanation or footnote. This indicates general contact on a casual basis with any amateur station, using that frequency or one very close to it. These schedules are followed as closely as possible, although not quite so religiously as the bulletin and code practice schedules. The WIAW schedule now makes the meaning clear.

The schedule is still complicated, what with all the footnotes, and times not corresponding to the times used by readers. In order to be understood, the WIAW schedule has to be studied, not simply glanced at. Any simplification would require much more space than now being devoted to the subject, even considering the amount of use the WIAW transmissions get from amateurs in the field.

One of the principal difficulties seems to result from the "time jumble." WIAW schedules are printed, for the most part, in GMT, a universal standard used worldwide. Conversion into local time is often a problem, especially as between "standard" and "daylight saving" local times. But even worse than the time conversion is the day conversion. Cases in which the reader misinterprets the day because of the time difference are fairly frequent, despite cautions. For example, someone will write that the schedule shows code practice at 5-25 wpm on Wednesday, but he copied us at 0130 Wednesday and found us sending 35-15 wpm. Reason was that he failed to consider that 0130 GMT Wednesday is *Tuesday evening* in all U.S. and Canadian time zones, so he was listening on the wrong night.

Note that there is a break in the schedule most days from 0500 to 1300. This is the break between sessions of WIAW operation. 0500 GMT is 1:00 A.M. Eastern Time (in most states), midnight Central, and the *previous evening* in the rest of the time zones to the west until you hit the date line in mid-Pacific. Most of the "early morning" hours shown in the schedule carry the date and name of the previous day in most U.S. and Canadian time zones. If you neglect this factor, you could miss out on something.

Operating Aid 14 and the printed WIAW schedule contain a convenient time conversion table (free on request for a s.a.s.e.), if you have trouble converting times, but don't forget that when you convert you are changing the date or day if you go through 2400. There's nothing "tricky" or devious about it; you just have to keep in mind that our time is not necessarily your time.

Copying the Official Bulletins. A few (not too many) clubs have complained that not receiving the weekly Official Bulletins in the mail has worked a particular hardship on them, especially those who publish newsletters. These mailings were discontinued last fall as a money-saving device (they cost almost \$4000 a year in postage alone) — one of many economies effected to try to keep ARRL dues down.

Naturally, we regret any inconvenience, but the saving of money wasn't the sole reason for the move. It was also desired to get the OBS program back to what it was always supposed to be — an *on-the-air* dissemination of latest info of interest to amateurs. A new bulletin is issued once weekly — on Thursdays usually, in order to get the latest amateur regs news, if any, out of FCC, which customarily meets on Wednesdays and hits the press tables the following day. The usual card (letter, if a long bulletin) is mailed to OBS appointees the same day. Most of them don't receive it until Monday, four days later, by which time WIAW has transmitted it about 15 times, simultaneously on as many as eight different bands, using three different modes, at just about all times of the day or night. Wouldn't it seem that to any active amateur interested in the news, it would be "old hat" by the time he received it from an OBS appointee who waited for the mail card to arrive or read it in his club's newsletter? By copying WIAW at 0000 GMT on cw or 0100 GMT on phone or 0300 on RTTY, he can get the hot news the same night it comes out (per present WIAW skeds). Why wait for the mail?



JA1AEA, top Asian scorer both modes in the 1970 ARRL International DX Competition, gets a first-hand plaque presentation from ARRL/IARU president WØDX.

There are a number of answers to this question. Probably the most frequent is that WIAW doesn't come in so well out west. This is very possible when conditions are bad, but it doesn't seem likely night after night if one keeps trying, considering that the bulletin is transmitted on all bands from 160 through 2 meters simultaneously. Another is that it is not possible to listen at the times when WIAW transmits the bulletin. This takes a lot of preoccupation, considering that the bulletin is transmitted at different times of the day and night by various modes.

A somewhat more valid reason is that an amateur at some distance from Newington operates vhf only and has no means of copying the WIAW transmissions on lower frequencies. Thus, OBS appointees capable of receiving on low frequencies and transmitting on vhf are needed to alleviate this deficiency. Technician licensees are eligible for OBS appointment, but their usefulness is impaired if they are not capable of receiving WIAW.

But think of the advantages of copying WIAW direct, or an OBS appointee who has done so. You get the bulletin almost immediately. You can take it to your club meeting, giving them the benefit of it. If you are yourself an OBS appointee, you can retransmit the "hot dope" on your regular schedules. Your club can make copying the OB from WIAW (or anybody else, for that matter) competitive among its members, thus creating a new activity, or assign one of its members the responsibility for this, to be reported at each club meeting (in lieu of the mail bulletin). Maybe if enough people copy the bulletin on the air, we can discontinue the mailing altogether, thus saving another couple thousand bucks a year. Make it a practice to copy the WIAW bulletin - every night if you can, because occasionally "specials" pop up, but preferably Thursday. The topics aren't always "hot news," but now and then you'll be glad you got the latest.

Alphabet Soup. Another letter complains that we use all kinds of initials in this and the ARPS column without explaining what the letters stand

for. We agree that this can be annoying and can drive away casual readers. Sorry, OMs. The booklet *Operating an Amateur Radio Station* (free for a s.a.s.e. - oops! a self-addressed stamped envelope) contains a list of operating abbreviations, as does the ARRL *Radio Amateur's Operating Manual*, and in last month's *QST* there was also a list of abbreviations, both technical and operating. Here are a few recently used that are not on either list:

A T & T - American Telephone and Telegraph Co.

CAN - Central Area Net (part of National Traffic System)

CARTG - Canadian Amateur Radio Teletype Group

DOC - Department of Communications (Canadian)

EAN - Eastern Area Net (part of NTS)

ECN - Eastern Canada Net (part of NTS)

EOC - Emergency Operating Center

FMT - Frequency Measuring Test

GMT - Greenwich Mean Time

ICAO - International Civil Aeronautics Organization

IRC - International Reply Coupon

PAN - Pacific Area Net (part of NTS)

PR - Public Relations

PS - Public Service

TEN - Tenth Region Net (part of NTS)

TWN - Twelfth Region Net (part of NTS)

TWX - Teletype (part of the Bell System)

1RN, 2RN, 3RN, 4RN, 8RN, 9RN - Region Nets of the National Traffic System.

RN5, RN6, RN7 - Region Nets of the National Traffic System

In all reading, the reader must have a certain amount of comprehension, including a knowledge of the meanings of words, terms *and abbreviations* used. Some abbreviations have become so common that they are no longer considered abbreviations at all, but are common terminology in the specialized field. For example, ac and dc are no longer strictly abbreviations and in electronics it is never necessary to spell them out. So well known is the concept that contradictory terms such as "ac voltage" are perfectly acceptable. If you don't understand the terms, you won't understand the text. It's not by any means simply a matter of knowing what the letters of an abbreviation stand for.

W5QNY Out, W6DQX In. CAC (that's Contest Advisory Committee) member W5QNY is spending a year in Europe and has bowed out of the committee. President Denniston has appointed W6DQX to take his place. Phil, W6DQX, is formerly K9ELT, a long-standing ORS/OPS appointee and at present Asst. SCM of Los Angeles. A well-known and proficient contest man, he is highly qualified for this advisory function.

-WINJM.



DX CENTURY CLUB AWARDS



Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings.

March 1-31, 1971

New Members

WA4ZYQ	220	WA0MLF	134	OK1KZ	112	JA6KZ	104	W3RY	101	VE3BIZ	100
JA2CPD	203	JA3BTR	132	ZI1BIM	111	OH5PA	104	W5TVH	101	W4VJH	100
CT2AK	185	WB41OD	128	JA6BRV	108	WB8BOH	104	WA6CVU	101	W4YVK	100
JA4DGG	168	W4DWK	122	WA2LXP	108	JA1OMH	103	DL4MJ	100	WB4HL1	100
K4BVD/6	163	W0NAR	121	W9FXZ	108	KR6TQ	103	F2GV	100	WA5WPB	100
JH1HWN	151	K31JU	117	DL7FW	107	LA4O	103	FM7WN	100	WA5WOL	100
I6KAW	150	K4PLK	116	K6KOS	107	W2ZPG	103	K3OVT	100	WA7KTF	100
WB2NDS	142	W4MVE	116	WA5RAS	106	DL8WV	102	K4DWO	100	WA81QP	100
WA4YVQ	141	G2BWN	115	K6QX	105	LZ1WZ	102	K6BUD	100	WA9ZQG	100
W6HRB	141	JA3FGJ	114	W81WF	105	W3GKM	102	K6QPI	100	W01U	100
						DJ6OJ	101	K7RMV	100	W0HG	100
								LZ2AW	100	YU2IH	100

W5OKZ	282	DK3VD	139	YV4YC	112	WA5RAS	106	4M1A	103	WB2NIN	100
VE6GN	270	I6KAW	135	W21WK	110	W6MDH	106	DL2BR	102	W3BLK	100
K7YWX	228	KH61QI	134	W3YHR	110	DL5ST	104	WA9LZT	101	W5KCK	100
WA4ZYQ	216	WB41OD	128	DK1TC	109	G2BWN	104	DL91J	100	WA5WLY	100
DK1YG	203	JA1BA	127	WA1JPI	109	CR7TK	103	FM7WN	100	WA5WOL	100
W1GKJ	192	W0GIL	116	JA6YG	107	KR6TQ	103	W1SWD	100	YV1ABP	100
JH1HWN	147									3BRCV	100

Endorsements

In the endorsement listings shown, totals from 120 through the 249 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

DL3RK	340	VE3NL	305	JA1OCA	270	ZI4JS	250	I3SM	180	WA11BX	140
G4MJ	340	W1DHP	305	K2QQU	270	CT1LN	240	W3BBO	180	WB41DT	140
W2RGV	340	W2C WK	305	K4CLB	270	K5ZJK	240	W3LR	180	WA5Q1Q	140
W3RNO	340	W0PAH	305	K6JR	270	K6PZ	240	W3QLW	180	W611D	140
K6CH	335	FA1BC	300	K9YXA	270	W3H1W	240	W1CT	180	W8KOS	140
W2GT	335	K4HFI	300	PY4AJQ	270	W9U1Q	240	W2UBJ	180	WA8VRE	140
W4LRN	335	K4IE X	300	VP7NA	270	JA8EL	220	WA7MGK	180	WA8YTC	140
W6DZZ	335	W2MZV	300	W41PW	270	K2AHO	220	Z86J	180	W0SQD	140
LUSAQ	330	W3GE	300	WA41-F	270	K2KGB	220	K4PY	160	WA0WZ	140
W3AFM	330	W6NWZ	300	W6CS	270	VK9KS	220	K4ZYU	160	WA0VK1	140
W8LY	330	W8V1K	300	W9WQ	270	WA2LOR	220	K6MT	160	DJ2YI	120
ZL3IS	330	W9WNB	300	W0TDR	270	W4WSI	220	K0HR	160	HB9AAH	120
W3GJY	325	W0CPM	300	YU2NLG	270	W8QBG	220	OF3HDW	160	I1ZGA	120
W5NUT	325	K4GFI	290	K1KNQ	260	W9MCT	220	DL6CL-W2	160	K6CLV	120
WA2RLO	320	K0BUR	290	K2KNV	260	W9QWW	220	W2SJM	160	K7DX1	120
JA6AD	315	SM6CKS	290	K41SJ	260	WA9NHQ	220	W3BRR	160	K0ZF1	120
K61V	315	WB2VAF	290	VE3DBT	260	WA9WJE	220	W8YMB	160	VE3GHZ	120
K8EHD	315	WA3HUP	290	VE6ABP	260	JA3AAW	200	W9PQC	160	WA11R1	120
K9WTS	315	WA6AH1	290	W11ZD	260	K2KCD	200	WA9YFY	160	W2DGV	120
PY2BKO	315	PY1WJ	280	WA1HFN	260	K4CLI	200	W0GKS	160	WB2CZM	120
VZ4OX	315	W01FB	280	W2RSJ	260	I1ARW	200	WA0LW1	160	W3YHR	120
W3HTF	315	W5DL	280	WB2PGM	260	PYSASN	200	DJ8WD	140	W4KV1	120
W4SSU	315	WA6HRS	280	W3NV	260	W1PPN	200	I1LAV	140	W4ZYT	120
W5AG	315	VE3CDP/W9	280	W4HFN	260	WA3AFX	200	K1ASJ	140	WA4EEN	120
W8LUZ	315	YU1AG	280	DJ4HR	250	W4JUK	200	K4FN	140	WB6RKH	120
DJ0PN	310	CR7BC	270	G2MI	250	W4YU1	200	K4MRZ	140	WA7UCM	120
K5CIL	310	DL1MD	270	KP4BJM	250	W5AC	200	K6MP	140	W8H1	120
OK3MM	310	G6RC	270	W1AH	250	WA811V	200	OH21U	140	W91VB	120
PZ1AH	305	HP1BR	270	W8GMX	250	W0JMB	200	VE7R1O	140	WA9SMM	120
										WA9VCK	120

VK5MS	340	VE3NL	290	K9W1S	260	WA4Z1P	220	W2BHK	180	K9HDZ	140
W1MMV	330	K4QEI	290	W31CO	260	WB6GKK	220	W91MH	180	VE2DJR	140
K9ECE	325	K0BUR	290	W3NV	260	W81AX	220	YU1AG	180	WA11BX	140
W5JWM	325	W1JWX	290	VE3CDP/W9	260	W9AG	220	K2QHT	160	WA1HOT	140
KP4CL	320	W6DZZ	290	YV5CIL	260	DJ6VM	200	K4KZ7	160	WA0WZ	140
W7OPK	320	W8VHY	290	K1KNO	250	DL3OM	200	K4LI	160	WA5QFD	140
W5AG	310	W2QT	280	VE6ABP	250	JA8EL	200	K6PZ	160	WA8AQ	140
PZ1AH	305	WB2VAF	280	VP7NH1	250	K5ZJK	200	K8LSK	160	WA0RRI	140
LA7Y	300	G6LK	270	W3COR	250	K41X	200	K9BTU	160	DJ3PY	120
SM5HK	300	JA1OCA	270	ZL3RP	250	KP4QOB	200	KR6JX	160	I1ADN	120
W1B1H	300	K4BBF	270	CT1HN	240	VR11	200	PY1DF1	160	K9BWO	120
W6NWZ	300	W3GI	270	CT1MW	240	W4WSF	200	WA3NRV	160	W1EKG	120
W0CPM	300	WA3HUP	270	W2ONK	240	W8QBG	200	W5AC	160	W31PF	120
HP1JC	290	DJ0PN	260	W5FDX	240	W8YFK	200	X11GA	160	W6HRB	120
JA6AD	290	DL1MD	260	EA1HY	220	DL4QG	180	YV4WT	160	WB6RKH	120
KH6BB	290	K2BK	260	ON4PL	220	K1RAW	180	Z1BSI	160	WA7MGK	120
PY3BXW	290	K2QQU	260	VK9KS	220	K4TSJ	180	DK21P	140	WA8PWZ	120
		K6JR	260	WA1HFN	220	WA1RYW	180	HK4BNC	140		

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)
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the ARRL Section of the Division, hereby nominate as candidate for Section Communications Manager for this Section for the next two-year term of office.

You are urged to take the initiative and file nominating petitions immediately.

George Hart, WINJM, Communications Manager

Section	Closing Date	Current SCM	Present Term Ends
W. Mass.	6/10/71	P.C. Noble, W1BYR	8/11/71
Ks.	6/10/71	R.M. Summers, K0BXF	8/18/71
W. L.	7/9/71	Jose Medina-Hernandez, KP4CQ5/1/71	
F. Pa.	7/9/71	G.S. Van Dyke, Jr., W3HK	6/15/71
Ore.	7/9/71	D.T. Justice, K7WWR	7/1/71
I. Bay	7/9/71	P.J. Parker, W6BDBH	9/2/71
S. Barb.	7/9/71	C.D. Hinson, WA6OKN	9/2/71
W. Va.	7/9/71	D.B. Morris, W6JM	9/18/71
Del.	8/9/71	J.L. Penrod, K3NYG	10/11/71
Manitoba	8/9/71	K. Witney, VE4EI	10/10/71
Va.	8/9/71	R.J. Single, K4GR	10/11/71
R. I.	8/9/71	J.E. Johnson, K1AAV	10/12/71
Vt.	8/9/71	E.R. Murray, K1MPN	10/17/71
Ind.	9/10/71	W.C. Johnson, W9BUQ	11/1/71
S. Dak.	9/10/71	F. Gray, WA6CPX	11/1/71
Orange	9/10/71	J.L. VerDutt, W6MNY	11/10/71
Hawaii	9/10/71	L.R. Wical, KH6BZF	11/11/71
F. Fla.	9/10/71	L.F. Porter, W4KGI	11/28/71

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.

R. C.	H.I. Savage, VE7FB	5/1/71
Wash.	A. Henning, W7PI	5/3/71
N. Mex.	J.R. Prime, W5NUI	5/9/71

ARRL AFFILIATED CLUB HONOR ROLL

In these days of raising requirements in one place and lowering them in another, the affiliated clubs 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, 45 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 those clubs who are 100% ARRL according to questionnaires so far received. If your club is 100% ARRL and is not listed below, it means we do not have your questionnaire form yet. Fill it out and send it in, so you will make the next listing of 100% ARRL Clubs in December QST. Ladies and gentlemen, our Affiliated Club Honor Roll!

- Aberdeen Amateur Radio Club, Aberdeen, Miss.
- Albert Lea Amateur Radio Club, Albert Lea, Miss
- Arkansas DX Assn., Lonoke, Ark.
- Associated Mountain Toppers, Anaheim, Calif.
- Athens Amateur Radio Club, Athens, Ga.

- Chicago Radio Traffic Association, Inc., Chicago, Ill.
- Decatur Amateur Radio Club, Decatur, Ala.
- East Coast VHF SSB Assoc., Passaic, N. J.
- Goldfield Radio Club, Goldfield, Iowa
- Greater Cleveland VIII Radio Club, Maple Heights, Ohio
- Huguenot Amateur Radio Club, Richmond, Va.
- IRU Amateur Radio Club, Philadelphia, Pa.
- Lamar Tech. Amateur Radio Club, Beaumont, Texas
- Laurentian DX Club, Beaconsfield, Quebec, Canada
- Limestone Amateur Radio Club, Athens, Ala.
- Lockhead (LERC) Amateur Radio Club, Burbank, Calif.
- Loudon County ARC, Lenox City, Tenn
- Louisville Gas & Elec. Co. ARC, Louisville, Ky.
- Lower Columbia Amateur Radio Assoc., Inc., Kelson, Wash.
- Mason County Radio Club, Ludington, Mich.
- Massillon Amateur Radio Club, N. Canton, Ohio
- McPherson Amateur Radio Club, McPherson, Kans.
- Meriden Amateur Radio Club, Inc., Southington, Conn.
- Mike and Key Radio Amateur Club, Camarillo, Calif.
- Murphy's Marauders, Vernon, Conn.
- Newington Amateur Radio League, New Britain, Conn.
- Norfolk County Radio Assn., Norwood, Mass.
- Norfolk Radio Club, Norfolk, Neb.
- Northeast Nebraska Radio Club, Norfolk, Neb.
- Northern Illinois DX Association, Prospect Hgts., Ill.
- Orange Amateur Radio Club, Orange, Texas
- O.R.P. No. 1 Radio Club of St. Louis, St. Louis, Mo.
- Order of Boiled Owls, Reynoldsburg, Ohio
- Order of Boiled Owls of N.Y., West Hempstead, N.Y.
- ORP Amateur Radio Club NYC Chapter No. 1, Brooklyn, N.Y.
- Radio Operators Assoc. of New Bedford, Fairhaven, Mass.
- Rome Radio Club, Inc., Rome, N.Y.
- Sante Fe Trail VHF Club, Inc., Shawnee Mission, Kans.
- Skagit Amateur Radio Club, Mt. Vernon, Wash.
- South - Eastern Virginia Wireless Assn., Norfolk, Va.
- Stratford Amateur Radio Club, Stratford, Conn.
- Windblowers VHF Society, Inc., Fair Lawn, N.J.
- York Amateur Radio Club, York, Pa.

CLUB COUNCILS AND FEDERATIONS

- Council of Connecticut Amateur Radio Clubs, Mr. James W. Parker, K1VH, Secy., 17 West Main Street, Natick, Conn. 06357.
- Federation of Eastern Massachusetts Amateur Radio Assoc., Mr. Eugene H. Hastings, W1VRK, Secy-Treas., 28 Forest Ave., Swampscott, Mass. 01907.
- Hudson Amateur Radio Council, Inc., Mr. Stan Zak, K2SJO, Secy., 13 Jennifer Lane, Port Chester, N. Y. 10573.
- Indiana Radio Club Council, Inc., Mr. Ronald Erve, WA9QI Q, Secy., 1810 Columbus Blvd., Kokomo, Indiana 46901.
- Michigan Council of Amateur Radio Clubs, Mr. Harold Bowers, W8C RP, Secy., 4626 Stillwell Ave., Lansing, Michigan 48910.
- Ohio Council of Amateur Radio Clubs, Mr. James W. Benson, W8OUU, Secy., 2463 Kingspath Drive, Cincinnati, Ohio 45231.
- Puget Sound Council of Amateur Radio Clubs, Mr. Jerry Seligman, W7BUN, Secy., 12406 80th Ave., East, Puyallup, Wash. 98371.
- Tennessee Council of Amateur Radio Clubs, Mr. Dave Goggio, W4OGG, Secy., 1419 Faveil Dr., Memphis, Tenn. 38116.
- West Virginia State Radio Council, Ms. K.C. Anderson, W8DUV, Secy., 209 Childers Ct., Huntington, W. Va. 25705.

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 145.588 MHz. For practice purposes, the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	Local Times/Days	GMT
10-13-15	7:30 P.M. EDST dy 4:30 P.M. PDST	2330 dy
5-7½-10- 13-20-25	9:30 P.M. EDST SnTThS 6:30 P.M. PDST	0130 MWFsn
5-7½-10- 13-20-15	9:00 A.M. EDST MWF 6:00 A.M. PDST	1300 MWF
35-30-25- 20-15	9:30 P.M. EDST MWF 6:30 P.M. PDST	0130 TThS
35-30-25- 20-15	9:00 A.M. EDST TTh 6:00 A.M. PDST	1300 TTh

The 0130 GMT practice is omitted four times a year on designated nights when Frequency

WIAW SPRING-SUMMER SCHEDULE

(April 25-October 31)

(Specific frequencies shown below indicate general operating periods)

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EDT, Saturday 7 P.M.-1:00 A.M. EDT and Sunday 3 P.M.-11:00 P.M. EDT. 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 May 31, July 5 and September 6.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0900							
0020-0030 ¹			3.700 ¹	14.020	14.020	7.150 ¹	14.020
0030			3.700 ¹	14.100	14.100	7.150 ¹	14.100
0100							
0105-0130 ²			3.820	50.120	145.600	1.820	21.270
0130							
0230-0300 ⁴							
0300							
0310-0330 ⁴							
0330							
0335-0400 ⁴							
0400							
0420-0430							
0430-0500							
1300							
1700-1800							
1900-2000							
2000-2100							
2200-2300							
2300-2330							
2330							

¹ CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.588 MHz.
² Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.588 MHz.
³ RTTY OBS (bulletins) 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 Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
⁶ WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
⁷ Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
⁸ Sent with 170-Hertz shift.
 Maintenance Staff, Wis QIS WFR, WA1NEU. *Times-days in GMT. Operating frequencies are approximate.

Measuring Tests are made 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 April QST practice text to be sent in the 0130 GMT practice on the following dates:

- June 14: It Seems to Us
- June 17: Correspondence
- June 23: League Lines
- June 29: ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio, First Edition*.

- July 7: The ARC-5 Transmitters
- July 9: V.H.F. Transmitters

Briefs

That April FMT report (Feb. 14 Frequency Measuring Test) should have shown WA2CCF with 12.5 ppm (parts per million) accuracy, W8NWU with an average error of .4 ppm and WB2YSR/3 should have been noted as WB2YSR/3. If K4ZBQ hadn't miscopied his readings, his ppm would have averaged out at 15.

The SKN (Straight Key Nite) quote on page 114 of the March issue should have been credited to VE7XN, not VE3XN. Sotry, Floyd! QST

Changes of Address

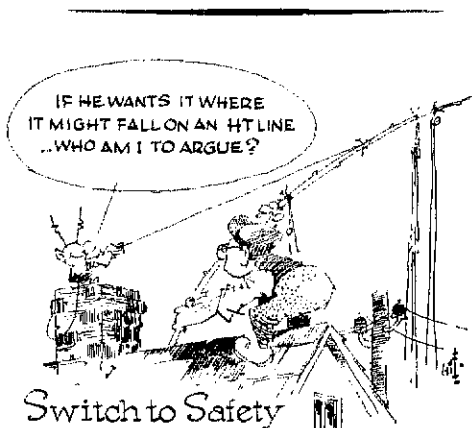
Please advise us direct of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

World Above

(Continued from page 101)

cost to around \$100, thanks to purchase of much of the tubing from surplus sources, and hand-making of most of the hardware. He estimates that new materials and commercial hardware would run the bill up to \$150 or so.

The next step is operation on 2300 MHz. He has a half-watt crystal-controlled exciter and converter already working. More power and better reception are in the works - then on to schedules with W4HHK! - *W1HDQ*



SCM AREC ORS CP SEC OBS TCC OO

Station Activities

OVS AIOPR EC DXCC CLUBS RW OPS RCC

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE — SCM, John L. Penrod, K3NYG — SEC/PAM: W3DKX. RM: W3EEB. A new trophy has been added to the John Thompson W3HC Field Day trophy. This one will be for the club with the highest vhf points. Check with your local radio club for details. A group of 24 members of the First State ARC visited Wash., DC and toured the National Environmental Services Administration building. The trip was one of the best the club has ever taken. WN3OYA has passed his Advanced Class exam and is working on a new antenna. W3FB will be handling less traffic this summer because big KOA campground becomes very busy during the summer months. K3GUW is shaping up his vhf station in the hopes of winning all the vhf contests. WA3BAO is the NCS of the Delaware Two Meter Net. Check in and say hello to Earl. If rabbit hunting is your game, check with the First State ARC. K3IXR will give you all the details. WA3ERV is helping the U. of Del. ARC teach code classes. K3NYG has a new ssb rig on 2-meters. Traffic: W3EFB 66, W3DKX 32, WA3LTA 5, K3NYG 3.

EASTERN PENNSYLVANIA — SCM, George S. Van Dyke, Jr., W3KHC. SEC: W3CC. RMs: W3EMC, W3MPX, K3MVO, WA3AEI, K3PII, W3CDB. PAMs: K3PSO, WA3GLL. VHF PAM: W3QUG. OO reports were received from K3RDI, K3HNP. OBS reports from W3CBH, WA3AFI, WA3FC, WA3KFT. OVS reports from WA3KFT, K3CQ/3, K3VAX. WJCL. RPLs: WA3OJM, K3NSN, W3JML, W3MPX, PSHR: WA3OGM, W3MPX, WA3YIC, WA3CKA, K3DHO. Nets not listed missed the dead line!

Net	Freq	Time	QNI	QTC	KM/PAM
PEW	3610	6:30 PM-F	535	330	K3PSO
PLTN	3610	6:00 P-Dy	452	271	WA3AEI
EPA	3610	6:45 P-Dy	479	369	W3MPX

George Hart's recent news letter brought a lot of overdue certificates out of the woods! Penn Wireless had a ball at ARRL Hq. WA3HC made away session of EPA, could be a record. WA3OGM did the same thing on PLTN. K3MVO is slowly being converted to phone. WA3AEI was appointed RDO for Chester Co. WA3ATO received a nice commendation from the Marine Corps for her phone patch work for the boys in Guantanamo. WA3CKA had to do a fast rebuild just before net time to take NCS! W3AQN sent a card to remind me he was still at it after 43 years. wow! WA3PLP announces the formation of the National Teenage Society Net on 6007 Sat. and Sun. on 39.25 kHz. WA3MCK is getting his shack in order for all vhf bands. W3GKM is going all out on RTTY. K3VAX completed an all transistor 2-meter rig. New officers of the Delmont Radio Club are: W3SO, pres., WA3INW, vice-pres.; W3PNM, 2nd vice-pres.; WA3DTA, treas.; K3DFY, secy. The Lancaster Radio Transmitting Society, Inc., elected K3EVP, pres.; W3NOI, vice-pres.; K3QJN, secy.; K3MAW, treas.; W3CFP, W3OMI, dir. 2-years; W3QLV, 1 year. I finally have retired from the Bulker Factory to should be more active on the nets. Traffic: (Mar.) K3NSN 1299, W3EMC 613, K3BHU 468, W3MPX 458, WA3OGM 246, K3PII 200, K3MVO 124, K3DHO 114, WA3AEI 106, WA3AFI 105, WA3VC 90, K3PSO 72, W3CDB 70, WA3XW 70, WA3CKA 52, WA3JF 49, WA3YIC 49, WA3PLP 37, W3VA 31, W3VAP 27, W3AXA 26, WA3DF 25, W3HK 25, WA3ZB 22, W3OY 18, WA3EL 17, W3BNR 14, WA3MOP 14, W3RBH 12, WA3JKO 10, W3KCM 10, K3HKW 8, WA3IMO 7, W3RUR 6, W3CL 5, W3OML 5, W3JKX 4, WA3JAZ 3, WA3JRY 3, WA3RJO 2, WA3HSV 2, WA3HIG 2, W3LI 1, W3GKM 1, W3DI 1, WA3KFI 1, K3VAX 1, W3YPF 1. (Feb.) W3CDB 97.

MARYLAND-DISTRICT OF COLUMBIA — SCM, Karl R. Medrow, W3FA — Nets: MDD held 31 sessions with a QNI average of 8.8 and 147 messages. MIXTN — 17 sessions, QNI 16.3 average

and 43 messages. MDDS — 27 sessions, QNI 4.3 with 32 and MTMTN — 13 sessions, QNI 8.2 and 7 messages. W3ZY digs out of the snow and renews as ORS/OPS/PAM. WA3AX renews the Univ. of Md. as ORS. W3PZW and K3GJD return to the ORS fold. WA3NUH is a new ORS and OCL. WN3JOEN joins the AREC. Mar. BPL man is W3IN. PSHR honors go to W3IN and W3JZF. New antenna men are WA3MSW with K3LFD about to plant and WA3GVP with summer visions of a beam. W3FCS is experimenting with dipoles. W3CP is back on his feet and handles more traffic when all than most of us do when we're. The vhf enthusiasts are WA3APO, W3GLL, W3JPT and WA3LOP who is snowed under with logs from the Worldwide VHF activity his club sponsored. WA3NUH is chasing DX. W3BHF discovered the world of ssb and vfo's and son WN3PKS is a General Class licensee as is WN3OWN. K3FEW recently retired from Bendix. W3FOV's auto was a total loss in an accident, but he is OK. WA3MIF went multiop, with K3IYZ in the DX tray. W3OKN keeps a wicked set of schedules. W3HXF keeps active in the phone nets. W3QCV announces a new YAESU, fun on 2-meters, and an upcoming 2-year tour of duty in Miami. First warning, MDD — MDC1N thing at PATAPSCO State Park July 18. W3LOJ is your S.C. Are you in the ARUC? W3CIX, after 15-years inactivity is back with RTTY, no less. The Md. Mobiles and the B&O/C&O RR Radio Clubs send bulletins along with the Potomac area VHF Section. Traffic: W3IN 269, WA3AX 115, W3FA 94, K3LFD 85, W3ORN 84, WA3MT 67, K3GZK 60, WA3IV 47, W3GL 44, W3ECP 40, W3CWC 36, W3EZF 33, WA3MIF 33, WA3MSW 27, W3HXF 18, W3OY 6, W3QCV 4, W3RFR 4, WA3NUH 3, K3QOC 1.

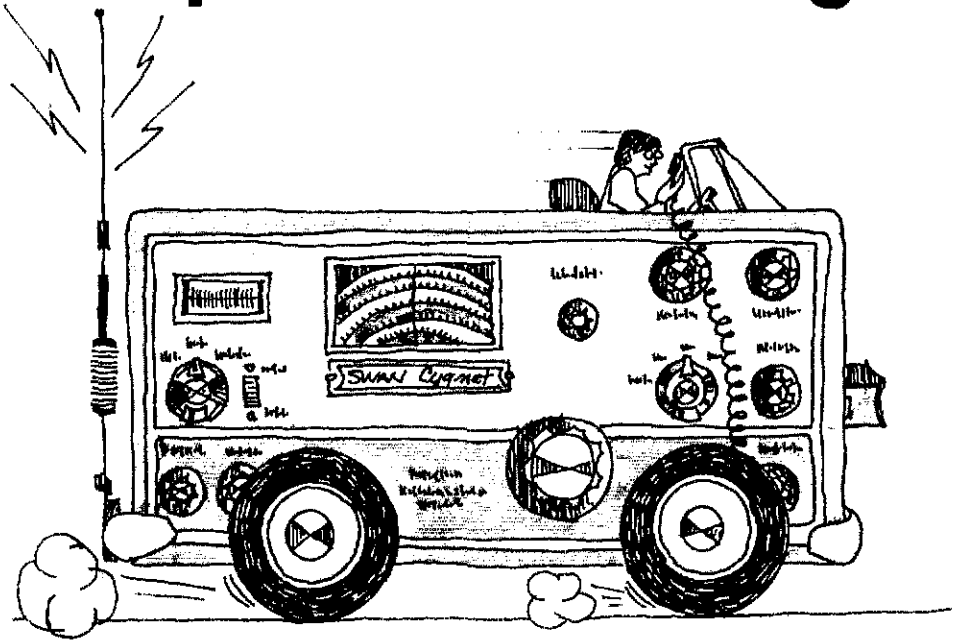
SOUTHERN NEW JERSEY — SCM, Charles F. Travers, W2YPZ SEC: W2LWV. PAM: WB2JF.

Net	Freq	Time	QNI	T/C	Mgr.
NJN	3695	7:10 PM	72	874	082 WA2BAN
NJPN	3940	8 Su	4	99	8 WB2JF
NJEPN	3980	8 M-S	30	599	156 WA2TAF
(Feb.)			29	718	308
MCPIN	145.9	8 F	4	23	1 W2YPZ

The GCARC program is in full swing. The club banquet is scheduled for May 29 at the St. Michael's Club, in Gibbstown, N.J. At the regular quarterly dinner meeting of the QCWA at Easterville, Pa., Mar. 27, W2AEZ was presented a 50-year certificate for her continuous operations. Della is a very active YL ham and is also corr. secy. of GCARC. W2AEZ is the second YL in the Delaware Valley Chapter area to be so honored. WA2KWB, a new OPS appointee, is a student at the Rutgers II School of I.I. and hopes to accompany the first Annual Radio Club Expedition of the U. over the Memorial Day week end to Bermuda. WA2NPP is the all of the Rutgers RC. W2EHE has renewed his OO appointment. W2ORS reports helping with the signal improvement of one station in Mar. It is gratifying to note an improvement in the number of activity reports received in Mar. Keep up the good work. Traffic: (Mar.) WB2VFI 166, WA2KAP 30, W2ORN 20, WB2HMU 15, W2IU 13, W2CLZ 9, W2YPZ 9, WB2JF 8, WB2SFX 5, WA2WLN 5, WA2KWB 4, WB2WHB 4, WA2BLV 3, WA2DVO 3. (Feb.) W2IU 4, WB2WHB 2.

WESTERN NEW YORK — SCM, Richard M. Pitzenise, K2KTK. Asst. SCM: Rudy M. Ehrhardt, W2WVI. SEC: W2RUF. The list of Section Nets appears in the Apr. station activities column. New appointees: W2EAF as OO, ORS and OPS; K2KOC and WB2LOP as OBS. Renewals: WA2MIV as OO and WB2YIM as OPS. I am very sorry to report the passing of W2ZDW of Newfield, formerly of Rochester. WN2NK completely overhauled his 18V vertical. W2OI spent 7 weeks in the sunny south and had no trouble ONI the Hit and Bounce Net on 1440 daily. WA2AWK also went south, New Mexico, for a couple of weeks. RAWNY elected W2DRY, K2HWF, K2HYQ, W2JPF to the board of directors, with K2HJ, pres.; K2HYQ, secy.; WA2GPO, secy. and W2IAX, treas. W2PLG, the outgoing pres. did an FB job of increasing activity. Nice to hear Father Harold, W2SCT on 75. BARRA elected WA2KTI, pres.; WA2MSV, secy.; WA2BVG, treas. and W2LOP, tech. dir. Their input frequency is 146.31 and output is on 146.91. K2PDP is active. Maritime, W2QLK, formerly of Cheektowaga, now is in Groves, N.Y. The BARRA crew activated K2LUMP at the Buffalo City Dump on Apr. WB2EAF is active with a fly-Gain 18V and plans an inverted "V" in the near future. WB2YIM is NCS of NYSPTEN

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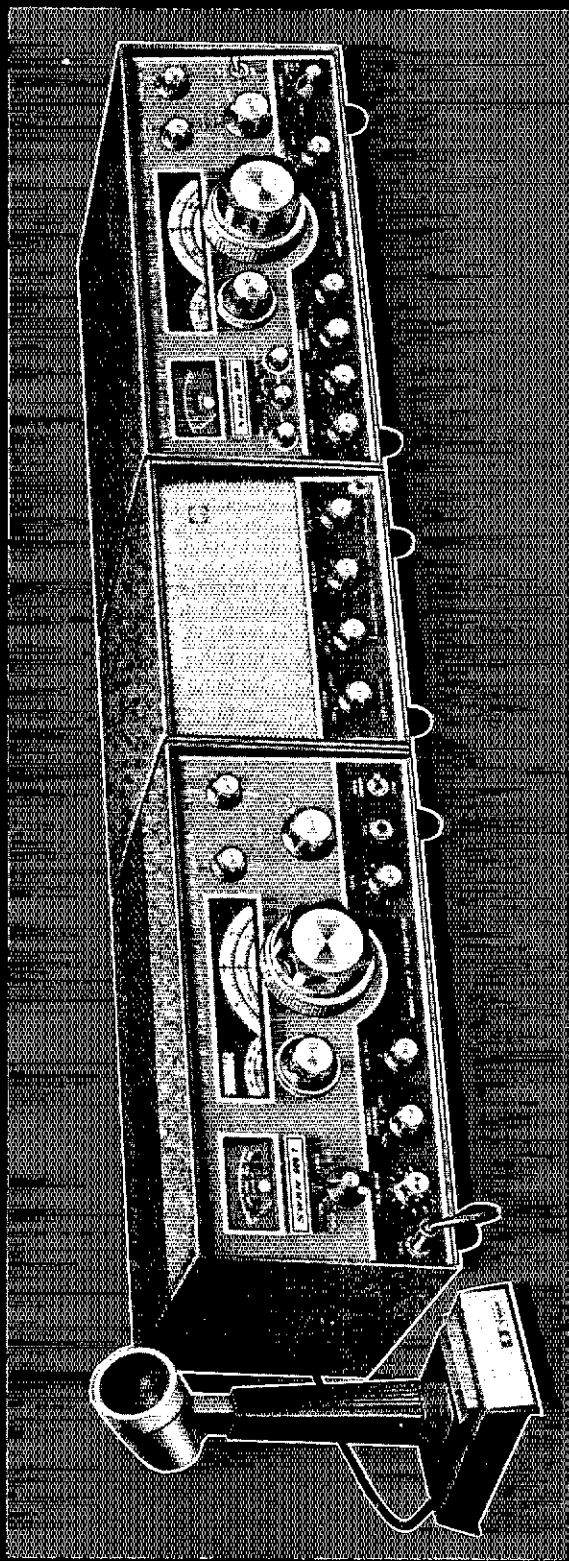
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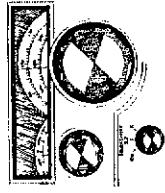
600R RECEIVER SPECIFICATIONS:

SSB: AM, CW superheterodyne receiver, frequency range with built-in tuning system:

3.4 to 4.4mc, 6.7 to 7.7mc, 13.8 to 14.8mc, 20.9 to 21.9mc, 27.5 to 30mc. With external tuner, Model 330: General coverage from 3 to 30mc.

With external crystal oscillator, Model 510X: 3 to 24mc, 10 crystal positions. These external oscillators plug directly into the 600R.

TUNING SYSTEM: The lower bands, 80 through 15 meters, are covered in 200 kc segments. 10 meters is covered in 500 kc segments. 100 kc and 25 kc crystal calibrator markers provide for highly accurate frequency readout on a large, easy to interpret dial.



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SENSITIVITY: Superior front end design gives you 1/4 microvolt sensitivity for 10 db signal plus noise to noise ratio at 50 ohms input impedance. At the same time, front end overload, cross modulation, image, and spurious responses have been reduced to "state-of-the-art" minimums.

R.F. SELECTIVITY: Antenna tuning circuitry in the 600R front-end provides continuous coverage from 3 to 30 mc. This is accomplished in 5 frequency ranges selected by the band switch: 3 to 5.5 mc, 5.5 to 10 mc, 10 to 16 mc, 16 to

24 mc, and 24 to 30 mc.

Reception outside the normal VFO range of the receiver requires an external oscillator which can be the Swan 510X crystal controlled oscillator, or the Model 330 general coverage tuner. Either of these external oscillators plugs directly into the 600R. Image rejection is a minimum of 55 db at 30 mc, increasing to better than 75 db at 3 mc.

I.F. SELECTIVITY: Swan's standard crystal lattice filter with 2.7 kc bandwidth, 1.7 shape factor, and ultimate rejection in excess of 100 db makes the 600R's selectivity superior to any other production receiver on the market.

With installation of the optional 16 pole crystal lattice filter (SS-16B), the 600R offers selectivity that far exceeds any receiver, at any price, anywhere! Selectivity then becomes truly

incredible, with a shape factor of 1.26 and ultimate rejection exceeding 140 db. Two additional crystal lattice filter options are available: One is a narrow band CW filter, the other is a broad band AM filter. There are provisions in the 600R for the installation of up to 3 filters, with front panel selection.

A.F. SELECTIVITY: Audio response of the 600R is 300 to 3000 cycles, \pm 3 db, with 3 watts output to a 4 ohm external speaker. Headphone jack is provided with the speaker accessory unit. An optional IC Audio Filter accessory is available for installation in the 600R. It provides a choice of either notching or peaking a selected audio frequency, and

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greatly enhances both phone and CW reception.

I.F. NOISE BLANKER: (optional) installs inside 600R. Extremely effective in suppressing impulse noises such as auto ignition interference.

EXCLUSIVE SINGLE CONVERSION DESIGN: with fewer spurious responses than multi-conversion designs.

HYBRID DESIGN: 7 tubes, 8 transistors, 12 diodes, Transistors used where they provide definite advantage. Tubes used where they still provide superior performance.

FULLY COMPATIBLE WITH 600T: providing for transceiver operation as well as separate frequency control. Also CW sidetone and genuine CW break-in operation.

BUILT-IN AC POWER SUPPLY: for 117 volts, 50-60 cycles.

DIMENSIONS: 15" wide x 6 1/2" high x 12" deep. Weight: 23 lbs.

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600T TRANSMITTER SPECIFICATIONS:

FREQUENCY RANGE: Full coverage of 10, 15, 20, 40 and 80 meters. Extended frequency coverage for MARS operation with plug-in crystal oscillator accessory, Model 510X.

TUNING: Internal VFO system is identical to that used in the 600R.

POWER RATING: 600 watts P.E.P. with a pair of 8KD6 power tubes. 500 watts CW, 150 watts AM, 100 watts continuous RTTY/SSV.

PI-Network output for 50 or 75 ohm coax.

Suppression: Carrier 60 db down, unwanted side-band 50 db, third order distortion approx. 30 db. Audio response: \pm 3 db from 300 to 3000 cycles.

CW Keying: Grid block, full break-in system. Includes sidetone to receiver.

INTERNAL POWER SUPPLY for 117 volts, 50-60 cycles.

DIMENSIONS: 15" wide x 6 1/2" high x 12" deep. Weight: 32 lbs. \$495*

ACCESSORIES:

STANDARD SPEAKER Has tone switch and headphone jack.....\$18*

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I.F. NOISE BLANKER Installs internally in 600R.....\$79*

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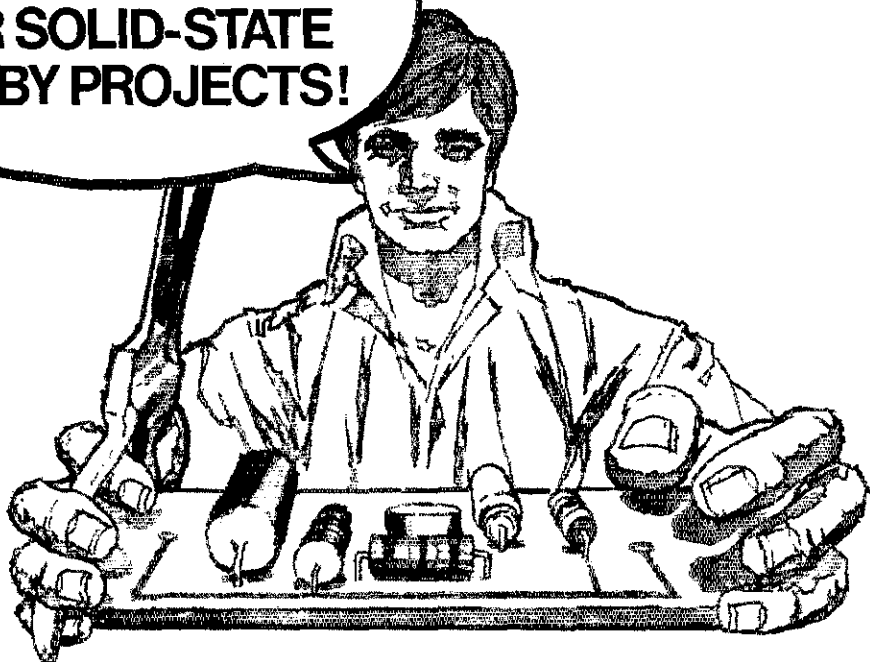
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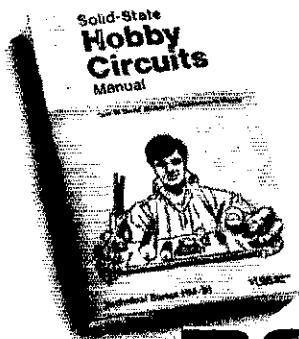
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every Mon. WA2WMT now is HS3ATB in Thailand and K2LWR managed a QSO with him. Nothing unusual about that you say? Well the QSO was on 3505 kHz. BPLer W2OF is now mgr. of the Mike Farad Net. W2RQF has a new 60 x 12 trailer as a permanent QTH near Moravia. NYS reports clearing 281 messages with 694 check-ins in Mar. Various proposals are going around these days concerning the elimination of the station activities column in QST. I'd like to hear from you guys on whether or not you feel it's worthwhile. If you do, I certainly would appreciate some worthwhile inputs for it. This column can and should be an open forum for you guys. It can be as good as you want it. Traffic for Mar. *indicating a PSHR recipient: W2FR 267*, WA2ICU 247*, W2OF 232*, W2RUF 140*, W2MTA 114*, K2KTK 87*, W2MSM 78, WB2VND 69, W2FZK 61, W2DUB 53, WA2ICB 48, W2RQF 48, W2FEB 39, K2DMN 35, WB2HLI 32, WB2HLV 28, WB2IQP 28, W2WS 20, WA2MPC 15, K2OFV 15, K2UIR 15, WA2ANE 12, WA2HFF 11, WB2YEM 11, K2IMI 6, W2PVI 6, WA2HSB 3, WA2KAT 3. (Feb.) WB2HLV 59, K2BWK 14.

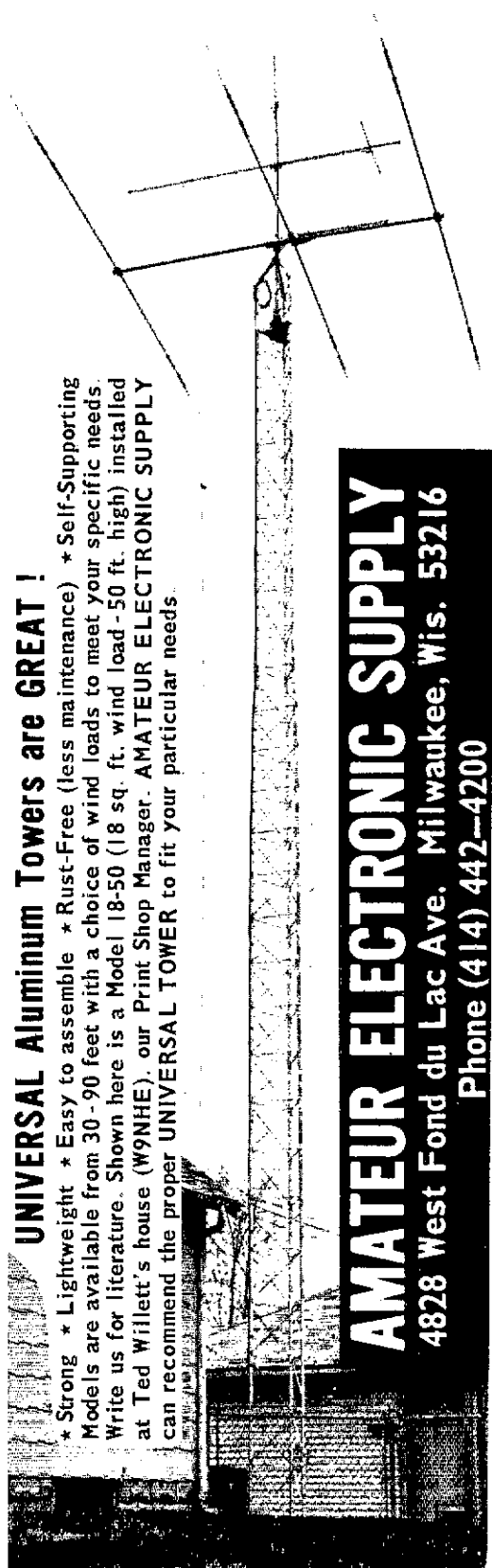
WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEM - SEC: W3KPI, PAM: K3ZNP, RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily on 3585 kHz at 7:00 P.M. KSSN meets M-F on 3585 kHz at 6:30 P.M. It is unfortunate to report that the Western Pennsylvania Phone Net has died. WPP ceased to exist after Apr. 1, 1971. A big tip of the hat to K3ZNP for the gallant effort and time he has devoted to managing the net over the past several years. The Nittany ARC is proud to announce their club station call was changed from K3HKK to W3YA and is the Gilbert L. Crossley Memorial Station. The NARC also requests all VHFers to continue to watch for K3HKK which now is licensed for the vhf site (NARC Park). The Etna RC put their station, W3EXW, into portable operation Mar. 29 to put on a ham radio demonstration for the opening ceremonies of a new Boy Scout training barn. The Presque Isle ARC reports the PARC expedition to Greece, Crete, Rhodes and Turkey left on May 28; their club station, WA3QDT, worked WAC its first day on the air; and WA3GMN received her DXCC award. The Foothills ARC reports they were 12 years-old Apr. 28. Congrats to the Valley High School Amateur Radio Club in New Kensington, Pa. on becoming an ARRL affiliate and a new club. WN3PRC is a new Novice in the Erie area. WA3NSL is the new EC in Crawford County. The Burrell High School ARC, WA3OGK, elected new officers WA3JBN, pres.; WA3MAE, vice-pres.; trustee; Douglas Young, secy.-treas. KSSN report for Mar.: QNI 119, 45 messages, 20 sessions. Traffic: WA3AQ 162, WA3PU 161, W3KUN 139, W3LOS 126, W3NEM 122, K3ZNP 90, K3HKK/W3YA 81, W2KAT, W3NEM opsl, WA3NAZ 77, W3MFB 55, K3HCT 48, WA3LDA 42, W3IYI 22, K3SMB 20, K3VQV 9, W3SN 6, W3IDO 4, K3SUN 4, WA3GBU/W8SH 2, W3LOD 1.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU, PAMs: WA9CCP and WA9PDI (vhf). RM: WA9ZUE, Cook County EC: W9HPG.

Net	Freq.	GMT/Days	Tfc.
IEN	3940	1400 Su	9
ILN	3690	0030 Dy	132
NCPN	3915	1300/1800 M-S	179
III PON	3915	2245/1430 M-F	649
III PON	145.5	0200 MWF	39
III PON	50.28	0200 M	6

W9HRY reports that the traffic total for the Ninth Region Net was 640. Director Haller spoke at the Apr. meeting of the Southeastern Illinois Ham Society at Carmi. WB9DPU has joined the U.S. Air Force. WA9LHU is hamming at home again with a Drake TR-4. W9LNQ has recovered from a leg injury. W9LDU reports that his county RACES station call is K9CLW-2F. W9JXV and WA9AES have been working the hard ones on DX - JT1KAA and CA9VH/JTL. Field Day is June 26 and 27. Many preliminary reports have been received. June 6 is the date of the Annual Starved Rock Hamfest which will be held at the same place as previous years. WA9WOW has upgraded from Technician to General Class and WB9DYI is a new Technician. Many an eyeball QSO was held at the Dayton Hamvention between the gang of the Ill. section. W9BYZ is a new repeater on the air on 146.34 input, 76 out with receiver in DeKalb and transmitter in Genoa. Club papers are reporting that they have been giving many Novice exams and are bolstering their club memberships. Why not plan now for fall classes. WA9OBR is the only BPL recipient for the month. Traffic: WA9OBR 269, W9NXG 212, K9AVQ 174, WB9DPU 136, WA9ZUE 131, W9HOI 90, W9FLF 67, WB9BYX 53, WA9LDC 50, W9DOQ 48, W9LNQ 46, WB9AWY 45, WA9RTB 42, WA9NZF 18, K9HSK 12, W9HJM 9, W9LDU 6, W9PRN 6, WA9LHU 1.



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EN-50 (14-18)	\$ 34	G-76 DC supply	59	V-107 VHF VFO	19				
PV-144 Preamp	12	G-76 AC supply	75	Star Roamer Rec.	19				
PS-1 AC supply	8	CSB-100 Xmttr	169						
B & W		HALLICRAFTERS							
5100B Xmttr	\$119	SX-71 Receiver	\$ 99	HA-9 VFO	\$ 29				
6100 SSB Xmttr	275	SX-101 Mk II Rec	139	HA-60 6m Xcvt	79				
515B-B SSB adapt.	109	SX-101A Receiver	199	HA-230 Receiver	59				
		SX-111 Receiver	139						
CLEGG		SX-130 Receiver	149	NATIONAL					
SQUIRES-SANDERS		SX-146 Receiver	175	NC-98 Receiver	\$ 79				
99'er 6m Xcvt	\$ 69	HT-32B Xmttr	299	NC-125 Receiver	69				
417 AC supmod.	75	HT-40 Xmttr	49	NC-301 Receiver	139				
2-wx VHF Xmttr	289	HT-44 Xmttr	225	YF-62	225				
Interceptor Rec.	249	HT-46 Xmttr	225	HRO-60 Receiver	225				
Interceptor B Rec.	325	SR-150 Xcvt	289	KCU-300 Calibrator	3				
Venus Xmttr	199	PK-180-120 AC sup.	169	NCX-3 Xcvt	169				
416 AC supply	75	PS-150-12 DC sup.	75	NCX-5 Xcvt	349				
35 Booster	75	MR-150 Rack	15	NCXA Mk II Xcvt	389				
4-wx Linear	175	SR-34AC Xcvt	149	NCXA AC supply	249				
SS-19 Band Scanner	95	HA-1 Keyer	59	AC-200 AC supply	59				
(new closeouts)		HA-4 Keyer	49						
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75A-1 Receiver	\$139	HQ-100C Receiver	\$109	LA-400C Linear	\$ 99				
75A-2 Receiver	219	HQ-110C Receiver	129	7-150 SSB conv.	189				
75A-3 Receiver	269	HQ-110AC Rec	169	POLYTRONICS					
75A-4 1ser./B11	349	HQ-145XC Rec	169	PC-6 6m Xcvt	\$139				
75A-4 1ser./B27A1	375	HQ-170AC Receiver	229	PC-629 6m Xcvt	75				
75A-4 1ser./A155	425	HQ-170AC Receiver	239	(AS-15)	75				
Speaker (A2, A3)	129	HQ-200 Receiver	169	RME					
QY-3 Xmttr	175	HQ-205 Rec w/ 1lm	159	DB-23 Preselector	\$ 29				
QY-1 Xmttr	149	SP-600J26 Rec.	275	VHF-126 Converter	99				
32S-3 Xmttr	575	S-100 Speaker	12	Clipper	19				
KHM-2 Xcvt	95	HK-1B Keyer	39	SBE					
516F-1 AC supply	75	HEATH		SB-33 Transceiver	\$129				
R. L. DRAKE		HR-20 Receiver	\$ 89	SB-14 Linear	149				
2B Receiver	\$189	SB-30 Receiver	225	SB-34 Transceiver	289				
2R-20 Spkr Q-mult.	79	SB-301 Receiver	249	SB-2-LA Linear	189				
2-LC Spkr Q-mult.	79	SB-302 2m Xveter	175	SB-23 (new closeout)	349				
P-4B Receiver	349	SC-6m Converter	25	SB2-LA (closeout)	229				
DC-4 DC supply	35	SB-310 S.A. Rec.	249	SIGNAL-ONE					
TR-4 Xcvt	439	SBA-300-3 2m Conv.	19	CX-7 Xcvt	\$1195				
TC-4 Remote VFO	69	SBA-400-4 6m Conv.	19	SINGER					
TV-4	225	SB-600 Speaker	15	PR-1	\$ 95				
EICO		Dx-100 Xmttr	89	SWAN					
75B SSB Xcvt	\$129	Dx-100B Xmttr	99	SW-240 (early)	\$159				
75L AC (new kit)	54	IX-1 Xmttr	115	SW-240 Xcvt (late)	169				
75L DC (new kit)	49	HX-10 Xmttr	189	117AC AC supply	59				
ELDICO		HX-20 Xmttr	129	400 w/ 410 VFO	250				
TFF-1 Ph. Patch	\$ 25	HX-30 6m Xmttr	175	400 w/ 420 VFO	275				
ELMAC		HW-12 75m Xcvt	89	400 Xcvt (no VFO)	175				
AF-6m Xmttr	\$ 69	HW-37 20m Xcvt	89	350 Xcvt (late)	229				
PMR-8 Receiver	79	HW-17A 2m Xcvt	139	512 DC supply	75				
RVP-250 DC supply	15	HP-20 AC supply	29	500 Xcvt	339				
PSR-612 DC supply	19	HP-23 AC supply	45	500C Xcvt	269				
GLOBE/GALAXY/WRL		HRA-10-1 calibrator	9	1417X AC supply	80				
L-1 Linear	\$ 59	HEWLETT PACKARD		14-117 DC supply	100				
Hi-Banner 67	89	HP-410R VTFM	\$125	14X LC module	49				
DSB-100 SSB Xmttr	49	HICKOCK		117B Basic AC sup.	65				
Galaxy V Xcvt	279	221 tube tester	\$150	1078 Remote VFO	100				
AC-350 Xcvt	239	HUNTER		260 Cynet	295				
AC-350 AC supply	65	1000A Linear sup	\$175	250 6m Xcvt	219				
AT-400 AC supply	75	7000A Linear	275	250C 6m Xcvt	325				
354H1 VFO	9	JOHNSON		210 VFO	75				
DAL-35 Calibrator	15	hanger I	\$ 89	1W-2 Transverter	219				
CAC-35 Dlx. console	75	variant I	139	TV-78 Transverter	249				
2000 Lin. Sup.	75	500 Transmitter	375	UTICA					
(new closeout)		Cable Linear	139	855 6m Xcvt VFO	\$ 69				
600-Bander 4.5	59	612 VHF Xcvt	85	650A 6m Xcvt VFO	79				
Economy DC supply	49	6N2 VFO	35	WIDROPEL					
FM-210 2m FM Xcvt	149	6N2 conv. (14-18)	29	Presentation - left-hand, with case	\$ 39				
FC-210 AC supply-boost	54	KING		WATERS					
booster for FM-210		DB-68 Preselector	\$ 23	Cydax Keyer	\$ 59				
GONSET		KNIGHT		469A Reflectometer	59				
Comm II 6m	\$ 79	R-100 Receiver	\$ 59						
Comm III 6m	99	1R-106 6m Xcvt	75						
Comm IV 2m	199	NEED CASH?							
GC-105 2m Xcvt	149	NEED CASH?							
GS-50 Xcvt	169	NEED CASH?							
500A 2m Xcvt	199	NEED CASH?							
501A AC supply	199	NEED CASH?							
510A 6m Xcvt	199	NEED CASH?							
411A AC supply	39	NEED CASH?							
Q-66B Receiver	39	NEED CASH?							
Thin Pak	19	NEED CASH?							
Q-76 Xcvt	99	NEED CASH?							

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INDIANA - SCM, William C. Johnson, W9BUQ - SEC: W9FC, PAMS: K9CRS, WA9OHX, (vhf) W9PMT. RMs: W9FC, W9HRY, WA9WMT, WA9ZLX.

Net	Freq.	Time(Z)Days	T/c.	Mgr.
		21.30 M-S		
		2.300 Dy		
QIN	3656	0000 Dy	252	WA9WMT
		0400 Dy		
ITN	3740	0100 Dy	26	WA9ZKX
PON	3910	1245 Su		WA9UMH
		18.30 S-S		
PONVHF	50.7	0200 Su-Th		WA9JTB
Hoosier VHF			32	W9PMT
ITFCn	3910	1.330 Dy	355	WA9OHX

It is with deep regret that I report K9LPW as a Silent Key. W9FPK of Churubusco has 22 countries confirmed. K9JWJ had the Telephone Co. put up his new 45-ft. pole. W9JRR is retiring and moving to Alaska. W9BUV/WA9AUM made 150,000 points at the Red Cross station, WA9LQJ during the last DX Contest. WA9YXA is EC for Clark County. WA9PQM and XYL were at the Lake County banquet. W9FKV passed the Advanced Class exam. WA9ABI received his 20 wpm sticker. IRCC had their Spring meeting at the Blind School in Indianapolis. They are going to reactivate the Hoosier 500 Certificate, Courtesy Award, and the Indiana QSO Party. The Annual IRCC Picnic and Hamfest will be July 11 at the LaPorte Fair Ground. W9PFI is EC for Elkhart Co. W9MM has a new vhf antenna for 2-meters. To all 6- and 2-meter operators: There is a lot of traffic that you can handle to isolated spots in the state. Let's start to use our vhf frequency for this purpose. QIN Honor Roll: W9NAT 27, W9HS 26, W9BDP 22, W9QLW 19, WA9WMT 16/15, W9EL 15/18, W9EBV 15, K9HYV 15, W9JBU 15. Amateur Radio exists because of the service it renders. BPL certificate went to W9JYO. Traffic: (Mar.) W9JYO 289, W9JBU 226, W9HRY 205, WA9VZM 194, WA9ZKX 189, WA9WMT 126, WA9OHX 107, W9QLW 83, WA9WA 70, W9JCL 65, WA9AUM 60, W9BUQ 50, W9PMT 36, W9HWR 23, W9FHT 21, W9MZD 20, W9KWB 20, W9YYX 20, K9RWQ 19, K9YBM 19, W91 G, WA9SMM 15, WA9UMI 15, K9CBY 11, K9RPZ 11, WA9XF 10, WA9BHG 10, K9CWD 3, W9RTH 3, W9AMB 1, W9BDP 1, W9EFC 1, WA9YXA 1, (Feb.) W9FC 9.

WISCONSIN - SCM, S.M. Pokorny, W9NRP - Asst. SCM Joseph A. Taylor, W9QMT. SEC: W9MGT. PAMS: W9CKE, K9FHI, WA9OAY, WA9OKP, WA9PKM. RMs: W9FFY, K9KSA.

Net	Freq.	Time(Z)Days	QNT	QTC	Mgr.
WSSN	3662	0030 ITS	59	6	K9KSA
WIN	3662	0115 Dy	295	130	W9FFY
WRN	3620	0130 Su RTTY			K9GSD
SW2RN	148.35	6230 13y	186	9	WA9PKM
SW6RN	50.4	0300 M-S	238	4	WB9CKX
BWN	3985	1245 M-S	530	281	WA9OAY
W-RACES	3993.5	1400 Su		84	
BEH	3985	1800 Dy	721	115	WA9OKP
W-PON	3925	1801 M-F	405	69	W9EMC
WBSN	3985	2300 Dy	1566	463	K9FHI

*All nets one hour earlier during the Daylight Saving Time period. WA9PKM is the new PAM for SW2RN. K9GDF is one of four who have been selected for participation in the undergraduate research honors program in the Stevens Point State University's Physics Dept., focusing their attention on semi-conductor material in the University's Nuclear Physics Lab. K9WFT is now a life member of ARRL. It is with regret that we note the sudden passing of W9VZL and we offer our sympathy to his family. The Central Wis. Repeater Assn. incorporates both of its Madison Repeaters, WA9PBW on 34/7w with 2100 Hz tone-on and WA9WVE on 46/88. Traffic: (Mar.) W9XY 419, K9CPM 315, W9ESJ 286, W9DND 133, WA9YSD 118, W9ABF 81, K9FHI 69, W9BJR 63, W9DXX 56, K9KSA 51, W9HW 40, K9JPS 39, WA9UNN 35, W9NRP 34, W9KRO 33, WA9OAY 26, W9OMT 23, WA9BZV 22, W9DAK 19, WA9ZLS 18, WA9IHF 17, W9BGP 10, K9JUT 9, K9VER 8 (Feb.) W9RTP 11, K9GSC 1.

DAKOTA DIVISION

MINNESOTA - SCM, John H. Halstead, K0MYF - Asst. SCM Edna M. Thorson, WA0RRA. SEC: WA0MZV. RMs: WA0IAV, WA0AAU. PAMS: WA0DWM, WA0HRM, K0FLT. The Minneapolis Southwest High School ARS, K0ELX, will activate soon with K0DYY and W0NCP as operators. W0JYP worked 153 stations in one week using only 1-watt average output. He used an attenuator and watt meter in the feed line to the antenna to control his output. 40 contacts were made on 75, 47 on 40, 37 on 20, 39 on 15, 0 on 10 and he also worked 50 states using line watts average output. WA0JXL is now a Life Member. WA0JLL passed the Advanced Class

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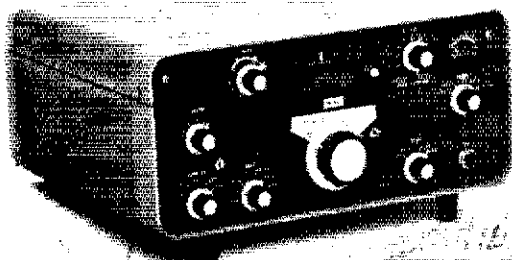
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- SBA-301-2, optional 400 Hz CW Xtal fltr., 1 lb. 21.95*
- Kit SB-401, 36 lbs. 299.95*
- Kit SB-220, 69 lbs. 349.95*

SB-303 SPECIFICATIONS—Frequency Range: (MHz) — 3.5 to 4.0, 7.0 to 7.3, 14.0 to 14.5, 15.0 to 15.3, 21.0 to 21.5, 28.0 to 30. Intermediate Frequency: (IF) — 3.395 MHz. Frequency Stability: Less than 100 Hz drift per hour after 10 minutes warmup under normal ambient conditions. Less than 100 Hz drift for ±10% line voltage variation. Frequency Selection: Built-in Linear Master Oscillator. Modes of Operation: SSB — Single sideband (suppressed carrier, with selectable upper or lower sideband.) CW — Keyed continuous wave. AM — Amplitude modulated continuous wave. RTTY — Radio teletype (frequency-shift keyed continuous wave). Sensitivity: Less than 0.25 uV

for 10 dB S+N/N for SSB operation. Overall Gain: Less than 1.5 uV input for 0.5 audio output (single tone SSB). AGC Characteristics: Blocking — Greater than 3.0 V CW/SSB/RTTY. Dynamic Range — Greater than 150 dB CW/SSB. RF Attenuator: Variable 0-40 dB nominal. Selectivity: SSB — 2.1 kHz @ 6 dB down, 5.0 kHz maximum @ 60 dB down (crystal filter supplied). CW — 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). AM — 3.75 kHz at 6 dB down, 10 kHz maximum at 60 dB down (crystal filter available as an accessory). RTTY — 2.1 kHz at 6 dB down, 5.0 kHz maximum at 60 dB down (uses SSB crystal filter). Image Rejection: 60 dB or better. IF Rejection: 3.395 — greater than 55 dB, 8.595 — greater than 50 dB. Spurious Response: All below 1 uV equivalent signal input. Temperature Range: 10°C ambient. Dial Accuracy: Electrical — Within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual — Within 200 Hz. Calibration: Every 100 kHz or 25 kHz. Dial Backlash: No more than 50 Hz. Antenna Input Impedance: 50 ohm nominal unbalanced. Power Requirements: 105 to 125 or 210 to 250 VAC, 40 W max. Dimensions (with knobs & feet installed): 12¼ W x 7¼ H x 14" D. Net Weight: 15¼ lbs.

SB-401 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. Power input: 170 watts CW, 180 watts P.E.P. SSB. Power output: 100 watts (80-15 meters), 80 watts (10 meters). Output impedance: 50 to 75 ohm—less than 2:1 SWR. Frequency range: (MHz) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. Frequency stability: Less than 100 Hz per hr. after 20 min. warmup. Carrier suppression: 55 dB below peak output. Unwanted sideband suppression: 55 dB @ 1 kHz. Intermodulation distortion: 30 dB below peak output (two-tone test). Keying characteristics: Break-in CW provided by operating VOX from a keyed tone (Grid Block keying). CW sidetone: 1000 Hz. ALC characteristics: 10 dB or greater @ 0.2 mA final grid current. Noise level: 40 dB below rated carrier. Visual dial accuracy: Within 200 Hz (all bands). Electrical dial accuracy: Within 400 Hz after calibration at nearest 100 kHz point (all bands). Backlash: Less than 50 Hz. Oscillator feedthrough or mixer products: 55 dB below rated output (except 3910 kHz crossover which is 45 dB). Harmonic radiation: 35 dB below rated output. Audio input: High impedance microphone or phone patch. Audio frequency response: 350-2450 Hz ±3 dB. Power requirements: 80 watts STBY, 260 watts key down @ 120/240 V AC, 50/60 Hz. Dimensions: 14¾ W x 6¾ H x 13¾ D.

SB-220 SPECIFICATIONS — Band coverage: 80, 40, 20, 15 and 10 meter amateur bands. Driving power required: 100 watts. Maximum power input: SSB: 2000 watts P.E.P. CW: 1000 watts. RTTY: 1000 watts. Duty cycle: SSB: Continuous voice modulation. CW: Continuous (maximum key-down 10 minutes). RTTY: 50% (maximum transmit time 10 minutes). Third order distortion: —30 dB or better. Input impedance: 52 ohm unbalanced. Output impedance: 50 ohm to 75 ohm unbalanced; SWR 2:1 or less. Front panel controls: Tune, Load, Band, Sensitivity Meter switch, Power CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Relative Power, and High Voltage). Rear Panel: Line cord, Circuit breakers (two 10 A). Antenna Relay (phono), ALC (phono), RF input (SO-239). Ground post. RF output (SO-239). Tubes: Two Eimac 3-500Z. Power required: 120 VAC, 50/60 cycles, at 20 amperes maximum. 240 VAC, 50/60 cycles at 10 amperes. Cabinet size: 14¾ W x 8¼ H x 14½ D. Net weight: 48 lbs.



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exam and missed the Extra by one question. KØBAD/4, former from Winona, checks into WSN from Fla. WNØCAP made HPL Mar. WAØEPX reports the Pionef All Day Watch (PAW) total on as 2281 in 162 hours of operation with 14.0 QNI per hour average. Ramsey County Radio Club members are making plans for Field Day including a dry run to check location and equipment. Traffic (Mar.) KØCSE 521, WAØVAS 478, WØDØB 237, WØZHN 214, WAØIAW 174, WNØCAP 141, WAØEPX 119, WAØEBZ 10, WAØRRA 96, WAØVYV 90, WØBUC 89, WAØYMU 86, KØZRD 80, WØØBRG 84, WAØVYV 75, WØAAU 63, WØPFT 63, WAØVDG 51, KØMVF 55, WØWFA 55, WAØSGJ 53, WAØQWE 50, WAØTEC 4, KØFLT 44, KØORK 40, WAØMMV 38, WAØCJS 33, KØZRI 21, WAØVYB 26, WAØHRM 25, WAØPRS 22, WAØRKV 20, WAØYE 19, WAØNQH 18, WØIYP 17, WAØYGE 17, WAØQAK 15, WAØP 10, WAØUWT 9, WØBÜO 8, WØØCNB 8, WAØJPR 7, WAØEQZ, WØISJ 5, WØPAN 5, WAØCGZ 4, WAØPYT 4, WAØWFB 4, WØØBE, WØFDM 3, WAØIXL 3, WØSZJ 3, WNØYVA 3, WAØMNE, WNØCP 1, KØLWK 1, WØUMX 1. (Feb.) WAØIAW 218, (Jan) WNØCAP 16.

NORTH DAKOTA - SCM, Harold L. Sheets, WØDM - BEC WAØAYL. OBS: WAØATJ, PAM: WØCAQ, RM: WAØRSSR. O: WØBE. WAØHUD has been ORL remodeling his home so the building of radio gear has suffered. WØDM came to his rescue with much needed high voltage by-pass capacitor. WNØHC is a new Novice in Grand Forks. WB4AYN/Ø is looking for some activity on 2- and 6-meters. He was active in the Calif. Quake activity and has been doing his share of nice DX lately with low power on 10 and 15. WØCGM reports that his teletype gear is coming along very good. KØPYZ returned to N. Dak. the hard way in a bad snow storm in southern Minn. The NØRACES Net was activated during the snow storm of Mar. 14 and again when we were hit by the high wind, snow and dirt storm of Apr. 2. The YL WX shut down for want of business in mid-Apr. Many thanks to the gals and fellows who kept this efficient net going. WØØBCZ has been setting a phone patch scheds for foreign students to talk back home with some success.

Net	kHz	CDT/Days	Stns.	QNI	QT
Goose River	1990	0900 Su	4	59	
NØPON	3996.5	1830 S-Su	13	350	
		0900 Su			
NDCW	3640	2100 M-F	20	63	
YL WX	3994	0730 S-Su	31	512	43
NØRACES	3996.5	1840 M-F	23	735	5

Traffic: WØWWL 52, WAØSUF 36, WØCDO 35, WØDM 3, WAØREW 26, WØBHT 22, WAØZJJ 18, WAØRSSR 16, WAØVMA, WØEJF 5.

SOUTH DAKOTA - SCM, Ed Gray, WAØCPX - Your SCM will be moving to Rapid City around June 1, to serve as Association County Agent with the Cooperative Extension Service Pennington County. The Huron Amateur Radio Club has promised to sponsor a picnic this summer. RM WØWCN wishes to thank SDN cw net members for their activity on the net. He expresses special thanks to WAØTNM, WAØYAK and WØNEO. If you have a car of state traffic the place to pass it is on the SDN cw net at 3.6 MHz every evening at 7:00 P.M. CDSI. The Dakota Division convention will be held Oct. 9 at the Sheraton Cataract Motor Hotel in Sioux Falls. KØCER reports that the Central States VHF Society convention will be held at the Ramada Inn in Sioux Falls Aug. 2, 22.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WASVWH - SE WSPBZ, RM: WASLTS, PAM: WASKJI, WASTVF is back on air with his SB-101 after being struck by lightning just before Christmas. The Fort Smith Repeater Society has applied for 2-meter repeater license and has applied for the memorial WSEC. The repeater will be operated on 146.94-146.34. WBSB will be leaving Ark. in Aug. after graduation from the U. of Ark work for TI in Dallas. WNSBRD has completed WAS and WAC as an HW-16 and dipoles. WASKJT has a new Swan 270-B tor camper and WSMCH has a new KWM-2 to use when he is camping. WBSZDV recently received his Technician ticket and plans to operate on 2-meter in soon. Nets and net reports for Mar.:

Net	GMT/Day	Freq.	Tfc.	QNI	Mins.	M
OZK	0000 Dy	3790	39	247	607	WAS1
Razorback	2330 Dy	3995				WAS1
APN	1100 M-F	3937	24	520	1470	W5V
PCN	2130 M-F	3925				W5N
CAREN	0100 W	146.04				W5C
		34				
EC Net	2300 Su	3995				W5I
DX Info	2345 M	3860				W5AE

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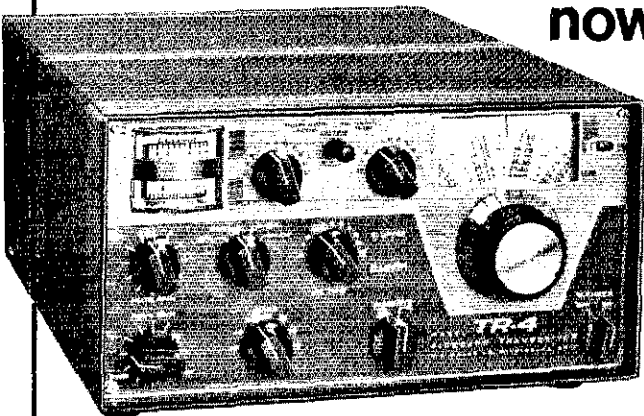
Linear permeability tuned VFO with 1 kc dial divisions. VFO and crystal frequencies pre-mixed for all-band stability • Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished • Any ten 500 kc ranges between 1.5 and 30 Mc can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 Mc not recommended) • Four bandwidths of selectivity, 0.4 kc, 1.2 kc, 2.4 kc and 4.8 kc • Passband tuning gives sideband selection, without retuning • Noise blanker that works on CW, SSB, and AM is built-in • Notch filter and 25 Kc crystal calibrator are built-in • Product detector for SSB/CW, diode detector for AM • Crystal Lattice Filter gives superior cross modulation and overload characteristics • Solid State Permeability Tuned VFO • 10 tubes, 10 resistors, 17 diodes and 2 integrated circuits • AVC for SSB or high-speed break-in CW • Excellent overload and Cross Modulation characteristics • Dimensions: 5½"H, 10¾"W, 12¼"D. Wt.: 16 lbs.

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• Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished; MARS and other frequencies with accessory crystals, except 2.3-3, 5-6, 10.5-12 Mc. • Upper and Lower Sideband on all frequencies • Automatic Transmit Receive Switching on CW (semi break-in) • Controlled Carrier Modulation for AM is completely compatible with SSB linear amplifiers • VOX or PTT on SSB and AM built-in • Adjustable Pi-Network Output • Two 8-pole Crystal-Lattice Filters for sideband selection, 2.4 kc bandwidth • Transmitting AGC prevents flat topping • Shaped Grid Block Keying with side tone output • 200 Watts PEP Input on SSB—200 watts input CW • Meter indicates plate current and relative output • Compact size; rugged construction • Solid State Permeability Tuned VFO with 1 kc divisions • Solid State HF Crystal Oscillator • 11 Tubes, 3 Transistors and 12 diodes • Dimensions: 5½"H, 10¾"W, 12¼"D. Wt.: 14 lbs.

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Plug-in 34-NB Noise Blanker \$100.00
TR4 with factory-installed Noise Blanker \$699.95

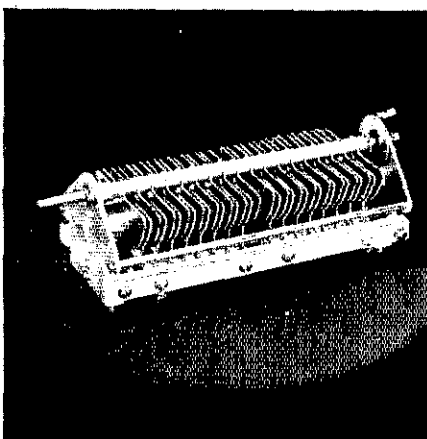


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MAIN OFFICE AND FACTORY
MALDEN
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Traffic: W5EIT 344, W5NND 112, W5VFW 51, W5YTL 3, W5WMC 23, W5SOQ 11.

LOUISIANA - SCM, J. Allen Swanson, Jr., WSPM - SE, W5UB. RM: W5VQF. Director W4WHN held a meeting of As. Dir. SCMs, SECS, in Natchez to determine your feelings about various matters in order to vote your sentiments at the Ann. Board Meeting. Don't forget the two-day Hamfest in Alexandria, Aug. 28 and 29. Guess you know that W5TVH was winner of the recent La. QSO Party with W5NUK running second. It is not too early to begin your equipment checks for the coming hurricane season! LAN operates on 3615 kHz nightly at 0030 and 0400. WNSZZA passed her General! Congrats! W5PHO joined the USA. W5VYS and K5AJK are operating on the "top band." W5CEZ busy with BS work. We understand that the AREC 6M Net working great guns. W5DXA has passed his 1st Phone. W5DRK working 2-meters. WB2UG/5 holds down a regular CAN bet. W5LNI is sprouting a new HW-101. The Springhill ARC is all set for Field Day. OARC's code and theory school is underway with attendance gratefully high. The GNOARC also has classes starting June each Tue, and Thurs. evening. Oh! Yes, the Jackson, Miss. ga. promise a bangup hamfest July 24 and 25. W5GRJ has moved Lafayette from N. La. The LARC boys participated in an American Cancer Drive. W5EXI has 42 enrolled for his largest ever Novice class. W5BV and W5CEW are both excited over their mobil rig. Traffic: W5VQE 177, WB2UG/5 119, W5WBZ 56, W5CEZ 3, W5EA 8, W5AOVX 6.

MISSISSIPPI - SCM, Walker J. Coffey, W5NCB - SE, W5AJWD. RM: W5SRM. PAMs: W5JHS, K5MDX. Appointment W5KEY as PAM; W5BKT, W5YJA, W5WJR as EcK; W5BCA as OO. Endorsements: W5YJA, W5UYW, W5SEG, W5HZO OPS; W5SEG as OO. Good to hear from W5VNE, now in the military. W5DYH is off to the military for 2 years. W5UBQ trustee of club station W5DKL and teaches code and theory. Vo-Tech school. K5SSZ is back on the air with new beams and chasing DX. W5CEW has a new rig and antennas on the air. WNSBSG has 30 states confirmed. W5CAV did a nice job on the FMT run. A 10 wpm code proficiency certificate was recently earned by W5DCY. W5UBQ passed his Extra Class exam. We hope that our Novice Net will be going full blast when you read this. Our sincere thanks to all those helping to get it started.

Net	QNT	QTC	Mg
MTTN	242	83	W5SH
CGCHN	1650	48	W5OF
MSBN	1239	89	W5ADY

Traffic: W5YZW 146, W5EDT 87, W5NCB 53, W5WZ 53, W5SE 33, W5SNX 18, W5BUE 10, W5BW 10, W5YJA 8, W5PDG, W5KYB 4, K5MDX 4, W5KEY 3.

TENNESSEE - SCM, Harry A. Phillips, K4RCT - SE, WB4ANX. RM: K4AMC. PAMs: W4PEP, K4MOL, WA4EWW.

Net	Freq.	Time/21 Days	Spvs.	QNT	QTC	Mg
TSSB	3980	2330 M-S	27	1724	105	K4M
TPN	3980	1145 M-F	31	1792	65	W4P
		1300 S-Su				
FTPN	3980	1040 M-F	23	690	20	WA4EV
TPON	3980	2330 Su	4	149	10	WB4BI
TN	3635	0000 Dy	31	147	78	K4AJ
ECVHF	145.2		9	45		WB4H
FCVHF	50.4		14	261	3	WB4H
E11M	28.7	0200 W&F	9	62		WA4G
MTTM	28.8	0200 T&F	9	122		WA4GJ

WB4LHV is contest ready now that his rig has been repaired. K4PUZ received his 5BWAS and has DXCC on each band. Remember the Crossville Hamfest July 17, 18 sponsored by the Crossville Radio Ops. Club. WA4YEM is chum. Field Day is coming and can be a lot of fun while serving a very good purpose. If you never tried it join a group or organize one of your own and go at it. The Mar. Quad City meeting in Johnson City was a real success. Tenn. Council of Am. Radio Clubs now has 16 members. Tenn. Council will honor the "Ham of the Year" at Crossville again next year. Traffic: W4OGG 129, W4SQE 69, W4WBK 62, WB4DAJ, K4AMC 56, W4ZJY 52, W4RUW 45, WB4DAJ 39, W4MXF, WB4MYZ 23, WA4YEM 16, W4PEP 14, WB4ANX 12, WA4GLS, W4FVM 10, WB4LHV 4, WA4MPJ 4, WB4MSS 4, WA4CGR

GREAT LAKES DIVISION

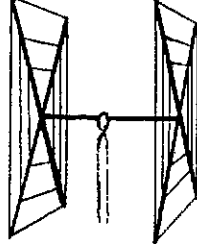
KENTUCKY - SCM, Ted H. Huddle, W4CID - SEC: K4YJ. Appointed: K4PW as ORS. Endorsed: WB4HOW as ORS; W4I and K4CSH as OPS; K4FPW as GHS and OVS. RPL: WA4MKI

Net	QNT	QTC	Net	QNT	QTC
KRN	430	31	KYN	346	280
MKPN	595	114	ECATN	91	8
KTN	1199	119	KPON	85	23

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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, XE1AB, DM4SEE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze... WB8DOI



CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a 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 3/8" 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
10-15 CUBICAL QUAD.....	32.00
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TWENTY METER CUBICAL QUAD	27.00
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BEAMS "Just a note to let you know that as a Novice, your 3-EI. 15 Beams 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; 3/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 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, WIWOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, 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, HC1LC, PY5ASN, FG7XT, XE21, KP4-AQL, SM5BGK, G2AQB, 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

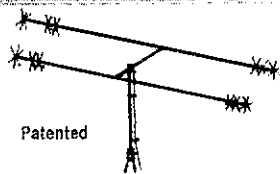
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Power Rating	2000 Watts P.E.P.
El. Length	11'
Turn. Radius	7'
Total Weight	11 lbs.
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

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Total Weight	5 lbs.
Height	11'
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

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The Falls City Net has QSY'd to 50.4 MHz and mgr. WA4AXC reports QNI up approximately 10%. WA4MEX and WB4GLE now have their Advanced Class tickets. WB4QMC has a new HW-100 mobile. WA4VZZ has a new final. K4CKJ finally worked 100 countries on 80 and is on his way to SBDXCC. K4TXJ now is QSI mgr. for ZS3KC and will have all logs after Apr. 1, 1971. WB4BAZ has been eyeballing some of the KYN gang with a saton to Hazare and a meeting with K4AVX, K4VHF, WB4IFA and W4JDU Traffic. WA4DYI 322, WA4MKH 287, K4PW 194, WB4KPL 181, W4BAZ 159, WB4NOZ 122, W4CID 102, K4DZM 87, WA4VZZ 83, K4MAN 79, W4QYI 66, K4TRT 41, WB4LOR 32, WB4LIL 28, WB4AUN 23, WB4PVC 22, K4TXJ 22, W4BTA 18, WN4PSJ 18, K4UNW 18, WB4MOR 16, WB4ILF 15, K4AVX 13, WA4WWA 13, WB4AXO 11, WA4AVV 9, WA4GHQ 9, K4FPW 8, WB4OYL 8, WA4FAF 7, K4QHZ 7, WA4AGH 6, WB4BO 5, WA4MXD 5, K4YCB 3, K4CKJ 2, WB4GCV 2, WN4UIQ 2. Totals: Traffic 2044 Reports 38.

MICHIGAN - SCM, Ivory J. Olinghouse, W8ZBT - SEC, W8MPD. RMs: WA8PIM, W8RTN, W8WVL, K8KMQ, W8BRT. PAMs: WA8TAN, K8PVC, K8MJK, VHF PAMs: W8CVO, K8AFA.

Net	Freq.	Time/Day	QTH	QTC	Sess.	Mgr.	
QMN	3663	2300 Dy		1227	579	93	WA8PIM
WSSB	3948	0000 Dy		811	182	31	K8PV
BR/MEN	3930	2230 S-F		940	82	27	WA8TA
UPEN	3920	2230 Dy		484	41	31	K8MJ
GLETN	3932	0230 Dy		767	133	31	K8PV
PON	3953	1600 Dy		823	316	31	K8LNT

Silent Keys: W8GHP, K8JLL, WB8AOK. New officers for the Wolverine Net are K8PVC, mgr.; W8BEU, asst. mgr.; WA8PII, sec. GRARA reports 55 of the original 75 applicants in the code theory class are still attending. The AAAR Club now has 2 members. W88ITM and W88AIO are new in Owasso, also W88GH is a General Class and W88EYF is an Advanced Class licensee. W88JLL is a new Novice and is the 10-year-old grandson of WA8PII. W88EEN is a new Advanced Class licensee in Livonia. WA8SC worked KM6DX on 75-meter ssb. WA8AAP has recently joined the CUC and now is a county hunter. WA8SDN is going R11Y. K8TA keeps busy patching servicemen to their homes. K8PVC has no lower parts. W8WNX had his HW-32A stolen from his car. The G. Convention at Muskegon was a big success, according to all reports. All meetings were well attended. Don't forget the CARS annual Swap and Shop July 25, 1971 at Jackson Armory, Jackson, Mich. KRAMU is a recent addition to the General Class licensees. Traffic (Mar.): WA8WZF 265, K8KMQ 369, W8PIM 223, W8SH 19, WA8LXY 166, WA8ZAV 148, W88BPF 127, W8LZ 114, K8LNL 101, K8ZIU 100, W88CFV 94, W8YVR 91, W88ONZ 8, W88ZDF 73, W8MO 72, W8ZBT 72, W8JYA 71, W88OLJ 6, W88EFL 53, W8RTN 51, W8VXM 50, W8LU 49, W8FZ 48, K8D 45, W8ART 42, W88WEN 38, W8DCN 37, W88DTT 37, W8WY 37, W89WYR 35, K8EJ 32, W8NOH 31, W8ACW 28, W8IUC 2, W88BJ 23, K8PVC 17, W8ETB 16, W8FX 16, K8ACO 1, W88ANR 13, W8SCW 13, W88BYB 12, K8MXC 12, K8PIR 11, K8TAK 11, W8UFS 11, K8JHA 10, W8VIZ 1, W88HZ 9, W88IAQ 9, W88IAJ 9, W8TBP 8, W8FZI 7, W88WF 7, W88DKQ 5, W88MDK 5, W88GJ 4, W88GPN 4, W88GO 4, W88JFZ 3, W83GBUR 1, K8NYI 1 (Feb.) W8ZBT 1, W8CUP 30, K8HKM 3.

OHIO - SCM, Richard A. Egbert, W8FTU - SEC: W8OUL. RM: W8IMI. PAM: K8UBK. VHF PAM: W8ABDU. Mar. section reports:

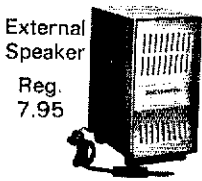
Net	QNI	QTC	Sess.	Freq.	Time/D	Mgr.
OSSBN	2378	969	62	3972.5	1430/2245	K8U
BN	635	472	61	3580	0200/2300	W8I
OmTrN	437	85	62	50.61	2300	WA8A
				50.16	0100	
OSN	149	60	31	3580	2225	WA8W
BN R11Y	261	65	29	3605	2200	WA8Y

BPLs were earned by W88ZU, W88ETX, K8IMF/8, K8O, W8OQU, W88BPH and W8IEL. Section Net Certificates for regular participation in RN went to WHCR, W88TWC, W88RSP, W88DOU. Congratulations to new Advanced Class licensees W88EXX and W881G. W88ELZ wants to get in touch with other teenagers who are interested in starting a teen net. W88DO worked two PYs, a PA0, a G and a VES on 160 during the DX Cont. K8CSG worked 99 countries from Feb. 13 to Apr. 4. W88CKI will have his flying spot scanner, built as a high school science project, on 432 MHz. We regret to report that W88FNE joined Silent Keys. Greater Cincinnati ARA has 86 hopefuls in its new class tended by W8UQI, K8KJK and K8CKI. Canton ARA Fieldline announces an updated Stark Co. Ham Directory listing area amateurs. Piqua RC's vice-pres. and secy. are listed in the Apr. column. Should be W88RC and W88EL, respectively.

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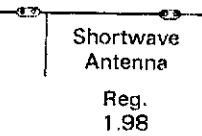
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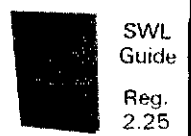
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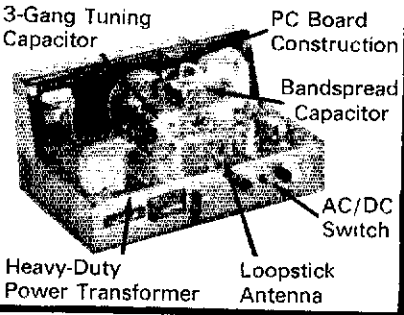
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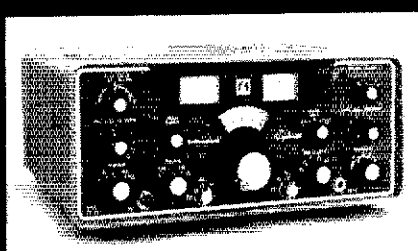
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Sorry, Scioto Valley ARC's Newsletter says the club has 12 students in its novice class. New officers of the Toledo RC are W8LIU, pres.; K8MYN, vice-pres.; W8RRT and W8UPH, secy., and W8WHA, treas. The Treaty City ARA will sponsor the 1971 Ohio QSO Party Aug. 7 and 8. Contact contest chmn W81GK for logs, check sheets, etc. W8BCE is a new OPS. The Queen City Emergency Net and the Apricot Message Net took part in the St. Patrick's Day Parades, furnishing communications and coordination. LC K8ONV reports a successful Red Cross-sponsored "Mock Disaster" exercise. The Scioto Valley ARC's 1971 officers are W8RHY, pres.; W8BBP, vice-pres.; W8ZVY, secy., Toledo's Ham Shack Gossip lists 40 new hams in its Mar./Apr. issue, including one General Class 74 years old. The Apricot Net set up a station at the Cleveland Sportsman Show, signing K8LMP/8, 499 originations were handled for attendees. I attended the Great Lakes Division Convention in Muskegon, Mich. The affair attracted 1100 which include ARRL and ARPSI forums in its program. ARRL Comm. Mgr. WINJM headlined the ARRL forum and then started a tour of Ohio, with appearances at Alliance, Cleveland, Lancaster and Columbus. The spring meeting of the Ohio Council of Amateur Radio Clubs was attended by 45 plus the officers, Director W8WC and myself. SEC W8OUU reports that our ARRL membership is now 1337. LCs report 39 nets are in operation, all with NTS liaison Traffic: (Mar.) W8SZU 690, W8RTX 335, K81 MF/8 519, K8ONA 267, W8CUT 262, W8IMI 256, W8OCU 256, W8RBP 220, W8OWL 209, W8WAK 206, W8BALU 207, W81 T 181, W8FTL 174, W8BCW 167, W8PMJ 163, W8BBI 149, W8MOK 147, W8OPK 135, W8NSL 135, W8FTW 129, W8GVX 110, W8J1 101, W8SUI 94, W8VSB 88, W8PBS 83, W8RYP 82, W81U 81, W8RHH 75, W8ZUK 72, K8UBK 69, W8BDH 65, W8EK 65, W8YUB 65, K8LGA 61, W8BUN 63, W8FTU 50, W8EC 44, K8BYR 43, W8GIG 42, W8NOO 41, W8RUF 41, W8RAK 40, W8OZK 39, K8LHE 38, W8ULF 38, W8RVK 38, W8VNU 38, W8RZX 36, W8OI 36, W8AJC 34, W8RRP 34, W8YIB 34, W8BHL 30, K8ONV 26, W8ADU 24, W8FTX 23, W8RAC 22, W8CTI 21, W8JLH 17, W8GID 16, K8OYR 16, W8RFA 15, W8GDE 15, W8FSX 14, W8SFX 14, W8NAT 13, W8IMD 11, K8LFI 11, W8OUU 11, W8BU 10, W8EBS 10, W8FGD 10, W8M11 9, W8QXO 9, W8AJZ 8, K8BNL 8, K8DII 8, W8RAZ 7, W8MGC 6, K8BFX 5, W8LEE 5, K8CKY 4, W8LAM 4, W8SSI 4, K8FKG 3, W8OKI 2, W8CQC 2, W8RMC 2, K8PB 2, W8LZL 1, K8RXD 1, W8WGL 1, (Feb.) W8AJC 5.

HUDSON DIVISION

EASTERN NEW YORK SCM, Graham G. Berry, K2SIN. Asst. SCMPAM: Kenneth Kroth, WB2VJB SEC: W2KGC. RM WA2VYS, VHF PAM: W8YQU. Section and local nets: Remember to look for time changes in schedules now that DST is in effect; no continue as listed in last column for freqs. and mode. Appointments and renewals: ORSs: WA2WGS, WA2VLS, WB2LL OPSs: WB2BL and WB2LR. OVS: WA2PYE. On the club circuit: The Schenectady ARA head K2LOI on low level astronomical T and slow-scan amateur TV. Classes are still in session at the Niskayuna HS under SARA members. Albany ARA heard W2AW on 50 years of antennas and feedlines; WA2EAH now is operation chmn, for AARA. The Communications Club of New Rochelle has Charles Ray of Superex as the Mar. speaker. The SCM talked on the Communications Dept. at the Yonkers ARA meeting. Individual station activities: Welcome to W2SIN, WA2WGS is getting back full activity after major surgery. K2DNR and vhf PAM WB2YOU are in the midst of tests and improvements on 100W-220 rig. WA2WGX is now an Advanced Class licensee. WA2FBI heads to RPI and W2SZ in the fall. WA2JLV has a Heath freq. Counter complete and ready to go. K2BK teamed up with W2DA. WB2BL, WB2PW and Murphy for recent DX Contest. Repeaters are springing up like weeds all over N.Y. - license holders please sure to report freqs., times, access method etc. to League Hq. stations; remember June 1st shut-off date for FCC comments proposed phone expansion cw contraction of bands. Only a few days left to be heard from. Classes just starting (or planned) please list dates/times for column. Route F-D messages via K2YCI. and good luck to all participants. Look for W2IR, museum station, on from Schenectady until the fall. Attention newcomers: NY State County Net 36/7 kHz Sun, 1000 local time Mon, 1945 and Thur, 1945 under W2RUI. Traffic: (Mar.) W2UJ 71, WA2VLS 68, WA2FBI 65, WA2VYS 44, WA2TIO 39, WA2EU 32, K2SIN 31, WA2ZZW 31, WA2JY 30, K2UYK 26, W8ZIN 24, W2ANY 23, W2KDC 23, WA2MGT 20, WB2VJB W2SVB 11, W2TUV 8, K2HNW 5, WA2WGS 5, WB2DXM WA2IGB 2, W2OGZ 1, (Feb.) WA2WGS 10.

NEW YORK CITY AND LONG ISLAND SCM, Fred Brunjes, K2DGI - SEC: K2OVN, RM: K2UAT. HF PA WA2UWA. VHF PAM: W8TRQF.

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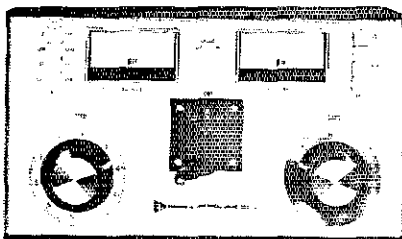
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NLI Phone*	3925 kHz	1600 Dy	WA2UWA PA
Clear House	3925 kHz	1100 Dy	WA2GPT Mg
Mic Parod	3925 kHz	1300 Ex. Su	K2AAS Mg
East U.S.	3685 kHz	0901 Nightly	
All Svc.	3925 kHz	1300 Dy	K2AAS Mg
NYSPTEN	3925 kHz	1800 Dy	WB2HLV Mg

*Section Nets: All times local DST. It is with regret that I report the passing of W2IDL into the realm of Silent Keys. Well, it's that time of year again! Field Day is once again upon us, and I hope you will attend the activities, preferably with a club, for without your support there is really no club in any form! W2GVT reports upgrading to Extra Class (and at 68 years young too. Congratulations! Members of NYCRA held a shindig for WB2FX who's entering the world of matrimony. Congratulations! K2AA reports he will be moving to Las Vegas in July for retirement. Keep in touch! WA2JZX making ready to smoke-test a home-brew line (have that fire extinguisher handy). Rumor has it that WA2POX is emitting 20-meter rf from Iceland these days. WB2WFJ reports efforts to get the N.Y. University Club station, WB2AYD, on the air are meeting with success. The Suffolk County Radio Club reports moving to a new meeting place; as of May 71, 1st Fri. of the month at the Bohemia Community Hall, Bohemia. I would like to thank the NYCRA group for a time tour W2TUK and myself were given their repeater operations. The WA2YYQ operation is one of the finest repeater operations in the area and sets a fine example of proper repeater operation and usage. Repeater operation in this section is quite widespread, and is fast approaching the point requiring even tighter cooperation and coordination if the purpose and pleasure of repeater usage is to be realized. Cooperation is also necessary from all operations above 146.0 MHz, because of the high rate of fm activity, both in direct and repeat functions. A little cooperation can go a long way to the enjoyment of everyone. BPL (Mar.) W2DSC; (Feb.) WA2FTS. Traffic: (Mar.) W2DSC 500, WB2LZ 245, WB2LGA 206, WB2DLJ 160, W2BC 151, W2DBO 18, W2LGM 18, WA2LJS 18, K2AAS 14, WB2WFJ 11, W2EW 9, W2PF K2JFE 6, WB2HWI 1. (Feb.) WA2FTS 544, WB2WFJ 173.

NORTHERN NEW JERSEY - SC'M. Louis J. Amoroso, W2ZZ
SFC: K2KQD, RMs: WA2BAN, WA2DRH and WA2TAF. PAM
K2KQD, K2SGX and WA2TAF.

Net	kHz	Time (PM)	Days	Sess.	QNI	Tfr	Mg
NIN	3695	7:00	Dy	31	530	358	WA2BA
NIN	3695	10:00	Dy	31	343	157	WA2BA
NJSN	3740	8:00	Dy	21	67	38	WA2DR
NJPON	3930	6:00	Su				WB2FJ
NJFPTN	3950	6:00	M-F	30	599	156	WA2TA
NJAN	50425	8:00	M-F				K2SG
PVETN	145710	7:30	Dy	31	81	26	WA2JNO
EC1N	145800	8:30	M-F	31	155	55	WB2LT

Endorsements: W2BVF and W2TJF as OOs; K2KQD and WB2B as ECs; WB2JYM as OVS; W2CVW, W2FWZ and WB2FEH as ORs; W2CVW as OPS. WN2SKG is a new ham in Bayonne. WN2JH passed the Tech., WN2LCH passed the Advanced and WB2LT passed the Extra Class exams. Congratulations to all. W2III NJDXA, now in W9-Land received his 5BXCC. W2TP has applied for his. K2UDQ made the DXCC Honor Roll. W2BXA and W2OH are both on 2-meter fm and W2ZZ still is working on his fm ge. W2ZEP is building a new SB-401. WB2RCS now has 5 Asst. EA. WA2EUX won 1st place in the Mich. QSO Party. WA2CCF sent a DXCC sticker No. 220. WA2KHO reports 101 worked with confirmed for his DXCC. WA2FUT is now on 2-meter RTTY. WA2LDX is moving back to Mich. and his old WB1BX call. NNI a NN will miss him and we say thanks OM for an EB job. WN2TO a new ham in Bayonne. W2JZC is giving his new 1CW-100 a worko. K2ZJP now is W0NGI. WB2JVO has 48 states confirmed. W2C received a special QD award. WB2TEA is an Advanced Class licensee. His station now includes the SR-400 and Polycomm 11. W2NCY home from the hospital. WA2UOO operated portable during recent Va. QSO Party. WB2NSV reports the Belleville ARC continuing to sponsor classes at the Belleville Evening High Sch and have WN2TTG and WN2TSY of Belleville and WN2TSP Bloomfield as graduates. I would appreciate some news from me of the various clubs in our section. We have openings for various appointments. Write your SCM. Traffic: (Mar.) WA2BAN 3, WB2VPR 221, WB2LTW 207, WB2DDQ 189, WA2LPI 1, WA3LXF/2 136, W2ZEP 107, WB2NOM 104, WB2TUL WA2JQJ 83, WA2ERZ 71, K2MFF 61, WA2KHQ 56, WA2FUI K2UOJ 48, WA2YXQ 48, WA2HAD 44, W2EWZ 43, WA2CCF W2UCU 31, WB2JAE 30, WA2FVB 28, WB2BRC 27, WA2JNO W2ZZ 26, WA2UOO 23, WA2CAK 20, W2CVW 19, WA2EUX WB2WNZ 11, WB2RCS 7, WA2JXE 7, K2ZFF 7, WA2LDX K2DQI 5, W2ABL 4. (Feb.) WB2RKK 344, WA2JNQ 1, WB2RCS 139, W2ZEP 105.

Dear Sir:

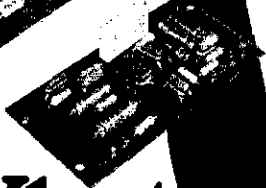
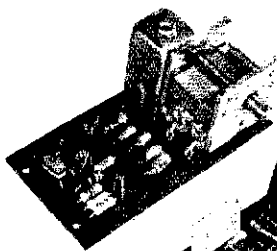
So far, I have not often written to manufacturers; however, this time I feel obliged to let you know how pleased I am with your low power building blocks.

Several months ago I obtained . . . the TEN-TEC basic modules MR 1 (40/80m), the AC 3 (15m converter) and the AC 6 (20m transceiver module). These modules were built into a small aluminum housing . . . the result is a thoroughly pleasing piece of equipment, which gave me many hours of fun in the "field" . . .

Many QSOs have been made during the summer and fall months and always the reaction to "my input hr 2 wats" is a skeptical "unbelievable", regularly followed by the question "what antenna do you use?". Obviously the chap on the other end thinks I have some big array and is even more puzzled to hear that I only use a G.P.! Worked so far most countries of Europe, several UA9s (over 3000KM away) and a 4x4 (all during the daylight hours). Even a HBØ and a OHØ have been worked through some pile-ups! The comments on frequency stability and tone quality are always excellent . . .

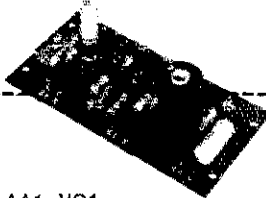
To me, the most surprising thing is the sensitivity of the receiver, the utmost simplicity of the design, even weak DX stations can be well received . . . and inexpensive job!

Congratulations and compliments to you for a fine
Dr. Gunther Haubenberger, OE1HGW
Vienna Austria



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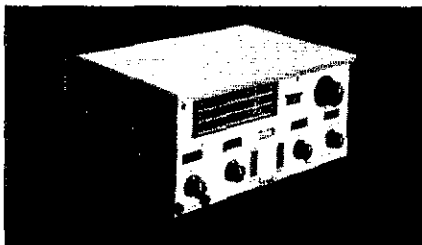
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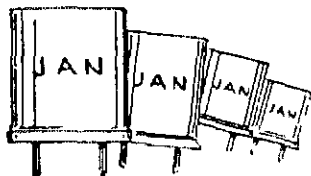
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IOWA - SCM, Al Culbert, K0YVU - SEC: K0LYB. Congratulations to the following hams who recently raised the class of license. Novice to General: W0OASM, W0B0F, W0B0V, W0C0S, W0C0L, W0Y0F, W0Y0W, W0Y0W, W0Y0X, W0Z0F and W0Z0I. Novice to Advanced: W0B0PH. General to Advanced: W0D11, W0HW, W0NEH, W0NRC, K0QKR, W0R0M and W0V0E. Advanced to Extra: K0JBD, W0TVD, W0UAD and W0VRX. It is interesting to note that W0TVD has his Extra Class ticket the ripe old age of 15 years! I journeyed to Spencer to join with the 3900 Club-of-the-air for their banquet on Mar. 2. Quite an affair with 122 in attendance to hear two fine speakers, W0BUO, ARRL veep, and W0TLE of Handi-Hams. The picnic season is rapidly approaching, with the 160-Meter ticket on Father's Day. Kind of makes that Mar. ice storm seem long way back. W0DO is on the air with Slow-Scan TV. A fire in Iowa? W0PEP now is operating RTTY on 6-meters using a ST-5 terminal unit. W0NEH and W0DFC both underwent surgery and are doing FB. A new ham at Fort Dodge is W0B0D.

Net	QNI	QTC	Mt
Iowa 75 (noon)	1669	135	K0LYB
Iowa 75 (eve)	1312	51	W0YV
TLCN (cw)	177	72	K0AZ

Traffic: W0LCX 639, W0VZH 157, W0MOO 67, K0DDA 6, K0AZJ 60, W0AUX 45, K0K0 31, W0JF 28, K0JG 2, W0P0J 16, W0D0Y 14, K0LKH 10, W0PPW 9, W0BW, W0YJW 4, W0EFN 2, K0LUZ 2, W0Y0Q 2.

KANSAS - SCM, Robert M. Summers, K0BXF - SEC: K0LPRMS: K0MRI, W0JZK, PAM: K0JMF, VHF PAMS: W0CCY, W0F0R. W0HI was elected TCC operator of the year 1970 with W0NH as runner up. Both fell us of the need for more traffic originations at the section level. High winds during the past month cost several of us some antennas. W0LXA has been elected pres. of the Letters Carriers Union in Salina. The Douglas County ARC has applied for ARRL affiliation. A new club formed in Wichita is the New South Kansas DX Assn. which meet the 2nd Tue. of each month at 7:30 P.M. in the Red Cross Bldg., 321 N. Topeka. W0UMZ and W0BGX are tied with the honor of being the Kansas Weather Man of Mar. All ARRL Zones with the exception of Zones 2, 9 and 10B reported activity this past month. Thanks to participating. K0LPE is a happy SEC. Mar. Net reports: QKS - QTC 522, QTC 203 in 62 sessions. K0BN - QNI 1230, QTC 144, 3 sessions. KPN - QNI 235, QTC 14, 14 sessions. K0FC Net - QTC 76, QTC 4. K0 Wx Net - QNI 787, QTC 5. HamButchers Net - QNI 892, QTC 116 in 23 sessions. Mid States Mobile Month Service - QNI 1506, QTC 112 and 75 phone patches in 142 hours of operation. Traffic: (Mar.) W0HI 204, W0LBB 198, W0NH 18, K0MRI 132, K0JMF 105, W0B0F 102, K0BXF 75, W0CCJ 7, W0JFC 70, W0LZC 65, W0MA 64, W0JZK 45, W0HJ 2, W0BSR 19, K0LPE 18, W0FDJ 15, W0WXY 14, W0CJR 1, W0PB 11, W0OWH 10, W0SFV 10, K0HCH 10, K0PSD, W0BGX 6, K0JD 4, W0OZP 3, K0GZP 2, W0LYC 1, (Feb) W0SEV 8.

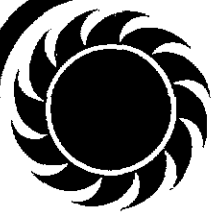
MISSOURI - SCM, Robert J. Peavler, W0BV - SEC: W0EN. New appointment: K0KUD as PAM. Appointments renewed: W0J as OVS, W0GCL as ORS. I am sorry to report that W0BKI, fat of W0BFD, is a Silent Key. Condolences to W0JFD and W0H0B, whose father also passed away. Net reports:

Net	Freq.	Time(Z)	Days	Sess.	QNI	QTC	Mt
MEN	3905	2230	MWF	14	244	17	K0KI
MOSSB	3963	2300	M-S	27	1418	141	W0RT
MUN	3585	0000	Dy	27	138	79	K0AJ
MON2	3585	0245	Dy	30	143	78	W0I
MMN	3715	2100	S	4	10	2	W0J2
MTN	3715	0100	Dy	7	24	4	W0J2
PHD	5045	0030	T	5	151	9	W0AK

Congratulations to W0RFD, who became the father of a boy: W0YCN, who was named to the National Honor Society at school; and to W0ZLI, who passed the Advanced Class exam. 1 amateur classes conducted by the PHD Club have been 14 out of passing the code. A new call in the Kansas City area is W0N0 ex-W0CZK, ex-KH6GPK and ex-K0JDM. W0OACW in Joplin is with a Swan. Traffic: K0ONK 367, K0AEM 213, W0HI 2, W0HTN 96, W0BY 70, W0KDE 54, W04OWY/0 46, W0NAI 42, W0ZLI 40, W0OUD 39, W0YYR 23, W0HJ 19, W0DK 18, W0CSE 15, W0BAW 2.

NEBRASKA - SCM, V.A. Caston, K0OAL - Asst. SCM; Ve Sayer, W0GHZ. SEC: K0DF. Appointments: W0BEN as O

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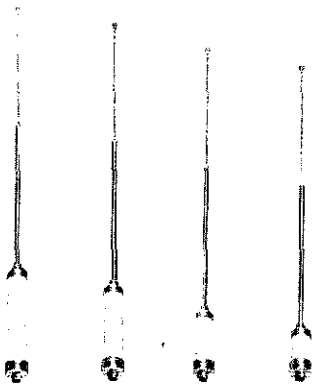
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- Higher radiation effectiveness
- Lightweight, super strength construction
- Shake-proof sleeve lock folds over for garaging
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- Swivel base for quick change from band to band
- Nominal 52 ohm impedance on all bands—no special matching (any length coax will work)
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- Turn-over mast is hefty 5/8" dia. heavy wall tubing of highly polished heat-treated brite dipped aluminum
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- Mast folds over, swivels, turns over—mount it on bumper or deck
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- Coil and tip rods are a one-piece assembly. Coil diameters are constant, only lengths change

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Order No. 256 40 meter mobile coil	\$17.95
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No. 256 No. 255 No. 254 No. 253

<p>SHAKE-PROOF SLEEVE LOCK sleeves fold over hinge.</p>	<p>SWIVEL BASE Simplifies quick change from band to band</p>
<p>(Order No. 492) Price \$2.80</p> <p>Coil and tip rod SPRING also available. Ship. Wt. 0.2 lbs.</p>	<p>COIL ASSEMBLY CUT-AWAY</p> <ol style="list-style-type: none"> Chrome plated brass fittings Inner fiberglass core. Precision coil Outer fiberglass shield <p>All permanently assembled and completely impregnated with special moisture proof compound.</p>

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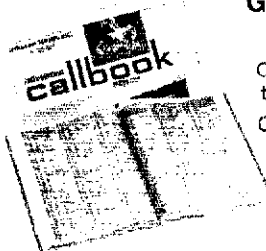
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WAØKGD as OO; WBØCAU as ORS. Renewed appointments: KØJFN as OO; WØAGK as ORS; WAØIBL, WØHOP and WAØKGD as OPS; WØBM as OBS and WAØQGM as EC. Mar; net reports:

Net	Freq.	GMT/Days	QNT	QTC	Mgr.
NSN 1	3982	0030 Dy	1294	24	WAØLOY
NSN 11	3982	0130 Dy	1052	35	WAØLOY
Nbr 160	1945	0130 Dy	640	277	WAØCBJ
NFB	3540	0400 Dy	199	45	WAØHWR
NMN	3982	1330 Dy	1386	18	WAØJUF
WNN	3950	1400 M-S	660	52	WØNIK
ARFC	3982	1430 Su	202	2	WØLRZ
CHN	1980	1830 Dy	1416	39	WAØGH7
NFB(Feb.)	3540	0400 Dy	136	38	WAØHWR

WAØOCW was injured in an accident. We all wish you a speedy recovery. WAØKGD is building a Heath SR-401 and 303. WAØHWR lost his antenna during the big blow. KØPTK is now 2-meter equipped. WØBADH is moving to Plattsmouth. Heard WØDIO in Cuzad working WØBOW in Seward on 80 cw. KØODF gave several local people a tour of the Pine Ridge ARC. WØFLO. Net managers are reminded to register nets by July 1 using ARRL Form CD-85. Traffic: (Mar.) WØLOD 340, WAØSCP 138, KØKJP 101, WAØCBJ 60, WBØCAU 41, KØUWK 32, WØLOD 29, WØBPN 27, WAØHWR 26, WØVEA 22, WØIAY 21, KØRJE 20, WØLFV 18, WØNIK 18, WØCSW 16, WAØQLI 16, WØDMY 15, WØIKB 14, WØRWM 13, WAØFX 12, WAØLOY 11, WAØPCC 11, WAØBK 10, KØIAL 10, WAØLRP 10, WAØEEI 9, WØGEO 9, WAØJH 8, WAØGHZ 7, WØBAAN 6, KØFRU 6, WAØKGD 6, WAØOX 6, WAØPI 6, KØUDW 6, WØCHN 5, KØJN 5, WAØJUF 5, WØWBSOP 5, WØYER 5, WØLOB 4, KØHTY 4, WØJNR 4, WØLJO 4, KØMUF 4, KØODF 4, WØWKP 4, WAØYT 4, WAØGAT 3, WAØHAL 3, KØOAL 3, WØBADH 2, KØEJI 2, WØNHS 2, WØPHJØ 2, WØSWG 2, WAØTF 2, WAØVIT 2, WØALA 1, WAØIHF 1, WAØJKN 1, WAØLE 1, KØSEA 1. (Feb.) WAØSP 19.

NEW ENGLAND DIVISION

CONNECTICUT - SCM, John J. McNassor, W1GVT - SEC: W1HHR. RM: K1ER, PAM: K1YGS. VHF PAM: K1SXF.

Net	Freq.	Time/Days	Sess.	QNT	QTC
CN	3640	1845 Dy	62	512	420
CPN	3965	1800 M-S 1000 Su	31	463	169
VHF 2	145.98	2200 M-S	23	74	42
VHF 6	50.6	2100 M-S	23	114	8

High QNT: CN - WA1GEH, K1ER, W1KV and W1CTI. CPN - W1GVT, W1MPW, K1SXF and K1YGS. SEC W1HHR again extends his offer to provide an EC program at your club meeting. Please check to see if he can make your next meeting. Director W1QV made every effort to obtain written comments on the FCC Proposed Rule Changes for the purpose of representing us at the May ARRL Board meeting. Hope you did your part in contacting him. Please note that CN now holds two sessions each day. They like interested newcomers and you are welcome to join. Theory classes continue at Hamden ARA. Last year many made General, this year they hold Advanced Classes. The Southington ARA were very successful as hosts for a huge auction. New officers for Murphy's Marauders: W1FLM, pres.; K1VTM, vice-pres.-act.; G3XPM/W1, secy.-treas.; W1ARR, editor. WØ2FC now is WA1OEP. W1ARR is back in Conn. Congratulations to: WA3JSU/1 for Mar. BPL; WA1JZC, WA1KKM, WA1IQ and W1PPN for Extra Class; WA1ZKE for Advanced; WA1NMZ and WA1NBB for General; W1N1RM and W1NOI for Novice! Field Day plans should be complete. Check new rules! Hope all clubs take part. K1SXF would appreciate more check-ins on the vhf nets. See sked above and point your beam toward Bloomfield! See you on Field Day and best of luck to all! Traffic: (Mar.) WA1JVV 325, W1EJ 280, WA3JSU/1 210, W1MPW 155, W1AW 66, K1SXF 61, K1YGS 55, W1GVT 52, WA1HOL 48, W1QV 45, WA1JMO 34, W1BDI 32, WA1OIP 21, W1EUF 7, W1YBH 7, K1DGG 6, W1YB 6, W1DQJ 5, W1KAM 1.1. (Feb.) W1HHR 11.

EASTERN MASSACHUSETTS - SCM, Frank L. Baker, W1ALI - SEC, W1AOG received quite a few annual reports from ECs and also reports from W1SUF, U1, K1SNEW, Z1P, WA1DXL, W1BO is a Silent Key, K1YHZ is the EC and RO for Weymouth. WA1NNT is the EC for Rowley. The 19 RC met at W1SXX's and new officers are W1JTP, pres.; WA1KNO, vice-pres.; W1SXX, treas. W1MKN, secy. WA1ODN is CD Director for Lynnfield. W1HTR the retired, W1QIU is a YL in Hingham. The New Eng. Emerg. Phon Net had 4 sessions, 108 QNTs, 5 traffic. W1NE was visited by ex-W1BHV. K1AGB/7 had 950 QNTs, 351 in 45 states and 800 81 countries on 5 bands. K1YKT is an ORS. W1QIHL has 14-AUQ antenna for new YAESU-560. W1N1AO is on 80 and 1.

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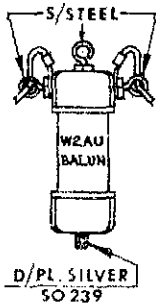
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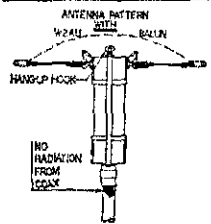
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 - 4:1—75 ohm coax to 300 ohm-balanced antenna or folded dipole.

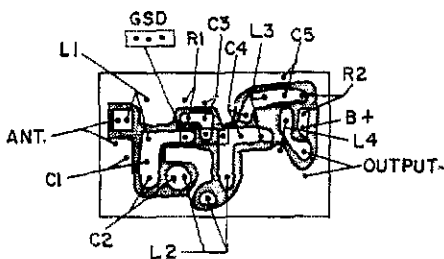
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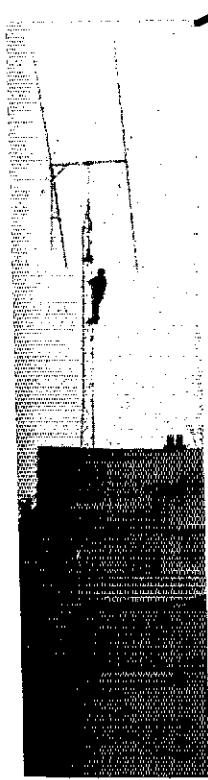
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WKWD and KIMAK are in the hospital. WA1AKR reports that
75-meters had some good openings at 0430 GMT. W1QHN has an
SB-102, SB-220, 2-KW linear, 60-ft. tower and a classic 33 triband
Yagis. W1GA/K1GA has retired. WA1AKR has started a 75-meter
and Raschewers Net on 3932 MHz at 7:30 P.M. on every night.
FM2MN had 23 sessions, 169 QNTs, 109 traffic. WA1MJD operates
at W1MX. W1MFG is back on 2. WA1DEL says he and W1DKD had
their 100th QSO. Waltham RC joined AMSAL. WA1NNW and
W1PVT gave a talk and demonstration on slow-scan TV on vhf, they
have a net on 50.5 at 8 P.M. on Mon. W1JZD has an NCX-5, 2-kw
generator, three-element Yagi. WN1MSB says the Early Eighty Free
Net had 30 sessions, 110 QNTs. K1DJG is active in the Mosaic
Amateur Radio Net on 21,447 ssb, Sun. at 1600 GMT. He has a
YAESU-560, W1OJM made BPL and W1PEX made BPL in Feb.
W1AQE still is county hunting. W1PZ says he won the Saskatoon
Wheat Belt Award. Appointments endorsed: WA1DPX as OVS; W1S
OFN, HKG, IPZ as FCs; W1S JMG, BB, K1YKT as ORSs; W1S BB,
AAR as GPSs; WA1JHQ as OBS; W1AQE as RM and ORS; K1OKE
as PAM for 6. WA1AKR is a new OO. WA1KZE is an Advanced
Class licensee. WA1AAR has an ssb rig. WA1ENM had a car accident.
WA1OJU is new on Nantucket. W1TPV/1 is now at the M-B,
Colorado Springs, Colo. and his XYL, WB1VYK/1 has been on 2.
W1ABC is building a 500-watt linear. W1OD is a new OBS.
Quannapowitt RA had talk on "Amateur Radio in the Space Age"
by WA1ZNB and WA1JUC. W1PI received an award from
Switzerland AC, also from Subotica RAC. The OOTC met at Valles
in Braintree. WA1KBG is a new OBS. The 6-Meter Crossband Net
had 21 sessions, 52 QNT. Dave Wallace is vice-pres. of the
Chelmsford ARC. K1JA is a Silent Key. Traffic: (Mar.) W1OJM
525, W1PEX 415, WA1EY 180, WA1FAD 133, W1MKN 125,
WA1FE 86, W1EMG 85, W1UX 76, W1ABC 52, WN1MSB 37,
WA1KZE 25, WA1MIG 25, W1DOM 17, WA1TX 13, WA1AR 9,
K1LCO 7, WA1DJ 6, WA1OD 6, W1WG 4, WA1ENM 2,
WA1JVL 2, W1TPV/1 1, W1CZB 1, W1E 1. (Feb.) W1PEX 688,
WA1EY 596, W1ABC 156, K1PRB 71, WA1BYM 61, W1EJN 43,
WA1HSI 32, WA1MH 17, W1E 7, WA1AKR 4, Jan.) WA1JVL 1.


MAINE - SCM, Peter F. Sterling, K1TEV - SEC: K1CLF,
PAM: WA1FCM. RM: W1BJG, W1VBY also DL4PC and his XYL,
K1GUK are returning to the Portland area after 5 years in DL-Land.
W1GA/K1GA is retiring to Woolich and hopes to be on the air soon.
I am sorry to report the passing of W1MSU who was very active in
ham radio through the years. I still am looking for news, any tidbit
will be welcome. New hams in Maine are WN1OGL, WN1OHL,
WN1OIT, WN1OKR, WA1OJB, WN1OIH, WN1OJL. W1BHA still is
looking for an assl. mgr. for the Barnyard Net. The Yankee
Repeater Assn. has incorporated and hopes to have the 2-meter
repeater on soon. WA1MXO is on with a new SB-220 and making all
kinds of contacts on the other bands. Traffic: (Mar.) K4BSS/1 45,
K1TEV 10, (Feb.) WA1FCM 274, K4BSS/1 91.

NEW HAMPSHIRE - SCM, Robert C. Mitchell, W1SWX - SEC:
W1LUD. RM: WA1GCE. Endorsements: W1DUB as OVS; W1RCC
as OPS; W1UBG as ORS. New appointee W1DXB is welcome as a
much needed OO. New hams in N.H. are WA1OAG, WN1ODG,
WN1OGE, WN1OGN, WN1OHI, WN1OHO and WN1OKH. The
VTNHN report shows 31 sessions with 188 traffic in 825 minutes of
net time. WA1TM is now a member of the A1-Operators Club.
Congrats. K1HDO has 121 countries confirmed on 10-meters.
W1FFF sent in his OO report. W1UBG worked two new countries
HV3SJ and 1Y1ABF. The only EC reporting SFT activity is
W1RCC with the following participating: WA1CYB, WA1GPF,
W1UDR, WA1FOP, K1YMH, WA1FL, W1PZU, WA1NJE, K1SYJ,
K1ACL, WA1MIN, WA1LO, K1UCU, WA1GCE, W1BXM,
W1NXP, W1OHS, W1MUL, K4NEH/1, WA1CEH and WA1MXT.
W1JLK is home from the hospital. WA1GCE reports the most active
stations on VTNHN are W1UBG, K1BCS, W1MRW, WA1MXT and
WA1JTH. Traffic: K1BCS 327, WA1GCE 207, W1UBG 151,
WA1JTH 102, WA1MXT 73, W1SWX 7.

VERMONT - SCM, E. Reginald Murray, K1MPN.

Ver	Freq.	Time(Z)/Days	QNT	QTC	Mgr
Green Mt.	3932	2130 M-S	419	21	W1JLZ
Carrier	5945	1300 M-S	431	5	W1BLA
V7NH	3685	2300 DV		188	WA1GC
V1CD	5990 S	1400 Su	29	15	W1A
V7PO	3909	2200 Su	63	10	K1BO
V7SB	3909	2130 M-S	516	81	
		1230 Su			

Welcome new Novices: WN1OGH (Winnsko), WN1OHM (Brattle-
boro), WN1OGV (Colchester), WN1OHS (Plymouth), WN1OJ,
WN1OJH, WN1OJL all in Burlington and to Conditional WA1OKK
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
Type	Description	Each
<input type="checkbox"/> 709	Operational	.88
<input type="checkbox"/> 710	Hr Speed Diff.	.88
<input type="checkbox"/> 711	Dual Comparator	.88
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<input type="checkbox"/> 2809	Dual 709	1.50
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DRAKE T-4XB	495.00	415.00	MOSLEY MP-33	105.00	85.00
DRAKE TR-4	699.00	590.00	MOSLEY TA-33	133.00	106.00
GALAXY GT-550	550.00	420.00	MOSLEY TA-36	167.00	134.00
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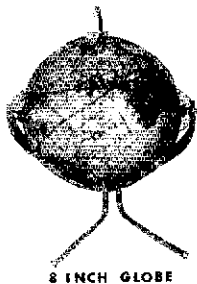
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contact me. Summer approaches and your help in net participation is greater than ever. Traffic: K1BOB 144, WA1GKS 68, K1MPN 16.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1RVF — SEC: WA1DNB, CW RM: W1DVW, 75-METER PAM: WA1MFB, Berk. Co. 6-Meter PAM: W1KZS. The SAC reports a total AREC membership of 73 with the section AREC weekly net having a QNI of 53, the 10-meter net 38, the 6-meter net 19. The CW RM reports WMN had 165 QNIs and handled 137 messages. Top five in attendance were: W1RVF, W1DVW, WA1LNF, WA1LPI, and WA1FBE and WA1BXQ/1 tied for fifth place. The 75-meter PAM reports WMFN held 22 sessions with 73 QNIs and handled 76 messages, top five were: WA1MFB, WA1LPI, WA1LNF, W1CSF and WA1LZS. WA1MFB now has 91 countries. W1EYC has an HA-410 10-meter mobile. WA1FBE is on 2-meter tm. WA1MUH is active on 2. New appointments: WA1DNB as OPS; WA1LPI and WA1MUH as QVSS; W1DVW as OPS. Northern Berkshire ARC will hold a hamfest Aug. 22, details from K1JMG. Officers of the Mt. Tom Repeater Assn. are K1ERB, pres.; WA1JNV, vice-pres.; K1IQZ, secy.; K1IAX, treas.; K1KBO, act. mgr. CMARA's new novice class has 21 members. HCRA's speaker of the month was K1PLP from ARRL. Club member K1RPB, B's, QST article received the Feb. Directors Plaque Award. MARC awarded a certificate to W1GUI for his 50 years as a ham. Speaker at the VARC Mar. meeting was WA1NFU. From the SCM: The date this is being written (Apr. 8) I am celebrating my 50th anniversary as a licensed amateur. During 35 of those 50 years I have been an elected ARRL official: SCM 2-yrs.; N.E. Div. Director 18-yrs.; League VP 6-yrs.; SCM 8-yrs.; and current SCM. Pardon an old man in his dotage for mentioning this — but I'm proud of it! Tr.: (Mz) WA1LP 371, K1SSH 240, W1DVW 100, WA1MFB 96, WA1LNF 67, W1RVF 64, W1KK 30, W1HI 24, W1CSF 18, WA1LZS 14, WA1DNB 5. (Feb.) W1PUO 20, WA1BXQ/1 11.

NORTHWESTERN DIVISION

IDAHO — SCM, Donald A. Crisp, W7ZNN — FARM Net: 0200 GMT, Dy. 3945 kHz. Idaho RACES Net: 1515 GMT, week days, 3990.5 kHz. Idaho P.O. Net: 0130 GMT, Tue., Thur., Sat. (GMT), 3930 kHz. NSN: 0300 GMT, 3700 kHz Dv. Orofino repeater: receiver 146.34, transmitter 146.76 and 146.94. K7NDX plans to raise the repeater antennas and install cavities to lessen interaction between the transmitter and receiver. W7GGH has built a slow-scan TV monitor which he demonstrated to the Thatuna Club, and he's building a camera. W7GGH has offered information to anyone who's interested in SSTV. The newly formed Thatuna Club in Moscow has adopted a Constitution and By-Laws. A club station licensed as WA7PKS was set up at the U. of I. by the Industrial Education Dept. Make plans to attend the W1MU hamfest at Mack's Inn, Idaho in Aug. Motel accommodations and camping areas are available. Traffic: W7LY 84, W7ZNN 59, WA7BDD 55, K7CSL 8.

MONTANA — SCM, Harry A. Roylance, W7RZY — Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. VHF PAM: W7IAC. PAM: WA7IZR. Congratulations to the Bozeman gang and their assistants on an FB job with the snowmobile races. The Capital City Radio Club party was well attended. W7SMY is on with his 5-band homebrew transmitter. W7LBK modified his model-19 printer for automatic carriage return and line feed. K7FLW is using a homebrew metal detector for locating water pipes for City of Laurel. WA7OBH has contacted the Governor of Mont. and he is proclaiming the week of July 12 through 18 as Amateur Radio Week in Mont. Sorry that we must list K7JJO among the Silent Keys this month. Some of you qualify for the PSHR. Check QST and send me the information. Bozeman is making tests with their 2-meter repeater and are getting good coverage. WA7IZR has put Livingston on the map with the installation of a Motorola 2-meter rig. Everyone get ready for the Glacier-Waterton Hamfest and the W1MU Hamfest. Plans are in the making for another vhf meeting and a visit from Dir. Thurston as well as from the gang in Newington. New appointees: WA7NWP as EC and OPS and W7INZ as EC. Traffic: (Mar.) W7FKB 303, WA7JQS 244, WA7NWP 81, K7CGJ 43, W7LBK 31, WA7IZR 13. (Feb.) WA7JQS 298, W7TYN 22, W7DB 12, W7OIO 2.

OREGON — SCM, Dale I. Justice, K7WWE — SEC: W7H1F, RM: K7GGO. PAM: K7ROZ. Net reports: WA7GTX reports for the AREC Net, sessions 30, check-ins 591, traffic 17, contacts 50, maximum no. of counties 15, WA7KJU reports for OSN, sessions 22, check-ins 115, traffic 41. K7ZQU reports for BSN, sessions 62, check-ins 1376, traffic 96, contacts 246. The EARS Club of Springfield held a dinner and viewed slides of Pitcairn Island sent to WA7FVK and slides of Johnston Island sent to WA7GCT. The Valley RC of Eugene also attended. The EARS Practice Net meets at 0500Z Tue., Wed. and Thur. on 3710 kHz. They conduct code

Silent Keys

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

W1BKE, Stephen D. Gulick, Franklin, NH
W1BO, Malcolm Bruce, Plymouth, MA
W1BVA, Robert W. Lawrence, Needham, MA
W1MSU, Dr. Langdon T. Thaxter, Portland, ME
K1PAN, Donald O. Witt, Bristol, CT
W1QFE, Charles O. LaCross, Everett, MA
K1TAX, Leonard H. Bastrup, Wilton, CT
WB2ASG, Oscar Parenti, Ronkonkoma, NY
WB2DUN, John (Jay) R. Neiman, Jr., Poughkeepsie, NY
WB2GRH, Stanley W. Trumpp, Levittown, NY
W21DL, John H. Christ, Hicksville, NY
W2JAX, Sydney Cramer, Locust Valley, NY
W2JWH, F. Courtney West, Stamford, NY
W2KXI, John F. Ferrer, N. Babylon, NY
W2YAT, Joseph D. Matuzich, Scipio Center, NY
W2ZDW, Walter L. Schaeffer, Newfield, NY
K3BP7, John J. Bowen, Westminster, MD
WA3CKM, James W. Kocher, Nicholson, PA
K3KFO, H. Maurice Banta, Washington, DC
W3KLD, Dr. Ralph V. Sheldon, Erie, PA
W3LR/ESSE, Rupert A. Lloyd, Washington, DC
WN3PJ, Charles I. Boblen, Doylestown, PA
W3RVY, Frank S. Sauson, Bethany Beach, DE
W4DF, James R. Wikle, Sr., Charlotte, NC
W4EDY, Mary A. Bonnof, Tampa, FL
K4FEB/EX-W8UID, Leonard B. Lucas, Bylesville, OH
W4IUO, James T. Butt, Chesapeake, VA
W4LSG, Nick Karangelen, Virginia Beach, VA
W4PLA, Norman E. Mayne, Summerdale, AL
WA4UJX, Dr. George H. Putnam, Keystone Heights, FL
WA4VCE, Mackworth Res., So. Naples, FL
W4YXD, James H. Mills, Sr., Pompano Beach, FL
W5EJW, William G. Neuville, Pearland, TX
W5RVC, Frank E. Olsson, Pasadena, TX
K5TEF, Stanley R. Prince, Amarillo, TX
W5UFG, John B. McGreevy, Canton, OK
WA5WMK, David G. Steelman, Oklahoma City, OK
W6MZ, Arthur E. Kellogg, San Francisco, CA
Ex-W6QBC, Thomas M. Hale, Mad River, CA
WA6UHR, Melvin E. Dunn, Willits, CA
W6WNI, Eldridge E. Marshall, Redwood City, CA
W6WYP, Charles L. Davis, McKinleyville, CA
WA7EDC, Roland E. Schwab, Hawk Springs, WY
W7ER, Charles M. Emigh, Tacoma, WA
K7EZU, James M. Forsythe, Forest Grove, OR
W7GXU, Marion E. Cornelius, Bremerton, WA
W7KON, Irving H. L. Herrigstad, Lynnwood, WA
W7NL, Arthur H. Peterson, Seattle, WA
W7QZV, Elbert I. Shaw, Shoshone, IN
W7RI, Joseph L. Condon, Seattle, WA
WA8CYK, Sam Menks, Cleveland Heights, OH
W8EWI, Martin O. Aro, Cleveland, OH
W8GHF, Stanley F. Steigman, Lansing, MI
W8GXO, Harry B. Angle, Crumpler, WV
Ex-8QB, John C. Haderer, Niagara Falls, NY
W8QUU, Edstel J. Stewart, Southgate, MI
Ex-9AWM, L. V. Berkner, Sleepy Eye, MN
W9BRK, Joseph H. Lugg, Madison, WI
W9CD, Harold G. McMaster, Taylorville, IL
W9IDV, Victor F. Kramitz, East Troy, WI
K9LPW, Thomas R. Felts, Lawrence, IN
W9LYO, Russell C. Sager, Oconto, Falls, WI
W9LYX, Louis H. Pansier, Green Bay, WI
WA9MSC, James P. Randell, Arlington Heights, IL
W9NPT, Robert C. Boyle, Appleton, WI
WA9JWJ, James E. Canning, Chicago, IL
W9YAL, Hubert E. Siepmann, Brookfield, WI
WA9IGI, Vm Simmons, Pratt, KS
K0RWZ, Willard E. Romer, Emporia, KA
VE3BT, D. R. Cairns, Hamilton, ON
VF6MS, Charles Gower, Medicine Hat, AB
EX-VE6XD, S. A. Shatford, Kelowna, BC
VO1FZ, George Carville, St. John's, NF
F8FR, Max Reygrobellet, France
HC2HE, Enrique Hunter Lozano, Ecuador, SA

Study Techniques

(Continued from page 59)

e. Do all easy, sure questions first and then return to more difficult ones.

Conclusion

If none of these specific techniques and skills seems to work for you, then it may be that your achievement is an element of attitude and interest or some other individual problem. If so, you may want to ask yourself the following questions:

1. Did I plan enough time for adequate study? Remember, learning takes time for some individuals. Adjust your time schedule if unexpected events arise. Don't rob Peter to pay Paul.

2. Did I establish effective study habits, at a regular time and in a regular place?

3. Did I utilize odd time periods during the day for quick reviews? A good way to stretch your coffee break.

4. Did I plan for spaced review? Don't expect instant recall after just one reading.

5. Did I strive for improved study efficiency?

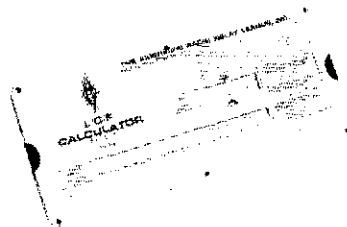
By applying the various techniques outlined in this article, I was able to successfully pass the extra class examination with a minimum of anxiety, loss of sleep, and tears. Being a non-theorist, I had the will power and found the way. Study habits and techniques may make the difference between achieving the extra class license or just verbalizing about it. Good Luck.

QST-

Strays

Members of Philadelphia's Pennarc Amateur Radio Club/Explorer Post 681-BSA, including (l to r) WA3MCK, WA3NFE, and WA3OVH, appeared recently on the popular tv show, "Captain Noah and his Magic Ark." Following a simulated cw contact, the group discussed DXing, public service communications, and other aspects of amateur radio. The show is syndicated on 50 stations.





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practice with mixed speeds and timed runs 8 to 25 rpm. Award runs are the last week of each month. Your SCM attended a meeting of Cooks Bay hams and as a result W7ID became an OBS. WA7KRH is on 2-meter fm and works K7GGQ among others. Traffic: K7NTS 133, K7OFG 126, WA7ICX 84, K7OUF 54, WA7IFS 42, WA7HFJ 29, K7WWR 25, W7MLJ 11, K7KPT 10, WA7KRH 8, WA7MOK 6, W7LFS.

WASHINGTON - SCM, Harry W. Lewis, W7IWI - The QCWA and the Wenatchee hamfest combined forces June 12, 13 at the Rocky Reach Dam. The WARTS-Noontime Net and WSN Nets combine for a hamfest July 10, 11 at a place to be announced. This will take the place of the Wash. State hamfest this year. Washington State Amateur Radio Week will be the 2nd week in Sept. with the annual BEARS Washington State QSO Party the week end of Sept. 11, 13. Rules may be obtained from K7RSB. We regret to report the passing of W7LWR. WA7LMO is a new OBS for the SSB Net. K7CTP is OBS for the Noontime Net. W7YRC will spearhead the Clallam County Amateur Radio Club for Uggd Day with the call W7ELL being used. WN7PXC is the latest submittal for AREC registration. AREC membership now is 253 with 8 emergency nets active with full liaison. WSN traffic as reported by mgr. W7GYF shows QNI of 364 and QTC of 163. W4UWZ/7 is a new liaison from WSN to RN7. WA7FKM is the new pres of U. of W. Radio Club. W7PI of Seattle is the new Wash. SCM and will take over from yours truly, W7IWI. He was first licensed in 1930 as W7PH. Spent 29 years as an accountant and retired a few months ago. Art was manager of WSN in 1969, checks into RN7, PAN, TCC, WARTS, Noontime and WSN Nets. He holds A-Op, DRS and OPS certificates, also BPL medalion and is a member of QCWA. Try Art on cw sometime! Good luck to a fine gentleman. When mobile in the wild Metho Valley, remember that K7TCU is home monitoring 146.76 along with OM W7IWI. WA7IOL is now production technician at the North Seattle Community College and can be frequently found behind the view finder of a TV camera. Traffic: W7PI 311, K7CTP 115, W7IFY 39, WA7LMQ 33, W7IWI 30, W7BO 27, W7EQE 23, W7AIB 14, W7RXH 13, W7IIZ 13, K7LRD 6, W7ILU 5, W7APS 38.

PACIFIC DIVISION

HAWAII - SCM, Lee R. Wical, KH6BZF - Asst. SEC: KH6BZF. RM: KH6AD. PAM: KH6GIN. VHF PAM: KH6GRU. OSJ Mgr.: KH6DQ. ECs: KH6s GPO, LP, BAS, GLU, GKD, KH6NO/KH6, KC6BJ and W7UZH/KG6. RACES Net Coordinator Dick Hamada, RO.

Net	MHz	Time (Days)
Friendly	7.290	2030 M-F
World-Wide Boy Scout	21.360	1800 S
Confusion (Patches)	21.400	0130 All
Pacific Interisland	14.338	0830 M-W-F
MICRONESIA	14.335	0800 Tu-Th-Sa-Su
S.E. Asia	14.320	1200 All
POPULE	7.290	0630 All
Pacific Typhoon*	14.265	*

*During typhoon alerts. Remember: The Pacific Division regional convention will be held in San Jose, Cal. at the Hyatt House July 2, 3 and 4. For details write Associated Radio Clubs, P.O. Box 6, San Jose, Cal. 95103. Last month I reported W7WON/KH6 was a new proud father. Make Harley's call KH6HGP, sorry. Our OYS/VHF-PAM KH6GRU filed a very good report on vhf activities. May I take this time to say Aloha to W7UZH/KG6 who's being transferred from Guam to his next Naval assignment. Good wishes to all the "Honeys." KH6GQW reports that HU9IT eyeballed him recently. Jo Jennings and his XYL are now signing KH6HLN and HLO respectively. KH6OR talked to the Honolulu ARC about improvements to his Linear amp. KH6HHI returned from Iairo after signing FO8DG. VE7IQ and his XYL were in town for some sand and surf. KH6J marks his 36th year writing the ham radio column for our local newspaper. KM6DX has applied for AREC status. Congratulations to Robert Smith, son of KH6AO and Mrs. Smith of Kualapuu, Molokai. He recently won a Navy ROTC scholarship. Please send your reports by the end of each month so that I may receive your inputs in time to submit them to the League.

NEVADA - SCM, Leonard M. Norman, W7PBV - SEC: L.L. "Mike" Blain, WA7BEU. WA7KFF will hold open house in his new ham shack July 4. Drop by for an eyeball. K2AAS is looking for a new QTH in So. Nev. W7IEV, ex-W3ANP is active on 2-meter fm. New family hams in Las Vegas are WN7PVT and WN7POO. WN7PCE and WN7PCC; WN7PWH and WN7PWI; WN7PWD and WN7PWC. WA7BAV has an amateur class of 25 generals to graduate in June and will start a new novice class in Sept. WN7PVU works WAS in 3 1/2 months. WA7JGV is home for summer vacation after

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Load: 1200 OHMS		Load: 600 OHMS		Gain: 5000:1 RMS	
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Output Transformer Coupled		Output may be Parallel		Input Transformer Coupled	
Output Chassis Ground Coupled				Output Chassis Ground Coupled	
CENTER CHANNEL FREQ.	CHANNEL	CENTER CHANNEL FREQ.	CHANNEL	CENTER CHANNEL FREQ.	CHANNEL
1 425 HZ	11 2125 HZ	32 4700 HZ	53 7750 HZ		
2 595 HZ	12 2295 HZ	33 4850 HZ	34 8150 HZ		
3 765 HZ	13 2465 HZ	34 4900 HZ	35 8300 HZ		
4 935 HZ	14 2635 HZ	35 5050 HZ	36 8450 HZ		
5 1105 HZ	15 2805 HZ	36 5200 HZ	37 8600 HZ		
6 1275 HZ	16 2975 HZ	37 5350 HZ	38 8750 HZ		
7 1445 HZ	17 3145 HZ	38 5500 HZ	39 8900 HZ		
8 1615 HZ	18 3315 HZ	39 5650 HZ	40 9050 HZ		
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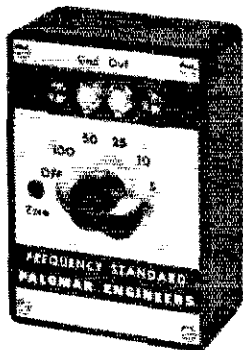
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building a linear for WA7HYG, U. of Ariz. where he is majoring in Chemical Engr. W7ZQV and W7TVF will schedule anyone needing Nev. DX or stateside. W7FBP has moved into a new QTH. K7RBM and bride honeymooned on Red Mountain near K7UGE. WA7BEU attended the Director's meeting in San Jose. Mobiling in Nev. try WPS5-3952, WCARS-7255, 146.34/146.94 fm. The SAROC Convention for 1972 will be at the Flamingo Hotel Convention Center, Jan. 6 through 9. Traffic: WA7BAV 3.

SACRAMENTO VALLEY - SCM, John F. Minke, III, W6KYA - The North Hills RC, RAMS, Sacramento ARC, GEARS and the Sacramento Army Depot RC were represented by WB6AUH, WB6KZN, WA6IQK, WN6EOO, W6DOR, WA6CXB, K6HTM and K6FO at the Pacific Division Director's meeting in San Jose. W6KYA and W6SMU represented the section. The Pacific Division Convention in July is shaping up and appears to be very promising. Sub-conventions are also being encouraged there. Those of you interested in where to write for High-Pass Filters, please send your SCM an SASE and indicate the TV manufacturer. WB6DXR has moved to St. Cloud, Minn. WB6WIS, Eagleville, has been busy on cw giving out Modoc County contacts. Looking through the Golden Empire ARS newsletter, it was noted that 42 members attended the Feb. meeting. Is there any other club in the section that can top that? W6NKR was listed as the only SV entry in the last 160-meter ARRL contest. Surely, there are more 160-meter fans in the section! The new tri-band beam was finally installed at W6KYA with the help of W6NKR. Traffic: W6NKR 23.

SAN FRANCISCO - SCM, Kenneth S. McTaggart, K6SRM - Anyone needing FCC Form 610 for renewal may obtain one from me for the asking. The Geo. S. Ladd Pioneer Radio Club is a new club in the S.F. area. Membership requires prior affiliation with the Bell System for 21 years or more. Inquiries should be directed to W6BFZ, W6KXG or W6RO. I would like to thank W6BWV for a job well done as EC in Humboldt Co. There have been some recent comments made regarding the value of this column in QST. Judging by the number of reports I receive each month, there are at least a dozen fellows in the section who find the column of value. WB6HZZ spent some time in KH6-Land in Mar. W6FAJ now has a DX-150A and an A-2515 for transistorized reception. W6WLV now is asst. mgr. for NCN. W6PZE reports he and WB6JFT are checking into the Redwood Empire Net on 3930 kHz. WA6QHP checks in mobile. W6KVO reports MARS activity and searching for ARRL members in the Mendocino Co. area. WB6KMF attended the Pacific Division's Director meeting at San Jose. WA6NQZ has joined the Navy MARS program. W6AJF continues vht experimentation. A number of S.F. section clubs participated in the Armed Forces Day at Skaggs Island Naval Communications Station in May. Traffic: (Mar.) W6WLV 161, W6KVO 150, WB6FZN 13, W6PZE 9, W6BWV 8. (Feb.) W6JAX 65.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU - The Fresno Amateur Radio Club will hold their annual Sectional Picnic July 11, 1971, at the Sunny Lake Picnic Area, 4262 West Belmont, Fresno, Calif. All are invited, pot luck, and the club will furnish refreshments. K7ZOG was a recent visitor to Fresno. WN6GOY is a new Novice licensee. WB6KSV is heard on 75-ssb. WA6ONZ gave a talk on towers at the Tulare County Radio Club. WB6PTW is in Navy MARS. WB6SPT sends code practice on 7140 kHz at 7 P.M. PST. WA6ZQG is on 2-meters. W6JUK is overhauling his 2-meter antennas. WA6HIN has some R1TY gear. WA6APF has a Regency HR-2. WB6DYS and WA6JWS are on 420 MHz. WB6LAY is on 220 MHz. W6MHD is on 2-meters tm. W6DPD has a 6-meter Squalo. W6GRV is chasing DX and is successful. WA6CPP is activating rare counties with his mobile equipment. WA6JDB is active in NCN. Traffic: WA6JDB 106, WA6CPP 2.

SANTA CLARA VALLEY - SCM, Albert F. Gactano, W6VZT - RM, WA6LFA. W6BPT has been operating W6LW, the SCARA club station, every Tue. night. K4BYD/6 has just completed the 5BWAS and 5BDXC awards. In Apr. W6DFE and his XYL spent a week in Paris and Nice. WB6GFE has a two-element phased array on 40-meters. WA6NHD is working on a better antenna system for 40- and 80-meter operation. W6RSY is now retired and expects to have more time for hamming. W6VUW made the phone DXCC Honor Roll. Congrats. WA6GYD publishes a very fine newsletter for the 220-MHz fans. It not only contains doings on the band but tips on equipment for that band. If anyone is interested in the newsletter he will mail it to you for the asking. By now most of the groups are well along with their Field Day planning and I want to wish all of you good luck. Yours truly will be on and looking for you. Traffic: W6RSY 419, WA6LFA 233, W6YBV 233, W6BVB 230, W6NW 164, W6DFE 107, W6VZT 94, K6DYX 89, WA6NHD 68, W6RFF 18, W6BPT 11, W6RZJ 10, W6DKE 8, WA6DKE 7, W6GUJ 4, K4BYD/6 1.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Cabin M. Dempsey, WA4UQC - SEC: W4EVN, PAM: W4AJT, VHF PAM: W4IUZ, RM: W4WXZ. We are happy to have the Wenoca Twin City Amateur Radio Club affiliated with ARRL. They are located in Winston Salem, N.C. WB4MLI received his Extra Class license. Congrats, W4TYE worked in the Apr. CD Parties from Fla., while on vacation, WN4QQY received her General Class license. FB Dianna, WB4MKI, Farmville, N.C., is also a General Class licensee.

Net	Freq.	Time(Z)/Days	QTC	Mgr.
CN (E&I)	3573	2345 1dy	85	K4IND WB4E1F
		0300		
NC SSB	3948	0030 Dy	15	WB4ADF

Traffic: W4EYN 178, WN4PNY 57, WB4JMG 49, K4MC 42, W4WXZ 35, K4VBG 28, K4CIA 9, WB4HGT 9, WB4OZL/4 8, K4ODX 7, WA4KWC 6, WA4UQC 6, K4ZKO 4, WB4BGL 3, WN4ODB 3, W4TYE 1.

SOUTH CAROLINA - SCM, Mrs. Elizabeth Y. Miller, WA4FFP - SEC: WA4ECJ, Asst. SEC: W4WQM, PAM: WA4GAW, RM: K4LND. 6- and 2-meter repeaters are becoming more popular in South Carolina. Information to date indicates both Greenville and Columbia with a repeater on each of those bands, reportedly with increasing activity. Charleston and Rock Hill soon will be repeating on 2, and four others are in the planning stage. Further information from anyone with knowledge of the facts will be sincerely appreciated. Details will be reported in this column. Station activity reports should include news items as well as traffic totals. We can only report what you tell us. Send them in early each month by mail or QSO. WN4QNP is a new ORS. The AREC forum has been discontinued.

Net	Freq.	Time(Z)/Days
SC SSBN	3915	0000 Dy
SCPN	3930	1700 M-S
SCPN	3930	1330/2030 Su
CN	3573	2345 1dy
CN	3573	0300 Dy

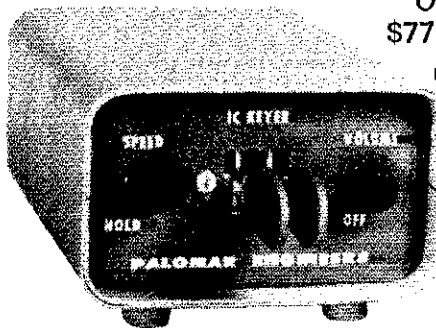
Traffic: K4LND 100, W10A/4 76, W4MTK 49, WA4FFP 33, K4ULT 19, W4WQM 17, W4NTO 10, WB4BZA 2.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4PBG, Asst. SEC: WB4CVV, RMs: WA4LUI, WB4NNO, W4SHJ, PAMs: W4OKN, WA4YXK, WA4JJE is mobile and taking off for western vacation to debug it, K4EZL QSOed 52 Novices in three evenings. Nice affair again at the LO meeting in Greensboro, thanks to host W4ACY. W4UQ is sweating out the last cards for 5BDACC. K4JYM is active in VN with 2-watter. WN4TTG was incorrectly listed for WN4TIG. WB4RNT is dreaming of a campeORL with school work. K4JM is up to 25 countries per watt with 1en 1ec. W4YZT transfers to the San Diego Naval Hospital in June. WA4PBG doing yeoman job with WA4JJE in getting 3800-4000 kHz back for net operations. WB4FDI operated from Prince Edward County during the Va. QSO party. Director W4KFC made the Board's Membership and Publications Committee in Nashville and the Nashville ARC. QG still at it with 2136 and 2467 counties respectively. K4MSG still overseas vhf experimenting. WA8FCO is a regular check-in to V5BN. WB4JEZ, WB4NSF, WB4RNT, WB4PCM and K4KA are new ORSs. WA4SVR sends list of over 50 RTTY check-ins on 2-meter RTTY! Keep the reports up and I will petition the Communications Dept. Mgr. for Virginia's larger deserved share. Traffic: (Mar.) WB4NNO 502, W4NIC 238, W4UQ 212, K4KNP 197, WB4KSG 114, WA4JIF 110, WB4DRC 101, WB4RNT 83, WB4KIT 62, K4PSS 57, W4OKN 45, WB4PCM 45, WB4KBJ 43, W4SHJ 36, K4AWV 28, WB4ORB 27, W4THV 27, WB4SIK 25, W4TE 24, WA4PBG 22, K4GR 21, WA4HOW 18, K4VY 18, W4YZT 17, WB4GMC 16, K4EZL 13, W4LOO 13, WB4FLT 12, K4KA 12, WA4WQG 12, WA4NJG 11, WB4FDT 10, WB4KCM 10, W4KFC 7, W4MK 6, WA4YRH 5, K4JM 4, K4JYM 4, K4LMB 4, W4OP 4, K4TSS 4, WB4JIZ 3, W4KX 3, W4YZC 2, W4JUJ 1. (Feb.) W4TE 158, WB4PCM 44, WB4FLT 4.

WEST VIRGINIA - SCM, Donald B. Morris, W8JM - SEC: WA8NDY, RM: WB8BBG, PAMs: WB8DUW, K8C1W, W8IYD Phone Net Mgr.: WA8LFW. I regret to report the passing of W8GXO of Crumpler, WB8CYB has a new 101 and is an A-1 Operator. QCWA held their annual spring dinner meeting in Fairmont. Director Clark, W4KFC attended the YI-OM dinner in Wheeling. W8IYD was guest speaker at the Buckeye Belles dinner meeting in Bellville, Ohio. WB8AKQ is very active in traffic nets. WB8ZA operated in the OOTC QSO party and attended the QCWA meeting. The WVN Phone Net with 589 stations reports 31 sessions, 69 messages handled. The CW Net in 46 sessions, 277 stations, handled 70 messages. The PAKA spring meeting was held in Summersville

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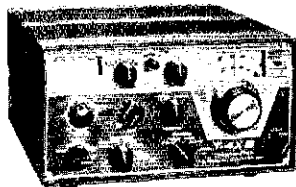
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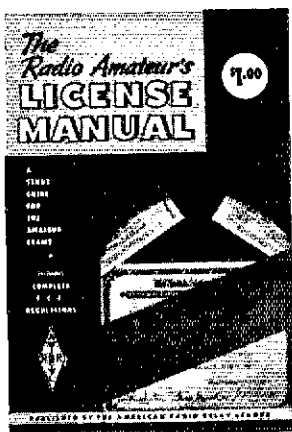
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with W8NBS and W8WPR as hosts. W8CLX is now W8NR, W8NDY will have W8WVA active from the State Convention at Jackson's Mill, including 2-meter operation. W8UHK relayed news of the L.A. earthquake to local radio station. W8LBT has a new TR-4 and Galaxy 2000. W8RGYY passed his General. Don't forget the Huntington Hamfest, June 6, Camden Park, Huntington. Traffic: W8SAKQ 173, W8RBBG 141, W8RCYB 100, W8RPOS 76, W8HZA 23, W8LFW 22, W8IWX 20, W8JM 19, W8DUV 18, W8AFC 11, W8LBF 6, W8AZNH 6, W8CKX 5, W8NDY 5, W8WCK 5, W8DDQX 3, W8CKG 3, W8BAKR 1, W8RCPU 1, W8BDMS 1, W8DXF 1, W8KBM 1, W8OLC 1, W8QOB 1, K8QYG 1, W8THX 1, W8WFL 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Clyde O. Penney, WA0HLO — SIC: WA0QOY. RM: W0LRN. PAM: W0AWG, K0IGA. W0IRW, W0CXW. Another "first" for amateur radio took place recently at the Air Force Academy in Colorado Springs. Academy Physics Instructor Major Bill Schrader, W4UDS/P and a student, CIC Ray Thomas, Jr., held two successful voice communications using a Laser beam as the carrier. First communication was "line-of-sight" over 950-ft., while the second used a mirror 120-ft. away to "bend" the beam into an adjacent classroom. The units they used were Helium-Neon Lasers, modified for voice modulation, and operated on a frequency of 475 Million Million Hz! Congratulations to Bill and Ray for their work in this area! Net traffic for Mar.: Hi-Noon QNI 1031, QTC 82, 15 phone patches, time of 9:25 min. for 31 sessions. Colo. Code QNI 207, QTC 100, time of 785 min. for 29 sessions. Eye & emergency QNI 754, time of 792 min., 233 eyes requested, 74 eyes shipped. Columbine QNI 1099, QTC 68, 233 informals, time of 1320 min. Silver State (Feb.) QNI 247, 148 informals, 23 informals, time of 1086 min. for 31 sessions. Traffic: (Mar.) W0WYX 368, W0LQ 155, WA0ZWA 106, W0LRW 102, K0JSP 62, W0LLA 61, W0SIN 53, K0EOR 45, W0MOH 32, K3TEZ/P 31, W0BAOI 30, WA0SIG 27, W0JGF 23, W0LCE 20, K0DAP 18, K0IGA 17, K0ADQ 16, W0LEK 14, W0ALK 10, W0CXW 7, WA0HLO 7, WA0LVM 5, WA0YFD 5. (Feb.) W0LGF 77, K0SPR 73, W0LLA 1.

NEW MEXICO — SCM, James R. Price, W5NUI — The New Mexico QSO Party, Mar. 27, 28, received more participation than last year. Was your county represented? The noble activity of K0QIX accounted for 11 counties. W5ALL "redecorated" the shack with Danish Walnut finish when the paint can fell and splattered. K5DAA and K5DAB acquired a new rig at the Midland, Tex. hamfest and now have a much improved signal. With Field Day very soon be sure to check with the forest service regarding any local changes, particularly spark arrestors. Stations not participating in the Road Runner Net missed the opportunity to get acquainted with our Director, W5SIN. Traffic: K5MAT 120, W5RE 80, W5NON 37, W5BLE 34, W5PBY 19, K5DAB 17, W5JNC 15, W5DMG 13, W5OHF 13, W5AXC 11, W5UNO 7, W5DAD 3, W5NTG 3, W5MIY 2.

UTAH — SCM, Carroll F. Soper, K7SOT — SIC: W7WKF. RM: W7OCX. K7CLS visited Hq. during Feb. taking the tour of the museum, lab, and memorial station which was most interesting. WA7LGV received a Section Net Certificate for his participation in the Beehive Utah Net. WA7MEL has received his Utah counties award, with 20 counties confirmed. W7WKF made 14 phone patches for servicemen and missionaries during Feb. W7HKC has been endorsed as OVS. The Beehive Utah Net reports QNI 866, QTC 49, average time 14:20 minutes. Traffic: W7EM 94, W7OCX 82, WA7HCQ 41, K7SOT 30, W7WKF 14, K7CLO 5, WA7MF 4.

WYOMING — SCM, Wayne M. Moore, W7CQL — SIC: K7NOX. New appointee: WA7DNZ as OVS. Hope to see all of you at the 1971 hamfest being held in Casper at the college. The Casper club has been working very hard on the affair and it promises to be something you won't want to miss. Why don't some of you get the dust blown off your old key and give the evening YO Net another check-in. Stan is doing a fine job but, he needs your help for outlets for traffic, etc. W0LLA, WA0WZA, WA0PEJ and WA7LWO are welcome members from our neighboring states. Hope to see you all active for Field Day this year. Had a very fruitful meeting in Mar. with other division League Officers. Keep those cards and letters coming for news for this column. Traffic: K7NOX 426, W7GMT 101, W7TZK 92, W7HNI 32, K7REL 8, W7BHH 7, W7BKI 2, K7WNE 2.

SOUTHEASTERN DIVISION

ALABAMA — SCM, James A. Brashear, WB4UK1 — SIC: W4DGH. RM: W4HFU. PAM: W4WLG. WB4OKT is the new NM of AEND. WB4KDI is the NM of ABNT and Ala. PON. We certainly



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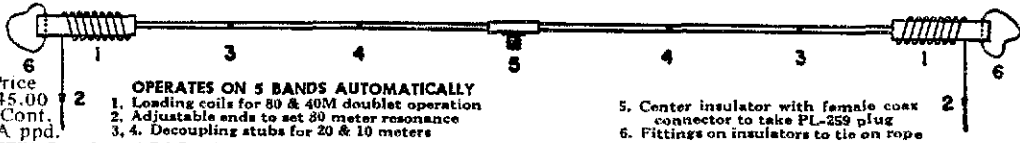
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QS 6-71

could use some liaison stations between the vhf nets and the lower frequency nets. It seems there is a constant need for liaison stations between the phone and cw nets. If you have a free evening or two each week, why not get in touch with your NM and arrange a liaison schedule. Since most of our severe weather comes from the Southern or Western part of the state, we could use many more volunteers and stations in those areas during periods of stormy weather. If you are available and have a desire to perform a public service, monitor your local or section net. If you are not sure of what to do, contact your EC, SEC or myself. Appointments: W4WLG as, PAM: WB4KSL as ORS. I am looking forward to serving as your SCM and don't hesitate to call on me if there is anything I can do for you while I am in office. If we didn't get a chance to meet at the Birminghamfest, maybe we can make it at the Mobile Hamfest (June) or at the North Ala. Hamfest in Decatur (Aug.). Traffic: WB4OJD 382, WB4OKT 221, W4HHU 79, WB4KDI 79, WB4JMH 76, WB4FKJ 68, WB4KSL 60, WB4POD 46, WN4SON 40, K4AOZ 38, WB4NLK 38, WN4SVH 21, WB4IAL 15, K4BTA 12, WB4OVR 11, WA4VFK 7.

EASTERN FLORIDA - SCM, John F. Porter, W4KGJ - Asst. SCM: Albert Hamel, K4SJH. SEC: W4LYT. Asst. SEC: W4SMH. RMs: W4ILE, K4EHY. PAMs: W4OGX 75 and W4SDR 40. On Mar. 10, David Couch, VK6WT, of Perth, Australia, member of the Wireless Institute of Australia, gave a very interesting talk on Amateur Radio, Australian style to the West Palm Beach Amateur Radio Club. Dave has been visiting ham friends in the U.S. A. The Sun Coast VHF Club held a transmitter hunt in Mar. and also a motorcade to Myaka State Park. Al and Mae left this month for home. Thanks for the help this winter with our traffic. W4RJL and W4VJH have new SB-220. W4SPX has his quad back up. New stations joining QFN this month include W4DFP, K4KO and W8WVU/4. WA9QVT/4 will depart in Apr. or May for Korea. W4UF now has 270 countries confirmed. W2J1/4 left for home this month. WA4OHO leaves us again for Ga. Tech. The Vero Beach ARC set up station W4OT at the local Home Show. Lots of traffic was handled. W4DQS gave an interesting talk to the club about the Navassa DXpedition. W4IYT reports that the Fla. OSO party was a big success. Andy also says that the Miami Springs Radio Club is in the process of reorganizing. New appointments: WB4OMG as ORS; WA9QVT as ORS; WN4RGO as OVS; WB4QKR as EC Monroe Co. and WB4LLD as EC Palm Beach Co. W3CUL/4 and W3VR/4 made BPL in Mar. WB4SMA, WB4OMG, K4FAC, WB4IAA and K4LEX

made the PSRR in Mar. Keep those cards and letters coming in. Reports are what keep us on the top. Traffic: (Mar.) W3CUL/4 2789, W3VR/4 603, WA4SLK 475, K4FAC 405. WA9QVT/4 310, WA4JH 187, WB4LAA 181, WB4SMA 178, W4IFC 167, W4PF 162, WB4OMG 159, WA4HED 104, W4DVO 85, W4YFX 71, K4IEK 62, WA4NNB 55, WB4HKP 51, W4NGR 49, WB4GHID 47, W4LEP 47, K4DAX 45, W4KRC 44, W4FHW 43, 8R1Y/W4 43, WB4MIQ 43, W4IA 41, W9UFM/4 34, W4SMK 29, WB4FIY 28, W4OGX 26, WA4HHD 22, K4BLM 20, W4YT 17, W4DFU 16, W4GDK 16, W4ILE 16, K4IWM 16, W4ZAK 16, W4IAD 14, W4KGJ 14, WA4OHO 12, W4GUJ 11, K4QG 11, W4DOS 10, K4FBF 9, W2J1/4 7, WB4FLW 5, W4LK 5, W4ZHG 5, WB4AID 3, WA4UQQ 3, (Feb.) WB4PKP 35, WA4BGW 18, W4ILE 5.

GEORGIA - SCM, A.J. Garrison, WA4WOU - Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4IXO. PAMs: K4HJQ, W4LRR.

Net	Freq.	Time(Z)Days	QNT	QTC	Mgr.
GSN	3595	2300/0200 Dy	929	246	K4BAI
GRN	3975	0000 Dy	-	-	WA4VWV
GTN	3718	2200 Dy	187	29	WB4IXO
Teen Age Fone	3985	2030 Dy	-	-	WB4HJQ
Ca. Cracker	3995	1200 Su	111	4	WA4IQU

Members of the Augusta Radio Club provided communications again this year for the movie crews filming the annual documentary movie of the 1971 Masters golf tournament at the Augusta National. About sixteen of the Augusta area hams participated. Everybody is invited to check-in with the teenage group meeting daily on 3985 at 4:30 P.M. It's a new net, and needs our support. The Atlanta Radio Club repeater is going on 146.88 in and 146.22 out. W4DQD participated in a DXpedition to the Turks and Caicos Islands Mar. 27 and 28. The group operated VP5IA and more than 2200 contacts were made. Traffic: WA4RAV 142, K4BAI 129, WB4RUA 116, WA4WOU 67, W4EEP 54, W4AMB 43, K4VHC 43, W4CZN 42, W4PIM 28, W4RNL 28, K4NM 12, WA4ZHC 12, W4UVP 8, WA4LLI 6, W4EDN 5, W4KRE 4, W4BXV 1.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKII - SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: W4NOG. VHF: W4UUF.

Net	Freq.	Time(Z)Days	Sess.	QNT	QTC
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QFN	3654	0000/0300 Dy		62	

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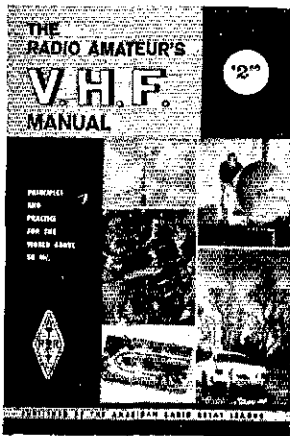
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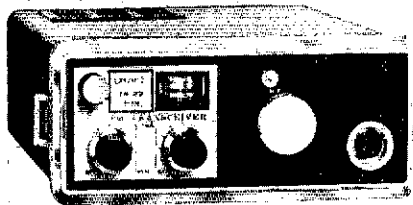
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Pensacola: W4MS is the first station in W. Fla. to get on SSTV. K0BAD/4 added a Viking Valiant for cw and is active on QFN. Rig problems and school are keeping WB4DVM ORL. The 6-Meter Net is again active with WB4JHQ as NCS, on 50.7 MHz each Sun, and Wed. nights at 1900 CS1. W4COF and W4GSY are two old-timers among the group. Others include KP4DFZ/4, WA3ODA/4, WB4PKW, K4FKV and WB4MXX. Port Walton: The first annual Boondocks Swapfest was a big success. New Novices this month are WN4s UFK, UFI, UGC and UHW. WB4NHH renewed his GRS appointment. New Playground ARC officers are W4MTD, WB4LOU, W4UWX and K4UBR. Panama City: WB4PNJ was transferred to Tallahassee. WB4IKK will take over as EC. WB9FUZ/4 is active on both ham and AI MARS traffic nets. WB5AXO/4, Tyndall AFB works mostly 40- and 15-meters. Chipley: W4IKB had only 4.8 ppm error in the last F-M-I. Tallahassee: W4MQQ designed a versatile tone generator for his fm mobile control head. Traffic: (Mar.) K4VEY 185, K0BAD/4 54, K1(Y)W4 43, W4RKL1 17, WB4NHH 7, W4IKB 6, W4FDJ 5, WB4DVM 2, W4NOG 2. (Feb.) K4CLS 21,

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - SEC: K7GPZ. PAM: W7UXZ. RM: K7NHL. Many Arizona amateurs took advantage of the opportunity to hear and talk with Director John Griggs, at a meeting either in Phoenix on Apr. 13 or in Tucson on Apr. 14. The Phoenix meeting was sponsored by ARCA and the Tucson meeting by OPRC. The Scottsdale ARC operated WA7APL/7 at Arizona's ocean in the desert, the Big Surf, the week end of Mar. 27, 28 on 21 and 28 MHz. Contacts with KH6s and stateside added to the beach and surfing. Section net certificates were awarded to K7JMM, WA7H11, W7JCK, WA7KOF, WA7NOA and W7OUE for their outstanding contributions to ALEN, OPS and GRS appointments were presented to W7FVD and WA7MAD, respectively. K7NTG has been on an extensive archaeological expedition in Mex. The Arizona ARC had an outing at Alamo Park Mar. 27, 28 with about 26 attending. The Arizona ARC also had a transmitter hunt Mar. 21 with K7PLK, K7PRS hiding and W7CEK the first to find them. Coming events include the SW Convention at Disneyland on Labor Day week end, the Ft. Luthill Hamfest in Flagstaff July 30, 31 and Aug. 1, and Field Day June 26 and 27. PSIR: W7CAF 51, K7NHL 46, K7UYW 44, WA7MAD 40. Traffic: (Mar.) K7NHL 159, K7UYW 115, WA7MAD 56, W7CAF 54, K7EMM 29, K7UOK 18, W7FVD 15, W7DOS 11, WA7JCK 10, K7ZMA 9, W6ORJ/7 8, W7LLO 7, W7OUE 6, K7RLT 3. (Feb.) W7DOS 25, K0LYN 7

LOS ANGELES - SCM, Harvey D.D. Hetland, WA6KZI - Asst. SCM: Richard I. Norton, W6DGH, Acting Sec: WA6OZY, RM: W6LYY. Section emergency/mobile frequency is 146.82 MHz repeated to 146.70 MHz tm. All section amateurs are encouraged to join ARRC and to equip themselves to operate this official section wide emergency frequency in order that they may provide their services in an effective manner in the event of another disaster such as the Feb. 9 earthquake. At present here are the following AREC nets available to section amateurs:

- Mon, 8 P.M., 146.61 in/147.33 out (fm) K6VGH, EC;
- Mon, 8 P.M., 28.9 K6VGH, EC;
- Wed, 8 P.M., 146.82 in/146.70 out (fm) WA6JXC, EC.

A special note of appreciation is in order for the Edgewood Amateur Radio Soc. and the Palisades RC for making the W6FNO and WB6ZDI repeaters available for use by the LA ARCC. A full report on the quake communications is available on request from the LA SCM, WA6KZI (adr. p. 6). K6HIV lowered his FMT accuracy to 5.3 ppm but hopes to do better the next time. W6YTB was elected vice-pres. of the Telco RC. W6L1 has a new FT-101. W6JVC is back on day shift and expects to increase his So. Cal. Net activity. K6FA received a 55-year award at a recent OJTC dinner. WB6BBO has provided a 35-year award by the American Red Cross. The Culver City ARCC group held a picnic for their membership and EC K6VGH reports that membership has increased to 24 and two new antennas went in at their LOC as well as two new base stations. W6LYY reports that an SCM directory has been prepared for the So. Cal. Net. W6YRA put their four-element quad repaired in time for the last week end of the ARRL DX Test. WA6JOC has supplemented his 6-meter activity with 2-meter fm in the cat. WB6ZTI added a new Tempo 1 to the stack. WB6JZL reports good late evening openings on 10-meters while rag chewing. WA6MBP notes good 160 activity to W9, W9, W5, and WB-lands between 0400Z to 0800Z. Don't forget the new allocations on 160-meters. Asst. SCM W6DQX was appointed to the ARRL Contest Advisory Committee. WN6MKV, WN6FEU and WN6HJ passed their General Class exams. WN6MKV completed his WAS as a Novice. PSIR was earned this month by W6MMW, W6EJT, WB6ZVC, W6LYY and W6NHL. Repeater info:

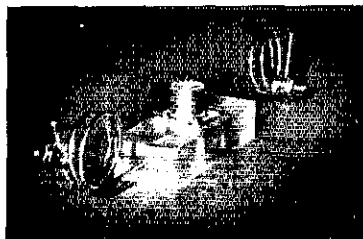
WB6ZDI fm 146.61 MHz in 147.33 MHz out,
 W6PNO fm 146.82 MHz in 146.70 MHz out,
 W6QFK 145.66 MHz fm in 147.28 MHz am in 145.30 fm out.

Traffic: (BPU/PSHR): W6AM 4/0, K6ASK 3/13, K6CDW 26/5, K6C1 14/0, W6DGH 8/9, W6FD 29/0, W6FJT 13/38, WA6FOC: 0/10, W7GAQ 8/10, WB6GGL 0/1, W6L1 15/29, W6INH 401/34, W6LVC 17/0, WB6KKG 19/17, WA6KZ1 0/1, W6LYY 93/30, W6MMW 16/30, W6MYB 5/23, W6NAA 5/3, WB6PAV 8/15, K6QPH 29/10, W6USY 32/0, WB6ZTI 24/12, WB6ZVC 152/31, WB6BBO 557/0.

ORANGE - SCM, Jerry L. VerDuft, W6MNY - Asst. SCM: Richard W. Birbeck, K6CID. SEC: WB6CQR. RMs: W6BNX, WB6AKR. Congrats to K6CID who is the proud recipient of an A-1 Operators Club certificate. W6LCP has resigned as RM and is succeeded by WB6AKR (ex-W6SQE). Anyone interested in the PAM appointment? To qualify, you must be active on one of the phone traffic nets. OPS W6WRJ is alternate Fri. night NCS on the Mission Trail Net. OO W6VOZ received a Swan-270 Cygnat for his birthday and worked VORCN on 40-meter cw. OVS WB6ASKR, WB6RAL and WB6RIU took 3rd place in the first NaCal VHF Club 6-meter transmitter hunt. WN6EAU worked 22 new states in the Novice Roundup. W6YXY now is mobile with a Swan-240. The Southern Calif. Net Training (SCNI) meets Sat and Sun. at 0030Z on 3600 kHz. This is a good place to break in on cw traffic handling before you QNI the Southern Calif. Net (SCN) at 0230Z on 3600 kHz daily as part of the National Traffic System. More stations from this section are urged to participate and provide needed traffic outlets. W6GB worked his 300th country for DXCC. New officers of the Automatics Radio Club are: W6LUD, pres.; W6LPO, vice-pres.; K6DJO, secy.; K6APY, treas. WN6CZJ and WN6CFJ were winners of the Victor Valley ARC Novice Log Contest. K6RAU is transmitting a course in learning cw Mon. through Sat. at 0630 PL1 on 3933 kHz. The SCM and SEC were guest speakers at the Apr. meeting of the Riverside ARC and the next evening attended the joint dinner meeting of Orange County and San Diego DXCC Clubs in Oceanside. Don't forget to report your Field Day activity to the SCM and may your outing be the best ever. PSHR: W6BNX 54, W6MNY 51. Traffic: W6MNY 73, WB6LYZ 59, W6WRJ 30, W6QBD 28, W6HNX 23, W6YXA 13, W6FB 10, WB67FC 9, W6GB 8, WB6QNU 5, WA6FOJ 2, WA6EWS 1, WB6ZOK 1.

SAN DIEGO - SCM, Richard E. Leffler, WA6COF - Asst. SCM; Art Smith, W6NL. SEC: W6SRS. June begins the vacation period for many amateurs. It may mean getting the mobile ready for summer use or to organize plans for Field Day June 26 and 27. Be sure to participate this year with your group if possible. Check May QST for the new FD rules before you begin, and have fun! Club activities: SOBARS continues to meet in the Red Cross Bldg. in Chula Vista. Their Apr. meeting was presented by Swan Electronics. IVARA have started their new novice class with an enrollment of 23. Both IVARA and the El Cajon Clubs have presented amateur radio on TV. The No. Shores Club had an interesting film program for Apr. The Palomar Club elected W6DEY as their new pres. The SD DX Club met in Mar. at the home of WB6OLR and in Apr. held its annual dinner meeting in Oceanside with the Orange section DX Club. W6YY showed slides taken during his trip behind the Iron Curtain. Station activities: W6LRU goes to the Sierra area for the summer. W6DEY put together a Heath counter. WN6JHK started a daily Novice net at 1600 on 3725. WN6QVH passed the General Class exam while both WB6KSS and WB6LYG went to Advanced. WB6TDA runs a new HW-22A mobile. W6NAI, W6NOZ have put together a freq. digital counter. July 15 is the deadline for pre-registration for the SW Division Convention, Sept. 4, 5, 6, Disneyland Hotel. Traffic: W6BGF 431, W6VNO 340, W6JOU 257, W6LRU 232, WB6HMY 90, W6YK1 78, W6DEY 27, WB6TOI 14, WN6CHK 11, W6MI 10, WB6LYG 8, WA6COE 5, W6INI 5, W6TAI 1.

SANTA BARBARA - SCM, Cecil D. Hinson, WA6OKN - SEC: W6JTA. RM: W6UJ. A vhf group is forming in Santa Barbara with the tentative name of Los Padres VHF Society. A repeater is under construction and those interested should contact WB6WKS/6. Again this year the Santa Barbara ARC had an entry in the Annual Recreation Dept. Hobby Show. They had a Swan-350 and Gouset Communicator III and made several contacts on 2, 10, 20, and 40-meters. Another feature was a demonstration of Slow-Scan TV by WA6OMT. The Ventura County Amateur Radio Club meets the 2nd Fri. of each month at 7:30 at the Oxnard Community Center. A new ham club is being formed at Hueneme High School and have been assigned the call WA6NKP. For additional information, call 488-4127. W6MQF has a new triband beam in the air. The Mike and Key Radio Club meets the 2nd Thur. of each month at the Security Pacific Bank in Camarill at 8:00 P.M. For additional information



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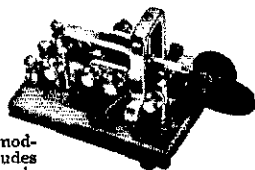


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contact K6VBX or W6IDU at the 3M Company, Camarillo, WA6DFI has moved to Oxnard. Traffic: WA6DEI 117, W6MOF 3.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.E. Gene Harrison, W5LR. Asst. SCM: Gene Pool, W5NFO. SEC: W5JSM, PAM; W5BOO, RM; W5OGZ. The Texas VHF Society presented their 450 MHz plan at the Midland Swapfest, attended by Dr. W5FYR, SCM W5LR, SEC W5JSM, Asst. Dir. W5NSO. Ken Sessions of 73 was guest speaker. W5KHE submitted his resignation from FITN, W5SAQI is a new ORS. W5BOO renewed as PAM and OBS. The Dallas 2-meter reports the Assn. submitted comments on docket 18803. New officers are W5NSO, W5SOVG, W5SWDW and W5PCX. W5EJ and W5BT reports that the Dallas QCWA chapter has fifty members with W5NT, W5JQY, W5LR and W5CPW as directors. The Garland ARC held their annual spring outing. W5EYB plus W5LR attended the Temple ARC meeting. W5UF returned to Wichita Falls. W5GWF failed to make the SH. San Antonio ARC Newsletter has an article on 3 phase power supplies (mobile). The Detroit ARC pres., W5SWT presented a resolution covering emergency procedures. The Killebrew Club, Ft. Worth shows 26 members in the General Class license course and WSQU nominated for pres. The EastTex Navy MARS meeting is at Tyler State Park Sun. May 2. K5ZCO wishes an OVS appointment. RM W5OGZ reports new applications for ORS and also submitted recommendations to FCC covering Docket 19162. W5TVS resigned as EC for Lubbock/Lyndon county areas. Volunteers for ECs in this area are needed. Contact W5JSM. Hereford, Tex. W5BZK expresses feelings regarding proposed frequency change OO W5KYD reported 14 observations in Mar. OOs are reminded to send copy CD-13 to SCM for information and copy direct to Hq. SEC NoTex reports 293 ARRL members. I want to take this means of thanking the many NoTex ARRL members for sending in reports. Form 1 cards are on the increase. If you do not have this card ask me about 'em. Traffic: W5VJW 282, W5QO 127, W5RUF 94, W5SMI 24, W5JSM 17, W5IZU 16, W5EVS 10, W5PHN 10, W5OGZ 6, W5LR 5, K5LZA 2.

OKLAHOMA — SCM, Cecil C. Cash, W5PMI - Asst. SCM: W.L. Smoky Stover, K5OOV. SEC: W5ASN. RM: W5YRO. PAMs: W5MEX, W5WHV, K5DLE and W5ZRZ. OSU Bureau: W5OMI. Repeaters: Enid, W5QYF 146.34/146.94 (1477 Hz day) - Oklahoma City, W5YH 146.34/146.94 Tulsa, W5LVT 146.34/146.94 - Ponca City, W5HZZ 146.37/146.97. W5NZM, a professor at OSU, seems to keep busy with phone patch schedules with W5HOC/KH6 for a brother who is a student at OSU. The station at OSU, W5YJ also is active. W5FW and XYL W5PHN report a great time at the Midland Hamfest. Glad to hear that W5BKN is out of the hospital and going again. Margaret and Melvin Hood K5VWO are now the Drake dealership for this area. The Muskogee Club W5LJK has a new Swan 270-B, also 6- and 2-meter equipment. The semiannual repeater meeting held in Tulsa Apr 3 was well attended with representatives from Tulsa, Oklahoma City, Enid, Wichita, Amarillo, Little Rock, Fort Smith, Lawton, Muskogee. Stillwater and from the North Texas Repeater Assn., also a visitor from Fla. W2FTR/5 of Aldus AFB is off on a three months tour of duty that will take him to N.Y., N.C., Fla and Colo. Congratulations to W5TSJ on winning the Okla. ARRL sweepstakes two years in a row. Congratulations to Extra Class W5LRS: Generals W5BHF and W5MYS; Novices W5NSDW and W5GJN. Traffic: K5IEY 1583, W5YRO 216, W5SCEZ 91, W5PKL 74, W5ZOC 44, W2FTR/5 36, W5MEX 29, W5FW 1R, W5ASN 17, K5WPP 16, W5WAX 10, K5OGX 6, K5QQA 4, W5NZM 4.

SOUTHERN TEXAS — SCM, J. Lee Drey, K5HZR - SEC: K5HAR. PAMs: W5QVA, W5KLV, RM: W5EZY. Congratulations to new appointees: W5FDA as VIII, PAM; W5BFI as OPS; W5RBB as ORS; W5FTG as OVS. W5GZX has applied for ORS. RM W5EZY's recent survey shows promise of a good Slow-speed Net. ORS W5ABO says the Novice Traffic Net on 7.175 kHz is going well. TTN mgr. K5MKV reports liaison stations assigned to each session of TTX. Trustee K5SBR reports WSAC is being moved to a new location. New officers at Texas 3&M Club are: WB4HSA/5, -4mm.; W5SVUP, pro. -4mm.; W5MWD, op. -4mm.; W5VOK, secy. -treas. Station activity reports were received from W5AC, W5BHO, K5HGB, W5LES, W5LPO, K5SBR and K5ISR. Congratulations to K5ROZ and W5RBR on making PSIR again. PAM W5KLV is back on the job after being hospitalized. W5GYW is active handling traffic while recuperating from a fall off the roof. New repeater in San Antonio with input on 5.288 MHz and output on 5.235 MHz. SEC K5HXR reports 17 Houston area amateurs involved in search for a downed aircraft. Houston and Pasadena 2-meter repeaters were used extensively. EC W5KR has acquired two 9-watt vhf-fm transceivers and is now on 146.94 MHz. The

Austin Repeater Organization provided communications for the March of Dimes march using their repeater.

Net	AHz	Secs.	QNI	QTC
FEK*	3770	62	409	197
YIN*	3961	31	1642	161
7290 Tfc	7290	46	2145	793

*NTS, Traffic: (Mar.) WSEZY 124, KSGDH 114, KSHZR 113, K5ROZ 104, WASMXY 90, WB4AIW/5 53, W5ABQ 52, WSRBB 50, WASFIN 35, W51FW 31, W5BGE 28, W5VW 26, K5RVP 20, WASAUZ 6, K5HUA 6, W5BHO 5, W5AIR 2, W5ACBT 2, W5KLV 2, (Feb.) W5SGZX 70, W5AC 2.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - SEC: VE6XC. VE6PM and the NARC VHFers have been quite busy with many public service schemes. We need a volunteer to relieve hospitalized VE6AFQ as EC for the southern area, July is a big month in Alberta. On July 5 the Powder Puff Derby originates in Calgary. EC VE6AZU, VE6AWW, VE6APF and VE6ATH will handle the race communications for up to 150 aircraft. VE6AZU is looking for more volunteers. This year's Calgary Exhibition and Stampede, July 7 to 18, will salute sport and recreation. The ARRL film "Hans Wide World" will be run several times a day in the major exhibit building. The CARA station, VE6NQ will be operated throughout the Stampede. A special QSL will be available and 100% QSL observed. On request from philatelists the stamp will be canceled with the special Stampede cachette. VE6NQ will operate 80- to 10-meters as band conditions dictate, phone and cw will be used, frequencies will be chosen to give all amateurs a chance. Contact will count as 2 points toward the 10 point Stampede City Certificate. July 17 and 18 is the big Hamfest at Waterton. Contact VE6NB for details. Traffic: VE6FK 14, VE6XC 10, VE6HD 4, VE6QY 4, VE6TL 4, VE6YW 3.

BRITISH COLUMBIA - SCM, H.E. Savage, VE7FB VE7AC and VE7AJM are improving. The Vancouver Island Picnic is June 6 at the Mountain View Resort, Shawman Lake. The Chilliwack ARC invited the Bellingham, Vancouver and Richmond ARCs for a dinner party which was very FB and enjoyed by all. OD VE7GG is doing fine on his frequency checking with ARRL tests. VE6LZ and VE7LL RTTY QSO solid at 75 wpm. VE7ATD is real busy now that she has her class "A." The 2-meter gang had an honest bunny hunt on 147.33; for several days a carrier had been left on and they found it miles away. VE7KCS mobile holiday in the Pentiction ARC's paper is worth reading. The Pee Gee news from the Prince George ARC is FB. The Certificate Kamloops Sportsman, awarded by the Kamloops ARC through VE7AZC, is worth working for. VE7SF is QSL (Mar.) for SH3MV. Traffic: (Mar.) WA7NXX/V: 136, VE7LL 49, VE7BL 02, VE7SH 15, VE7QQ 14, (Feb.) VE7LI 63, VE7AC 36, VE6GG 3.

MANITOBA - SCM, Keith C. Witney, VE4EI - VE4DI. Lost his feedline in a wind storm and hopefully it is fixed by now. VE4SI is building a linear. VE4FQ reports a light month. VE4QJ reports a net roster of 85. With the summer months ahead activity will slow down and I hope everybody will enjoy pleasant holidays. By the time this reaches you my resignation will be imminent as with the end of my studies drawing near my future plans will make the job impossible. So it is time to start nominating a successor. Traffic: VE4FQ 32, VE4KE 16, VE4RO 15, VE4IA 8, VE4DI 7, VE4QJ 6, VE4FF 5, VE4IR 5, VE4RW 4, VE4WT 4, VE4XN 4, VE4CR 3, VE4QK 3, VE4YQ 3, VE4JE 2, VE4LA 2, VE4DO 1.

ONTARIO - SCM, Holland H. Shepherd, VF3DV - Daylight Saving Time is back with us again and for the benefit of the traffic managers here is a list of Ont. Traffic Nets.

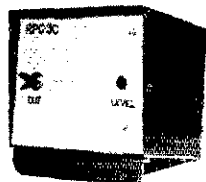
Net	Freq.	FDT	GMT	Mgr
CIN	3790	1830	2230	VE3EQM
GRN	3645	1830	2230	VE3DPO
Laurentian	3755	1845	2245	VE3BI 7
OPN	3770	1900	2300	VE3CRW
QON	3735	1900	2300	VE3FRW
NWON	3750	1915	2315	VE3UOH
FCN	7040	1945	2345	VE3GI

VE3CQS is a new EC for Waterloo County. VE3DSS is a welcome addition to the ranks of QVS. VE2BG, still very active, recently received a 50-year award from OCWA. VE3ERU is moving back to Windsor from Wheatley, Ottawa is the first Canadian City to start the new Postal Code. Unlike the U.S. Zip Code they look more like exotic DX calls. Your SCM has put out a proposal to all Ont. amateurs through ARCs for a cw net training net, to operate for a three-month period under the direction of a highly qualified traffic manager and using the Radio Amateur's Operating Manual as a guide. Intent is to try and interest new amateurs who seem to be ending up

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Quoted from QST's advertising rate card.

Amateurs and Electronic Engineers: Practically everything you need can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff

on 2-meter fm and also to provide the know-how for the amateur that now spends most of his time on sb. The KWARC Bulletin is a real professional job under editor VE3CBU. It is very gratifying to notice the Canadian response to the FCC proposal to enlarge the U.S. phone band segments. The Ottawa Valley Mobile Radio Club, Inc. provided the major part of communications for the March for Millions that took place in Ottawa, May 1, 1971. Traffic: VE3GL 153, VE3FRU 133, VE3DPO 118, VE3GFN 79, VE3DV 72, VE3PXT 48, VE3NO 34, VE3DU 16, VE3FHL 15, VE3CRW 13, VE3FWD 12, VE3BUR 10, VE3AUF 4, VE3DH 2.

QUEBEC SCM, Joe Unsworth, VE2ALE - I regret to hear that the cw net RTQ is off the air for the time being. RX a nice report from VE2CMR, VE2s DM, ZA, ALE had to crawl over snow to reach VE2RM at start of the month. VE2BU changed cars and is off 2-meter mobile for a while. Some members of the VE2RM are building a frequency clock timer as a club project. VE2ALP replaces VE2AGW as RO for Dorion civil protection. Air Canada's 747 was again aeronautical mobile during the month. C'est le mois du Congres "71" de RAQI: rendens nous tous nombreux a Trois-Rivieres, les 25, 26 et 27 juin. Bienvenue a la nouvelle YL ham Cecilia, VE2BVU. Le club VE2CFL est tres actif grace a VE2s DEU, DMT, DKW, DAX, DMV, CM, VE2DMM s'est procure un SB-112. Les HAM du Saguenay experimentent une repetitrice de 1 watt. Le club VE2CTM a organise une partie de sucre. Les HAM de plouville sont tres actifs sur VE2OM, VE2BU and VE2AJD were endorsed as ECs in Feb. '71. VE2AJD is back traffic-handling after an accident to the antenna complex. VE2DCB is a leader on the Quebec YL Net. VE2FC will be off 2-meters for a few weeks. VE2OK was in Fla. for a few weeks. It seems that all repeaters worked overtime during the severe snow storm with no failures reported. Practice safety first during your vacation this summer and return in one piece. PSHR: VE2APT 32 Traffic: (Mar.) VE2DR 53, VE2AP 22, VE2DHY 19, VE2EC 16, VE2ALE 12, VE1APT 12, VE2BVY 7. (Feb.) VE2DR 124.

QST

IARU

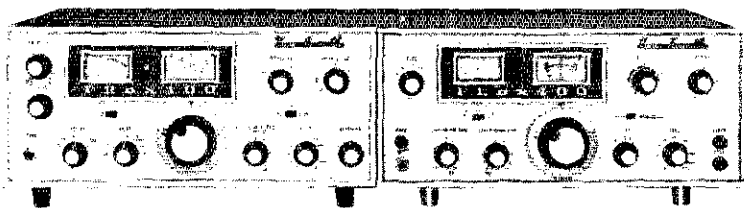
(Continued from page 89)

- Samoa (American):* Utulei High School Amateur Radio Club, 7, Director, Pago Pago, Tutuila, 96920
- Samoa (Western):* Director of Post Office and Radio, Post Office, Apia
- Scotland:* via Great Britain
- Senegal:* Ch. Tenot, 6W8HF, 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:* URK, 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-122 07 Enskede 7
- Switzerland:* USKA, Sonnenrain 188, 6233 Buero/H.U.
- Syria:* TIR, P.O. Box 35, Damascus
- Tanzania:* RSEA, P.O. Box 1387, Dar es Salaam
- Thailand:* STAR, P.O. Box 2008, GPO, Bangkok
- 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:* HVICN, Domenico Petti, Radio Station, Vatican City
- Venezuela:* RCV, P.O. Box 2285, Caracas
- Virgin Islands:* Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix. V.I. 00820
- Wake Island:* Jack A. Chalk, KW6EJ, P.O. Box 7, Wake Island 96930
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The FRdx 400 sells for \$359.95.

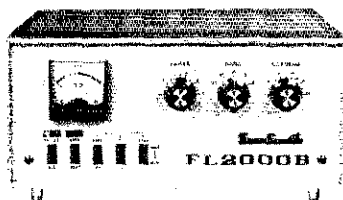
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We rate the FLdx 400 very conservatively. That rating guarantees you 240 W PEP input SSB, 120 W CW and 75 W AM. The FSK option will go all day at a continuous 75 W. And you get full frequency coverage on all amateur bands—80 meters through 10

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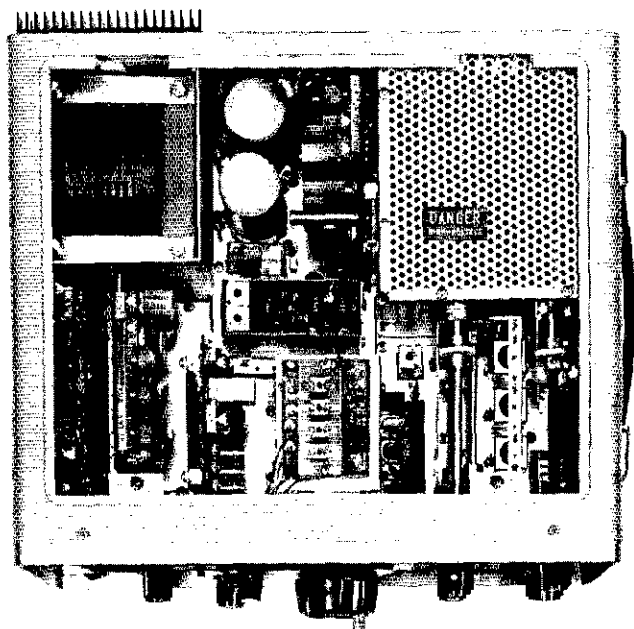
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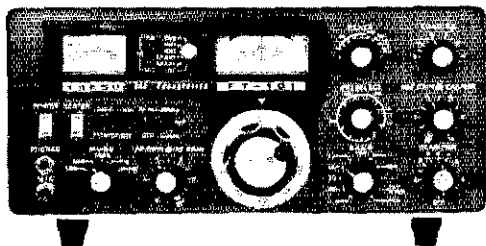
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DRAKE MN.....	77	53112.....	189	SWAN 500.....	299
DRAKE MK7000.....	167	52100.....	189	SWAN 500.....	259
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Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc., Box 394, Mamaronck, NY 10543.

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HAM-A-RAMA Wood County Amateur Radio Club July 18, 1971 10:00 A.M. at Wood County Fairgrounds Bowling Green, OH.

HAMFEST: Indiana Radio Club Council's annual picnic Sunday, July 11th, LaPorte County Fairgrounds, LaPorte, Indiana. Large Flea Market with reserved locations available for large exhibitors and vendors on the Midway and Main Building. Mobile FM Clinic. Tech Sessions. For flyer, write: Dave Osborn, K9BVF, P.O. Box 272, LaPorte, IN 46350.

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HAMFESTERS 37th Hamfest and Picnic Sunday, August 8, 1971 Santa Fe Park, 31st and Wolf Road, Bloom Springs, Illinois, southwest of Chicago. Exhibits for OMs and SWLs. Famous Strappers Row. Information and tickets, Joseph W. Paradya, WA9WU, 5701 S. California Ave., Chicago, IL 60629

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QSLs 300 for \$4.50, samples 10¢, W9SKR, George Vesely, Rte. #1, 100 Wilson Rd., Ingleside, Ill. 60041.

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QSLs "Browne" W3CJH, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

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CREATE a QSL with a "Sampler Instruction Kit" 25c. Samco, manufacturer of (Extra-Class) and regular printed QSLs. Write Samco, Box 203, Wyanankskill, NY 12198

QSL Print. Samples. 25c. P.O. Box 33, Blaisdell, Melrose, MA 02177

WANTED - All types of tubes. Top prices paid for Varian and Eimac. Jaro Electronics Corp., 150 Chambers St., New York, NY 10007.

WE BUY all types of tubes for cash, including Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, NY 11551

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY 10012.

WIRELESS sets, parts, catalogs, bought, traded, Lavery, 118 N. Wycombe, Lansdowne PA 19050.

NOVICE crystals: 40-15M \$1.38. 80M \$2.08. Free flyer. Nat Stinnette Electronics, Umatilla FL 32784.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs, and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

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. Electronic Distributors, Inc. 1960 Peck St, Muskegon MI 49441. Tel: 616-726-3198

HAM ticket - Amateur radio license course for Novice, General, Advanced, Extra Class. Write for information. Clayton Radio Co. 220 Mira Mar Av. Long Beach CA 90803.

PROP Pitch Kotor, 10,000:1, unmodified, excellent \$45. Safety belts climbing box, conversion \$15. Counter 100 kc Benlye \$30. Gertsch FM3/PS3 0019 20-1000 Mc \$350. 1W Handtalkies on 146.94 \$55. FOB Link, 1081 Aron St. Cocoa FL 32922

WANT 238 early wireless magazines for WAAA historical library. Send for list, Wayne Nelson, Concord NC 28025.

QST's before 1922 and amateur teletype publications wanted. Orville Magoon, 1941 Oakdale Dr., Menlo Park, CA 94025

RECEIVING & Industrial Tubes, Transistors, all brands -- Biggest discounts, Technicians, Hobbyists, Experimenters -- Request Free Giant Catalog and save! Zalytron 469 Jericho Turnpike, Mineola, NY 11501

SPIDERS for homeless quads, Helvar welded aluminum. AP's Antennas, 1339 So. Washington St., Kennewick, WSN 99336

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. Tel: 210-354-3141

TOROIDS & teletype. Lowest prices anywhere. 40/\$10 postpaid, 32KSR printer, reconditioned \$225, Model 14, 15, 19, 28, 32, 33! Many more bargains. List, stamp please. Van W2LTL 3027 Passaic, Stirling NJ 07980

CAMPING in Europe this summer? Write now to DL4VA/WA4WME to plan eyeball QSO. Vandegrift, MATCOM-DSO, APO NY 06052

CAPACITORS -- brand new 275ufd electrolytics at 50¢/wvdc. Ten for \$19.50. Mehafey, K4HP, P. O. Box 642, Marietta, GA 30060

TELETYPEWRITER machines, parts, bought-sold. S.A.S.E. list Tynetronics, Box 8473, 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)

1000 PIV @ 2 amp, new epoxy diodes includes die bypass & bridge resistors. 10 for \$4.50. Diodes only 10 for \$3.50. New 450 MF @ 500 volt Electrolytic caps. \$1.60 ea. Postpaid USA. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga NY 14225

WE'RE trying to complete our collection of callbooks at Ha. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111

WANTED -- For personal collection. The Radio Amateur's License Manual, Edition 12. ARRL "Map of Member Stations," 1914. WFLUP, 18 Mohawk Dr., Unionville CT 06085

DIODES -- 1000 PIV 1.5 A Epoxy 24 cents each ppd. Toroids 88MHY or 44 MHY 5 for \$1.50 ppd. Weinschenker, Box 353, Irwin PA 15642

EDITING a club paper? Need public relations help? You should belong to Amateur Radio News Service. For info contact Al Mavey, W4ID, Sec'y., 461 Third Ave., Eau Gallie FL 32927

SAVE on all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Rd., Swampscott, MA 01907. Tel: 617-898-9700/617-598-2530

VERY in-ter-est-ing! Next 6 issues \$1. "The Ham Trader," Sycamore, IL 60178

SIGNAL One -- including deluxe cw filter -- latest model -- warranty -- will ship in original carton -- best offer. Harry Kurhaus, RD1, Box 103, Malvern PA 19355. Tel: 215-827-7374

\$500 cash for good R390 receiver. R. E. Brown, W9EXR, 25352 Martindale Rd., North Liberty, IN 46554

SB-300 and SB-400 w/CW filter: \$500, SB-630 console: \$65, built by Heath Tech. Beautiful, W2ERV, 14 Bernice Dr., Freehold, NJ

SB 102 with HP 23 supply, Turner 254C mike, Eico keyer. Excellent condition, \$425. K7LQI, Frank McJannet, 11557 Evanston N. Seattle, WA 98133

DRAKE 2NT transmitter, used five months, absolutely mint condition. With cables, manual, \$110. Shipped job, Larry Wilson, W0NMD/7, 1445 Lynn Ave., Billings, MT 59102

COLLINS recvr 75-A-2; xmt 32-V-2 excellent; supply. Like new. Highest offer. S. Stoiler, W9TMM, 4535 Pratt, Lincolnwood, IL 60466

CLUBS: Send membership list for QSLs. World QSL Bureau, 8200 Panama Ave., Richmond, CA 94804

AMPLIFIER 4-1000A, TR-44A rotor, antenna parts, 371 Jackson Ave., W. Hempstead, NY 11552. Tel: 516-481-2021

COMPLETE station for sale, EG, TR4, NCL2000, kw matchbox, HP 102, and other presently priced goodies. KASE for list. AZYHR/6, 883 Dartsire, Sandyvale, CA

WANTED: hvy duty tower 50' up. Crank up &/or tilt or rotating. S. Talago, Rt. 3, Box 130A, Bridgeport, WV 26330

CONTESTERS -- Ohio, Indiana, Kentucky. Openings in MYARCS. For info, contact W8JLO

YOU all come to International Independent County Hunters Convention in Kansas City, July 2,3,4, 1971. SASE to WA0SHE for information.

WILL sell Swan 350 (late) with vox and cad. With or without ac supply. Make offer. Ira Deutsch, 1575 Tremont St., Boston, MA 02120. Tel: 617-277-0729

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Racha, Orlando, FL 32806

LABORATORY test equipment at steal prices. Large SASE for listing. Electroncraft, P.O. Box 1113, Binghamton, NY 13902

WANTED: Hallicrafters S-30 Radio Compass. Howard Hoagland, 639 North Sierra Bonita, Los Angeles, CA 90036

CINCY Stag Hamfest; Attention hams: mark this date, Sunday, Sept. 26, for the 1971 Cincinnati 34th Annual Stag Hamfest. The one big Stag Amateur Radio event of the '71 year. Meet all of your friends here. More details later. W8DSR, Hamfest Secretary

R-390/URR Collins Digital read-out receiver. 0.5 - 32 MHz. Good working condx. \$475. W8CV, Longpoint, Pontiac, MI 48053. Tel: 313-458-1021

DUMMY loads, 1 kw. \$9.95; phone patch, \$8.95. Wired, \$4.00. Ham-Kits, Box 175, Cranford, NJ 07016

SELL: 2 meter fm, IC-2F-STD, \$180. W4YNP, 612 Archave Ct., Norfolk, VA 23502

PRIVATE collector wants old wireless gear. Buy, trade, Dick Sepp, 1945 E. Orangegrove Blvd., Pasadena, CA 91104

QST magazines April 1917 through August 1917 - November 1919 - May 1920 through September 1963 less 3 issues missing. Best offer and pay shipping takes all. Howard Lerch, 495 Pine St., Lockport, NY 14094

DRAKE TR-4 SN 23481, RV 4 VFO and spkr, ac and dc supplies. FE-1 feed line, adapter with 3999kc xtal. Excellent condition. \$595. W1WNY, One Dew Ln., Danen, CT 06820. Tel: 203-655-9997

VALIANT ssb adapter \$150. Complete. Valiant xmt included \$250 package. Ship collect. WA2KWH

VALIANT 1, Valiant 11 factory wired wanted. Must be perfect shape and clean. W8MJJ

SELL: HW-12 transceiver, good condx, with mike, manual, mobile mount, Hustler mast and Eico 752 dc supply (not working) \$75. Local interest preferred. Howard R. Miller, K3LWR, Philadelphia, PA 19140. Tel: 215-CUR-9043

HEATH HW-16 transceiver wanted. Larry Dersch, 1 Otley Ct., Manchester, MO 63011, or Tel: 314-227-2725

ARRL Handbooks wanted. Condition, year. W6CZP, 850 Groff, Pomona CA 91768

HARDBOUND QST's 1961-1970. K2GBH 12401

WANTED: GR-1211, HP-803A. Trade or sell Dumont 304H oscilloscope w/robot modification for "Fast Scan" SSTV \$100; B&K 1076 Television Analyst Rving spot scanner \$195; Heath HW-14 150M ssb transceiver \$80; Hallicrafters HT-33 linear 100W; pair 7034 (250W) like 3CX200B, 7289 (3CX100A) 5, 6907 each \$5; swap wh/whf components list S.A.S.E. W4APJ, Box 4095, Arlington, VA 22204

FOR SALE or trade for quality ssb transceiver, etc., Narco Saphire 1016--a aircraft type transceiver 118 to 135.95 MHz. 36 channel transmitter, 560 channel receiver, 12 or 24 volts input. Will operate Simplex, Cross-Channel, or Off-set. W7DVK, 1260 West Broadway, Missoula, MT 59801

FOR SALE: Collins 30S-1 and 82S-1, used very little. Hallicrafters SX-92A, J. Kelley, 1100 17th St., N.W., Washington, D.C. 20038. Tel: 202-466-4793

VIKING "Navigator" mint condition \$85 postpaid. WB2AMJ

MASS. Sell complete working Novice station including antenna. No ship. Will deliver 100 miles. \$300, spencer, 27 Crocker St., Hyannis 02601

FOR SALE: Varitronics IC-2F w/all accessories and manual \$210. W. R. Phillipson, 1150 Polk, Sunnyvale, CA 94086. Phone: 408-732-1173

SAN DIEGO hamst elect an outstanding amateur. Paul Thompson, W6SRS, Section Communications Manager. W6INI

COLLINS 30 S-1 with 2500 watt Bird dummy load \$950. Pick up deal only. 609-494-2201 weekends, or write Box 45, Harvey Cedars, NJ 08040. K2HY

CRYSTALS aimed: Novice FT-243, 80M \$1.75, 40M - 15M \$1.50, Five or more Novice, 80M \$1.49, 40M - 15M \$1.29 each. Mix OK. Postage/crystal. Airmail 12c, 1st-cl 8c. General purpose FT-243 crystals, any frequency, 0.1% 3500 - 8600 kilocycles, \$1.90, (minimum five same or mixed \$1.75), (crystalize your net, ten same frequency \$1.45). .005% add 50c crystal. MARS a specialty. Free general frequency order-bulletin. Crystals since 1933. Bob Woods, W0LPS, C-W Crystals, Marshfield, MA 06706

SELLING receivers: SX116 w/manual \$225; rack model SP600JX w/manual, \$175; Navy RB5-1 2-20 mcs. w/p.s. \$25. Also, used Ham-M rotator, \$25; Collins 75A5 speaker, \$7. Fob. S. Savage, 101 N. Ladera Vista, Fullerton CA 92631

STAINLESS, other, fine threaded, washer, hardware. Guying accessories. Insulators. Base caps. 20c! W8BLR, 29716 Briarbank, Southfield, Mich. 48076

FOR SALE: National NC-300 80-10 M recvr with xtal calibrator, Heath DX-60B xmt. Dow key coaxial relay. Fine Novice station. Very good condition. All manuals. Simon, 8610 Second Ave., North Bergen, NJ 07047

SALE: Polyquad kit never used 13 foot fiberglass spreaders \$50. W2DMP, 45 Eastbrook Ln., Willingboro, NJ 08046

I AM looking for a capable part-time person to manage or purchase the Rignates Company, which has been successfully manufacturing a product line of Amateur equipment modifications for over one year. Send for full information to Rignates, Box 84, Kings Park, NY 11754

FM 2 meter mobiles, G.E., TPL 30 watt (trunk), late models, excellent, without accessories, \$130. Some accessories, \$10 each. Want TPL accessories. Will buy late Motorola G.E. systems, mobiles, portable, etc. under \$50. Want H-5, 818A, 608D, 8708, 5245, Bonton 202B, E, or H. Ampex VR-6000 video recorder, extras, excellent. \$650. K4GYO, 430 Island Beach Blvd., Merritt Island, FL 32952

NEED quality built Heathkit metal locator. Also schematic for Laboratory for Electronics model 401 scope. Richard Riddel, 2412 South Bowen Rd., Arlington, TX 76016

DRAKE 2B, 2BQ Q-multiplier, calibrator, extra crystals. Excellent condition \$185. Gonset GSB-100 transmitter 100W. sb/cw/am. \$90. Both units \$250. Will ship. K4EQA - 808 Palmisto Dr., Cary, NC 27511

HALLICRAFTERS SR-46, 6 meter transceiver; HA-26 2 & 6 meter V.F.O.; Turner 254C desk mike. All like new \$160. R. D. Little, 161 Kapok Park, Clearwater, FL 33615

MUST SELL HQ-145-XC with crystal calibrator and matching speaker. Excellent condition. \$150. R31UN, John Hychko, 98 Newport Ave., Nanticoke, PA 18634

SELL: Mint CE 200-V with 160 meters \$400; Drake 6 & 2 mtr converter, calib. & console \$100; Johnson Courier \$119; TA-33 Sr \$70; Collins PM-2 \$90; 516F2 \$110; Wagner Xrms 3600-0-3600 1/1 amp \$25, 1/7 amp \$40 with dual 110/220 nm. All fob. W0AII, Paul Bittner, 314 4th st. s., Virginia, MN 55792

SELL Hallcrafters SX117 or buy Hallcrafters HT44 & AC. Edgar Bernal, 10827 Vandervord, Houston, TX 77036. Tel: 713-498-1964

WORLD-Radio has guaranteed used gear with terms and trial Transceivers: HW-106 - \$199.95; 250(GM) - \$199.95; TR-4 - \$399.95; GT-550 - \$399.95; 6N2 - \$79.95; Ranger - \$99.95; 32S3 - \$499.95; 8X100 - \$129.95; HQ100 - \$119.95; 8X130 - \$119.95; R-530 - accessories \$649.95; HQ170A - \$199.95; 2R - \$179.95; R4 - \$299.95; R4R - \$329.95. Free "Blue-Book" for more. 3415 West Broadway, Council Bluffs, IA 51501

HAM Radio Counselor, male, for co-ed camp in the Berkshires, Massachusetts. Able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Avenue, New York, NY 10024

SELL: HT-37 transmitter, excellent, manual, \$165 or best cash offer. Collins 75S-1, excellent, manual \$250. Bendix Dual Channel Hy Band Handie Talkies with diagram and hand set, \$25. John Fearon, 3384 Peachtree Rd., N.E., Suite 705, Atlanta, GA 30326. Home Phone: 247-1261, W4WKE

FOR SALE: HT-39-F, w/soild state plug in rectifiers, fan, exc. cond. \$260. W2CSE, 96 Hague St., Jersey City, NJ 07307

HALLICRAFTERS SX140 receiver 80-6 meters, crystal calibrator, manual \$40. Dan Wert, 302 Monterey Dr., Westminster, MD 21157

SUPER high powered linear - pair 41000A, 10 kW. Components ultra heavy duty, 7 foot tall cabinet. Extremely heavy. Includes oscilloscope. Write for details. \$1 for color photos. Would like \$900 in which case would accept trades, help with transportation. Or would take \$700 net. Money back guarantee. Rudge Swain, 1009 Monte Sano Blvd., Huntsville, AL 35801

TOWER: Rohn, three 10 ft. sections plus top section and shelf \$60 FOB. Stan, 914-SC3-6050, 15 Myrtle Dale Rd., Scarsdale, NY 10583

DRAKE TR-3, DC-3, AC-3, and MS-3 \$425. "Hustler" antenna tilter base section w/80-10 meter resonators \$45. Temalab 10 M. beam 3 element, gamma match, plytubular constr. w/cast alum. fittings \$35. Astatic microphone D-104 w/push talk base \$25. B & W 1000 W. low pass filter model No. 425 \$12. John W. Karr, W9FYU, 1119 B Greenleaf Ave., Wilmette, IL 60091

SWAP good sbx exciter for Collins 32V, or will buy if cheap enough. trouble included. Gene, W7DL, 6633 East Palo Verde Ln., Scottsdale, AZ 85253

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer, 1025 Harrison St., Oakland CA 94607

HALLICRAFTERS SX140 receiver, good condition. Best offer over \$35. 1172 Cora Dr., Flint, MI 48504

SELL: Hallcrafters SX-100 rev, good condition \$100, W8JKB, 2369 Woodford St., Toledo, OH 43605

SELL: Drake TR3 with ac power supply and freq. meter BC221. WAING, RFD 1, Saundertown, RI 02874

SELL: Heath HR10B new assembled, not aligned, 100KC oscillator. Offer. Hannah, Junction, TX 76849

HEATH SB101 transceiver, SB600 spkr, p/s \$350, DX60A, HG10 \$75. NYC area. Call Len, W2BP20, 212-336-1911

SELL: Hamerlund HQ-170AC, manual, ask \$200; T.R. switch, matches HQ-170AC, ask \$65; Viking Vallant with solid state P.S., manual, ask \$100; P.O.B. Greg Widin, W2ZSSH, 108 Valley Dr., Watchung, NJ 07060

MUST sell KWS-1, 75A-4, Heath keyer. Shure mike, Nutronics 4BT vertical with Radials. All in excellent condition, \$725 or best offer. Steve Kanne, W6EHW, 10203 Santa Monica Blvd., Los Angeles 90067. Phone: 213-277-6620

SELL: Lafayette RCVRs HA-225 \$60, HA-226 \$20. Heath DX-60P \$35 swr meter \$10. Ameco PGI-P rampup \$20. Johnson TR switch \$20. All for \$170. WA3LFU, Jim Price, Millington, MD 21651

WANTED: modulation transformer for DX100. Must be Heath manufactured. W1KGU, Pope, 294 Sumner St., Brockton, MA 02402

WIDE band oscilloscopes, USM-32, OS-29, Paco S-55 \$48 each. RB series receivers with p/s \$45 each. Also spare parts. All sizes Vanacs. H/P AC-4A DCU plug-ins \$5. H/P 477B \$35. TS-186F/U \$50, FR-4V \$48. Trammell, 1507 White Oak Ct., Martinsville, VA 24112

SBE 34 with xfl calibrator, mobile mount, extra tubes, mike, orig. owner, 10 hrs. use. All for \$240. John Olson, W7YYW, 1173 Adobe Dr., Great Falls, MT 59401

AMATEUR paradise vacation, Livingston Lodge, Masconic Lake, N.H., cosy cabin for two weeks, \$55. Swimming, fishing boats, sports, ham radio, hot showers, fireplaces, high housekeeping, children half, camp sites, literature. A. Q. Livingston, W2QPN

MAN UALIN: \$8.50 each: R-390/URR, URM-25D CG-591A/URR. Hundreds more, S. Consado, 4905 Rounne Dr. Washington, DC 20021

NOVICE equipment Globe HG-303 transmitter, Hallcrafters S-107, receiver with preselector. Everything \$35. WB2QLR, 7f Kemmit Pl., Brooklyn, NY 11218. Tel: 438-0840

FOR SALE: Hallcrafters communication receiver model S-12b with Hallcrafters model R-50 speaker. Total price \$100. Write to Rob Michaels, 91 Brookside Dr., Greenwich, CT 06830. Tel: 203-861-5325

WANTED: mint Collins 32S3, with A.C. power supply. Prete pickup, radius 100 miles, W1GVE, Stamford, CT 06902

ANTIQUÉ radios, parts, etc. for sale or trade. Write for list. Want 1923 or earlier sets. Correspondence from collector invited. Carl Osborn, W6RXP, 13816 Calvert St., Van Nuys, CA 91401

SWAN 350C unit, 117-XC ac supply, 14C dc converter, \$350. Steven Baumgartner, W4WJK, 2750 Tanglewood Trail, East Point, GA 30344

DX QSL manager: I will handle your QSL cards for the postage charge out! See for full details. WB2MXL, 635 N. Manetta Dr., Ft. Pleasant, NJ U.S.A. 08742

MICROMATCH model 261 coupler wanted. Must be in good electrical condition. K4RRG, 3120 Shannon Dr., Winston-Salem, NC 27106

HEATH, HD10 keyer, excellent condition \$25. Craig, WB8GRH, 3629 Twinview Dr., Cincinnati, OH 45249

SELL: Collins 32S-3, 75S-3, 516F-2 ac supply \$950, Drake R4B, T4XR, AC-4 power supply \$850, Johnson 6N2 xmr, Elec mod. 730 modulator, Johnson 6N2VFD, Heath UT-1 power supply \$100, Glegg Zeus mod. 341, mod. 332 power supply, \$75. Henry Radio 2K final amps No. 259, \$375. H. H. Heard, K5PLI, 600 Main St., Arkadelphia, AR 71925

WANT: Yaesu FTdx560. Trade mint GT-550, SC-550, F3, VOX, CAL-25, AC-400. Cant get on MARS. Pay C.O.D. This end for best deal. WA5OUJ, FL Supply, OK 73841

CLEGG 99'er good operating condition. \$75. WA2RIUW, Jerry Nelson, RD5 Box 159, Woodland Dr., Kingston, NY 12401. Tel: 338-9312

FOR SALE: Vibroplex DeLuxe, chrome base, mint. \$20. W8ZJWH

HEATH HW-16 cw transceiver, super perfect condition, factory aligned and tuned, never operated. Crystals, j-34 key, operating manual. \$80. Must sell. Ron Mendel, W9NCGV, 9343 Kildoum, Skokie, IL 60076

WANTED: R390, R390A, R389, 51J4, 5181, Racal, Nemo-Marke marconi receivers. SWRC, P.O. Box 10048, Kansas City, MO 64111

COLLEGE forces sale. Swan 500C (mint), 117XC supply, digital keyer, EV634 mike. All \$495. Herb Graeber, WA5AKW, 1301 Washington, Brenham, TX 77833. Tel: 713-836-6695

REORDER: Akai X180USD (Roberts 778X), reel8-track cartridge, w/spkrs, acc., like new, \$290 WA5AEK, Rickman, 613 University Dr., Starkville, MS 39759

HE 45 B \$40, Heath Tower mobile supply \$35. 516-489-4295. W2PAA, All \$70.

COLLEGE-bound: Must sell Drake TR-4 \$385, RV-4 \$55, AC-4 \$55, MN-4 \$55. Prefer to sell as set. WA2GLH, Robert Scott Pallack, 100-26-67th Rd., Forest Hills, NY 11375. Tel: 212-275-1864

WANTED: variable transmitting capacitors, one 200 PF, single section; one 250 PF each of 2 sections. Both .077 spacing minimum. Will consider substitutes. State physical size and price. All letters answered. W7TE, 1418 Federal Way, Salt Lake City, UT 84102

SW-3 (1931) 80 40 20 coils, excellent, even copies sbx! with filament xmr and batteries \$90. Mint copy 200 Meters and Down" #24. Most QSTs 1922, 1924 thru 1940, what issues do you need? Wanted QST Sept. 1919 to complete Vol. 3. W5ABV, 4808 Braeburn, Bellaire, TX 77401

QSTs from 1940 thru 1967. CQs from 1950 thru 1961. Make offer. W9VIN, 124 Oak Knoll, Lake Villa, IL 60046

ELECTROSTATIC Photocopy Service, 8 1/4 x 11 or 8 1/2 x 14, any original, 1 to 10 @ 1lc, 10 and on @ 8c. Immediate postpaid return. Complete drafting service also available. R. K. Wildman, 6142 Glenbrook Ln., Stockton, CA 95207

ELDRICO SSB100A exciter, SSB1000 linear, Collins 75A2A, with antenna 295, cables - package deal only \$500. Units in Silver Spring, Maryland, Jim Keyes, K4FCW, 1300-284th Ave. North, St. Petersburg, FL 33704

SELL, or trade: RDZ uhf receiver \$95; ARC-3 receiver \$15; Lambda 500V 5 amp rpg supply \$60; L & N Galvo 2430-C \$75; FSR 115V Kingston supply and modulator Z-817A \$150; Tektronix 5B/54L plug in \$50; new Viking mono deck \$30; Kay Varsweep 2-215 MHz \$85; Radiation Technology Tritium Monitor T-750 \$100; carriage extra, much more, stamp for list. S. Clarke, 380, via Almar, PVE, CA 90274

FOR SALE: GT-550, SC-550, ac ps, vox, 25kc, cw filter, mint, in original cartons, \$400 or best offer. W6MQR, 805-482-3134-611 E. Loop, Camarillo, 93010

FOR SALE: 2-400 A's new in factory sealed unopened cartons \$20 each, HG-10 vfo \$20, 2-833A's \$7.50 each, 2-810's \$7.50 each, 3 4X250-B H.F. tube sockets \$4.50 each, J. L. Best Jr., 610 N. Madison Ave., Goldsboro, NC 27530

LEAVING country. Sale: HQ150 \$100, HX50 \$100, child's hifi amp \$50, TR106 6M xevr \$60. Sase list excellent professional HR equipment - Components very cheap. WA3DBC, 109 Cort, West Newton, PA 15089

SELL: HW-32 w/ht HP-33 \$100; DX-40 \$30; Twoer \$25. WB8HAT, 19 Curtis St., Athens, OH 45701

WANTED: 406B mobile vfo for Swan 350. DJ4BZ/WI. 401-828-6313

WANTED: SB200. Must be clean. Phillips, 26 Hope Terr., Lincoln Pk., NJ 07035

MOTOROLA P-33 2mt hand-talkie w/charger, nicads, good condx \$150. Clegg 99'er bmtx xevr, like new \$90. Paul Goldman, WA2LZV, 394 Rutland Rd., Brooklyn NY 11225

WANTED: Swan 500XC transceiver, 117-XC power supply, V-X-2 vox, 510X crystal oscillator, FP-1 phone patch, D. Wilbur, 369 Sixth Ave., North, Tierra Verde, FL 33715. Tel: 813-361-8291

CONTACT us for new or reconditioned Collins, Kenwood, Tempo-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler, MO 64730

POWER: 80 feet Rohm 25G, base, rotor plate, 4000 lb, insulated gys \$125, 24 foot 2 inch Telrex mast \$20, thrust bearing \$10, 24 good condx. Pick up. UG8X 700PF \$25 others plus LC's, surplus gear, etc. Sase for list. W2VJN, R.D. No. 1, Box 659A, Princeton, NJ 08540

SALE teletype model 19 complete \$75. Transformer 4200 volts CT 1 amp, \$10. George Rutledge, 156-10 Oak Ave., Flushing, NY 11355. Tel: HI 5-8442

1920, up QST, send want list. Beardsley, 119 Wythburn Rd., South Portland, ME 04106

YAESU FTDX-400, new, \$450 or best offer. Clyde Bullard, 269 N. 15th Brighton, CO 80601

WANTED: Millen all band rf amplifier, W8QZF, 16412 Marquis, Cleve., OH 44111

SIMPSON 458 scope \$75. 312 and 715 vtms \$30 each. WB2CYU, 958 Vail Rd., Parsippany, NJ 07054

COLLINS 511-3/R388 receiver. General coverage. Working condition. \$295, plus shipping. Stuecker, 14947 Prospect, Dearborn, MI 48126. Tel: 313-446-2974

SELL: AN/FRR-3A RTTY \$110; Beckman 7050A counter \$35; SG89 signal generator \$30. 3-page list, sase please. Want: 8X-73, S-84, S-85, handgon, telescope, 1258, old manuals. WA9DY6, 114 Lakeview, Milwaukee, WI 53217

SWAN 270, ac-dc supply, ssb and cw and am, fine condition. Used 10 months; also V-X-2 vox included. Asking \$400. Drake 2NT, used 8 months as Novice, fine condition, \$75. Prefer to deal locally if possible. Craig Thompson, WA1LMQ, 206 Fayerweather St., Cambridge, MA 02138

WANTED: 40-80 vertical 1000 watts. Swingler, K6LFX, 5444 Carpenter Ave., No. Hollywood, CA 91607

TELETYPE mod 15, with inverter and tools, \$125. Lafayette HE45B w/vfo, \$75. Mike Koneczak, Box 727, Chillicothe, TX 79225

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2NT, HR108, 10 novice xtals, \$140. WN2R10, 5 Edgehill Close, Bronxville, NY 10708

SX-73 (R274/FRR) Near mint, Complete with all manuals. \$300. Doug Flagg, 287 Main St., apt. 1, Northport, NY 11768

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FOR SALE: immaculate HT37 \$140, Immaculate Drake 2A/2AC/2AQ \$125, D. McDonald, 85 W. Las Flores, Thousand Oaks, CA 91360. Tel: 805-495-7637

SIGNAL/ONE Alpha Seventy, Collins new and used. Used NCL-2000, 3450, 30S1, \$500; Kirk 14MH5 5 element Heliodial beam, \$300; New Kirk 7MH3, 3L, 40 M beam, \$500; New Hallicrafters SX-122A, \$315; S214, \$70; S240, \$80; Kenwood, etc. Douglas Electronics, 1118 South Staples, Corpus Christi, TX 78404

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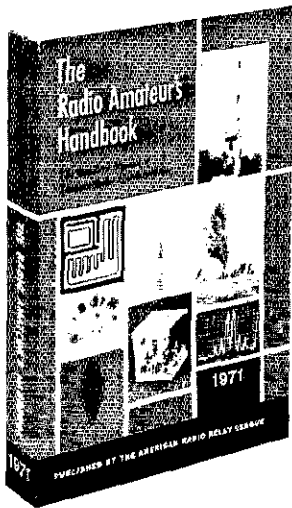
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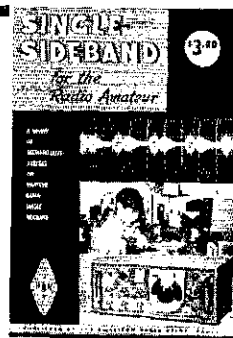
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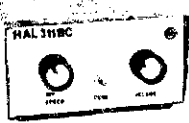
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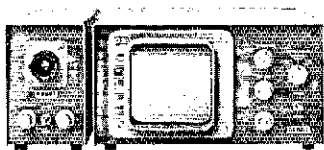
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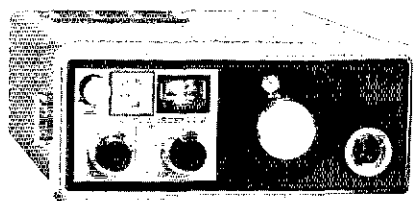
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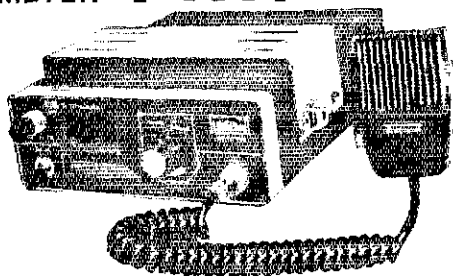
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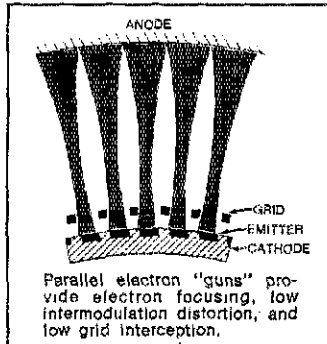
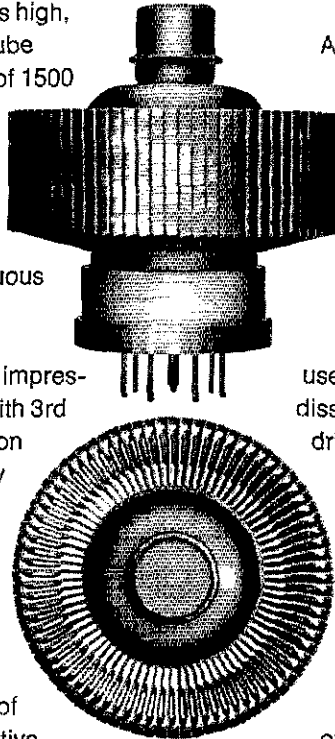
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