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OF THE AMATEUR RADIO SOCIETY

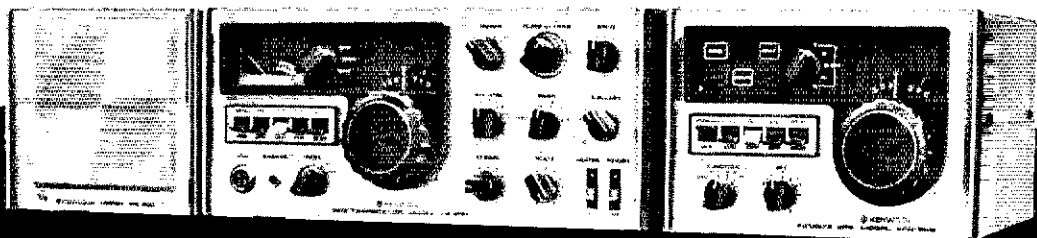
amateur radio



OFFICIAL JOURNAL OF THE ARRL



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FEATURES: • Break-in CW with sidetone • Built-in 100 KHz and 25 KHz crystal oscillator • Built-in RIT and RIT indicator light • Built-in RTTY frequency shift for FSK • Built-in noise blanker • Built-in VOX • Modular construction — repair in or out of equipment • RF AGC to prevent front end overload to strong signals • Completely solid state except final section • 1 KHz readout

GENERAL SPECIFICATIONS: Frequency Range: 3.5 - 30 MHz Amateur Bands and WWV • Mode: SSB, CW, or FSK • Power Output: 150 watts PEP nominal into 50 ohms for SSB, 100 watts nominal into 50 ohms for CW, 50 watts nominal into 50 ohms for FSK • Frequency Stability: Within 100 Hz during any 15 minute period after warmup. Within ± 2 KHz during the first hour after 1 minute of warmup • Receiver Sensitivity: 0.5 microvolts for a 10 db (signal + noise)/noise ratio • Receiver Selectivity: SSB and FSK — 2.2 KHz bandwidth (6 db down), 4.4 KHz bandwidth (60 db down), CW — 0.5 KHz bandwidth (6db down), 1.5 KHz bandwidth (60 db down), (with optional CW filter installed) • Dimensions: 12.6" wide x 5.5" high x 12.6" deep • Weight: 26.5 pounds (32.5 pounds shipping weight) • Price: TS-900 \$795.00, PS-900 (AC Supply) \$120.00, DS-900 (DC Supply) \$140.00, VFO-900 (Remote VFO) \$195.00.

THE KENWOOD R-599 RECEIVER... 1.8 to 29.7 MHz (Amateur Bands) • Dial readout to $\frac{1}{2}$ KHz • Special detectors for SSB, AM, and FM • Transceive operation with T-599 • Built-in 100 KHz and 25 KHz calibrators • Built-in 500 cycle CW filter • Provision for 2 meter and 6 meter coverage with accessory self-contained converters • 120/240 VAC or 12 VDC operation • All solid state • R-599 — \$389.00 Converters — \$31.00 S-599 Speaker — \$16.00.

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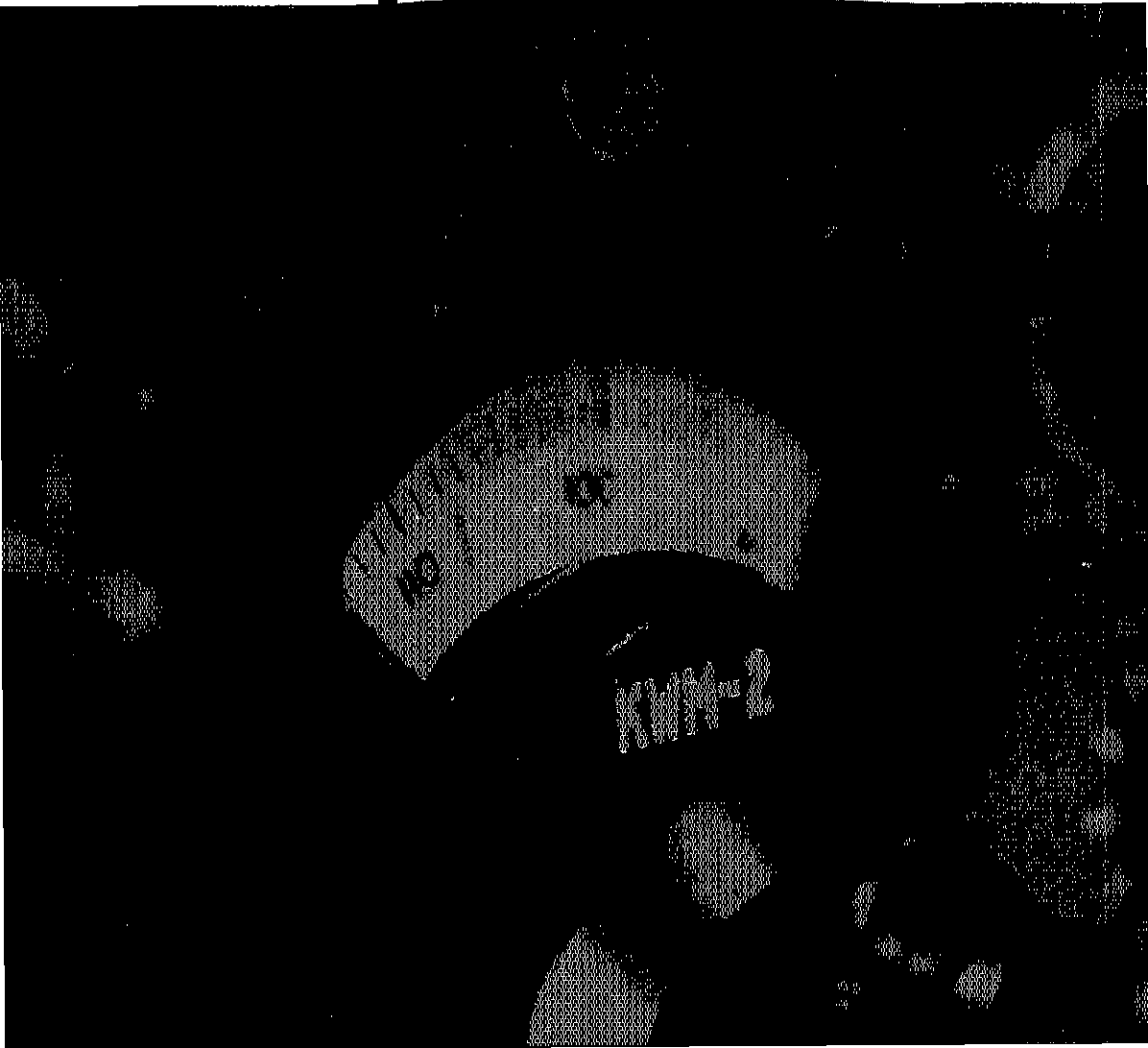
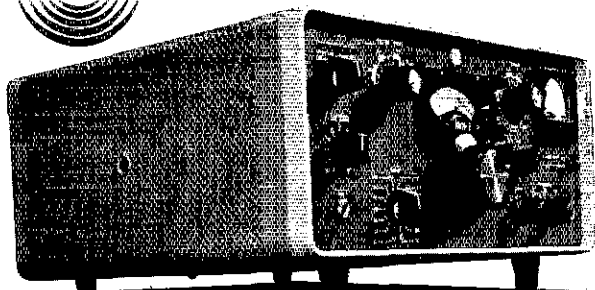
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OUR COVER
State of the art comes to the builder of homemade solid-state gear. See page 11 for Part I of W9MIJ's series on how to build this ssb/cw transmitter.

QST

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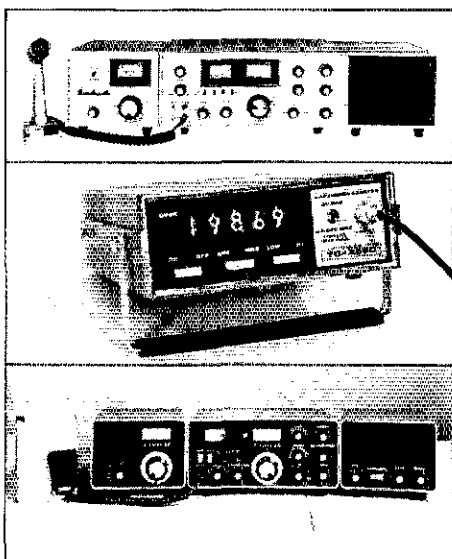
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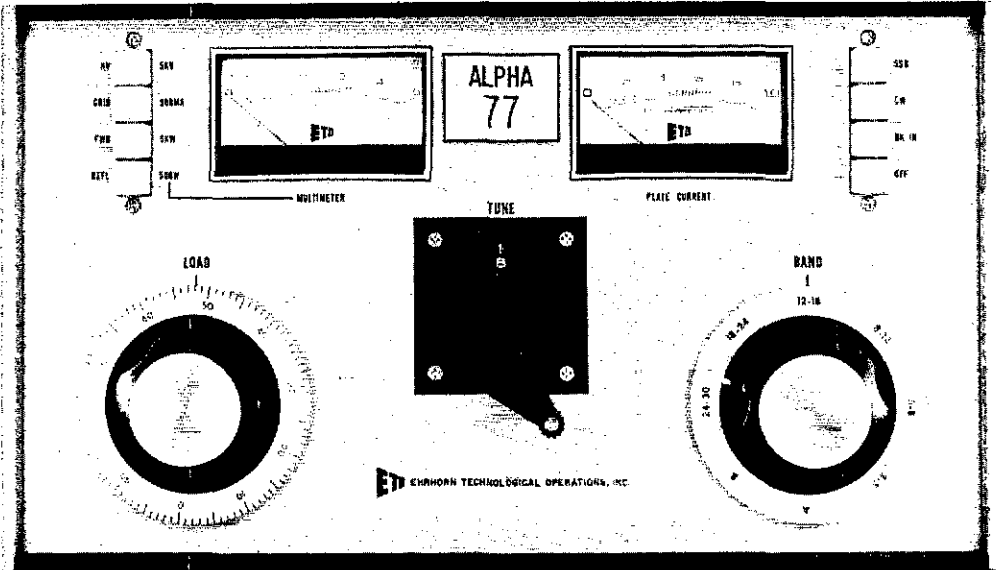
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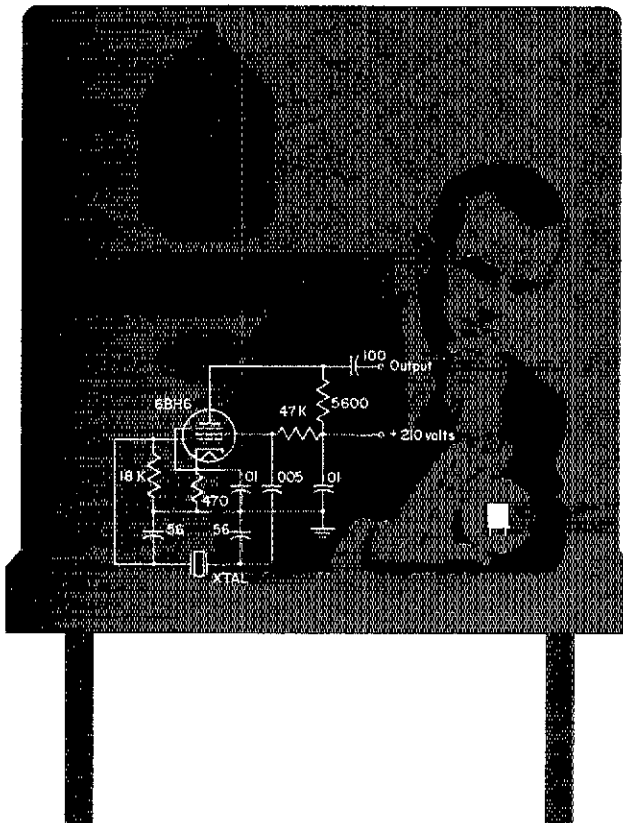
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111.



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"It Seems to Us..."



VOLUNTEER LEADERS . . .

EACH YEAR the Board of Directors of the League adopts a resolution of thanks and appreciation to the various volunteer field officials of ARRL for their untiring work and devotion to our affairs. This has been a regular action of the Board for so long that we must take care not to assume it is simply routine. The Board is indeed deeply appreciative of these efforts, because of their inestimable importance in the advancement of organized amateur radio.

The amateur service, like any other radio service, must operate in the "public interest, convenience or necessity" in order to be able to continue justification for our existence and right to use portions of the public domain of the radio frequency spectrum. Perhaps in no other single way is this better accomplished than through group efforts as represented by the League's field organization program.

These volunteer leaders make our machinery run. They accept posts as officers of affiliated clubs, planning programs in technical, operating and other fields to spread knowledge and improve the stature of the individual as well as the club. Others in the club take on special jobs such as with the TVI committee or as public relations officer, adding to the amateur's stature in the community. Still others head up a local Field Day or Simulated Emergency Test exercise to demonstrate amateur radio's capabilities. The huge operating organization of the League is staffed with many volunteers contributing their time to improve amateur radio's ability to perform in the public interest — through traffic systems, section and regional nets, emergency communications, civil defense, SCMs, SECs, and QSL Managers have especially arduous duties, requiring many hours of personal time and all performed for the good of the cause.

A real strength of the League lies in the accomplishments of these volunteer leaders, who are not interested alone in what they can get out of the hobby of amateur radio, but want to contribute something to it.

. . . AND NEWCOMERS

FROM TODAY'S new amateur licensees will eventually come our leaders of the future. Are we assisting them, as we should, to become useful amateur citizens? Are we properly indoctrinating them in the traditions of amateur radio and the spirit of public service?

These questions are especially important today when amateur radio is developing and changing rapidly in many areas — e.g., 2-meter repeater operation. Years ago, a person became interested through contact with another ham, or the local radio club, or at least through League publications. We had a certain interdependence on each other for information. Local groups especially were more tightly knit, and newcomers were quickly and easily taken under the wing of club leaders and older amateurs for helpful guidance.

Today, nearly every newsstand has one or more "popular" books dealing partially or wholly with amateur radio (in some instances, we regret to say, being little more than a collection of manufacturers pictures and description of gear), and so some of our newcomers enter the game with no concept of what amateur radio really offers, nor its traditions and responsibilities. Many licensees are neither members of the League, nor of affiliated clubs, nor of any organized group or operating activity. This is not to say that they are not, or cannot be, good amateurs. But newcomers, like youngsters, are prone to imitate. Without participation in a group having qualified leaders, they do not necessarily learn from the one who does the right thing, or who does a thing best, and consequently they sometimes imitate a good example, sometimes a bad one. This inevitably means that many of the newer, younger amateurs are indoctrinated first with the more frivolous aspects of the game and are never influenced by the desire to be of service and a sense of dedication so important to maintaining high standards.

Our responsibility to public service doesn't end with the public alone; it should extend also to our own group, to the

(Continued on page 34)

League Lines . . .

That CI prefix appearing on the bands isn't China, but Canada. DOC is permitting amateurs on Prince Edward Island to use the special prefix during 1973, the island's Centennial Year. In doubt about such special calls? Check the list in back of Chapter 24 of any recent edition of the Handbook, or on the inside back cover on current copies of the ARRL Log Book.

On the U.S. side, FCC earlier had been fairly liberal in issuing special call signs on a temporary basis in connection with events of "general public interest." But the latter phrase has been interpreted considerably more strictly in recent months, to the point where even meritorious cases have had an arduous task achieving their objectives. Before making any such application, therefore, be certain you can provide full documentation.

Bracketing World Telecommunication Day of May 17, the Brazilian Ministry of Communications is sponsoring an amateur cw contest for the 24 Greenwich hours of May 12, and a similar event for phone on the 19th. See April "Operating Events" for details of this salute to the International Telecommunication Union.

Reverse Doppler? After 130 years of acceptance of the theory that an object emitting wave energy which moves toward and then past you exhibits an apparent downward shift in frequency, a couple of dedicated vhfers found just the opposite characteristics on parts of some Oscar 6 orbits. See "World Above" this month for details.

Amsat has announced a new operating schedule for Oscar 6: battery condition permitting, the translator will be open for business from 0001 GMT Thursday to 2359 GMT Monday, a total of five days. If you hear the satellite on one of its "off" days, Tuesday or Wednesday (GMT), do not try to use the translator; you'll be interfering with vital telemetry-gathering or with special educational projects, as well as with the battery-recharging which is necessary for Oscar's long life.

It happens in the best of circles:

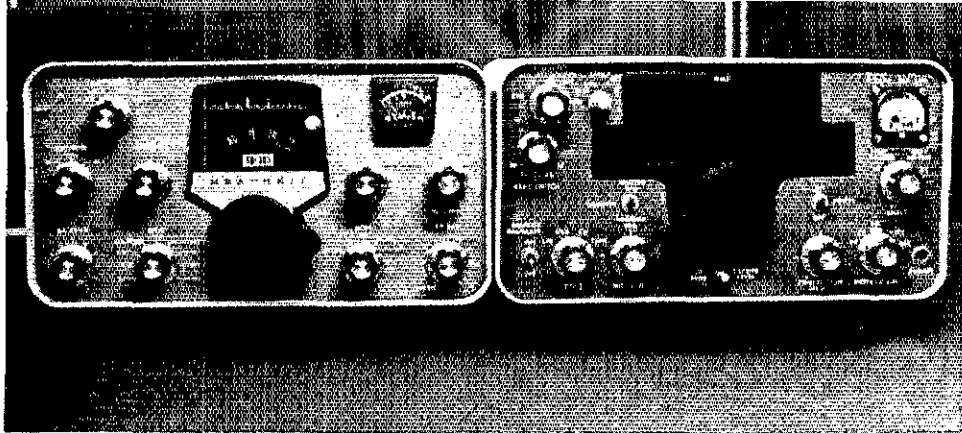
K6KA heard a signal with key clicks and sent an ARRL Official Observer "cooperative report." In this case the recipient turned out to be the engineer in charge of an FCC monitoring station! On checking, he indeed found clicks, however minor, and set to work to clean them up. He added, "We in FCC appreciate the time and effort put forth by ARRL volunteer observers. Without your help we could hardly keep order in the ham bands and our paper work would mushroom."

You can't win! With the new computer addressing system we received, on one hand, several letters saying the April issue had arrived the earliest time of the month ever; and on the other hand, numerous complaints asking where the heck is my April issue?! Let's hope time heals all things.

In a public-relations project guided by assistant director WB2FBF, the Hudson Division is encouraging each club to appoint a publicity chairman and "develop the basic capability to communicate via local media those events deserving of note while they are still news." At 2200 GMT the second and fourth Sundays of each month, a discussion group meets on 3925 kHz, with FBF or W2OOJ handling net control. If you have a "sincere interest in a wider communication of ham radio's activities," you are cordially invited to join.

Apparently regulatory problems are not unique to the amateur service. The trade press reports FCC Chairman Dean Burch as telling broadcasters it is "right and proper" for them to seek relief from "overbearing regulation."

Field Day plans made yet? It won't be long now . . .



A Medium-Power HF SSB CW Transmitter

All HF Bands,

All Solid-State, All the Way

BY TIMOTHY P. HULICK,* W9MLJ/4

PART I

ABOUT A YEAR and a half ago, RCA announced a new rf power transistor designed for linear amplification from 2 to 30 MHz. What's so special about this? A pair of these transistors can deliver up to 150 watts PEP output power with IMD levels less than -32 dB! Having just purchased a new SB-303 solid-state receiver about the time this announcement was made, the temptation to do away with the hybrid station and attempt to go

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solid-state all the way (save the big "Shoes") was irresistible. A pair of these transistors in a broad-band PA would be equivalent to or better than a pair of 6146s, and they should never go soft. Being an avid DXer and enthusiastic builder, it was decided that all of the DXpeditions that would take place between about November 1971 and May 1972 would have to be missed while design and construction were underway. Six months after completion of the transmitter, the conclusion is that it was well worth it. To the best of the author's knowledge, the result is a transmitter unlike any other in the world, and is concurrent with the state of the amateur art.

Although this transmitter is designed to be a companion to the SB-303 receiver, all modern ssb transmitters are basically the same as this one in that they employ low-level ssb generation and then go through two conversions at slightly higher levels before the PA provides the usual 180 watts PEP input with a pair of 6146Bs. The major differences between most commercial transmitters are the frequencies used in the conversion processes. (Receivers use the reverse conversion process, sequentially.) To adapt the transmitter described here to accompany any good amateur-band receiver, it will be necessary to match conversion frequencies and perhaps the levels of these signals to produce a companion transmitter. All other design parameters are constant! This transmitter uses conversion frequencies and conversion-frequency signal-injection levels compatible with the SB-303.

The day of medium-power, all solid-state transmitters has arrived. This article is not intended to be primarily a construction treatise. Rather, it represents a tutorial guide for those wanting to design and build equipment of this type for their own specific applications. Many of the circuit modules described in this series can be used as parts of projects that do not reflect the overall design offered by the author. The series comprises a landmark in amateur achievement, proving again that amateurs need not buy commercial equipment in order to have a neat, functional, high-performance piece of gear. LCDR Hulick is a graduate of the U.S. Naval Academy and is presently serving in the Naval Electronics Systems Command. His current assignment is Ship's Advanced Electronic Warfare Systems Test Site Coordinator, Virginia Beach. He wrote his first QST article in 1963 while being a midshipman at the U.S. Naval Academy.

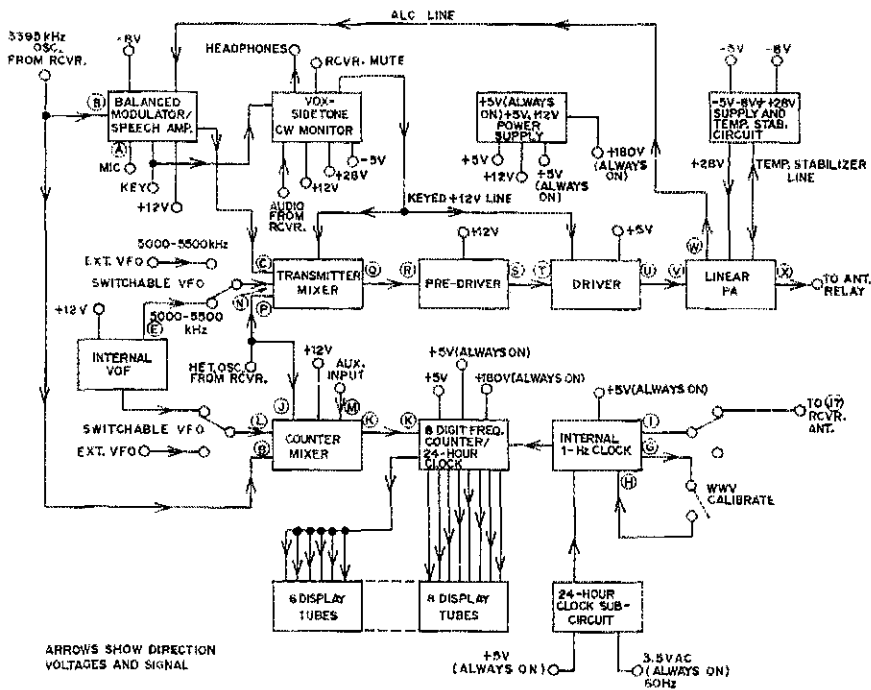


Fig. 1 — Block diagram of the solid-state transmitter showing the various modules and how they are connected to one another.

It is the author's intention to provide the reader with food for thought on modern solid-state ssb design and to illustrate what can be accomplished with state-of-the-art components and techniques. Avid builders will find that putting this transmitter together from scratch is challenging, but rewarding.

Specifications

The specifications and capabilities of the transmitter are outlined below:

1) The transmitter is completely solid state with a broad-band power amplifier requiring no external rf controls other than a band switch.

2) The linear amplifier is mismatch protected with rf output-derived alc and is capable of delivering 100 watts PEP to a 50-ohm resistive load on 80, 75, 40, and 20 meters. Power output is reduced to 75 watts PEP on 15 meters and about 50 watts PEP on 10 meters. The PA stage efficiency is 50 percent and the PA transistors are operated at about two-thirds their rated capability on the lower-frequency bands. The pair will handle 300 watts PEP input on 10 meters, however.

3) The solid-state transmitter contains a built-in three-resolution frequency counter. Frequency can be counted to 0.1, .01, or .001 kHz accuracy. Large Nixie readouts are used, giving numbers that are easy on the eyes. This is a deviation from the strict definition of being "all solid-state." The counter will display the resultant frequency determined by either the transmitter or receiver VFO regardless of how the VFO is used for controlling the transmitter and/or receiver.

4) The transmitter VFO has a drift rate of less than 100 Hz per hour after initial turn on. Either the transmitter or receiver VFO can be used for transceive operation, or the VFO roles can be split with either VFO controlling the transmitter or receiver.

5) VOX and break-in cw keying with side-tone cw monitor is built-in.

6) All circuit boards, except those for the power supply and VFO, are the plug-in type with gold-plated edge-pin connectors.

7) Three of the seven power-supply circuits are SCR protected, making destruction of most of the integrated circuits nearly impossible from over-voltage.

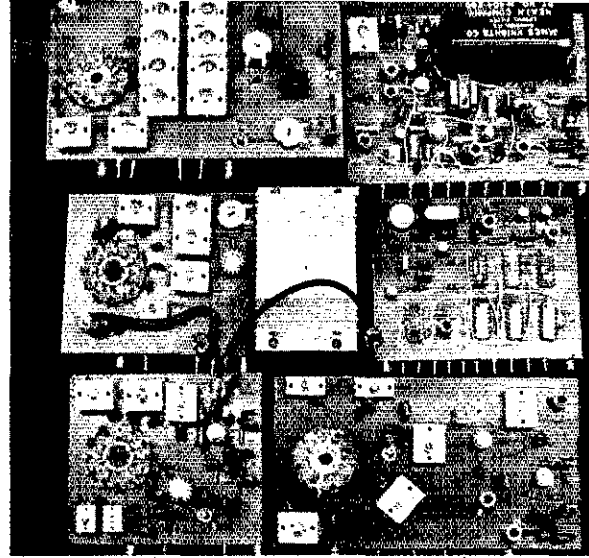
8) All components are used within their design limits. Parts failure has been nonexistent during the first six months of use.

Block Diagram Functional Description

It is best to introduce the transmitter circuit in functional blocks rather than to show individual components. Fig. 1 is meant to provide the reader with an overview of how this transmitter is configured. For more detail refer to the "specific circuit description" portion of this article.

This transmitter is dependent on the oscillators used in its companion receiver. There are two reasons for this approach. Primarily, it would be redundant to have two oscillators independently controlling the transmitter and receiver when one could do the job. Also, exact transceive operation would be impossible. Secondly, it is expensive.

Some of the completed circuit boards. Left to right, starting at the top: PA, balanced modulator, driver, internal clock, predriver, and transmitter mixer board. Note switch sections mounted on some of the modules.



Twelve crystals at \$3.50 each amounts to \$42 that need not be spent.

Each block in Fig. 1 represents approximately one circuit board. The balanced-modulator speech-amplifier block is contained on one plug-in board. This module provides low-level ssb of either sideband on approximately 3395 kHz, depending on which sideband is selected at the receiver. The receiver controls both the receiver and transmitter sideband selection.

The balanced-modulator speech-amplifier stage provides audio output for driving the VOX. It also has a sine-wave audio oscillator from which cw is derived. Cw is generated by the speech amplifier being coupled to the output of this oscillator instead of a microphone. Injecting a sine-wave audio signal at 1 kHz into the speech amplifier causes a single-tone ssb signal to be generated 1 kHz away from the original carrier. It is indistinguishable from a conventionally generated carrier except that it is frequency shifted by 1 kHz from the frequency displayed by the counter. This tone is also available to the VOX circuit for cw break-in.

The VOX, sidetone, cw-monitor block contains all of the VOX and anti-VOX circuitry, including the control relay. An IC multivibrator is used as the sidetone oscillator, but is not used in other modes.

The transmitter-mixer block receives three frequencies as inputs to two cascaded balanced mixers. The first mixer combines the ssb or cw from the balanced-modulator speech-amplifier block at 3395 kHz and the VFO from 5000 to 5500 kHz. The output of the first mixer stage provides a ssb or cw signal at the sum frequency, i.e., 8395 to 8895 kHz. The second mixer heterodynes the first-mixer output and that of the heterodyne oscillator in the receiver. The second-mixer output is a difference frequency in the desired transmit band. This signal is obtained at point Q. The entire mixer circuit is contained on one board. The VOX, sidetone, cw-monitor board provides keyed +12 volts to the mixer board so that the mixer is disabled while receiving. This ensures no excitation to the final amplifier while in STANDBY or RECEIVE. The predriver increases the amplitude of the mixer output to the level required for the driver input. The driver provides about 3-1/2 watts to the PA. The predriver, driver, and PA boards contain all rf components necessary for their specific functions.

The -5, -8, and +28-volt supply and temperature-stabilization section provides some supply voltages, but also contains the required circuitry to keep the operating level of the PA transistors constant, as they heat up when driven. The

temperature stabilization circuitry drives the collector current down to normal, maintaining it at the proper quiescence value.

The function of the VFO allows for transceive operation, controlled by the transmitter, or to control the transmitter or receiver separately while the receiver VFO is controlling the opposite unit. The VFO block is self-contained on one circuit board, except for the main tuning capacitor.

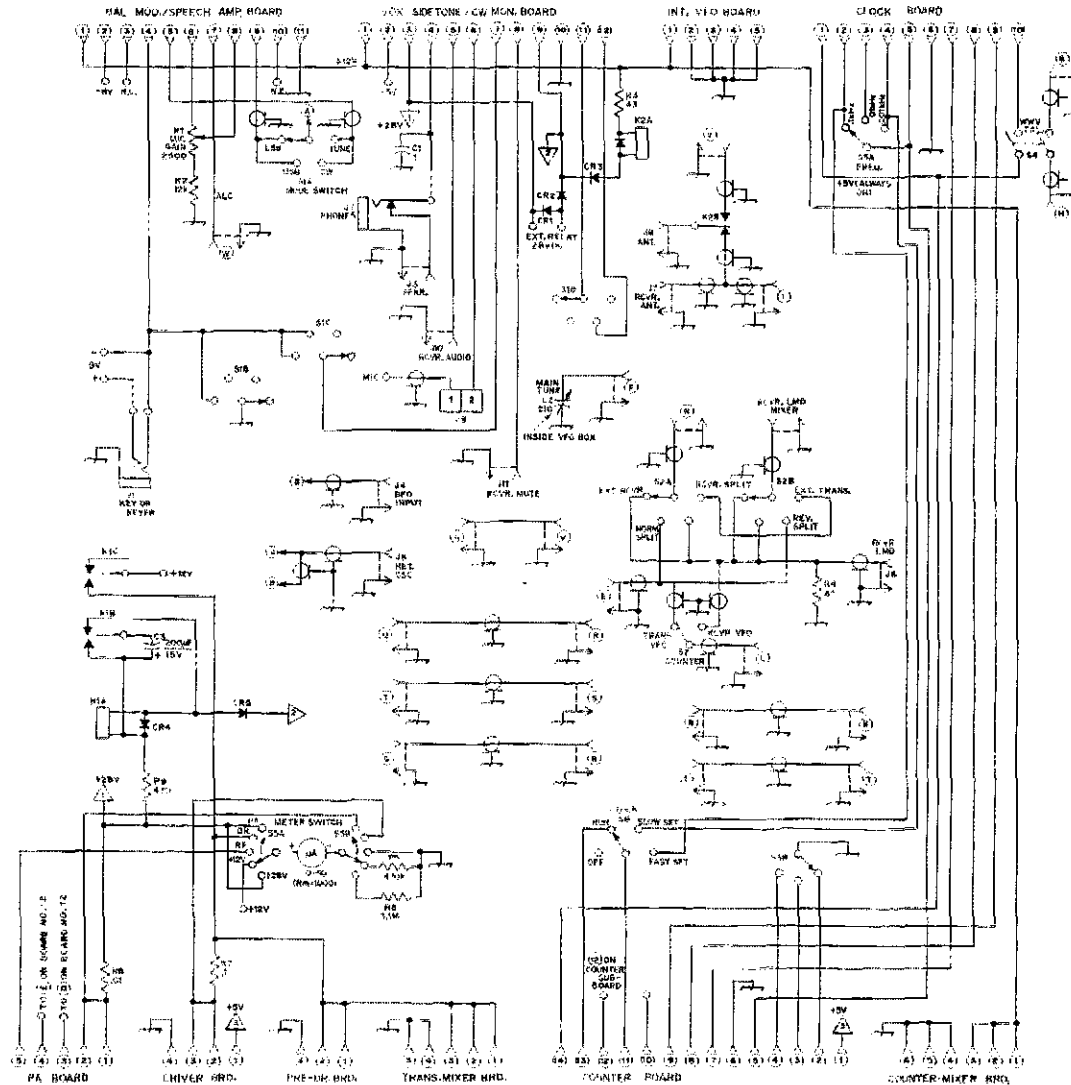
The counter mixer block is complete on one board, the mixer functioning in the same manner as the transmitter mixer except that a carrier injection at 3395 kHz replaces the ssb or cw injection at that frequency. It is necessary to have a frequency readout at all times, not just when modulating the rig.

The frequency counter/24-hour clock block counts the number of positive half cycles of the counter mixer-block output. The 24-hour clock portion counts every sixtieth positive half cycle of the 60-Hz ac line current. The resultant time and frequency are displayed on the Nixie-tube readouts.

The internal clock is self-contained on one board and dictates to the counter board the length of time it is supposed to count before the frequency is displayed. The timing pulses for the counter must be extremely accurate for good frequency measurement. Therefore, a 4000-kHz crystal-oscillator standard is used. The fifteenth harmonic of the divide-by-four circuitry, following the 4000-kHz oscillator output, is beat against WWV at 15 MHz for calibration purposes. This provides an accuracy of one part in 15×10^6 assuming that the allowable error is 1 Hz away from absolute zero beat. Measurement accuracy is even better than this if exact zero beat is obtained. (This subject is discussed later.)

The 24-hour clock sub-circuit block is contained on one board and divides the line-current frequency by six for further division by ten on the frequency counter/24-hour clock board to run the 24-hour clock.

Fig. 2 — Schematic diagram of the under-chassis wiring used in the W9MIJ solid-state transmitter.



EXCEPT AS INDICATED, RESISTOR VALUES IN THIS SCHEMATIC ARE IN MICROHMS. THE VALUE MAY BE INDICATED BY ONE OR MORE RESISTANCE CODES IN CIRCLES. (SEE THE METHOD BOOK.)

This transmitter requires an assortment of voltages, so the power supplies are split between blocks. A common power transformer is used for all voltages except the +5 and +180 voltages that must always be left on to supply the 24-hour clock and internal timing-clock oscillator.

Specific Circuit Description

Since in most cases one circuit board performs more than one function, all of the circuits of a particular board will be discussed. This will provide

the reader with greater depth into the circuitry.¹

Each board is given a number. This number, in addition to being a board identifier, indicates the first digit of a component identifier such as R101, which is resistor 1 on board 1, and C203 which is the third capacitor on board 2 and so on. Component numbers of less than three digits are part of the under-the-chassis wiring and can be seen (schematically) in Fig. 2 (except for the band switch, S8, which is common to most boards). Fig.

¹ A complete set of pc-board patterns (to scale) will be offered at the conclusion of this series.

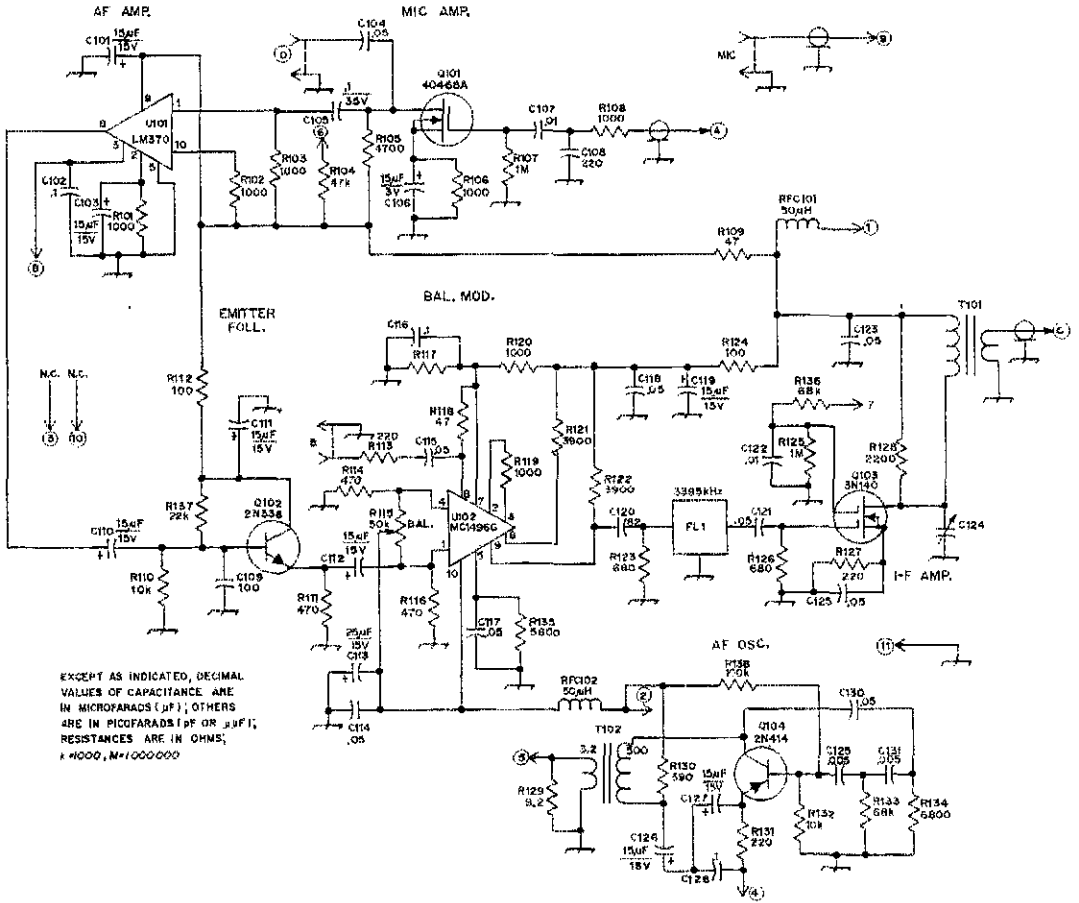


Fig. 3 - Schematic diagram of the balanced-modulator/speech-amplifier board used in the solid-state transmitter. N.c. means no connection. Fixed-value capacitors are disk ceramic unless otherwise noted. Polarized capacitors are electrolytic. Fixed-value resistors are 1/4-W composition unless signified otherwise. Numbered components not appearing in parts list are so numbered for text discussion and for pc-board identification purposes.

C124 - Compression trimmer, 110 to 580 pF (Arco 467 or equiv.).

FL1 - 3395-kHz i-f filter (Heath part No. N404-200).

R115 - 50,000-ohm 1/2-W mini-pot carbon control (Amphenol 6203P or equiv.).

RFC101, RFC102 - Three Indiana General CF-101 toroid cores (Q2 material) stacked and wound with 35 turns No. 36 enam. wire.

T101 - Three Indiana General CF-101 toroid cores stacked and wound with 13 turns No. 30 enam. wire (pri.) and 5 turns No. 30 enam. (sec.) over primary.

T102 - 500-ohm to 3.2-ohm miniature transformer (Calrad CR-80 or equiv.).

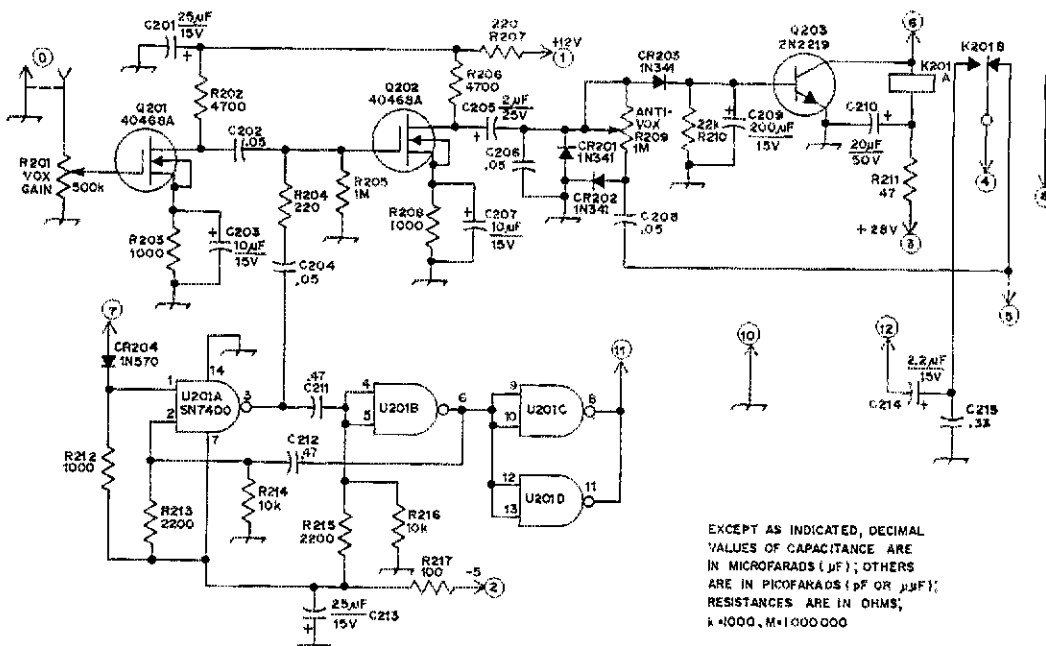


Fig. 4 - Schematic diagram of the VOX/sidetone/cw-monitor circuit. Fixed-value capacitors are disk ceramic or Mylar unless otherwise noted. Polarized capacitors are electrolytic. Fixed-value resistors are 1/4-W composition. Numbered components not appearing in parts list are so numbered for text discussion and pc-board layout purposes.

- K201 - Dpdt subminiature 28-V (2000 ohm) dc relay (Phillips Advance No. MV-2C-600D-17 or equiv.).
- R201 - 500,000-ohm linear-taper carbon control (CTS Mfg. No. X201-R504B or equiv.).
- R209 - 1-megohm linear-taper carbon control (CTS Mfg. No. U201-R105B or equiv.).

2 represents circuitry and components external to any board and is complete in its representation of all chassis wiring.

Balanced-Modulator/Speech-Amp. Board

The balanced-modulator/speech-amplifier board (Board 1) schematic diagram appears in Fig. 3. In the ssb mode of operation the microphone input is routed through S1A to the gate of Q101. Q101 is a Class A audio amplifier employing an IGFET. It permits a wide range of microphone impedances to be used. The output at D in Fig. 3 taps a portion of the speech amplifier output to provide an input to the VOX circuitry. Most of the output of Q101 is used to drive the speech amplifier, U101. A National LM-370 is used for this purpose because it delivers the required audio-output level to drive the balanced-modulator preamplifier/emitter follower and has built-in gain-control circuitry. Speech gain is controlled by R1 (Fig. 2). The output of U101 drives audio emitter follower Q102, which provides the necessary low-impedance source to modulate the balanced modulator, U102. The MC1496G in the balanced modulator provides at least 50 dB of carrier suppression at 3 MHz. It also has the advantage of having no rf energy on the balance control, R115, and has conversion gain - not the loss that is common to diode-ring modulators. One half the spectrum of the dsb output at pin 9 of

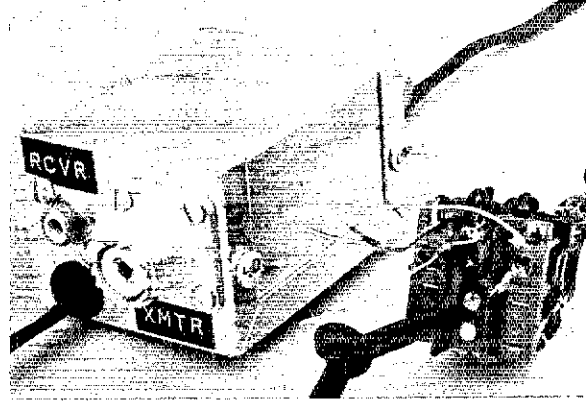
U102 passes through the crystal filter, FL1, and to i-f amplifier Q103. Low-impedance, low-level ssb output is obtained at C. Afc voltage biases the second gate of Q103 and is derived from the PA output. It can be set to any output power level between zero and maximum.

In the case of cw, output from the i-kHz generator, Q104, is fed through S1A in the CW or TUNE position to the speech amplifier input at A. This single-tone audio causes a single-tone ssb signal to appear at C as if it were derived from a microphone. But the fact that it is single tone makes it indistinguishable from cw except for the fact that the ssb-generated cw carrier is displaced from the real carrier frequency by the frequency of the audio tone. (With the SB-303 in the cw mode, the single tone is displaced from the original carrier frequency by approximately the same amount as the passband of the receiver crystal filter, and in the right direction, placing the transmitted cw almost zero beat with the received cw when listening to a 1000-Hz cw note in the receiver. As in the ssb mode, the VOX is tripped from D, providing cw break-in operation, Q104 of the audio oscillator is of the common RC phase-shift type with low-impedance transformer output through T102. This type of oscillator generates a very clean sine wave which is essential to ensure

(Continued on page 41)

• *Beginner and Novice*

At the right is the modified relay, ready for installation in the box.



An Antenna Changeover System and Power-Output Indicator

BY KI NEGORO,* WN6QJP

WHILE THE radio stores carry all of the ready-built equipment needed for the Novice to get on the air, I believe there is another facet in the hobby of amateur radio. It is even more interesting when one builds his own gear.

The feeling of accomplishment and the application of electronics theory to the art of ham radio are rewards worth working for. Home builders are always complimented, and expressions of the desire to build such equipment, are often heard on the air.

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

This article describes the construction of two devices that are simple to make. The first is an antenna switching unit and the second, an output indicator to aid in tuning one's transmitter.

The Antenna Changeover Relay

The antenna switching relay, Fig. 1, by the flip of a control switch, will perform the following:

1. On Receive -- (control switch in OFF position)

1) Antenna is connected to receiver.

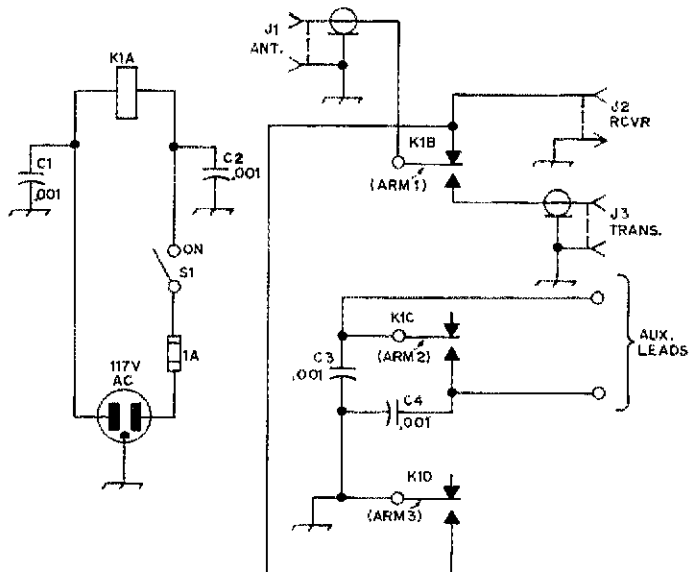


Fig. 1 — Electrical circuit of the antenna relay.

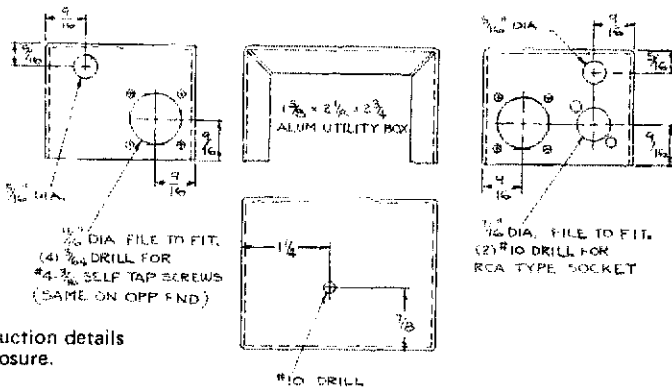
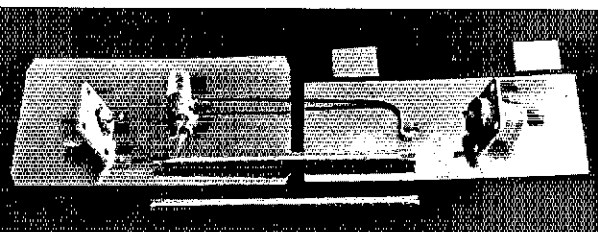


Fig. 2 — Construction details for the relay enclosure.



All the necessary parts for the output indicator are shown in this view.

- 2) Audio output is connected to speaker or phones.
- 3) Antenna is disconnected from the transmitter.

II. On Transmit — (control switch in ON position)

- 1) Antenna is connected to transmitter.
- 2) Audio output is shorted or muted.
- 3) Receiver antenna lead is grounded to reduce rf pickup.

The complete unit will operate equally well in 50 or 75-ohm coaxial line with negligible loss. A

control switch could be a part of the existing receive/standby switch in some receivers, or could be a master toggle switch mounted on the operating table.

The relay selected is a commercial quality unit available on surplus. The mechanical problem associated with the mounting, and the housing itself, do not concern us since only the basic relay is used in this project.

- 1) Remove cover and discard.
- 2) Clip all solid wire leads between relay and socket pins.
- 3) Apply soldering iron to tip of socket pin and remove flexible leads from socket. Leave opposite end attached at this time.
- 4) Apply heat to each lug and remove the short pieces of solid connector wire. Shake off all solder in order to expose open holes in the lugs on the relay. There are six places on the end piece, and two places on the side of the coil.
- 5) Remove flexible lead from movable tab No. 1, and clean tab of loose solder.
- 6) Connect flexible lead obtained from tab No. 1 to tab No. 2. Tab No. 2 now will have two flexible leads in parallel.
- 7) Mount four capacitors as shown in drawings.

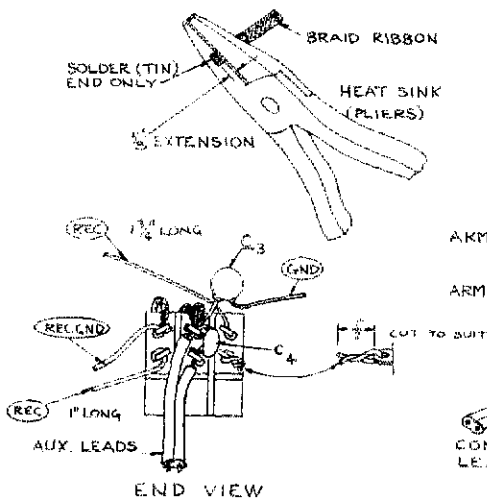
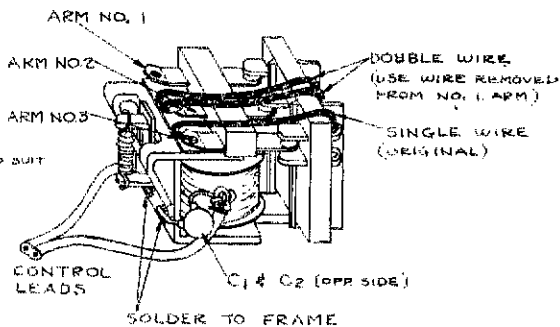


Fig. 3 — Wiring details for the connections on the antenna relay.



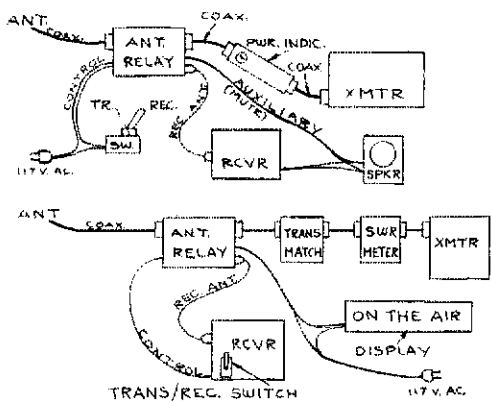


Fig. 4 - Two suggested hookups for station controls making use of the antenna relay.

- 8) Attach ends of control and auxiliary leads.
- 9) Solder all joints, leaving ends as shown in drawings. Also solder the grounded ends of two capacitors to the relay body as shown.

The metal box should be prepared following Fig. 2. Mount coax sockets using 4 x 3/16-inch self-tapping sheet metal screws. No. 4 machine screws with hex nuts can be used as well. Mount the phono socket, and push the grommets in place. Install relay and secure with a 6 x 32 x 1/2-inch machine screw.

The rf leads are braided ribbons fashioned from the shielding removed from a four-inch piece of RG-58A/U coaxial line.

- 1) Carefully cut outer plastic cover about 1/4 inch from one end - do not cut copper braid directly inside.
- 2) Slip off cover and cut the plastic cover to 2-1/4-inches long. Discard rest of cover.
- 3) Push braid back away from the end to bunch and expand the braid. Remove braid and discard inner core parts.
- 4) Pull braid lengthwise and flatten to form braided ribbon approximately 3/16-inch wide. Cut one piece 2-1/2-inches long. Cut another piece 1-1/4-inches long.
- 5) Holding the short piece tightly with pliers as shown, tin the 1/8-inch extension with solder. The

This view shows the completed indicator. Be sure that all surfaces of the metal are clean before soldering.

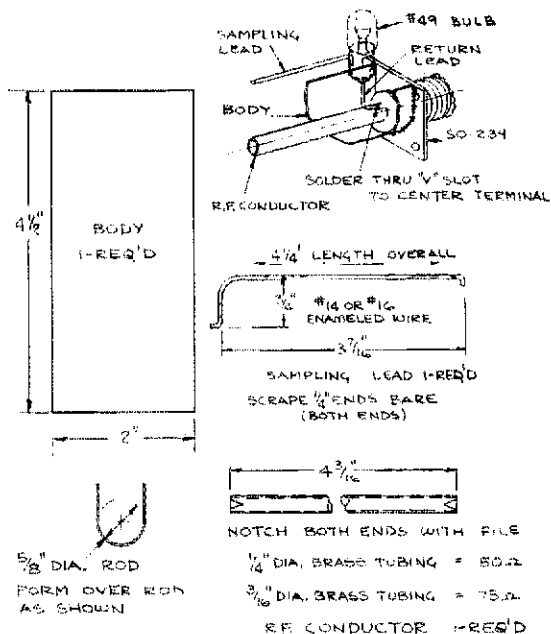
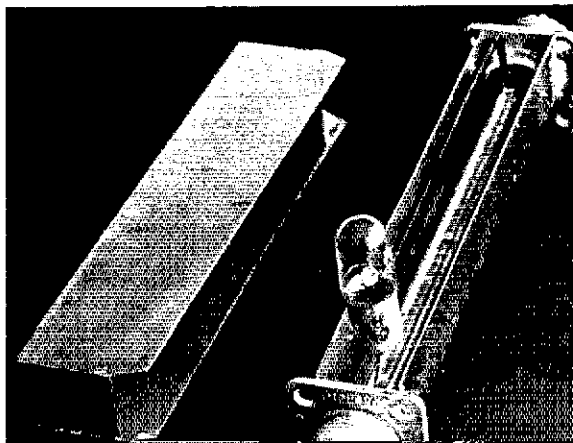


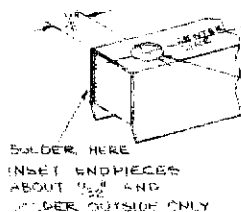
Fig. 5 - Construction details for the output indicator enclosure.

pliers, acting as a heat sink, prevents the solder from bonding the braid wires beyond the first 1/8-inch of ribbon. Allow time for the solder to cool before releasing pliers. Check braid for stiffness beyond about 1/4 inch from the end. If solder has penetrated beyond 1/8 inch, discard the ribbon and start with a new piece.

Repeat tinning operation on the opposite end.

- 6) Holding the pre-tinned braid with pliers 1/8 inch from the end, solder the braid to the No. 1 relay arm as shown in drawings and photographs.
- 7) Form the braid into an S shape to maintain flexibility and solder the opposite end to the center point of the coax socket, again holding the braid with pliers per explanations above.
- 8) Solder one end of the long braid to the coax socket body, aligning the braid to locate directly over the No. 1 movable arm on the relay. Place the plastic cover over braid and solder opposite exposed end to the second coax socket body. The





- AFTER ENDS ARE SOLDERED
1. SCRIBE $\frac{7}{16}$ " DIA. CIRCLE
 2. DRILL $\frac{1}{8}$ " HOLE IN CENTER
 3. ENLARGE HOLE CAREFULLY USING LARGER DRILLS IN SMALL STEPS AND FINISH TO SCRIBED CIRCLE WITH ROUND FILE (1-END ONLY)

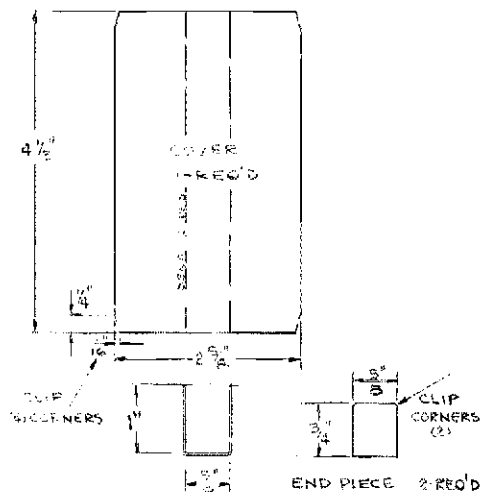


Fig. 6 - Cover details for the indicator.

GND end of capacitor C3 is also soldered to one of the braid tie points.

9) The two wires marked REC are soldered to the center point of the phono jack. Lead marked REC GND is connected to the body tab on the socket. In some phono jack designs it may be necessary to place a solder lug on the nearest mounting screw to obtain a grounding tab.

Several arrangements for connecting the antenna relay into a station system are shown. However, there are no best ways since each station has its specific limitations and requirements. Some good planning is now in order!

The auxiliary leads are internally switched closed when relay is in transmit mode, and are open when relay is in receive.

The capacitors are used to bypass the rf voltages to ground, thus reducing leakage to the outside of the shield.

Power Output Indicator

Whenever the transmitting frequency is changed, even within the band, it is sometimes necessary to retune the final tank coil to an indicated dip in the plate current, and to retune the coupling or output load to "maximum output." Specific information on this procedure is in our operating manual.

For less than two dollars, here is a power output indicator. It absorbs very little power and may be left permanently in the coaxial feeder line. The device is designed for 50 to 55-ohm coaxial line, but no measureable difference was seen in tests on 75-ohm systems. However, for the purists, data for a 75 to 90-ohm unit are included in the drawings and parts list. The device can be used with any rig running 25 watts or more.

Operationally, this unit is a sampler. A small amount of power is sampled from the feed line and measured by the color or brightness of the indicator lamp filament. Only relative power comparisons can be made with the bare unit, but "maximum output" is easily read. A photographic light meter could possibly be incorporated to calibrate the device.

The housing is made in two parts of material obtained from the sidewall of a three-pound Crisco shortening can. These cans are smoothly surfaced on both sides. The tin-lead mix on the can surface is a good rf conductor, and the better looking side is used on the inside of the housing. The coating makes soldering very easy. Construction details are shown in the drawings and photographs.

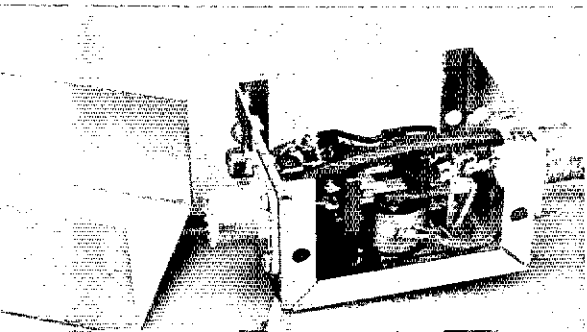
Care should be taken not to let any part of the base of the lamp touch the metal housing. Observation of the spacing dimensions of the short lead will insure correct lamp clearance.

The device will work in either direction, there is no "in" or "out" specification. The coaxial feeder from the antenna connects to one end, and a short length of coax connects the other end to the transmitter output socket.

To get the best output from your transmitter, simply tune the output or load adjustment for maximum color on the filament, while readjusting the plate tuning control for the dip in the plate current indicator. A totally peaked transmitter can make a difference of an "S" point or more, and it may be the difference between a "go" and "no-go" DX contact.

For transmitters of over 100-watts input, a No. 47 lamp should be substituted for the No. 49. For inputs greater than 500 watts, the length of the instrument should be reduced to 3 inches overall.

QST



The completed installation shows how the relay is installed in the box.

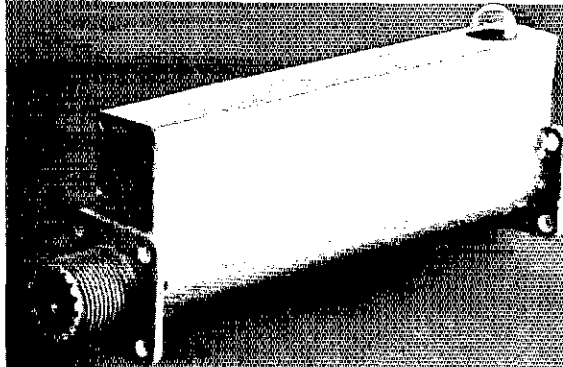
QST for

Parts List for Antenna Relay

- C1, C2, C3, C4 – capacitor, disk ceramic, .001 μ F 400 volts.
Aluminum Box, 2-1/8 \times 2-3/4 \times 1-5/8 inches (Radio Shack part No. 270-245).
Coax receptacle, type SO-239 square flange (2 required).
Phono jack, flange mount.
RG-58A/U coaxial cable, 6-inch long piece.
117-V cord, "zip" type twin line, 6 ft. each (2 required).
Relay, Potter and Brumfield type KAP, 3 PDT, 115 VAC (Poly Paks \$2.98. Specify. No Substitute).

Parts List for Output Indicator

- Coax fitting, type SO-239, with square flange, (2 required).
No. 14 or No. 16 enameled copper wire, 4-1/4-inches long.
Dial Lite, No. 49, 2 V .06 A.
No. 22 copper wire, 1/2-inch long (tinned).
Brass tubing, 4-3/16 inches. 1/4-inch OD for 50-ohm unit. 3/16-inch OD for 75-ohm unit, (available in 12-inch lengths at hobby shop.)
Metal from side wall of can (see text).



Here is the completed device ready for installation in the feed line.

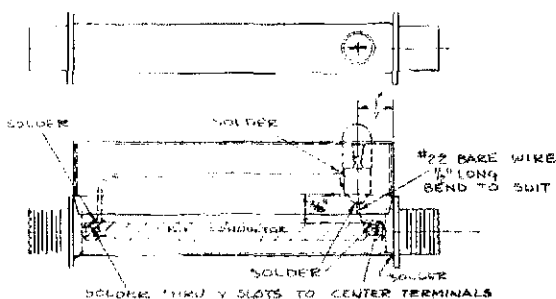


Fig. 7 – This drawing shows the completed output indicator.

Strays

The Foundation for Amateur Radio, Inc., a non-profit organization with its headquarters in Washington, D. C., announces its intent to award three scholarships for the academic year 1973-74. All amateurs, wherever resident in the U. S. and holding an FCC license of at least General Class, can compete for one or more of the awards if they are now enrolled or have been accepted for enrollment in a full-time course of studies beyond high school.

The John W. Gore Scholarship pays \$500. Applicants must intend to pursue a career in electronics or a related science and have completed at least one year in an accredited college or university. Preference will be given to residents of the District of Columbia, Maryland, and Northern Virginia. Recent award winners are: WA7BIP, WB2TCZ/3 and WB6UFT.

The Richard G. Chichester Scholarship pays \$250. Applicants must be a member of the ARRL and be sponsored by an ARRL-affiliated club. There is no restriction on the course of study, but applicants must be enrolled in or have been accepted by an accredited university, college or technical school. Preference will be given to residents of Ohio, Kentucky, Indiana, Illinois, the District of Columbia, Maryland and Northern Virginia.

The FAR Technical Scholarship pays \$200. Applicants must have been accepted or enrolled in

an accredited technical school. Area preference is the same as the Gore Scholarship.

Application forms can be requested from the Chairman, Scholarship Committee, 8101 Hampden Lane, Bethesda, MA 20014. Requests must be postmarked prior to June 1, 1973.

The Foundation is devoted exclusively to promoting the interest of amateur radio and to scientific, literary and educational pursuits that advance the purposes of amateur radio.

We don't usually highlight home station operation during Field Day, but Marc Schwaegerle, W6GQEW, had a valid reason for not operating portable – he was in a body cast up to his chest for two months this summer! Marc made 43 contacts during FD from this *very* non-portable position.



Precise Frequency Measurement with Amateur Equipment

BY R. B. SHREVE,* W8GRG

FOR MOST AMATEURS, investment of substantial sums of money in equipment devoted solely to precise frequency measurement would be a waste. Even to qualify for a Class I Official Observer appointment the required accuracy is only 71.4 parts per million, which is 1/4 kHz on the 80-meter band, or 1 kHz on 20 meters. As a 1968 *QST* article pointed out,¹ this can be done with nothing more elaborate than a well-calibrated receiver that has a dial graduated in 1-kHz intervals.

This article is directed to those who, like the writer, want to do better — those who would like to be able to measure an incoming signal under actual operating conditions with an accuracy of 5 Hz or better, or set the transmitter oscillator in a 144-MHz rig exactly on frequency — and do it without a lot of expensive specialized equipment.

Those lucky ones with access to a frequency counter that will count Megahertz have no problem setting the trimmers in a crystal oscillator, but measuring the frequency of an incoming cw signal is something else. The difficulty lies in obtaining a clean signal, free of noise and QRM that would affect the count, for a sufficient time interval.

What It Is

Fig. 1 is a block diagram of the essential elements of a multicomponent system which has been used for years in one form or another to measure frequencies with equipment that is readily available, and generally useful around the shack. Basically, the system consists of an accurate frequency standard, plus a way to compare the signal to be measured with this standard, and means of measuring the difference in frequency between the two. The only item out of the

* 2842 Winthrop Road, Shaker Heights, OH 44120.

¹ Wood, "Try the FMT!", *QST*, July 1968.

ordinary is a binary counter, and this can be built quite easily of relatively inexpensive components, since it operates entirely at audio frequencies.

If the signal to be measured and a marker of comparable strength and known frequency are fed to a receiver simultaneously, they will generate a beat note at the difference between the two frequencies. Measuring this beat note, and adding it to or subtracting it from the known marker frequency will give the signal frequency. The easiest way to measure the beat note is to compare it with the output of an audio oscillator. The oscillator frequency can be read from a calibrated dial, but using a counter makes the readings easier, faster, and more accurate.

It is possible to measure ham-band frequencies with any receiver that will tune in the signal, but this is one place where some of the old-time gear has an advantage over more modern equipment. For example a receiver designed for a-m and cw, in which the BFO can be turned off, is easier to work with than one built for ssb and cw exclusively. For measurements outside the ham bands, as when setting the frequency of a crystal that is multiplied eight times to reach 144 MHz, a general-coverage receiver is almost a necessity. The writer uses an old receiver that tunes 155 kHz to 30 MHz, and has vernier logging scales on both the main tuning and bandsread dials.

It is more important that the receiver be stable than that it be accurately calibrated. Sensitivity to vibration, or a tendency to drift during the short periods required to make the measurements, will complicate matters.

As with the receiver, the most important requirement for the standard is stability. When calibrated to WWV it should hold the adjustment long enough to complete the measurements desired. It should also provide markers every 10 kHz, so that an audible beat note, never higher

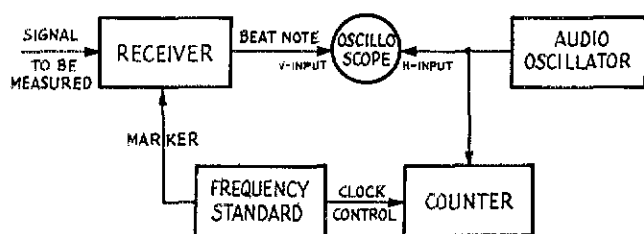
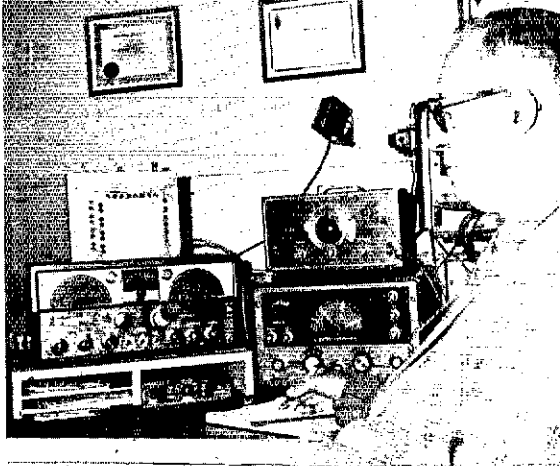


Fig. 1 — Block diagram of the frequency-measurement system.

Here is the author making a frequency measurement. The binary counter is mounted on top of the receiver.



than 5 kHz, is obtainable with any signal. The writer uses a Mainline FS-1 standard,² which is ideal. It employs a high-accuracy 4-MHz crystal and integrated-circuit dividers to generate markers at intervals of 1 MHz, 100 kHz, and 10 kHz, selected by a switch. Stability of its output is excellent — there is no measurable drift at normal room temperatures — and it can be set to within 1 Hz of WWV at 10 MHz, an accuracy of 1 part in 10,000,000.

It is possible to obtain 10-kHz calibrator and a decade divider, but unless the crystal is mounted in an oven and the calibration adjustment better than most, it will be difficult to obtain the stability and accuracy desired.

As mentioned above, the beat between the unknown signal and the known standard is matched with the output of a tunable audio oscillator. The matching is done while using an oscilloscope. Neither the oscillator nor the scope need to be elaborate or expensive, as no frequencies over 5 kHz are to be compared. Simple kit-type instruments are entirely adequate; the writer uses an old Heathkit audio oscillator and the Heath monitor scope used to monitor the transmitter. The latter has a vertical input in addition to its rf input; this vertical input is connected to the receiver audio output. Output of the audio oscillator is connected to the scope horizontal input and to the frequency counter.

Measuring a Signal "On the Air"

For high-accuracy measurements, some preparation is desirable. Equipment should be turned on well in advance, and allowed to reach a stable operating temperature. The standard should then be checked against WWV and recalibrated if necessary. If the standard has switch-selected outputs, calibrate it with the switch in the 10-kHz position. The crystal frequency may vary several Hertz when the switch is moved from the 1-MHz position to the 10-kHz position, unless an unusually well regulated power supply is used!

Tune in the signal to be measured and zero beat it initially against the receiver BFO, with the standard turned off. Read the frequency as accurately as the receiver dial will permit, and write it down. You should be within a half kilohertz. This approximation will help you decide later on what marker frequency you measured from, and whether to add the beat frequency to the marker or subtract it.

If the unknown signal appears to be more than 500 Hz and less than 4500 Hz from a 10-kHz marker, you're in luck. Turn off the BFO, turn on the standard, and tune the receiver so the beat

between the signal and the marker is audible in the speaker and visible on the scope. Don't worry about the dial reading now; what we're trying to do is get the two signals and the beat note in the receiver passband.

When you are sure you can identify the beat note in which you are interested in as a vertical pattern on the scope (this may take a few tries alternating the BFO and the standard if you are attempting to measure a cw signal in a crowded band), set the audio oscillator to the approximate beat frequency and tune it back and forth slowly, until you get the oval pattern on the scope that indicates a one-to-one relationship between the beat note and the oscillator.

We now have, in the oscillator signal, an audio frequency free of the noise and QRM that messed up the vertical pattern on the scope. Measure it with the counter, and add or subtract the reading to or from the marker frequency. Check your result against the dial reading you wrote down earlier to be sure you went the right way from the right marker.

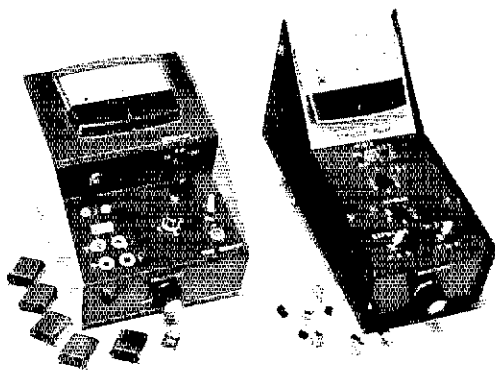
But suppose we weren't lucky, and the signal falls either very close to a marker or about 5 kHz from one? To get a recognizable and measurable beat note, use the receiver BFO. Start by beating the unknown signal against the BFO signal, with the standard turned off, but instead of a zero beat, tune for an easily recognizable beat note, say between 1000 and 2500 Hz. Measure this beat frequency and record it. Turn the standard on and the unknown signal off *without disturbing the receiver tuning* (I use a switch in the antenna lead for this) and tune the audio oscillator to the new beat note between the marker and the BFO, and measure it. The difference between the two measured beats is what the beat would be between the marker and a signal close to it; the sum of the two is what the beat would be between the marker and a signal about 5 kHz away.

Setting Crystal Frequencies

There's nothing nicer than putting a newly converted two-meter fm rig on the air and hearing "Nice signal, OM — full quieting and right on the button" from your first contact. Much better than

(Continued on page 27)

² Hoff, "The Mainline FS-1 Secondary Frequency Standard," *QST*, Nov. 1968.



Exterior view of the testers. The crystal/bipolar-transistor checker is at the left. FETs and bipolar transistors can be tested with the instrument at the right.

A Pair of Handy Testers

BY DOUG DEMAW,* WICER AND CLARKE GREENE,** WA1JLD

IF YOU'RE a chap who likes to experiment with transistors and surplus crystals, chances are you have plenty of devices that possess unknown characteristics—good, bad, or somewhere in between. If you're like the writers, you probably have a number of surplus solid-state computer cards in the workshop, and those may contain transistors with "odd" numbers stamped on their cases . . . or no numbers at all! It would be nice, therefore, to be able to determine whether they are npn or pnp types, and if they will function in the hf spectrum as amplifiers or oscillators. That drawer filled with surplus crystals might bear investigation too. The good crystals could be classified as to activity and frequency, and the bad ones cast into the trash bucket. You might even own a handful of FET or bipolar transistors. The condition may be questionable, since they have been used, or were purchased from a surplus dealer. Wouldn't it be comforting to know if they

were good or bad before soldering them into that new circuit you've been working on?

The two testers described here can be classified as "go-no-go" units, for they tell the relative condition of transistors and crystals, rather than reading out the exact specifications of either device. However, one can get a pretty good idea as to the general usefulness of the part being tested by understanding how these testers perform. Those builders skilled in the art of miniaturization might well consider building either of the units in a more compact manner, suitable for carrying to flea markets and hamfests. Wouldn't it be nice to know whether or not those surplus crystals and transistors the other guy has for sale are in good condition before paying for them? You bet!

No. 1 Tester

The circuit shown in Fig. 1 is intended solely as a tester for npn and pnp transistors, junction FETs, and dual-gate MOSFETs, n or p channel. Sockets are provided on the top surface of the tester, permitting the user to plug in whatever rf device he may be interested in testing. This equipment is not for use in checking audio or high-power tran-

* Technical Editor, *QST*.

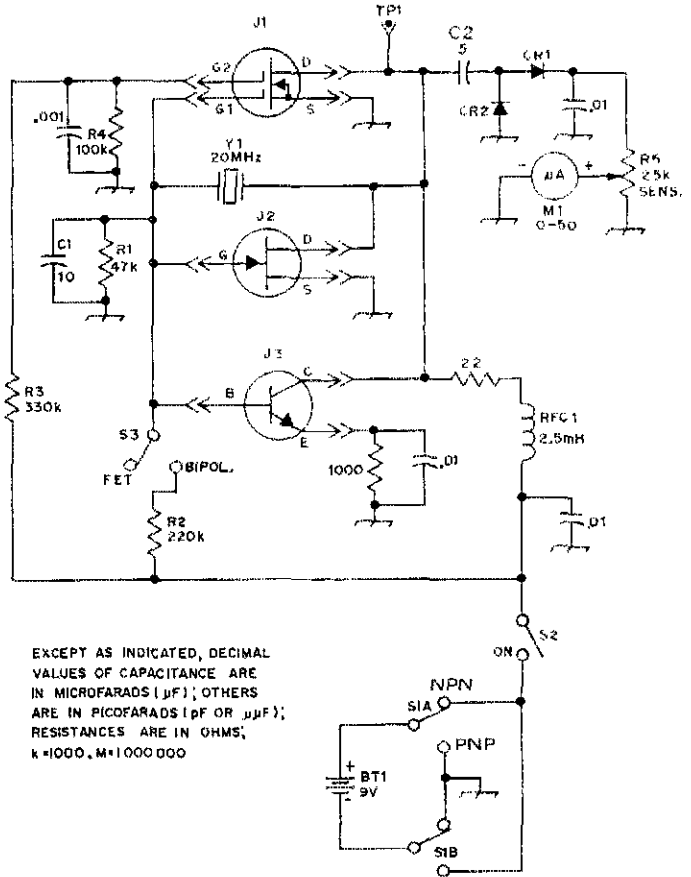
** Lab Technician.



Interior view of the No. 1 tester. The battery is held in place by means of a standard clip. Though some of the parts are mounted on a homemade pc board, other mounting techniques are acceptable (see text).

Fig. 1 — Schematic diagram of the No. 1 tester. Capacitors are disk ceramic or mica. Resistors are 1/2 or 1/4 watt composition except for R5. Estimated cost for this tester (all parts new) is \$15. Numbered components not appearing in parts list are so designated for text discussion.

- BT1 — Small 9-V transistor-radio battery.
- CR1, CR2 — 1N34A germanium diode or equiv.
- J1 — Four-terminal transistor socket.
- J2, J3 — Three-terminal transistor socket.
- M1 — Microampere meter. Calectro D1-910 used here.
- R5 — 25,000-ohm linear-taper composition control with switch.
- RFC1 — 2.5-mH rf choke.
- S1 — Two-pole double-throw miniature toggle.
- S2 — Part of R5.
- S3 — Spt miniature toggle.
- Y1 — Surplus crystal (see text).



sistors. One of the simple testers found in the ARRL *Handbook*, or made by Heath as a kit, is suited to that purpose, and provides a go-no-go method of checking for leakage, short circuits, and relative dc beta (current gain). It should be no trick for the innovator to build both circuits into one small box.

The circuit of Fig. 1 is an oscillator which is wired so that it will test various small-signal transistors by switching the battery polarity and bias voltage. A crystal for the upper range of the hf spectrum is wired into the circuit permanently, but could be installed in a crystal socket if the builder so desires. A 20-MHz crystal was chosen for this model merely because it was in the parts drawer at the time. Any hf crystal cut for fundamental-mode operation can be used. Most crystal manufacturers do not offer fundamental-type crystals for frequencies above 20 MHz. The higher the crystal frequency, the better, as this will let you know if your transistor will oscillate in the upper part of the hf range. However, any hf-band crystal can be employed if one isn't too concerned about the upper range of the transistor with regard to frequency.

When testing FETs the bias switch, S3, is placed in the FET position, thus removing R2 from the

circuit. However, when testing bipolar transistors the switch position must be changed to BIPOL so that forward bias can be applied to the base of the bipolar transistor under test. R1 is always in the circuit, and serves as a gate-leak resistor for FETs being evaluated. It becomes part of the bias network when bipolars are under test. C1 is used for feedback in combination with the internal capacitances of the transistors being checked. Its value may have to be changed experimentally if crystals for lower frequencies are utilized in the circuit. Generally speaking, the lower the crystal frequency, the greater the amount of capacitance needed to assure oscillation. Use only that amount necessary to provide quick starting of the oscillator.

Components R3 and R4 are used as a voltage divider to provide bias for dual-gate MOSFETs. C2 is kept small in value to minimize loading of the oscillator by the low-impedance voltage doubler, CR1 and CR2. Rectified rf from the oscillator is monitored on M1. Meter deflection is regulated manually by means of control R5. S1 is used to select the desired supply voltage polarity — negative ground for testing n-channel FETs and npn bipolars, and a positive ground when working with p-channel and pnp devices.

Evaluating

A word of caution is in order before we continue. When testing MOSFETs that are not gate protected (3N140 for one), make certain that the transistor leads are shorted together until the device is seated in the test socket. Static charges on one's hands can be sufficiently great to damage the insulation within the transistor. The writers like to use a single strand of wire from some No. 22 or 24 stranded hookup wire, wrapping it two or three times around the pigtails of the FET as close to the transistor body as possible. After the FET is plugged into the socket, unwrap the wire and perform the tests. (It's not a bad idea to have an earth ground connected to the case of the tester when checking unprotected FETs.) Put the shorting wire back on the FET leads before removing the unit from the tester.

The meter indication is significant in checking any type of transistor. If the device is open, shorted, or extremely leaky, no oscillation will take place, and the meter will not deflect. The higher the meter reading, the greater the vigor of the transistor at the operating frequency. High meter readings suggest that the transistor is made for vhf or uhf service, and that its beta is medium to high. Lower readings may indicate that the transistor is designed for hf use, or that it has very low gain. Transistors that are known to be good but will not cause the circuit to oscillate are most likely made for low-frequency or audio applications. The dc current-gain tester mentioned earlier can be used to confirm this.

Tester No. 2

The circuit of Fig. 2 is intended primarily to test surplus crystals and bipolar transistors. It uses a Pierce oscillator, as does the circuit of Fig. 1. Battery polarity can be switched to allow testing of

npn or pnp transistors. Crystal quality is indicated on M1. The greater the crystal activity, the higher the meter reading. A suitable transistor for use at Q1 (when testing crystals) is the 2N4124, MPS3563, or HEP53. All three have f_T ratings well into the vhf spectrum, and each has reasonably high beta. The two characteristics make the devices ideal as general-purpose oscillators.

This tester will work well from the upper hf range down to at least 455 kHz. S1 is used to change the value of feedback capacitance. The lower the frequency of operation, the greater the amount of capacitance required.

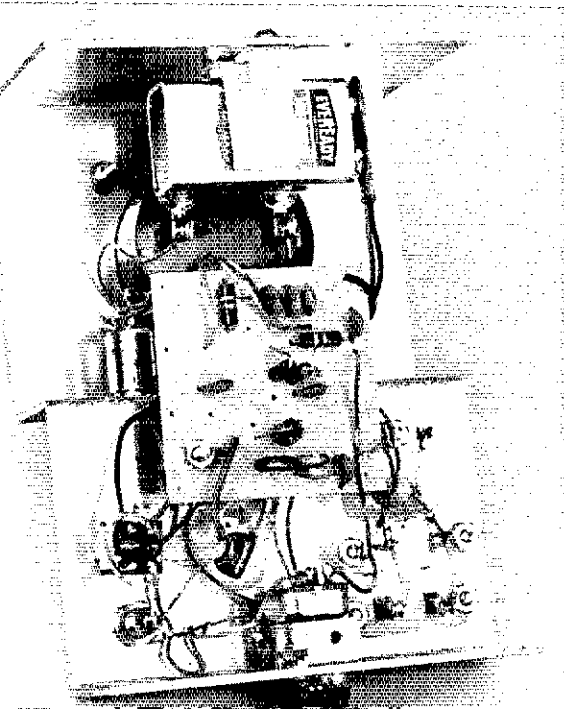
A transistor can be checked by plugging the unknown type into the panel socket while using a crystal of known frequency and condition. Both testers can be used as calibrators by inserting crystals for band-edge checking. The frequencies of unknown crystals can be checked by listening to the output from the test oscillators on a calibrated receiver or while using a frequency counter connected to the designated test point.

Four crystal sockets are provided in the model shown here. J1 through J4 provide for testing of FT-243, HC-6/U, HC-17, and HC-25 crystals, the most popular holder styles in use today. Other types can be added by the builder if desired.

Construction Notes

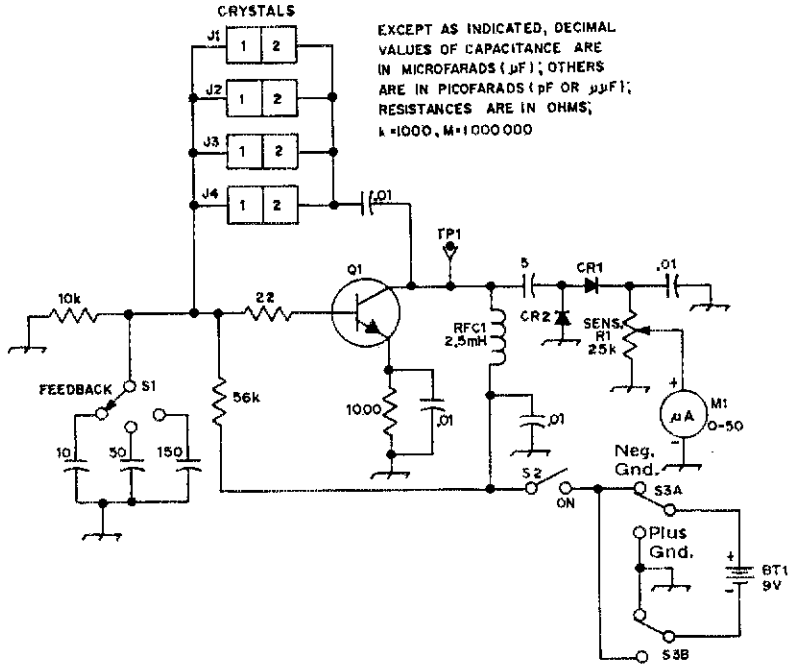
No layout templates are given for the small circuit boards used in the testers. Since wiring is by no means critical, any hookup format will work fine provided the connecting leads are kept short in the if portions of the circuits. Perforated board with push-in terminals will work fine, or ordinary multilug terminal strips can be employed in place of circuit boards.

Writer WA1JLD has a flair for packaging equipment in neat and fancy boxes, so he is responsible for the good looks of these boxes. W1CER was concerned only with the circuitry of these projects, so can't take credit for the modern



Interior view of the crystal tester. Various styles of crystal sockets are visible at the lower right. The feedback switch can be seen just to the left of the circuit board.

Fig. 2 — Schematic diagram of the No. 2 tester. Capacitors are disk ceramic. Fixed-value resistors are 1/2 or 1/4-watt composition. Estimated cost for this tester (all new parts) is \$13.



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

- BT1 — Small 9-V transistor-radio battery.
- CR1, CR2 — 1N34A germanium diode or equiv.
- J1-J4, incl. — Crystal socket of builder's choice.
- M1 — Microampere meter, Calectro D1-910 used here.
- R1 — 25,000-ohm linear-taper composition control with switch.

- RFC1 — 2.5-mH rf choke.
- S1 — Single-pole three-position phenolic rotary wafer type, miniature.
- S2 — Part of R1.
- S3 — Double-pole double-throw miniature toggle.
- Q1 — Vhf npn bipolar. 2N4124, MPS3563, HEP53.

appearance of the units. It should be pointed out that any packaging technique desired by the constructor should be ok. Miniboxes are easy to obtain and should be considered. The boxes shown in this article were fashioned from sheet aluminum and painted in two complimentary colors by means of spray-can paint dispensers. Labeling was done with press-on decals.

Most of the parts used in these projects were obtained from Allied/Radio Shack. The crystal

sockets are James Millen and International Crystal Co. types.

Any microampere meter will do the job well. Basic meter movements from 50 to 500 μA will provide plenty of sensitivity for the tests described in this article. Those not having transistor sockets on hand can use Nuvistor tube sockets instead. Remove the socket lugs that aren't needed. This will help to avoid confusion when plugging in the transistor to be tested. QST

Precise Frequency Measurement

(Continued from page 23)

"Sorry, OM, you're way off frequency and just not making it." How? Nothing to it!

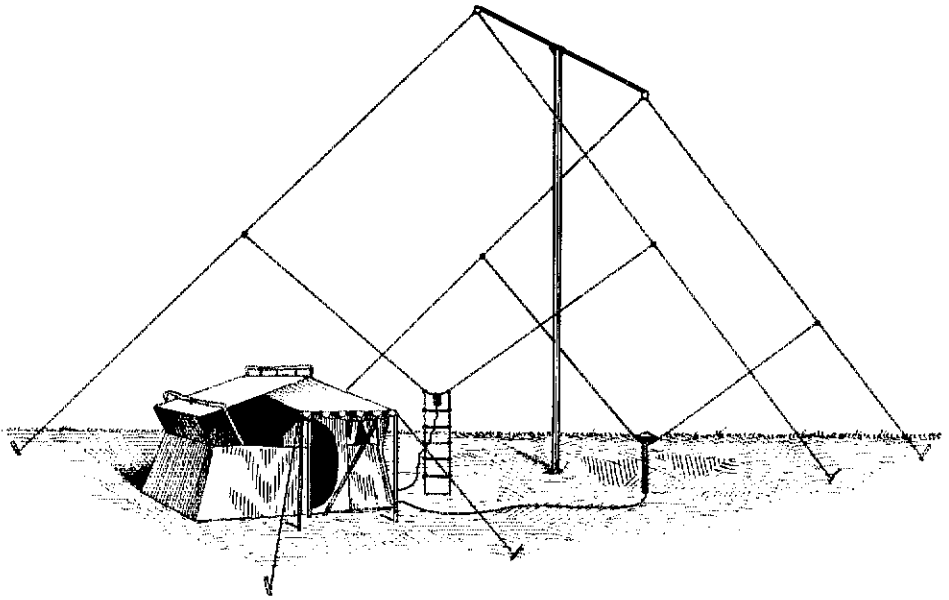
Connect your nice new transmitter to a dummy load. Loop a couple of turns of an insulated wire in the vicinity of the crystal oscillator and connect the other end to the antenna terminal of your frequency measurement receiver.

Let's say we are going on 146.94 MHz with a rig that multiplies the oscillator frequency eight times. Our crystal frequency is $146.94 \div 8$ MHz, or 18,367.5 kHz. Obviously, this is where the

general-coverage receiver comes in, and we will be outside any calibrated scale on the bandspread dial.

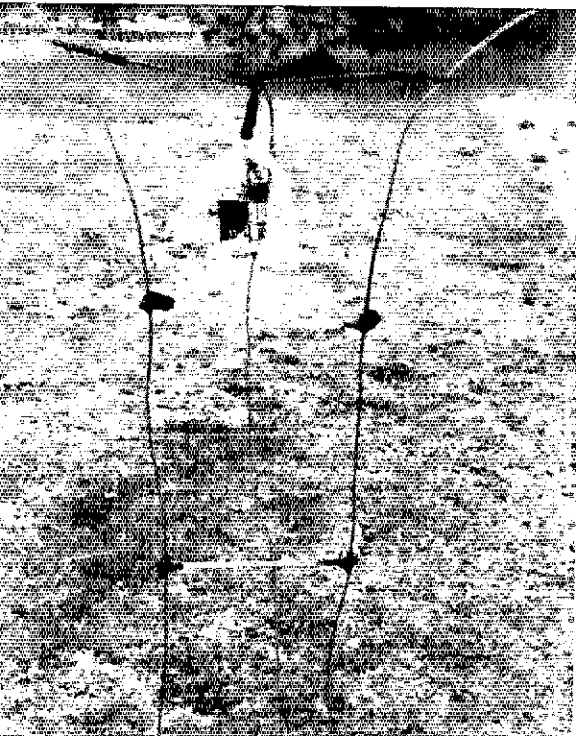
Set the frequency standard to produce markers at 100-kHz intervals, and zero beat the marker at 18,400 kHz with the receiver BFO. Switch to 10-kHz markers and tune carefully down three markers to 18,370.0 kHz. Turn off the BFO, key the transmitter, and you should hear the beat between the marker and the crystal.

Set the audio oscillator exactly to 2.5 kHz, checking the setting with the counter. Adjust the crystal trimmer to match the beat note with the oscillator frequency on the scope, and there you are — crystal on 18,367.500 and output precisely on 146.94 MHz. Easy, isn't it! QST



A PRACTICAL 40-METER QUAD

BY PETER H. GRILLO,* W9LVT/6



WHAT WAS IT that made Field Day a successful event for your club last year? Was it the publicity generated in your local newspaper? Was it the mere fact that the generator lasted the duration? Did you finally get enough operators to keep all the transmitters going simultaneously? For once, did you finally penetrate the ether and score well on the low bands primarily because the big antennas stayed up? Whatever your reasons may have been for a successful event, good luck certainly played its part since it takes only one small failure to dampen Field Day results. You say that you weren't so lucky? Oh well, there's always next year — or, how about Sweepstakes?

You can start planning right now for the next contest. One of the most perplexing problems continuously plaguing the Field Day committee is

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Fig. 1 — A simple relay arrangement is used to short out the stub and change the pattern of the antenna from one direction to another. A small plastic bag provides weatherproofing in the event it rains. (Doesn't it always?)

QST for

how to install a good antenna system. For most clubs, finding a good location is generally the easiest job. The location must be surveyed by the club antenna specialists. The decision of how many transmitters to use depends mostly on how many individual antennas can be set up for simultaneous operation as well as how many operators are available for the 24-hour stretch. Of course, an abundance of equipment is desirable.

Propagation conditions for Field Day and Sweepstakes generally favor the lower bands since they usually remain "open" all night. Success on the higher frequency bands (10 and 15 meters) depends primarily on catching the short-duration openings. As we approach the minimum of the present solar sunspot cycle, 80 and 40 meters will become the most productive bands. A good antenna system becomes critical. The old trick of tying a rock to the end of a long piece of wire, tossing it into the tallest tree and loading it with a coupler just won't "cut the mustard" anymore. Gain and directivity into the dense population areas is the goal. However, the antenna must be simple to construct, easy to tune, and moderately stable against the wrath of Murphy and Mother Nature.

Our club decided to try a two-element full-sized cubical quad for 40 meters. The immediate reaction within the more conservative ranks of our club was, "A 40-meter quad? It'll never work, the first breeze will knock it down!" With these objections in mind, we went ahead with our plans. Our location was approximately rectangular in shape, 60 feet wide, 500 feet long, and above the rest of the terrain. Of course, it just happened to be one of the highest locations in Winnebago County, Illinois!

The sketch illustrates the basic construction of the quad. Dimensions were estimated, using the formula

$$L(\text{feet}) = \frac{248}{F(\text{MHz})}$$

where L is the length of one side of the diamond. The parasitic element was constructed as a reflector using an extra long stub. A small relay shorts out the stub, thus converting the parasitic element from a reflector to a director (see Fig. 1).

The resonant frequency of the driven element is 7150 kHz, the middle of the band. The distance L for the driven element is 34 feet 8 inches. The parasitic element dimension is 5 percent smaller than the driven element. The stub is constructed so that the total circumference of the parasitic element with stub in the line is 5 percent greater than the driven element. L for the director is 33 feet. The stub length is 6 feet 9 inches. Eight-inch plastic spacers are placed between the two wires of the stub.

Supporting the quad is very simple. The mast is 50 feet high guyed with nylon ropes. The boom is constructed from two telescoping sections of electrical conduit and is 18 feet long. The elements are made from No. 14 stranded wire. The driven element is fed directly with RG-58/U coaxial cable.

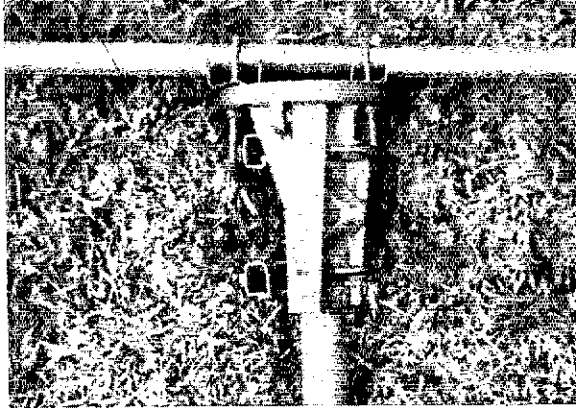


Fig. 2 — The bottom section of a CDE Ham-M rotor can be adapted to serve as a boom-to-mast bracket.

Location of the stub short is determined by the point of maximum front-to-back ratio. The boom-to-mast construction utilizes the support base from a Ham-M rotator. All it takes is a couple of U-bolts and the boom-to-mast assembly is complete (see Fig. 2). The wire is strung from the end of the boom and is supported by a small piece of nylon rope and an egg insulator.

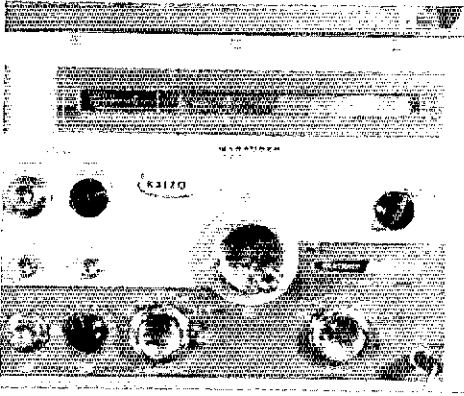
Results

Orientation for the quad was east and west. Favoring the eastern direction was the driven element/reflector combination whereas the driven element/director combination was broadside to the western direction. A local amateur, approximately 5 miles west of the Field Day site, assisted in tuning the quad for maximum front-to-back ratio. The end result was approximately 25 dB.

Results were a tremendous surprise! The antenna worked just as planned. The class of entry for simultaneous operation of two transmitters was used. One transmitter operated on 20 and 80 meters; the second transmitter was set up for 15 and 40 meters. Our club, W9AXD/9, scored third place in the two-transmitter class. Our biggest totals came from 40 meters — 693 contacts; over one third of our total number. For the first four hours of the contest the antenna was aimed east. A rate of 90 contacts per hour prevailed for five solid hours. From that point on it was a steady decline after a sharp drop to about 45 contacts per hour. It was later surmised that the reason for the drop in contact rate was lack of activity and difficulty in finding stations that hadn't been worked before. The East Coast QRM was drastically reduced by changing the switch from "east" to "west." By midmorning we were surprised to find only a dozen W5-stations listed in the log. The antenna may not have been too effective in the southern direction.

There is no reason why this arrangement couldn't be used for DX operating. The antenna could be positioned just underneath a beam for the higher frequency bands with the peak of the diamond supported from a boom placed through the top section of the tower.

QST



Front view of the transmitter with the new dial markings in place. The transceiver switch is at the extreme right.

Transceive Operation for the Heath HX-10

BY MARTIN E. BERMAN,* K3IZQ

THE Heath Marauder ssb transmitter may be modified to operate in the transceive mode with an SB-300 or SB-301 Heath receiver. The modification is very simple; no structural changes are required. The only cost is that of a crystal to cover the band desired. Since the 3.5-MHz band position does not utilize heterodyne frequency conversion, it is not possible to transceive on this band. The receiver has a phono jack for obtaining linear master oscillator (LMO) energy, from 5 to 5.5 MHz. The VFO in the Marauder has a 600-kHz range from 4.9 to 5.5 MHz. The transmitter can be excited either from the VFO or crystal oscillator. A two-position FREQUENCY CONTROL switch is provided on the panel for this purpose, marked VFO and CRYSTAL.

Detailed Description for Conversion on 20 Meters

1) Obtain a crystal for 10.500 MHz. It must be substituted for the original 10.4 MHz heterodyne crystal in the transmitter. This will raise the lower end of the 20-meter band segment from 13.9 to 14 MHz.

2) Prepare a plastic strip, embossed from left to right with the numerals zero through five. Space out these figures to line up with the markings on the slide-rule dial. Apply this strip to the lower face of the green bezel so that zero is at the left end of the dial. Prepare a strip marked TRAN-

SCIVE and apply this over the word CRYSTAL at the FREQUENCY CONTROL switch. Prepare a short strip marked 14.0 and place it over the 13.9 figures for the BAND SELECTOR.

3) Prepare a 30-inch length of shielded single-conductor microphone cable. Place a phono plug on one end, and two small alligator clips on the other end.

4) Remove the transmitter from the case.

5) Insert the phono plug into the LMO jack on the rear apron of the receiver. Connect the inner wire of the cable at the other end to the left socket of the crystal holder on top of the transmitter VFO. Connect the shield to the chassis.

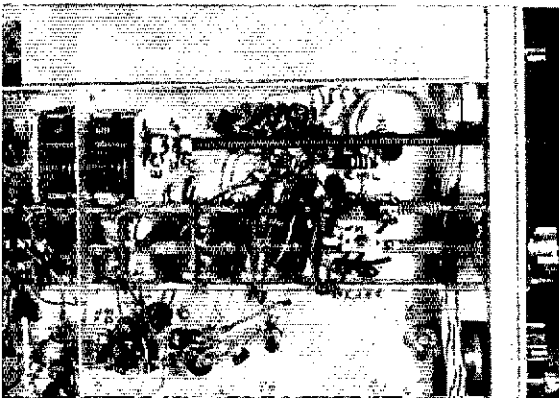
6) Replace the 10.4-MHz heterodyne crystal with one for 10.5 MHz.

7) Turn the FREQUENCY CONTROL switch to the TRANSCIVE position and the FUNCTION switch to SPOT.

8) Set the receiver to 14.2 MHz and monitor your voice for correctness of pitch. The chance that the pitch will be correct is slim, so you will have to pull the heterodyne-frequency oscillator slightly. If your voice pitch is high, connect a small gimmick capacitor (two 2-inch long No. 22 insulated wires twisted together) or a very small-value trimmer capacitor (not over 10 pF) from terminal 3 on wafers BS1 of the band selector switch to the chassis. Adjust the capacitor until your voice pitch sounds natural. If your voice pitch

(Continued on page 34)

* 62 Jefferson Drive, Pittsburgh, PA 15229.



The band selector is at the center of the photograph. Some of the gimmick capacitors have been made by winding several turns of No. 22 wire around the grounded switch frame.

BY NEIL JOHNSON,* W2OLU

A SHORT TIME AGO, a local ham was telling me about the latest power supply that he had built . . . slightly larger than a cigar box, and good for half a kilowatt, he said. This seemed odd since no one has succeeded in miniaturizing the watt. Granted that certain improvements in power supply design have been made in recent years such as Hypersil cores and the substitution of solid-state rectifiers for vacuum tubes. Power supply design still remains basically the same. After speaking with my young friend I learned that he managed to burn up his power supply while operating over an extended period in a recent contest.

This information brought back to mind something which took place a short time before. After reading all about the advantages to be expected from a voltage-doubler type of power supply, we had hooked up a small surplus transformer, rated at 400 volts center tapped and 200 milliamperes. Using silicon diodes and some large filter capacitors, we proceeded to run voltage vs. current curves. The results were rather mystifying in that the curve resembled a hysteresis loop (see Fig. 1). The voltage vs. current figures were not consistent when readings were being taken. While going from 0 to 200 mA, one set of readings had been obtained. But when retracing the curve - from 200 milliamperes to zero current - identical readings were not obtained. After a good deal of thought and further investigation, we came to the conclusion that the large amount of heat generated in the transformer at the higher outputs had run up the resistance of the copper wire appreciably. Judging from my friend's experience, it would seem that this process can be carried too far.

Most amateurs tend to regard power supplies as something akin to the water that comes from the tap: just push a button and the current will flow. It is only when trouble occurs that some thought is given to the actual workings of the supply. With this in mind, we decided to investigate thoroughly the different types of power supply circuitry in use by the amateur fraternity, with an eye to learning what changes actually take place, especially those inside the transformer, whenever one circuit is substituted for another. With such information at hand, it should be relatively easy to visualize what is taking place in the power supply. The results of the investigation are tabulated in Table I.

Power supply circuits that are most frequently used by amateurs are (1) full-wave rectifier with choke-input filter, (2) full-wave rectifier with capacitor-input filter, (3) bridge rectifier with choke input, (4) bridge rectifier with capacitor input, and (5) full-wave voltage doubler. If we consider the circuit of Fig. 2A as a starting point, it is obvious that by introducing an input capacitor before the filter choke, as shown in Fig. 2B, and by drawing the same load current, we have increased the dc wattage out of the filter by approximately 50 percent. This would seem to be a favorable trade-off, since we have increased the ac input (measured in volt-amperes) by only 25 percent.

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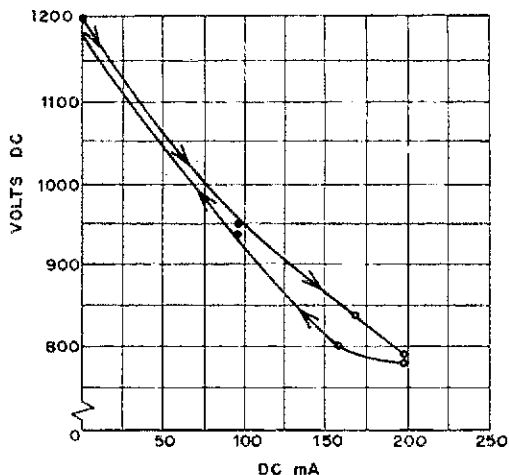


Fig. 1 - Voltage versus current plot from a power supply using a small surplus transformer. Changes in characteristics are caused by heat-induced resistance changes in the secondary and, to a lesser extent, in the primary winding.

Heat Losses in Power Transformers

Calories You Can Do Without

Closer scrutiny will indicate that the I^2R losses in the secondary are now five times what they were with the choke-input filter. Since the two rectifier circuits are identical, we may assume that the change to capacitor input has resulted in 50 percent more dc power out of the filter, but has increased the heating in the transformer secondary by a factor of five times. This results principally from the poor "form factor" of the pulsating or charging current, which is typical of capacitor-input filters. More on this subject later.

It has been postulated that a choke-input filter, fed by a bridge rectifier as shown in Fig. 2C, will deliver more dc power without a commensurate strain upon the transformer, when compared to a full-wave rectifier feeding into a capacitor input filter. In other words, when going from the circuit of Fig. 2B to that of 2C, the dc output is substantially increased, but the heating of the transformer is not. This is in accord with generally accepted theory. Bridge rectification results in

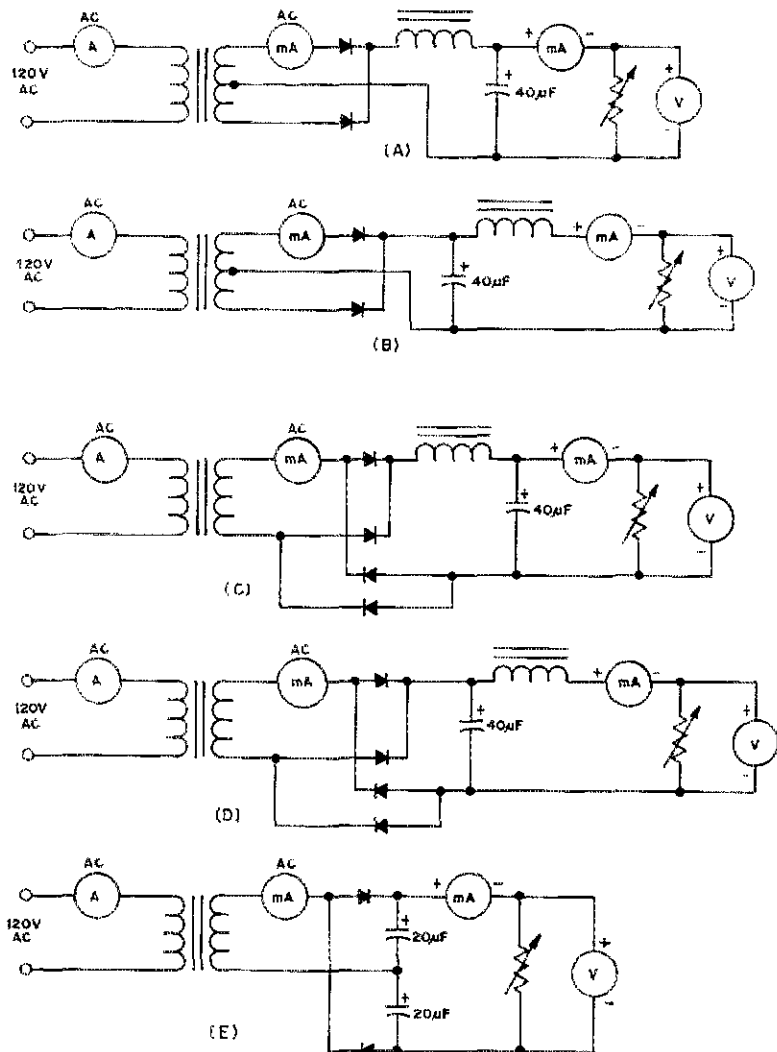


Fig. 2 - The five power supply circuits investigated by the author. See text for details.

more efficient utilization of the transformer secondary, and a choke-input filter will produce lower peak currents, with less heating of the transformer. Grammer pointed this out in a thorough article in *QST*¹ His thesis was that an economical power supply could be built around an existing broadcast-set transformer, using bridge rectification and a choke-input filter, without exceeding the ratings. This should be done judiciously, including lower consumption from the filament windings, but it points the direction in which to proceed and the results we may reasonably expect.

In the transition from the circuit of Fig. 2C to 2D, notice that the dc wattage has increased by a factor of 43 percent, and the ac input measured at

¹ For this and all subsequent references, refer to the bibliography at the end of this article.

the primary has done likewise. At first glance this would seem to be an "even up" exchange. However, the primary I^2R losses are now twice their value in 2C, while the secondary losses are roughly 3.6 times their previous value. If such losses are ignored for any length of time, it is obvious that the transformer in question will heat up internally and the copper wire in the windings will subsequently develop a higher resistance, and so on. Too much of this and we will experience burnout of the transformer. Some idea of the magnitude of the thermal increase to be expected can be calculated from a formula given in a recent article by McCarthy²

Finally, in the voltage-doubler type circuit, as shown in Fig. 2E, we obtain a vastly increased amount of power. According to the values shown in Table I, the ac input power is up 71 percent and

| Circuit 2A Full-wave rectifier, choke input | Circuit 2B Full-wave rectifier, capac. input | Circuit 2C Bridge rectifier, choke input | Circuit 2D Bridge rectifier, capac. input | Circuit 2E Full-wave voltage doubler |
|---|---|---|---|---|
| .34 A pri. .065 A sec. Pri. 12 .1156 Sec. 12 .004225 | .43 A pri. .145 A sec. Pri. 12 .1849 Sec. 12 .021025 | .49 A pri. .095 A sec. Pri. 12 .2401 Sec. 12 .009025 | .7 A pri. .18 A sec. Pri. 12 .49 Sec. 12 .0324 | 1.2 A pri. .33 A sec. Pri. 12 1.44 Sec. 12 .1089 |
| 165 V dc .1 A dc | 240 V dc .1 A dc | 340 V dc .1 A dc | 485 V dc .1 A dc | 900 V dc .1 A dc |
| .34 × 120 = 40.8 VA ac input | .43 × 120 = 51.6 VA ac input | .49 × 120 = 58.8 VA ac input | .7 × 120 = 84 VA ac input | 1.2 × 120 = 144 VA ac input |
| 16.5 W dc output | 24 W dc output | 34 W dc output | 48.5 W dc output | 90 W dc output |

Table 1 — Results of experimental data. In all circuits the entire secondary winding of the transformer was utilized, and the load current was held at 100 mA.

the dc output wattage is up 85 percent from the circuit 2D, but we now find the primary I^2R losses to be three times those of the preceding circuit, while the secondary losses are 3.36 times that of circuit 2D. It is quite obvious that considerable heating will take place. In fact, relative to circuit 2C (bridge rectifier with choke input), we conclude that the secondary I^2R losses are twelve times as high. Such rectifier-filter combinations may be suitable for relatively light duty, say for example, but when used for any appreciable period on cw or RTTY, excessive heat problems may be anticipated.³

Form Factor

The subject of form factor is rather thoroughly covered in the Radiotron Designer's Handbook.⁴ "As an example, take a transformer with centre tapped secondary which is required to deliver 100 mA. D.C. into a certain load resistance. With choke input and full wave rectification the heating value of the current in each half of the secondary will be equivalent to that of a current of 70.7 mA. RMS. Under similar conditions with typical condenser input† this figure will increase to approximately 78.5 mA. RMS."

A relatively simple explanation may be gathered from the following analogy. If we modify a sine wave to be triangular shaped, it is then immediately apparent that the I^2R factor will be greater, and losses will be more than would be the case for a flat-topped wave form having the same duration of time, but with half the amplitude (see Fig. 3). Both the triangle and the rectangle contain equal amounts of energy. However, the peak currents in the first wave form are high, while in the second instance they are constant and equal to

the average current. This wave form constitutes a theoretical ideal, but it is approached in large three-phase full-wave commercial systems. On the other hand, a high ratio of peak-to-average current is best avoided in the design of efficient power supplies. In smaller equipment this is often overlooked or ignored, but when substantial amounts of power are to be handled such factors have to be considered.⁵

Another advantage of the choke-input filter lies in the fact that it is possible to reduce greatly the static or "dead" load imposed on the system by resonating the input choke to the ripple frequency, usually 120 hertz.⁶ This enables a much lower bleeder current to be drawn, and still maintain good power supply regulation from no-load to full-load conditions. Since bleeder current usually represents a drain 100 percent of the time that is, it is not keyed on-off as are the actual transmissions — tuning the filter choke reduces the dead load imposed on the transformer-rectifier-filter system and further enhances the situation by lowering the temperature in the power supply enclosure.

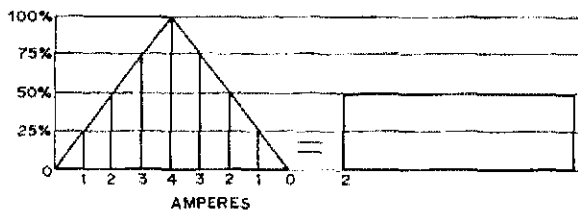


Fig. 3 — The peak currents in the triangular wave at the left are high, while the average current is represented by the rectangle shown at the right.

† [EDITOR'S NOTE: I.e., capacitor input.]

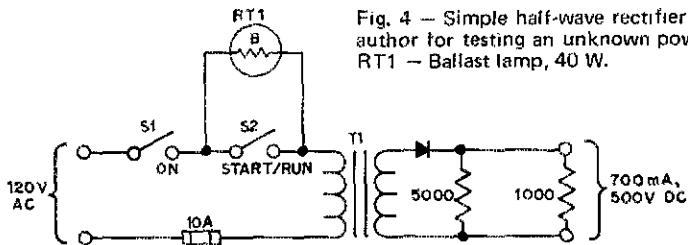


Fig. 4 — Simple half-wave rectifier circuit used by author for testing an unknown power transformer. RT1 — Ballast lamp, 40 W.

It is possible that the foregoing will not completely serve those who would prefer a more rigorous approach to the problem. Perhaps the following observation will satisfy those readers who agree that "the proof of the pudding is in the eating." Recently we had need to conduct some very basic experiments in order to obtain a rough idea of what to expect from an unknown power transformer, a surplus item. This was a high-quality product and weighed in at 50 pounds. When hooked up in the simple half-wave circuit, as shown in Fig. 4, our 10-ampere experimental fuse links kept blowing. At the time we had no ac ammeter of the proper range, so we plugged in a nonreactive load — the family electric iron — rated at 1200 watts. Surprisingly, this did not blow the fuses. Upon subsequent checking with an accurate ac ammeter, the following information was obtained: 1200 watt electric iron, 10 amperes ac primary current; transformer into half-wave rectifier, developing 350 dc watts, 15 amperes ac primary current.

The trial circuit was without an input filter capacitor. If one had been used, the peak (or fuse-blowing) currents would have been much higher. The foregoing example is a clear illustration of what is meant by "poor form factor." The dc wattage out of the filter was only 350, but the primary circuit was drawing more than 1800 volt-amperes (not watts), and that is what consistently blew the fuses. Similar heating effects,

from high peak currents, will overheat the innards of the power transformer in your transmitter or transceiver if it is not properly rated, or if overloaded.

The best circuit to use, if one has the option, is that of Fig. 2C, the bridge rectifier with choke-input filter. The full-wave rectifier with choke input filter circuit is next best. If you can't have either of these options, the wisest course is install some sort of compact fan with the thought in mind of lowering the temperature of the power supply enclosure. QST

Bibliography

- 1) Grammer, "More Effective Utilization of the Small Power Transformer," *QST*, November, 1952, p. 18.
- 2) McCarthy, "Electronic Temperature Measurements," *73*, February, 1968, p. 70.
- 3) Gordon Company, "CW Transmitters, Or A Plea To Some Manufacturers To Put Heft Back Into Their Products," *Ham Radio*, April, 1969, Cover III (inside back cover).
- 4) "Transformer Heating," *Radiotron Designer's Handbook*, Third Edition, RCA, 1940, p. 190 (4th impression, 1941).
- 5) "Form Factor," *Radiotron Designer's Handbook*, Fourth Edition, RCA, 1952, p. 134.
- 6) Johnson, "Tuned Filter Chokes - The Easy Way," *73*, December, 1969, p. 18.
- 7) Spindler, "Monograph," *Improved Small Power Transformer Design*, Zenith Radio, 1957.

Transceiver Operation

(Continued from page 30)

is low, unsolder the wire at this switch terminal, and insert the capacitor in series with this wire and the switch terminal. Adjust for correct voice pitch. This completes the change for this band segment.

If you wish to return to independent operation with the transmitter VFO, turn the FREQUENCY CONTROL switch to the VFO position. Now the frequency relates to those on the new marker strip, which are 100 kHz higher than before. When you are thoroughly satisfied with the operation, you can make similar changes to the 6.9, 20.9 and 27.9 bands. For each of these you will need a new crystal which is 100 kHz higher than that of the original heterodyne crystal. The low end of these bands then will be 7.0, 21.0 and 28.0 respectively.

Fortunately, the 28.5-MHz band requires no crystal change because the low end of this band is at 28.5 MHz, corresponding to that on the receiver. You may need to provide for pulling the heterodyne crystal frequency as described above,

however. If it is desired to change the 29.1-MHz segment, you will need a 25.5-MHz crystal to convert the low end of this band to 29.0 MHz. This crystal is 100 kHz lower than the original. The 3.5-MHz band does not employ a heterodyne oscillator and thus does not lend itself to this modification. There is ample drive from the receiver LMO to operate the transmitter. The only thing which cannot be done is switch from one sideband to the other. This modification allows lsb operation on 40 meters and usb on the other bands. QST

It Seems . . . (Continued from page 9)

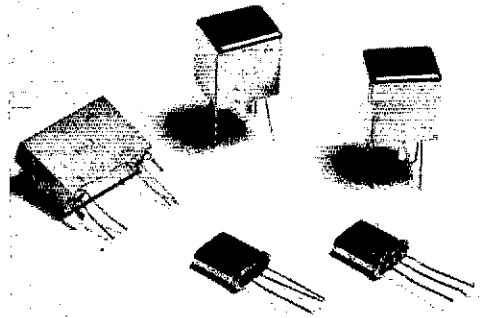
recruitment of more amateurs in fields of organization. So let's extend a helping hand to guide newcomer activities, so that they will develop the sense of responsibility and team work that goes far deeper than any individual effort. In this way, since newcomers are the leaders of the future, we can help assure that this leadership will be in good hands. QST

• New Apparatus

MONOLITHIC FILTERS FOR THE FM-RECEIVER BUILDER

Amateur radio equipment builders and experimenters are showing considerable interest these days in designing and building their own fm receivers. The heart of a satisfactory fm receiver is its i-f filter, which determines what the overall selectivity of the i-f strip will be. An excessively wide pass band will seriously impair reception when the receiver is used in areas where more than one repeater operates in a given band — 146, 220, or 450 MHz. Though some builders have had reasonable success in obtaining satisfactory i-f selectivity by using the double-conversion concept (10.7-MHz first i-f, and 455-kHz second i-f), and relying upon an i-f filter consisting of several 455-kHz i-f transformers connected in cascade, the money saved may not be as noteworthy as it would first appear.

Most builders of homemade equipment seem to prefer circuit simplicity which is consistent with good performance. Such a philosophy is appealing because it shortens the time required to



build the project, and reduces the cash outlay because fewer components are needed. Therefore, a single-conversion fm receiver should appeal to that kind of experimenter. Until recently the cost of a high-quality 10.7-MHz filter has been somewhat prohibitive for many builders — \$30 price class for an 8-pole crystal filter. Now there are a number of less-expensive filters available for use at 10.7 MHz. These components are manufactured by Piezo Technology Inc., and come in a variety of bandwidths and prices.¹

The Piezo filters, shown in the photo, come in various case styles and sizes — flatpack, upright mount, and pc-board mount. These combine integrated crystal filters are (depending on the model number) available in sizes from 0.185 X 0.432 X 0.450 inch to 1 X 2.39 X 0.52 inches.

Amateurs should be particularly interested in the Model 2194F, which can be used singly to obtain a ± 30 -kHz band width at the 20-dB points, with a ± 6.5 -kHz band width at the 3 dB points. Ripple is rated at 1 dB maximum, insertion loss is 2 dB, and the nominal termination impedance (bilateral) is 2700 ohms. A curve for this filter is given in Fig. 1. Single-lot price is \$10 (1 to 4 pieces). In quantities of 5 to 9 the cost drops to \$5.95 per unit. Club groups wishing to engage in a joint project might consider the 10-to-49 unit price break of \$4.45. The 2194F filters can be used in cascade (Fig. 2) to provide increased selectivity.

Filters with steeper skirts and narrower band widths are available from Piezo, and at a slightly higher cost. The 1463 through 1468 series are in this category. Data sheets which show the curves for all of the filters can be obtained by writing to the manufacturer. — WICER.

¹ Piezo Technology Inc., P. O. Box 7877, Orlando, FL 32804. Phone 305-425-1574.

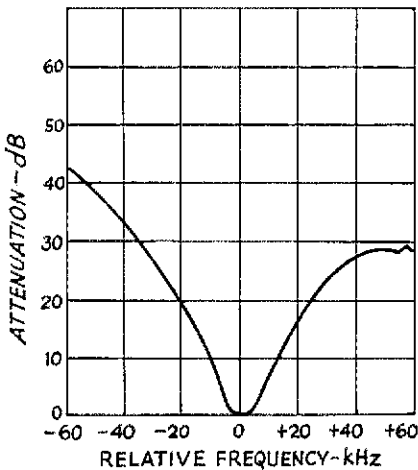


Fig. 1 — Band-pass characteristics of the Piezo No. 2194F monolithic filter.

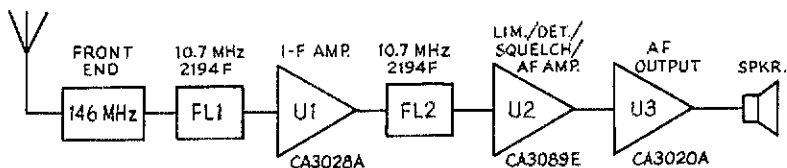


Fig. 2 — Block diagram of a suggested receiver for 2-meter fm using two 2194F filters and RCA integrated circuits.

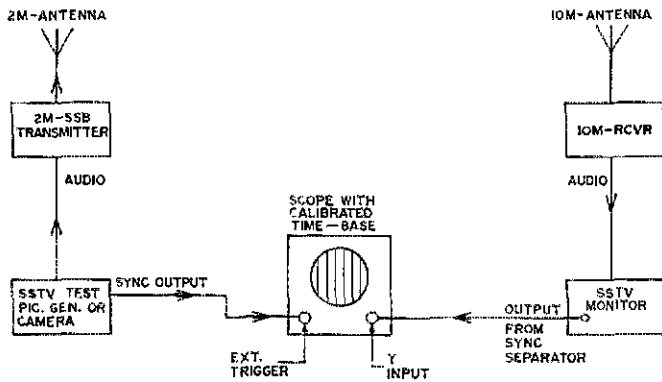


Fig. 1 - Slow-scan TV equipment configuration for ranging with Oscar 6.

Range Measurements with Oscar 6

Using Slow-Scan TV Equipment to Determine Orbital Parameters

BY KARL MEINZER,* DJ4ZC

TRYSING TO DETERMINE a satellite's equatorial crossing time, and particularly the longitude of equatorial crossing by simple means is a rather difficult job. On the other hand, with range data, these orbital parameters can be calculated after observing a single pass of the satellite.

It is possible to gather range information using the satellite's transponder. By measuring the time a radio wave takes to travel to the satellite and back, the distance to the satellite can be determined, since the speed of light is known to be 300 meters (1000 ft.) per microsecond.

The range to Oscar 6 will be between about 1500 and 4000 km (900 and 2500 miles), giving delays from 5 to 13 milliseconds for one way, or 10 to 26 milliseconds for the round trip of the signal. If the desired accuracy of the satellite's equatorial crossing time and longitude is 10 seconds and 2/3rds degree respectively, then a ranging accuracy of 75 km (45 miles) is desirable since the satellite travels at a speed on the order of 7 km/second (4-5 miles). In order to achieve this accuracy, the ranging timing error should not exceed 0.5 ms. From this, it is evident that the signal-delay within the satellite transponder, which is on the order of 10 microseconds, can be neglected. On the other hand, the delay introduced by the ionosphere over the ten-meter downlink cannot be neglected.

In order to investigate the ranging concept, a very simple arrangement was tried. Standard slow-scan television equipment has a line frequency of 15 Hz, corresponding to a 66.6-ms period. The horizontal sync pulses last 5 ms. It was felt that

slow-scan test transmissions could provide a useful means to carry out ranging experiments.

The sync pulses of a test transmission are used to trigger a scope line. The received sync pulse is then displayed on the scope (see Fig. 1). To do this, the output of the sync-separator of the monitor has to be made available. The line flyback pulse was tried, but it was found that this had too much jitter and it was impossible to tell the quality of the recovered pulse. By using the sync-separator output of the monitor, any poor return quality is immediately evident on the pulse shape (it is shortened).

The systems must be calibrated in order to account for the various delays in the station. It was found that the transmitter and receiver introduce about 2 ms delay, and the monitor another 2 ms delay.

By placing a converter in front of the ten-meter receiver, the system can be run in a short-circuit or "back-to-back" mode. The line start of the scope should be adjusted in such a way that the displayed pulse starts at a grating reticle on the oscilloscope screen. Line start and pulse start should be noted. If the system is operated through the satellite repeater, the pattern will look like that shown in Fig. 3. During a period of good reception, the start of the received pulse should be marked and the time noted (It's best to have a second operator do the writing and time recording for you.) Now note the time delay t_d from the scope. About ten good measurements per pass are sufficient to get the necessary information.

In order to calculate orbit information from these measurements, it is desirable to have a

*c/o Amsat, Box 27, Wash. DC 20044.

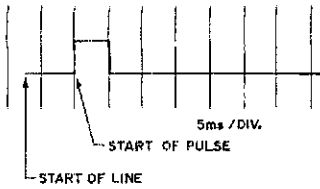


Fig. 2 - Scope pattern in short-circuit ("back-to-back") mode.

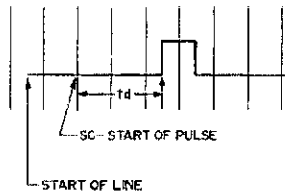


Fig. 3 - Scope pattern in ranging mode.

calculator. At first, the t_d 's are converted to distance by the formula:

$$t_d (\text{ms}) \times 150 = d (\text{km})^1$$

where d is the slant range distance to the satellite. In order to be able to transfer this distance into a chart, it has to be turned into a great-circle distance (Fig. 4)

$$E = r \cos^{-1} \left(1 - \frac{d^2 - h^2}{2r^2 + 2rh} \right)$$

$$\approx \sqrt{\frac{d^2 - h^2}{1 + r/h}}$$

where E is the great circle distance between the subsatellite point and the observer, r is the earth's radius, and h is the height of the satellite above the earth.

These E -values now can be used to construct a graph. First start by drawing a vertical line to represent the subsatellite track. Next, divide this line into about 25 equal distances, representing 1-minute intervals corresponding to 425 km (265 miles) each. Choose a scale that is practical for the size of the page. Now set a compass to the first radius E_0 and draw a circle or arc from the "zero" time mark. Then, go to each subsequent one-

¹ To use miles, substitute "93" for "150" in the formula.

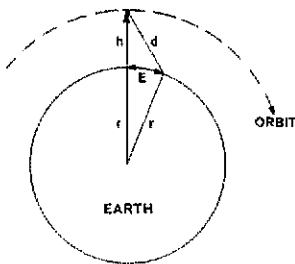


Fig. 4 - Relationship between slant-range (d) and great-circle distance (E).

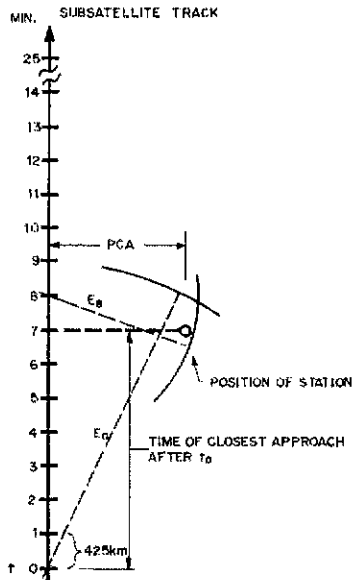


Fig. 5 - Determination of satellite position from range measurements.

minute interval mark, and draw an arc with a radius equal to the corresponding E value. Fig. 5 illustrates the technique, although only the E_0 and E_8 arcs are shown. When the corresponding arcs for all E values have been drawn, it will be possible to locate on the graph, the position of the station.

The circles do not meet in one point, because the ionosphere introduces errors as high as 500 km (300 miles) at ten meters, if the satellite is at a low angle above the horizon. Part of this error is cancelled by the approximations implied in the planar construction of this actually spherical problem, and by the approximation for the arc cosine given in the above equation. In addition, you must make an educated guess at the station's

(Continued on page 40)

VERSATILITY WITH DECADE DIVIDERS

Technical Editor, *QST*:

During the past few years there has been a proliferation of articles in *QST* and other publications describing frequency dividers and counters. This is caused in large part by the drastic price reductions of integrated circuits. One of the most popular families of ICs is the SN5400/7400 series which are of the TTL type. Specifically, the SN7490 enjoys immense popularity as a decade counter.

The logic structure of the 7490 is shown in Fig. 1. Normally for divide-by-ten operation, pin 12 is connected to pin 1. In this mode, flip-flop 1 divides the incoming pulses by two. Flip-flops 2, 3, and 4 divide by a factor of five. This is accomplished essentially by detecting the current count using the AND gate and resetting the entire chip to zero with every tenth pulse.

I would like to point out that the 7490 is really much more versatile. The same method used within the 7490 to reset at every tenth pulse can be used, with external components, to divide by N , where N can be any positive integer less than 10. Suppose, for example, that one desires to divide by nine. The circuit shown in Fig. 2 can be used. The AND-gate IC will detect a BCD nine and almost

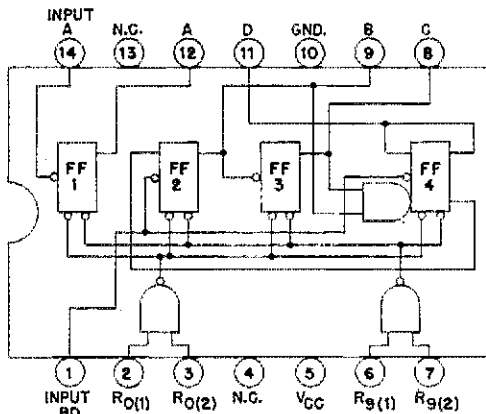


Fig. 1 - Logic structure of a 5490/7490 integrated-circuit decade counter. Internal connections may vary slightly among manufacturers. A typical reset gate contains 4 transistors and 4 resistors; a typical flip-flop contains 16 transistors, 5 diodes, and 9 resistors. All "components," approximately 76 transistors, 48 resistors, and 20 diodes (the exact count may vary among manufacturers) are integrated onto a single small chip of silicon and packaged in a case measuring only 3/8 by 3/4 inch, as shown in Fig. 4.

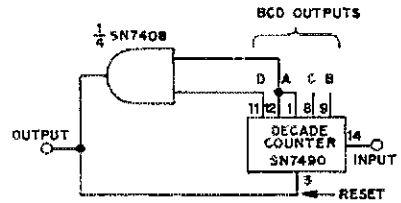


Fig. 2 - Circuit for using a decade counter for divide-by-nine operation. An external AND gate, such as one fourth of an SN7408 quadruple 2-input positive gate, is connected with its inputs tied to the A ($2^0 = 1$) and D ($2^3 = 8$) counter outputs. In turn, the AND-gate output is connected to a zero-reset input of the counter, so as to reset the counter to zero almost immediately after nine input pulses (1 and 8) have been received.

instantaneously zero the IC, effectively skipping one count.

If one wishes to divide by a number greater than 10, simply use more than one IC. Fig. 3 shows how to divide by 78. The current price of the 7490 is about \$.90, and the 7408 about \$.21. Therefore it is possible to divide by any integer between 1 and 100 for just about two dollars. - David L. Madison, K3ACN, 264 Heartwood Ct., Glen Burnie, MD 21061.

THE CAUSE AND CURE OF CHIRP

Technical Editor, *QST*:

Early in 1972 I decided that it might be interesting to keep detailed records of stations to whom I sent Official Observer cooperative reports to find out the most prevalent infractions, kind of equipment used by the recipients, and so on. The following is the result of that study. In an eight-month period in 1972, 89 OO cooperative reports were sent out. Of the 89, five were second notices and one was a third notice. From these

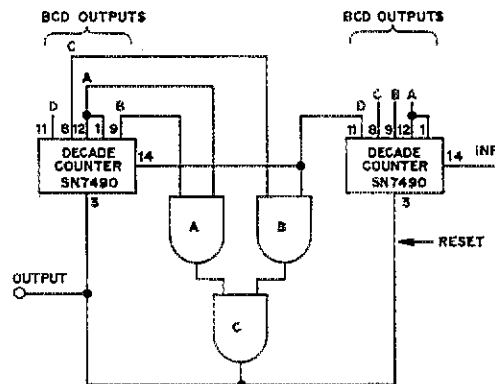


Fig. 3 - Two decade counters and external gates wired for divide-by-78 operation. The divider shown at the right is the units counter, and that at the left the tens counter. The 1, 2, and 4 outputs from the tens counter (7) and the 8 output from the units counter are combined in gates A, B, and C, three sections of an SN7408 quad 2-input positive AND gate, to reset both counters to zero after 78 input pulses have been received.

reports, 12 written responses were received in which the report recipients expressed gratitude for being told about their particular problem. Only one unfavorable response was received by telephone from an irate ham who was offended at being told about his chirpy cw signal.

Fifty-seven out of the 89 reports sent out (64 percent) were for chirp. Another 15 were for a combination of chirp, key clicks, and rough note. Only two out of the 89 reports were for non-technical violations (improper identification). Of the 57 recipients of chirp notices, 47 of these were operating on 15 meters. When tripling the oscillator frequency, as is done in most cw transmitters on 15 meters, any frequency shift at the fundamental of the oscillator is tripled on the 15-meter band. Incidentally, reports were sent only to those who seemed to have severe chirp. Those with a "slight chirp," for instance, were not notified.

What should be done when an OO report comes in the mail? Several alternatives are available which include (a) throw the notice in the trash and promptly forget it, (b) write the OO or call him collect and tell him that he's full of prunes, (c) eat your heart out, or (d) fix the problem. In the long run, the latter choice is the best. If the report is for chirp, for instance, listen to your own signal or have a good friend listen to it. In general, on-the-air signal reports are not reliable. If three different people are asked about your signal, you'll probably get three entirely different opinions.

To prevent overloading your receiver, remove the receiver antenna, or short it to ground. Load the transmitter (preferably into a dummy load) and listen to your receiver for a change in pitch or frequency of the transmitted signal. If a change in pitch is heard, you can assume that the OO was not as stupid as you thought when the card came in the mail.

Check the transmitter tubes first. Tube testers will give a questionable answer as to which tubes are bad. Just because a tube tester indicates that a tube is "good" or amplifying properly does not mean that the tube could not cause chirp. Temporary replacement with a known good tube is the best method. Power supply filter capacitors and bleeder resistors are also prime culprits in causing chirp and ripple. In kits, I have received brand-new resistors and capacitors that were bad! Never assume that just because a component is new that it could not be defective. A voltage-regulator tube is easy to add to a power supply and will improve voltage stability. An unstable power supply voltage often causes chirp. The ARRL *Radio Amateur's Handbook* shows how to put one in a circuit. By the way, no ham should be without this valuable book.

Obviously not every ham is a millionaire (wouldn't it be nice?) so be careful when buying so-called "bargains." Paying \$1 to \$1.50 for a crystal is easy on the pocketbook but may cause problems later on. At any rate, it is an easy and simple matter to plug the crystals one at a time into the transmitter and listen to each signal for defects caused by a faulty crystal. Every ham, whether or not he is having technical difficulties, should get a copy of Form TAS-1 "Curing Signal and Operating Difficulties," which is available free from ARRL headquarters if a stamped return envelope is sent to them.

Be sympathetic with the Official Observer. He volunteers to assist hams in correcting difficulties before they are cited by government monitors.



Fig. 4 — These 14-pin dual-in-line package (DIP) integrated circuits are shown at approximately actual size.

OOing takes up about 50 to 75 percent of his hamming time, so not much time is left for general operating, building, and so on. OOs are chosen for technical competence and attitude. Those with a grudge or a desire to be a "policeman" or informer are discouraged as OO candidates. So if an OO report comes in the mail to your home, don't cry or scream, but dig in and correct the problem! — Ken Bishop, WA5MIN, Box 514, Lake Jackson, TX 77566.

THE HEATH SB-303 AND CW RECEPTION

Technical Editor, *QST*:

Thank you very much for your article by W2NZ regarding improved cw reception in the SB-303.¹ This article states that using the modified SB-303 in the transceive mode with the SB-401 (cw mode) will not result in any change in the transmitted cw frequency, as the SB-303 passes the (modified) BFO frequency back to the SB-401.

Please note that the SB-401 in the cw mode (transceive or transmit) does *not* use the BFO frequency supplied by the SB-303. Switch M4R of the SB-401 selects the BFO input supplied by the SB-303 only in the usb or lsb portion of the SB-401 mode switch.

The BFO in the SB-303 may be completely disabled in the cw mode without changing the transmitted SB-401 frequency. (Pull the BFO cable from the SB-401 to SB-303 to demonstrate this). This is true *only* in the cw mode of the SB-401, however.

The W2NZ modification works wonders as far as improving SB-303 reception goes. For those who are concerned about zero-beating the received cw signal using the SB-401/SB-303 combination as a transceiver, the SB-303 BFO frequency has no bearing on zero beat. — Robert England, W2ECV 20 Lincoln Dr., Poughkeepsie, NY 12601.

FINDING RECIPROCAL EASILY WITH POCKET CALCULATORS†

Technical Editor, *QST*:

Since the advent of electronic calculators, many engineers now own and use them daily. These versatile tools can perform a variety of arithmetic functions to get answers quickly and easily, but obtaining the reciprocal of a number is quite cumbersome, since most inexpensive calculators don't have a "1/X" key. Many users write the

¹ Waters, "Improving CW Reception on the SB-303," *QST* for July 1972, p. 21.

† Reprinted from *Electronics*, January 18, 1973; copyright McGraw-Hill, Inc., 1973.

TABLE I

| OPERATION | ACCUMULATOR/DISPLAY REGISTER | K REGISTER | K OPERATION FLIP-FLOP |
|---|------------------------------|------------|-----------------------|
| K function on $\left\{ \begin{array}{l} \div \\ +/= \\ +/= \end{array} \right.$ | N | clear | \div |
| | $1 (N \div N)$ | N | \div |
| | $1/N$ | clear | clear |

number on paper, clear the machine, enter 1, press "divide," reenter the number and then press the "add/equal" key.

Although this method is viable, many of the pocket calculators can solve the problem more directly by using the "constant" (K) register. If N is the number, then its reciprocal, $1/N$, can be found directly, as shown in Table I.

- Depress and hold (or otherwise activate) the "constant" key.
- Press "divide" key.
- Press "add/equal" key.
- Release the "constant" key.
- Press "add/equal" key.

— Dexter R. Wheeler, W1TUM, 41 Windsor Ln., Topsfield, MA 01983.

FEEDBACK

In my article in February *QST*, on high-speed keyed antenna relays, Q4 (incorrectly labeled as an MPS-103), should be an MPS-U03. An MIE-340 makes an inexpensive candidate as well, but from what I hear, is no longer manufactured by Motorola. — Don Lawson, WB9CYY

W9LUO mentions that in his "Solid-State SSTV Monitor — Mark II" (*QST* for March 1973), C1 of Fig. 1, in the discriminator section, should be 0.22 μ F, rather than 22 pF as shown. The center tap for

L2 should be grounded. Further, pins 3 and 14 of U5, the multivibrator IC, should be connected together. (The diagram may be corrected by adding a horizontal line between the vertical line coming from pin 14 and the one shown approximately 1/4 inch to its left.) In Fig. 2, a preferred value for the capacitor connected between pin 4 and pin 13 of U8 is 500 pF, rather than 100, as shown. Wire-wound resistors are not desirable for R13 and R14, and composition resistors are preferred. Each may be made by paralleling two 1-ohm resistors. If current shut-down is not needed, then R10, R13, and R14 may be replaced with a short wire. In this case, fusing is recommended.

QST

Range Measurements

(Continued from page 37)

position indicated by the small circle in the figure, the nearest measurement being the most accurate. From this graph it is easy to find the distance of closest approach and the time of closest approach, which can be used to set the orbital semicircle on a meteorological satellite plotting map. Working backwards, equator crossing time and longitude can be found (note that there are actually two ambiguous solutions, only one of which is correct).

South-to-north passes are most useful for calculating equator crossing data, while northwest-to-northeast passes can be used to check the system with known inclination, or to determine inclination.

The accuracy obtained is about one millisecond, which falls slightly short of the desired value, but nevertheless the system provides a reasonably accurate way available to amateurs to determine equator crossing information.

An advanced system is under construction using a 30 Hz tone modulated onto an audio subcarrier. By measuring the phase shift, it is hoped to increase the accuracy to the theoretical limit consistent with the ranging signal-to-noise ratio; this limit is about 0.3 ms.

Here are some results, taken by D14ZC on Orbit 215, on November 3, 1972 (station location: 50° 49' North Latitude, 351° 16' West Longitude).

| Measurement no. | Time (GMT) | Measured range (k) |
|-----------------|------------|--------------------|
| 1 | 2041:30 | 4087 |
| 2 | 2042:07 | 3637 |
| 3 | 2043:34 | 3337 |
| 4 | 2045:05 | 3038 |
| 5 | 2046:20 | 2663 |
| 6 | 2048:25 | 2438 |
| 7 | 2050:50 | 2438 |
| 8 | 2051:27 | 2438 |
| 9 | 2052:08 | 2512 |
| 10 | 2053:00 | 2663 |
| 11 | 2053:37 | 2888 |
| 12 | 2054:30 | 3188 |
| 13 | 2055:42 | 3412 |
| 14 | 2056:24 | 3788 |
| 15 | 2057:19 | 4013 |

Using these data in the preceding equations, the following results were calculated:

- Time of closest approach: 2049:30 GMT
 - Time of equatorial crossing: 2034 GMT
 - Longitude of equatorial crossing: 356.8° West
- These results compare favorably with NASA orbital predictions, which gave the time and longitude of equatorial crossing for Orbit 215 as 2033:26 GMT and 356.16° West, respectively.

QST

HF Transmitter

(Continued from page 16)

single-carrier cw. Keying of the oscillator is achieved by grounding the emitter of Q104. (See Fig. 2 for the appropriate switching circuitry through S1.) Cw carrier level is controlled by R1 (also used for the microphone level adjustment).

Supply voltages required to power the balanced-modulator/speech-amplifier board are +12 volts at edge pin 1 and -8 volts at edge pin 1.

VOX Sidetone Cw Monitor Board (Board 2)

In Fig. 4, a portion of the speech preamplifier output from Q101 is applied to the gate of Q201 through C to D and R201, the VOX gain control. The VOX audio signal is amplified by two 1GFET stages in cascade before being applied to the VOX diode rectifier CR201. CR201 allows a + dc voltage to build up across C206 when modulation is applied to the mic input. This + dc voltage is connected to the base of Q203 through CR203 causing CR203 to saturate, in turn causing relay K201 to energize. VOX delay is fixed by the values of R210 and C209. Receiver audio is applied to C208 from edge pin 5. CR202 provides a low-resistance path to ground during the positive portion of the receiver audio output, leaving a negative charge on the plate of C208 (connected to R209). The level of dc antivoice voltage that is required to cancel the VOX voltage on the high side of R209 (connected to CR201) is determined

by the setting of the wiper on R209. Therefore R209 is the antivoice level control.

Push-to-talk or push-to-hold for cw is achieved by grounding edge pin 6. Pin 6 connects to the two-pin mic. input socket.

Relay K201 functions as a receiver mute switch, speaker or earphone disable switch connecting either to the cw sidetone oscillator when in cw and also provides a return path to ground for the internal coax relay and the external relays when it is energized by Q203 or the PTT or PTH functions. K201 can be any subminiature dpdt relay with a 28-volt coil, such as the crystal-can relays manufactured by Phillips (Phillips-Advance number MV/2C/600D-17 with wire leads and flange bracket).

U201 functions as a multivibrator and speaker or earphone driver for cw monitoring. Edge pin 7 is connected to the cw key through S1C during the cw mode. By completing the keying circuit to ground, the multivibrator is allowed to oscillate. CR204 prevents the cw audio-oscillator (Q104) emitter current from interacting with the pin 1 U201 gate current, since both oscillators are keyed simultaneously. C214 and C215 act as a voltage divider to provide a cw monitor level in the earphones or speaker while also suppressing unwanted high-frequency components of the multivibrator output. Supply voltages required to power the VOX sidetone cw monitor board are +12 at edge pin 1, -5 at edge pin 2 and +28 at edge pin 3.

Part II will appear in a subsequent issue of *QST*.

QST

• New Apparatus

WIDE BAND ENGINEERING CO. MINIATURE RF AMPLIFIER

Recent progress in the application of solid-state devices and wide-band techniques has led to a proliferation of specification sheets that cause the reader to pass most of them over with only a cursory reading. However, when one of the devices is in hand, it prompts a second reading of the sheets to be sure that something is not missed. When the device is the A82 RF Amplifier from Wide Band Engineering, it strongly calls to mind the much-worn saw about great things in small packages.

The cast-aluminum housing seems barely adequate as a place to mount two coaxial connectors, yet between the input and output WBE has managed to provide 20 dB of gain that is flat within 0.5 dB over a frequency range from 1 to 500 MHz.

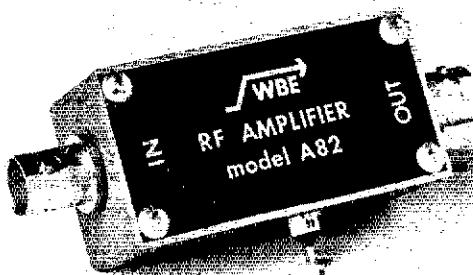
The A82 was tried in the laboratory at ARRL Headquarters and found to be very useful in conjunction with an oscilloscope for inspecting very low-level signals, for boosting the output of sweep and signal generators, and for amplifying the harmonic output of a 100-kHz standard.

This writer also gave the amplifier a workout in the shack as an i-f amplifier between a converter

and a communications receiver, as a preamplifier in front of various vhf converters, and also ahead of an old-but-revered general-coverage vhf receiver.

Specifications for the A82H, a model tailored more for ham needs, are relaxed only slightly from those of the A82. The most significant change is the bandwidth from 3.5 to 450 MHz. The output is 0.5 V at the 1-dB compression point for the A82H and 0.7 V for the A82. The price class of the A-82 is \$105; the amateur version is somewhat less.

Power required is 20 volts dc at 25 mA. These units will work on less voltage but at lowered output capability and increased susceptibility to overload. Either model is available with type BNC, N, or UHF fittings. The address for Wide Band Engineering Company is P. O. Box 21652, Phoenix, AZ 85036. - *WISL*





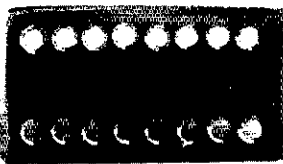
Hints and Kinks

For the Experimenter



DIP-IC UNSOLDERING JIG

Here is a method for removing dual-in-line package IC's from pc boards. Use 0.1-inch perf-board as a guide and any convenient small drill. Drill the pin pattern of the IC in a piece of copper approximately 1/16-inch thick. Cut the copper to a



final dimension of $1/2 \times 1$ inch. Be sure that each pin of the IC is vertical to the base. The pins can be straightened by heating them with a small iron and then aligning them with a pair of long-nose pliers. Lay the copper over the pins of the IC. Heat the copper with a large iron (100 to 200 watts). Gently apply pressure to the IC as the solder is melted around the pins, pulling the IC off as it is loosened from the solder. Heat will spread rapidly if the copper IC jig is tinned.— *Ralph F. Anderson, K0NT*.

HEATH HW-7 PRESELECTOR MODIFICATION

When changing bands, the critical tuning of the receiver preselector capacitor (C1) can be annoying to some operators and the following modification works quite well.

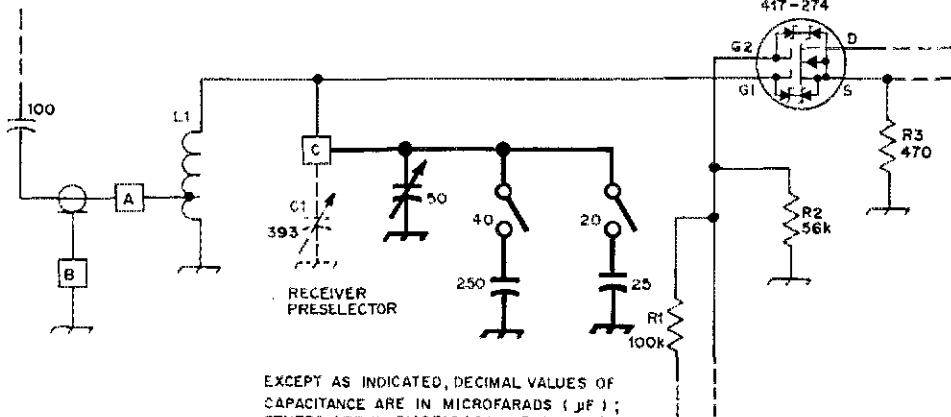
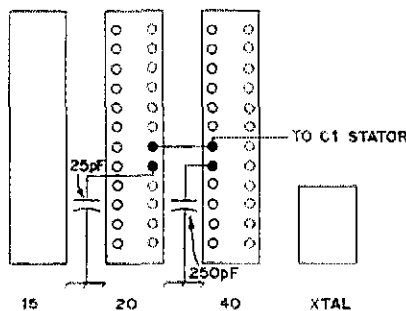
1) Replace C1 with a 50-pF variable capacitor such as a Hammarlund HF-50.

2) Connect the stator of the new C1 to pin 6 of the 40-meter band switch and pin 18 of the 20-meter band switch as viewed from the top.

3) Install approximately 25 pF of fixed capacitance between pin 17 of the 20-meter band switch and ground (I used a lug mounted under the machine screw holding the front of the cabinet on).

4) Install approximately 250 pF of fixed capacitance between pin 5 of the 40-meter band switch and ground.

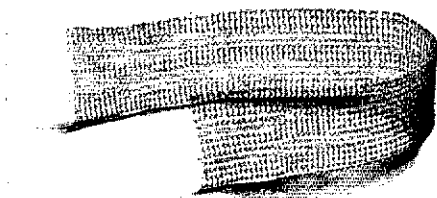
The different values of fixed capacitance are switched in on 40 and 20 meters with the band switch and out on 15 meters. Each band can be peaked with about half of the variable capacitor being used. Peaking on 15 meters is still quite critical, 20 meters broader, and 40 meters quite broad. *R.J. Harker, WN9JML*



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR $\mu\mu\text{F}$); RESISTANCES ARE IN OHMS; k=1000, M=1000 000.

INSTANT TUBE SHIELDS

Need an inexpensive tube shield? Scotch brand No. 24 electrical shielding tape is the answer. It is tinned copper, easy to cut to length, and will fit over most 7- and 9-pin miniature tubes. It may also be used to shield ignition wires. — Alan Applegate, WBØBHE



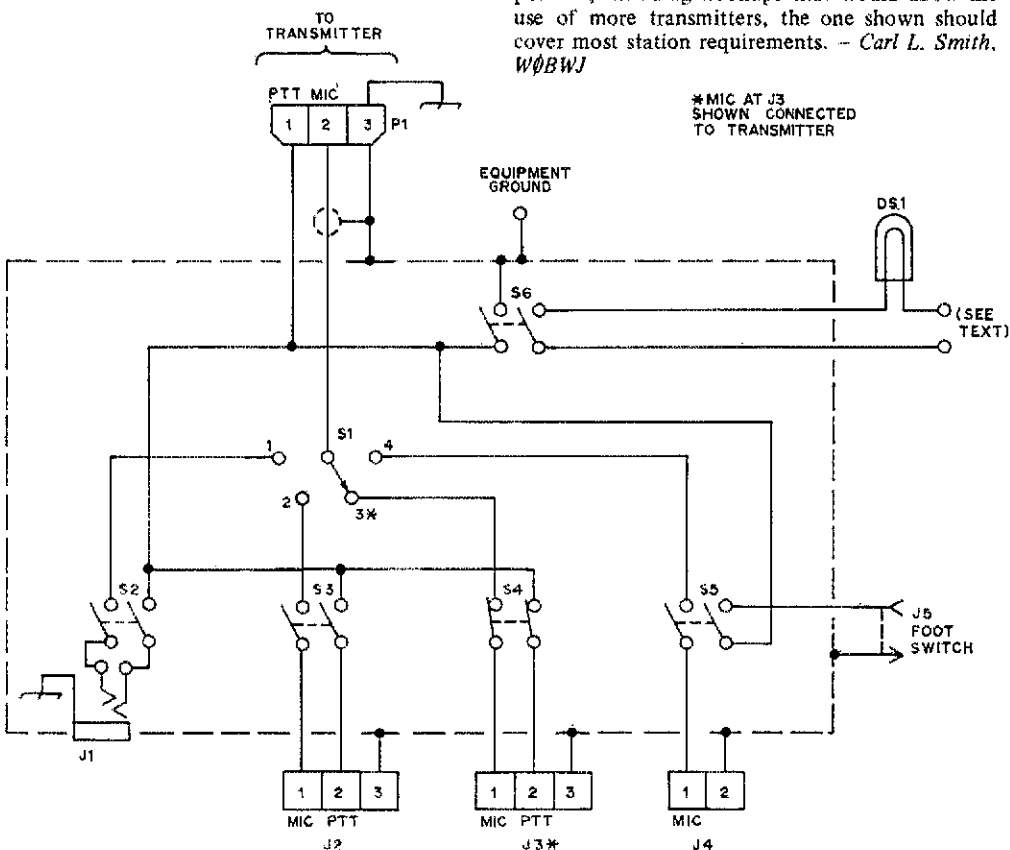
A MIC PATCH

Eventually amateurs collect more than one microphone and usually there is a problem in trying to adapt various mic connectors to the transmitter. The microphone patch shown here provides a neat solution to the problem. J1 will take the PJ-068 plug (used with most Collins transmitters). J2 and J3 are for the Amphenol series 80 and series 91 types, respectively. Even microphones without PTT capabilities can be used with an external foot switch (J5) and an appropriate mic connector (J4). Operation is simple; the desired mic is selected by turning S1 to

the proper position and closing a dpst switch (S2, S3, S4 or S5).

The patch is built inside of a 6 x 6 x 6-inch aluminum box and then mounted on a standard 19-inch rack panel. S6 is an optional switch that can be used to close the PTT line. If a dial light (DS1) is used to indicate that the line is closed, it should be mounted on the rack panel rather than inside of the box. Run the leads into the shield compartment as shown. This prevents possible audio pickup if an ac line is used.

While different circuit combinations are possible, including hookups that would allow the use of more transmitters, the one shown should cover most station requirements. — Carl L. Smith, WØBWJ



Schematic diagram of the microphone patch. For maximum isolation, shielded wire should be used throughout the circuit (not shown inside of the shield enclosure in diagram).

DS1 — 12-V pilot lamp. Can be connected to a 12-V filament supply. A 117-V lamp could also be used but be sure that S6 has a 117-V rating.

J1 — MT-342B (Switchcraft).

J2 — 8-PC2M male receptacle (Amphenol).

J3 — 91-PC3M male receptacle (Amphenol).

J4 — 75-PC1M receptacle (Amphenol).

P1 — Type normally used with transmitter.

S1 — Single-pole, 4-position rotary switch.

S2, S3, S4, S5, S6 — Double-pole, single-throw toggle switch. Should be mounted close to appropriate mic connector.

Isolated-Pad Circuit-Board Construction

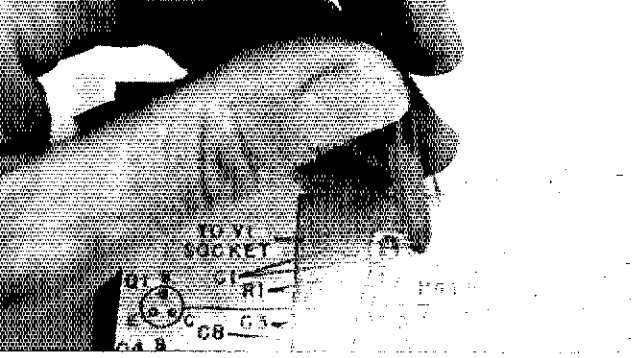


Fig. 1 — Locating holes for components with a center punch.

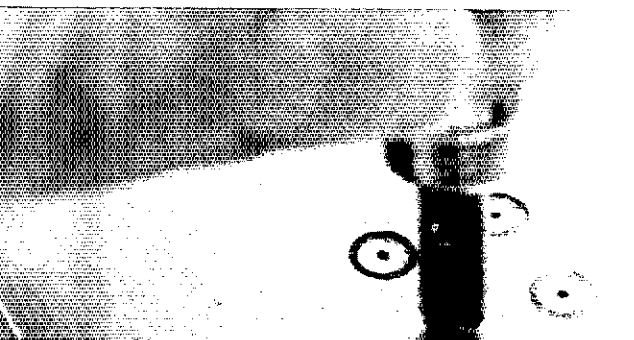


Fig. 2 — The isolated pads and the component holes can be made in one operation.

BY ALFRED F. STAHLER,* W6AGX

A PROBLEM often encountered by the amateur is how to lay out a single circuit board without an inordinate expenditure of labor and time. The isolated-pad method of circuit-board construction is well suited to instances where only a few boards are desired. Another advantage of the isolated-pad technique lies in the ease and simplicity of transferring artwork to the board surface. Fig. 1 shows an electrostatic copy of the artwork taped to a board and the hole centers being directly transferred to the copper by a center punch. Once this is done each of the holes is drilled and an isolated pad formed around the hole (Fig. 2). The components are then inserted, soldered, and excess leads trimmed. Normally, the molten solder will not bridge the gap of the isolated pad because of surface tension. The components are

* 5521 Big Oak Dr., San Jose, CA 95129.

then electrically joined by using tinned wire soldered to the projecting wire stubs. The resulting isolated-pad circuit-board is shown in Fig. 3.

Use of the isolated-pad technique allows the builder to duplicate circuit templates with identical parts location and wiring layout. The component mounting is just as rugged as with etched pc-board construction.

An article by Ted Swift,¹ W6CMQ, suggested the basis for the construction technique described here. An improved version of the tool used in the Swift article was designed by the author. Improvements included a No. 60 drill as a center drill and adapting the shank to fit a Stanley Tools Co. Yankee screwdriver. Now the hole for the component wire and the isolated pad can be made simultaneously. The improved tool is shown in Fig. 4. These isolated-pad drills can be obtained from the author's son and a similar product is offered by Vector Electronics Co., parts No. P116 or P138.

¹Swift, "Low-Cost Instant Printed-Circuit Boards," *Ham Radio*, August, 1971, p. 44.

Fig. 3 — Bottom view of pc board (copper-clad side) showing method of wiring components.

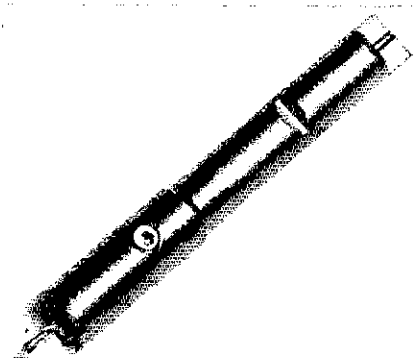
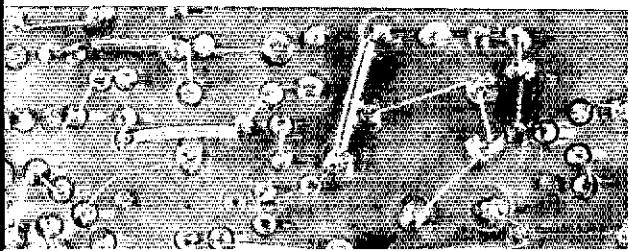
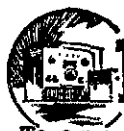


Fig. 4 — Tool used in isolated-pad construction. Set screw allows removal of the No. 60 center drill. The shank will fit either an ordinary hand drill or certain push-type screwdrivers.

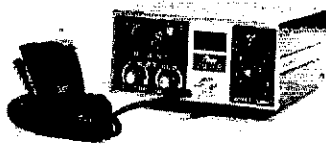


Recent Equipment



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

Clegg FM-27B FM Transceiver



RECENT EQUIPMENT reviews are always difficult to write because what may be the reviewer's cake could be the reader's poison. Sometimes it is difficult to be objective. This was certainly the case when testing the Clegg FM-27B.

Anyone who has operated 2-meter fm knows that it is primarily a crystal-controlled type of operation. One usually buys crystals for the local repeater and then hopes that he will find the same frequencies in use when traveling to another area. It can be frustrating to take a trip and discover there are plenty of repeaters along the way, but they all operate with different frequencies than the ones available in your transceiver.

The number one feature of the FM-27B is that it covers *all* frequencies, both transmit and receive, from 146 MHz through 148 MHz. When the reviewer first got into ham radio (quite a few years ago!) all of his transmit operation was with crystals. That first VFO was a real joy and opened a whole new world of amateur radio. Using the FM-27B provides the same effect.

Transmitter Circuit

Fig. 1 is a simplified block diagram of the transmitter. Clegg uses the term "Crystiplexer" in describing both the transmitter and receiver frequency-controlling circuits. There are ten crystals used in an oscillator with 100 kHz steps from 25.55 to 26.45 MHz. The output from this oscillator is fed to the first mixer. The "fine-tuning" circuit consists of a voltage-controlled

oscillator using Varicap tuning that covers 4.45 to 4.54 MHz (shown schematically in Fig. 2). Output from this oscillator is fed to the first mixer. This energy is then routed through a band-pass filter (30.5 MHz) to the second mixer. Output energy from a crystal-controlled oscillator (116 MHz) is also fed to the second mixer; the resulting output is in the 146-MHz range. The signal is then filtered and amplified.

Phase modulation is used in the transmitter. The FM-27B is capable of 10-kHz deviation and 12-dB peak clipping. The transmitters are factory adjusted for 5 kHz of deviation with 3 dB of clipping.

The Receiver

If one took Fig. 1 and reversed the conversion process, he would have a diagram for the receiver. There is one exception, however. A third mixer is employed to convert the signal to the last i-f (455 kHz). Output from the last mixer is fed through a 10-pole ceramic filter and then to an IC limiter (a CA3076) and on to the discriminator (a CA3075). The discriminator current can be monitored via a panel-mounted, zero-center meter. This same meter is switched to read relative output when transmitting.

There are two frequency-setting controls mounted on the panel for the receiver (also two similar controls for the transmitter). The first control is a switch and is used to select the appropriate crystal oscillator in the 25.55- to

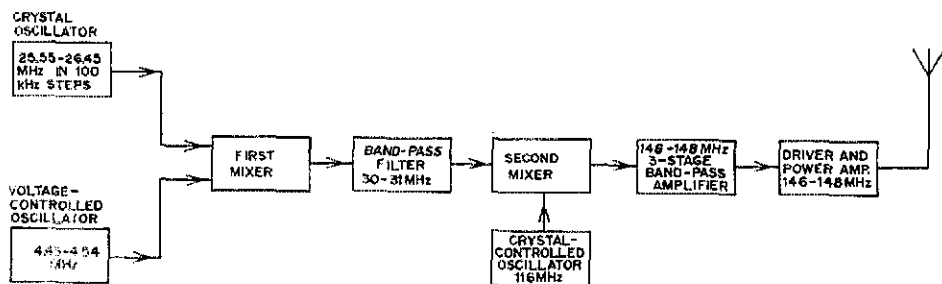
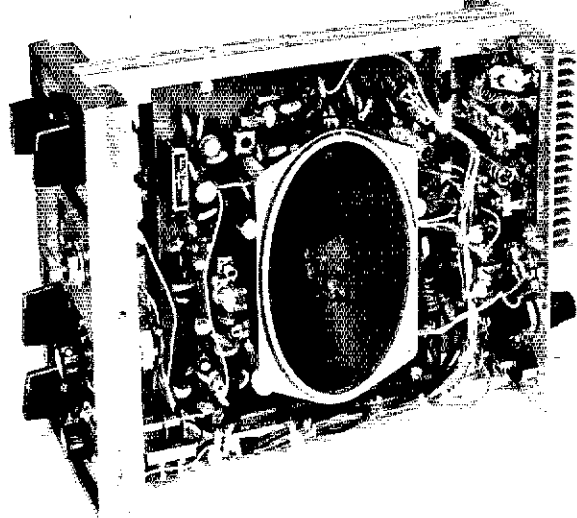


Fig. 1 - Simplified block diagram of the FM-27B transmitter.



This view shows the receiver board. At the upper left-hand corner is the 10-pole ceramic filter.

26.45-MHz range. This control is numbered from 0 to 9. The second control is a linear potentiometer in the Varicap oscillator circuit. The dial for the control is numbered from 0 through 9.

If, for example, one wants to listen to "146.94," he switches the 100-kHz receiver selector control to 9 and the receiver tune control to 4. With a signal coming in, the tune control should be adjusted so the needle on the discriminator meter reads zero. This indicates that the receiver is tuned exactly to the repeater's output frequency.

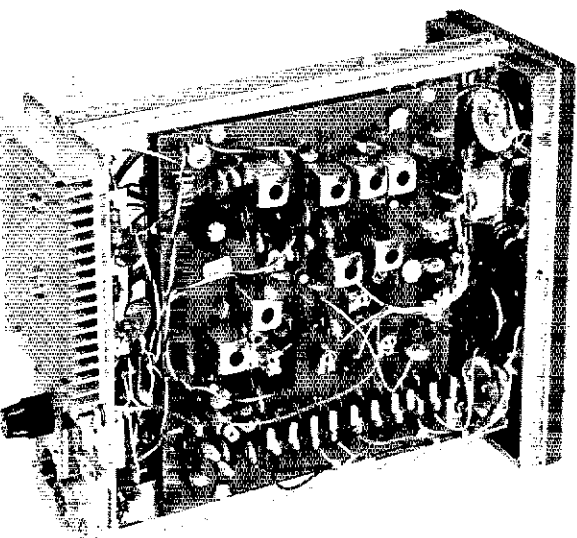
The transmitter adjustments are similar. For "146.34," set the 100-kHz transmitter selector switch to 3 and the transmitter tune control to 4. A push-pull switch is mounted on the rear of the volume control. When the volume control knob is pulled forward, the spotting switch is activated. This turns on the low-level stages of the transmitter. With the switch activated, adjust the 100-kHz transmitter tune control so that the discriminator meter is zeroed. This puts the transmitter exactly on frequency (assuming of course that the repeater is on frequency in the first place!).

With the spot switch on and the microphone push-to-talk button depressed, the operator can monitor his own modulation quality. No signal is radiated since the spot switch deactivates the antenna relay.

The logical question would be, "How does the operator know his transmitter is on the correct frequency?" This is where the Clegg Crystiplexer goes to work. The receiver crystal that is controlling for 146.94 is 26.45 MHz. The 26.45 MHz frequency plus the Varicap tuned oscillator (VCO) at 4.035 MHz, (plus the i-f at 455 kHz) and the fixed oscillator at 116 MHz adds up to 146.94. When the spot control is turned on, diode switching shifts the transmitter to the same (or almost the same) frequency as the receiver. The 26.45 MHz oscillator is controlling the transmitter. The transmitter VCO is then adjusted so that the transmitter is zero beat with the receiver as indicated by the discriminator meter. When the spot switch is turned off, diode switching shifts the transmitter back to 146.34 MHz by reactivating the 25.95 MHz crystal. Since the transmitter VCO is not switched, its setting is not affected by the change from spot to operate. The accuracy of the transmitter frequency is dependent on the crystal tolerances used in the Crystiplexer. We found that in several tests, using a frequency counter, the error was less than 100 Hz.

Other Information

The earlier model of the transceiver, the FM-27A, was designed to cover 146 to 148 MHz in one Megahertz steps for receiving but would



The 10 crystals in the Crystiplexer circuit are visible along the bottom of transmitter board. The heat sink for the final amplifier stage is mounted on the rear wall.

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

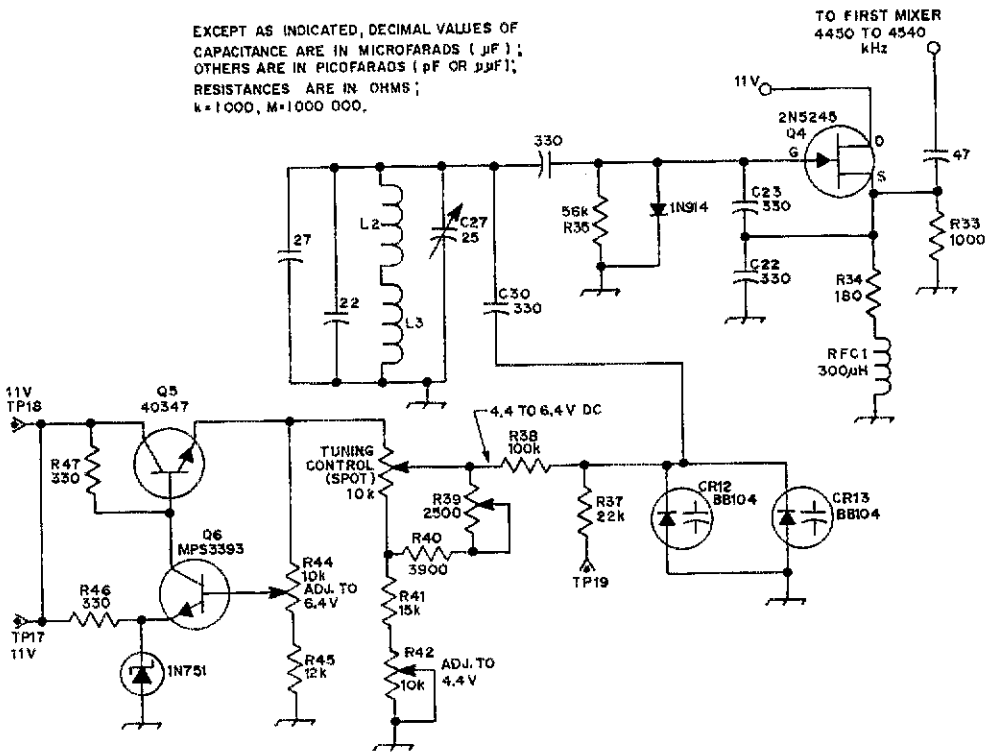


Fig. 2 — Circuit details of the transmitter Varicap-tuned oscillator section.

transmit only in the 146 to 147 MHz region. The FM-27B however, is capable of receiving and transmitting in both one-MHz segments or receiving in one range while transmitting in the other.

The transceiver is fully transistorized and is rated at 25 watts output. The unit we tested actually produced slightly more than 25 watts. The rf amplifier has inherent protection against damage from mismatched loads.

In the Hartford area there are repeaters operating from 146.64 to 146.94 MHz on every 30-kHz assignment. Some receivers we have checked have shown severe cross-modulation tendencies. However, the FM-27B has been exceptionally clean in this respect. One crazy problem did crop up when using the unit, but it is hard to fault the manufacturer for this one. We had an occasion to use the transceiver, but had no regular antenna available. A wire, 19-inches long, was inserted into the coax fitting and the rig was turned on. We could hear each local repeater and managed to trigger them but received reports of no audio or poor audio. After much head scratching and checking it was discovered there was rf from the antenna getting back into the audio circuits. A simple ground-plane antenna with about two feet of coax feed solved the problem. As stated, it is hard to fault the manufacturer because instructions

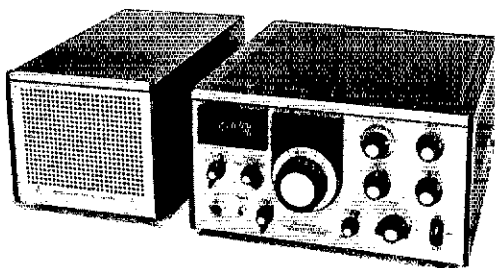
clearly point out that a 50-ohm coaxial load with less than a 2:1 SWR should be used.

The FM-27B comes with a mounting bracket that is unique. It is equipped with a lock and key. The transceiver can be quickly installed and locked in place. A thief with a crowbar could steal the set, but it wouldn't be easy! — *WIICP*

Clegg FM-27B 2-Meter FM Transceiver

- Power output: 28 watts at 13.5 V dc.*
- Sensitivity: 0.37 μV for 20 dB of quieting; 0.13 μV to open the squelch.*
- Frequency stability: Less than 100-Hz frequency change at 146 MHz, transmit and receive, with a voltage change from 12 to 14.5 V from the supply.*
- Dimensions (HWD) and Weight: 7-3/8 \times 3-1/2 \times 9-1/4 inches, 4.5 pounds.*
- Power requirements: 12 to 14 V dc; standby 0.4 A, receive 1.2 A, transmit 6 A.*
- Price class: \$480, includes microphone and mounting bracket.
- Manufacturer: Signal and Control, International Corp., Clegg Division, 3050 Hempland Rd., Lancaster, PA 17601.
- * Tested in ARRL Lab.

The Henry Radio Kenwood TS-511S Transceiver



MADE IN JAPAN has become a hallmark to the electronics industry and the Kenwood TS-511S transceiver manufactured by Trio of Tokyo is no exception. In terms of dollars per watt, and dollars per convenience, the unit described here is hard to beat. The test model was equipped with the optional cw crystal filter, power supply, and external VFO. A speaker is included in the power supply cabinet. The transceiver with accessories has been in service nearly seven months before this writing (almost daily) and the only malfunction that can be reported is a "popped" fuse. Upon initial inspection of the transceiver, this writer found the tuning dial drive mechanism was binding at several points. Henry Radio, however, supplied us with a new drive assembly immediately and the swap was made with little difficulty. No doubt the original mechanism was damaged in shipment.

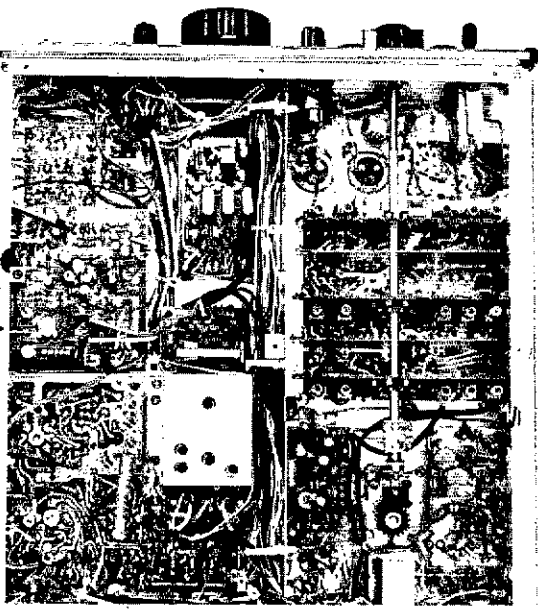
Operation

As with any item of amateur radio equipment, the prospective purchaser must carefully evaluate his needs and budget to determine the features that are desired and the type of operation contemplated. Categorizing the TS-511S into one

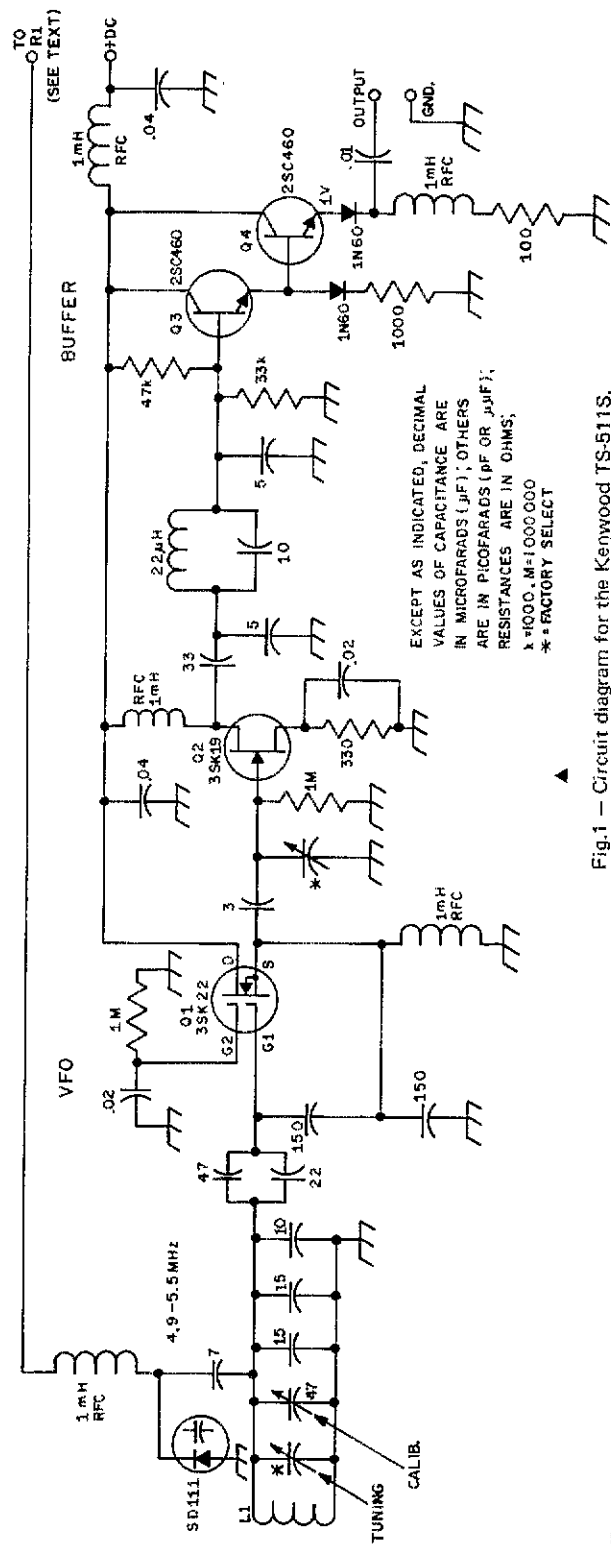
of the two classifications, transceiver or separate transmitter-receiver combination, is quite difficult since it fits either category quite well. From the packaging point of view, the basic unit is a transceiver. When combined with the accessory cw filter and the model VFO-5SS variable oscillator and switching circuit, the effect of a completely separate transmitter and receiver is achieved.

Generally speaking, a transceiver will fill the requirements of most amateurs for single sideband operation. The transmitter-receiver separate units come into play, however, when operating cw, or when chasing DX on ssb using split-frequency techniques. Some transceivers on the market today have provisions for cross-band operating on ssb, but none known to this writer (with the exception of this unit and the Kenwood TS-900) provide a means for using the external VFO as if it were a separate transmitter (or receiver). The problem has always been one of zeroing the external VFO to the basic transceiver frequency. This is usually done by actually tuning in a signal on the transceiver and then switching to the other VFO to tune in the same station. But what does one do if there is no signal on the frequency where the operator wants to set the external VFO? The problem is solved by Kenwood with the inclusion of circuitry which provides a way of actually setting the external VFO to a known point in the band, without having to rely on a signal being present or on the calibration accuracy of the tuning mechanism.

With the flick of a switch on the VFO-5SS, the operator can transceive with either VFO, transmit with one VFO and receive while using the other, or reverse this function. Additionally, a receiver incremental-tuning control (RIT) is included in both the transceiver and the VFO-5SS. The RIT allows the associated VFO to be tuned several kilohertz in



Bottom view of the transceiver.

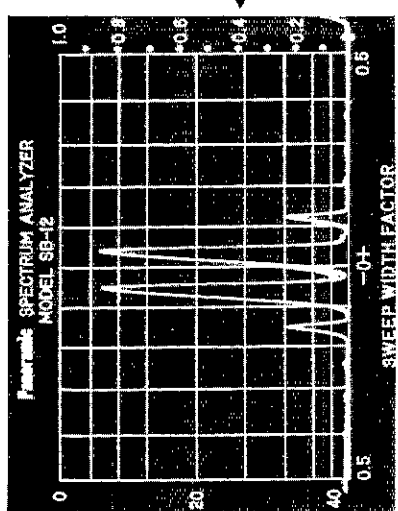


EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μJIF); RESISTANCES ARE IN OHMS; 1 = 1000, M = 1000000 * = FACTORY SELECT

Fig.1 — Circuit diagram for the Kenwood TS-511S. Component designations are those of the manufacturer. R1 provides a variable voltage for receiver incremental tuning.

Spectrum-analyzer display of the output of the Henry Radio Kenwood TS-511S with a two-tone 450-watt PEP input. The horizontal axis of the display represents frequency, and the vertical axis amplitude. Each "pip" represents a single-frequency component of the rf output. The display is adjusted so the amplitude of each component may be read from the scale at the left, directly in decibels below the peak-envelope power (PEP) output, as rated by the manufacturer. Each reticle division represents 5 dB. Responses other than the two individual tones near the center are distortion

products; third-order products 30 dB down may be seen here. Individual tones of the two-tone signal are down by 6 dB from the PEP output. This is because the tones are displayed as two discrete frequencies. At the instant when voltages of the individual tones are in phase, they add to produce a peak in the envelope wave-form pattern which is the voltage amplitude of a single tone alone. The power at the peaks of the envelope (PEP) is therefore four times that of a single tone, a 4:1 power ratio being equivalent to 6 dB.





Top view of the Kenwood TS-511S. The optional cw filter is not installed. A fan is mounted to the back cover for the output tubes (not shown) and a tight solid cover is placed over the compartment.

either direction of the transceiver frequency, but during receive conditions only. The transmitter always transmits on the frequency set by the dial. To calibrate the external VFO to the transceiver frequency, place the AGC/CAL switch in the CAL position and rotate the external VFO dial until *perfect zero beat* is heard in the headset (or speaker). The matching of tones or the listening to birdies is not necessary.

The Circuit

The TS-511S is a hybrid circuit consisting of ten tubes, seven integrated circuits, 41 transistors, and 57 diodes. Printed-circuit-board construction techniques are used throughout. The instruction manual gives layout details for the major boards and provides a list of voltage measurements at several hundred points in the circuit for both transmit and receive conditions.

The front-panel meter allows the monitoring of any of five circuits. During transmitting periods, the operator may monitor a/c, plate current, relative output, or high voltage. S-meter indications are provided for determining the relative strength of received signals.

A circuit diagram for the external VFO sub-assembly is given in Fig. 1. The VFO for the transceiver is nearly identical in design, and nearly as stable. Stability measurements are shown in Table IB. Q1 is used in a Colpitts oscillator

TABLE IA - SPECIFICATIONS

| BAND (MHz) | POWER OUTPUT AT 312 WATTS CW INPUT | RECEIVER SENSITIVITY (for 10 dB Signal-plus-Noise to Noise) |
|------------|------------------------------------|---|
| 3.5 | 195 | 0.5 μ V |
| 7.0 | 200 | 0.8 μ V |
| 14.0 | 198 | 0.47 μ V |
| 21.0 | 200 | 0.2 μ V |
| 28.0 | 205 | 0.8 μ V |
| 28.5 | 200 | 0.7 μ V |
| 29.1 | 205 | 0.9 μ V |

TABLE IB - FREQUENCY STABILITY*

| TIME (MIN) | TS-511S VFO | EXT. VFO | TIME (CONT) | TS-511S VFO | EXT. VFO |
|------------|-------------|----------|-------------|-------------|----------|
| 1 | 39 | 707 | 13 | 157 | 744 |
| 2 | 75 | 719 | 14 | 165 | 745 |
| 3 | 79 | 726 | 15 | 171 | 745 |
| 4 | 80 | 730 | 20 | 198 | 746 |
| 5 | 83 | 733 | 25 | 218 | 746 |
| 6 | 102 | 736 | 30 | 234 | 746 |
| 7 | 112 | 737 | 35 | 248 | 743 |
| 8 | 120 | 739 | 40 | 261 | 744 |
| 9 | 130 | 739 | 45 | 271 | 746 |
| 10 | 136 | 741 | 50 | 280 | 747 |
| 11 | 145 | 743 | 55 | 284 | 751 |
| 12 | 151 | 742 | 60 | 290 | 754 |

* Actual VFO frequency in Hz to be added to 5.199 MHz for the TS-511S and 5.198 MHz for the external VFO. Measurements made from a cold start.

configuration, lightly coupled to Q2 to assure adequate isolation between the oscillator and the following amplifier stages. A harmonic filter between Q2 and Q3 reduces the level of unwanted energy above 6 MHz thereby reducing spurious responses in both the transmitter and receiver. Q3 and Q4 are used to give additional buffering and isolation at a low impedance. A tuning diode is incorporated to give receiver incremental tuning of about three kilohertz either side of the dial-indicated frequency by adjusting R1, a front-panel control.

Odds and Ends

The frequency range of the VFO is 600 kHz, which allows 100 kHz of band coverage above the top end of 80 meters. The MARS operator might find this frequency scheme useful. Ten meters is covered in three ranges, 28.0 to 28.6 MHz, 28.5 to 29.1 MHz, and 29.1 to 29.7 MHz.

The REC-SEND switch has the heft that old timers will appreciate. The large bat-handle lever gives a very solid feel when being activated. The PTT connection at the microphone jack may be used when the switch is in the REC position, or the VOX relay may be held in continuously by the SEND setting. The VOX position allows the transceiver to be VOX controlled on both cw and ssb.

Pictures don't do justice to the TS-511S, for it is most handsome and certainly does not give the "black box" impression associated with some amateur equipment of yesteryear. In fact, the casual observer could mistake the transceiver for a piece of home entertainment gear.

On the negative side, although hardly crucial, there are some items of interest which should be reported. The noise blanker, as with most on the market today, is *relatively* ineffective against ignition and fluorescent-lamp noise. When the optional cw filter is installed, there are no provisions to allow the operator to use the broader ssb filter while operating cw. Switching to the upper sideband position during receive periods on cw is not possible since a different crystal is used for the carrier oscillator in the ssb position than is used for cw operation.

The transmitter drive-level control is an internal "set-and-forget" adjustment. Since the transceiver is typically operated at normal input power, this presents no problem. If a final amplifier is used with the transceiver, provision may have to be made for limiting or reducing the output level from this exciter.

During a conversation with Henry Radio at the time of this writing, they indicated units currently being shipped have a "tune" switch which reduces the final-amplifier screen voltage during transmitter tune-up. They are now providing a modification sheet showing how to use this switch position for operating at reduced power.

Opening the package when a TS-511S arrives can be a very interesting activity. It is amazing how every little detail of operation is considered. No need to go out and buy any interconnecting cables,

TABLE II - VOLTAGE AND CURRENT REQUIREMENTS FOR THE TS-511S

| Voltage (Under key-down conditions)* | Current (With 200-watts output)* |
|--------------------------------------|----------------------------------|
| 840 V dc | 390 mA |
| 300 V dc | 49 mA |
| 195 V dc | 5 mA |
| 150 V dc | 52 mA |
| 13.6 V ac | 2.3 A |
| 13.8 V ac | 2.2 A |
| -90 V dc | 13 mA |

*Approximate values.

plugs, or jacks. Everything is included from spare fuses to a tuning tool. Another feature many amateurs will appreciate: the transceiver comes equipped with a cooling fan attached to the final amplifier compartment. It runs very quietly and provides cool operation for the "instrument."

Some amateurs consider a transceiver to be a compromise in size, efficiency, economy, and flexibility when compared with separate transmitter and receiver setups. A careful look at the TS-511S, however, reveals that the *only* task this transceiver cannot perform is that of monitoring its own signal as it is actually transmitted. The internally generated sidetone substitutes this function nicely. - *WIFBY*

The Henry Radio Kenwood TS-511S Transceiver

Frequency range (MHz): 3.5-4.1, 7.0-7.6, 14.0-14.6, 21.0-21.6, 28.0-28.6, 28.5-29.1, 29.1-29.7.

Modes of operation: Lsb, usb, cw.

Maximum input power: 500 watts PEP for ssb service, 300 watts for cw.

Sensitivity: See Table IA.[†]

Stability: See Table IB.[‡]

Selectivity (at 6 dB points): 2.4 kHz for ssb, 0.5 kHz with optional cw filter installed.*

Audio-output: 1 watt.

Audio-output impedance: Speaker and headphones both 8 ohms.

Amplifier tubes (rf): 6LQ6 (2).

Power requirements: 117 V ac at 550 watts (PS-511S power supply).**

Dimensions (HWD) and Weight: 7-1/4 x 13 x 13-5/8 inches, 22 pounds.[†]

Price class: Transceiver, \$415; external VFO, \$105; ac power supply, \$105; cw filter, \$40.

Color: Black and brushed aluminum.

U.S. Distributor: Henry Radio, 11240 Olympic Blvd., Los Angeles, CA 90064.

[†] Measurements made in the ARRL lab.

^{**} Voltage requirements for the transceiver are given in Table II.



Henry Radio Tempo CL-146 and CL-220 FM Transceivers

THERE HAS BEEN a great number of neat-appearing fm boxes in circulation recently, and one that attracted the attention of this reviewer bore the label CL-220. The CL part of the designation stands for Commercial Line, presumably meaning that it is a cut above most amateur-band-only equipment. Another attraction was the 220 part; equipment for the 220-MHz band has been rather slow to appear until late. Being somewhat of a skeptic, this writer tempered his enthusiasm over the size and appearance of the outside with a degree of foreboding as to what might be in the box. Upon sliding the unit out of the case, the surprise was pleasant and genuine! Even before inspecting the instruction manual and diagram, it was apparent that considerable thought had gone into the design. Some manufacturers use a shiny chromium or nickel-plated chassis to distract attention from poor workmanship; not so with this rig. The durable and shiny plating is there but so is the excellent construction.

At about the same time, a brother to the unit appeared on the scene, appropriately named CL-146. As can be seen in the photograph there is little to mark them apart. Since there is a limit to the number of rigs that can be used at one time, the 2-meter unit was turned over to headquarters staffer WA1FCM for checkout. His commentary appears later.

The Henry Radio Tempo CL-220 (top) and CL-146 (bottom). Any of twelve channels may be selected by means of the large-skirted knob. A back-lighted number in the skirt serves as an indicator. The meter has an offset zero to enable the operator to read an off-frequency carrier indication without switching the meter polarity. Volume and squelch controls are to the right. Both units are furnished complete with microphone, mounting bracket and power cord.

CL-220 Performance

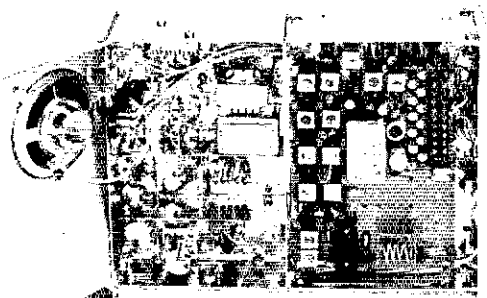
Several months of operating with the 220-MHz unit has turned up no problems large enough to dampen the early impression of the equipment. That same operation has further reinforced the opinion that a properly installed 220-MHz system will equal the coverage of the machines now crowding the 2-meter part of the spectrum.

The problems were quite minor; the squelch in one unit was slightly temperature and voltage sensitive. This required a change in the squelch-control setting as the surrounding air warmed up, or as the condition of the battery changed. The trouble was attributed to a transistor in the squelch-switching circuitry. Another unit that was tried exhibited no such problem, performing flawlessly even though the mobile environment was not particularly friendly to the equipment. At times the temperature in the car was four or five degrees below zero Fahrenheit at start up. After the automotive heater began to make things more comfortable for the operator, the temperature of the air blast behind the rig was quite high, perhaps 150°F. Even under these extremes of temperature, the receiver and transmitter performed well, remaining on channel. There was no apparent degradation of audio quality in the receiver or reduction of rf output from the transmitter. On one subzero morning the coil-cord succeeded in pulling the microphone out of the operator's numb fingers. A pair of gloves and a firm grip solved that problem.

Circuit Highlights

Much of the circuitry is identical in the 146- and 220-MHz units. Of necessity, the frequency-determining components are different, but the difference is generally a matter of the number

The CL-146 as seen from the bottom. A bracket with the speaker mounted on it has been tipped back for a better view. Near the center, in the rear section, are what appears to be coils looped through holes in the pc board. This actually is storage for the coaxial cable used in the diode T-R switch. That prominent module in the rear section is the rf preamplifier for the receiver. At the center of the transmitter board is the audio compression amplifier. The large air trimmers in the rear compartment are in the output circuit of the PA.



of turns in an inductance or the value of capacitance. The i-f circuits, audio section, T-R switching and physical arrangement are all alike. A neat diode-switching circuit is used to change the rf path between transmit and receive. As shown in Fig. 1, the diodes are in series for dc, but parallel for rf. The transition from one mode to the other is so quiet that often nothing is heard after releasing the microphone button until the other stations voice is emanating from the speaker.

Both models have built-in circuits to protect the output transistor in case of a high SWR. The sensing unit is a toroidal pickup transformer, with a diode detector and an SCR as part of the circuit that removes operating voltages from the driver stages.

Considerable effort was put forth to reduce spurious output or responses. Both the transmitter and receiver make liberal use of multiple-tuned circuits and high-Q circuits between stages. The

receiver selectivity is further enhanced by the use of two i-f filters, one at 10.7 MHz, the other at 455 kHz. Sensitivity of the receiver is aided by a module mounted externally to the receiver deck itself. An error in labeling led the writer to wonder what a "PF PREAMPLIFIER" was. Investigation of the schematic confirmed the suspicion that it was actually an RF PREAMPLIFIER, all sealed up in a small package that required only input, output, and +12-V connections. Incidentally, this module (available as a spare part) might be worth thinking about if a home-built receiver needs a bit of help in the gain department.

Controls

Controls on the front panel include a pair of toggle switches — one to turn the unit on or off, the other to select either high- or low-power output. In the LO position, output is 3 watts; in HI the output is 10 watts, minimum.

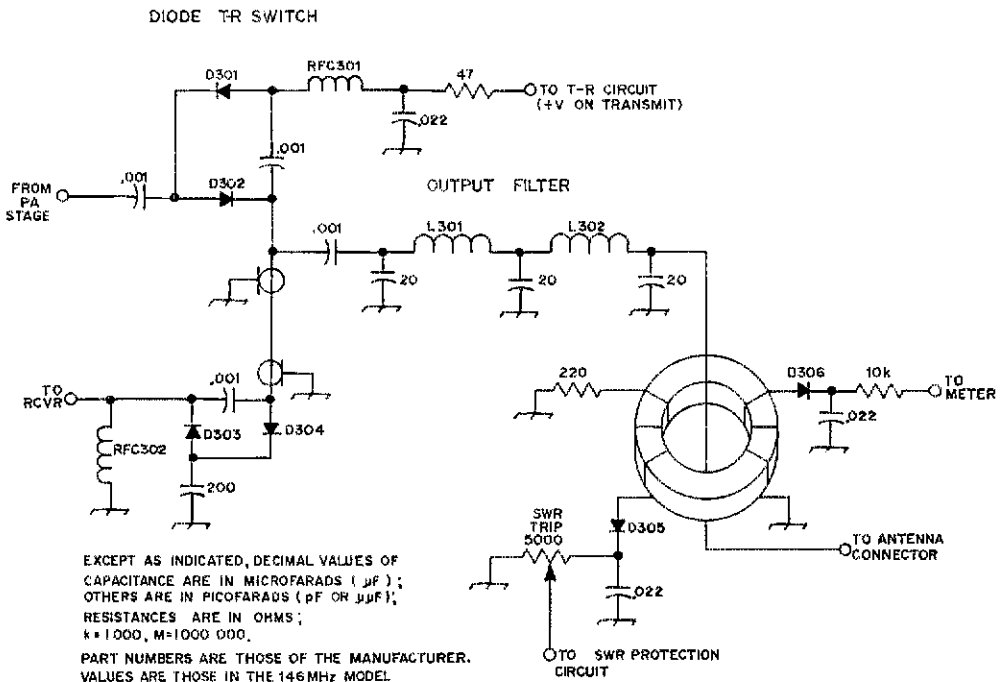
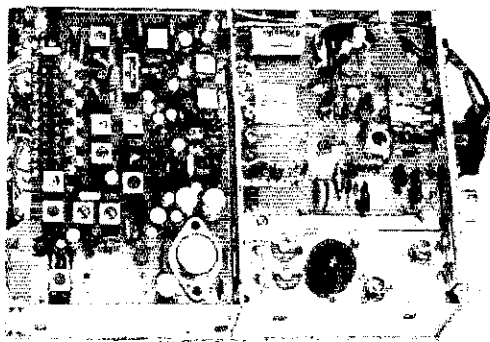


Fig. 1 — Partial diagram of the rf output circuitry in the Henry Radio Tempo CL transceivers (component designations are those of the manufacturer). A positive voltage applied to the T-R switch through RFC 301 causes all four diodes to conduct. D301 and D302 effectively connect the PA to the output filter and the antenna

connector. D303 and D304 present a short at the end of the length of coaxial cable. Since the cable is an electrical quarter wavelength, the impedance at the transmitter end is high. D305 is part of the SWR sensing circuit, and D306 rectifies output rf so that the front-panel meter can indicate relative power output.



Any one of twelve channels can be selected by turning the knob on the selector switch. The number of the channel selected is back-lighted and visible through the skirt on the knob. The squelch and volume controls are mounted away from the other controls, thus aiding in operating convenience.

A meter on the front panel is well lighted for visibility in high ambient light levels, but a nearby switch will dim the lamp for night driving. Another switch will connect the meter to the discriminator output for frequency-reading purposes, or to a limiter stage to obtain an indication of received signal strength. In the latter switch position the meter also indicates relative power output while transmitting.

Another front-panel item is a small push-button switch marked MONITOR. Translating from the Japanese to a language understood by those familiar with servicing domestic two-way radio equipment, this would be called a "netting switch." This switch applies voltage to the oscillator in the transmitter and the discriminator meter will provide an off-channel indication. This same test will show that the receiver is working, as well as check out the transmitter audio section. An audio feedback howl will be heard if the receiver volume control is advanced slightly. While this check is not of much use for split input and output frequencies as used through a repeater, it is very handy for simplex channels. It also eliminates the necessity for connecting a dummy load to the transmitter output when setting the frequency for either simplex or repeater operation.

An additional feature of the equipment is a lamp that comes on when a carrier is being received (or when the squelch is open) thus indicating that something is happening even if the operator has the volume control turned down.

Instruction Manual

Another pleasant surprise was the operating and instruction manual that is furnished with each unit. The schematics, while small, are easy to follow. They are essentially in three parts, being main frame, receiver, and transmitter. A description of each part of the circuit is given and alignment instructions that include voltage readings at each of several test points make the manual one of the best that this writer has seen.

A top view of the CL-220 showing the row of twelve sockets and trimmers for the receiver crystals near the front. The bottom portion of the rear compartment contains the ten-watt power amplifier. Input and output tuning controls for the PA may be seen on each side of the round black heatsink. Output filtering and T-R circuitry occupy the upper portion of the compartment.

In the event that 12 channels are not enough to satisfy the user, a plug on the rear apron provides a means of connecting external frequency control devices, such as more crystals, a VFO, or synthesizer. Another socket is provided, with nothing connected to it, which may be wired for use with tone devices or other accessories.

An external speaker jack is provided, and the use of one is advisable. The speaker in the unit is adequate, but no more than that. Being small and mounted on the bottom of the chassis to face sound-absorbing floor mats, it has to work hard to overcome the noise level in most cars. An external

(Continued on page 58)

Henry Radio Tempo CL-146 and CL-220 FM Transceivers

Power output: CL-146 - 12.5 watts at 13.5 V dc. CL-220 - 12.6 watts at 13.5 V dc.*

Sensitivity: CL-146 - 0.36 μ V for 20 dB of quieting; 0.12 μ V to open squelch.* CL-220 - 0.2 μ V for 20 dB of quieting; less than 0.1 μ V to open squelch.*

Dimensions (HWD) and Weight: 2-5/16 x 5-15/16 x 9-inches, 4-1/2 pounds.*

Power requirements: 13.8 V dc nominal, useful range 11 to 16 V dc, 2.8 A during transmit, 0.25 A receive.*

Channel capability: Provisions for 12 channels plus external control.

Transmitter crystal frequency: CL-220, operating frequency divided by 18; CL-146, operating frequency divided by 12.

Receiver crystal frequency: CL-220, operating frequency minus 10.7 MHz divided by 5; CL-146, operating frequency minus 10.7 MHz divided by 3.

Price class: \$330.

U.S. distributor: Henry Radio, 11240 W. Olympic Blvd., Los Angeles, CA 90064.

* Measurements made in the ARRL lab.

ARRL QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 5 by 8 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

W1,K1,WA1,WN1 - Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.
 W2,K2,WA2,WB2,WN2¹ - North Jersey DX Assn. P.O. Box 505, Ridgewood, NJ 07451.
 W3,K3,WA3,WN3¹ - Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
 W4,K4 - North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.
 WA4,WB4,WN4 - J. R. Baker, W4LR, P.O. Box 1489, Melbourne, FL 32901.
 W5,K5,WA5,WB5,WN5¹ - ARRL W5 QSL Bureau, Box 1690, Sherman TX 75090.
 W6,K6,WA6,WB6,WN6 - No. California DX Club, Box 11, Los Altos, CA 94022.
 W7,K7,WA7,WN7 - Willamette Valley DX Club, Inc., P.O. Box 555, Portland, OR 97207.
 W8,K8,WA8,WB8,WN8 - Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
 W9,K9,WA9,WB9,WN9 - Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
 W0 - Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, IA 50169.

K0,WA0,WB0,WN0 - Dr. Phillip D. Rowley, K0ZFT, Route 1, Box 455, Alamosa, CO 81101.
 KP4,WP4¹ - Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.
 KV4 - Graciano Belardo, KV4CF, P. O. Box 572, Christiansted, St. Croix, VI 00820.
 KZ5 - Lee DuPre, KZ5OD, Box 407, Balboa, C.Z. Box 407, Balboa, C.Z.
 KH6,WH6¹ - John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.
 KL7,WL7 - Alaska QSL Bureau, Star Route Box 65, Wasilla, AK 99687.
 VE1 - L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS.
 VE2 - A. G. Daemen, VE2UJ, 2960 Douglas Avenue, Montreal 301, PQ.
 VE3 - R. H. Buckley, VE3UW, 20 Almont Road, Downsview, ON.
 VE4 - D. E. McVittie, VE4UX, 647 Academy Road, Winnipeg R3N 0E8, MB.
 VE5 - A. Lloyd Jones, VE5JJ, 2328 Grant Road, Regina, SK, S4S 5E5.
 VE6 - D. C. Davidson, VE6TK, 1108 Trafford Dr. NW, Calgary 47, AB.
 VE7 - H. R. Hough, VE7HR, (291) McKenzie Rd., Victoria, BC.
 VE8 - Yellowknife Centennial Radio Club, P.O. Box 1944, Yellowknife, NWT, Canada.
 VO1 - Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.
 VO2¹ - Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, I.B.
 SWL - Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

¹These bureaus prefer 4 1/4 by 9 1/2 inch or No. 10 business envelopes.

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



May 1923

... A special issue on antennas features a Stuart Ballantine treatise on losses - in the wire, from nearby masses, earth resistance, and corrosion. One thing is certain: galvanizing iron is not a good choice! Another article reports tests on a couple of dozen insulators of all sizes and shapes; it must have been a dangerous job in view of the repeated ratings of "heated," "exploded," and "flashed over."

... "How large to make the antenna" has a predictable answer: as large as possible! One wavelength - i.e., operation at the fundamental - seems the consensus. At 200 meters that is 660 feet, and a lot of wire in any language. How such mammoth structures were kept up is indicated in an adjacent story on masts, showing a pair of railroad ties imbedded in rocks in the ground as guy anchors!

... The second National Radio Conference attempted to solve broadcasting's interference problems with a realignment of voluntary wavelength assignments. Amateurs get 150-200 meters, while spark is allowed only 176-200; special arrangements are possible for amateur cw in 200-222 meters. Licenses, which up to now specified a particular wavelength, will (for the first time) allow choice of operation anywhere in the band.

... The editorial says spark has "gotta go," but believes this will be a natural and voluntary result rather than requiring regulatory prohibition.

... ARRL message traffic hit a fantastic total of 160,000 for March.

... "Amateur Radio Again Proves Its Worth" describes emergency medical treatment rushed

through a raging storm to a fever-ridden attendant in a Lake Erie waterworks crib, all coordinated by amateur station 8AJ0 - today, WB8GKU.



May 1948

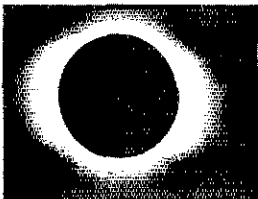
... Twenty-five years later interference to other services is still a major headache to amateurs - but now it is television, beginning a spectacular boom. Editor Warner is critical of a "deficient" allocation scheme, which puts an unwarranted burden on amateurs. Phil Rand, W1DBM, commences a major attack on the problem with a "let's get our own house in order first" approach, and provides data on traps, tubes, shielding, filters, all to cut down on harmonics.

... The swing to sideband continues, with pioneer Don Norgaard, W2KUJ, holding out the plum of 9 dB effective gain over a-m for the same power. Leaving the carrier and one sideband "at home" does the trick. And reducing receiver bandwidth cuts out a lot of undesirable noise, as well.

... Now that we have 220-225 Mc. (replacing the temporary 235-240 assignment), Ed Tilton, W1HDQ, gets down to business with a description of crystal control for an exciter unit - which could be used also as a portable transmitter.

... The Clapp oscillator makes its appearance, and tests in the ARRL lab confirm its high stability, largely independent of voltage and temperature changes.

... But BCI has not entirely disappeared, and W2PGZ describes for us a narrow-band fm exciter which won't bother the neighbor's kitchen radio. - W1RW



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Special Prefix STAs¹

BY LARRY E. PRICE, * W4DQD

A FUNNY THING happened at the office one day. (Not on the way to the office -- at the office.) The XYL called and told me that an old friend, Ken, W5THY, and his family were stopping by to spend the night on their way home from a Florida vacation. Ken and I had begun amateur radio together in 1951 when we were WN5THY and WN5TIA respectively. We hadn't seen each other or talked in some time, so, like most hams we swapped some tall tales about our amateur achievements. I mentioned my advanced class ticket; Ken had his extra! I mentioned a new expedition I had finally worked; Ken had worked them on five bands! In desperation I revealed my secret plan: my club was going to put on an exhibition of amateur radio at an upcoming fair. No, not just an ordinary fair station. We were going to be the first WC4 on the air. Now, there was an event to try and top! (At this point my plan was so secret that not even the FCC knew about it.) Having thus bragged out of turn, I was committed to try and live up to the attempt to activate one of the first special prefix callsign stations. Thus, in the summer of 1968 was born the planning for WC4GSC to be operated by the Georgia Southern College radio club.

* Director, ARRL Southeastern Division; P.O. Box 2067, Georgia Southern Branch, Statesboro, GA 30458.

A quick check of Part 97 of the Commission's rules revealed 97.51 (a) (4):

A specific call sign may be temporarily assigned to a station connected with an event, or events, of general public interest.

Now came some agonizing discussion with club members over how to approach the filing of an application. With the help of our club president, Dave, WB4FTZ, we reached the following conclusions:

1. No formal application is necessary. A letter is fine.
2. Special Temporary Authority (STA) is sought, not the grant of a license in the normal fashion.
3. No fee is required for STA.

We planned to operate during the Ogeechee² Fair from October 12 to 20, 1968. Our license was issued on September 20, as WC4GSC {Okay, Ken -- Top it!} With the day of the operation fast approaching, we started the time honored ham practice of borrowing equipment. Many rigs were promised, few showed up. Time to put up antennas, "sure we'll all be there . . ." (sound like Field Day?) Four showed up. Yet somehow, in typical ham fashion everything was GO when the fair opened. What did we learn from the operation?

1. Get your request in to the League early for article reprints, pamphlets and other "handouts" for the crowd. We didn't give headquarters enough lead time and the booklets just made it in time for distribution.

2. Have at least two, or better still three, operators on duty at the fair booth at all times: one to answer questions from the on-lookers and give general information about amateur radio, the others to man your station, log, etc.

¹ STA = Jargon for "Special Temporary Authority" from the Commission.

² An American Indian word. Caused us no end of trouble trying to get it across phonetically to DX and W/K stations alike during fair operation.

Larry, W4DQD operates WE4SUN from observation platform. W4WRY (hands on hips) looks into distance waiting for eclipse. WB4FTZ, bites nails, wondering, "Is it really going to get dark?"

QST for



Table 1

| Call used | yr of opr | number QSOs | QSLs rcvd | % rcvd |
|-----------|-----------|-------------|-----------|--------|
| WC4GSC | 1968 | 579 | 244 | 42 |
| WC4GSC | 1969 | 896 | 414 | 46 |
| WE4SUN | 1970 | 457 | 203 | 44 |
| KF4GSC | 1970 | 1381 | 552 | 40 |
| KY4CD | 1971 | 1397 | 423 | 41 |
| KT4OF | 1972 | 393 | — | — |

3. Get as much local publicity *before* the event as you can so that visitors will especially want to see your station while they are on the grounds. Make use of your *Publicity Handbook* provided by the League to all affiliated clubs as part of the club "kit." See Fig. 1 for an example of our local news releases.

Results

All of us enjoyed the operation. Some of the contacts were funny, such as the G3 who insisted on giving our call phonetically as *Water Closet Four* . . . Others weren't intentionally funny but gave us a laugh anyway, such as the Novice who was sure he had hooked up with a Novice in Antarctica! Others weren't so funny — the self-appointed experts who assured others on the frequency that ours was a pirate operation since there is ". . . no such call as a WC4."

How did we do? Well, we tallied 579 QSOs, all of whom received our special card. Unfortunately, only 244 of you sent us your QSL. Another year went by. Not content to rest on our laurels we set out to "do it again" in 1969. We selected KO4GSC as our call sign: O for Ogeechee, of course. The reply of the Commission: No, we couldn't have KO4 but howabout WC4 again? Table 1 shows our box score on all of our operations. Once again we sent QSLs via bureau to every DX station worked and direct to every W/K. Returns were now up to 46 percent!

We are fortunate in having a number of different professional skills represented in our club. One of our members, W4WRY, is a physicist. He came across an interesting note in a scientific journal. Seems there was going to be a total solar eclipse visible in the U.S. for a few minutes on March 7, 1970. Here were the seeds for another special operation. Thus, along came WE4SUN for, of course, SUN Eclipse. Due to a fortuitous combination of circumstances this coincided with one day of the ARRL phone DX contest. No advance publicity was given to this operation. Our primary purposes in this venture were:

1. Make some D-layer absorption measurements.³
2. Lecture to some high school and Boy Scout groups on the mechanics of the eclipse. (This was a task that fell to W4WRY)
3. Have some fun in the DX contest.

All objectives were accomplished. We had some problems in the DX contest though. Everyone *knew* there was no such thing as a WE4, so their ears played tricks. They heard VE4. Try as we would, many contestants insisted that we were a VE4 and apparently so logged us.

³ For interesting results of another group's D-layer experiments, see: "d-Layer Absorption During a Solar Eclipse," Kennedy, *et al.* *QST* July 1972, p. 40.

This 1970 was a banner year for our club. We came back strong in the fall at our Fair with KF4GSC. Get it? F = Fair. For the first time we broke the 1-k mark on QSOs. QSL returns were no better, however, even a little worse than previous operations. And we were still sending cards to every station worked!

Try, Try Again

Now it's 1971, another year; why not another call? Why not, indeed! But now the idea was beginning to catch on elsewhere. New call signs were being heard on-the-air almost daily. We like to think that we had something to do with popularizing this pastime. For, after all, it is a way of gaining favorable publicity and introducing amateur radio to the non-amateur public while having some fun on the air, both for our operators and for the operators on the other end of the circuit. A number of groups wrote asking for advice on how to apply for an STA for a special call sign. We answered each of these as carefully and fully as we could. Some were not granted their requested calls because they wanted to operate what I call a "non-event." That is, an event especially created for the purpose of justifying the call instead of the other way 'round. After all, who can accuse us of staging the solar eclipse? It's been said by some that we must have some influence in high places: I assure you we have very little *that* high!

AT STATESBORO

Radio Hams Add Flavor to Fair

By RIC MANDES
Atlanta Journal-Constitution Correspondent

STATESBORO, Ga.—A group of "hams" plans to make the 1968 Ogeechee Fair a very interesting place this week. They'll not be listed or seen in the livestock area of the large and colorful fair site, but later they'll be located, clean and neat, just at the entrance of the fairgrounds, right out in front so everybody will see them.

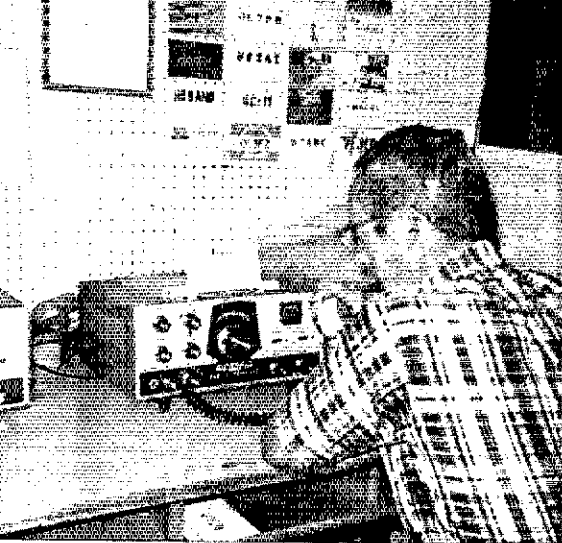
It's all right, however, for these are extra-special "hams." Operators, that is. Folks who through the technical gadgetry of radio transmitting, talk to people all over the world.

Hams take their hobby very seriously.

Some of the people Price talked to last week, explaining to them what we were going to do. They said they'd pass the word on to hams in their towns and communities."

Some of the people Price talked to last week are planning

Fig. 1



Dave, WB4FTZ, checks out one of the rigs at KF4GSC.

Our call for 1971 needed to be something really special then. We considered a number of possible combinations. We settled on KY4. It had not been used previously to our knowledge. It sounded exotic, almost like a newly discovered DXCC island. For the suffix, we selected CD, thus KY4CD. CD came from Civil Defense. I am serving as CD radio officer for the county and it seemed natural to try and gain publicity for our CD effort. We categorically deny that it stands for Communications Department. This rumor was no doubt given credence by the *coincidence* that a CD QSO party fell during the fair operation. We were able to operate in the CD party because: (1) Our Georgia SCM, WA4WQU, kindly appointed

KY4CD as an OPS. (2) Our cross-state colleague, K4BAI (an excellent top-notch contest operator) came over for the week-end in order to operate the station. In fact, he had so much fun he stayed the entire week. One interesting note about those CD party operators: our strange call didn't faze them a bit. They simply "rogered" our exchange and went on with the party. Even Headquarters staffer W1FBY, went right on with the party and didn't ask a single question as to who we were!⁴

KY4CD set a new record for us of nearly 1400 QSOs. So far we have sent QSLs through foreign bureaus, to all DX stations worked. We have sent cards in answer to all W/K cards received.

The 1972 operation was under the call KT4OF, which arrived the day the fair opened. We were less organized than usual because of this, but still managed to work 393 stations in 38 states and 37 foreign countries.

No decision has been reached about the cards for large number of Ws who did not send us a card. Do they want one? Perhaps not. Perhaps they just don't know where to send theirs. Our logs are still open for WC4GSC, WE4SUN, KY4CD, and KT4OF. We will be happy to provide QSLs to any who worked us and haven't yet received a card.

No report of the activities of the club would be complete without an acknowledgement of the contribution made by operators WB4ERS, WA4SSC, and WA4YYU. What about 1973?? Wait and see and watch for us on the air. QST

⁴ W1FBY rebuts: "No question! With a fist like that and from Georgia, it *had* to be K4BAI at some operation staged by W4DQD!"

Henry Radio Tempo

(Continued from page 54)

speaker, mounted to project the sound at the operator, afforded comfortable listening with the volume control advanced only 20 percent of full range.

One last item: What was apparently a misprint in the instruction manual listings of dimensions indicated that the unit was 7.66-inches long. If size is a crucial factor in mounting the transceiver under the dash, be aware that the unit measures 9 inches instead. — W1SL

Observations on the CL-146

Most of what has been said previously about the Tempo CL-220 applies equally well to the CL-146. However, this writer has made some observations on operation of the 2-meter version which may bear mentioning.

The 3-watt output-power range proved quite satisfactory for distances of 12-15 miles or more from repeater locations, despite the moderately hilly Connecticut terrain. At greater distances the 10-watt power became advantageous to the extent

that most any repeater heard could be worked. The CL-146 is supplied with a transmit and a receive crystal for "52 direct" operation (146.52 MHz).

The car bearing the transceiver was subjected to the frost-heave-infested roads of New England. No noticeable vibration problem affected the rig on either transmit or receive. The mounting bracket is not particularly convenient for quick and easy transceiver removal and reinstallation when the rig is shuffled between house and car. The mounting screws must be completely removed from the sides of the transceiver before it is released from its fastenings. When the rig is returned to the auto, lining it up in the bracket so that the mounting screws can be installed can be a bit tricky. One consolation though — it will take a thief longer to remove the rig, too!

The transceiver is enclosed in a box which seems to be more rugged than many on the fm market today. The unit's size exemplifies the trend for compactness: its length and width are slightly smaller than an ARRL *Handbook*; its height is approximately one and one-half times the thickness of that same manual. — WA1FCM

The Case for Minimal Regulation

ARRL's President Tells March Meeting
of Washington QCWA Chapter that
Restrictive Rules Inhibit Growth
and Stifle Public Service

MR. CHAIRMAN, distinguished guests, fellow amateurs:

It is always good to be among old friends, and your annual gathering here in Washington has long been one of amateur radio's proud occasions. So I am doubly honored to be your guest tonight.

I have now completed something over a year as President of the American Radio Relay League. It has been a most interesting and challenging assignment. In a little more than twenty-five years — yes, I've only been a QCWA member for a year — in these years of involvement with amateur radio, and especially with the League in organizational matters, I continue to be impressed — and extremely pleased — with the ingenuity and drive of our radio amateurs. We never stand still.

The continuing breadth of amateur interests is illustrated, I think, by the subjects of technical articles in recent *QST*'s chosen as outstanding for each issue — there was a frequency synthesizer, SSTV monitor, digital keyer, high-power 432-MHz amplifier, QRP cw transmitter, matching systems for antennas, and a channelization plan for 2 meters. And these are just a small sample of the many interests which we share. While this is one of the fascinating points about our service . . . that is, something for almost everyone . . . and can be considered one of our strong points, it also has potential disadvantages because it tends to split us into many specialized interest groups without common goals. However, there are two things we share as a common denominator . . . and I would really like to think of them as inseparable. One of them is our amateur license and the other is our membership in ARRL — the only organization which truly represents all of us no matter what our specialized interest may be. Experimentation, DX, the world of vhf-uhf, traffic handling and public service, RTTY, ragchewing, SSTV . . . whatever



ARRL President Dannals, W2TUK

your interest may be, the American Radio Relay League is serving as the common bond of our fraternity. We must never lose that bond.

From time to time we are inclined to think that our own special interest is really what amateur radio is all about . . . that the rest of the fellows really aren't on board. However, history has a way of drawing everything into focus, compelling us to take stock of ourselves, to decide what we are and where we are going. This is good because self-assessment, if it is done wisely and well, always leads to greater strength and greater vitality.

Self-Appraisal

We reached such a point in the early 1960s, when we took a good look in the mirror, and decided there could be some desirable improvements for the long-term benefit of amateur radio. Many of you will remember the late ARRL president Herb Hoover's speech just ten years ago here in Washington covering this subject. This self-analysis culminated in the incentive licensing program, and although the final regulatory result was considerably different than the League's original concept, I believe the net effect has been all to the good.

Taking stock, and measuring by cold numbers, or in purely quantitative terms, can result in an erroneous evaluation of the true vitality of ham radio. The licensee total on FCC records has been level for some years now, rather than showing numerical growth. But let's dig beneath the surface of simple statistics. The normal annual increase in license totals ceased in 1964. This is the same year the Commission imposed fees, and in my opinion, it is not mere coincidence — it is cause and effect. It has been said that as many as 50% of amateur licensees have been on the inactive list, and for every newcomer to the game, we seem to be losing a long-time but inactive licensee who felt sentiment was no longer justification for holding a ticket if it cost \$4, later \$9. With a proposal now for \$10, I expect we'll see a continuation of this horizontal

line on the graph of license issuance. But we do have a much higher percentage of licensees today who are actively engaged in ham radio. In other words, we've eliminated considerable deadwood — and I think this is all to the good.

Yes, we're still adding newcomers to the ranks, and I believe one reason for this is the extensive exposure of amateur radio to the public through the League's color films. One, "The Ham's Wide World," has now been shown more than 450 times on television, with an estimated audience of twenty million; and more than 5,000 times at civic clubs, schools, and such, before 250,000 persons. A shorter version oriented more to youth, "This Is Ham Radio," has been in use for only a year, but already has had some 1,400 showings, mostly in schools, with an estimated audience of 200,000. Close cooperation is maintained by our Hq. with the Boy Scouts and the Boys' Clubs of America, with amateur-oriented projects active in both groups. Many of our 1,200 affiliated radio clubs conduct local courses in code and theory in preparation for an amateur license. A basic curriculum is now in preparation for use by high school science teachers, incorporating experimentation with the Oscar satellite as a fundamental of a space program with an intensively personal touch. In such activities I believe we amateurs are carrying out the admonition made on this same rostrum several years ago by then FCC Chairman Rosel Hyde, to stimulate interest in the amateur radio service, particularly in our youth. He said, "By channeling their interests into the amateur service, youngsters can develop a lifetime hobby — can enlarge their educational horizons and often can make use of their talent in developing a career in engineering or other related fields."

The major trends in amateur radio today are, quite naturally, in the vhf and uhf. Principal among these growing activities are fm-and-repeaters, and satellite communications.

Repeaters and Satellites

The esteem of amateurs for those pioneering in the space communications field has already been demonstrated tonight in the award to Amsat. And widespread enthusiasm is shown by statistics covering individual amateur participation from home stations. Practically every mode of emission has gone through the translator in Oscar 6 — cw and voice, of course, but also teleprinter and slow-scan TV. K7BBO is approaching two thousand individual contacts. G3IOR has worked more than 30 countries. VE2BYG has been in contact with more than 37 states. JA8PL has four continents to his credit. My son Bob, WB2UZU, seated in the audience tonight, was one of the first to submit cards confirming contacts qualifying for the Satellite DX Achievement Award. Even I took the time to communicate via Oscar 6, as did IARU President Bob Denniston, W0DX, from his station at VP2VL. And remember, please, the normal "window" for such communication is a maximum of 20 minutes several times a day at any one location. But this is only the beginning.

Coming back to earth — to coin a phrase — the wholesale shifts in recent years to fm and repeater activity, largely on 2 meters, has been unprecedented in our history. We've had both 2-meter setups, and repeaters, for many years — but mostly in limited areas such as Schenectady (It is more than coincidence that this is the home of General Electric!). The split-channel proceedings of FCC, eventually making thousands of two-way mobile units obsolescent for commercial services, provided a surplus market of gear for hams to tear apart and rebuild for our own use.

Amateurs realized — incidentally, long before any FCC rules, and even before ARRL official recognition — that here was an ideal, untapped source of highly-useful communications, an efficient use of frequencies, an opportunity to organize for emergency communications and public service. Without much external guidance, these amateurs used good common sense, showed responsibility, and achieved spectacular results. They are a credit to the community and to the amateur service. And I think it important to underscore that it was all done without one word in the amateur rules specifically treating repeater operation.

No one knows better than the longer-time members of QCWA, many of you right in this room, of the vital part amateur radio has played in the development of communications, particularly in the earlier years. It is not my intention tonight to recite a long list of those accomplishments. It is my intention to affirm that these results, as in the more modern case of repeaters, came about largely because of a favorable regulatory atmosphere which was totally encouraging of free and wide-ranging experimentation. And we believe deeply that this positive attitude must continue for amateur radio to have a promising future.

The Board Resolution

On January 18th, at its annual meeting, the League's Board of Directors unanimously adopted a resolution that I am sure many of you have had an opportunity to read.¹ It was an unusual action — the first time in more than a quarter century that the League has taken an official step of this kind. The resolution takes strong issue with what the Board sees as an increasingly restrictive trend in recent Federal Communications Commission actions and interpretations concerning amateur radio.

What does this move mean? Is the resolution a call to battle as some have interpreted it? Is it merely an act of defiance? Or is it in any way an attack on the Commission or its personnel?

The resolution is, in fact, none of those things. I'd like to try, if I may, to put the issue into perspective for you because, as amateurs, and as League members, you are very much involved — as indeed is every amateur. What is at stake here cuts across every area of amateur activity and interest because our basic concern goes well beyond specific regulations and interpretations affecting third

¹ *QST*, March 1973, p. 11.

party traffic, repeaters, phone expansion or environmental protection. The real issue is a very fundamental one: What is amateur radio to be in the years to come and how should it reach that destination? This is a basic philosophical question as we see it, and it is a crucial one. And this is the issue to which the Board's resolution is addressed.

Actually, the Board is saying that no one can determine what amateur radio should be or will be in the years to come — and that no one should try to mold it to any specific goal or expectation.

I am reminded of a remark by Paul M. Segal, Ex-3EEA and for many years before his passing the General Counsel of ARRL. He said, "If Guglielmo Marconi had been required to fill out FCC form 301 before undertaking to send the letter S across the Atlantic Ocean, God knows where radio-communications would be today!"

Flexibility Needed

A major premise in amateur radio is that it is unfettered, with its participants free to try anything and everything, no matter how logical or illogical, no matter how scientific or how screwball. Thomas Edison, the story goes, made something over 2,000 false starts or mistakes before he invented the electric light bulb.

And full flexibility in amateur radio must include the opportunity to make mistakes — only so long as we do not bother other services. To chart a course for amateur radio and constrict us to one route is the very antithesis of our basic structure. We can guide, we can lead, we can implore — but a rule, even written in good faith, to mold amateur radio to a certain direction, or to discipline the few unruly, is most often a strait-jacket which will stifle our growth and development.

It is important, I think, to emphasize here that our quarrel is most assuredly not with the dedication or motivation of the FCC or its staff. We have the deepest respect for their concern with and commitment to the future of amateur radio. We think we understand very well their responsibility as a regulatory agency and the difficult problems with which they must deal in fulfilling that responsibility. Theirs is no easy task.

Amateur radio is fortunate that the people charged with that responsibility at the FCC are not only deeply dedicated but widely experienced and exceptionally capable as well. Their efforts are — as they always have been — directed to the growth, development and upgrading of the amateur service in accordance with their statutory mandate.

And the Commission has always given us strong support. We were most pleased, as a very recent example, to hear Commissioner Robert Lee say of amateurs, "They are our most responsible licensees . . . Their self policing is marvelous . . . Amateur radio is the only service where I couldn't suggest any improvement."²

The Commission and the League have long shared broad objectives, a mutual determination to

² From an interview by K8ONA.

provide for and encourage a maximum contribution by radio amateurs in the public and national interest. Our difference now lies in how best to achieve those common goals.

The Dangerous Trend

What we see happening in recent FCC actions, decisions and interpretations is a trend that can have only two ultimate effects. In the first instance we see excessive and restrictive regulation aimed at the small minority of undisciplined, uninformed or irresponsible amateurs which will impose a wholly unwarranted burden on the effective public service performance of the vast majority. In the second place, and of greater concern, we see a redefinition of amateur radio which can lead to its becoming a small body of elite technical specialists. Both effects, we believe, are not only completely contrary to the traditional concept of amateur radio, but to its purposes as defined in the Communications Act and the Commission's own regulations. While we believe that the traditional concept and the historic performance of amateur radio are as valid and as vital today as they have ever been, it is not the League's intent to rest its case on the past alone. We recognize fully the need to adapt to change. New technology, new circumstances and new attitudes all pose new challenges for the future which amateur radio and radio amateurs must be prepared to meet. We most assuredly cannot simply stand still and rest on our laurels.

The challenge is enormous. We are proud of the Commission for its clear recognition of that challenge and its determination to meet it boldly, imaginatively and intelligently. But we submit in all sincerity that the task is one that demands the best that all our diverse experience, skills and resources can bring to it. That is what the League is uniquely equipped to mobilize through its management organization and its membership at large. I should point out that League membership today is the highest in our history, despite the fact the amateur totals have been substantially level for seven years.

And in no group is there such a concentration of experience, expertise, judgment and historical perspective in all aspects of amateur radio as there is among you here tonight. There has never been a time when those qualities were needed more. The future of amateur radio involves too much complexity and diversity of both technology and operating interests for any individual or small group of individuals to be qualified to make necessary judgements — regardless of their competence and dedication. Our call is not a call to battle, but a call to mobilize the best of our talents so that we may all of us — the Commission, the League, and all amateurs — work together toward the common goal we all share: an amateur service that will meet future needs as well as it has those of the past . . . an amateur service that can stand up and be counted in the international fight for spectrum space . . . and finally, an amateur service in which you and I can take justifiable pride.

Thank you.

Q57

OSCAR NEWS

Our new wrinkle in the Oscar 6 story this month comes courtesy of W2GN, East Greenbush, New York. In looking for a new challenge within the amateur satellite program, Fred decided to try mobile operation. After all, the most common use of earthbound repeaters is in conjunction with mobiles, to increase the range of these stations, which must operate within severe limitations on antenna size and transmitter power. Terrestrial repeaters have proved to be a tremendous asset to the mobile operator; how about Oscar?

Fred was able to assemble his mobile satellite ground terminal from commercially available units: an Inoue IC-20 two-meter rig with 50-watt solid-state amplifier and 5/8-wave whip for uplink, and an FT-101 transceiver and Hustler antenna for down link. The only special features were a low-pass filter in the ten-meter feedline to keep the two-meter rf out of the receiver, and a keying relay which interrupts the dc to the transmitter driver and final amplifier stages. With this method of keying, the cw signal sounds quite clean.

The first contact from W2GN/2 was W3TMZ on orbit 1983, March 23 at 0109 GMT. Fred's mobile installation has proved to be so successful as to be almost anticlimactic; on March 26 he drove to ARRL headquarters to demonstrate it and on a morning pass worked W7ZC, K4TI and K6DS from the League parking lot in a ten-minute span. All contacts have been on cw, but the strength of the returning signal suggests that mobile ssb might be practical as well. Now Fred is looking for another station to be on the other end of the first mobile-to-mobile satellite QSO. Any takers?

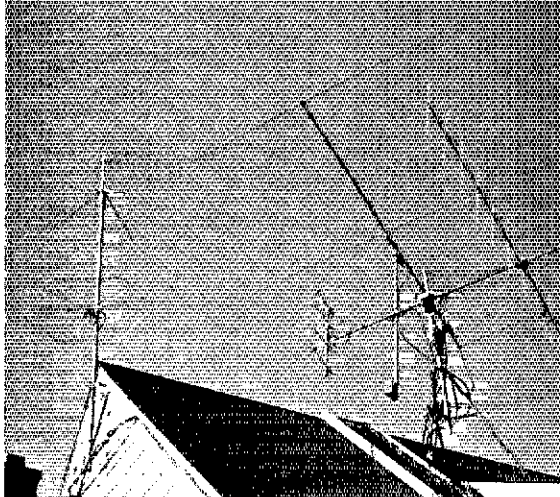
Traffic Talk

This heading usually belongs in the "Public Service" section of *QST*, but its appearance here emphasizes that the value of an amateur satellite is not limited to hams interested in space communications and vhf techniques. Two accomplished cw traffic men, WAØTAQ and KØDDA, succeeded in handling the first reported piece of message traffic through Oscar 6 on March 5. Perfectly predictable and not affected by the vagaries of hf propagation, satellite-borne translators have a great potential for public service and emergency communications work.

Polarization

Antenna experimentation has been one of the most interesting Oscar-related activities for those

W2GN demonstrates the first amateur mobile satellite ground terminal.



W2GN's fixed-station Oscar antennas: 3-element Kirk ten-meter Yagi, 20 elements circularly polarized for two, and 20-element collinear for 435 MHz. The Kirk antenna is made of fiberglass and weighs only 8 pounds, making it a natural for an az-el mount.

hardy enough to brave the winter weather. With spring now upon us, no doubt many will be working to improve their satellite skywires. The experiences of others can serve as a guide in making changes to your system.

Uplink: Gain is not the answer to your two-meter antenna woes. Running power grossly in excess of the 100-watt effective radiated power limit is a good way to build an unsavory reputation, but is no way to demonstrate your operating skill. There *are* improvements to be made, however. To quote PAØWLB, "Three different transmitting aeriels have been tried: a 16-element horizontal long Yagi with a fixed elevation of zero degrees, an omnidirectional vertical with zero dB gain, and a 2 x 3-element crossed Yagi with a fixed elevation of 12 degrees. The long Yagi was the worst of all (deep long QSB) and only 6 QSOs have been made with this aerial. The vertical omnidirectional was good for 62 QSOs, but results were bad when the satellite was less than 10 degrees over the horizon. The crossed Yagi turned out to be the best of all. Circular polarization makes the difference. It's very easy to find the people with horizontal polarization only. One moment they are



overloading the transponder while the next moment you don't hear them at all." W9ZTD has made tests which also indicate that vertical polarization is better than horizontal, and W6OAL confirms that circular polarization is best.

Downlink: Gain can be very beneficial in the ten-meter receiving antenna, but it may not be the most important consideration. For most amateur work, we tend to think in terms of gain at the horizon, or at least at low radiation angles. For satellite work, high-angle response is often the key. In fact, it may be advantageous to use an antenna with minimal response at low angles, so as to reduce man-made noise. A rotatable beam can be an excellent performer, but it is advisable to have a second antenna with good high-angle response — perhaps a low dipole or turnstile — for those overhead passes. Also, if you have a beam, try pointing it away from local noise sources rather than toward the satellite. If you don't have a beam, you may find that two dipoles, strung at right angles to one another and instantaneously switchable to offset fading, are just as effective.

Wanted: More States

States-worked totals for the more dedicated Oscar 6 workers are over the 40 mark, and the only thing standing in the way of some operators in their quest for the special Amsat WAS award is a lack of activity in the remaining states. To date, little or no activity has been reported from the following states: Kentucky, Louisiana, Nebraska, Nevada, New Mexico, South Dakota, Vermont, West Virginia, and Wyoming. Surely there is someone in each of these who would like to be a pioneer in the amateur satellite service! If you are, and you're having problems or would like to arrange schedules, drop a note to Amsat, PO Box 27, Washington, DC 20044.

Now that warmer weather is here, weekend "DXpeditions" to these rare states are a realistic possibility. An announcement to Amsat a few weeks before a planned trip should guarantee a pile-up for you! —K1ZND

Recent Satellite DX Achievement Award Winners

OH2RK, JA1ATL, DJ6RD/W9, K2GUG, WB4RUA, K2KNV, W9NTP, K7VNU, K2ZRO, W3BWU, WA0TAQ, K2QBW/3, W9OII, WA1NUH, 1A8DJJ, WB6WAX, DJ2RE, SP2DX, W1JSM, K2EFB.

Certificates have been issued to 50 stations in 7 countries and 3 continents.

OSCAR 6 TWO-WAYS

| Stations worked | States | Countries |
|-----------------|--------|-----------|
| F8XT | 500* | 30 |
| F9FT | 300 | 17 |
| PA0WLB | 252* | 26 |
| SP2DX | 230 | 3 |
| VU2UV | 2 | 2 |
| VE2BYG | 412 | 41 |
| VE3HD | 116 | 30 |
| VE3QB | 183 | 15 |
| VE3TW | 43 | 17 |
| VE7ANP | 91 | 23 |
| K1HTV | 324 | 39 |
| W1JSM | 175 | 32 |
| WA1NUH | 225* | 31 |
| W2GN | 121 | 11 |
| K2GUG | 387 | 38 |
| WA2HKS | 116 | 31 |
| K2LGJ | 231 | 29 |
| WB2VKZ | 173 | 37 |
| WB2ZOW | 16 | 8 |
| K2ZRO | 44 | 4 |
| K2QBW/3 | 68 | 22 |
| W3BWU | 50 | 19 |
| K3JTE | 21 | 8 |
| W3TMZ | 271 | 40 |
| WA4JID | 210 | 39 |
| W6ASH | 245* | 30 |
| W6BGJ | 130 | 34 |
| W6OAL | 236* | 25 |
| K7BBO | 1840* | 38 |
| K7GWE | 95 | 30 |
| W7JQ | 110 | 25 |
| DJ6RD/W9 | 98 | 29 |
| W9OII | 84 | 28 |
| K0 DDA | 60 | 20 |
| K0 FLY/0 | 49 | 15 |
| W0 PHD | 187 | 37 |
| WA0 TAQ | 71 | 22 |
| W0 YUQ | 63 | 21 |

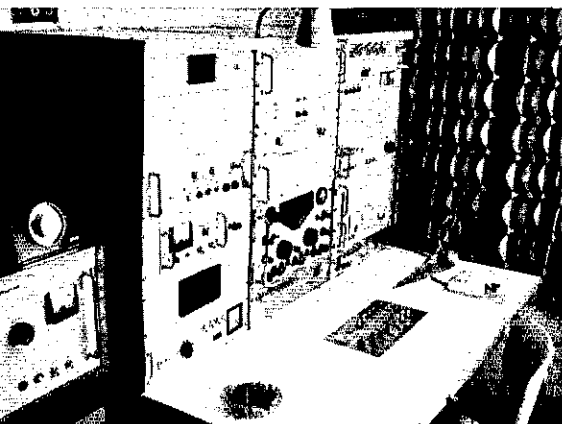
*Total contacts

Strays

SWL Karl Muller visited the U.S. as representative from Swaziland on a youth science tour at the time of the Apollo 17 launch. Attention of Karl's NASA hosts was called to the amateur space program, when amid the excitement over Apollo, Karl reportedly was caught up in getting the latest info on how Oscar was doing!

K2KNV and K2LGJ have developed a computer program written in RPG II language which generates Oscar 6 orbital data such as equator crossing time and longitude, acquisition time, length of pass, azimuth at acquisition and at loss of signal, and maximum elevation during the pass. The program will run on many IBM and some smaller computers. A copy of the program may be obtained from A. B. Buscaglia, K2KNV, 2497 W. River Rd., Grand Island NY 14072; be sure to enclose a stamped, self-addressed envelope.

PA0WLB has conducted numerous experiments using Oscar 6 from this well-equipped station in The Netherlands. William's gear is entirely home-brew, except for the receiver — a Racal RA-17L.



Results, 39th ARRL November Sweepstakes

Reported by Rick Niswander,*
WA1PID/WA8VRB

PRESS ON, INDEED. The adjacent treatise (sent to us through the kind graces of the XYL of W9DOB) exemplifies the one characteristic that makes great contesters great. No contesteer, no matter how talented or erudite in the tricks of contest operating, will win without the firm application of the seat of the pants to the seat of the chair for hours of key-swatting or mouth-moving.

We all start from humble beginnings in the contest game. KN1ZND had only 25 QSOs in 26

*Asst. Communications Mgr., ARRL.

**PRESS ON
NOTHING IN THE WORLD CAN
TAKE THE PLACE OF PERSISTENCE.
TALENT WILL NOT;
NOTHING IS MORE COMMON
THAN UNSUCCESSFUL MEN
WITH TALENT. GENIUS WILL
NOT; UNREWARDED GENIUS
IS ALMOST A PROVERB.
EDUCATION ALONE WILL NOT;
THE WORLD IS FULL OF
EDUCATED DERELICTS. PERSISTENCE
AND DETERMINATION
ALONE ARE OMNIPOTENT.**

hours in his first contest -- the Novice Roundup of 1963. KN1LPI did a bit better with 48 QSOs in 33 hours in the NR of 1960. In the 1955 NR KN4BA1 topped the two previously mentioned laggards with 65 in 37. All pretty sad scores when compared with their current accomplishments. But these are scores from years ago and many a NR, DX Test and SS has passed since. It was only with the application of the principle established at the left that they became the type of contesteer they are now. Granted, talent, education in the tricks of the trade, and yes, even a little genius, all combined to help produce their scores of today. But without their stick-to-it-ivness, their willingness to try again after failure, their dogged persistence, they might have given up contests to pursue some easier, not so frantic, aspect of our (or another) hobby.

But this adage does not apply to the big contesters only, not by a long shot. As WA6PYS succinctly put it in his SS comments: "Very few contestants expect to win; otherwise they'd drop out when they find themselves hopelessly behind. But there is a strong urge to continue; to build up your score and skill." Most of us in highly competitive sections such as MDC, VA, WA, OH, CT, etc. know we don't have a chance to take the section certificate. We need to look at the contest from a different angle; still with an eye to our saying. Hold your own miniature competition with your friend down the street who has the same limitations as you, be they operator or equipment. Compete with yourself; compare last year's score with this one. Be careful, though. Setting too high a goal, such as shooting for the MDC section award using a tri-bander at 30 feet with average operating abilities, can sour one on contests. Set an attainable goal and go after it. If you succeed, you've won! You may not receive a piece of paper attesting your contest prowess but you know what you have done. A paper award can be chomped to bits by the family dog or burned to a crisp. A personal achievement, recorded historically in *QST*, is something you can remember as long as you live. There is something in each contest for each one of us. We need only look for it, set it as our goal, go after it and -- hopefully -- obtain it. Even if we don't quite reach our personal pinnacle, take heart in the fact that the only losers in Sweepstakes are those who don't participate.

The 39th November Sweepstakes, held November 11-13 on phone and November 18-20 on cw, registered a drop in entries of about 12% to 2065. Cw logs still outnumbered phone entries 1042 to 994; check logs numbered 29. Participation appeared high; scores were at approximately the same level as last year. We just didn't receive quite as many logs this time.

For the past few years the "Clean Sweep" has been easy on phone and difficult (to say the least) on cw. This year was no exception. Phone Clean Sweeps numbered a hefty 102 (a drop of 23) while cw Sweeps amounted to only 16 (down 13 from last year). Wyoming was the only section that could be remotely considered difficult on phone -- we had 3 VE8s, 4 or 5 KL7s, bunches of VE4s and VE6s, a few VE5s and KZ5s and an adequate

TOP TEN
(Single Operator)

| CW | PHONE | CW | PHONE |
|---------|---------|--------|---------|
| W7RM | 167,325 | W7RM | 240,975 |
| W6MAR | 162,225 | W9YT | 198,900 |
| K6EBB | 155,250 | WA5JMK | 195,600 |
| W6HX | 155,104 | WA8ZDT | 187,738 |
| K1ZND | 145,440 | K1VTM | 184,500 |
| K1LPL/3 | 141,716 | WSWU/5 | 182,400 |
| W9YT | 135,504 | VE7WJ | 178,125 |
| VE7WJ | 133,809 | K6JAN | 174,750 |
| K5PFL | 133,644 | WB6VZI | 173,667 |
| W3IN | 132,650 | WA0QLH | 173,100 |



Traversing the country from his WPA home to Michigan (attending MSU) to California (attending Berkley) and now settled (for a while anyway) in Southern Texas, WA3GBU/5 has experienced contest conditions from all over the U.S.A. Tom garnered 116K on cw (with help from 3 and 4 element monoband twirls at 70 feet) and was one of the operators at the nation-high phone multi-operator setup of WB5DTX. The licence plate is a memento of his California stay.

supply of Vermont and VE1s. On cw, these sundry sections seemed to sink into the salty seas (which is kinda hard for a VE5). Nevada, Mississippi, VE8, W.I., VE6 and VE4 seemed to be the most difficult. They were there, however, since 16 lucky souls snagged all 75. Mega-thanks to those who participated, on either mode, from the usually hard-to-get sections. Your occasional answer to a CQ, or time spent being the object of a pile-up, is gratefully applauded by all SS participants. Your appearance is an important and exciting facet of the SS or any other contest. Congrats to the following who made the Clean Sweep on both modes: W8OK, W7RM (K7VPF, opr.) W6NUT, WB4YOJ, K4CG and W1ICP (WA1PID, opr.). Each year someone tries to make "75 in 75" (a Sweep in 75 contacts). This year W8OK accomplished that feat on both modes! Hq. made a Sweep on phone, receiving logs from all 75. On cw we had to settle for 74, lacking only Nevada.

The 1972 SS was the first contest in which the new disqualification criteria were applied — and applied they were. Numerous dupe checks were made, with most resulting in a lowered score. The penalty provision of the criteria (item 6 on page 55 of November 1972 QST) dropped some scores considerably. If you find your total scalped by a few hundred or thousand points your dupe checking procedure (or lack of it) is probably the culprit. If you still have a question on your entry (and yours alone) drop me a note and I'll lay my info on you.

Speaking of rules and such, the Contest Advisory Committee (W1BGD (chairman), W2E1F, W3BQV, K4BA1, K5TSR, W6DQX, K7NHV, WA9AUM, W0HP, KH61J and VE2NV) is ready

and willing to accept for study any comments or suggestions on the SS. Drop them a line.

A number of entrants remarked about the absence, in many cases, of manners, even downright rudeness, on the part of some. Having been on the soapbox before I'll let someone else have a go at it. K1VTM makes some good points on this subject (he is talking about the cw bash but his ideas are applicable to either mode): "Check out a new frequency before pouncing on it. IE, ?, or QRL? can help. Be sure to zero properly. Most cw filters have narrow passbands. QRM to adjacent channels will be minimized, too. Use a dupe sheet. How would you like to be called by the same station 6 times? Keep calls short. If the other guy has your call, repetition should be minimized. Don't take over a busy frequency. Courtesy dictates that the first guy there has preference to continue." Well said, Ron. The only thing I could possibly add to that is: *don't* repeat the exchange unless asked to do so. If you receive an exchange sent once, there is no reason to repeat your transmission two, three or even (gasp!) four times. If the guy on the other end needs a repeat he will ask for it — don't waste his time and yours reviewing your message. The most time consuming,

Second spot in SCV goes to WA6GFY, operated by WB6EXW. In his second year of SSing Gary racked up a very creditable 92K on phone. He heard two sections that he didn't work because they were operating in the Advanced section of the band.





Number Ten in the country on phone, top Colorado, and top W0 is WA0QLH operated by WB0DJY. George was aided in his contact quest by monoband beams at 70 feet and a KW amplifier. The glass of ice water is a good way to keep your throat lubricated and prevent tonsil dehydration.

SOAPBOX

Clicks

and possibly the most frustrating, aspect of the SS is not the time you spend sending your exchange but the time spent by the guy you are working in sending his. 'Nuff said.

Congratulations to all section leaders. Your awards are scheduled for a May 15th mailing. The accomplishments (and disappointments) of you and all other participants cannot be chronicled in this short space; we leave that chore to the scores and the soapbox. Don't be disappointed if your picture or soapbox does not show up here. We get so many that prudent picking is the order of the day. Try again next year with a different picture or comment; you may more closely capture the situation.

We cannot leave this lovely lead without pausing to rejuvenate our tired minds with an imbibition of cool, clear statesman-like oratory from our very own master of melodic mottos and prolific prose, V.Y. Senny Tree, who said, "Before the contest begins SS stands for Sweepstakes; sometime in the middle it stands for So Silly and at the end, after hours of battered ears and broken pencils, SS stands for So Sleepy."

Thank you. . . . and goodnight. ZZZZZZZZ

I guess next year I'll have to increase my power to 10 watts. - (W4ZRJ) A KL7 dupe? Fantastic! - (W4OZF) Scylla and Charybdis are pikers compared to Murphy and Parkinson. Oh, woe is me! - (W2WQE/4) I'm willing to start taking a collection to send good cw ops to VE8 and KZ5 or to train any phone men who want to learn the code. - (W1BGD/2) Very pleased to hear of the new regulations governing contests. Wisely done! - (VOICA) Was interesting as well as very frustrating to try QRP (8 watts) during the last half of the contest. Let's see. . . 55 QSOs at 8 watts makes it 7 QSOs per watt, therefore, I have come to the conclusion that if I run a kilowatt next year I should have 7000 QSOs! - (VE3EEW) Greatest achievement during SS was working WA4BAT and WB2MAN in consecutive QSOs. - (W4KFC) Crystal controlled on 7048, with a QRP signal thin as a prairie wind whistlin' through a barbed wire fence, and a background noise like a hundred empty freight cars rollin' down grade off a San Francisco slope - that's the SS biz! - (K4DHB) And so it was decreed: QRM shall reign. - (VE7BBL) Missed VE4. Heard one on 21 MHz. (VE4HH) but skip was bad at the time and he eluded me. Lost a lot of contacts just because I stubbornly kept looking for that last section. I also think that I worked the largest collection of lids ever. Why do some of these guys insist on repeating everything when they have already accepted the message that was sent just once? Ugh! - (W4DQS) My last SS was in 1962 (the old 40-hour variety). This one was great fun; a short period - do or die - and a meaningful exchange. - (W6MYP) One

(Continued on page 68)

DIVISION LEADERS

| CW | | | PHONE | |
|------------|----------|--------------|------------|----------|
| Single Op. | Multiop. | | Single Op. | Multiop. |
| K1LPL/3 | W2FXA | Atlantic | W3GRF | K3WUW |
| W9YT | WB9BWN | Central | W9YT | WB9IDS |
| K0ORK | K0VVY | Dakota | WA0VKP | K0ZXE |
| W5WUMU/5 | WA4UCE | Delta | W5WUMU/5 | WA4UCE |
| K4GSU | WB8JBM/8 | Great Lakes | WA8ZDT | W8EDU |
| WA2UOO | WB2OEU | Hudson | W1BGD/2 | WA2SPL |
| K0GXR | K0KU | Midwest | WA0TKJ | K0GXR |
| K1ZND | WA1JUY | New England | K1VTM | W1ARR |
| W7RM | W7SFA | Northwestern | W7RM | W7FO |
| K6EBB | W6BIP | Pacific | WB6KBK | W6NUT |
| W4NQA | K4CG | Roanoke | WB4YOJ | K4CG |
| WA0CVS | WB5AXC | Rocky Mtn. | WA0QLH | WB5AXC |
| W4DOS | WB4QNX | Southeastern | W3ZBW/4 | WA4ECY |
| W6MAR | WA6SFM | Southwestern | K6JAN | W6YRA |
| K5PFL | WN5EYG | West Gulf | WA5JMK | WB5DTX |
| VE7WJ | VE7UBC | Canadian | VE7WJ | VE1UNB |

Four clubs rose within or into the Top 10 rankings this year, three of them never having appeared there before. The most spectacular rise was the Buffalo Area DX Club who took 9th after not having an entry last year. A no less spectacular jump was recorded by the Norwood Amateur Radio Club who nabbed 7th after placing 46th in 1971. The Wisconsin Valley Radio Association jumped nine spots, grabbing 10th this year. The other club that advanced in the Top 10 listings was the Northern California Contest Club who moved up one notch to 8th spot.

In contests, recognition is given to single and multi-operator stations on a regional basis such as sections or divisions. Following the same line of thought (and in addition to our regular listings) we have listed the top club in each call area this year. They are:

1 - Murphy's Marauders 2 - Buffalo Area DX Club 3 - Mason-Dixon Pirate RS 4 - Potomac Valley RC 5 - Texas DX Society 6 - West Valley ARC 7 - Radio Club of Tacoma 8 - Indian Hills RC 9 - Wisconsin Valley RA 0 - Minnesota Wireless Club

The concept of a regionalized format for club competition has been batted around these parts (and within the CAC) for some time. The CAC and Hq. would appreciate additional input from the field on this idea. Should the "by score" listings of the clubs be dropped and a "by score within call area" listing be instituted? Should the regionalized competition be dropped altogether? While you are writing, give your opinion on the idea of separating the SS weekends by one week - allowing a free weekend in the middle to repair antennas and household relations.

AFFILIATED CLUB SCORES

| | Entries | Phone Winner | CW Winner |
|---|-----------|--------------|-----------|
| Potomac Valley Radio Club (Va.) | 7,810,895 | 123 W3GRF | K1LPL/3 |
| Murphy's Marauders (Conn.) | 6,300,752 | 95 K1VTM | K1ZND |
| Minnesota Wireless Association | 2,587,265 | 40 WA0VKP | K0QRK |
| West Valley Amateur Radio Club (Calif.) | 1,862,068 | 18 WB6VZI | W6HX |
| Radio Club of Tacoma (Wash.) | 1,390,569 | 39 W7RM | W7RM |
| Boeing Employees Amateur Radio Soc. (Wash.) | 1,283,638 | 54 WA7JBM | W7VMF |
| Norwood Amateur Radio Club (Mass.) | 841,407 | 32 WA1EOT | WA1EOT |
| Northern California Contest Club | 684,039 | 10 | K6EBB |
| Buffalo Area DX Club (N.Y.) | 522,122 | 11 WB2PGM | |
| Wisconsin Valley Radio Assoc. | 507,945 | 17 W9RQM | W9RQM |
| Indian Hills Radio Club (Ohio) | 449,229 | 9 WA8USP | W8AEB |
| 128 Contest Club (Mass.) | 412,919 | 9 W11XL | W1BPW |
| Texas DX Society | 404,066 | 6 K5PFL | K5PFL |
| Saginaw Valley Amateur Radio Assoc. (Mich.) | 396,104 | 22 K8MFO | K8MFO |
| Canton Amateur Radio Club (Ohio) | 384,954 | 16 K8YQW | K8YQW |
| Conejo Valley Amateur Radio Club (Calif.) | 360,585 | 5 | |
| Radio Society of Greater Brooklyn | 349,143 | 10 WA2QBC | |
| South Jersey Radio Assoc. | 332,222 | 14 W2EA | W2PAU |
| West Park Radiops (Ohio) | 293,330 | 5 WA8YWX | |
| Central Michigan Amateur Radio Club | 278,116 | 14 W8TJQ | WB8BPY |
| Johnson County Radio Amateur Club (Kan.) | 270,516 | 10 K0UYN | WB0EQZ |
| Hollywood Amateur Radio Club (Fla.) | 240,930 | 11 WA2AFL/4 | W4OZF |
| Massillon Amateur Radio Club (Ohio) | 234,157 | 8 K8EKG | K8EKG |
| L.E.R.A. Amateur Radio Club (Calif.) | 224,271 | 8 WA6GFY | W6HLP |
| Arapahoe Radio Club (Colo.) | 221,731 | 3 | |
| Dallas Amateur Radio Club (Tex.) | 198,246 | 5 | |
| Ozaukee Radio Club (Wisc.) | 192,966 | 8 WB9BGJ | W9NYJ |
| Pasadena Radio Club (Calif.) | 189,105 | 9 W6BVN | |
| Overlook Mtn. Amateur Radio Club (N.Y.) | 185,358 | 5 WB2BXL | |
| Twin City DX Assoc. (Minn.) | 156,305 | 4 W0NUH | |
| Mason-Dixon Pirate Radio Soc. (Del.) | 155,744 | 9 WA3GSM | WA3GSM |
| Chicago Radio Traffic Assoc. | 147,760 | 8 WA9BLP | W9HPG |
| ARINC Amateur Radio Club (Md.) | 142,600 | 9 W3AWN | W3TOS |
| North Augusta Belverdere ARC (S.C.) | 128,512 | 5 | WA4PBS/4 |
| Central Virginia Contest Club | 96,844 | 7 W4QCW | K4JM |
| Garden State Amateur Radio Assoc. (N.J.) | 92,918 | 7 | WA2RYD |
| Utica Amateur Radio Club (N.Y.) | 89,601 | 7 WA2EXZ | WA2EXZ |
| Colonie Central High School RC (N.Y.) | 77,527 | 6 | WA2TUJ |
| Larkfield Amateur Radio Club (N.Y.) | 68,186 | 5 WA2DCP | |
| S. E. Virginia Wireless Assoc. | 65,278 | 5 WB4OXD | |
| Arlington Amateur Radio Club (Tex.) | 63,409 | 4 WA5SRK | |
| Parkway West Sr. Hi Ham RC (Mo.) | 56,546 | 6 | WB0DYU |
| Northwest Amateur Radio Club (Ill.) | 55,466 | 3 | |
| Tuscaloosa Amateur Radio Club (Ala.) | 51,906 | 4 WB4SVH | |
| Douglas Aircraft Company ARC (Calif.) | 43,198 | 6 WA6BFD | |
| Gloucester County ARC (N.J.) | 24,460 | 4 | |
| Muskegon Area Amateur Radio Council (Mich.) | 17,926 | 4 W8QAO | |
| Spokane Radio Amateurs (Wash.) | 15,069 | 4 | K7BFL |
| Parma Radio Club (Ohio) | 6750 | 4 WA8OYR | |



K2AU, before and after (no, no, no. The before picture is on the left). Joe took the NLI section on cv with over 105K. I guess winning a section takes quite a bit out of a person.

rather interesting contact was with the Novice that indicated a precedence of B. - (W6DQX) Few operating hours due to XYL overheating. - (WB2GUL) All the sevens in Wyoming and Nevada must have gone to Washington. - (K8OQL) Very difficult to compete in Kentucky. My son, K4GSU, is much too tough for me. - (K4QW) I just can't understand the need for rushing from station to station without being sure that you were good copy. - (WA2LFE) When the brand new rig blew up prior to the SS, disgust was the order of the day. I pressed the Argonaut back up rig into service and, what do you know, EPT was right; you can't win the SS with one but you can have a lot of fun. - (WA6QQI) I remember when Idaho used to be a rare contest multiplier; but not any more. - (W7IUO) I had a lot more fun than I did sleep. - (WN8KOA) Where do they hide Alaska? - (WA1MYK) I decided to make this a completely QRPP operation. My maximum power input was five watts. Although my signal was not competitive with the higher-powered stations I did manage to work many sections. I even worked a couple of ZLs on the side. - (W9PNE) It was fun to operate simultaneously in the SS with OM W9LVH. The vast span between our scores resulted from the vast span between our skills plus off-time caring for 6 week old Jr. Op. number 1. - (WN9HGN) Not only did my 14-year-old neighbor more than double my score but I had an angry XYL all weekend because of a wedding anniversary that landed on the second day of the contest. - (WN4AVG) Almost gave up when flu struck early in contest but K9LBQ's prescription of 500 mg. of Vitamin C every 50 contacts saved the effort. - (WA9TPV, opr. at W9YT) Entered this SS after 15 year absence. More fun than ever. - (W0HAW/6) If the guys knew I am a 16-year-old YL I probably would have done a little better. - (WN2JLM) Great Scott! Two Wyoming, three Vermont, six Utah, six Idaho and ZERO Mississippi - (W4UQ) Fifteen minutes after the contest ended my hot water heater gave up and spewed water all over the kitchen floor.

Glad it waited. - (WN6RXI) Great contest - but wonder how many points K0DDA and I cost each other? - (K9DDA) I would like to see how many yester-year heroes would do today against the new crack operators. - (W9DOB) On Monday evening was visited by a Market Research interviewer wh

QSO LEADERS

(Single Operator)

| CW | | PHONE | |
|---------|------|---------|------|
| W7RM | 1117 | W7RM | 1609 |
| W6MAR | 1089 | W9YT | 1327 |
| W6HX | 1050 | WA5JMK | 1305 |
| K6EBB | 1038 | WA8ZDT | 1272 |
| K1ZND | 1010 | K1VTM | 1230 |
| K1LPL/3 | 998 | W5WMM/5 | 1223 |
| W3IN | 948 | VE7WJ | 1200 |
| W9YT | 944 | WB6VZI | 1194 |
| WA0CVS | 941 | K6JAN | 1165 |
| K1VTM | 922 | WA0QLH | 1154 |

QRP CHAMPS

(200 Watts or Less at all Times)

| CW | | PHONE | |
|--------|---------|--------|---------|
| WB0DLE | 113,040 | WB0DSP | 122,850 |
| WB5AOF | 103,824 | K7PXI | 99,134 |
| WB2RJJ | 101,470 | WB5AAU | 97,412 |
| WA0BWM | 100,110 | WA6BBV | 97,056 |
| WA2LCC | 93,436 | W9RQM | 90,946 |
| KH6HKM | 91,542 | WB2RJJ | 88,500 |
| WB5AAU | 89,886 | WB6OLD | 87,912 |
| W1FCC | 87,381 | WA2LCC | 87,468 |
| W2FVS | 86,380 | K0LUW | 87,000 |
| W8QHW | 85,540 | WB9CGL | 85,824 |

The signal at multiop WB9IDS was helped considerably by this 40 meter beam at 40 feet and the TH-3 10 feet higher. Using low power WB9s IDS, EBP and JFK racked up a nice 126K showing on phone from Illinois and took the Central Division multiop leader spot at the same time.

One of the many MDC cw entries was WA3QDH shown here scratching for another QSO. Robb used Drake gear and a 14-AVQ during his cw effort. He also operated in the WA3GIN multi setup on phone.



interviewed me about my radio listening habits. She asked if I listened to the radio over the weekend! - (K4BAM/4) Wait 'till I get a better receiver, a bigger antenna, an amplifier. . . - (WA1MHJ) A word of thanks is in order to the speed demons who QRSeD for us slower fellows. - (WB2FKF) There must be something terribly masochistic about a person who spends hour after hour in a hard chair, hunched over a key, with all the filters in, the volume too loud and wearing those God awful phones. If so, why do I hate myself and when is the next SS? - (K0FRH) Again, the SS is the king of all contests. Great excitement, challenge and fun for all. - (W4YZC) Next year, high power for both contests. Maybe I'll raise my antenna higher also. This power/cost race is something that we need to consider terminating. - (W5QGZ) Of stations worked from K8IKO, 84% were using more than 200 watts, and I would suspect from the strength of the signals, that most of the A class stations were running 150-200 watts. The result was, from the torture-chamber between my headphones, a deluge of power; a deafening, brain-numbing torrent of kilowatt signals that represents the most exaggerated electronic overkill I have yet heard on amateur bands. - (K8IKO/8) Must be a record for the coldest shack - 36 degrees. My fingers froze to the bug. - (WASBHR) Been a ham 20 years and this is the first contest I have ever entered. Really enjoyed it but wish I had more time to operate. - (K4FCZ) Got my cast off and pin taken out of fractured right thumb three days before cw contest and could move thumb just enough to send. - (WB4SVX) Finished putting beam on rooftop of apartment building 20 minutes before start of SS. Lots of time for checking it out. - (W2FVS) Most fun I've had since the Novice Roundup - (WB2ADW)

Splatter

The ARRL Sweepstakes certainly gives one a fuller understanding of just what the word "contest" means. That old familiar "itch," the stirring of the blood and that faraway look are just a few of the symptoms that are frequent visitors here whenever the word is mentioned. Guess I've really got the bug. - (WB4OGW) Expect to operate W7LR/7 multiop next year from Wyoming, phone and cw. - (W7LR) When I told the XYL about the fellow who gave me his number I with two minutes to go in the contest her answer was, "That sounds like the only sensible guy in the whole batch." - (W7FXQ) Most fun was operating from Quebec and feeling wated. - (W3GRW/VE2) There ought to be a rule about operators with marbles in their mouths and no knowledge of phonetics. - (WB2GUB) My presumed "clean sweep" fell prey to a bookkeeping oversight! Thought I had Oregon tucked away early in the contest only to discover (after the SS was over) that it had eluded me! - (W4KFC) Had to rescue a squirrel who fell 25 feet down our chimney behind the fireplace damper during the phone SS. - (W1ECH) How about a mobile category so I can heat somebody - anybody. - (W4OZE/4) Got so excited on working my fourth Delaware in 15 years that I forgot his call. - (W4HOS) It didn't

CLEAN SWEEP CW

| | | |
|----------------------|---------------------|--------|
| W1ECH | W4KFC | W6NUT |
| W3AU* | WA4KJR* | WA6NYV |
| K4CG* | WB4YOJ | W8DB |
| W4DM | W6MAR | W8OK |
| W1ICP (WA1PID, opr.) | K6OYB (K6OVJ, opr.) | |
| K6EBB (W6CUF, opr.) | W7RM (K7VPF, opr.) | |

CLEAN SWEEP PHONE

| | | |
|------------------------|-----------------------|-----------|
| K1DKX | W4NOA | WB6RKH |
| K1DQV/1 | W4WSF | W7EXM |
| K1JHX | W3ZBW/4 | W7GKF |
| K1VTM | WA4IVL | W6HX/7* |
| W1FLM | WB4BUT* | WA7FFFU |
| WA1KBG | WB4GRN | WA7JBM |
| WA1PQA | WB4UYD | K8MFO |
| W1BGD/2 | WB4YOJ | WA8EB |
| W2KGY* | K5PFL | W8OK |
| W2VDX* | W5WU/5 | W8OQH |
| WA2CLQ | WA5JMK | WA8USP |
| WB2OEU* | WA5LUM | WA8YWX |
| WB2PGM | WA5QXD* | WB8IAY |
| WB2RJJ | WA5RTG | WB8JBM/8* |
| WB2YQH | WA5RXT | K9IU* |
| K3WUW* | WA5YAS | W9ZTD |
| W3AZD | WA5ZNY | WA9BWW/9 |
| W3BWZ* | WB5DTX* | WA9NPM |
| W3E2T | K6JAN | WB9GFC |
| W3GRM | K6SSN | K0GXR* |
| W3IN | W6BIP* | K0LUW |
| WA3LHG | W6DSQ | K0SGJ* |
| WA3QHI | W6NUT* | W0NUH |
| K4BNC | W6OKK* | WA0RBW |
| K4CG* | W6ONV | WA0VJF |
| K4FU | W6YRA* | WA0VKP |
| K4HPR | WA6TVC* | WB0DSP |
| K4LDR | WB6KBK | KH6IJ |
| K4ZA | | VE6MP |
| W1ICP (WA1PID, opr.) | K6SVL (K0GJD, opr.) | |
| WA1KZE (WA1NRV, opr.) | W6UA (W6HOH, opr.) | |
| W2CXM (WA1LKX, opr.) | WA8ZDF (WA8RWU, opr.) | |
| K1LPL/3 (WA3IAQ, opr.) | W9YT (K9LBC, opr.) | |
| W3GRF (K1ANV, opr.) | WA0QLH (WB0DJY, opr.) | |
| WA3HGV (WA3KZQ, opr.) | VE2UN (WA3HRV, opr.) | |
| W4ZCY (K3EST, opr.) | VE4RR (VE4EA, opr.) | |
| K6BCE (WA6NNJ, opr.) | VE7WJ (VE7BDJ, opr.) | |

*Multioperator

LED SECTIONS BOTH MODES

(Boldface = over 100K each mode)

| | | |
|-----------|---------|---------|
| VO1CA | W3ZBW/4 | WA6NYV |
| WBQNY/VE3 | WA4UCE* | W7RM |
| VE7WJ | WB4VJK* | W7UQ |
| W2CXM** | WB4YQJ | W9YT** |
| W2MO/2* | K5PFL | K0VYV* |
| WB2OEU* | W5WMU/5 | WB08CZ |
| K3WUW* | WB5AXC* | KL7AIZ* |
| K4CG* | WA6NGG | KZ5BB |

*Multioperator

**Different call or operator each mode.

bother me that a couple of guys said "Hi Bob" while Dave (K1ZND) was at the mike - but it really jolted me when somebody called me and asked "Is that Dave?" (If the asker had been in Wyoming, I would gladly have given him any answer he liked!) - (W1ARR) Next year I'll make sure I don't have to babysit during the contest. - (W9CQD) I'll never operate Sweepstakes again. . . . well, not until next year. - (K3DVS) Seems like everybody in Virginia was operating SS. Toughest competition I've ever faced. - (WB4UOX) [He ended up seventh in VA with over 100K. - Ed.] Enjoyed it very much although one fellow in W4 land insisted there was no room for a DL in a U.S. SS contest. - (DL2AA/W1) Next year I have to remember to keep a dupe sheet during the contest, not after. - (WB2GUQ) Very fortunate that Murphy missed Newfoundland for this year's SS. Three weeks after SS-72 we obtained 100 mph winds and I lost my rotor. - (VO1CA) [That's all you lost?! - Ed.] Conditions were never like this when I was VE8BB. - (VE6MP) How about a separate category for people who live in N.Y.C. and have to use indoor dipoles inside steel and concrete buildings? My first SS was a madhouse but somehow enjoyable. - (WB2UFN) I like the stricter new competition rules even though I had to dupe the logs three times to get rid of all the dupes. - (WB4NFQ/4) Have been in SS contests since about 1938. It was a real pleasure this year to go multi-op with an 18-year-old ham who is a tremendously good operator and who produced a clean sweep "first" for my station. - (W6OKK) Found that "Radio Macaroni" worked well phonetically; it's easily recognizable yet different enough to attract attention. - (K7VPF, opr. at W7RM) Taking 5 hours off at one shot proved advantageous - fewer "cobwebs" to deal with. - (K1VTM) My rotor control box wouldn't indicate so a 150 watt spotlight and a mirror outside the window by the shack did the trick. I wonder what the neighbors thought? - (WB2RJJ) Worked WA2RZA and WA2RAZ in succession; both number 7 and both NYLI for a real double-take on the check sheet. - (W0BJW) The toughest part was sorting out the log sheets afterwards (which is a small price to pay for enjoyment received). - (WB6DBO) Where I was, Murphy was. - (WB0CLY) I wonder how much time I lost listening to remarks about my call. - (W1FCC) SS gave me will power to take Advanced. Heard a KH6 and KL7 but in the Advanced band. - (WA3QLG) [Now that's what I call real incentive licencing. - Ed.] If I flunk my First Phone it's your fault for not letting me get any sleep this weekend. - (WB4HUS) Never have 309 QSOs been so difficult. - (WA3QIA/3) I sure can't forget when the SS is. That is the weekend my beam always falls down. - (WB2JSJ) Ninety mph winds slamming into the shack on top of Rainow Ridge caused more QRM problems than did the entire SS contest. - (K6BCE) Football on TV makes it hard for us testers. - (WA5F11) Old finals never die - they just fade away. - (WA1LAI) I am getting awfully fed-up with guys who don't check dupe

CONTEST PERIODS

1973

| Starts | | Ends |
|-------------------|-------|-----------------|
| Saturday, Nov. 10 | | Monday, Nov. 12 |
| 2100 GMT | PHONE | 0300 GMT |
| Saturday, Nov. 17 | | Monday, Nov. 19 |
| 2100 GMT | CW | 0300 GMT |

sheets before calling. I assume they keep dup sheets. - (W4NOA) My biggest problem in the contest was after 250 QSOs I forgot what section was in and could do nothing but mumble into the mike until I recalled it. - (WB6KMW) Needed only VE3 to make sweep with almost 4 hours to go in contest. Guess who didn't show? Must have missed them in the QRM from the VE8s. - (WA6NYV) As you might know it - ice, rain and finally snow kept the beam in the factory carton. - (WB8IDK/9) Hooray for the VE stations. Never heard so many VE4-6s. - (WA0WEZ) Weekend was a disaster. Interfered with college police on 4 phone so couldn't use linear or beam. Fifteen meter antenna fell down and my body died at 10 o'clock Sunday afternoon. - (WA1LKX, opr. at W2CXM) The one effort which brought the club together. - (WA4UCE) Lots of fun, lots of work when single operator - best of contests! - (W6PYK) Did fair with my rain gutter antenna. - (WB4WLK/4) Found that one cannot expect good score if one goes to Saturday night party. - (WB9APC) QRM on 80 meters Saturday night was so thick you couldn't cut it with a knife (or a 18 watt PEP rig for that matter). - (WA1MYK)

NOVICE WINNERS

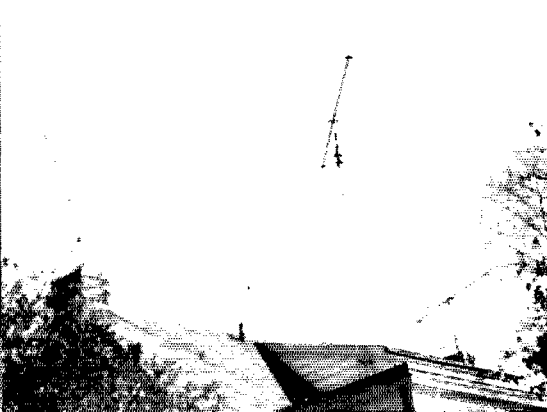
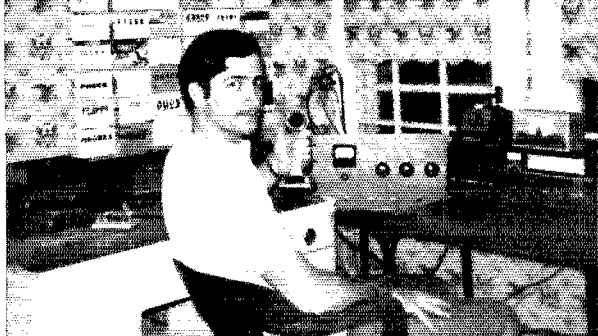
(Top 10)

| | |
|--------|---------|
| WN5DLY | .60,306 |
| WN6ION | .29,700 |
| WN3QNT | .25,137 |
| WN4TVU | .24,750 |
| WN5GIV | .24,009 |
| WN0GTJ | .22,412 |
| WN7TDZ | .21,280 |
| WN6GGP | .16,848 |
| WN4AJL | .16,640 |
| WN6RXI | .16,184 |

Other Winners - WN2SXO, WN2FTQ, WN2FHX, WN7UQV, WN8IOT, WN8KEO, WN9KDY, WN9IHH, WN9JIC, WN0GRJ.

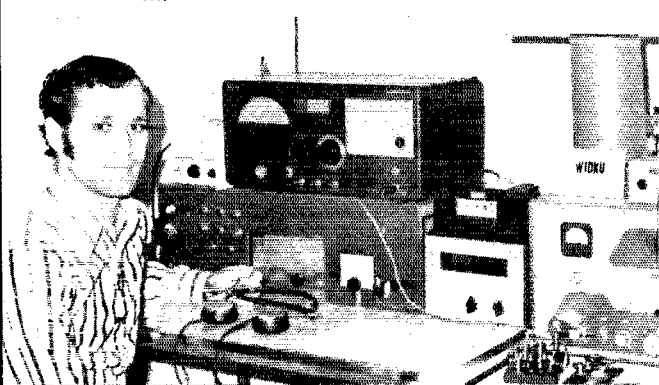
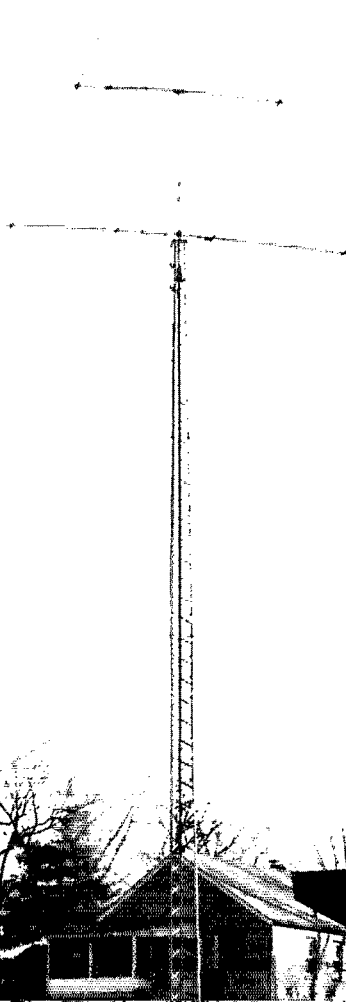
THIRTY-NINTH SWEEPSTAKES CONTEST

Scores are grouped by call area. Sections within call areas, are broken down by power category. Example of listings: VO1AW 7880-99-40-6 or final score of 7880, number of QSOs 99, number of sections 40, total operating time of 6 hours. An asterisk denotes a liq. station member, ineligible for an award. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.



Top left: Some of you might remember him as DL5BR. His now back in the states handing out rare W2-land WSOs as WA2CLO. Jeff used a Swan 500 and four 811As to snag over 1000 QSOs in all sections from ENY on phone. Above: The antenna farm at WA2CLO. The monobanders are (from the left); 5 elements on 15 at 42 feet; 3 on 20 at 46 feet and (stuck back in the tree) 3 on 10 at 40 feet. Left: A participant in many a contest is K4PUZ. Don topped Tennessee again this year on cw (for the sixth year in a row) with a fine 129K effort. His Heath gear feeds a TH6DXX and dipoles.

Below top: Using a DX-100, S-40 and R4 with a multiband vertical and 2 element 20 meter beam radiators W1DKU ran up a very nice 69K low power cw score to take the Western Mass. section certificate. Below, bottom: Participating in his first SS since his Novice years in 1966 WA0TKJ walked off with the section award in Kansas. A tribander and dipoles at 50 feet spewed his signals through the country for the tune of over 158K. Right: Some of the antennas of Mo. Section leader W0TDR. The 2 element 40 meter beam on top is at 75 feet. The lower beam is a 4 element 20 meter radiator. Warren has another tower that supports a 4 element 10/15 quad at 62 feet. These antennas can be fed by either of 2 S-lines followed by a choice of a L-4 or SB-220 afterburner. Not bad, eh?



Illinois
W9DOB 133,006- 915-73-22
WA9JCO 72,562- 501-73-19
K9AUZ 68,034- 498-69-20
WA9BLP 60,568- 452-67-19
W9MTN 56,000- 400-70-21
W9XOC 54,605- 410-67-21
WB9APC 44,916- 394-57- 9
WB9DED 43,032- 326-66-14
K9BQL 37,319- 279-67-16
WB9CPT 30,160- 290-52-11
W9IB 26,000- 200-65- 7
W9KDR 24,576- 192-64-14
WB9HTJ 23,126- 189-62-15
WA9DRE 19,038- 167-57-10
WB9JPS 14,280- 140-51-15
W9UDK 10,580- 115-46- 5
K9DWK 8342- 97-43- 3
K9KHI 7326- 99-37- 3
WB9DVQ 2790- 45-31- 3
W9YYG 1440- 36-20- 1
W9OTV 780- 26-15-20

200 Watts or Less
WB9CGL 85,824- 596-72-24
WB9GFC 73,500- 492-75-24
WB9AJV 72,080- 530-68-23
WB9HAD 59,640- 421-71-23
WA9SVZ 44,744- 329-68-20
K9UON 38,927- 291-67-12
WB9FNY 21,168- 168-63-14
WB9GLQ 20,458- 193-53-16
WB9FHL 19,376- 174-56-20
K9DKJ 15,714- 146-54-10
WA9ZWY 11,340- 126-45- 7
W9COD 9828- 126-39-11
WB9GSZ 8686- 101-43-11
W9PFD 6150- 75-41- 5
W9REC 3584- 64-28- 8
K9ORP 832- 26-16- 1
W9ZPC 520- 20-13- 4
W9HPG 306- 17- 9- 2
WB9IDS (+WB9s FBP JFK)
126,540- 863-74-22
WB9GHT (+WB9HFD)
17,914- 169-53-11
WA9JQE (W9YPO WA9OCK)
5040- 63-40- 8
W9LVH (+WN9HGN)
616- 22-14- 1

Indiana
WA9BWY/9
135,750- 909-75-22
WA9AUM 122,100- 825-74-21
W9YB (WA9VYJ, opr.)
120,168- 839-72-24
K9CUY 111,962- 758-74-21
K9HDP 93,980- 635-74-20
WA9NPM 76,950- 515-75-24
W9ZTD 73,875- 493-75-16
WB9CFP 46,230- 345-67-15
WA9UFO 26,800- 200-67-12
WB9EQY 20,400- 200-51-10
W9BF (WA3OJX WA8TXG
WB9s CNE ITG)
78,621- 539-73-24
W9BHR (WA3JUA WB9BYS
J.Archer B.Barr G.Benedict)
44,289- 399-57-24
WB9AUJ (+WA9WKA)
42,480- 295-72-19

200 Watts or Less
W9SFR 46,760- 334-70-18
K9CDB 41,076- 326-63-15
WA9EBR/9
24,857- 236-53-12
WB8IDK/9
20,664- 164-63-12
W9MDW 10,944- 114-48- 6
WA9QDB 10,212- 112-46-14
K9IU (K9KYH WB9s CUK
DZS FAY EAZ EON GVV)
105,225- 702-75-23
Wisconsin
W9YT (K9LBO, opr.)
198,900-1327-75-23
K9EYA 63,210- 453-70-21
W9ZHE 44,400- 300-74-15
W9GKJ 34,710- 267-65-14
K9REE 33,800- 260-65-12
WB9DRE 32,512- 259-64-13

WB9ELH (+WA9PUN)
54,954- 391-71-20
W9NYJ (multiop)
43,540- 311-70-14
200 Watts or Less
W9RQM 90,946- 615-74-17
WB9FKL 49,840- 356-70-22
K9HFR 37,084- 254-73-16
WB9CKG 33,480- 274-62-15
WB9BGJ 18,348- 139-66-17
K9JPS 15,096- 148-51-14
K9MIX 14,960- 136-55-11
K9YBC 12,960- 135-48- 6
WB9KDP 12,720- 121-53-15
W9CTI 10,209- 125-41-16
WB9CHP 10,166- 111-46-10
WB9KPX 9696- 101-38-16
W9VHA 5214- 79-33- 9
K9MAU 4200- 70-30- 5
W9LOM 3936- 62-32-10
WA9AWO 1760- 55-16- 2
K9OXY 570- 19-15- 2
WB9EWQ (+WB9EWR)
24,827- 208-61-17

Colorado
WA0QLH (WB0DJY, opr.)
173,100-1154-75-24
W0MYN (WB0DLE, opr.)
151,996-1027-74-24
WA0CVS 121,764- 834-73-16
K0TMM 93,126- 711-66-17
W0BWJ 38,232- 267-72-18
K0VFN 29,829- 245-61-12
W0ATA 12,960- 120-54- 7
200 Watts or Less
WB0AMJ 38,304- 336-57- 9
WB0GEX 20,748- 182-57-13
W0LQ 9912- 118-42- 5
WB0BLJ 7482- 87-43- 8
K0FLQ 6960- 87-40- 5
W0LBP 5244- 69-38- 5
W0JF 1292- 34-19- 3
WB0FRB (+WA0YED)
19,700- 198-50- 8

Iowa
WA0JCE 108,332- 746-73-20
WA0ATY 18,666- 153-61- 8
WA0EFN 5544- 77-36- 4
K0GXR (+W9LVT)
146,250- 981-75-23
W0WVS (K0s HWE PSC W0s
B7Y GGO WA0s FHI VUY
WB0s BPH CZN FHH FNM
WN0s EXM GWH GWJ JP
M.Heffern)
43,810- 339-65-21
200 Watts or Less
K0LUW 87,000- 581-75-23
WA0TAO 49,500- 375-66-21
WB0DL 30,876- 249-62-16
WA3PWL/0
11,200- 160-35-10
WA0PHK 4560- 60-38- 9

Kansas
WA0TKJ 158,775-1102-73-22
K0KU (WB0FGV, opr.)
141,266- 972-74-22
WA8JZY/0
103,368- 709-73-21
K0UYN 83,283- 589-71-15
K0ROD 62,160- 444-70-20
WB0CEF 16,112- 152-53-13
K0CML 2688- 48-28- 2
W0QQQ (WA0s SWC TAS
WB0DAV T.Visco)
42,640- 331-65-21
W0SOE (WA0WTT WB0s AMA
bVC WN0DPR)
38,880- 324-60-14
200 Watts or Less
WA0DOZ 23,800- 186-64-19
W0VJF 13,575- 91-75-16
WB0CUY 11,270- 123-46-13
K0PFV (+K0CVA)
61,128- 426-72-24

WA0SEV/0 (+K0s OLI TLQ
WB0EYS)
44,756- 334-67-20
WB0BMC (+WB0FIS)
20,650- 175-59-14
WB0CBR (+WB0IRY)
8127- 97-43- 8
Minnesota
WA0VKP 143,100- 954-75-24
W0NUH 133,350- 889-75-21
WA0ENP 110,230- 760-73-18
WB0CJV 109,816- 742-74-18
WA0RBW 106,500- 710-75-20
WA0PRS 102,273- 701-73-20
WB0ANT 68,442- 519-66-13
W0IYP 60,270- 431-70- 9
W0HW 55,860- 400-70-13
WA0WEZ 50,022- 401-63- 7
WA0MHJ 45,968- 341-68- 8
WA0URW 40,820- 318-65-10
WA0VFN 40,796- 329-62- 6
K0JIL 40,788- 309-66-10
W0FDK 32,768- 256-64-12
K0CHE 29,000- 250-58-12
W0TIV 20,160- 160-63- 6
WB0CLY 13,950- 155-45- 6
WA0W0V 6314- 77-41- 9
WA0KQU/0 5811- 75-39- 3
W0HP 2001- 44-23- 1
K0ZXE (+WA0JEF)
92,710- 635-73-24

200 Watts or Less
WB0DSP 122,850- 819-75-24
WA0WUC 23,045- 211-55-19
WB0DZ 22,896- 212-54-14
WB0EJG 20,496- 184-56-18
W0PAN 10,650- 75-71- 8
WB0BQA 9108- 99-46- 5
W9LIZ/0 8424- 109-39- 6
W0MKU 7562- 100-38-10
W0YC 2420- 55-22- 2
WA0QWY 418- 19-11-10
WA0VHX (+WA0GES WB0s
DYZ ZA EJH)
56,787- 413-69-21
WA0YAW (+WA0BWM)
52,824- 372-71-
WB0BZ (+WB0AJA)
46,150- 355-65-18
WA0NWR/0 (+WA0s IDD IDK)
44,088- 335-66-20

WA0RXB (+WA0LMT)
23,084- 199-58-22
Missouri
K0ZHD 67,744- 464-73-23
K0RPH 54,648- 398-69- 9
W0QWS 49,280- 355-70-22
W0CDC 26,928- 204-66-16
K0EYJ 6612- 87-38- 5
K0STJ (+W0HBB)
63,000- 422-75-18
200 Watts or Less
WA0JNF 51,660- 371-70-24
W0MYQ 45,057- 328-69-19
WB0AEW 41,454- 330-63-21
WB0FMT 34,524- 274-63-20
WA0VBG 20,580- 173-60-11
W0BEZQ 8473- 115-37- 6
W0BV 2800- 50-28- 6
W0DSW 2800- 50-28- 3
WB0DQI/0 (WA0WBJ WN0s
DBF FOI GQP)
41,646- 318-64-24

Nebraska
W0ODF 31,620- 310-51-10
WA0OJK 6080- 81-38- 4
W0KK (+K0AKK)
36,288- 285-64-16
WA0WHB (+WB0DIO)
30,256- 248-61-14
200 Watts or Less
K0DTK/0 28,728- 228-63-11
K0SBV 15,720- 131-60-12
W0SPF/0 10,878- 131-42-11
W9LHG/0 5916- 87-34- 4

North Dakota
WB0BCZ (WA0OVW, opr.)
91,168- 619-74-24
WA0MLE 10,494- 99-53- 3
WA0LJM 10,000- 100-50- 9
200 Watts or Less
KSZRR/0 39,534- 300-66-19
WB0IQK 26,845- 230-59-16
South Dakota
K0VVY (WA0s VKQ ZCE
WB0CVW)
109,150- 740-74-24

Disqualifications

CW: W2GGE, W3CRE, K5RHZ. PHONE: K1EUF, WA1JHO, W3CRE, WA3GJU, K5RHZ, W7MWR (opr. of W7OAD), WA7MEO and WA7MJJ (oprs. of W7SFA), K8UNG and WA8VHV (oprs. of K8UNG), K9KGA (opr. of W9A9GK).

Check Logs

CW: VE2SD, VE3DH, VE6MP, WLXE/VE8, W10Q, W2SS, W3EBK, WA3THD, WN3SWP, K4EJO, W5SYH, W6DWI, WA6NSZ, WA7HHI, W8VPC, WB8JAY, WB8NRC, WB9FHL, WN9HZB, WN0EMZ. PHONE: VE3DH, VE7UBC (VE7BBO, opr.), W10Q, WA2TMD, WA3GRO, WB4OQN, WB5FFA, W6OOH, WA6WFW, K8LOU, W8K0I, K9CHC, WB9BPG, WA9BZY/0, W0DAD/KH6, KL7HJE, KZ5DK.

Invalid Logs

CW: WB6ABK/6. PHONE: WB6ABK/6.



Stolen Equipment

A Hallicrafters SR-150 No. 415006-325001 with ac supply PS-150AC No. 715001-326017, plus microphone, SWR meter, low-pass filter and connecting cables were stolen from Lary Lassermer, WA2FHI, 28 Washington Court, Livingston, NJ 07039.

Rules for the 1973 ARRL Field Day

Annual Test for Emergency-Powered Stations, June 23-24

SPRING HAS SPRUNG around these parts (hopefully it has where you live, too) which signifies to many that the time is at hand to start planning for Field Day. If you haven't begun a good way to get the ball rolling is by sending for our Field Day package consisting of a summary sheet, the rules, and a sample of the suggested check sheet. If you have your FD plans all set—congratulations—you are ahead of most. Please send for our FD package anyway. The only thing you have to worry about then is the weather. . . . or the generators. . . . or the food. . . .

Last year there was a misconception on the part of some to the effect that no check sheets or any other supporting QSO evidence was required with your entry. Logs are not required BUT a check sheet or some other listing of stations worked on each band IS REQUIRED. Your entry MUST consist of your summary sheet and a listing of all contacts made per band in numerical order (by call area) and alphabetical order (by suffix within each call area). In addition, if you are claiming any bonus points proofs of same must be enclosed with your entry.

Your Field Day score can be bolstered and valuable public relations for amateur radio can be achieved through use of Oscar 6 from your site this year. The usual repeater prohibition in the rules is waived to the extent that cw (no phone) contacts via Oscar 6 may be counted towards your score. Any Class A or B station making one or more such contacts receives an add-on bonus of 50 points added to your score in the same manner as other bonus credits. On the summary sheet show Oscar as a separate 'band' but note that it does not change your transmitter category. All other FD rules apply. Please clearly list your satellite contacts separately on your entry.

Entries must be postmarked no later than August 1, 1973. Read the rules carefully. If you have any questions ask for a clarification. GL — WA1PID

Rules

1. **Eligibility:** The Field Day is open competitively to all amateurs in the ARRL Field Organization (plus Yukon and N.W.T.). Foreign stations may be contacted for credit but are not eligible to compete.

2. **Object:** For portable and mobile stations, to work as many stations as possible. For home stations, to work as many portable and mobile stations as possible.

3. **Conditions of Entry:** Each entrant agrees to be bound by the intent as well as the provisions of these rules, the regulations of his licensing authority and the decisions of the ARRL Awards Committee.

4. **Entry Classifications:** Entries will be classified in accordance with the number of

Do not write above this line

FIELD DAY

FIELD DAY call (with indicate portable) MINNESOTA R. S. LOCATION QUARAIN
 Club or group name MURPHY'S MURDERERS CITY SEAROCKS, CT

Check now if you began set-up operations prior to noon EDT on Saturday. Indicate the number of people participating in this operation. 23

CLASS A (1503) BY GROUP 2 LICENSE NUMBER 3006
 (Non-club portable (1-10 ops.)) (Station) (Class home points)

NUMBER OF TRANSMITTERS 3 (IF Class B, indicate calls of operators)

ENTRY CLASS (check only one)

A. Club or non-club group portable
 B. Non-club portable (1-10 ops.)
 C. Mobile
 D. Home station (commercial power)
 E. Home station (non-commercial power)

OPERATING MODES: CW PHONE OTHER

DESCRIPTION OF POWER SOURCE (generator type, etc.) BATTERY, CHARGER

IF a remote position is used, (this applies only to Class B and above) indicate call sign, location and list total bonus points earned in the space provided to the right.

| Band | Number of QSOs | Transmitter | Power |
|--------|----------------|-------------|-------|
| 80 ph. | 108 | 32V3 | 150 |
| 40 ph. | 267 | 5B-101 | 40 |
| 30 ph. | 415 | 32V3 | 150 |
| 20 ph. | 93 | 5B-34 | 50 |
| 15 ph. | 205 | KANBER | 75 |
| 10 ph. | 87 | 5B-101 | 40 |
| 6 ph. | 148 | HX-10 | 180 |
| 4 ph. | 47 | GENERT | 10 |

NET QSO 1420

TOTAL POINTS (MULTIPLY QSO BY POINTS PER QSO) 83 (MULTIPLY QSO BY POINTS PER QSO) 1503

Attach proof(s) for claimed bonus points (check below). The points will be added at Area HQ.

1000 Emergency Power (100 pts per hr) 1000 Emergency Power (100 pts per hr) 1000 Emergency Power (100 pts per hr) 1000 Emergency Power (100 pts per hr)

This certifies that the station whose calls appear above was operated in accordance with the current Field Day rules (if one over) and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

7/5/73 Date C. Murphy Signature (local club president)
 Full mailing address (please print) WEDLEY MURPHY
 Number and street 2 BROADWAY DR. CITY, STATE/PROVINCE, ZIP SEAROCKS, CT 06485

Do not reattach proof(s) necessary for bonus points, coupons, photos and send to: ARRL, 225 Main Street, Westford, CT 06891. Printed in U.S.A.

operating positions capable of instantaneous operation at any one time during the FD period, followed by the designation of the nature of the individual or group participation. This does not prohibit more operating positions than your intended classification; however, use of electronic or mechanical devices or other methods of simultaneous operation on two or more bands without counting them separately in the entry classification is prohibited. Class A. Club or non-club group (3 or more licensed amateurs) set up specifically for operation in the FD and using portable identification. Such stations must be located in places which are not regular station locations and must use no equipment or facilities installed for permanent station use, nor any structures installed permanently for FD use. Stations must be operated under one call (except when a novice position is used, as provided by miscellaneous rule c) and under control of a single licensee or trustee for each entry. All equipment (including antennas) must lie within a circle whose diameter must not exceed 1000 feet. All contacts must be made with transmitter(s) and receiver(s) operating from a power source independent of commercial mains. Entrants who, for any reason, operate a transmitter or receiver from commercial mains for one or more contacts, will be listed at the end of their class. Class B. Non-club stations operated by not more than two licensed amateurs. Other provisions same as for Class A. Class C. Stations located in vehicles capable of operation while in motion and normally operated in this manner, including antenna. Class C stations may operate stationary, but no stationary equipment or facilities may be used. A Class C station may not be used as a station in any other class. The

operator of a Class C station may also operate from another station during the FD period, but scores for his (mobile) operations must be submitted separately. Class D. Stations operating from permanent or licensed station locations, not portable or mobile, using commercial power. Class E. As above, but using emergency power for transmitters and receivers.

5. **Field Day Period:** FD operation starts at 1800 GMT the fourth Saturday of June and lasts until 2100 GMT the following Sunday, a period of 27 hours. Class A and Class B entries who do not begin any setting-up operations until 1800 GMT on Saturday may operate the entire duration of the FD period. Others may operate no more than 24 consecutive hours.

6. **Bands:** Each phone and each cw segment is considered as a separate band. All voice contacts are equivalent and RTTY is counted as cw. A station may be worked once on each band. Cross-band contacts are not allowed. The use of more than one transmitter at the same time in a single band is prohibited, except that a novice position may operate on any novice band segment at any time. Contacts made by retransmitting either or both stations do not count for scoring purposes.

7. **Exchanges:** Stations making contact, in order to count their contact as valid, must exchange ARRL section (see page 6 in any *QST*) and signal report.

8. **Valid Contacts:** A valid contact is defined as a two-way exchange (see above) between stations. Class A, B or C stations may contact any station. Class D or E stations may contact any Class A, B or C station.

9. **Miscellaneous Rules:**

a. Operators participating in the FD may not, from any other station, contact for point credit the FD portable station of a group with which they participated. This is intended to outlaw any kind of manufactured contacts.

b. A station used to contact one or more FD stations may not subsequently be used under any other call during the FD period. This rule is intended to outlaw multiple contacts on the same band with the same station, using different calls. It is not, however, intended to prohibit the use of jointly-owned stations which are normally used under different calls by members of the same family.

c. Any Class A group whose entry classification is three or more transmitters may also use one novice operating position (to be set up and operated only by novice class licensees) without changing their basic entry classification. The novice position must use a novice call sign and must keep their own logs and check sheets. The novice position QSO total may be added to the group QSO total before multiplier.

10. **Scoring:** Scoring is based on the number of valid contacts times the multiplier corresponding to the highest power used at any time during the FD period, plus bonus points. Power Multipliers. If all contacts are made using a dc input power of 10 watts or less and if a power source other than commercial mains or motor-driven generator is used (e.g. batteries, solar cells, water-driven generators, etc.), multiply by 3. If any or all contacts are made using a dc input power of 200 watts or less, multiply by 2. Multiply by 1 if any or all contacts are made using a dc input power over 200 watts up to 1000 watts. Over 1000 watts, multiply by ZERO! Power on ssb phone is considered to be half the peak envelope power.

If the Op Aid 6 system is used (see sample above), enter the suffix of each station worked in the appropriate call area block under the first letter of the suffix. Just enter Ws; underline Ks; circle WAs; and double underline WBs. (For example, WA1NFS, would be listed by taking the letters FS, placing them under the N column and circling same since the prefix is WA.) Whatever dupe system you choose, be sure to submit a separate listing of stations worked *per band* in numerical order (by call area) and alphabetical order (by suffix within each call area). Remember, each phone and each cw segment is considered as a separate band.

Batteries may be charged while in use for Class C entries only. For other classes, batteries may be charged (during the FD period) from a power source independent of the commercial mains. Bonuses. The following bonus points may be added to the score (after the multiplier is applied) to determine the final score. Only Class A and B stations are eligible for bonuses.

1. 100 points for 100% emergency power, per transmitter classification. ALL equipment and facilities at the FD site must be operated from a source independent of the commercial mains.

2. 50 points for public relations. Publicity must be obtained or a bona fide attempt to obtain publicity must be made. Evidence must be submitted in the form of a clipping, a memo from a HC/TV station stating publicity was given or a copy of material sent to news media for publicity purposes.

3. 50 points for message origination. A message must be originated by the club president or other FD leader, addressed to the SCM or SEC, stating the club name (or non-club group), number of operators, field location and number of AREC members participating. The message must be transmitted during the FD period and a fully serviced copy of it must be included with the Field Day report.

4. 5 points for each message received and relayed during the FD period, up to a maximum of 50 points. Copies of each message, properly serviced, must be included with the Field Day report. Club Aggregate Mobile Score. Entries under Class C may be combined to form an aggregate score for their club, having no connection with the club's portable entry, if any. Individual reports must include the club name. The club secretary or other designated club official must submit the club aggregate mobile score claim. Only bona fide members of a club operating in the club territory (175 mile radius from the club headquarters address) may contribute to this aggregate mobile score.

11. **Reporting:** Entries must be received by ARRL Headquarters by August 1. The proper summary sheet, plus a list of stations worked on
(Continued on page 84)

VHF QSO Party Announcement

STARTS **ENDS**
 1900 GMT June 9 0600 GMT June 11
Operate any two 14-consecutive-hour periods

IF YOU haven't already done so, it's time now to start planning for this year's June VHF QSO Party scheduled to take place June 9-11.

Read the rules carefully, then send right away for your free contest logs, being sure to state the quantity desired (38 QSOs per log sheet). To aid us in getting these logs to you as fast as possible, please be sure to include with each request a self-addressed stamped legal-size envelope containing your full name, call and mailing address complete with Zip code. We can send 5 log sheets First-Class for 8 cents postage. Using this as a guideline, you can estimate the amount of postage to include.

Be sure your entry is postmarked no later than July 4th and don't forget to include comments and pictures with your log. — *WA1PID*

Rules

1) The June 1973 VHF QSO Party begins at 1900 GMT, Saturday, June 9, and ends at 0600 GMT, Monday, June 11. Entrants may operate any two 14-consecutive-hour periods beginning no earlier than 1900 GMT Saturday (starting on the hour) and ending no later than 0600 Monday. All claimed contacts must be within the two chosen periods and must be made on amateur

frequencies above 50 MHz., using authorized modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed, portable or mobile operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC).

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

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

4) Scoring: 1 point for completed two-way exchanges on 50 or 144 MHz.; 2 points for such exchanges on 220 or 420 MHz.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Aircraft mobile stations cannot be counted for section multipliers.

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

6) A contact per band may be counted for each station worked. Ex.: W2E1F (S.N.J.) works K1-YON (Conn.) on 50, 144 and 220 MHz. for complete exchanges. This gives W2E1F 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2E1F contacts other Conn. stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

7) Each section multiplier requires a complete exchange with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

8) Awards: Entries must be postmarked no later than July 4, 1973. A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multi-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received.

9) Disqualifications: If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

1) Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

2) If a participant is disqualified, he will be barred from submitting an entry in the next annual

(Continued on page 85)

| NAME | | SECTION | | MULTIPLIER | | POINTS | |
|----------------|---------|---------|------------|------------|---------|------------|--------|
| CALL | SECTION | SECTION | MULTIPLIER | POINTS | SECTION | MULTIPLIER | POINTS |
| <i>JUNE 9</i> | | | | | | | |
| 44-1302 | W2E1F | CT | 1 | 1 | | | |
| 1318 | K2E1A | MASS | 2 | 1 | | | |
| 52-1253 | K1M02 | CT | 1 | 1 | | | |
| 1337 | W2E1A | MASS | 2 | 1 | | | |
| 220-1958 | K1YON | CT | 1 | 2 | | | |
| 440-2232 | W1G4WT | MASS | 1 | 2 | | | |
| 125-2347 | W2L10X | CT | | 3 | | | |
| <i>JUNE 10</i> | | | | | | | |
| 44-0931 | W2L10X | CT | 3 | 1 | | | |
| 10042 | K1MTV | CT | - | 1 | | | |
| 0817 | W2E1H | MASS | 4 | 1 | | | |



1973 Armed Forces Day Communication Tests

EACH YEAR on the third Saturday in May, the Department of Defense sponsors the observance of Armed Forces Day. This year's observance, the twenty-fourth, will be held on Saturday, May 19. Once again the Departments of the Army, Navy and Air Force will conduct communication tests between military radio stations and amateur radio stations to demonstrate the partnership and mutual respect enjoyed between the U.S. amateur radio community and the U.S. military.

The tests will consist of military-to-amateur crossband operations, using continuous wave (cw), voice (ssb) and radio-teletypewriter (RTTY) modes of operation and cw and RTTY receiving tests. QSL cards designed especially for this occasion, will be forwarded to those amateurs who establish two-way contact with participating military stations confirming crossband communications. Certificates will be awarded to those who aptly demonstrate their operating ability and technical skill by receiving an acceptable copy of the Secretary of Defense originated cw and/or RTTY message (s) transmitted during the receiving portion of the communication tests. Interception by shortwave listeners (SWL) will not qualify for a QSL card in confirmation of communications. However, anyone who has the equipment and the ability may copy the Secretary of Defense messages and will be eligible to receive a certificate.

Military-to-Amateur Crossband Test

The military-to-amateur crossband operations will be conducted from 19/1300 GMT to 20/0245 GMT. The military stations WAR, NSS, NPG, NNNN and AIR will transmit on military frequencies and listen for amateur stations transmitting in the portions of the amateur bands indicated below. Additionally, consistent with operational and training commitments, U.S. Navy aircrafts using the call signs NSSAM and NPGAM, will conduct crossband operations on frequencies listed below while flying over various cities. The operators at the military stations will specify that portion of the amateur sub-band they are tuning.

| <i>Station</i> | <i>Military Frequency (kHz unless otherwise noted)</i> | <i>Mode</i> | <i>Appropriate Amateur Band (MHz)</i> |
|---|--|-------------|---------------------------------------|
| WAR (Army Radio Station, Washington, DC) | 4001.5 | cw | 3.5 - 3.65 |
| | 4020 | lsb | 3.775 - 4.0 |
| | 4030 | RTTY | 3.65 - 3.775 |
| | 6997.5 | cw | 7.0 - 7.15 |
| | 14405 | cw | 14.0 - 14.2 |
| | 20994 | ssb | 21.25 - 21.45 |
| NSS (Naval Communication Station, Washington, DC) | 3385 | cw | 3.5 - 3.65 |
| | 4012.5 | RTTY | 3.65 - 3.775 |
| | 4040 | lsb | 3.775 - 4.0 |
| | 6970 | lsb | 7.15 - 7.3 |
| | 7301 | cw | 7.0 - 7.05 |
| | 7380 | RTTY | 7.1 - 7.15 |
| | 7385 | cw | 7.05 - 7.1 |
| | 13827.5 | RTTY | 14.1 - 14.2 |
| NSSAM (Navy Aircraft) | 14385 | usb | 14.2 - 14.35 |
| | 14400 | cw | 14.0 - 14.1 |
| | 27900 | usb | 28.5 - 29.7 |
| | 49.692 MHz | a-m | 50.1 - 54.0 |
| | 143.820 MHz | a-m | 144.1 - 146.0 |

Aircraft to depart Washington, DC 19/1300 GMT; Providence, R.I. 19/1400 GMT; Buffalo, NY 19/1500 GMT; Indianapolis, Ind. 19/1630 GMT; Memphis, Tenn. 19/1730 GMT; New Orleans, La. 19/1830 GMT; Tallahassee, Fla. 19/1930 GMT; Miami, Fla. 19/2030 GMT; Jacksonville, Fla. 19/2115 GMT; Spartanburg, S.C. 19/2215 GMT; Washington, D.C. 19/2300 GMT.

| | | | |
|--|---------|----------------|---------------|
| NPG (Naval Communication Station, San Francisco, Calif.) | 4001.5 | lsb | 3.775 - 4.0 |
| | 4005 | cw | 3.5 - 3.65 |
| | 4010 | cw | 3.65 - 3.75 |
| | 6989 | cw | 7.0 - 7.075 |
| | 7301.5 | lsb | 7.15 - 7.3 |
| | 7347.5 | RTTY | 7.0 - 7.1 |
| | 7365 | cw | 7.075 - 7.150 |
| | 13922.5 | RTTY | 14.0 - 14.15 |
| | 14356 | usb | 14.2 - 14.275 |
| | 14375 | cw | 14.0 - 14.1 |
| 14389 | usb | 14.275 - 14.35 | |
| 20983 | cw | 21.0 - 21.2 | |

| | | |
|--------------|------------|---------------|
| | usb | 21.27 - 21.4 |
| *49.995 MHz | a-m/usb/cw | 50.0 - 51.0 |
| *143.995 MHz | a-m/usb/cw | 144.0 - 146.0 |
| **148.41 MHz | a-m/RTTY | 145.0 - 146.0 |
| **148.95 MHz | fm | 146.0 - 148.0 |
| *222.0 | a-m/usb/cw | 221.0 - 222.5 |

* To be operated from Mt. Vaca

†† To be operated from Mt. Diablo

NPGAM (Navy 148.005 MHz a-m Aircraft) 145.0 - 146.0

The aircraft will be flying from San Francisco to Los Angeles to Seattle and back to San Francisco.

| | | | |
|---------------------------------------|---------|-----|--------------|
| N0NNN (Naval Academy, Annapolis, Md.) | 4008.5 | lsb | 3.775 - 4.0 |
| | 7350 | lsb | 7.15 - 7.3 |
| | 13975.5 | usb | 14.2 - 14.35 |
| AIR (Air Force Radio, Washington, DC) | 4025 | lsb | 3.775 - 4.0 |
| | 7305 | lsb | 7.15 - 7.3 |
| | 7315 | cw | 7.0 - 7.15 |
| | 13997.5 | cw | 14.0 - 14.2 |
| | 14397 | usb | 14.2 - 14.35 |

Cw Receiving Test

A cw receiving test will be conducted for any person capable of copying International Morse Code at 25 words per minute. The cw broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radio amateurs and other participants. The cw broadcast will commence at 20/0300 GMT with a ten minute CQ call for tuning purposes with the Secretary of Defense message commencing precisely at 20/0310 GMT as follows:

| Transmitting Station | Frequencies (kHz unless otherwise indicated) |
|----------------------|--|
| WAR - Army | 4030, 6997.5, 14405 |
| NSS - Navy | 4012.5, 7385, 14385 |
| NPG - Navy | 4005, 6989, 14375, 49.995 MHz, 143.995 MHz |
| AIR - Air Force | 7315, 13997.5 |

RTTY Receiving Test

A radioteletypewriter RTTY receiving test will be conducted for any individual amateur or station possessing the required equipment. This test of the operator's technical skill in aligning and adjusting

his equipment, serves to demonstrate the growing number of amateurs becoming skilled in this method of rapid communications. The RTTY broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts. The broadcast will be transmitted at 60 words per minute, beginning at 20/0335 GMT with a ten minute CQ call for tuning purposes followed by the Secretary of Defense message at 20/0345 GMT as follows:

| Transmitting Station | Frequencies (kHz unless otherwise indicated) |
|----------------------|--|
| WAR - Army | 4030, 6997.5, 14405 |
| NSS - Navy | 4012.5, 7385, 14385 |
| NPG - Navy | 4010, 7347.5, 13992.5, 148.410 MHz |
| AIR - Air Force | 7315, 13997.5 |

Submission of Test Entries

Transcriptions should be submitted "as received." No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copied as well as the name, call sign (if any) and address, including zip code of the individual submitting the entry must be indicated on the page containing the test. Each year a large number of acceptable copies are received with insufficient information, thereby precluding the issuance of a certificate.

Entries should be postmarked no later than May 25, 1973 and submitted to: Armed Forces Day Tests, Chief, Navy-Marine Corps MARS, 4401 Massachusetts Avenue, N.W. Washington, DC 20390, Mail Stop 394.

WI9ANG Special Certificates

WI9ANG (Wisconsin 9 Air National Guard) will be on the air May 19 and 20. Special Armed Forces Day Certificates will be issued to all stations worked. The operating schedule for both Saturday and Sunday is: 7.280 MHz, ± 5 kHz, 1330-2130 GMT; 14.310 MHz ± 5 kHz, 1330-2130 GMT.

To obtain a free certificate your QSL card is required. Send all QSLs to WI9ANG, c/o WA9DZL, 128th Air Refueling Group (TAC), General Mitchell ANG Base, Milwaukee, WI 53207.

QST

Field Day Rules

(Continued from page 81)

each band and appropriate proof(s) for bonuses constitute an entry. A copy of your FD log is *not* required unless specifically later requested by ARRL. This does not, of course, relieve you of the responsibility of keeping an operating log as required by FCC/DOC. Send a stamped addressed envelope to ARRL Hq. for FD forms which include the rules, a summary sheet and a sample of a suggested check sheet.

12) *Disqualifications:* If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

1) Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers.

duplicate contacts, banned countries, and/or other scoring discrepancies.

2) If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1972 phone SS prohibits submission of an entry for the 1973 phone SS, but 1973 cw SS participation is okay).

3) The calls of all disqualified participants will be listed in the QST report of the contest.

4) Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

5) For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria.

QST

Silent Keys

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

W1BFI, Domenick M. DeVito, Stamford, CT
 WA1CCC, William H. Wells, Waterbury, CT
 W1CTK, John T. Smith, Williamstown, MA
 W1FB/K7FB, Laurence G. Cumming, Wilton, CT
 W1JLK, Hollis M. French, Grantham, NH
 W1KCO, John S. McCormick, Taunton, MA
 Ex-W1LTP, Samuel H. Bradish, Marblehead, MA
 K1TWX, William E. McCarthy, Stoughton, MA
 W1UF, George H. Jette, Wellfleet, MA
 K2CA, Vladimir L. Spoley, Bronxville, NY
 W2CFB, Harry S. Noble, Toms River, NJ
 WN2CTD, Morris H. Kirsner, Yonkers, NY
 K2EL, John M. Conner, Millburn, NJ
 W2GWY, Raymond F. Jenkins, Schenectady, NY
 K2HG, Robert P. Dutton, Naples, NY
 WA2HHI, Albert F. Rickborn, Boonton, NJ
 WB2LIX, Michael Alota, Bronx, NY
 WB2MTD, Richard N. McMahon, New York, NY
 W2PVC, Frank Knight, Jr., Potsdam, NY
 K2SDF, Curtis A. Noble, Stormville, NY
 W3ALW, Edward C. Kottcamp, Jr., Eagles Mere, PA
 W3ASX, Robert E. G. Schmid, Philadelphia, PA
 W3DFY, Arthur R. Hunsinger, Sayre, PA
 W3GJV, Norman A. Geiger, Rockville, MD
 W3LKR, Miles W. Lewis, State College, PA
 K3MEH, Charles L. Birk, Levittown, PA
 K3MQE, Albert W. Rhoades, Sunbury, PA
 W3MUF, John O. Stewart, Carmichaels, PA
 WA3PIUY, Walter F. Chappel, Baltimore, MD
 K3RYD, Henry D. Spear, Upper Darby, PA
 K3WMY, Richard A. Love, Philadelphia, PA
 WB4ARX, Joseph Edward Kingson, Daytona Beach, FL
 W4DCQ, Herman P. Jolitz, Clinton, NC
 K4HW, Joseph D. Amoroso, Richmond, VA
 K5BBA, William A. Simkins, Bartlesville, OK
 WB5ERQ, Jackie R. Smalley, San Antonio, TX
 W5JOS, Harold L. Miles, Houston, TX
 W5RFJ, Lawrenz H. Dyvad, Alamogordo, NM
 K6ATS, Hardy H. Rothschild, Chula Vista, CA
 W6EUM, Don M. Wherry, Oakhurst, CA
 W6FZ, John A. Grutzius, Tarzana, CA
 WA6HXG, Bruce W. McComb, Newport Beach, CA
 W6IUF, William E. Dailey, El Cerrito, CA
 W6JDP, Leland G. "Pat" McGorray, Salinas, CA

WB6MYQ, Ashley S. Hallett, San Diego, CA
 W6NAW, Ralph E. Lynch, San Diego, CA
 W6PHJ, Asa G. Langford, Harbor City, CA
 W6RAL, Samuel E. Goldstein, Palm Springs, CA
 W7DF, Lee H. Machin, Mt. Vernon, WA
 W7IUY, Victor M. Rice, Phoenix, AZ
 K7KBS, Henry H. Hewitt, Jr., Portland, OR
 K7ZYL, Julius O. Krause, Salem, OR
 W8BVN, Albert Phoenix, Parma, OH
 W8FVW, Charles C. Whitehead, Middletown, OH
 W8HUD, Philip H. Smith, Birmingham, MI
 W8JBW, Harland R. Williams, Jefferson, OH
 W8NFD, Harold W. "Heiney" Lingenfelter, Rocky River, OH
 W8NMV, Richard S. Roberts, Novelty, OH
 W8OR, Homer Dunham, Royal Oak, MI
 W8OVP, McKinley Warth, Chillicothe, OH
 WA8PLX, Melvin C. Miller, Clinton, OH
 WA8ZQU, Elvis F. Eyes, Flint, MI
 WB9CLY, Scott B. Bennett, Rothschild, WI
 K9DSR, Ross I. Parker, Hinsdale, IL
 WB9EFY, Harold E. Melchi, Pierceton, IN
 WB9GJO, Roy L. Shriver, Grant Park, IL
 W9QKG, Peter Broehl, Jr., Downers Grove, IL
 W9WUH, John D. Harkins, Evansville, IN
 W0BMB, Harvey N. Majors, Kansas City, MO
 WN0DBV, Edyth M. Fike, Falcon, MO
 W0ECY, William R. Lorenzen, Denver, CO
 W0GBZ, Clarence J. "Bud" Hartneck, Lakefield, MN
 W0JBA, Harry O. Weiss, Jr., House Springs, MO
 W0MAF, Francis A. Carmichael, Jr., Shawnee Mission, KS
 WA0REY, John P. Brunk, Uniontown, KS
 W0SKD, Francis D. Wardner, St. Paul, MN
 VE2UK, John L. Walker, Westmont, PQ
 VE3AHK, G. McArdle, Ottawa, ON
 VE3AJE, Edward C. Houlgate, London, ON
 VE3AUF, F. R. "Roy" Chappell, Guelph, ON
 VF7AMO, Delbert Mc S. N. Baker, White Rock, BC
 VF7GX, Alex Sicord, Vancouver, BC
 VE7LW, Walter E. Piper, Victoria, BC
 VE7YT, W. A. White, Vancouver, BC
 G2DC, J. M. "Jack" Dudge-Coates, Hants, England
 HBEL, Giuseppe Berrino, Novi Ligure, Italy
 XE1PY, Sidney La Nier, Jojutla Mor, Mexico

Strays

Murphy stuck his finger in the ED results pie and removed a few logs from the listings. Our apologies to the following who were left out of the results: W6EIF/4 was correctly listed as winning class 1C in the summary box. His missing score should read: W6EIF* 269-B-538. W5SOD* 83-B-166 - Class 1D. W1QYY/1 (+K1GNW) 425-B-950 - Class 1B.

Further checking of June VHF QSO Party logs has resulted in a change in the order of the Washington multiop stations and W7VE/7 is declared the multiop winner.

In the same contest K2DEL was erroneously listed as a single operator entry. Correction of this mistake results in K2OWR winning the NNI section and Hudson Division awards for single op

and K2DEL winning the section and Division leader awards for multiop. Sorry fellas.

VHF QSO Party Rules

(Continued from page 82)

running of that specific contest, (e.g., disqualification from the 1972 phone SS prohibits submission of an entry for the 1973 phone SS, but 1973 cw SS participation is okay).

3) The calls of all disqualified participants will be listed in the QST report of the contest.

4) Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

5) For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJM

TWIXT DUTY AND PRIVILEGE

DUTY IS THE TYPE of thing one must perform in order to gain a privilege; conversely, a privilege is something granted as a result of a duty performed. These may not be adequate dictionary definitions, but they will serve our purposes. Because in order to merit privileges, we must perform duties, often whether or not we relish them.

Public service communication is one of these duties, let's face it. By performing it, we who are public-service-minded help justify the existence of amateur radio and of the comparatively large portions of the radio spectrum we use. Are we the only ones who "pay the bill"? Not by any means, but who will deny that we make an outstanding, a major contribution to the basis and purpose of amateur radio?

From time to time you will find amateur groups prone to argue whether the operating or the technical phases of the art are the more important to the basic *raison d'etre*. Naturally, this column would be inclined to favor the former; but there is no real basis for argument, because amateur radio is made up of *both* operating and technical phases, neither one of which could stand alone without the other. Both are mentioned frequently, or strongly alluded to, in Section 97.1, amateur radio's "basis and purpose."

And they are not really separable. That is, there aren't many amateurs so tied up with the technical side that they never have any desire to try out their experiments and building projects on the air - and this is operating. And there aren't many amateurs who operate without knowing anything whatever about what goes on inside the little box - and this is technical knowledge.

Nevertheless, it was the tendency toward the latter that inspired "incentive licensing," the fear

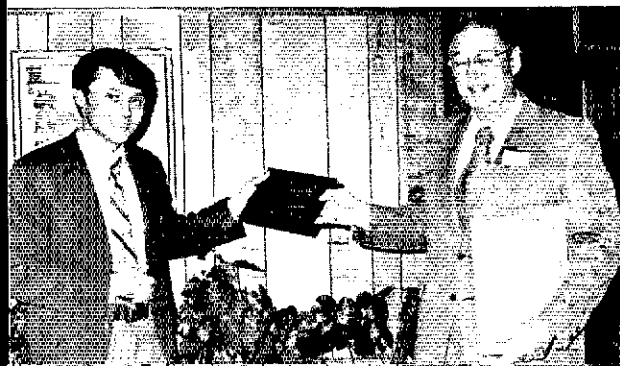
*Communications Manager, ARRL.

that we were gradually becoming a group of "appliance operators" who weren't keeping up with the state of the art, must less being leaders in it.

We amateurs have the bounden duty *both* to maintain our technical knowledge and to perform operating in the public interest; those amateurs who perform only the former are just as derelict as those who perform only the latter. Or, to put it slightly differently but arriving at the same conclusion, those who perform the latter are deserving of just as much consideration as those who perform the former.

The incentive licensing program was and is one primarily of technical upgrading - or at least, this is the intention. There are those who will argue that passing a test, no matter how difficult, is not necessarily an indication of one's inherent or ambient technical proficiency. You have to stay with it, live with it, accumulate experience. But everybody agrees that any technical upgrading is beneficial to the service as a whole, along with public service operating by performing a communications service, "particularly with respect to providing emergency communications." Also, we *hope* no one will argue that an effective emergency communications service can be performed without planning, training and experience.

So, where are we? By increasing our technical knowledge and acquiring 20 wpm codespeed (a purely mechanical skill), we may acquire extra frequency privileges not enjoyed by most others. Fine. A worthy incentive indeed, and it follows the pattern of duty = privilege. But providing public service communication is a duty also, one which is clearly spelled out in the *first* basis and purpose of amateur radio. What incentive privilege does *this* kind of beneficial amateur radio pursuit have? None whatever. In fact, FCC seems to be saying, in its reply comments on Docket 19162, that in order



WA4EUL (left) is shown receiving a plaque in appreciation of his work as Route Manager for the Va. High Speed CW Net from 1965 to 1971. Presenting the award is WA4VQQ, President of the Va. Beach ARC.

to achieve the "privilege" of performing this *duty* in other than the general-class segments, one must first perform the duty of upgrading himself technically. So, for this kind of beneficial amateur radio we have a different equation: duty (public service) + duty (technical upgrading) = privilege (extra frequencies).

If technical upgrading is paramount, and all the other factors mentioned in 97.1 are secondary or inconsequential by comparison, then one wonders why public service and emergency communication were mentioned *first* when this section was formulated? -WINJM

Field Day Rules

Elsewhere in this issue of *QST* you will find the detailed Field Day Rules. Yes, they are complicated. Sorry about that, but the reason is simply that FD is a multi-faceted activity and the rules have increasingly had to try to cover all facets.

This just isn't possible, of course. To illustrate just how impossible it is, about the turn of the year we received a letter from an amateur (who shall be nameless and call-less) inquiring about the possibility of use of the facilities of an industrial complex for Class A operation. All the requirements of the rules would be complied with, including 100% emergency power, supplied by an existing, already-installed company generator (multi-kW capacity) capable of running the air conditioning, all-electric kitchen facilities and all the other comforts of home, and including 100-ft. existing towers, dormitories, bath and shower and recreational facilities. In fact, although we say "all the comforts of home," few homes ever had it so good.

Yes, under the existing rules, such things are possible, and we suppose it's nice if you can get it. But somehow, such a Utopian setup doesn't seem to have the intent and flavor of Field Day. It's like taking an African Safari in an air-conditioned van complete with all the comforts, secure from all the hazards that normally make such a venture exciting. Is this "the field?" Not in our book, it isn't. Yet, if we require all groups to go out in tents or unused or abandoned buildings, what will happen to our precious participation statistics? All the old codgers and many of the women and kids will stay at home, operate in Class D (or is it E?), or not at all. Nothing in the rules, per se, prevents participants from using tiled johns, modern electric facilities, sleeping in comfortable beds. There is no requirement that you be out in the wet, or the cold, or the heat, or suffer any human discomfort or even inconvenience. But such a setup wouldn't seem like "Field" Day, somehow. How about a X4 multiplier for every group that actually goes out in the *field* for FD, away from all fixed man-made buildings or facilities, taking everything but everything they need with them, staying out there for the full period? That's what we'd call *Field* Day! -WINJM

More REAL WINNERS

Since the listing of the REAL WINNERS OF FIELD DAY, clubs who curtailed or cancelled their Field Day plans to assist with the Hurricane Agnes emergency operations, (Feb. '73 *QST*, page 68), we have been advised of three other clubs eligible for this honor:

- Communications Club of New Rochelle, K2YCI, New Rochelle, NY.

The following is a message from Governor Nelson Rockefeller directed to all New York State amateurs who helped during the Hurricane Agnes emergency:

"The amateur radio operators of New York State perform a most valued service, for which all New Yorkers are grateful.

Never was their value more clearly demonstrated than during the Southern Tier flooding of June 1972, one of the worst natural disasters ever to strike our state.

Without regard for personal safety in many cases, amateur radio operators gave important support to official government agencies and the military in rescuing and protecting hundreds of thousands of flood victims in the stricken areas.

The enthusiastic help which the amateur radio people rendered, however, came as no surprise to those who work regularly with them. Amateur radio operators have distinguished themselves in many ways, over the years, helping in emergency communications.

As Governor of the State of New York, it is a great pleasure to commend our amateur radio operators and to thank them for their dedication and devotion."

Dated: December 11, 1972

Signed: Nelson A. Rockefeller, Governor

- Schuylkill River Rats, West Chester, PA.
- Cumberland Amateur Radio Club, K3IEC, Boiling Springs, PA.

Registered Yet?

Last call for registration of all public service nets for the annual Net Directory. Have you mailed your net registration card (CD-85) to ARRL yet? (See Apr. *QST*, page 73.) Have you asked the net managers of some of those nets you report into if THEY have registered? If you are not sure whether or not a net has been registered and are able to supply accurate data on that net, send for a registration card, complete and return to ARRL. We prefer to weed out the duplicate registrations rather than be unable to list a net because we lack the information. Hurry, deadline is June 1, 1973.

Pictures?

Here's another plea for pictures to be used in this column. Snapped any operators in action, small group meetings, amateur radio at special events, etc., lately? Send 'em along. Based on their reproducibility and "hammyness," we'll try to run them in future columns. Let's hear from some of you amateur photographers. - WA1FCM

Public Service Diary

On Dec. 15, KP4MO had a problem with his automobile while operating mobile. He was in QSO on 2 meters with KP4QM who relayed the information to KP4AHQ. KP4AHQ moved to the

Public Service Honor Roll February 1973

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

| Category | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | Totals |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| Max Pts. | 10 | 10 | 12 | 12 | 12 | 20 | 3 | 3 | 5 | |
| WA0VYB | 10 | 10 | 12 | 12 | 12 | 12 | | | 5 | 73 |
| WA8ETX | 10 | 10 | 12 | 12 | 12 | 10 | | | 5 | 71 |
| K0PIV/4 | 10 | 10 | 12 | 12 | 12 | 10 | | | 5 | 71 |
| W4OGG | 10 | 10 | 6 | 12 | 12 | 20 | | | | 70 |
| WA3CQZ | 10 | 10 | 12 | 12 | 12 | 5 | | | 5 | 66 |
| WB4SVH | 10 | 10 | 12 | 12 | 12 | 5 | | | 5 | 66 |
| WA1MSK | 10 | 10 | 12 | 12 | 12 | | 3 | | 5 | 64 |
| WA2RYD | 10 | 10 | 12 | 12 | 12 | | | 3 | 5 | 64 |
| WB5AMN | 8 | 10 | | 9 | 12 | 19 | | | 5 | 63 |
| WB8IAD | 10 | 10 | 12 | 12 | 12 | 2 | | | 5 | 63 |
| WA0VAS | | 10 | | 12 | 12 | 20 | 3 | | 5 | 62 |
| WA2CLB | 10 | 10 | 12 | 12 | 12 | | | | 5 | 61 |
| WA3GSM | 10 | 10 | 12 | 12 | 12 | | | | 5 | 61 |
| WA3QGM | 10 | 10 | 12 | 12 | 12 | | 3 | | 5 | 59 |
| WB5E1N | 10 | 10 | 12 | 12 | 12 | | | 3 | 5 | 59 |
| WB8BMV | 10 | 10 | 12 | 9 | 12 | | | | 5 | 58 |
| WA0MLE | 10 | 10 | 12 | 6 | 12 | | 3 | | 5 | 58 |
| W7AXT | 10 | 6 | 12 | 12 | 12 | | | | 5 | 57 |
| WB0AXW | 10 | 10 | 12 | 12 | 12 | 1 | | | 5 | 57 |
| WB2AEH | 10 | 10 | 12 | 12 | 12 | | | | 5 | 56 |
| WB2CHY | 10 | 10 | 12 | 12 | 12 | | | | 5 | 56 |
| WB2OYV | 10 | 10 | 12 | 12 | 12 | | | | 5 | 56 |
| WB4VZQ | 10 | 10 | 12 | 12 | 12 | | | | 5 | 56 |
| W7OCX | 10 | 5 | 12 | 12 | 12 | | | | 5 | 56 |
| WB9A1J | 10 | 10 | 12 | 12 | 12 | | | | 5 | 56 |
| WA2ICU | 10 | 10 | 9 | 12 | 12 | 1 | | | 5 | 54 |
| K0JTW | | 10 | | 12 | 12 | 20 | | | | 54 |
| WA3CNE | 10 | 6 | 12 | 12 | 12 | | | | 5 | 52 |
| WA3QLG | 10 | 10 | 12 | 6 | 12 | 1 | | | 5 | 51 |
| WB4ROA | 10 | 8 | 12 | 3 | 12 | 1 | | | 5 | 51 |
| WA2LUD | 10 | 10 | 12 | 6 | 12 | | | | 5 | 50 |
| WB4AJL | 10 | 10 | 12 | 3 | 12 | | 3 | | 5 | 50 |
| WA6DEI | 10 | 10 | 12 | 6 | 12 | | | | 5 | 50 |
| WA8UPI | 10 | 10 | | 12 | 12 | 1 | | | 5 | 50 |
| W2ROF | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| W6LRU | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| W7BO | 10 | 10 | 12 | 12 | | | | | 5 | 49 |
| K7OUF | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| WB9KVN | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| K0BLX | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| K0MRI | 10 | 10 | 12 | | 12 | | | | 5 | 49 |

| | | | | | | | | | | |
|---------|----|---------|----|----|----|----|----|---|---|----|
| WAWSIG | 10 | 10 | 12 | | 12 | | | | 5 | 49 |
| W2TPV/0 | 10 | 9 | 12 | | 12 | | | | 5 | 48 |
| W7GHT | 10 | 9 | 12 | | 12 | | | | 5 | 48 |
| W8UPD | | 10 | | 9 | 0 | 0 | 20 | | | 48 |
| WB0HBM | 10 | 10 | 12 | | 12 | | 4 | | | 48 |
| WB0HOX | 10 | | | 3 | 12 | 20 | 3 | | | 48 |
| WA2CZA | 10 | 10 | 6 | 12 | 9 | | | | | 47 |
| WA5YEA | 10 | 10 | 12 | 3 | 12 | | | | | 47 |
| WA7JOS | 10 | | | 12 | 12 | 8 | | | 5 | 47 |
| VE3BQZ | 10 | 10 | 12 | 12 | | | | 3 | | 47 |
| WA3QOR | 10 | 10 | 12 | | 12 | 2 | | | | 46 |
| WA6TVA | 10 | 10 | | 12 | 9 | | | | 5 | 46 |
| WA8RCX | 10 | 10 | | 12 | 12 | 2 | | | | 46 |
| WA0TFC | 6 | 10 | 12 | 12 | 3 | | | 3 | | 46 |
| WB2UVB | 3 | 10 | 3 | 12 | 12 | | | | 5 | 45 |
| WA9FED | 10 | 3 | 12 | | 12 | | | 3 | 5 | 45 |
| WB2CST | 44 | W3LOS | | 39 | | | | | | 34 |
| WB2FEX | 44 | W3NEM | | 39 | | | | | | 34 |
| K3OHQ | 44 | W5ABQ | | 39 | | | | | | 34 |
| WA3JUG | 44 | W6GJF | | 39 | | | | | | 34 |
| WA3ODH | 44 | WB1BK | | 39 | | | | | | 34 |
| W4ZJY | 44 | WB8KZD | | 39 | | | | | | 34 |
| W5AMZ | 44 | WB0H | | 39 | | | | | | 34 |
| K5MTA | 44 | VE3AWE | | 39 | | | | | | 34 |
| K5YTA | 44 | VE3DPO | | 39 | | | | | | 34 |
| WB5BWV | 44 | VE3EWD | | 39 | | | | | | 34 |
| WB6GLC | 44 | WA3ATO | | 38 | | | | | | 34 |
| VF6JG | 44 | K3MVO | | 38 | | | | | | 34 |
| VEJSB | 44 | K5ROZ | | 38 | | | | | | 34 |
| WB5EDS | 43 | W7WAI/S | | 38 | | | | | | 34 |
| W2RUF | 42 | K8MLO | | 38 | | | | | | 34 |
| WB8CSH | 42 | W2MTA | | 37 | | | | | | 33 |
| WB8VKE | 42 | WB5PML | | 37 | | | | | | 32 |
| WA6YVT | 42 | W2CU | | 36 | | | | | | 32 |
| WB4PNG | 41 | K4IAF | | 36 | | | | | | 32 |
| WB5DLW | 41 | WA2LCC | | 35 | | | | | | 32 |
| W6LYY | 41 | WA2UOO | | 35 | | | | | | 32 |
| WB4EKJ | 40 | W7PI | | 35 | | | | | | 32 |
| WB6KJ | 40 | WB8WD | | 35 | | | | | | 31 |
| K1SXF | 39 | WB8KKI | | 35 | | | | | | 31 |
| W1UBG | 39 | WB2NRK | | 34 | | | | | | 30 |
| W2FR | 39 | W3OKN | | 34 | | | | | | 30 |

*Denotes multioperator station.

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

area and provided the necessary assistance. — (KP4QM)

A call for rare drugs for a 12-year-old child sent by CN8BF was received by VE2BRW at 1831 GMT December 15 on 20 meters. Since conditions were poor, 0W8DY helped relay the information. With the help of the Red Cross and a local doctor, VE2BRW located the drug in Montreal and arranged for its shipment via Paris the following day. Without the drug the child would have lived only two weeks. — (VE2ALE, SCM PQ; VE2BRW)

When a power blackout occurred in Corozal, PR on Dec. 31, the sub-station was without communications. KP4AHQ requested help via 2 meters. KP4QM responded and relayed the information to a dispatcher at the PR Water Resources Authority, who sent maintenance personnel. — (KP4QM)

On Jan. 7 W0AFO came upon a wreck near Lawrence, KS. His call for assistance was answered

by WA0FEE and was reported to the Sheriff Department. Information on the car that caused the accident was turned over to Highway Patrol and the driver apprehended. — (K0BXF, SCM KS)

While traveling from Kansas City to Bonner Springs, KS on Jan. 14, W0QJU spotted 5 cars which had skidded off the road at different locations and a 4 car accident which was blocking the turnpike. All were called in through K0BXF to turnpike officials.

In the same afternoon, WB0EYS came upon a truck which had jackknifed blocking both lanes of traffic on the turnpike. It was reported through WB0DON and W0ERZ. — (K0BXF, SCM KS)

At 1:30 Jan. 20, K3ICH/mobile was hit broadside by a speeding auto, which injured his wife. His call for assistance on the WB4QFP repeater was answered by K4CGY who notified police and ambulance. Assistance arrived in three minutes. — (K4CGY/3)

A fire at a home in Winnipeg, MB on Jan. 27 seriously injured the owner's son and a housekeeper. The homeowners were enroute to a vacation in Mexico. Since their itinerary was not known, attempts were made to locate the couple by amateur radio. With the help of Mexican and Canadian officials, hotel and radio station personnel, the party was located in Acapulco on Feb. 1. Several Canadian, Mexican, U.S. amateurs and the YL-ISSB Net were involved. - (VE4FQ, SCM MB)

WAØGDA was traveling on the Kansas Turnpike near Lawrence, KS on Jan. 28 and observed a bus which had slid off the road. WAØGDA was in contact with WBØEVE, WØQJU, WAØFEE and the accident was called into the Highway Patrol and help sent. - (KØBXF, SCM KS)

On Feb. 2 at 2000, Trenton (NJ) CD Director W2VU notified Communications Officer K2SNK and RO K3CPF that heavy rains were causing flooding in Trenton. K3CPF, WA2s BIX GMH left for Trenton EOC. The RACES net was activated and after radio contact was established with Mercer Co. Communications Officer W2HX, mobile units were dispatched to several flooded areas to assist police and others in the evacuation of families. Mobile units also spotted flooded areas and requested pumps, sandbags and other materials. The net was closed at 0030 Feb. 3 when flood waters began to subside. Eleven RACES personnel were involved. - (K3CPF, RO Trenton, NJ)

Dozens of amateurs participated in "Operation Search" for a missing woman in Shiawassee Co., MI beginning Feb. 3. Shiawassee ARA members set up club station W8QQQ in the Owosso City Hall. SARA members, Genesee Co. ARS and Central Mich. ARS members and non-club members furnished 2-meter communications to base station W8QQQ/8. The woman was not found during the search. - (WB8DKQ)

When hearing of a plane crash into an Alameda (CA) apartment house on Feb. 7, WA6AGA and WB6s GWQ RPK immediately discussed the situation and committed the resources of the Grizzly Peak VHF ARC for emergency communications for the Red Cross. W6NKF and K6KAP went to the scene with portables linking them to WA6GCS at the Alameda RC Headquarters. Other amateurs reported to the scene throughout the night as the fire blazed. Still others made themselves available for uncounted hours during the gruesome cleanup and search for victims, providing the communications links needed to allow RC staffers and volunteers to meet the emergency needs of the victims as well as to provide logistics support for the cleanup workers. Operations secured on Feb. 10. - (The Repeater; WB6RPK, SEC EBay)

On February 10, a severe winter storm rendered commercial power, telephone and teletype circuits inoperative in Wanchese, NC. W4PCN set up a 2-meter transceiver at the WOBR radio station and made contact with W4s JPY LCV, WA4JZX and others through repeater WA4VTX in Elizabeth City. These amateurs quickly collected weather reports, road conditions, etc. This information was

passed on to the public by WOBR. In one instance, information was relayed to amateurs at the base station that fifty automobiles were marooned at Coinjock. - (W4PCN)

On Feb. 16, WB4YBO joined the search for a drowning victim near Wewahitchka, FL using his two-meter mobile unit. He remained at the scene all that night and the following day, reporting to Jackson Co. CD Director WB4TUF, NFIa SEC W4IKB and Leon Co. EC W4MQQ through WB4UQH at the base station in Blountstown. On Feb. 17, WB4TUF took his two-meter mobile unit to Wewahitchka and W4IKB took his boat to the scene to join in the search. Communications between the rescue workers and their families were maintained. The search efforts were hampered by snow, cold temperatures and river flooding conditions. - (WB4UQH, EC Calhoun Co.)

Enroute to work on Feb. 16, WB9EBL came upon a traffic accident involving serious injuries. A call on 2 meters was answered by K9ERG/mobile who informed officials. Help arrived on the scene within minutes. - (WB9EBL)

While operating in the ARRL DX Competition on March 3, K6SVL received a call from TG9VD indicating a medical emergency. His XYL, TG9LN requested assistance in obtaining some special medication for a young accident victim who had had a leg amputated and was a hemophiliac. He was in extremely serious condition and would die without this specific medication which was available from Hyland Laboratories in Glendale, CA. W9LVT/6 and WA6TSK broke in with offers of assistance, with the latter advising he had a friend who was a doctor and promptly enlisted his aid. The doctor contacted the laboratory and made arrangements to obtain the medicine. The doctor was also successful in having the medicine delivered to Guatemala City by a special Air Force flight which required extensive arrangements culminating in a call to Herb Klein at the White House who obtained authorization from President Nixon for the flight. K6SVL, WA6TSK and W9LVT maintained contact with TG9LN during the night on 20 and 40 meters coordinating this activity. T12CGM also assisted in maintaining radio contact. The medicine was received in Guatemala City the following afternoon and later contact indicated that the young man's condition had improved. A large-circulation western newspaper headlined the operation on the front page, affording excellent publicity for amateur radio. - (K6SVL)

At 1940Z March 6, W7JZ spotted an automobile accident near Auburn, CA. He immediately asked for someone on the Beehive Utah Net to inform the Calif. Highway Patrol. Several attempts were made to contact a California amateur without success. W7JZ was then directed to get on WestCARS, which he did. In less than 4 minutes from the time he spotted the accident, the Highway Patrol was alerted. BUN members assisting were W7OCX, K7CLO, WA7FGU. - (W7OCX, SCM UT)

On March 9 at 1517 local time, WA8BRD/mobile arrived at the scene of a hit-and-run accident moments after it occurred. The victims'



Many groups who participated in the Simulated Emergency Test last Jan. held meetings to discuss SET results and ways to improve their emergency preparedness. This is a post-SET meeting of the Raleigh Amateur Radio Society (NC). Back row (left to right): WB4SDJ, W4FMN, WB4VBM, WB4ZSM, WA4DKZ, W4YDY. Front row: W4RUH, WB4PMI, WA4PEN. SET results will be in June QST

automobile was disabled, on fire, and the occupants were trapped in the car. Through the WB8CQR repeater, he called W8GRG who relayed the report to the Cleveland Fire Department, which arrived on the scene three minutes after the alarm. In the meantime, WA8BRD brought the fire under control with fire extinguishers. Then, with help of others on the scene, he freed the occupants of the car before the fire department arrived. Aside from a bad scare, they were uninjured. — (W8GRG, EC Northeast Ohio)

On the night of March 13, a tornado touched down in a housing development in a remote area of Stone Co., MO near the town of Blue Eye totally destroying 11 mobile homes and injuring 18 persons, four of whom required hospitalization. Since telephone and power lines were cut, the extent of damage and injury did not reach authorities until the next morning. WA0JOG was at the scene for much of the day on March 14. One piece of welfare traffic was handled through the Midwest Amateur Radio Service which also provided frequency watch and other valuable assistance. — (WA0JOG, EC Stone Co., Red Cross Ass't Disaster Chairman)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for February Traffic

| Call | Orig. | Recd. | Rel. | Del. | Total |
|--------------|-------|-------|------|------|-------|
| W3CUL/4 | 218 | 1949 | 1891 | 37 | 4095 |
| WA4JH | 12 | 576 | 546 | 7 | 1141 |
| WA0VAS | 113 | 470 | 43 | 427 | 1053 |
| W1PEX | 77 | 486 | 413 | 34 | 1010 |
| WB1JPH | 1 | 474 | 426 | 46 | 947 |
| K0ZSO | 6 | 420 | 420 | | 846 |
| K3RHU | 3 | 359 | 318 | 24 | 704 |
| W6RSY | 26 | 334 | 270 | 34 | 664 |
| W3VR/4 | 157 | 269 | 213 | 12 | 661 |
| W9CXY | 12 | 299 | 296 | 3 | 610 |
| WB0FMN | 25 | 277 | 275 | 3 | 580 |
| K0ONK | 132 | 222 | 204 | 12 | 570 |
| WA1MSK | 80 | 279 | 195 | 5 | 559 |
| WA3JGM | 44 | 238 | 193 | 35 | 510 |
| WA0VAS(Jan.) | 117 | 874 | 71 | 803 | 1865 |
| K0CSE(Jan.) | 29 | 279 | 304 | | 612 |
| WA3JYS(Jan.) | 32 | 238 | 209 | 23 | 502 |
| WA0VAS(Dec.) | 118 | 641 | 41 | 600 | 1400 |
| W8ZHN(Dec.) | 27 | 313 | 277 | 17 | 634 |
| K0CSE(Dec.) | 28 | 261 | 282 | 2 | 573 |

BPL for 100 or more originations-plus-deliveries

| | | | | | |
|--------|-----|--------|-----|--------------|------|
| KLBCS | 199 | WA3RCI | 110 | K3CR | 100 |
| WA0YVT | 169 | WB0HOX | 109 | W9MFG | 100 |
| WA8AUX | 165 | WN0HTR | 108 | WA0DCI(Jan.) | 218 |
| W3TN | 134 | WA2RYD | 106 | K0ZSQ(Jan.) | 214 |
| W5TI | 127 | WN0GVR | 105 | WB4HIS(Jan.) | 1193 |
| WB4AJL | 125 | WA0MLE | 105 | WA0YVT(Jan.) | 1149 |
| WN0FSL | 122 | WB5FML | 104 | WB4AJL(Jan.) | 1133 |
| WB5EJN | 121 | WB9AHJ | 103 | WA0TFC(Jan.) | 1102 |
| K7NTS | 115 | WB2ADW | 102 | WA0YVT(Dec.) | 1155 |
| WB1BX | 111 | WA0TFC | 102 | W0BUCI(Dec.) | 125 |
| | | | | K0GNI(Dec.) | 105 |

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: K2VGD, K4SCL, WB4WCM, W4SMCR, K0AEM, WA0SUB, W0YYX, VESUH.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their S.M. 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.

Forty Section Emergency Coordinator's reports were received for the month of February. Reports listed 11,242 AREC members, down from Feb. '72's total of 12,571. Sections reported: Alta, Ariz, Conn, Del, ENY, Ind, Iowa, Kans, Ky, Mar, Mich, Minn, Miss, Mont, Nebr, Nev, NFla, NNJ, NTex, Ohio, Okla, Org, Ore, SV, SDgo, SJV, SBar, SCV, Sask, SDak, SFla, STex, Tenn, Utah, Va, Wash, WV, WMass, WNY, WPa.

Traffic Talk

Does this sound familiar: "Message number seven routine WA3XEE no check Zonksville..." or "HR NR 7 R WA3XEE XX ZONKSVILLE..."? The problem is in the check, or rather the lack of a check. The check is NOT optional; it is just as much a part of the preamble as the number, precedence, station of origin, place of origin and date.

What does it mean when the originator doesn't use a check (and "check double x-ray" is NOT a check!)? It may mean that the operator is not familiar with message format. Or, maybe the originator doesn't know how to count the words in the text. Another reason, perhaps the most common, is that the operator doesn't "bother" with the check. The first two reasons can be dispelled by studying the appropriate pages in the booklet, *Operating an Amateur Radio Station*. The latter is a matter of operator principles.

Okay, so why bother with a check? Well, the check should serve as a check for the receiving station to quickly spot whether or not he has the entire text. The "sharp" operator will be writing the text in groups of five or ten words to a line. A glance at the end of the message transmission will indicate whether or not he has recorded the complete text. If not, a check with the transmitting station will supply the missing words (or occasionally point out that the sender skipped a word or two when transmitting the message). The

check also indicates to the receiving operator how many words the message he is about to copy will contain.

Here are a few reminders regarding the check. The check is the count of words, numbers, mixed or coded groups (letters and numbers in the same "word", e.g. 6DQSB is 1 "word"), and punctuation. (Punctuation as such is not recommended in messages; it is usually less confusing to spell out the punctuation.) In both voice and cw operation, spacing between words or groups should be deliberate and methodical. If you disagree with the check, query the sending station. If the check is still different from the originator's check, then note the change, but leave the original check in the preamble (e.g. 14/13). DON'T WASTE TIME ARGUING OVER THE CHECK OR HOW TO COUNT THE CHECK!

QTB is a useful signal in confirming the check. However, it is frequently used incorrectly. QTB as a question simply means "Do you agree with my counting of words?". As a statement QTB means "I do not agree with your counting of words; I will repeat the first letter or digit of each word or group." It does *not* mean "You repeat the first letter or digit of each word or group." i.e. it is not a request. A small point but one which may lead to confusion. On voice use the appropriate words, not Q-signals (of course!).

Remember, the check is not optional. It's a mini-insurance policy. Don't deprive the receiving station of the opportunity to check to see if he has the message complete and accurate. Don't dispense with the courtesy of letting the receiving station know the "size" of the message he is about to receive. Do use a REAL check. - WA1FCM

National Traffic System

The Continental Traffic Net, the pinnacle of the Daytime National Traffic System, began operation in mid-March on a Monday-Wednesday-Friday schedule. At this writing, plans call for daily operation beginning April 1. CTN meets on 14,313 kHz at 1830Z. K7IFG is net manager with WA8MCR assistant manager for the Eastern Area. No assistant manager for the Central Area has yet been appointed.

Most daytime region nets in the Eastern and Pacific Areas have begun operations and are providing the liaisons on the Continental Traffic Net. The daytime region net managers appointed as of March 15 are: First Region - W1YNE, Second - WA2RYD, Third - WA3QOZ, Fourth - WB4PNY, Sixth - W6INH, Seventh - W7AXT, Eighth - W8CHT (8RN Mgr.), Twelfth - WA0SIG. Presently we are completely void of leadership personnel in the Central Area (Fifth, Ninth and Tenth Regions). C'mon guys (and gals) how about a little support.

February Reports. All three Area nets reported 100% representation in Feb. EB! But...CAN reports lowest Feb. traffic total since 1956. W6BNX congratulates W7BQ for 11 years as PAN NCS on Sunday nights. W2FR sez considering traffic being way down from last Feb. and rotten band conditions, the 2RN gang did a terrific job. Initial 2RN certificates have been earned by WA2s AYC CAM CLB PJL and WB2CHY. 4RN certificates were issued to WB4OZL, K0PIV/4 and WA0YDJ/4. K0BAD/4 reports RN5 continues to run smoothly. The SET inspired several new stations to report into RN5 regularly. W7GHT is filling in for RN7's W7KZ who is sunning in Arizona. 9RN certificates have been earned by W9s

EI MUC, K9HYV, WB9JTK. W0LRN submits his first report as TWN Mgr.

| Net | Sessions | Traffic | Rate | Avg. | %Rep. |
|-----------------------|----------|---------|-------|------|-------|
| EAN | 28 | 1550 | 1.240 | 55.4 | 100.0 |
| CAN | 28 | 1110 | 1.106 | 39.6 | 100.0 |
| PAN | 28 | 945 | .975 | 33.8 | 100.0 |
| 1RN | 56 | 533 | .401 | 9.5 | 96.4 |
| 2RN | 56 | 591 | .756 | 10.6 | 99.3 |
| 3RN | 56 | 460 | .500 | 8.2 | 98.3 |
| 4RN | 52 | 628 | .515 | 12.1 | 91.8 |
| RN5 | 56 | 924 | .538 | 16.5 | 96.4 |
| RN6 | 56 | 593 | .467 | 10.6 | 100.0 |
| RN7 | 56 | 290 | .285 | 5.2 | 54.8 |
| 8RN(E) | 55 | 445 | .373 | 8.1 | 80.4 |
| 8RN(D) | 27 | 78 | .185 | 2.8 | 78.6 |
| 9RN | 55 | 566 | .598 | 10.2 | 95.5 |
| TEN | 56 | 520 | .570 | 9.5 | 89.2 |
| ECN | 56 | 212 | .284 | 3.8 | 94.1 |
| TWN | 56 | 475 | .305 | 8.5 | 81.1 |
| TCC Eastern | 1121 | 683 | | | |
| TCC Central | 831 | 501 | | | |
| TCC Pacific | 1121 | 703 | | | |
| Sections ² | 3168 | 14133 | | | |
| Summary | 3945 | 25940 | EAN | 6.5 | |
| Record | 3059 | 34238 | 1.767 | 24.3 | |

¹TCC functions not counted as net sessions.

²Section and local nets reporting (98): AFSN (AB); MTN (MB); WQ-V/UHF (PQ); GBN OPN ODN (ON); SA FN (SK); AENB AEND AENM AENO AENR AENT (AL); ALEN (AZ); OZK (AR); IEN NCN SCN (CA); CCN (CO); UN CPN Nutmeg-VHF (CT); DEPN DTN (DL); EAST FMTN GN NFPN QFN QFTN TPTN VEN (FL); GA-SSB GSN (GA); IMN (ID, MT); ILN (IL); QIN (IN); TLLCN (IA); KPN KSPN KSWX QKS QKS-SS (KS); KRN KTN KYN MKPN (KY); MDCTN MDD MEPN (MD-DC); EMN EMPN EM2MN WMN (MA); MNN QMN (MI); MJN MSPN PAW (MN); MSBN MTN (MS); ICA N MSN WEN (MO); MTN (MT); WNN (NE); NIN NJPN (NJ); NLI NLS NYCLI-VHF NYS (NY); CNCTN (NC); NDN (ND); BN BNR OSSBN (OH); OLZ (OK); OSN (OR); EPA PTN WPA (PA); SDN (SD); TN TNN (TN); TEX TTN (TX); BUN UCN (UT); VRN VSRN VSN (VA); MSN WSN (WA); WVPN (WV); BEN WIN WSSN (WI).

Transcontinental Corps.

W2FR is kept busy overseeing TCC-Eastern in addition to 2RN in the absence of W3EML. A TCC-Pacific certificate has been issued to K7NHL.

| Area | Functions% Successful | Traffic | Out-of-Net Traffic | |
|---------|-----------------------|---------|--------------------|------|
| Eastern | 112 | 94.6 | 1834 | 683 |
| Central | 83 | 89.2 | 1034 | 501 |
| Pacific | 112 | 93.8 | 1412 | 703 |
| Summary | 307 | 93.2 | 4280 | 1887 |

The TCC roster (Feb.): Eastern Area (W3EML, Dir.) - W1s BJG EIJ NJM QYY YNE, W2s FR GKZ, WA2s CNE ELD ICU UWA, W3s CB EML, K3MVO, WA3OGM, W4s SQQ UQ, K4s FAC KNP, WB4s OMG SGV, W8s IBX PMJ VDA/4, K8KMO, WA8PIM. Central Area (K0AEM, Dir.) - W4OGG, WB4s KPE YCV, W5s MI QU SBM TNT, WB5FDP, W9s CXY DND YB, W0s HI INH ZHN, K0DDA, WA0IAW. Pacific Area (K5MAT, Dir.) - W5RE, K5MAT, W6s BGF FOI IPW MLF RSY VNO VZT, WA6DEI, WB6VKV, W7s BQ DZX EKB EM GHT KZ PI, K7NHL, W0LQ, K0OTH, WB0AXW.

Independent Net Reports (February)

| Net | Sessions | Traffic | Check-ins |
|--------------------------|----------|---------|-----------|
| North American Traffic | 24 | 240 | 309 |
| Mike Farad | 24 | 88 | 241 |
| 7290 Traffic | 40 | 504 | 2137 |
| YL | 4 | 28 | 18 |
| 20 Meter Interstate Tfc. | 21 | 1330 | 312 |
| Clearing House | 24 | 252 | 382 |
| Ohio Valley Teenage | 28 | 102 | 335 |
| 75 Meter Interstate SSB | 28 | 389 | 1527 |
| New York Region RTTY | 27 | 57 | 186 |
| IMRA | 37 | 466 | 1308 |

Hamfest Calendar

| MAY | | | | | | | | | | | |
|------|----|----|----|----|----|----|---|---|---|---|---|
| 1973 | | | | | | | | | | | |
| S | M | T | W | T | F | S | S | S | S | S | S |
| | | 1 | 2 | 3 | 4 | 5 | | | | | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | | | | | |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | | | |
| 27 | 28 | 29 | 30 | 31 | | | | | | | |

Alabama — "Birminghamfest" is May 5-6, State Fairgrounds. Contact WB4PJU for info.

California — The Fresno Amateur Radio Club's 31st annual hamfest is May 4-6 at the Sheraton Inn, formerly the Hacienda. Friday registration is 4-8 PM. Choral Room "Champagne" get-together is 6-8 PM. Saturday equipment displays, transmitter hunts 2 and 75 m., tech talks, SSTV, ladies luncheon and tour, MARS, WCARS, swap tables, code proficiency, explore fm. Sunday breakfast meetings. Motel reservations direct Sheraton Inn, 2515 N. Parkway Dr., Fresno CA 93705. Singles \$13, doubles \$15, twins \$17. Hamfest registration \$10.50 before April 27, later, \$11.50. Write FARC-HF, PO Box 783, Fresno CA 93712.

California — The 1973 West Coast VHF/UHF Conference is May 5-6 at the Pene Quill Motor Hotel, 3501 Sepulveda, Manhattan Beach, Calif. Sessions, noise-figure contest, swap shop. W7JNK and W1HDQ ARRL speakers. Registration \$2. Write: West Coast VHF/UHF Conference, PO Box 2473, Palos Verdes Peninsula CA 90274.

Florida — The St. Petersburg Amateur Radio Club's annual hamfest is Sunday, May 6 at Lake Maggiore in St. Pete. Address inquiries to Dorothy Patterson, St. Petersburg Amateur Radio Club, PO Box 4026, St. Petersburg FL.

Illinois — The Starved Rock Radio Club's annual hamfest is at the La Salle County 4-H home and picnic area southwest of Ottawa on June 3. Advance registration until May 25, \$1.50; at the gate \$2. Free coffee and doughnuts 10-10:30 AM. Food available and ample parking. Follow big, yellow "Hamfest" signs on Rt. 71 from south end of Illinois River bridge at Ottawa. For further details, write, G.E. Keith, W9QLZ/W9MKS, RFD No. 1, Box 171, Oglesby IL 61348.

Indiana — The Madison County Amateur Radio Club's annual Spring hamfest is Sunday, May 6, 10 to 5 PM. The location is 4 miles north of Anderson (West of State Rd. No. 9) at the Madison County Civil Defense Bldg. (old Linwood School). Talk-in 146.94 and 146.22/146.82 MHz fm and 3.92 MHz ssb. Plenty of refreshments; all are welcome.

Indiana — The Fifth Annual Wabash Amateur Radio Club hamfest is Sunday, May 20, at the Wabash 4-H Fairgrounds. Food available, flea market, technical sessions, bingo for the XYLS. Camping is available the night before at the fairgrounds. Call in on 52.525, 146.940 and 28/88. Admission \$1 at the gate. Write to Bob Mitting, 663 N. Spring St., Wabash IN 46992.

Indiana — The Delaware Amateur Radio Association Annual Hamfest is Sunday, June 3, at Prairie Creek Reservoir, southeast of Muncie. For further details, contact Gilbert T. Rager, W9BZI, 1407 May Avenue, Muncie, IN 47302.

Kansas — The Central Kansas ARC's annual hamfest is Sunday June 3 at the 4-H Complex, Kenwood Park, Salina. For early arrivals there is a dinner Saturday evening. Registration starts Sunday at 9 AM with a program of interest to OM, YL, XYL and harmonic. Covered-dish lunch with beverages supplied by the club. Talk-in on 146.34-94, and 3920 kHz. For info write WN0DEQ, William Peck, 1028 W. Ash, Salina KS 67401.

Louisiana — The Baton Rouge Amateur Radio Club's annual hamfest is at Father Colbert's Camp on May 5-6. Women's activities, RC model airplanes, Novice activities, banquet Saturday night and dinner Sunday. Camper facilities available. For tickets write: BRARC Inc. Hamfest Committee, PO Box 53194, Baton Rouge LA.

Maryland — The Gaithersburg Swapfest is Sunday, May 20, at the Gaithersburg Civic Center, located on South Summerset Ave., next to the U.S. Post Office. Talk-in is on .52, .94 and .04/.64. For info call Larry, W3ZPO, at 948-9029 or write to MARC, PO Box 611, Gaithersburg MD 20760.

Maryland — The Maryland Mobileers hamfest is Sunday, May 20, at Anne Arundel Community College, 6 miles north of Annapolis, on College Pkwy. which branches off Maryland Rt. 2. Registration \$1, at the gate \$2. Ample parking, refreshments, exhibits, games. Talk-in starting at 0800 on 146.94, 146.10/70 and 146.16/76. For info write Larry Sheets, WA8FTK/3, Rt. 4, T-63, Crestwood Trailer Park, Severn MD 21144.

Michigan — Wexauke Amateur Radio Club's 13th Annual Swap n' Shop and Eyeball QSO is at the National Guard Armory in Cadillac, on May 5. Doors open at 9 AM. More info from PO Box 386, Cadillac MI 49601.

Michigan — The Huron Valley Amateur Radio Asso.'s 7th annual Swap n' Shop is Sunday May 27 at the Saline Country Fairgrounds, Saline. Sales in the car, if rain bldg. available. Donations \$1.25 or \$1 advance. Contact Terry Marsh, 702 Stanley, Ypsilanti MI 48197. (Tel. 313-482-9577).

New Jersey — The Delaware Radio Asso. auction and flea market is Sunday, May 20 at the VFW Post 7293, Green Lane, Trenton NJ. Talk-in 145.200 g-m, 146.520 m simplex.

New York — The 40th annual Western New York hamfest and VHF Conference is May 11-13. Activities Fri. night at the Rowntowner Motor Inn, Hamfest Hdqtrs. Saturday's programs include speakers, MARS, AREC, QCWA, general interest and vhf meetings, YL fashion show and largest flea market in the NE. Location — Monroe County Fairgrounds, Rt. 15A, near Thruway exit 46. Advance registration \$3 with banquet \$7 by May 5. For tickets and info write — WNY Hamfest, Box 1388, Rochester NY 14603.

New York — The Long Island Mobile Amateur Radio Club's annual flea market is at the New York Institute of Technology, Rt. 25A and Whitney Lane, Old Westbury on Sunday, June 3 from noon to 6 PM. Admission \$1 for buyers, \$2 for sellers. Refreshments available. Call in on WA2PDJ, .25/.85 or .52 and .94 simplex.

New York — The Rome Radio Club's 21st Ham Family Day is Sunday, June 3 at Beck's Grove, 10 miles west of Rome. Complete program for all ages, tech talks, contests, equip. displays, ladies and children fun programs, meetings, flea market. Registration at 11 AM and ends with (all you can eat) steak and chicken dinner served at 5 PM. Advance registration — adults \$5.75; children under 12, \$2, under 6 free; at gate \$-50 more. (W/o dinner adults \$2.) Reservations to Rome RC, PO Box 721, Rome NY 13440.

Pennsylvania — The Presque Isle Amateur Radio Club hamfest is May 19, at 7 PM at the Sunflower Club, Metz St., Erie PA.

Pennsylvania — The 19th annual Breeze Shooters hamfest is Sunday, May 20 at White Swan Park (Pkwy. West, 4 miles east of the Greater Pittsburg Airport). No fees; parking is free. Tables and swap n' shop are available. Amusement park for your family's enjoyment. Check-in on 29.0 MHz and 146.94. For info write Herb Heller, W3OFL, 2873 Beachwood Blvd., Pittsburg PA 15217.

South Carolina — The Blue Ridge Radio Society Hamfest is Sunday, May 6. For details, contact Jeannie Roberts, 131 Wilshire Dr., Greenville SC 29609.

Tennessee — The annual Humboldt ARC hamfest is Sunday, May 20, at Shady Acres City Park, Trenton. Flea market, ladies activities and a play-

ground for the children. For info write Ed Holmes, W4IGW, 501 N. 18th Ave., Humboldt TN 38343.

Tennessee - The Greater Knoxville hamfest/flea market is May 26-7 at the Jacobs Administration Bldg., Chilhowee Park Fairgrounds, Knoxville. Camping, family activities and baby-sitting. For info write - Sue Van Eps, WB4LSK, Secretary, PO Box 10453, Knoxville TN 37919.

Texas - The 3rd annual Picnic of the 7290 Traffic Net is May 18-20 at the Bastrop State Park. Bring your own food. Space for campers and small trailers; cabins are already reserved. For info on other accommodations and details write William W. Biehunko, 1508 East Warren, Victoria TX 77901.

West Virginia - The Tri-State Amateur Radio Asso. hamfest is Sunday June 3, from 11:30 AM to 4:30 PM. For info write John N. Norris, PO Box 1295, Huntington WV.

VIRGINIA STATE CONVENTION

Vinton May 27, 1973

The Roanoke Valley Amateur Radio Club invites you to attend the 1973 ARRL Virginia State Convention at the Vinton War Memorial in Vinton on Sunday, May 27. The War Memorial is located on Washington Avenue (old route 24) near downtown Vinton. Talk-in monitoring will be maintained on 146.34/94 fm. Roanoke Division Director Vic Clark, W4KFC, and other League officials will be in attendance. Several technical sessions are planned, one of which will concern the current Oscar program. Plenty of free space for the flea market and manufacturers displays. Registration is \$2 per person or \$5 for three. Write to ARRL Convention, c/o Earl Wood, 120 Noble Avenue N.E., Roanoke, Virginia 24014 for further information.

FLORIDA STATE CONVENTION

Orlando June 2-3, 1973

The ARRL Florida State Convention/Orlando Hamfest will be held at Orlando Exposition Park on June 2-3, 1973 in booming Central Florida's recreational and attractions center. Convention activities will be highlighted by an address by Harry Dannals, W2TUK, President of ARRL. Other activities will consist of technical discussions, organizational meetings and other ARRL related business. Orlando will also be the kick-off location for the first Southeastern FM Convention, with representatives from many repeater organizations signifying their intention to participate. Technical sessions are planned for the two day activity, and guest speakers known to the fm fraternity will be announced at a later date.

The Convention will be located in downtown Orlando and will be totally enclosed with 25,000 square feet of exhibition and swapfest area available to various manufacturers and distributors of ham gear and components. Other features will be an "old-time" radio display by a member of the Antique Wireless Association. There will be large QCWA, OOTC, and MARS groups activities included in the overall program.

For the visiting ham and his family, the area presents a great array of attractions including Disney World and Cape Kennedy, with Atlantic

COMING ARRL CONVENTIONS

May 27 - Virginia State, Vinton.

June 2-3 - Florida State, Orlando.

June 9-10 - Georgia State, Atlanta, Georgia.

June 30-July 1 - Rocky Mountain Division, Cheyenne, Wyoming.

June 30-July 1 - West Virginia State, Jackson's Mill.

September 14-16 - Roanoke Division, Reston, Virginia.

September 29-30 - New England Division, Hyannis, Massachusetts.

October 5-6-7 - Midwest Division, Lincoln, Nebraska.

October 13-14 - Pacific Division, Santa Cruz, California.

October 20-21 - Southwestern Division, Burbank, California.

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.

and Gulf beaches nearby. Excellent motels/hotels with 16,000 accommodations available, all types of restaurants, family to exotic. Orlando A.R.C. expects this year's activity to be the biggest and best yet. Make reservations early - address inquiries for accommodations to: "Hamfest" - Orlando Chamber of Commerce Convention Dept., P.O. Box 1913, Orlando, FL 32802. Advance registration is one dollar - includes the whole family. Address: Orlando ARC, 8024 Charlin Pkwy., Orlando, FL 32807.

GEORGIA STATE CONVENTION

Atlanta June 9-10, 1973

The Atlanta Radio Club, in conjunction with the Georgia Council of Amateur Radio Societies, invites you to the 1973 ARRL Georgia State Convention/45th Annual Atlanta Hamfest. Activities start Saturday morning, 9:00 AM at Lenox Square, with an informal parking lot QSO and refreshments, followed by transmitter hunts and ARRL meeting conducted by Division Director Larry Price, W4DQD, and other League officials. Fm technical forum hosted by a member of the ARRL Hq. staff, and a banquet and entertainment at the Rodeway Inn, Lenox Square, Saturday evening. Sunday is highlighted by displays and manufacturers representatives. MARS meeting and FCC exams at 9:00 AM sharp. Free bus tour of Atlanta for the ladies and children. Ample covered parking for the South's largest flea market. Motel, banquet and hamfest all conveniently located at Lenox Square. For further information write: W4BTW, Atlanta Radio Club, P.O. Box 11555, Atlanta GA 30305 or call 404-252-4311.

QST

Happenings of the Month

LEAGUE OPPOSES FEE INCREASES: ASKS TEST CREDITS AND RENEWAL NOTICE

In its response to Docket 19658, FCC's proposal to raise virtually all filing and grant fees, ARRL opposes any increase in the amateur fees, however modest, and offers statistics showing that the growth in numbers of amateur radio licensees leveled off at the time fees were first imposed in 1964, and the number of licensees declined following the 1970 increases. The paper further contends that the Commission already gets more money from the amateur service than it spends on us; and that services to amateurs should be increased before there are any further increases in fees.

Finally, the League requests amendment of Section 1.1115 (c) in the administrative portion of the FCC rules so as to add to this list of exemptions any amateur application for re-examination within 12 months, and requests automatic notice of license expiration. The text follows:

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

In the Matter of
Amendment of Subpart G,
Part I, of the Commission's Docket 19658
Rules Relating to Fees
To The Commission

OPPOSITION TO PROPOSED FEE INCREASES

The American Radio Relay League, Incorporated, a non-profit corporation organized under the laws of the State of Connecticut and having as voting members approximately 85,000 amateur radio operators licensed by the Federal Communications Commission, hereby (1) opposes the increase in fees for certain applications in the Amateur Radio Service proposed by the Notice of Proposed Rule Making released December 27, 1972 (37 FR 28574, FCC 72-1140), (2) requests that Section 1.1115 (c) of the rules be amended to

provide for (a) examination and reexamination in certain circumstances without requiring the payment of more than one fee, and (b) credit upon reexamination for examination elements passed during an unsuccessful examination for an amateur radio operator license¹, and (3) requests the establishment of a license expiration notice service.

In support whereof, the following is respectfully submitted:

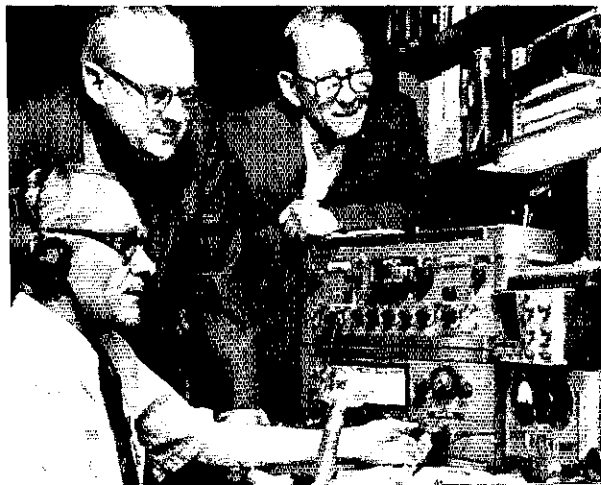
1. The Amateur Radio Service is the only non-commercial radio service required to pay fees to the Commission. All other non-commercial services are exempt.^{2,3} The League has consistently objected to this unfair, discriminatory and burdensome practice and policy, and has had suggestions and requests for slightly modified requirements for examination and reexamination summarily rejected even though the examination load on the Radio Inspectors of the Commission's Field Engineering Bureau would be reduced and substantial savings would be achieved. If the fees are increased, the Amateur Radio Service in general and the individual amateur in particular should receive more for the money in keeping with the often stated policies of President Nixon and his Administration in their fight against inflation.

2. The statutory authority under which fees are imposed by the Commission directs that fees be "fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy, or interest served, and any other pertinent facts***."⁴ In refusing to set aside the original fee schedule for the Amateur Radio Service, the United States Court of Appeals for the Seventh Circuit⁵ recognized the public service aspects of amateur radio and noted that the Commission had "set the fee at a minimum so as not to interfere with the purpose of the Communications Act [citing Section 303 (g)] to encourage and enlarge the use of radio by amateurs in the public interest." The Court gave the Commission reasonable discretion in determining what weight should be placed on each of the factors.

3. The League's fear, first expressed in its objections to the original fee proposal involving the Amateur Radio Service issued in 1962 (Docket No. 14507, 27 F.R. 1729), that the imposition of fees would retard the growth of amateur radio, has proven to have been well founded.⁶ Fees first were

¹This and other footnote references are found at the end of this item.

Three QST cover plaques have come to rest in Owensboro, Kentucky — the three winning authors are (seated) J.W. Rush, W4EWL, a 1966 awardee; William J. Lattin, W4JRW, who wrote, "Antenna Traps of Spiral Delay Line," for the November, 1972, issue; and a 1969 winner, J. A. Bryant, W4UX. (Messenger and Inquirer photo by Bickwermert)



Puerto Rico's amateur radio week was March 18-24. After the formal proclamation was signed, this photo was taken. From left: Jesus Figueroa, KP4CQM; the Hon. Victor M. Pons, Secretary of State for the Commonwealth of Puerto Rico; Juan S. Sepulveda, KP4QM, president of the Radio Club de Puerto Rico; and Roberto Gorbea, KP4AEF.



paid in 1964. The Commission's records show the following:

| 6/30 | Total Ops | Novices (no fee) | Subject to fees | Change fm 1965 |
|------|-----------|------------------|-----------------|----------------|
| 1962 | 230,459 | N/A | None | - |
| 1963 | 247,603 | N/A | None | - |
| 1964 | 256,237 | 16,365* | 239,872 | - |
| 1965 | 258,881 | 15,452* | 243,429 | - |
| 1966 | 257,836 | 13,853 | 243,983 | +0.23% |
| 1967 | 257,935 | 11,605 | 246,330 | +1.19% |
| 1968 | 260,294 | 14,224 | 246,070 | +1.07% |
| 1969 | 260,052 | 18,700 | 241,352 | -0.85% |
| 1970 | 265,146 | 22,895 | 242,251 | -0.48% |
| 1971 | 267,690 | 24,964 | 242,726 | -0.29% |
| 1972 | 265,752 | 25,326 | 240,426 | -1.23% |

*Approximate

The increase in fees over the last nine years has far exceeded the cost of administering the Amateur Radio Service and the rate of inflation:

| | 1964 | 1970 | Incr. | Proposed | Incr. |
|------------------------------|------|------|-------|----------|-------|
| Initial license, new & renew | \$4 | \$9 | +125% | \$10 | +150% |
| Mod, no renew | 2 | 4 | +100% | 5 | +150% |
| Mod & renew | 2 | 9 | +125% | 10 | +150% |
| Spec call | 20 | 25 | +20% | 25 | +20% |

The only valid conclusions to be drawn from these figures are that the fees imposed in 1964 caused a halt in the growth of amateur radio and the increase in fees in 1970 produced a significant decline which, in all probability, will continue at an increased rate under the proposed fee schedule.

4. The League long has contended that the fees collected from amateurs far exceed the actual cost of administering the Amateur Radio Service, even when basic administrative and overhead costs of the Commission are considered. This contention finally has been proven correct by the recent testimony of the Chairman of the Commission, Dean Burch, and the Chief of the Safety & Special Radio Services Bureau, James E. Barr, before a subcommittee of the House of Representatives considering the Commission's budget for fiscal year 1974. Mr. Barr is reported to have testified that the fee paying services of his Bureau, which includes the Amateur & Citizens Radio Division, already contribute "more than their share" in fee revenues. Chairman Burch is reported to have testified that the Safety & Special Radio Services Bureau already collects enough in fees to cover 54 new positions in the Bureau which had been stricken from the Commission's budget request by the Office of

Management and Budget.⁷ The tremendous tribute already exacted from the amateurs and the commercial services administered by the Safety & Special Radio Services Bureau becomes even more significant when it is remembered that every one of the fee-exempt services listed in footnote 2, above, are administered by that Bureau.

5. The fee schedule does not represent the actual burden imposed upon a substantial percentage of amateurs, particularly those seeking to upgrade or advance to a higher class of license in response to the Commission's incentive licensing program. A single fee of \$9.00 or \$10.00 is most substantial to many youngsters seeking to become radio amateurs and to tens of thousands of retired persons who keep young by engaging in amateur radio. Unfortunately, far more than a single \$9.00 payment must be made by many seeking a grade of license above the Novice Class because a high percentage fail the examination, sometimes as many as two or three times. The full fee must be paid each time.⁸ The cost of obtaining a General or higher class of license often involves more than just the application fee because a high percentage of applicants must travel substantial distances just to have the opportunity to pay a fee for an examination he has only a 50% chance of passing. But that is not all! If an amateur desires to advance to a higher class under the incentive licensing program, the same procedure must be followed and the same expenses incurred at least one more time. Finally, if the Commission abandons or limits the term of the Conditional Class, which Commission spokesmen have reported as being under consideration,



Sylvan High Amateur Radio Club officers went to the top, and secured proclamation of amateur radio week in Georgia June 17-23, 1973 from Governor Jimmy Carter. Looking on: SHARC vice president Charles Chapman WB4UIH (left) and president Gordon Gibby, WB4MWC. SHARC is asking other clubs in the state to help them "celebrate" by holding an amateur radio exhibition of some type during the Week.



Commissioner Robert E. Lee of FCC was in Cleveland recently, where he consented to an interview by Eunice Bernon, KBONA, columnist for the *Cleveland Plain Dealer*. When asked about proposals for Citizens Radio on 220 MHz, the commissioner said: "I would not favor doing anything that would at all disaccommodate the ham operators. . . . The ham operator is our most responsible licensee. . . . They are very proud of what they have and what they do. . . . They are self-policing. . . . If they have serious objection, they'll probably find me in their corner." While discussing Docket 19555 on environmental protection, Mr. Lee said, "Tell the amateurs we're not going to let anyone take their licenses away from them — not our best people!" Later the commissioner also mentioned favorably the amateur phone patching he had observed at 4U11TU, and also expressed an interest in having an amateur license himself. Finally: amateur radio is "probably the only service where I couldn't suggest any improvement!" (*Tnx, KBONA, for the tape; WA8QFK, for the pix!*)

some 30,000 amateurs may require reexamination.

6. Even if the fees are not increased as proposed, the amateurs are entitled to far more service than the Commission now is providing. Even though the output in rule making matters has increased considerably in the last few months, dozens of rulemaking petitions are awaiting action. At least 1,000 highly technical and complex applications for VHF and UHF repeaters must be processed within the next few months in compliance with new rules recently adopted in Docket No. 18803. Examinations need revising to reflect recent rule changes and new techniques. More frequent examinations at readily accessible locations are urgently required.⁹ Protection of the amateur bands from intruders operating in violation of international regulations and treaties becomes increasingly important.¹⁰ These and other services should be improved before new financial burdens are loaded upon the amateurs.

7. One of the most frequent complaints to the League is the manner in which Commission-conducted examinations are administered. When an applicant passes the code examination but later fails the written examination, he should receive credit for the code element if he seeks reexamination within the next twelve months. Such a procedure will reduce the work load upon the Commission employee-examiner. The savings to the Commission by following such a procedure will justify the elimination of an entirely new fee for reexamination within the next twelve month

period. A simple, fool-proof receipt or certificate can be given at the time the code examination is passed to be surrendered when reexamination on the written elements is requested. FCC Form 610, as revised in April 1971, makes possible almost immediate adoption of this proposal. The allowance of credit for having passed some elements of an examination would do much to reduce the cost of entering and advancing in the ranks of the Amateur Radio Service, might halt the decline in the number of amateurs, and remove at least some of the burden of the present excessively high fees. Suggested wording of an amendment of Section 1.1115 (c) is attached as Appendix A.

8. The Commission long has followed the practice of notifying licensees in some services of the necessity of filing an application for renewal of license shortly before the expiration of the license period. Data processing techniques make possible the mailing of preprinted renewal applications which merely require a signature and fee payment if no substantial changes have occurred. Such a service, similar to that now provided by most states in renewing vehicle and driver licenses, would save the Commission many thousands of dollars each year and would be much appreciated by every one of the more than 265,000 amateur operator and station licensees who now must keep track of expiration dates. Such new services would do much to make the already excessive license fees more acceptable throughout the amateur fraternity.

9. It is respectfully submitted that, in imposing the present fee schedule upon the Amateur Radio Service in 1970, the Commission failed to adhere to the guidelines specified by the Congress, which require that fees be "fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy, or interest served, and any other pertinent facts . . ." (See paragraph 2, above). Any increase in fees, such as that now proposed, without increasing the services rendered by the Commission to the Amateur Radio Service would deviate even farther from the guidelines.

Wherefore, the premises considered, the Commission is respectfully requested to (1) withdraw the proposed increase in fees for the Amateur Radio Service, (2) adopt the amendment to Section 1.1115 (c) proposed herein, and (3) establish a license expiration notice and renewal service for the Amateur Radio Service.

Respectfully submitted,
THE AMERICAN RADIO RELAY LEAGUE,
INCORPORATED

By Robert M. Booth, Jr.
Its General Counsel

March 14, 1973

SUGGESTED AMENDMENT TO SECTION 1.1115 (c)

(9) Applications for reexamination in the Amateur Service provided reexamination is held within 12 months, or the next scheduled date thereafter in the same general area, following denial of an application for the same class of license for failure to pass examination. Reexamination for elements passed in such earlier examination shall not be required.

¹ Suggested wording of the amended section is set forth in Appendix A.

² Section 1.1115 (c) of the Rules exempts from the payment of fees applications in "the

Here is a facsimile of the brass plate dedicated on February 5 and affixed to a shipboard radio display at the Dossin Great Lakes Museum, Detroit. The display was assembled, checked for authenticity and installed by the late Ralph P. Thetreau, W8FX, long ARRL SCM for the Michigan section. A dedicated League supporter, Tate left a large portion of his estate to ARRL as well. (Photo courtesy of K8DYI)

Police, Fire, Forestry-Conservation, Highway Maintenance, Local Government, and State Guard Radio Services"; Section 1.1115 (c) (2) exempts "applications filed by governmental entities in any of the Safety and Special Radio Services"; Section 1.1115 (c) (3) exempts applications "in the Special Emergency Radio Service; Hospitals, Disaster Relief Organizations, Beach Patrols, School Buses, and non-profit Ambulance Operators and Rescue Organizations"; Section 1.1115 (c) (4) exempts applications in the Disaster Communications Service; Section 1.1115 (c) (5) exempts applications for ship inspections; Section 1.1115 (c) (6) exempts applications for "Novice Class license in the Amateur Radio Service, applications for amateur stations under military auspices, and applications filed in the Radio Amateur Civil Emergency Services (RACES); Section 1.1115 (c) (7) exempts "Operational Fixed Microwave Applications filed for Closed Circuit Educational Television Service"; and Section 1.1115 (c) (8) exempts applications for "Civil Air Patrol Stations, Aeronautical Radio-navigation Stations and for Aeronautical Search and Rescue Stations."

³The Citizens Radio Service is essentially a commercial service.

⁴From Title I of the Independent Offices Appropriation Act of 1952 (31 U.S.C. 483 (a)).

⁵*Aeronautical Radio, Inc., et al v. United States and FCC*, 335 F. 2d 304 (1964), cert. denied 379 U.S. 966 (1965).

⁶In its Report and Order, 34 FCC 811, by which fees first were imposed, the Commission said as follows with respect to comments filed in Docket No. 14507: "In view of the comments which were filed, we believe the two areas in which the proposed fees may possibly discourage the larger and more effective use of radio are in the field of amateur radio and the experimental use of frequencies." (Emphasis supplied) Unfortunately, the Commission's recognition of the possible adverse impact on amateur radio soon was forgotten.

⁷OMB is reported to have vetoed the Commission's request for 54 new positions in the Safety & Special Radio Services Bureau, which administers the amateur service; 69 new positions in the Field Engineering Bureau, which conducts amateur license examinations, monitors the amateur bands, and investigates interference complaints; and 42 new positions in research, planning and spectrum management, which are of vital concern to the amateur service.

⁸The present practice of the Commission in not allowing credit during reexamination for elements passed in an earlier unsuccessful examination simply makes additional work for the employee-examiner and is another example of unnecessary expense.

⁹The League once again urges most thorough consideration of use of retired Commission personnel, amateurs retained on a consulting basis as temporary Commission employees, and Civil Service personnel for administering examinations.

¹⁰The 7 MHz amateur band is a horrible example of such operation. This comment is not intended to be critical of the excellent work of the Commission in recent years in attempting to remove intruders from the amateur bands.



NEW PETITIONS FOR RULEMAKING

Several petitions for rulemaking have been filed by individuals in the past several weeks which ask FCC to change the amateur rules. These are only requests: They may be summarily denied by FCC without notice or hearing. However, if FCC finds merit in any of them, it may issue a Notice of Proposed Rulemaking. (NRPM) officially suggesting changes. A period of time - usually 90 days - must follow an NRPM during which all interested parties may comment before the rules can actually be altered.

Comment can be offered by others at the request stage, too, although the time for filing formal comment here is only 30 days, which will have been passed before you read these words. Nevertheless "informal" comments on these requests may still be offered to FCC, and may help them to determine whether a petition should be denied or should advance to the NPRM stage. Address the Amateur and Citizens Radio Division, FCC, Washington, DC, and be sure to include the RM number so they know to which petition your comment applies.

RM-2133, recorded by FCC on February 2; filed by Frederick J. Hagen, WA6GLD; asks that 1 x 3 calls (e.g., W6XYZ) be made available to Extra Class licensees who do not presently qualify for 1 x 2 (W6XY) calls because their first license was issued less than 25 years ago.

RM-2148, received at the Commission February 12; from Robert R. Rule, WA7EGK; seeks amendment of section 97.41 (f) (1) so that maps on a scale of 1:250,000 can be used for repeater license applications regardless of the contour interval; presently, the rule requires contour intervals of 50 feet. (The maps are used in determining height above average terrain, which in turn affects the effective radiated power to be permitted to a repeater station.)

RM-2149, recorded February 26; filed by Melvin R. Wardean, K6QXE; requests that Technician Class licensees be permitted to use A1 on the frequencies 21.1-21.2 and 28.1-28.2 MHz with not more than 75 watts dc power input to the final stage.

(Continued on page 103)

FCC Examination Schedule

For the convenience of those planning to take an FCC examination for General, Advanced, or Extra Class license, we present below a tentative schedule of dates and places. (Applicants for Novice, Technician, or Conditional Class licenses should follow procedures outlined in Chapter 5 of the *Radio Amateur's License Manual*.)

No advance notice is required of the applicant, except as noted. Of course, no tests are administered on national holidays. Additional examination points are listed after the office schedule in most districts; at such places, appointments should be made during the month previous through the district engineer. He will probably ask that the completed form 610 and check or money order for \$9 be filed in advance. An applicant may appear at any FCC examination point regardless of where he lives.

1 Boston, Mass. 02109; India & State Streets; Thurs.-Fri., 9-11 A.M. Exams with code test, Friday only. Also conducts examinations at Bangor, Me. in May; Hartford, Conn. in March and Sept.; Portland, Me. in Apr. and Oct.

2 New York, N.Y. 10014; 641 Washington Street; Tues.-Thurs., 9-12 A.M. Also conducts examinations at Albany, N.Y. in Mar., June, Sept., and Dec.

3 Philadelphia, Penn. 19106; 2nd & Chestnut Streets; without code test, Mon.-Wed., 10-12 A.M.; with code test, Tues.-Wed., 8-9 A.M.

4 Baltimore, Md. 21201; 819 Geo. M. Fallon Federal Bldg., 31 Hopkins Plaza; Mon. and Fri., 8:30 A.M.

5 Norfolk, Va. 23502; Military Circle, 870 North Military Highway; Thurs., 9 A.M. Also conducts examinations at Salem, Va. in Apr. & Oct.; Wilmington, N.C. in June & Dec.; Winston-Salem, N.C. in Feb., May, Aug., and Nov.

6 Atlanta, Ga. 30303; 1602 Gas Light Tower, 235 Peachtree Street, N.E.; Tues. and Fri., 8:30 A.M. Also conducts examinations at Nashville, Tenn. in Feb., May, Aug., and Nov.; Memphis, Tenn. in Jan., Apr., July, and Oct.; Knoxville, Tenn. in Mar., June, Sept., and Dec.; Birmingham, Ala. in Mar., June, Sept., and Dec.

6S Savannah, Ga. 31402; York & Bull St., P.O. Box 8004, by appointment one week in advance only.

7 Miami, Fla. 33130; 51 S. W. First Avenue. Exams with code test, Thurs. 9 A.M.; others, Tues., Wed., 8 A.M. - 1 P.M. Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33606; 500 Zack Street; by appointment made one week in advance only.

8 New Orleans, La. 70130; 600 South Street; with code, Tues., 8:30 A.M., others, Tues.-Wed., 8:30-12 A.M. Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug., and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; call Monday for appointment.

9 Houston, Texas 77002; 515 Rusk Avenue; without code, Fri. 9 A.M. to noon; with code, Thurs., 8-9 A.M. Also conducts examinations at San Antonio, Texas in Feb., May, Aug., and Nov.; at Corpus Christi, Texas in Mar., June, Sept., and Dec.

9B Beaumont, Texas 77701; 300 Willow Street; by appointment one week in advance only.

10 Dallas, Texas 75202; Rm 13E7, Federal Bldg., 1100 Commerce St. Tues. 8-12 A.M. Also conducts examinations at El Paso, Texas in Feb. and Aug.; Lubbock, Texas in Feb. and Aug.; Oklahoma City and Tulsa, Okla. in Jan., Apr., July, and Oct.

11 Los Angeles, Calif. 90012; Rm 1754; 312 N. Spring St.; Wed. 9 A.M. and 1 P.M. Also conducts examinations at Bakersfield, Calif. in May; Las Vegas, Nev. in Jan. and July; Phoenix, Ariz. in Jan., Apr., July, and Oct.; Tucson, Ariz. in Apr. and Oct.

11SD San Diego, Calif. 92101; 1245 Seventh Avenue; by appointment one week in advance only.

12 San Francisco, Calif. 94111; 555 Battery Street; Fri., Extra & Advanced, (no code) 8:30 A.M.; General and Advanced (with code) 10 A.M. Also conducts examinations at Fresno, Calif. in Mar., June, Sept., and Dec.

13 Portland, Ore. 97204; 319 S.W. Pine St.; Fri. 8:45 A.M. Also conducts examinations at Boise, Idaho in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 909 1st Avenue; Fri. 8:45 A.M. Also conducts examinations at Billings, Mont. in Apr; Helena, Mont. in Apr. and Oct.; Spokane, Wash. in Apr. and Oct.

15 Denver, Colo. 80202; 19th Street between California and Stout Streets; 1st and 2nd Wed. 8 A.M. Also conducts examinations at Albuquerque, N. Mex. in Apr. and Oct.; Rapid City, S. Dak. in May; Salt Lake City, Utah in Mar., June, Sept., and Dec.

16 St. Paul, Minn. 55101; 4th and Robert Streets; Fri., 8:45 A.M. Also conducts examinations at Jamestown, N. Dak. in Oct.; Marquette, Mich. in May; Sioux Falls, S. Dak. in Mar., June, Sept., and Dec.

17 Kansas City, Mo. 64106; 601 E. 12th St.; Thurs., 1 P.M. Also conducts examinations at Des Moines, Iowa in Mar., June, Sept., and Dec.; Omaha, Nebr. in Jan., Apr., July, and Oct.; St. Louis, Mo. in Feb., May, Aug., and Nov.; Wichita, Kans. in Mar. and Sept.

18 Chicago, Ill. 60604; 219 South Dearborn Street; Fri., 9 A.M. Also conducts examinations at Davenport, Iowa in Jan., Apr., July, and Oct.; Fort Wayne, Ind. in Feb., May, Aug., and Nov.; Indianapolis, Ind. in Feb., May, Aug., and Nov.; Louisville, Ky. in Feb., May, Aug., and Nov.; Milwaukee, Wis. in Jan., Apr., July, and Oct.

19 Detroit, Mich. 48226; Washington Blvd. & Lafayette Street; Wed. and Fri., 9 A.M. Also conducts examinations at Charleston, W. Va. in Mar., June, Sept., and Dec.; Cincinnati, Ohio in Feb., May, Aug., and Nov.; Cleveland, Ohio in Mar., June, Sept., and Dec.; Columbus, Ohio in Jan., Apr., July, and Oct.; Grand Rapids, Mich., in Jan., Apr., July, and Oct.

20 Buffalo, N.Y. 14203; 905 Federal Bldg., 111 West Huron St.; Fri., 9 A.M.; for groups of 8 or more, by appointment. Also conducts examinations at Pittsburgh, Penna. in Feb., May, Aug., and Nov.; Syracuse, N.Y. in Jan., Apr., July, and Oct.; Williamsport, Penna. in Mar., June, Sept., and Dec.

21 Honolulu, Hawaii 96808; 502 Federal Building; Wed., 8 A.M. and by appointment. Also conducts examinations at Hilo in Sept., Lihue, Kauai in Oct.; Wailuku, Maui in Sept.

22 San Juan, P.R. 00903; 322 U.S. Post Office and Courthouse, P.O. Box 2987; Fri., 9 A.M.

23 Anchorage, Alaska 99501; Rm G-63, U.S. Post Office Bldg., 4th & G Streets; P.O. Box 644; Mon.-Fri., by appointment only. Also conducts examinations at Fairbanks, Juneau, and Ketchikan in Apr. and Oct.

24 Washington, D.C. 20554; 1919 M Street, N.W.; Fri. 9:00 A.M. and 10:30 A.M.

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

REPORT FROM CHINA

In October, 1972, Dr. Edmund C. Casey, W8DWJ, president of the National Medical Association, headed a delegation of ten members of the organization to the People's Republic of China. Dr. Casey's 15-day visit covered more than 3,000 miles within China and included visits to the major population centers of Kwang Chow, Shanghai, Peking and Chang Sho. With some persistence, Dr. Casey was able to obtain information on the status of amateur radio within the People's Republic and brought back some interesting impressions of its possible future.

Dr. Casey's efforts to learn about amateur radio in China first bore fruit in Shanghai, where he visited the radio section of the leading department store. In his words: "I talked with the leading salesman and communicated well with him about amateur radio. He refused to acknowledge any such activity, but understood very well what my call represents and what amateur radio is and how it functions. He was so knowledgeable about radio receivers, transmitters and television that it was certain that he indeed knew much about amateur radio and its operation.

"In Peking, the answers to all of the concerns about radio operators came suddenly. The year 1949 marked the end of the revolution . . . Operations of amateur radio stations gradually decreased until 1952, when the last station went off the air . . . The return of amateur radio operation is contemplated and probably will be restarted in about five years, according to one member of the leading revolutionary committee in Peking.

"To help the amateur's cause in the People's Republic of China, an ARRL *License Manual*, *Handbook*, and *How to Become a Radio Amateur*

were left with the leading member of the Revolutionary Committee of the China International Travel Service. This organization has assured me that the presents will be turned over to the proper authorities."

U.S. - JORDAN THIRD PARTY AGREEMENT

The United States and the Hashemite Kingdom of Jordan have entered into an agreement to authorize the exchange of messages of behalf of third parties by radio amateurs in the two countries. As with all such agreements, only messages that are of a character that would not normally be sent by any existing (commercial) means of electrical communication, or except for the availability of the amateur stations, are authorized. In addition, under the agreement amateurs may handle, in emergencies, traffic relating to the safety of life or property.

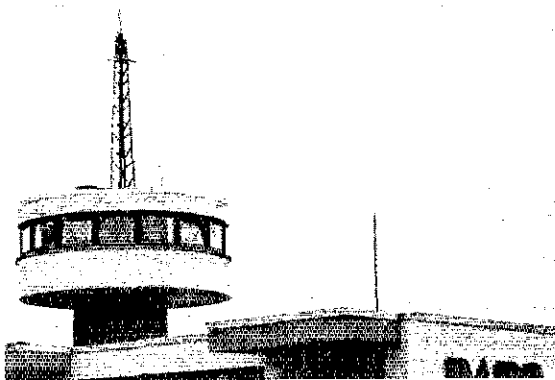
A complete list of countries with which similar agreements have been concluded by the U.S. and Canada appears on page 85 of April *QST*.

U.S. - FIJI RECIPROCAL OPERATING AGREEMENT

The United States and the Pacific island nation of Fiji have concluded a reciprocal agreement under which radio amateurs who are citizens of one country may obtain permission to operate in the other. Operation from the island by U.S. amateurs was previously covered by the reciprocal agreement between the U.S. and the United Kingdom, but the recently-realized independence of Fiji necessitated a new agreement.

Details on obtaining permission to operate in Fiji may be obtained from: Secretary for Posts and Telecommunications, P.O. Box 40, Suva, Fiji. **QST**

The new headquarters of the *Deutscher Amateur Radio Club* in Baunatal, Germany was officially opened last October 28. Its facilities include a penthouse hamshack and an automated sorting system for the QSL bureau. (r) Ulf Kluge, DJ1BQ, is the newly-elected Secretary of *DARC*.





Correspondence From Members -

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

PROPER RESPONSE

● W0CD states his belief on page 77 of your March issue that "The FCC is supposed to be responsive to the Congress of the U.S., not the ITU. . . ." The International Telecommunication Union is constituted of those countries which either are or become a party to the International Telecommunication Convention.

The Congress wrote into law that the FCC can revoke the license of any party violating any provision of any treaty or convention binding on the United States. Section 303 (m) (1) (A), Communications Act of 1934, as amended and with emphasis supplied. Pretty strong legislation, that! Then does it really make sense for W0CD to say that the FCC, contrary to Congressional legislation, should not be responsive to the ITU? — Francis K. Williams, K4GTS, Washington, DC

WC1MAR

● I visited the special amateur station WC1MAR at Wellfleet and wanted to tell what a favorable impression their whole set-up made. Of course they had to use auxiliary power, but their efficient temporary antennas plus the superb location (picked by Marconi) helped in making contacts.

I think the best part of all was the obvious sincerity and interest on the part of WIHWM and others heading it up, together with the surprisingly young operating staff.

Certainly their treatment of the many visitors will give a needed public relations boost for amateur radio.

They were intrigued to learn that I work as a radiotelegraph operator at present day WCC, the descendent of the original Marconi station. — Robert B. Leech, K1ZZU, North Chatham, MA

50TH EDITION HANDBOOK

● You've done it again! The new *Handbook* is a masterpiece. It's been great to see this publication continue its reputation over the years, yet the contents certainly have undergone changes. I recently picked up an old 1940 edition I had tucked away and the contrast was pretty startling. — George R. Wood, W1SR, Needham Heights, MA

● My compliments on a very well done *Handbook*. The section on vhf and uhf along with the section on repeaters comprise a most useful reference work. — John Pakustich, WB6KVF, San Pedro, CA

● I recently bought the 1973 *Handbook* and found it generally clear and complete as usual, with several new items of interest to me. It is the best source I know of for a good deal of practical knowledge about radio communication. — Thomas J. Murray, Madison, WI

● The mention in League Lines of the 50th edition of *The Radio Amateur's Handbook* brings

to mind an observation that I wonder if many others share.

For more years than I like to admit, a pleasant way to kill some idle time has been to browse thru the shelves in the used book stores.

Of the over four million copies that have been printed, I have yet to find a single copy on the shelves of these stores.

I would say that this is a silent testimony to the *Handbook* and to those that put it together. — Fred Gussman, W6OAR, Oroville, CA

● You are to be congratulated for continuing the fine tradition of providing the technical world with a reliable and up-to-date reference, all for the ridiculously low price of \$4.50. The *Handbook* is at home whether it is found on our laboratory work benches or in our home workshops. We use it regularly and though we can't predict what the next fifty years will bring to our hobby, it's a cinch that the *Handbook* will still be around. Larry Houghton, K8ZVF, Chief Engineer, Communications, Heath Company, Benton Harbor, MI

BELL RINGER

● Dave Bell's article is the funniest thing I've ever seen in *QST*. It is a perfect description of two meter fm in Southern California and should be published in all of the fm society journals and recited on all of the repeaters. If nothing else, fm provides a repository for all of the riff-raff of amateur radio that might have been spread out on other bands and in different modes, not that they don't have their fair share too. Long live J.A. Pan! — Eric Lundstrom, WB6CVR, San Diego, CA

● W6BVN's article was excellent! I, too, thought 2-meter fm would be the ideal mode for mobile until I found out it consisted of a few gentlemen surrounded by a lot of intolerant, rude, sophomoric newcomers!!! And they talk about crusty OTs on 75 fone! The result? I sold my rig (oops, "radio"!). — R. W. Hammond, K6SGQ, Long Beach, CA

● After reading W6BVN's article, it was painfully obvious that he had seen only one small side of two-meter fm and not a very good side at that.

First of all, Mr. Bell's introduction to fm occurred in California which is not the best, though not necessarily the worst, place to begin. As Mr. Bell says: The acknowledgement of an unfamiliar voice is rare . . . and this is too bad. Luckily, however, this is only a phenomenon occurring in the California area where one would think there is a master plan to close two-meter fm to all but the chosen few.

Next Mr. Bell degrades the use of "10" calls. Though they are popular with the 11-meter set, and rarely used on the east coast, they do serve a purpose. Anyhow, what's really the difference between 73, QTH, QRZ, etc., and ten-four, ten-eight, and ten-ten?

Now, as to Mr. Bell's main dilemma - repeaters. It appears as though he "timed-out" a repeater. In any case, timers are put on repeaters because of FCC regulations and so that a single 3-minute transmission, usually attempted by hard-core, twenty-meter sideband devotees, cannot occur.

Mr. Bell says: "Veteran two-meter fimers don't volunteer their names." He also advises against using phonetics on calls and making station identification as ambiguous as possible. Well, here again we have the California syndrome at work. As a veteran two-meter fimer (4 years plus), I've found NO evidence that fimers withhold their names, are resistive to using phonetics, or deliberately slur their calls. There may not be a wide spread use of phonetics on fm simply due to the inherent "broadcast" quality where such use is almost unnecessary.

In sum, I resent Mr. Bell's biased portrayal of fimers. Hopefully my oppositely biased opinions will offset most of his negativism and readers of both articles will get a better balanced, a more truthful picture of two-meter fimers and their repeaters. - R. W. Perry, WA2CGA/WA2MRQ, W2CVT Trustee, Fishkill, NY

● Dave Bell's comments on closed repeaters and quick talk QSOs seem appropriate for the East coast as well. In spite of the negative aspects of fm, I'm glad that W6BVN recognizes the good it does for club membership. Our group has tripled the attendance since including 2-meter fm in its AREC nets. - Don Huber, WB2UKA, Huntington, NY

● We don't care how many 2-meter buffs send in letters to complain about Dave Bell's "New on Two" article. We don't even care about the bunch of guys out on top of that crazy mountain trying to build a repeater for K2CC. We think Mr. Bell hit the nail right on the head, and we couldn't have said it better or funnier ourselves! - Larry S. Kaufman, WA2MOR, James A. Penna, WB2LJT, Clarkson College, Potsdam, NY

PHONE DXCC

● I protest!!! I protest!!!

Discontinuance of the DXCC Phone Award can only be akin to blasphemy. A plague on the DX Advisory Committee!!!

I know which side of the microphone to bark into and I also know how to wiggle that funny gadget that makes dots and dashes, so for 10 years it has been my great pleasure to pursue BOTH awards.

Discontinuance indeed - may the din of a thousand screaming phone men rest on your frequencies!!! - Wm. B. Shepherd, W3ZSR, Bowie, MD

● I note that the League is proposing to discontinue the Phone DXCC Award. This is to advise you that I, as a member of ARRL, oppose such action.

Even as a relatively new amateur it is obvious to me that it is considerably more difficult to work one hundred countries on phone than it is on cw.

I urge that action be taken to rescind the plan to abolish the Phone DXCC Award. - S. T. Del Corso, Maj. Gen. Ret., WB8GBU, Worthington, OH

● I hear that you are about to drop the Phone DXCC award. I know that you will get a lot of flak on this - but I most heartily approve! Since I left Iowa and KØHGB, I have been off the air until 20 months ago, a 5 year layoff. Since I have returned to the DX wars, I have been appalled by rampant, blatant illegal power levels. I have arrived

at the conclusion that this has been encouraged by ssb DXing. Many ssb DXers I know bend or totally break the kW input - before they add speech processing. I know no cw oriented DXers that run multi-kWs.

I realize that dropping Phone DXCC is not going to change all this, but at least it's a start in the right direction - and I am pleased for that.

Now if you could establish a cw only DXCC - hi. - Bob Locher Jr., W9KNI, Deerfield, IL

WR1AAA

● We filed a repeater directory card with you recently, but since then, effective March 1, 1973, our new call has been assigned - WR1AAA.

We are very pleased to have been issued this prestigious first call in the first district.

Information received during Lew McCoy's talk at the NERA meeting in Hartford on February 17 was a great source of good information. WR1AAA is a small 40-watt local repeater, with local control.

Melvin H. Dunbrack, WIBHD (WR1AAA), Malden, MA

QSL BUREAU

● Enjoyed reading the article on Bureaus. It worked: I've gotten quite a few envelopes from guys who are first time users of the Bureau. Some have even made reference to the article. I really wish, however, that all amateurs would pay attention to envelope size: less than 10% of the envelopes I have here are 5 x 8, despite a standing request of several years for that size. Any suggestions, huh? - Phil Rowley, KØZFL, KØ, WAØ, WBØ, WNØ, QSL Manager, Alamosa, CO

● I found that the recent article by Troster in QST re the bureau has helped tremendously. It spawned an inflow of envelopes from long-timers in the dead card files. The result is a better Bureau, less in the files and happier hams, we trust. Several wrote me, indicating that a reading of that article was an awakening for them.

Hams in general could more efficiently utilize this free service. When they fail to comply with standard, requested, well-promulgated procedures, the result is a delay in service to them. As an example, if an envelope has no call letters in the upper left-hand corner, I would have to put them there myself - but not at the moment. The envelope would go in a separate box to wait until I had time to take care of it. The thought was those who had properly prepared envelopes should not have to endure a longer wait; that if someone had to, let it be the "offender." - Kenneth F. Isbell, W5QMJ, former W5 QSL Manager, Enid, OK

PACEMAKER INTERFERENCE

● About the article "Danger! When You Transmit You Can Turn Off a Pacemaker," how well I know this. My first pacemaker was implanted June 3, 1968. I called the people of Medtronic, Inc. in Minneapolis. They said keep one hand on your pulse and turn on your transmitter to see if it stops - it did not. On Feb. 5, 1970, I had to have another one implanted. When I came home from the hospital about 3 weeks later, I started to run the Navy MARS net, to take traffic. I turned on my transmitter, and it felt like I was sinking in a hole. It so happened the Indiana Navy MARS Coordinator was on the net and sensed I was in trouble, told me to secure the net, and called the police. It took about 6 minutes to come to my senses.

At the present time I have my fifth pacemaker, but Dr. S. A. Sanchez, K5FYF is right in his article - it can kill. - *Vernon B. Swigert Sr., K9YBZ, Indianapolis, IN*

● I am particularly interested in Dr. Sanchez's article on heart pacemakers in March *QST*, as we are also investigating the pacemaker interference problem . . . We have been concerned primarily with the effects of fm and TV broadcast stations although some preliminary tests have been made using six-meter and two-meter amateur mobile transmitters. Our studies are still in progress. - *Robert W. Vreeland, W6YBT, Electronics Engineer, Research and Development Laboratory, University of California, San Francisco Medical Center, San Francisco, CA*

● I was very taken aback after reading "Danger! When You Transmit You Can Turn Off a Pacemaker." As a manufacturer and distributor of implantable cardiac pacemakers, this over-exaggerated warning is not valid. The separation of knowledge between physician and engineer is always a problem, usually two years worth.

The information in this article concerning causes of interference were obsolete over three years ago. Pacemakers or pulse generators, as they are referred to, now have sophisticated sensing circuits and most of the manufacturers are now utilizing the titanium cases.

The only source of interference other than very rare isolated cases, (approximately 70 per 9,000,000 pacemakers out in the field) is densifying due to a strong radar transmitter or electro-magnetic field such as those used in a scrap metal yard. Certain older models of electro-surgical machines have caused the problem. Shavers, mowers and a-c motors do not interfere.

A radio transmitter operating within the amateur legal limit would not cause a demand pacemaker to shut down even if the code speed were 60 to 70 pulses per minute. Most demand pacemakers that are manufactured, upon coming in contact with interference, will divert to a continuous mode and not shut down. - *Joel H. Kornreich, W2OBV, President, Cardiotronics, Inc., North Arlington, NJ*

UNSUITED?

● Received March *QST* this date. Ref. front cover. Since when did *QST* a magazine devoted to amateur radio start modeling "Pants Suits"? - *Jim Simmons, W6WH, San Diego, CA*

REPEATER PLEA

● Our repeater, WA3KXF, operating with a 146.01 MHz input, is experiencing increasing interference from users of the Oscar satellite. We have recently experienced strong interference from cw and sss directly on our input frequency.

We understand that the nominal input frequency range of Oscar is 145.90 to 146.00 MHz, but that stations using high power are capable of accessing Oscar at frequencies up to 146.07 MHz. As you know, fm repeaters are in operation all over the Northeast U.S. using inputs at 146.01, 146.04, and 146.07 MHz. It therefore appears that friction is developing between the space communications effort of Amsat and the terrestrial communications efforts of many 2-meter fm operators.

For ourselves, we request that Oscar users avoid our repeater input channel and allow us a guard-band of ± 10 kHz (146.00 to 146.02 MHz). Other

repeater operators would undoubtedly desire the same courtesy. Because repeater operations are now legally limited to 146.00 MHz and above, we believe that Oscar users should restrict their operations to the usable frequencies below 146 MHz.

We ask your co-operation in solving this interference problem. - *Alan B. Caplan, K4AVQ/3, Secretary SERCOM (CD), Lancaster, PA*

HELPING HAMS

● Congratulations to WA5YRL for his ad on page 154 of February *QST*. Any ham who will take a 3-month trip on his own just to provide free help to handicapped amateurs, as Phillip Rosenstein is apparently doing this summer, is something more than "ok" in my book. May his trip be busy and fruitful; may he make many lasting friendships, and may the rest of us, who sometimes see only the differences among hams, know that there are some among us who rise above the petty squabbles to provide real service to their fellows. - *David C. Goodfellow, K7BKX, Renton, WA*

ON THE BEAM

● I just finished reading March *QST* and found it to be most interesting, including the article on page 22 entitled "Tips on Ten" by Edward P. Tilton, W1HDQ.

Anyone who thinks there is no chatter on ten meters should monitor the crowded DX on eleven meters, then switch the coax to the cw rig and have a ball. A \$20 investment in a nasty ole' "CB" rig can keep you informed as to when the ten meter band is open. If you haven't tried QRP power, especially on a beam, there is a real surprise awaiting you. - *Lonnie Strebeck, WN5EQX, Houston, TX*

VERSATILITY

● The answer to OM W2OHF's quandary (February *QST* Correspondence) is obvious. As an amateur active in most phases of ham radio, including contests, nets, DXing and ragchewing, both phone and cw, the problem to me is simply non-existent. Both the ARRL Sweepstakes and the CQ DX contest which the writer complained about do not occupy the "whole amateur spectrum." For one thing, the cw contest is not on the same weekend as the phone contest for either of these operating events. Thus, at least half the spectrum is available either weekend for non-contest operation. Further, non-contest operation is relatively simple to accomplish on the ten-meter band during the heat of any contest, to say nothing of six of two meters. Also, depending on the time of the day, there are always segments of any band quite usable for non-contest purposes for any distance.

To explain more simply, the answer to OM Coote's problem can be given with one word . . . VERSATILITY. - *Dick Pitzeruse, K2KTK, SCM, Western New York, Syracuse, NY*

CHALLENGING OPPORTUNITY

● My husband, who has an Extra Class license and 17 years of experience as a ham radio operator, finds the articles in *QST* interesting and stimulating. I have been licensed almost 3 years and generally find most of the technical articles a "little over my head." However, I feel that one of the best things about amateur radio is its challenges and opportunities for growth. I sincerely feel that *QST* should continue its high standards for

technical articles and I should take advantage of the background material offered in the other League publications to help me reach the level needed to understand the new ideas presented in *QST*. - (Mrs.) Judith Fox, WBSAYK/6, Riverside, CA

ALARMED

● I must confess that I was more than a little alarmed to read American Airlines Capt. Charles G. Vess' letter in February *QST*. Capt. Vess, while I'm sure very right in his pursuit of those revealing airline/FAA communications to unauthorized sources, nevertheless seems most willing to accept press information that one guilty party was a ham. While I have no special reason to doubt the press, I am most familiar with its tendency to label all persons possessing even an SW-3 as a "radio ham." KSDNH is quite correct in his statement that our public relations needs improvement, but I'm not at all sure that the way to achieve this is to malign our group - even by inference. Communications via radio are available to anyone possessing the necessary equipment, unless scrambled in some manner. Logically, therefore, any number of people might have heard the conversation to which Capt. Vess refers, and quickly revealed its contents to the nearest ears. The violation of the law has little to do with the label of the offender, but care should be exercised before we blithely convict one of our own. We've enough trouble keeping our white hats clean as it is. - Harry F. Landon, WØJGL, Castle Rock, CO

OUTDATED PRACTICE?

● With concern being expressed about clear frequencies for amateur traffic activity it may be appropriate to generally re-evaluate this practice so many amateurs are involved in.

It's difficult to justify the amateur traffic being passed on nets today in view of the economical and reliable commercial alternatives.

Times have changed since amateur message handling was born and the ARRL was founded. Today, it would seem that amateur traffic efforts should be preparatory in nature for local, area, or regional service when power and telephone lines are down. The amateur's unique service is to provide communications only to the nearest point where the commercial communications network remains operative.

Emergency power for the amateur is a *must* in this type of traffic work, the only kind I believe can be justified today. All the practice "clearing the frequency" for those important "informals" and QNCs with big rigs powered from commercial mains just doesn't count in a real emergency. Amateur practice or FCC order would seem to guarantee a clear frequency for legitimate emergency or priority traffic.

A committee including hams not associated with traffic nets, amateurs with expertise in commercial communications, and, indeed, perhaps some non-amateurs might well be formed to make a general study of the demand for our "product" in the 1970's. The Amateur Service doesn't depend on the needs of yesterday to justify itself. It will be to our credit to recognize this and streamline our message service to the possible demands of today. - Bob Rooney, W2AET/W2QCI, Fulton, NY

EDITOR'S NOTE: For the opposite view see WINJM's remarks under "traffic handling" on pages 70-71 of March *QST*.

Happenings

(Continued from page 97)

RM-2150, on the record February 28; submitted by Walter A. Schroeder, WB2EXK/KB6DC; seeks to reallocate the amateur subbands presently reserved for higher-class amateur licensees; to change amateur power limitations to output rather than input; to provide new subband allocations and mode designations in the 1800-2000 kHz band.

RM-2151, filed March 1, 1973; by Robert D. May, K2GCL; asks that repeater input, output and separation frequencies be established in the rules (e.g., on two meters he seeks 146.00-146.40 MHz for repeater inputs, 146.40-146.60 for simplex, 146.60-147.40 for repeater outputs, 147.40-147.60 for simplex and 147.60-148 for repeater inputs, with 600 kHz separation between input and output on a repeater - already the voluntary custom in most of the U.S.)

RM-2154, received at FCC March 12; sought by Robert E. Lord as coordinator for Fort Worth and Tarrant County Civil Defense; looks toward amendment of the RACES rules, subpart F of Part 97, so that frequencies available on the vhf and uhf bands in Civil Defense will coincide with standard amateur practice and regulations. (Currently, for instance, a RACES repeater might transmit on 145.65 MHz; it could not be used except during drills and emergencies.)

REVOCATIONS AND SUSPENSIONS

The station license of Walter P. Shreiner, WA6KFN, of Sacramento, California, was revoked effective March 15, 1973 by FCC. The licensee was found to have repeatedly violated Section 1.89 of the rules by failing to respond to official communications.

The General Class operator license of Paul Horvitz, WA6IAF, of Palo Alto, California was suspended for a period of one year effective September 10, 1972. It was found that the licensee, on December 16 and 17, 1971, in association with General Class Amateur licensee Steven E. Louton, WA6GJK, willfully and maliciously interfered with or caused interference to, radiocommunications or signals of other radio stations, in violation of Section 303(m) (1) (F) of the Communications Act of 1934, as amended, and Section 97.125 of the Commission's Rules. It was additionally found that on the same dates, the above-named licensee, in association with WA6GJK, transmitted unidentified communications in violation of Section 97.123.

In connection with the preceding case, the Commission also suspended the General Class operator license of Steven E. Louton, WA6GJK, of Redding, California for a period of one year, effective February 23, 1973. The licensee was found to have committed the same violations as WA6IAF. QST

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

FM REPEATER NEWS

At press time, the FCC has issued several more repeater calls. The list now includes WR1AAA, WR1AAB, WR2AAA, WR4AAA, WR6AAA, WR6AAB, WR7AAA, WR9AAA, WR9AAB, and WR9AAC. Some were issued for direct, manned control, also for wire control, and a few for radio remote control. FCC regards many repeater groups as "over-filing," in that they include information not required. For example, no circuit diagrams are required with the filing, yet many applications are loaded with such information. The rule here is to keep your applications as simple as possible, but furnish the basic information required.

In order to help repeater applicants, ARRL recently mailed out a bulletin on "how to license" to all repeaters that are registered in the ARRL Repeater Directory. There are still a few copies available; so if you need the information, please let us know.

Several repeater owners have filed simple applications for direct-manned control repeaters, with no remote control. The idea is that they would quickly get an early call and then ask the FCC for modification of that license to fit a remotely-controlled repeater. It should be pointed out that prior notification must be made to the FCC for any significant changes in a repeater license. They then must wait for FCC approval before making the changes. With the heavy backlog of applications, one shouldn't expect to get quick action for any modification. April 30th was the shut-off date for any existing repeater installation. This means that any of these manned, direct control repeater installations have only until July 1 to obtain desired modifications. After that date, they must conform to the type of repeater their license calls for or shut down operations.

Telephone Control

We have had several letters from amateurs concerned over the telephone control system shown in March *QST*. The general theme of letters suggests possible violation of phone tariffs by making direct connections to the phone line. The important point is that every repeater owner or group planning to use telephone control should check with the local company on how to couple properly to the phone lines. We have found that local companies have different requirements and the only safe procedure is to check before making connections to the line. — *WTCP*



Proudly displaying repeater call number 1, WR9AAA, are W9OKM (left) and K9PRB.



We couldn't show the picture of all the members at this radio meeting. Why? There are too many, because this is the largest club in the east, with over 400 active members. We are talking about the Northern Virginia FM Assoc. Inc. that runs CARS (Capitol Area Repeater Station, 146.31/146.91). From left to right, Bud, K4ASU, treasurer; Don, WB4QAX, President Emeritus; Charlie, W4YEB, director; John, K4GGY, President; Bob, W4GPD, director; and Tom, K4LHB, vice president.

QST for



CONDUCTED BY BILL SMITH,* W7JNK

*Doppler Anomaly on Oscar 6
435-MHz Beacon*

CHRISTIAN JOHANN DOPPLER, an Austrian, in 1842 wrote the first paper on what became known as the Doppler Effect. Having to do with the apparent change in frequency of sound emanating from a body moving toward or away from an observer, the principle has also been applied to the frequency of a transmitter in a satellite, as observed from the earth. In fact, the Doppler effect is widely used in the study of earth satellites.

But two Minneapolis amateurs, John Fox, WØLER, and Ron Dunbar, WØMJS, have noted an anomaly in the Doppler effect, as observed on the frequency of the 435-MHz beacon signal from Oscar 6. Their findings have interested scientific and space officials, none of whom has any entirely satisfactory explanation, as yet. At my request, WØLER and WØMJS prepared a preliminary report, summarized below, while their study continues and interest in scientific circles increases.

The "normal" Doppler frequency shift of a signal arriving on earth from a satellite is in the high-frequency direction as the satellite approaches the observer, the divergence from "true" frequency gradually decreasing until the satellite reaches the point of closest approach (PCA), when the frequency then appears to be that actually transmitted. Then as the satellite recedes the frequency decreases. Maximum change occurs when the satellite is moving directly toward, or away from, the observer.

This behavior had been observed on all satellites monitored by the Minneapolis amateurs previously, but for certain orbits of Oscar 6 the 435-MHz telemetry beacon has exhibited "inverted" Doppler. On north-bound passes crossing the equator between 49 and 105 degrees west longitude, the Doppler frequency shift appeared to be inverted, from time of acquisition until 8 minutes of

*Send reports and correspondence to Bill Smith, W7JNK, ARRL, 225 Main St., Newington CT 06111.

1215-MHz STANDING

| | | | | | | | |
|---------|----|---|-----|--------|---|---|-----|
| KIPXE | 7 | 4 | 500 | W5LDV | 1 | 1 | 290 |
| K9AQP/1 | 7 | 3 | 300 | K5PUF | 1 | 1 | 290 |
| WA2LTM | 12 | 6 | 770 | W5AJG | 1 | 1 | 235 |
| W2OMS | 8 | 5 | 537 | K5LLL | 1 | 1 | 235 |
| K2UYH | 8 | 5 | 520 | W5HPT | 1 | 1 | 235 |
| K2JNG | 8 | 4 | 305 | W8YIO | 5 | 4 | 551 |
| WA2VTR | 6 | 4 | 330 | W9JIV | 4 | 3 | 300 |
| K2YCO | 3 | 2 | 350 | W9WCD | 3 | 3 | 770 |
| K3IUV | 7 | 4 | 320 | WA9HUV | 3 | 2 | 220 |
| K15FF/3 | 7 | 4 | 260 | W9JTP | 3 | 2 | 165 |
| K4QIF | 6 | 4 | 551 | VE2HW | 1 | 1 | 260 |
| K4NTD | 2 | 1 | 350 | | | | |
| W4VHH | 2 | 1 | 350 | | | | |

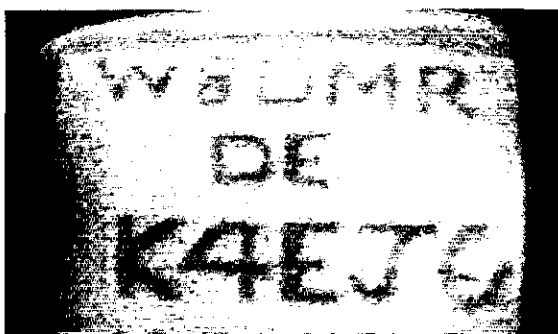
Listing revised April, 1973.

orbital time north of the equator. At this point the satellite was 23.5 degrees north, or at the Tropic of Cancer.

First observation of this effect was made Oct. 24, 1972, during orbit 118. WØLER, first to note it, was the only observer in the Minneapolis area at the time, and he thought the shift in the "wrong" direction (up-shift) might be due to drift in his receiver. A check of the receiving system showed no malfunction, but passes later the same night did not exhibit the up-shift effect. It was observed the following evening, however, and John measured the amount and duration. The upward movement was approximately 450 Hz, and it lasted about 7 minutes. John then contacted WØMJS, who had been observing the two-to-ten meter repeater, and enlisted his help with the 435-MHz tracking.

After three weeks of observations it was found that the inverted Doppler was confined to north-bound passes crossing the equator in a "window" between 60 and 90 degrees west longitude. Because of the slow eastward drift of the orbits, more time was needed to determine the exact boundaries. It was found that the inverted Doppler always ended approximately 8 minutes after the equator crossing, and only on north-bound passes. South-bound (daytime) passes revealed only normal

W8DMR received this picture from K4EJQ over a 250-mile path November 9 concluding six months of schedules using standard fast scan ATV on 436 MHz.



Doppler shift (downward), even as the satellite crossed the equator in the area that produced the inverted Doppler on north-bound (evening) passes.

Long-term observation revealed that the inverted-Doppler window extended from 50 to 105 degrees west longitude. The fact that the inverted Doppler ended at about 8 minutes time north of the equator helps to explain why the effect was not noted east of 50 degrees — an equatorial crossing at 50 degrees places acquisition time at Minneapolis more than 8 minutes after the crossing, with the satellite north of 23.5 degrees north latitude. Disappearance of the inverted Doppler effect beyond 105 degrees west longitude is still unexplained, as the satellite would still be within range (at 23.5 north) for equator crossings as far west as 123 degrees.

For a time it was thought that the satellite might be moving away from the Minneapolis observers at acquisition time on the western orbits, but WØRLI ran a computer analysis of the orbits which negated this theory.

Because of the need for battery conservation, the 435-MHz Oscar beacon was not operated continuously. To expand data gathering, WØLER and WØMJS attempted to use the 137.5-MHz ItoS-D weather satellite signal. This satellite was launched with Oscar 6, and is in an almost identical orbit, but only normal Doppler effects have been observed on its signal. This gave rise to conjecture that the inverted Doppler of Oscar 6 was caused by thermal conditions within the satellite package, as it moved from sunlight into the earth's shadow. Two other stations, W4PJ in Richmond and W5SD in Houston, were tracking the satellite during the observation period, but neither noticed the anomaly. It may be that the closer an observer is to 23.5° N, the less observable the inverted Doppler becomes.

When Oscar's 435-MHz beacon began to exhibit reduced performance on orbit 1081, January 10, WØLER and WØMJS built receiving systems for the 400-MHz satellite band, but they soon discovered that few of these satellites transmitted long enough at a time to permit much observation. The first positive proof that inverted Doppler was possible on satellites other than Oscar 6 was obtained January 30, on a satellite named Copernicus. This satellite is active only long enough to permit retrieval of its normal data. Its frequency is about 400.5 MHz. There are several navigational satellites on 399.972 MHz, operating continuously, but in polar orbits reversed from that of Oscar 6; south-bound passes are at night and north-bound occur in daytime.

The Doppler anomaly experienced on Oscar nighttime north-bound passes was very evident on south-bound night passes of the navigational satellite. Daytime north-bound passes yielded no inverted Doppler. The up-Doppler occurred at approximately the same latitude as the end of the inverted Doppler on Oscar 6, about 23.5 degrees north. This is about 6 minutes of orbital time for the navigational satellites. This anomaly ended February 5, and has not been observed since, up to this writing.

The investigation by WØLER and WØMJS continues. Using data from research satellites, giving profiles of electron, ion, and magnetic effects in the area of the observed Doppler anomaly, they hope to find an explanation for the inverted and "hanging" Doppler.

Some findings from collected data thus far are as follows: The Doppler anomaly is a night effect, occurring in the earth's shadow. There is a seasonal effect centered on the winter solstice. The effect appears to be frequency-selective. Whatever the cause, it appears to be more than could be explained by magnetic, electron, and ion effects in the area of the anomaly. These could account for only 30 Hz of Doppler.

WØLER and WØMJS solicit information from others who tracked the Oscar 435-MHz beacon, regardless of whether any Doppler anomaly was observed. This information would help determine the area of the effect and if it is latitude selective.

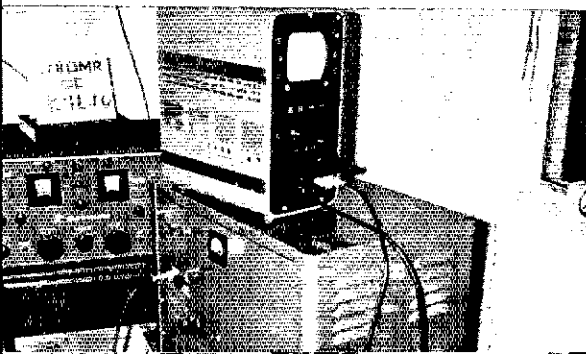
Here is an opportunity for amateur radio to contribute to science, an opportunity that should not be lightly considered. Our congratulations to John and Ron for once again causing professionals to take note of the work of amateurs.

California-to-Hawaii Tropo Tests Scheduled

In the middle of May nightly tropo schedules will begin between California and Hawaii in the 220-MHz band. The operation will extend through the summer and is spearheaded by WB6NMT and W6FZJ. On the Hawaiian end of the schedules will be Lee Wical, KH6BZF, who has been furnished stations for both 220 and 432. KH6BZF's location gives him a clear over-water shot at the U.S. mainland. Tentative time for the daily schedules is 0400 GMT. The frequency will be approximately 222 MHz. Exact times and frequencies are to be determined after this writing, and a trip to Hawaii by WB6NMT and W6FZJ for equipment check-out at KH6BZF.

It is hoped to re-establish the California-to-Hawaii circuit on 220, first worked on June 22, 1959 by KH6UK, now W2UK, and the late W6NLZ. Those two operators would have worked two-way also on 432, had it not been for an equipment malfunction when the path was open. The path is in excess of 2500 miles, and it may be one of the best long-haul tropo paths anywhere.

K4EJQ used this 500-watt 436-MHz ATV transmitter to work W8DMR, Columbus, Ohio last November for apparently the first 3/4 meter ATV QSO between those two states. K4EJQ, Bristol, TN., used a 40-element array.



The involved operators are hoping to interest other West Coast stations to participate in the tests, establishing a network between the northern and southern borders of California. Specific details are available from WB6NMT and W6FZJ.

OVS and Operating News

50-MHz DXers will be encountering early-summer sporadic E by the time this appears in print. There has been the expected lack of E during the late winter months, except from at least one location as we'll note later. Several late winter and spring auroral sessions were reported, the most noteworthy being February 21 through 24.

WA1PEA, Dartmouth, Mass., turned on his rig at 2305 GMT, February 21, to find 50 MHz filled with buzz signals. Chuck's first contact was with WA3PNQ, Maryland, for a new state. Other contacts with eastern and New England states followed. WA1EXN, Maine, worked a Kentucky station and, somewhat strangely, most beam headings for maximum signal strength were direct-path, although the signals sounded aurorally propagated.

WA3SKT/4, Norfolk, Va., caught the aurora, working stations from New England west to Ohio, but he says that other than the aurora, propagation was poor during February.

W1HDQ, Canton, Conn., reports the 27-day recurrence of the aurora reported above, on March 20. Ed projects the sun daily, sky conditions permitting, and saw major sunspot activity throughout the last half of March, traditionally a time of disturbed hf propagation, and a period of frequent and widespread auroral activity on the vhf bands. On March 20, back-scatter on 10-meter stations was tremendously strong, from the south throughout the day, and auroral propagation was heard on 50 MHz in the early evening. WA1EXN was heard to say that he'd been hearing auroral signals from 2 pm on, in Maine.

Depressed hf conditions were common in late March and it is expected that more vhf auroral reports will be available for this period, when the March mail is all in. (This copy is completed during the third week of the month.)

From Houston, WASHNK reports not much doing, but Joe has good news for those seeking Latin American contacts. He says six stations are active in Guatemala City; TG9s KJ, QQ, MP, SO, NT and VV, who all participate in a 1500 to 1600 GMT net Sundays; no frequency specified. Joe's information comes from TG9KJ and TG9QQ, March 3, TG9SO worked LU3MBL, Argentina, at 2200 GMT. The following day TG9KJ heard LUs weakly, and on the 10th logged strong signals from Argentine commercial stations just below 50 MHz, but no amateur signals. WASHNK will be moving to a new home in June. Says Joe, "That is when KL7 and KH6 will come in - I need both."

As usual, WA5IYX sent his report from San Antonio, 16 pages worth this month! Reading through it, one gets the impression there is constant E from his location. Pat's records dating back several years indicate that this February 1973 was the most productive from the E standpoint of any February thus far recorded. The E muf soared into the fm broadcast band numerous days, and the magnetic disturbance the third week in February pushed the F-layer muf to 47 MHz on the 19th. Mixed with F-layer was intense E_s to southeastern states, producing both morning and evening E past 90 MHz. This was the first date since last summer that Pat noted morning and

2-METER STANDING

| | | | | | | | |
|--------|----|----|------|--------|----|----|------|
| K1HTV | 36 | 8 | 1310 | K5WXZ | 38 | 10 | 1450 |
| K1ABR | 35 | 8 | 1478 | W5WAV | 38 | 10 | 1310 |
| W1AZK | 34 | 8 | 1412 | W5HFV | 38 | 10 | 1285 |
| K1WHT | 31 | 8 | 1300 | K5BXG | 36 | 10 | 1330 |
| K1UGQ | 30 | 8 | 1370 | W5AJG | 33 | 9 | 1360 |
| WA1FFO | 29 | 9 | 2500 | W5UQK | 33 | 9 | 1290 |
| K1WHS | 29 | 8 | 1300 | K5PTK | 29 | 9 | 1330 |
| W1VTU | 29 | 8 | 1296 | W5LO | 29 | 7 | 1325 |
| W1JSM | 29 | 8 | 1100 | W5SXD | 25 | 6 | 1265 |
| K1BKK | 28 | 7 | 1275 | W6GDO | 18 | 5 | 1326 |
| K1PXE | 28 | 7 | 1250 | W6WSQ | 16 | 4 | 1390 |
| K1MTJ | 26 | 7 | 1250 | K6HAA | 13 | 4 | 1380 |
| W1HDQ | 24 | 7 | 1040 | K6JYO | 13 | 4 | 1240 |
| K1RJH | 22 | 7 | 1450 | K6HMS | 11 | 4 | 1258 |
| W1FZA | 22 | 7 | 960 | W7JRG | 27 | 6 | 1320 |
| WA1JXN | 18 | 7 | 990 | K7NII | 25 | 5 | 1290 |
| W1MX | 18 | 6 | 850 | K7ICW | 18 | 4 | 1278 |
| K1JIX | 18 | 6 | 800 | K7VTM | 10 | 6 | 950 |
| W2AZL | 38 | 9 | 2500 | W8KPY | 41 | 9 | 1310 |
| W2NLY | 37 | 8 | 1300 | K8AXU | 38 | 8 | 1275 |
| W2CXY | 37 | 8 | 1360 | W8IDU | 36 | 8 | 1150 |
| W2ORI | 37 | 8 | 1320 | W8YIO | 36 | 8 | 1100 |
| W2BLV | 36 | 8 | 1150 | W8IDT | 36 | 8 | 1150 |
| K2RTH | 34 | 8 | 1215 | K8DEO | 35 | 8 | 1200 |
| WA2EGK | 33 | 8 | 1340 | W8NOH | 31 | 8 | 1165 |
| W2CUX | 33 | 8 | 1334 | K8HWW | 31 | 8 | 1125 |
| WB2WIK | 32 | 8 | 1080 | W8LLY | 28 | 8 | 820 |
| WA2CJK | 31 | 8 | 1160 | W8TIU | 24 | 8 | 1000 |
| W2CRS | 30 | 8 | 1270 | K8ZES | 22 | 8 | 675 |
| K2CEH | 27 | 8 | 1200 | K9SGD | 42 | 9 | 1300 |
| W2CNS | 27 | 8 | 1150 | WA9DOT | 41 | 9 | 1303 |
| K2DNR | 25 | 7 | 1200 | W9AAG | 41 | 9 | 1200 |
| WB2SIH | 25 | 6 | 1000 | K9AAJ | 41 | 9 | 1200 |
| WA2EMB | 23 | 8 | 1335 | K9UIF | 41 | 9 | 1150 |
| K2BWR | 23 | 7 | 1350 | W9YYF | 41 | 9 | 1050 |
| WA2PMW | 23 | 6 | 1000 | W9BRN | 36 | 9 | 1260 |
| W2DWJ | 23 | 6 | 860 | W9PBP | 34 | 8 | 820 |
| WA2UDT | 22 | 7 | 1020 | K9HMB | 33 | 10 | 1827 |
| WB2YQU | 22 | 6 | 850 | WA9QZE | 28 | 8 | 960 |
| WB2FXB | 21 | 6 | 915 | W9JDJ | 26 | 8 | 800 |
| K2VCO | 21 | 7 | 750 | K0MQS | 45 | 10 | 1605 |
| W3RUE | 36 | 8 | 1250 | W0LER | 44 | 9 | 1440 |
| W3BHG | 35 | 8 | 1260 | W0DQY | 41 | 9 | 1300 |
| K3CFY | 35 | 8 | 1200 | WA0CHK | 40 | 9 | 1120 |
| W3GPK | 32 | 8 | 1108 | W0LFE | 40 | 9 | 1100 |
| W3BDP | 29 | 8 | 1225 | W0EYE | 35 | 9 | 1380 |
| WA3GPL | 26 | 8 | 1100 | W0ENC | 35 | 9 | 1360 |
| W3LNA | 26 | 8 | 970 | W0RLI | 35 | 8 | 1139 |
| W3OMY | 26 | 8 | 800 | W0EMS | 34 | 10 | 1320 |
| K3CFA | 25 | 8 | 1200 | W0LCN | 33 | 9 | 1100 |
| W3TMZ | 24 | 8 | 1000 | W0RLI | 31 | 9 | 1115 |
| W3HB | 23 | 8 | 1310 | W0DRL | 27 | 9 | 1295 |
| W3TFA | 21 | 8 | 1342 | W0MJS | 25 | 8 | 1107 |
| K3OBU | 21 | 7 | 930 | VE1AUC | 7 | 2 | 500 |
| W3ZD | 20 | 7 | 850 | VE2DFO | 33 | 8 | 1385 |
| K4GL | 39 | 9 | 1270 | VE2BZD | 23 | 7 | 1309 |
| W4HJQ | 39 | 9 | 1150 | VE2HW | 18 | 6 | 800 |
| W4WNH | 38 | 9 | 1350 | VE3ASO | 37 | 8 | 1290 |
| W4HHK | 38 | 9 | 1280 | VE3BQN | 37 | 8 | 1250 |
| K4EJQ | 37 | 8 | 1125 | VE3EJC | 33 | 8 | 1283 |
| K41XC | 36 | 8 | 1403 | VE3AIB | 29 | 8 | 1340 |
| W4VHH | 36 | 8 | 1100 | VE3EVW | 28 | 8 | 1100 |
| W4CKB | 35 | 8 | 1440 | VE3DSS | 27 | 8 | 1200 |
| K4QIF | 35 | 8 | 1225 | VE3CWT | 27 | 7 | 1072 |
| W4FJ | 34 | 8 | 1150 | VE3EMS | 24 | 8 | 1100 |
| W4AWS | 29 | 8 | 1350 | VE7BQM | 12 | 3 | 7920 |
| W4ISS | 29 | 8 | 1000 | SM7BAE | 1 | 11 | 1055 |
| W5UGO | 43 | 10 | 1398 | VK3ATN | 3 | 31 | 0417 |
| W5ORH | 42 | 10 | 1507 | ZL1AZR | 2 | 21 | 1055 |
| W5RCI | 42 | 9 | 1289 | | | | |

The figures after each call refer to states, call areas, and mileage of best DX. Revised April, 1973.

evening E at such high frequencies. February 20 was not nearly as active, but the 21st was. F-layer signals from many U.S. locations filled 35 to 45

220- and 420-MHz STANDING

| | | | | | | | |
|--------|----|---|------|--------|----|---|------|
| WA1MUG | 15 | 5 | 450 | W2OMS | 16 | 5 | 537 |
| K1PXE | 13 | 6 | 700 | W2DOWJ | 16 | 4 | 570 |
| W1HDQ | 13 | 5 | 450 | K2OV5 | 15 | 5 | 734 |
| K1JIX | 12 | 4 | 600 | K2YGO | 14 | 6 | 675 |
| W1A2K | 10 | 3 | 375 | W2CNS | 14 | 6 | 525 |
| K1BFA | 10 | 3 | 225 | WA2EUS | 10 | 4 | 280 |
| K2CBA | 19 | 7 | 2650 | W3RUE | 19 | 7 | 850 |
| W2DWJ | 15 | 5 | 740 | K31UV | 18 | 5 | 720 |
| W2CRS | 14 | 5 | 600 | W3UJG | 9 | 4 | 400 |
| K2RTH | 13 | 5 | 960 | W4FJ | 22 | 7 | 995 |
| K2DNR | 13 | 5 | 600 | K4GIF | 21 | 7 | 1065 |
| W2SEU | 13 | 5 | 325 | K4EJQ | 19 | 7 | 800 |
| W3UJG | 14 | 5 | 460 | W4HJZ | 15 | 5 | 560 |
| W3RUE | 11 | 6 | 480 | K4SUM | 15 | 5 | 462 |
| K31UV | 11 | 4 | 340 | W4VHH | 15 | 4 | 750 |
| W4UCH | 9 | 5 | 543 | K4GL | 11 | 3 | 720 |
| K4IXC | 5 | 3 | 1115 | K4NTD | 9 | 2 | 835 |
| K4GL | 4 | 2 | 485 | K4IXC | 4 | 2 | 800 |
| W5RCI | 10 | 5 | 910 | W4AWS | 4 | 2 | 750 |
| W5AJG | 4 | 2 | 1050 | W5RCI | 19 | 6 | 880 |
| W5LO | 2 | 2 | 660 | W5ORH | 13 | 4 | 700 |
| W6NMT | 9 | 5 | 2650 | W5AJG | 7 | 3 | 1010 |
| W6WSQ | 6 | 4 | 1142 | W5UKQ | 6 | 2 | 590 |
| W7CNK | 6 | 3 | 923 | W5SXD | 5 | 2 | 850 |
| W7JRG | 5 | 3 | 959 | W5GVE | 3 | 1 | 365 |
| K7BBO | 5 | 3 | 940 | W6HXW | 6 | 4 | 7500 |
| K7ICW | 4 | 2 | 250 | W6DQJ | 4 | 2 | 360 |
| K7HSJ | 3 | 2 | 400 | W6FZJ | 3 | 2 | 2517 |
| W8PT | 11 | 6 | 660 | K7ICW | 4 | 2 | 225 |
| K8HWW | 8 | 5 | 550 | W7JRG | 2 | 2 | 420 |
| K9HMB | 18 | 8 | 1086 | K8DEO | 24 | 8 | 775 |
| W0EYE | 11 | 5 | 950 | W8YIO | 22 | 7 | 650 |
| WA0QLP | 4 | 2 | 923 | K8REG | 21 | 7 | 700 |
| VE2HW | 5 | 2 | 325 | K8UQA | 19 | 7 | 800 |
| VE3AIB | 7 | 4 | 450 | W8HVX | 18 | 7 | 660 |
| | | | | W8CVQ | 13 | 7 | 625 |
| | | | | W8MNT | 13 | 7 | 600 |
| | | | | W8RQI | 10 | 6 | 425 |
| | | | | W8SVHG | 8 | 6 | 625 |
| | | | | W8FWF | 8 | 5 | 450 |
| | | | | W9WCD | 22 | 9 | 1725 |
| | | | | K9HMB | 21 | 8 | 836 |
| | | | | WA9HUV | 17 | 7 | 780 |
| | | | | W9JY | 15 | 6 | 550 |
| | | | | W9AAG | 15 | 5 | 800 |
| | | | | K9AAJ | 12 | 5 | 425 |
| | | | | W0DRL | 23 | 8 | 1210 |
| | | | | W0LER | 15 | 5 | 1000 |
| | | | | W0LCN | 13 | 4 | 700 |
| | | | | K0TLM | 10 | 5 | 700 |
| | | | | W0YZS | 9 | 4 | 650 |
| | | | | W0EYE | 7 | 2 | 702 |
| | | | | VE2HW | 6 | 3 | 750 |
| | | | | VE3DKW | 19 | 7 | 940 |
| | | | | VE3AIB | 9 | 5 | 600 |
| | | | | VE3EZZ | 7 | 5 | 510 |
| | | | | VE4MA | 2 | 1 | 420 |
| | | | | VE7BBG | 1 | 1 | 1125 |

420 MHz

| | | | |
|---------|----|---|------|
| K1PXE | 18 | 7 | 1210 |
| K1HTV | 17 | 5 | 610 |
| W1AJR | 16 | 5 | 680 |
| WA1MUG | 15 | 5 | 740 |
| K3EAV/1 | 14 | 6 | 700 |
| K1BFA | 13 | 5 | 710 |
| K1JIX | 13 | 5 | 620 |
| W1SL | 11 | 5 | 400 |
| WA1JTK | 11 | 4 | 715 |
| W1HDQ | 11 | 4 | 380 |
| K2ACQ | 24 | 8 | 925 |
| W2AZL | 21 | 7 | 1000 |
| K2CBA | 20 | 8 | 2670 |
| W2CLL | 20 | 6 | 790 |
| K2UYH | 19 | 7 | 2500 |
| K2RIW | 19 | 6 | 812 |
| K2VDK | 18 | 6 | 750 |
| WA2EMB | 18 | 6 | 720 |
| WA2FGK | 17 | 6 | 745 |
| K2ARO | 17 | 6 | 740 |
| W2BLV | 17 | 6 | 732 |

The figures after each call refer to states, call areas, and mileage of best DX. Revised April, 1973.

MHz. Pat says it would appear that 50 MHz was open for transcontinental contacts, but six-meter operators were apparently napping. February 22 was nearly a repeat, except 50 MHz was obviously open to South America — and they were napping! Commercial signals were logged at 49.99 MHz. Much the same conditions continued through February 25, as the effects of the magnetic disturbance subsided. During February, WASIYX logged *F*-layer muf in excess of 45 MHz on six days.

Moving into March, Pat found *F*-layer muf soaring to 45 MHz on the 2nd, mostly to the West Indies. March 6 found mid-day muf at 47 MHz and from the first of the month, until mid-March when WASIYX's report concluded, *E* was active each day.

On the West Coast, little was doing at WA6HXM, but WB6NMT was scheduling W7FN, Washington, and W0MTK, Colorado, on EME. WB6NMT heard W7FN in early March with a large rhombic array. W7FN has an array of eight 8-element Yagis, while W0MTK aims four 4-element Yagis skyward.

From Las Vegas, K7ICW says 50 MHz was open on *E*_s February 8 through 11 to southern Texas. The *E* muf peaked at 107.9 MHz on the 8th, but an attempt on 2 meters with W5QDB, San Antonio, produced nothing. WA7FPO says February and March were poor for *E* from Phoenix, with only a few scattered, weak openings noted, mostly to Texas.

Need North Dakota? Here is an offer from K0ALL at Fargo. He says he will be very active this summer, but if he doesn't happen to be on and you think the band is open in his direction, telephone him at 701-237-9026. Or send him a postcard with your telephone number and location, also those of others in your general area who need North Dakota, and he'll call you when the band looks favorable. That is *some* service! It would be a nice courtesy if those working K0ALL would include a stamped, self-addressed envelope for a return QSL. During the February 21 aurora Ron was state number 48 for an Iowa station and number 43 for a chap in neighboring Minnesota. And I thought W0GNS had worked everyone!

144-MHz news this month centers around moonbounce, and in particular the work being done by Bob Sutherland, W6PO. Bob's 160-element collinear, producing an excellent signal, has fostered much interest in 144 EME. W6PO's most recent successes included contact with VE2DFO March 9. This was the first EME for VE2DFO, but just a few minutes later he worked VE7BQH. On March 13, W6PO and VE7BQH both worked Australian VK5MC for that operator's first and second EME contacts. VK5MC runs 150 watts and a stacked rhombic array similar to that at VK3ATN.

W6PO now has 12 states worked on 144, four of which are on EME, and four countries in three continents, on EME. Bob's success is prompting a number of operators with smaller arrays to attempt EME. He has worked several who are using arrays of four Yagis, taking advantage of ground-reflection gain. In a recent contact I had with W6PO on 75 meters, Bob said he felt it too bad that the necessity for monster-type arrays had been overplayed in years past. Bob says he believes this has stopped many potential moonbouncers from trying the EME route. With systems such as Bob's on one end of the circuit, this is certainly true.

Elsewhere on 2 meters, I am getting more frequent reports of tropo DX from fm operators using simplex channels. WA3EC/1, Providence, R.I., reports an excellent tropo opening February 25, extending throughout New England. I expect we'll hear this summer of more 2 meter sporadic *E* openings caught by fm operators in high-activity areas. I hope they take time to make details of such openings known to this column because much is yet to be learned about 144-MHz *E*.

(Continued on page 116)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whom:

This year's guest of — umm — honor at our annual DX Hoggery & Poetry Depreciation Society spring thing survived his introduction with little more than bruises and a temporarily dislocated pelvis. But chairman-pro-tem Lem E. Wurkimfurst didn't fare as well, flattened by a rain of oversized heatsinks, Old Haywire mugs and five-amp filter chokes. Two more splashy rounds of O.H. and a rafter-rattling DXHPDS Wouff Hong Song sing-along made permanent chairman Waite Yerturnbud brave enough to gavel a semblance of order. Ike N. Splattermore shouted his opener from the floor:

Slushy-voiced Screamy O'Skree
Who clips and compresses with glee
Couldn't care less
That his signal's a mess.
It's harmless at *his* end, you see.

A gigantic red-flashing neon sign kept blinking **TURKEY-RAFFLE!** over the stage of noisy Long Hall. Our weird guest, billed as an authority on 20-meter repeaters, loudly bragged how he hooked up a 9U5 with an entire DX club who were all at work at the time

No stranger to danger was Mel
Whose fist on the high voltage fell.
His wide-open rig
Steamed off his wig
And widowed his new XYL.

*c/o ARRL, 225 Main St., Newington, CT 06111.

Next our vain visitor boasted how he hooked up an entire DX club with a 9U5 who wasn't even on the air at the time

For code practice somewhat absurd
Try copying Spaceless N. Slurd.
His letters ain't bad
But the sequence is sad,
One endless discouraging word.

The flap-lipped kook now crowed about hooking up a 9U5 who wasn't on the air at the time with an entire DX club who were all at work at the time

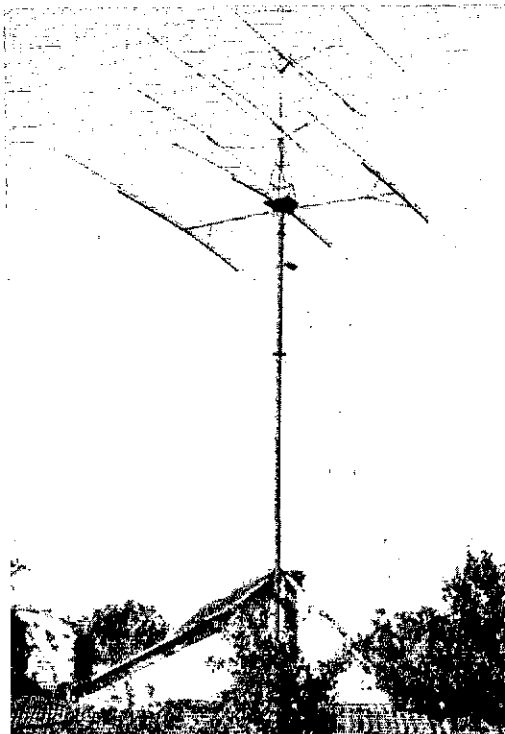
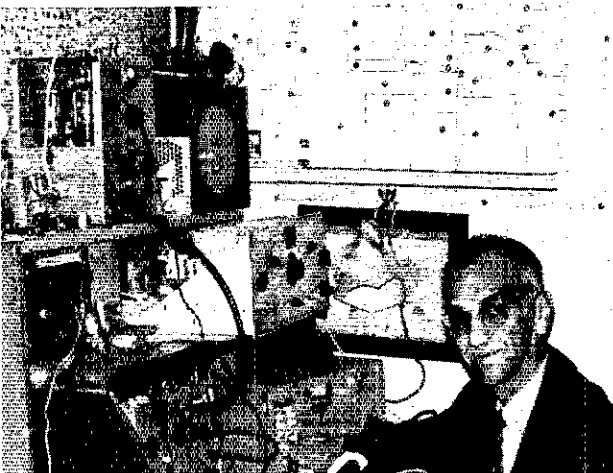
"Incentive licensing? Yuchh!"
Wails QRM-riddles Von Shtuck.
He'd rather complain
Than strain his fine brain
To upgrade and move out of the muck.

An enormous cage suddenly clanked down to imprison our selected DX Clod of the Year. From stage left came jets of epoxy glue followed by clouds of multicolored goose feathers from stage right

Power pig Boyam I. Blue
Ran gallons to blast his way through.
The whatchamacallit
That emptied his wallet
Subtracted his ham ticket, too.

The DXHPDS Conversion Committee had converted our feted loudmouth into a hideous squawk-

YO2BC, one of Rumania's pioneer radio amateurs, still thrives on the homebrew DX approach. That rotary Yagi was built by Costy 22 years ago and still whirls majestically over our Timisoara QTH of the Month. YO2BC is an old pal of WB2AQC (ex-YO2BO) who recently visited DXers in the Caribbean with XYL WA2BAV and Eva's father Steve of YO2KBO. George's camera work takes you along with them on following pages.



ing birdlike thing, beak and all. When the glaring neon abruptly changed its wording from TURKEY-RAFFLE! to PARROT-SHOOT! we tore up our fake raffle tickets, seized hidden Saturday Night Special repeaters and hooked him up with paradise.

† † †

Where:

NORTH AMERICA - Let's all be more considerate of the time required for a DX station's log to reach his QSL agent, even when mailed on a regular and frequent basis. (KH6GHZ) . . . QSL managers who find it temporarily difficult to discharge their responsibilities should solicit help from other volunteers. The backlogs of some heretofore reliable QSL representatives must be accounted, according to the grapevine (WA7RKA) . . . Problems associated with a QTH change caused K3RLY's DX QSL chores to lag in midwinter. (WCDXB) . . . Reminder: 3E stations are Panama HPs, suffixes unchanged. (LIDXA) . . . Aves isle YV0AA QSL requests are answered quickly via Radio Club of Venezuela. (YV5BPG) . . . If any overburdened op at the DX end is looking for a Stateside QSL manager, I'm interested. (WN2FQN) . . . QSLs are answered direct when they arrive direct, others via bureaus. W/Ks should indicate countries on their cards. (OA4QS) . . . Halp! W10PJ hunts hints on running down the missing wallpaper of PJ2VD, TR8PB and SB4AF. K0ALL likewise for HM1BB and FL8MB. Fast QSLers for some guys are QSL holdouts for others, an ancient pasteboard paradox . . . "QSLers of the Month" commended by K3PQP, WA5 3RJS 7RKA, WB4URW and VO1KE for unusually quick card comethroughs are CX1BBL, DJ4VU, DK5 4ET 5PR 5QP, EA3NI, FG7XZ, G3BVA, HK3CPW, PY2GC, SP5 1AFU 9CDA, TI2WX, VQ9M, WL7HHX, YU3FS, ZF1FOC, ZI1AMO, ZSSFF and 3B8DA. Any deserving QSLers in your recent collection for recognition here?

AFRICA - I manage A2CEW's QSLs for all A activity starting last October and must protest the number of W/Ks who send s.a.s.e. (self-addressed stamped envelopes) bearing U.S. postage. They're unusable here, of course. Please also note that I do not handle QSLs for A2CIP as some sources have indicated. (VE4SW) . . . My brother TU2DV has his U.S.A. QSOs confirmed through me, others via International Short Wave League whose address appears in your "Where" credits. (WA6NFC) . . . All contacts with TU2DJ can be confirmed through me. (K4AEB) . . . ZD80 calls will mark an Ascension Island holiday this month and next. (WCDXB) . . . 5Y4X fellows are Kenyans of like suffix, 5Y4XKZ being 5Z4KZ. (LIDXA) . . . FB8s XA (F5BR), XB and XC (F6AGR) remain quite active on Kerguelen,

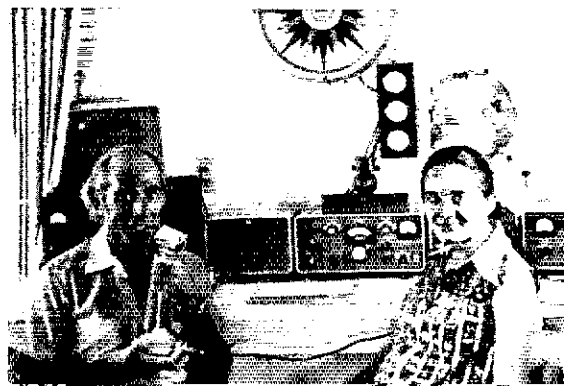
also signing FB8XX at the main base station. I handle QSLs for all. (F2MO) . . . U.S.A. and Canadian contacts with XT2s AG and AK this winter can be confirmed through my address. I can also QSL for all XT2AA QSOs of January 31 through February 7, 1973. (WIAM) . . . I assumed EL4E QSLing responsibilities as of March 1, 1973, and also handle cards for ELs 2CI and 4B. The customary s.a.s.e. from W/Ks, s.a.e. plus IRCs (International Reply Coupons) from others, will ensure rapid direct response. (K8LUH) . . . 3B8DA wants the gang reminded that his address is a bureau route to all 3B6-7-8-9 stations. (VO1KE) . . . I still QSL for 3B8AA QSOs appearing in 1968-'69 logs, also for GD5API and F0ZZ. S.a.e. plus sufficient IRCs, of course. (F6BHK) . . . After an eleven-month lapse in deliveries we received some 300 QSLs via Ghana's bureau just before departure Statesward. One more complication in our last-minute packing rush! (9G is WW YA)

ASIA - I have all logs since 1947 for my A operation as VS1HC, 5Z4IR and G2BPC. Due to a long illness I may have failed to reply to some past QSL requests. Include IRCs for quick reply from my Cambridge QTH. (G2BPC) . . . Ex-VS9AWR still has his old Aden logs plus a stock of blanks for those concerned. Try his new U.K. address. (WCDXB) . . . QSLs to JY9GR's home DJ9GR address go unattended. Roger wants them only via DK4PP. (K4ELV) . . . Those who have not received deserved QSLs for my VU2REG, YA1REG and VSSRG operations are invited to reapply via ARRL's VE7 Bureau branch or direct to my B.C. address. I also have on hand my log for October 1970 contest operation from 9N1MM. (VE7IG)

EUROPE - The Faeroes QSL Bureau is now E manned by OYs 3G and SNS. Receipts indicate continued pirating, especially by bogus OYs 5KT and 9CM. (WCDXB) . . . No logs received for the past year so I no longer handle QSLs for SP5PWK. (W7HK1) . . . My outstanding Azores QSL debts were liquidated via various bureaus by late February from Delaware. (ex-CT2BB) . . . New DXers usually are slow to comprehend that QSL exchange via bureaus can take a year and more. (VO1KE) . . . Now the QTH catalog, being aware that each listing is necessarily neither "official," complete nor accurate. . . .

A4FB, C. Wilson, P.O. Box 981, Muscat
CO8RC, Box 5, Santiago, Cuba
ex-CT2BB, H. Cross, W3FVC, RD No. 1, Box
308X, Hartley, Delaware, 19953
EG0GE, R. Little, P.O. Box 63, Marigot, St.
Martin, F.W.I.
G5BPP, S. Stimson (WB4CDD), Box 2935, APO,
New York, NY 09238
IV5PPZ, P.O. Box 200, Viareggio, Italy
IZ5ZWY, P.O. Box 200, Viareggio, Italy

FG7XL's Jean-Pierre and Monique check the bands in Pointe-a-Pitre while visiting Rumanian amateur Steve looks on. At right HH2JT, Haiti's only active DXer these days, discusses 20-meter doings with Steve's daughter, WA2BAV.



JZ9CKP, P.O. Box 8, 90100 Palermo, Sicily, Italy
K4VMA/VP7, D. Baird, AUTEC Box 47, FPO,
New York, NY 09559

KG4FU, J. Brooks, Box 358, USNAS, Norfolk, VA
23593

OKs 5BOB ØBOB (to OK2BOB)
PZ1BC, P.O. Box 1825, Paramaribo, Surinam
SVØWH, RMC G. Braswell, USN ComOps, FPO,
New York, NY 09525

TR8PB, P.O. Box 13132, Libreville, Gabon

TU4AF, Box 2518, Abidjan, Ivory Coast

VP2VV/ES7 (via F6AEV)

VSSRG-VU2REG-YA1REG (see text)

VS6GA, I. Dredge, Senior Rates Mess, HMS Tamar,

BFPO 1, London, England

ex-VS9AWR, W. Reid, RAF Cosford,

Wolverhampton, Staff., WV73EX, England

XT2AK, Dr. M. Piolet, 10 Av. Thermale, 63400

Chamalières, France (or via F6AXP)

YB9ABH, 30-P River Valley close, Singapore 9

YN1ZZG/9, Aptdo. 9, Jiotega, Nicaragua

5U7BA, P.O. Box 877, Niamey, Niger

5U7BB, J. Gruson, P.O. Box 66, Niamey, Niger

6Y5s DB EE (via VE3EDC)

9G1HO, Box 194, Accra, Ghana

ex-9V1QJ, J. Daugherty (WB5HQY), USADPO,

Poro Pt. Br., c/o 848th AC&W Sq., APO, San

Francisco, CA 96277

CN8BO (via K7VAT)

CR8AG (via CT1SH)

EL4E (via K8LUH)

F5XU/XT2 (via F6AXP)

ex-HL9TH (see 9V1QJ)

IZ9LZG (to IT9LZG)

JD1AHC (via JASAWH)

JW7FD (via LA3UC)

KC4UST (via W3JAK)

KG6SY (via K6ZIF)

ex-KR6JD (see 9V1QJ)

ex-MP4MBP (to A4FB)

OK5KBB (via OK3CIB)

PAØXKW (to VS9AWR)

PJ8GQN (via W2GHK)

PJ8HR (to W2JKN)

PS-PVØWH (via W3DJZ)

PZ1BX (via WB5SOG)

SP5PWK (see text)

SVØEAA (via DL3CQ)

TU2DJ (via K4AEB)

TU2DV (see text)

ex-VKØPF (to VK3FF)

ex-VS1HG (to G2BPC)

VS6AV (via G3SGQ)

VS6CU (via SMØEGE)

XT2AM (via WJAM)

ZC4EJ (via G3ZGG)

ZE6JP (via K6AQV)

1S1A (via W1YRC)

3E1XIS (see text)

5B4AU (to OE3SPW)

5Y4XKZ (see text)

ex-5Z4IR (to G2BPC)

6J9AA (via W2GHK)

9H5D (via G3PRS)

ex-9G5GR (via DK4PP)

Amateur Radio Society News (5N2ABG), North
Texas DX News (W5SZ), Northern California DX
Club DXer (Box 608, Menlo Park, CA 94025),
Southern California DX Club Bulletin (W6EJJ),
VERON's DXpress (PAØs INA TO), West Coast DX
Bulletin (WA6AUD) and Western Washington DX
Club Totem Tabloid (WA7JCB). Any tips for the
troops?

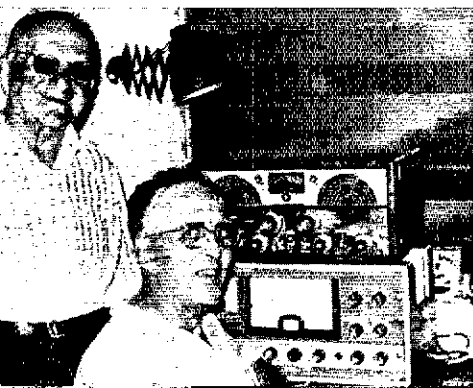
† † †

W h e n c e :

ASIA - YA1LM's brother HC1MH filled us in on
aspects of recent disaster communications
following the Managua earthquake. Afghanistan
has its own proclivities along that line so Camel
Drivers Radio Club members are evaluating their
emergency-preparedness facilities. (YA1AB)
... JY4AH/am, a pilot for RJAL, was QSLd on a
flight from Jeddah to Lagos. (K2QHT) ... JY9VO
will continue active through most of '73.
(W7JHO) ... JY9GR (DJ9GR) expects to re-
main available from Jordan until October.
(K4ELV) ... I'm back on 15, 20 and 40 as
WA9QVT/4 in Florida looking for the many
friends I made while hamming in Korea. Watch out
for my 15-watt wonder rig. (ex-HL9WU)
... UAØFGM of the Russian Academy of
Sciences likes 7084-kHz ssb and cw with homespun
gear. His receiver has a crystal-filtered front end for
maximum SWBC QRM rejection on 40. He expects
three more years in the Kuriles. (K6SEF) ... I
find both short and long paths good for DX around
1300 GMT. Activity in Africa and the near east
appears to be increasing. (KA2PJ) ... WIAW's
code practice and bulletins follow me around the
world aboard M/V *Midas Apollo*. (HM5AP-
ELØP/mm) ... The JA crowd really goes for
10-meter QRP a-m QSOs with the States.
(WN2SXD) ... Finally made my DXCC from
Singapore although I'm really a rag-chewer at
heart. I formerly signed HL9TH and KR6JD. Hope
to get on the air from the Philippines next.
(ex-9V1QJ, WB5HQY) ... Good southern open-
ings into central North America on 20, also the
usual fine 40-meter skip to the U.S. west coast.
(9V1QP) ... Looks as though no DXpeditions
will be allowed into Bhutan this year. (VE6BAA)
... Ws 1SWX 3MFW and 1GL gave VU25BX his
first 80-meter U.S.A. QSOs in that order last
December, probably the first VU/W contacts on
3.5 MHz ever. (W1SWX) ... 7Z3AB's appearance
at a recent Texas meeting was especially enjoyed
by W5s AJ IIN PIP, KSVIK and myself.
(W5LJ) ... TAIKT reportedly ends the Turkey
DX drought with a 20-only transceiver. (VERON)
... After QSOing 5Z4KL on 160 in February
JA3AA needs only South America for his 1.8-MHz
WAC. (JDXRC) ... Treacherous weather,
murderous seas, technical difficulties and mediocre
propagation failed to foil the heroic Spratly islands
effort of K7CBZ, VS6DR, HS4AGN & Co. in late
February. Tragedy almost aborted the DXpedition
on landing when HS4AGN was swept out to sea.

This QTH round-up is yours thanks to Ws 1CW
3FLA 6AM 6GSV 7HKL, Ks 1ZND 3QAP 4ELV
6AQV, WAs 3OHF 6NEC, WBs 2EOO 9CJS,
KH6GHZ, VE7s BAF IG, VO1KE, Columbus
Amateur Radio Association *CARAScope* (WBZCQ),
DX News-Sheet (G. Watts, 62 Bellmore Rd.,
Norwich, N. 72T, England), Far East Auxiliary
Radio League (M) *News* (KA2LL), Florida DX
Club *DX Report* (K4KQ), International
Short-Wave League *Monitor* (E. Chilvers, 1 Grove
Rd., Lydney, Glos., GL15 5JF, England), Japan
DX Radio Club *Bulletin* (JA3GZN), Long Island
DX Association *DX Bulletin* (K2KGB), Newark
News Radio Club *Bulletin* (M. Witkowski, RT5,
Box 167, Stevens Point, WI 54481), Nigeria

FM7WG presents his radiotelegraph facility to Steve in Fort-de-France where he's a 14-MHz regular. In the next frame Helen of YV5CKR puts Caracas on the air with son YV1ACI and OM YV5CIZ, all three of Hungarian descent.



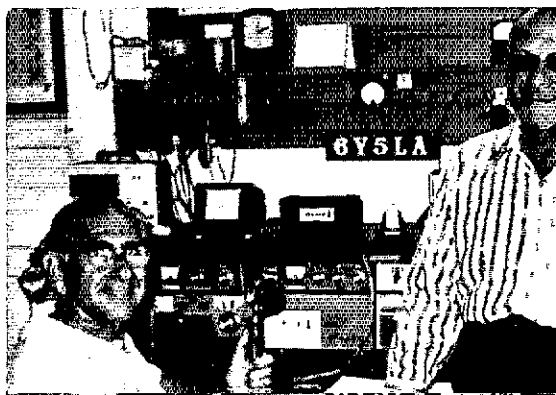
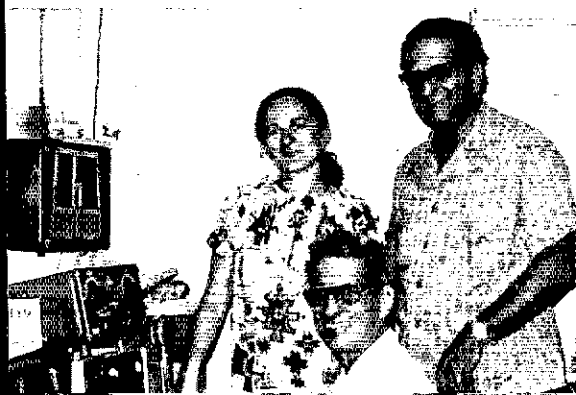


VO9HCS will probably be gone from the Aldabras by the time this picture gets around but his DX melody lingers on. Harry did his best to unrarity those remote islands, quite an undertaking for a brand new ham. Where next, OM? (Photo via WAIHAA, W2CTO)

Jerry was luckily rescued in open water hours later. Many pursuers didn't do so well but W6AM caught IS1A on four bands by mike and key. (WCDXB)

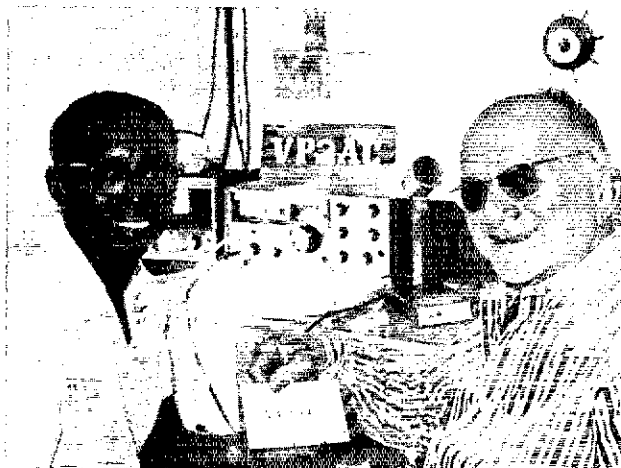
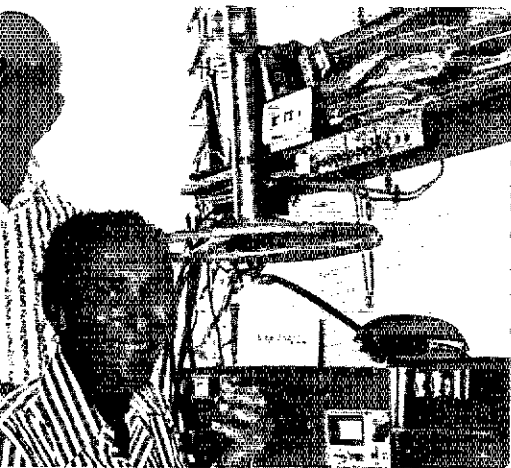
AFRICA — SA3TB and other would-be Libyan DXers have hopes of returning to the air upon completion of a new government monitoring station. Literature from ARRL already has been of considerable help and encouragement toward this objective. (K6EYV) . . . CTJAS returns to England for an operation this month. His countless on-the-air acquaintances will wish him well. I expect to visit Hal and family again this fall. (WA4EPM) . . . TU2DD returned to France after two years of multiband DX. He turned over his antenna mast to TU2CW. Mike gets married this month and plans to accept another DXotic oceanographic assignment later in the year. (K2QHT) . . . KP4DIW and I expect to visit SUI5 IM and MI in Cairo this autumn. (W3HNK) . . . EL2DK will keep his kW going on several DX bands till February. Norm likes to hit the contests. (W5PAQ) . . . Spent an interesting week on Ascension isle in January as ZD8HT.

H18FED proprietor Felix with his brother H18JD show WA2BAV their Santo Domingo DX corner. At right Jamaica Amateur Radio Association president 6Y5LA puts his Kingston DX layout through its paces for Steve.



(W3ABC) . . . TJ1BG signs WB4KPZ when Stateside. (W1UED) . . . My neighbor SM6APQ will be DXing as 912BL for the next year or so. (SM6CKU) . . . Barely got a chance to try out a new RTTY set-up before leaving Ghana. We made many good friends among 15,000 QSOs. After settling in California we hope to strike out for another DXCC. Watch for new 9G1s ALand HO. (ex-9G1s WW YA) . . . I'll be signing a 4Z4 call with my Collins and FA-33 shortly. (ex-ZS3S) . . . QSOs with ten FA8s may qualify North American amateurs for the Canary Islands Award, contacts dating from April 29, 1971. S.a.e. plus IRCs to URK, P.O. Box 860, Las Palmas, will bring full details. (EA8GK) . . . A visit to Virginia by ZS6KC and daughter was enjoyed by W4s RL UPJ YEB, K4GEL, WA4OGH and myself. (W4KVI) . . . A2CEW (VE4EW), stationed in Pikwe with his parents since October, should be heading back to Canada this month. (VE4SW) . . . CR3AB goes back to CT2BA in May or June, and CR3RY soon returns to CT1RY. FL3OM, with the Somalia border only ten miles away, has applied for a 601 operating permit. (DXNS) . . . SZ4KL leaves Kenya next month but hopes to activate Juan de Nova before departure. (VERON) . . . WIAM's visit to the Voltaic Republic last winter gave W/Ks the bulk of 800 XT2 contacts. (LIDXA)

EUROPE — Correspondence concerning Radio Society of Great Britain's high-frequency communications awards hereafter should go to my address. This should lighten the load on London and speed processing. (G5GH) . . . The SRDXCC boys keep LX1BW very busy on 40 and 80 meters. OY9LV, another QSL client of mine, left the Faeroes but OY5 SNS and 7JD still keep me busy. (W3HNK) . . . DL6EN gets across the pond on 160 with a scant seven watts. The G gang, GM3YCB, GW3YGH, EI9J, OE5KE and several OKs are other 1.8-MHz regulars here. (VO1KE) . . . Wonder if any 16- or 17-year-old Stateside YLs would be inclined to correspond with this 16-year-old British apprentice radio relay technician. Very few young YL amateurs in my country. (G4ANH) . . . GB3UCW was a centenary special at University College of Wales in February-March on 2 through 160 meters. (GW3DRV) . . . My vacation as F0AEE, G5AYL, C31EF, etc., will conclude about the middle of this month. (W4WFL/1) . . . 9H1CH keeps the DX gang jumpin' with his T4XB/R4B and Yagi. Les is active on 10 cw when the skip is favorable. (W3FLA) . . . I'll be signing FI7CJ for three years with an Argonaut on all hf bands. Before leaving for Ireland I found five watts sufficient for a flock of countries and 45 states on 28 MHz. Who says 10 is flat? (K6SGD) . . . Watch for me on 15 and 20 under my new reciprocal call, G5BBP. After two months in England I'm already halfway to WAS and DXCC.(WB4CDD) . . . The passing of G2DC costs ham radio a fine OT. Many of us worked or



FM7WN demonstrates his "armstrong" beam rotating device for visitor Steve at St. Joseph, Martinique. Right, OM Jerry of VP2AC presents a QSL to Steve confirming their Antigua eyeball QSO. (All photos courtesy WB2AQC)

heard Jack, active for 50 years, when he signed Y-DCR, ai2KX, VO6DCR, VU2FO, 14AAC and/or DL2RO. (W4WFL/1) . . . I'll be visiting the U.S. extensively in September and October. Studied at Cornell in 1967 and have worked for IBM-Germany the past five years. I particularly hope to visit W/Ks in the smaller towns of your country. (DJ51H) . . . Filled six log books and confirmed 205 countries from the Azores. (ex-CT2BB) . . . SQ57 is an unusual Warsaw entry on 15 and 20 cw. (VO1KE) . . . F0ZZZ lost his 70-foot tower and all antennas in fierce winter gales. (F6BHK)

NORTH AMERICA - We gadabouts whose work never permits us to live in one area long enough to make DXCC deserve more consideration in the rules of DX awards. The present limitations encourage frantic use of high power and monster beams to beat the calendar. (W9LHG/0) . . . Good to be back out of the Navy writing to "How's" about DX again. (WB8IJN) . . . Winter goodies on 80 cw included CE8AA, JA0SX, ID1YAA, UD6CM, UL7NAF, 4S7DA and 9G1HE. (WISWX) . . . Loaded up my rain gutter on 20 and worked three VKs. (WB4WLK) . . . Sure a different DX world working the stuff from Florida with 4 or 5 watts after running a hundred watts in the Bahamas. (K4BZH) . . . K8UDJ will be signing T12DX in San Jose for a few more months. (K1ZND) . . . Made more than 800 contacts as W1RED/KV4 and 8P6EZ on vacation last winter. Tell the lads to bring a sufficient supply of three-prong adapters for their two-prong ac plugs. (W1RED) . . . Forty cw really explodes with DX around supertime, most stuff concentrating near the very low edge. (VE3CUI) . . . Much sport rolling up 493 QSLs as VP2VAN, then 1559 contacts as PJ8DX this winter. QRN obstacles on the lower bands were compensated for by excellent results on 28 MHz where the Ten-Ten net kept things interesting. Having another op along would have helped my eating and sleeping! (K2FJ) . . . Still seek constructive input from Nines for my work on ARRL's DX Advisory Committee. (W9NN) . . . Great fun working 160-meter DX with 180 watts, a converted 75S1 and inverted-L skywire. E19J, G3SZA, KP4JDLW, PJ2VD and VK6HD were January delicacies. (WA9NK1) . . . January was a joyous 1.8-MHz month here, too. contacts with CO2DL, DL1FF, E19J, seventeen Gs GM3s IGW WDF, HB9NL, HR2HH, KH6s CHC RS, KP4s AST DLW, KV4FZ, K2SLS, LUSHP, OA8V, OK2s BCI BFN, OLIAOH, PJ2VD, PY1DVG, VPs 7NY SKF 9BO 9FW, VS6DO, YV5CKR and 8P6DR. Totaled 44 DX contacts and 24 countries in just two contest

nights. (W3IN) . . . Regarding 51.2KG's six-minute WAC five years ago, a "Stray" in September 1957 QST mentioned a WAC roundtable in which the roll was called and acknowledgments received in 85 seconds between F7AC, HZLAB, ZS6KD, KH6RU, YV5FL and W7DSO. (W5DI) . . . I found it more difficult to collect a hundred countries on cw than on voice during the past year. Isn't it time we encouraged radiotelegraphic skills with a cw-only DXCC endorsement? (K6SF) . . . TG9DX will soon be signing TG8DX at a new location. (W3HNK) . . . With higher-frequency DX getting spotty I've been trying 75-meter traffic work. (W9LNQ) . . . The minicountries of Atland, Outer Baldonia, Humanity, Fenwick, Lundy, etc., are featured in a recent Washington Post supplement. Mini-DXCC? (K3CL) . . . Good to revisit 7 and 3.5 MHz cw again after a long layoff. Forty was quite fruitful in the ARRL Test. (WA3NUH) . . . Ten- and 15-meter pickings grow scant but 20 and 80 make up for it. (VE7BAF) . . . The Nicaraguan earthquake postponed my YN4 DXcursion plans until late summer or fall. (W5OPX) . . . Members K6SSN and WB6UDC milked 80 for their final 5BDXCC countries in February. (SCDXC) . . . Certificate manager WA6AFI lists OE2JP, JA2DNA, DL8KO, CT1UE and YJ8BL as winners of California Awards Nos. 222 through 226. (NCDSO) QST

Strays FM7WN

QST congratulates . . .

Warren B. Causey, WB4VZQ, appointed editor of the *Model Cities Responder*, Nashville, Tenn.

John Sanders, WB4ANX, on his recent appointment as vice-president, chemicals, of Eastman Chemical Products, Inc., Kingsport, Tennessee-based chemical marketing arm of Eastman Kodak.

Thomas C. Jorgensen, WA0RWL, honored by the Elks with an award for outstanding leadership.

J. Foy Guin, Jr., W4RLS, recently elected chairman of the Judicial Commission of Alabama.

Robert J. Freund, WA9LYV, recipient of a plaque in recognition and appreciation for past service to Illinois Institute of Technology's Alumni Association.



YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

Look It Up!

WE CONSULT reference rooms, or departments in our local libraries for information on specialized subjects. When we do the weekly shopping we check the newspapers for sales, or certain prices. We carry memo lists for all sorts of purposes to remind us of conferences, or meetings, or special events. At home we regulate our waking activities with telephone directories, Zip Code books, recipes, household repair manuals, needlecraft directions, and laundry methods for all the new types of fabrics. Even our electric irons have temperature guides. We refer to the marked calendar to remind us of dental appointments, birthdays, vacation dates, or when the relatives are planning to visit, and we govern our activities by all these aids.

In amateur radio most of us have our own "Reference Library." The traffic addict is

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

equipped with all sorts of maps, directories and routing guides. There is a net directory to assist us in finding a particular group, and there are all sorts of aids for that particular operation. Those who find that contests are most interesting, add additional papers and check lists to keep informed of the various rules.

The library of the amateur is filled with the ARRL publications on everything from *How to Become a Radio Amateur*, through aids to learning the code, the *License Manual* that not only assists in acquiring a license, but keeps us abreast of regulations that govern our operating in a legally correct manner, to the many specialized works on antennas, mobile, vhf, as well as the "Bible" of amateur radio now celebrating its 50th edition, *The Radio Amateur's Handbook*.

We keep records of DX paths, and many of us have a special card file for a fast reference to a call during our contacts. And always there are the battered copies of *QST*, and *YL Harmonics*, as well as the local club bulletin to keep up to date on news and reviews of equipment.

The Call Books are almost a "must" for everyone, and for the YL operators there are additional references to assist in the many nets, certificates, and contests as well as awards for working a specified number of women operators. In this very specialized section of the YL amateur's reference library are found the membership lists of many clubs, the *Canadian YL Directory* that is updated annually and lists all the YL operators in Canada, published by CLARA; and the "Directory Issue" of *YL Harmonics*, published each fall.

One of the major works found in most of the YL libraries is *CQ-YL*, that continuously revised work of Louisa Sando, W5RZJ, the YLRL historian. Here is the story of this international organization for women operators only. The YL who wants the background of women in amateur radio, the story of the accomplishments of women operators, as well as the history and traditions of YLRL finds this work an invaluable reference:

In our daily activities we are continually in the act of "looking it up" to check out an advertisement, prove a point from an encyclopedia, find the definition of a word. If we aren't sure of a telephone number we reach for the phone book, we hunt out the Christmas card list. As amateur radio operators we are just as dependent on all the many aids that make up our private reference library that is almost as important to the many facets of our operating pleasure as the gear on our desk.



Regina Wiggs, WN5IWA, has just received her Novice license and is already preparing for the next test. Regina is the first XYL to receive an amateur radio license in northwest Mississippi. The OM is Joe, K5DGL. (Photo courtesy K5DGL.)

Midwest YL Convention Changes

The annual Midwest YL Convention usually held in May has been changed for the year 1973. Instead of the usual form of a weekend convention, this year's meeting took the form of a YL get-together at the Dayton Hamvention. The YL operators attending the hamfest from the many states generally represented at the more formal convention attended the women's luncheon.

The present plans call for a resumption of the conventional gathering in 1974.

1973 Buckeye Belle Officers

The Buckeye Belles, Ohio's statewide YL club, has selected the following women to guide the club's activities for the year 1973: President, KSONV, Mary Ryden; Vice President, WA8BWD, Lucy Beidner; Secretary, WBSFIC, Jean Blakeslee; Treasurer, WA8QFL, Elaine Simon.

YLRC Italiano Elettra Marconi Contest

The YLRC Italiano Elettra Marconi announces the start of a contest called Mini-Contest "Jolly Flower," to introduce Italian YLs into international amateur radio activity. Jolly stations will be in all bands, using all modes of operation for the six months of the contest period. It has been requested that because of the women's imperfect knowledge of the English language that all DX stations speak slowly during the contest contacts.

Dates: Starts: July 1, 1973 at 1400 GMT. Ends: December 31, 1973, 2400 GMT.

Exchange: Reports and name only.

Scoring: Italian contact, one Jolly station, plus two other Italian YLs; Europeans contact one Jolly station, plus one other Italian YL; Extra-Europeans contact one Jolly station only. Italian YLs count as "plus" contacts only if not already contacted as Jolly stations.

Award: The Jolly Flower award, an artistic lithograph of a well-known Venetian painter signed by the painter featuring a flower will be awarded to the first 200 winners. All other winners will be awarded certificates. Note: All Italian YL contacts count towards the WIYL certificate.

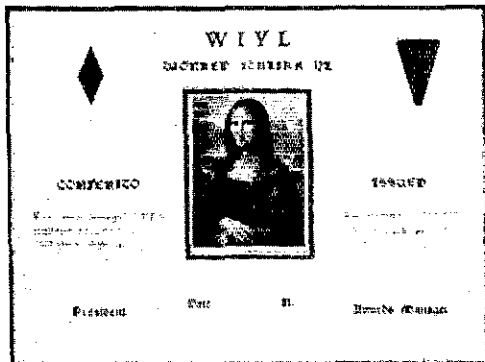
Log: Logs must show the call signs of the YLs contacted, reports given and received. No QSLs are required. Italians include 12 IRCs, Europeans 15 IRCs, all Extra-Europeans 20 IRCs.

Meet the Club - YLRC Italiano Elettra Marconi

To all of us the name Marconi connotes radio, but to the YLRC Italiano there is a dual connotation for in September 1972 the Princess Elettra Marconi i Giovenelli became the Honorary President of the club and permitted the membership to name the organization for her.

Three years ago ISPLH, Hildegard Pellicone Goldstein, began writing to all the licensed YLs listed in Italy's National Call Book, regarding an organization, of on the order of those in other countries to unite the Italian women amateur radio operators, as well as assisting these women to become known outside their own country. Twenty-four of the 36 YLs then licensed in Italy

YLRC Italiano first directory staff: (l-r) I3ZMT, Valentina Donati; I8PLH; I4XYL, Anna Conti; I4YLG, Ginevra Restani.



WIYL Certificate.

responded and the organization meeting was held in Rome, on September 24, 1969 with I1ZMI, Valentina Donati, President; I1XYL, Anna Conti, Treasurer; and I1PLH as Secretary. (Note that the call area designations were changed in February this year, but the suffixes remain the same.)

In 1970 the club held an intra-club contest to encourage on the air activity among members. This has led to the new contest that will begin this July that is open to all amateur radio operators who wish to contact Italian YLs.

The YLRC Italiano Elettra Marconi was founded with the principle of encouraging members to become well known in the amateur community. They all are most anxious to give a YL contact to anyone calling them, but, since all are not fluent linguists, and therefore there is a language difficulty, they request: "Please be so kind as to speak very slowly as talking is easier than understanding."

Worked All Italian YL Certificate

The WIYL certificate offered by the Italian YLRC is available to all OMs and YLs and SWLs. Contacts for points must be dated after January 1970. All bands and modes may be used, but only one contact with each call is valid. Charter members count two points; other Italian YL contacts one point; Jolly station counts as four points.

Requirements: Italians work 10 points, send 10 IRCs. Europeans work eight points, send 15 IRCs. Extra-Europeans work six points, send 20 IRCs. Log extract must be signed by two OMs. No QSLs are required. The certificate is issued free of charge to handicapped persons.

Charter members: IPIYG, IPIMOG, I8LIA; I4CLL, I3GLK, I2ZRF, IP1ZNA, I3ZMT, I8LBP,





18PLH.

14YLY (formerly 14RGI) 14XYL, 18SGZ, 12YD, 17LIL, 13CDW. Awards Manager: Carla Benatti, 14CYB, P.O. Box 155, 46100 Mantova, Italy.

Hildegard Pellicone Goldstein, 18PLH

For the past 9 years Hildegard has not only been well known in DX circles, and as a member of several YL Clubs in this country, she has been extremely busy sparking the interest and activity of YLs in Italy. The OM, Joe, 18PEG had barely received his own license before she became curious, then interested, and several months later received the call 18PLH.

Present President of the YLRC Italiano Elettra Marconi, YLRL, Colorado YL, ISSB, CHC, DXOTC, she holds AI-Operator, DXCC, YLCC, WAC-YL, DX-YL, DUF Excellence, MINOW Net, WOD, and 5ISSB awards.

One of Hildegard's greatest interests is friends, and the act of helping people. In this regard she is not only the gal who is responsible for the spadework involved to form a YL club for Italian woman amateurs, but is now president of that organization.

Some of her greatest contributions have been a contest for club members only as an incentive to greater on the air activity, and the membership getting to know each other. The other is a course in English to help the gals in working DX stations. Because the lack of knowledge in English, as well as understanding the rather baffling terminology we use on the air, has been a major handicap for the YLRC Italiano, so Hildegard's course, both written, and taped to familiarize them with the "sound" of the terms, has been a great success not only with the YLs, but, she says, with the men as well.

This course is a tape of types of transmissions such as contest, the opening transmissions, or ragchew transmissions as they are on the air, then repeated slowly in English, and followed by a translation into Italian in order that the girls may become familiar with the terminology used in English contacts. This tape is accompanied by a booklet for study.

When not busy with her amateur radio activity, Hildegard and Joe enjoy classic music, literature, and travel, but most of all friendship. QST

World Above

(Continued from page 108)

W9OII, near Chicago, has modified the K2RIW 432-MHz kilowatt amplifier for 144, using a quarter-wave plate circuit and half-wave grid circuit. Steve says the design is easily duplicated, and the amplifier can be built from materials available most anywhere. Steve, we'd like to see details on your amplifier. K9UNM, Ft. Wayne, Indiana, will be listed in the states worked box next time it appears in print, having worked 29 states with 50 watts cw in the past three years.

W0LER now has 33 states worked via Oscar — and 12 countries! In addition to his Oscar project, John worked a number of eastern stations during the February 21-24 auroral sessions and says he has found the problem in his EME array. John will be ready for EME tests with W6PO and others this spring. And on top of all that, John has 432 meteor scatter schedules set this summer with W4FJ, Virginia, and W5SXG, Texas.

Another Midwesterner looking for business on 144 and 432 is WB0DRL, Salina, Kansas. He would like 144-MHz ms skeds, and 432-MHz tropo skeds. If he can do as well as the other Kansas DRL, he will be a welcome addition to the fraternity!

At Des Moines, WB0AAM is preparing for summer DXing on fm, with stacked 11-element Yagis at 70 feet. Jerry says repeaters are fine, but there is more to 2-meter fm than that. And from Rochester, Minn., W0OHU reports surprising results during a four-month series of schedules with W9OII, over a 250-mile path.

VE3EBS has increased his states worked total to 27 and will be recorded in the next listing.

220 and 432 MHz reports will be increasing with the approach of favorable tropo conditions. But W6FZJ, San Jose, continues to use the moon for his contacts, not to be dependant on tropo. Joe exchanged reports with W9WCD, DeKalb, Ill., March 13, via the moon, bringing Joe to four states worked and W9WCD to 23. W6FZJ continues to work VE7BBG and schedules F8DO and VK2AMV.

K7ICW, Las Vegas, had his receiving system cleaned-up and is running schedules with W6HPH over a 270-mile mountain-obstructed path. Al says HPA2800 hot carrier diodes work well in converter front ends, without degrading noise figure. Al says also that Fred Brown, W6HPH, a long-time experimenter with converters, reports \$1.50 Sylvania ECG160s are equal to the more expensive and popular AF239 devices.

At Rochester, Minn., W0OHU plans power higher than his 2 watts, for summer tropo DXing, but had worked 5 states with that power level; pretty good from Minnesota. VE4MA, Winnipeg, lost the balun on his 432 array during the middle of the Canadian winter, forcing Andy to use a smaller antenna until weather warms.

Turning to 1296 MHz, we find the Crawford Hill group in New Jersey assaulting the current 5100-mile DX record. Spearheaded by Dick Turrin, W2IMU, the W2NFA gang is putting an excellent signal into Australia via the moon. VK3ATN heard W2NFA for 2 hours solid February 9, and on February 20, VK4ZT and VK3AKC also heard W2NFA. All three Australian stations are using dish antennas measuring 10 to 20 feet. K0JIN has supplied VK3ATN with a WB6IOM ring-type amplifier for late-March two-way tests with W2NFA. We expect to have a new 1296 DX record to report after those tests are completed. QST

Operating Events

de WTVL

May

3 **W6OWP Qualifying Run** (W6ZRI, alternate) 10-35 wpm at 0400 GMT on 3590/7090 kHz. This is 2100 PDST the night of May 2. Please note that dates are always shown at least two months in advance and times are always the same local "clock time," i.e. 9 PM local Pacific time. Underline one minute of highest speed copied, certify copy made without aid and send to ARRL for grading.

5-6 **H-22 Contest**, p. 107 April.

5-7 **Georgia QSO Party**, p. 107 April.

12 **Frequency Measuring Test, World Telecommunications Day Contest**, cw, page 107 April.

12-13 **Russian Contest**, p. 107 April.

12-14 **Connecticut QSO Party**, p. 107 April.

13 **YL ISSB QSO Party**, cw, write W7EOL for details. (Phone version May 19-20.)

16 **WLAW Qualifying Run** (10-35 wpm at 0130 GMT) on 3,580 7,080 14,080 21,080 28,080 50,080 and 145,588 MHz. This is 2130 EDST the night of May 15. 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.

19 **Armed Forces Day**, this issue. **World Telecommunications Day Contest** phone, p. 107 April.

19-20 **Tennessee QSO Party, Five Flags ARC VHF Contest**, p. 108 April.

23-Aug. 30 **Royal Canadian Mounted Police 100th anniversary commemoration**, p. 81 April.

26-27 **New York State QSO Party**, sponsored by the Rensselaer Polytechnic Institute Radio Club, W2SZ, from 1700Z May 26 to 0500Z May 27 and 1200-2359Z May 27. Stations may be contacted once on phone and once on cw on each band. NY stations may work other NY stations. Exchange QSO no., RST and QTH (counties for NY, ARRL section or country for others). Suggested freqs.: cw 1810 3560 7060 14060 21060 28060, phone 3975 7275 14285 21375 28575, novice 3725 7125 21125 28125. Score 1 point per QSO times no. of multipliers (ARRL sections plus counties for NY stations, maximum of 62 NY counties for others). Number the first contact for each new multiplier. A check sheet is requested from stations making over 100 contacts. Appropriate certificates will be issued. Logs should be sent no later than July 1 to John C. Yodis, WA2AEH, 43 Beacon Avenue, Albany, New York 12203. For results, enclose a no. 10 s.a.s.e.

27-June 2 **Ascension Day Commemoration**, p. 108 April.

June

3 **Minnesota QSO Party**, sponsored by the Viking Amateur Radio Society, no time or mode restrictions. Following times/freqs. are encouraged to concentrate Minnesota stations: phone 0000-0400, 0400-0800, 1600-2000; cw 0400-0800, 1200-1600, 2000-2400. Freqs.: 3580-3590, 7080-7090, 14080-14090, 21080-21090; 3980-3990, 7280-7290, 14285-14295, 21380-21390. On all bands, please listen carefully and avoid phone patches and nets. Stations making more than 50 QSOs are requested to include a check sheet for each band worked. Logs must contain all contact exchange information plus date, time, band, mode, and score computations. Please indicate your call, section, county (or country) on the log itself. Logs must be postmarked no later than June 25 and an s.a.s.e. must be included. You will be sent the results of the party as well as a check sheet indicating how the log was scored. Appropriate certificates. Minn. stations send QSO no., B(CT), county. To score, multiply QSOs by multiplier (sections worked on cw plus those worked on phone). Minn. counts as a section. A low-power multipliers of 1.25 may be used if power during entire contest is 250 watts, or less. A bonus of 25 points per mode is given if all sections in one call area are worked (to be added after multiplier). Outside stations send QSO no., B(CT) and section/country. To score, multiply Minn. QSOs times counties worked on cw plus those worked on phone. Same low-power mult. A bonus of 25 points per mode is added after multipliers for every 5 Minn. counties worked. Send logs to the club, Box 3, Waseca, Minnesota 56093.

6 **W6OWP Qualifying Run**.

9-10 **VHF QSO Party**, this issue.

10-14 **Worked All Mass. Cities and Towns Contest**, sponsored by the Mass. Chapter of the National Awards Hunters Club, from 0001 June 10 to 0001 June 14. This is a maximum of 100 possible operating hours. Exchange report, city (or town), county and state, Score 1 point for each Mass. station worked regardless of band or mode utilized. Multipliers are the Mass. Cities and Towns, a total of 351. Mobiles do not count. Community subdivisions of a city or town count only for the city or town of which they are a part (for example, Mattapan is part of Boston, etc.). Final score is the number of different Mass. stations worked times the number of different cities and towns worked. (25 points required for any award). Mobiles may be worked only once regardless of date and/or location. Portables and/or mobiles are considered separate stations from their home station and their scores may not be combined. Portables shall be considered a new station from each location. Single band and multiband categories. Appropriate awards, decision of judges final. Entries must be received by July 31 and must show date/time of Mass. station worked plus the "exchange" info. Send entries to: Nina Robbins, 30 Prospect St., Bridgewater, MA 02324.

10-17 **Massachusetts Amateur Radio Week**; full GMT period. Certificates of recognition will be issued all amateurs who take part. Massachusetts amateurs must work 16 other Mass. amateurs. The rest of the New England States work 8 Mass. Hams. All other continental U.S. amateurs must work 5 Mass. amateurs. DX, including KH6 and KL7, must work 2 Mass. stations. Any band/mode. All amateurs who submit logs meeting the requirements will be issued a certificate signed by the Governor of the Commonwealth who has proclaimed the week of June 10-16 as Massachusetts Amateur Radio Week. Exchange reports, county and state. Logs must also show date/time/frequency. Certificates will be endorsed for band/mode only if requested. Applicants must include a no. 10 s.a.s.e. with their application which must be received no later than July 31. Send to: William C. Holliday, WA1EZA, 22 Trudy Terrace, Canton, Mass. 02021.

14 **WLAW Qualifying Run**.

23-24 **Field Day**, this issue.

23-July 15 **NRL's 50th anniversary celebration**, p. 60 January.

27 **WIAW Morning Qualifying Run**.

JULY

1-Dec. 31 **Italian YL Club Mini-Contest**.

5 **W6OWP Qualifying Run**.

13 **WLAW Qualifying Run**.

14-15 **"Open" CD Party**, cw.

21-22 **"Open" CD Party**, phone; HK Contest.

Aug. 18-19, **SARTG World-Wide RTTY Contest**.

Sep. 8-9, **VHF QSO Party**.

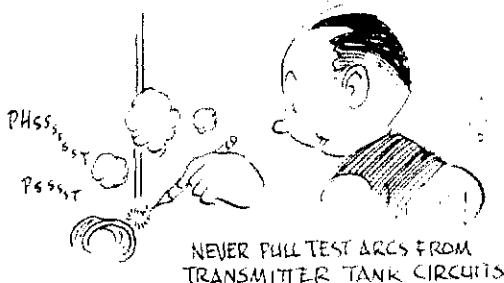
Sep. 22-23, **VE/W Contest**.

Nov. 10-11, **SS, phone**.

Nov. 17-18, **SS, cw**.

Dec. 8-9, **160-Meter Contest**.

QST



Operating News

GEORGE HART, WINJM
Communications Manager
ELLEN WHITE, WIYL
Deputy Communications Mgr.

ASST. COMMS. MGRS.: DXCC, R. L. WHITE, WICW; *Hq. Station*, C. R. BENDER, WIWPR;
Contests, F. D. NISWANDER, WA1PID; *Public Service*, W. C. MANN, WA1FCM.

CQ Field Day. Early last year we were contacted by WA2MYK, Elinor Stecker of Larchmont, N.Y., with a proposal to produce an "ARRL" film on Field Day, to be produced on a low budget using Super-8-millimeter sound film. It sounded attractive, the way she put it, so we gave her full encouragement that we would add it to our Training Aids collection.

The idea was to gather clips from the entire field, taken during the 1972 FD, and combine them with her own footage to make a composite FD production which would be available to clubs through our Training Aids facilities. However, a solicitation for such film produced so little that it was decided to concentrate on footage taken of the Westchester Amateur Radio Assn. FD by WA2MYK. This film is now completed and ready for booking.

We suppose there will be a concentrated rush of clubs wanting to show it before Field Day, but there are only two copies, one with sound-on-film (special projector needed) and one without, but a tape recording accompanies the latter. We have no alternative but to book it on a first-come, first-served basis. Some time after FD, we can decide whether it's a popular enough item to get additional prints made.

Now let's face it, "CQ Field Day" is no "Ham's Wide World." In the first place, no 8-mm. production can equal 16 mm., not even Super-8. In the second place, it contains no professional actors or actresses. In the third place, it was produced on a voluntary basis under field conditions; no setups were made, there was no scenario, no script, no professional direction. Weather conditions did not turn out to be the best, as some of you who went on FD here in the East last year will remember. So don't expect too much.

On the other hand, the film may just set the stage for your own FD and constitutes light entertainment for a club program. We think it is a

fitting replacement for "Field Day at DK," which has long been a popular staple of our film library and is now being retired.

Super-8 sound projectors are not too common, but if you can get one you can use Copy No. 1, which has the sound track on the film. Otherwise, use No. 2, which is without sound but has an accompanying tape recording — either reel-to-reel or cassette. Synchronization isn't always as good with the separate tape, but the sound commentary is arranged as much as possible to make exact synchronization unnecessary.

And speaking of Field Day! Here it is May already, and if your FD plans aren't well under way by now, you're probably not going — not with the idea of racking up much of a score, anyway. Go out if you can. It's a great experience, and even if you're not a hotshot operator you can still contribute through use of other skills, at least one of which you must have. Can you troubleshoot equipment? Know anything about generators? Are you young and agile, available for climbing trees, walking around on roofs, shinnying up poles? Can you cook? Know anything about first aid? How are you at general organizing? Maybe you can contribute something along lines of paper work, logging, scheduling operation, keeping records? Maybe the club can use some of your equipment, transportation, camping gear — or even a site you could make available.

You say you'd like to go out, but nobody invited you? Oh, don't let a little thing like that stop you. Borrow a tent or a trailer or somebody's summer place and "roll your own." (Usually you can get at least *one* buddy to go along.) Experiences in recent earthquakes have shown that the ability to set up literally "in the field" is valuable — when there is danger of buildings crumbling around you. Even in other types of emergency, buildings housing communications facilities can be destroyed or rendered at least



Here's senior SCM W1ALP (32 years service) teamed with Eunice Randall W1MPP, the "first woman broadcaster in the U.S.A." New England Division Director W1QV on the right. (Photo by WITTE.)

WIAW SPRING-SUMMER SCHEDULE

(April 29—October 28)

(The specific frequencies shown below are approximate and indicate general operating periods)

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EDST, Saturday 7 P.M.-1:00 A.M. EDST and Sunday 3 P.M.-11:00 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed May 28, July 4, and September 3.

| Times/Days GMT | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|------------------------|--------------------------|--------|-----------------------|-----------|----------------------|------------------------|----------|
| 0000 | ..... | ← |  |  |  |  | → |
| 0020-0100 ⁴ | ..... | ..... | 3.7 Nov. ⁵ | 14.080 | 14.080 | 7.15 Nov. ⁵ | 14.080 |
| 0100 | OSCAR ¹⁰ | ← | | | | | → |
| 0105-0130 ⁴ | ..... | ..... | 3.990 | 50.180 | 145.588 ² | 1.820 | 21.390 |
| 0130 | ← | | | | | | → |
| 0230-0300 ⁴ | ..... | ..... | 3.580 | | 1.805 | | 3.580 |
| 0300 | RTTY BULL. ³ | ← | | | | | → |
| 0330 | PHONE BULL. ³ | ← | | | | | → |
| 0335-0400 ⁴ | ..... | ..... | 7.290 | 3.990 | 7.290 | 3.990 | 7.290 |
| 0400 | CW BULL. ¹ | ← | | | | | → |
| 0420-0500 ⁴ | ..... | ..... | 3.7 Nov. ⁵ | 7.080 | 3.990 | 7.15 Nov. ⁵ | 3.580 |
| 1240 | ..... | ..... |  |  |  |  |  |
| 1300 | ..... | ..... |  |  |  |  |  |
| 1700-1800 | ..... | ..... |  |  |  |  |  |
| 1800 | ..... | ..... |  |  |  |  |  |
| 1900-2000 | ..... | ..... |  |  |  |  |  |
| 2000-2030 | OSCAR ¹¹ | ← | | | | | → |
| 2030 | ..... | ..... |  |  |  |  |  |
| 2100-2130 | ..... | ..... |  |  |  |  |  |
| 2130 | ..... | ..... |  |  |  |  |  |
| 2200 | ..... | ..... |  |  |  |  |  |
| 2300 | ..... | ..... |  |  |  |  |  |
| 2330 | ..... | ..... |  |  |  |  |  |

¹ CW Bulletins (18 wpm) and code practice on 1.805, 3.580, 7.080, 14.080, 21.080, 28.080, 50.080 and 145.588 MHz.

² Phone Bulletins on 1.820, 3.990, 7.290, 14.290, 21.390, 28.590, 50.180 and 145.588 MHz.

³ RTTY Bulletins, on 3.625, 7.095, 14.095, 21.095, and 28.095 MHz. Bulletins repeated when time permits.

⁴ Starting time approximate, following conclusion of bulletin or code practice.

⁵ WIAW will tune the indicated bands for Novice calls, returning the call on the frequency on which called.

⁶ Participation in section traffic nets.

⁷ Operation will be on one of the following frequencies: 21.02, 21.08, 21.1, 28.02, 28.08, 28.1 MHz.

⁸ Operation will be on one of the following frequencies: 21.260, 21.390, 28.590 MHz.

⁹ When an OSCAR satellite is in orbit, daily updated orbital data is sent at 18 WPM on cw frequencies.

¹⁰ OSCAR orbital data for the coming week, on RTTY frequencies.

¹¹ OSCAR orbital data for the coming week, on cw frequencies.

WIAW CODE PRACTICE

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

| Speeds | Local Times/Days | GMT |
|----------------------|-------------------------------------|------------|
| 10-13-15 | 7:30 PM EDST dy 4:30 PM PDST | 2330 dy |
| 5-7½-10- 13-20-25 | 9:30 PM EDST SaTThS 6:30 PM PDST | 0130 MWF5n |
| 5-7½-10 13-20-25 | 9:00 AM EDST MWF 6:00 AM PDST | 1300 MWF |
| 35-30-25- 20-15 | 9:30 PM EDST MWF 6:30 PM PDST | 0130 TThS |

35-30-25- 9:00 AM EDST TTh 1300 TTh
20-15 6:00 AM PDST

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To improve your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and QST practice text (from the issue 2 months previous) to be sent in the 0130 GMT practice on the following dates:

| | |
|---------|----------------|
| May 11: | It Seems to Us |
| May 15: | Correspondence |
| May 23: | League Lines |
| May 31: | ARPS |
| June 4: | World Above |
| June 8: | YL News |

temporarily unusable. The ability to set up anywhere, on the spur of the moment, in a hurry, with a maximum of versatility and utility, is invaluable. The existence of a wide field of supporting at-home stations is also a valuable asset, without which we could not do.

But Field Day is more than just an emergency exercise, so if none of the above reasons appeal to you, go out and participate, or stay home and participate, just for the doggone fun of it. It's the big event of the year for all hams, regardless of your individual preferences. During the June 23-24

DXCC Notes

Reference the Honor Roll listing for March, 1973. In the processing of some 700 DXCC records (for which deletions were needed for Honor Roll determinations), we inadvertently goofed on two participants records. The Honor Roll total for W0ELA should have appeared as 320/348 CW/F, and the total for WA4WIP should have appeared as 313/318 Phone. Our apologies.



DX CENTURY CLUB AWARDS



Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings - February 1-28, 1973

New Members

| | | | | | | | | | | | |
|--------|-----|----------|-----|--------|-----|--------|-----|---------|-----|---------|-----|
| G3KDB | 276 | DJ6RK | 134 | SV1CH | 110 | G3KPT | 104 | KSDJUT | 102 | KW0OL | 100 |
| W7ORH | 265 | YU3CNO | 130 | CT2AZ | 109 | JA7CF | 104 | VF2CO | 102 | UY50Q | 100 |
| 1198FZ | 261 | JH1CJU | 129 | F5RS | 109 | KL7HGR | 103 | VE5JK | 102 | VE1ART | 100 |
| WB58BD | 211 | SM7JZ | 125 | F9WD | 109 | SM6ERO | 103 | VF7KL | 102 | W1GNC | 100 |
| K4APL | 202 | WSVLF | 122 | D11YH | 108 | UF6HS | 103 | YU1NFR | 102 | W3ZSR | 100 |
| WB9FJV | 202 | UB5JK | 121 | DL1MP | 108 | UQ2IL | 103 | WA5ZDF | 102 | WB4TDH | 100 |
| WA9JCO | 178 | UW3TJ | 121 | K2FKM | 108 | WB8KNZ | 103 | WA1NZT | 101 | WB4VOF | 100 |
| UV3GW | 172 | WA0TKJ | 120 | WA2KWP | 108 | DI1JN | 102 | WA2LWX | 101 | W4GCB | 100 |
| JA1NPV | 160 | LR1TI | 110 | W9RJM | 108 | JH1PEZ | 102 | WA7OBL | 101 | W6AHD | 100 |
| VP9GO | 139 | JA6MBU | 110 | UY5ZI | 106 | K210J | 102 | WRCS | 101 | | |
| DJ2AA | 273 | K8UNG | 197 | DJ6UP | 131 | UB5JK | 113 | W8OGO/4 | 107 | -DU1GJM | 101 |
| UT9SFZ | 250 | WB2KHO | 180 | VP9GO | 130 | ZD8KO | 112 | OK4WPR | 106 | SV1FN | 101 |
| W1JFL | 233 | UV3GW | 161 | YV5CW | 130 | JA6MBU | 110 | F6BOC | 104 | DJ4OC | 100 |
| F9OW | 220 | WA9JCO | 156 | JA1NPV | 127 | JA8ZO | 110 | DI3ZI | 103 | K91CR | 100 |
| TR8DG | 219 | DL2AA/WI | 141 | PY2FCP | 131 | W9WNB | 110 | F1G5 | 102 | W3ZSR | 100 |
| CT2BB | 205 | W4EPZ | 141 | W6PSQ | 120 | W47OJ | 108 | UA9MP | 102 | W7US | 100 |
| WB9FJV | 202 | W7ORH | 141 | JH1CJU | 114 | 9X5WJ | 108 | Z7GYP | 102 | W7ZSL | 100 |
| K4APL | 200 | WB58BD | 137 | PY2DBB | 113 | UB5DE | 107 | W1BKE | 102 | | |

Endorsements

In the endorsement listings shown, totals from 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

| | | | | | | | | | | | |
|-----------|-----|--------|-----|--------|-----|--------|-----|----------|-----|--------|-----|
| OF1FF | 325 | K6PZ | 280 | K9LH | 240 | K3SXQ | 200 | WRHD | 180 | WSRBB | 140 |
| W9CH | 325 | W1JFL | 280 | OZ8BZ | 240 | K4JS | 200 | F8VO | 160 | W7DQ | 140 |
| W4EFO | 320 | W3KA | 280 | VF5GG | 240 | K6M | 200 | I5BOL | 160 | YA1OS | 140 |
| W6FI | 315 | W8OA | 280 | WSKHP | 240 | W1DIT | 200 | K4MRZ | 160 | SZ4IR | 140 |
| W9NLJ | 315 | WA4YVQ | 270 | WA6CXK | 240 | W4KNW | 200 | K3RBA | 160 | JH3HPX | 120 |
| W9JQD | 310 | WRNPF | 270 | W7ZHZ | 240 | WASEMH | 200 | K6BUU | 160 | K6SF | 120 |
| WA4TSP | 305 | K5JZY | 260 | W0LU | 240 | W5YMW | 200 | K8CML | 160 | K7NTW | 120 |
| WB6UDC | 305 | WS1GW | 260 | K9ZPJ | 220 | W6JZU | 200 | W1DAY | 160 | K8LGY | 120 |
| W5OBS | 300 | WSNBI | 260 | KP4DLW | 220 | DK2LM | 180 | W1RML | 160 | SL5BG | 120 |
| W7LEA | 300 | WA6LLY | 260 | W2S2 | 220 | JA1FNZ | 180 | WB2AID | 160 | WA1COA | 120 |
| JA2PIC | 290 | WB6WHM | 260 | WA2FJW | 220 | K6VA | 180 | WA5ZWC | 160 | WA1JKZ | 120 |
| K4CYU | 290 | K4BHG | 250 | WA4LDM | 220 | PA0JR | 180 | WA8FWZ | 160 | WA1NSJ | 120 |
| K4IR | 290 | PY5TUG | 250 | WA9FQG | 220 | VE7BZC | 180 | K5CSK | 140 | WA1PID | 120 |
| VE7IG/VE8 | 290 | W3AG | 250 | DJ1QT | 200 | W2GWT | 180 | K4PCL | 140 | WB2MAN | 120 |
| WB6DXU | 290 | WRUM | 250 | DJ6BN | 200 | WA4UFW | 180 | VE5CJ | 140 | WA3KQZ | 120 |
| WR6MX | 290 | K4LR | 240 | DK5OK | 200 | WB4LXF | 180 | DL2AA/WI | 140 | WA7GYR | 120 |
| G2GM | 280 | K8UNG | 240 | DL6PI | 200 | WB4TUP | 180 | W1NIV | 140 | ZP5AO | 120 |
| SP6RT | 280 | | | K3ICA | 200 | | | W2JKN | 140 | | |
| W61SQ | 310 | VE3BSJ | 270 | OZ4FA | 220 | WA0HZP | 200 | WB4TPU | 160 | K5RBA | 140 |
| OA4OS | 305 | WA4YVQ | 270 | WA6LLY | 220 | OK4YA | 180 | W5YMW | 160 | LASQK | 140 |
| WA4TSP | 305 | W5QBM | 260 | WBXJM | 220 | VE6RP | 180 | WRHD | 160 | W2MSV | 140 |
| W9JQD | 305 | K4HS | 250 | W9NLJ | 220 | W2MPK | 180 | WRPCA | 160 | WA2EJS | 140 |
| HP1JC | 300 | WB6WHM | 250 | W9YRM | 220 | W4KNW | 180 | W9OKL | 160 | WA4NIB | 140 |
| K9LKA | 300 | WRCOG | 250 | ZE1BP | 220 | WA7BPS | 180 | WA9YEW | 160 | WA4UFW | 140 |
| WB9UDC | 300 | CP1FW | 240 | I3CRW | 200 | W8MBB | 180 | WB1BH | 160 | W7DQ | 140 |
| W7LEA | 300 | K6PZ | 240 | K4BHG | 200 | JX6RL | 160 | WA8VWZ | 160 | JH3HPX | 120 |
| CT1MW | 280 | W8LAX | 240 | WSNQN | 200 | K6SE/2 | 160 | DJ1QT | 140 | VO1CV | 120 |
| SM5WJ | 280 | K9LH | 220 | WASEMH | 200 | PY1BOL | 160 | F5BV | 140 | W3AVJ | 120 |
| W5OBS | 280 | K9VOK | 220 | WASSMM | 200 | W1DAY | 160 | K2C/BC | 140 | W6MFC | 120 |
| WA9IVL | 280 | | | | | | | | | W6OZF | 120 |

weekend, you'll hear a lot of "CQ Field Day" on the air. *Be a part of it!*

Prosigns and Such. We have been asked, by an amateur who returned to the air after a long lay-off, to mention that the reason prosigns, ending signals and other cw symbols are expressed in the form of letters in print is simply for the sake of convenience, not necessarily because this is the way they are supposed to be sent. That is, when the letters are to be run together, they are overlined. Thus, it makes little difference whether we say SK or VA, KN or NG, SOS or VGI in print;

on cw, it all comes out the same. Reason we standardize on certain letters is to convey meaning in print. For example, you wouldn't say that the standard distress call is VGI, would you? Ridiculous! Yet, when strung together as it should be, it comes out the same as SOS. Similarly, we customarily use SK, KN, AR and others. Don't separate them, when using them. Run them together; that's what the overline means.

How about CL? Ah, that's different! This prosign is supposed to be separated into the two letters, because it stands for something - "closing station." Confusing, ain't it? - *WINJM*.

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE - SCM, Roger E. Cole, W3DKX - RM: W3EEB.
 PAM: WA3GSM. PSHR: WA3GSM 61, K3KAJ 56.

| Net | MHz | Time (EST) | Mgr. |
|-------|---------|-------------|--------|
| DTN | 3.905 | 6:30 PM M-F | WA3GSM |
| DEPON | 3.905 | 5:45 PM S | WA3QUJ |
| DEPN | 3.905 | 6:00 PM S | WA3GSM |
| DE2MN | 145.260 | 7:30 PM M | WA3BAO |

The resignation of SEC WA3DUM because of work and school pressures is accepted with regret. Jim did a fine job. U. of Del. is claiming most of WA3HD's time. Sussex Co. EOC has a new HW-12 in operation. WA3RTX now active in the Rehoboth Beach area. On June 2 and 3 Delaware Ham Campers and friends will gather at Tuckahoe Acres Camping Resort, Dagsboro. More information from W3ZNF or W3DKX. DTN QNI 111, QTC 53/51. DEPN QNI 43, QTC 3. Traffic: K3KAJ 127, WA3GSM 126, WA3DUM 48, W3DKX 38, W3EEB 24, W3HKS 2, WA3SYT 1.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3PBF. RMs: W3EML, K3BR, WA3AFI, K3MVO, K3PLE, W3CDB. PAMs: K3BHU, WA3PLP. OBS reports from WA3AH, W3ID, WA3EUG, WA3OOZ, WA3LWR, W3CBH. OO reports from W4KCM, W3FTG, W3KEK, W3BFF, K3RDT. OVS reports from W3CL, W3ID. BPLs: K3BHU, WA3OGM. PSHR: K3DIO, WA3OGM, WA3QLG, WA3QOZ. Net reports are getting later each month. If yours doesn't show it didn't get here in time.

| Net | kHz | Operates | QNI | QTC | RM/PAM |
|----------|------|-------------|-----|-----|--------|
| PEM(Jan) | 3960 | 5:30 P.M.-F | 810 | 606 | K3BHU |
| PEN | 3960 | 5:30 P.M.-F | 585 | 613 | K3BHU |
| PTN | 3610 | 6:30 P.Dy | 130 | 57 | WA3AFI |
| FPA | 3620 | 7:00 P.Dy | 310 | 222 | K3BR |

RM WA3AFI put out a real nice annual report on PTTN. W3KEK doing fine on OO FM tests. RF Hill ARC elected the following new officers: K3AWZ, pres.; WA3MOY, vice-pres.; K3AXA, treas.; W3JSX, secy. Hope by this time W3EML will be fully recovered. WA3OGM is filling in for him. WA3OGM and WA3KWU now regulars in FCC. WA3ATQ still having sked with SS Hope. U of P ARC W3ABT really active these days. W3NNL received Public Service award and they spelled his name wrong! WA3CKA moving up to VHF 6 now and 2 later. W3ID doing well on 2-meter fm. RF Hill ARC banquet had 87 attending. W3KCM says his FM test should make Class I OO. WA3RKH says he has an all band antenna and no problems with harmonics. How about sending it to ARRL so we all can use it! W3GMK let his license expire, have you checked the renewal date on yours lately? W3FTG made DXCC after 15 years! W3EU reports local ORM soon, his grandson just passed Novice test. WA3RKH now has 25 wpm sticker for his code proficiency certificate. Let's get those reports and net activity reports in early. Traffic: K3BHU 704, WA3OGM 510, WA3QOZ 404, K3PLE 306, K3DCB 154, K3BR 150, WA3ATQ 97, K3MVO 79, WA3MOP 72, W3ABT 65, K3DIO 60, WA3KWU 58, WA3QLG 44, W3NNL 43, W3NSZD 42, W3ADE 38, WA3AFI 36, WA3CKA 20, WA3QWP 17, W3TQB 16, WA3IYC 15, W3VAP 15, W3ID 14, W3CBH 13, W3BNK 12, W3CL 9, K3KTH 8, W3BUR 7, W3KCM 7, W3OML 7, W3OY 7, W3WRE 6, K3MNT 3, WA3RKH 3, WA3BJQ 2, W3EU 1, WA3EUG 1, W3FTG 1, W3GMK 1, W3KEK 1.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medrow, W3FA - SEC: K3LFD. RM: W3EZT. PAM: K3TNM. NCM: W3LDD. Congratulations to W3TN and WA3RCI Feb. BPL men and WA3IYS who made it in Jan.

| Net | Freq. | Operates | Sess. | QTC | QNI Avg. |
|--------|-------|------------|-------|-----|----------|
| MDD | 3643 | 0000/0245Z | 56 | 285 | 4.25 |
| MEPN | 3920 | 2300Z MWF | 23 | 69 | 24.50 |
| MDCNTN | 3920 | 2300Z TTSS | 16 | 52 | 27.20 |

MEPN also meets Sat. and Sun. at 1800Z. Attention: the annual get together is planned for July 22 at the Patpasco State Park McKeldin area 501. W3FZV and W3CFJ worked a few in the Novice Roundup. W3TN sponsored W3FA for QCWA membership. K3RUQ and W3ZNW planning new antennas for 80. WA3QNP has a 60-ft. windmill tower with visions of a big Quad. W3QU nominates W3TN as top brass for Feb. WA3TOM says the American Univ. Club is giving code and theory classes while awaiting the club license. WA3RJS agrees with the ARRL resolution. W3CDQ visited KV4AA during her latest jaunt. K3QAP reports WA3SSB to General and WA3TWX to Advanced Class. WA3RVU made it to General Class. W3BHE says the Cumberland Club spawned WN3UBP, WN3UHK, WN8OOG and WN8OOH as new ones with upgrades WA3SYD, WA3SYF, K3YDA to General and WA3TFX to Advanced Class. Congrats to all. The Chesapeake ARC and WA3OHP take over the MDC QSO party duties from K3JYZ and the Maydale ARC. Look for dates sometime in Aug. K3RXT gave a very good talk to the Goddard ARC on the NASA communication worldwide setup. W3ABC says the WG3SFC cards are beginning to roll. W3EOV has lots of travel plans and a good traffic list as well. W3OKN says he is "ground breaking" on an SB102. WN3UHH passes along his special thanks to his WA3QEL of the IBM ARA WA3PJG enjoys his stint as a Page at the General Assembly. W3FCF putting his beam to DX-chasing use. The Net Mgr. of the East Coast Teenage Traffic Net is WA3SWS. WA3EHK and K3GZK are ginning up some new ARL texts for service messages. WA3RCI takes on a paying job to buy new equipment. WA3QIA a busy beaver on the cw nets. K3TNM keeps the fone net humming. W3LDD has 63 counties to go. WA3AFQ looking forward to the CD party. WA3QDH curtails radio to become an actor at High Point High. W3ADQ keeps Southern MD active. WA3LQV reorienting his activities. Back to the fold from the sunny west and south is WA3IIV. Traffic: (Feb.) W3TN 313, WA3RCI 220, WA3QIA 113, W3OU 112, W3EOV 106, WA3PJG 105, WA3SWS 86, W3OKN 64, WA3QDH 63, K3GZK 61, WA3AFQ 53, W3EKA 46, K3TNM 44, W3FCF 39, W3FZV 17, W3BHE 16, WA3ERH 13, W3ADQ 10, W3ZNW 6, W3ABC 3. (Jan.) WA3IYS 502.

SOUTHERN NEW JERSEY - SCM, Charles L. Travers, W2YPZ - Acting SEC: W2YPZ. PAM: WB2FJE. RM: W2I1.

| Net | Freq. | Time(PM) | Sess. | QNI | Tyc. | Mgr. |
|-------|-------|----------|-------|-----|------|--------|
| NIPON | 3925 | 6 Su | 4 | 75 | 18 | WB2FJE |
| NISN | 3730 | 8:15 Dy | 14 | 11 | 5 | WA2RYD |
| NJPN | 3950 | 6 M-F | 28 | 495 | 271 | WA2IVH |

Trustee K2RRC reports the Burlington County ARC officers for 1973 are WA2LXW, pres.; W2PKF, vice-pres.; WA2SNO, WA2BKK, treas. The Cherry Hill HS East ARC, W2MBC, recently has applied for affiliation. The station has capability for the simultaneous operation of three stations at once. Work is continuing on the erection of the second tower which will support a quad and a 20-meter beam. WB2FNK, secy. of the club is an OBS. Latest bulletins are transmitted on 3965 kHz. OO WA2NKV has been working very hard and doing a very fine piece of work. In his latest report he found the most common infractions were splatter and distortion. Most hams are very cooperative and immediately try to improve the condition. K2ARY reports that regular bulletin transmissions are made on the following schedule: Thur. at 0200Z on frequency 29.0 and on Tue. at 0200Z frequency 146.27. Traffic: WB2VFI 276, WB2UVB 147, WA2CZA 131, WB2JF 26, W2ZQ 20, W2YPZ 16, W2J14 13, WB2GBR 10, W2Z1 10, W2IU 9, WA2TRK 9, WA2KWB 6, WB2FNK 5.

WESTERN NEW YORK - SCM, Richard M. Pitzeruse, K2KTK - Asst. SCM: Rudy Ehrhardt, W2PVI. SEC: W2C1P. Check that expiration date on ye ole appointment. If due, (or past due!), drop me an SASE and I'll send you an endorsement sticker. Easy enough? The Auburn Amateur Radio Association is contemplating a combined picnic/auction. In 28 Feb. sessions, ESS handled 124 pieces of traffic. WA2AQO qualified for an ESS certificate. How about you? Know how to handle traffic? WB2VND does a nice job on the

Heathkit® 2-Meter FM gear is here!



NEW Heathkit
2-Meter
FM Transceiver

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HW-202 shown above
with Tone Burst
Encoder installed.

• All solid-state design • Can be completely aligned without instruments • 36-channel capability — independent push-button selection of 6 transmit and 6 receive crystals • 10-Watts Minimum Output — designed to operate into even an infinite VSWR without failure • Optional Tone Burst Encoder — mounts inside, gives front-panel selection of four pre-settable tones

The Heathkit HW-202 compares with the best wired amateur 2M/FM rigs. Plus it has: 36-channel capability via independent selection of 6 transmit and 6 receive crystals. Solid-state circuitry with complete built-in alignment procedures using only the manual and the front-panel meter allow operation over a 1 MHz segment from 143.9 to 148.3 MHz. Removable front-panel bezel permits installation of the new Heathkit HWA-202-2 Tone Burst Encoder.

10-15 watts transmission into an infinite VSWR — indefinitely, with no failure! The HW-202 needs no automatic shut-down — it continues to generate a signal regardless of antenna condition. Transmitter deviation is fully adjustable from 0 to 7.5 kHz, with instantaneous deviation limiting. Harmonic output is greater than -45 dB from carrier. The push-to-talk ceramic microphone supplied has an audio response tailored to the HW-202.

Excellent reception — 0.5 uV or less produces 12 dB Sinad, or 15 dB quieting. Output at the built-in speaker is typically 2 watts at less than 3% total harmonic distortion. The receiver circuitry utilizes diode-protected dual-gate MOSFETS in the front end; an IC IF that completely limits with less than a 10 uV signal; dual conversion, 10.7 MHz and 455 kHz via a 4-pole monolithic 10.7 MHz crystal filter. Image response is -55 dB or better. Spurious response is -75 dB or better.

The Heathkit HW-202 comes with two crystals used in initial set-up and alignment, give you simplex operation on 146.94. Kit includes microphone, quick-connecting cable for 12-volt hook-up, heavy duty alligator clips for use with a temporary battery, antenna coax jack, gimbal bracket, and mobile mount that lets you remove the radio from the car by unscrewing two thumbscrews. The HWA-202-2 Tone Burst Encoder provides four pre-settable pushbuttons for instant repeater access. Fixed station operation is as easy as adding the HWA-202-1 AC Power Supply. The HA-202 2-Meter Amplifier puts out 40 watts for 10 watts in, and externally it's a perfect mate for your HW-202.

Kit HW-202, 11 lbs., mailable 179.95*

Kit HWA-202-2, Tone Burst Encoder, 1 lb. . . 24.95*

Kit HWA-202-1, AC Power Supply, 7 lbs. . . 29.95*

Kit HWA-202-3, Mobile 2-Meter
Antenna, 2 lbs. 17.95*

Kit HWA-202-4, Fixed Station 2-Meter
Antenna, 4 lbs. 15.95*

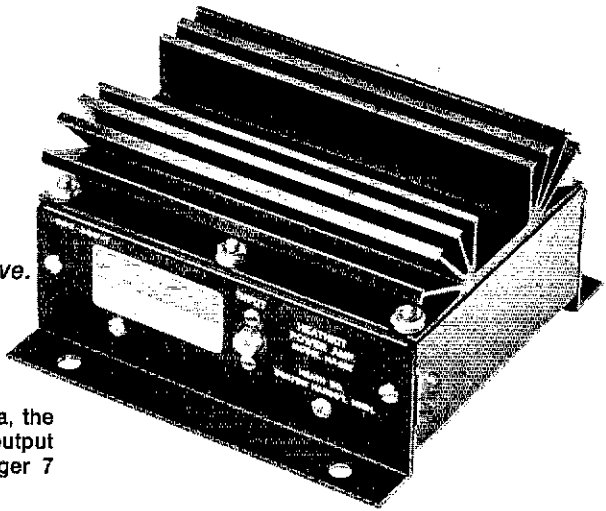
HW-202 SPECIFICATIONS — RECEIVER — Sensitivity: 12 dB SINAD* (or 15 dB of quieting) at .5µv or less. Squelch threshold: 3 µv or less. Audio output: 2 W at less than 10% total harmonic distortion (THD). Operating frequency stability: Better than ±.0015%. Image rejection: Greater than 55 dB. Spurious rejection: Greater than 60 dB. IF rejection: Greater than 75 dB. First IF frequency: 10.7 MHz ±2 kHz. Second IF frequency: 455 kHz (adjustable). Receiver bandwidth: 22 kHz nominal. De-emphasis: -6 dB per octave from 300 to 3000 Hz nominal. Modulation acceptance: 7.5 kHz minimum. TRANSMITTER — Power output: 10 watts minimum. Spurious output: Below -45 dB from carrier. Stability: Better than ±.0015%. Oscillator frequency: 6 MHz, approximately. Multiplier factor: X 24. Modulation: Phase, adjustable 0-7.5 kHz, with instantaneous limiting. Duty cycle: 100% with ∞ VSWR. High VSWR shutdown: None. GENERAL — Speaker impedance: 4 ohms. Operating frequency range: 143.9 to 148.3 MHz. Current consumption: Receiver (squelched): Less than 200 mA. Transmitter: Less than 2.2 amperes. Operating temperature range: -10° to 122° F (-30° to + 50° C). Operating voltage range: 12.6 to 16.0 VDC (13.8 VDC nominal). Dimensions: 2¾" H x 8¼" W x 9¾" D.

*SINAD = $\frac{\text{Signal} + \text{noise} + \text{distortion}}{\text{Noise} + \text{distortion}}$

...and here!

NEW Heathkit
2-Meter Amplifier for cleaner
FM copy on the fringe... 69.95*

40 watts nominal out for 10 watts in —
requires only 12 VDC supply.
Fully automatic operation — with any
2-meter exciter delivering 5-15 watts drive.
Solid-state design — all components
mount on single board for fast,
easy assembly.



If you're regularly working from a fringe area, the new Heathkit HA-202 can boost your mobile output to 40 watts (nominal), while pulling a meager 7 amps from your car's 12-volt battery.

Install it anywhere...in the trunk, under the hood or dashboard. Use it with any 2-meter exciter delivering 5-15 watts drive. Features fully automatic operation. An internal relay automatically switches the antenna from transmit to receiver mode when you release the mike button.

All solid-state design features rugged, emitter-ballasted transistors, combined with a highly efficient heat sink, permitting high VSWR loads. Tuned input-output circuits offer low spurious output to cover the 1.5 MHz segment of the 2-meter band without periodic readjustment. All components mount on a single printed circuit board for easy,

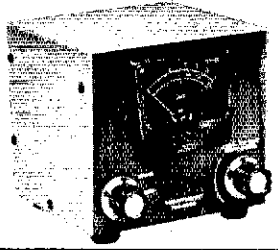
4-hour assembly. Manual shows exact alignment procedures using either a VOM or VTVM. And installation is just as simple.

Kit includes transceiver connecting cable, antenna connector. Operates from any 12 VDC system — additional power supplies are not required. Add HA-202 power to your mobile 2-meter rig, and boom out of the fringe. **Kit HA-202, 4 lbs.**

HA-202 SPECIFICATIONS — Frequency range: 143-149 MHz. Power output: 20W @ 5 W in, 30W @ 7.5W in, 40W @ 10 W in, 50W @ 15 W in. Power input (rf drive): 5 to 15W. Input/output impedance: 50 ohms, nominal. Input VSWR: 1.5:1 max. Load VSWR: 3:1 max. Power supply requirements: 12 to 16 VDC, 7 amps max. Operating temperature range: -30° F. to +140° F. Dimensions: 3" H x 4 1/4" W x 5 1/2" D.

...and here!

New Heathkit
VHF Wattmeter/SWR Bridge... 29.95*



Perfect tune-up tool for your 2-meter gear. Tests transmitter output in power ranges of 1 to 25 watts and 10 to 250 watts ±10% of full scale. 50 ohm nominal impedance permits placement in transmission line permanently with little or no loss. Built-in SWR bridge for tuning 2-meter antenna for proper match, has less than 10-watt sensitivity. **Kit HM-2102, 4 lbs.**

HM-2102 SPECIFICATIONS — Frequency range: 50 MHz to 160 MHz. Wattmeter accuracy: ±10% of full-scale reading.* Power capability: To 250 W. SWR sensitivity: less than 10 W. Impedance: 50 ohms nominal. SWR bridge: Continuous to 250 W. Connectors: UHF type SO-239. Dimensions: 5 1/4" W, 5 1/8" H and 6 1/2" D, assembled as one unit. *Using a 50 Ω noninductive load.

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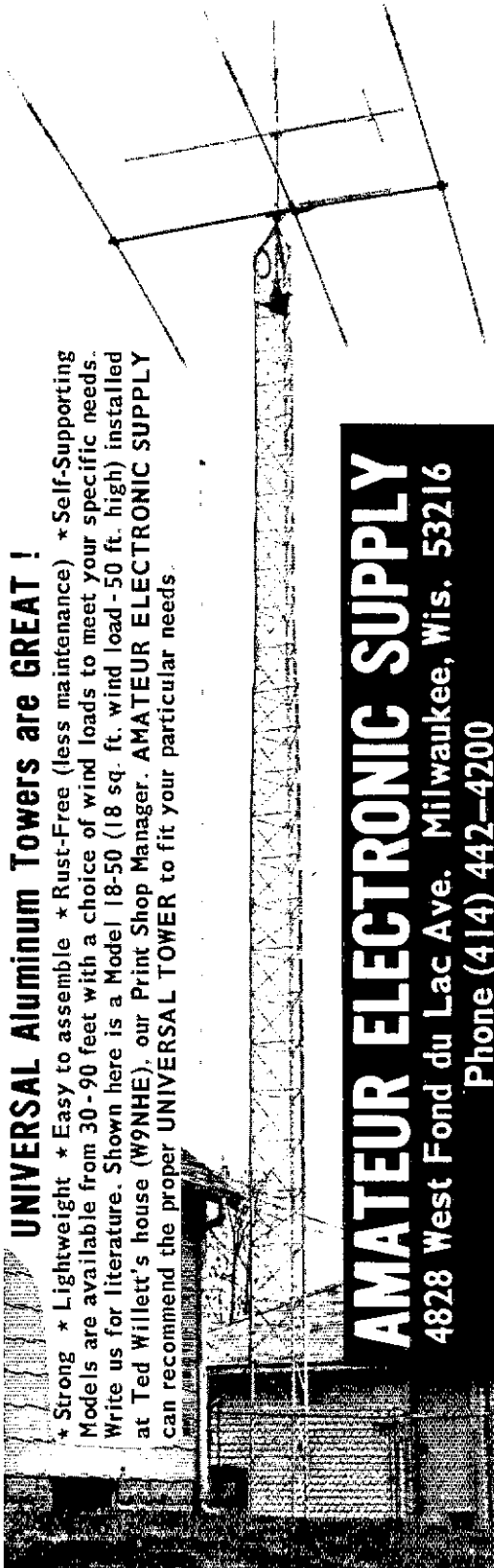
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monthly ESS Bulletin. The RARA gang had a real good time at their 12th annual Valentine dinner-dance. The Utica Amateur Radio Club has elected WA2LEZ, pres.; W2IPO, veep; K2SOT, treas.; WA2EXZ, secy.; W2DNR, W2QXA, WB2QAX and WA2ZVN, board. The Liverpool Amateur Repeater Club elected K2OLE, pres.; WA2LLA, vice-pres.; W2FPP, secy.; K2PJS, treas.; W2EEA, W2YRL, W2SBA and W2EOS, board. W2EOS is the new Onondaga County EC. With 26 sessions in Feb. NYS handled 409 messages with 813 check-ins. Standing room only at RAWNY when W2FLF and W2PBU demonstrated SSTV. WA2NRE has free Novice classes for RAWNY and ARATS. 14 Buffalo clubs are having WIHQ talk on "trips on ten" on May 10. WB2NRE is crushing rocks with his new linear. Congrats to WA2FHI on his new Advanced and to WB2FIC on his new General. K2CZN has a new HW-12A and W2FWQ a new SB-401. Sorry to hear of the illness of W2FFD. WN2SMM and WN2OXH upgraded to General. K2ISN and XYL are reworking a half gallon. The 1973 Hamburg International Hamfest will be Sept. 15, 1973. Tickets and information from WB2HCL. W2EMW is getting parts together to get something back on the air after his year or so in the South. The Tompkins County Radio Club has elected K2GOU, pres.; WA2WXZ, vice-pres.; WB2TNL, secy.-treas.; WB2TQE, trustee. BPL this month to WB2ADW. Traffic with * indicating PSHR: (Feb.) WA2ELD* 23b, W2FR* 229, W2RUF* 194, WA2ICU* 17b, K2KQC 155, WB2ADW 133, W2MTA* 131, WA2AYC 123, WB2LFX* 57, W2RUT 55, WA2LCC* 54, W2ROF* 53, WB2HCL 52, WA2PUU 47, WA2ABI 43, WA2TLB 36, WB2NRK* 35, WN2FHX 30, W2GLB 28, W2PVI 26, K2OFV 25, WB2VND 24, W2EAF 23, W2HYM 23, WA2MPC 16, W2PZL 14, K2IMF 13, WA2AOG 12, WA2DRC 12, WB2QAP 11, WA2SIS 8, K2KTK 7, WA2SMO 6, WA2AIV 4, WA2CEA 3, WA2OMN 2. (Jan.) W2CFP 56, WA2DRC 36, WA2QMN 6.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEM - SEC: W3KPI, PAM: K3ZNP, RM: W3KUN, W3LOS, WA3IPU, WPA CW Net meets daily on 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. at 6:30 P.M. on 3585 kHz. WPPNN (Western Penna. Phone Net) is being reactivated. Manager is K3ZNP and will meet daily on 3896 kHz at 4:45 P.M. local time. All those interested in NCS spots and other functions contact K3ZNP. Initial starting date was Apr. 1, 1973. The newly formed Juniata Valley ARC announces new officers as K3KDK, pres.; K3OFN, vice-pres. WN3TRG, secy.; WN3TTU, treas. New Novices in that area are WN3S IJ, IJ, TRE, IRI, IRG, IJU, UGZ, UHA. The Nittany ARC held their annual Inauguration Banquet on Mar. 6, 1973 and installed the following officers for the coming year: WA3KWD pres.; WA3LJV, vice-pres.; K3RBH, secy.; W3ZX, treas.; W3NEM trustee. The Sky-View Radio Society also has new officers for 1973 with W3QCL, pres.; WA3EJO, vice-pres.; K3JRV, secy.; W3GVI, treas. The Indiana County ARC has received the special call of WT3REE for their annual Christmas Tree celebration the 3rd weekend of May. Look for them. WN3UGW is a new Novice in the Indiana area. The Radio Association of Erie announces their annual auction on June 9, 1973 at Waldameer Park starting at 9 A.M. RAL also has been running monthly transmitter hunts over the winter months. Congrats to W3ZUH who has obtained his SBWAS certificate number 140. Public Service Honor Roll for Feb. WA3OOR 46, W3LOS 39, W3NEM 39, W3YA (W2KAT/3 opt) 34, WA3PXA 32. WPA CW Net had 490 QNI, 28 sessions, 260 QTC. 10 more QNI would have broken an all time high record (on 28 days)? Traffic: W3YA 202, K3CR 191, W3KUN 129, WA3OOR 120, W3LOS 110, W3NEM 99, W3MJ 66, K3HCF 58, WA3IYA 52, WA3PXA 52, K3ZNP 51, W3ATO 27, WA3LU 19, WA3MDY 19, W3SAY 19, K3SMB 18, K3SIN 12, W3IDO 9, WA3IDA 8, W3ELL 6, W3LOD 3, K3TNH 3, WA3PML 2.

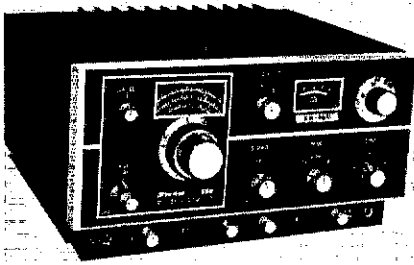
CENTRAL DIVISION

ILLINOIS - SCM, Edmund A. Metzger, W9PRN - SEC: W9RYU PAMS: WA9CCP and W PDI (vht) RM: W9MLC: Chgo County EC: W9HPG.

| Net | Freq. | GMT/Days | Loc. |
|---------|-------|------------------|------|
| ILN | 3690 | 1400 Su | 5 |
| ILN | 3690 | 0630 Dy | 20* |
| NCNPN | 3915 | 1300 M-S 1800 | 136 |
| III PON | 3915 | 1430 | 85* |
| III PON | 145.5 | 0200 MWF | 2 |
| III PON | 50.28 | 0200 M | 0 |
| ILNN | 3720 | 0100 Dy | 80 |

The ILN set a record of over 500 QNIs this month. The Dewitt County Civil Defense is now using two meter gear. The first WR call

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| ALLIED A-2514 Speaker \$ 12 A-2515 Receiver 59 A-2514 Receiver 99 | 753 55B Xcvr 119 952 DC supply 49 950 Res-Cap Comparator-Bridge 25 | HQ-110AC Receiver 159 HQ-140X Receiver 119 HQ-170C Receiver 149 HQ-170C Receiver 159 HQ-170A Receiver 194 HQ-170A/HF Receiver 199 HQ-215 Receiver 225 HX-50A Xmtz 199 | NCX-500 Xcvr 269 NCL-2000 Linear 375 AC-500 AC supply 75 | SINGER PR-1 Panadaptor \$ 89 |
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| AMECO CN-50 (30.5-34.5) \$ 29 PV-144 Preamp 9 TX-62 VHF Xmtz 79 621 VFO 39 | ELMAC PMR-6A Receiver \$ 39 PMR-8 Receiver 79 PSR-612 Supply 19 AF-67 Transmitter 49 | HEATHKIT HR-10 Receiver \$ 49 HR-20 Receiver 69 RX-1 Receiver 139 XS-4 6m Converter 25 HS-24 Speaker 9 DX-20 Transmitter 29 DX-35 Transmitter 35 DX-60 Transmitter 59 TX-1 Transmitter 99 HW-10 6m Xcvr 129 HW-20 Transmitter 125 HX-30 6m Xmtz 149 HA-20 6m Linear 66 HW-12 75m Xcvr 75 HW-32A 20m Xcvr 85 HW-16 Transceiver 99 HW-100 Transceiver 249 SB-110C Transceiver 375 SB-310 SWL Rec 229 SB-303 Receiver 289 SB-500 2m Xvter 175 SB-620 Scanzlyzer 119 WH-3 (Seneca) 39 VHF-10 (Twoer) 119 HF-23A AC supply 54 HF-23B AC supply 59 HRA-101-calibrator 7 HO-13 Hamcan 69 HW-17 2m Xcvr 119 HWA-17-1 DC supply 16 | SWAN SW-120 Transceiver \$75 SW-140 Transceiver 75 NS-1 Silencer 24 410 VFO 85 VX-1 VOX 19 410C VFO 85 50B VFO 95 117B AC supply 59 350 Xcvr (early) 249 350 Xcvr (late) 289 500 kc Calibrator 15 500C Swan Xcvr 369 500CX/SS-14B Xcvr 459 500 Transmitter 349 117AC AC supply 59 117XC AC supply 89 117C AC supply 75 TV-2 2m Xvter 189 22B VFO adaptor 25 TV-2B 2m Xvter 225 250 6m Xcvr 229 210 VFO 85 250-C 6m Xcvr 339 1200X Linear amp. 199 FM-2X 2m FM 219 | YAPETONE XC-50 (14-18) conv. \$29 TEMPO FMA 2m FM Xcvr \$239 ACA AC supply 25 TEN-TEC Argon-35 \$208 PM-3 20-10m Xcvr 49 PM-3A Transceiver 54 RP-10 Receiver 39 PM-2 Transceiver 34 PM-2A Transceiver 39 TX-100 Transmitter 69 |
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* - no shipping - pick-up only

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| B & W 6100 55B Xmtz \$239 | CELEST QT-1 Anti-trip \$ 6 100-V Transmitter 325 20-A Transmitter 99 BC-55B w/10m VFO 39 | COLLINS 75A-4 (ser.# 765) \$325 75A-4 (ser.# 2146) \$375 75A-4 (ser.# 3535) 399 75A-4 (ser.# 4125) 449 75S-1 Receiver 325 R-1000 Receiver 795 R-390A Receiver 795 22V-2 Transmitter 149 22S-3 Transmitter 695 KHP-1 Transceiver 249 351D-1 Mount 35 KWH-2 Mount 649 516F-1 AC supply 75 516E-1 DC supply 75 G-11 carrying case 60 MM-1 mobile mike 15 | CONSOLE G-35 AC supply 65 G-35 DC supply 65 RV-550 VFO 59 G-200 DC supply 75 VX-111 VFO 9 SC-35 Speaker 15 DAC-35 Dk. console 69 G-1000DC supply 95 PR-550 ph. patch 34 F-3 300 cycle filter 24 2000 Linear/Supply 249 Duo-Bander Xcvr 99 AC-384A AC supply 69 FM-210 2m FM Xcvr 99 Supply-booster 19 Duo-Power 300 (combo AC-DC supply) 69 AC supply for rector 4 | CONSOLE Comm IV 2m \$149 Comm IV 6m 125 Comm IV 220Mc 220 GC-105 2m Xcvr 119 G-50 Transceiver 139 910A 6m Xcvr 199 Thin-Pak 19 G-76 DC supply 49 972-A Comtron 2m 12vdc Linear Amp - 180 watt 149 | JOHNSON Valiant I \$ 29 Valiant II 139 Valiant III 189 Invader 200 225 Invader 2000 495 275w Mbox/SWR 69 6N2 VHF Xmtz 89 TR Switch 19 | KNIGHT R-100 Receiver \$ 59 X-10 Calibrator 9 T-50 Transmitter 24 T-50A Transmitter 69 TR-106 6m Xcvr 69 V-107 VHF VFO 19 TR-108 2m Xcvr 89 | LAFAYETTE HA-500A Receiver \$ 89 HA-225 Receiver 79 HA-750 6m Xcvr 49 HB-500 AC supply 19 | LAKESHORE Bandhopper VFO \$ 59 | MILLEN 9220 Transmatch \$ 99 | HOSLEY CM-1 Receiver \$ 99 | NATIONAL NC-98 Receiver \$ 89 NC-125 Receiver 75 NC-155 Receiver 119 NC-270 Receiver 125 NC-300 Receiver 125 NC-303 Receiver 199 HR-5071 Receiver 125 HRO-60 Receiver 199 NCX-5 Receiver 329 NCX-5 Mk II Xcvr 369 NCXA AC supply 75 NCXD DC supply 75 NCXE AC supply 75 |
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NEW EQUIPMENT SPECIALS & CLOSEOUTS

Due to the low prices and limited quantities of the merchandise listed below all prices are for "Payment in Full With Order—No Trade".

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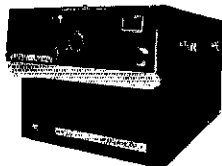
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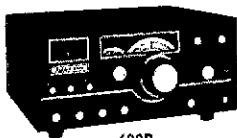
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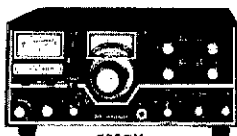
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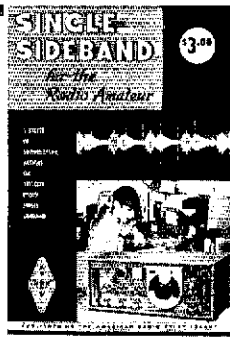
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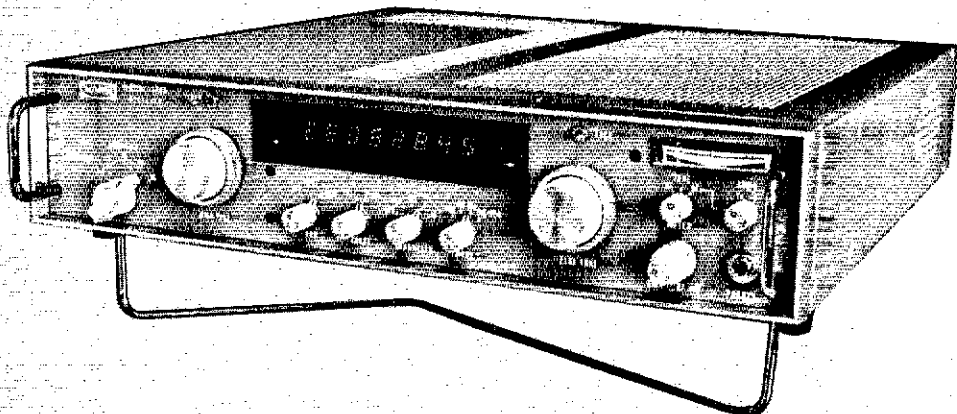
in U.S. was unveiled at the Joliet Amateur Radio Club's banquet. The call of their station is WR9AAA. WB9FVG RTTY. WB9KHK passed the Advanced Class exam. WN9LW and WN9LOW are new Novices in the Springfield area. Officers of the Egyptian Radio Club, Inc. are WA9WOB, WB9HZG, K and W9YZE. Their annual Hamfest will be held June 24 on club house grounds. The Six Meter Club of Chicago will hold picnic and Hamfest on Sun. Aug. 8 at Frankfort, Ill. The San Valley Radio Club of Springfield will soon be active on 6 repeater operation. K9VGN is the new pres. of the Teleprinter Society. The TriTown Banquet will be held on 1. New appointments this month include WB9HEG and W9ZORS; K9RGL OG and WB9FVG OBS. The Davenport Amateur Club's second annual Hamfest was well attended by of the Ill. gang and reports were that all had an EB eyeball. The Chicago FM Club's Radio Expo '73 committee are working hard to make this year's event the finest. Date is July 7 and 8 at the Lake County Ill. Fair Grounds. They promise a good time attending. Director Haller appointed W9JXV of Decatur, as Dir. and the certificate was presented to him by W9PRN a Feb. meeting. Traffic: (1-Feb.) WB9NXG 266, W9MUC 169, W145, WA9OBK 130, WB9FHI 83, W9LNO 74, W9OY WB9FVG 58, W9FHD 48, W9JUC 48, WB9GSS 44, W9K WA9HLC 40, WB9JBS 36, WA9LHU 19, W9HOT 17, W9K WB9EIP 10, W9PRN 10, WB9HAD 5, W9HPG 1. (Jan.) W46, WB9HAD 6.

INDIANA - SCM, William C. Johnson, W9BUQ - WA9YXA. RMs: WA9EED, W9HRY, WB9KVN. PAMs: K (vbf), W9HWR, W9PMT.

| Net | Freq. | Time(Z)/Days | Tfc. |
|-------------|-------|--------------------------|------|
| ITfCN | 3910 | 1330-2300 Dy 2130 M-S | 405 |
| QIN | 3656 | 0100-0400 Dy | 245 |
| IFON | 3910 | 1300-2130 Su 2000 S | 27 |
| IFON CW | 3740 | 0100 Dy | 95 |
| IFON VHF | 50.7 | 0100 M-W-Th | 12 |
| IFON SSB | 50.7 | 0200 Dy | 60 |
| Hoosier VHF | | | 23 |

With deep regret, I report W9WUH as a Silent Key. Lake ARC had their Annual Banquet Feb. 10 with W9HPG as speaker. WB9CAC received the Outstanding Amateur Award Year. W9PNP reports Gibson Co. AREC Net 3 session check-ins, traffic 3, time 87 minutes. W9KT made 104 contacts the CD party. After 10 years WA9FUD passed his General exam. QIN members receiving Section Net Certificates: WB9FST, WB9EAY, WB9KVN, K9HPD, WB9GVT, K WB9LHL. K9YZB advises all amateurs who use a Pacemaker read the article in Mar. QST page 58. Indianapolis Radio Amateur directory for Marion Co. should soon be out. New Net in Clark Co. are WN9LWZ, WN9LTI. K9FZX picked up traffic the morning on 20 and brought it to the ITfCN on 80 at 2 PSHR list is from cw traffic nets, phone operator take note Honor Roll: W9LEL, W9QLW, W9HDP, K9HYV, WA WB9KVN, W9LHL. Amateur radio exists because of the rendered. Ind. Traffic Net total estimated. BPL: WB9AHJ, T (Feb.) WB9KVN 436, WA9LED 272, WB9AHJ 173, W9I-W K9KTB 141, K9FZX 138, K9HDP 111, W9QLW 93, WB9EA K9HYV 80, W9HRY 61, W9BUQ 54, W9ZSC 51, K9CB WB9GVT 48, W9LHL 46, W9JBO 44, WB9HOT 36, WA9OE W9PM1 31, WA9TOD 30, W9EL 29, K9YBM 26, K9RF WA9OKK 22, K9IQY 21, W9KWB 19, K9ILK 17, WA9T K9PSU 12, K9DIY 11, WA9OAD 11, WA9ULH 11, WA9YX WN9IUQ 9, WA9WA 8, WB9BAP 7, K9EQT 6, WN9I WN9HQU 5, WA9NOA 4, WB9CAC 2, WB9DWW 2, W9P WA9VBG 2, W9BDP 1. (Jan.) WB9LHL 160, WB9GVT WN9IHH 86, WA9YXA 40, W9KT 18, WA9ULH 13.

WISCONSIN - SCM, Joseph A. Taylor, W9OMT - W9NGT. PAMs: K9JHI, WA9OAY, WA9OKP. RMs: W K9KSA. Net statistics: WIN (date) QNI 188, QTC 113. WIN QNI 327, QTC 167. Wisconsin Slow Speed Net QNI 61, (Congrats to W9CXY for BPL again this month. The MRAC with ARPC is planning to assist in communications for Milwaukee Summerfest July 13-22. We are always glad to report news Public Service assistance by section amateurs. Incomplete liminary reports on the SFT held in Jan. indicate 244 s participating with something like 900 messages handled. WA9 new pres. of Tri-County ARC. He's also been working through Geneva Repeater with a new HR-212. W9HXV now is by Madeline Island in Lake Superior after two months visiting s daughter and mobbing as M3 and M4. He has a new Maco qu



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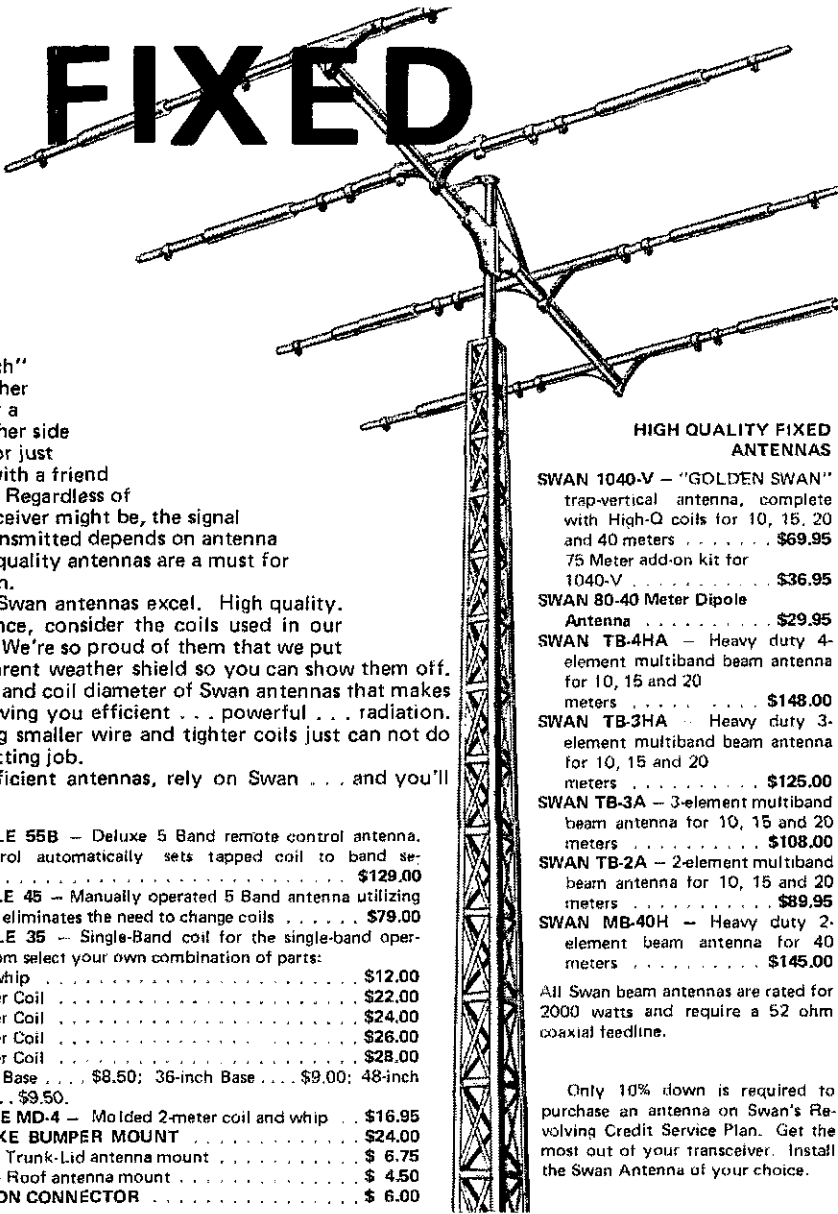
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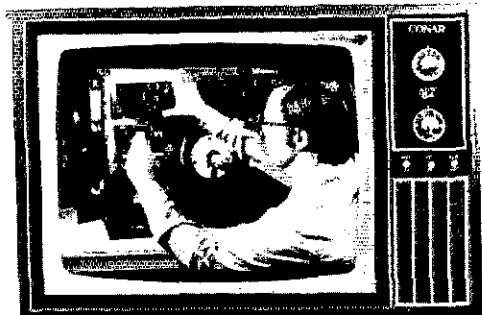
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SB-220 to match his Drake TR-4. W9HHJ, WB9GKY and W9HX have been representing Wise, in the Tri-State net which meets Tu and Fri. at 1430 GMT on 3920. W9UCR now working up a storm on two meters with a new HR-2A. K9DAY is sporting a new SB-303, SB-401, 200. WB9FDG is back on the air with an HR-5. W9PJT reports the Neenah-Menasha banquet will be held on May and all are welcome. W9MMP now teaching a novice class ever Wed. night at Bloomer High School. He also is on the air with a new HT-44 and SX-117. Lake Geneva repeater machine on the air on 37/97 from Elkhorn. WB9ICF reports an estimated mobile range of about 40 miles. K9KSA gave a fine talk at the Mar. meeting of the WVRA on integrated circuits. Traffic: W9CXY 610, W9MFG 130, W9UCR 50, W9AYK 44, K9KSA 34, W9MMP 33, W9KRO 15, W9IRZ 14, WA9AJW 9, W9PJT 8, K9UTQ 7.

DAKOTA DIVISION

MINNESOTA - SCM, Casper H. Schroeder, WA0VAS - The family of W0NO are all amateur radio operators with calls WN0JJA, WN0JBE, WN0JJC, WN0JJD. The Eagle Scout award was presented to WB0DZA. We regret the passing of WA0WYJ. BPL traffic: (Jan) WA0VAS 1865, K0CSE 612, WA0DCJ 405, WA0YVT 19, WA0TFC 140. (Dec.) WA0VAS 1400, W0ZHN 634, K0CSE 57, WA0YVT 229, W0BUC 227, K0GNI 179. Traffic: (Feb.) WA0VA 1053, WB0FMN 580, WA0YVT 250, WB0HOX 212, WA0GRX 164, K0ZRD 160, WA0TFC 113, W0BUC 85, WA0VTZ 85, WA0ON 84, WB0FMR 71, W0VIA 69, WA0IAW 58, W0NO 57, WB0TI 54, WA0VYB 46, WA0YAH 46, K0ZBI 43, W0RIO 41, K0LFI 31, W0OPX 37, WB0CNM 36, K0CSE 35, WA0IB 29, WB0EMI 21, WA0URW 24, W0WAS 24, WB0DDH 23, K0PIZ 19, WA0KQU 13, K0MVF 14, W0IDM 13, WA0PZY 13, WA0MMV 12, K0LDS 1, WB0BOA 10, WA0JPR 10, K0ITW 8, WA0NOB 8, WB0CYM 7, K0GNI 7, K0TCG 7, K0WXH/0 7, WA0YER 6, WA0DCJ 5, WA0YGE 5, W0KYG 4, W0PET 4, WA0HRM 3, K0LWK 3, K0VPI 3, WA0EBZ 1.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC WA0AYL. OBS: K0PVG, RM: WA0MLE. OO: W0BFF, W0BIO. hopes to be on 75 meters. W0BFF is on 160 with sub. WA0RW took time off from her hospital duties to become an XYL. Congrat Jean. Sherwood is now on the map with two stations. John received his old call W0QSP back while his XYL came up with WB0JGM. W0CAQ reported to be very much improved. FB. WA5WSU/0 has been heard from Finley. The Theodore Roosevelt Club reports W0KXP on with a Hallierafter, WB0EER with a Heath 101 and WB0GIZ with an HW-22A. WB0ETR is a YL. The Feedback RC of Gratton hosted the Forx Amateur Radio Club and those of the surrounding area. A good time was had by all. The Interest Trophy was won by the Forx Club. W0HNV, The Honorable Amateur of The Year and the Outstanding Amateur was K0MDB. WA0MLE and WA0FLO continue their good work on T.N. WA0MLE again made BPL. Some items may be missing, W0DM was called to Minneapolis because of the illness of his mother.

| Net | kHz | CDT/Days | Sess. | QNI | QTC | Mgr |
|-------------|--------|----------|-------|-----|-----|-------|
| Goose River | 1900 | 0900 S | 4 | 55 | 1 | W0CD |
| RACES | 3996.5 | 1730 M-F | 40 | 748 | 48 | W0AA |
| | | 1830 M-F | | | | WA0SU |
| YL WX | 3994.0 | 0730 M-F | 20 | 352 | 355 | WA0GR |
| PON | 3996.5 | 0900 Su | 11 | 254 | 15 | WA0SJ |
| | | 1830 S-S | | | | |
| NDN | 3642.0 | 2150 M-F | | | | WA0ML |

Traffic: WA0MLE 302, W0WWL 43, WA0SUF 15, W0CDO 1, W0PDT 8, W0MXF 8, W0BAU 2.

SOUTH DAKOTA - SCM, Ed Gray, WA0CPX - The South Dak. CW Net continues to be very active. RM WA0INM and all other controls are doing a fine job. You are encouraged to check it. The SDN CW meets at 7:00 CST at 3650 kHz. If the procedure worries you contact WA0INM and he will be happy to explain it to you. SDN CW Net reports 23 sessions with a QNI of 210 and QTC of 67. The Hub City ARC of Aberdeen has started code and the classes. Don't forget the S.D. Ham picnic is scheduled for Aberdeen this summer. WA0VIX has a new SB-102 and has been on t.w. from Rapid City, Huron, Mitchell, Yankton, Watertown, and the Northern Hills areas are discussing putting in repeaters. It looks like most of them will get started this summer. Net reports: K0N 581 QNI and 24 formal; Early Evening QNI 729 and 26 formal. Late Evening QNI 1488 and 43 formal. Traffic: W0ZWL 35, W0MZI 218, W0HOJ 106, WA0EN 93, WA0ROK 76, W0IC 4, K0WA0NM 47, K0AUF 24, WA0BZD 34, W0DYB 23.



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| | | | |
|--------|-----------|-------------|---------|
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| AR-220 | 100 watts | 220-225 MHz | 12.50 |
| AR-450 | 100 watts | 420-470 MHz | 12.50 |
| AR-6 | 100 watts | 50-54 MHz | 18.50 |

(B) **4 POLE:** A four dipole gain array with mounting booms and coax harness 52 ohm feed, 360° or 180° pattern.

| | | | |
|---------|------------|-------------|---------|
| AFM-4D | 1000 watts | 146-148 MHz | \$42.50 |
| AFM-24D | 1000 watts | 220-225 MHz | 40.50 |
| AFM-44D | 1000 watts | 435-450 MHz | 38.50 |

(C) **FM MOBILE:** Fiberglass 3/8 wave professional mobile antenna for roof or trunk mount. Superior strength, power handling and performance.

| | | |
|--------|--------------------|---------|
| AM-147 | 146-175 MHz mobile | \$26.95 |
|--------|--------------------|---------|

(D) **POWER PACK:** A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

| | | | |
|---------|------------|-------------|---------|
| A147-22 | 1000 watts | 146-148 MHz | \$49.50 |
|---------|------------|-------------|---------|

(E) **4-6-11 ELEMENT YAGIS:** The standard of comparison in VHF/UHF communications, now cut for 2 meter FM and vertical polarization. 4 & 6 Element models can be tower side mounted.

| | | | |
|---------|------------|-------------|---------|
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| A147-11 | 1000 watts | 146-148 MHz | 17.95 |
| A220-11 | 1000 watts | 220-225 MHz | 15.95 |
| A449-6 | 1000 watts | 440-450 MHz | 10.95 |
| A449-11 | 1000 watts | 440-450 MHz | 13.95 |

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| | | | |
|----------|------------|---------------|---------|
| A147-20T | 1000 watts | 145 & 147 MHz | \$39.50 |
|----------|------------|---------------|---------|

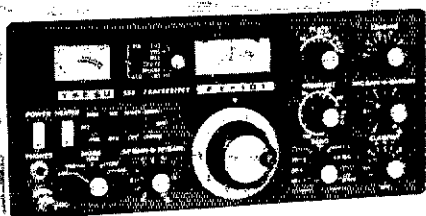
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| MMB-1 | Mobile bracket | 9 |
| FA-9 | Fan | 19 |
| MIR-1 | FT-101 mod. kit | 40 |
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| FTdx-401 | Transceiver | 599 |
| FLdx-400 | Transmitter | 339 |
| FRdx-400D | Receiver | 299 |
| FRdx-400SD | Rec. w/6 & 2m | 399 |
| FV-401 | External VFO | 99 |
| SP-401 | Speaker | 19 |
| SP-401P | Speaker/Patch | 59 |
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DELTA DIVISION

LOUISIANA - SCM, John R. Riviere, K5AGI - Asst. SCM: Louis Muhleisen, Jr., WB5AFH. SEC: K55VD. RM: W5GHP. YHF PAM: W5KND. The first meeting of the La. Council of Amateur Radio Clubs was held Mar. 10 in Lafayette. Attending from LARC: K5DPG, K5ARH; TCHS WASYKD, WASZCF, BRARC WASOLU, W5OVV; CLARC WB4NMC/S; GNOARC WB5AFH; NOVHFC W5AKND; DDXA WA5WEY, W5YFO; JARC WA5WHS; ARRL K55VD La. SEC: W4WHN Delta Div. Director and W4WBK Vice Dir. Interim chm. is K5DPG and secy-treas. is K5ARH. The next Council meeting will be Baton Rouge on May 5 in conjunction with BRARC Hanifest. All La. clubs are cordially invited and encouraged to attend. Let's make this the greatest Amateur Radio Club organization on a state level anywhere! The 1973 LARC Banquet scheduled for May 10. A great time in store for all. W5EVH/WB5BPD was the recipient of the K5AGI Trophy as winner of the La. QSO Party. Others receiving awards were K5ARH, K5UO, W5MPX and XYL W5EXI. A special "Passport to Cajun Land" went to LAIRB and KYL. Nice going LARC! W5GHP reports Old Timers to LAN W5CEZ and K5OKR checking in again. K5WOD announces that the Springhill ARC has reorganized. Officers are K5WOD, pres.; WASLNL, vice-pres.; W5AFRU, secy-treas.; K5QNX, act. mpr. W5EA lost his antenna in a rare La. ice storm, but should soon be back on the air again. W5THS moved to Denver. MTA new officers are WB5APJ, pres.; WB5CXJ, vice-pres.; W5SWQM, secy.; WB5APL, treas.; WB5DJC, K5HAN, K5MKW and W5ATRL, hon'dr. Traffic: W5M 223, W5GHP 203, W5ZZA 129, W5CEZ 71, W5WBZ 49, W5LA 14.

MISSISSIPPI - SCM, Walker Coffey, W5NCB - Asst. SCM: Gene McGahey, WA5JWD. SEC: W5FHL. PAMS: W5JHS, W5KEYE. RMs: W5YZW, WB5DEK, PSHR: WB5ELN, W5AMZ, K5YTA, WB5DLW, WB5ML. BPL: WB5ELN, WB5ML. Welcome to new hams: W5N1Q, W5N1L, W5N1V, W5N1M, W5N1K, W5N1P, W5N1X, W5N1Z, W5N1Q, W5N1R, W5N1U, NE Miss. ARC: K5DGL, pres.; W5N1G, secy-treas. Thanks for the Public Service activity reports, fellows, which are very valuable in documenting our case to the FCC. K5MDX has moved to Ga. WB5ENF back home at Gulfport with Advance ticket after 4 years in Navy. New club formed at Vicksburg, more later. W5N1VY was in NR and has WAS confirmed. Congrats to WB5GNR with Advance ticket. FCC reg. have depressed interest in 2-meter repeater applications and phone patches. Start planning now for FD in June.

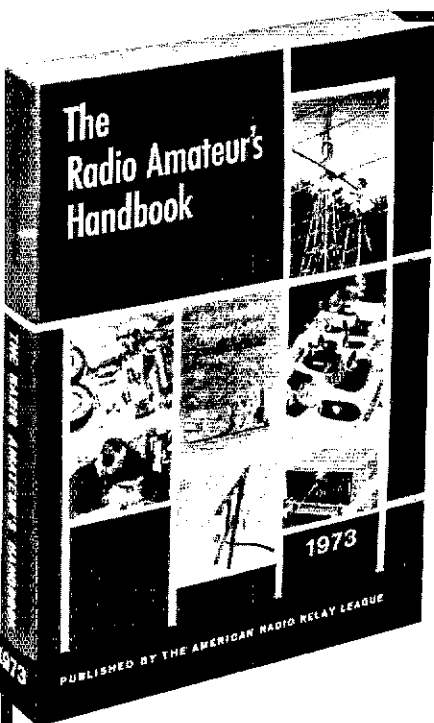
| Net | Freq. | Time/24 Days | QNI | QTC | Mgr. |
|-------|--------|--------------|------|-----|----------|
| MTN | 3665 | 2:45 Dy | 189 | 230 | W55YZW |
| MNN | 3733 | 0100 TFS | - | - | WB5DJK |
| GCSBN | 3925 | 2:30 Dy | - | - | W5IHS |
| CGCHN | 3935 | 0100 Dy | 1306 | 123 | W55VYV |
| MSPON | 3970 | 0845 MS | 343 | 53 | WA0GVO/S |
| MSKN | 3987.5 | 0015 Dy | 995 | 162 | WB5BUI |

Traffic: WB5ML 211, WB5ELN 204, WB5DLW 160, W55YZW 119, W5EDT 100, W5NCB 72, K5YTA 72, W5AMZ 70, W5WZ 43, WB5BUI 25, WA0GVO/S 24, W51U 19, W5SHNZ 15, W5SAHY 9, W5ATHM/S 8, W5NHYV 5, W5BW 2.

TENNESSEE - SCM, O.D. Keaton, WA4GLS - SEC: WB4ANX. PAMS: W4PFP, K4MOI, WA4EWW, WA4NEC. RM: W4ZJY.

| Net | Freq. | Time/24 Days | Sex. | QNI | QTC | Mgr. |
|---------|--------|--------------|------|------|-----|--------|
| TPN | 3980 | 1400 M-F | 28 | 1683 | 78 | W4PFP |
| | | 1400 SSuH | | | | |
| JNSBN | 3980 | 0030 T-Fu | 24 | 1447 | 54 | K4MOI |
| EJPN | 3980 | 1140 M-F | 22 | 515 | 24 | WA4EWW |
| TCN | 3980 | 0200 Th | 4 | 33 | 0 | W4CYL |
| TPON | 3980 | 0030 M | 4 | 198 | 15 | WB4BHZ |
| LN | 3635 | 0000 Dy | 28 | 224 | 191 | WB4YCV |
| TNN | 3707.5 | 0000 Dy | 28 | 157 | 40 | WB4USG |
| E1VHFN | 50.4 | 0000 TFS | 14 | 194 | 0 | W45GI |
| E1VHFN | 145.2 | 0000 WF | 9 | 36 | 0 | WB4DZG |
| FTIMN | 78.7 | 0200 WF | | | | WB4NH |
| MFTMN | 28.8 | 0200 TF | 9 | 61 | 0 | W4Y4Y |
| KVHFN | 50.7 | 0100 T | 4 | 22 | 0 | WB4MPJ |
| KVHFN | 146.22 | 0100 T | 4 | 15 | 0 | WB4MFI |
| | 146.52 | | | | | |
| ACAREUN | 146.28 | 0100 M | 5 | 68 | 0 | WB4DPI |
| | 146.88 | | | | | |

New officers of the Oak Ridge RC are WA4BXX, pres.; WB4VSI, vice-pres.; K4MOA, tech. chm.; WA0EDP/4, secy-treas.; WA4XXZ, pub. chm. The new Net Mgr. for the ACAREC is WA4BXX, K4PR attempting to set up a middle Tenn. chapter of the OWCA; contact him if interested. WB4NIR replaces WB4USG as Mgr. of TNN. CW Net Honor Roll for Jan.: WN4BUE, WB4NIR, WB4USG, WB4YCV, W4ZJY. Congrats to WB4YCV on qualifying for the CW Net Mgr. Award. YN1AMC made a very interesting presentation of the



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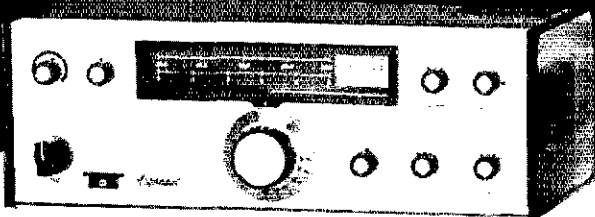
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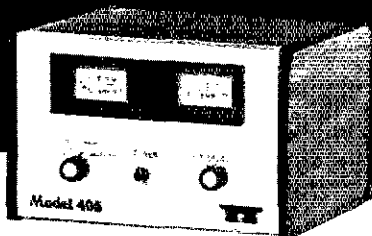
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| Net | QNI | QTC | Net | QNI | QTC |
|------|------|-----|------|-----|-----|
| KRN | 345 | 34 | KYN | 272 | 233 |
| MKPN | 571 | 48 | KNFN | 145 | 95 |
| KTN | 1301 | 199 | KPON | 92 | 72 |

SEC WA4GHJ reports that for the first time in many moons all 21 Emergency Coordinator positions are filled. Good work Jim! The hamfests are starting! The Prestonsburg 'fest will be May 3. New licensees: K4TXJ and WB4YAF have their Advanced while WN4S ZMG and ZMK are soon dropping the "N". WN4DFQ is a new Novice in Owensboro. Numerous "brass" attended the QST award to W4JRW. They included: Vice-Director W4JYU; SEC WA4GHJ and W4CID. WB4YAF now has CP-25. Traffic: WB4WCM 406, W4BAZ 176, W4B2SA 110, K4TXJ 92, WN4ZMK 84, K4UNW 81, W4CID 77, K4MAN 77, W4EOR 68, W4AUN 59, WA4GHJ 57, WB4NHO 48, W4NBZ 43, K4DZM 40, WN4YOS 25, WA4FAI 21, WB4BEO 20, WB4TNZ 18, WB4ZML 18, WA4AVV 17, WA4LNI 16, WA4RCD 16, WB4REN 16, WA4VZZ 16, WB4ROT 14, WB4NFQ/4 13, WB4YAF 13, W4CDA 12, K4QHZ 10, K4LOL 9, W46KIN/4 8, WB4RCD 8, W4B1A 6, W4RTH 6, WB4GCY 4, K4AVX 3.

MICHIGAN - SCM, Ivory J. Olinghouse, W8ZBT - SEC: W8MPD. RMs: W8JYA, W8WVL, W8RTN, K8KMQ, W8GLC. PAMs: K8PVC, W8KHB, W8HQ8, VHF PAMs: K8AEM, W8WVV.

| Net | Freq. | Time/Days | QNI | QTC | Secs. | Mgr. |
|--------|-------|-----------|------|-----|-------|--------|
| QMN | 366.3 | 2300 Dy | 1214 | 448 | 84 | W8JYA |
| W8SB | 3935 | 0000 Dy | 696 | 114 | 78 | K8PVC |
| HR/MEN | 5940 | 2230 Su/F | 721 | 74 | 23 | W8KHB |
| UPFN | 3920 | 2230 Dy | 576 | 35 | 27 | W8HQ8 |
| GLETN | 3932 | 0130 Dy | 607 | 68 | 27 | W8RAK |
| PN | 3955 | 1600 Th | 1018 | 342 | 28 | K8LNE |
| PON/CW | 3648 | 2400 M/S | 167 | 17 | 25 | VE3DHO |
| ML6M | 50.7 | 0000 M/S | 181 | 15 | 17 | W8VXE |
| MNN | 3720 | 2230 Dy | 200 | 73 | 28 | W8JAD |

K8ZWR reports 6-Meter Weather Net 57 QNI and 4 sessions. W8CVQ, W8URH and W8WVY report three 2-Meter Nets 153 QNI and 12 sessions. W8CX and W8OR have joined Silent Keys. Shiawassee ARA elected officers for 1973 as follows: W8AGB, pres.; W8RLK, vice-pres.; W8AZI, secy.-treas. SEMARA elected 1973 officers W8BHW, pres.; W8KAZ, vice-pres.; W8BDZ, secy.; K8JQK, treas.; W8BNYK, W8RX and K8AIZ, dir. W8TD wired the Lansing repeater for emergency power operation. The Lansing gang are getting a very good start on 52 simplex, 52 stations, W8DSW has been OBS for over 12 years. W8OLD is new Novice in Plymouth. K8WEP has new Advanced Class ticket. W8DLO has joined the 2-meter fm gang. W8OIK and VE3FDZ made solid contact across Lake Superior on 2-meter ssb. W8BITX is mobile with MS scanning transceiver. New officers for SRARS are W8BKS, pres.; W8BFXY, vice-pres.; W8SSV, secy.; W8WNT, treas.; W8LN, trustee. P.O. Net Amateur of The Month is W8FBG. Traffic: (Feb.) W8FNW 300, K8KMO 289, W8BX 269, W8PMP 232, W8JAD 217, W8GLC 154, K8LNE 114, W8JYA 110, W8ZBT 100, K8DNI 99, W8HHB 83, W8WZF 76, W8IZ 68, W8FBG 58, K8PVC 58, W8KWI 51, W8TZZ 47, W8TUC 44, W8BIM 41, W8HPZ 40, W8OW 40, W8KHB 38, W8HQ8 36, W8NNTK 35, W8WVL 35, W8NOH 33, K8JED 29, K8MXC 29, K8VZO 28, W8FXR 27, W8MO 25, W8SBBY 22, W8BDIS 22, W8SCW 21, K8WRJ 21, W8BDKQ 20, W8TBP 19, W8FDI 16, W8FQ 16, W8FES 15, K8JLJ 14, W8NDI 14, W8WVV 14, K8ACO 13, W8VIZ 13, W8BEU 12, W8OJI 12, W8ACW 10, W8BDTJ 9, W8FZL 9, K8KCF 8, W8KXI 8, W8DCN 7, K8HJ 7, W8LXY 7, W8N9H 6, W8VXM 6, W8DRD 5, W8HKL 5, K8GOU 4, W8GWK 4, W8RNYO 4, W8ACUP 3, W8DRM 3, W8BEUN 2, K8ODY 2. (Jan.) W8BCXF 32, K8AEM 16, W8HHB 16, W8BII 9, W8LGB 2, W8RXI 1.

OHIO - SCM, William E. Clausen, W8MI - Asst. SCM: Kenneth L. Simpson, W8FTX. SEC: W8COA. RM: W8WAK. PAM: K8UBK. VHF PAM: W8ADU.

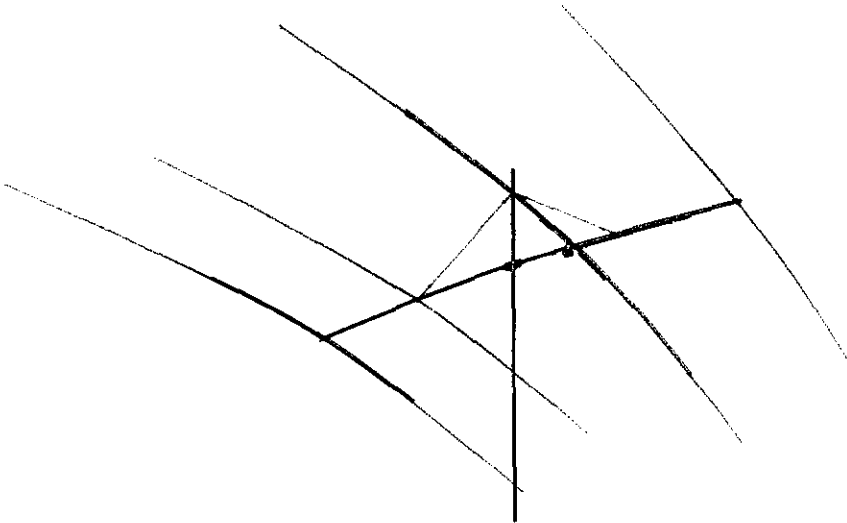
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New appointees: WA3BGE/8, ORS; W8KAG, ORS/OPS. Renewals: W8LZE, ORS; W8JMD, OPS/ORS; K8DHI, OO/ORS. Our thanks to retiring SEC W8OUU for six years of fine service. New SEC is WABCOA - give him your support. W8MCR reports the DNTS Continental Traffic Net is on 14300 at 1730Z. New officers of Lima Area ARC are W8SDHC, pres.; W8ISY, vice-pres.; ex-W8NIDE, secy.; W8WEG, treas.; W8MML, trustee; W8AYS, act. mgr. The Ohio Council of ARCs elected K8UBK, chmn.; W8ZTV, vice-chmn.; W8OUU, secy.; W8EMK, treas. Based on AREC reports, our SFT activity increased approximately 25 per cent this year. W8RTW now is W8TJB. W8HSI has prepared a great circle map based on Cincinnati. Greater Cincinnati ARA's W8DZ now has 2-meter fm to assist AREC. Central Ohio AREC moved its ten meter net to 29.0, Wed. at 0000Z. Congratulations to new Tech. W8BITV and W8BITW and to new Advanced W8MNR, K8HGY, K8JDI and K8PUM promoted ham radio in eastern Ohio on WOH. ARRL's WIUED spoke in Cincinnati and Columbus on "Our Regulatory Dilemma." WABCOA's newspaper column reports that K8CKI, K8CKJ and W8UQI were honored by Greater Cincinnati ARA for conducting code and theory classes which resulted in nearly 1000 new hams in eight years. K8ONA interviewed FCC vice-chmn. Lee and reported it in her Plain Dealer column and on local nets. The Westpark Radiops Log reports the club had a great evening touring the FAA Oberlin Traffic Control Center. W8KXR/PY2ZAN spoke on hamming in Brazil to the Massillon ARC and to the Canton ARC. The Cuyahoga Falls RC Newsletter reports the club net on 50.88 (Mon. at 2000 local) is growing and that liaison has been established with the Apricot Net for Cleveland-Akron area traffic. Southwest Ohio AREC's family picnic is scheduled for June 17 at G.E. Park. Dayton ARA's RF Carrier congratulates new Extra W8SHRR, new Advanced W8BJJ and new Novice W8OFR. The Canton ARC awards a Pro Football Hall of Fame Certificate for contacting 11 club members - W8RDGO is club pres. Traffic: W8IPH 947, W8MCR 270, W8PMI 213, W8YEW 203, W8HGH 176, W8AZM/8 152, W8MGA 149, K8MLO 138, W8OCU 132, W8CUT 130, K8UBK 104, W8WAK 100, W8GVX 91, W8UPD 90, W8HUP 86, W8BETX 82, W8BKZD 74, W8SUS 73, K8BPX 68, W8KKI 66, W8OUU 64, W8DWL 62, W8CHT 56, W8RCWD 56, W8CFL 54, W8BIBZ 53, W8KXV 53, W8SFD 51, W8MCKZ 50, W8WEG 49, W8DDG 47, W8BFXD 47, W8MNR 46, W8YIB 44, W8EEZ 43, W8JGW 42, W8FGD 41, W8SUI 41, W8RTW 38, W8FSX 36, K8JDI 32, W8MOK 32, W8BCSH 31, W8YVW 30, W8BVKF 28, W8FTW 27, W8ENI 26, W8ADU 23, W8BIL 23, W8BFCF 23, W8RAYC 22, W8BXC 21, W8BGE 21, W8MTH 21, W8FAI 20, W8SSI 19, W8ARV 17, W8GLR 16, W8STX 15, W8BLH 12, W8FRD 10, W8GOE 10, W8QZK 9, W8KAG 8, W8WEM 8, W8MHO 7, W8BGE/8 6, K8CKY 6, K8BNI 5, K8DHI 5, W8MAZ 5, K8QYR 4, W8VND 4, W8FTU 2, W8ABL 2, W8RMYA 2, W8VVL 2, W8RMXU 1, K8RXD 1.

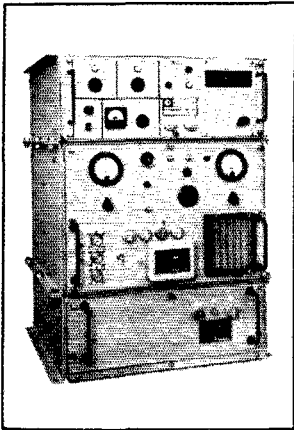
HUDSON DIVISION

EASTERN NEW YORK SCM, Graham G. Berry, K2SJM - Asst SCM/PAM; Kenneth Kroth, W2VJB. SEC: W2URP. RMs: W2ZFI, W2IXW. RTTY RM: K2DN. Nets: see last column for detailed listing of times and frequencies. Add to list Hudson Division P/R net designed to help clubs with their Public Relation problems on second and fourth Sun. 3.925 at 2200Z; NC: W2ZFB. All clubs affiliated or not are welcome to have representative check in. Look for opening sessions of daytime National Traffic System, which should be a going concern by the time you read this column. Long time RM W2VYS, has had to resign; can't let her go without a deep bow of thanks for her help. Replacement is W2IXW, sharing with W2ZFI the RM assignment for the section. Ev has primary responsibility for the down-state counties, Westchester, Putnam, Rockland, Orange, Dutchess and Ulster - Marty the rest. New OBS appointment, active primarily on fm schedule through K2AVP repeater, to W2VUK, W2SVH now holds ORS appointment. Regret to report K2CA, ex-W2ASF, joined Silent Keys Feb. 8. Harmonic Hills plans classes for newcomer starting soon. Details from PO Box 73, Katonah, RPI Club, W2SZ, sponsoring NY QSO party in Apr. Schenectady and Albany Club both are main springs of County AREC. WARA, Westchester County senior club, heard K2BQO on his 2-meter "handie talkie" experiences in Europe last summer. Welcome to new calls at Harmonic

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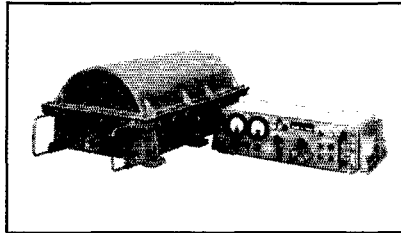
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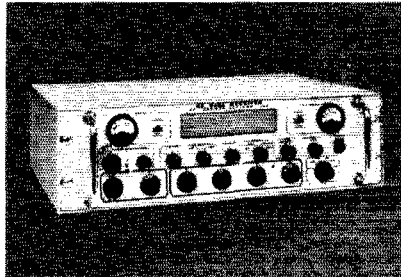
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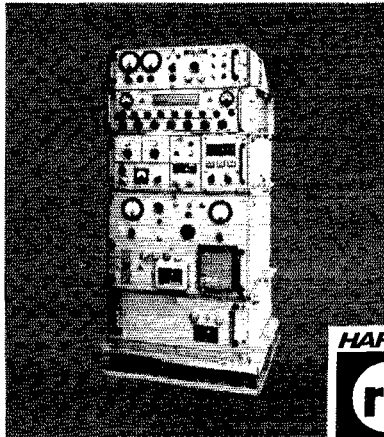
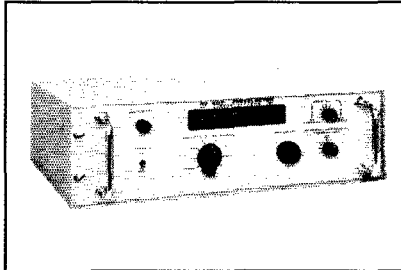


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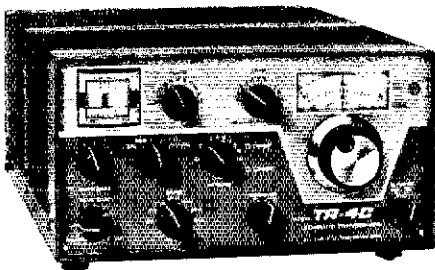
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Hills: WB2KEF, WN2HSI, WB2OLO, K2COG. Schenectady ARA heard Dr. R.L. Orville from SUNY on "Lightning." Albany ARA speaker Emil Sticht of NY Telephone Co. on new system developments; holds its Annual Dinner May 19 - details from WA2KUL. Communications Club of New Rochelle claims new record - Feb. speaker has been wiped out by "bug" of some sort each of past three years! W2VP and W2KGV recuperating nicely. WA2PIL back from /6, planning for 280-ft. legs on his V-beam. WA2WGS handled arrangements for BQ dinner. K2DN looking for more ENY check-ins on his RTTY net; latest starter WA2CNE. WB2DXM reports Albany County AREC now 20 months strong. Traffic: (Feb.) WA2CNE 312, WA2LIK 182, K2DN 92, W2OPH 87, WB2DXM 52, WB2VJB 30, K2DYK 30, WA2WJS 29, K2SJM 28, WB2LXC 23, WA2PIL 20, WA2RFP 12, WB2SON 10, WB2KLY 9, K2HNW 6, WB2CUH 5, WA2EAH 5, WB2NME 4. (Jan.) WB2VJB 24.

NEW YORK CITY AND LONG ISLAND - SCM, Fred J. Brunjes, K2DGI - SEC: K2HTX. RM: WB2LZN. HF PAM: WA2UWA. VHF PAM: WB2ROF. The following are major ARFC/RACES nets; join one!

| | | | |
|----------------|--------------------|-----------|------------|
| Bronx | 28.64 MHz | 50.38 MHz | 146.17 MHz |
| Kings | 28.64 MHz | 50.35 MHz | 146.26 MHz |
| Richmond | | | 146.88 fm |
| New York | 29.5 MHz | 50.48 MHz | 145.62 MHz |
| Queens | 29.5 MHz | 50.20 MHz | 145.62 MHz |
| Nassau | 28.72 MHz | | 146.10 MHz |
| Suffolk (West) | 28.73 MHz (Hunt.) | 50.46 MHz | 145.59 MHz |
| Suffolk (East) | 28.65 MHz (Smith.) | | 147.21 fm |
| | | | 146.88 fm |

Note: Net times between 2000 and 2100 local, Mon. It is with regret I report WB2ORM as a Silent Key. Our fraternity will miss him from the ranks. The Hudson Division now has its own Publicity Department instituted by K2SJO Division Dir., and managed by WB2PBI. A questionnaire was sent to all affiliated clubs for comments. Has your club sent in theirs? If not how about it? Other groups or individuals who may have served the public in a responsible way are invited to forward information that will enable all amateurs in the Division to at long last gain the public recognition they deserve. Send information to WB2IBF, 21 Judith St., Nantuet, N.Y. 10954. Congratulations to WA2CLB on upgrading to Advanced Class. After a year of work for Novice to Advanced Class, someone "borrowed" WB2FHN's mobile equipment including the "wheels." For those interested in "Bunny Hunts" (no, not the Playboy type). Bi-weekly hunts are held on 28.72 MHz courtesy of Nassau ARFC/RACES, alternating on Mon. with Suffolk (West) ARFC/RACES on 28.52 MHz. In addition, LIMARC holds hunts on the first Thur. on 146.52 MHz fm. W2PF reports going mobile the hard way; 2 weeks aboard the QE-2 in the Caribbean. Congratulations to K2VGD who made BPL in three years? Feb. 1961, Mar. 1965 and Dec. 1972 (that's 3 years!) WB2UKA and WB2GSM are now active with new 1m gear. WB2AZT is burning the midnight oil on 2- and 10-meter solid state amplifiers. A Public Service traffic and emergency RTTY repeater is in operation in central Nassau Co. Its purpose is to provide a high volume traffic facility for our section nets, and to provide RTTY service to section ARFC/RACES groups and liaison with adjacent ARRL sections in case of emergencies. Via an inter-community link, communication is expected from Boston to Philadelphia with an additional direct link to ARRL, Newington. The repeater is not an "open" repeater in the strict sense, it is available for a purpose not entertainment, and control will be maintained. K2SHU is now /8 at the Heathkit Plant in Mich. WB2STQ is experimenting with ARRL Official Bulletins via SSTV on 14.340, at 1330Z, Mon., Wed., Fri.; on 21.340 at 1300Z Mon. and Wed. Comments on the service and reception would be appreciated by K2CFG. Traffic: (Feb.) WB2WJF 345, W2EC 277, WA2CLB 138, WB2LGA 119, WB2DYV 104, WB2CHY 101, K2VGD 36, K2JHE 27, W2LW 23, WB2RZ 21, WA2PIL 10, WB2JEC 8, W2PI 8, WB2BY7 7, WA2RRG 3, WA2VXN 3, WB2CDN 1. (Jan.) WB2CDN 2, WA2LJS 2.

NORTHERN NEW JERSEY - SCM, John M. Crowell
WA2UOO - SEC: K2KQD. RM: W2ZEP. PAMS: K2KQD and WA2VH.

| Net | kHz | Freq (PM) | Days | Sex | QNT | Tte. | Mg |
|-------|--------|-----------|------|-----|-----|------|--------|
| NJN | 3695 | 7:00 | Dy | 28 | 503 | 269 | W2ZU |
| NJN | 3695 | 10:00 | Dy | 28 | 204 | 86 | W2ZU |
| NJSN | 3730 | 8:15 | Dy | 14 | 11 | 5 | WA2RYV |
| NJPN | 3950 | 6:00 | M-S | 28 | 495 | 221 | WA2VH |
| NJPON | 3930 | 6:00 | Su | 4 | 75 | 18 | WB21D |
| PVJEN | 145710 | 7:00 | Dy | 25 | 92 | 21 | K2KQD |

New appointments: WB2CST as EC for Fair Lawn and vicinity WA2EXX as TC for Waldwick and vicinity. WB2ACH as OPS

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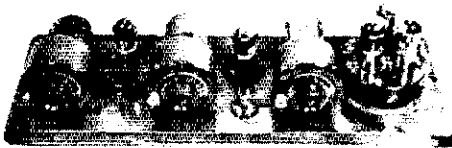


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TEN DAY MONEY-BACK GUARANTEE

WB2IKL as OPS and QRS. New officers of the Belleville ARC for 1973 are K2DOT, pres.; WB2NSV, secy.-treas. The club meets the 4th Wed. of each month at the Belleville Recreation Center. Tri-County ARC holding code and theory classes Mon. nights at Red Cross Hq., Plainfield. The Garden State ARC also holding classes the 1st and 3rd Tue. of each month Red Cross Hq., Route 35 Shrewsbury. A good month for license upgrading: WA2RUO, WA2UKO and WA2UOO qualified for the extra. WA2RYD, WB2BCY and WA2ZNS upgraded to Advanced. WN2KKT, WN2JGO and WN2KZZ are all recent Novices. Congratulations to all! WB2CST and WB2RJJ are organizing a contest club. Interested OPSs should contact them if interested. WA2RYD has been appointed D2RN Mgr. for Daytime NTS. Vacationers include WA2KWP visiting GM-Land and W2AMS operating portable VK/ZL on 14 and 21 MHz cw. WA2SHT has a new Swan-400. WA2OII building an HW-100 to improve his NJN signal. K2KDO attended the S.E. Division Convention in Miami. WN2DEP has erected a 48TV vertical. WA2CRF recently acquired a new Drake Line. WB2JUI has been appointed chmn. of Amateur Radio Week in Union City. WA2ZYP now located in Bergenfield. WA2SRQ doing an extensive study of vertical antennas for multiband operation on 160, 80 and 40 meters. The NJDXA is sending its usual delegation to the Dayton Hamfest. WB2DRJ is QRL at Paterson State College. W2JYU has relocated in Englewood. WA2OOH has a new frequency standard built from his junkbox. WB2DTV attending Newark Coll. of Engineering and operating the NCE club station K2MFT. WB2URF busy building the HW-7. WA2OMB again active on 75 mobile after repairing the balanced modulator. W2FCC also active on 75. WA2RYD operated portable four while vacationing in South Carolina. WN2CWS looking for other QRP stations to OSO. K2AGI gave a fine RTTY presentation at recent Morris RC meeting. WA2RYD made BPL for Feb. Traffic: (Feb.) WA2RYD 268, WA2EUO 254, W2ZEP 115, WB2AEH 106, WB2CST 106, WA2NPF 82, W2CU 63, K2ZFI 38, WB2RJJ 28, WA2CAK 27, WA2FVH 20, WA2MJG 14, W2CVW 9, WA2CCF 8, WB2CFT 5, WN2CSX 5, W2ABL 1, (Jan.) K2OOJ 38, W2OPE 20, WA2SHT 10, W2WOJ 6, WN2CSX 4, W2ZZ 2.

MIDWEST DIVISION

IOWA - SCM, Al Culbert, K0YVU - SEC: E0CLL W0DSJ announces the following additions to the ham population in Usage: WN0JFV, WN0JFW and WN0JFX. WA0EMX has moved to Kansas City. W0BW has returned from a mid-winter trip to VP2A. VP2G-VP2L, FG7, P1S- and YV-Lands; shucks, most of us would be happy just to work most of them places, much less visit! Congratulations to the Daytonport Radio Amateur Club on their second annual hamfest held the 25th. K9HKS took home the HW-101. It sure seems strange to write up the traffic tallies and not be placing W0LCX down with a three digit number. W0AAAM is listening for 2-meter DX with stacked yags at 70-ft. W0BPH is new Heath SB-line. WA0DY7 is working for KLEM at LeMars. W0NPL is experimenting with rotatable antennas for 160 meters?

| Net | QNI | QTC |
|----------------------|------|-----|
| 75 meter fone (noon) | 1441 | 121 |
| 75 meter fone (eve) | 1030 | 41 |
| Tallcorn (cw) | 142 | 4 |
| Interstate (cw) | 96 | |

Traffic: WA0AUX 217, K0AZJ 172, K0DDA 163, W0DBG 45, W0JPI 30, W0AAAM 15, WA0VZH 12, WN0FNA 10, W0WSV 9, K0YVU 8, W0BW 5, K0LKH 5, W0BPH 4, W0MOO 4, W0BDT 2.

KANSAS - SCM, Robert M. Summers, K0BXF - SEC: K0JMF, PAMS: W0GCI, W0BCL, RM: K0MRI, VHF PAM: WA0TRC, K0LPE is again on the sick list. Because of bad weather condition SET activity was a little low this year. Zones 2, 6, 7, 8, 12, 14 and 15 says not. Net activity for Feb.: QKS SS QNI 220, QTC 307 in 2 sessions. RWN QNI 523, QTC 160 in 28 sessions. K0BN QNI 807, QKS 99 in 24 sessions. QKS QNI 503, QKS 197 in 56 sessions. KPI QNI 186, QKS 14 in 17 sessions. Mid States Mobile Monitor QN 1612 serving 63 mobile units, QTC 88, handling 106 patches and phone calls in 90 hours of operation. We welcome the report of the Ham-Butchers Net - - Feb. QNI 531, QTC 63. W0GQR, net picnic Forsythe, Mo. July 29. Officers of the PRO - Pittsburg: W0LYI pres.; W0BFBM, vice-pres.; WA0LYU, secy.; K0HSA, treas. Considerable changes have been occurring in the state's 2-meter repeater systems the past month. The changes as they appear. K0DKI on 146.22-82 moving to permanent location in Lenexa, Ks. Operator will otherwise be the same as present. WA0VWN Lawrence, move to 146-16-76 and should be operational by now. A new YL net has

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Receive: 400 Ma squelched,
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SELECTIVITY: 11 KHz at 3 db; Less than
 30 KHz at 70 db. Adjacent (30 KHz
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TUNING RANGE: Same as RECEIVER.

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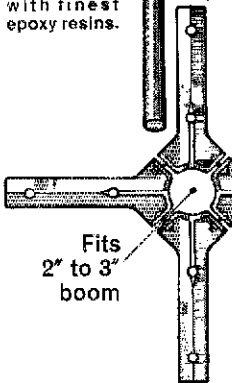
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been formed (YLN) with WN0GOL as mgr. Operation on 40 meters. Also a daytime Novice Net. Looks like all clubs are holding novice classes and all clubs should be growing this year. Wheat Belt Radio Club planning a 2-meter repeater. Traffic: WN0GVR 265, W0HI 229, WN0HTR 184, WN0FSL 167, K0MRI 166, WN0GQL 132, W0HBM 132, W0NEE 125, WA0LLC 113, W0MA 98, W0PB 62, W0GCI 54, W0INH 46, K0BXE 45, W0CUY 42, K0JMF 34, K0ZHO 27, W0CZR 26, WA0VXI 18, W0BHI 14, W0RBO 14, W0BLI 12, WA0SXR 12, WN0HHT 10, WA0SRQ 10, W0LB 8, W0MCH 7, WA0SEV 7, W0YMK 6, WA0TAS 5, WA0OWH 4, WA0SRR 1.

MISSOURI — SCM, Robert J. Peavler, W0BV — SEC: W0ENW. New appointments: W0HMN as QVS; WASKBH/0 and WA0RVT as PAMs. I am grateful for the honor of serving the Mo. section as SCM for the past four years. I hope all will give K0VVH the cooperation I have been given.

| Net | Freq. | Time(Z) | Days | Sex. | QNI | QTC | Mgr. |
|--------|--------|---------|-------|------|------|-----|----------|
| MoPON | 3963 | 2300 | M-S | 24 | 791 | 106 | WA0TAA |
| MoSSB | 3963 | 2400 | M-S | 29 | 1065 | 63 | K0HNE |
| | | 0230 | Su, I | | | | |
| MON | 3585 | 0100 | Dy | 25 | 169 | 97 | K0AFM |
| MON2 | 3585 | 0345 | Dy | 23 | 109 | 72 | K0AEM |
| MSN | 3703 | 0130 | T-Su | 26 | 73 | 28 | K0BIX |
| | | 2200 | Su | | | | |
| WEN | 28.6 | 0130 | M | 4 | 31 | 7 | WASKBH/0 |
| PHD | 50.45 | 0130 | T | 4 | 81 | 13 | WA0KUH |
| JCAREC | 146.94 | 0330 | I | 4 | 39 | 0 | WA0RVT |

MoSSB has added two sessions per week, meeting at 8:30 P.M. CST on Mon. and Wed. WA0EMX has returned to Mo. after 7 years in Iowa. WN9HUX is in college in Springfield. New officers of St. Louis Chapter No. 3 QRP/ARC are WA0OCU, pres.: K0GXZ, rec. secy.; W0GJF, corr. secy.; W0POE, net control; WA0WWN, treas. Congratulations to: W0TF (ex-W5FRP), who passed General Class and returned to amateur radio after a lapse of several years; to new Tech. W0JJS and new Novice WN0JJV. W0DSW finally got last QSL for DXCC. Traffic: K0ONK 570, K0AEM 203, WA0VBC 95, W0BV 93, K0BIX 91, W0CXN 72, W0UD 52, WA0WOC 37, WA0DHR 36, W0FQM 36, K0DEO 28, K0PCK 28, W0GBJ 18, WA0KUH 18, WN0GWE 13, WN0EOV 8, WA0JBX 6, W0NUB 4, WA0WOA 4, WN0GQP 3, WA0QWV 3.

NEBRASKA — SCM, V.A. Cashion, K0OAL — Asst. SCM: Velma Sayer, WA0GHZ. SEC: K0ODF. Endorsements: K0BRS as QO; WA0OQX and WA0JH as OPSs.

| Net | Freq. | (MT)Days | QNI | QTC | Mgr. | |
|-----------|-------|----------|-----|------|------|--------|
| NSN I | 3982 | 0030 | Dy | 1220 | 35 | WA0LUY |
| NSN II | 3982 | 0130 | Dy | 837 | 33 | WA0LOY |
| Nebr. 160 | 1995 | 0130 | Dy | 576 | 276 | WA0CBI |
| NMN | 3982 | 1330 | Dy | 1330 | 40 | WA0JUF |
| WNN | 3950 | 1400 | M-S | 333 | 26 | W0NIK |
| AREC | 3982 | 1430 | Su | 181 | 2 | W0IRZ |
| CHN | 3980 | 1830 | Dy | 1064 | 51 | WA0GHZ |
| SHN | 3950 | 1930 | Dy | 202 | 11 | W0DJQ |
| DEN | 3980 | 2100 | M-I | 507 | 23 | WA0AUX |

Our sympathy to WA0JUF on the loss of a loved one. WA0DHU doing fine job as EC in Douglas Co. Congrats to W0CQX on PSA and WA0AUX on BPL. WA0PCC is in Tex. for few weeks. Wedding bells to ring for W0YCY. K0EYV operating RTTY regularly on 30 W0DMQ and W0NAM erecting towers at Utica. W0FOB, W0KH and W0MW were participants in recent QCWA contest. Ak-Sar-Ben RC Novice class was so large it was necessary to split them into two groups. WA0PSN back on the air. Box Butte Co. 2-meter AREC Net QNE 15, QTC 1. Pine Ridge ARC picnic will be held the first Sun. in June. All Nebr. amateurs are urged to complete an AREC registration form, give it to the EC in their Co. or forward the completed form to K0ODF for action. Traffic: WA0IXD 44, W0CAU 38, W0HTA 32, W0HOP 29, WA0CB 27, W0EVS 27, WA0EX 27, W0FOY 26, W0LAY 26, W0CSW 19, W0NIK 19, W0VYX 19, W0VEA 17, W0NHS 16, WA0SCP 15, K0DGW 11, WA0OQX 11, WA0BK 10, W0DMY 10, WA0GHZ 8, W0FHE 7, E0HT 6, WA0JH 6, W0LWS 6, W0RIA 6, W0WKP 6, W0DJQ 5, K0MUF 5, W0MW 5, W0POP 5, WA0LE 4, K0ODF 4, K0SDG 4, W0PCWD 3, W0HBS 3, WA0LOY 3, K0OAL 3, K0SFA 3, WA0YGZ 3, W0ZNI 3, W0BNY 2, W0POW 2, K0PTK 2, WA0HQ 1, K0WPF 1.



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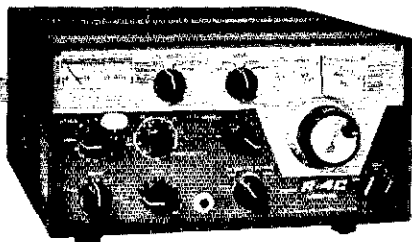
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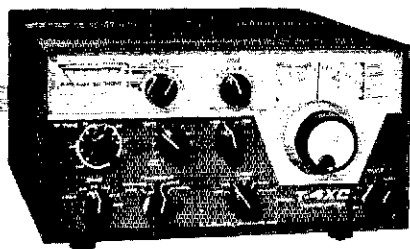
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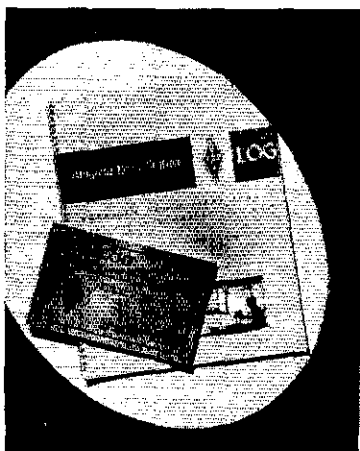
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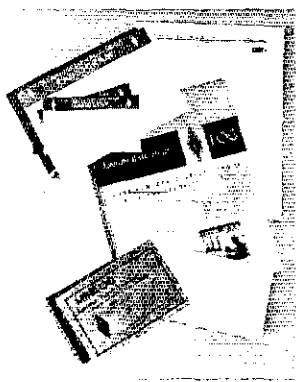


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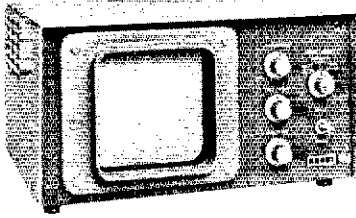
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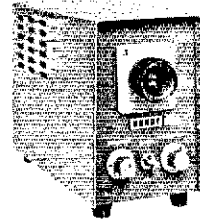
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A

B

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D

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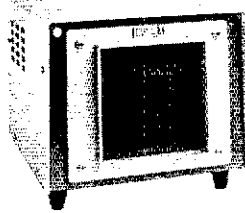
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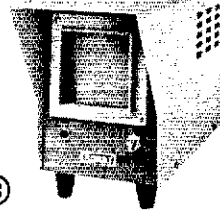


④

⑤



③



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| B | 25 | 1.9 | 24 | \$ 25 |
| C | 25 | 1.4 | 24 | \$ 37 |
| D | close-up lens set for use with lens C only | | | |
| E | 25 | 1.4 | 6 | \$ 54 |
| F | 50 | 1.9 | 42 | \$ 43 |
| G | 150 | 3.2 | 96 | \$ 79 |
| H | 18-90 | 2.0 | 60 | \$220 |

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| 50 | .04 | .06 | .12 | .15 |
| 100 | .06 | .08 | .16 | .20 |
| 200 | .08 | .10 | .20 | .25 |
| 400 | .12 | .14 | .28 | .50 |
| 600 | .14 | .16 | .32 | .58 |
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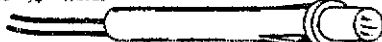
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| | | 1000 Su | | | |
| VHF 7 | 145.98 | 2200 M-S | 20 | 53 | 30 |
| VHF 6 | 50.6 | 2100 M-S | 20 | 94 | 12 |

High QNI: CN — WIBYW, WICTI, KIEIR, WAIGFH and WIKV. CPN — KIBTD, KIEPW, WAINLD, WAIOPB, WAIOZH and KISXF. SEC WIHHR enjoyed a visit with a very active AREC group — the Bristol ARC! He will be happy to assist your club with an AREC program. Dir. WIOV Affiliated Club letter suggests clubs plan to send Club Delegates to the ARRL N.E. Convention in Hyannis Sept. 29 and 30. KIEIR reports over 6 hours Net time by CN during SET with over 700 points for NTS SET operation! Daytime 20-Meter Transcon Net is starting — Daytime 1RN Mgr. is WYNE. With deep regret we add the call of WIEB to the list of Silent Keys. Hope all clubs will voice support of the current ARRL program to seek more reasonable regulation of amateur radio by FCC. Candlewood ARA will again sponsor the Conn. QSO Party on May 12, 14 — see page 107 Apr. QST for details. New officers: L. Coun. ARA: WAHYH, pres.; KIAPE, vice-pres.; KIMYF, treas.; KIVGF, secy.; WICLU, trustee. Bloomfield High School ARC includes theory and code class plus joint projects for members. WNIRHI made 10,000 points in Newington High School interclub Novice Contest. Congratulations to: WIMPW high QNI on CN and CPN during Jan.; New Novices: WNIRH, WNIRHJ, WNIRIN, WNIRIO, WNIRMI and WNIRCH! That's it for now, see you next month! Traffic: WIEF 242, WIEJ 214, WAIFCM 201, WAIGFH 156, WIKV 120, WICTI 110, KIEPW 101, WAINLD 96, WAINYU 75, KISXF 57, WAIPHU 49, WIGVT 47, WIAW 46, WAIGGN 46, KLYGS 38, WAINES 37, WIRML 24, WIQV 22, WAINBS 15, WAICN 13, WIDQJ 12, WAIOPB 11, WIRDI 9, WAHYN 5, WICUH 3, W1WEE 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, W1ALP — The following are Asst. Director's to WIOV our New England Director, keep them posted: W1s ALP, RGH, LJO, BCN, AOG, VRK, LE. To those who knew him when he was in our section, W1JLK is a Silent Key. South Shore Vo-Tech ARC, WA1ROP now affiliated with ARRL with WA1NBJ as pres. W1BHD has his repeater call, WR1AAA. WINMK moved next door. T-9 Club met at W1WNK's. W1SMO in the Brockton VA hospital. W1AYN retired. W1AOG enjoying stay in Fla. W1GRI, W1AQPD on many bands. W1ADWV, W1AKY's son at Clark Air Base, Philippines as a ground radio operator, in the Air Force. WIPEX, W1AIMSK made BPL. South Shore ARC had Ted Macintosh of The Patriot Ledger speak on High Speed Computers for type setting. K1DZG back at work. W1AKV/SM in Fla. K1REW home from Fla. W1IIPZ fooling with SSV. W1AHCY reports antenna is down and rig is on the tritz. W1ALP attended banquet of the Whitman ARC. K4VH new call of ex-W1GM. W1ALQ has an HW-12A and will get in on daytime traffic nets. W1MYK has WAS. Framingham RC had a presentation on SSV & FAX by W1AMTI. Middlesex ARC had a Bowling Party. W1A1PFA has 4-400 linear for 6. W1AEC's code and theory classes rapidly growing. W1MGE rebuilt his shack. W1DXI handled traffic for Medford Red Cross during SET. Watch out for Mass. Amateur Radio Week, June 10-16. New officers of Massasoit ARA: W1WLZ, pres.; W1ECK, vice-pres.; W1A1NH1, secy.; W1JH1, treas. K1AGB gave a talk on "Air Strip Line Techniques" applied to a two K.W. P.E.P. amplifier for 2. Capeway RC met at K1NDA's. Quannapowitt RA had a talk by Jerry Hanfling on "Phased Arrays". W1HKG/4 settled in new home in Fla. Norwood ARC held an auction. W1AOX has his General. K1AAP on 2-meter fm, also W1AKDL. W1OW with TR-2200s. W1N1ND passed her Tech. W1DES has a TR-33 jr. beam. W1BDC and W1AIMGC moved to NH. W1AHEJ got married. W1DMD in Raynham on 6 and other bands. K1ZBZ in Wayland. W1s PDM, OLV new OPS. Endorsements: W1DOM as OBS; W1AECY, W1ATX ORS; W1QFN, W1IIPZ ECs; W1AUQ OO. Samuel Bradish of Marblehead is a Silent Key. We are sorry to hear that W1JK was in a bad accident in Fla. W1EYF is on 6. W1A1PLN has his Tech. and on 6. W1AIMSK made PSHR.

| Net | Freq. | Time/Days | QNI | QTC | Mgr. |
|-------|-------|--------------|-----|-----|---------|
| EM2MN | 145.8 | 2000 M-F | 124 | 150 | W1OWQW |
| NEEP | 3945 | 0830 Su | 87 | 8 | K1LPL |
| FMPN | 3898 | 1800 M-F | 151 | 75 | W1MYA |
| EMN | 3660 | 1900/2200 Dy | 401 | 215 | W1AIMSK |
| 6MCBN | 50.85 | 1930 M-F | 20 | | K1OKE |

(Jan)
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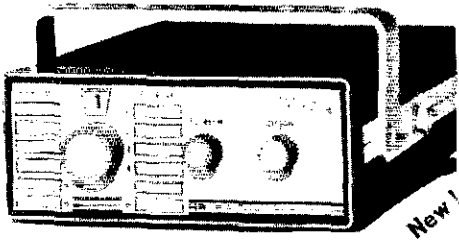
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MAINE - SCM, Peter F. Sterling, K1FEV - SEC: K1CFL PAM: WA1PFN. RM: W1BJG. The Portland Amateur Wireless has moved to their new QTH. W1KVVY is now Extra Class. Congratulations, W1GKJ as of this writing, will be celebrating his 40th year as a ham. Norm has been very active in all modes, also in a types of contests. He now is very active on RTTY, all bands. The Northeast Area Barnyard Net reports 24 sessions, 785 check-ins, for Feb. W1KVVY is on 2-meter fm. The Seagull Net operates Mon through Sat. on 3940 kHz at 1700. The Pine Tree Net meets daily on 3596 at 1900. New hams in Maine are WN1RNA, WA1RNN, WN1RNG. Congratulations, fellows! We are looking for net control for the Seagull Net, also the PIN. Please get in touch with you PAM and RM for more details. K1GLEY finally back on the air after a long absence and working DX. K1NFL back from Fla. vacation. SBB looking for news. WA1QHU now has his old call back, K1MZL Traffic: WA1JHT 29, WA1QHU 24, K1MZB 17, K1GUP 13, K1FEV 11, WA1NMW 4.

NEW HAMPSHIRE - SCM, Robert C. Mitchell, W1SWX - SEC: K1RSC. RM: W1UBG. Endorsements: W1JFF as EC Newport. ECs: W1ALF and W1DUB as OVSs. Welcome to new ham WN1RMJ, WA1RNN, WN1RMG, WN1RLO, WN1RLJ, WN1RL and WN1RLO. K1PQV chasing rare counties on 7055 and 14070. The Derry CD group meets each Tue. at 7 P.M. local on 2R 740. WA2DZG/1, WA1MXT, K1YMH, W1SWX, K1BCS, W1MHW, W1TLR, W1UBG and K1PQV were active during SE1 on the C Net. W4WVO now is W1G5Y and active with KWM-2 and two meter gear. W1JSM uses 2-meter circular polarized omni-directional antenna and 100-watts ERP for Oscar 6 work. Traffic: K1BCS 47, W1UBG 130, K1PQV 71, WA1GCE 37, W1SWX 4, W1DXB 2.

RHODE ISLAND - SCM, John E. Johnson, K1AAV - SEC: W1YNE. PAM: W1LXL. Endorsements: W1JFF as EC Newport. Middletown and Portsmouth. W1VY as EC of Block Island. The following officers were elected at the Newport County Radio Club: WA5FXE/1, pres.; W1JFF, vice-pres.; W1IAG, secy.; W1GAM, secy. WA1QSL, treas. On May 7 the Club will hold its annual auction at the Seaman's Institute at 7:30 P.M. On May 21 Ed Filton scheduled to speak at the club and the officers invite everyone to attend. WN1POJ finished the Novice Roundup with over 26,000 points which may be tops in the State. WN1OQG recently passed his General Class exam and is waiting for his new call. WN1RFT has QSLd 34 states of 40 worked. He also worked W5ZIS/YV1 on 10 meters. The Prov. Radio Assn. W1OP, announced their new Novice were active in the Novice Roundup. They are WNS NCC, OJ1, PO, PIC, PID, QOG, RET, RKL, RLN, RMF. The PRA welcomes newcomers with regularly scheduled code and theory classes for the year. Traffic: WN1POJ 104, WN1OQG 5.

VERMONT - SCM, James H. Viele, W1BRG - SEC: W1VSA

| Net | Freq. | Time(Z)/Days | QNI | QTC | Mgr |
|-----------|-------|---------------------|-----|-----|------|
| VTSB | 3909 | 2200 M-S 1130 Su | 549 | 193 | W1ZC |
| VFPO | 3909 | 2100 Su | 78 | 50 | K1BO |
| Carrier | 3932 | 1300 M-S | 516 | 9 | W2QW |
| Gr. Mt. | 3932 | 2100 M-S | 440 | 29 | W1JJ |
| Vt. Phone | 3932 | 1330 Su | 111 | 4 | W1KK |

Welcome new amateur WN1ROE. WA1LDT has moved to Lew- N.Y. WA2DZG/1 has been appointed ORS. WB2QLQ looking for Vt. skeds on 10, 15 and 20 meters. Thanks to all who contribute to the success of the VT QSO Party. W1ONM and W1CBW ju- vacationed together in Nassau, Bahamas. Traffic: K1ROB 29, WA1OQP 30, WA2DZG/1 23.

WESTERN MASSACHUSETTS - SCM, Percy C. Noble, W1BV - SEC: WA1DNB. CW RM: W1DWV. PAM: WA1TL. VHF/UF PAM: W1KZS. WMEN held four Sun. sessions with QNI 44 at traffic 7. NCSs were WA1DNB, W1KZS and WA1TL. WA1ORT the new Hampden Co. FC. WMN held 28 sessions with QNI 163 at traffic 125. Top 5 in attendance: W1BVR, W1DWV, W1T, WA1LNF, WA1OUZ. The 4:30 P.M. WMPN (3935) held 18 sessio with QNI 186 and traffic 76. NCSs: K1RGO, K1PKZ, WA1JN W1KZS, WA1TL. Top 8 in attendance: K1RGO, W1FNG, K1MA W1PT, WA1LNF, W1WYS, W1NLE, WA1GKN. The 2-meter p- peater, K1FKK on Mt. Greylock, is conducting an AREC messas handling course with W1KZS and K1JVM as instructors. New OP: W1NLE and W1OHA. WA1LNF received score of .7 PPM in the 1st (MT. CMARA reports WA1LEA, pres.; WN1OAS, vice-pre WA1MLH, secy.; WA1QZI, treas. New member WA1PYA donat his Novice station to the club for loan to new Novices until they have their own. FBI HCRA says a tape and slide program of t- DXpedition to the island of Annobon was the highlight of the meeting. MARC reports a fine demonstration of Slo-Scan TV v

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See QST, December 1972, page 41



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put on by W11BZ. From V of Lincoln: the list of members' True Portables (2-meter fm) now totals 15. Many of the members are donating money to Educational Station WGBY to assist them in getting new antenna facilities to replace recent damage. Mt. Tom ARA reports W1MDM, pres.; WA1EYX, vice-pres.; WA1IDU/J, sec.; W1PHU, treas.; K1KBQ, act. Sec WA1DNB spoke on the past SFT. NBARC says W2NSD/1 has donated 6 sections of 45G tower to replace the damaged tower of the Spruce Hill repeater! New members are W1FJH, WA1RFA, WA2FT1, WB2ZJO. Traffic: WBVR 93, WIDVW 75, WA1LNF 60, WITM 59, W1KK 32, W1STR 20, WA1OUZ 12, WN1QHR 10, W1KZS 5, W1ZPB 5, W1OBA 4.

NORTHWESTERN DIVISION

ALASKA - SCM, Kenneth R. Klopf, KL7EVO - Ever hear of DRN7 - read Dec. QST. Its part of a daytime National Traffic Net. Net mgr. W7AXT says we need volunteers for liaison from Alaska. Operation will be on phone with cw check-ins permitted. Training sessions will soon start on 7235 kHz at 000Z. Also remember your friendly AKS (Alaska Section Net) for your cw traffic inter-and intra-Alaska 3735 kHz, 0330Z. KL7HMU needs more stations checking in for better coverage. The Kodiak crew is hopping again. This is a controlled net which meets 7 days a week on 3920 kHz at 0330Z. Its primary purpose is to provide weather broadcasts for amateur stations on Kodiak Island and adjacent islands. Additionally, normal phone patch and third party message traffic is handled for the Kodiak area. KL7HUX is NCS with KL7s BDC, DND, EQ, FC, GCH, GMT, HNH, HOG, JDO and WA4APN and WB4PMP in it so far. They have a 2-meter repeater more than on the drawing board to back up 75 meters.

IDAHO - SCM, Donald A. Crisp, W7ZNN - The new Idaho-Montana/ Net (IMN) frequency has been changed to 3583 kHz. The net meets week days at 0230 GMT. W7GHT reports good participation but check-ins are needed from many Mont. and Idaho cities. Active with cw traffic? Write your SCM for an ORS appointment. W7AXL made 1291 contacts in Feb. WA7EJC and WA7MMG are new EC members. SCM W7ZNN was the speaker at the KARS club at Coeur d'Alene. New KARS officers are WA7HPB, pres.; WA7FMZ, 1st vice-pres.; W7NV, 2nd vice-pres.; W7KFP, 3rd vice-pres.; Margie Hogeweide, secy.-treas.; W7HZD, membership WA7PUX, traffic ed. The club had a ham radio demonstration at the high school and is sponsoring no less than 2 beginners and one advanced code and theory class. W7W7GPM passed away. The Idaho RACES Net now has 691 check-ins per month. Idaho Mont. Net 23 sessions, 120 check-ins, 28 traffic. FARM Net 28 sessions, 1180 check-ins, 64 traffic. Idaho P.O. Net 12 sessions, 128 check-ins, 11 traffic. Traffic: W7AXL 242, WA7BDD 124, W7GHT 120, W7ZNN 20, W7IY 17, W7NHV 12.

MONTANA - SCM, Harry A. Roylance, W7RZY - Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN, PAM: WA7IZR. New officers for the Laurel Radio Club are WA7NKV, pres.; K7ELW, vice-pres.; W7IUN, act. mgr.; W7LBB, secy. The IMN Net is in operation and meets at 0230Z on 3583 Mon. through Fri. W7NEG is state director for Army MARS. Mont. traffic net had 984 check-ins, 19 sessions with 38 pieces of traffic handled. WA7OBH endorsed as OPS; WA7HAG OO; W7EKB RM; WA7PZO, WA7MKY ECs. Traffic: WA7OBH 23, WA7JQS 20, WA7KMP 7, WA7IZR 3.

OREGON - SCM, Dale T. Justice, K7WWR - SEC: W7HLE, RM: K7GGQ, PAM: K7RQZ. Net reports: WA7NWV reports for BSN for Feb. sessions 56, check-ins 1098, traffic 112, contacts 183. WA7GTX reports for AREC Net (Jan.) sessions 28, check-ins 198, traffic 13, contacts 17. AREC (Feb.) sessions 22, check-ins 276, traffic 13, contacts 46, maximum no. of counties 15. W7FFE reports for the Nuclear Net (6 meters) for Jan. 28 check-ins and for Feb. 22 check-ins. New calls in Bend: WA7PFN, WA7RIR, WN7VHL and WN7UXB. W7KYC is on 2-meter fm. Traffic: K7NTS 134, K7OUF 198, K7RQZ 156, K7QFG 138, WA7TXV 100, W7ZRR 88, WA7NWV 50, W7DAN 30, K7WWR 12, WA7KRH 9.

WASHINGTON - SCM, Arthur Henning, W7PI - SEC: W7UWT, RM: K7OZA, PAM: W7GCV, W7MCW, VHF PAM: K7BBO, K7IRD. New OPS: WA7RCR, W7AXT. Regret to report W7FE became a Silent Key.

| Net | Freq. | Time(Z) | QNT | QTC | Sess. | Mtr. |
|-------|-------|----------|-----|-----|-------|--------|
| WSN | 3590 | 0245 | 375 | 129 | 37 | K7OZA |
| NSN | 3700 | 0300 | 347 | 200 | 28 | WA7OCV |
| ARFC | 3930 | 1800(Su) | 54 | 3 | 4 | W7UWT |
| NWSSR | 3945 | 0230 | 763 | 35 | 28 | W7SVV |

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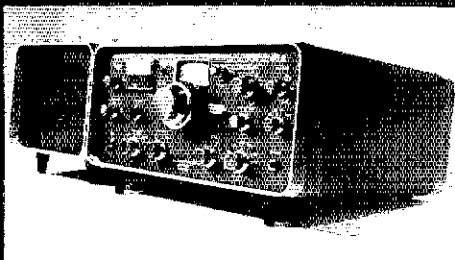
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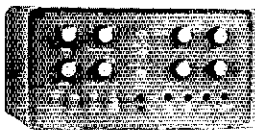


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Hamfest dates: Yakima - May 20 at Selah Community Hall; Wenatchee - June 9 and 10, mark your calendars for these events. AREC now has 317 members. After 20 years as a Technician, W7TIZ passed his General Class exam. W7BUN elected Puget Sound Council of Radio Club's - "Ham-of-the-Year" for 1972. Fast-growing Western Washington DX Club now has over 140 members and meets second Tue. of month at Royal Forks Restaurant on Mercer Island at 7 P.M. for dinner followed by program at 8 P.M. Wash. PON now meets Tue., Thur. and Sat. on 3960 kHz at 0130Z. OO K7GGD contacted 53 stations in Novice Roundup. WA7LQV converted to S-Line. FC W7EBU contemplating expanding into 2 meters. Traffic: (Feb.) WA7HR 238, W7KZ 235, W7PI 227, W7DZX 135, WA7OCV 119, K7OZA 112, W7AXT 161, W7APS 61, W7GYF 60, W7JFY 44, K7OXL 34, WA7KNW 27, W7PWP 23, WA7RCR 21, W7BUN 18, W7AIB 12, K7VAS 10, W7BO 8, W7IEU 7, W7UWT 6, W7YGU 1. (Jan.) W7QCW 15.

PACIFIC DIVISION

EAST BAY - SCM, Paul J. Parker, WB6DHH - WB6NMZ is sporting new Argonaut QRP transceiver and also is back into Intruder Watch duties. Special thanks to the following from Grizzly Peak VHF ARC for their outstanding service during recent airplane crash: K6AN, K6AG1, WA6CBN, WA6CCG, WA6CCW, WB6DFX, WB6GJG, W6FKQ, WA6KCS, WB6GWO, W6NKI, WA6PRG, WA1PZC, K7QIP, WA6QVS, WA6RPF, WA6TRP, WB6WLE and WB6FTN. Many thanks also go out to those whose names do not appear but were also lending a helping hand. Traffic: W6JPW 291, WB6VEW 11, W6ZF 5.

HAWAII - SCM, Lee R. Wical, KH6BZF - SEC: KH6BZF. RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. SRC: KH6FOX. QSI. Mgr.: KH6DO.

| Net | MHz | Time(GMT)/Days |
|----------------------------------|--------|----------------|
| Friendly | 7.290 | 2030Z M-F |
| Hey BRUDDAH | 21.295 | 2000Z S/Su |
| Confusion (Patches) | 21.400 | 0030Z All |
| Pacific Interisland & Micronesia | 14.305 | 0800Z All |
| S.E. Asia | 14.320 | 1230Z All |

Announcing the 4th Annual Confusion Net Banquet on Sat. July 7, 1973 in San Diego, CA. Check in with W6MHA during the net for last minute details or write direct to W6MHA for registration forms. KX6DB has returned home from his tour. KC6RS is in Guam. WA2KDZ is a new OBS and is putting selected bulletins into the Army MARS system. W0LYI/KH6 and his XYL were here for some surf and sand as was W0HP and K4NL. KH6GNK recently retired and is busier than ever. KH6MOP recently visited by their SCM. OM and XYL team KH6CBS and CBI formerly DA1WI and DL5EW respectively are again active. KH6HC reports JR6HP (ex-KR8HP) a student visited his shack. Ken was the 1st Okinawan to be on SSB and 6 meters. Also VE7BEZ and parents visited KH6HC's shack who's now running Drake TX4B/R4B to an FL2090B. Heard KH6IAD quite active in recent contests. KH6BEG and XYL recently returned from JA-Land vacation. KH6IAY is a Scoutmaster. KH6CHC should be back from KP6-Land. KH6HLZ recently returned from a trip through the far East. Hopefully KH6BSA will be activated from the local BSA Aloha Council. Traffic: KH6BZF 10, KH6BWT 1, KH6HC 1, W6MHA 1.

NEVADA - Acting SCM, Hal Leary, K7ZOK - W7OK is recuperating from heart attack. Don has worked all States and 13 Canadian provinces with 2 letter calls in Extra Class portion of 75-meter band. EC WA7ESM and North Las Vegas CD RO reports that WA7GIV and K7RBM and 32 units checked into State CD exercise on the 24th and 25th. In addition 17 units of Clark County CD participated in Red Orbit 6 exercise. W7OOF elected to Board of LV Repeater Assn. K7VYT and W7YKN have completed display of Amateur Radio for Reno Library. Film "Hams Wide World" was shown to about 500 people. Same film will be on 1V later. WA7LGP is new PR for SNARS. WA7MOP is asst. chmn. for SNARS. K7VYT having great results with triangle antennas. W7EDN is prebal on 160. WA7GVF moving to new OTH. Welcome to K4UGL and K4GAO. State CD Net meets Mon. at 1900 PST on 3996.5 MHz. Traffic: W7LUX 61.

SACRAMENTO VALLEY - SCM, John F. Minke, III, W6KYA
About the time you read this I will no longer be SCM. At the time of writing, (Mar. 8), I know of only one candidate for SCM, so watch for the new SCM. K6GGG who has been an OO longer than I



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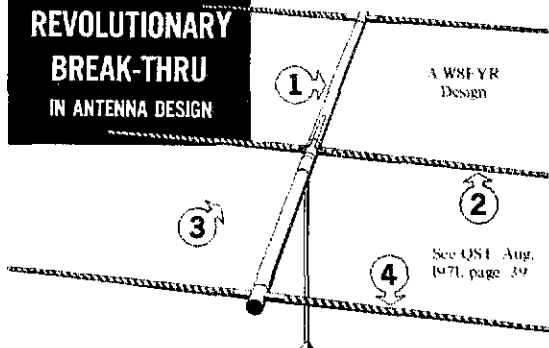
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2 ELEMENT LENGTHS 28% TO 35% SHORTER THAN METALLIC ARRAYS

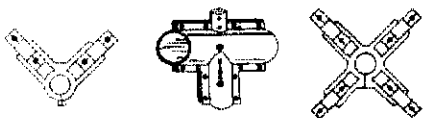
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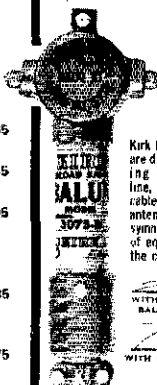
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- (1) 1 1/2" Boom to 1 1/2" Mast T-Mount Net \$14.65
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Application Frequency Coverage & Power Ratings For the Various Models Shown Below

| MODEL | APPLICATION | F/MC | POWER |
|---------|-------------|------------|--------|
| 5075-D | Dipole | 3.4-62 mcs | 2K PEP |
| 5075-B | Beam | 3.4-62 mcs | 2K PEP |
| 5075-LV | Dipole | 1.7-10 mcs | 2K PEP |

MODELS 5075-D & 5075-LV For Unipole Antennas Net Wt. 7 Oz.



MODEL 5075-B For Beam Antennas Net Wt. 7 Oz.

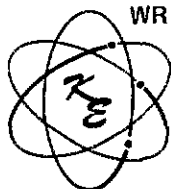
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Just Arrived! G.E. "Message Mates"
High Band Receivers with sel-call

G.E. PROGRESS LINE STRIPS physically complete, sold as is only.

| | LOW BAND | VHF | UHF |
|--|--------------------|----------------|-------------|
| Power supply, 30 watts, less vibrator | MA, E13 MA, E16 MA | E33 MA, E36 MA | E42 |
| Power supply, 60 watts, less vibrator | \$20. | \$20. | \$20. |
| TX narrow band less final tubes | \$25. | \$25. | \$25. |
| Note: MA, E42 wide band | \$18. | \$25. | \$25. |
| RX wide band less ovens | \$18. | \$18. | \$18. |
| 14" Progress Line Case, consisting of front basket and front plate with lock | \$25. | \$25. | \$25. |
| Low band dual front end, 2 freq. strip | \$20. | | |



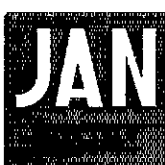
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have been SCM, received a letter of thanks for one of his OO notices. Next time one of you receives a notice from an OO, don't gripe and find fault. The OO is doing you a service by informing you that your transmission are below satisfactory. OVS WB6NKO now has 20 states confirmed through Oscar VI. We welcome W6BIL as a new OO. The section can use more appointments; those of you are interested contact the present SCM. The John I. Sabin Pioneer RC, K6NP, has become affiliated with the ARRL. The club also placed fifth in the Annual Telephone Pioneers QSO Party, with 8 chapter members helping. WB6MDP is the owner of a new Swan 350 hamceiver. W6BLL reports hearing many east coast Novices with 87 signals - on 20 meters! W6KYA moved the hamshack out of the basement and into the utility room off the kitchen. Much better and more comfortable. Traffic: WA6JVD 33, K6YZU 15.

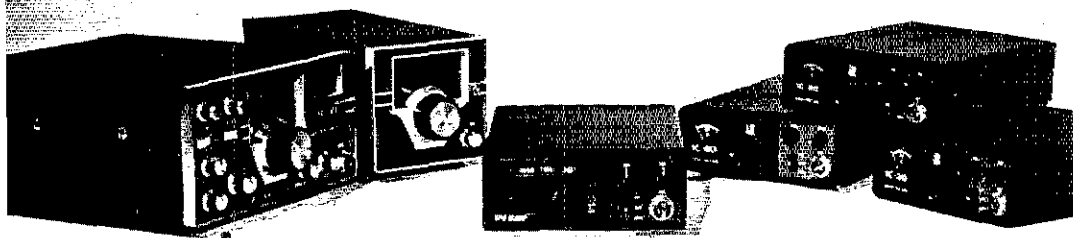
SAN FRANCISCO - SCM, Thomas A. Gallagher, W6NUT - W6LAI, Robert G. Garner is the new asst. SCM. Bob is often on 160 and 2 meters, so bend his ear with news and/or gripes! WA6PYN is the new VHF PAM. Mike has 36 states on 6 meters and is active in the VHF contests. The section still needs an RM and a PAM. Are there any active traffic men interested? WB6NMT is coordinating 222 and 432 MHz tropospheric tests between the West Coast and KH6BZF beginning in May. Contact Louis Ancieux, NAVRADREC/FAC, Skaggs Island, Sonoma 95476 for details. While on vacation waiting for a train in Vancouver, B.C., W6SLX spotted a man with an ARRL pin who turned out to be VE7 and the train engineer! It pays to wear your League emblem. W6EAI is adding a matched pair of nine-element two meter beams. W6WLTV's health is improved and is taking a few RN6 spots. W6PZE continues as the Petaluma area EC. Activity reports from all amateurs and clubs in this section are solicited. Let us know what you are doing. This column must be mailed to the League on the seventh of the month for publication in QST two months later, so time your mailings accordingly. Traffic: W6WLTV 93, W6RNL 72.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU - The Stockton Amateur Radio Club meets on the 2nd Wed. of each month at the S.J. First Federal Savings Bldg. WA6IVN has a I-399 and an R-599. WA6TJJ is heard on 2-meter fm. WB6OSH received his 20 wpm code proficiency award. K6QPE is going east guns on SSTV. WB6RZI vacationing in Ariz. WA6CPP is busy on WESCAR. WN6RXI placed in first place in Calif. QSO Contest, and is busy working on his new ham shack. W6ZRJ and W6VZT were recent visitors in SJV visiting with members of the Turlock, Fresno, Tulare and Bakersfield club members. WB6OPQ received the Delta Amateur Radio Club's Super Novice award. W6MUV is the IYI chmn. in Tulare Co. K6RGZ gave a talk on transistors at the Tulare Co. Amateur Radio Club. 146.52 MHz fm has been suggested as a simplex frequency for local QSO. W6PSQ has 129 countries confirmed. W6GRV has built a speech clipper with good results. W6QFR is heard on 75 sb. Don't forget the Fresno Amateur Radio Club's annual Hamfest on May 3, 4, 1973. Traffic: WA6JDB 19, WA6SCE 12, WN6RXI 5.

SANTA CLARA VALLEY - SCM, James A. Hauser, WA6LFA - RMS: W6BVB, W6RE1. W6BVB reports that NCN had 70 sessions in Feb. with 731 check-ins and 542 pieces of traffic. Sounds like business is picking up. W6AUC reports hearing echoes on a voice net confirmed by other stations on the net. W6PAA has antenna troubles due to our very bad weather this year, says that if it ever stops raining he will be back on the air; also he is still WA6DKF as well as W6PAA. WA6PGB reports much contest activity. They say that no news is good news. This section has lots of good news apparently. Traffic: (Feb.) W6RSY 664, W6BVB 169, W6YBV 150, W6KZJ 125, W6DEF 63, W6RE1 54, W6AUC 32, WA6HAD 22, W6ZRJ 16. (Jan.) W6OH 7.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Chuck Brydees, W4WXZ - SEC: W4FVN. PAM: W4JMG. VHF PAM: K4GHR. RMS: W4VBM. W4E1TF. Congrats to K4GHR our new VHF PAM, former OVS/OPS and member of the Repeater Advisory Committee. Please channel your VHF ideas and suggestions to K4GHR. WB4NXS has 1.5 kw generator and as EC Wilson Co. reports new 6-meter fm link to Raleigh CD. The Wilson Co. ARS is running Novice classes. During the Feb. 10, 11 ice storm in Eastern NC assistance was provided through W0BR by W4PCN who ran a 2-meter link with information from W4IPY. W4LCV, WA4JZX and others through repeater WA4VTX. This group passed weather reports, information



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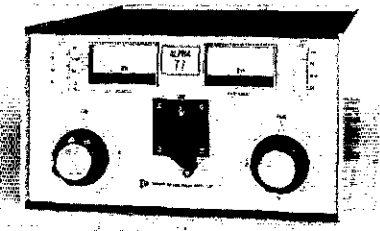
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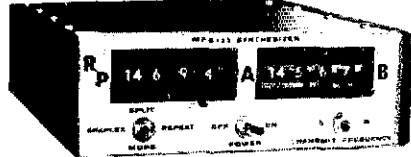
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- Low Impedance (50 ohm) Outputs: Allow long cable runs for mobiles
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MFA-22 \$275.00
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on stranded motorists and road reports. K4BE continues hot in FMK with close to "dead-on" measurements. WB4VVP, new QRS, is running bulletins in Burlington. K4MSG's OM now is WA4CVA, in Va. WA4TC, NC State Univ. is adding new equipment and now handles phone-patch traffic for students. The Carter-Craven ARC has Novice class going and WA4CID is newly licensed. Tarheel Emerg Net new mgr. is WA4GMC with WB4HDS alternate and W4OFO as secy. The Cape Fear ARS continues issuing large bulletins edited by WB4LXM, with indications of good activity in Fayetteville.

| | | |
|-------------------------------|----------|-------|
| Carolinas Net (CN) (Early) | 3573 kHz | 0000Z |
| Carolinas Net (CN) (Late) | 3573 kHz | 0300Z |
| Tarheel Emergency Net (HEN) | 3923 kHz | 0030Z |
| LEK Center Military Assis. | 3923 kHz | 2330Z |
| North Carolina SSH Net (NCSS) | 3948 kHz | 0030Z |

My sympathy to the family and friends of K4EMZ, W4UCQ, WB4LUG, now members of Silent Keys. Traffic: (Feb.) WA0YDJ/4 228, WB4OZL/4 163, W4EVN 132, WA4DJ 66, W4WXZ 58, K4MC 54, K4I ZH 52, W4OFO 15, K4VIG 14, WB4CTS 9, WB4JMG 9, K4TTN 9, WB4OU 9, WB4HDS 8, WB4NXS 8, WB4HJ 5, WB4VSA 5, K4KJ 2, (Jan.) W4LVN 201, WA4DLJ 55.

SOUTH CAROLINA - SCM, Joseph Rubin, WB4CJ 5LC; WA4ECJ. PAM: WB4KNE, RM: K4LND. New appointments: WA4ABY as ORS: WA4LX 00 and LC Endorsements: W4NTO 00; WA4LX ORS. Stations desiring appointments or endorsements, please notify your SCM by mail or message.

| Net | Freq. | Time/Day | QNT | QTC | Mgr. |
|-------|-------|-----------------|-----|-----|--------|
| SCSSB | 3915 | 0000 Dy | | | WB4KNE |
| CN | 3573 | 0000 Dy (Early) | | | WB4VBM |
| CN | 3573 | 0300 Dy (Late) | | | WB4EJF |
| SCNN | 3718 | 0000 Dy | 195 | 18 | WN4BJF |

Repeaters: WB4PLN Columbia 146.34/146.94 B1800 Carolina Rptr. Soc.; WB4OGX Greenville 146.34/146.94 B2400 Greer ARC. New officers of Anderson Radio Club: WA4HC, pres.; K4LNU, vice-pres.; WA4ZPM, secy.; W4RSK, treas.; W4IVV, act. dir. Let's get the Palmetto ARC going again! W4CF will help. ATV activity growing, full report soon. Carolinas Net doing 1R job as usual. Check into the new Novice Net and give them a hand. K4LNO and WB4PAG on ten meters, mobile. Thanks fellows, for your reports and cooperation. Traffic: (Feb.) WA4ABY/4 156, K4IND 75, W4NTO 40, WB4OBZ 30, W4AKC 20, WB4CJ 11, WA4LX 6, K4NJS 5, (Jan.) WA4LX 8, (Dec.) W4AKC 109.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: J.L. Martin, Jr., W4THV SEC: WA4PBG, Asst. SEC: WA4JF. PAM: WB4RZW, RM: W4HIR, W4SOQ, W4SHJ, K4PIV/4, WB4PNY has been nominated as RM for the daytime 4RN. K4LIIB reports a new repeater by NVFMA coming in Fairfax, WB4WLK going to Fla. to eyeball some 20-meter friends; reports WN4DRO new in Va. Beach. Roanoke Division Director W4KFC active in contests and in making meetings. K4KDJ coming on strong. WB4GMC specializing in maritime phone patches. W8VDA/4 painting and wallpapering so traffic count suffered (?). OO K4KPE heavy after Intruders. OO W4HU reported twenty out-of-banders this month, and not all WNs either - tighten up before ICC does! W4DM still DX contest specializing. WA4EPH custodian of "Worked All Richmond and Virginia Large Cities Award." W4TE too busy with Auto-Call to ban much. W4KX reports alive and well but not very active. W4UQ has his 500 QSLs for 5BDXCC but wants a couple more just in case. Previous call. W4T7C reassured to WB4KBJ. PVRC celebrating 25th anniversary. W4YZC new secy. of NVARC WB4YIL is new General, and headed straight to VSBN! W4UJ first in Va. in Ark. OSO Party. W4LJN reports nothing interesting (to him). VSBN QTC 257. QNI 944, VRN QTC 21, QNI 66. W4HIR appointed FC, Eastern Shore and is hard at it. I am building the SB-620. PAM WB4RZW reports all going well - busy as usual. WA4JF off to southwestern USA for a couple of months. K4POL active on 2 fm. Counties: W4WQG 3044, W4UJ 2818, WA4EPH 800. Out of space - see last month for net frequencies and times. Traffic: K4KNP 274, K4PIV/4 246, W8VDA/4 168, W4UO 148, W4HIR 138, K4IA 117, WB4SGV 113, WB4KIT 111, WB4PNY 110, WB4RZW 85, W4TJN 77, W4YZC 62, W5VZD/4 54, K4VIG 53, WA4JI 50, WB4KSG 29, K4GR 34, K4KA 34, W4KIC 34, K4KDJ 29, WA4PBG 29, WB4RDM 25, W4T7C 21, WA4HOW 18, WA4OLN 17, W4FOV 16, K4JM 14, WB4YIL 8, WB4GMC 7, W4MK 7, K4POL 5, WA4WQG 5, WA4UGG 4, WB4IDF 3, W4UO 3, W8ZM/4 3, W4TE 2

WEST VIRGINIA - SCM, Donald B. Morris, WB8M - SEC: W4NDY. PAMS: W8UDW, K4CHW, W8UYD, CW Net Mgr. WBRCYB. Phone Net Mgr.: WB8BMV. Logan Amateur Radio Club again active, with W4DXS as pres. Weirton Steelworkers ARC cod-

WHICH ANTENNA WINS THE CONTEST ?

In open competition against thousands of commercial and home-brew antennas, WA1JFG won the New England championship with a Gotham beam, by a margin of 5,982 points! WB2JAM won the sectional award for the Sweepstake contest in 1969 and 1970 with a Gotham 4-element 15-meter beam! Hundreds of unsolicited testimonials from grateful hams are our proof that Gotham antennas give you the best design, and the best materials. Forget our low prices — rely on the results of open, competitive contest. Ask yourself: Why do Gotham antennas win?

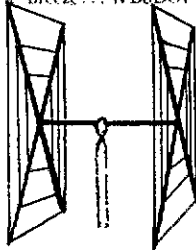
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QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze... WB8DO1

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:

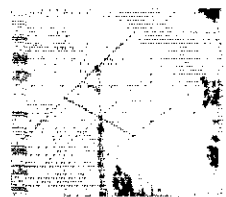
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|---------------------------------|---------|
| 10-15-20 CUBICAL QUAD. | \$41.00 |
| 10-15 CUBICAL QUAD. | 36.00 |
| 15-20 CUBICAL QUAD. | 38.00 |
| TWENTY METER CUBICAL QUAD | 31.00 |
| FIFTEEN METER CUBICAL QUAD | 30.00 |
| TEN METER CUBICAL QUAD. | 29.00 |

(all use single coax feedline)

BEAMS

"Just a note to let you know that as a Novice, your 3-E1. 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 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 E1 20 | \$25 | 4 E1 10 | \$24 |
| 3 E1 20 | 31* | 7 E1 10 | 38* |
| 4 E1 20 | 38* | 4 E1 6 | 24 |
| 2 E1 15 | 21 | 8 E1 6 | 34* |
| 3 E1 15 | 25 | 12 E1 2 | 31* |
| 4 E1 15 | 31* | | *20-ft. boom |
| 5 E1 15 | 34* | | |

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, WA4WJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

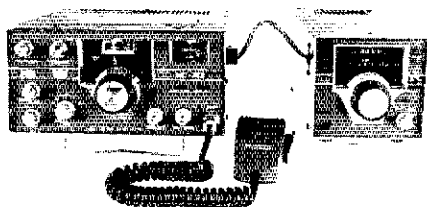
FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

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and theory classes resulted in 9 new Novices in the Weirton area. It is with deep regret, I report the passing of WRPNR and W8LBT. WVN Phone Net with 28 sessions, 405 stations passed 142 messages. WVN CW Net with 74 stations, passed 39 messages. W8DUV and W8DUW attended B and O Ham Banquet in MD., and W8DUV, Gen. Chmn. for the State ARRL Convention announces something "new" this year. "A Celebrity Auction." WICP will represent the League at the Convention. WBKBMV making PSHR regularly. New YL Novice at Nitro, WN8UDV. Remember: LO meeting May 19 and 20 at Richmond, Va. and West Va. State ARRL Convention, Jackson's Mill, June 30 and July 1. Traffic: W8KBMV 47, WA8NDY 32, W8RDX 24, W8JM 20, WASWCK 16, K8QF-W 15, W8YCD 13, WA8LFW 10, WN8MKL 8, W8DUV 7, W8BEMG 7, WA8OKG 7, WA8UIH 4, K8BCF 3, W8CUL 3, W8GDP 2, WA8EC 1, W8CKX 1, W8EYR 1, K8SVH 1, WA8TOM 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde O. Penney, WA0HLO - SEC: K0FLO. RM: K0OTH. PAMS: K0CNV, W0LRW, WA0WYP. On Feb. 20 WA0YFD reported to the railroad involved that one of their freight cars was on fire near Grand Valley, Colo. The message was handled via 2-meter fm, through WA0SMO and W0GDC. Congratulations to the Denver Radio Club and the Denver Chapter of the American Red Cross on the dedication of the new Floyd Frazier Communications Center. WA9SZW is enjoying many FB contacts with his new Ten-Tec PM3A, while WB0CGI is making extensive DX contacts with his new Ten-Tec 505. Net traffic for Feb.: CCN QNI 371, QTC 162, 28 sessions, Columbine QNI 1154, QTC 69, informals 213, 26 sessions, SSN QNI 391, QTC 200, informals 30, 28 sessions, 837 minutes. Late Net traffic for Jan.: CTN QNI 304, QTC 37, informals 82, 655 minutes. Traffic: (Feb.) K0ZSO 846, W0LQ 210, W0LRN 159, W0HCK 155, K0OTH 154, WA0SIG 125, W0BAXW 109, W0HSHZ 87, W0IW 78, W2TPV/p 76, W0NGA 67, W0NZZL 51, W0OPN 38, WA0ZPP 38, W0GV 37, K0RTO 28, WA0YCI 26, WA0TMA 25, K0TIV 22, K0JSP 21, W0SIN 21, W0OOY 18, W0CCB 17, W0GAO 16, W0HBT 15, W0KFF 14, W0ONK 14, K0ELO 12, W0JRW 10, WA0YFD 10, WA0NF0 9, W0LAE 8, W0BY 7, K0CNV 7, K0SPR 6. (Jan.) K0ZSO 425, W0OOY 59, W0LAE 15, W0KFF 14, W0TFPH 4.

NEW MEXICO - SCM, James R. Prime, W5NUI - I am most pleased to announce the appointment of W5UH as the new RM. W5BHN now holds ORS in addition to OVS. My apologies to W5LOH and the Mesilla Valley ARC for advancing the Bean Feed date one month on the calendar. WA5MLY has added an SB-630 digital display frequency counter to the shack. W5DAD is serving as NCS on the Halo net. K5DAA and K5DAB abruptly shortened an FB mobile signal by clipping the antenna on the arch of the drive-in Bank. Is there a space on the deposit slip for antennas? Field Day will soon be here; now is the time to check out the generator and antennas. Traffic: K5MAT 231, W5BHN 206, W5UH 203, W5RE 78, W5MYM 69, W5PDY 32, W5DAD 18, W5HRS 18, W5YO 16, WA5OHI 12, W5M7Y 6, W5BLL 5.

UTAH - SCM, John H. Sampson, Jr., W7OCX - SEC: W7GPN. RM: K7HLR. The Beehive Utah Net meets daily at 1930 GMT on 2272 kHz. The Utah Code Net daily at 0230 GMT on 3575 kHz. The Utah Novice Net MWT at 0001 GMT on 7130 kHz. All nets are part of the National Traffic System. WA7BSG reports 15 Intruder Watch reports. K7POZ moved into a new QTH and is on the air! W7DBR now working towards his third retirement as a school crossing guard. WA7JXN reports wind and winter took his antenna down and put him off the air. W7LYV active after rig trouble. K1TMK/7 reports erratic conditions on 20 have raised havoc with his TCC schedules. W7UTM troubled with power-line noise. W7HKC about ready to fire up on teletype. W7BRV making a slow recovery and hopefully will soon be on the air. K7PEB happy with his new rig and linear. The new Novice Net could use some support from General and higher-classed operators. The NIS daylight net is slow in starting. Regular representatives from BUN and UCN are needed. If interested, contact your net mgr. or SCM. Now is the time to be making plans for Field Day. If you would like to see your call in this column, please inform the SCM of your interest and activity in amateur radio. BUN 28 sessions, 899 check-ins, 56 completed messages and 128 different stations checking in. UCN 210 check-ins and 74 messages. Traffic: W7IM 125, K7HLR 91, W7LTM 84, K1TMK/7 75, W7OCX 66, W7IQJ 38, W7DKB 27, W7LLH 24, WA7OAU 21, K7CLO 18, WA7MEL 18, W7FYR 17, WA7FGU 12, WA7KZP 12, K7BNZ 9, K7PFB 8, WA7HCQ 6, WA7OAR 4, W7IEJ 3, W7GPN 2, WA7GTL 2, W7HKC 2.

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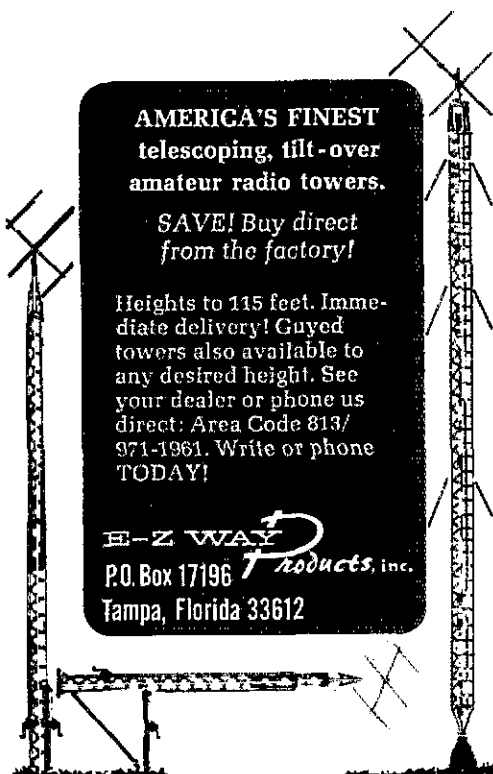
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WYOMING - SCM, Wayne M. Moore, W7COL - SEC: K7NOX. Note that the PO Net has changed frequency to 3.597 kHz and all are invited to check in. We lost a couple more active hams from the state: WA7EUX moved to Va. and WA7VTB moved to Colo. Both will be missed as they were quite active. WA7RBBW has moved into a new home in Casper. The hamfest will be held in Lander instead of Riverton as previously reported - same date but, at the Lander blks hall. Don't forget the division convention coming up in Cheyenne. Am looking for a lot of activity during Field Day - let's show the rest of the country that Wyoming is on the map. I have received several nominations for the PICON award and am sure that one of them will be chosen for the award - to be presented at the convention. Traffic: K7NOX 240, W7SDA 166, W7TZK 145, K7VWA 134, W7HNI 104, W7RHH 65, W7YWW 45, W7GSO 41, K7ITH 14, K7SLM 10, WA7NHP 8, W7HEB 1.

SOUTHEASTERN DIVISION

ALABAMA - SCM, James A. Brashear, Jr., WB4EKJ - SEC: W4DGH. RM: W4HFU. PAM: WB4WAL. The University of Ala. - Huntsville now has a station on the air. K4AEB recently gave an interesting talk to Huntsville ARC on DX operations. New members of the Mobile ARC are WN4ZJR, K4ELV and W4YZO. Congratulations to WB4TNI who recently upgraded from WN4TNI and can now be heard using a new TR-4C. W4AUP has a new transverter on 160 meters. K4JK now has an HR2A in his car. K4HJM went "all-out" recently on publicity for ham radio via WHMA-TV as well as AM-RM. He reports all systems "go." Hope to see a big turnout for the Birminghamfest on May 5 and 6. AENM net participation holding up very well. Sorry our other section nets are not doing so well. Why not join in and originate a "bunch" of traffic. Then send your traffic report to the SCM at the end of the month; we have many stations active on our nets but very few report regularly. Be sure and tell your Novice friends about our training net "AFND" - meets daily at 2330Z on 3.725. Endorsed WA4FYO as EC. Appointed W8PAW/4 as OVS. Traffic: (Feb.) WB4EKJ 199, WB4SVH 103, W4MOQ 43, K4AOZ 33, WB4JMH 28, K4HJM 12, WB4KSL 2, WB4WUS 1, WN4ZQF 1. (Jan.) WB4KSL 14.

GEORGIA - SCM, A.J. Garrison, WA4WQU - Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: WB4RUA, WB4SPB.

| Net | Freq. | Times(Z) | QNI | QTC | Mgr. |
|--------|-------|----------------|-----|-----|--------|
| GSN | 3595 | 0200/1050/2300 | 705 | 229 | WB4RUA |
| Ga.SSB | 3975 | 0000 | | | K4VNV |
| GTN | 3718 | 3200 | | | WB4SPB |

Due to the SCM being hospitalized, it was not possible to report club and other activities for Feb. Traffic: WB4RUA 91, K4OSL 72, W4EEP 69, W4AMB 63, W4CZN 56, WA4WQU 46, WA4RAV 45, W4RNL 41, W4NSO 36, WA4NMU 25, W4JM 12, WB4UFW 8, K4BAI 7, W4FDN 7, W4VSR 6.

NORTHERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH - SEC: W4IKB. RM: WA4BGW. RTTY: WA4WIW. PAMS: WA4IZM 75, W4SDR 40.

| Net | kHz | Time(Z)/Days | Sess. | QNI | QTC |
|------|------|--------------|-------|-----|-----|
| NFPN | 3947 | 2330 Dy | 28 | 574 | 147 |
| QFN | 3651 | 0000/0300 Dy | 56 | - | - |

Pensacola. New officers of the FM Assn., now at 50 members, are WB4MUS, pres.; WA4IZM and WB4PKR. WB4KGW was re-appointed as VHF PAM. WA4DCV received his Tech. ticket. WA4NAP/1 is still dry-docked with USS Lexington in Boston. WA4JNA, K4SVX and WB4KGW plan to set up ATV demonstration at area hamfests. WB4RBY had FB article on tracking Oscar 6 in W4UC News. Ft. Walton: WB4OHK acquired a 2-meter fm rig. WA8ZDE/4 is now chief op. at Hurlburt MARS station. WA9QVT/4 building a 2-meter fm handle-talkie, and is on 220 m when not handling traffic. The Relay Chatter now has a DX column by W3ZBW/4. The AREC supported a MOD March; over a dozen 2-meter mobiles took part under WB4CWG. Blountstown: WB4UQH and W4IKB assisted in search for lost boat. WB4UQH made a 1ex. contact on 2-meter fm. Tallahassee: WB4NCH/4, WN4BSP and WB9FUZ/4 of P.C. earned Net Certificates. WB4PNJ renewed OPS. WB4DBD is a new ham. Starke: WB4OMG renewed EC and ORS; he has a new HR-212 for fm. Gainesville: EC WA4VFO reports renewed interest in club activity and local nets. Ocala: EC WB4GMG prepared a list of hams in Marion Co. The Ocala repeater has a new transmit antenna; the Assn. meets 1st Thur. of each month. New Silver Springs Club officers are WB4GMB, pres.; WA4SYD and WN4YUH. YUH also is editor of their Newsletter. WN4CPF and WN4CZH received their tickets. Orlando: WB4WHK now mgr. of

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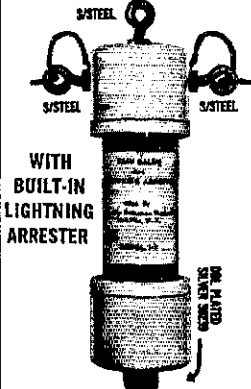
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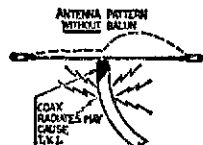
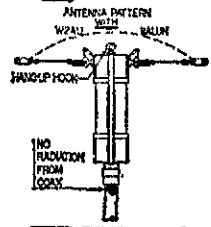
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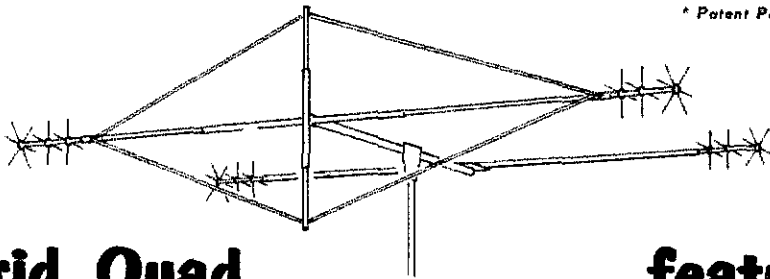
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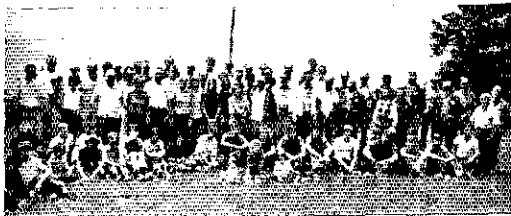
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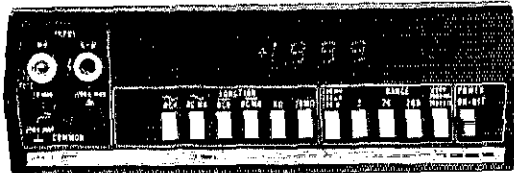
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IPTN. K4OER earned TPTN Net Certificate. W4LDM lost his 80-meter antenna. W4LSR and WA4ITP prepared a list of Seminole Co. hams to help me in EC recruiting! K4SP relieved W4YSO as RACES RO. RACES/AREC meets on 145.35 and 146.16/76 fm. Daytona Beach: WB4VTB received Extra Class. K4FLV completed an HW-101. The DBARA celebrated its 17th year. W4AWY took over Fla. RTTY Net while WA4WTW made repairs. Jacksonville: WN4s DBT, DBU, DBV, DBW and DAD joined our ham ranks. W4VLK reports training nets paid off in improved procedures during SET. The WB4QFT repeater now all solid-state. Alternate simplex channel is 146.82 MHz. Traffic: (Feb.) WA9QVT/4 271, K0BAD/4 184, WB9VU/4 172, WB4OMG 147, K4BSS/4 139, W4SDR 130, W4YSO 128, WB4WHK 80, WA4BGW 75, WA8CW/4 57, WB4NJI 51, WA4EYU 48, W4RKH 48, K0ECC/4 37, WA4LDM 36, WB4QAA 33, K4CVO 32, W4LSR 31, W4GDU 28, W4LDM 23, WA4FJA 22, K4EZE 20, WA4BXT 19, W4YXP 18, WB4ZOC 17, WB4ADL 16, W4IA 16, K4OER 16, W4NGR 15, WB4ONW 15, W4DITV 14, W2JI/4 13, WA4VZF 12, W4DFP 11, WB4JY 8, WB4RCI 7, WB4HPR 5, WA4NRP 4, (Jan.) WA4NAP 93, W4IA 20, WB4BYJ 16.

SOUTHERN FLORIDA - SCM, John F. Porter, W4KGI - SEC: W4IYT. Asst. SEC: WASMK. RMs: K4FAC CW, K4EBU RTTY. PAM: W4OGX. WN4BSP, WN4UPJ qualified for Gator Net Certificates. RPLs: W3CUL/4, WA4IJJ, W3VR/4, WB4AJL (Jan.) WB4HIS and WB4AJL, WB4PNG, WB4AJL and WA2AFL/4 made PSNR for Feb. The Fla. Chapter of OOTU now has 52 members. W4OZF building equipment for Acupuncture. WIGM new call is K4VH. K4OG building homebrew 4-1000A linear. W4DDO using new converter on 62SI for 144 MHz. New Net Mgrs. are WB4WHK IPTN and WB4AJL QFTN. Best of luck fellows. QOs reporting: WB4HKP, WB4INC and W4OZF. WB4PNY mgr. of the new D4RN. Lets all plan now to be at the Orlando Hamfest and state ARRL Convention. The Southeastern EM Convention will be held at the same location, same time. This will be the big one for the Orlando Club, June 2 and 3. The Broward ARC Auctionfest was a big success. Plenty of room and plenty of goodies. We need ECs for several counties. Please check and if your county does not have an Emergency Coordinator contact W4IYT or W4SMK and volunteer for the job. Section Net certificates will be issued to those meeting the nets 10 times in a month for 3 consecutive months. Each Net Mgr. may add extra requirements, this is only the minimum for my office. All Station Activities Reports should reach me before the 7th of the month. Traffic: (Feb.) W3CUL/4 4095, WA4IJJ 1141, W3VR/4 661, K4FAC 416, WA4SCK 401, K4SCL 363, WB4GHD 280, WB4AJL 233, WB4AID 119, W8RZY/4 114, WB4PNG 105, WA2AFL/4 91, WB4HJV 86, W4IAD 84, W4IYT 69, W4DVO 67, WB4FLW 67, WB4WYX 65, WB4HRP 64, W4BIM 61, WA4BMC 57, W4KGI 51, K4BLM 40, WA4ESS 38, W4EH 32, W4TIM 29, W4GDK 28, W4DQS 26, K4OG 22, K4EBU 21, WB4UNV 21, E4SIH 19, W4YZR 17, WB4OID 15, W4BCZ 13, W4OCX 13, W4SMK 12, W4ZAK 11, WB4TUP 10, W4MML 7, W4LK 6, W4DDW 5, WN4ZZB 5, WA4SXB 4, WA4ALF 3, W4NTE 2, WB4ALF 1. (Jan.) WB4HIS 321, WB4AJL 236, WA2AFL/4 234, K4GFW 17, K4OG 17, WB4CHB 14, WA4CKI 11.

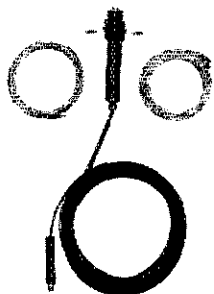
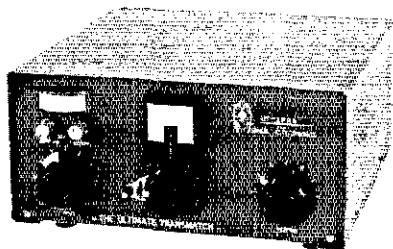
WEST INDIES - SCM, Pedro J. Piza, jr., KP4AST - SEC: KP4CB. OBS: KP4OM, KV4FZ. OO: KV4HW. PRARC held a hamfest on Mar. 25 with W4DDO as the guest of honor. Remember the PRARC Net is every Sun. at 1000 AST on 7250 kHz and the Caribbean Net daily 1100Z 7158 kHz. 160 meters a new interest at KV4EY. New stations heard on 2 meters were KP4s ACC, RO, DON, BNY, CQM, CO, ZU, DKZ, SV. KP4AHO has an SV Collins "S" line with L4-amplifier. KP4BO will soon be on 2 meters. KP4AST put up a new tower with the help of KP4DHD. KP4CLB getting married this summer. For appointment please contact me P.O. Box 2001, Ponce, Puerto Rico 00731.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF PAM: WA7JCK. RM: K7NHL. The Hualapai ARC elected the following officers: W7GJ, pres.; W7JLH, vice-pres.; WA7OP, secy-treas. Meetings are the third Wed. at 1930 MST at the DPS building in Kingman. The club maintains a 146.16/76 repeater and sponsors a net on Tue. at 1930 MST. The Maricopa ARPSC Team elected K7GRP as chairman. One of the recent activities was providing communications for the Rainbow Girls Roke-a-thon. The Ft. Tuthill Hamfest is July 27-29 in Flagstaff. Field Day is June 23, 24. The Arizona House of Representatives has a bill under consideration for

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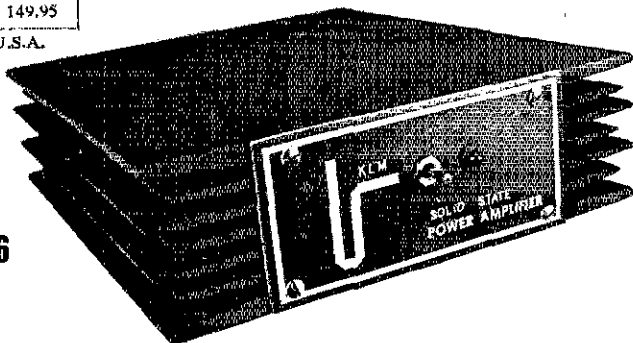
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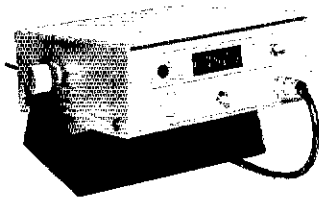
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raising fees for auto licenses and registrations but also includes repealing of the law providing for amateur call letter plates. For latest information, contact W7CAF, K7GHS, WA7NMJ or W7WGW. K7KRU passed his Extra and is now operating with a TR-4C, L-4B and TH-6. WA7KEC of Scottsdale is not a Silent Key although was listed in that column in Feb. Section awards were earned by K7GJA, WA7JCK, WA7KOE, K7NTG, K7RLT and WA7TZO. A7EN: 732 QM1, 73 QTC, 652 minutes. Traffic: K7NTG 239, K7NHL 237, K7MTZ 79, K7RLT 48, W7UQO 40, WA7QVN 36, W7DQS 26, K7KRU 20, W7PG 20, W7CAF 14, WA7GAE 13, K7UDG 13, WA7JCK 9, K7UYX 7, K7ZMA 6, W7XQF 5, WN7TWI 5, WN7TCJ 4, WN7SIV 2, WA7IXC 1, K7NMO 1, WN7TXE 1, WN7TXX 1.

LOS ANGELES - SCM, Eugene H. Violino, W6INH - SEC, W6QZY. RM: W6LYY. In the recent earthquake the AREC group was activated, all local members were alerted. After checking into headquarters and 3907 executive net all was well in our area. The AREC was active in the Temple City Camela Parade with 15 2-meter mobile units. W6QWC still very active with Slo-Scan; can be heard on most bands at all times. W6BHG active in the OCWA Net Sun. mornings. W6QIL still active in both the Inglewood Club and the Long Beach Club, also active teaching code class, those interested call DA 4-6631 for more information. The Antelope Valley Club reports W7GAQ walked off with the big prize recently with door prize winner W6BHCQ. PARC hosted the first annual meeting of the Southern Calif. Repeater Assn. on Mar. 3; officers and tech. committee were appointed. Eight members of the Ramona Radio Club participated in the recent SET drills, with fair results after having antenna problems. W6GLD has finally landed in a new QTH and gives us some news from the West Valley Club. W6FDM planning a European trip in July; expects to operate from HB0-land. W661UE back on the air at a new hilltop location. W6ROY recovering from the flu, is expected to be in hospital for surgery at this writing. Good luck Bill. K6JJO was a recent speaker at the Santa Clarita RC, subject "Similarities of Wave Motion" with demonstration on propagation of energy waves. It would be to our advantage to contact Congressman Charles M. Teague, 13th district regarding introduction of bill HR-16916, requiring manufacturers to install hi-pass filters in receiving equipment. A flow of letters from you and all your neighbors would be a good idea. So. Calif. VHF Club reports K6YNB and WA6ARC won 1st and 2nd place in their VHF Contest. The club also provided communications for the Carson City Anniversary Parade. WA6JTM and W6PDL both recuperating at home after a stay in the hospital. The San Fernando Valley RC have appointed W6VYZ and WA6KUS as the new prize chmn. K6YO has a beautiful article in the TRW Cross Talk for Feb. I hope lots of the hams have a chance to read it. K6AWO is organizing TRW Clubs Field Day group well in advance. W6NJU attended the Council of Radio Clubs and also was guest speaker at the San Gabriel Radio Club. WA6IDN has been active getting the locals back on the air in the Claremont area also active as GPS. The daytime National Traffic System should be underway on 14300 kHz at 1830Z, this will be a phone net for long haul traffic. I hope that we can have a large turn out. Traffic: W6INH 146, W6LYY 88, W6KJH 53, W6QAE 47, W6KGGK 36, WA6ZKI 35, W6UYX 32, W6KXC 6, W6QAW 6, W6HUI 5, W6TPO 4, W6DGH 3, W6OLD 3, WA6IDN 2.

ORANGE - SCM, William L. Weise, W6CPB - Asst. SCM; Richard W. Birbeck, K6CID. SEC: WA6TVA. PAM: K6YCI. RMs: W6AKR, W6BNX. Silent Keys: W6EBO and W6LOX. Our condolence to their families. Good news for Novices. A new Novice Emergency Net is established. Check in to the NEN Sat. at 9 A.M. on 7125 kHz. New Novice in Independence is WN6THH. SCN needs more outlets in Orange Co. If you have time please check in on 3600 kHz at 6:30 P.M. local time. Appointment endorsements are RM: W6RNX; FC: WA6TAG, W6WOO; QBSS: W6WRJ, WA6LGZ, W6GJOT; ORS: W6BNX; OPS: W6BUK, W6BNX. Congrats to all for FB work. If you would like an appointment please get in touch with me. W6VTK reports school is taking up much of his activities therefore not been very active. Numerous hams, WA6TVA, W6WOO, WA6LGZ, to mention a few participated in a joint civilian/military simulated air crash disaster at Santa Ana J.C. on Mar. 3. They used RACES-FM mobiles to handle traffic and assist in other communications for rescue work. Several military Helicopters and local hospitals also participated. Traffic: (Feb.) W6AKR 94, K6GMI 93, WA6TVA 69, W6WRJ 55, W6OBD 16, W6YWS 14, W6VTK 7, W6CPB 7, W6BUK 2. (Jan.) W6ISC 316, K6GGS 18.

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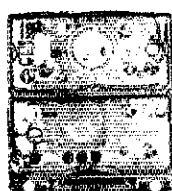
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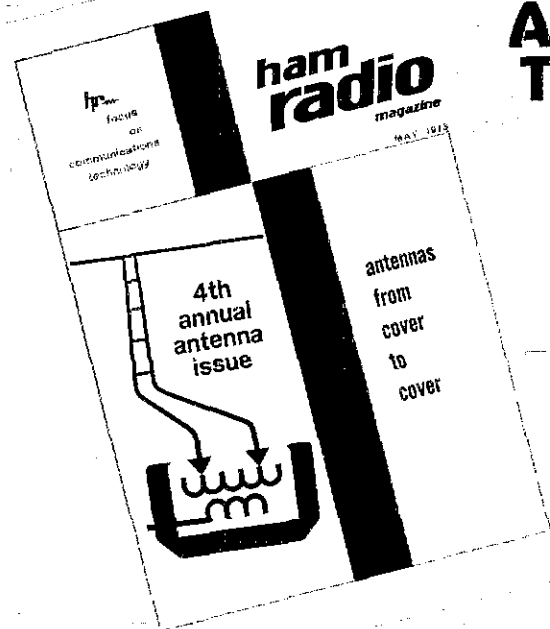
SAN DIEGO — SCM, Paul C. Thompson, W6SRS — Asst. SCM: Art Smith, W6INI. SEC: W6GBF. Section participation is very gratifying. Amateur operators have been taking on the added responsibilities of "Emergency Communications" preparedness. Radio Officers for OES now include WA6HGU to provide liaison with AREC. Appointments to "Official Stations" in the section are also available. Contact your SCM. SNC has been awarded to WB6PVH for operation with SCN. WA6KXO discussed Ocean Racing Communications with North Shores. El Cajon, Palomar and SOBARS had a presentation by a local communications manufacturer. SFC W6GBF attended the SANDRA meeting. SDIX is enjoying an increase in activity. WB6SEZ has been operating WA6LDJ/MM2. WA6ILK is a regular with SCN. W6ARN again has a tower up. WN6TWL is Steve Smith. New call for Wayne Bamford is W6PDA. Thanks to WB6LYG for maintaining the "Novice" crystal bank. New manager is WN6VHV. SANDRA took responsibility for the "Home Show Display" held Apr. 25-29. Additional members of the 1974 Convention Committee are needed to share the load. Contact WB6ODR. AREC provided communications for Amigos de la Americas Walk in Mar. PSHR: W6LRU 49, W6BGF 39, WB6VKV 34. Traffic: W6LRU 238, W6BGF 229, WB6VKV 136, W6VNO 72, W6DEY 33, WA6BDW 16, WA6ILK 14, W6FMZ 5, K6CXR 4, W6SRS 1.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DFI — SEC: W6JTA. RM: W6UJ. PAM: K6EVO. Send me reports of your activities, others are interested in what you are doing. WN6MLJ constructed antenna tuning units with the help of W6TYP to use with 1 watt ORP. SEC WA6JIA visited the Paso Robles ARC and SCM WA6DEI spoke at the SBARC on ARPSC in Feb. WB6DKE is the new secy. for SBARC. Jim recently moved to Solvang. MTN board members in the section are K6TIB, WB6MXM, K6EVO and WB6DXY. WB6MNY had an antique wireless display in the Oxnard Library. W6MSG is our new EC for the San Luis Obispo Inland District. Let's all pledge our support. WA6QYJ from Los Osos passed his General. W6EOL had DXCC endorsed for 140 countries. W6IDU keeps weekly cw skeds with ex-K6SUA, now W1GQU in Maine. WB6DHW and WA6DEI handled H and W traffic after Oxnard Earthquake. The Ojai Valley vhf gang planning for a big time during the June VHF QSO Party. W6OAL back after operating as KX6BU and KH6HQX on his last trip to the Pacific. WA6SSN building 160-meter gear for airplane radio control. K6FVQ worked 9M2DDQ for a new country on his 33rd wedding anniversary. W6IDU is new station on repeater WA6SIN. Does your club sponsor a code/theory class? Belong to the Radio Council? Hold emergency training? I would like the High School and College club stations to contact me. Keep July 22 open for the big TRICAR sponsored BBO. PSHR: WA6DEI. Traffic: W6PGK 146, WA6DEI 121, W6JTA 45, WA6WYD 34, K6EVO 21, W6CDN 13, WA6PFH 10, K6QPH 7, WN6MLJ 3, W6IDU 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.E. Harrison, W5LR — Asst. SCM: Frank A. Sowell, W5IZU. SEC: K5QKM. Asst. SEC: W5AKHE. RM: W5QU. W5GY interested in AREC work. K5QKM has the dope. New DARC officers now final including W5QZ, pres.; W5AHT, vice-pres.; W5BNS, secy.; W5AZN, treas. W5SFP 1974 pres. elect. Eastex annual Murval Picnic June 1, 2 Huxley Bay, (Toledo Bend) near Center Tex. Contact K5ILL or W5CYS. Lawton-Ft. Sill Hamfest attendance near 200. New QSL Mgr. 5th Dist. Box 1690 Sherman, TX 75090. Temple ARC met Feb., 1 27 in attendance. Club net meets each Mon. 7:00 P.M. 145.29 (am). Richardson WK reports passing of W5HD Jan. 20, '73 shortly after a fall from his "Ham" tower. The TEX CW Net meeting on 3970 kHz each evening offers interesting activities for "finger talkers." Note that Daytime nets are under consideration and if you wish to participate see W5QU in Fort Worth. If you understand what RNS, CAN and TCC means you can spend many enjoyable minutes or hours for that matter operating. Before I forget it - DX is on 80 and 160 too. XYL and yours truly spent a few days in valley with W5KR and his buddies. W5HT, W5NT and W5GOO were also present. W5BFW Ft. Worth Feb. report arrived late but made this issue. How many of you received the new issue of TEXAS "RACES" Roster? This includes all 62 districts and very accurate. Don't forget upcoming ARRL West Gulf Division Convention scheduled for Lules, Tex. between Fort Worth and Dallas. Get your reservation in now. No information received from Abilene

ANTENNAS ARE THE ISSUE ...



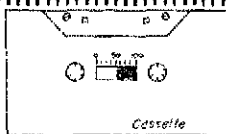
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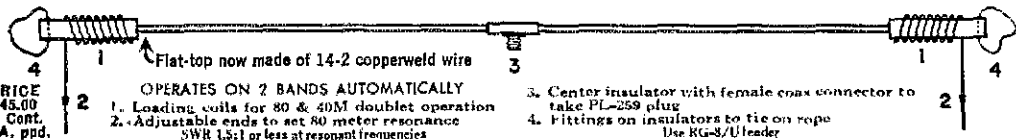
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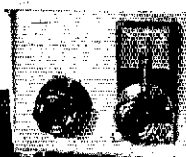
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Amarillo, Lubbock, Wichita Falls, Tyler, Longview and also Waco. W5BOO needs some help over there, I'm sure. K5QKM's SEC report came in ahead of time. Congrats, Joe. Traffic: (Feb.) W5T1 254, W5QU 199, K5QKM 71, W5HVF 40, WBSEE 27, W5LR 7, W5YK 4. (Jan.) K5QKM 83, W5SHN 51.

OKLAHOMA SCM, Cecil C. Cash, WSPML - Asst. SCM/SEC: Leonard R. Hollar, WA5FSN. RM: W5RB. PAMs: W5MFX, WB5CW and K5DLE. Well here we are back on that crazy daylight saving time. Congrats to the newcomers to the bands. The two new WN5s are WNSISN and WNSISO. Welcome fellows, we are going to need some new blood to keep things going when some of us older ones, by nature, go out to the happy hunting ground. Congrats also to two new upgrades to Advanced K5ASW and WB5EQ both of Marlow. New club officers are as follows: The Great Plains ARC WA5YQO, pres.; WA5YOR, vice-pres.; WA5YQP, secy.-treas.; WN5ECO, act. mgr. Oklahoma Central VHF ARC WB5ECJ, pres.; W5OZE, vice-pres.; W5AKFT, secy.; W5KE, treas. Aeronautical Center ARC W5HXL, pres.; W5WSW, vice-pres.; K5VVO, asst. to pres.; W5ZTE, secy.-treas. Look in earlier issues of QST or in your net directory for listings of the Okla. nets. Please send me the news around your station with your Form 1 station activity report card or by RADIOGRAM: "I can't print what I don't have." Traffic: K5TEY 382, W5RB 104, W5FB 39, K5OTM 35, W5IKL 31, W5MFX 31, WB5B-X/S 28, WASZOO 27, W5JGU 20, W5PML 20, W5ASCUJ 18, WB5EEY 12, W5SOUV 12, W5SUG 11, WB5AZS 8, K5ZDB 7, WB5HK 6, WA5FSN 6, W5J1 1.

SOUTHERN TEXAS - SCM, Arthur R. Ross, W5KR - SEC: WA5YXS. New PAM, who also is EC for Victoria Co. is W5HWY. Former PAM W5KLV requested relief from the duties; STEN activities keep him busy. EC W5YCK Jeff Davis Co. reports 100% amateur participation. OPS K5RVE is replacing his SBE-33 with new Hallicrafters FAM-300 for mobile operation. W7WAH/5 has acquired a 20A SSB exciter and Viking Courier amplifier and will soon be on SSB; still chasing DX but with no luck. WA5ZBK says rig trouble and visiting relatives reduced his Feb. activity. W5SMA is going SSTV. OPS W5BHWV, W5NGVO, WA5GZI, K5INU, WNSHEC, WNSHEE set up ham station at Mercedes Scoutarama; originated 20 messages, received and delivered ten more at the booth. WB5EDS teaching cw at Delmar College, Corpus Christi; more than half of 35 students have passed 5 wpm. K5ROZ sent color photo of self and station. W5AIR, once SCM for Southern Tex. is a new ORS appointee. W5AVBM says WB5CJL newest Lufkin station on 2 meters and that Lufkin repeater ready for new license. W5BGE took time out from editing and publishing SARC BULLETIN to send in good traffic report. W5ABQ seeking donations to keep the TEX CW Net Bulletin going. W5YAX handled 55 phone patches in Feb. WA5ZBI is new ORS in Austin and has upgraded to Extra Class. W7WAH/5 upgraded to Extra Class same day. Austin ARC has arranged for its members to check into TTN and FFX daily; several also check into the 7290 net. Every ORS appointee in this section is a member of the TEX CW Net! Said membership is not a requirement, let it be known, but we are glad that they are living up to their appointments. OVS K5CWS has successfully worked through Oscar with 50 watts to the RG-110; says that 100 watts ERP not required; is waiting patiently, ready to go on 444 MHz, for rest of gang to join in; going ATV in future; has second call for Clint, Tex., W5SILL. Traffic: WB5CJR 166, W5YAX 144, W5BHWV 141, W5AVBM 127, W7WAH/5 120, W5ABQ 108, WA5YXS 93, WA5YEA 87, K5EJL 75, W5AMN 68, WA5ZBK 66, W5ALNV 43, W5BGE 35, WB5DBK 29, WB5EDS 29, WA5ZBJ 28, W5TFW 26, W5TJF 25, W5SMA 23, K5ROZ 22, WA5JF 20, K5FFH 15, W5BHWY 14, K5RVE 13, W5KLV 11, K5HVT 9, WA5CTJ 5, W5SMA 5, W5UKN 4.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - Asst. SCM: Mrs. Dorez Booth, VE6YL. SEC: VF6KC. Feb. was a month noted for extremely poor conditions for APSN, in fact for all 75-meter nets. We did struggle through, but during such periods could the various repeater and two meter enthusiasts help with the load? I believe it could be done. EC VE6FM now has repeater VE6RPT and in the process of moving it to a new location. I enjoyed meeting the Lethbridge club and a short visit with VE6FS. VE6AGZ report VE6AVV found snowmobile ignition completely washed out communication possibilities. VE6AJR should soon be on sb. VE6ARU has moved into his new broadcast studio "ham shack."

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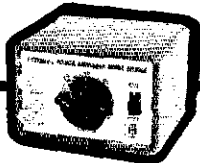
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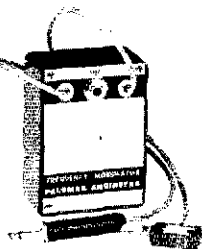
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Congrats to VE6AK one of the first 18 in the world to make the Oscar 1000 award. EB OM. Congrats to former QSL Mgr., Vice-Director, VE6EO on his appointment to Asst. Director for Alberta. Traffic: VE6BAT 32, VE6FS 32, VE6FK 30, VE6XC 17, VE6ASL 15, VE6YW 12, VE6AXH 11, VE6AD 7, VE6PL 7, VE6V 7, VE6FV 4, VE6KS 4, VE6AOZ 1, VE6KP 1.

BRITISH COLUMBIA - SCM. H.E. Savage, VE7FB - Light-house tenders: VE7BZF, Green Isl.; VE7DAJ, Pine Isl.; VE7AOI, Kains Isl.; VE7APR, Malcolm Isl. and active on the air. In the same hospital this month are VE7BVV, VE7BLO, VE7AYB, all because of accidents of one kind or another. VE7KX is in hospital for some time. WIFB who has resided in Victoria is a Silent Key. Kent Radio Club: VE7BBV, pres.; VE7AYZ, vice-pres. Club project is code and theory class, tune students. Nanaimo ARC's paper Static Editor VE7BIO is FB and VE7BXN, pres.; VE7NP, vice-pres.; VE7AWC, secy.-treas. East Kootenay ARC reports they are progressing well with their latest state 2-meter repeater. Traffic: (Feb. VE7CCJ 34, VE7QO 10, VE7CDF 6, VE7TF 5. (Jan.) VE7TT 50.

MANITOBA - SCM. Steve Fink, VE4FO - We welcome VE4LG as new RM and MTN mgr. this month. Special thanks to VE4EA for a fine job this past year. VE4VA is now *Advanced Class* and is heard on 20 ssb. Nice to hear from former SCM VE4EI, now VE3DYN in Toronto. VE4JC now active as 912AR in Zambia and ex-VE4RH now is VE7AXC. Condolences to VEARS on the passing of his XYL. VE4MA has added XE-Land to his Oscar tallies. Winnipeg stations still needed on MTN. MTN (3660 kHz, 0045Z daily): 22 sessions, 88 QNI, 73 QTC. MEPN (3765 kHz, 0100Z daily): 22 sessions, 968 QNI, 42 QTC. Traffic: VE4LG 61, VE4RO 57, VE4PG 25, VE4EA 24, VE4JA 13, VE4CR 12, VE4HR 10, VE4YC 8, VE4LU 7, VE4OW 6, VE4RV 5, VE4LN 4, VE4NE 4, VE4PA 4, VE4FO 3.

MARITIME - SCM, W.D. Jones, VE1AMR - Congratulations to VE1AMB on winning the Hager Trophy in the YLAP contest. The winners of the LOIA contest were VE1AMB the YL and VE1ADV for the OMs. The "Brownies (in 'The Air Day') was held again this Feb. Led by Dave operating VE1WN from Greenwood VE1s MY, TK, ZY, YV, WF, AAB and VE1AMB all had Brownies on the air.

The Prince Edward Island "Abeqwt" is now available to all amateurs and SWLs. VE1 and VO1 stations. OSO all three countries west of Canada and U.S. stations. QSO any three P.E.I. stations, DX QSO any two P.E.I. stations. Send list of QSLs, certified by two other amateurs with \$1.00 to award mgr., P.O. Box 1732, Charlottetown, P.E.I. Congratulations to VE1VR, ex-VE1AFY or making the DXCC Honor Roll. The Central Nfld. repeater is fast becoming one of the more sophisticated repeaters in Canada. A new repeater is planned for Cornerbrook. This year's Ham-en-annuy will take place in July, possibly at Norris Arm between Grand Falls and Gander. APN reports QNI 88, QTC 72 in 28 sessions. Traffic: VO1CA 70, VE1AMR 58, C11ARB 53, VE1AYJ 21, VE1AMB 4.

ONTARIO - Acting SCM, Ed. W. Doyle, VE3EWD - Ont. Daytime CW Net commenced Feb. 26 on a trial basis, operating at 7.645 at 1600Z and 7.100 at 2100Z as advised by VE3FOZ. By the time you read this, VE3DV will be back in harness and preparing to bring you a more detailed record of the proceedings of Ont. activities. Many thanks for reports received from Net Mgrs. and others for this and the past month. The "pro" will now take over. Ont. AREC is in need of concerned amateurs interested in emergency communications preparedness in cities over 5,000 population throughout the Province. Inquiries on this vital service should be directed to your SCM and/or SEC. How about it? Traffic: (Feb.) VE3SB 164, VE3EHF 143, VE3FOZ 135, VE3DPO 97, VE3AWE 84, VE3GFN 71, VE3GIG 71, VE3DVE 64, VE3EWD 63, VE3DGC 62, VE3CYR 48, VE3GT 34, VE3FRG 33, VE3AIA 29, VE3FGV 27, VE3ASZ 19, VE3ATR 16. (Jan.) VE3AIA 81.

QUEBEC - SCM, Joe Unsworth, VE2ALE - SEC: VE2BDM VE2SD back to Hull after sojourn in VE8-Land and VE2ABF back home after a week in the hospital. VE2DU now is VE3DMK a Mississauga and VE2BU will move to the same area at end of May. VE2DGD, XYL of VE2APT was also in hospital for a short stay. VE2BMO and VE2ZA found and located the interference a VE2KM being caused by vhf units used on trucks by a Montreal based trucking company. VE2DR make PSHR every month by hunk as ORS. Former VE3COH now is VE2BIG located at Nunavut Island and is on 2 meters. New net controllers for the QR Net are VE2s WX, BRW, AXO. Former VE2DIC now 4X4JS visits

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Montreal during Apr. VE2BBK moved QTH from Beaconsfield to Hudson. VE2BEN lost human modulator for a few days. MARC elections: VE2AS, pres.; VE2ZH, vice-pres.; VE2HI, secy.; VE2NB, treas. Attention VE2s: RAOI Congress will be held this year at Saguenay in Sept., and Radio Amateur Week will be the preceding week of the Congress. Three directors of RAOI have stepped down, VE2s BAI, RE and BBL and VE2DGO replaces VE2BAI. Les deux derniers Volumes de la Radio-Amateur de RAOI sont a votre disposition. VE2BYG doing very well with Oscar 6 communications. PSHR: VE2APT. Traffic: (Feb.) VE2DR 191, VE2BP 50, VE2AP 43, VE2ALE 31, VE2AJD 19, VE2DLG 17. (Nov.) VE2DR 150.

SASKATCHEWAN — SCM, William H. Parker, VESCU — Time is right now. Get ready for Field Day the last week end in June. Everyone should participate. Great fun, and lots to learn. Hamfest 1973 will be held at Saskatoon this year on the July 1 week end. The AREC is a real asset to the Emergency Measures Organization of Sask. The following have met and addressed EMO personnel at their meetings on amateur radio and the emergency aspects: VESBO, VESRI, VESCU. We will be participating this year in the Sask. Emergency Measures Area Division exercise. The 2-meter bug is enlarging and repeaters are very efficient in Moose Jaw, Regina, Saskatoon. We need more activity on RTTY. The ARRL QSL Bureau is looking for your self-addressed envelopes. The Canadian Film, "Fine Business" has been viewed by the Saskatoon Club. If you would like to see it, ask VE6FK for a date to show it. See you at the Saskatchewan Hamfest. Traffic: VESGL 59, VESOS 35, VESHD 33, VESTT 14, VESQO 10, VESIX 8, VESKS 7, VESHE 6, VESBW 4, VESPA 4, VESSN 4, VESWB 4, VESXG 3, VESFO 2, VESIM 2, VESQO 2, VESPM 2, VESSM 2



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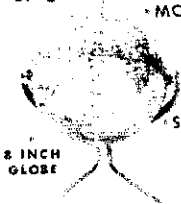
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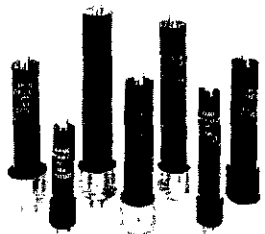
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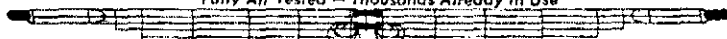
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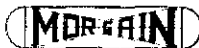
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HAM-ADS

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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, Mamaroneck NY 10543.

PROFESSIONAL CW operators, retired or active, commercial, military, govt., police, etc. invited to join Society of Wireless Pioneers - W7GAB/6 Box 530, Santa Rosa CA 95402.

EDITING a club paper? Need public relations help? You should belong to Amateur Radio News Service. For information contact Rose Ellen Bils, WA2FGS, Secretary, 17 Craig Pl., Pennsville NJ 08070.

ROCHESTER NY is the place to go for the largest Hamfest, VHF meet and flea market in the northeast, May 12th. See Hamfest Calendar for details.

FOR real hospitality, a real good time and a real hamfest - Don't forget "The Big One" - the Orlando Hamfest/Southeastern FM Convention and Florida State ARRL Convention, June 23 at Orlando Exposition Park. Bring the family, Disney World, Cape Kennedy and beaches nearby! Accommodations, Orlando Chamber of Commerce, Convention Department, PO Box 1913, Orlando FL 32803. See you there!

THE 26th annual Turkey Run Hamfest and VHF picnic sponsored by the Wabash Valley ARA Inc will be held Sunday, July 29, at Turkey Run State Park, near Rockville, Ind. Don't miss the midwest's finest hammarket. Fun for the whole family; KYL bingo and flea market; food and refreshments; camping facilities, and park recreation for the kids. Activities begin at 9 AM with free coffee and doughnuts. Talkin' 146.94 by W9UUB. For details send SASE to WVARA Hamfest, Box 81, Terre Haute IN 47804.

WARREN Hamfest, largest family style hamfest in east. Sunday August 19th, @ famous Yankee Lake Park. Giant Hammarket, swimming, picnicking, all free. QSL W8VFD, Box 808, Warren OH 44482.

AN INVITATION NYC area hams and SWLs are invited to attend NY Radio Club meetings - 2nd Monday of every month, Williams Club, 24 E. 39th St. near Madison Ave. at 8 PM - New members welcome. Interesting programs.

HAMFEST: June 3rd. Save this date for the annual Starved Rock Radio Club Hamfest at Ottawa, Illinois. Write George E. Keith, W9QLZ/W9MKS RFD1, Box 171, Oglesby, IL 61348 for details, or see May QST Hamfest Calendar.

CAPE Cod's fabulous Hyannis! N.E. ARRL Convention, September 29 & 30. Flea market, seminars, FM, SSTV, REDXCC, AMSAT, V1, trips, 2 pools, golf, beaches, sailing, early bird. Registration - \$3. W1KCO, 572 Berkeley Street, Taunton MA 02780.

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord NC 28025.

QSLs?? Finest and largest variety samples 50c. Deluxe 75c. Religious 35c. (Deductable). Sakkera, W8DED, Box 214 Holland MI 49423.

TRAVEL-PAK QSL Kit - Send call and 10c; receive your call sample kit in return. Sameco, Box 203, Wyncott NY 12194.

PICTURE QSL cards of your shack, etc. from your photograph 500, \$12.50, 1000, \$16.25. Also unusual non-picture design. Generous sample pack 30c Half pound of samples 60c. Raum 4154 Fifth St. Philadelphia PA 19140.

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SAMPLES 20c. Harry Sims, 3227 Missouri Ave. St. Louis MO 63118.

QSLs 300 for \$4.55, samples dime, W9SKR, Ingleside IL 60044.

QSLs "Brownie," W8CJL, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

DELUXE QSLs, Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

COMPLETE QSL catalog, 300 cuts, 10 report forms, ink and stock samples, plus ten sample QSLs. 25c. Carmlison's Quality QSLs, 321 Warren St., N. Babylon, NY 11704.

3-D QSLs - Far more spectacular, little more cost. Samples 25c (refundable). 3-D QSL Co, Monson 2, Mass. 01057.

DON'T buy QSL cards until you see my free samples. Free service, economical prices. Bolles, Little Print Shop, Box 9344 Austin TX 78757.

QSL, SWL, WPE cards. Samples 25c. Log books, file cards, decals. Malgo Press, Box 375, Toledo OH 43691.

QSLs, SWLs, WPE samples 15c. Nicholas & Sun Printery, (C) Box 11184, Phoenix AZ 85011.

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 2 for \$1, 7 for \$3, prepaid and guaranteed. Lepabo Box 198T Gallatin TN 37066.

QSLs, 3 color glossy, globe, eagle, straight key, ham gift capsules on front, report form on back. 100 - \$4.75 postpaid. Rusprint, Box 7575, Kansas City MO 64116.

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QSL's 300 for \$4.95! Samples 15c. Colourcard Box 32 Taosaga CA 90290.

QSLs - Dime or your present card brings samples. Alkanpin Box 3494, Scottsdale AZ 85257.

RUBBER stamps, \$1.75 includes postage. NJ residents add tax. Clints Radio, W2UDQ, 32 Cumberland Ave. Verona NJ 07044.

QSLs - Custom QSLs, brochure 25c. WFLX QSL Designs, 2 Britton St., Pittsfield MA 01201.

QSLs - Free samples, fast service, good designs. W7IIZ Fred Box 2387, Eugene OR 97402.

200 two color QSLs \$5.20, stamp for samples. Mark, W8GNK 2534 El Tonas Way, Carmichael CA 95608.

CANADIANS free surplus parts catalog. Etron, Box 74 Montreal.

CANADIANS, Collins 75A2 \$200. Technical Material Converter SRE2 \$250. FR4/U frequency meter \$100. All w/ manuals and in excellent condition. John Dobrosinski VEDDD Newcastle PO LOA 1HO Ontario Canada.

CASH paid for your unused tubes and good ham and commere equipment. Send list to Barry, W21NI, Barry Electronics, 5 Broadway, NY NY 10012.

WANTED: All types of tubes. Top prices paid for Varian Eimac, Jaro Electronics Corp. P.O. Box 414, Orlando, FL 32802. For fast action call Toll Free: 800-327-7799. Ask for Bob Hoffman.

WANTED: An opportunity to quote your ham needs. \$3 year ham gear dealer. Collins, Drake, Galaxy, Tempo, Kenwood Ten-Ten, Hy-Gain, and all others. Also \$25,000 inventory us gear. Request list: Chuck, W3I0G, Electronic Distributors, 1190 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 1220 Mira Mar Av. Long Beach CA 90803.

SPIDERS for boomless quads. Helicar welded aluminum. 3 Antennas, 1339 So. Washington St., Kennewick WA 99336.

ELEINSCHMIDT Manuals, Mite KSK. Teletypewriter supply gears, parts, toroids. SASE list. Typtronics, Box 8873, Lauderdale FL 33310. W4NYF. Teletronics, manu bought.

NOVICES: Need help for General ticket? Complete record audio-visual theory instruction. Easy, no electronic background necessary. Write for free information, Amateur License, PO B 6015, Norfolk VA 23508.

WANTED: tubes, transistors, equipment, what have you. Bernard Goldstein, W2MNP, Box 257, Canal Station, New York NY 10013.

TOWER climbing safety belt/harness \$21.50. Prop pitch ro \$65. 178 175 frequency meters \$45. 2M handtalki \$50. Cox switches multiposition \$16-\$48. Free list. Link, 1000 Mon Ark, Monroe CT 06448.

IN4007 diodes with suppression networks, 10 for \$2.50, 100 \$22.50. East Coast Electronics, 123 St. Boniface B Cheektowaga NY 14226.

PREPARE for ham exams! Use Post-Check. Original, expertly devised, multiple-choice questions and diagrams covering all areas tested in FCC exams. Keyed answers, explanations, 181 sheets for self-testing. All newly revised and updated. General Class \$4.25. Advanced Class \$4.50. Extra Class \$4.75. Each applies to its own class only. First class mailing included. Add 25c per copy for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbana, IL 61856.

WANTED CE200E, HQ180AX, state condition and your lowest price. John Waskowitz, 35-30 73 St., Jackson Hts NY 11372.

DAH-DITTER Electronic Keyer. Self completing ac supply, sidetone oscillator, speaker, 5 to 40 wpm, many other features. Wired \$44.95. M & M Electronics, 6835 Sunnysbrook, NE, Atlanta GA 30328.

SELL Collins KWM2, mnt. with 516F2, 516F1, noise blanker, mobile mount, cables. \$880. Package only. C. W. Tinsley, 75-561 Donwood Drive, Naperville IL 60540.

Will buy your unfinished or inoperative amateur related Heathkits. Must be complete. WQWAM, 7928 Hedges, Raytown MO 64138, 816-358-1148.

WIRELESS sets, parts, catalogs, bought, traded. Laverty, 215 Geneva St., RD1, Egg Harbor NJ 08215.

GREENE Center Insulators, with or without Balun - A tough number to beat. Free fiber. Kaufman Industries, Box 817Q, Reeds Ferry, NH 03054.

TORODES 88 or 44 nby, five for \$2.50 postpaid. M. I. Buchanan PO Box 74, Soquel CA 95073.

NEWS: Free sample copy of "World Radio," Amateur Radio's Newspaper, 2509A Donner Way, Sacramento CA 95818.

WANTED: Straight keys and bugs for collection. Give make, model, condition, price. John Elwood, WTGAQ6, Box 1243, Lancaster CA 93534.

FOR SALE: General coverage rcvr BC348, ac, good condx, \$50, shipping extra. WB2VND.

WANT January, February 1921 QSTs in excellent condition suitable for binding. Will pay premium price for premium quality. Marcy, WAID, 461-3rd Ave., Sea Park, Eau Gallie FL 32937.

CX7A new Jan 72 best offer. MN2000 matching unit best offer. Would prefer sale in NY area so rig can be demonstrated. John Hipp PO Box 431, New Milford CT 06776, Tel (203) 354-9735 anytime.

COLLINS 455 kc filters: 2 kc, 4 kc, 8 kc. New 3/850, GR716C \$100, GR916A ant bridge, GR760 \$95, GR921A \$70, LM14 C-15, Labco Freq synthesizer \$395. W8CV 1910 Longpoint, Pontiac MI 48053.

SIGNALONE, Alpha Seventy, new and used. Also Collins, Tempo, Kenwood, Hallcrafters, Drake, Regency, HyGain, Mosley, etc. A real ham store with complete service department, one of the best. Write or call Dallas Electronics, W5GEL, 1118 South Staples St., Corpus Christi TX 78404.

KWM2, better than new, in one hour. You do it. Write - W9 BNF.

WANTED for personal collection pre 1930 wireless and wire telegraph and telephony equipment, manuals, books, magazines, pamphlets, etc. Will Nangle, 761 N. 29th St. Milwaukee WI 53208.

SOUPY GROVES, W5NW, celebrates fiftieth anniversary on the air June 16 1973 (0001-2400 GMT) with a 24-hour operation, through 10, depending on propagation. 30 kHz inside low end of cw and phone bands, concentrating operation on the hour and half hour. Would especially enjoy renewing old contacts and making new ones. 1406 W. 12th, Odessa TX 79763.

HT37 new xformer and relay, perfect, with carton, bought new, \$175. Will ship. Dave Gogola 1419 Favell, Memphis TN 38116.

GLADDING rcvr 12-V dc; Savoy kits 16-76, 22-82, 28-88, 34-94 and 94 direct. All factory mod's - \$175, plus shipping. W1QFJ.

MOTOROLA HT-200, handle-talkie, 94/94, Nicad, with charger - \$150. K. E. Booher, 1421 Williamsburg Rd., Flint MI 48507.

TRADE, Miranda 35 mm SLR Fl. 4 50 mm, with prism light meter and case for HW32A, SB200, etc. W1GIR, Bitzer, Wear NH 03281.

SENECA VHF1, needs power trans. - \$65. Wanted: Seneca power trans; Ameco CN220, (W6RQZ), 1330 Curtis St., Berkeley CA 94702. (415) 526-7346.

BEAM, lower spring special: Trix W51 - \$386; MW50 - \$250; MW65 - \$331.50; Hamk - \$99; PR44 - \$59.95; AR22R - \$31.95; HyGain TH6DKX - \$139; 204BA - \$129; TH3MK3 - \$114; Mosley CL36 - \$149; CL33 - \$124; TA33 - \$114; MCQ3B - \$91; S402 - \$143; #214 RGB foam Belden 16cft; #448 Swire rotor cable 10cft; 3/16-inch cable clamps 1kg; Polycen fiberglass spreader arms \$7.50; 6V/600 ma transformer \$3.85; 1/2" dia. \$5.45; Writex quote Class PM77B; Halcrafters FPM300A; Drake TR72; B&W; SBE; Standard; Gimatec, Collins, Cde replacement parts. Prices, For Houston, warranty guaranteed. Mastercharge, BAC. Write list. Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668.

COLLINS mechanical filter F465F-21, brand new - \$30; McEloy keyer - \$25; 1.5 kV A commercial UTC power transformer, will take 6 kW ssb - \$25; 250 QST's from 1936 and 250 CQ's - \$5. W2ABE.

MANUALS for Gov surplus gear - \$6.50 each: R-390/JRR, WRC-257/AFC, WRC-257/H, Hummel more. S. Consalvo, W3IHD, 7218 Rosine Drive, Washington DC 20021.

FOR SALE - Cubical quad, HyGain Model 224 two-element tri-band, complete in original carton - \$55. FOB, W4YGY, Box 746, Melbourne Beach FL 32951.

WANTED, manual, Heath A1, transmitter. Carlton M. Ozlas, 463 Delmar St., Philadelphia PA 19128.

WANTED: HG10 VFO (21.165 kHz., 2000 GMT). Steve, WN8NL (313) 725-0098.

SELL-trade - 4 variacs 220/110/9 amps. Handbook electronic keyer. Several 100-TH's, 3 ten-pound spools, No. 22 formvar copper wire. Heathkit twee transistor mobile supply. Need: Simpson 260, silver dollars. Or?? Stan, WB9KU, 2748 Meade, Detroit MI 48212.

WANTED: Gonset Super-12 converter. 100 Shelburne-Chase, Fairport NY 14450. (W2GTE).

HOOSIER Electronics - Your ham headquarters in the heart of the Midwest where only the finest amateur equipment is sold. Individual, personal service by experienced and active hams. Factory-authorized dealers for Drake, Regency, Standard, Ten-Tec, Galaxy, Hy-Gain, CustCraft, Mosley, Ham-M, Hustler, electronic, cockpit, calculator, plus many more. Orders in-stock merchandise shipped the same day. Write or call today for our quote and try our personal, friendly, Hoosier service. Hoosier Electronics, R.R. 25, Box 403, Terre Haute IN 47802. (812) 894-2397.

PROFESSIONAL assembly of your SB200 - \$20; SB220 - \$25. Write or mail to R.R.1, Box 195, Poseyville IN 47853. WB9KUZ, WB9KTH.

HOME for sale: beach, marina on L.I. Sound, 60-ft. tower, beam, radio room, split 1/4 bdrms, 2-1/2 bchs, rec. rm., bsment, 4 appliances, wet bar, patio, entrl. A/C, gas heat, humidifier, rugs, drapes, pool garage, elec. openers, fireplace, center hall, sprin syst., in-caspe - beam area, 2 mi. N.W. of house with everything - \$35,000. W2ASJ, call for appt. New Rochelle NY. (914) NE-3-7077.

COLLINS KWM-2 with PM-2 ac supply and CC-2 suitcase - \$774; 351D-2 mobile mount - \$40; 312B-5 PTO - \$125; Hamamand HX13 keyer with Vibplex - \$40; Henry 2K - \$450; Mosley CL33 beam - \$80. All in exc. condx. Pvt. Pay, Ray Grimes, 4312 Paterson Way, Long Beach CA 90815.

SELL: Heath HW-17A 2-meter transceiver with HG-10 VFO. Both excellent condition - \$100; Hy-Gain with HG-10 VFO, both like new - \$89; two 7-element HW-16 2-meter beams - \$45; Johnson Viking VFO - \$20. Steve A. Clegg, WA2DCX, 80 Andover Lane, Matawan NJ 07747.

FM-210 Galaxy rcvr., AC-210 PS, 10 xtals (all Sentry), bracket, cables for ac, 5W & 10W operation; updated by Galaxy 1972, all manuals, B2E - \$125, from Incl. shipping insured 48 states. Tom Donohoe, W2NJB, 45 Gramercy Park, NY. (212) 673-3458.

COLLINS KWM-2, 516F-2 ac supply, D-104 microphone, Ten-Tec KR-40 "Squeeze" keyer, all in excellent condition and now on air - \$750. Will ship, will deliver within 100 miles. Also, Gladding 2m 2m with 4 pairs of xtals, mounting bracket, antenna cables, and manual. Excellent condition - \$150. Steve, WA2GMC, 11 Francesca Drive, Oyster Bay NY 11771.

SELL: SB-102, SB600, HM-102, HN-31, HDP-21A mic., GH-12A mic., HS-24 spkr., Eico 710 GDO. All equip. like new cond. - \$435, takes all. W. H. Wiley, FOB 52, Montana CA 94037. Ph. (415) 728-7136 days.

DRAKE 2-NT cw transmitter, VFO socket - \$95; Drake 2-C 80-10 m. receiver - \$195, both - \$275. Each perfect, late models, little used. Original cables, manuals. Ppd. in USA. Novice expiring. Must sell. N.P. Murray, WN 5 EFT, 12 Redbud, Conway AR 72032.

DRAKE TR4, TV4 & AC4 mnt! Not a scratch - \$550. J. Reed, 1031 W. Lafayette St., Norristown PA 19401. (215) 279-1517.

WANTED - Yaesu 2000-B or 2100 linear. K4CC (904) 343-3787, after 6 P.M.

WANTED: Heathkit SB-301/401, or Drake system. Gordon Laubach, K3DQX, 725 George Drive, King of Prussia PA 19406.

SELL: Heath HW12A with ac supply and mike - \$110; Hamamand HQ180 rec. and matching speaker - \$200, all in excellent condition - will ship. WA9QZE, B. Ahlquist, 1420 Brentwood, Round Lake IL 60073. (312) 546-8100.

BC-939B, antenna tuner - \$60, excellent. Loads longwire or whip, WA2FNF. (201) 895-3156 evenings.

CLEAN out ton of parts. Ton old to build. Sale for bargain list. K. Fries, W0LO, 1918 E. 12th St., Des Moines IA 50318.

SELLING out: Panel meters, xmtg. tubes, test equipment, antique radio magazines, ham gear. Sale for listing. Samkofsky, K4HRU, 4803 Brenda Drive, Orlando FL 32806.

QUITTING - Drake R4B, T4XB, Gonset GSB-201, Swan 240 with dc. magazines, accessories, Galaxy console, test gear. Sale for list. Charles Pranger, 1932 Bonita, Las Vegas NV 89105.

SELL: HT-37 - \$150; SB-301 w/all filters - \$200; A-2515 - \$45. All in fb condx and in use now. Arvch Weiss, WB9GQJ, 3848 W. Kirk, Skokie IL 60076. (312) 679-3855.

FOR SALE: Excellent condition, barely used, Swan FM-2X rcvr, complete with ac power pack, six-channel xtals and manual, in original carton - \$200 takes all. Will ship. E. Borley, 96-22 Dongan Ave., Elmhurst NY 11373.

SELL: Drake 2m fm ML-2, 2 months old, used very little, mint 5/8 GP 1/4 mobile whip, accessories - \$275. Also, chrome Vibroplex - \$15, new JM-18 VTVM - \$26.50. WA4BTK, John Gwin, 1316 Kirby Road, Knoxville TN 37919.

RFTY, Sell Model 28KSE Teletype - \$250, no shipping; Electrocom frequency shift converter Model FSC250 and electronic filter tone keyer. Complete parts inventory. Payne Radio, Box 525, Springfield TN days (615) 384-5573, nites (615) 384-5643.

SIGNAL/one CX7A: Special purchase sale, new CX7A, 90-day warranty by dealer - \$1895. Complete parts inventory. Payne Radio, Box 525, Springfield TN days (615) 384-5573, nites (615) 384-5643.

FOR SALE: Collins 75A4 (gear dial, 500, 1500, 2100, 3100 cycle filters) - \$325; Heath SB-102 (with optional cw filter) & HP-23A (both 6 mos. new) - \$385; Collins CU351 (AR antenna tuning unit - \$29. Wanted: filters for 7553B and 250KC-2 75C (K25JZ-3), mechanical filter. Steve Hose, WA9AXE, 102 West Jackson, Hope IN 47246.

SELLING OUT - KWS-1 - \$375; 75A4 - \$250; Zeus - \$225; 62S1 - \$50; Swan 250 - \$200; Model 15 TTY - \$40; G.E. Prog. Line "3" supply w/4 chan. deck - \$160; TX-62 - \$60, lots more, same for list. WB2PMF. (201) 264-7631, 808 Brook Ave., Union Beach NJ 07735.

FOR SALE: Nice Swan Model 260 5-band transceiver, ac supply, dc supply, speaker and make all built-in, only \$245. Collins ac supply, Model 516R1 - \$75. Jack Yeoman, WRVHV, R.R. No. 4, Washington C.H. OH 43160.

SHACK cleanout: Collins 180V-1 kW ant cplr (30 No.) - \$15; Johnson Invader 200 xtrsr - \$130; AN/URR-13 whf rvy - \$30; Northern Radio two-tone R-TTY channel filter pair 1955 & 2125 Hz 45 No. 1 - \$4; Navy RBB, RBC rvy with ps - \$25 ea. Wanted: Collins 75S-3C rvy. FOR: Larry Laitinen, WA6JYJ, 217 Orchard Rd., Felton CA 95018. (408) 335-7549.

FOR SALE: HW-16, crystals, spare tubes, excellent condition - \$30 or offer. Wanted: SB-200, commercial or homebrew matchbox. Larry Allen, 6812 - A Stuybridge Dr., Baltimore MD 21234.

HAMMARLUND QS-180, perfect function, appearance - \$260, includes shipping. Irv Korenman, 57911 Hidden Gold, Yuca Valley CA 92284.

SELL: TR-4, RV3 with spkr and AC3, DC3, MMR3 mounting kit. Just factory overhauled, new power tubes, manual - \$495 Will ship. F. Colby, 212 Callodine, Buffalo NY 14226.

COLLINS R-390A, new, still in factory carton. Complete 60 tubes - \$800. Bill Betts, 33 Offutt Rd., Bedford MA 01730. (617) 274-6171.

SALE: Heath "Kompak" kw amp with ac power supply - \$100. Will ship. W3PWB, 4905 Henry St., Easton PA 18042.

WANTED: NC-300 excitation section water switches S1GAB12374 and S1HBT2375 - \$10. WN3UDS, 143 Fairhill, Churchville PA 18966.

FOR SALE: HW-32A, HW-22A - \$50 each. WA8MJZ/Q, 1949 S. 15th St. Omaha NE 68108.

WANTED: Yaesu FLDX-2500, 2 kW linear or equiv. K6HER, 575 Grand Ave., Colton CA 93224.

QST December 1916 through December 1927 except four issues and some covers missing, rough bound, January 1928 through December 1971 unbound. Make offer plus shipping. Collectors: Many old parts, tubes, books, etc. State desires. Burg, Box 854, Stuart FL 33494.

SELL: International freq. meters C-12M and C-12B, Heath HW-16 (new) with xtals; Knight Sweep gen.; Drake WV-4, Minolta auto pak-8 D6. Write RB Harper, 188Veamore Dr., Hazlet NJ 07730.

SELL: Eico 720 xmt - \$40; 722 VFO - \$20; DK relay - \$10; Heath SB301 with cw filter - \$190; HM102 - \$20; HD16 - \$5. E. F. Casey, WB9CNG, 2904 Roma Terrac, Manhattan KS 66502.

HEATHKIT SB-102 80-10 ssb transceiver with HP-23A, ac pwr supply. Mint condition - \$380. Will deliver within 100 miles. Bill Montag, WB2JFS (609) 927-0159. Box 788, Cologne NJ 08213.

HT-32A, excellent condition - \$125; Heath Apache, working condition - \$45; Hy-Gain 18AVQ - \$25; HRO-5, with all coils, make offer. W1AOX, 100 Gordon Ave., Dumont NJ 07628. (201) 384-7921.

VIKING II, xtals - \$50; Atwater Kent Radio type L ch. operating, original manual, cabinet repairable. Best offer. arrange delivery nearby. WB2BVJ, Box 238, Etna NY 13069.

RTTY: Model 14 typing reperb. TD and Model 15 page pri. All have vnc. motors. All for \$150. WA6TKF, 15871 Belmont Lane, Huntington Beach CA 92647.

COLLINS R-388/51 J3, cabinet, manual, aligned, very good condition - \$350 or trade for xcvr or motorcycle. WN3SMW, 301 N. Lansdowne Ave., Lansdowne PA 19050.

CLEAN and in good condition, Hallcrafters SR 42 2-meter a-m transceiver. Ac or dc, 13 watts - \$65. FOR: Yeakum TX 77995. Cecil Rowan, K5QJS, P.O. Box 14.

DRAKE 2-A with calibrator, swt xtals, Heath Q-Multiplier. All excellent condition - \$140. WA5RKY, 1900 Colebrook, Orla City OK 73120.

WANTED: R4B, T4XB, ac supply, good condition. WB4URW, 8602 Bellefonte Road, Richmond VA 23229. (703) 282-6735.

HW101 factory aligned, cherry condition - \$275; SB200 - \$250; HP23A - \$50. W6NFT, 10517 Debra, Granada Hills CA 91344.

SALE: Heath sixes and power inverter, best offer. Les Mathews, 5616 Castle Oak, Orlando FL 32808.

HEATH HW-16 - \$90, firm, crystals, manual. WN4JVL, 8808 Bellefonte Road, Richmond VA 23229. (703) 82-8901.

SELL: QST since 1950. W5RVZ, 601 - Hannett N.E., Albuquerque NM 87110.

FOR SALE: Heath table-top linear amp, p. 1 - 100 watt tube (new). C. Sodergren, 3017 Shady Lane, Wood Dale IL 60097.

COMPLETE: Novice station, used 3 tubes. Heath HW16 transceiver, key, head phones, SWR meter, c. x., balun, antenna system, speaker, dummy load, 10 crystals, sight and sound code practice system - now on the air. Try it before you buy it. \$135 plus you on the air, \$300 value. Getting General, need money for new rig. E. Rotator, WN1PYF, 550 Winter St., Framingham MA 01701. (617) 872-6817.

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FOR SALE: CE600L with solid-state rectifiers - \$150; Eico Space Ranger Model 711 - \$25; Panasonic Adaptor Mod. PCA-2 type - \$20; Heathkit Seneca VHF1 an Q multiplier QF-1, best offers. All above with manuals, will ship, you repay. Sase answered. K4DP, 1004 Drake Ave., Huntsville AL 35802.

WANTED: Cash for Heath SB/HW series and accessories. Alpine, 415 Demarest Ave., Closter NJ 07624. (201) 757-0123.

WANTED: Motorola HT220 transceivers, with tone-pager circuit in original condition, not modified for 2 meters. For sale: Collins 388/URR receiver, good condition - \$250, plus shipping costs. Paul Neuen, Jr., W1CRA, 60 Northwestern Dr., Bristol CT 06010. (203) 582-4885.

SELL: Hallcrafters, HT-32B, absolutely mint - \$250; SX-101A, mint - \$125; Heath SB-200, excellent - \$150; Millen kw transmatch, mint - \$95; MonitorScope No. 00932, mint - \$70; Hy-Gain 14AVQ-WB, new - \$30. F. Martin, 160 Meadowstream, Buffalo NY 14226. (716) 839-2645.

WANTED: Gonset 913A & Mobile bracket for Gonset 910A and 912A. WA2MUG, Watkins, 160 West End, New York, NY 10023.

WANTED: Hallcrafters HA-5, VFO in good shape. K3GEO, 4229 Estates Court, Allison Park PA 15101.

KW Johnson Matchbox w/coupler, near new condition - \$130. P.P. WA6YTR, Box 241, Calimesa CA 92320.

HAM-M - \$70; TA033 - \$70; Hy-Gain 2TDQ 40-80 traps - \$18. Peterson, (801) 277-1066.

SB-300, ssb, cw, filters, excellent - \$175. WB2EYZ, (212) 256-5014.

DRAKE R4B, mint condition - \$330. 1 pay shipping. Cashiers check or money order only. Michael Garton, 611 Gray St., Eau Claire WI 54701.

75S2 wanted. Please state price, condition, in first letter. Harvey Hollister, AFRTS, APO 96305.

FOR SALE: HP 5240/625A/525C/526B/526C 510 MHz counter - \$900; HP AN/USM 105 (160A/162A) 15 MHz scope, new crt - \$400; Hickok 288AC 4-am gen generator - \$200, 80 day guarantee; 400 above items: Heath SB200 - \$175; Johnson 250-39 TR switch, new - \$20; Johnson 275-watt matchbox - \$25; TS 731/URM power meter, holometer, 10-4000 MHz - \$35; Bud LF601 filter - \$10; Eico 488 - \$10; Knight 15 MHz scope, dual trace, differential plug ins - \$175. Everything meets specifications. Best offers considered. Sase for details. Don Harris, W9GUM, 5051 W. Jackson Blvd, Chicago IL 60644.

6939s, 6360s, guaranteed good - \$250 each. Jack Filiano, W6TNR, 13718 Mayall, Sepulveda CA 91340.

SPEND your IRS refund - Drake R4B - \$340; MS-4 - \$10; MN-4 matching network with wattmeter - \$70; Ten-Tec KR-200 keyer - \$40; Viking Ranger Two - \$150; R-400 Ham Blower w/rotor plate - \$25; Mosley MP-33 tribander - \$40; Johnson TR switch - \$20; Heath dummy load - \$6; Heath HM-15 swr bridge - \$6; coaxial switches - \$6 each. Manuals, will ship. First checks take. Chris Daly, WA2BAN, 2 Timberhill, Livingston NJ 07039.

DRAKE 2C with 2CQ speaker, Q-Multiplier bomb & noise blander. No reasonable offer refused. Sorry can't ship, W1DOM, 29 Belmont Street, North Quiney MA 02171. Tel. (617) 479-1453.

SELL: Swan 350 - \$175; 117XC - \$75; CT-550 - \$289; 75A4 - \$395. W4HF, 5006 Indiana, FL, Wayne IN 46807.

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WANTED: cw filter for 75S1. WA6FRJ, 11388 Campus, Loma Linda CA 92354.

CHILDREN'S Summer Camp needs operator (General ticket) with rig. Roberts, 353 West 56 St., NYC NY 10019. (212) 246-0052.

HAM - Radio Counselor, Male, for Co-ed camp in the Berkshire, Mass. Able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Tacomir, 451 West End Ave., NY NY 10024.

COUNSELOR: 20+ General Class operator or better. Summer Camp for boys in Maine (July-August). Excellent salary + benefits. Allowance for own rig. Write: Maurice Steinberg, Box 178, Carle Place NY 11514.

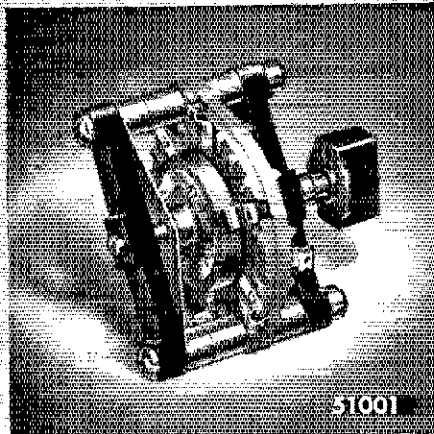
HAM - Counselor, over 19, to instruct at a children's camp in the Pocono Mountains of Penna. Own equipment and General Class license required. Explain type equipment and further specifications to Pocono Highcamp Camps, 6528 Castor Ave., Phila PA 19149, phone (215) JE3-1557.

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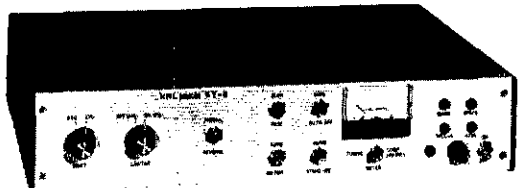
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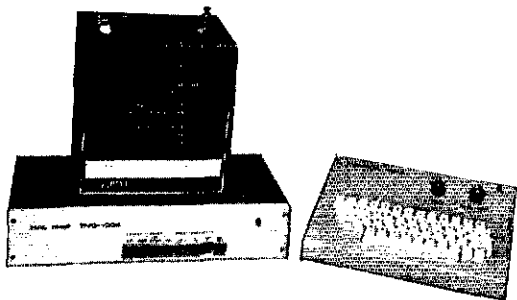
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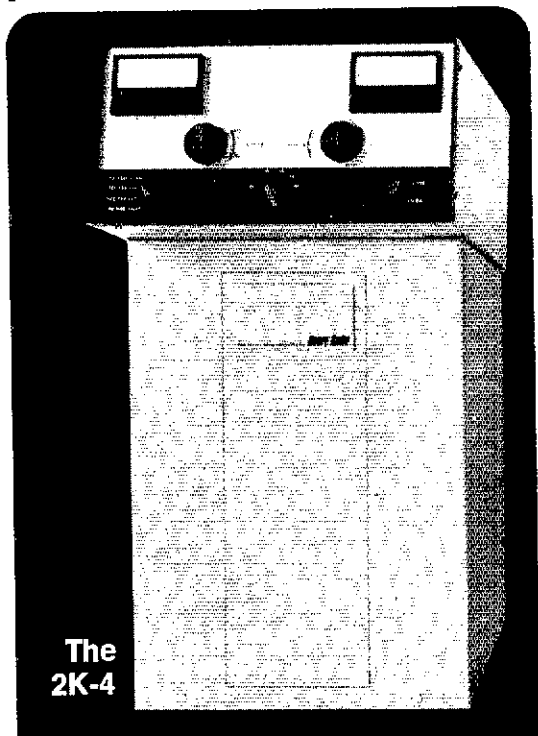
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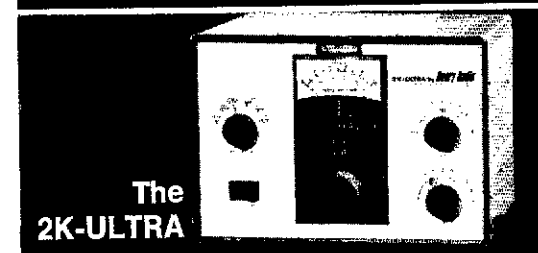
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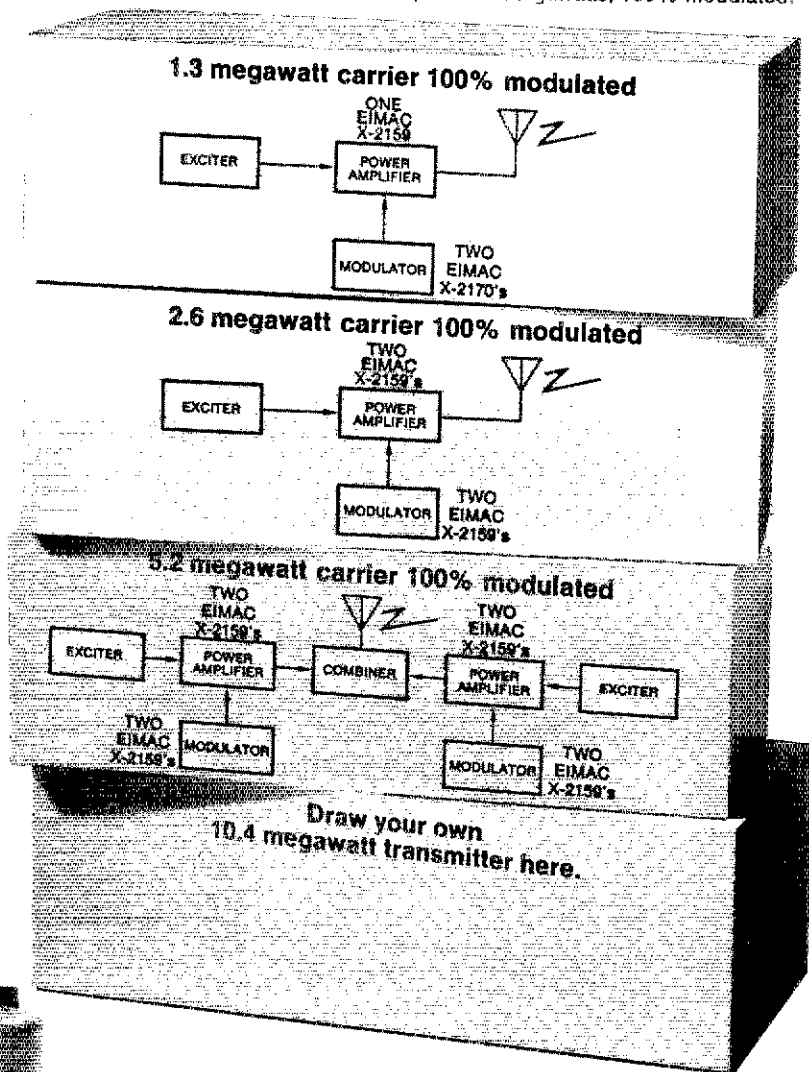
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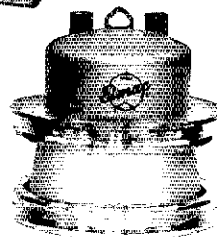
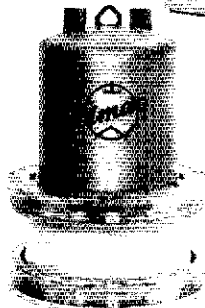
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X-2170

