March 1969
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QST

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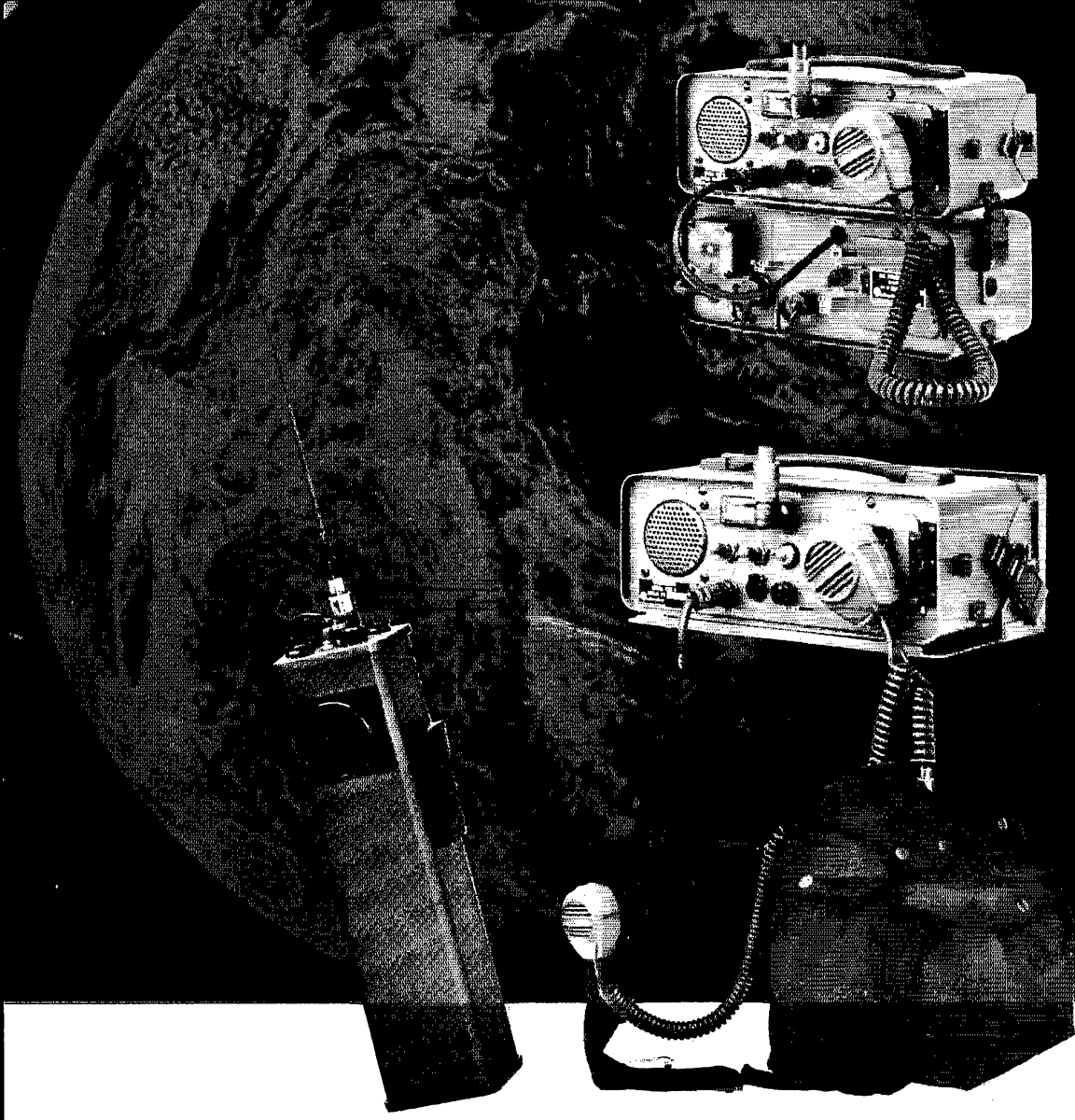
OFFICIAL JOURNAL OF THE ARRL



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Designed for, tested and proved in the jungles of Southeast Asia, *Models FM-1* and *FM-5* transceivers meet the needs of 2-way communications: Commerce, industrial plant, waterfront, law enforcement, fire protection, civil defense, etc. A general purpose radio-telephone, Hallicrafter's *Model FM-5* is solid-state, all environment master of all communications needs. It may be used, with equal success as a fixed, portable man-pack, repeater or mobile unit.

Teamed in a single FM system for the 148-172 MHz range, *FM-1/FM-5* and available accessories give you the versatility and reliability to be in command of communications requirements. For full details, write for descriptive bulletins, available free on request.

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and hams everywhere who've improved their 2-way communications with noise-canceling microphones and handsets from Electro-Voice.

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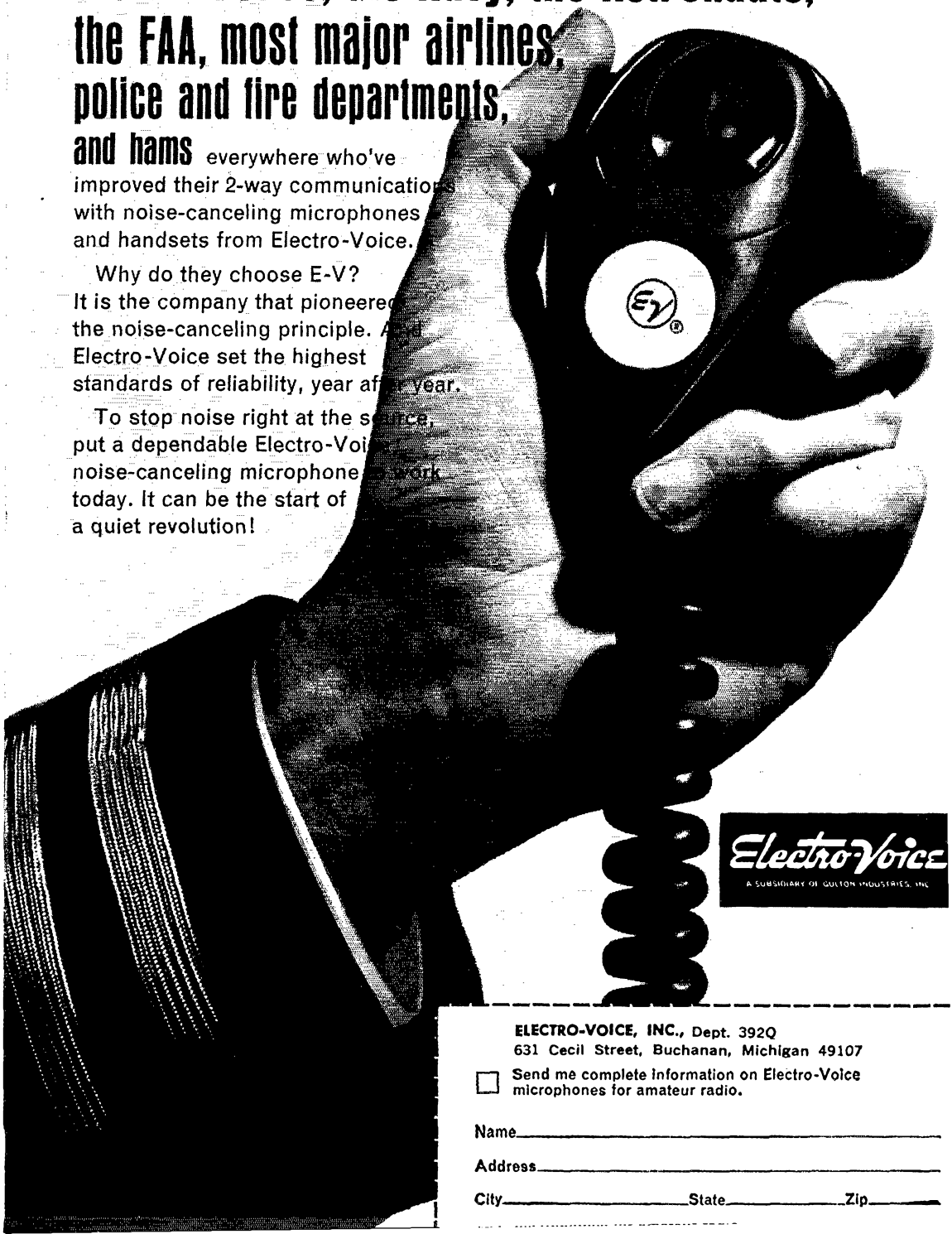

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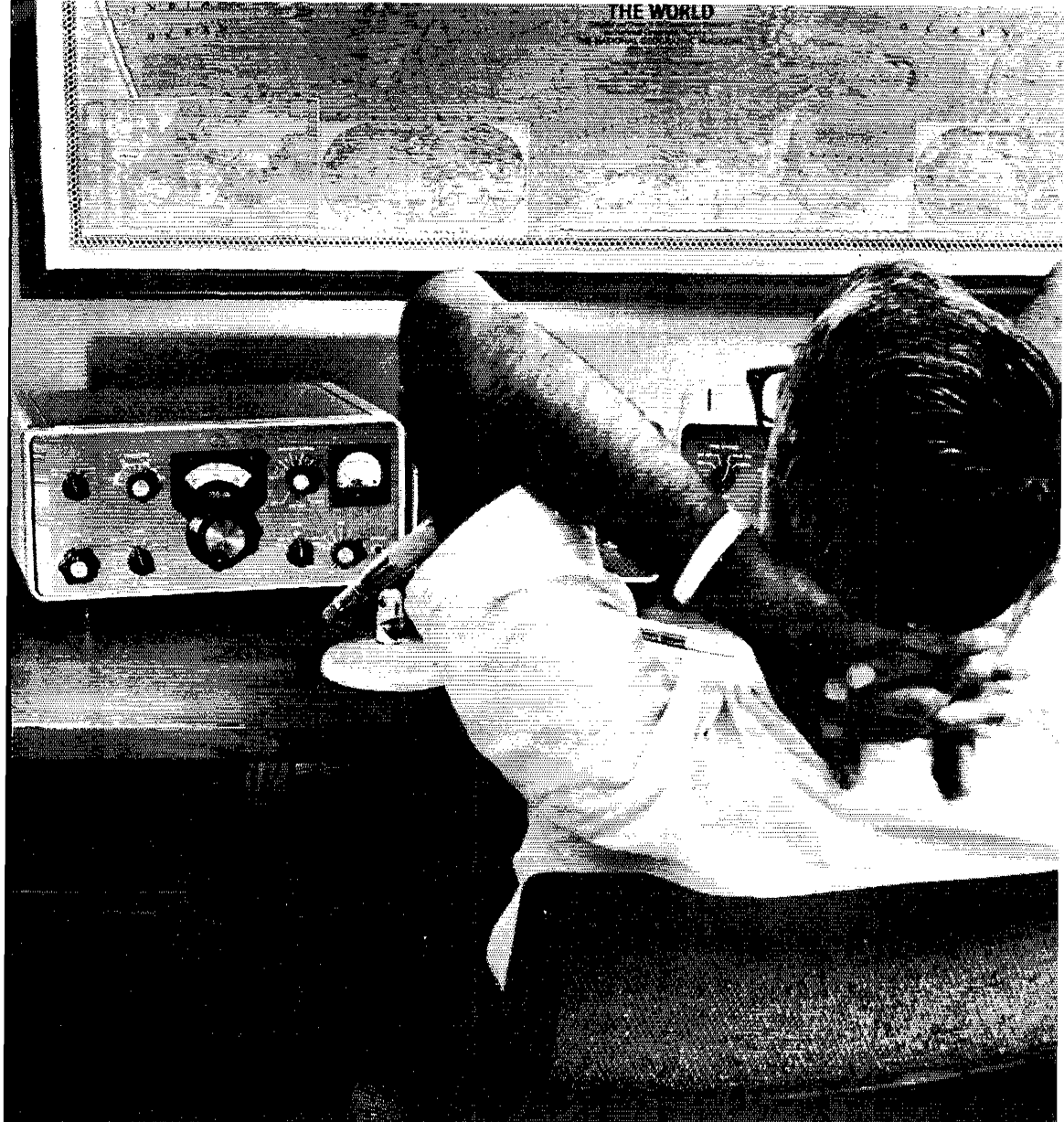

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Tired of twiddling and twiddling with the tuner to dig out a solid signal . . . of chasing QSO's up and down the band?

The answer is Collins' 75S-3B Receiver. Most stable front end and sharpest selectivity offered in a ham receiver.

COLLINS

QST

MARCH 1969

VOLUME LIII NUMBER 3

PUBLISHED MONTHLY, AS ITS OFFICIAL JOURNAL, BY THE AMERICAN RADIO RELAY LEAGUE INC., NEWINGTON, CONN., U. S. A. OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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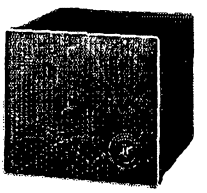
OUR COVER

The "old lamp lighter" in this photo is the "Airstream Loop." More on antennas for travel trailers and campers on page 34.

—CONTENTS—

Buy your new Hammarlund receiver this spring...

and we'll throw in a free matching speaker.

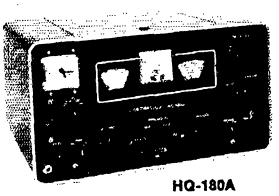


See your Hammarlund dealer for full details.

During March and April, Hammarlund will give you free an extended range speaker in matching cabinet, with the purchase of any new Hammarlund receiver.

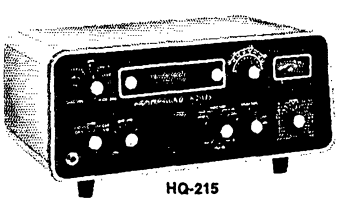
HQ-110A-VHF

HQ-145A

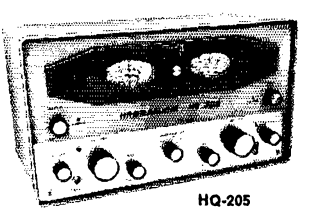


HQ-180A

HQ-200



HQ-215



HQ-205

MODEL HQ-110A-VHF
11 tube dual conversion, extra wide range receiver. Two to 160 meters *in seven bands – all built in!*

MODEL HQ-145A
Ten tube dual conversion general coverage receiver. 540 KHz to 30 MHz *in five bands, featuring exclusive* crystal and slot filter selectivity.

MODEL HQ-180A
Ten to 160 meters in a superlative *17-tube triple conversion general* coverage receiver with linear product detector, selectable sideband, and vernier IF passband tuning for unequaled SSB reception.

BRAND NEW MODEL HQ-200
Versatile general coverage receiver. 540 KHz to 30 MHz in five bands, expanded ham bandspread, SSB product detector, variable B.F.O., Zener diode regulation for superb stability.

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The transceiver which incorporates a general coverage receiver. Five-watts on CB or 10-meters in 6 crystal-controlled transmitter channels. Plus 540 KHz to 30 MHz and ham bandspread.

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The **HAMMARLUND**
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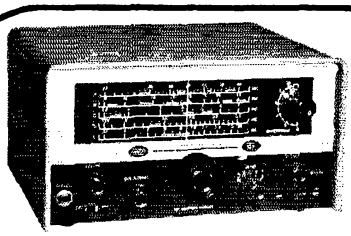
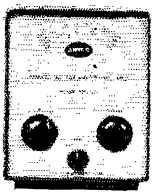


MODEL R-5A ALLWAVE RECEIVER

An exceptionally fine receiver for the short wave listener and beginning amateur operator. Fully transistorized—solid state. Covers .54 through 54.0 Mc in five continuous bands. Includes standard broadcast band, all foreign broadcast bands, all amateur bands from 160 through 6 meters, all 27 Mc CB Channels, all 2-way radio frequencies from 30 to 50 Mc including many police and fire departments. Controls include Variable Beat Frequency Oscillator, Noise Limiter, Bandspread. Newest model has "Q" Multiplier jack and built-in transformer type 117VAC Power Supply. Compare with tube-type units costing as much!

Wired and tested $99.95



VFO-621

VFO for 6, 2 and 1 1/4 meters. Transistorized oscillator plus built-in zener diode regulated power supply gives highest stability. Ideal match for TX-62 and other VHF transmitters.

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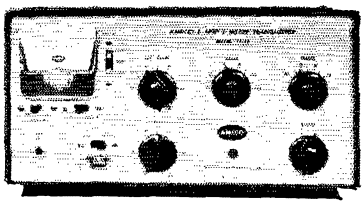

TX-62 TRANSMITTER

In response to the demand for an inexpensive, compact VHF transmitter, Ameco has brought out its 2 and 6 meter transmitter. There's no other transmitter like it on the market. 75 watts input, phone and CW. Built-in solid state power supply. Broadbanded circuits make tuning easy. Uses inexpensive crystals or external VFO.

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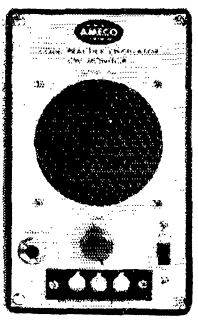

MODEL OM

CODE PRACTICE OSCILLATOR AND MONITOR

A combination code practice oscillator and CW Monitor. Transistorized. Has built-in speaker, tone and volume controls, and headphone jack. Automatically turns itself off—No "ON-OFF" switch.

Model OCMK, Kit (less batteries) ..... $ 9.95
Model OCMW, wired and tested, (less batteries) $12.50

Similar unit, but without CW Monitor Feature.

Model OCPK, Kit (less batteries) ..... $ 7.95
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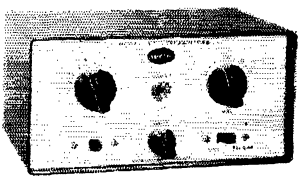
Receivers, transmitters, VFO, Pre-amplifiers, converters, code practice oscillators, code records, theory and license books.

160 THRU 6 METER TRANSCEIVER PRE-AMP



MODEL PT

Low noise, high gain preamplifier. Built-in power supply. Interconnecting cables included. Station power control center—one switch controls everything. Automatic changeover, transmit to receive. Feeds and mutes second receiver.

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PASS NEW ADVANCED AND EXTRA CLASS LICENSE EXAMS WITH NEW AMECO LICENSE GUIDES

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Extra Class Guide #17-01 (48 pages) ..... 75¢

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No. 106-33 19 to 24 wpm supplement to above $3.95

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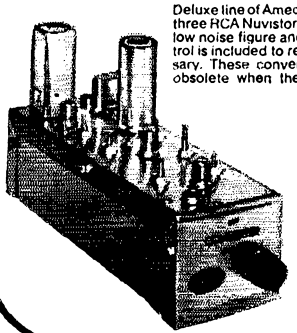
Write for name of your local Ameco dealer and free catalog

NUVISTOR CONVERTERS FOR 50,144 and 220 Mc. HIGH GAIN, LOW NOISE



Deluxe line of Ameco VHF Converters uses three RCA Nuvistors to obtain an extremely low noise figure and high gain. A gain control is included to reduce the gain if necessary. These converters do NOT become obsolete when the receiver is changed.

Model
CN-50W.... $49.95
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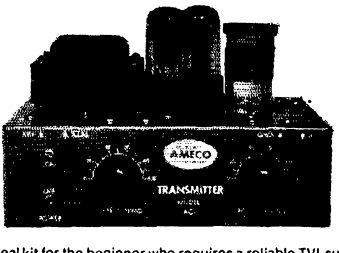
Model CN-50K, CN-144K or CN-220K in kit form, (specify IF) $34.95

PS-1 Power Supply, Wired and tested $12.95

NOVICE TRANSMITTER KIT



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Ideal kit for the beginner who requires a reliable TVI-suppressed transmitter. Keying is clean and chirp-free. Kit is simple to build and easy to operate. Crystal Controlled, Pi-network Output, Includes AC Power Supply. For 40 and 80 meters CW. 15 Watts input.

Kit with coil for any 1 band, including tubes. $23.95
Extra coil kit for any 1 band, CK-1 ..... $ 1.00

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F. PAM. Novices may be appointed OVS. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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Maryland-D. C.	K3LFD	John Munholland	306 Holland Rd.,	Severna Park, Md. 21146
Southern New Jersey	W2ZI	Edward G. Raser	19 Blackwood Drive	Wilburta Gardens Trenton 08628
Western New York	K2KTK	Richard M. Pitzeruse	303 Woodland Rd.	Syracuse 13219
Western Pennsylvania	W3GJY	John F. Wojtkiewicz	1400 Chaplin St.	Conway 15027
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South Dakota	KØTXW	Seward P. Holt	Box 58	Clear Lake 57226
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Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington 70433
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Ohio	W8ETU	Richard A. Egbert	6479 Red Fox Road	Reynoldsburg 43068
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New Hampshire	K1QES	Donald Morgan	Bayview Drive, P.O. Box 65	Laconia 03246
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
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Oregon	K7WWR/WA7KTV	Dale T. Justice	1369 N. E. Sunrise Lane	Hillsboro 97123
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Maritime	VE1NR	William J. Gillis	Shediac Road, RR 6	Moncton, N. B.
Ontario	VE3BUX	Roy A. White	5 Northwood Crescent	Belleville
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Type EX Crystal

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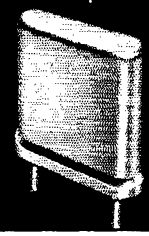
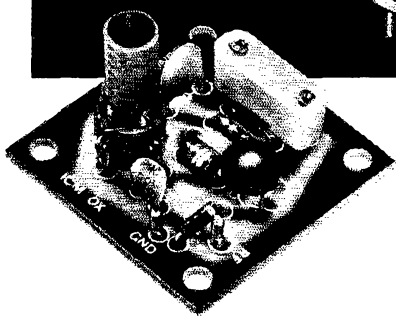


$3.95

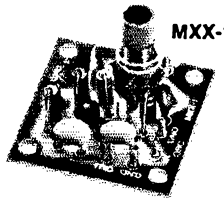


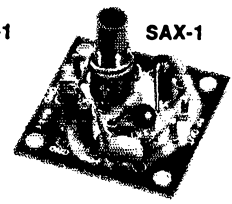
OX OSCILLATOR

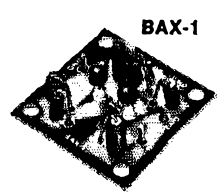
Crystal controlled transistor type.
Lo Kit 3,000 to 19,999 KHz
Hi Kit 20,000 to 60,000 KHz
(Specify when ordering)

$2.95

MXX-1 Transistor RF Mixer **$3.50**
A single tuned circuit intended for signal conversion in the 3 to 170 MHz range. Harmonics of the OX oscillator are used for injection in the 60 to 170 MHz range.
Lo Kit 3 to 20 MHz
Hi Kit 20 to 170 MHz
(Specify when ordering)







SAX-1 Transistor RF Amplifier **$3.50**
A small signal amplifier to drive MXX-1 mixer. Single tuned input and link output.
Lo Kit 3 to 20 MHz
Hi Kit 20 to 170 MHz
(Specify when ordering)

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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.

Past Presidents

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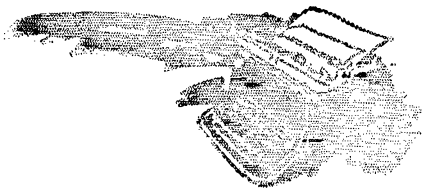
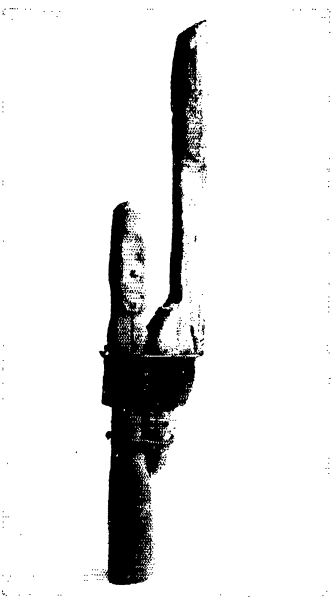
"It Seems to Us..."



THE WOUFF HONG

In an institution as old as amateur radio, traditions and symbols of the art appear and become a part of it. Our traditions are many, among them our long record of self-policing, our dedication to public service in emergencies, our amazing versatility in experimentation, our instant response to the call of our country in time of war. But of the symbols, only one — aside from the ARRL diamond — has become a part and parcel of the framework of amateur radio, the symbol of its finest traditions, its long and glorious history.

That symbol is the Wouff Hong. Every ham should know its origin.



It seems to us that now is a good time to retell the story of this famous and beloved part of the very fabric of amateur radio. Visitors to Headquarters and to W1AW seeing either the original or one of the many replicas in our buildings, ask what it means. New members of the Royal Order of the Wouff Hong, initiated during the midnight convocations of the Order at League Conventions, ask, "But where did it come from, in the beginning?"

It started back in 1917, in the very earliest days of ARRL and *QST*, when an anonymous amateur, writing under the title "The Old Man," created a wonderful series of humorous stories in the magazine. In a pithy, irascible style he assailed all that struck him as criticizable about ham radio operation of the period in his famous "Rotten Radio" series beloved to this day by all who read them. He pitilessly exposed the poor operating practices of the day, yet did it in a way which drew chuckles even from those recognizing themselves as the special targets of his ire.

In one of those stories, "Rotten QRM," he launched forth with examples of some of the poor sending cluttering up the band in a particular QSO to which he was listening. The gibberish included the words "wouff hong" which, apparently, was being used by someone on somebody else.

It turned out to be one of those priceless pieces of spontaneous word invention. Instantly, it caught on with the gang. Although T.O.M. himself admitted at the time he didn't know exactly what a wouff hong was, it quickly became something with which both to attack bad operating practices and to discipline their perpetrators. Within three months, the editor of *QST* found it necessary to write an editorial on the growing demand from the gang for wouff hongs. How rapidly this situation might have developed had not World War I intervened is a matter of speculation. But the tradition had been established, the Wouff Hong created in the minds of thousands of amateurs as some mythical instrument of torture to be used in enforcing good operating practice in amateur radio.

When *QST* resumed after the war, one of its first contributors was T.O.M. In an early 1919 issue he contributed an article "Rotten Starting" to work off steam on the slowness with which our government was getting around to let us operate again. At the conclusion of this article appeared the following: "In the meantime . . . I am sending you a specimen of a real live Wouff Hong which came to light out here when we started to get our junk out of cold storage. Keep it in the Editorial sanctum

(Continued on page 71)

League Lines . . .

Though not a round-the-clock project, FCC is spot checking the restricted bands and sending official notices of violation to those found without the proper grade of license. One way we know is from W1AW's receipt of a citation for operation on 7020 kc.! Apparently Commission records were not up to date in this case.

WAØIQN suggests this summer may produce some surprising v.h.f. propagation activity. See the "World Above" this month, page 79. There could be some excitement for low-frequency DXers as well as 50-MHz. enthusiasts.

Board meeting coming up! Communications within the League is -- or should be --. a two-way street. Correspondence from members to directors (and Hq.) carries a lot of weight, yet only a small percentage use this opportunity to register views. Let's have your opinion this year. Turn back one page for the name and address of your division representative.

Ever stick your hand in a hornet's nest? After last month's editorial on "Conversation Discipline," W1LVQ now knows how it feels! Letters of emotional outrage, thoughtful disagreement, and even a few of approval, were too late for this issue but we'll set aside some space in April (no fooling!) "Correspondence."

A United Press wire story datelined Washington gives ham radio a black eye with an unfortunately-true report on FCC tapings of obscenities in the hambands. The public won't realize it's a minuscule percentage among us, and fuzzy definitions of obscenity by courts handicap prosecution. Thus while not the whole answer, self-discipline, and self-policing, are still major tools for us in keeping amateur radio's image bright -- despite the "freedom of speech" protests to the aforementioned editorial.

Operation Retread, reported in "Haps" last month, makes it possible for an ex-amateur to come back in by the Novice route after his license has expired for a year or more. But it also ended the dual holding of Novice and Technician tickets If you pass the Tech test hereafter, any Novice license you hold will be cancelle

And K3CUI reminds us that holders of the Extra Class license who request an FCC certificate will save time and additional correspondence if they submit a photocopy of the license with the request.

Radio clubs and the League are both sometimes accused of too soft a sell on membership recruiting. Copies of "The Case for Belonging," a leaflet promoting club and League membership, are available for local mailing or other club distribution

The FCC year-end count of amateur operators shows 256,546, down only slightly from a year ago. ARRL Full Membership also declined, by 1%, to 80,012. Worldwide, the figure is 97,678.

Hq. is a many-specialitied thing. It helps us help you faster, when you have matters for several departments, to put only one question or suggestion on a card or piece of paper. All can go in the same envelope, however, since we have a central point for mail opening. Return address on each, please.

See you at the National in Des Moines this year?

Phone Patching — Legitimately

How the New Tariffs Will Work
How to Meet Technical Requirements

BY GEORGE P. SCHLEICHER,* W9NLT

THE telephone companies associated with the A.T.& T. Co. (The "Bell System") recently filed tariff changes with their regulatory bodies that are of importance because they permit interconnection on a completely legitimate basis — on the condition of course, that all applicable tariff provisions are complied with. Independent telephone companies (those not associated with the Bell System) will determine their own policies in this matter but they will probably choose to make similar offerings. While the new tariff provisions offer several interconnection arrangements for both voice and data equipment, only the voice equipment interconnection will be discussed here.

Of interest to the amateur operator is the offering whereby the telephone company will provide a voice connecting arrangement to be associated with a telephone set. The company will provide a device known as a "Voice Coupler" and a key or switch to connect and disconnect the coupler. In Illinois, the rate established for the connecting arrangement includes an initial charge of $5.00 and a monthly charge of $0.50. The rate and service became effective on January 1, 1969. The availability and rates in other states are subject to the approval of each state's regulatory body. As a matter of practical operating convenience, an amateur operator would want the telephone and voice coupler close to the operating position. For most of us that would mean that we would have to order an extension telephone (at the regular tariff rates) in addition to the connecting arrangement.

Operation

In operation the telephone set would be used to originate an outgoing or answer an incoming telephone call. The switch would then be operated to complete the circuit to the voice coupler Options may be available that will permit the handset transmitter and/or receiver to be disabled when the coupler is in use. (Disabling the handset transmitter might be desirable so as to avoid the pickup of room noise; some operators might prefer to leave the handset receiver in operation as it would be convenient for monitoring the conversation in progress through the radio facility). Connection to the voice coupler is simple. It is equipped with a jack that will accept a standard ¼-inch phone plug such as a PL-55 or equivalent. See Fig. 1. Coupler input may be balanced or have one side grounded.

The voice coupler will remain telephone company property and its circuitry is subject to change from time to time. It can be expected to contain a number of electrical components that will include a transformer for isolation purpose, diodes for limiting electrical levels, and some capacitors. The options mentioned above may not be available in every case and they may change over a period of time.

User's Responsibility

An amateur using the new interconnection privileges will be responsible for operating in accordance with the FCC rules, for conforming to all provisions of the applicable tariffs of the telephone company serving him, and for meeting certain technical criteria for the protection of the telephone network. We should all have a copy of the FCC rules applying to Amateur Service

Effective January 1, 1969, tariffs set up by the Bell System in response to an FCC Order covering interconnection with privately-owned facilities went into effect. Phone patching is no longer an under-the-table business, but bringing it out into the open also brings some responsibilities that the amateur must shoulder. Here's the dope, including the description of a phone-patch circuit that meets the technical requirements.

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The voice coupler, to the left of the telephone, is supplied by the phone company, ready for the phone patch to be plugged in. The coupler is normally fixed to a wall or desk and serves also as a connecting block. Lifting the left hookswitch plunger connects the coupler and disables the handset.

somewhere handy for reference. Telephone company tariffs are available at most of their business offices as well as people who will explain any provisions that might be difficult to understand. The technical criteria have been filed with the FCC in the A.T. & T. Company's tariff No. FCC 263. It may also appear in local tariffs.

Briefly, the electrical limitations at the point of interconnection as defined in the tariff are as follows;

- The average voice level[1] to be applied at the point of interconnection will be specified by the telephone company so that the voice signal power will be received at the serving central office at a level that is not stronger than −12 dbm.; the power level at the point of interconnection will not be in excess of one milliwatt (0 dbm.) in any case.
- Power in the band from 3.995 to 4.005 kilohertz shall be at least 18 db. below the average level as specified above.
- Power in the band from 4.0 to 10.0 kilohertz shall not exceed −16 dbm.
- Power in the band from 10.0 to 25.0 kilohertz shall not exceed −24 dbm.
- Power in the band from 25.0 to 40.0 kilohertz shall not exceed −36 dbm.
- Power in the band above 40.0 kilohertz shall not exceed −50 dbm.
- At no time should signal power be present *only* in the band from 2.450 to 2.750 kilohertz; when present, it must not exceed the power that is present simultaneously in the 0.8 to 2.450 kilohertz band.

The amateur's equipment should be designed so as to have an internal output impedance of 900 ohms at the point of connection with the voice coupler. Its maximum output power should be no more than zero dbm. (0.95 volt, r.m.s.) and be adjustable down to −12 dbm. (0.238 volt, r.m.s.) at the voice-coupler terminals. Operating levels should be carefully observed, as excessive levels will cause distortion that results from clipping in the voice coupler. The amateur's equipment must not apply any d.c. potential to the coupler.

[1] The term "voice level" as used here means the peak level averaged over a 3-second interval as read with a meter having standardized speed of response, such as a "v.u." meter or a fast-acting rectifier-type meter.

The Problem

Amateurs are familiar with radio systems which inherently provide separate paths for the two directions of transmission. The wire line equivalent of this arrangement involves the use of 4 wires; one 2-wire circuit for sending and another 2-wire circuit for receiving. Normal residence telephone service (in the U.S.) uses the same two conductors for both transmitting and receiving. To interconnect radio sending and receiving equipment with such a line requires that we achieve three objectives. First, we must comply with all of the technical limitations in the tariff. Second, our equipment must be able to recognize which direction of transmission is intended (the "land" party sending or receiving) and condition itself accordingly. Third, there will be a significant difference in the level of the signal that is received over the telephone line from one call to another as compared with the level of the signal sent over it from the amateur's equipment.

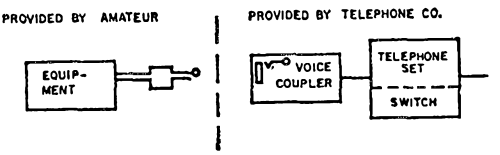


Fig. 1 —Interconnection arrangement.

Taking the level problem first, we know that our sending level will be somewhere between zero and −12 dbm; it is to be specified by the telephone company. The received level can be expected to arrive over a much wider range. If the telephone communication is between two locations that are served by the same telephone central office and they are close to it, the received level might be in the order of −10 dbm. depending on the type of instruments, central office equipment, cables, etc. On the other hand, the received level on a long distance call might occasionally drop to the −30s or even the −40s.

The other serious problem is that of recognizing which direction of transmission should be open. Of course, we can always put a switch in the voice path and operate it manually, perhaps in connection with our carrier control. Such a method is cumbersome, however, and would preclude the rapid back and forth exchange of comment that amateurs are likely to be transmitting.

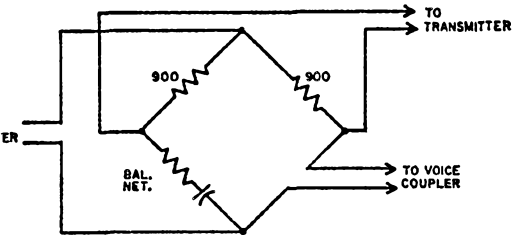


Fig. 2—Wheatstone Bridge hybrid.

An automatic device that will put the transmitter in an operative condition is called a "VOX" circuit; the letters refer to "voice operated transmission." Whether the voice signals come from a microphone or a telephone line, there is a need to inhibit the VOX circuit so that it will not respond to signals coming from the station receiver. Such added circuitry is often referred to as an "anti-VOX" feature. It now appears that we need an electrical circuit that will interconnect our receiver output and our transmitter input with the telephone voice coupler in a way that will greatly reduce the amount of audio energy that goes directly from the receiver into the transmitter. By doing this we will be able to use simpler VOX and anti-VOX circuits and their adjustment will be far less critical. A number of adequate VOX and anti-VOX circuits have already been described in amateur radio publications. Information on combining circuits, usually called "Hybrids," is pretty scarce, however, and so several kinds are described below.

While VOX equipment is not the subject of this article it is so closely related to the success or failure of interconnection that a few suggestions are in order. The VOX and anti-VOX circuits should give control of the transmission direction

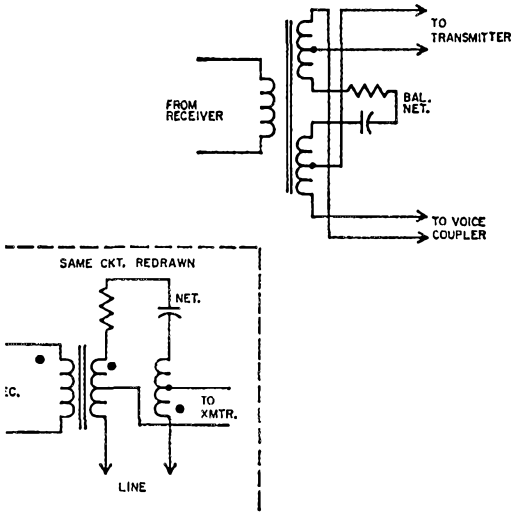


Fig. 3—Transformer hybrid.

to the "land-line" party. A voice signal from the telephone line should disable the receiving path and enable the transmitting path, in that sequence. When the land party stops talking the transmitting path should be disabled and the receiving path enabled, in that order. Switching of the transmission direction should take place in about 100 milliseconds. Good station design will permit a two-way conversation to take place over an a.m. or s.s.b. radio system even though transmitting and receiving are done on the same frequency.

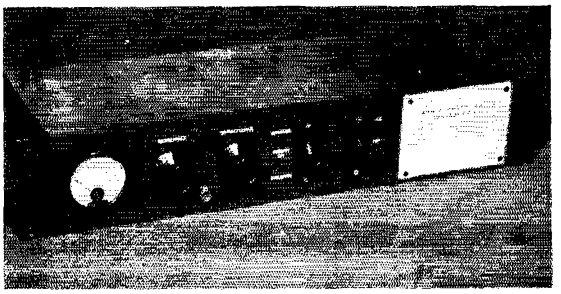
Hybrid Circuits

A number of different hybrid circuits have been developed. All of them rely on dividing voice-energy currents that come from the receiver between the wire line and an identical dummy load or "balancing network." The transmitter is connected to the two current paths in such a way that these currents and/or voltages are zero at the transmitter connection. Energy from the wire line will be divided among the various circuit elements, one of which will be the transmitter audio path. Hybrid balance requires that the network simulate the electrical impedance at the voice coupler terminals as closely as possible. A simple *R-C* series circuit will usually be adequate, but unusual conditions might require the addition of an inductive element.

Perfect balance at all frequencies will never be achieved, of course, due to the complexity of the impedance of the telephone set and line as seen at the terminals of the voice coupler. (Energy reflected from impedance irregularities in the line can also be troublesome). A well-designed hybrid should be capable of reducing the level of any one frequency from the receiver by over 50 db. as measured at the transmitter connection and it should be capable of reducing the level of all frequencies in the voice band by more than 36 db. By achieving this degree of reduction we cause the unwanted signal from the receiver to arrive at the transmitter at a level that is no higher — and hopefully well below — the level of the signal from the telephone line. *This effect is what really simplifies the design of our VOX and anti-VOX circuits.*

The simplest hybrid circuit is an adaptation of the Wheatstone bridge. It is easily constructed with few elements. The basic design is shown in Fig. 2. Good results can be obtained with this circuit but its use generally requires that the transmitter and receiver audio circuits be well balanced to ground or isolated by well-balanced transformers.

Another form of the Wheatstone bridge circuit can be made with a transformer that has three windings, two of which are center-tapped. The transformer must be connected as shown in Fig. 3. The taps on the windings must be accurate, however, and each of the windings must be well balanced to ground and to the other windings. Proper polarity of the two tapped windings is required, otherwise the output voltage will be zero across all three branches!



W9NLT's hybrid includes a surplus db. meter for leve indication. The relay-rack size panel provides ample room for the resistance and capacitance controls in the balancing network, as well as the on-off and monitoring-control switches. Since only voice frequencies are present, the physical layout can be practically any that suits the constructor.

A third hybrid configuration involves two transformers, each having three windings. While it is best if the transformers are well balanced and identical, the hybrid is not critical in this respect as long as the balancing network can be adjusted to compensate for the differences. The transformers would be wired as shown in Fig. 4. Energy from the receiver is coupled through the first transformer to the line and the balancing network. Currents in these two paths are made equal in magnitude and phase by adjustment of the network. The transformer windings are poled so that the magnetizing forces in the core of the second transformer cancel, resulting in no output toward the transmitter. Voice energy from the telephone line is divided between the transmitting and receiving branches of the circuit. The advantages of this circuit are that minor variations in the transformers are easily compensated for by network adjustment and that the transformers provide isolation between all of the branches of the hybrid.

Building A Hybrid

It is not difficult to build a hybrid that will be useful in making legitimate phone patches and while doing so, comply with all of the technical requirements that are now listed in the tariffs. My hybrid uses the two-transformer arrangement and includes such refinements as a level-indicating meter, provision for a fixed attenuator for meeting telephone company level requirements, earphone connections for monitoring and balancing, and finally a low-pass filter. The circuit is shown in Fig. 5. The reasons for some of my choices may be of interest. I found that the best quality audio transformers that were available at low cost were the "telephone repeating coils" offered by several surplus stores who are *QST* advertisers. Most of these transformers have split primary and secondary windings consisting of either four or six individual windings; turns ratios are commonly 1:1, 1:1½ or 1:2. Almost any pair of transformers may be used if they are of the same type. Fig. 6 shows one of the more common terminal numbering plans. The 9-10 and the 11-12 windings are seldom used alone; they usually are connected in series with the 3-4 and 7-8 windings if they are used at all.

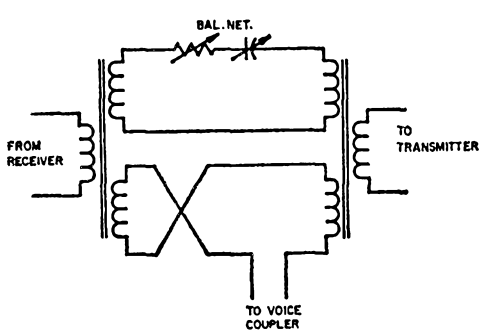


Fig. 4—Two-transformer hybrid.

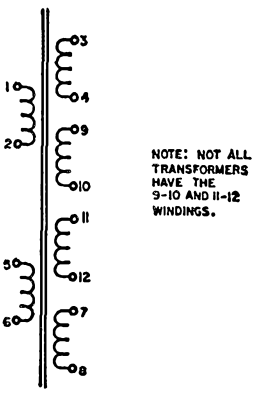


Fig. 6—Repeating-coil terminal numbering system.

If you are not sure of the quality of your transformers, a simple test can be made to determine which transformer and which of its windings will give the best balance. Assume that you have a 4-winding transformer of the type shown in Fig. 6. Its primary terminals are numbered 1-2 and 5-6; the secondary terminals are 3-4 and 7-8. Connect 2 to 5 and 4 to 7; also connect 1 to 6, shorting the primary. Supply a 1-kHz. tone at about 1-milliwatt level to the primary, connecting the source to terminals 1-6 and 2-5. If the transformer primary is well balanced, the level measured at terminals 3 and 8 will be −70 dbm or lower. Reverse the transformer, feeding power to the now-shorted secondary and measuring the power in the primary at terminals 1 and 6. This arrangement determines the degree to which the secondary winding is balanced. Whether testing one transformer or a half-dozen, you will find one primary or secondary winding that is better balanced than all of the others. Use that transformer to supply energy to the transmitter branch of the hybrid (T_2 in Fig. 5). The winding that showed the best balance should be split for connection to the line and balance-network branches. A transformer

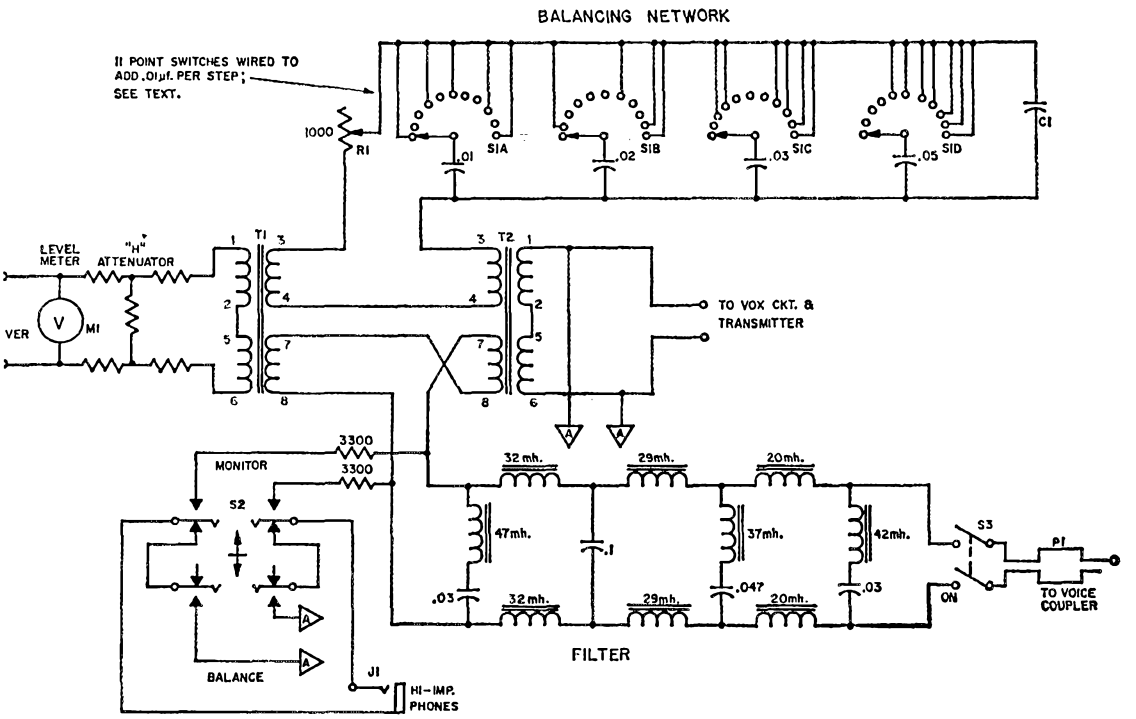


Fig. 5—Circuit diagram of complete hybrid. Capacitances are in μf.; capacitors are paper or mylar, 50 volts. Resistances are in ohms; resistors are ½ watt. See text, Tables I and II, and Appendix for discussion of component types and values.

C_1—App. 2 μf.; see text.
J_1—Insulated phone jack.
M_1—Volume-level indicator meter.
P_1—Standard phone plug.
R_1—Linear control.
S_1—Rotary, 4 sections, 1 pole per section, 11 contacts per section.
S_2—4-pole double-throw key switch.
S_3—2-pole single-throw toggle or key switch.
T_1, T_2—Audio, 1:1, split windings.

that shows less than about 55 db. loss when tested this way should not be used on the transmitter side of the hybrid; it might be OK on the other (T_1) side, however.

Filters

A filter is recommended at the point of connection with a voice coupler. Properly designed and built, a filter offers several advantages to the amateur. It will assist greatly in meeting the technical limitations for which the amateur is responsible and it can help to achieve good balance in the hybrid. That is because a properly designed filter will present a more constant impedance to the hybrid than will the voice coupler. It will not completely isolate the hybrid from impedance changes beyond the coupler, however. Some hams might prefer to connect the filter between the receiver and the hybrid, in which position it will meet all technical requirements as well as limiting the range of frequencies over which the hybrid must be balanced.

Inductors for filters are of odd values and can be costly if purchased new. I recommend acquiring a dozen or so of the 44- and 88-millihenry "loading coils" that are showing up in surplus. My design for a filter uses inductance values that can be obtained by modifying these coils.[2] The toroids selected can be the smallest size available (if you have a choice) for either value of inductance since the voice power is low and there will be no d.c. present that might tend to cause saturation. If you use this kind of inductor, remember that the two windings must be connected in series aiding in order to obtain the rated inductance. Filter design is covered in the Appendix.

My trip to the surplus store also netted a couple of lever-type switches and a fast acting "db." meter designed to be bridged across a 600-ohm circuit. All of the other parts — panel, chassis, terminal boards, etc. — came from normal sources, some by way of "Ye Olde Junke Boxx". In fact, a large instruction card on the front panel of my unit is really there to hide some unused holes. It ought to be emphasized that no part of the hybrid is so special that other parts could not be substituted if good judgment is used in their selection. Component tolerances of ± 20% are acceptable except in the filter, where components should be within 5% of the values that are specified.

[2] Wetherhold, "Inductance And *Q* Of Modified Surplus Toroidal Inductors", *QST* Sept., 1968.

Levels

The loss of this kind of hybrid will be found to be close to 4.5 db., plus the loss of the filter. Convenient levels for metering will probably be in the order of zero to +3 dbm., because of the scales on available meters. An attenuator may be required between the metering point and the voice coupler to reduce the voice level to that specified by the telephone compnany. If it is placed between the metering point and the hybrid it will minimize the energy level that the hybrid must balance for the benefit of the transmitter branch. It could also be located between the hybrid and the filter, in which case it would simplify the work of balancing the hybrid by isolating much of the reactance in the load. This arrangement is desirable, however, only if the improvement in balance that can be obtained (by placing the attenuator here) exceeds *twice* the loss of the attenuator when both are expressed in db. Resistor values for various attenuator losses are given in Table I below. The values are computed ones; the nearest commercial values may be used in construction.

Practical Details

Two switches are provided on the finished unit; one disconnects it from the voice coupler and one is used to switch an earphone jack from a monitoring position across the line to a position across the transmitter audio connection. This permits the phones to be used during the course of a patched communication both for monitoring and to determine that the network is adjusted for optimum during the progress of the call.

The balance network is arranged with adjustable resistance and capacitance values. A 1000-ohm wirewound pot is used as the resistance element. Four capacitors and a four-deck, eleven point switch are arranged to give eleven values of capacitance ranging from 0.01 to 0.11 μf. in increments of 0.01 μf. That is not normally enough to balance the hybrid so additiona capacitance is placed in parallel with that in th switch when the hybrid is initially balanced The small increments are about right for precis adjustment of the balance net. The way th switch is connected is indicated in Table II an Fig. 5.

TABLE I

Resistance values for 600-ohm "H" attenuators; multiply all values by 1.5 for 900-ohm attenuators.

Loss	*Series Arms*	*Shunt Arms*
1 db.	17 ohms	5200 ohms
2	34	2580
3	51	1700
4	67	1260
5	84	986
6	100	800
7	115	670
8	129	568
9	145	488
10	156	422

Note: Four resistors of the value shown for the "series" arms are required.

TABLE II

Step	*Total Capacity*	*Capacitor Unit 0.01*	*0.02*	*0.03*	*0.05*
1	0.01	×			
2	0.02		×		
3	0.03			×	
4	0.04	×		×	
5	0.05				×
6	0.06	×			×
7	0.07		×		×
8	0.08			×	×
9	0.09	×		×	×
10	0.10		×	×	×
11	0.11	×	×	×	×

Note: An "×" indicates the connection of a capacitor unit on the step shown.

Balancing The Hybrid

After constructing the phone patch it will b necessary to balance the hybrid. This means th the balancing network is adjusted to match th impedance that is connected to the "line" sid of the hybrid. If the hybrid is completely u balanced, the coupling from the receiver branc to the transmitter branch will be maximum. A the hybrid is brought into balance the energ that reaches the transmitter branch from th receiver is reduced. The amount of reductio can be expressed in decibels and this figure use as a measure of the hybrid's performance. Wi high-quality transformers and single-frequen testing, hybrid balance in the order of 70 d can be obtained.

It is a good idea to test the hybrid before it connected to the line. One way to make such test is as follows: Connect the receiver bran to an oscillator or the station receiver. Feed tone of 1 to 2 kilohertz into the hybrid at a lev of one milliwatt. Disconnect the filter, leavi the line side of the hybrid open; short circu the balance network and read the level of t signal at the transmitter leg. With this arrang ment the transmitter branch is connected to t receiver branch through the two transforme Good transformers of 1:1 ratio will have a lo of 0.5 to 1.5 db. each, so the level reading shou be between −1 and −3 dbm. Now connect resistance of about 900 ohms (give or take 100) the line side of the hybrid and another of simil value to the network side. The resistive eleme in the balance network can be used, as one the resistances should be adjustable to compe

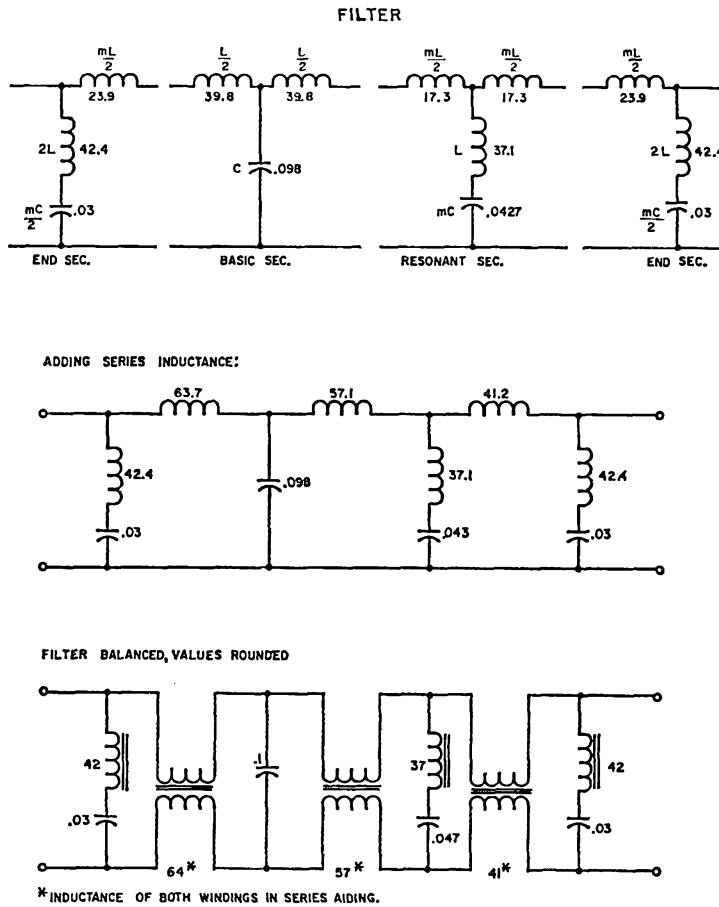


Fig. 7—Top: basic filter sections. Center: M-derived pi-section filter, single-ended. Bottom: Same, balanced. Inductances are in millihenrys and capacitances are in microfads.

sate for small differences in the transformers. Measure the signal level in the transmitter branch, adjusting the variable resistor for minimum level. The hybrid should now be in balance and the level should have dropped to −50 dbm. or lower. A hybrid that fails this test should be checked for incorrect wiring or a defective coil; a good hybrid should meet the above test at any voice-band frequency. After the hybrid has been tested the wiring should be restored to normal.

The next step is to balance the hybrid with the filter and coupler connected. If you have an impedance bridge you can save time by measuring the impedance that the filter and coupler present to the hybrid. Without the bridge some old fashioned cut-and-try will have to be used. The impedance that will have to be balanced cannot be estimated because it will depend on many variables. The filter, coupler and telephone set all contribute to the total impedance and yet each of them is largely transparent, in the sense that its input impedance is dependent on the load impedance that is connected to its output. Most of the elements mentioned usually have an impedance that is capacitive. If you choose to leave the receiver in the telephone handset operative it could shift the total impedance so that it would appear to be inductive. No two situations will be alike, but here are some suggestions: As a starting point, use 900 ohms in series with 2 μf. in the balancing network. A capacitor decade will help to speed the work along. Remember that a condition of balance must be achieved with a telephone connection established, so you may want to make some advance arrangements with a patient and understanding next door neighbor or a cross-town ham that you can talk to on the air while testing. If you find that the balance seems to be only fair and that the capacitance required in the network exceeds 3 μf., it may be an indication that inductance will have to be added to the network. After good balance has been obtained at some frequency in the middle of the voice band, be sure to check the low and high ends. As a rule, a simple series circuit will be adequate in the

(Continued on page 41)

A C.W. Filter For The Collins 75S-1 Receiver

BY WILSON DOTY,* WA4DID

I RECENTLY acquired a used Collins 75S-1 receiver to replace my old HQ-140X. Because I am a c.w. enthusiast, I desired selectivity beyond that available from the 2.1-kHz. s.s.b. filter. Being an inveterate homebrewer I had high hopes of being able to design and install a c.w. filter which would be a reasonable substitute for the rather costly Collins c.w. mechanical filter.

After several experimental models, I finally arrived at the circuit shown in Fig. 1. Basically the circuit is a solid-state adaptation of the simple crystal filter described by K3CUW several years ago in *QST*.[1] A final model of this filter is now installed in my receiver and it can be duplicated for about five dollars. Its performance leaves little to be desired as can be seen from the selectivity curve shown in Fig. 2.

Needless to say, this filter can be adapted to many other receivers or transceivers which may lack adequate c.w. selectivity. I found that, if shielded, the input and output leads can be at least 15 inches long without sacrificing filter performance. Thus the filter could be designed for use as an outboard unit if there is insufficient room under the chassis for an inboard installation. If the filter is to be used with another receiver, the hook up shown in Fig. 3 should be followed.

Construction And Installation

In an attempt to hold down the cost of the filter unit I used many parts from my junk box as well as surplus items. For T_1 I used a subminiature 455-kHz. i.f. transformer salvaged from a defunct transistor radio. If your transformer doesn't resonate with the value of C_1 specified, C_1 must be adjusted accordingly. FT-241 crystals are used for Y_1 and Y_2. They are supplied with high accuracy to your specifications, and are currently available for $1.75 each.[2,3] Y_1 and Y_2 can be of the same frequency but the extremely sharp peak in the filter's response may cause the filter to ring. I experimented with various frequency spacings and found 100 Hz. to be best.

Don't be tempted to steal a little current from the receiver's negative bias supply. Its voltage regulation is very poor and even a drain of a couple milliamperes will cause a considerable drop in the receiver's negative bias voltages. The voltage divider circuit consisting of R_1 and R_2, Fig. 1, is a much better way to obtain the required eight volts for operating the filter.

Because the receiver's filter is peaked to 455 kHz., a c.w. signal beating against the 456.35-kHz. b.f.o. signal will be heard as a 1350-Hz. note — a little high for my taste. To avoid the addition of a special c.w. mode crystal to the b.f.o., I peaked my filter at 455.35 kHz. to obtain the 1-kHz. note that I prefer to copy. The slight shift in the receiver's i.f. causes no sacrifice in the receiver's performance because the passband of the circuits following the filter is very broad.

* 9610 S.W. 35 St., Miami, Florida 33165.

[1] Opal, "Simple Crystal Filter," *QST*, March, 1964, p. 64.

[2] JAN Crystals, 2400 Crystal Drive, Ft. Meyers, Florida 33901.

[3] Texas Crystals, 1000 Crystal Drive, Ft. Meyers, Florida 33901 or Texas Crystals, 4117 Jefferson Blvd., Los Angeles, California 90016.

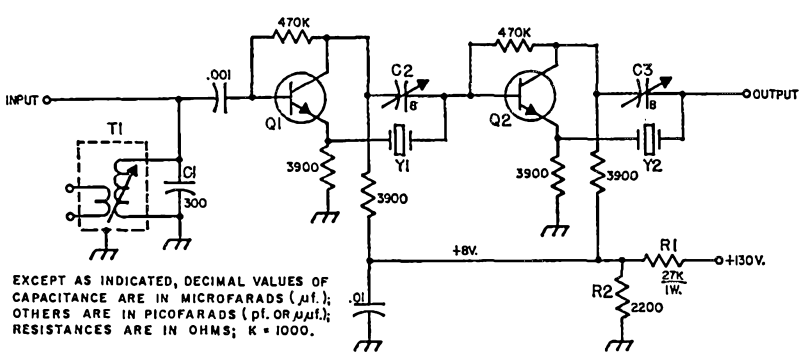


Fig. 1—Circuit of c.w. filter. Resistors are ½ watt except R_1 which is 1 watt. Capacitors are disk ceramic; working voltage 15 v. or greater. Current drain for the filter is 4 ma.

C_1—300 pf. used, see text.
C_2, C_3—1-8 pf. plastic trimmer.
Q_1, Q_2—2N706 or equivalent.
R_1, R_2—For text reference.
T_1—455-kHz. miniature transformer, primary winding not used, see text.

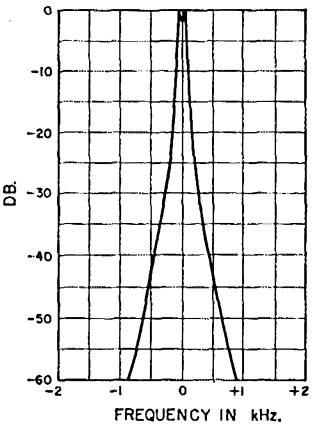


Fig. 2—Selectivity curve of c.w. filter when installed in 75S-1 receiver.

In the center of the 75S-1 chassis you will find a rectangular opening provided for the optional installation of a noise blanker. I cut a thin sheet of phenolic to fit this opening and used it as a mounting board for the filter. The assembly is of the conventional circuit board type using point-to-point wiring techniques.

Viewing the c.w. filter from the top, Fig. 4 is a diagram of my layout. If the transistor sockets are mounted with the collector terminals toward the middle of the board, there will be no crossing of the hook-up wires underneath the board.

Whatever changes you may make in the layout, I recommend that T_1 be located as shown in Fig. 4 so that the filter's input will be near the mode-switch wafer S_7. This wafer is on the mode switch shaft on the rear side of the zig-zag shield partition. The c.w. terminal on this wafer is the one nearest the top when the receiver is upside down on the work bench. A two-inch piece of unshielded wire may be used to connect this terminal to the filter's input.

On the other side of the shield partition is the wafer S_6. The c.w. terminal is in the same position as on S_7. Run a shielded lead from this terminal to the filter's output and ground the shield at the filter end. It is well to keep this lead well above the components of the second mixer circuit so as to avoid any stray coupling which might broaden the filter's skirt selectivity.

Beyond a rear corner of the filter board is another mode-switch wafer, S_{8B}. Three of the terminals on the side of the wafer nearest the filter are connected together and are at a potential of 130 volts d.c. Connect R_1 from one of these terminals to R_2 on the filter board.

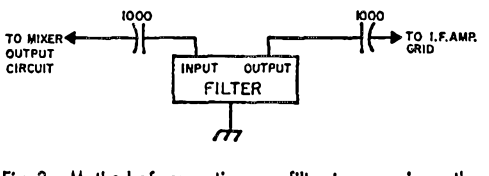


Fig. 3—Method of connecting c.w. filter to a receiver other than the 75S-1. Capacitance is in pf.

Adjustment And Operation

According to crystal filter theory, if the parallel capacitance of a crystal is perfectly neutralized, the crystal will exhibit only series resonance and the attenuation curve will be symmetrical. Therefore the symmetry of the curve is a good test for proper neutralization.

Plug Y_2 into its socket and a high-frequency FT-243 crystal in the Y_1 socket. This high-frequency crystal is used only as a convenient plug-in coupling capacitor and any 7 or 8 MHz. crystal will be suitable. Turn on the receiver's crystal calibrator, set the band switch to 3.4 MHz., set the mode switch in the c.w. position, and advance the r.f. gain control to maximum.

Now, with the receiver's dial near zero or 100, tune in the calibrator signal and peak it up on the S meter by first adjusting the receiver's pre-

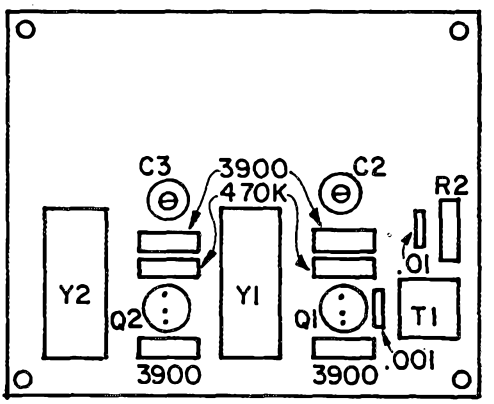


Fig. 4—Top view of c.w. filter parts layout as used in the 75S-1 receiver. C_1 is mounted on the input tie point on the reverse side of the board.

selector and then by tuning T_1 in the filter. Finally, adjust the dial calibration so that it reads exactly zero or 100 as the case may be. With a little patience you can then adjust C_3 until the S meter reads the same when the receiver is tuned 2 kHz. above or below the peak frequency. When the S meter readings are different, adjust C_3 until the meter reading splits the difference. After a few repetitions of this procedure the readings should be equal and the neutralization is adequate. With Y_1 in its socket and the high frequency crystal in the Y_2 socket, repeat the above procedure — adjust C_2 until Y_1 is also adequately neutralized.

The apparent insertion loss of the c.w. filter is ten or twenty db. less than that of the s.s.b. mechanical filter. It is convenient to have the insertion loss of both filters the same so that a given received signal will produce the same S-meter reading whether the receiver is in the

(Continued on page 51)

Integrated Circuits in the Keyboard Code Machine

Semiconductor Shift Register for the W2QYW Keyer

BY W. T. WIEDERHOLD,* W5OGZ

Two previous articles on fingertip keyers [1, 2] used magnetic cores arranged in a shift-register configuration to store the information required for each letter to be sent. These bits of information were then shifted out serially, and this output controlled a code generator to produce the desired combination of dots and dashes to form the letter in code. Magnetic cores with windings are not cheap and are not readily available to most of us. The idea of using flip-flops to take the place of the cores is very timely since the advent of low-cost integrated-circuit flip-flops. A method of using one kind of IC flip-flop is presented here.

Flip-Flops

The flip-flops used are in a TO-85 flat pack with 14 leads. They are JK set-reset clocked flip-flops having a pair of three-input AND gates called J and K gates. There are separate set and preset inputs which are paralleled for this application. The reset input is used only on U_{11} and U_{12}, as shown in the diagrams. The J and K gates control the action of the flip-flop when a negative-going pulse is applied to the clock input. If all three J inputs are high and all K terminals are low a clock pulse will set the flip-flop to the 1 condition (the left-side output high, Fig. 1). A reversal of the voltage on these J and K terminals will cause the flip-flop to reset to the 0 condition (the left-side output low). The bias on these gates is supplied from the outputs of each preceding flip-flop in the string, and it is from this action that the shifting takes place. One could say that U_1 tells U_{11} what to do and U_2 tells U_1 what to do and so on, each time a clock pulse is applied. The delay circuits needed for the magnetic-core shift register are not needed here.

* 2812 Pritchett, Irving, Texas 75060.

[1] Johnson, "Codamite", *QST*, May, 1961.

[2] Horowitz, "Perfect Code at Your Fingertips", *QST*, August, 1965.

The shift-register cores used in W2QYW's "Perfect Code at Your Fingertips" keyboard keyer, described in August 1965 QST, have been hard to get. W5OGZ's substitution of an integrated-circuit shift register using readily-available and inexpensive flip-flops should bring the "typewriter" keyer within reach of anyone. The necessary changes are described in this article.

Other Circuits

The clock and its associated flip-flop is a duplicate of the circuit in August 1965 *QST*. Negative-going pulses from the right side are used to feed the shift-register driver and also the monostable delay flip-flop which resets the keyboard disconnect. Negative going pulses from the left side of the clock flip-flop are used to reset U_{11}, which provides a relay shutoff signal.

The code generator and monitor are also taken from the same article, except that a resistor is used in place of the Zener diode for bias in the code generator since current is essentially constant.

The keyboard disconnect is different from that in the August 1965 article because of lack of current through the keyboard during the setting process.

Operation

In all cases a negative going-pulse, produced by a drop to zero of the collector voltage in a flip-flop, is the type pulse used and will simply be called a "pulse" in this discussion.

The theory of operation is the same as that of the August 1965 keyer. A pattern of 1s is read into the shift register by grounding the flip-flop set terminals through the diode matrix and the keyboard switches. Clock pulses from the right side of the clock flip-flop are fed to the register driver and this in turn produces clock pulses which are applied to the clock terminals of all the flip-flops in parallel. Each clock pulse moves the pattern to the right one unit. When a 1 is shifted out of either U_2 or U_1 a pulse is sent to the left side of the code-generator flip-flop which closes the keying relay. When a 1 gets into U_{11} the next pulse from the *left* side of the clock flip-flop resets U_{11} to zero, and this action sends a pulse to the right side of the code generator flip-flop and opens the relay. Pulses from both sides of the clock flip-flop are always being fed to the shift register and U_{11}, but they have no effect unless a 1 is somewhere in the shift register or in U_{11}.

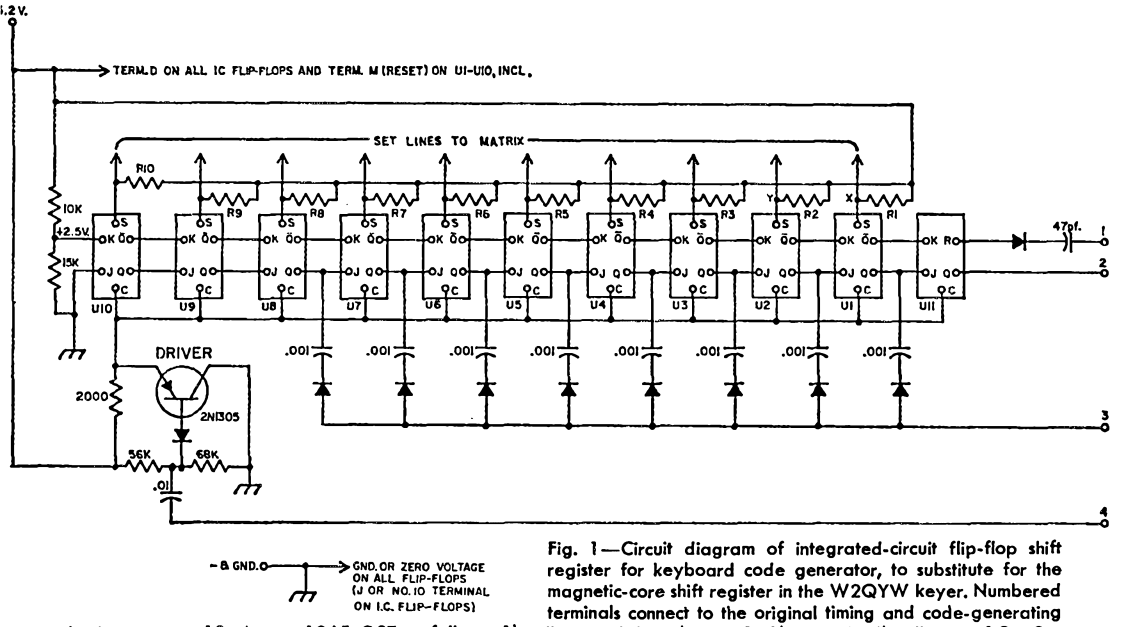


Fig. 1—Circuit diagram of integrated-circuit flip-flop shift register for keyboard code generator, to substitute for the magnetic-core shift register in the W2QYW keyer. Numbered terminals connect to the original timing and code-generating circuits on page 18, August 1965 *QST* as follows: 1) collector of Q_3; 2) point B; 3) point A; 4) collector of Q_4. Capacitances, except as indicated, are in μf.; capacitors are ceramic. Resistances are in ohms (k = 1000); resistors are ½-watt composition. Diodes may be any low-p.r.v. silicon type. Transistors are same as in the August 1965 circuit. U_1 through U_{11}, inclusive, are JK flip-flops; those used by the author are type FF-1 from Solid State Sales (see text). R_1 through R_{10}, inclusive, should be adjusted individually for 4.8 volts at the set terminal (M) of each flip-flop; values in the author's case range from 2200 to 10,000 ohms.

Letters shown on flip-flops are conventional functional designations. Connections to the type FF-1 are as follows:

S (set and preset)—I +H on FF-1
K (K gate)—A +B +N
J (J gate)—E +F +G
C (clock)—C
$\overline{Q}$ (output, high when set)—K
Q (output, low when set)—L
R* (reset)—M

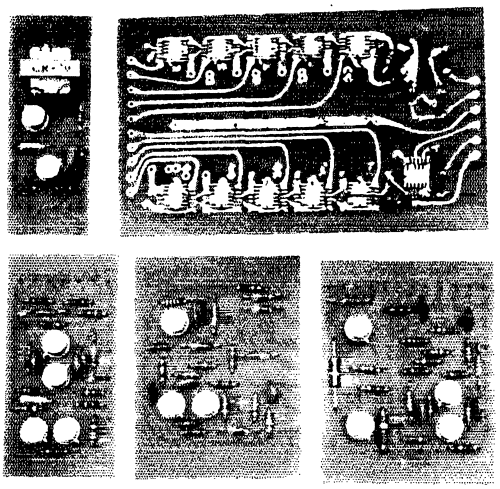
Terminal M on the FF-1 is used for reset only on U_{11}; on U_1 through U_{10}, inclusive, it is connected to $+V_{cc}$.

Keyboard Disconnect

The keyboard common has to be disconnected just as in the original model. To do this the common is connected to the output side of U_{12} that is at ground when in the reset condition. By connecting the No. 1 and No. 2 set lines through isolating diodes to the set terminal of U_{12}, U_{12} will set when a key is pressed and the keyboard common will go to about +3.5 volts, which is higher than the voltage on the other side of the keyboard switches. In this condition the keyboard is ineffective. When a letter has been completed and the left side of the code generator flip-flop goes low, pulses from the monostable delay flip-flop are allowed to get to the reset terminal of U_{12} through the diode AND gate, causing U_{12} to reset and bring the keyboard common back to ground, at which time another letter can be read in. The monostable delay flip-flop is driven by the right-side clock pulses and its output trails the clock pulses by about five microseconds. This circuit allows endless repetition of a letter as long as a key is held down, just as in the original model. The key for another letter can be pressed and held down before completion of the first letter and the second letter will be sent with the proper spacing.

Precautions

Care must be used to prevent pulses from straying into the wrong circuits and causing faulty operation. It is especially important that unused IC terminals be tied down to prevent spurious response to stray pulse voltages they might pick up. All three J inputs on the flip-flops are tied together; similarly with the K inputs. The reset terminals (except that on U_{11}) must be connected to $+V_{cc}$, which is easily done by running a jumper between terminals M and D on each IC. The inactive set terminals must also be connected to $+V_{cc}$; this is done by connecting all ten set lines to $+V_{cc}$ through individual resistors, R_1 through R_{10} in Fig. 1. As the currents taken by the various set lines were not all the same, the values of these resistors were determined by cut-and-try so that the voltage at the set terminal of each IC was 4.8 volts. (With matched ICs the resistors no doubt could all be the same value.) The resistance should be high enough to provide the necessary isolation between lines. I started by putting 10,000-ohm resistors in all lines and then shunted them individually with a pot to determine the correct overall value to achieve 4.8 volts in each case. Fixed resistors of equivalent values were then substituted.



With the exception of the diode matrix, W5OGZ's keyboard code-maker is assembled on the five etched boards shown here. The integrated-circuit shift register is the large board at the top, with its eleven flat-pack ICs. The terminals for the ten set lines come out at the left end. The keyboard-disconnect and delay circuits shown in Fig. 2 are on the center board in the lower row. The remaining boards duplicate circuits given in August 1965 *QST* and are not discussed in this article: upper left, monitor oscillator and amplifier; lower left, time base; lower right, code generator.

It is also necessary to reduce the capacitance between the connection strips in the diode matrix in order to prevent occasional false starts. I use two boards, 3½ by 9 inches, spaced one inch apart. The strips of copper, 10 on one board and 50 on the other cross-wise to those on the first board, were etched 1/16 inch wide and the holes for the diodes were drilled through both boards at the same time — adjacent to the copper strips, not through them. The strips on the keyboard side are 1/16 inch apart and those on the set-line board are ¼ inch apart. On the set-line board the holes can be enlarged to pass the diodes, which will speed up the job a lot. The diodes can be connected to one board first and then threaded through the holes in the other board before assembling the two boards with spacers between. After assembly of the boards the diodes can be soldered to the second board. The boards should be kept at least an inch from the metal of the cabinet to reduce coupling between strips.

The unit is sensitive to random pulses on the a.c. line and to r.f., so adequate bypassing and shielding must be used.

Power

About 5 volts, well regulated, is required for the operation of the IC flip-flops in this unit. Each IC takes a maximum of 25 ma. All other circuits will operate at this voltage too, with the exception of the relay and its controlling transistor, where a 12-volt source is required because a 1500-ohm surplus relay was used. A 12.6-volt center-tapped filament transformer is used with a voltage-doubling rectifier-filter on each side, to provide positive and negative voltages with respect to ground. The positive side is regulated by a 5.2-volt Zener and the negative side by an 8.6-volt Zener.

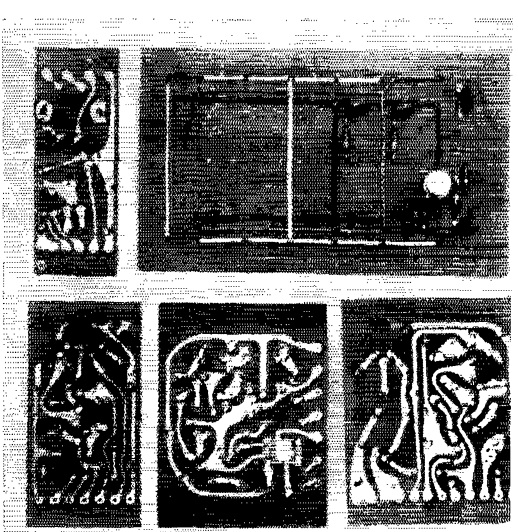
In the code generator a bias resistor of 120 ohms is used instead of a Zener diode; it causes a bias voltage of 1.3 volts, leaving 12.5 volts across the relay. Note that everything is operated from the positive voltage supply except the relay and the monitor.

Miscellaneous

The IC flip-flops used here were obtained from Solid State Sales, P. O. Box 74, Somerville, Mass. 02143 and cost $1.15 each. Several other companies offer similar IC units, and no doubt non-surplus types can be used in a similar circuit.

Except for the power supply, all circuits are mounted on five home-designed and etched printed-circuit boards. The integrated circuits are mounted on the copper side of the board, and numerous jumpers had to be used on the shift register board. A double-sided board could have been used for this.

Separate boards were made for the timer and its flip-flop, for the relay-operating transistor and its control flip-flop, for the keyboard disconnect, and for the audio oscillator and amplifier. These could easily be put on one board about three by six inches while the shift register would be left on a separate board. Electrology, Inc., 3706 Alta Vista, Dallas, Texas 75229, has expressed an interest in producing these boards if enough interest is shown. They could produce the individual boards or the one board to hold all the systems.



Reverse sides of the boards shown in the other photograph. Note that the IC flip-flop in the keyboard-disconnect cicruit (center, lower row) is mounted on this side.

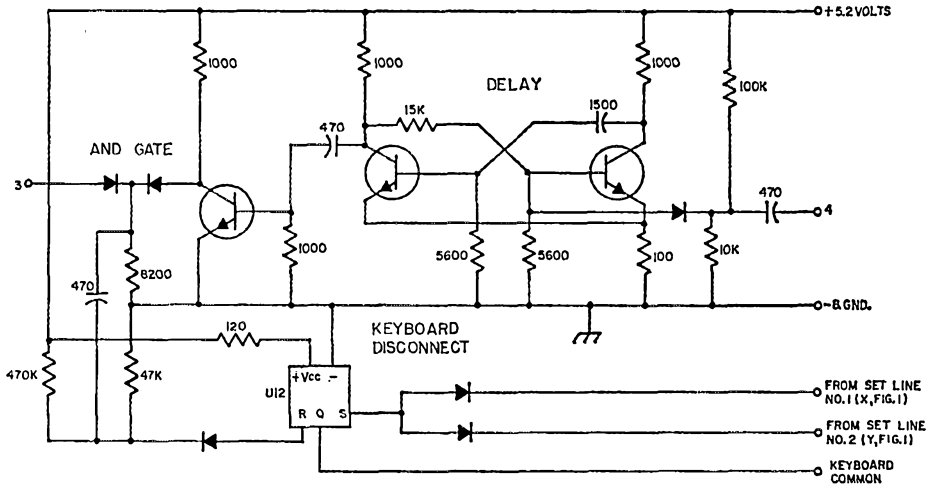


Fig. 2—Circuit of the delay flip-flop, pulse amplifier and gate, and keyboard disconnect flip-flop. Capacitances are in pf.; capacitors are ceramic. Resistances are in ohms (K = 1000); resistors are ½-watt composition.

Numbered terminals connect to the August 1965 circuit as follows: No. 3, to collector of Q_{10}; No. 4, to collector of Q_4 (same as terminal 4 in Fig. 1). See Fig. 1 for diodes, transistors, and U_{12}. Lettered terminals for U_{12} are

S (set and preset)—I + H
$+V_{cc}$—D on FF-1
Ground and negative—J
R (reset)—M
Q (output, high when set)—K
S (set and prereset)—I +H

W2QYW did a fine job on his article in August 1965 *QST*. It is suggested that reference be made to that article for more information on the timing pulses and the uses which are made of them. The diagrams in that article clearly show the relationship of the various pulses and how they fit together for the end product. Those portions of the circuit in that article which are not mentioned in this article are not used.

This has been one of the most interesting and time-consuming projects of my ham career, but the results are most gratifying. QST

March 1944

. . . More on post-war planning. K. B. Warner states that response has been tremendous to the suggestion that we should open up discussion on the question of maximum power for amateurs. We shall have to wait for next month's issue to get a glimpse of excerpts from members' letters. Warner maintains that it is timely to discuss certain aspects of our policy. We would not be weakening our position with the Government. But the time is not yet ripe to talk about other aspects of our policy. The war is not yet won. After the war, there is going to be a vast horde of claimants for frequencies. All sorts of services want in, many justifiable and some sort of way-out. This is just to remind the membership that we will be under a lot of pressure.

. . . Hollis M. French, W1JLK, shows and describes a very neat little package for WERS. It is a walking station supported on the chest and completely self-contained, even the antenna. A W. E. microphone breastplate is the foundation. It is not a transceiver, the receiver and transmitter tuning separately adjustable.

. . . In his article on "An Improved Electronic Key," William L. Gardner built a number of keyers described previously in *QST* and found it highly desirable to correct certain deficiencies he found. This he has done and tells how in simple language. Instructions for final adjustments and testing are given.

. . . Walter E. Bradley, W1FWH, describes a simple signal tracer for use in servicing home radios, as well as ham equipment. It can compare the input signal with the output signal from any stage of the receiver. In this day of "make do", fix up, etc., this is a very handy test rig.

. . . The good old windmill tower engages the attention of Robert J. Donaldson, W8WJF. He tells how to disassemble an old tower and set it up again in its new location. The top and heavy parts are taken apart piece by piece, as much as possible, to lessen the weight and cumbersomeness. Then one picks the remaining and heavy part and heaves it over the side, being careful not to follow it down or let it hit one of the legs!

. . . Hams in Combat, by Capt. J. E. Roberts and S/Sgt. John R. Dunn, recites the story of the control tower at Henderson Field, Guadalcanal. They had a hectic time, alright, and this story is quite worthwhile reading.

. . . Another story by Jefferson D. H. Lamb, XU8JL, tells about his life in a Japanese prison camp and his pre-war activities. No picnic.

. . . Seymour Lobel takes up the business of "Adjustable I. F. Selectivity" and tells how to accomplish this.

——*W1ANA*

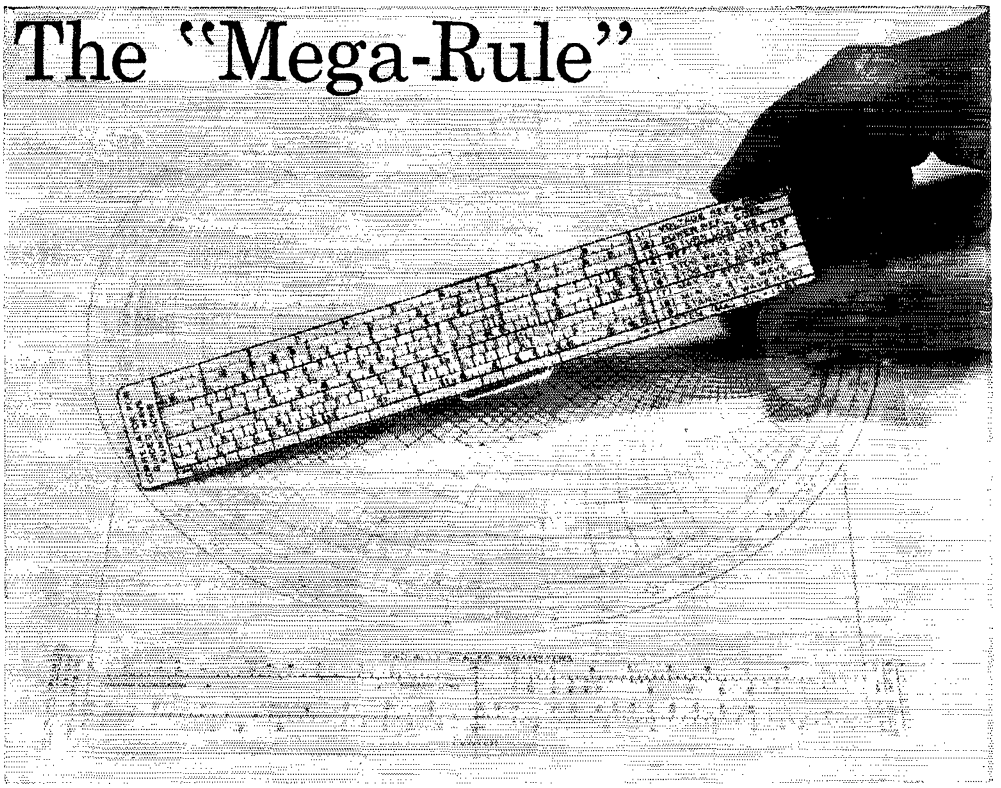


Fig. 1—Slide rule for computing effects of reflection and dissipation in transmission lines.

Slide-Rule Device Computes Reflection and Dissipation in Antenna Feed Lines

BY PHILLIP H. SMITH*

THE detrimental effects of two electronic bugaboos — reflection and dissipation — in transmission lines and wave-guides can now be rapidly evaluated to slide rule accuracy through the use of the simple pocket sized device shown in Fig. 1. This effective little instrument was designed and developed by the writer and originator of the "Smith Chart" with which it is fully compatible. Its use avoids the need to memorize transmission-line definitions and formulas and, like the conventional slide rule, eliminates all possibility of arithmetic errors. Furthermore, little or no previous knowledge of the operation of either slide rules or transmission lines is required in order to obtain useful information from it.

The "Mega-Rule," as this device has been named, also serves to facilitate and encourage the adoption of a consistent set of standardized definitions of transmission line terms such as "return loss," "reflection loss," "attenuation," and "transmission loss." Because of failure of the electronic industry as a whole to adopt uniform standards, the precise meaning of such terms is frequently confused, with the consequence that quantitative comparisons have often been erroneous and misleading. The Mega-Rule scales are based on definitions which have been standardized by the IEEE (in which work the writer has actively participated for many years) and which have been adopted by the United States of America Standards Institute (USASI).

The nearly instantaneous solutions obtainable with the Mega-Rule make it a useful tool for the design or evaluation of antenna and transmission-line systems, for providing an analog check of computer programs, writing or interpreting engineering specifications, in technical design conferences, etc., which, in the writer's experience are frequently interrupted by discussions as to the exact meanings of terms used by the various participants.

* Bell Telephone Laboratories, Whippany, N. J. 07981

Description

The front face of the Mega-Rule is shown in Fig. 1. The device consists, basically, of a set of ten parallel scales, all of the same overall length, having their end points co-aligned. Each scale represents a commonly-used guided-wave function. The functions, which will be defined individually below, are independent of the characteristic impedance of the transmission line or waveguide and of the mode of propagation, and therefore the scales which represent them apply to any type of guided-wave structure including uniconductor waveguide, coaxial or open-wire transmission line, etc., all of which are henceforth referred to as "transmission line", or simply "line". Individual scale values, corresponding to conditions which may exist at any point along any transmission line, are mutually related by a sliding cursor. The functions which the individual scales portray, and their approved definitions, unaltered in meaning but restated by the writer as a set of simple ratios of two scalar quantities, are printed on the back side of the Mega-Rule as shown in Fig. 2. Also shown, adjacent to the definitions, are the mathematical relationships of the values on each of the ten scales. These are all referenced to values of the standing wave ratio (S) since this is a generally familiar and measurable quantity.

Additional formulas in Table I show values on each of the ten Mega-Rule scales referenced to the magnitudes of the incident (i) and reflected (r) traveling waves, and also to the magnitude of the voltage reflection coefficient (ρ).

Operation

The operation of the Mega-Rule is extremely simple. The cursor is first aligned with a known value of any one of the scales where conditions along the transmission line may be known, including its input or output end. The corresponding values of any of the related functions are then read directly from the other scales. For example, if at any point along a line the standing wave ratio (Scale 9) is known to be 3.0, the cursor is set at this position and the corresponding values for the remaining functions, as shown in Table II, are then observed. The effects of attenuation can then be separately added.

Attenuation Scale

As officially defined, "attenuation" is the decrease with distance of a guided wave *in the direction of propagation.* It is thus a measure of the dissipative loss per unit length of transmission line in the *forward traveling wave,* or the loss only when the line is match-terminated, and consequently when no standing waves are present.

The attenuation is represented by the red scale across the bottom of the Mega-Rule. The scale values can be used to either add or subtract the effects of attenuation *on any or all of the reflection functions* which are expressed by the remaining scales printed in black. Attenuation effects are added to the function values when the point of observation along a transmission line is moved in a direction which increases the line length—i.e., toward the generator—and vice versa. The cursor is simply moved across the proper number of attenuation units (decibels) in the direction indicated by the small arrows with their associated plus and minus signs at each end of this scale; plus indicating an *increase* in line length as when moving along the line from the load *toward the generator.*

The attenuation scale is not numbered, as are all the other scales, but is calibrated in 1 db. major (and 0.1 db., 0.2 db., or 0.5 db. minor) attenuation units, thus enabling this scale to have effectively a floating zero position in relation to the other scales. In any given problem its zero position is assumed to correspond to the initial position of the cursor.

The effect of a specified amount of attenuation (e.g., 2.5 db) on the function values obtained in the above example (Table II), due to adding lossy transmission line, is found by moving the cursor across that number of attenuation intervals in the plus direction of Scale 10, to obtain the new set of function values shown in the last column of Table II.

Transmission Loss

The "transmission loss" is the difference between the net power passing two points along a transmission line. It is thus a measure of the *total* dissipative loss in a line section under consideration, which is always more than the "attenuation" because of added dissipation associated with the backward traveling-wave energy. It is not represented directly as a scale on the Mega-Rule, but is obtainable from the other scales as described below.

Standing-Wave Loss Coefficient Scale

The "standing-wave loss coefficient" (Scale 5) provides one means for determining the transmission loss in a line when standing waves are present. This coefficient or "factor", as it is also

Here is a calculator for determining line losses and related quantities by very simple procedures The author, originator of the universally-used Smith Chart, has designed it as a supplement to his well-known Transmission-Line Calculator. However, you don't have to use it in conjunction with the Calculator; it can be used to its fullest extent quite independently.

Phillip H. Smith is an old-time amateur, having had the call 1ANB in the mid-Twenties. He is now an Antenna Consultant at the Bell Telephone Laboratories. QST is pleased to present the details of this newest device for simplifying transmission-line problems.

TABLE I

Formulas for Mega-Rule in Scales Terms of (1) Amplitude of Traveling Waves, (2) Voltage Reflection Coefficient, and (3) Standing-Wave Ratio.

SCALE	FUNCTION	TRAVELING WAVES	REFLECTION COEFFICIENT	STANDING WAVES
(1)	VOLTAGE REFL. COEF.	$\frac{r}{i}$	ρ	$\frac{S-1}{S+1}$
(2)	POWER REFL. COEF.	$\left(\frac{r}{i}\right)^2$	ρ^2	$\left(\frac{S-1}{S+1}\right)^2$
(3)	RETURN LOSS, DB	$10 \log_{10} \left(\frac{i}{r}\right)^2$	$-10 \log_{10} \rho^2$	$-10 \log_{10} \left(\frac{S-1}{S+1}\right)^2$
(4)	REFLECTION LOSS, DB	$10 \log_{10} \frac{i^2}{i^2 - r^2}$	$-10 \log_{10}(1-\rho^2)$	$-10 \log_{10} \left[1-\left(\frac{S-1}{S+1}\right)^2\right]$
(5)	STDG. WAVE LOSS COEF.	$1 + \frac{[(i+r)/(i-r)]^2}{2[(i+r)/(i-r)]}$	$\frac{1 - \rho + \rho^2 - \rho^3}{1 - \rho - \rho^2 + \rho^3}$	$\frac{1+S^2}{2S}$
(6)	STDG. WAVE RATIO, DB	$20 \log_{10} \frac{i+r}{i-r}$	$20 \log_{10} \frac{1+\rho}{1-\rho}$	$20 \log_{10} S$
(7)	MAX. OF STDG. WAVE	$\left(\frac{i+r}{i-r}\right)^{\frac{1}{2}}$	$\left(\frac{1+\rho}{1-\rho}\right)^{\frac{1}{2}}$	$\sqrt{S}$
(8)	MIN. OF STDG. WAVE	$\left(\frac{i-r}{i+r}\right)^{\frac{1}{2}}$	$\left(\frac{1-\rho}{1+\rho}\right)^{\frac{1}{2}}$	$\frac{1}{\sqrt{S}}$
(9)	STANDING WAVE RATIO	$\frac{i+r}{i-r}$	$\frac{1+\rho}{1-\rho}$	S
(10)	ATTENUATION, DB	$-10 \log_{10} \frac{r}{i}$	$-10 \log_{10} \rho$	$-10 \log_{10} \frac{S-1}{S+1}$

i = incident wave amplitude
r = reflected wave amplitude
ρ = reflection coefficient
S = standing wave ratio

} voltage or current

called, multiplies the incident power dissipated by the line attenuation in the region of the point of observation.

The increase in dissipative loss over attenuation is thus obtainable from this scale. Values obtained therefrom represent the average of the increased loss per unit length of line taken over ±0.5 wavelength on either side of the point of observation. Thus cyclic variations in transmission loss within each half standing wavelength are effectively smoothed through the use of this scale.

Reflection Loss Scale

The "reflection loss" (Scale 4) is the ratio of the power incident upon a discontinuity (point of reflection such as a mismatched load) to the power reflected from the discontinuity. In itself it does not represent a measure of added dissipation or system loss. However, the reflected wave in traveling back to the generator will encounter attenuation and added dissipative losses will thus be produced. These added dissipative losses can be evaluated either from the "standing-wave loss coefficient" scale, as previously described, or as follows: The "reflection loss" scale is read at each of two positions of the cursor, i.e., the initial position of the Mega-Rule cursor and the translated position as determined from the attenuation (Scale 10) for the section of transmission line under consideration, as described above. The added dissipative loss is then the difference of the reflection losses as observed at the two cursor positions. This incremented loss (in decibels) is added to the attenuation (also in decibels) to obtain the total dissipative loss (transmission loss).

The total system loss (insertion loss) is the arithmetic sum of the transmission loss and the

TABLE II

Example of Effects of Attenuation on Standing-Wave Ratio and Related Reflection Functions.

Scale	*Function Designation*	*Value When s.w.r. = 3.0*	*Effects of 2.5 db. Atten.*
1	Voltage Refl. Coeff.	.50	.282
2	Power Refl. Coeff.	.25	.08
3	Return Loss, db.	6.00	12.00
4	Reflection Loss, db.	1.25	.36
5	Stdg. Wave Loss Coeff.	1.67	1.17
6	Stdg. Wave Ratio, db.	9.60	5.00
7	Max. of Stdg. Wave	1.73	1.335
8	Min. of Stdg. Wave	.58	.748
9	Stdg. Wave Ratio	3.00	1.78

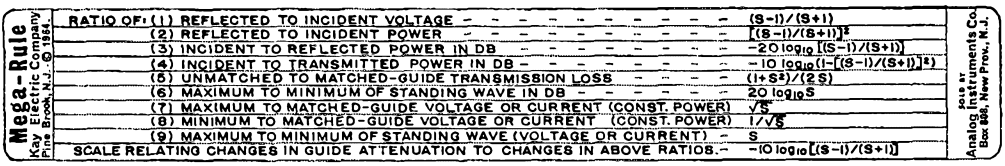


Fig. 2—Definitions and formulas for scales shown in Fig. 1. This is a reproduction of the back side of the Mega-Rule.

reflection loss at the input end of the line section. This latter loss can be entirely recovered only by a loss-free matching device (lossless transformer) between the input end of the line section and the generator terminals.

Other Scales

The captions associated with the remaining scales (1, 2, 3, 6, and 9) and their respective definitions on the back of the Mega-Rule are self-explanatory. These scales will be recognized as simply alternative and uniquely related ways for describing the magnitude of a standing wave. The type of measuring equipment used (reflectometer, standing wave indicating device, directional couplers, etc.) generally dictate which is the more convenient to use in a given application.

Scales 7 and 8 show the maximum and minimum values, respectively, of the current or voltage standing wave relative to the match-terminated value, for constant power dissipated by the load (or radiated by the antenna). From Scale 7 the maximum effective power which the line will have to withstand can be determined.

Examples of Use

Problem No. 1

A given length of transmission line connecting a radio transmitter to an antenna has a known (usually published) attenuation of 1.3 db. at a particular operating frequency. At the antenna end of the transmission line, at this frequency, the standing-wave ratio is observed to be 2.5 (8.0 db.). It is desired to determine the total system loss (insertion loss) contributed by the load mismatch (reflection loss) and the total dissipative losses (transmission loss) in the transmission line.

Enter the Mega-Rule by setting the cursor to 2.5 on the standing-wave ratio scale (No. 9), or 8.0 db. on the standing- wave ratio, db., scale (No. 6). Observe from Scale 4 that the reflection loss at the antenna (a nondissipative loss defined on the back of the Mega-Rule) is 0.88 db.

Next, slide the cursor across 1.3-decibel intervals in the positive direction on the attenuation scale, at the bottom. Now observe from Scale 4 that the reflection loss at the input end of the waveguide is 0.47 db. The increase in dissipative loss, due to a reflected wave in the waveguide, over the losses due only to the forward-traveling wave (attenuation) is obtainable from the Mega-Rule by subtracting the reflection loss at the input end (0.47 db.,) from the reflection loss at the load end, (0.88 db.) to yield 0.41 db. The total dissipative loss (transmission loss) is, therefore, 1.3 db. plus 0.41 db. or 1.71 db.

The total system loss (insertion loss) incurred by the nondissipative load-mismatch at the input end of the waveguide (0.47 db.), plus the attenuation of the transmission line (1.3 db.), plus the increase in dissipative loss due to the reflected wave (0.41 db.), is thus 2.10 db. Of this total it is possible to recover only the reflection loss at the input end of the transmission line (0.47 db.), by conjugate-matching the transmitter impedance to the input impedance of the transmission line rather than to its characteristic impedance. Conjugate impedance matching is generally achieved when the transmitter output circuit is tuned to provide optimum loading for the final amplifier stage.

Problem No. 2

It is required to measure the attenuation at a given frequency in a section of coaxial cable 50 feet long. For this measurement the cable may be either open-circuited or short-circuited at the far end, at which point the power reflection coefficient is unity. (This corresponds to a standing-wave ratio of infinity.) The standing-wave ratio at the input end of this cable is observed to be 2.8 or 9.0 db.

Enter the Mega-Rule at the extreme right end, where the power reflection coefficient is unity. The attenuation which the cable would have if it were terminated in a matched load is now obtained by sliding the cursor from the initial setting to the position where the standing wave ratio is 2.8 on Scale 9, or 9.0 db. on Scale 6, and then reading the number of decibels on the attenuation scale (Scale 10) at the bottom traversed by the cursor. The result in this case is seen to be 3.25 db. attenuation for the 50-foot length, or 0.065 db. per foot.

Alternatively, the attenuation may be obtained from the Mega-Rule by reading the round-trip loss on the Return Loss, db., (Scale 3) and taking one-half of the 6.5 db. value read thereon, namely 3.25 db.

Use with Smith Charts

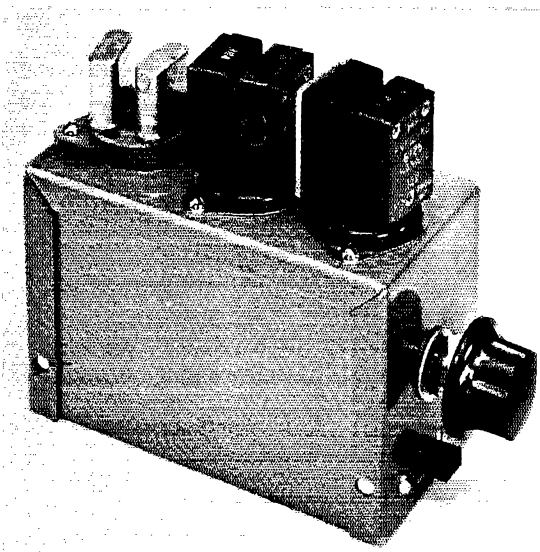
The voltage reflection coefficient scale (Scale 1) on the Mega-Rule is linear from zero at its left end to unity at its right end. Since individual values on all other scales are related by the cursor to individual values on Scale 1, any or all of these scales may be used to determine radial distance on a Smith Chart to the point where specific

(Continued on page 51)

● *Beginner and Novice*

A Band-Spotter and W1AW Marker

BY LEWIS G. MCCOY,* W1ICP



This is the completed marker generator ready for use. The upper knob is S_1 and S_2 is mounted directly below S_1. The four crystals to the front are FT-243 type holders and they are mounted in octal sockets. The two crystals at the rear have 0.05-inch pins and they are mounted in a Compactron socket.

WHEN a newcomer builds or buys his first receiver, one of the big problems he encounters is finding the amateur bands, or even tougher, finding a given frequency. This is not as bad a problem with a ham-bands-only type receiver but the majority of newcomers start out with a low-priced, poorly calibrated general coverage receiver. In addition, while these types of receivers may have mechanical or electrical bandspread, the bandspread usually consists of setting the tuning dial of the general coverage section and then tuning the bandspread range with a separate tuning dial. It can be downright difficult to set the main dial to the correct place so that the bandspread portion is correctly covered. Nearly every ham has had this problem at one time or another in his ham career and even experienced old timers have been known to throw up their hands in frustration.

One may say the answer to the problem is to use a 100-kc. crystal calibrator, the type that gives a marker frequency every 100 kc. However, some two-dial receivers are calibrated so poorly that even with the marker signals you still don't know which segment of the radio spectrum you are tuned to. The answer to the problem is to have marker signals that are only in a particular, or the desired portion of the spectrum. That's what this article is about, a simple marker generator that will show you where a particular frequency is, such as W1AW, or the limits, or approximate limits of a particular amateur band.

* Novice Editor

A troublesome problem that many beginners have is trying to find amateur bands on their receivers. Here is a simple-to-build unit that will take the pain and strain out of the problem.

The Marker Generator

Fig. 1 is the circuit diagram of the unit. The circuit is simply a crystal oscillator using an FET transistor, Q_1. A multi-contact switch is installed in the gate of the FET and the switch is used to switch various marker crystals into the circuit. The unit shown has provisions for six crystals, two markers for each of the 80-, 40-, and 15-meter Novice bands. Also, it is an easy matter to change crystals if other markers, such as the W1AW "finder," are desired. One point here: surplus type crystals can be used to keep the costs down[1]. Many types are available at rather low prices. For example, the type CR7/U can be purchased at 75 cents each or three for $2.00. While these crystals may not be on the *exact* frequency desired they will be close enough to get you in the "ball park." More about this in a moment.

The circuit used in the unit is a Pierce type oscillator. Crystals ranging from 1500 kc. up to 15 Mc. all oscillated in the circuit. Q_1 is a Motorola type HEP-802.

BT_1, a 9-volt battery of the variety used to power transistor radios is used in the oscillator. The current drain when in use is less than one milliampere so a battery should last almost as long as the normal shelf life. No special subchassis is required in the unit as the transistor and other components in the circuit are mounted on unused socket terminals.

[1] JAN Crystals, 2400 Crystal Drive, Fort Myers, Florida 33901.

While the unit is primarily designed as a marker generator it can also be used as a code-practice oscillator. All that is needed for this purpose is to open the lead between the source on Q_1 and ground and insert key leads in this lead. The oscillator can then be keyed and the signal monitored in the receiver. Still another use for the unit is as a signal generator. In many instances a ham would like to have available a reliable signal source to align a receiver or possibly tune up an antenna and this unit can be used for these purposes. However, the basic use is as a marker generator.

Construction Information

The generator is built in and on a Minibox, Bud CU-2115-A, that measures $4 \times 2\frac{3}{4} \times 2$-inches. Tube sockets are used for the crystal holders and these are mounted on top the box. Regular octal sockets are used for the FT-243 type crystal holders. One socket will accommodate two crystals. The FT-243 has a pin spacing of $\frac{1}{2}$ inch and the pins are 0.093 inch in diameter. The CR7/U type crystal mentioned earlier has the same pin spacing but the pin diameters are smaller, 0.050 inch. A Compactron tube socket will take two of this type holder.

Actually, S_1 can be a 12-position switch and if the builder desires, a larger chassis could be used to mount more sockets and hold any number up to 12 crystals.

Crystals

When you start looking through the surplus crystal lists you may not see, or find, crystals on the desired frequency. You may have to settle for band markers that are not exactly on the band edges. For example, in the type CR7/U mentioned earlier, while there is no crystal listed at 7150 kc., there is one at 7144 and another at 7155 kc. Either of these should be close enough, along with the receiver dial calibration, to provide a solid indication of the band edge on 40 meters. As another example, let's assume we are looking for the markers of the Novice band on 15 meters, 21,100 to 21,250 kc. We'll want one crystal at the lower number and another at the high end.

In this case, we may be able to get a better buy on crystals by using harmonics of the marker signal. For example, a crystal at 4220 kc. has

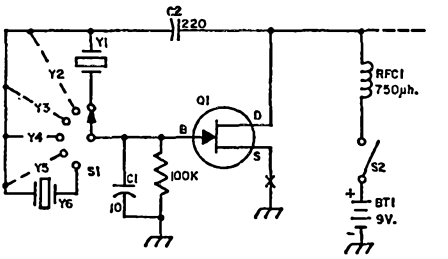
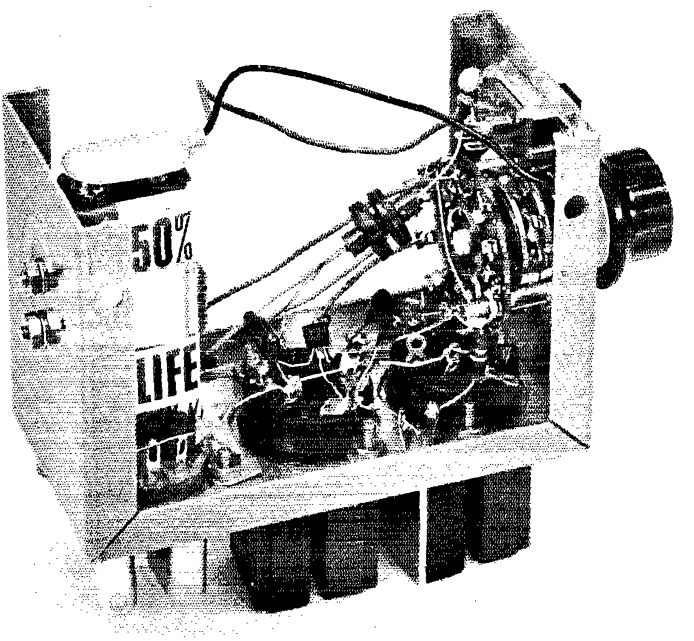


Fig. 1—Circuit diagram of the marker generator. All resistors are ½ watt; resistances are in ohms (K = 1000).
BT_1—9-volt battery.
C_1—10 pf. mica.
C_2—220 pf. mica.
RFC_1—Any value from 750 μh. to 2.5 mh.
Q_1—Motorola type HEP-802.
S_1—Single-pole, 12-position switch (Mallory type 32112J or similar).
S_2—S.p.s.t. slide switch.



This view shows the component arrangement inside the Minibox. The battery, BT_1, is mounted in a battery holder on the back of box. The FET transistor is mounted on the unused terminals of the center octal socket.

a fifth harmonic, five times 4220 kc., at 21,100 kc. The harmonic signal from the oscillator is plenty strong enough to be heard in your receiver and such a crystal would be much cheaper than one at 21,100 kc. directly. By the same token, the fourth harmonic would require a crystal at 5275 kc. and a third harmonic from one at 7033 kc. The main point here is that you don't have to have crystals exactly at the desired frequency. Harmonics can be used, and even if the frequency isn't exact (to what the band edges are), you'll know what the marker is and be able to find and set the band accordingly.

W1AW

The Maxim Memorial station, W1AW conducts on the air code practice, twice daily. A complete schedule can be obtained, along with a list of other stations that transmit code practice, from A.R.R.L. Headquarters[2]. However, even knowing the times that the station transmits, it can be difficult to locate a c.w. station if your receiver is poorly calibrated. The W1AW code practice frequency is easy to remember. The frequency is 20 kc. inside the *low* end of the 80- through 6-meter bands. On 80 meters, the frequency is 3520 kc., on 40, 7020 kc., on 20, 14,020 kc. and so forth. All you need do is pick out a crystal that will generate a signal or harmonic at the desired frequency and it will simplify the job of finding W1AW.

Keep in mind that the crystal doesn't have to be exactly on frequency. All that matters is being close enough to set your receiver dial accurately. During the fall, winter and spring, the following frequencies may be best in your area to copy W1AW. If you are within 500 miles of Connecticut, 3520 kc.; from 500- to 1500 miles away then 7020 kc. might be best. For any distances over 1500 miles, try 14,020 kc. These figures can vary a great deal depending on the time of day and time of year but they at least give you something to shoot for.

Also, along the same lines, unless you know what W1AW is sending it may be difficult to single the station out from other c.w. stations. Code practice starting times are 0030 and 0230 Greenwich Mean Time. Exactly at those times W1AW comes on the air and sends QST QST QST DE W1AW W1AW W1AW. This is repeated six times covering a period of 3 to 4 minutes. To recognize the signal, you can quickly learn what QST sounds like. Phonetically, QST is DahDahDiDah DiDiDit Dah. If you repeat that aloud to yourself a few times you'll learn to recognize the W1AW introduction very quickly. (Learning the rest of the alphabet and getting up speed will take a little longer!)

In using the marker generator, the unit can be placed anywhere near the receiver. If you find that you don't get enough pickup to hear the signal, and this may be the case in using a harmonic, a small antenna may be needed. The dotted line above RFC_1 indicates an antenna. All that is needed is about six inches of wire connected to the junction of RFC_1 and C_2. The wire should be run outside the cabinet. A small hole can be drilled in the top or back of the cabinet for the wire and the wire should be insulated where it goes through the cabinet.

If you are concerned that the marker signal will be radiated to a point where it will be picked up more than a few feet from your receiver, forget it. However, if you put a full-sized antenna on the unit it could be used as a transmitter, running about one milliwatt (!) input — anyone for DX?

[2] Please address your request to the Communications Dept. and enclose a self-addressed, stamped envelope.

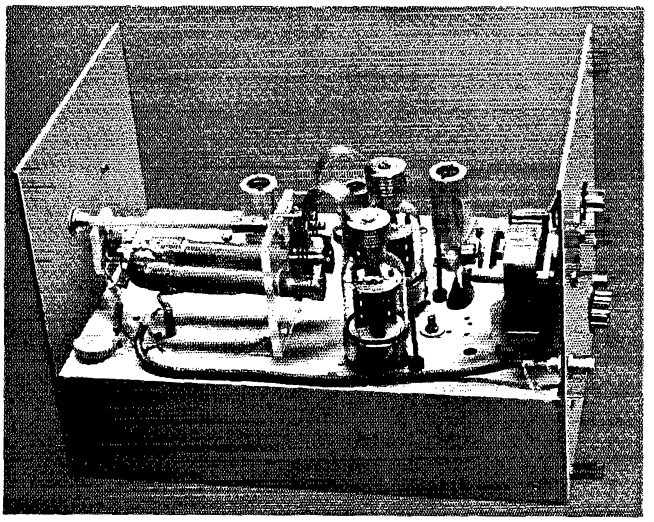
Strays

Here's a list of those certifying at the top of the ARRL code-proficiency ladder in 1968. Making the grade at 35 w.p.m. were:

WA1ABW*	K3GJD*	W5IUW	W7HMA	WA9MQI*
WA1DRS*	WA3IYS*	K5OCX*	K7RQI	WA9NWK
W1EEN	W3PLK*	K5RIR*	K7RSD/WA5SZU*	WA9QDQ*
W1WSE	WB4AJV/4*	W6EDI	W7VSE	WA9SYD*
WB2AIJ*	W4DAT	W6FAX*	K8DGL*	W9TNN*
WN2CIQ	W4DFV	W6GEN	W8IHD*	K9UIJ
WA2IIT	W4DUQ*	WB6OVV*	K8JLF*	W9ZEN*
W2NU	WB4IDO*	K6OZL*	W8LOF*	WØHI*
WB2UHZ*	W4LBX	WB6PNY*	W8SQO*	KØKQK
W2UPN	W4MVE*	WA6QAY*	WA8WWS*	WAØOVW*
WA3BLE*	W4NG	W6QB	W9BLB	VE3BKP*
W3CBF	WA4NMQ	W6WLV*	K9FZU*	VE3DXV/W6
W3DHL	W4OJT*	K6YUW	WA9ITB*	VE3ERU
K3EMA*	W4UHI	W7AAF/6*	K9IYC	VE3GTQ*
W3GEB	WA4WJJ*	W7GVV*	W9JJL	DL1QT
		Joseph E. Patten* Dearborn, Michigan		KH6GHZ

* Endorsement Sticker

A Medium-Power Transmitting Converter for 144 MHz.



Top-chassis view of the 2-meter transmitting converter. The amplifier plate lines are in the left foreground. The oscillator section, mixer and driver are in a line along the far side of the chassis.

2-Meter Version of 50-Mc. Model Previously Described

BY H. GORDON DOUGLAS,* W8PMK

CONSIDERABLE similarity can be seen between this transmitting converter and the 6-meter model described earlier. The tube lineup is the same with the exception of the mixer stage, which in this instance is a 6GM6. Use of this tube instead of a 12BY7A was based on its lower output capacitance — a factor when designing tuned circuits for 144 MHz. The basic circuit is similar to one used by Hall, K1RPB,[1] in the transmitting section of his transverter. The main difference is in the amplifier section. Hall used an 829B. The writer uses push-pull 6146Bs, duplicating an amplifier described in *QST*.[2] Operating voltages can be taken from the h.f. s.s.b. exciter, or a separate power supply can be used. A Heath HX-10 supplies the driving signal and operating voltages for the converter at this station.

* Box 164, Luther, Michigan 49656.

[1] Hall, "A 100-Watt 2-Meter Transmit-Receive Converter," *QST*, January 1966.

This is a follow-up article to one that described a 6-meter unit of similar characteristics. It is designed to be driven by a low-power 28-MHz. s.s.b./c.w. exciter and requires less than 5 watts 28-MHz. energy to develop its rated input power, approximately 100 watts. If conventional v.h.f. construction techniques are followed, the builder should have no difficulty in putting this equipment into s.s.b. or c.w. service on 144 MHz.

Circuit Information

A 58-MHz. overtone crystal is used in the oscillator circuit at V_{1A}. The high crystal frequency minimizes the chance for spurious responses, which often result when higher orders of multiplication are used in the oscillator chain. V_{1B} operates as a doubler and supplies 116-MHz. injection to the mixer, V_2. The 28-MHz. driving signal is injected into the mixer cathode by means of tuned circuit L_4. Bandpass coupling is used between the output of the mixer and the input of the driver, V_3. This type of coupling helps reduce unwanted frequencies in the drive to V_3, and spurious responses in the output of the transmitter.

The driver stage is neutralized by means of C_3, a 1-inch length of hookup wire. This is soldered to Pin 2 of the tube socket, and the free end of the wire is placed near the coil lead connected to Pin 6 of V_3. The spacing is varied until the stage is stabilized. This may not be needed

[2] DeMaw, "An All-Mode Amplifier for 2 Meters," *QST*, September 1966.

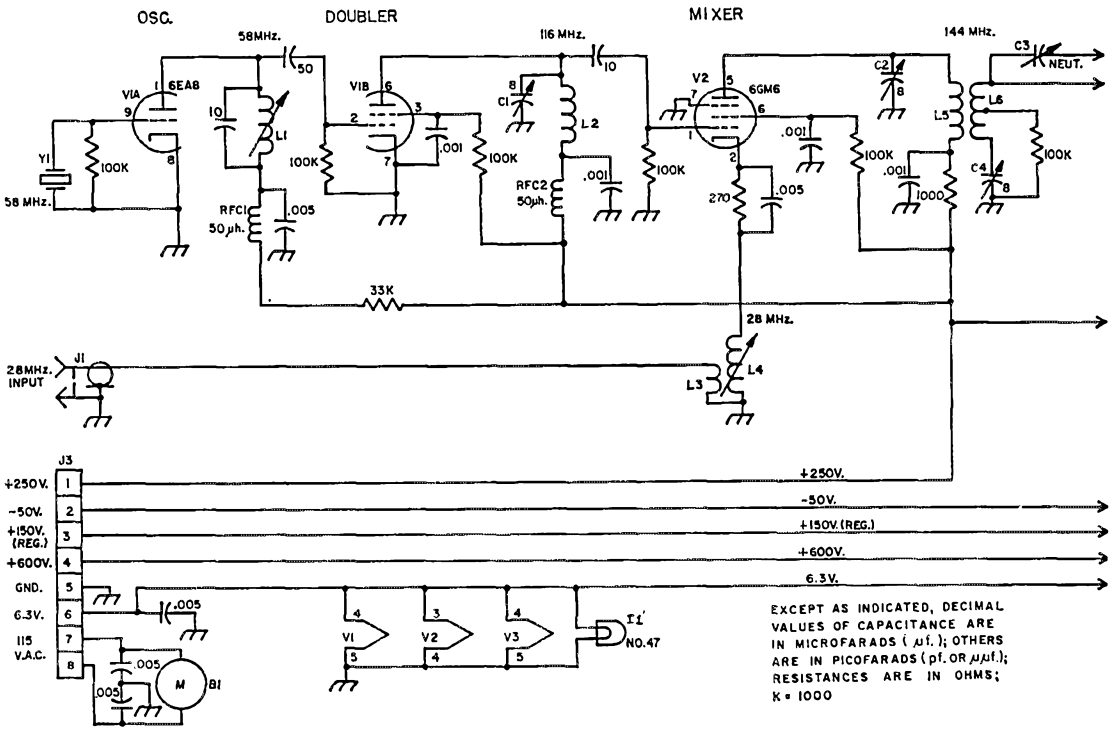


Fig. 1—Schematic of the W8PMK transmitting converter. Fixed-value capacitors are disk ceramic. FT = Feedthrough. BM = Button Mica. Resistors are ½-watt carbon unless otherwise noted.

B_1—Medium- or high-speed tube-cooling fan.
C_1, C_2, C_4—8-pf. plastic tubular variable.
C_3, C_6, C_7—Neutralizing capacitor (see text).
C_5—10-pf. miniature variable (Johnson 160-104 suitable).
C_8—Butterfly-type variable (Johnson 167-22 with two rotor and three stator plates removed from each section).
C_9—50-pf. miniature variable (Johnson 167-3 suitable).
I_1—Panel indicator, No. 47 lamp.
J_1—Phono jack.
J_2—BNC-type chassis-mount connector.
L_1—8 turns No. 26 enam., close-wound on ¼-inch slug-tuned form (Miller 4500-4 form suitable).
L_2—4 turns No. 20, ⅜-inch diam., ¾ inch long.

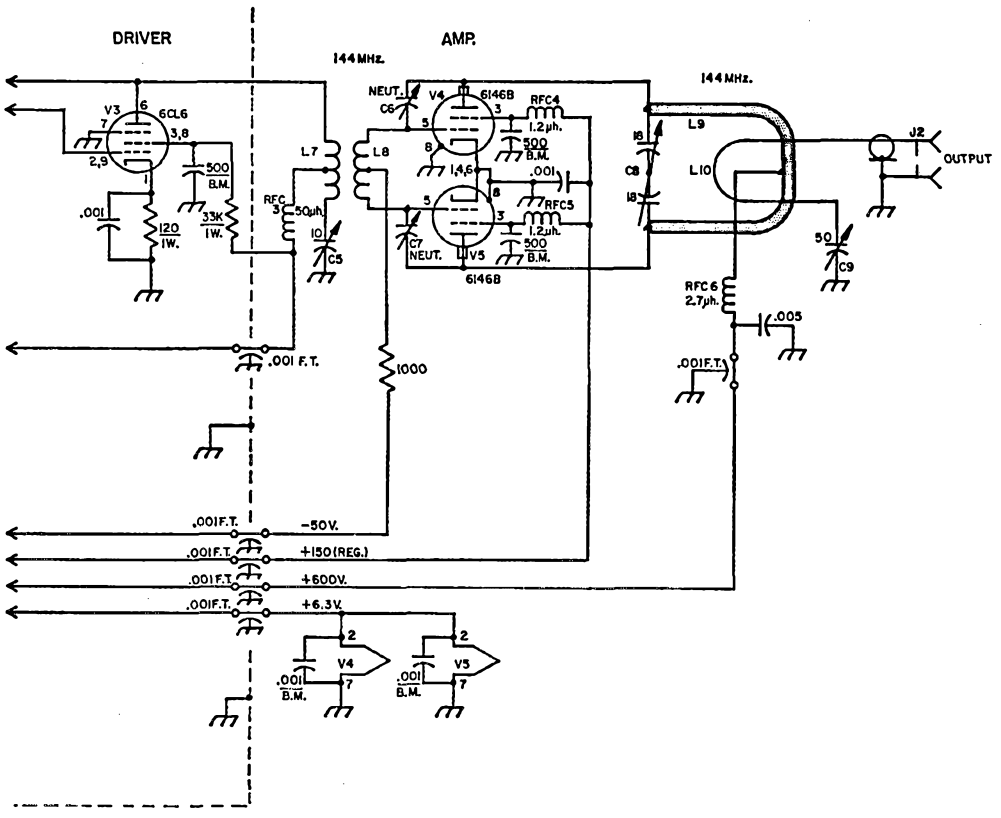
Bottom view—The oscillator, doubler, mixer and driver stages are below the copper partition which divides the chassis. The driver plate and amplifier grid coils are parallel to each other, just to the right of the amplifier tube sockets.

and should be used only if instability is observed in the driver. The driver operates Class A and gets its bias from a 120-ohm cathode resistor.

Bandpass coupling is used between the driver plate and the input of the amplifier. L_7 and L_8 are mounted parallel to one another, ⅛ inch apart. Detailed information on the amplifier circuit will not be given here since a full description is given in an earlier issue of *QST*.[2] The screen voltage is reduced from that used in the 6-meter model. This was done to make it easier to derate the tubes at 144 MHz., as recommended by the manufacturer. Input should be reduced about 28 percent to assure their normal life span at this frequency.

Construction

The same chassis, panel, and cover dimensions as in the 6-meter version are used here. A copper partition separates the driver plate and grid



L_3—2 turns insulated hookup wire over ground end of L_4.
L_4—1.6-3.1-μh. variable inductor; 13 turns No. 26 enam. on ⅜-inch iron-slug form.
L_5—5 turns No. 20, ⅜-inch diam., ¾ inch long.
L_6—6 turns No. 20, insulated, ½-inch diam., ¾ inch long, center-tapped. Mount with C_4 end against B-plus end of L_5.
L_7—5 turns No. 14 enam., ¾-inch diam., 1¼ inches long, center-tapped.
L_8—5 turns No. 14 insulated wire (or ⅛-inch wide copper strip), ⅜-inch diam., 2 inches long, center-tapped. Adjust turn spacing for maximum grid drive.
L_9—See footnote 2.
L_{10}—See footnote 2.
RFC_1–RFC_3, incl.—50-μh. r.f. choke (Millen 34300-50 suitable).
RFC_4, RFC_5—1.2-μh. r.f. choke (Millen 34300-1.2 suitable).
RFC_6—2.7-μh. r.f. choke (Millen 34300-2.7 suitable).
Y_1—58-MHz. overtone crystal (International Crystal Co.).

circuits to aid stability of the driver and amplifier. Operating voltages for the driver plate circuit, and for the entire amplifier section, are decoupled by means of 0.001-μf. feedthrough capacitors. The capacitors are mounted on the copper divider (see photo).

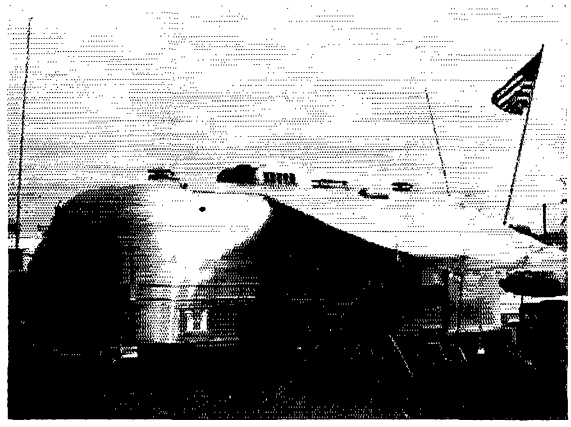
Unlike the 6-meter version, this unit uses copper lines for the amplifier plate circuit. The large-diameter tubing provides a higher tank-circuit Q, and efficiency. The rotor of C_8 is not returned to ground. This practice aids amplifier balance and stability at 144 MHz. C_8 is mounted on a Plexiglas plate. A piece of ¼-inch diameter insulating rod is used as a tuning shaft, to isolate the rotor from ground. Forced-air cooling helps prolong the life span of the tubes. A small fan is mounted near the tubes and can be seen in the photo. Heat-dissipating plate connectors offer additional help in this regard. Those used in this equipment were removed from discarded 2C39 tubes and were rebored to fit the 6146B anode caps.

Testing and Use

Adjustment procedure given for the 6-meter model is used with this unit. Rough alignment of the tuned circuits can be done with the help of a grid-dip oscillator. Final touching up of the various stages can be carried out by observing the amplifier plate current and adjusting all of the tuned circuits (except the amplifier tank) for maximum input. This should be done with reduced drive from the 28-MHz. exciter so that plate current will not be excessive. Adjustment of the amplifier neutralization wires is the same as in the 6-meter model, though it should be noted that the wires are not cross-connected for conventional neutralization. The technique used here may be necessary when 6146-type

(Continued on page 51)

Antennas for Travel Trailers and Campers



The author's 30-foot Airstream trailer with the 75-meter Airstream Loop in place. The "tuning" mast is the one carrying the flag.

BY PHILIP S. RAND,* W1DBM

THE sport of camping, whether it be in a tent, a truck camper or a travel trailer, is growing by leaps and bounds, as evidenced by the increasing number of various types of trailers encountered on the nation's highways today. As a class, trailer owners include an above-average number of radio hams. In the United States, the ham population averages about one out of every 1000 people. A city of 50,000 usually has about 50 hams. My town of about 6000 has 6 hams. On the other hand, the New England Unit of the Wally Byam Caravan Club, an Airstream travel-trailer club, with a membership of some 500 travel-trailer owners, has over 15 hams as members. The International WBCC has about 225 hams for 22,000 trailers, or an average 10 times as great as normal.

Who knows why hams like to go camping in such numbers? Perhaps it's their Field-Day training; perhaps it is the next logical step after mobile operation, or perhaps they just cannot leave home without their rigs. At any rate, it is nice to have your own means of communication with the outside world when you are away from home in the Maine woods, at the Grand Canyon, or even down in Mexico.

One thing all hams know is that no matter how good a transmitter you may have, you cannot get out without an antenna; and the better the antenna is, the better you get out. The antenna is usually no problem for the home station. The sky is the limit, so to speak. A 65-foot crank-up tilt-over tower with a triband beam on top, and a couple of inverted Vs for 40 and 75 are not at all uncommon. But did you ever contemplate transporting such an antenna system to a state park, or some other camp ground, and setting it up while your XYL cooked supper? Obviously, the mobile operator is faced with vastly different problems than those confronting the ham who stays at home, when it comes to antennas.

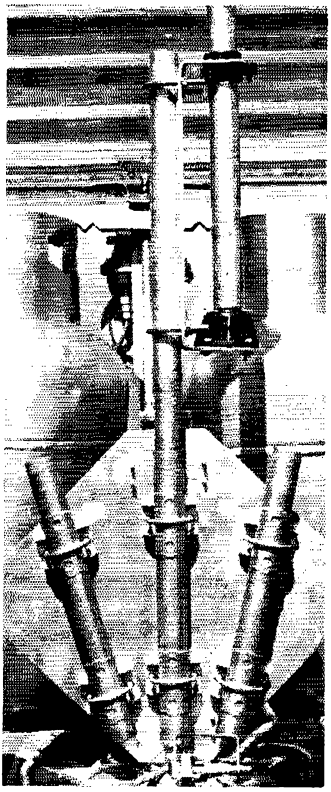
My trailering experience began in 1929, when I built my own 14-foot travel trailer, which was christened "Black Maria." Shortly thereafter, I got my ham license, and one of the first thoughts was toward a rig for the trailer. This was in the days when mobile operation was still a novelty, and the story of Black Maria was my first contribution to *QST*, in 1933. The rig used a pair of 33s in parallel operating from a B-battery pack.

Over the ensuing 35 years, many portable antenna designs have been tried, and much has been learned about their relative performance. The degree to which a trailer traveler is restricted in his choice of an antenna varies widely, of course, depending upon the facilities available at each stopping point. These are seldom known in advance, but to get the most out of his equipment, the trailer operator should be prepared to take maximum advantage of whatever facilities he may find on each occasion.

Dipole Antennas

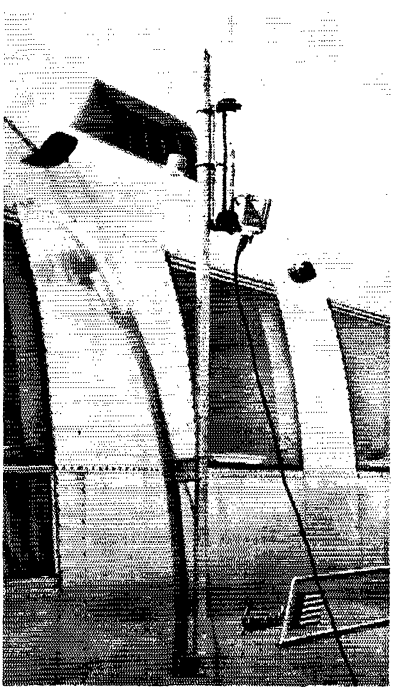
Long ago, I found that a simple dipole for 40 or 75 would far outperform my mobile whip, even with the dipole only a few feet above ground. As I write this, sitting in the latest Black Maria — a 30-foot Airstream job — up in Port Colburne, Ontario, I am listening to the 75-meter phone band. The dipole is only 8 feet above ground. This morning I checked into the Airstream Travel Trailer Net, which meets every Sunday on 3963 kHz. at 8 A.M. local time. I worked other trailer stations in Connecticut, New Jersey, Maryland, Pennsylvania, New York and Ohio. Several times I switched to the mobile whip and could not be heard through the QRM. Such a dipole can be prefabricated and, when rolled up, occupies very little storage space.

* P.O. Box 28, Redding Ridge, Conn. 06876.

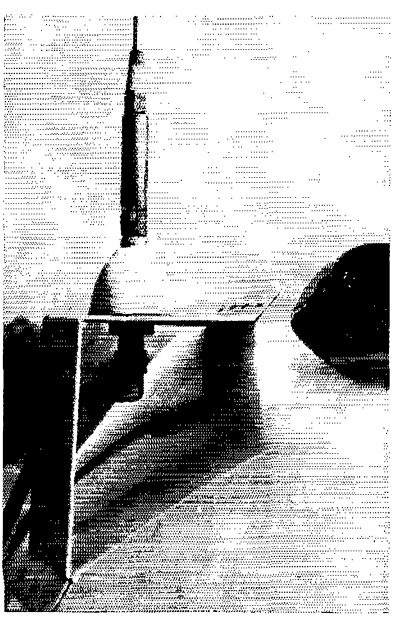


Insulated mounting at one end of the "Airstream Loop" 75-meter antenna. The "tuning" mast can be mounted directly in one of the other sockets. The tuning will vary with the spacing between masts as well as the length of the "tuning" mast. The insulated mounting can be transferred to one of the side sockets to obtain maximum spacing.

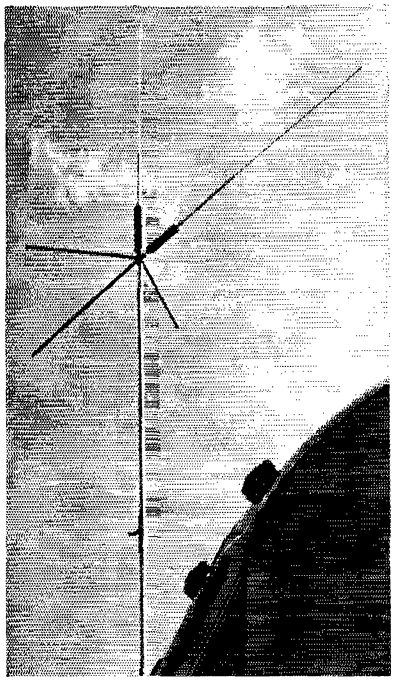
A check with a 20-watt fluorescent lamp by W1WKZ indicates the "hot" points on the Airstream Loop 75-meter antenna system.



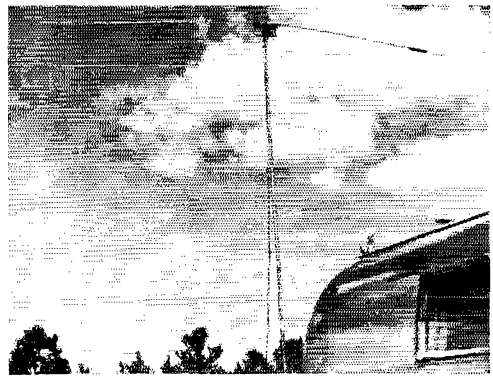
A 25-foot base-loaded antenna mounted on brackets attached to the side of the trailer.



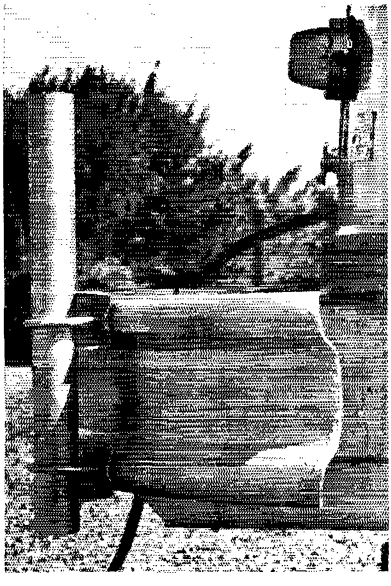
An elevated mounting for a mobile whip at a top rear corner of the trailer body. The bracket is fastened by pop rivets. This point may also be used, with the whip removed, for feeding wire dipoles.



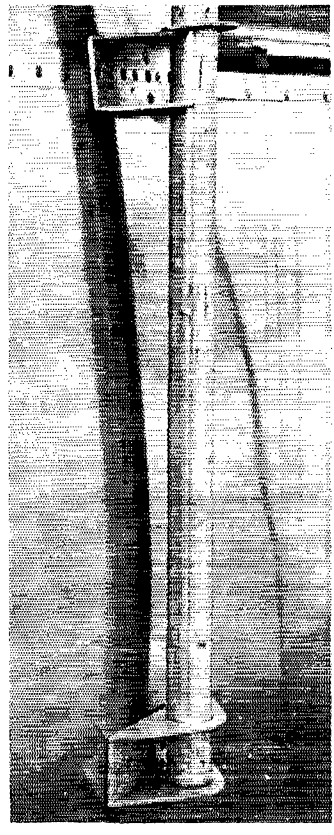
A five-band antenna system. A New-Tronics mobile antenna base section is fitted with a Waters Add-a-Band adapter. The short resonators for 10, 15, and 20 meters are Waters. The 80-meter resonator (top) is New-Tronics. A threaded stud has been added to the vacant side of the adapter to take a New-Tronics 40-meter resonator. The system is fed at the base with a single coax line.



An 80-meter dipole made of two New-Tronics 75-meter mobile whip back to back. The 15-foot mast is bumper-mounted. A 1-to-1 balun is mounted on the center insulating panel, which is secured to the mast with U bolts. This antenna is quite narrow-band when operated on 75 meters, making it necessary to retune the antenna for excursions of more than 30 or 40 kHz.



A bumper-mounted socket for TV masting.



Brackets for mounting TV masting on the side of the trailer. The upper bracket is fitted with a removable U-shaped yoke bolted to the bracket. The brackets are fastened to the trailer with pop rivets.

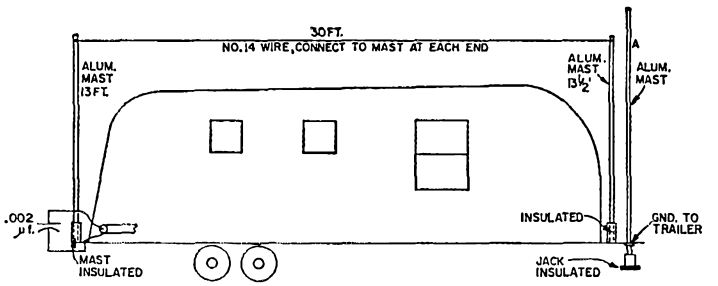


Fig. 1—75-meter "Airstream Loop"

When the length of the stay warrants it, and trees or other supports are available, the antenna will be even more effective when raised to a respectable height. I keep a bow and arrow on hand for shooting lines over taller trees. Incidentally, Hy-Gain makes a deluxe portable dipole consisting of two stainless-steel tapes in a double plastic housing. The tapes are calibrated in meters, and can be quickly reeled out to the proper length for use on any desired band. The unit is fitted with a coax connector, making installation very easy.

If only a single support is available, the dipole can be used in "inverted-V" fashion. A convenient way of putting up such an antenna is to use three or four 5-foot lengths of 1¼-inch aluminum TV masting as a center pole, mounting it on the front of the trailer. I have a mounting for such an arrangement clamped to the bumper, as shown in one of the photographs. The mast can be equipped with light nylon halyards for hoisting the center of the dipole. The ends of the dipole can be attached to whatever may be handy, but the higher, the better.

Loaded Antennas

Of course, there are many times when the surroundings, or the shortness of the stopover, make erection of a conventional dipole impractical. On these occasions, I have used one or another of several arrangements shown in the accompanying photographs and sketches. Where the antenna system is one that requires a ground for operation, I have found that a quarter-wave wire counterpoise connected to the trailer, and strung out a few feet above ground, is usually a much better "ground" than the trailer alone, even if the trailer is actually grounded to a driven rod. I carry two each of wires cut to lengths of 8, 16, 32 and 60 feet for use as counterpoise on the 10-, 20-, 40-, and 75-meter bands, respectively. One end of each wire is fitted with a large battery clip, while the other is terminated in an insulator. Trailer awning poles come in handy as counterpoise supports when nothing else is available.

"Airstream Loop" Antenna

Of particular interest is the 75-meter folded configuration shown in the sketch of Fig. 1, which I call the "Airstream Loop," although, strictly speaking, it does not function as a true loop. With the fittings that I have provided, this antenna can be put up in a few minutes, and its performance seems to be about equal to that of a low dipole. It has the advantage that it is completely supported by the trailer, and requires no external supports. It is contained entirely within your own campsite. There are no wires strung out for you or your neighboring campers to trip over or be garroted by in the dark. A 30-foot length of wire is strung between, and connected to, two poles made of aluminum TV mast sections. A third mast (A), of approximately the same length as the others, and connected to the trailer, is an essential part of the system. This arrangement appears to work as a folded half-wave antenna, the 30-foot wire and the two poles connected to it forming one half of the antenna, while the other half is formed by the trailer body and mast (A). Probing with a fluorescent lamp shows that the end of the trailer opposite the feed point is "hot" while the feed-point end is "cold." The system can be tuned by adjustment of the length of pole A, and/or changing the spacing between A and the adjacent pole. The spacing can be changed by a selection of the pole mounting sockets shown in one of the photographs. In this manner, the resonant frequency can be changed by almost 150 kHz. For any adjustment, the transmitter can be tuned about 30 kHz. either side of the resonant point before the s.w.r. exceeds 3 to 1. Since the "hot" end of the trailer is the front end in my case, the tow car must be unhitched, and an insulating block used under the customary supporting jack.

In a similar arrangement for 40 meters, mast A is omitted, and a wire approximately 21 feet long is connected to the pole at the feed-point end. The open end of the wire is supported from the pole at the opposite end of the trailer by a length of nylon rope.

40-Meter Monopole

Another 40-meter antenna that I have used with considerable success is a 34-foot length of 300-ohm ribbon line connected as a folded monopole, and strung up in the same manner as the antenna just described. One conductor of the ribbon is grounded to the trailer at the feed point, while the other conductor is connected to the center conductor of the coax line. The two ribbon conductors are connected together at the far end.

Matching

Standing-wave ratios up to 5 or 6 to 1 are hardly worth worrying about at 4 Mc. so far as

Table I

Hustler 75-meter mobile whip mounted vertically on top rear corner of trailer	S7
Same as above, with 60-foot counterpoise wire connected to trailer	S9
Two Hustler 75-meter mobile whips back to back as a horizontal loaded dipole	S9 + 5 db.
60-foot horizontal wire 8 feet high, using trailer as ground	S9 + 10 db.
Hustler 4BTV trap vertical with 75-meter resonator	S9 + 10 db.
120-foot dipole, 15 feet high at center	S9 + 20 db.
"Airstream Loop" Antenna	S9 + 20 db.
Home-station dipole 50 feet high	S9 + 30 db.

additional power loss is concerned. However, an s.w.r. greater than 1 to 1 causes the line input impedance to vary, depending on the length of the line. The output circuits of many transmitters and transceivers are not designed to work into loads departing significantly from 50 ohms. With these units, it may not be possible to load the final stage, or components in the output stage not designed for the voltages that develop with higher-impedance loads may be damaged. Use a Monimatch, or other reflectometer, and adjust the antenna for minimum s.w.r. I carry along several mica capacitors ranging in value from 50 pf. to 0.002 μf. with battery clips attached, which are used to shunt the line at the feed point. I start out with the lowest value, and double the capacitance in steps until I get an s.w.r. of 1 to 1 somewhere in the band, and then adjust the antenna length for resonance at the desired frequency.[1]

To get some idea of the relative performances, a series of checks was made at 3825 kHz. on several of the antennas described. A receiver with a horizontal antenna was set up at a distance of 8 miles from the trailer, and S-meter readings were taken with the results shown in the accompanying tabulation. All readings were made with identical input power to the transmitter, and with the antennas adjusted for an s.w.r. of 1 to 1.

[1] This method is equivalent to the use of a stepdown L network. It can be used when the antenna feed-point impedance is lower than the line impedance. To obtain a match, the antenna length must be somewhat longer than a resonant length, so that the antenna shows inductive reactance at the feed point. (This reactance serves as a substitute for the reactance of the coil of a conventional L network.) For an accurate match, it is necessary to adjust the antenna length and the value of the capacitor until the appropriate transformation ratio is obtained. — *Editor.*

To sum it all up:

1) Carry a complete set of mobile whips for lunch stops, or other occasions where you just do not have the time or room for anything better.

2) If at all possible, use a ¼-wave counterpoise clipped to the trailer when using a mobile whip.

3) If you have the time or space, clip a ¼-wave wire, instead of a whip, to your mobile antenna mount, and run it out to a bush or tree.

4) In addition to (3), clip a ¼-wave counterpoise to the trailer, and run it in the opposite direction.

5) If you are stopping for a short time, or for the night, rig up the 5-band mobile whip with five ¼-wave counterpoises, one of appropriate length for each band.

6) If you want to concentrate on one band, put up the 16-foot mobile-whip dipole, if your space is limited.

7) If you have plenty of room, put up a ½-wave dipole for your favorite band.

8) If you want to work all bands, and space for dipoles is limited, then put up your trap vertical with the 75-meter resonator tuned to your favorite frequency.

9) If you are going to spend a week in a particular camp ground, shoot some lines over a couple of high trees with a bow and arrow, and get your dipoles up in the air as high as possible.

10) The use of balloons and kites is good, but depends completely on the wind.

11) Next best to a high dipole, put up the "Airstream Loop" antenna for 75 meters.

12) If all else fails, bring your 2-kw. p.e.p. linear and your 2½-kw. a.c. gas generator along. This will at least keep the other campers awake. Don't forget a low-pass filter for TVI! QST

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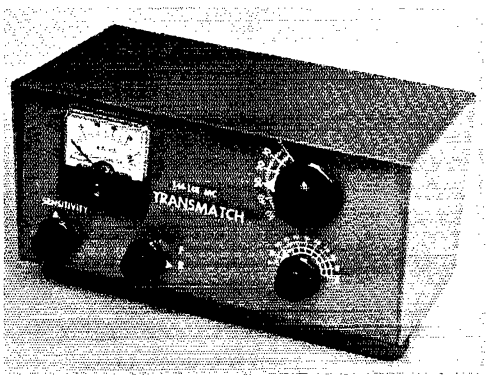
A 2-Meter Transmatch With S.W.R. Indicator



Front view of the 2-meter transmatch. In the foreground, from left to right, are R_1, S_1 and C_1. The large knob in the upper right corner controls C_2.

THIS article tells how to build and use a 2-meter transmatch. By adding selectivity between the v.h.f. transmitter and the antenna, this tuner can reduce spurious radiation and prevent subsequent TVI. When used ahead of a v.h.f. receiver, it will help to reduce images. Furthermore, the 2-meter transmatch will enable the operator to obtain a 1:1 impedance match between the v.h.f. transmitter and either a low-impedance coaxial feed line or 200- to 600-ohm balanced feeders.

Most transmitters are designed to load properly when the power amplifier looks into a flat line. However, some antenna systems have a mismatch between their terminals and the feed line, thus preventing the transmitter (and receiver) from seeing a proper load. This transmatch can disguise the condition and enable the transmitter to develop its full rated power.

A high s.w.r. often has a marked effect on the tuning of the power amplifier stage, making it impossible to obtain smooth operation. This transmatch can prevent that condition.

Some antennas are quite sharp in terms of frequency response, thus limiting the practical operating range on 144 MHz. to one section of the band. Going above or below that range results in a high s.w.r. with a resultant reduction in transmitter performance. This tuner will permit wider frequency coverage, but with standing waves still existing on the line.

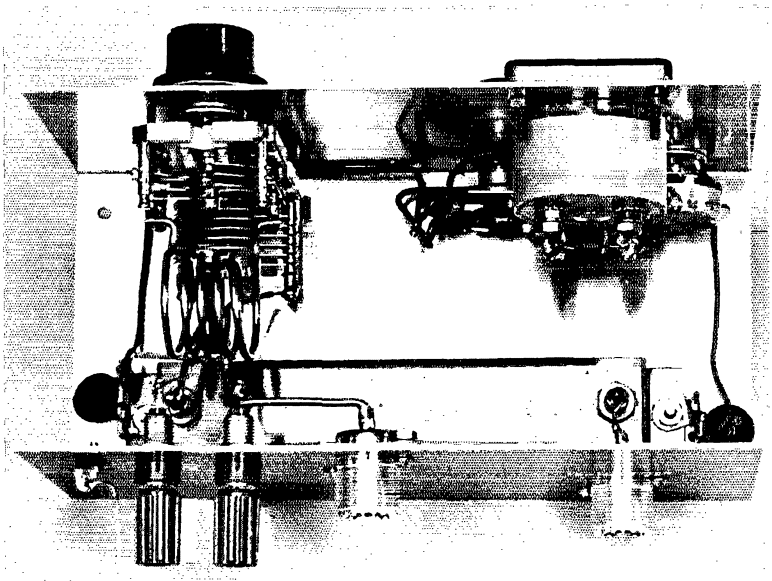
A built-in Monimatch-type s.w.r. indicator permits on-the-nose adjustment of the transmatch and will give full-scale forward-power readings with as little as 0.15 watt of transmitter output. The complete assembly will handle up to 300 watts of 144-MHz. r.f. When the transmatch is inserted in lines that are truly flat (1:1 s.w.r.), as much as 1000 watts peak can be used without difficulty.

Construction

An LMB No. W-2C aluminum cabinet is used as a housing. It is 3¾ inches deep, 7 inches wide, and is 3½ inches high. The s.w.r.-bridge element is a separate unit and is bolted to the inside of the chassis along the rear wall so that its input and output terminals (National TPB feedthrough bushings) are near their related circuit points.

Referring to the photograph of the Monimatch and Figs. 1 and 2, form the outer channel, L_6, from a small sheet of flashing copper and install feedthrough bushings in both ¼-inch holes. One-fourth inch from each end of the inner line, L_5, drill a ⅛-inch hole through the line so that L_5 can be fitted over the two feedthrough bushings. Before soldering L_5 in place, mount it in two plastic blocks (Fig. 2), and fit the two pickup leads, L_3 and L_4, in the 1/16-inch slots in the blocks. Then solder L_5 to the feedthrough bushings, making sure L_5 is centered in L_6. Position L_3 and L_4 ⅛ inch from the outer edge of L_5 and equidistant from the ends of L_6. To secure L_3 and L_4, put a drop of Duco cement at each point where they pass through the plastic blocks. Referring to the Monimatch photo, attach the anode end of CR_1 ⅜ inch from one end of L_3, and attach the anode end of CR_2 ⅜ inch from the opposite end of L_4. Connect a 150-ohm resistor from the free end of each pickup lead to the outside of the channel. Install the Monimatch near the rear of the cabinet, using a two-contact terminal strip under each mounting screw, and bypass the free ends of CR_1 and CR_2 at the tie points with 0.001-μf. disk ceramic capacitors.

Complete the remainder of the assembly by referring to the photographs and Fig. 1.



A look inside the transmatch. R_1 is on the right side of the meter, and S_1 is on the meter's left side. C_2 is above C_1 in the upper left corner of the photo. Along the back of the unit, from left to right, are a ground jumper, binding posts J_3 and J_2, and coaxial connectors J_1 and J_4.

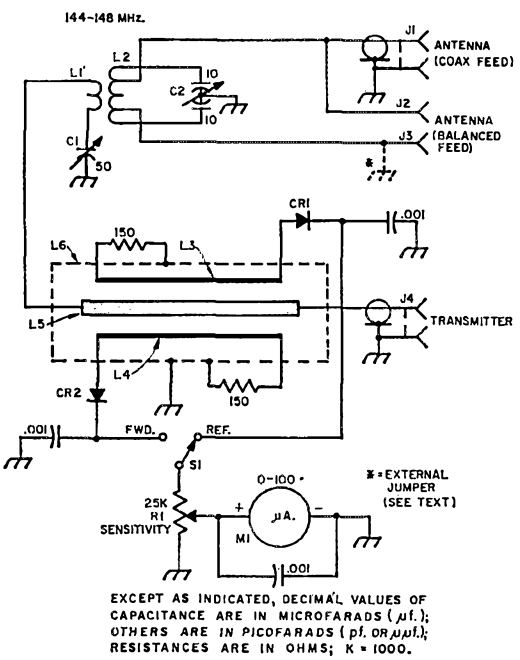


Fig. 1—Schematic of the 144-MHz. transmatch. Fixed-value capacitors are disk ceramic, and fixed-value resistors are ½-watt composition.

C_1—50-pf. miniature variable (E. F. Johnson 167-3, or equivalent).

C_2—Butterfly variable, 10 pf. per section (E. F. Johnson 167-21, or equivalent).

CR_1, CR_2—Germanium diode, 1N34A or similar.

J_1, J_4—Coax chassis connector, SO-239.

J_2, J_3—Insulated binding post (E. F. Johnson 111-101, or similar).

L_1—2 turns No. 20 Formvar insulated magnet wire, ¾-inch o.d. Insert inside L_2 at center.

L_2—5 turns No. 12 tinned copper wire, ⅞-inch i.d., 1¼ inches long. Tap 1½ turns in from each end.

L_3, L_4—4-inch length of No. 16 bare wire. Space ⅛ inch from L_5.

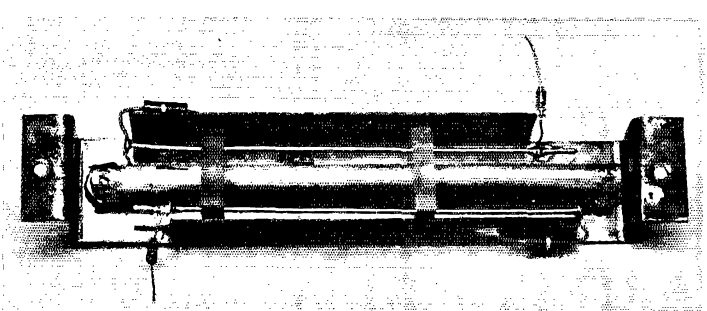
L_5—4¾-inch length of ¼-inch diameter copper or brass rod, or tubing. Drill hole near each end to fit over feedthrough bushing (National TPB). See text.

L_6—Flashing-copper outer channel. See Fig. 2.

M_1—0-100-μa. d.c. meter.

R_1—25,000-ohm linear-taper control.

S_1—S.p.d.t. phenolic rotary, single section.



Bottom view of the s.w.r.-bridge element.

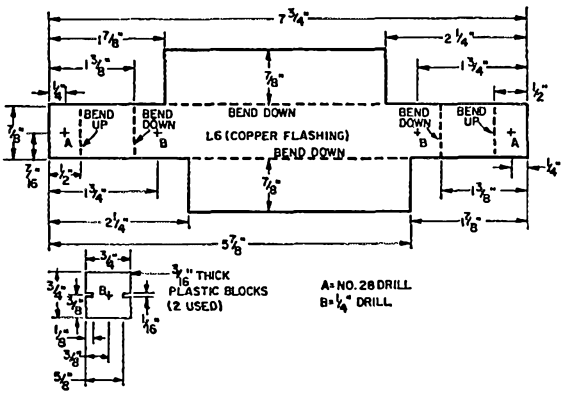


Fig. 2—Sketch of the copper-flashing channel, L_6, and the plastic blocks used to support L_3 and L_4 in the channel.

Operation

If the tuner is to be used between two coaxial lines, connect the antenna feeder to J_1 (Fig. 1) and the external jumper (shown in dashed lines) to J_3. Connect the transmitter to J_4 and place S_1 in the FWD position. R_1 should be set for minimum sensitivity (fully counterclockwise). Apply a small amount of power from the transmitter and adjust R_1 for full-scale reading on M_1. Next switch S_1 to the REF position and alternately adjust C_1 and C_2 for minimum reading on the meter. It should be possible to get a zero reading. Now retune the transmitter for maximum power output, using the normal tuning procedure. Readjust R_1 for a full-scale reading on M_1 with S_1 in the FWD position. Repeat the foregoing until zero reflected power is noted.

If the tuner is to be used with a balanced antenna feeder, remove the jumper and attach the balanced line to J_2 and J_3. Then use the same tuning procedure as for coaxial lines. — *W1CER*

Phone Patching — Legitimately

(*Continued from page 17*)

balance network. Unusual circumstances, such as a change from positive to negative reactance with frequency, may require a more complicated network. Be careful to observe all technical limitations when testing.

If you are located close to the telephone central office you may find that hybrid balance changes somewhat from call to call. Or you may discover that there is one best setting for local calls and another for calls into other exchange areas. If you live some distance away from the office you may be able to use one setting of the balancing network for all calls. If this is the case you will want to consider leaving the switches and variable controls out of the assembly. With no need to adjust controls, you might be able to locate the hybrid more advantageously. QST

Appendix
Composite Filter Design

An excellent filter for use with the telephone voice coupler can be designed and built to meet the following general requirements: Frequencies below 3 kilohertz should pass without appreciable attenuation but losses above that frequency should rise rapidly; loss should be great at 4 kilohertz. Filter impedance should be 900 ohms and essentially constant across the voice band. A "composite" filter has been selected; such a filter includes a basic section to provide a nominal cutoff at 3.6 kilohertz, a resonant section at 4.0 kilohertz and two end sections for impedance compensation. See Fig. 7.

Units:

R: Nonreactive impedance
L: Henrys*
C: Farads*
π: 3.14
(*) Final values expressed in convenient units
f_c: Cutoff frequency, hertz
f_r: Resonant frequency, hz.
m: A constant, set equal to 0.6 for constant-impedance end sections.

Basic Section:

$$L = \frac{R}{\pi f_c} = \frac{900}{3.14(3600)} = 0.0796 = 79.6 \text{ mh.}$$

$$C = \frac{1}{\pi f_c R} = \frac{1}{3.14(3600)900} = \frac{1}{1.02 \times 10^6} = 0.098 \ \mu\text{f.}$$

M-type Resonant Section:

$$m = \sqrt{1-\left(\frac{f_c}{f_r}\right)^2} = \sqrt{1-\left(\frac{3600}{4000}\right)^2} = \sqrt{0.19} = 0.435$$

$$\frac{mL}{2} = \frac{0.435\ (79.6)}{2} = 17.3 \text{ mh.}$$

$$L\left(\frac{1-m^2}{4m}\right) = 79.6\left(\frac{1-(0.435)^2}{4(0.435)}\right) =$$

$$79.6\left(\frac{0.812}{1.74}\right) = 37.1 \text{ mh.}$$

$$mC = 0.435 \times 0.098 = 0.0427 \ \mu\text{f.}$$

End Sections:

Set $m = 0.6$ for constant impedance

$$\frac{mL}{2} = \frac{0.6\ (79.6)}{2} = 23.9 \text{ mh.}$$

$$L\left(\frac{1-m^2}{4m}\right) = 79.6\left(\frac{1-(0.6)^2}{4(0.6)}\right) =$$

$$79.6\left(\frac{0.64}{2.4}\right) = 21.2 \text{ mh.}$$

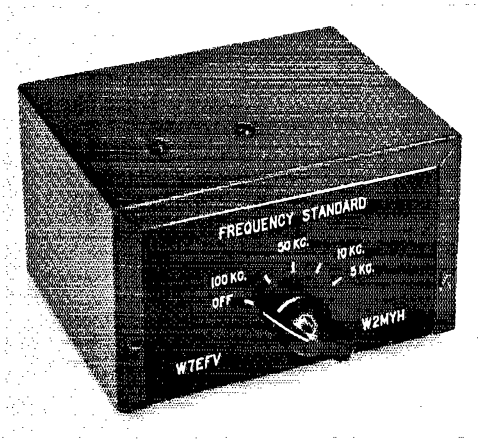
$$mC = 0.6(0.098) = 0.059 \ \mu\text{f.}$$

IMPORTANT NOTICE
Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code.* Your promptness will help you, the postal service and us. Thanks.

A Tiny Frequency Standard With Big Ideas

BY
HENRY O. PATTISON, JR.,* W7EFV/W2MYH



This miniature frequency standard gives 100-, 50-, 10-, and 5-kHz. markers throughout the h.f. spectrum. It operates from an internal 3-volt flashlight-cell battery.

An accurate frequency standard is one thing that every amateur station should have — and, unfortunately, far too few possess. Here is a good one that should tax neither the pocketbook nor the skill of any of us!

It is tiny . . . it can be built in just a few hours . . . and it's a fine way to learn something about the new IC's. But don't let its small size fool you. It is an accurate and stable frequency marker. And with our present-day new band edges no ham setup is complete without it. Furthermore, it is completely portable and can be used anywhere in mobile or fixed station use.

The circuit is simplicity itself. Using one HEP 580 dual 2-input gate, two resistors, one capacitor and a 100-kHz, crystal, we start with a stable and reliable basic oscillator. A small trimmer allows exact WWV adjustment.

All other stages use HEP 583 JK flip-flops strung together like building blocks to give the desired "divide-by" ratios. The diagrams show quite clearly where the division pick-off points are for each frequency.

The first flip-flop divides by two for 50-kHz. output. The next three flip-flops unite to make up a divide-by-5 output of 10 kHz. The final flip-flop again divides by two for the 5-kHz. output. Should it be desired, 25-kHz. output can be taken off at the point shown in Fig. 2.

* Box 737 P, RD 2, Tucson, Arizona 85715.

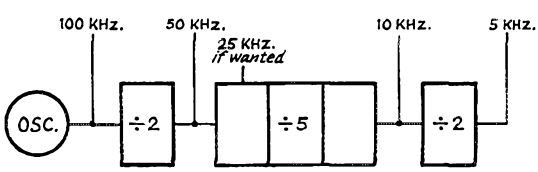


Fig. 1—Arrangement of the divider shown in block form.

From a construction point of view simplicity is the keynote. All of the IC's have eight-terminal bases. In the unit described here Motorola type 454 sockets were used, but this is by no means necessary. The IC terminals may be soldered directly into the circuit if desired.

The No. 8 terminal of each IC is wired to plus d.c. power and the No. 4 terminal goes to ground. As shown in the pictures, this lends itself to a simple layout, with a ground bus running down the center of the Vectorbord and a 3-volt bus in a "U" configuration around the outside edge.

Originally, a similar unit was made up with buffers and amplifiers, much as described by K9CPZ in July 1968 *QST*. Further experimentation, however, demonstrated that such additions were not necessary; the harmonic output of this unit is very strong through the 30-MHz. band, and in fact is usable through 144 MHz.

The current drain is 40 ma. at 3 volts. At this drain "C" cells will provide many hours of service.

The basic circuit is assembled on a 2½ × 4½-inch piece of No. 95G175 Vectorbord, and the entire gadget — including switch, batteries and all — fits handily in a 3 × 4 × 5 Minibox. It could probably be made much smaller, if you want to get carried away by miniaturization.

As to operation, no adjustment is necessary — just plug the output into your receiver antenna jack, turn on the switch, set the crystal to WWV, then listen to the strong, accurate markers up and down your frequency dial.

One final thought for those who operate close to the band edges (3.999 for example): the addition of three more flip-flops in another divide-by-5 counter will give 1-kHz. markers. Puts a period to those endless arguments. QST

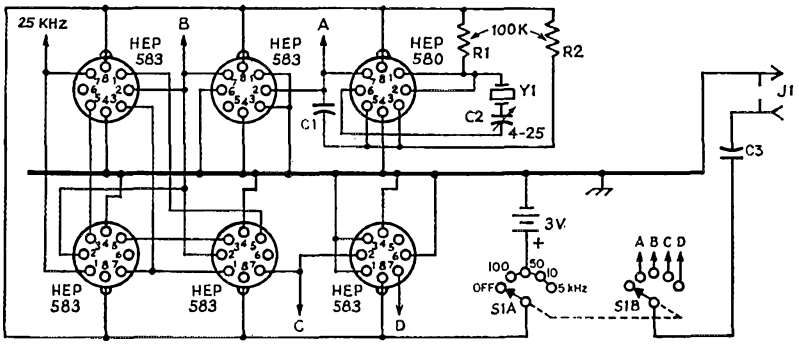


Fig. 2—Circuit of the frequency standard. Pin numbers shown for the integrated circuits correspond to bottom views The Motorola HEP 580 is a dual 2-input gate; the HEP 583 is a JK flip-flop.

C_1, C_3—0.1-μf. disk ceramic, 10 volts.
C_2—4.5-25-pf. ceramic trimmer (Centralab 822AZ).
R_1, R_2—100,000 ohms, ¼-watt composition.
S_1—Rotary, 2 poles, 5 positions (Mallory 3226J).
J_1—Phono jack.
Y_1—100-kHz. crystal.

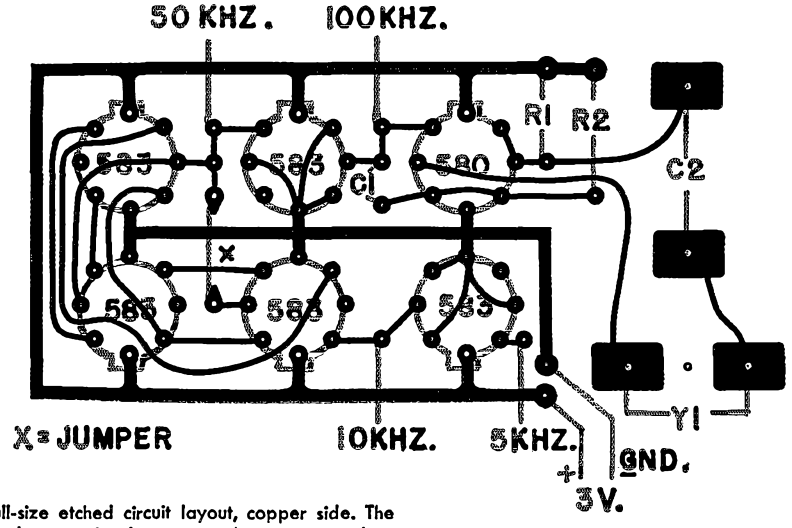
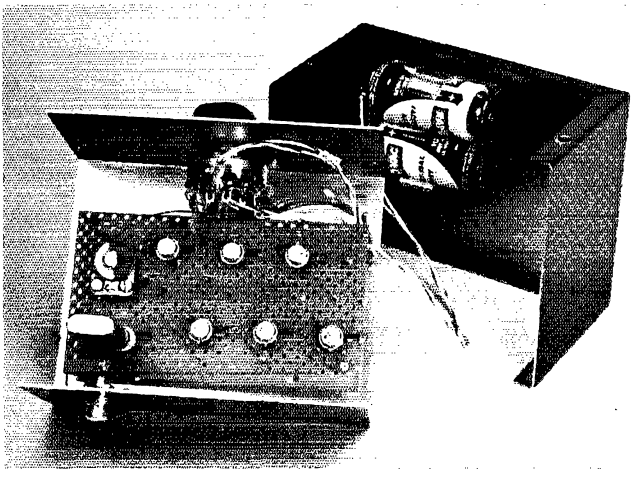


Fig. 3—Full-size etched circuit layout, copper side. The board may be any size large enough to accommodate the etched pattern shown, plus room for mounting holes.



In this original model, Vectorbord was used for mounting the components; a later circuit uses the etched layout shown in Fig. 3. The two-cell battery holder is mounted on the box cover.

Hints and Kinks For the Experimenter

USING A LEFTOVER ROTATOR-TO-MAST FLANGE AS AN ANTENNA-TO-MAST BRACKET

THE leftover rotator-to-mast flange, CDR part TRA-2, which is not used if an AR-22 or TR-44 series rotator is bolted to a flat plate, as in an in-tower mounting, may be pressed into service as an antenna-to-mast bracket by securing the boom to the flat side of the flange and clamping the flange to the antenna mast. — *Bob Wheaton, W5PKK*

EQUALLY SPACING PANEL CONTROLS

To lay out a panel so that any number of controls may be equally spaced, let X equal the desired number of controls. Then, as shown in Fig. 1, place a ruler along the lower edge of the panel and slant the right-hand end of the ruler upward until the edge of the panel intersects $X + 1$ divisions on the ruler. Draw a line along the ruler and mark off the divisions. Using a T square, complete the job by drawing a line perpendicular to the bottom of the panel through each division. — *Melvin Leibowitz, W3KET*

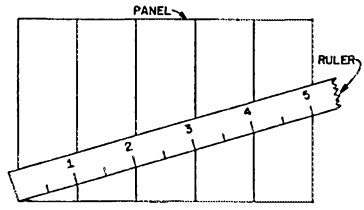


Fig. 1 — Slanting a ruler on a panel makes it easy to equally space any number of controls.

CLEANING THE HEAD OF A SPRAY PAINT CAN

WHEN using a spray can of paint one has to clean the spray head between jobs so that paint won't harden in the head and block the passage. This cleaning is usually done by turning the can upside down and spraying until the nozzle is empty of paint or by removing the spray head and cleaning it by hand with paint or lacquer thinner and a fine wire. The first method is wasteful, and the latter is a messy job at best.

With the use of spray contact cleaner or circuit cooler one can neatly and economically clean the spray heads from spray paint cans. Simply remove the spray head from the cleaner or circuit cooler and substitute the head that is to be cleaned. A couple of squirts of cleaner through the head will clean it thoroughly. — *Loyd L. Shoman, W9EYS/Ø*

ETCH-RESISTANT CIRCLES

EVER have difficulty painting small, nearly perfect etch-resistant circles on copper-clad board? Use a paper punch to punch holes in masking tape and use the tape as a guide. — *Paul Maurice.*

AMPLIFYING LOW-LEVEL V.F.O. OUTPUT

MOST solid-state v.f.o.'s deliver less than 10 volts peak across their low-impedance output terminals. More often than not the output voltage is only two or three volts.[1,2] If the v.f.o. is to drive a vacuum-tube stage in a transmitter, considerably more voltage swing will be needed at the tube grid in order to obtain satisfactory output from the tube stage. If the driven stage does not consume appreciable power from the v.f.o., the typical circuits shown in Fig. 2 can be used between the low-impedance output of the v.f.o. and the normally high-impedance input of the tube stage. Both circuits shown have given good results when amplifying the 3-volt peak output of a test v.f.o. to a suitable level for driving the oscillator stages of several tube-type transmitters.

In Fig. 2A, the v.f.o. output signal is amplified by a 5-watt n-p-n transistor, Q_1, which operates Class A. L_1 is a low-impedance winding on the cold end of L_2, and the combination of the two windings provides a step-up ratio between the transistor output and the vacuum-tube input. The Q of the output circuit, L_2C_1, is determined by the L/C ratio used. Low values of C will result in lower Q and greater bandwidth — useful for QSYing. Unfortunately, a low-C circuit will not discriminate well against harmonic currents, so a compromise should be sought. In Table I typical L and C values, which should be satis-

[1] "A General-Purpose V.F.O.," *QST*, September, 1968.
[2] Hanchett, "The Field-Effect Transistor as a Stable V.F.O. Element," *QST*, December, 1966.

Table I

Tuned Circuit Data

L_1 coils are closewound with No. 30 enameled wire at ground end of L_2 coils (Miller). C_1 capacitors are ceramic or mica.

Freq. in MHz.	L_1 *(turns)*	L_2 *(μh.)*	C_1 *(pf.)*	*Miller No.*
1.8 to 2.0	30	138–238	50	4410
3.0 to 4.0	22	74–124	30	4409
5.0 to 6.0	15	33–66	22	4408
6.6 to 7.5	15	33–66	22	4408
7.5 to 9.0	10	16–29	15	4407

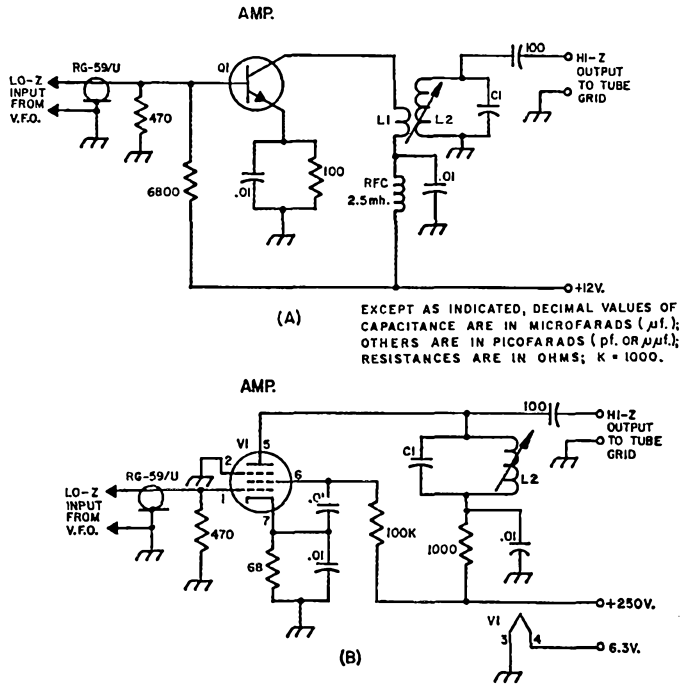


Fig. 2—Two circuits for increasing the output from a solid-state v.f.o. Resistors are ½-watt composition. Capacitors are ceramic.
C_1—See Table I. Q_1—2N2102.
L_1, L_2—See Table I. V_1—6BA6.

factory for most applications, are given for some of the popular v.f.o. tuning ranges.

In the circuit of Fig. 2B, a vacuum-tube Class-A amplifier, V_1, is used between the transistor v.f.o. and the input to a tube stage. The grid circuit of V_1 uses a 470-ohm resistor to afford an impedance match to the v.f.o. output terminals and to load the v.f.o. output circuit to minimize interaction between the amplifier stage and the v.f.o. The signal is taken from the high-impedance end of L_2 and is capacitively coupled to the grid circuit of the stage to be driven. Since the vacuum-tube amplifier does not produce harmonic currents of the magnitude that the circuit of Fig. 2A is capable of generating, it is not important in this instance to strive for a high-Q output tuned circuit for the purpose of harmonic reduction. The higher the Q, however, the greater will be the peak output voltage available from these two circuits.

In the v.f.o. amplifier circuits shown, it's OK to substitute other types of transistors and tubes provided they have electrical characteristics similar to the ones specified in the schematic caption. It is important that the amplifiers be well shielded and bypassed to prevent transmitter r.f. from affecting their performance. The coupling cable (RG-59/U) from the v.f.o. to either of these circuits should be as short as possible, and the v.f.o. amplifier should be located near the stage being driven and preferably on the same chassis. — *W1CER*

EASY TRANSFORMER MOUNTING

THE cumbersome task of having to saw or file comparatively large rectangular holes for power transformers, chokes and the like can be dispensed with by the use of four spade bolts. As shown in Fig. 3, mount a spade bolt at each end of two of the four existing screws that sandwich together the transformer's laminations and metal cover. Feed the spade bolts through four small holes drilled through the chassis, and then secure the bolts with lock washers and nuts on the underside. Finally, drill a hole for the primary and secondary leads and, of course, fit it with a grommet. — *John E. Maass, K7JKZ*

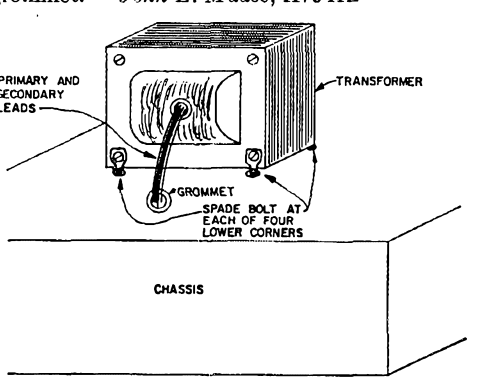


Fig. 3—By mounting a transformer as shown, much chassis work is eliminated.

Receiver Offset Tuning for the SB-101

BY AVNER BARZELY,* 4X4LO/W2

ALTHOUGH provisions for receiver offset tuning are not included in the SB-101, it's easy to add this feature. This article describes a simple modification that permits the receiver frequency to be varied 1600 Hertz without changing the transmitter frequency. The modification, which uses parts available for less than five dollars, is based on a recent *QST* article.[1]

Circuit Description

Fig. 1 is a schematic of the conversion. During receiving periods, C_2 couples the offset tuning capacitor, C_3, to the frequency determining circuit in the LMO. Tuning C_3 through its range results in a ±800-Hertz change in the frequency at which the LMO is set. During transmitting periods, relay K_1 is energized, switching C_4 in the circuit and C_3 out. C_4 is permanently set at half capacitance so that the received frequency will be the same as the transmitted frequency when C_3 is at midrange. To compensate for the added capacitance of C_3 and C_4 across the LMO tuned circuit, the trimmer capacitor, C_1, in the LMO is decreased in capacitance until the dial indication is correct. For normal transceive operation, S_1 is opened, de-energizing K_1 in transmit as well as in receive.

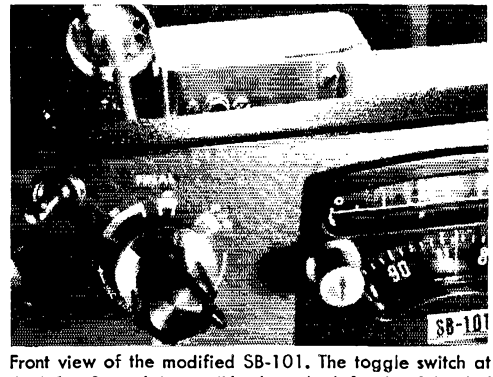
Construction

Referring to the photographs, remove the top cover of the LMO[2] and form a small slot in the upper left corner of the plate so that a length of RG-174/U coax — you may have a scrap of this cable left over from the SB-101 construction — can be run through the hole. Then prepare C_2 as shown in Fig. 2. Next connect the inner conductor of C_2 to the live terminal of C_1. The point to which C_2 should be tied is easy to identify because a 330,000-ohm resistor is connected between it and the tube. Since there is limited space for approaching C_1, first connect B of C_2 to the inner conductor of the coax that goes to K_1. Then apply a small amount of solder to wire A of C_2 and form a small hook from the lead. With the hooked end of C_2, catch the bare wire running out of C_1. Solder wire A to C_1 while slightly pulling the coax, and close the cover of the LMO. Trim the cable leaving the box to three inches, making sure there is no slack coax inside the LMO.

A 1½ × 2 × 2½-inch aluminum box is used for mounting relay K_1 and trimmers C_3 and C_4. Before installing the parts, attach the box to the left side of the LMO as shown in the photographs. Use two brackets, one between the box and the LMO and another between the box and the left side of the chassis. Then locate a point on the left side of the LMO dial escutcheon corresponding to the location of the ZERO SET knob on the right side, and drill a ¼-inch hole through the escutcheon and the front panel. This job can be made easier by drilling a smaller hole first. After the dial and panel have been drilled, slide a ¼-inch shaft through the hole until it touches the front side of the aluminum box. Position the shaft parallel to the FINAL tuning shaft, and mark the point where the center of the shaft touches the box.

Remove the box from the transceiver and drill a hole for the shaft of C_3 at the spot marked. Then, referring to the photographs, drill mounting holes for this variable as well as for C_4 and K_1. After installing the two trimmers and the relay, reattach the box to the LMO and connect C_3 with a coupling to the ¼-inch shaft. If there isn't sufficient space for the dial pointer stud to travel without being stopped by the shaft, raise the dial pointer assembly about 1/16 inch by inserting washers between the top cover of the LMO and the dial mounting bracket. In case the shaft stops the dial pointer arm on its way to the left just before the circular dial reaches zero, reduce the diameter of the shaft where the arm and the shaft come in contact. This can be done easily by rotating the shaft with a hand drill while pressing a round file on the shaft at the appropriate point.

As shown in the photographs, place S_1 on the front panel between the DRIVER PRESELECTOR and FINAL controls. Before drilling the hole for the switch, be sure S_1 will clear the plate on which



Front view of the modified SB-101. The toggle switch at the left is S_1, and the small knob on the left side of the dial escutcheon is the receiver offset tuning control. At the top center of the photo is the box used for mounting the offset tuning components.

*34 Hillside Ave., Apt. 4-J, New York, N. Y. 10040.

[1] Phillips, "Receiver Offset Tuning for the KWM-2," *QST*, March, 1967.

[2] Opening the LMO voids the Heath warranty on the unit. —*Editor.*

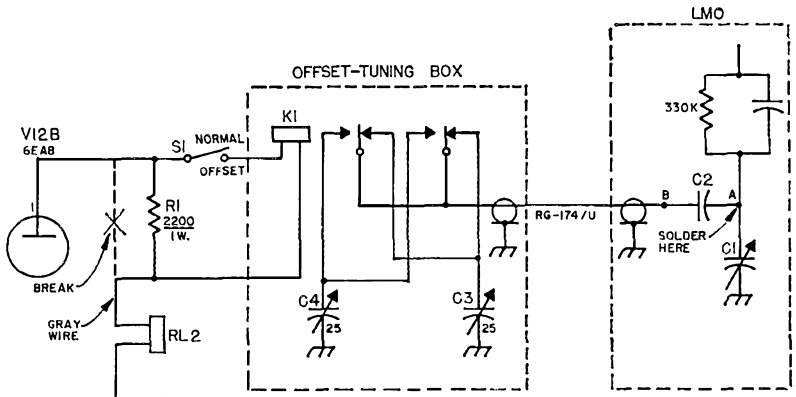


Fig. 1—Schematic of the SB-101 modification. Resistance is in ohms, K = 1000. The parts not listed below are original SB-101 components.

C_1—Trimmer capacitor in the LMO.
C_2—See text and Fig. 2.
C_3—25-pf. trimmer for shaft coupling (Hammarlund APC-25B).
C_4—25-pf. trimmer (Hammarlund APC-25).
K_1—D.p.d.t. relay, 2-ma. 10,000-ohm coil.
R_1—Composition.
S_1—S.p.s.t. toggle switch.

the VOX DELAY control is mounted. While drilling be extremely careful to prevent metal pieces from falling on the circuit board. A few pieces of paper and masking tape will do the job. If it is necessary to enlarge the hole with a file, place masking tape on the front panel around the hole so that the panel will be protected against scratches in the event that the file slips.

Connect the free end of the coax as shown in Fig. 1. Then wire the relay contacts to C_3 and

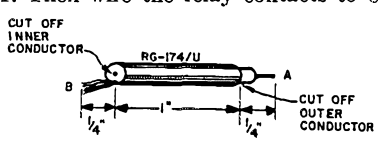


Fig. 2—Gimmick capacitor, C_2, made from the remainder of the RG-174/U coax supplied with the SB-101 kit.

C_4. Disconnect the gray wire from pin 1 of V_{12} (foil side of BANDPASS CIRCUIT BOARD), and insert a 2200-ohm resistor, R_1, in series with this wire and pin 1. Connect one side of S_1 to this same pin, and connect the other side of S_1 to one of the coil terminals of K_1. Connect the remaining coil terminal to the junction of R_1 and the gray wire.

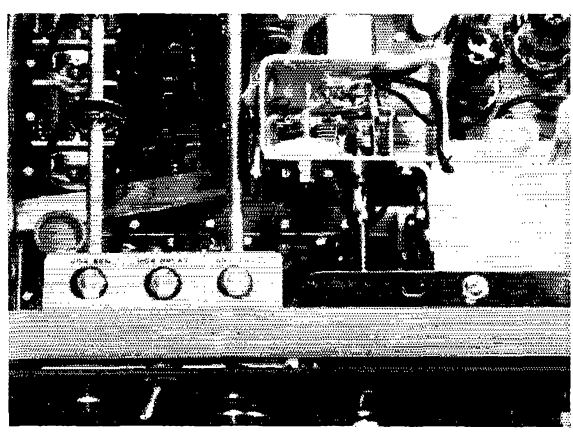
Alignment

Assuming that you are familiar with the position of the hairline when the receiver was calibrated, you should now find that the calibration signal appears about 20 kHz. lower than before (the dial indicates it as 20 kHz. higher). This is the result of adding C_2, C_3 and C_4 to the frequency determining circuit in the LMO.

Place the hairline at the point where calibration zero beat usually occurred, and set zero of the circular dial under the hairline. With the transceiver warmed up and C_3 at half capacitance, position the function switch at CAL and decrease the capacitance of C_1 (on the back of the LMO) until the LMO is zero beat with the calibrator. C_1 should not need to be turned more than about one-eighth of a turn. If you are not sure where calibration zero beat occured before the modification, disconnect C_2 and calibrate the transceiver as suggested in the Heath instruction manual. Then proceed as above. Finally set C_4 at half capacitance.

Operation

The stability and linearity of the LMO are not at all affected by the modification, and the warm up time is the same as before. The 1600-Hz. offset tuning range is sufficient for c.w. and ideal for s.s.b. round tables. Increasing the range to more than ±1 kHz. by increasing the capacitance at C_2 is a disadvantage: the size of the offset tuning knob is limited, and it is not wise to congest the most used range of this control to a few degrees of dial rotation. QST



Top view of the SB-101. A small bracket secures the offset tuning box to the left side of the LMO, and a larger bracket is used between the left side of the chassis and the left side of the box. K_1 is on the rear wall of the box, and C_3 and C_4 are on the front side.

Technical Correspondence

DIRECT CONVERSION AGAIN

Technical Editor, *QST:*

I have built the direct-conversion receiver described in November *QST*, and my friends and I are amazed at the high order of performance that such a simple set delivers. It is all the authors said it would be.

My receiver was built for 40-meter c.w., and Fig. 1 shows a simple modification that increases the selectivity markedly. No other changes were made.

The original filter should be left in the circuit. It might be argued that additional filtering might be applied at the input of the audio amplifier for increased selectivity, and I did try that method. The method shown here worked better from the standpoint of less hum pickup and better amplifier stability, and I think produced better selectivity. — *Melvin Leibowitz, W3KET, 1401 Philadelphia Pike, Wilmington, Delaware 19809.*

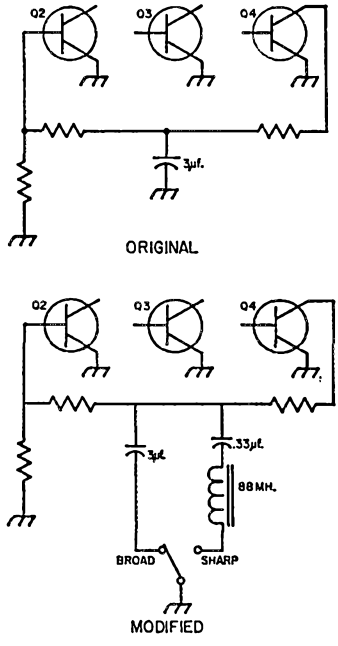


Fig. 1—Modification to increase audio selectivity in the direct-conversion receiver circuit on page 16 of November 1968 *QST*. Original circuit components and wiring not shown above are not changed.

NEON-BULB TESTER

Technical Editor, *QST:*

Pictures of Square-D switches with the words "Switch to Safety" will never correct the damage that could be done if some misfortunate were to build the "115-Volt Three-Wire Tester" (page 43, January *QST*) *without* reading the text and parts list. The schematic shows a neon indicator bulb connected directly across the 115-volt house wiring without a series current limiting resistor. I assume that the Industrial Devices indicators specified include the resistor,[1] but your schematic should then indicate a resistor, with dotted lines around the bulb and resistor to show that it is a unit.

The heat that would be generated within a neon bulb connected directly to 115-volt a.c. mains could cause it to explode rather violently if the bulb should short internally. The fuse or circuit breaker in the mains would never have a chance to prevent this explosion. I have seen this demonstrated. *Neon bulbs are dangerous without current limiting.* — *J. D. Weaver, W6IPC/W7AAF, 360 E. Grantline Road, Tracy, California 95376.*

[1] They do, as do also other neon pilot-light assemblies ordinarily available. Neon bulbs with screw bases also contain the necessary limiting resistors, but those with other types of bases — or wire leads — do not. Check before using; if a resistor is required, 47K to 56K is satisfactory for 115-volt circuits. — *Editor.*

C.W. MONITOR

Technical Editor, *QST:*

The R.F. Actuated C.W. Monitor in November *QST* was well worth the time spent in construction. For those who may have experienced some disappointment, the following suggestions may be helpful. Actuating the multivibrator with the battery, one may select an audio pitch to suit his taste simply by changing the value of one of the bridging capacitors. In my case, a 0.04-μf. was substituted for the 0.01-μf. between the collector of Q_1 and the base of Q_2.

A more demanding alteration was found necessary because the transistors were too r.f.-conscious to tolerate a short length of antenna feed inside the box. Erratic operation occurred with the exciter running only about 40 watts, and no amount of shielding, bypassing or patience seemed to tame it. Remote pickup and rectification of r.f. from the antenna coax solved this problem. Ultimately, the pickup was placed inside the exciter cabinet. Only the rectified d.c. was brought to the monitor box, but the voltage-control potentiometer was still convenient. The resistors selected provide adequate coverage of voltage by the potentiometer. The schematic is shown in Fig. 2.

Lastly, a 0.1-μf. capacitor was connected from the tip of J_3 to the chassis to "cool" stray r.f. picked up by the phone cord.

Now for the unexpected bonus: The writer is a member of the Lions Club and the Eyebank Network, and assistance to those who have impaired vision is a prime interest. McCoy's little box will perform as a very useful tuning "eye" for hams thus handicapped. In the tuning of an exciter/transmitter, as resonance is approached, the output increases. As this output increases, the voltage pickup to the multivibrator is increased. An increase in this voltage causes a change in audio pitch which may be interpreted by the sightless as a tuning null. It really works! Many hams may wish to spend a few pleasant hours building one of these magic boxes for a less fortunate friend. — *Robert V. Austin, W8ER, 305 Wilton St., Ann Arbor, Michigan 48103.*

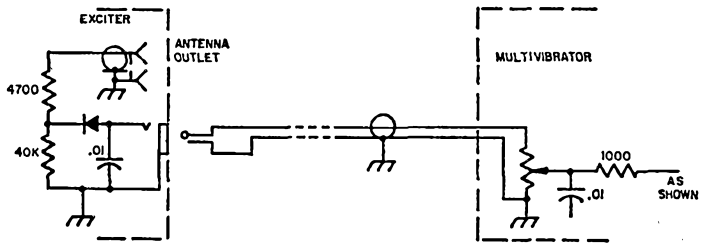


Fig. 2—R.F. pickup arrangement for actuating the c.w. monitor.

MORE ON THE "BUGLESS BUG"

Technical Editor, *QST*:

Memory dot and dash circuits and integrated circuit techniques seem to have taken keyer technology another step toward the ultimate. However, in September, 1963, *QST*, a keyer circuit by Boelke,[1] which uses discrete components and no memories, is worthy of note. The circuit has very low power drain, only one control (speed), and an electronically fixed ratio. Unfortunately, some of the units built have been plagued by self-generated errors. There have been several suggestions on possible solutions,[2,3] but in my experience with two units none of these suggestions have worked. Even though this may mean that each unit may have to be debugged individually, a description of my solutions may help others who have had the same problems.

First, my unit would generate only dashes for both key states. This problem was traced to the 0.01-μf. capacitor from the emitter of Q_5 to ground. This capacitor had to be removed, because its low reactance grounded the emitter of Q_5 for a.c. and prevented Q_5 from acting like an open switch in its dot mode.

Second, the keyer would occasionally send a dot before the beginning of a string of dashes. To solve this problem, the resistor between the emitter and base of Q_1 was adjusted to the lowest value which permitted error-free sending. In my case this changed the value of the resistor to 1000 ohms. Adjusting this resistor compensates for different base saturation voltages in transistors of the same type. The circuit can now control the turn-on time of Q_1 as described by the author.

Additionally, I am including a schematic of a circuit, Fig. 3, to convert the "Bugless Bug" to transistor keying. With transistor keying the adjustment of a tricky relay is eliminated and it also provides a constant weight at all speeds. The weight is heavier for dots with transistor keying, and I think this is an advantage. As shown, the relay can be switched back in, so that code oscillators and other high-current devices can be keyed. — *David Wojcinski, WA9FDQ, 8556 Hohman Ave., Munster, Indiana 46321.*

[1] Boelke, "The Bugless Bug," *QST*, September, 1963.

[2] Hedgecock, "'Bugless Bug' Modifications," *QST*, January, 1965.

[3] Patriarche, "More on the 'Bugless Bug'," *QST*, September, 1965.

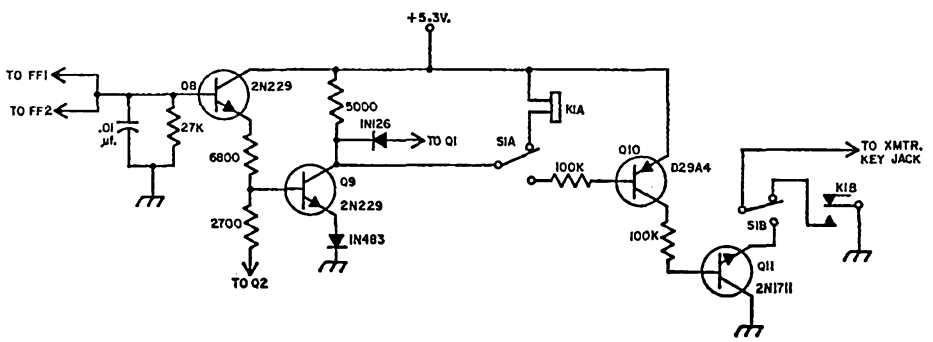


Fig. 3—Modification of the "Bugless Bug" for transistor grid-block keying of transmitter. Resistances are in ohms; resistors are ½-watt. Q_8, Q_9 and associated components are as in original circuit, as is also K_1. Added components are Q_{10}, Q_{11}, S_1 (double-pole double-throw toggle) and the two 100K half-watt resistors. Q_{10} is a G.E. type. Circuit as shown is satisfactory for transmitters in which the open-circuit voltage across the key does not exceed 15 volts. For other voltages, required ratings for Q_{10} and Q_{11} are:

Q_{10}, V_{BC}—1.25 (5.4 + V_{Key}) volts.
Q_{10}, V_{CE}—1.25 (5.4 + $Q_{11}V_{BC}$) volts.
Q_{11}, V_{BC}—1.5 V_{Key}.
Q_{11}, V_{CE}—1.5 V_{Key} volts.

A Triband One-Loop Cubical Quad Element

BY HANS F. RUCKERT,* VK2AOU

With the present sun-spot cycle near its peak, regular DX communication is again possible on twenty, fifteen, and ten meters. The cubical quad has in recent years joined the list of antennas which are very popular with DX enthusiasts. However, the installation problems involved in erecting such a monster spider web have limited the popularity of the quad to some extent. A mini-quad would in many cases be the answer, especially if three-band resonance could be obtained with a single-wire loop element.

The advantages of a rotatable beam antenna are well known to all DXers. A problem arises in many situations just how a reasonable compromise between antenna performance and cost, size, and weight can be obtained. Because I like to live in peace with my XYL, the neighbors, and the local council, my antenna must not be considered dangerous or an eyesore as far as appearance is concerned. In addition my antenna must not hang over the fence of our 50- × 150-foot block, half of which is already occupied by buildings. With these limitations firmly implanted in my mind, I added such factors as cost and difficulty of erecting and supporting a full-size 20-meter Yagi or cubical quad. After weighing all the facts, I felt that my only way out was to construct an economy-style, reduced-size antenna.

A single-loop cubical-quad triband element is shown in Fig. 1. Such a cubical quad has only one-fourth the weight and wind resistance of a full-sized three-element cubical quad of the same mechanical strength. The mechanical and installation difficulties are many times smaller; the cost of mast and rotor are also considerably reduced. Yes, the antenna is a compromise and the gain is less than that of a three-element quad, but this antenna still puts my signal in good DX company. This quad, because of its smaller physical size, will be tolerated in many more locations than its big brother. If desired, this quad could be used as an indoor antenna strung between two opposite room walls.

Rather than going to a complicated switching arrangement to change bands, I decided to apply what I shall call the "triband-antenna principle" to this antenna. The theory behind this principle evolves around the same general ideas outlined by Pichitino in *QST*[1] several years ago. Antennas constructed along these guidelines do not operate harmonically and have only the desired resonances. The quad that I have built is shortened only at the lowest operating frequency. It is full size at the middle operating frequency and much longer at the highest operating frequency. In addition, no heavy blocking tuned circuits are used near the element ends.

With C_1 giving 20-meter resonance depends mainly on the total element length and L_1. Fifteen-meter resonance is controlled principally by C_1 and L_2. Ten-meter resonance is determined by C_2 and L_2. Once the antenna is constructed, it may be fine-tuned on each band by varying the constants that control the resonant frequencies. After my quad was tuned up, I found the s.w.r. on

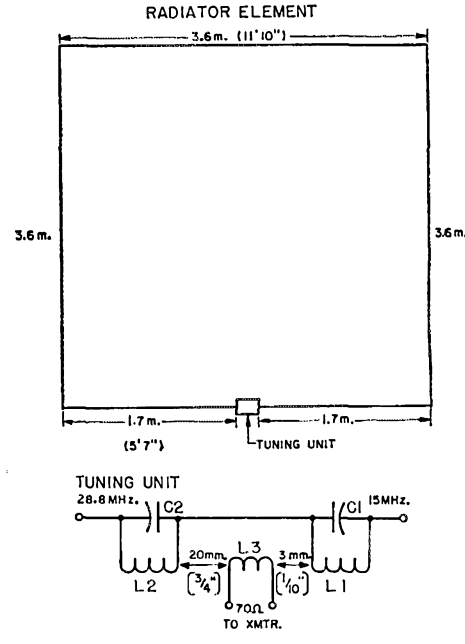


Fig. 1—Single-loop triband cubical-quad element. Metric dimensions are shown; approximate English-unit dimensions are given in parenthesis. Frequencies shown for C_1L_1 and C_2L_2 are those to which these circuits are tuned when disconnected from the loop.

C_1—55 pf.
C_2—49 pf.
L_1—7 turns, No. 12, 37-mm. (1½-inch) diameter, space wound to 16 mm. (⅝-inch) length.
L_2—4 turns, No. 12, 37-mm. (1½-inch) diameter, space wound to 18 mm. (11/16-inch) length.
L_3—4 turns, No. 12, 37-mm. (1½-inch) diameter, space wound to 9-mm. (⅜-inch) length.

*25 Berrille Road, Beverly Hills, New South Wales, 2209, Australia.

[1] Pichitino, "A New Principle in Two-Band Rotary-Beam Design," *QST*, October, 1948.

each band to be very satisfactory. On twenty meters, the antenna resonated at 14.15 MHz. with a resulting s.w.r. of approximately 1:1. With a fifteen-meter resonance at 21.3 MHz., an s.w.r. of 1.3:1 was measured. On ten meters, 28.6 MHz. was selected as the resonant frequency. The resulting s.w.r. at resonance on this band was 1.5:1. The phase relationship of the fields in L_1 and L_2 varies from band-to-band so that too much direct coupling between these coils should be avoided.

Although I used copper wire to make the loop element, you may desire to use aluminum tubing. The actual constructional details are left to the builder. The materials used and the methods of supporting the antenna are limited only by your imagination. The techniques employed may be as simple or as sophisticated as you may desire. DJ2UT used short pieces of coaxial cable as capacitors and placed them inside the tubing which he used for the element. The coils and inner capacitor ends were sealed and molded in resin. Fifteen- and ten-meter resonances are obtained by shifting copper rings over the ends of L_1 and L_2. This can be done without affecting the sealed coils in any way.

I have concluded this antenna to be rather efficient based on my observations that the tuning network does not become warm and a low s.w.r. has been measured across each of the three bands. This writer wishes to thank OM Sommer DJ2UT and his co-workers for the very considerable amount of work carried out, and the many practical ideas which have made successful antennas with the triband principle possible. QST

The "Mega Rule"

(*Continued from page 27*)

scale function values apply. The left end of all Mega-Rule scales corresponds to the center point of a Smith Chart; the right end corresponds to any point around its periphery.

If the radius of the Smith Chart is not the same as the length of the Mega-Rule, all corresponding intermediate positions on the chart and Mega-Rule can, of course, be determined by simple proportionality, or graphically by the use of proportional dividers.

Construction

The Mega-Rule scales were machine engraved for the original printing plate. They were subsequently printed in black ink, with red line spacators, on a thick white strip of polyvinyl plastic, over which is laminated a thin layer of clear vinyl plastic for protection and durability. The cursor is cast polystyrene, and the overall length is seven inches.[1] QST

[1] The Mega-Rule is available commercially from Analog Instrument Company, Box 808, New Providence, New Jersey 07974. $3.75 postpaid, with instructions.

C.W. Filter For the Collins 75S-1

(*Continued from page 19*)

c.w. or s.s.b. mode. This also will help demonstrate more accurately the QRM-eliminating capabilities of the c.w. filter when switching from one filter to the other. I accomplished this equalization of insertion loss by simply detuning T_1 until with the calibrator signal peaked in the c.w. mode no change in the S meter reading was caused by switching to the u.s.b. mode. This adjustment is not necessary if you feel that the extra i.f. gain with the input to the c.w. filter peaked is worth keeping.

If the r.f. gain control on the 75S-1 is left wide open, you might be disappointed in the filter's performance. Keep the r.f. gain control turned down enough so that the S meter does not kick with the signal you are copying. Only then will you realize the filter's full selectivity.

I have never copied c.w. with a Collins narrowband filter. Because of the superior shape factors of mechanical filters, no doubt they are superior to mine. However, if you successfully duplicate my filter, I think you will agree that it is quite adequate, even when the band is crowded with signals during a contest! QST

Transmitting Converter For 144 MHz.

(*Continued from page 33*)

tubes are used at frequencies above approximately 70 MHz., their normal self-neutralizing frequency. The same is true of the driver stage, V_3.

Because of the derating factor mentioned earlier, the plate current of this amplifier should be limited to 150 ma. or less at dip. Tight coupling to the load is necessary during s.s.b. operation to assure a quality signal. The dip in plate current should be quite shallow, 10 ma. or so, at resonance. The loading capacitor, C_9, should be adjusted to provide the foregoing condition. No more than two or three watts of 28-MHz. drive should be needed to develop the specified input power to the amplifier.

On-the-air reports with this equipment have been excellent. The signal is clean, and no TVI has been noted during more than a year of nightly use.

With the operating voltages specified here, other types of 6146 tubes — 6146, 6146A, etc. — can be used in place of the 6146Bs shown in Fig. 1. Provisions should be made for cutting off V_3, V_4, and V_5 during receive. This can be done by opening their screen-supply leads with a set of relay contacts. Other methods, such as fixed bias cutoff, can also be used. We'll leave that part of the project up to the constructor. QST

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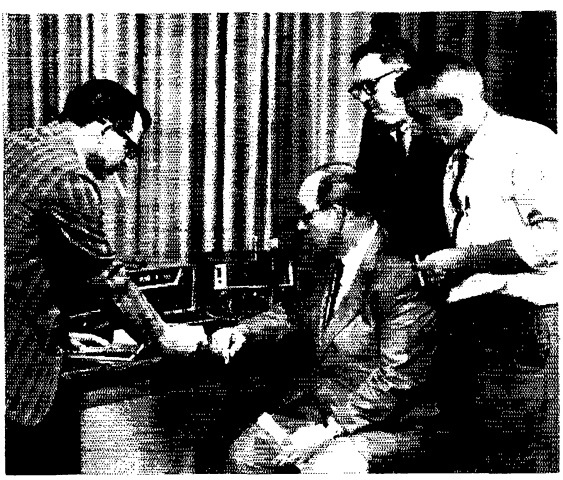
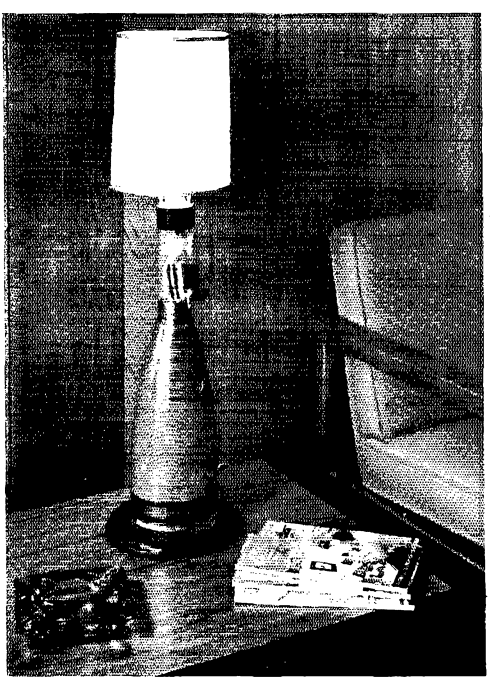
Strays

During 1968 WHTN Channel 13 presented a half-hour "special" in color on amateur radio, produced by the Tri-State Amateur Radio Association of Huntington, W. Va. Some of those participating in this public relations effort on behalf of amateur radio are shown in the accompanying photos. Above at the left is Kay Anderson, W8DUV, who talked about the activities of the YLRL. At the right above are Howard Osborn, WA8RQB, manager of the W. Va. Fone Net, who is describing the National Traffic System, and Dean Sturm, K8CYW, who was the interviewer on the show. Opposite at the left are Howard Osborn, WA8RQB; Dean Sturm, K8CYW; Carl Johnson, WA8HSZ; and Percy Hysell, W8SQO; discussing some of the fine points of amateur operating. You'll be able to see some of these people in person at the 1969 ARRL Roanoke Division Convention in Huntington on the weekend of October 12th.





▶▶

A winter "fun" project, requiring only simple hand tools and readily available hardware (once the CR tubes were "acquired") resulted in a pair of rather aesthetically pleasing and functional living-room lamps for the White house (W1CW/YYM's, that is).

The CR tube was first de-vacuumed by drilling through the high-voltage connection with a 1/16-inch drill* (which was then enlarged to 1/4 inch). The CR tube's exhausting tip was exposed by drilling a 1/8" hole in the socket base above the glass tip—then breaking the tip off. A high speed drill was run through the 1/8" hole and down through the gun of the tube (increasing the drill size in gradual steps to 1/4 inch). This allowed the a.c.-lamp cord to be brought down through the inside of the tube and out the high-voltage connector.

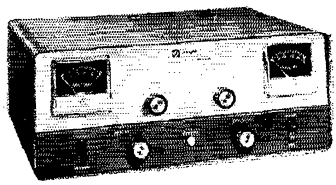
The somewhat unique coloration used by Tektronix for the inside coating of the CR tubes, alternate black and brown stripes, added considerable eye appeal to the finished product. A turned base of polished walnut, crafted by W1ANA, added the final touch.

*Observe safety precautions.

Recent Equipment

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

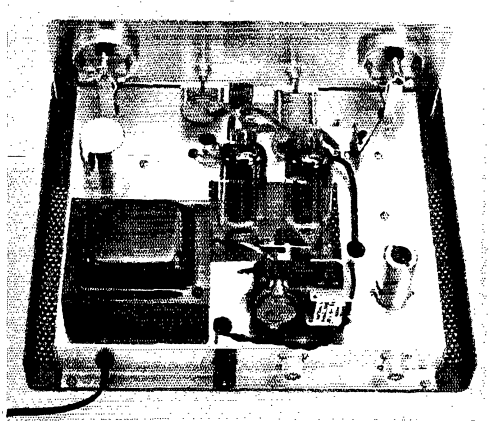
Knight-Kit T-175 Linear Amplifier



Most commercial amateur-band linear amplifiers that have been manufactured in the past few years are high-power units that require considerable driving power. As a result, those owners of converted CB rigs and low-power 6-meter transmitters who wished to increase the output level of their gear have either had to build their own amplifiers or scrap their equipment and go to higher-power exciters. The recent introduction by Knight-Kit of their T-175 linear amplifier offers one solution to this problem.

The T-175 is capable of operating on 10 or 6 meters, and its drive requirements are only 1 to 4 watts on a.m., 1 to 7 watts on c.w., and 1 to 15 watts p.e.p. on s.s.b. A 50-ohm, 5-watt swamping resistor is included with the kit so that the amplifier can be used with exciters whose minimum output levels exceed the amplifier's maximum drive ratings. Maximum input ratings of the amplifier are 120 watts on a.m., 150 watts on c.w., and 300 watts p.e.p. on s.s.b.

The heart of the amplifier consists of two triode-connected 6JE6A beam pentodes wired in parallel and operated in Class B grounded grid. A 7-μh. r.f. choke in the cathode line of the tubes serves as an untuned input circuit for the exciter. Driving power reaches the amplifier tubes via an r.f.-actuated relay. As shown in Fig. 1, a sample of the r.f. drive is rectified by CR_1, and the resulting d.c. that is developed across R_5 is used to bias V_1 into conduction. This activates K_1, permitting the exciter output to arrive at RFC_1. If the driving power is less than about a watt, insufficient voltage is developed across R_5 to turn on V_1. Under these conditions, and also when the OPERATE/STANDBY switch is in the STANDBY position, the input signal is fed directly by the relay to the output connector. This arrangement allows the operator to run his exciter barefoot without disconnecting it from the amplifier; he only needs to put the T-175 in the STANDBY or OFF condition.



Top view of the T-175. The two amplifier tubes are mounted partially below the top of the chassis and at an angle, permitting the same type low-silhouette cabinet to be employed as is used with the Knight-Kit TR-108 and TR-106. Heat dissipating plate caps and a fan help to cool the tubes.

There aren't any parasitic suppressors in the plate leads of the amplifier tubes as is the usual practice; however, apparently none are needed in this case. A check of the T-175 in the ARRL lab didn't reveal any v.h.f. oscillations.

The output circuit of the amplifier is a pi network designed to work into 50- to 70-ohm loads with a three-to-one or less s.w.r. Two plate coils are provided, one for 6 meters and one for 10 meters. In order to change bands it is necessary to unsolder the unwanted coil and solder in the desired one. Although this procedure is inconvenient, it avoids the circuit losses that can result from mechanical switching.

A single transformer is used in the self-contained power supply. Its 6.3-volt winding powers the tube filaments, the pilot lamps for two meters, and a half-wave voltage doubler. Depending upon the setting of a front-panel control, the half-wave doubler supplies -10 to -15 volts of bias to the control grids of the 6JE6As. A full-wave voltage doubler, in conjunction with a high-voltage winding, furnishes about 780 volts for the plates of the amplifier tubes, and about 385 volts for the plate of the relay amplifier. Two silicon diodes are used in each voltage doubler.

A 2-ampere fuse in one side of the transformer primary protects the T-175 from overload. In case there is a breakdown of the coupling capacitor that ties the amplifier tubes to the pi network, an r.f. choke across the loading capacitor prevents B-plus from appearing on the feed line and the antenna. The choke shunts B-plus to ground and blows the fuse if such a short occurs.

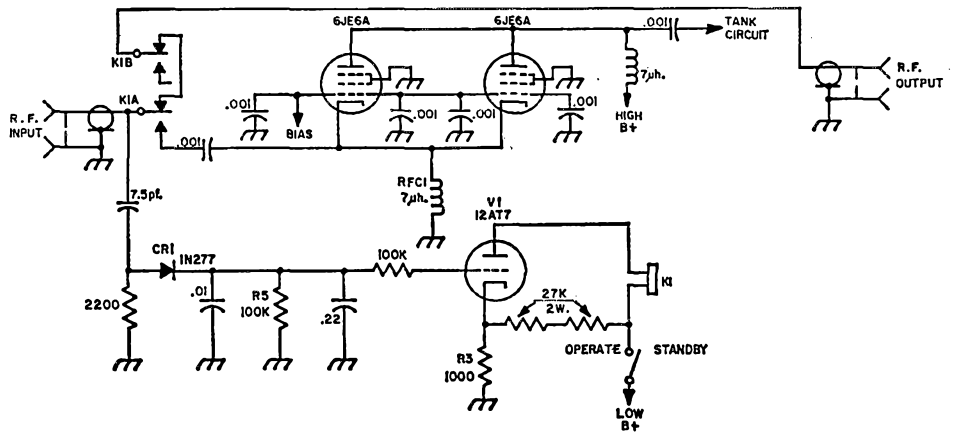
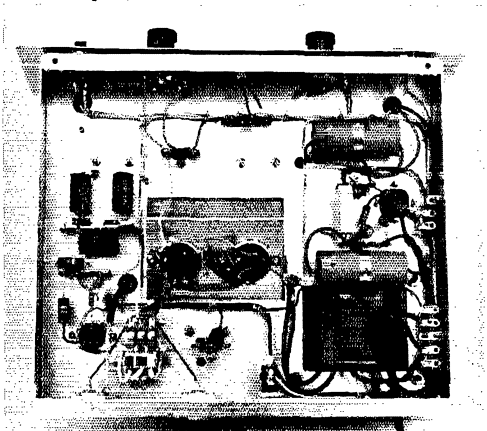


Fig. 1—Partial schematic of the T-175, showing details of the r.f.-actuated relay circuit. Part numbers are the manufacturer's and are used for text reference. Capacitance is in μf. unless specified otherwise. Resistance is in ohms, K = 1000. Resistors are ½-watt composition unless indicated otherwise.

To make the T-175 easy to adjust, two meters are included on the front panel. A 0-250-ma. d.c. meter in the high-voltage line continuously monitors amplifier plate current, and depending on the setting of a front-panel switch, a separate 0-20-ma. d.c. meter monitors either grid current or relative output power.

Thermal radiators are employed on the plate caps of the 6JE6As to reduce the temperature of the tubes and, in addition, a fan is used to provide forced air cooling. Apparently, as a result of both of these measures, the manufacturer is able to rate each tube 10 watts above its normal 30-watt plate dissipation rating. Usually for long tube life, tubes with a combined plate dissipation rating of 60 watts shouldn't be run at more than 90 watts input in a.m. linear service (the plate efficiency of this mode of operation is only 33 percent). However, in the case of the T-175, the amplifier manufacturer states that it's OK to operate the tubes at a maximum input of 120 watts (80 watts plate dissipation, 40 watts output).



Underside view of the amplifier. As can be seen, plenty of room was available for an easy wiring job.

The fan only runs when the amplifier is being driven, and it is turned off and on by the previously-mentioned relay. A neon lamp wired in parallel with the fan indicates when the amplifier is in operation.

Because K_1 (Fig. 1) isn't able to keep up with c.w. speeds greater than 12 w.p.m., it's necessary to keep the relay energized during each transmitting period when such speeds are used. This can be accomplished by substituting a 270-ohm resistor (not included) for R_3 and using the OPERATE/STANDBY switch to go from transmit to receive.

It was easy to assemble the T-175. The wiring instructions are clear and, as the photographs show, the unit is neatly laid out and uncluttered. In color, shape and overall size, the T-175 resembles the Knight-Kit TR-106,[1] the 6-meter exciter the manufacturer apparently designed the amplifier to be used with. Included on the front panel of the amplifier are the two previously-mentioned meters, the OPERATE/STANDBY switch, a GRID MA/REL POWER switch, the GRID BIAS control, a POWER/OFF switch, a LOAD control, a PLATE-tuning control, and the neon-bulb TRANSMIT indicator. Along the back of the unit are an SO-239 OUTPUT connector, an SO-239 INPUT connector, and a fuse holder.

The operator's manual on the T-175 suggests that a low-pass filter be used at the output of the linear if TVI is a problem. However, it's doubtful if such a measure will be too effective, since the back of the amplifier is wide open. Also, because of a heavy coat of paint, the top cover of the linear is not a very effective shield. The only metal-to-metal contact between the cover and the rest of the cabinet occurs at four mounting screws.

The amplifier was tested in the ARRL laboratory, and with one exception — the plate-current meter indicated only about 60 percent of the

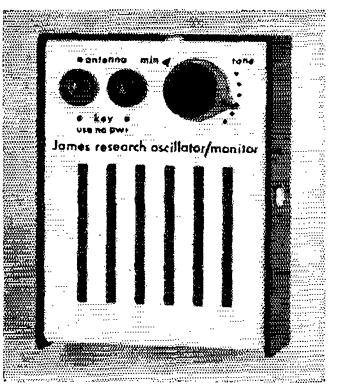
[1] "The Knight-Kit TR-106 Transceiver," *QST* October 1966.

actual plate current being drawn — it performed satisfactorily. A CB rig that had been converted to 10 meters was connected to the amplifier, and 30 watts of output was indicated on a Bird wattmeter for 3 watts of drive. Similar results were obtained on 6 meters. In both cases the input power was about 90 watts. By following the T-175 instruction manual — adjusting the PLATE and LOAD controls for maximum relative output power and then increasing the loading for a 10 percent drop in the meter reading — it was possible to get fairly good linearity without the aid of an oscilloscope. — *W1YDS.*

Knight-Kit T-175 Linear Amplifier

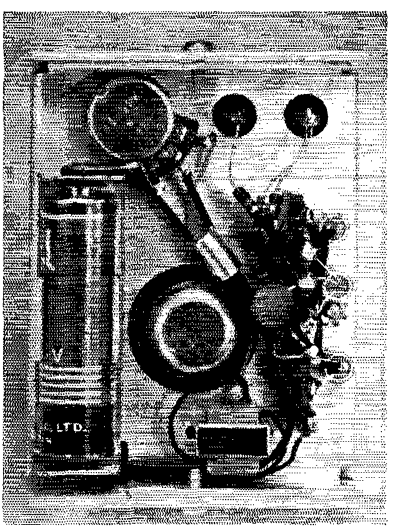
Height: 5½ inches.
Width: 13½ inches.
Depth: 11 inches.
Weight: 20 pounds.
Power Requirements: 110-130 volts, 60-Hz. a.c., 220 watts maximum, 45 watts standby.
Price Class: $100.
Manufacturer: Allied Radio, 100 North Western Ave., Chicago, Illinois 60680.

James Research Oscillator/Monitor



A VERY handy accessory for the ham shack is the James Research oscillator/monitor shown in the photographs. The accessory can be used as a code-practice oscillator, c.w. monitor, or r.f. detector. It will indicate if certain components are good or bad, it will tell whether an unknown transistor is an n-p-n or p-n-p type, and it will point out the anode and cathode ends of an unmarked diode.

As shown in Fig. 1, two diodes and four p-n-p transistors are employed in the five-stage circuit of the oscillator/monitor. Diodes CR_1 and CR_2 make up a detector for the 100-kHz. to 1000-MHz. range. When the output of the detector reaches a sufficient level, it forward-biases into conduction Q_1, the first of three d.c. coupled amplifiers. This action turns on a second amplifier, Q_2, which in turn forward-biases a third, Q_3. Q_3 acts as an emitter resistor for the final stage, audio oscillator Q_4. When Q_3 conducts heavily, the voltage drop between its collector and emitter is low enough to permit Q_4 to operate. The tone can be heard on a built-in speaker, and its pitch can be varied by a front-panel control, R_1.



Underside view of the oscillator/monitor.

Next to the tone control on the front panel of the unit are two tip jacks, one red and one black. The red jack is furnished so that a small antenna (8-inch length of wire) can be connected to it for r.f. pickup. If the antenna is close enough to the signal source, as little as 10 milliwatts of r.f. is sufficient to activate the oscillator. For power levels under 100 milliwatts, in place of an antenna a 0.001-μf. capacitor can be used between the r.f. source and the red jack. The black jack is provided so that it and the red jack can be bridged with a zero to high resistance (100,000 ohms or so) to key the oscillator.

Power for the unit is supplied by a self-contained 1½-volt penlight cell. Because it has no on/off switch, there is a constant current drain of about 50 to 80 microamperes. This increases to many milliamperes (10 to 30 or more) when the oscillator is running.

To use it as a code-practice oscillator, it is only necessary to connect a key across the red and black tip jacks. For diode testing, connect the diode across the jacks and listen for a tone; then reverse the connection and listen again. If, regardless of which way the diode is connected, no turn is heard or one is heard all the time, the diode is defective. If a tone is heard when the

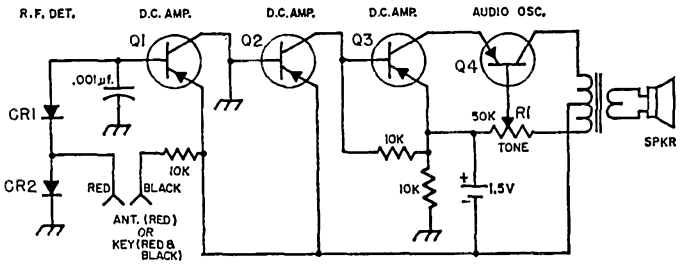


Fig. 1 — Schematic of the oscillator/monitor. Resistance is in ohms, K = 1000. Component designators are for text reference.

diode is connected one way but not the other, the diode is OK. With a good diode the tone will be heard only if the cathode is connected to the black jack, and the anode is connected to the red jack. The same general procedure can be used to determine whether an unmarked transistor is an n-p-n or a p-n-p type. A tone will be heard when the black jack is connected to N material, and the red jack to P material. If a transistor is good, when these connections are reversed there will be either no tone or a higher-pitched tone. When the oscillator/monitor is used as a component checker, a shorted or leaky capacitor will cause a tone, and a good or open capacitor will result in none.

For r.f. detection or c.w. monitoring, just plug a short pickup wire (about 8 inches) in the red jack. When the lead is put in an r.f. field of sufficient intensity, a tone will be heard. Adjustments for maximum power output can be made by varying the spacing between the unit and the tuned circuit until the oscillator/monitor is just triggered on by the r.f. source. Then if the power output of the source is increased, the pitch of the tone will decrease.

The oscillator/monitor is built in a sturdy 16 gauge aluminum cabinet that uses an attractive white and black color scheme. A magnet on the back of the unit permits it to be mounted on any steel surface. Included with the device are two tip plugs, a penlight cell, and a four-page instruction pamphlet. — *W1YDS*

James Research Oscillator/Monitor

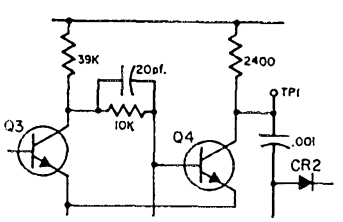
Height: 3⅜ inches.
Width: 2½ inches.
Depth: 1⅞ inches.
Weight: 7 ounces (including battery).
Power Supply: Self-contained 1½-volt penlight cell.
Price Class: $13.
Manufacturer: James Research Company, 11 Schermerhorn St., Brooklyn, New York 11201.

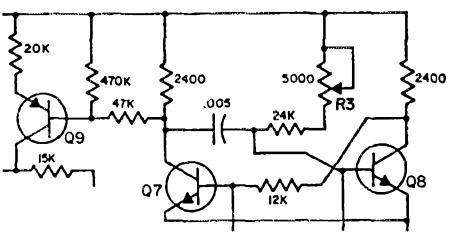
Strays

Feedback

The call of Sidney Usdan, listed in "Silent Keys" for January 1969, should be K4DNK, not K4DNX.

In the article "Transistorized A.G.C. and Squelch Circuits," January *QST*, Q_2 in Fig. 1 and Q_5, Q_6, Q_8 in Fig. 4 were mislabeled n-p-n. All four are p-n-p types, agreeing with the circuit diagrams.





The accompanying diagrams show changes that should be made in the Schmitt trigger and one-shot multivibrator circuits that were part of Fig. 2 in the article "Synchronous Weak Signal Detection with Real Time Averaging," December 1968 *QST*. Substitute these for the equivalent parts of the circuit shown on page 32 of that issue.

Results, 8th World-Wide RTTY Sweepstakes

"Conditions during the contest were good," are the happy tidings received from CARTG Contest Chairman VE3GK. "Fifteen- and twenty-meter operation was excellent; and with the sustained activity on the part of the European hams, the result was continuous pileups on both bands." Some 140 logs were submitted, with about 450 to 500 stations participating. Once again, PY2CQ amassed the worldwide high score and is the winner of the CARTG Trophy. Congratulations to our neighbors to the north on another FB competition!

SCORES

Top Ten

PY2CQ	1,412,184	WA8BOT	544,575
ON4CK	1,083,420	W2RUI	525,140
I1KG	965,300	EL2N	515,360
W5QCH	572,550	VK3KF	448,800
DJ6ZBA	555,395	W9HHX	435,600

Other Scores

YV5AVW	424,145	W6AEE	98,946
DL4RY	384,224	CE3EX	97,584
DL1TV	309,800	W8CQ	93,240
WB2AHF	305,900	WA6GYQ	87,360
VE3RTT*	288,100	W3ILZ	86,400
WA6WGL	260,280	DL1VR	79,530
WA4GTA	255,450	UA4KED	79,080
W9EWC	244,320	ZL2AFE/3	77,860
W7TZL	229,155	DJ8GJ	76,200
WB6JSY	225,585	PAØGKO	75,260
K7MNZ	221,535	K8KAG	70,250
K6EV	210,970	W6TX	70,040
I1KFL	208,775	OA4HR	64,846
G6JF	207,200	PJ2MI	59,520
LU7EBB	206,640	WA4TWB	58,995
I1KBT	205,868	DL9VD	58,600
UQ2AB	198,900	VE5LG	52,920
VK3DM	192,924	VE5DR	51,300
W8FWG	181,970	W8CAT	51,000
K5OLU	171,020	OZ4EDR	50,324
W1BZT	170,445	WB2JBH	48,300
VE2UN	166,650	HB9AKA	46,736
W4EGY	154,770	LX2FB	45,980
WB6RXM	151,065	VE3FBP	43,120
W1GKJ	146,240	W6MTJ	41,344
W4YG	133,912	DL5PQ	40,500
I1AHN	132,480	PJ2CR	38,960
W3ISE	130,020	OE6WF	37,584
HP9B	124,780	WA2YVK	36,860
W7KS	120,120	K9BJM	36,788
K8MAM	114,660	W3KN	35,328
ZL2ALW	113,024	WA6TLA	35,120
W6JOX	107,065	K8YJO	34,304
KL7FLR	107,030	DJ8BT	31,120
K5OIM/Ø	99,480	K8QLO	30,485
		I1CLC	28,680

* Not eligible for award.

KH6AUX	28,413	I1AFF	6552
K5ARH	27,180	VE3EBR/2	5724
W8VON/8	26,368	WA8NGJ	5535
WB6QFE	25,680	VE7CZ	5472
HC1MF	24,480	W1AW	5424
W7BDU	21,400	K2RYI	4473
WA2CUB	21,320	K4GJW	4431
VE7BHH	20,160	HB9ACQ	4392
W9CAA	19,686	VE3FWX	4008
WB2FPT	19,008	SM7CFR	3870
WA8NWN	18,432	ON5WG	3660
SM5CLW	18,320	W9MAI	3600
HA5FE	17,568	W2OER	2240
G3IYG	17,010	VE3RH	2112
K2PTH	16,864	DJ2YE	1474
F3PI	16,800	WAØBJG	1416
K6HGF	16,588	VE4FG	1392
K9UYU	16,060	VE1AK	1356
F9RC	14,510	OZ6OB	1280
K2YEQ	13,818	SM5BRQ	888
I1LCL	12,232	W4ULY	790
OM1MP	10,440	VE6MM	570
W5APM	8640	W2VAQ	440
WØHAH	8480	W7CBY	408
KH6GLV	8211	KP4JM	268
W2FAN	7812	VO1EE	82
W9TKR	7420	W6DFR	48
W4LLL	7056	VE7AMJ	32
W6FFY	7056	VE3FHQ	2

Soapbox

"An extremely well-organised and enjoyable contest. The enforced rest periods are welcomed by us farmers and do permit us to undertake the milking duties quietly instead of going around the cows like a scalded cat as in the past. Conditions generally seemed favorable." — *G6JF*. . . . "Your contest was a very good introduction to what RTTY operating is. I just got on RTTY a week before the contest." — *WA9MQI*. . . . "By all reports this was the best so far and a feather in your cap." — *VE4FG*. . . . "How about an award for single-band operating next year? Was disappointed in lack of activity on 80 and 40." — *W2OER*. . . . "Propagation conditions were generally better than in past years in the South Pacific area. Too long CQs." — *VK3KF*. . . . "This was a real 'sooper-dooper' of a contest. Didn't know there were that many RTTY stations." — *VE5LG*. . . . "This was a terrific contest, but unfortunately I was forced out for repairs. Propagation conditions were excellent in KP4-land and I copied more than a score of new countries." — *KP4JM*. . . . "Your rules for the contest were very good. It was terrific to notice how bands were dead for some days after the contest." — *ON4CK*. . . . "It was the greatest contest yet. Would like to see small awards or certificates or even just recognition to the top score in each of the call areas of the U.S.A. and Canada. I will be in there next year no matter what." — *K7MNZ*. . . . "Not much time for contest, but could not miss all the fun." — *VE6MN*. . . . "Only had time to operate one day, but what enjoyment!" — *VE3FBP*. . . . "Hope this contest becomes an annual CARTG affair." — *W5QCH*. QST

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY GEORGE HART,* WINJM

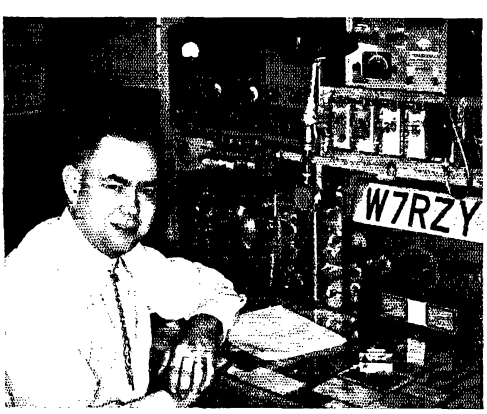
Technicians as ECs

THE wheels of decision move slowly, especially where the matter is controversial and opinions change. A couple of years ago, most officials and appointees seemed against the idea of making Technician Class licensees eligible for the important leadership appointment of emergency coordinator, and two polls verified this. More recently, the attitude on the matter seems to have changed as (1) General Class licensees to fill the spots became more difficult to find and (2) local AREC activity gravitated more and more to the v.h.f.'s, involving more Techs and many both eager and willing to take the lead. Many of them actually have done so, in fact if not in name. A more recent poll reflects an increasing change of opinion on the part of field leadership.

Consequently, effective Mar. 1 SCMs may appoint Technician Class licensees as ARRL emergency coordinators if in their judgment the individual can handle the job.

We expect this will tend in the direction of making AREC even more of a v.h.f. proposition than it now is, but we hope it will not have the effect of estranging other class licensees from the AREC program or of eliminating the use of lower-frequency bands for AREC purposes where a medium- or long-range requirement is indicated. Generally speaking, the higher grade licensee is still to be preferred for appointment, other things being equal.

*Communications Manager, ARRL.



Harry Roylance, W7RZY, is SEC and Assistant SCM of Montana

Phone Patches

These two words have been so long banned from the pages of *QST* that we are almost afraid to use them. But at last phone patches are "legal" and may be used if you pay the phone company for use of an "interface," whereas before they were "illegal" but cost nothing. If you use them as before, the telephone company may refuse you service.

While phone patches should not be used to circumvent telephone toll lines as a general rule, they can be a most valuable public service tool if used properly. Most commonly, they are used to patch servicemen overseas to their families at home, but there is relatively little of this carried on in the amateur bands because amateur radio is not permitted in most combat areas where the demand for such service is greatest; and where it is permitted there is an international ban against third-party communication by amateur radio.

Its principal potential lies in the field of emergency communication. A mobile stuck somewhere can be patched into a service garage and explain his circumstances first hand instead of by relay. A mobile coming across an accident on the highway can talk directly to police headquarters, or the hospital. Field communications can be conducted by a c.d. director from his desk, if preferred, rather than necessitating his being present at a manned operating position. If one station does not reach the desired point he can phone patch through a different one, only provided the necessary "interface" (how we love that word!) exists at the various stations he can command from his desk.

This is not to imply the feasibility of taking the operation of an emergency station away from the operator, it is only to extend the ability of an administrator or supervisor, be he RACES radio officer or AREC EC or higher authority, to make direct contact with the people in the field under his direction so that relay of such is minimized and the responsibility for what he says lies directly with him rather than a relaying operator who may misunderstand; whom someone at the other end may misunderstand; or who may be unfamiliar with terminology not in his field and foul it up. It is axiomatic that the more relays the greater the chance for error. Emergency phone patching can eliminate much of it. Can we work some of this into our emergency preparedness activity?

New Heading

Just in case you didn't notice it, this column has a new heading and a slightly different format. Actually, there is little if any change in content. The column will continue to discuss all the on-the-air public service aspects of amateur radio, as it always has, without any de-emphasis on ARRL organizational sponsorship. The new heading and format are simply recognition of this fact and, we hope, will

encourage those amateurs operating in the public service *other* than in AREC, NTS and RACES to submit information that could be useful reading herein. The idea is more to chronicle the public service performed (for posterity, if you please) than to achieve publicity for the efforts of any individual or group. The best place for the latter is in your local newspaper and on your local TV and radio stations.

Note that the former "National Traffic System" column is now "Traffic Talk," (anyone think of a better title?) but will still report NTS data and other palaver monthly. The former "Diary of the AREC and RACES" becomes, simply, "Public Service Diary," although it will still report AREC and RACES goings-on. Photos especially are welcome.

We hope these changes will have a salutary effect in helping to dispel the notion, held by a few, that the column is for AREC, NTS and RACES and not open to any others. — *W1NJM.*

Traffic Talk

The advent of legalized phone patching brings to the fore stronger than ever the thought that there should be some means of crediting them, similar to the crediting of BPL points for the handling of record traffic in standard ARRL form. But it's a sticky problem, because an unrecorded third-party communication is an ethereal and wraith-like thing which, like a ghost, is not really something you can lay your hands on and which leaves no trace.

Let's get basic. Being an unrecorded communication, how does a "phone patch" differ essentially from any other form of unrecorded third party communication? Is it any different, basically, from one ham in a ragchew saying "Give my regards to your XYL?" or "Tell Joe I'd like to ragchew with him sometime?" True, these are "informals" while a phone patch requires direct communication from a third party to another (fourth?) party not at the operating position. Or does it? No, it is still a phone patch if only a third party is involved. That is, an amateur operator wants to talk to his Aunt Susie in Azusa, so he gets hold of another amateur in Azusa and has him call her. Is this as worthy a phone patch as one which involves a *fourth* party — that is, phone patches at *both* ends? Is a short-distance phone patch as worthy as a long-distance one? Is a half-hour phone patch more worthy than a 30-second one? How about domestic phone patches, which are almost certain to be frowned upon. Should we encourage them? If we do, should we count them the same as overseas patches with service men? How about other foreign patches? How about emergency phone patches, should they count the same as the run-of-the-mill humdrum patches?

These are a few of the questions that come up. There are

A number of traffic handlers gathered at the Rocky Mountain Division Convention in July, 1968. Left to right are K7NHL, manager of the Twelfth Region Net; W1NJM; and WØFEO, a former manager of the twelfth Region Net.

The polling place at Avon, Connecticut, where members of the Talcott Mountain UHF Society helped with election communications. Here, K1IXG is operating WA1CKT/1.

or will be others, all of which have to be answered before we can get up a crediting system for phone patching. See what we mean? — *W1NJM*

National Traffic System. K3MVO, along with a number of NTS Managers, report very light traffic for December. A little research showed that December, 1968, was the lightest December since 1965. W7BQ says that although representation is up a little, band conditions have been making things difficult at times. WA6ROF has issued RN6 certificates to W8VDA/6, *WA6s* BYZ LFA and WB6TQS. *WA7s* GYQ IFD ISP and WØLRN have earned TWN wallpaper from K7NHL. W6VNQ has sent PAN certificates to *W6s* LRU VZT and W8VDA/6.

December reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	62	669	.348	10.8	92.4
2RN	62	923	.869	14.9	98.7
3RN	62	1036	.565	16.7	98.4
4RN	58	1058	.597	18.2	84.3
RN5	62	985	.516	15.9	90.1
RN6	62	1590	.700	25.6	97.7
RN7	58	586	.369	10.1	43.8
8RN	62	814	.481	13.1	100.0
9RN	62	1016	.643	16.4	93.6
TEN	62	1025	.689	16.5	82.8
ECN	61	287	.270	4.7	73.7
TWN	62	369	.264	6.0	80.0
EAN	31	3059	1.877	98.7	99.4
CAN	31	2232	1.536	72.0	100.0
PAN	31	2089	1.311	67.4	100.0
Sections[1]	2230	17,503		7.8	
TCC Eastern	183[2]	1545			
TCC Central	123[2]	1025			
TCC Pacific	150[2]	1656			
Summary	3058	39,467	EAN	21.5	—
Record	3450	51,705	1.916	27.3	—

[1] Section and local nets reporting (68): HNN (Colo.); CNN, NCN, NCNS (Cal.); BUN (Utah); RISPN (R.I.); PTN (Me.); PVTEN, PTTN, EPA, EPAEPTN (Pa.); Franklin County, OSN, BN, OSSB, (Ohio); OZK (Ark.); M6MTN, WSSB, QMN (Mich.); WSBN, WIN (Wisc.); NMRTN (N.M.); SSZ, OLZ (Okla.); TEX, TTN (Tex.); LAN (La.); MDCTN, MDDS (Md.-D.C.); FCATN, KTN, KYN (Ky.); ILN (Ill.); VN, VSBN (Va.); CN, CPN (Conn.); NLIP, NLI, NYS, NLIVHF (N.Y.); WSN (Wash.); QIN (Ind.); GTN, GSN (Ga.); NJEPTN, NJSN, ECTN (N.J.); QFN, WFPN, FMTN, TPTN, FPTN, NHN (Fla.); AENB, AEND, AENH, AENT (Ala.); MNN, SMN (Mo.); MSN, MJN (Minn.); QKS, KSBN, FPN (Kans.); NCNL, THEN (N.C.); GBN (Ont.).

[2] TCC functions, not counted as net sessions.

A number of Columbus, Mississippi, area amateurs received awards from the Air Force for their participation in traffic handling to the Pacific. In the customary order are W5SCM, WA5SKI, WA5HEC, WA5DGO, WA5RRE, WA5HEE, and Col. John H. Archer, Jr., Commander of Columbus AFB, who presented the citations. W5JJA, KR6US and K1FNA/6 were also active, but weren't available for the presentation.

Transcontinental Corps. W3EML says that most failures during December where misses on the alternate schedules set up to handle the deluge of Christmas traffic. WØLCX says the increase in failures was because of poor conditions. W7DZX agrees with both, but adds that non-adherence to the frequency plans may have also been a problem.

December reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	184	85.9	4235	1545
Central	123	87.8	2184	1025
Pacific	152	84.9	3312	1656
Summary	459	86.1	9731	4226

The TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BJG EFW EMG EOB NJM, K1ESG, *W2s* FR GKZ MTA PU ZVW, K2RYH, *WA2s* BHN BLV CAL UWA, WB2RKK, *W3s* AIZ EML MPX, K3MVO, WA3CTP, W4s NLC UQ ZM, K4KNP, WB4DXX, *W8s* AHZ IXJ UM, K8KMQ, WA8POS. Central Area (WØLCX, Dir.) — W4OGG, *K4s* AT DZM, WA4WWT, WB4AIN, *W5s* KRX RHF, *W9s* CXT CXY DND DYG VAY, *WAØs* RAK VZM, *WØs* INH LCX QQQ, KØAEM, *WAØs* DOU IAW MLE SDC. Pacific Area (W7DZX, Dir.) — *W6s* BGF BNX EIPC IPW VNQ VZT, *WA6s* BRG LFA ROF, WB6HVA, *W7s* KZ ZIW, *Z7HLR*, *WA7s* CLF IFD.

Public Service Diary

Quebec SEC VE2ALE reports several incidents in which Quebec amateurs helped out after automobile mishaps.

On Sept. 27, VE2APT radioed through VE2MT that there was a two-car collision on the Bonaventure Autoroute in central Montreal. VE2DAY answered the call and the Quebec Provincial Police were notified.

On Oct. 27, VE2AUD called through VE2RM reporting a single car accident. VE2DEA responded and summoned the authorities.

VE2APT again discovered an accident Oct. 31. This time three vehicles were involved, and two of the three lanes of the Trans Canada Highway were blocked. VE2AKM replied through the repeater and the police and tow trucks were dispatched.

VE2BPF came upon a car and truck collision on the Decarie Expressway in Montreal on Nov. 11. VE2AKM was again on hand to summon aid. — *VE2ALE, SEC, Quebec.*

On the morning of Oct. 2, a light plane carrying four men failed to return from an elk-spotting flight over northern New Mexico and an air search yielded no results.

The Los Alamos ARC was asked to provide communications for a ground search. Short and long distance facilities were necessary. Two-meter f.m. was used between the search parties and a field station while 75 meters was used to cover the distance to the base station a hundred miles away. About fifteen amateurs participated, led by W5PNY, K5QIN and WA5ROW. Unfortunately the results of the search were again negative. — *WA5ROW, EC North Central New Mexico.*

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Amateurs of the Owensboro and Henderson (Ky.) AREC mounted an intensive search when it was reported to police that a twin-engine aircraft had been seen trailing smoke at a low altitude over an isolated section of Ohio River bottomland on Nov. 24. Only an hour after the search began, darkness fell, followed by several days of bad weather, thus delaying the search. When the search resumed, ten mobiles and additional fixed stations, manned by twenty amateurs, were active, but the missing plane was not found. — *W4CSN and WA4FMY, ECs Henderson and Owensboro, Ky.*

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Several additional "Operation Goblin" reports have been received. In such an operation, amateurs usually try to aid local authorities in curbing outbreaks of vandalism that occur around Halloween.

Seventeen amateurs under the direction of ECs K2HTX and W2HAE aided the local Civil Defense Auxiliary in patroling the Huntington and Suffolk sections of Long Island. Ten, six and two meters were used by fifteen units in the joint AREC/RACES operation. Five mobiles and ten stationary watches kept an eye on schools and various other public and private fixtures. — *K2HTX and W2HAE, ECs Suffolk and Huntington, N. Y.*

The Haverhill, Mass., RACES provided mobile communications for the auxiliary police Oct. 31. Tragedy was avoided when a mobile unit, WA1EBJ, discovered a vandal-set fire and radioed the alarm. — *W1EEF, RO Haverhill, Mass.*

Franklin County (Ohio) AREC/RACES used two-meter f.m., as well as six and ten-meter a.m., to help the police of the Columbus area curb vandalism. At least eighteen mobiles, in addition to several base stations, were manned by about thirty-five amateurs. — *W8ERD, EC Franklin County, Ohio.*

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On October 31, the Hiawatha (Kans.) Amateur Radio Club furnished equipment and operators for marshalling duties of the 54th annual Halloween Parade. Four base stations and six walkie-talkies were used on two meters. Fifteen amateur participants helped make the parade more enjoyable for the 25,000-plus spectators. — *WAØOZP, EC Zone 1, Kans.*

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There are also several additional reports of amateurs assisting with election-return gathering on Nov. 5 and 6.

More than twenty amateurs of the Josephine (Ore.) County AREC, under the direction of EC W7DEM, participated at various key precincts by relaying early tallies of important races to the National Election Service. Only twenty minutes after the polls closed, early returns were relayed to NES

computers where predictions on the eventual outcome of the elections were made. — *W7DEM, EC Josephine County, Ore.*

WA9QPC and K3UWZ/9 used duplex on six and two-meters f.m. to relay election returns from Wabash to North Manchester, Ind., where the returns were broadcast by a commercial outlet. — *K3UWZ/9.*

The necessity for a new polling place was realized in Avon, Conn., when the former polling place, the town hall, was destroyed by fire. The decision to use the city's high school created severe communications problems. The Talcott Mountain UHF Society, and other Avon area amateurs, volunteered to help out. It appeared, at first, that two meters and simple antennae would suffice since only a short distance was to be covered. However, rough terrain and the necessity for temporary installations intervened, and several evenings of tests were needed before satisfactory signal levels were obtained at all three stations. The set up, with WA1CKT at the poll and with W1HDQ and WA1HSA at the two party headquarters, was used for more than twelve hours supplying voter check-off lists for volunteer party workers. — *W1HDQ.*

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This past Christmas season, Toronto, Ont., amateurs made a concerted effort to make the holidays more joyous for some of the less fortunate families. About 120 mobile units, including amateur, EMO and GRS personnel, collected toys and other articles, as well as money, during the drive sponsored by one of the local radio stations. The collections were then turned over to the city's fire halls and the Salvation Army for distribution. VE3CWA was instrumental in setting up the radio car drive.

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At 2325 GMT on Dec. 6, EC of Glen Falls, N. Y., K2AYQ, called a surprise drill simulating a natural gas explosion in Schuylerville. K2MUG and WA2AQD picked up a six meter transceiver and 2-KW power plant and headed for the scene of the disaster, where a number of buildings were assumed damaged or destroyed. The Glen Falls and Saratoga Springs American Red Cross Chapter Houses were used for base stations by W2BOR, K2AYQ, WB2ZTP and WB2RNV. WB2UEX acted as primary NCS. Red Cross officials, who helped plan the drill, sent prearranged messages among the several active stations. The test was successful in that it pointed up several deficiencies which can now be corrected. — *K2AYQ, EC Glen Falls, N. Y.*

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Forty-five SEC reports, representing 15,850 AREC members were received for the month of November, 1968. This is the same number of reports but 83 fewer AREC members than the same month last year. The following sections reported: Ala, Alta, Ariz, Ark, Colo, Conn, Del, E Fla, E Mass, Ga, Ill, Ind, Kans, Ky, La, Mar, Mich, Mo, Mont, Nebr, Nev, NH, NMex, NLI, NC, NNJ, Ohio, Okla, Org, Que, SDgo, SF, SCV, Sask, SDak, SNJ, STex, Tenn, Utah, Va, Wash, WVa, WFla, WNY, WPa.

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Independent Net Reports:

Net	*Sessions*	*Check-ins*	*Traffic*
Clearing House	31	649	748
North American SSB	26	629	819
Interstate 20M SSB	22	461	8009
Northeast Traffic	31	385	560
Mike Farad E & T	37	556	883
7290	44	2025	1205
75 M ISSB	31	1315	766
Hit & Bounce	27	363	663
Eastern U.S. Traffic	31	124	101

QST

ARRL QSL Bureau

The function of the ARRL QSL Bureau System 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 4¼ by 9½ 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:

W1, K1, WA1, WN1[1] — Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.

W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.

W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4, K4 — H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4[1] — J. R. Baker, W4LR, 1402 Orange St., Melbourne Beach, Florida 32951.

W5, K5, WA5, WN5 — Hurley O. Saxon, K5QVH, P.O. Box 9915, El Paso, Texas 79989.

W6, K6, WA6, WB6, WN6 — San Diego DX Club, Box 6029, San Diego, California 92106.

W7, K7, WA7, WN7 — Williamette Valley DX Club, Inc., P.P. Box 555, Portland, Oregon 97207.

W8, K8, WA8, WN8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.

W9, K9, WA9, WN9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60216.

WØ, KØ, WAØ, WNØ — Alva Smith, WØDMA, 238 East Main St., Caledonia, Minnesota 55921.

KP4 — Alicia Rodriquez, KP4CL, P.O. Box 1061, San Juan, P.R. 00902.

KZ5 — Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Alea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.

VE2 — John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5[1] — A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.

VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

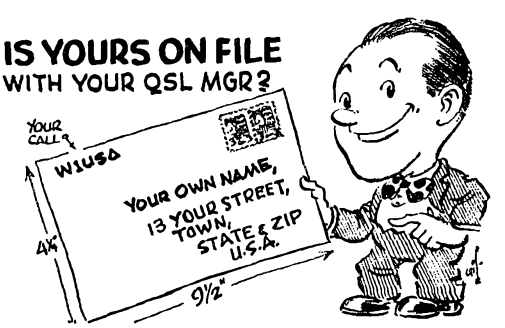
VE8 — George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.

VO2 — Goose bay Amateur Radio Club, P.O. Box 232 Goose Bay, Labrador.

SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1] **These bureaus prefer 5 × 8 inch or #50 manila envelopes.**



ARRL Advisory Committees

Introducing the Members of the V.H.F. Repeater and the Contest Advisory Committees

At its meeting last May, the ARRL Board of Directors, responsive to the opinions of many individual amateurs and after a study by its Planning Committee, set up the machinery which would provide for greater participation by individual members in League affairs. Thus, we now have two advisory committees who will serve to strengthen the bond between individual members of the League and the management (Board and Hq.) of the League, particularly in the specialized fields of contests and v.h.f. repeaters. Page 70, November *QST*, describes the concept and functions in greater detail.

The members of these two committees were selected by President Robert W. Denniston, WØDX, based on recommendations of directors and nominating groups of three or more amateurs. The number of well-qualified amateurs nominated made the selection difficult — so much so that WØDX requested and received permission to increase the size of both committees so as to include as many skilled amateurs as possible.

V.H.F. Repeater Advisory Committee

The members of this committee are:

Taylor Shreve, WØCXW, 1230 Valentia St., Denver, Colo. 80220
Arthur M. Gentry, W6MEP, 7832 Jellico Avenue, Northridge, Calif. 91324
Gilbert J. Kowols, W9BUB, 216 Belle Plaine Ave., Park Ridge, Ill. 60068
H. H. Lang, VE3ADO, 12 Orchard Drive, Port Colborne, Ontario
Jon Marcinko, W7FHZ, 26501 18th Pl. So., Kent, Wash. 98031
George F. Munsch, W5VPQ, 11314 Janet Lee, San Antonio, Texas 78230
Jon J. O'Brien, W6GDO, 6605 Fifth St., Rio Linda, Calif. 95673
George D. Rose, Jr., W4GCE, 105 Middleboro Place, Lynchburg, Va. 24502
Howard L. Lester, W2ODC, 8 Bath St., Alplaus, N. Y. 12008

Taylor Shreve, WØCXW (chairman) has been a licensed amateur and member of the League since 1927. Professionally he is the engineer in charge of the Colorado radio system of the Bureau of Land Management, which includes six mountain-top repeater stations. He has been active in the Denver Radio Club as secretary, vice-president, and president, and is currently program chairman.

Arthur M. Gentry, W6MEP, licensed since 1938, has owned and operated pioneer amateur repeater station K6MYK since 1956. He is president of the California Repeater Network Association, and is trustee for WB6TSU, Frazier Mountain relay station of the CRNA.

Gilbert J. Kowols, W9BUB, has been active in v.h.f. f.m. networks for several years, and is the technical expert for the CFAR repeater in Chicago. He is a professional electronics engineer for Cook Electric, where he has worked on various satellite projects.

H. H. Lang, VE3ADO, has been a League member since about 1925. He is a retired Canadian National Telegraph Engineer, and is a member of the Buffalo Repeater Group. He is also licensee for VE3NSR, the repeater serving Niagara Peninsula.

Howard Lester, W2ODC, has been active in the design, construction, and maintenance of the K2AE repeater in Schenectady during the seven years of its operation. He is employed by GE as manager of wideband recording at the Information Sciences and Engineering Laboratory.

Jon Marcinka, W7FHZ, is employed as a two-way radio technician and engineer, and has been associated with many commercial repeater installations, as well as several amateur repeaters in the Northwest.

George Munsch, W5VPQ, is employed as a Senior Research Physicist at Southwest Research Institute. He pioneered the first open repeater in Texas, on 2 meters, and guided the organization of the San Antonio Repeater Organization, of which he was president in 1967-68.

Jon J. O'Brien, W6GDO, is former Air Force MARS Director in charge of repeaters, Area Six. A December 1961 *QST* story reported on a 2-meter repeater he set up for a boat race. He is currently vice-chairman of the California Amateur Repeater Committee. Professionally, he is a transmission engineer for the Pacific Telephone Company.

George D. Rose, Jr., W4GCE, has been active in f.m. communications on 50, 144, and 420 Mc. for the past 10 years, and is the licensee of an active repeater station. He is a Senior Development Engineer (Electronics) for GE.

Contest Advisory Committee

The members of this committee are:

James A. Maxwell, W6CUF, 18125 So. Santa Ana Rd., Los Gatos, Calif. 95030
Leonard Chertok, W3GRF, 8301 Temple Hills Rd., Washington, D. C. 20031
Roger Corey, W1AX, 60 Warwick Drive, Westwood, Mass. 02090
Jack duBois, K2CPR, 5667 Birch Ave., Pennsauken, N. J. 08109
Reno W. Goetsch, W9RQM, 929 So. 7th Ave., Wausau, Wisc. 54401
E. V. Gulden, W8DB, 4710 E. Rte 571, Tipp City, Ohio 45371
Jack Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec
Thomas A. Russell, WAØSDC, 1325 Hertz Drive, S.E., Cedar Rapids, Iowa 53403
Gene Sykes, W4BRB, 6510 Carambola Circle, West Palm Beach, Fla. 33406

James Maxwell, W6CUF (temporary chairman) was national high scorer in the SS contests in 1950 and 1966, and has been section winner in the DX contest and the SS a number of times. He is past president of the Northern California DX Club.

Leonard Chertok, W3GRF, first licensed in 1936, has been an active contest man, particularly since WW II. One of the Potomac Valley Radio Club crew, he has served as president, activities manager, and secretary, helping to fan the friendly rivalry between PVRC and the Frankford Radio Club.

Roger Corey, W1AX (formerly W1JYH) has been a section winner in many SS, DX, and CD

contests since 1946, and has missed only one Field Day in that time. He has been active in ARRL and local club work, having served as SCM, SEC, and assistant director, and is past president of the Connecticut Wireless Association and the Hampden County Radio Association.

Jack duBois, K2CPR, has been active since 1932 participating in almost all of the SS and DX contests, plus FD. He has served as SCM, and is one of the Frankford Radio Club members, having served the Club in almost every office.

Reno Goetsch, W9RQM, has been an active participant in all phases of contest operation since 1934. He has served as assistant director and SCM, and is former president of the Wisconsin Valley Radio Association.

E. V. Gulden, W8DB (formerly W8ZJM) has been licensed since 1931, and in the 20 years since WW II has missed very few contests. He has been Ohio section winner in the DX contest a number of times, as well as being a high scorer in the SS. Field Day, and various other operating activities. He is currently president of the Miami Valley Amateur Radio Contest Society.

Jack Ravenscroft, VE2NV, has been licensed since 1938, and has been active in Field Day and DX contests for many years. He was chairman of the DX Committee for the 1967 National Convention, and is an active member of the Laurentian DX Club as well as being the VE2 QSL bureau manager.

Thomas A. Russell, W8FAW/WAØSDC, was first licensed in 1955 and has been section winner in the SS four times recently, twice accomplishing "clean sweeps." He places high in CD parties, and helped organize a club multi-op set-up at W8UM.

Gene Sykes, W4BRB, has been licensed since 1932, and has been particularly active in the SS and DX contests, being a perennial section winner. In recent years he has concentrated on running up high scores without high power.

The Committees Need Your Support

The director having liaison responsibility between the Board and the V.H.F. Repeater Advisory Committee is John Griggs, W6KW, while the Headquarters staff liaison is provided by Edward P. Tilton, W1HDQ.

For the Contest Advisory Committee, the Board's liaison director is Victor C. Clark, W4KFC, while Headquarters liaison will be by Ellen White, W1YYM.

However, you, the individual League Member, ought to feed your ideas and your suggestions for improvements and changes in these specialized areas directly to the advisory committee, either via some committee member with whom you may be acquainted, or via the chairman. These are *your* committees, and they will produce something of value to the extent that you support them. Your constructive suggestions are the support they are looking for. QST

ARRL 1969 NATIONAL CONVENTION

June 20-22, 1969

The 1969 ARRL National Convention is set to open Friday June 20, 1969 for three days at the Fort Des Moines Hotel, Des Moines, Iowa. According to convention general chairman, Lee J. Roy, WØUDO, special attention is being given to planning features of interest for wives and children as well as a complete program covering all areas of amateur radio including f.m. repeaters, DX, the National Traffic System, MARS, and many other topics.

On display at the hotel exhibition hall will be amateur radio equipment from the leading manufacturers.

The FCC will be on hand to administer all grades of amateur examinations on Friday, near the site of the convention headquarters. Anyone interested in taking the exams should preregister with the District FCC Engineer-in-Charge, 601 East 12th Street, Kansas City, Missouri.

The Convention program will be highlighted by U.S. Senator Barry Goldwater, K7UGA; E. G. Henry, W3BG, Chief, Amateur and Citizens Radio Division, FCC; Edward Liscombe, K4KNV, Chief — Army MARS; Ldr Robert Mickley, Chief — Navy MARS; Robert Denniston, WØDX, ARRL President; John Huntoon, W1LVQ, ARRL Secretary and General Manager, along with other members of the Headquarters Staff.

Prior to May 15, registration can be obtained from Convention '69, P.O. Box 1051, University Station, Des Moines, Iowa, 50311, for $15 per person. Registration at the time of the convention will be $6 each for the convention, the two nights of entertainment and the Sunday banquet.

COMING ARRL CONVENTIONS

May 9-10 — Michigan State, Grand Rapids.
May 24-25 — New England Division, Swampscott, Mass.
June 13-15 — Pacific Division, Sacramento, Calif.
June 20-22 — NATIONAL, Des Moines, Iowa.
July 4-6 — Rocky Mountain Division, Salt Lake City, Utah.
July 5-6 — West Virginia State, Jackson's Mill.
August 16-17 — West Gulf Division, Amarillo, Texas.
October 11-12 — Roanoke Division, Huntington, West Va.
October 17-19 — Southwestern Division, San Diego, 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 for up to two years in advance.

Happenings of the Month

Phone Patch Tariffs
New Goldwater Bill
Anti-Smog Proposals
Examination Schedule

WAY CLEARED FOR PHONE PATCHES

As we reported briefly in "League Lines" last month, the Federal Communications Commission has permitted new tariffs filed by the Bell System to go into effect January 1, 1969, cancelling earlier prohibitions against "foreign attachments." Similar documents concerning intrastate service have been filed by the phone companies with the various state public utilities commissions. In some states these tariffs have been accepted; in others approval has not yet been given. Other telephone systems, such as General, have been a party to this proceeding, so nearly everyone will be governed by the outcome, regardless of the company furnishing service.

For direct coupling of a radio system to the telephone lines, the tariffs require use of a voice coupler or interface. (There is still an area of dispute, to be resolved later, as to whether the interface must be supplied by the phone company, or may instead be provided by the customer.) Charges for installation vary widely from company to company or state to state, and may range from a dollar or two to $20. Most of the intrastate tariffs we've seen, however, call for 50¢ a month rent of the voice coupler.

Pertinent portions of FCC's "Memorandum Opinion and Order" released December 26, 1968, are quoted below:

"We have before us new tariffs and supporting papers filed recently by the American Telephone and Telegraph Company (AT&T) in behalf of itself and other telephone companies wherein it is proposed to effectuate significant changes in the 'foreign attachment' provisions now appearing in certain tariffs of A.T.&T. These provisions govern the connection or attachment of customer-provided facilities to common carrier-provided facilities used in furnishing interstate or foreign communications service to the public . . .

"First, the new tariffs would delete currently effective paragraph 2.6.1 which, in pertinent part, now reads as follows:

> No equipment, apparatus circuit or device not furnished by the telephone company shall be attached to or connected with the facilities furnished by the telephone company, whether physically, by induction or otherwise x x x . . .

"Second, in addition to cancelling the above-cited paragraphs, the new tariffs would publish new provisions as follows:

> 'Customer-provided *terminal equipment* may be used with the facilities furnished by the Telephone Company, for long distance message telecommunications service, as specified in 2.6.2 through 2.6.6 following';
>
> 'Customer-provided *communications systems* may be connected with the facilities furnished by the Telephone Company for long distance message telecommunications service as specified in 2.7.2 through 2.7.10 following'. (Italics added)

"As indicated above, the new tariffs will permit any kind of customer-provided terminal equipment (e.g. a computer) or customer-provided communications system (e.g. a private microwave system) to be attached to or connected to the telephone company facilities subject to the specifications set forth in the new tariff. Thus, an important feature of the revisions is the new set of conditions, referred to above, that are to govern the interconnection of such terminals and systems.

"In the case of both customer terminals and systems, it will be the general responsibility of the customer to assure that his terminal or system shall

FCC Chairman Rosel H. Hyde (right) presents the 1968 John W. Gore Memorial Scholarship to Richard M. Tavan, K3QDD, a 3rd-year student at Massachusetts Institute of Technology. The $500 annual award is presented by the Foundation for Amateur Radio, Inc., comprised of 21 clubs in the Greater Washington area, including the Potomac Valley Radio Club of which K3QDD is a member. J. F. Tex DeBardeleben, W4TE, (left) past president of FAR, joins the Commissioner in making the presentation.

not interfere with any of the services offered by the telephone company, nor endanger the company's employees or the public or damage or change the company's equipment or facilities. (2.6.2 and 2.7.2). Also in the case of both customer terminals and systems, all 'network control signalling' functions are to be performed by equipment that is furnished, maintained and installed by the telephone company. . . .

"Network Control Signalling is defined in the new tariffs as the transmission of signals used in the telecommunications system which perform functions such as supervision (control, status, and charging signals), address signalling (e.g. dialing), calling and called number identification, audible tone signals (call progress signals indicating re-order or busy condition, alerting, coin denominations, coin collect and coin return tones) to control the operation of switching machines in the telecommunication systems. The ordinary telephone set as used in the message toll service is a 'network control signalling' unit . .

"The second, or voice category of customer terminals, may also be connected either directly or indirectly. If direct connection is used, such a terminal must use a telephone company interface called a 'connecting arrangement' and the terminal must meet the technical criteria set forth in *Appendix C* hereof. If indirect connection is used, such connection must be made externally to the telephone company's network control unit. However no other interface is required and no technical criteria will apply until January 1, 1970. On and after that date, the criteria shall be as shown in *Appendix D* . . .

IV. Conclusion

"In view of the foregoing, we conclude that we should permit the new and revised tariffs to go into effect as now scheduled on January 1, 1969, without scheduling a formal investigation or hearing at this time. Our action is not to be construed as approval thereof and these tariffs are subject to such further action as the Commission may wish to take with respect thereto."

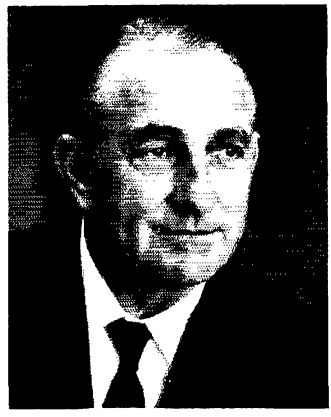
Appendix C

Technical Criteria for All Terminals and Systems Connected by Direct Electrical Connection
(Effective January 1, 1969)

i. The power of the signal at the central office shall not exceed 12 db below one milliwatt when averaged over any three second interval.

ii. The signal at the Telephone Company interface located on the customers' premises shall be controlled so that:

1. The power in the band from 3,995 Hertz to 4,005 Hertz shall be at least 18 db below the power of the signal as specified in i. above.
2. The power in the band from 4,000 Hertz to 10,000 Hertz shall not exceed 16 db below one milliwatt.
3. The power in the band from 10,000 Hertz to 25,000 Hertz shall not exceed 24 db below one milliwatt.
4. The power in the band from 25,000 Hertz to 40,000 Hertz shall not exceed 36 db below one milliwatt.
5. The power in the band above 40,000 Hertz shall not exceed 50 db below one milliwatt.
6. The signal shall at no time have energy solely in the 2450 to 2750 Hertz band and any signal power in such band shall not exceed the power present at the same time in the 800 to 2450 Hertz band.



David Packard, ex-W9DRV

EX-W9DRV DEPUTY SECRETARY OF DEFENSE

David Packard, named by President Nixon as Deputy Secretary of Defense, was an amateur — W9DRV — during his high school days in Pueblo, Colorado. He's more well-known lately as the second half of Hewlett-Packard, which manufactures about three-hundred million dollars worth of electronic measuring apparatus a year. He has both B.A. and electrical engineering degrees from Stanford, an honorary Sc.D. from Colorado College, an honorary LL.D. from the University of California, and is a Fellow of I.E.E.E.

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The new Administration has other connections with amateur radio, too. The Secretary of Transportation, John Volpe, is the brother of Pat, W1LEL. Tony Rogers, ex-W3BFW, is the son of William P. Rogers, new Secretary of State. And President Nixon related three incidents involving ham radio and himself when, as Vice President, he spoke at our 1958 National Convention in Washington, D. C. (see page 9, October 1958 *QST*) — one of them concerning W3BFW and a noisy W-VE contest!

And of course K7UGA again represents Arizona in the Senate, which leads us right into the next item . . .

GOLDWATER BILL FOR IMMIGRANTS

Senator Barry Goldwater has introduced S. J. Resolution 27 which would allow immigrants with permanent resident status, who have filed "first papers" for citizenship, to acquire amateur radio operator and station licenses. His earlier bill allowed visitors to operate here on a reciprocal basis; this did nothing for refugees whose licenses would have been cancelled by their former country, nor for immigrants who found an interest in radio after arriving here. The bill has been assigned to the Commerce Committee. (A similar bill was introduced in the House last year, but was not acted upon before Congress adjourned; such bills do not carry over into the next Congress, but must be reintroduced.)

POWER OUTPUT YARDSTICK DENIED

A petition for rulemaking, RM-576, filed by the late Earl R. Thomas, W2MM, in March 1964 has been denied by FCC. Mr. Thomas had asked that power output, not input, be the yardstick of power measurement for s.s.b. rigs. The FCC text follows:

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

In the Matter of Amendment of Part 97 of the Commission's Rules governing the Amateur Radio Service to measure the output power of amateur stations.	RM-576

ORDER

1. A petition for rule making in the Amateur Radio Service has been filed by Earl R. Thomas. Petitioner proposes that the power output, not input, be the yardstick of power measurement for single sideband suppressed carrier transmitters.

2. Section 97.67 of the Rules provides that, with certain exceptions, amateur transmitters may be operated with a power input not exceeding one kilowatt to the plate circuit of the final amplifier stage of an amplifier oscillator transmitter, or to the plate circuit of an oscillator transmitter. The rule further requires that transmitters operating with a power input in excess of 900 watts shall provide means for accurately measuring plate input power to the tube or tubes supplying power to the antenna. Petitioner proposes that the maximum power output of a single sideband suppressed carrier transmitter be limited to 750 watts. In support thereof, petitioner alleges that the result of defining power limitations in terms of d.c. power input tends to promote the use of tube types which are "incapable of handling instantaneous peak powers and tend to add to the general interference levels on the amateur bands." To support his contention, petitioner submitted curves showing the power output versus power input for a number of tubes commonly used in linear amplifiers, and states that tubes which give superior linear performance frequently require as much as 500 watts input power with zero signal output.

3. There are many types of tubes available to the Amateur Radio Service for linear amplifier operation which have operating efficiencies in the order of 55 to 60 percent. Failure to achieve a reasonable efficiency is generally due to an improper choice of operating parameters for the desired power level for the tube concerned. Petitioner would compensate for this by measuring power output instead of power input.

4. It is the Commission's belief that the practical limitations of measuring output power militate against that method of power measurement in the Amateur Service. The average amateur is not equipped with a radio frequency wattmeter or other equipment for determining power output, whereas the use of metering circuits for transmitter adjustment, which can also be used to determine power input, are common. The substitution of power output measurements in lieu of the present input power measurement would do little, if anything, to decrease the general interference levels on the amateurs bands since power output would not necessarily be reduced and, in some instances, might be increased. The radiation of spurious emissions resulting from transmitter maladjustments, which are also the cause of interference, would not necessarily be reduced by changing the method of power measurement.

5. The measurement of power output is currently beyond the ability of the average amateur and, in any event, such measurement would be of no significance in reducing congestion in the amateur bands. Accordingly, IT IS ORDERED, That the petition, RM-576, to measure power output in lieu of power input for single sideband suppressed carrier transmitters IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Secretary

Syndicated cartoonist L. D. Warren of the Cincinnati (Ohio) *Enquirer* depicted Cincinnati's Queen City Emergency Net as Santa Claus in a December 6 cartoon. The net handled 200 messages from W8VND/8 in the *Enquirer's* lobby during the Hanukkah/Christmas season under the direction of WA8GRR, vice president of QCEN. (Photo thanks to Jim Weaver, WA8COA, who has a regular ham column in the *Enquire.*)

WASHINGTON STATE LICENSE FEE

A bill has been introduced into the legislature of Washington State which would reduce the initial fee for call letter license plates from $30 to $5. Senate Bill 35 was introduced by State Senator Nat Washington on January 15, 1969. It attempts to undo the damage done inadvertently by the 1967 legislature in setting up "vanity plates" for which the fee was to be $30. The $5 fee would apply when complete plates are issued by the State; no extra fee would be charged those years that a renewal sticker or tab is issued.

Behind the Diamond

Number 13 of a Series

We've always like the romantic stories of a girl operator and a boy operator meeting via ham radio and then courting by dits and dahs — it really happened to our circulation manager **Joseph A. Moskey, W1JMY** and the former Norma Winkler, W1MUW, just before World War II.

Joe had come to the headquarters a little earlier, in 1938, to check contest logs in the Communications Department. In 1940 he took over administration of the National Trunk Lines System, as assistant to the communications manager. During the war W1JMY worked on radar development at the Massachusetts Institute of Technology laboratories, and overseas.

Returning to ARRL, Joe became deputy communications manager and then in 1953, joined the "Circdep" as assistant manager. Upon the retirement of David H. Houghton in 1965, he moved up to head the department. He's in charge of more than a third of ARRL's staff, supervising membership records, dealer relationships, inventories, mail room and shipping department — to give only a "once-over-lightly" of his duties — all involved in the annual distribution of nearly 2,000,000 copies of *QST* and other ARRL publications.

Joe's and Norma's station operates on 10 to 80 meters, c.w., s.s.b. and c.w. though W1JMY's favorite loungin' spot in recent years is the high end of 75, around supper time, evidence he's a friendly conversationalist.

One chat among Joe and some of "the boys in the back room" at hq. led to one of the cutest April Fool bi'ev'er in *QST* — a little advertisement which read,

ORIGINAL CARTONS

Command better prices for your used equipment by packing it in Original cartons! Combination offer includes 1 Original carton for any type of equipment, Original packing material, Original labels and Original serial number updating kit. Offer expires April 1. Prices on bequest.

Write: Original Carton Co., Ltd.
Lampoon, Conn. 060606

Yes, W1JMY is lots of fun to be with. Withal, he's a steady family man who serves on the Board of Deacons at Elmwood Community Church, and who with his wife Norma has raised three fine children to young-adulthood.

ANTI-SMOG REGULATIONS

Last year Congress added Section 302 to the Communications Act of 1934, giving the Commission authority to regulate the manufacture, sale, import or shipment of devices capable of causing interference to radio communications. (The Commission already had authority to regulate the **use** of these devices, which it has done through Part 15 of its Rules, in Volume II of the FCC Regulations, $2.00 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

Docket 18426 would apply the technical standards and radiation limits now required for the use of restricted radiation devices to the earlier stages of production and distribution, including provisions for type approval, type acceptance or certification.

Since no technical standards apply as yet to incidental radiation devices (motors, switches, neon lights, etc.), FCC feels it likely that control will have to continue on a use basis as in the past. However, it invites comment to the contrary as to whether and what technical standards should be considered for any particular type of incidental radiation device. These comments should be entitled, "Incidental Radiation Devices" and should be mailed to the Commission's Chief engineer.

Comments on the restricted radiation devices (receivers, garage-door openers, etc.) should refer to Docket 18426. Comment is nominally due by February 28 and reply comment by March 10, an original and 14 copies being called for. However, informal and late comments may also be accepted if a reasonable explanation is made of the circumstances (e.g., learned of the docket late; no reproduction facilities available to an individual).

A little concern has been expressed by hams as to whether this docket might backfire on us. A footnote appears to clear away this concern:

"Certain r.f. devices need not at present be type approved, type accepted or certificated notwithstanding that technical standards have been established for such devices. In those instances, e.g., . . . amateur transmitters, the basic requirement will be compliance with the applicable technical standards."

"Tennessee's Outstanding Ham Radio Operator," Werner Dolder, WB4CXL (ex-HB9MJ, VE3COL) of Greeneville holds the trophy he received at the Council of Amateur Radio Clubs convention in 1968. Vern is advisor to a radio club within the Scouting movement.

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.*)

1 Boston, Mass. 02109; India & State Streets; Thurs and Fri., 8:30–10:30 A.M.
*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.-Fri., 9–12 A.M.
*Also conducts examinations at Schenectady, N.Y. in Mar., June, Sept. and Dec.

3 Philadelphia, Penn. 19106; 2nd & Chestnut Streets; Mon.-Wed., 9–10 A.M.

4 Baltimore, Md. 21202; Gay & Lombard Streets; Mon. and Fri., 8:30 A.M.

5 Norfolk, Va. 23510; Granby & York St.; with code, Thurs., 9 A.M.; others, Wed., Fri., 9 A.M.–2 P.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; 240 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 Streets; 2nd & 4th Tues. each month, by appointment only.

7 Miami, Fla. 33130; 51 S. W. First Ave.; Thurs., 9 A.M.
*Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33602; 500 Zack Street; Tue.-Fri., 8:15 A.M. by appointment only.

8 New Orleans, La. 70130; 600 South Street, with code, Mon. 8:30 A.M.; others, Mon.–Wed. 9 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; Wed. by appointment only.

9 Houston, Texas 77002; 515 Rusk Avenue; Tues., 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; Tues., by appointment only.

10 Dallas, Texas 75202; 1314 Wood Street; Tues., 8 A.M. to 1 P.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; 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; Wed., by appointment only.

12 San Francisco, Calif. 94111; 555 Battery St.; Fri., Extra, Advanced, 8:30 A.M.; General, 9:30 A.M.
*Also conducts examinations at Fresno, Calif. in Mar., June, Sept. and Dec.

WHO THE DEVIL IS WHO?

Eleventh in a Series of Call Conversion Charts

Here are additional calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. If you should be listed here, let us know by post card right away.

Now	*Was*	*Now*	*Was*	*Now*	*Was*	*Now*	*Was*
W1LB	W1UOF	W3NZ	W3GHS	K6HX	K6BLC	W9FG	W9HNU
W1LF	W1POW	W3UF	W3HHT	K6ND	W6GFE	W9FL	W9BRY
W2BT	W2VFQ	W3VA	W3KJJ	K6NL	W1BOD	**WØ**FK	WØNCS
W2HB	K2ERE	W3VF	W3TLQ	K6NM	W6HHI	WØGF	WAØIKK
W2NQ	W2JAE	**W4**BM	W4HAD	K6NN	W6ORC	WØGL	WØBDG
W2PA	W2UJS	K4CZ	W4MGT	K6NS	W6CUQ	WØGN	WØPXH
W2RC	W2TAY	K4JD	W3BVN	K6NU	WA6EEI	WØHB	WØVSZ
W2SK	W2TTA	K4FR	W4CAL	K6NX	W6NAM	WØHY	WØDAC
W2TA	W2ADE	W4FV	W4LRL	**W7**MS	W7HDM	WØIR	WØJYA
W2YW	W2DVM	K4IY	W4JSS	W7NG	W7EYD	WØJH	WØCQY
W2YY	W2MES	W4UH	W4DJC	**W8**CP	W8FVP	WØJN	WØDCP
W2ZN	K3RWY	**W5**DE	W5PWO	W8HV	K8GNT	WØJP	WØROQ
W3JU	W3FND	K6BH	K6EWY	W8IR	W8GXR	WØJS	WØRZU
W3LT	W3AAY	K6CD	WA6OKI	**W9**DH	W9PQA	WØJT	WØUFY
						KH6AG	KH6AHD

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 May; Missoula, Mont., Aug.; Great Falls, Mont. in Sept.; Spokane, Wash. in Apr. and Oct.

15 Denver, Colo. 80202; 19th Street between California and Stout Streets; 1st & 2nd Thurs., General, Advanced, 8 A.M.; Extra, 9 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 & Robert St.; 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. and Fri., 8:30–11 A.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 St.; 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, Wisc. in Jan., Apr., July and Oct.

19 Detroit, Mich. 48226; Washington Blvd. & La Fayette 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; Ellicott & Swan Streets; 1st & 3rd Fri., 9 A.M.
*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; Tues. and Wed., 8 A.M. and by appointment.
*Also conducts examinations at Hilo in Oct.; Lihue, Kauai in Nov.; Wailuka, Maui in Oct.

22 San Juan, P. R. 00903; 322 U. S. Post Office & Courthouse; Fri., 9 A.M.

23 Anchorage, Alaska 99501; 4th Avenue at F & G Streets; Mon.-Fri., by appointment only.
*Also conducts examinations at Fairbanks in May and Nov.

24 Washington, D.C. 20554; 1919 M St., N.W.; Fri., 9 A.M. and 1 P.M.
Gettysburg, Pa. 17325; 334 York St.; 1st & 3rd Tues. by appointment only.

IMPORTANT

Appointments for exams in these field points should be made in the previous month with the District Engineer incharge, who will then furnish the location, date and time of the test. He will probably require advance submission of the completed Form 610 and check or money order for $4, payable to the FCC. (No appointment is needed at the regular offices unless so noted.)

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 325
January 1 , 1969

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Everglades Hotel, Miami, Florida, at 9:40 A.M. January 18, 1969. Present: President Robert W. Denniston, WØDX, in the Chair; First Vice President Wayland M. Groves, W5NW; Directors Charles G. Compton, WØBUO, Harry J. Dannals, W2TUK, Noel B. Eaton, VE3CJ, and Carl L. Smith, WØBWJ; and General Manager John Huntoon, W1LVQ. Also present was General Counsel Robert M. Booth, Jr., W3PS, and, for portions of the meeting, visiting Directors Charles J. Bolvin, W4LVV, Robert Y. Chapman, W1QV, Jean Gmelin, W6ZRJ, Alban Michel, W8WC, and Philip Spencer, W5LDH.

On motion of Mr. Dannals, affiliation was unanimously GRANTED to the following societies:
Bow Radio Association Concord, N. H.
Brandywine High School Amateur Radio Club Wilmington, Del.
Greeneville Amateur Radio Club Greeneville, Tenn.
Nassau College Amateur Satellite Tracking Astronomy and Radio (NASTAR) Syosset, N. Y.
Ridge High Amateur Radio Club Basking Ridge, N. J.
Schreiber Radio Club (H. S.) Port Washington, N. Y.

On motion of Mr. Smith, unanimously VOTED formally to approve the holding of a Pacific Division Convention in Sacramento, California, on June 13–15, 1969; a Rocky Mountain Division Convention in Salt Lake City, Utah, on July 4–6, 1969; a West Virginia State Convention at Jackson's Mill on July 5–6, 1969; a Roanoke Division Convention in Huntington, West Virginia, on October 11–12, 1969; and a Southwestern Division Convention in San Diego, California, on October 17–19, 1969.

On motion of Mr. Compton, Life Membership applications for the following were unanimously APPROVED:
William S. Dean, K5ZSC
Richard Dundon, W7LIA/WA4VVE
Marvin J. Fein, W2AH
Robert W. Glines, K9HSL
Harry Gourley, K7ESS
George H. Greenberg, WB2YPN
Walter P. Greenwood, WØIJA
Theodore M. Hannah, K3CUI
John H. Hardman, K2MVR
Conrad L. Helber, KØRAX
Otis R. Hill, WA1IJV/K6MLZ
Jack Johnson, WA5VZV
Richard E. Johnston, K1QJD
Joseph C. Kern, K1VWI
William A. Koontz, W9POX

Mrs. Ruth Christian, WA4HED (and NØEXA in Navy MARS) is Broward County (Florida) Ham of the Year. The award, by directors of the Broward Amateur Radio Club, was presented by the president, C. Ivan Peterson, W4EOD, in recognition of her traffic handling in amateur and MARS nets.

Robert Leonard, W9HRY
R. L. Marquess, W5TTQ
Mark L. Potter, W9FBD
Plez Z. Reid, Jr., W1CCX
E. E. St. John, K6EV
Renny A. Smith, WA5CAW
Rubin Smulin, WA4YTO
George E. Sparrow, VE3BQN
William C. Voedisch, Jr., W1QKX
F. Clarke Walker, Jr., WN4HWM
R. J. Wallenborn, W4SJH
George J. Watts, WA6JKO

On motion of Mr. Smith, unanimously VOTED to approve the action of the President in expanding the membership of the VHF Repeater and the Contest Advisory Committees to nine amateurs each.

On motion of Mr. Groves, unanimously VOTED to authorize the General Manager to execute a change of beneficiary, as necessary, in connection with the retirement annuity of Francis L. Higgins.

The Committee heard an extensive report from the ARRL General Counsel on the TVI-nuisance lawsuit against Ansel Gridley, W4GJO, and agreed that the League should continue to assist with background advice and guidance in the case as necessary to insure protection for amateur radio generally.

The Committee was in recess for luncheon from 1:45 to 2:35 P.M.

The Committee next examined in great detail the question of the establishment of an outgoing QSL bureau. On motion of Mr. Smith, unanimously VOTED that, after a careful review of the comprehensive presentation by the General Counsel and General Manager on the question of an outgoing QSL bureau, the Committee concludes that it would be in the best interests of amateur radio not to expand the existing system.

(During the course of its meeting the Committee discussed, without formal action, arrangements for the 1969 Board meeting, FM repeaters, accident insurance for directors and SCMs, Project Oscar, distinctive QSL cards for directors, and FCC regulations.)

There being no further business, the Committee adjourned, at 3:45 P.M.

JOHN HUNTOON, W1LVQ
Secretary

QST

Illinois — The Sterling-Rock Falls ARS is sponsoring a Hamfest that will be held at the Sterling Coliseum in Sterling, Ill. on Sunday, March 16. For more information write Sterling-Rock Falls ARS, P.O. Box 11, Sterling, Ill. 61081.

Maryland — The B&O/C&O Amateur Radio Club's 10th Annual Dinner-Dance will be held at the American Legion Hall in Arbutus, Maryland on April 19. Tickets are $5.00 per person and must be submitted by April 5. Tickets and further information may be procured from Joseph W. Zorzie, W3LBC, B&O/C&O RRS ARC, B&O Central Bldg. 107, Baltimore, Md. 21201.

Michigan — The Blossomland ARA will hold its annual auction on Sunday, March 16 at the Downtowner Restaurant, 69 Wall Street, Benton Harbor, Mich. The auction will run from 10:00 A.M. to 5:00 P.M. Anyone is invited to bring anything electronic that they would like to sell or have auctioned off. Three call-in frequencies will be used: 146.94 and 52.535 MHz. for f.m., and 2.930 MHz. for s.s.b. Station call is W8MAI. Free parking is available. Write for an information bulletin and map from W8AEF, 653 Pearl Ave., Bridgman, Michigan 49106.

New Jersey — The Key Klickers of Stirling, N. J. will hold their annual Ham Auction on Friday evening, April 11 at the Central School Gymnasium, Central School, Stirling, N. J. The event features three top auctioneers working simultaneously and refreshments for all. Come early the show starts at 8:00 P.M. For further information, maps and talk-in, call or write Van, W2DLT, 201-647-3325 after 10:00 P.M. or at 302 Passaic Avenue, Stirling, N. J. 07980. Talk-in stations on 146.94 f.m. and 145.26 a.m. Come out for an evening of fun and bring your excess gear along.

New Jersey — Annual W2-DX Round-up Saturday March 22 (Saturday prior to IEEE Convention) at Holiday Inn of Newark, 430 North Broad St., Newark, N. J. Starts 1:00 P.M. Tickets basis — afternoon program only, or total package with prime rib banquet. Afternoon program will include talks on speech processing, antenna performance, DX panel on "how to." Conveniently reached by train, subway, car and bus. Further details call W2LA. Also call 201-226-4545 or 212-344-2997, both daytime.

New Jersey — The annual spring auction of the Raritan Bay Radio Amateurs, Inc., will be held on Sunday, March 23 at Spezzi's Restaurant, Washington Rd., Sayreville, N. J. These events, held each spring and fall, regularly attract amateurs from the entire eastern seaboard. Further information from box 73, Sayreville, New Jersey 08872.

New York — Annual Luncheon in connection with the SSB Amateur Radio Exhibits will be held Tuesday, March 25 in the East Room of the Statler-Hilton Hotel, New York City. Send reservations ($7.00) to Mr. Mark Devaney, W2NQR, Room 1064, 99 Park Avenue, New York, N. Y. 10016.

New York — See W2-DX Round-up under "New Jersey."

New York — The tenth annual New York State Southern Tier Hamfest sponsored by the IBM ARC, QCWA, AREC and affiliated clubs will be held on April 19 at St. John's Memorial Center in Johnson City, N. Y., starting at 1:00 P.M. Adult tickets $4.50 each and student tickets are $2.50. Advance sale only. Closing date on ticket sales is April 16. Afternoon activities include speeches, displays and contests. Surprise events throughout the day. Banquet/dinner promptly at 7:00 P.M. Tickets and full particulars may be obtained from ticket chairman, Joe Kuntz, WA2ZTY, 1020 Forest Rd., Endwell, N. Y. 13760.

New York — RAGS is sponsoring its annual hamfest on March 29. W2FR can supply the details and tickets.

Texas — The Midland ARC, W5QGG, of Midland, Texas has scheduled its annual Swapfest for Sunday, March 23 in the Midland County Exhibition Bldg. An informal dance will be held Saturday night, March 22. Further information and advance registration forms may be obtained by writing P.O. Box 967, Midland, Texas 79701.

Every seven or eight years, new metallic automobile license plates are issued in Hawaii. This year, 1969, new call plates will be issued and those collectors of ham call plates wishing to obtain old KH6 plates should contact any Hawaiian station or the Honolulu Amateur Radio Club, P.O. Box 2868, Honolulu, Hawaii 96803, which has undertaken this distribution as a club project. Correspondence to the KH6 should be accompanied with an s.a.s.e. Requests for KH6 plates should be accompanied with $1.00 or 10 IRCs for surface mailing. All requests should be received before 31 March 1969.

— *KH6BZF*

RULES FOR LIFE MEMBERSHIP

1. The Board of Directors has established a provision for Life Membership in The American Radio Relay League, Inc., effective August 1, 1967.
2. Life Membership is granted only by the Executive Committee, upon proper application from a Full (U. S. or Canadian licensed) Member.
3. The Life Membership fee is twenty times the annual dues rate, or currently $130.
4. An applicant may choose an alternative time-payment plan of 8 quarterly instalments, $16.25 each. In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
5. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the instalment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
6. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of $1, but without receipt of *QST*. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
7. Application forms are available upon request from the Secretary, ARRL, Newington, Conn. 06111.

"It Seems to Us . . ."

(Continued from page 9)

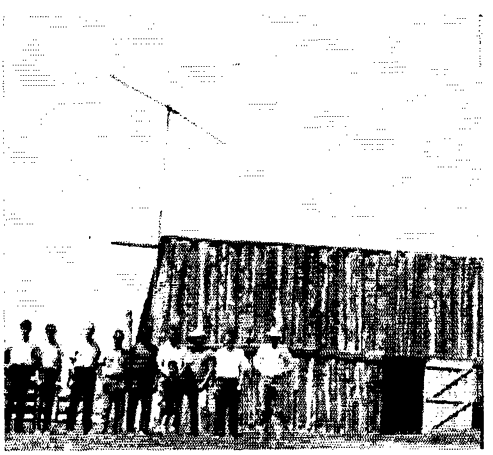
where you can lay hands on it quickly in an emergency. We will be allowed to transmit soon and then you will need it."

The object was duly received at Hq. The Editor, fully mindful of the historic significance of the occasion, took the instrument to one of the first Board meetings in New York, May 3, 1919, subsequently duly reporting in *QST* that "each face noticeably blanched when the awful Wouff Hong was . . . laid on the table." By an action still a part of the League's official records, that Board voted that the Wouff Hong be framed and hung in the office of the Secretary of the League. There it remains to this day.

We know the significance of the Wouff Hong. We don't know the significance of its weird shape. Not even the beloved T.O.M. (revealed, after his death, as none other than our first president, Hiram Percy Maxim) ever explained that. Nor was the precise manner of its use ever prescribed, although it perhaps may be guessed with a little imagination. But as the years passed, it continued to grow in the affections of amateurs the country over, old-timer and youngster alike. It became the inspiration of the Royal Order of the Wouff Hong, the amateur secret society of ARRL convention. Today, it is thoroughly entrenched in the lore of amateur radio as its most sacred symbol.

The Wouff Hong! — see it when you next visit ARRL Hq. QST—

Strays



DXpeditions go everywhere these days . . . this photo shows one to Wyoming sponsored by the Utah DX Association. The group sponsored a previous DXpedition to Nevada—both were attempts to put the states on-the-air for stations outside the U.S.

This is WA3EQM, an Extra Class licensee at age 14. Brad is a past president of the St. Paul's School for Boys Amateur Radio Club and currently attends Baltimore Polytechnic Institute.

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

NEW MEMBERS

Bringing membership to an all-time high of 80, the International Amateur Radio Union admitted amateur radio societies in Mauritius and Surinam. The *Vereniging van Radioamateurs in Suriname* now represents PZ amateurs in the Union. In fact, all 41 amateur licensees in Surinam are *VRAS* members! Radio amateurs in Mauritius, Agalega, St. Brandon, and Rodrigues Islands are represented by the *Mauritius Amateur Radio Society*. Application for IARU membership was made by *MARS* on March 12, 1968 — the date on which Mauritius became an independent country.

INDONESIA

As has been reported earlier, the ban on international amateur radio communications between Indonesian amateurs and the rest of the world has been lifted. However, Indonesian telecommunications authorities wish it to be known that presently the only call signs valid for DX QSOs are YBs. YC and YD calls are restricted to use within Indonesia, and PK8 prefixes are illegal. Indonesian authorities are particularly anxious that no contacts be made with the illegal stations using the PK8 prefix.

B.A.R.T.G. SPRING RTTY CONTEST

The British Amateur Radio Teletype Group is sponsoring a spring RTTY contest that will run from 0200 GMT March 15 to 0200 GMT March 17, 1969. The total contest period is 48 hours but no more than 36 hours of operation is permitted. Time spent in listening counts as operating time. The 12-hour non-operating period can be taken at any time during the contest, but "off periods" may not be less than two hours at a time. Times on and off the air must be summarized on the log and score sheets. Stations may not be contacted more than once on any one band (80 through 10 meters), although additional contacts may be made with the same station if a different band is used. Use the ARRL country list for country status. However, KL7, KH6, and VO will be considered as separate countries. The message exchange will consist of message number, report (RST) time in GMT, country and continent. All two-way RTTY contacts with stations in one's own country will earn two points, with stations outside one's own country earning ten points. All stations will receive a bonus of 200 points per country, including their own. Scoring will be done as follows: (A) Two-way exchange points times total countries worked. (B) Total country points, times number of continents worked. Add A and B for total score. Use one log for each band and indicate any rest periods. Logs must contain band, message number, time in GMT and continents plus exchange points claimed. All logs must be received by May 5, 1969 to qualify. Certificates will be awarded to the top two scorers in each country. The decision of the judges is final and no correspondence can be entered into in respect to incorrect entries. This is to enable the scores to be worked out more quickly and should result in more speedy publication of the results. Send your logs to Ted Double, G8CDW, B.A.R.T.G. Contest Manager, 33B, Windmill Hill, Enfield, Middlesex, England.

NOTES

The following addresses supersede those shown in "QSL Bureaus of the World" which appeared in the December 1968 column. Germany: *DARC* QSL Bureau, P.O. Box 86 03 20, D 8 Munich 86. Faroe Islands: OY-Bureau, Sofus

Mauritius Amateur Radio Society member Mico Palmyre helps with the assembly of the Johnson Viking Ranger II transmitter kit presented to the Society. Mico has already passed the Mauritius amateur license examination, and hopes to be on the air soon, when he has passed the Morse test.

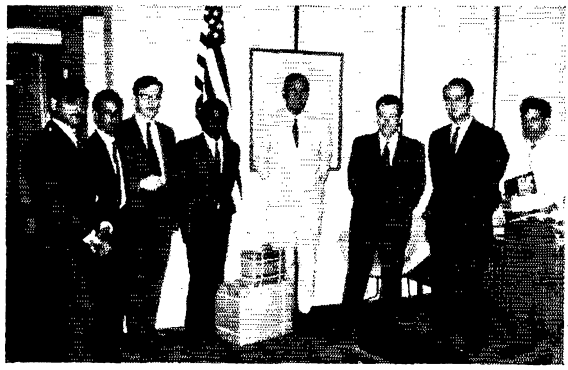
Rubeksen, OY3B, Undir Svartafossi, DK-3800 Torshavn.

VERONA, IARU society in the Netherlands Antilles, reports that the amateur call sign system has been revised so that each of the six islands is now designated by a digit: Curacao-PJ2, Aruba-PJ3, Bonaire-PJ4, St. Eustatius-PJ5, Saba-PJ6, and St. Maarten-PJ7. PJ8 and PJ9 are issued to alien non-residents and PJ1 and PJØ will be used on special occasions.

AMATEUR RADIO EDUCATION

The promotion of amateur radio, and the training of neophytes is a universal and necessary activity if amateur radio is to remain strong. In Nigeria, four members of the *Nigerian Amateur Radio Society* who are also on the staff of Ahmadu Bello University have started a program to interest students. Morse classes are again being run for the second year; elementary radio theory classes will be arranged if there is sufficient demand. 5N2AAF reports, "With the first term of the new university session just beginning it is hoped that students will not devote so much attention to their work that they will have no time for a new hobby, amateur radio!"

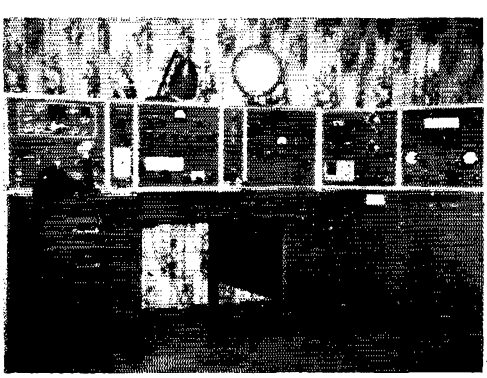
Another step in training new amateurs is the training of instructors. Recently, the *Central Radio Club of Bulgaria* sponsored a seminar in Sofia for the benefit of district radio club instructors. The purpose of the seminar was to help instructors improve their methods of teaching. Construction practice, h.f. and v.h.f. operating, contests, transmitter hunting, as well as the organization, conducting and judging of competitions was discussed and various practical exercises were included. (Tnx *Region 1 Bulletin.*) QST



William B. Hussey, U.S. Charge d'Affaires a.i. presents a transmitter donated to the *Mauritius Amateur Radio Society* through *ARRL*'s Project DARE (Developing Amateur Radio Everywhere). At the ceremony, held at the U.S. Embassy, Port Louis, were (l. to r.) VQ8CI, VQ8CJ, VQ8CC, Mico Palmyre, Mr. Hussey, VQ8AD (*MARS* Chairman), VQ8AH, and Samuel Boyjonauth.

Strays

Plan to include the Single Sideband Show in your activities during the IEEE convention this year? It's being held again in 1969 on Tuesday, March 25, from noon to 9:00 P.M. in the Penn Top Room, Statler-Hilton Hotel, Seventh Ave. at 33rd St. in N.Y.C.



WØDAK takes pride in his all-homebrew console shown above. Gene rationalizes the two kits included by saying "they replaced equivalent homebrew units!

The Staten Island Amateur Radio Association, SIARA, will celebrate 50 years of amateur radio on Staten Island aboard a Staten Island Ferryboat, for a 16-hour period on Saturday, Mar. 1, 1969. In addition to operating 2 -20–75 meters, an amateur-TV hookup between the boat and the ferry terminal will be in operation. A special certificate or QSL will be issued for contracts with the club (W2CWW). Special permission for the event has been obtained from the New York City officials.

—•••—

St. Louis area hams, want to join a charter bus trip to the Dayton Hamfest? WAØVMP is trying to locate 39 hams to charter a Greyhound bus (their newest coach, complete with air conditioning, lavatory and five-position reclining seats!) to attend the one-day affair. Contact him at 4350 Heidelberg, St. Louis, Missouri 63123.

—•••—

During the recent Apollo 8 flight, astronomers at Foothill College observatory were observing the moon and noticed three mysterious light spots or streaks on the dark side of the moon. The sightings were radioed by ham radio via "Astronet"[1] and eventually to the astronauts in Apollo 8. No word on whether or not the astronauts had time or luck to check out the sightings. However, ham radio furnished the important link between the astronomers and Mission Control in Houston, Texas.

[1] Calkins and Guter, "Astronet," *QST*, February 1966, page 50.

Correspondence From Members-

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

PIANO HARMONICS?

¶ I had begun to doubt my senses and to lose faith in Farady and Maxwell because, for some weeks running I had been bothered on my c.w. schedules with crashes of interference that seemed somehow connected with the wife's piano playing.

The piano is two rooms away from the shack and, although it's a mechanical device, with long metal strings over a metal bridge, vibrating in the earth's magnetic field — "Oh no! A harmonic on 20 meters? Impossible! Yet, it seemed strange that I got that particular type of interference or noise only when she was playing the piano.

Then one night I decided to have it out with that piano even if I had to take it apart. The XYL was playing the "Raindrop Prelude" (Chopin Opus 28, Nr. 15). This isn't a particularly loud or dynamic number but there's a persistant and repetitive "A flat" to it and my noise crashes were synchronized with that one note. — Stop everything! First a frequency check. — "Nope, the same thing on all bands." So, turning up the receiver gain so I could hear it from the music room, I plunked that suspicious A flat. — Now how in the name of Hertz?" — I rolled my head ceilingward while I pondered things like electromagnetic induction, contact potential, thermoelectricity — thermo — thermo — "That's it! Thermostat." Sure enough, a slight twist of the temperature setting and the noise disappeared. The spring in that darn thing is tuned to A flat and, when its contacts are just about to "make," their slight vibration, caused by the piano note, produces arcing. Very minute arcing, to be sure.

Another case of troublesome interference cleared up, Watson. A grand piano is indeed an entirely mechanical device. — *W. Conley Smith, K6DYX, Monterey, Calif.*

BAND MARKERS

¶ I fully agree with Mr. James A. Gundry, W8BW, that the logical place for the W1AW code practice sessions is 25 kHz. in from the band edges. (January 1969)

This would give the Extras an additional four kHz., or so, of *their* band, and most Generals will stay a kHz. above the demarcation. This should be the closest thing to a clear channel yet. — *John E. Ball, Sr., W5REL, Slidell, La.*

[EDITOR'S NOTE: See Op News this month.]

UNITED FRONT

¶ Of late the amateur radiotelephone signal interference problem in the low end of 7 MHz. is getting worse. I can understand the problems of fighting the commercial signals, but must we suffer in our own ranks? An a.m. telephony signal uses up space where five or six telegraphy contacts could be successfully taking place and the calls I listen to on a.m. telephony are amateurs who should be aware of the precedents they are establishing.

When the time comes for the commercial interests to begin nibbling at our precious frequencies it would sit much better if all of us in Region Two could present a somewhat united front in terms of band usage. A good place to start would be in our own neighborhood if it is at all possible. — *Herbert A. M. Luther, W5WQN, Bryan, Texas.*

UPGRADING

¶ It was largely thru your effort and the challenge "because it was there" that brought the Extra ticket and the ultimate two-letter call. "They" will cuss and discuss for some time to come — but those uncluttered band segments sure do sound good and others will want to be there too. Keep it up! — *Ed Vosicky, WØJT, Overland Park, Kansas.*

¶ The position of many persons not in favor of incentive licensing was that a lot of us Advanced Class holders were simply in favor of incentive licensing just because of the "grandfather rights" that we would automatically enjoy.

For the record, I did get off my butt and did some studying and now hold the Extra Class license (also I am now WØJS instead of WØRZU).

A very good friend of mine WØVSZ (who is now WØHB), also held the Advanced ticket and campaigned in favor of incentive licensing. He also now has the Extra Class license.

So, you see, some of those people don't know everything after all.

Congratulations to the ARRL for pushing incentive licensing! I now know more about the technical side of ham radio than I otherwise would — just because there was some "incentive." — *Edward P. Hardt, WØJS, Minneapolis, Minn.*

¶ Somewhere along the line during the past few years, the FCC has seen fit to legislate me out of my former rights (old Class A) to occupy all amateur frequencies and make me a second-class lid. Frankly, I believe a proper presentation to the courts would restore all of my rights and reverse the present policy.

However, I do not intend to make a contest of this because class-distinction does not belong in amateur radio and if scorn is heaped on me for only having an Advanced ticket, then I must bear the burden. I'll only talk with the other bums with Advanced tickets and I shall ignore the Extra Class ops. If enough of us lids will adopt the same line of thought and voluntarily restrict ourselves, then W1AW can operate code practice sessions 20 kHz. inside the band without fear of being QRM'd. Why? The Extras will soon get tired of talking with one another and they eventually will require only 5 kHz. of the band.

Thus, they need not worry about undeserved scorn and ridicule generated by class distinction. Most of it will be self-generated. — *Doug Rice, WA4NZI/W1FQX, Plantation, Florida.*

¶ Any hobby to be worth its while, needs certain goals or incentives that should be met in order to give one a feeling of accomplishment. What purpose is there for a higher-class license if the General Class ticket gives one all the privileges associated with amateur radio? . . . Citizens Banders will never have the feeling of accomplishment we "hams" can have because there are no goals to be attained in the operation of CB radio. — *Joseph H. Bevaque, WB8CEQ/6, FPO, San Francisco, Calif.*

¶ What goes on up there? Now with all your, and the FCC's scheme of incentive licensing you've got me back grinding away at the code! I thought after I'd gone through Novice, Technician, General, and recently the Advanced, I'd be able to sit back and rest on my laurels. Now it's the Extra Class dangling in front of me!

I'm over seventy and now I'm back in the student class again, thanks to you!

Keep up those code practice sessions, especially the 20–25 w.p.m. I may still be able to get that Extra Class if I live long enough! — *Fred E. Ennis, W3RXS, Salisbury, Md.*

PREJUDICE

¶ In that long-standing argument between amateur radio constructors and operators, the constructors seem to have had the most to say lately, and that is usually in disparagement of the operators. The more extreme of these factions of hams might consider the example of their counterparts in the field of photography and similarly resolve their differences. In reading any photography magazine one can readily see that photography "constructors" (technicians) and photography "operators" (artists) understand and acknowledge each others' necessary and complementary contribution to the science and art of photography. Isn't it strange that only hams, practicing the science and art of telecommunications, cannot communicate with each other toward the same end?

Perhaps this is partly because the result of the amateur radio constructor's efforts are right there in front of him and are easy to see and appreciate. The value of the operator's contribution, on the other hand, may be mainly potential and less easily appreciated. But when the chips are down, and our national security is threatened, in our first line of defense are the operators of complex military electronic equipment such as no ham constructor could build at home. . . . Because those operators already in regular armed forces service are inadequate for the vastly expanded facilities necessary during extensive hostilities, the reservoir of amateur radio operators (and technicians) becomes a national defense asset as important as our oil reserves and mothballed fighting ships. . . . — *B. Frank Borsody, K4EC/W2AYN, Palmetto, Fla.*

¶ Would someone please inform me as to what divine rights WØHQW has in calling appliance operators "a microphone-happy bunch of lids" in the August issue of *QST*?

It is just this type of arrogant rudeness that is spoiling amateur radio today. . . .

There are many facets to amateur radio and I am getting sick and tired of the prevailing intolerance of a.m.er's running down s.s.b., both running down c.w., and vice-versa. There should be room for everyone if hams curb their prejudices. — *R. T. Knight, VE7BWA, Trail, B.C.*

W1AW's NEW FREQUENCY

¶ Anyone who believes restrictive licensing has helped clean up the bands, is invited to come to California and try to copy the 40-meter ARRL code practice through the "Extra Class" lids who can't find a free frequency elsewhere.

Even using the .4kc. position of my R4A, they have been causing enough QRM to make copy almost impossible.

I am not prone to writing letters in haste, however, the frequency with which it is impossible to copy W1AW because of QRM requires some comment, especially since the "cream of our crop" is causing the problem. — *Dr. Lawrence A. Edler, WB6MVK, Santa Cruz, Calif.*

¶ As an aspiring Extra, I have been listening faithfully to W1AW code sessions at 3.520 MHz., which is almost always the best frequency here. Nearly every night I experience terrific QRM from stations near 3.520 MHz. Along with most phone operators I have no c.w. filter in my transceiver, only selectable sidebands, so selectivity is part of the problem. However, this band segment is populated nowadays exclusively by Extras and the lack of consideration of these top operators for their fellows who are trying to work up the ladder is an egregious example of what amateur radio should not be. They are all too fast for me to copy at present or I would send QSLs individually requesting a little room at practice time. . . . — *Frederick C. Grant, WB4ELZ, Newport News, Virginia.*

¶ Before the effective date of the ruling which keeps all transmissions except those of the Amateur Extra licensees away from W1AW's code practice signals my attempts to pick out the code practice signals on 80 and 40 meters were hindered by QRM which seemed to cover all frequencies near that of the W1AW carrier.

Last night's experience was quite different. The QRM was no longer bothersome. It was as though transmissions were being kept farther away from the W1AW carrier.

Knowing that my rather simple, none-too-selective receiver makes me a rather hard-to-please SWL, I want to say that the Extras were very considerate last night. — *George T. Phillips, Westlake, Ohio.*

¶ I find one thing very difficult to understand and that is why some hams just seem to wait for your signals to start and WHAM — they're right on top of your frequency. . . . I wonder what kind of people these inconsiderate and rude hams must be. Maybe if others did not respond to their signals, things would clear up. — *James M. Carroll, W1UYL, Lynn, Mass.*

NOVICE ACCENT

I have read the reprint of the article "Your Novice Accent" and find that I make some of the mistakes you point out. One thing I do is send R R after my call in a QSO. If you remember your first QSOs and how nervous you were when you answered a CQ and found that someone was actually calling you, you might understand how a Novice would send R R (I heard you, I really did). Another mistake I make is to use punctuation marks during a QSO. I feel by using these punctuation marks I might become more proficient in their use.

I might say in closing that the Novice is bound to make mistakes; and it is only by these mistakes that he will learn. — *Robert S. Milman, WN6MNQ, Woodland Hills, California*

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The Art of Ragchewing

It has been said that one of the most colorless experiences in life is standing in a reception line smiling, shaking hands, and saying the same polite nothings to person after person, so that in retrospect, everything and everybody is just a blurr with no particularly outstanding personality. What a relief it would be to have someone say something that wasn't in the correct conventional rut.

We run into this "reception line" technique far too often in our amateur operating. In particular during the Novice part of the hobby, but quite regularly after we have earned our higher-level licenses. True, some of us truly enjoy logging a great many short contacts in a single period of operating, and if the next day is going to be an easy one with little or no responsibility such as work or school we log them far into the night. The QSLs flow in, we paper our shack wall, but when we look them over do we really *know* anything about these many people we have worked other than a name and signal report?

One of the real arts of amateur radio operation, and a privilege granted to our service, is ragchewing. This skill goes beyond the signal report, name and what sort of equipment we are using, it is a reflection of our ability to chat with a key and can begin as easily as any conversation. For the Novice this isn't too easy. As beginners we have to think out all the proper forms we must use, and because we must adjust to talking with our fingers and spell out all the words we shy away from using anything but a fixed formula. It's so easy to fall in to the mold and follow the tried and true conventional technique. But the one way of really getting to know people is by talking to them. In this day of "projecting" it isn't too hard to cut loose from the standardized name, location, signal report, followed by a second transmission of an inventory list, it is as simple as following the urge to break the monotony of the reception line. There was one Novice who abandoned the etiquette of "so back to you" or "what say?" and ended the transmission with "How many crimes have you committed today?" And back came the reply "Sorry no crimes, I wouldn't dare. I am a policeman." That was all that was needed to start a ragchew that ended only when skip changed.

Nothing can quite equal the wonderful moment when we receive our license, nor can anything equal the agony of buck fever in that first contact, but following these two extremes come the exciting experiences when we settle down to making friends on the air. We can accomplish these meetings in the formal "reception line" manner, or, by extending the second or third transmission with some comment or question build up a wall full of cards that have a personality on almost every one. Thus, when we are asked, as we always are, by our truly curious unlicensed friends "What do you talk about?" our answers are colored by the many things we have said that are beyond the "rig hr" form of operating. Ragchewing is not the exclusive pleasure of the high-speed c.w. operators, or of the phone man, it is for everyone who breaks out of the "reception line" formality into one of the most pleasant and rewarding phases of amateur radio.

*YL Editor, *QST*, Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.

K5BNH and K5TEY presented ARRL Award of Merit

Two women amateur radio operators of the West Gulf Division recently received the ARRL Certificate of Merit which is awarded for "outstanding service."

Bea Winnett, K5BNH, who was licensed in 1955, became interested in traffic handling right after receiving her General Class license. Since then, she has made BPL 14 times in 15 months. A member of the 7290 and 3961 traffic nets, Bea also is active on the Eye Bank Net, TYLRUN, and Navy MARS. She received an ARRL Public Service Award for her work during Hurricane Beulah in 1967, and has given valued assistance during many North Texas Emergencies.

Nina Walker, K5TEY

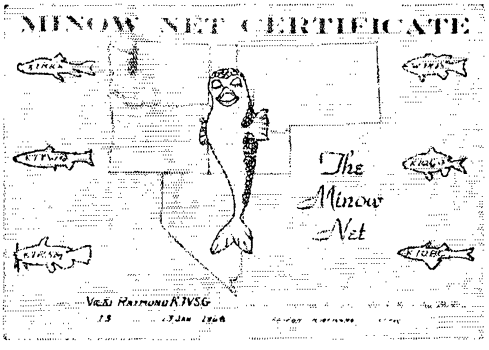
Nina Walker, K5TEY, was licensed in 1959, and is another YL who immediately became actively involved in public service and emergency communications. She is active on the North American s.s.b., 20 Meter Interstate, and 7290 traffic nets. Also Nina participates in the Sooner Traffic net, the Oklahoma, Kansas, and the Arkansas Post Office Nets, and Navy MARS.

The ARRL Certificate of Merit that was presented to each of these YLs is the most recent recognition of their contributions to public service.

"Across the Line in '69"

If you are planning to go "across the line" there are just two months left. Be sure to remember to bring those "swaps." For those who are still toying with the idea remember that this is the only annual affair that is for YLs only. It is the best way to combine vacation with a good gabfest and excellent entertainment all about our favorite topic — Amateur Radio. If you have put it off remember the dates are May 16, 17, 18, 1969, the place is Toronto at the Canadiana Motor Hotel. Send your registrations to Doree Butler, VE3EUV, Apt. 501, 38 Clarkluke Cr. Willowdale, Ontario, Canada.

Please remember also that if you plan to operate portable it is getting very late to apply for those operating privileges from the Office of Transport!



MINOW Net Certificate

Meet the Club — The MINOWs

In September 1962 a group of YLs in northwestern United States started an informal meet-and-talk net. By May of the following year the MINOW net had become a formal on-the-air club.

The northwestern part of this country isn't exactly a vast undeveloped frontier, far from it, but it does cover a good deal of territory. The gals living in the states of Montana, Idaho, Nevada, Oregon, and Washington decided to use the first letters of the names of the states where they were located for the name of the club, and thus show the area it covered.

The MINOW net has a membership of over 50 YLs who meet each Friday on 3.913 MHz., at 1600 GMT, and later on 14.313 MHz. at 1830 GMT. Both nets welcome any YL who would like to participate. Membership in the MINOW club is restricted to women operators who live in the states designated by the club name. The MINOWs hold two off-the-air meetings each year: the annual spring picnic, when officers for the coming year are elected, and the Bazaar at the Walla Walla, Hamfest.

The MINOW net certificate is available to U.S. stations who send log confirmation of working 6 MINOW members, with 3 of the states represented; to DX stations submitting confirmation of contact with three members. Custodian is Frieda Raymond, K7PVG, in Richland, Washington.

Bea Winnett, K5BNH

YL ISSB

International in scope and membership, and with the motto "We believe in the dignity of man," the ISSB started existence as a YL organization. V. Magree, K4ICA, founded the group with the idea of a world-wide YL. association in mind. In the early days the women met once a week for a couple of hours. Soon there was a demand from the OMs to be allowed to join them, and she opened the membership to all those who were interested in maintaining the spirit of the group.

Because of the international completion, as well as their interest in the service to others, the ISSB have made truly outstanding contributions to the public service in times of emergency.

Membership is not limited to operators of s.s.b. alone, there are many c.w. members, and it doesn't take a kilowatt to join the net.

It is unique that this very active net that was originally organized by a YL for YLs have elected a woman as their president for the first time in the year 1969. Jessie Billon, WA6OET, is the first woman besides the founder, K4ICA, to guide the ISSB membership since its organization. QST

Caroline Gmelin, K6BGM getting an explanation of the Navy MARS set up at SAROC, January 1969

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* WB4HIP

R.F. Hazards

CONSIDERABLE interest is being expressed in the amateur u.h.f. bands. There is much to be learned at these frequencies, including possible physical dangers from r.f. absorption. David Oliva, K9CNN, has brought to my attention a recent paper published in *Electro-Technology* concerning r.f. effects on humans and other living matter. The paper was written by Henry M. Hoffart, of General Electric's Missile and Space Division. The highlights of his paper are especially noteworthy to those using the u.h.f. bands.

The communications industry has become quite interested in the effects of r.f. on men working with microwave equipment. There is limited knowledge of the subject, but some engineers are concerned that more positive safety precautions are not being taken. Such safeguards as shielded work areas and r.f. intensity monitors have been suggested.

Man is most susceptible to r.f. in the 1000 to 3000-MHz. frequency range. This includes our 1215, 2300 and 3300-MHz. bands. These frequencies cause the most concern because of the propagation wavelength in relation to a man's physical height. Standing erect, we are most susceptible to vertical or circular polarized fields. The thermal effects of r.f. exposure depend upon frequency and intensity. The eyes and reproductive organs are the most likely to be damaged, but also included is the nervous system and muscle tissue. The radiation causes only a slight increase in skin temperature and may go undetected.

R.f. radiation may be reflected, absorbed or passed through. Sensory elements of the body are located primarily in skin tissue. Therefore, Hoffart says, frequencies below 1000 MHz. are considered extremely hazardous because the radiation will not be detected by the surface sensory system. Skin tissue may absorb as much as 40 percent of the r.f. arriving at the body surface! This r.f. appears as heat.

According to Hoffart, our ability to dissipate this heat and minimize radiation hazards depends upon many factors. Included are humidity, air temperature and circulation, clothing and so forth. Sedatives and tranquillizers also interfere with the body's ability to regulate temperature and lose heat.

In a recent issue of *Ham Radio*, WB6IOM warned against improper handling of high power at 1296 MHz. He says the most danger exists near the feedpoint of a parabolic reflector (dish), open connectors or any other physically small radiating device. It is good practice to not walk in front of an antenna under power, and never look into the energized feedpoint at close range. The eye has no nerve to warn against heating.

Reading the full article by Hoffart in the November, 1968 issue of *Electro-Technology* is suggested for those using our u.h.f. bands, especially with high power and narrow-beam width antennas.

Solar Peak Coming?

There are indications that *solar cycle 20* may yet offer some surprises. It was thought the cycle peaked last summer. The lull in 50-MHz. *f-layer* activity during October and November supported this belief. But strange things have been happening.

The "educated guesses" are now that present *cycle 20* is behaving much like *cycle 17* of the mid 1930s. That cycle had two peaks, *coming* some 12 months apart. Historically, solar cycles may have a *secondary* peak, coming as much as three years after the primary. However, *cycle 20* appears to differ. The peak last summer had a smoothed sunspot count of 110 to 120, just below what has been shown necessary for regular 50-MHz. *f-layer* openings.

Using a crystal-controlled 2C39 transmitter on 2304 MHz., WA4HGN covered a 117-mile path from this mountaintop near Camden, Tenn., to W4HHK, Collierville, Tenn. The dish is 2½ feet in diameter. The KWM-2 was used for 75-meter liaison.

* Send reports and correspondence to Bill Smith WB4HIP, ARRL, 225 Main St., Newington, Conn. 06111.

Don Lund, WAØIQN, whose occupation is studying the sun's behavior for ESSA at Boulder, Colorado, says it is possible that *cycle 20* will reach a primary peak this coming summer and a smoothed count of 200, *if* the present level of solar activity continues. A 200 count is comparable with *cycle 19* when 50 MHz. was open the world-around. Don's estimate is based on current (January) solar activity. After an October and November lull the sun sprang back to life in December. He cautions that relatively little is yet known about solar predictions and that the current activity could be short-lived.

There is, however, a suggestion that six meters will be open fairly often this summer between the southeastern states and South America, and the west coast and Hawaii, via *f-layer*. We should encourage ZK1AA, 5W1AR and others operating 50-MHz. beacons in the Pacific to continue. Other paths should not be ignored, either. All of this lends hope that transequatorial and auroral scatter may also be exceptionally good this spring and next fall.

Another Moonbounce First

On the morning of January 10th, Mike Staal, K6MYC, and Dick Hart, KØMQS, scored another first when they contacted via the moon on 144-MHz. s.s.b.

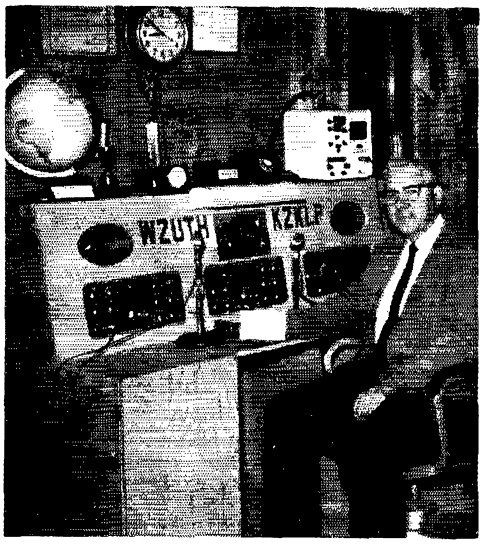
Their contact is the first using two-way s.s.b. and strictly amateur-type antennas. There have been previous two-way s.s.b. moonbounce contacts, but always with a large dish not of amateur construction on at least one end of the path. K6MYC's antenna is a 160-element collinear, mounted on the roof of his Saratoga home. KØMQS's antenna is an eight-wire rhombic stack, over 700 feet long, on a Cedar Falls, Iowa hilltop. The antenna's gain exceeds 30 db. over isotropic at the favored elevation angle. Both stations run kilowatt amplifiers.

The s.s.b. signals were excellent, rising well above the noise, and readable enough so that the stations were able to arrange a 75-meter schedule for later in the day. They worked on 144-MHz. c.w. via the moon again on Jan. 22, at 0300 GMT.

OVS and Operating News

50 MHz. came back to life during December following a disappointing late fall. We have previously reported some of the DX worked, but here is a look at the entire month. On the first, W2UTH worked ZD8NK on Ascension Island at 1515 GMT, but the African faded before he could be worked by others. On the 2nd, KV4FU had *TE* into Argentina and W1ELP reported hearing W6ABN, briefly at 1855 GMT. The 4th found 50 MHz. open between Hawaii and California and Arizona. KH6EQF worked several stations in those states between 1900 and 2015 GMT. KH6EQF was again heard in southern California on the 5th, 1930 to 2010 GMT, and at WA7GFP, Oregon. On Dec. 6th, W6NIT, K6SEK and WB6NVF heard the beacon signal of ZK1AA, Cook Islands, over a 4500-mile path. ZK1AA was copied from 0125 to 0220, and 0300 to 0310 GMT. ZK1AA was also heard in California on Dec. 8, 9, 10, 21, 22, 24, 25, 26 and 28! There were no contacts reported with the Cook Island station. Thanks to W6ABN for the reports on ZK1AA.

I'd like to make a comment or two on beacon transmissions at this point. There are pros and cons to their operation. On the plus side, many openings would undoubtedly be missed if the beacons were not operating, but the operators of these beacons should likewise be encouraged to listen at regular intervals for answers. However, we must recognize the time zone differences and consider that it isn't always possible to be on hand when the band is open. Some of us do work for a living! We should all encourage use of 50 MHz. in DX locations, and hope that the contacts will take care of themselves.



This is Hank Blodgett, W2UTH, who worked ZD8NK on 50-MHz. Dec. 1st. Hank is also the author of the Jan. *QST* article on converting the SB-200 to 50 MHz.

On Dec. 24, WB6UYG reports an opening to Hawaii from 0325 to 0520 GMT with KH6NS being worked. Christmas day, W6DPD and others worked KH6NS, while in the east, VE2AIO and K1AGB worked HK3OK in Colombia between 1458 and 1528 GMT. VE2AIO also heard K1IKN, W3KWH and W8GZ on backscatter from the South Atlantic. VE2AIO heard backscatter from the same area on the 26th. Also on the 25th, KV4FU found WØPFP and WØEKB ragchewing in Iowa. KV4FU worked both, then Nebraska and Wisconsin, between 1555 and 1632 GMT.

KV4FU reports renewed *TE* activity. On Jan. 10th and 11th Bob noted South American t.v. between 2215 and 0230 GMT. On the 12th and 13th CE3QG's code wheel was copied. Jan. 14th was quiet, but on the 15th, KV4FU worked CX5AAP, Uruguay, on a.m. at 0050 GMT. Bob also worked OA4BR, 0140 GMT, and OA4C, 0220 GMT, both in Peru. Do I hear rotors turning south again?

The winter E_s season was not nearly as good in many areas this year as in some previous years. E_s reports were received from KV4FU, WB2YQU, W6DPD, WB6UYG and others, but for the most part, they were single-hop E_s and of rather short duration. Multi-hop E_s between the coasts was noted on Dec. 2, 8, 22 and 23. In general, E_s during the January contest was disappointing.

Now these 50-MHz. DX notes. Bob Cooper, KV4FU, says he will return to the U.S. Mainland this spring. Thanks, Bob, for what you did for v.h.f. during your business assignment in the Virgin Islands. W4ZXI says he will be on Swan Island, some 700 miles south of Miami, the last two weeks of April. His call will be KS4CF. W4ZXI also says it is possible that KS4CG will be active from Swan during June. Both men are employees of the FAA, which maintains a station on Swan. Also looking ahead to June, WB4BND and WB4HIP will operate ZF1DT, Grand Cayman Island, for one week

around v.h.f. contest time. The h.f. bands will be used for liaison.

144 MHz. news this month is topped-off by e.m.e. activity. In addition to the K6MYC-KØMQS contact reported earlier, K6MYC also worked SM7BAE in Sweden on Jan. 3rd and 9th. On the 3rd, K6MYC heard Kjell, SM7BAE, tune up and copied him through the entire hour of their schedule! Their contact on the 9th was nearly as good. When SM7-BAE goes s.s.b., they will attempt a two-way s.s.b. contact. On Dec. 31, 1966 and 1967, K6MYC worked Australian VK3ATN. They tried again this year, but just missed. VK3ATN heard Mike nearly solid, but K6MYC could copy only partial calls and signal reports. And on Dec. 30 and 31, K6MYC had limited success in schedules with VE3BZS/VE2. The Canadian has a 160-element Yagi array.

KØMQS is continuing schedules with ZL1AZR, in New Zealand. They are quite close to making a contact. ZL1AZR has an array of eight 8/8 J-slot antennas.

In other e.m.e. news, W6DNG continues schedules with SM7BAE and F8DO. K6MYC reports hearing SM7BAE, but never W6DNG or F8DO during those schedules. KØIJN, Minnesota, is scheduling ZL1AZR. A moonbounce possibility in Hawaii is KH6EEM, and in Alaska, KL7DTH and KL7FNL have made known their interest in e.m.e. VK3ATN expects to complete his 50-foot dish this spring, and WB6KAP has plans for a 320-element collinear array to be completed in the spring.

Meteor scatter drops off this time of year, and the Jan. 1–4 Quadrantids shower was disappointing. Those who ran schedules agreed that the shower peaked on the 3rd, but no contacts were reported. WA9DOT, Wisconsin, missed again with K7NII, Arizona, after three years of trying. KØMQS and K7NII nearly worked, but Dick was not sure of the signal report received from K7NII. Dick also scheduled VE1PL on Nova Scotia. They managed only an exchange of pings and short bursts.

December m.s. was considerably better. We have these contacts not previously reported. W5ORH, Oklahoma, worked Canadians VE3ASO and VE3-BQN on random meteors, Dec. 7 and 8. On the 13th, VE7BQH worked K7ICW, Nevada, and W7UBI, Idaho. VE7BQH is located in Vancouver, British Columbia and would like more schedules. Fred, K5TQP, brought his standing to 28 states worked from New Mexico when he worked WA4-HGN, Tennessee, on the 14th.

One final m.s. note, KØMQS suggests closer attention be paid the May 1-6 Aquarids meteor shower. Dick says he has found this shower to be very good, and comparable to the August Perseids.

Now these 144-MHz. briefs. Most 75-meter v.h.f. net activity has moved to 3.980 MHz. The Central States Net meets formally on Sunday evening at 0330 GMT, or 9:30 CST. The eastern net, although somewhat inactive at present, meets 30 minutes earlier. Stations on the west coast join the midwest group usually after 0400 GMT. Additionally, there is still some activity on the 3.815 MHz. frequency, now available only to Extra class licensees.

WA3GPL, Pennsylvania, has a kw. and 40-element Yagi array ready for m.s. schedules; W9NFO, Illinois, is readying a kw. and 32-element collinear for schedules; W6DPD and W6JUK are installing crossed Yagis with switchable polarization sense. W6DPD reports growing s.s.b. activity in the San Francisco Bay area with horizontal polarization becoming popular. The favored frequency is around 145.05 MHz.

220 and 420-MHz. activity fell off during the winter months. Conditions were good enough on January 14 for W4FJ, Richmond, Va., to work W4VQA, Ashland, Ky., for Ted's 18th state on 432. That contact places W4FJ second nationally in the 432 standings.

W2CRS has a 4X150 and 8/8 J-slot antenna ready for 220 m.s. schedules. K4GL, South Carolina, has stacked Tilton Yagis all set for 220 m.s., and W2DWJ offers 220 and 432 schedules. He has moderate power and good antennas. K4IXC, Florida, continues searching for 220 and 432 schedules. Kilowatts and large antennas await on both bands. In Ohio, K8DEO has a new 44-element Yagi array and desires schedules. K8REG likewise will accept schedules.

K1JIX/W2BVU comments about my December editorial. He agrees equipment and operating techniques at 432 have improved, but John also believes tropospheric conditions during 1968 were the best in 8 or 9 years, especially along the east coast. Thanks also, John, for your other remarks.

1215 and Up shows a surprising amount of activity this winter with much planning and building being done. In Washington state, K7ASX says he, W7AZU, WA7FJC and WØIOD/7 are establishing a troposcatter link near Seattle on 3300 MHz. The link will be used to test equipment for an assault on the 3300 MHz. DX record this summer. The same group also has its eye on the 40 GHz. record. Thanks, Tom, for the letter. It is good to hear from the Pacific Northwest. Good luck and keep us posted on your group's activity.

In Kansas, WAØJYK, at Olathe, wants information on a 1296-MHz. balun permitting the use of low-cost feedlines, and constructional material on an easily-built antenna that can be expected to give reasonable results without requiring high-priced equipment for adjustment. WØSPF, Wichita, is working on 1296 receivers.

In South Carolina, WB4CBJ and W4MAR are preparing for experiments on 5650 MHz. They are doing a topographic survey over a 22-mile path between Leesville and Pelion, looking for suitable antenna sites. WB4CBJ is also erecting a self-supporting *140-foot* steel tower to hold v.h.f. band antennas.

In two reports from Tennessee, we find WA4HGN continuing to improve his 2300 MHz. system, and W4HHK is running moonbounce tests with W3-GKP, Spencerville, Md. W3GKP has 300 watts output to a 28-foot dish. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Where?

"Where have all the Gs gone?" We ran the first installment of this science nonfiction mystery thriller (or chiller) in December. Many readers, realizing that it *could* happen here, expressed keen interest in finding an answer to the query chorused by G3s FKM and VA, so we had better get on with the yarn.

Early British response to RSGB's *Radio Communication* articles, as not unexpected, places most of the blame for decreasing G activity on TVI and/or the probability thereof. Rights and legalities notwithstanding, one naturally desires to live amicably with one's neighbors, and the U.K. gang has always been long on civility and common courtesy. G3VA continues the investigation in last November's *RC*. We quote briefly:

> . . . The British amateur is almost alone in having to cope with the 41.5-45-MHz. Channel 1 television allocation (used in few other countries), still perhaps the most susceptible of any channel to interference of all types. . . .

And you thought Channels 2 and 6 were bad! How would you like to cuddle with their Ch. 1? Even with clean transmitters and faultless TV sets the effect of stray local rectifications alone could unpredictably splatter the neighborhood with 42-MHz. harmonics, fringe area or not. Reduce power? Sure—all the way down to 0.00 watts, which is just what seems to be happening.

'Tis said that such v.h.f. TV channels are on the way out. Fine, fine, if we live so long. Meanwhile we miss our G friends. And meanwhile, in too many regions, it appears that hams and their neighbors must be martyrs to short-sighted, slipshod and makeshift professional engineering.

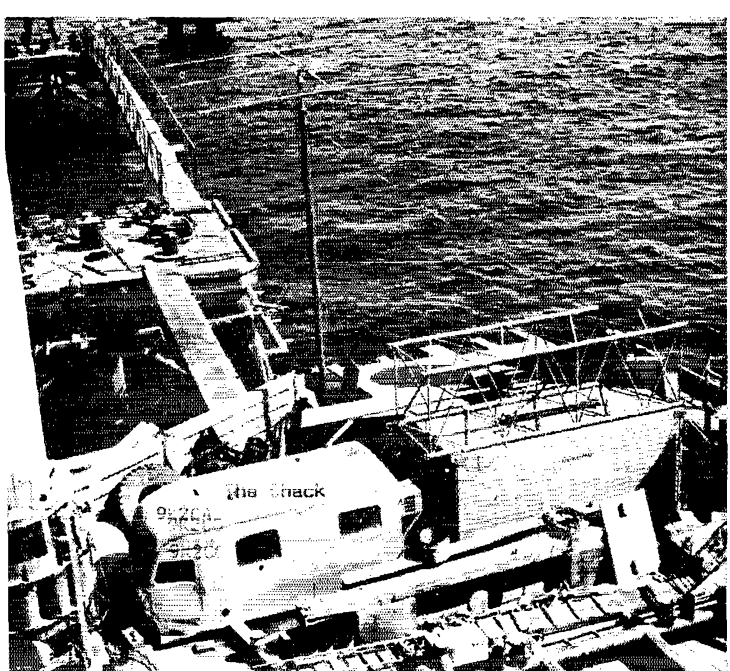
—•••—

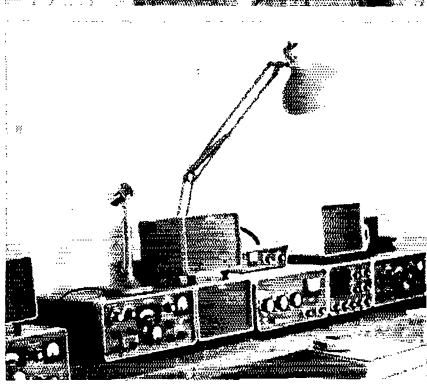
Two down and two to go! Week ends, that is—the climactic wind-up of your 35th ARRL International DX Competition explodes this month. March multiband propagation often is the best of the year, so stand by for ionospheric fireworks on the 1st-2nd (phone) and 15th-16th (c.w.).

In this one you don't sit around listening to a bunch of UB5s working a flock of OK1s. Of all the thousands of ARRL Test QSOs *every* contact has a W/K/VE/VO at one end. It could be you, barefoot even.

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

9K2s CA CC and CB, burnoosed left to right, man a picturesque DX outpost in oil-rich Kuwait. This principality was a neglected caravan stopover until its first gusher blew in around '38—from Endsville to Richvillel Hank, Bud and John, usually on 14 MHz. with that rotary, also hit 7 MHz. with a ribbon dipole. Their shack is an air-conditioned bus body, the site an oil-loading platform for supertankers. (Photos via K9CSM)





What:

At the happy halfway point in your annual ARRL DX classic you've doubtless assembled your own up-to-the-*minute stalk* lists. So this is an appropriate chance to catch up on our *vox DX Populi*. We'll rest the Bandwagon for a little eavesdropping on the "How's" roundtable. . . . "It's time that TV manufacturers assumed their full share of responsibility in TVI problems."—*D. C. Rasmussen, Big Thunder ARC, Belvidere, Ill.* . . . "I greatly enjoy your DX photo coverage."—*K9CUY*. . . . "Now have an 18-ft.-high homebrew triband quad to go with my T-60."—*WA1KEX*. . . . "8R1J puts a rather rare prefix on 14,010-kHz. c.w. at 2100 GMT."—*K3CUI*. . . . "Wonder how many DXers got worked by VS6FLU."—*WB2UZU*. . . . "Hooked KC4USP one night with my HW-12A on 75 while mobiling home from work."—*WA1GKS*. . . . "Good DX on ten!"—*WA8YXE*. . . . "VK3PV was my first Australian on 20."—*WA3GVP*. . . . "SV1BX has *fun* on 15 c.w. with his 6146, NC-173 and dipole."—*W1EGM*. . . . "Hope to become a regular 'How's' reporter."—*WN9WLF*. . . . "I'd vote for power limitations of 150, 400 and 1000 watts for Generals, Advanceds and Extras, respectively."—*W8IBX/2*. . . . "Still stalking XW8CX and 9X5AC around 14,085 kHz."—*W2KXK*. . . . "Worked a VP1 at a timed speed of 2.8 w.p.m."—*WA5PPZ*. . . . "Moved down to 20 after getting my General."—*WA1IDP*. . . . "My QTH, Normal, Ill., doesn't seem quite normal to the DX gang."—*W9GXR*. . . . "A lightened DX diet helped me pass my Extra."—*WA1DJG*. . . . "Good to be back at DXing after *three years* on the move."—*W6YKS*. . . . "That 1P1DK of Pantelleria island had me guessing."—*K4TWJ*. . . . "I'd like to try one of Grommethead's piston verticals."—*WA9MQI*. . . . "You must have missed listing my previous report but I'll try again."—*WA9URY*. . . . "Concentrated on 15 c.w. this winter."—*WA1GGN*. . . . "Make mine 15 phone and 20 c.w."—*WA2BHJ*. . . . "Same old DX-cramping holiday rush at the post office."—*W3HNK*. . . . "After six years in Africa the Philippines are heaven."—*DX1MHI-W8HML*. . . . "I'm always anxious to work U.S. stations."—*ZC4GM*. . . . "ARRL's DX Contest is best because of the quality and courtesy of U.S. operators, but I believe double week ends are unnecessary."—*ON4ZU*. . . . "Our Ark. DX Assn. 75-meter DX-info net started January 6th."—*K5HYB*. . . . "W9IOP and I welcome suggestions toward improvement of our 'Second Op' DX operating aid."—*W9IW*. . . . "Finally caught up with UA1KED of Franz Josef Land."—*WA1FHU*. . . . "Possible operating reciprocity with the U.S.A. is under consideration here."—*YS1XEE*. . . . "My c.w. frequencies will be high enough to permit contest contacts with other than Extra Class U.S. amateurs."—*PJ8AA-W2BBK*. . . . "Hope to hear many W/K/VE/VOs in our PACC Contest next month."—*PA0VB*. . . . "Travel from Stockholm to OHØ-land is exceedingly simple."—*SM5DKH*. . . . "It seems silly to attempt to set an arbitrary 'activity level' for Gs, amateur radio still being only a hobby."—*Mrs. G3UHR/VO2*. . . . "I'll always remember my 1957 visit to ARRL Hq."—*HB9P*. . . . "Why didn't FCC create a c.w. equivalent to the Advanced Class license?"—*K5YUR*. . . . "WB6JAY, signing FØLT, is with Stanford U.'s foreign studies program at Tours."—*WB6HBK*. . . . "My PX1FD plans are 90-per-cent definite."—*ON5FD*. . . . "Some of the boys really get around—I suggest some

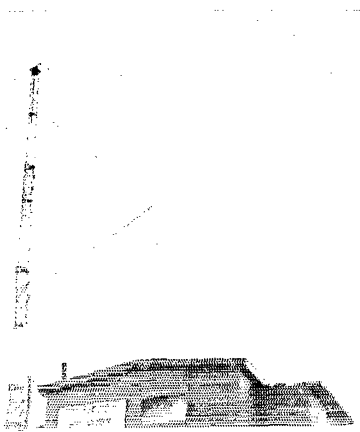
XW8BP can often be found on 10, 15 or 20 meters with this outfit in Vientiane. Feng thoroughly enjoys hobnobbing with W/K/VE friends. (Photo via K6HPZ)

ZC4GM, an RAF navigator stationed at Episkopi, fired up from Cyprus in late '67 and won't return to G3-MCY for another year or so. Gordon normally uses 14,220 kHz. at 1500-1600 GMT with 220 watts to a TA-33 jr. Operation on 80 and 160 meters also is planned.

new award for working any given Yank from 100 countries."—*VK8AF-W5ONL*. . . . "Watch for possible operation by VK2s BPO and BRJ (Ws 6BPO and 4WS) from Cocos-Keeling early this month."—*W1-DTY* of Ham radio. . . . "There will be 40 silver shields and 100 copper medallions available to high scorers in October's VK/ZL-Oceania DX Contest."—*ZL2GX*. . . . "Most W/K ops are very courteous but certain tail-enders are most annoying."—*VK6IZ*. . . . "All stations, particularly DXers in the Pacific area, are invited to participate in our new Pacific DX Net."—*KH6GLU*. . . . "Seems as though the whole world of amateur radio has suddenly burst wide open here in Indonesia."—*WB4GCL/YBØ*. . . . "Postal bulletins will be issued concerning my future Indian Ocean operations."—*VQ8CC*. . . . "An 80-meter c.w. contact with a CR4 counts four points toward our *Cabo Verde* DX award."—*CR4BB*. . . . "I have a feeling there's a signer of pirate calls in the VE7 area."—*VE7AZG*. . . . "Too many QSLs arrive bearing wrong dates, times and other misinformation."—*VP5AA-W1WQC*. . . . "Ten bucks for 5B-DXCC? Wow!"—*WA8MCQ*. . . . "7P8AB on 40 c.w. started my new year off right."—*W1ARR*. . . . "Been after DXCC for fifteen years."—*KØBX1*. . . . "Still need the right partner for my Albania DXpedition."—*DL7FT*. . . . "Just sent out 70 QSLs and vow never again to get so far behind."—*WA8VBY*. . . . "Been busy building the Health twins that Santa left me."—*W7BE*. . . . "Somewhat inactive here but you can't forget DX."—*W2DY*. . . . "Woe—no *QST*s since September."—ex-*KG6AQG*. . . . "Good 20-meter signals from the Middle East at 1300-1400 GMT."—*F. Kilroy*. . . . "VR6TC, 21,162 kHz., was pretty good DX for a two-month Novice."—*WNØWEP*. . . . "Eighty c.w. is great but my signal only seems to hit Europe."—*WA2DQE*. . . . "Same here on 15."—*WN9ZRV*. . . . "I was SP8CK until last year."—*SP5CK*. . . . "Evidently the boys are still eager for VEOs."—*VEØMD-VOIAW*. . . . "Busy with interesting DX skeds on 160."—*XEØGEN-W6GEN*. . . . "PYOs will try more 1.8-MHz. operation on s.s.b. and c.w."—*PY7AKW*. . . . "Still chasing DX after many, many years."—*W8AFN*. . . . "Good old W2CTN sure keeps those QSLs rolling."—*WA8TGX*. . . . "9M2-US (K3JJG) is an old friend and neighbor."—*W3GRS*. . . . "Plenty of Gs on sideband around 7100 kHz."—*WA2DEY*. . . . "My new location overlooks the North Sea toward W/K-land."—*LAØAD*. . . . "Finally worked one of those pirates 'in Biafra' on 20 c.w."—*K4ADU*. . . . "6O1GB's departure knocks Somalia off the air."—*W2VRC*. . . . "Chemist EA3KI studies English in school and on 20 c.w."—*WB2ZQE*. . . . "I'll be using *six* bands on this one."—*W4BPD/??* . . . "DX pops into my log around the clock since I hooked a beam to my DX-60A."—*WA1IOB*. . . . "Please ship me a *Mobile Manual*."—*AP2AD*. . . . "KL7s AIZ and AZN of Adak regularly look for Novices on 40 and 15."—*K1LNJ/KL7*. . . . "VS6s MH and TJ share equipment in Brunei."—*W1DGJ*. . . . "I have lists of Ja-

pan's 46 prefectures and 565 cities for JARL's WAJA and JCC awards if anyone with s.a.s.e. is interested."—*K6PIH*. . . . "WA8KRE, in my shack when I raised ET3USA on 15, raced home in time to catch Bill, too."—*WA8VZS*. . . . "Radio Peking and other nonamateur QRM clutter up 3.5 and 7 MHz. down under."—*VK2-BKM*. . . . "Coibita island, activated last year by HPØA, lies eighteen miles off mainland Panama."—*HP1AC*. . . . "Glad to help pull the 'How's' Bandwagon past the megahertzes."—*WA9TFM*. . . . "New quad does well on 20."—*WA5SXC*. . . . "More DX on 20 but more DX sport on 40."—*WB4GTI*. . . . "Fifteen c.w. is *great*,"—*W8HMR*. . . . "QSLs are still the ultimate courtesy of QSOs."—*WB6PGK*. . . . "W1-IKE's brief '68 visit to my station resulted in fast receipt of 115 QSLs."—*5U7AL*. . . . "Power outages require a generator ready for DXing here in Cincinnati."—*WA8TYF*. . . . "Nothing wrong with my 80-meter dipole on 20."—*WA1HVL*. . . . "My 149/120 countries claimed/confirmed may not be many but I've got some real goodies in there."—*W8CNL*. . . . "Fifty watts and a dipole is enough for plenty of c.w. DX on 14 MHz."—*WB4GSS*. . . . "Not such an active DX hound now but I do work some of the contests."—*K4HAV*. . . . "Our Indianapolis radio club takes Novice exams April 5th, then on to DX!"—*H. Ritter*. . . . "Still working for a 6Y5 hamming permit here in Kingston."—*W4WXZ*. . . . "DX will be tough for a General." —*W9WHM*. . . . "CR6AF and 4X4RH finally give me WAC on 40 c.w."—*K8DHT*. . . . "After my first year on 80 and 40 c.w. a G5 helped me discover DX."—*VE3GHO*. . . . "WB2FJY and I still yearn for a trip to St. Pierre."—*WB2DZZ*. . . . "Thanks to WA2NQP for starting me out toward 15-meter DX."—*WN2GMC*. . . . "ZD5s R and X are rival goodies on 10 phone around 1700 GMT."—*K9CSM*. . . . "I'm ISSB No. 4136."—*OA2BH*. . . . "Ten countries already, and two confirmed."—*WN4JYB*. . . . "VK6KP is transplanted Kentuckian W4HCX."—*W4YOK*. . . . "Fifteen is really hopping with DX!"—*WN4IYX*. . . . "Why aren't there DXpeditions to Delaware?"—*WN2FEH*. . . . "WN3s KHN and KHY cornered ZL3JO on 15." —*WN3KHZ*. . . . "As a Novice I found 21.132 and 21.153 kHz. my best spots for DX."—*WA2FOR*. . . . "Lots of Gs and SMs working Novices on 15."—*WA3-JRY*. . . . "Why do so many 21-MHz. WB6s answer DX stations calling 'CQ WN'?"—*WN7JIG*. . . . "Wow —am I rusty on this mill!"—*W1APU*. . . . "Our Beaverton H.S. club, K7ICY, has a membership of ten."—*WA7HGD*. . . . "Leo of UW9CC likes a 20-sideband rag chew."—*W4SOFT*. . . . "Sent my first c.w. 'way back in 1916."—*K9IIV*. . . . "Mixing and pouring a cubic yard of tower-base cement made big aches for W1YYM, 13-year-old Jamie and me."—*W1CW*. . . . "Now operating from my Pensacola home."—*8R1Y/W4*. . . . "Enjoyed '68 contesting from Calgary."—*W8ILH/VE6*. . . . "Signal reports given to DX stations by W/Ks still vary directly as the square of the rarity."—*K8CFU-GC5AJE*. . . . "Been Class A (Advanced) since 1935—now for the Extra."—*W2HCW*. . . . "Frequent traveling has shifted my activity from v.h.f. to h.f. DXing."—*VE3ABG*. . . . "Too bad each issue of *QST* requires so much preparation time."—*W4-GRG*. . . . "I'd like to hear from any W/Ks contemplating visits to GC-land."—*L. Bard, Forest Hotel, Guernsey, C.I.* . . . "ZL2CU was our first contact from ZL2s ATK and ATL."—*WA2s NAY and NAZ*. . . . "Send me one ARRL *Mobile Manual*, too."—*EL9B*. . . . "Schedules with 9J2XZ on 40, 80 and 160 meters can be set up through me."—*WA9PRE/2*. . . . "I look forward to those contests."—*AP5HQ*. . . . "I'm not far from the Burma border."—*HS3AL-W9SZR*. . . . "Judging from pile-ups on 20, Korea is still rare."—*HL9WK-W7YBX*. . . . "I'm especially interested in receiving unneeded literature on s.s.b. and antennas."—*AP2HB*. . . . "No sense sending U.S. postage to QSL managers in Canada."—*VE3GNM*. . . . "The guy pirating my call on c.w. gives a complete description of my station."—*TF2WKI*. . . . "Has Schultz got a remedy for auroral fadeouts?"—*W8YGR*. . . . "CN8CO has a pipeline from Morocco on 21,085 kHz. at 1700-2000 GMT."—*WA1CKO*. . . . "A part-time DX hobby of mine is collecting phoneys on 15 and 20 c.w.—*VE7-BAF*. . . . "Port Stanley's VP8KE is ex-VS9ABL."—*W4NJF*. . . . "WA4MMO and I are newly Advanced." —*K5KFT/KP4*. . . . "North Dakota was my toughest state."—*WN2EKS*. . . . "U. of Pittsburgh's W3YI keeps weekly skeds with UP2KBC."—*K8OLG*. . . . "My postmaster tells me there is no mail service in Bhutan."—*WA3EFH*. . . . "QSLer of the Month' FP8CK doesn't respond for me."—*WØDAK*. . . . "I'm also licensed as DL5MI." *W3ZUH*. . . . "Sure need a QSL from the KL7CDF who was worked by several stations on 75 meters the night of October 14, 1968."—*K1OJQ*. . . . "Bushels of Gs, DJ-DK-DLs, OKs and other Europeans on 80 c.w."—*W1SWX*. . . . "Connecticut Wireless Assn. and Potomac Valley R.C. team up for PJØCC contest work."—*W1BIH*. . . . "We also used W9ZRX's PJ5MN call on St. Maarten."—*W9ZTD-PJØMM*. . . . "Worked 76 quick countries with my HT-37 and TA-33."—*WB2BXS*. . . . "I also sign portable-4 when in Norfolk."—*WA7KPH/mm*. . . . "This letter authorizes WA4GQM to be my QSL manager as of October 31, 1968."—*FY7YQ*. . . . "VP8KL is an XYL in Port Stanley."—*WA8IKK*. . . . "Lots of 'QSLers of the Month' here lately."—*WA3GCZ*. . . . "Where are FP8AU and VP3RS of the late '50s?"—*K8AMZ*. . . . "Had an awful time raising Africa for my WAC."—*K7BHJ*. . . . "The DX bug bit me in '53 and I've had a total relapse since '62."—*W8YQM*. . . . "I'm old W9YSM."—*W4YHB-VP2GSM*. . . . "The W2 DXCC Round-up at Newark on the 22nd of this month is conveniently accessible by train, subway, auto and bus."—*W2LA*. . . . "We have a Japanese TH3 on 10 and 20 sideband from Kyushu."—*KA7OW*. . . . "It's back to WA8HBL after my draftee duty ends this month."—*HL9UD*. . . . "Especially enjoy QSOing K4JC and W2OCM."—*VU2CK*. . . . "9X5GG is still active from time to time."—*W2GHK*. . . . "I refer all W/K contacts to my QTH listing in October '68 *QST*."—*FØCV-WA9FZQ*. . . . "Received only five *QST*s of the last twelve due." *CR8AI*. . . . "Indonesia's former ITU/FCC Ban status turned out to be merely a problem of communications and mutual understanding."—*W1IKE*. . . . "Civilian operating authorization for Kure island doesn't look promising."—*KH6BZF*. . . . "Where are all the KH6s and KL7s on 21 MHz.?"—*WA9SQY*. . . . "We plan early replacement of our old modified BC-625 transmitter."—*JX3DH*. . . . "DFM BRZY NSL is HPE CU AGN in Czech c.w."—*WB2BCI*. . . . "Our new RTTY gear is of considerable interest to visitors."—*GB2SM*. . . . "CN8AW and W2OKM visited Frankfurt recently."—*DL4FS-W8IMZ*. . . . "Mobile operation is specifically prohibited in Greece." *-SVØJJ-WA4FIJ*. . . . "Loads of DX on the low edge of 40 c.w. make me glad I have my Extra."—*WA8PVN/8*. . . . "There seems to be much new world-wide interest in 160-meter DX."—*W1BB*. . . . "November *QST* arrived in Liberia with loose staples and flying pages."—*EL2AG-W4FHE*. . . . "Have a new 3-element beam on 15."—*WA9TCW*. . . . "My trusty Viking I comes in handy for 160-meter DX, and so do a couple of near-by broadcast-band towers."—*K1KSH*. . . . "W9WEA retired to his DX farm after 43 years at WGN but I have two more to go."—*W9NN*.

KC4USV keeps in touch with home from far-off McMurdo Sound with this arrangement. Commissaryman Ralph W. Smith, known around the ham world as "Smitty", regularly represents Operation Deepfreeze on 20-meter phone.



AP2HB concentrates on 14-MHz. voice work with a modified HW-32A at Kohat. Hamid finds a simple ground-plane sufficient to attract hordes of North Americans. (Photo via K4CAH)

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Next month should find us back at the big "How's" bandspread dial through the cooperation of (20 phone) **W**s 2DY 2VOZ 3HNK 4NJF 4UF 4YOK 8IBX/2 8YGR, **K**4TWJ, **WA**s 1IDP 2BHJ 3HRV 3IID 5PUQ 8MCQ 9TFM, **WB**s 2BCI 2DZZ 4GSS 6WLH/3, P. Kilroy; (20 c.w.) **W**s 1VAH 2ICO 2KXK 2LJF 3HNK 4YOK 6YKS 7BE 8IBX/2 8YGR, **K**s 3CUI 4TWJ 5YUR, **WA**s 1FHU 1GGN 1IDP 1JMR 2BHJ 3GVP 3HMR 3HRV 3IID 3JRY 3KOS 5PPZ 8MCQ 8VBY 8YXE 9MQI 9SQY 9TFM, **WB**s 2RNL 4GSS 4GTI; (15 phone) **W**s 2DY 2LJF 3HNK 4UF 5YOK 8YGR, **K5**YUR, **WA**s 1IDP 2BHJ 9MQI 9SQY 9TFM 9URY, **WB2**DZZ, P. Kilroy; (15 c.w.) **W**s 1EGM 2LJF 3HMR 3HNK 4YOK 7BE 8YGR, **K5**s MHG/6 YUR; **WA**s 1FHU 1KEX 2DQE 2FOR 3GVP 3IRY 8VBY 8YXE, **WB2**s DZZ RNL, **WN**s 2GMC 9WLF 9ZRV ØWEP; (10 phone) **W**s 1EGM 2VOZ 3HNK 4UF 4YOK 8YGR, **K**s 1HDO 5YUR, **WA**s 8MCQ 9TFM **WB2**DZZ; (10 c.w.) **W**s 4YOK 8YGR, **K5**YUR, **WA1**FHU, **WB2**RNL; (40 c.w.) **W**s 1ARR 4YOK 8YGR, **K8**DHT, **WA**s 1FHU 2FOR 8MCQ, **WB4**GTI, **VE3**GHO; (40 phones) **W8**YGR, **WA8**MCQ; (80 c.w.) **W1**SWX, **K8**DHT, **WA**s 1FHU 2DQE 2FOR 8MCQ; (75 phone) **WA8**MCQ; (160 c.w.) **WA1**FHU, **K8**DHT and informants yet to file, *K, man!*

Where?

HEREABOUTS—"I signed OX5BA for only two weeks in '66," points out K4HAV, lately receiving QSLs for more recent QSOs with that station. Jim still has OX5BA cards on hand to confirm his contacts only. He wishes he could keep more up to date on new prefixes popping up here and there—so do we! . . . . . "On return from my many visits to the islands as VP5AA there are frequently as many as 500 cards already in my mailbox," remarks W1WQC. "These are positively answered within one week. When in town, I answer received cards the same day. As I travel in my business this is not always possible, but QSLs are never delayed more than one week." . . . . . Reviewing QSL procedures of W2GHK's DXpedition of the Month facilities: "Cards should continue to be sent to Box 7388, Newark, N.J., 07107. They are picked up several times a week, sorted and forwarded to various assistants. Generally speaking, sending QSLs direct to W2GHK slows down the process. Cards are answered via bureaus unless accompanied by self-addressed stamped envelopes or self-addressed envelopes and International Reply Coupons, a separate envelope per QSL expected." . . . . . According to W1ARR's advices, VE3EUU is sole dispenser of PJ2MI-FG7TI/FS7 pasteboards. Jose now signs PJ7JC . . . . . If you still seek confirmation of a W8CNL/KL7 contact in early 1966, check with W8CNL at the address in the listings to follow . . . . . K5YUR and VE7AZG consider themselves in the running with VE7BAF for DXCC-BL kudos. K5YUR figures he has about twenty noncountries pseudoworked . . . . . Northern California DX Club's *DXer* lists K6AHV with 26 ounces of unclaimed DX QSLs in his Sixland ARRL Bureau branch. Do *you* have s.a.s.e. on file at yours? . . . . . The DX *New-Sheet* of G. Watts indicates that W8EWS will be back home next month to knock out VP2MK QSLs . . . . . CE9AT, CRs 4BB 7FM, EA9AQ, F2IU, FG7XX KR6KQ, MI1I, PX1SZ, PJ0CC, PY0OM, SV0WM, TJ1-QQ, TL8GL, UF6AM, UG6EA, UM8AE, VP5CB, VQ8-CC, YS1XEE, ZD8J, ZP5KA, 5A3TT, 7G1A and 9K2BJ, together with QSL aides CE3ZN, K9CSM, PY2SO, VE2DCY and W4SYL, are boosted emphatically by "How's" correspondents W8YGR, 5YUR, WAs 1FHU 2DQE 8MCQ and 9TFM as this month's "QSLers of the Month." Any notable snappy receipts out your way? . . . . . *Halp!* these italicized brethren solicit suggestions toward dislodging QSLs from holdouts mentioned: *W1ARR*, HL2AJ, IS1CXF, KR6AA, LU4ZD, PJ2AZ, VPs 2GV 2LU 6GT, YJ1DL, YS2AF, 3V8DZ, all of '56-'57 vintage; *W4YOK*, ZD1DR of '56; *KØBXI*, CR7GF HG2KRD, PJØMM, VR1P, UA2KAW, UT5KCH, ZP3-CW, 4Z4HF; *W4SQY*, CR6GO, PJØCC; *WB2DZZ*, CN8FC '67; and *WB2RNL*, OX3LP of '67. Any 'alp? . . . . . WA3HUU adds his call to those available as QSL tenders for overseas DX ops in need . . . . . "I'm serving as QSL manager for 9Y4KK as of September 15, 1968," declares KØETY. "Cards received without s.a.s.e. will be answered via bureau." . . . . . WA9SQY nominates TI2CB's QSL as Fanciest QSL o the Month. "The hand-painted Costa Rican oxcart i colorful to say the least."

AFRICA—K4RTA apprises, "I'm QSL manager fo ZS3D effective October 1, 1968; ZS3BP, Octobe 15, 1968; and ZS3C as of November 20, 1968." . . . . . VQ8CC, who wants QSLs direct only, promises fas airmail reply on receipt of three International Repl Coupons. Other answers go via bureau . . . . . WB2 BCI expects to be tending EL2AY's pasteboards til mid-1970. QSLs received without self-addresse stamped envelopes, IRCs or sufficient postage will b forwarded to EL2AY for indefinite disposition . . . . . WA3KFS disclaims Togo QSL connections . . . . . Ex-9Q5RD, now W4WXZ, still has records for his Au gust '65 to January '67 Congo contacts . . . . . "I hav all 6Ø1GB logs and will confirm QSOs for the usua s.a.s.e. or IRCs," offers W1YRC . . . . . "W7TDF tells me he no longer manages ET3USA QSLs," affirm WA8VBY. "VE3IG has the job." . . . . . "CR5SI logs of September 10 to December 5, 1967, are miss ing," advises W2GHK & Co. "We do have current log through September 8, 1968." . . . . . *DX News-Shee* understands that F9MS has FB8YY logs from Januar 30, 1966, to February 16, 1968, with more expected Geoff also hears that VE2NV can handle no mor QSLs for VE2BUJ/SU because of liaison lapse . . . . . W4NJF writes, "ZE1CX worked a pile of stations i the Bulawayo 75th anniversary deal and sent me specia QSLs. As long as they last I'll send them out fo QSOs between October 2 and November 30, 1968. . . . . "I'd like to close the books for ZD8HAL' QSLing," says KØETY. "Hal shut down on Ascensio July 4, 1968. Anyone still needing his card should appl as soon as possible." . . . . . WØDAK notes tha A2CAU wants QSLs direct only.

OCEANIA—"Only YBØ calls are valid for DX QSOs," notes W1IKE of ARRL, referring to cor respondence from Indonesia's telecommunications coun cil. "YC and YD prefixes are for internal use only. O special note is the fact that stations signing PK calls are illegal." WB4GCL/YBØ-YBØAAB welcome s.a.s.e. from U.S. contacts, IRCs from others . . . . . W4NJF comments, "My logs for YJ8BW start wit May 25, 1967. I hold a bundle of cards for QSO on prior dates that I cannot get YJ8BW to confirr although I was previously successful in gettin Bill to verify thirty or forty old contacts. He's un communicative now, so I have no alternative but t hold the growing pile." . . . . . "I QSL 100 per cen via W5AG," assures VK6IZ, "or direct in response t IRCs." . . . . . "It's a lot easier to reach me via th ARRL W5 Bureau," hints KP6AQ . . . . . *DX News-Sheet* says that VKØKJ, on return to VK7KJ thi month, will help liquidate QSL obligations for VKØ IA KJ and MI. Greg is a stamp fan. U.S. commemora tives preferred.

EUROPE—DX veterans may be interested in WA1 FHU's data on current calls held by old-time Hun garian hams. K2OYN is former EWam-HAF3RF HA3B; WB2CKS, ex-HA5BM-HA5KBA; WB2EDC ex-EWh4-HA4A-OE2DB-OE5HA; W4GRG, ex-HA2U WN6VDK, ex-HA6K; WN6VDL, ex-HA3ZZ; K8MII ex-HA7O; K9IFB, ex-HA1R; LU4ECO, ex-HA2G ON5OX, ex-HA5BB-YO5BT; PY2PA, ex-EWah HAF3B-CN8MM; and SM5CLW, ex-HA5V. WA1FHU who is old HAF3RL-HAF3HI-HA4EA-HA4SA, adc that ex-HA1YL and ex-HA6B are in California, ex HA4H is in Switzerland, ex-HA8N and ex-HAF8 live in Montreal. Are there more ex-HAs than HAs . . . . . SM5DKH indicates to W1CW that SM5MX ØHØ wallpaper should be getting around as you rea this. Bob also hears from DL7FT that the latter n longer distributes TG9EP QSLs, nor does DL7F handle cards for EA8CB and 3A2MJC . . . . . "I' doing QSL honors for YO2BB as of December 14, 1968, confirms WA2DWE, specifying s.a.s.e. from W/K

single IRCs from others . . . . . WA1IOB's QSL to EA6AX bounced back from EA6AM marked "pirate."

ASIA—"I am now QSL manager for TA1IB," notifies W4GHV, "replacing K4EPI who remains manager for TAs 1AM 1RT and 2SC." . . . . . Ex-W8BB has no Turkey QSL clients despite indications to the contrary . . . . . JH1AJT turns the tables by acting as QSL agent for W6FM and WB6ZNM in Japan . . . . . "KR6IS has had no operating staff for months," states KR6RL, undertaking to clear up that club station's QSL backlog. "Give us about three months to get cards prepared for the mails." . . . . . Now let's see what individual recommendations slide out of the "How's" mailbag, bearing in mind that each specification is necessarily neither complete, accurate nor "official". . . .

A2CAU, P. O. Box 200, Francistown, Botswana
DX1AAV, L. Eisler (W3JTC), c/o U.S. Embassy, APO, San Francisco, Calif., 96528
DX1NY, B. Smith (K8LNY), c/o SEACR, APO, San Francisco, Calif., 96274
FØLT, R. Robinett (WB6JAY), 1 Pl. Anatole France, E. 37, Tours, France (W/K/VE/VOs via WB6HBK)
K8MLM/mm, USS *Rival* (MSO-468), c/o FPO, New York, N.Y., 09501
ex-KG6AQG, S. Bennett, W7ALE/6, 421 Coral Reef Rd., Alameda, Calif., 94501
ex-KG6IC, D. Janicki, K8WXV/1, 161 1st Av. S., Portland, Me., 04106
KV4FZ, H. Schoenbohm, Box 428, Christiansted, St. Croix, V.I.
KX6BB, Box 997, APO, San Francisco, Calif., 96555
PAØTO, A. Dijkshoorn, Jan van Gelderdreef 11, Voorschoten, Holland
PZ1CY, W. Johnson, Box 1810, Paramaribo, Surinam
TI2CB, C. Moore, Apdo. 4035, San Jose, C.R.
UA2AO, A. Moskalenko, Box 77, Kaliningrad, Kal., U.S.S.R.
UB5WE, V. Goncharsky, Box 41, Lvov, Ukrainian S.S.R., U.S.S.R.
VEØNA, HMCS *Restigouche* ARC, c/o FMO, Halifax, N.S., Canada
VK9LR, Rev. R. Leskie, c/o Lutheran Mission, Goroka, T.N.G.
VP8s FL JG JH JI JQ JW KN KO, c/o E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15, 5JE, England
VQ8s CCB CCR (to VQ8CC)
ex-W8CNL/KL7, R. McClure, W8CNL, 120 Collier Av., Battle Creek, Mich., 49017
WA7KPH/4/mm, W. Witt, RM2, USS *Chukawan* (AO-100), FPO, New York, N.Y., 09501
WB4GCL/YBØ, E. Cannon, Djakarta, APO, San Francisco, Calif., 96356
YBØs AAB AAG, U.S. Embassy, Djakarta, APO, San Francisco, Calif., 96356
YV2LL, P.O. Box 275, San Cristobal, Venezuela
YV4AQ, Box 81, La Victoria, Venezuela
ZD9BK, J. Bothma, 30 Dunwoody Av., Waverley, Pretoria, S. Africa
ZE1DC, Box 528, Bulawayo, Rhodesia

Here's one "DXCC" you can't QSO. It gives out big earfuls from this studio building in Cagayan de Oro, Mindanao. W8HMI, stationed in the Philippines as DX1HMI, forwards the photos via W1CW. You've probably heard or worked Frank previously as FL8AU, JY1AU, TU2AU and/or 6O1AU.

ZS2MI, via P.O. Box 838, Germiston, S. Africa
ZS3s BP C D (via K4RTA; see text)
5A1TA, Box 313, Benghazi, Libya
5V4s AP EG JL (via DL1HR)
7C1CG, P.O. Box 33, Conakry, Rep. of Guinea
8P6CZ, Capt. R. Walker, Air Canada, Seawell Airport, Barbados (or to VE2YG)
8R1J, P. Taylor, P.O. Box 557, Georgetown, Guyana
8R1T, Sonia Blue, Box 25, Georgetown, Guyana

CM2DC (via FRC)
CR7JV (via LREM)
EL2AY (via WB2BCI)
HB9AFG/EAØ (via USKA)
HC1HV (via WA2DWE)
HV3SJ (via W6KNH)
JX5C1 (to LA5CI)
KP6AQ (via K5QVH)
KR6IS (via KR6RL)
OX3NN (via EDR)
OX5BA (see text)
ex-PJ2CR (to PJ1CU)
ex-PJ2ME (to PJ7VL)
PJ7JC (via VE3EUU)
PJ8AA (via W2BBK)
PJØCC (to W2TA)
PX1FD (to ON5FD)
SM5MX/OHØ (to SM5MX)
TA1s AU RF (via DJ4SK)
TA1IB (via W4GHV)
TA2EM (via WØDAK)
TG9EP (see text)
VK6IZ (via W5AG)
VK8s AF KK (via W5ONL)
VKØKJ (W/Ks via K4-HJE)
VKØVK (to VK6VK)
VP2VY (to KV4EY)
VP5CB (via W4SYL)
VP8s HO JP (via RSGB)
VQ8CC (see text)
VQ9GA (via WA6AHF)
VR5AE (via VE6AO)
XEØIK (to VE3IK)
XEØEKN (to W6EKN)
XW8CR (via W2CTN)
YO2BB (via WA2DWE)
ZD7ZI (via E90E)
ZD8HAL (see text)
ZK2BA (via NZART)
ZP5CE (via RCP)
4TA4OS (to OA4OS)
5H3LV (via VE3ODX)
5N2NAS (via G3VIS)
5W1AS (via WB6HBK)
8QAYL (to 4S7YL)
ex-9Q5RD (to W4WXZ)
9Q5WS (via W1BPM)
9Y4KK (via KØETY)

This QTH catalog comes courtesy **Ws** 1ARR 1CW 1DTY 1IKE 2DY 2LJF 4YOK 8YGR ØDAK, **Ks** 3CUI 5YUR 8DHT, **WAs** 1FHU 8MCQ 8VBY 9SQY 9TFM, **WBs** 2DZZ 2RNL 6ZNM, **WNØWEP**, Canadian DX Association *Long Skip* (VE3HJ), Columbus Amateur Radio Association *CARLscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, Nor. 72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (K4GRD), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham 30, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y., 12020), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025, attn. K6YGS), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB), VERON's *DXpress* (PAOs FX LOU TO VDV WWP) and Wes' Coast *DX Bulletin* (WA6AUD). FB, mates!

Whence:

AFRICA—VQ8CC threatens operational visits to St. Brandon and/or Rodriguez isles between now and his May European vacation. "Calls will be VQ8s CCB and CCR with operation on 160 through 10 meters using Drake gear. Particular attention will be paid the l.f. bands to help those working toward Five-Band DXCC." *Hit* it, Steve . . . . . "6O1GB's sudden departure from Somalia in December was caused by a severe eye problem which had to be attended to without delay in the U.S.A." discloses W1YRC . . . . . "Lightning paid a personal visit to ZE1CX," notes W4NJF. "Now he's looking for a new operation switch for his Spitfire linear." Gay also hears unruly pile-ups discouraging Maurice of FB8XX. "PY2PE does well in getting FB8XX to work the gang a.m. to s.s.b." . . . . . *Diploma Cabo Verde* is a colorful certificate awaiting those who collect a prescribed number of CR4 QSL-points dating after January 1, 1968. For details consult LARCV, Box 73, Praia, Cape Verde Islands . . . . . Via literature of aforementioned clubs and groups: 7G1CG's 21-MHz, 50-watt s.s.b. outfit is a welcome Guinea addition. . . . 5N2s AAX and ABG offer 5R-DXCC credits on 7040- and 3795-kHz, s.s.b. around 0500 GMT. . . . VQ8CJ runs code and theory classes for prospective Mauritius Amateur Radio Society recruits. The club's membership has reached 73.

OCEANIA—"I've been on the air since December working Stateside but conditions have not been the best on 20," writes YBØAAB (WB4GCL) to W1IKE. "Best openings have occurred on long path from about 2200 to 2400 GMT, usually extending to 0100 or 0200. There are short-path openings at 1200. I'm running an SB-101/200 to a TA-33 recently raised from 35 to 60 feet. After starting out around 14,210 kHz, I often move up to 14,240 to pick up the Generals. I'll soon have an out-

board v.f.o. going for split-frequency work. YBØs AC AE and AR are also active here, the latter rigging a quad for his 500 on 20." .-.-.- KH6GLU is net control for the Pacific DX Net at 14,240 kHz. on Fridays. DX bulletins are transmitted at 0800, 0900 and 1000 GMT. Juicy check-ins are anticipated. Ed also announces reactivation of Aloha DX Club and invites membership inquiries from KH6s .-.-.- "I'm in Darwin for Collins in connection with installation of three 250-kw. high-frequency BC transmitters for Radio Australia," enlightens W5ONL. "VKs have been very hospitable. I'm signing VK8AF on 20, 15 and 10 voice and code with a KWM-1 and TH-6. The long path to North and Central America is open every morning on 14 MHz. with excellent signals. However, one-way skip, misdirected beams or poor listening habits at the far end seem to cut down results. Short path on 15 does better for the U.S. but we have to sift through piles of JAs. I've almost given up calling Novices because most of them resume CQing too fast. VK8AV will become a VK5 soon. VK8s DI HA and I have visas for CR8 but Timor requires a one-year residence for licensing. We're still working on all angles." .-.-.- "W4WS may stretch his return trip to include VR5 and other spots," hears W1DTY of *Ham Radio*, concerning VK2BRJ/VK9 .-.-.- KH6IJ and WA1FHU had a New Year's get-together in the latter's Massachusetts hamshack, celebrating the 22nd anniversary of *their first* QSO when Laci was HA4EA .-.-.- Giant-killer VK6IZ comments, "Many do not believe I'm really running only five watts output. I'm on 14,030 kHz. most of the time but also have crystals for 14,020 and 14,050. My usual hours of operation are 1000-1500 and 2200-0200. May I observe that excessively long calls are a complete waste of time." .-.-.- W3JTC expects to sign DX1AAV in Manila till June .-.-.- Via the clubs press: Wandering VE6AJT *wants to follow* his VR5AE triumph and Wallis doings with ZM7 output sooner or later, preferably sooner. . . . CR8AH's imminent return to Portugal will leave Timor up to CR8AI, 21,240 kHz. at 0500 GMT or so. . . . This month's scheduled Macquarie departure of VKØs IA and KJ will turn the island's DX program over to VKØMI, carrier a.m. and c.w. on 10 through 80 meters.

EUROPE—Poland's PZK society throws its annual c.w.-only SP DX Contest next month. DXers throughout the world are urged to collect SPs on 3.5 through 28 MHz. from 1500 GMT on the 5th to 2400 the 6th, transmitting the customary RST001, RST002, etc., serials at three points per band-contact with each SP. Polish stations will append *powiat* designators to the RSTs they give you (579WA, 469CP, *etc.) and your* final score will be total band-contact points multiplied by the number of powiats worked, single-band and multiop categories available. Log entries, a separate sheet for each band, accompanied by signed declarations that rules and regulations have been observed, should go to Contest Manager, PZK, P.O. Box 320, Warsaw 1, Poland, postmarked no later than May 1, 1969. At the same time you might request data on various *PZK* certifications available to qualified DX specialists .-.-.- In the 1968 PACC DX Contest, Holland's VERON sponsor, Ws 2ZV 3BYX 1FZ 9LBJ 4WBK and 4JUK finished in that order for our side, VO1AW, VEs 1AE and 2IL likewise for Canada. PAØs BRM LOU LBN GRF VDR and LO paced the PAØ pack in that sequence. Country winners include CR7IZ, DL9ER, DM2AYK, EA2HR, F6ACD, G3ESF, GC2LU, GM3-KLA, HA5KFZ, HB9QA, JA1EGE, LZ1KRD, OE1-LM, OH5WH, OK1KPR, OZ1QW, SM3EWB, SP2PAH, UAs 2KAP 3NP, UB5HS, UC2KAR, UD6AX, UH8BO, UJ8AB, UL7KAA, UP2KBA, UQ2FJ, UW9AE, ZS6-AJS, YU1KO and 4X4NY. Entries from DLs, DMs, HAs, OKs, SPs, UAs and UB5s each exceeded the number filed by U.S. participants. This year's PACC wingding comes off on the 26th-27th of next month, details due in April's "How's" .-.-.- Yanks visiting Greece can check on licensing possibilities with E. R. Thomas, Army Section JUSMAGG, APO, New York, N.Y., 09223, as suggested by SVØJJ (WA4FIJ) .-.-.- Carving the new SMØ call area out of old SM5 caused complexities in rules for SSA's WASM certification. You're invited by the Swedish society to inquire for new terms via Diploma Mgr., SSA, Enskede 7, Sweden. .-.-.- WA1FHU finds that operator Peti, 13-year-old speedster on the HA8KUX c.w. staff, already has five years of ham radio behind him .-.-.- "I intend to reactivate PX1FD, probably from April 6th to 13th," warns ON5FD, "mostly using 20 and 40 s.s.b. in conjunction with PX1s KT and YY. Last summer a defunct generator and thunderstorms *made* our operations difficult." .-.-.- WA9SQY remarks, "G6OY normally runs 150 watts but I found Ray having fun on 15 c.w. with a homespun 5-watter." Competition for QRPer VK6IZ? .-.-.- HB9P, licensed since 1930, enjoys the RTTY DX angle on 20 .-.-.- "FØLT, WB6s GZM and HBK will probably operate from a few rarish European countries this summer," states the latter .-.-.- "No lack of Gs noticed here," disputes K5YUR. "They're on 10 and 15 c.w. by the dozens, and 10 sideband is packed with G-GC-GI-GW signals around 1600-1700 GMT." .-.-.- SM5DKH writes W1CW, "Our SM5MX/OHØ operation resulted from teamwork by SM5s BGK MX and myself. As a contest man I was mainly interested in the stir that our signal could create, but it certainly did not outweigh the trouble of using such a long callsign on c.w." .-.-.- According to FEARL's *News*, occupying Germans during WW-II built a 100-ft. observation tower on property of K8CFU's aunt on the isle of Jersey, even cozy rooms at the base. Since they couldn't take it with 'em, Arch now finds it quite convenient for his GC5AJE hamshack.

ASIA—Present Far East Auxiliary Radio League officers are KA2s DO, president; SF, vice-president; LS, secretary; EB, general manager; PX, observer-coordinator; *BD, QSL manager*; KS, awards manager; LL, *News* editor; and W6VOM, treasurer. Ex-KA2DM now works old Japan-based buddies as W8ARB/Ø, and ex-KA7CW (WB2KNS) just finished a hamless military assignment in Turkey. FEARL members continue to get together on 14,195 kHz. of a Sunday evening .-.-.- From the West Coast *DX Bulletin* we learn that CR9-AK, Macao's last remaining resident amateur, is the enclave's postmaster and communications chief .-.-.- The same organ indicates that XW8AX may attempt to get something going from Cambodia later this year but he doesn't hold much hope for Burma possibilities under the current regime. Mainland China? Well, let's see what W4BPD comes up with 'way out there in DXville.

HEREABOUTS—"I've been given the call PJ8AA for operation in St. Maarten," informs W2BBK. "Present plans call for being on the air there March 12th-19th which will, of course, include the second c.w. week end of the 35th ARRL International DX Contest. In the test I plan to operate c.w. 30 kHz. inside the low-frequency edge on 10 through 80 meters. Noncontest operating during our stay will be divided between c.w. *and single-sideband.*" Doc formerly signed PJ5MJ down that way .-.-.- "It took me five months to get my license," writes YS1XEE to W1ARR of ARRL, "an authorization renewable every three months. I was given only a phone permit at first, then c.w. privileges after two or three requests." .-.-.- "I fly Caribbean routes for Air Canada," says VE2YG, "and will occasionally operate as 8P6CZ with a KWM-2 and groundplanes on 10, 15 and 20 meters." .-.-.- *A ham's life* can get complicated. WA1FHU's friends YV5s CIZ and CKR (OM and XYL) were transferred to Valera where they operated as YV5s CIZ/1 and CKR/1 until their callsign modifications came through. Shortly after becoming YV1s ACG and ACH then work took them back to Caracas where they now sign YV1s ACG/5 and ACH/5. Hi! .-.-.- W9IOP's "Second Op" is a circular DX-info calculator calculated to come in handy in any hamshack .-.-.- W5s HJA HTY THY, K5s HYB QHS, WA5s EFL OFT and QYR serve as net control for Arkansas DX Association's DX information net each Monday on 3860 kHz. at 0030 GMT. Guests are welcomed .-.-.- W4WXZ, on official duty in Jamaica, is busily snipping Navassa red tape. Chuck, formerly KA2FEC and 9Q5RD, is optimistic enough to have a boat ready for the trip .-.-.- "VP8KE was doing a land-office business until he blew his power transformer," remarks Brian's QSL rep, W4NJF .-.-.- VP8FL says South Sandwich will probably remain off our DX menu for a while .-.-.- W4BRB passes Florida DX Club *DX Report* editorial responsibilities over to K4GRD. Now back to DX, eh, Gene? We note in the December issue that W1FZJ/KP4 knocks off all that 160-meter stuff with a steerable two-element beam .-.-.- Canadian DX Association officers are VE3s DLC, pres.; ACD and UX, veeps; CKW, sec-treas.; NE, recording sec.; and HJ, *Long Skip* editor. CDXA now numbers 190 members throughout Canada .-.-.- Current Northern California DX Club brass includes W6RGG, pres.; W6NEQ, v.p.; WA6AUD, sec.-treas.; K6YGS, *DXer* ed.; W6s CUF ERS and K6CQF, directors. Member W6ISQ is assembling electronics literature for shipment to U.S. Samoa where an effort is under way to boost the resident-KS6 population .-.-.- Southern California DX club, led by pres. W6FRZ, veep W6GEN, sec. W6DQX, treas. W6EJJ, directors W6s FW NJU, and *Bulletin* editor WA6GLD obtained poll results from 21 members showing that yagis outrank quads 19 to 2, *and yagis* average 3.5 elements per boom, beam heights average just over 60 feet, and the order of most desired countries in Albania, Heard Isle, Iraq, Malpelo, Navassa, Laccadives, Rio de Oro, Qatar, Clipperton and Bouvet island. Got it, Gus? QST

Operating News

GEORGE HART, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE
Contests: ROBERT HILL, W1ARR
DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

About W1AW Scheduling. Some of you will have noticed, in last month's W1AW schedule, that a few changes were made. If not, permit us to call them to your attention at this time. As is always the case, the changes were made in an effort to better serve the needs and desires of all amateurs and prospective amateurs.

First of all, much of the general operating has been shifted from the bulletin frequencies to frequencies in the General Class part of each band, in order better to make W1AW available for QSOs to a greater segment of the amateur population. Only brief periods immediately following transmissions of bulletins remain in the 20-kc. indentation spots.

Secondly, those periods devoted to making contact with Novices have been transferred to the edge of the Novice band in each case; thus, 3700 and 7150 kc., four times weekly.

With these and many other considerations in mind, it has not been possible to regularize and simplify the W1AW schedule to the extent desired; in fact, the greater the number of things that have to be considered the more complicated the scheduling becomes. Hope you will bear with us.

Now concerning the new bulletin and code practice frequencies. Nobody (well, hardly anybody) argues the merit of sending daily news bulletins or sending code practice. The arguments center around *how* this is done, on what frequencies, at what speeds, at what times and using what procedures. Your suggestions and comments on all such matters are most welcome and help make the ultimate decisions.

Neglecting for the moment the speeds, times, and procedures and concentrating on the frequencies, quite a few correspondents have asked why W1AW sends its bulletins and code practice 20 kc. inside the low ends of the bands instead of on the dividing line, thus serving as a segment marker in addition to other services performed.

OPERATING EVENTS (Dates in GMT)
ARRL-IARU-SCM-Affiliated Club-Operating Events

March	April	May
1-2 **DX Competition**, phone (p. 64, Dec. *QST*).	2 **Qualifying Run, W6OWP**	1 **Qualifying Run, W6OWP**
1-16 IARC Propagation Research Competition; c.w., RTTY (p. 66, Feb. *QST*).	5-6 SP DX Contest (p. 86, this issue).	3-4 Ohio QSO Party Nebraska QSO Party
6 **Qualifying Run, W6OWP**	10 **Qualifying Run, W1AW**	10 **Frequency Measuring Test,** Official Observers *only*.
8-9 YL/OM Contest, c.w. (p. 97, Dec. *QST*).	12-14 **CD Party** (c.w.)*	12 **Qualifying Run, W1AW**
12 **Qualifying Run, W1AW**	19-21 **CD Party** (phone)*	17 Armed Forces Day
15-16 **DX Competition**, c.w. (p. 64, Dec. *QST*).	26-27 PACC	June 14-15 VHF QSO Party 28-29 Field Day
15-17 B.A.R.T.G. Spring RTTY Contest (p. 72, this issue).		Sep. 13-14 VHF QSO Party
17 W1EIA High Speed Code Test (p. 88, this issue).	*League Officials and Communications Dept. appointees, only.	Nov. 8-10 SS, phone 15-17 SS, c.w.
29-30 West Virginia QSO Party (p. 108, Feb. *QST*). Florida QSO Party (p. 110, this issue).		
29-April 13 IARC Propagation Research Competition, phone (p. 66, Feb. *QST*).		

NOTE: Possible W6OWP Qualifying Run "alternate" (same times and frequencies) is **W6ZRJ.**

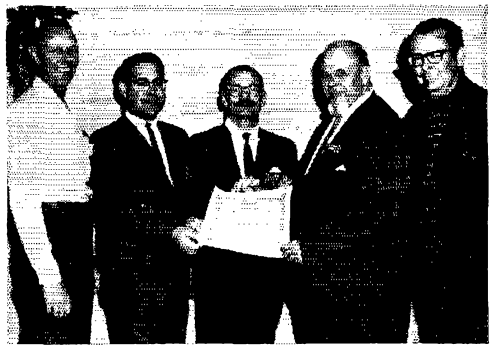
On the surface, this would seem like a quite logical and natural thing to do, and quite a few continue to think so, even after hearing the disadvantages they didn't think could possibly exist. The matter was discussed in some detail in a recent issue of the *CD Bulletin*, a circular distributed quarterly to the ARRL appointment family. It seems the information should also be available to the membership as a whole, so we include it herewith:

The disadvantages are mostly practical ones, as it works out. Sure, it would be nice if W1AW could be a "marker" station, not just to divide Extra from General Class segments, but General from Novice, General from Technician, phone from c.w., and even band edges. But for the most part, it just "ain't practical." Thus the first disadvantage of the suggestion, (1) that W1AW is not at present equipped to operate in accordance with as close a frequency tolerance as would be necessary if it were to serve as an effective sub-band edge "marker." To equip the station to serve as a miniature WWV would be an expensive proposition. (2) Since the station operates on these frequencies for bulletins and code practice an average of but two hours per day, its "marker" function would be extremely limited. (3) If W1AW marks the demarcation between Extra and General on the c.w. bands, who marks all the other band and sub-band edges? (4) Is it desirable to remove from the amateur himself the basic responsibility for observing the amateur regulations, including sub-band limits? (5) Since operation on the demarcation frequency must be very limited, how often will W1AW and the League be blamed by irate members who set their transmitters by W1AW and then drift off and get a ticket from FCC for being out of segment?

There were three principal reasons for making the frequency changes, all three aimed at the greatest good for the greatest number. First, to get out from under QRM, already bad enough, which would be bound to increase when all General Class amateurs had to move out of the restricted segments. Second, to avoid *adding* to the clamor in those segments of the band. And third, to make W1AW code practice and bulletin frequencies, often hard for beginners to find, easier to find and easy to remember — 20 kc. inside the low end of each band or sub-band (except on 160 and 2 meters).

Naturally, the move did not figure to be popular with the Extra-Classers, some of whom have complained bitterly that the League, having fought for the principle that created them, now takes away their extra privileges by plopping W1AW in their midst. But is this really a valid consideration in view of the above?

New Appointment for Technician Licensees. The leadership appointment of emergency coordinator is open to technician licensees, effective Mar. 1, at the discretion of the SCM. Please see the *Amateur Radio Public Service* column (p. 58) for full details. It is hoped that this will enable SECs better to fill vacancies in their EC ranks for which they have been unable to find qualified amateurs of conditional class or better. — *W1NJM.*



It was a historic moment for the Camarillo Mike and Key Club upon presentation of their Charter of Affiliation by ARRL Division Director W6KW; (L-R) **W6IDU** Vice President, **K6VBX** Secretary-Treasurer, **WA6MLI** President, **W6KW** Southwestern Division Director and Santa Barbara SCM **WA6OKN.**

HIGH SPEED CODE TEST, Mar. 17

On March 17, starting at 0115 GMT (Mar. 16 at 0815 EST), W1EIA and four volunteer stations scattered throughout the country will transmit a code test at 40, 45, 50, 55 and 60 w.p.m. for certificate qualification at those speeds. This will mark the tenth anniversary of this program put on by the Connecticut Wireless Assn. and will be the 21st such test transmitted. W1EIA will transmit simultaneously on 3637 and 7120 kc., W5QMJ on 3665, K6DYX on 3690, W6EOT simultaneously on 3640 and 7115 and WØFA on 3653. Following a 15-minute call-up and instructions, 40 w.p.m. will begin at 0150, 45 w.p.m. at 0200, 50 w.p.m. at 0210, 55 w.p.m. at 0220 and 60 w.p.m. at 0230 GMT. There will be five minutes of plain English text at each speed; copy of one minute consecutively solid at any speed will qualify you for a certificate. Anyone may copy and apply. There is no charge.

The last test, transmitted by the above stations on Sept. 16, 1968, produced 19 submissions of which 15 qualified at various speeds from 40 through 60 w.p.m. Noteworthy were WA4KDI and W4KR who qualified at 60 w.p.m., the latter for the fourth time; and W2LYH, who qualified at 55 w.p.m. for his twelfth CWA certificate. Others: WA4WWT, W5PHH, W6NKR, K6SST, W7VSE, WA9RAK, WAØGSA/1, WØKQK and WØTDH at 45; W1EOB, W6IPW and VE3GCE at 40.

On the tenth anniversary of this program, it is noted that there are recorded 447 submissions of copy for the tests resulting in the awarding of 333 certificates. Note the long list of 60 w.p.m. qualifiers: K1DZG, K1RYT, W2LDQ, W2LYH, W3CXX, K4ASU, K4HPR, W4KR, K4TUA, W5JPC, W6EAR, W6OZ, WA6QIH, K6VYJ, W7BAJ, W7FKK, K7YUR, K8HKU, K8HLR, W8RMH, K9AUB, W9EDO, W9FSP, W9YZO, WØJZN, VE7CQ. Of course many of these have changed their calls since they qualified, and a few are deceased. Actually, 40 certificates have been issued at 60 w.p.m., so some of these have qualified more than once, just to prove they could do it.

Give it a try, come Mar. 17? Meanwhile, copy W1EIA practice sessions Mondays starting at 0120 GMT (Sundays at 2020 EST).

ARRL CODE PROFICIENCY PROGRAM

Qualifying Runs

Any person can apply for an ARRL code proficiency award. Neither League membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted (10–35 w.p.m.) you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period.

W1AW will transmit a qualifying run on all listed c.w. frequencies at 0230 GMT March 12. (In converting, 0230 GMT March 12 becomes 2130 EST March 11.)

W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. 0500 GMT March 6. (In converting, 0500 GMT March 6 becomes 2100 PST March 5.)

Code Practice

W1AW transmits daily code practice according to the following schedule. For practice purposes, the order of words in each line may be reversed during the 5–13 w.p.m. transmissions.

Speeds	Local times/days	GMT times/days
10, 13, 15	7:30 P.M. EST daily 4:30 P.M. PST	0030 daily
5, 7½, 10, 13, 20, 25	9:30 P.M. EST (SnTTh 6:30 P.M. PST (Sat	0230 MWFSn
35, 30, 25, 20, 15	9:30 P.M. EST MWF 6:30 P.M. PST	0230 TThSat

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and texts to be sent in the 0230 GMT practice on the following dates:

Date	Subject of practice text from January *QST*
Mar. 10:	*It Seems to Us*, p. 9
Mar. 13:	*Ordinary and Processed Speech . . .* , p. 17
Mar. 19:	*The DX Gutter Getter*, p. 47
Mar. 25:	*The Case for Preparing*, p. 58

Date	Subject of practice text from *Understanding Amateur Radio*, First Edition
Apr. 4:	*The Earth's Part*, p. 101
Apr. 7:	*The Ionosphere*, p. 102

DX CENTURY CLUB AWARDS

From December 1, through December 31, 1968, DXCC certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

K6KA.....285
VQ9B.....166
KH6GLU...159
WA3IKK...158
DJ5MC.....145
WA4QYI...142
WA8ZDF...142
WA1EUV...140
WA8LTX...133
ZL3UP.....128
K2CBQ.....125
K3AHB.....124
F5NW.....123
W2CUI.....120
K5YMY....118
W7ZC.....113
SM5BRS....110
F3OF.....109
OZ7DX.....109
ZD8Z.....109
HB9AIM...108
K6BTT.....108
ZL4LZ.....107
5N2ABD....107
DJ1KV.....106
JA1DIO....106
JA0AWF....105
K4RTA.....105
W6MBJ.....105
W9EVD....105
K9IJL.....104
WB2SCK...104
WA4KYR..104
WA5PPZ...104
TA2BK.....103
CT2YA.....102
DM3JBM...102
GC5ACH...102
K9USE.....102
W2FIU.....102
W4IQO.....102
WA7IFD...102
WA8CXU...102
5T5KG.....102
9L1KG.....102
EI9AR.....101
TY2KG.....101
W2SLF.....101
W3NNK....101
W8ZVL/KL7.101
WA9VIZ....101
K9YXA.....100
TU2CA.....100
W1ELB.....100
WA1CQW..100
WA1DVE...100
W6EGX....100
WB6PHC...100
WA8TXG...100

Radiotelephone

ZL1AH.....227
JA1ITE.....149
EA2DV.....137
I1RZ.....136
K9GCE.....135
WA1EUV...135
WA8ZDF...127
ZL3UP.....127
K3AHB.....119
WB6SAZ....119
DJ5MC.....117
KH6GLU...117
W7GXC....117
WA8LTX...115
K6BTT.....108
K8RCQ.....108
WA3IKK...108
WAØIRP....108
OZ7KV.....107
OZ7DX.....106
K4NSU.....105
ZL4LZ.....105
K4RTA.....104
K5KNZ.....104
WA7BAV...104
W3CDL....103
W7ELU.....103
VK2AGO...102
W3IWF.....102
WB2OIV....101
K1NLQ.....100
K4PPN.....100
K9HDZ.....100
W1FZJ/KP4.100

Endorsements

Endorsements issued for confirmations credited from December 1, 1968 through December 31, 1968 are listed below. Endorsemen listings through the 300 level are given in increments of 20, above the 300 level they are given 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.

340
PAØFX

335
W3EPV

330
W9YSX

310
K1SHN

300
JA3UI
W1WY
WØBK

280
SM0AJU
W3KV

260
K1JHX
K4ET

WB4BD
WA8MCR

240
K9TZH
KØIFL
OZ7KV
VP7NA
W2MZV
W3BWZ

220
K3BSY
W1MIJ

W4REZ
WA9KQS

200
IUT
IILGR
K8ZBY
K8ZIP
VE6PL
W3AES
WA5ALB
W6EJJ
W9ALP

180
DJ5BW
DL5MI
DL6PI
HB9OA
K3IKM
K9GCE
W2GA
W2ZZ
W8OG

160
K5YUR

W1ETV
W5AC
W8QXQ

140
GM2HCZ
GM5AHS
K2UFM
K3AFO
K3OTY
K3SGE
KØJHE

VE5JU
W2YWO
WB2RBG
WA5MYR
W6EBO
W7BE
W6CQC
WA6OTE
ZK1AR

120
DL7JY/W6

DJ6QT
DL9ZE
G3FVC
K3UXY
KR6KQ
W1DAL
W1LVQ
W2DKM
W3JET
WA3HRV
W4DUQ
WA7BPS
WA8ECE

Radiotelephone

325
W9YSX

310
PAØFX
W2CKY

300
W2NUT

280
JA3UI

240
HP1JC
I1ZPB
K4ET
W9QLD

7P8AR

220
VE3BDB
K4RQZ
K6TXR
W4SPX
WØBK

200
KØIFL
VE6PL
WA5ALB
6Y5DW

180
EA2EL

G3SVH
I1BXK
K1DRN
W1OKG
W3EPV
W4BQY

160
CT1MW

K2ANT
VE3BIF
W4WR
YA5RG

140
K3OTY
K5BXG

KP4CRD
VK9BS
WB2MWW
W3KCS
WB4BAP
WA5ATM
W8OAR
WA6OTE

120
G5AFA
WA1DJG
W5AC
W5LJT
WA5MYR
W7ZPV
WØINI

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for December Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
WA2UWA	1010	3080	2910	10	7010
W3CUL	2098	2291	2087	167	6643
K9ONK	246	3070	2028	47	4391
K5TEY	45	1918	1883	4	3850
W3VR	249	1406	1294	67	3016
W7BA	15	1416	1309	99	2839
K3N8N	600	1175	475	197	2447
WA9CNV	4	907	855	7	1773
W8UPH	17	721	631	86	1455
W6GYH	57	605	597	13	1272
WB2UVB	364	470	233	180	1247
K7UDG	161	384	280	104	1229
K9FZX	11	585	576	2	1174
K5BNH	10	573	475	46	1104
WB2RKK	31	525	490	33	1079
W8IHD	170	450	30	420	1070
W7DZX	17	559	471	12	1059
WA2BJN	31	516	505	6	1058
WA7HKR	20	480	452	10	962
W3EAL	30	527	378	4	939
WB4AIW	22	454	437	18	931
WA9AKR	5	448	437	23	913
WØLCX	14	457	370	17	858
W5OBD	28	406	402	-	836
W6R8Y	21	460	218	128	827
W8IAJ	124	370	185	136	815
WB6BBO	26	403	310	67	806
WA3IYS	68	361	327	24	780
K9IVG	11	398	344	12	765
W9JYO	411	162	148	14	735
WA1EYY	64	339	270	61	734
W1PEX	83	335	273	20	711
WA4SCK	18	345	309	6	678
W1OJM	6	325	325	—	656
WØINH	114	284	255	8	641
WA2GPT	82	294	198	60	634
K4KNP	16	311	303	1	631
W6KVQ	2	312	312	0	626
WB6TYZ	397	116	87	23	623
W1EFW	60	301	221	9	591
K7RQZ	27	281	247	34	589
WA2ABY	39	261	220	46	566
WA9UTD	15	278	267	3	563
WA9QKP	20	269	255	9	553
WA3LPU	27	265	253	5	550
W2FR	20	287	234	7	548
WAØDOU	18	263	261	2	544
WB6UTC/4	46	249	213	28	536
W3ERL	22	257	247	8	534
W1BJG	33	266	222	10	531
WB4HUS	100	227	196	6	529
W6YBV	4	256	232	34	526
WA3AOJ	45	245	183	52	525
W6BHG	249	142	103	25	519
WB4JEZ	17	250	244	4	515
WB6OLD	7	249	247	11	514
W7KZ	15	259	228	9	511
WA2CAL	44	232	198	34	508
WA3EKP	78	212	110	102	502
Late Reports:					
WA2UWA (Nov.)	25	950	940	10	1925
WA2UWA (Oct.)	15	830	810	5	1660
WA2UWA (Sept.)	12	512	500	0	1024
W7DZX (Nov.)	7	328	267	5	607

More-Than-One-Operator-Stations

K2DEL/2	990	22	16	1	1029
Late Report:					
WB2BDJ/2 (Oct.)	600	12	0	0	612

BPL for 100 or more *originations-plus deliveries*

K9CWD 247	WA1GGN 124	WA2CLD 109
WA2TBS 225	WB2WNZ 124	WA2FCZ 109
W9YH 210	W9EQO 124	WB6HVA 109
K3WEU 204	WA4VEK 122	WA9TPA 107
W3HK 168	K2KDQ 120	W7OCX 106
WA3IUV 164	WA3EEC 120	WA9QOQ 106
W6MLF 162	WA9GJU 120	KØMRI 106
WA3INC 157	W4FP 118	WA2GRJ 103
W3TN 155	K9ADQ 118	WA9QBM 102
W6MLZ 141	W9ESJ 116	W4RHA 101
W2OE 138	KØOAL 116	WA3GLI 100
WITXL 134	WA1HOL 110	Late Report:
W4VYS 134	WB1HQW 110	VE3ERU (Nov.) 108
WAØHTN 129	WB2BKC 109	

More-Than-One-Operator-Stations

K1NQG/1 400 K3NSS 154 W8VND/8 115

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: W1OJM, WA8AUZ.

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

W1AW SCHEDULE, MARCH 1969

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.-3 A.M. EST, Saturday 7 P.M.-2:30 A.M. EST and Sunday 3 P.M.-10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your *original* operator's license with you.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	.....	.....	.....	.....	RTTY OBS[3, 7]	.....	.....
0030	← CODE PRACTICE DAILY[1] 10-13-15 w.p.m. →						
0100	.....	← C.W. OBS[1] →					
0120-0130[4]	.....	.....	7.020	3.520	7.150[6]	3.700[6]	7.020
0130	.....	.....	7.080	3.555	7.150[6]	3.700[6]	7.080
0200	.....	← PHONE OBS[2] →					
0205-0230[4]	.....	.....	3.820	50.120	145.600	1.820	3.820
0230	← CODE PRACTICE DAILY[1] (35-15 w.p.m. TThSat), (5-25 w.p.m. MWFSa) →						
0330-0100[4]	.....	.....	3.555	.....	1.805	.....	3.555
0100	RTTY OBS[3]	.....	← RTTY OBS[3] →				
0110-0430[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0430	Phone OBS[2]	.....	← PHONE OBS[2] →				
0435-0500[4]	.....	.....	7.220	3.820	7.220	3.820	7.220
0500	C.W. OBS[1]	.....	← C.W. OBS[1] →				
0520-0530[4]	.....	.....	3.700[6]	7.150[6]	3.520	7.220	3.520
0530	.....	.....	3.700[6]	7.150[6]	3.555	7.255	3.555
0600-0700	.....	.....	7.080	3.945	14.100	3.555	7.080
0700-0800	.....	.....	14.280	7.255	3.945	14.100	14.280
2000-2100	.....	14.280	21/28[5]	14.095	21/28[5]	14.280	.....
2100-2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300-2345	.....	7.255	21/28[5]	21.1[6]	21/28[5]	7.255	.....

[1] C.W. OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02 and 145.6 MHz.
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.015 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies; 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
[6] W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
Maintenance Staff; W1s QIS WPR. *Times-days in GMT. Operating frequencies are approximate.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—SEC/PAM: W3DKX; RM: W3EEB. Renewals and endorsements: WA3DUM as ORS, K3MPZ as OBS, W3DKX as PAM, W3BDP as OVS, W3DEO as OPS and W3HKS as ORS. K3GKF shipped out 520 OO notices in 1968. W3TRC is trying his hand as NCS on the MDDS. W3CZK is s.s.b. with a new Swan on 6 meters. K3NVV is active on all bands again. K3RBU is breaking his 6-meter DX records. W3DEO and W3EEB report having the Hong Kong flu. Santa Claus brought WA3GSM a new 2-kw. linear. W3DRD has the new SB-101 and the SB-640. WA3HGV now is Extra Class and will be returning to Wilmington early in July. The U. of Del. station, WA3GAY, is active on 40 and 15 c.w. The Delaware radio clubs are looking for new members. How about you non-joiners making it a point to visit your local radio club at your first convenience. DEPN reports QNI 26, QTC 7; DSMN, QNI 26, QTC 7; DTMN, QNI 47, QTC 4. Traffic: W3EEB 132, W3DKX 28, WA3GSM 25, WA3HWC 18, K3NYG 17, WA3DUM 7, W3HKS 6, WA3FYS 5, W3TRC 5, K3NVV 3, K3RBU 2.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3ICC. RMs: W3EML, K3-MVO, W3MPX, K3SLG. PAMs: K3WAJ, K3MYS. V.H.F. PAM: W3FGQ. OBS reports were received from WA3AFI, WA3HGX, K3WEU, K3SLG, W3CBH, WA3-EEC, WA3INC; OVS from K3VAX, WA3BJQ, WA3-HGX, WA3IAZ, WA3EEC, K3WEU; OO from W3-NNC, K3RDT, K3HNP, W3RFF, K3EMA.

Net	Freq.	Operates	QNI	QTC	RM/PAM
EPA	3610	Daily 6:45 P.M.	418	629	W3MPX
PTTN	3610	Daily 6:00 P.M.	340	317	W3MPX
EPAEP&TN	3917	Daily 6:00 P.M.	662	650	K3WAJ
PPN	3960	Daily 5:30 P.M.	658	726	K3SLG
VHF (6)	50.25	Mon.-Fri. 7 P.M.			W3FGQ
VHF (2)	145.35	Mon.-Fri. 8 P.M.			W3FGQ
ENTN	3740	Daily 7:15 P.M.	43	15	WA3HUV

New officers: WENS ARC—K3KDU, pres.: K3NSN, vice-pres.; W3GFK, treas.: K3LPD, secy. Reading Radio Club—K3HIU, pres.: K3IIJ, vice-pres.: W3UQC, secy.: K3MGO, treas. Beacon ARC—W3KYL, pres.: W3IUB, secy.: K3FOU, treas. Explorer Post 703 ARC—WA3FFR, pres.: WA3ASL, vice-pres.: WA3ADN, secy.: WA3EKM, treas.: WA3ILW, advisor: W3AES, comm. chmn. W3EML was very busy with TCC and wants to thank W3MPX, WA3IZ and WA3CTP for their excellent assistance. WA3AOJ found a Swan 500C under the Christmas tree. WA3AFI and W3CBH are giving WA3IUV and WA3INC a hand in getting the Eastern Novice Training Net going. K3MVO missed the traffic rush while in Kentucky. WA3JKB got his "A" ticket and a new keyer for Christmas. WA3CFU was with the Penn. State Blue Band at Miami Orange Bowl. K3VYG note. W3RV has more antenna room at his new QTH. K3NPC reports a base-loaded 40-meter vertical antenna is bagging 80-meter DX. OO K3HNP reports 335 cards for 1967 and 174 for 1968. WA3EWV received a VOM and bug for Christmas. K3EMA got his 35-w.p.m. sticker. WA3GZP has a new SB-301. Frankford Radio Club's new officers are W3WPG, pres.; K2CPR, vice-pres.; K3JLI, secy.; W2UI, treas. The QCWA nets are now on 3917 kc. and the Guardian Angle Net meets on 7263 kc. Sun. mornings. Traffic: W3CUL 6643, W3VR 3016, K3NSN 2447, W3EML 939, W3ERL 534, WA3AOJ 525, W3MPX 382, WA3INC 374, WA3IZ 323, WA3CTP 305, WA3IUV 291, K3MVO 268, WA3EEC 255, W3HK 247, K3WEU 232, W3CID 217, WA3GUK 179, K3OIO 172, WA3JKB 153, W3FGQ 140, WA3GLI 139, WA3GAT 129, K3PIE 128, WA3ATQ 126, K3PSO 125, WA3CFU 112, WA3EXW 111, WA3FCP 111, WA3IMV 111, K3YVG 111, WA3JWL 104, WA3JWF 80, W3FPC 76, K3RUA 71, WA3CNM 68, WA3GPW 66, W3HNK 65, WA3EXB 60, W3RV 60, W3VAP 55, W3BNR 51, WA3IOB 51, W3NNL 43, K3VBA 32, WA3AFI 30, W3AXA 30, K3MDG 30, K3SLG 30, W3KQE 28, WA3IYC 25, W3CBH 22, WA3HGX 22, W3KJJ 20, K3HKW 19, WA3JLF 16, WA3LAK 16, W3OY 16, WA3FBP 14, W3JKX 14, K3-NPC 12, W3BUR 10, WA3BSV 9, WA3HEU 9, K3KTH 9, WN3JZB 8, K3RZE 8, WA3FPM 7, W3IVS 7, K3HNP 4, W3ADE 3, WA3BJQ 2, WA3IAZ 2, W3ABT 1, K3BNS 1, WA3CKA 1, W3CL 1, K3EMA 1, W3EU 1, WA3EWV 1, K3FOB 1, WA3HIT 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, John Munholland, K3LFD—SEC: W3LDD.

Net	Freq.	Time	Days	Sess.	QTC	QNI Ave.	Mgr.
MDD	3643	0000Z	Daily	31	447	16.8	WA3HTQ, RM
MDDS	3643	0130Z	Daily	26	39	5.9	W3CBG, RM
MDCTN	3920	2300Z	STTS	18	111	17.1	K3GZK, PAM
MEPN	3920	2300Z 1800Z	MWF SS				K3IAC
MTMTN	145.206	0200Z	T through S	20	8	7.6	W3IFW

Greetings to all MDC radio amateurs from your new SCM, K3LFD. Thanks to K3JYZ for two years of outstanding leadership and accomplishment as SCM, in which he built MDC into a well-organized section, highly active in public service operations. The Foundation for Amateur Radio has awarded its 1968 Scholarship Award to K3QDD, son of K3QDC, in his third year at M.I.T. A3LQY, alias W3LQY, has received the First Army MARS Trophy for 1968. W3GEB says the wind downed his antenna, the Hong Kong bug downed him and another bug downed his transmitter. WN3-KCP finally got a Czech to add to his DXCC list. Old Man Winter got to W3FA's antenna farm before he did, so he has a spring project cut out for him. K1PKQ, K7ROP, WA9REN and K8HQK, all portable 3, are keeping K3NSS transmitters humming with traffic. It's good to hear WA3DWF on the air again after a long hospitalization. K3NCM is trying to overcome a power-supply installation problem and go mobile in his new car. K3NCM's harmonic, WN3KBU, has added Kansas to his WAS list. WA3KLP made his first report. WA3EQM has almost recovered from a broken arm and leg and is back on the air with an Extra Class ticket and a full gallon transmitter. W3-EWP is a recent arrival from Missouri, where he's known as WØJBK. WN3KNJ put up a ground-plane antenna and got a G3 on the first try. WA3EQI (ex-W1ICW) is planning a 6-band station in Rockville and raring to go. K3GJD now runs a full kw. WA3JPI is the new net mgr. for CVTN. K3JYZ finished his kw. amplifier in time for the ARRL DX Test. WA3FRL is now operating from ET3USA. K3EFR is Asst. EC, Baltimore City. Traffic: (Dec.) WA3IYS 780, WA3EKP 502, WA3ATQ 272, W3TN 262, W3PQT 239, K3NSS 205, KL7FRX/3 180, WA3HTQ 161, K3OAE 106, K3LFD 92, W3CBG 85, K3GZK 82, WA3IRQ 68, K3PEQ 65, WA3-IRL 64, K3GJD 57, W3EOV 54, K3JYZ 52, W3ADO 48, WA3IAQ 34, WA3IJR 31, W3ECP 28, W3FA 27, WA3-JBY 27, W3ZNW 25, W3PRC 24, WN3KAA 19, K3FQF 17, WA3KLP 11, WA3CEK 10, W3CRE 10, K3QDC 10, K3LFN 8, WA3DWF 5, K8IRC/3 4, WA3EOP 3, WA3EWP 3, WN3KNJ 2, W4TFX/3 1, (Nov.) W3FA 31, W3LBC 22, K3NSS 10, W3EWP 3, WN3KCP 3.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, WA2BLV. PAMs: WA2UVB, W2ZI. NJN reports 7 P.M. session traffic 554, QNI 482, 2nd session, 10 P.M., traffic 160, QNI 141. NJEPN reports traffic 496, QNI 695. WA2BLV is our new NJN Mgr. WA2ABY and WB2UVB made the BPL. W2TDU is now a Silent Key. WA2FGS passed her Ad-

vanced Class exam. W2ZQ was very active in the Sept. and Jan. V.H.F. QSO Parties. K3CPF is heading the committee. W2DNF and W2BLM are new OPSs. W2ZI received his 50-year ARRL lapel pin. WB2QMA is a new station reporting from Lawrenceville. W2ORS is increasing his traffic totals. W2PU (K8JLF opr.) joined TCC. W2ZVW is operating mobile c.w. in Texas. Ex-W2BZJ/W2FK. returned from Fla. and has a new call, W2JI. "Roll" Read is now W2YH in Rio Grande. W2ZI made top score for Mercer County in the N.J. QSO Party. W2PU (K8JLF opr.) was top man in the Oct. CD Party. W2ZVW was the man on phone. The SJRA 2-Meter Net meets Wed. on 145.3 Mc. at 9 P.M. W2FYS and W3CXO manned K2AA both week ends of the Sweepstakes. Delaware Valley Chapter of QCWA's new officers for 1969 are W3HK, chmn.; W2AEW, vice-chmn.; W2FJ, treas.; W2HX, secy. West Jersey Radio Amateur's new officers for 1969 are K2QIJ, pres.; WA2HJF, vice-pres.; WA2CHY, secy.-treas. W2ZI gave a talk at the Gloucester County Amateur Radio Club meeting Dec. 4 on traffic work and the early history of the League. The new ham license plates look real neat. Traffic: (Dec.) WB2UVB 1247, WA2ABY 566, WA2MGV 178, WB2VEJ 170, WA2FCZ 165, W2ORS 156, WA2CLD 152, W2ZI 121, W2YPZ 93, W2PU 68, W2ZVW 68, WA2KIP 41, W2DNF 39, W2BLM 36, WB2FJE 27, WB2QMA/2 27, W2CKF 26, K2JJC 18, K2SHE 18, W2IU 13, WA2KAP 13, W2JI 12, WB2SFX 10, W2CDZ 3. (Nov.) WA2BLV 111, K2SHE 31, W2BLM 30, WA2-WLN 27, WB2MIRD 16, K2JJC 15, WA2KAP 13, W2DNF 10, W2CDZ 5, K2SOL 4.

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—Asst. SCM, Rudy W. Ehrhardt, W2-PVI. SEC: W2RUF. In addition to those nets listed last month please add Clearing House Net, 3925 kc., 1300 local time daily, WA2GPT mgr. NYSPTEN elected K2SPO, mgr., WB2VJB and WB2GAL asst. mgrs., WA2ILE, secy.-treas. They report that the net in Nov. handled 279 messages with 1476 check-ins. Three WNY OOs sent out a total of 109 cards during Dec. Appointment renewals are W2ZCZ, W2BLP and W2FXA as OOs; W2ZRC, K2JBX, K2GQU, K2DNN, W2FR, K2KIR and WA2PZD/WB2NNA as ORSs; K2QDT as OPS. Congrats go to new Extras WB2FXK, WA2LWF and W2BPB. The RAWNY and ARATS have combined and meet the 2nd Tue. of the month. W2PE does a fine job of handling phone patches for the boys at KC4. K2EE continues active on 2 meters from an antennaless apartment. K2DWI and W2IUF have new solid state theatre organs. W2QLK is starting a class for Novices in Buffalo. W2PVI is doing a super-job as Asst. SCM. The Syracuse V.H.F. Club elected W2RHQ, pres.; K2QWD, vice-pres.; W2UKA, treas.; W2IYR, secy.; K2AVA, act. mgr. NYS reports clearing 505 messages with 699 check-ins for Dec. WA-2BSG and K2RIP are constructing 2-meter RTTY set-ups. WB2VVZ meanwhile occupies himself planning a 432-Mc. station. WB2JCE is the new district treasurer for the YLRL. W2CFP attended the SAROC Convention. K2TXB lost his v.h.f. antennas, 100-ft. tower and all to the WNY wind. The RAGS is sponsoring its annual hamfest Mar. 29. W2FR can supply the details and tickets. WA2PZD/WB2NNA is back at R.I.T. operating K2GXT. The Rome Radio Club elected WA2HNQ, board chairman; W2PRY, pres.; W2GR, vice-pres.; K2AFK, secy.; WA2FLX, treas.; W2MSM and W2IXR, board members at large. The Fulton Amateur Radio Club elected K2HPY, pres.; WB2ABB, vice-pres.; WA2ZXU, secy.; WA2ZXT, treas. The NYS report for Nov. was 335 messages cleared with 549 check-ins. Congrats to WA2JYZ on his new Advanced Class license. W2UTH worked as ZD8 on 50.1 Mc. Traffic: (Dec.) W2FR 548, WA2CAL 508, W2OE 484, K2KQC 282, W2RUF 244, WB2SMD 234, WB2OYE 232, W2MTA 205, WA2HSB 193, W2FEB 135, K2RYH 132, WB2YBX 132, W2HYM 120, W2QC 88, WB2YEM 66, WB2VND 62, K2KTK 58, WB2HLI 57, W2FCG 48, K2QDT 48, WB2VSL 46, W2RQF 42, W2PRY 40, WA2BEX 36, WA2ALV 26, WA2PZD 22, K2OFV 21, WB2ZDK 20, K2DNN 16, K2IMI 16, W2PZL 16, K2BWK 12, WA2GLA 12, K2KIR 11, WA2ANE 10, W2CFP 8, W2-PVI 7, WB2NZA 6, W2EMW 5, WB2OMY 3, WB2WZG 1. (Nov.) K2KIR 10.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3KPJ. PAM: W3WFR. RMs: WA3AKH, W3KUN, W3MFB, W3NEM. Traffic nets: KSSN, 2330 GMT; WPA, 0000 GMT, 3585 kc. Condolences to the family of W3VZA, who passed on to the land of Silent Keys. WA3IPU made the BPL. The WPA Traffic Net had 31 sessions, 393 QNI, handled 408 messages with 36 stations reporting plus 16 visitors. W3ZUH certifies 125 countries for DXCC, 196 as DL5-MI. K3WWP says incentive licensing is great. WN3IYA passed the General Class exam. PY7ALP/KH6BQG visited K3LGM. K3UIK and K3AFO strive for higher DX totals. W3LMK enjoys his retirement with more activity on the ham bands. WN3KXO has amassed 26 states to date. New officers of the Beaver Valley Amateur Radio Assn. are K3OSL, pres.; W3VYH, vice-pres.; K3HCT, secy.; K3LGM, treas. W3UJ tried out a new quad. W3ZDW, after a 4-year wait, received a much-sought QSL from JT1KAA. K3NPY is asst. chief engineer at Channel 53 TV station in Pittsburgh. W3WDK has been appointed Asst. EC for Erie County. W3BRB relocated to Erie. W3TVW experiments with radio-controlled model submarines. Joining the upgrading ranks are K3FGQ to Advanced, WA3-EFH and WA3EFI to Amateur Extra. W3RTB built a solid state receiver. K3UPC gets ready for the upcoming Boy Scout Jamboree with a new tower and beam. ECs are needed in the following counties: Armstrong, Bedford, Clarion, Clinton, Greene, Forrest, Franklin, Fulton, Lawrence, Mifflin, Somerset, and Warren. How about it fellows? Here's your chance to promote emergency organization; 100 percent county coverage in this section is our goal. If you like traffic-handling, check in to the KSSN or WPA traffic nets. Club secretaries, your club bulletins are welcome. New appointees: WA3JDT, EC for Mercer County; K2VCO/3, OO. Endorsements: W3BLZ, OPS; W3GJY, ORS; WA3IPU, ORS. Traffic: (Dec.) WA3IPU 550, W3MFB 387, K3-ZNP 273, WA3AKH 190, WA3GPK 160, W3LOS 153, K3SOH 111, W3GJY 85, K3HCT 60, W3KPJ 51, W3YA 20, K3SJN 18, W3RUL 16, K3SMB 14, WA3HSI 11, K3AST 10, W3BLZ 6. (Nov.) W3BLZ 8, W3ZUH 2.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	*Freq.*	*Times*	*Days*	*Tfc.*
IEN	3940 kc.	1400Z	Sun.	45
ILN	3760 kc.	0100Z	Daily	347
NCPN	3915 kc.	1300Z	Mon.-Sat.	1232
NCPN	3915 kc.	1800Z	Mon.-Sat.	
Ill PON	3915 kc.	2245Z	Mon.-Fri.	942
Ill PON	3915 kc.	1430Z	Mon.-Fri.	
Ill PON	145.5 Mc.	0200Z	M.W.F.	123
TNT Net	145.35 Mc.	0300Z	Sun.-Fri.	463

W9NWK reports that the traffic count of the 75-Meter Interstate Single Sideband Net for Dec. was 766. This column's sympathy is extended to W9LOY and her children upon the passing of her husband and their father, W9RQF; also to the family and friends of W9PGW and K9YRI. Our condolences also to WA9CLL, whose wife recently died. The Palestine Grade School Radio Club is looking for used equipment and parts, contact K9TXJ, trustee. W9HOV is hospitalized but hopes to be out soon. K9DQU has a new Motorola "handie talkie" for 2-meter f.m. W9TQR is using his new HQ-170A and 2-meter converter for receiving coverage of 160 through 2. WB9ALI received his Tech. Class license and is now on 6 meters, and WA9NEJ received her Advanced Class license. W9LUO gave a demonstration talk of slow-scan TV to the Wheaton Community Radio Amateurs Club at its last meeting. K9PGN, W9YMF, K9AQJ and K9TOL were elected officers of the Chicago Area Radio Club Council, Inc. New appointments include WA9ZGF as OVS and K9-CZU as OO. WA9QZE has a Drake FET SC-2, a CPS power unit and CC-1 converter on 2 meters. Many amateurs from the Illinois area attended the Lake County (Ind.) Club's Annual Banquet Feb. 8 at Teibel's Restaurant in Northwestern Indiana. WA9SDT has new TR-108 and T175 Knight kits. WA9WVJ passed the General Class exam and is now trying for Advanced Class. W9LBQ, formerly K5VOL, is now living in Wheeling. K9KNX passed the Amateur Extra exam and W9BFO is now 1st-class phone. W9DKN is recuperating from surgery after a hospital stay. W9-QXR finished his home-brew 6-meter equipment and is now building a Knight T175. W9BYD, W9DJR, WA9KQD and W9UHO are the new officers of the Argonne Radio Club. W9QUE is the new trustee with an Amateur Extra license. The Southeastern Illinois Ham Society elected W9BFO, K9CNX, K9KNX and K9CVL as its officers for the coming year. WA9SYT, WA9PBS, WA9QBE and K9LAB were elected officers of the Sterling-Rock Falls Amateur Radio Society. WA9TCW has a new Drake SC-2 and received his WAS and WAC certificates. The new Northwest ARC officers are WA9ENA, WA9TKO, W9HWG and K9ZXQ. WA9OCH has homebrewed a briefcase solid state c.w. transceiver and reports FB QSOs. W9YID was elected

pres. of the Egyptian ARC. WA9CNV, WA9AKR, WA-9MHU, WA9OTD, W9YH, WA9QBM, WA9PPA and WA9ADQ are BPL certificate recipients for Dec. traffic. Traffic: WA9CNV 1773, WA9AKR 913, WA9OTD 563, W9YH 312, W9NXG 276, WA9QBM 243, W9HOT 203, WA9PPA 191, K9ADQ 179, WA9BRQ 171, WA9TUM 128, WA9ZUE 119, WA9WNH 117, W9JXV 106, WA9SFB 89, W9HPG 72, WA9SPA 67, WA9RCQ 57, K9RAS 43, WA9LDC 42, WA9OBP 38, WA9LDU 27, K9HSK 24, W9PRN 24, K9DRS 16, K9TXJ 15. K9DQU/WB9AIE 14, WA9YQT 10, WA9LHU 7, W9LNQ 7, K9FRZ 6, W9IDY 2, K9IDQ 1.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9-BUQ.

Net	*Freq.*	*Time*	*Dec. Tfc.*	*Mgr.*
IFN	3910	1330Z Daily 2300Z M-F	399	K9IVG
ISN	3910	0000Z Daily 2300Z S-S 2130Z Mon.-Sat.	997	K9CR8
QIN	3656	0000Z Daily	249	W9HRY
Ind. PON	3910	1245Z Sun.	159	K9EFY
Ind. PON V.H.F.	50.7	0200Z Mon., Thurs.	282	WA9NLE

WA9QPC and K3UWZ/9 used full duplex on 6-meter f.m. in election coverage. Fort Wayne has two repeater groups going strong, 146.34 input, 146.76 output and 146.46 input, 146.88 output. The Allen County Amateur Radio Technical Society's call is WA9YJV. New officers are K9LSB, pres.; WA9SDO, vice-pres.; WB9AJJ, secy.-treas.; K9UBF and WA9ALY, activities. The following helped to put up the repeater antenna: K9-UBF, WA9SDO, WA9SDP, WA9WNF, WA9VRA, W9-INA and K9LSB. W9UC received a plaque from the Ft. Wayne ARC for service to the club and its members. WA9JHC is working TV on 432 Mc. WA9INJ worked 45 states including Hawaii with 40 confirmed. New officers of the Indianapolis Radio Club are K9-LNX, pres.; K9EAT, vice-pres.; W9SUN, secy.; W9AI, treas.; K9DWT, chief op.; W9POF and W9FZW, directors. W9PUB has a 100-ft. tower and a four-element quad. K9FUZ sends Official Bulletins on 7100 at 1800Z and 0300 every other night. W9JBQ is using a tubeless v.f.o. with his 99er. WA9ABI. WA9KBT and WA9CFW handled a wedding between Dunkirk and Cleveland. W9AQW lost his tower and all antennas and now is using a dipole. W9ICU is home from the hospital. W9PMT reports the Hoosier V.H.F. Net's Dec. traffic at 176. QIN Honor Roll: W9BDP 28, K9VHY 26, WA9FDQ 23, K9DHC 18, W9HYV 17, W9QLW 17, W9KAG 16, W9EPZ 15. BPL certificate recipients are K9FZX, K9IVG, W9EQO, W9JYO, K9CWD and WA9-QOQ. *Amateur radio exists because of the service it renders.* Traffic: (Dec.) K9FZX 1174, K9IVG 765, W9-JYO 735, W9HRY 316, W9EQO 270, K9CWD 249, WA9-RSI 193, K9HYV 188, W9ENU 178, WA9QOQ 164, W9MM 150, W9CBY 120, WA9VZM 120, W9JBQ 112, W9BUQ 75, WA9ZCE 69, K9VHY 67, WA9BHG 66, K9EFY 59, WA9CJR 58, WA9GNA 58, K9KTB 58, W9FWH 50, WA9TJS 48, W9CMT 47, WA9MXG 45, W9SNQ 42, K9JQY 34, W9LG 32, WA9OHX 27, WA9-QOR 27, WA9VBG 26, WA9PUM 23, W9YYX 23, W9DOK 22, K9FUJ 20, K9GBR 16, K9ILK 16, WA9-QEQ 16, W9CUC 15, WA9IPS 15, WA9AXF 13, W9ALM 12, W9BDP 12, WA9JIX 9, WA9SBR 9, W9PMT 6, WA9KYG 4, WA9ZCE 4, WA9ABI 1, WA9AQW 1. (Nov.) WA9GNA 24.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: K9DBR, WA9IZK, W9LVC, W9NRP, WA9QNI. RMs: K9KSA, W9DND.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1245Z	Mon.-Sat.	401	276	W9AYK
BEN	3985 kc.	1800Z	Daily	732	219	W9LVC
WSBN	3985 kc.	2300Z	Daily	1387	516	WA9QNI
WIN	3662 kc.	0115Z	Daily	261	95	W9DND
WSSN	3780 kc.	0030Z	Daily	177	40	K9KSA
WRN	3622 kc.	0130Z	Sun.	15	2	K9GSC
SW2RN	145.35 Mc.	0230Z	Daily	292	52	WA9IZK
SWRN	50.4 Mc.	0300Z	Mon.-Sat.			K9DBR

Net certificates went to W9IRZ for WSSN; WA9VCK, WA9LFO, K9JPS, WA9HFB and WB8CIZ for WSBN. New appointments: WA9AIB as OPS and W9AYK as PAM for BWN. Renewed appointments: K9LGU as OPS; W9EWC and W9PJT as OVSs; K9KJT, W9NRP, W9VHA and W9SQM as ECs. WA9QKP was the top Wisconsin QNI in 9 RN. Ex-SCM W9KQB is recovering from a heart attack. W9CTI took part in his first SS in 30 years. WA9UMT received his WAS award. K9DHN added a new SB-200 to his station. K9ZMS is #6 with a Drake line. BPL certificates for Dec. traffic went to WA9QKP, W9ESJ and WA9GJU. Traffic: (Dec.) WA9QKP 553, W9CXY 395, W9DND 347, WA9-GJU 333, W9ESJ 264, K9CPM 258, WA9RAK 180, WA9QNI 136, K9FHI 102, WA9PKM 83, K9KSA 79, W9KRO 60, W9IHW 46, K9JPS 44, WA9OMO 42, W9-NRP 40, WA9NPB 39, WA9OFF 35, WA9WOC 35, K9TBY 34, W9QYK 33, WA9UMT 32, W9DXV 25, W9RTP 24, W9BCH 23, K9DHN 23, WA9LRW 23, K9WRQ 22, K9PKQ 21, WA9TXN 21, WA9VCK 20, W9IRZ 11, WA9NBU 11, WA9TUP 11, WA9SSN 10, K9FYM 7, WA9SAB 4, K9ZMS 4, W9SQM 1. (Nov.) W9IHW 27, W9RTP 17, K9DHN 6.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØMZW. RMs: KØORK, WAØ-RRA. PAMs: WAØMMV, WAØHRM. MSN meets daily on 3685 kc. at 0030 and 0400Z. MJN meets Tue.-Sun. on 3685 kc. at 0100Z. Noon MSPN meets Mon.-Sat. at 1805Z on 3945 kc. Sun. and holidays at 1500Z. Evening MSPN meets daily on 3945 kc. at 2315Z. Congrats to new Noon MSPN PAM, WAØOEJ. Helen is taking over for WAØMMV, who has been Noon Net PAM for the past two years. Many thanks to Clarence for a job well done. The newly-established Minnesota Section RTTY Net meets each Sun. at 0200Z on 3620 kc. WØAA is NCS and the net is looking for check-ins. WØHP and WØPAN would like to organize a Midwest-or Minn.-DX association, consisting of holders of DXCC. Anyone interested, drop a note to WØPAN. The newly-established Cottonwood ARC is holding code and theory classes with 12 prospective amateurs enrolled. A good time was had by all in attendance at the Annual PICONET Winter Hamfest in Dec. WA-ØUNS is recovering from a car accident. We wish him a speedy recovery. WAØSBU is enjoying a new HW-100. WNØWEP is on the air with a T-60 and an SX-111 on 40 and 15 meters, looking for skeds. Correction: WAØKWO Sept. traffic should have read 200. Traffic: WAØTQT 244, KØZRD 164, WAØMMV 155, KØSRK 99, WAØEPX 95, WAØONS 82, WAØPFV 77, KØMVF 61, WAØVAQ 61, WAØIAW 58, WAØRKV 46, WØTCK 46, WØFHH 42, WAØODB 36, WØBE 34, WAØQIT 32, WAØRRA 32, KØFLT 31, WAØHRM 25, WAØKWO 24, WAØRKF 24, WAØJRA 23, WØATO 19, KØICG 17, WAØNQH 17, WAØEZQ 16, WØFHO 16, WAØLAC 16, WØKYG 15, WØEQO 12, WAØDFT 11, WAØOEJ 10, KØCSE 8, WØHEN 8, W8UMX 8, WAØEWK 5, KØZBI 4, WØPAN 2, KØSZQ 2, KØ-ZWG 2.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. PAM: WØCAQ. RM: WAØRSR. KØTYY has a new SB-200 working for him now. WAØOVW lost the quad in that bad windstorm in Dec. Father-and-son combination WA-ØVGJ and WAØRWL came up for top scouting church awards during Scout Week in Feb. WØDM qualified for a 52-year veteran in scouting, another item to show how ancient he is getting. KØOVT has a new SB-101 and a new inverted "V." WAØKRI is the proud papa of a new baby boy. KØRSA moved to a new QTH with more room for antennas. His XYL, WNØUDC, has had a siege in the hospital. WØMQA is working in the Twin Cities again. WAØOAT braved the snow and cold to spend Christmas in Grand Forks. WAØGQI/3 is in the Navy in Maryland and active in DX and contests from W3MSK. He is working in communications at the Naval Ordinance station. WØ-GFE still is busy with phone patch traffic with S. America on 15 meters. WAØHUD won top honors in Tenth Regional for checking in 47 times. Bob received the CAN certificate also. WØNMV has been doing a fine job also. The N. Dak C.W. Net meets at 0300Z on 3640 kc. 17-F. WAØRSR is RM with WØBF and WAØHUD in there pitching.

Net	*Sess.*	*Check-ins*	*Tfc.*	
Goose River 160M	5	64		Sun. 0900 CST WØCDO
YL WX	20	483	32 3995 kc.	0730 CST WAØMND, WAØGRX
ND PON	14	315	49 3915 kc.	1730 CST Sat.-Sun. 0930 CST Sun. WAØHUD
NDRACES	42	955	181 3996.5	1730 & 1830 CST M-F KØSPH

Traffic: WAØHUD 263, WØNMV 105, WØBF 33, WØ-GFE 33, KØPZK 30, WAØIKS 29, KØSPH 26, WØWWL 26, WØEFJ 23, WAØGRX 23, WAØAYL 16, WAØMND 13, WØDM 10, WAØTBR 10, WAØJPT 9, WØDXC 8, WAØUKD 4, KØTYY 3.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WAØCPX. RM: WØIPF. PAM: WAØCWW. Net managers: WØZWL, WAØLLG, WAØPNB, WAØ-OYT. Sioux Falls Amateur Radio Club held its election and mapped out a program for the coming year,

including a newspaper. Those who took NCS during the storm are to be complimented on the good job. Reportedly quite a number got their licenses and those who tried got a higher license at the recent test in Sioux Falls. Net reports: SDN, 23 sessions, 163 QNI, 45 QTC from 30 stations. NJQ net, 389 QNI, 155 QTC, 56 informals. Early Session Phone Net, 313 QNI, 41 QTC, 30 informals. Late Session Phone Net, 1365 QNI, 82 QTC, 184 informals. It would help WØZWL, WX net manager, if all who could would use numbered traffic. Let's give her a hand. Traffic: WØZWL 485, WAØPNB 427, WAØNZA 197, WAØFUZ 144, WØOIG 52, WAØPBL 30, WAØBZD 28, WAØLLG 27, WØDJO 20, WAØRIQ 9, WØDVB 8, WØFJZ 8, WAØCPX 6, WØHOJ 4.

DELTA DIVISION

ARKANSAS—SCM, Robert Dennis Schaefer, WA5IIS—SEC: W5PBZ. PAM: WA5PPD. RM: W5NND. The RM appointment of W5NND was renewed for another year. WA5TIY and WA5TJB received OPS appointments and WA5RTG is a new ORS. WA5PPD is back on the air with a new KWM-2 and NCL 2000. Top stations on OZK during Dec. were W5NND 28, W5QOO 19, W5MYZ 18, WA5TFE 18 and WA5NOC 17. AREC membership is now up to 113. W5OBD made the BPL for the 95th time. Net reports for Dec.:

Net	*Time*	*Freq.*	*Tfc.*	*Mins.*	*QNI*
OZK	0100Z	3790	44	841	235
PON	2130	3925	120		492
RN	0030	3995			
APN	1230	3885			
Teenage	2330	3995			

Traffic: W5OBD 836, W5NND 272, W5MYZ 169, WA5KEF 72, WA5TJB 14, WA5TLS 11.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: K5ANS/5. V.H.F. PAMs: WA5DXA, W5UQR.

Net	*Freq.*	*Days*	*Time/GMT*	*Net Mgr.*
LAN	3615	Daily	0030/0400	W5MBC
Delta 75	3905	Sun.	1330	WA5EVU
LaPON	3915	Sun.	1300	W5KC
LaRTTY	3612.5	Sat.	0100	W5GHP
CenGCHN	3935	Daily	0015	WA5NRG

The Annual Lafayette RC Banquet was one of the year's outstanding events in the state. W5WMU was awarded the W5PM Trophy as the winner of the 1968 La. QSO Party and W5CEZ was awarded a Certificate of Merit for his outstanding contribution to the development of LAN. W5UK, the GNOARC station, worked into Mississippi, Alabama and Florida on 2 meters and north and northeast during Dec., according to WA5DXA. We all extend our sympathy to WA5RZC on the recent passing of his XYL. The City of San Diego, Calif., has set aside Apr. 28 to May 4 as Louisiana Week in commemoration of its 200th Anniversary and a suitable award will be presented to the Louisiana amateur who contacts the greatest number of San Diego amateurs during this week. W5JFB also reports good 2-meter openings into southeastern states. W5CEZ spends most of his time on Army MARS. WA5OJG received a Hawaiian QSL to complete his WAS. WA5WBZ has earned his coveted LAN Net Certificate. W5KC has overhauled his final and replaced the steam horses with 3-500Zs. W5WMU and K5UYL passed the Extra. The GNOARC elected W5HUT, pres.; WA5ORS, vice-pres.; K5GKK, treas.; WA5FBQ, secy.; WA5DXA, local EC. WA5LGO has added a shack to the back of his house. Don't forget, fellows, the Annual Board of Directors Meeting of ARRL will be held in New Orleans May 2. For further information contact W5LDH. Traffic: W5KRX 270, W5CEZ 147, K5ANS/5 114, W5MXQ 81, W5MBC 61, W5PM 17, W5EA 10, WA5OJG 5, WA5GVB 4, W5KC 2.

MISSISSIPPI—SCM, Clifton C. Comfort, WA5KEY—

Net	*Freq.*	*Days*	*Time GMT*	*Net Mgr.*
Gulf Coast Side Band	3925	Daily	2330	W5JHS
Miss. Side Band	3990	Daily	0015	WA5TUD
RACES	3987.5	Sun.	1345	W5IZS

I regret to report that W5ALZ has joined the Silent Keys. The Keesler AFB Radio Club, K5TYP, reports KØJAI/5 now is pres. replacing WA8WNK/5, who has transferred. The Jackson Amateur Radio Club's Annual Installation of Officers Dinner showed the ARRL film of the Alaskan Earthquake. New officers for 1969 are K5PJY, pres.; W5QGP, vice-pres.; W5QDC, secy.-treas. During the RACES Weather Watch there were eleven tornadoes in the state, seven of them touched down. WA5PTE did a masterful job of directing traffic until the MSBN&RACES could be combined into one net. The State RACES meeting had a small but effective turnout. We welcome WA5WEG as Miss. RACES Staff *Communications Officer*. Hernando Lions Club sponsored a Message Center by amateur radio to send Christmas messages to service personnel. WA5MPQ set up in a trailer on the court square for the event. WA5CAC has his orders for Vietnam in Apr. Traffic: K4RIN/5 140, W5BW 53, WA5FII 51, WA5JDF 37, WA5SIM 35, WA5PTE 20, WA5JWD 6, WA5SEG 6.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—SEC: W4WJH. PAMs: W4PFP, WA4YBT, WA4EWW, WA4CRU.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	Tue.-Sun.	0030Z	26	1472	260	WA4YBT
TPN	3980	M-Sat.	1245	31	1242	126	W4PFP
		Sun.	1400				
FTPN	3980	M-F	1140	22			WA4EWW
TCN	3980	Thurs.	0200	(Wed. night CST)			W4TYV
TPO	3980	Mon.	0030	5	134	18	K4RTA
TN	3635	Daily	0100	31	309	164	WA4YEM
TTN	7290	Daily	2200	31	501	199	WA4CRU
ETVHF	50.4	Tu.Th.St.	0000	13	220		WA4TJJ
ETVHF	145.2	W&F	0000	9	63		WA4TJJ

On behalf of the Tennessee section I want to extend our thanks for a job well done to the net control stations of all the Tenn. nets. In order to improve the nets and help the NCS read the section on network operation in the booklet *Operating an Amateur Radio Station*. EC WA4NEC says in Bristol ARC's *QRM*: "... it is not what you can do which will change things ... only that which you will do." OO/ORS W4WBK helped his harmonic in operating WB6YPX with Korea traffic during a short vacation in So. Cal. Congratulations to W4UJH and WA4WVW on teaching a Novice class. ORS W4OGG got his DXCC after 28 years. Traffic: W4OGG 274, K4AT 263, WA4UAZ 188, WB4GSS 186, WB4ANX 160, WA4GLS 129, W4SQE 125, WB4HYY 79, WA4YEM 78, WA4CRU 66, WB4EAB 50, WA4NEC 50, WA4JTI 44, W4WBK 33, WA4WVW 32, WA4ZAL 32, WB4DYJ 30, W4OQG 30, K4MQI 28, WB4DJP 26, W4PFP 26, WA4TWL 22, WA4CGK 20, K4LTA 20, WA4TWL 19, K4RTA 18, K4UWH 18, WA4ZBC 18, WB4JFT 15, WB4HLH 11, W4VJ 9, WA4BXH 8, K4PUZ 7, W4WJH 6, K4AMC 5, WA4YOM 3.

GREAT LAKES DIVISION

KENTUCKY—SCM, George S. Wilson, III, W4OYI—SEC: W4VYS. Appointments: W4VNJ, K4MPT, W4SZB, WA4AVV, WA4AGH, WB4IBO, WA4WQZ as ECs; WA4FAF, K4OEK, WA4MEX, W4SZB as OPSs; WB4LRG as OBS. Endorsed: W4VYS as ORS.

Net	*Freq.*	*GMT*	*QNI*	*QTC*	*Mgr.*
KRN	3960	1130	284	41	K4KIS
MKPN	3960	1330	518	163	K4TRT
KTN	3960	0000	1026	207	WA4AGH
KYN	3600	00+0300	490	736	W4BAZ
FCATN	50.7	0200	141	110	W4OTP

WB4HUS is copying RTTY and soon will send it as well. WB4AIN is remodeling the shack and is off the air for a bit. Did y'all know that "QRX" went out as a recognized Q signal long before the Edsel disappeared? The chicken-eatin' meetin' on nets, traffic, AREC *and good works was well attended and* fun at Louisville. WA4WWT has CP-45 from the CWA. K4KLB is prexy and WA4YXC corr. secy. of the Greater Cincy ARA, and WA4ZYN is editor of the v.h.f. paper in that area. Recalibrate your VOMs! The official standard volt has been reduced by 10^5 (per *Ham Call*). Traffic: WB4HUS 529, W4NLO 458, WB4HQW 381, WA4DYL 259, W4BAZ 239, WA4VZZ 188, W4VYS 164, W4NBZ 133, WA4AGH 126, WB4AIN 118, WA4WWT 112, W4OYI 111, K4MAN 109, K4TRT 95, W4UK 80, WA4GHQ 58, WB4EOR 53, W4OTP 48, WA4UHR 43, WA4VUE 42, W4KJP 35, K4OEK 32, K4MPT 29, WA4UAZ/4 29, K4AVX 25, WB4FDK 20, WA4MEX 19, W4CDA 18, K4VDO 17, WB4FLA 15, K4SWL 15, W4SZB 15, WB4IZX 14, K4UMN 14, K4HOE 13, WB4EQY 10, W4MWX 10, K4NYO 9, W4BTA 7, WA4UIH 7, WA4WWQ 5.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR,

K8KMIQ, W8IXJ. PAMs: K8GOU, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8DNZ, W8FX, W8SCW, W8SJF, WA8VGQ as ORSs; K8EFY, W8ER, K8JED, WA8ONZ, W8SS as OPSs; W8GZF, K8IGQ, K8PVC as ECs; W8IHD, W8SS as OBSs; WA8EOW, W8FZ, W8HTN as OVSs. Silent Keys: W8COW, K8JQP, K8KCL, W8MCC, W8SJH, K8TWL, W8WEK, K8LYF.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300	Dy	900	684	90	W8FWQ
WSSB	3935	2400	Dy	895	227	31	K8WRJ
PON-DAY	3935	1600	M-Sat.	475	424	25	K8LNE
R/R-MEN	3930	2230	M-Fri.	989	137	36	K8LJS
GLETN	3932	0230	Dy	1104	124	31	WA8ONZ
M6MTN	50.7	2400	M-Sat.	351	57	26	WA8LRC
UPEN	3920	2230	Dy	331	42	30	WA8UCD
PON-CW	3645	2400	M-Sat.	76	44	25	VE3DPO

New officers: Cent. Mich. ARC—W8BCI, pres.; W8CKK, vice-pres.; W8VPC, secy.; K8BGZ, treas.; K8HZV, K8UDJ, board. K8HKM, W8RXY, W8TJQ and W8VPC now have Extra Class licenses. WB8BKA got married in Sept. and is building an HW-100. W8OCT moved to Cleveland. W8AET to Florida. W8IL is now K4JR. W8EGR is recuperating from surgery. W8JXU has a plush red carpet in his new shack. The Mich. 6M Club handled "OPN Veteran" Thanksgiving and Christmas and will do it again Easter. K8VQP now is Extra. W8IJP modified the HW-17 and is on 2. WB8AYB is building an HW-17. W8KAZ and WA8OLN worked G-Land on 160. WA8SIQ has a daily sked with WB4JNP on 21,315. WA8KXC works 160 with a T4X. WA8WCZ has a new Ranger and WA8VAR is putting an Elmac in the new Volkswagen. WA8ZOF put up a dish antenna on his farm. WA8NYK is on 160 with an Elmac. WA8RQI has a new G76. The Grand Rapids ARA ARRL Convention will be held at the Pantlind Hotel May 10. The CARS, DARA, SEMARA and Hazel Park ARC are all planning swaps and shops. W8OWG is moving to Collins, Cedar Rapids, Iowa. Traffic: (Dec.) W8IHD 1070, W8IXJ 815, K8KMIQ 485, W8GAI 460, K8LNE 331, K8ZJU 245, W8DET 189, K8JED 176, K8MXC 155, WA8SQC 129, W8IUC 121, W8NOH 120, W8MO 119, W8JTQ 99, W8QQK 94, W8RTN 79, WA8ONZ 69, WA8UPB 63, WA8MCQ 57, W8FX 54, K8GOU 51, WA8OGR 44, WA8GRI 31, W8IWF 28, W8YAN 28, W8FWQ 20, W8FZ 17, K8HKM 15, WA8MGM 12, W8TBP 11, W8UFS 11, W8WVL 11, W8MPD 9, WA8ZAV 5, K8VDA 4, WB8ANR 3, WN8-CLR 3, W8DSE 2, WA8VGQ 2, WA8PZT 1. (Nov.) K8HLR/8 103, WA8QAA 3.

OHIO—SCM, Richard. A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IMI. PAM: K8UBK, V.H.F. PAM: WA8ADU. Dec. traffic net reports:

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time*	*Mgr.*
OSSBN	2046	1179	58	3972.5	1530 & 2345Z	K8UBK
BN	631	555	62	3580	0000 & 0300Z	W8IMI
OSN	188	82	30	3580	2325Z	WA8VNU
O6MtrN	264	63	31	50.6	0000Z	WA8ADU
Apricot	261	31	31	51.0	0100Z	K8ONA

BPL certificates for Dec. traffic go to W8UPH and W8VND/8; Net certificates (O6MtrN) to WB8AHY, WA8VVP, WA8SSU, WA8WTK, WA8CXV, WA8RLJ, WA8MTS, W8IMI; (OSN) to WA8ULF, WA8RQQ. OSN Mgr. WA8VNU promises more emphasis on procedure training in the future. The Novice Traffic Net meets Mon., Wed., Fri. on 7160 kc. at 2130Z and Wed., Fri., Mon. on 3709 kc. at 0030Z. BN Mgr. W8IMI tells of plans to sponsor an Ohio QSO Party about mid-year. Congratulations to WA8RWU and K8WQE on their new Advanced Class licenses. The Massillon Radio Club put up a traffic-handling exhibit station in a shopping center. QCEN handled the third Holiday-Messages-for-Servicemen program with the *Cincinnati Enquirer*. Sorry to report that W8GXK joined Silent Keys. K8EHU and WB8ACF operated VP2MO and VP2ML for 3 weeks making 3500 QSOs. QSL to WA8-RWU. Appointments in Dec.: WA8CXY as ORS and OPS, W8GRG as OO. New club officers: Scioto Valley ARC—WA8TSL, pres.; WA8PZJ, vice-pres.; WA8WZE, secy.-treas. Westpark Radiops—W8IMF, pres.; K8RKF, vice-pres.; K8DZR, secy.; WA8CPS, treas. Van Wert ARC—WA8TGA, pres.; WA8WJY, vice-pres.; WA8-WFK, secy.; WA8CPS, treas. Treaty City ARA—WA8KZR, pres.; WA8QID, vice-pres.; WA8KQQ, secy.-treas. This column will be shorter than usual because of a lull in reports and activity and shortness of time. The next two or three columns will be written by Asst. SCM K8DDG while I make a trip to South East Asia on business. Traffic: (Dec.) W8UPH 1455, WA8VNU 350, W8IMI 329, WA8LAM 276, W8RYP 219, WB8BZX 212, W8QCU 203, W8PMJ 170, W8SUS 166, W8VND 166, W8QZK 165, W8CHT 158, WA8UTX 151, W8GOE 140, W8SZU 124, WA8CXY 115, W8VND/8 115, W8ERD 109, W8GVX 91, WA8AJZ 83, WA8DWL 82, W8FGD 82, K8ONA 80, W8OE 79, WA8RQQ 69, W8ETU 66, K8IDG 61, W8SHP 61, WA8ADU 59, WA-8DUL 58, WA8MHO 56, W8UDG 56, W8LRE 54, W8NAL 51, W8IUS 49, W8FRV 41, W8OUU 39, W8DAE 37, W8GNL 37, WA8SED 37, K8BYR 34, WA8MTS 34, W8EFB 32, K8QYR 32, WA8VVN 32, WA8PPK 30, W8WDU 30, W8IO 28, WA8GRR 26, W8QXQ 25, WA8-WJR 25, WA8YHN 23, W8GRT 22, W8HII 22, WA8FSX 21, WA8CXV 20, W8LT 19, WA8UPI 19, W8PNP 17, W8LAG 16, WA8JSW 15, WA8COA 14, WA8JEH 14, WA8KPN 11, WA8VVP 11, K8CKY 10, W8LZE 10, W8UX 10, W8VVL 10, W8BBH 9, WA8TRE 8, W8EEQ 7, W8AEB 6, W8ELE 6, W8WEG 5, W8YGR 5, WA8-ZNC 5, WB8AZH 3, WA8SQR 3, W8AQ 2, K8EKG 2, WA8NTA 2. (Nov.) WA8ULF 179, WA8ZGC 15.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Graham G. Berry, K2SJN—Asst. SCM/RM: Ruth E. Rice, WA2VYS. SEC: W2KGC. PAM: WB2VJB. Section nets: NYS, 3765 kc. nightly at 2400Z; ESS, 3590 kc. nightly at 2300Z; NYSPT&EN, 3925 kc. nightly at 2300Z. WB2-MOI chaired the Annual (33rd) Christmas Banquet of the Westchester Amateur Radio Assn., which drew 60 area amateurs. The following week the Communications Club of New Rochelle had W1UED of Hq., W1NLB and Director W2TUK all speaking briefly at its Dinner. 1969 officers of the club are WA2TEQ, pres.; K2JQB, vice-pres.; WB2MOG, secy.; WB2VQB, treas.; WB2-WBZ, sgt. at arms; WA2VEG, WB2NVJ, W2DPV and K2SJN, directors. Congrats to PAM WB2VJB on his election as asst. mgr. of NYSPT&EN. WA2EUX asks listing for NYPON Sun., Wed., Fri. at 0300Z on 3760 kc. with WB2YQO as manager. Check-ins are wanted. Newcomers to the section are WN2GZK and WN2HZX and VK1ZAR, now in Larchmont. WA2GQW reports new East Coast AR Service on 7252 kc. like the Mid-west and West Coast Service Nets. New Westchester County EC, WA2JWL, is writing all former AREC stations and plans 75- and 2-meter nets as soon as possible. Note the change in time and day for the WARA Tech. Net—Wed. at 8 P.M. local on 28,690 Mc. with W2KFB in the driver's seat. Bring your problems to the net for discussion. WB2IYO now holds an Advanced Class license. WB2YQU reports success with the Oct. '64 6-meter cavity trap—a whole week with no TVI calls; RTTY is working and he hopes to have it on the 146.72 Net soon. WB2GXF is rejoining MARS and reports a significant lack of a.m. stations on 6 during the 12/22 opening. Traffic: (Dec.) WA2BHN 1058, W2EAF 294, WA2VYS 236, WB2SIH 205, WA2VYT 153, WA2CRW 133, K2SJN 96, WB2VJB 46, W2ODC 43, W2ANV 42, WA2HGB 29, WA2WGS 25, WA2FYE 24, WA2BUF 18, WB2IYO 10, WB2AFV 9, WB2NQK 8, K2HNW 7, WB2UHZ 5, WA2BUC 4, WB2FUV 2. WA2-JWL 2. (Nov.) WA2HMX 187, WB2VJB 27. (Oct.) W2EAF 151.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunies, K2DGI. SEC: K2OVN. PAM: W2EW.

NLI*	3630 kc.	1915/2200 Nightly	WA2UWA	RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF	PAM
NLIPhone*	3932 kc.	1600 Daily		
Clear Hse	3925 kc.	1100 Daily	WA2GPT	Mgr.
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG	Mgr.
East US	3683 kc.	0001 Nightly	K2UBG	Mgr.
All Svc	3925 kc.	1300 Sun.	K2AAS	Mgr.
NYSPTEN	3925 kc.	1800 Daily	K2SPO	Mgr.

* *Section nets. All times shown above are local*

Listen, my apologies to one and all. A whole bunch of circumstances ganged up last month and I missed getting out the monthly report. WA2GPT allows that Dec. was a hard month for NCSing. K2UBG echos the same thought but adds, "It was especially difficult while scrapping with the Ding Dong Flu!" K2AAS accepted the "SARAH" award for WA2GPT out at the Las Vegas SAROC Convention (it was conferred on WA2GPT for her contributions to the public service. That rascally old Huntington Breeze (80 m.p.h.) got the W2GKZ TCC/DX-type beams again! WA2FTS, of Clearing House, Mike Farad and ABC-TV Olympics film crew fame, was on Christmas leave from the Army. Friends report that WA2FMN is doing a yeoman job on the NLIVHF Net. Old K2AAS spent 15

days locked up in a Con Ed generating station during the recent labor altercation and came out of it feeling like it was 6 or 7 Field Days rolled into one. WB2DRW is working up an FET 2-meter converter for his v.h.f. operations planned for this summer. W2BCB has his 160-meter long-wire up and is looking for skeds on that good old band. WB2UQP says the club is putting up low-band dipoles over at W2AEE and will be in some traffic nets soon. WB2PJH has received the MARS call of NØLXA. K2KYS is tickled pink with the performance of the "W1ICP Multiband Antenna System and TransMatch" that he put together. WB2-THL, with the help of W2KW, W2PF, W2RSC and others, has plans under way to revive the grand old Radio Club of Brooklyn which was first organized back in 1917. Much of the WA2LJS time was spent this month in raising a tower complete with antenna. WA2-EUX reports that the New York Post Office Net meets on 3760 kc. every Sun./Wed./Fri. at 0030Z. WB2BKS reports he missed a peachy-keen opening on 6 meters in Dec. because the weather delayed the erection of the new beam. W2NXB says 160 meters has come alive since Nov. 22. WA2IPC, who is working with pulse code modulation up at R.P.I., finished building the '68 *Handbook* Speech Clipper and then cleaned up the messy old shack for a New Year's resolution. WA2VKK has become program director of WICB-FM at Ithaca. WB2NLM has a new tower and beam up. Traffic: (Dec.) WA2UWA 7010, WA2GPT 634, W2GKZ 378, K2UBG 258, WB2RQF 212, WB2DRW 133, W2EW 122, WA2GRJ 117, WB2YKU 112, WA2RUI 74, K2AAS 68, WB2AEK 61, WA2FTS 48, WA2FMN 38, W2BCB 34, WB2ACE 23, WB2UQP 19, WB2PJH 16, W2EC 14, K2KYS 12, WB2WCS 11, W2DBQ 7, WB2DZZ 7, W2PF 6, W2JTZ 5, WA2LJS 4, WA2QJU 2. (Nov.) WA2UWA 1925. (Oct.) WA2UWA 1660, WB2BDJ/2 612. (Sept.) WA2UWA 1024.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2ZZ—Asst. SCM: Edward F. Erickson, W2CVW. SEC: WA2ASM. RMs: WB2DDQ and WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, WA2TBS.

ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695 kc.	7 P.M.	Dy	31	428	554	WB2DDQ
		10 P.M.	Dy	31	141	160	WB2DDQ
NJSN	3740 kc.	8 P.M.	Dy	26	113	59	WB2RKK
NJEPTN	3929 kc.	6 P.M.	M-Sat.	31	695	494	W2PEV
NJAN	50,300 kc.	8 P.M.	M-F	22	337	86	WA2KZF
PVTEN	145,710 kc.	7 P.M.	Dy	31	337	457	K2KDQ
ECTN	146,700 kc.	9 P.M.	Dy	31	334	465	WA2TBS

New appointments. WA2TAF as OPS; WA2IGQ as EC for Rahway and vicinity. OO reports: W2BVE 28, K2BMI 14. New officers of the Land Rovers ARC are W2BVE, pres.; WB2EQL, vice-pres.; K2ZOQ, secy.; WA2FGZ, treas. The ECVHFS's new officers are K2-UYH, pres.; K2GNA, vice-pres.; K2IBF, treas.; WB2LIJ, secy.; WB2SCW, sgt. at arms. Your SCM would like to be added to all Club mailing lists. WA2-BLV is the new net mgr. for NJN replacing WB2DDQ, who resigned. Many thanks to Tom for an FB job and good luck to Steve who is an "Old Pro" with traffic. WA2EUX is now NCS two nights a week for the NJSN. WA2DQE is having transmitter problems. WA2-FUI has a new SB-101. BPL certificates for Dec. traffic went to WB2RKK, K2DEL/2, K2KDQ, WA2TBS, WB2WNZ and WB2BKC. It was high month for the year. Year-end totals show that WB2RKK made the BPL 5 times and WA2IGQ 4. WA2CRF is on 6 with a Thor and also has completed high TU. WA2BCT has a long wire up and plans 80-meter traffic work. WB2QJI received his Advanced Class license and is planning for the Extra. He says the low end of 80 and 40 looks good to him. K2BMI is putting the HW-100 together. WA2GLI lost his antennas during a recent storm. WB2ZSH has his 2-meter rig perking again. WB2DRJ, WN2GHM, WB2EZI and W2ZZ enjoyed a visit to ARRL Hq. during the Christmas vacation. WA2NVG and WB2EYC passed the Advanced Class exam. WB2DRJ applied for his WAS. K2IEF reports 119 confirmed. Traffic: (Dec.) WB2RKK 1079, K2DEL/2 1029, K2KDQ 413, WA2TBS 372, WB2NSV 214, WB2-WNZ 137, WB2BKC 131, WB2TUL 130, WA2CAI 117, WB2FEH 105, WA2NJB 102, K2PBP 102, WB2AMV 92, WA2EUX 89, WB2BXK 84, WA2TAF 84, K2DEL 80, WB2ZSH 63, WA2CCF 61, WA2ACP 53, W2PEV 52, W2ZZ 50, WA2CRF 49, K2ZFI 43, WA2BCT 41, WA2-TNA 37, WA2BAN 35, WB2BCS 35, WB2WID 34, W2-CVW 32, WB2YPQ 31, WA2KZF 29, W2CU 27, WB2QMA 27, WA2GLI 26, W2EWZ 23, W2JDH 17, WA2DQE 13, K2MFX 11, WB2DRJ 9, K2JSJ 8, W2TFM 8, W2ABL 6, WB2YXY 6, WA2DRH 5, WA2FUI 5, WN2FVH 2, WN2HYP 2, WB2UIR 2, WA2DNF 1, W2LWP 1. (Nov.) K2JSJ 27, WA2CLO 21, WB2YPQ 8, WB2NIH

MIDWEST DIVISION

IOWA—SCM, Wayne L. Johnson, KØMHX—SEC: KØLVB. PAM: WØPZO. RM: WØLGG. OBSs: WØ-LCX, WØJAQ, WAØMIT. The voice of WØGKN is stilled. "Slim" passed away Jan. 3 after suffering ill health for several years. His cheerful voice will surely be missed on 75. Our sincere sympathy to his family. More than fifty "hams" increased their operating privileges at the Dec. examinations in Des Moines. New Extras include WØHUF, WØLRY, WØLUA, KØHTC, WAØDIC; new Advanced Class KØBMW, KØARV, KØHFT, KØJVF, WAØHAL, WAØIAF, WAØJZX, WAOOBD, WAØPIY, WAØTGI, WAØTGJ, WAØTOP, WAØVBX, WAØVJL, WAØVOQ. The rest were new Generals, Techs, and Novices. March is the time for the next examination in Des Moines. Check 3970 for the date. New officers of the 160-Meter Net are WØ-SRO, pres.; WAØGSQ, vice-pres.; KØTDO, secy.-treas.; WAØLPN, act. mgr. WØEIT and WØPFP report poor conditions and very little activity on v.h.f. during Dec. KØTFT has a new antenna tuner with open line feeders. WAØKZL has his new home-brew linear fired up. KØLVB issued 51 new certificates effective Jan. 1. Included are several old-timers and many new appointees. There are still vacancies in the Emergency Corps, although the state is pretty well represented in all areas.

Net	*Freq.*	*Day*	*GMT*	*QNI*	*QTC*	*Mgr.*
Iowa 75	3970	M-Sat.	1830	1376	189	WØPZO
Iowa SSB	3970	M-Sat.	2359			WØYLS
Iowa 160	1815	Daily	0100	760	16	KØTDO
TLCN	3560	Daily	0030	141	167	KØAZJ
PON	3915	W & F	0030	95	11	WAØDYV
PON	3697	Tue. & Sat.	0030	35	3	WAØDYV

Traffic: (Dec.) WØLCX 858, WØLGG 161, KØJGI 116, WØCZ 73, WAØDYV 59, WAØBSF 36, KØTDO 33, WØJPJ 25, KØTFT 22, KØEVC 18, WAØOTE 13, WØREM 10, WAØPOE 8, WØBX 4, WAØPPW 4, KØYVU 4, KØVDY 1. (Nov.) WAØSDC 26.

KANSAS—SCM, Robert M. Summers, KØBXF—Dec. reports:

QKS	3610 kc.	QNI 259	QTC 122	61 sess.
KSBN	3920 kc.	QNI 789	QTC 251	23 sess.
KPN	3930 kc.	QNI 210	QTC 54	13 sess.
KWxN	3920 kc.	QNI 857	QTC 101	34 sess.
KPON	40 & 75	QNI 1044	QTC 1087	
HBN	7280 kc.	QNI 585	QTC 153	19 sess.
Ks EC	3920 kc.	QNI 60	QTC 6	5 sess.

SEC: KØEMB. PAM: KØJMF. RMs: KØMRI, WAØJFV. V.H.F. PAMs: WAØCCW, WAØLSH. Sincere sympathy to the family of WAØOZP, who lost his father Jan. 4, and to WØHL, who lost his wife in Dec. KØMRI is a new RM and WØHI a new ORS. The Johnson Co. ARS elected KØPFV, pres.; WAØKDQ, vice-pres.; WAØJYK, secy.; WØHAJ, treas. The Jayhawk ARS elected WAØOWS, pres.; WAØLIW, vice-pres.; WAØPPN, secy.; WAØOQD, treas. The Ham-butchers Net elected KØICB, net mgr.; WØEMB, picnic chairman; WAØRHG, treas. Are you working DX on 75 and 80? WØHI says it is there. KØLHE finally got his 100 countries worked. Have you heard the new DJ on radio KKAN, Phillipsburg? It's WAØLSH. Skip also is working on 432-Mc. gear. WAØJFV reports that QKN, the Kans. Novice Net, is adding a new session to its sked, Sat. at 1700 CST, 3735 kc. WAØTHQ will be NCS. Frequent QNIers on the net are WNØs TUQ, UES, TUS, TVH, TAS, UCZ, TTU, WAØs RTK, KPE, RBR, UTT, KHN, THQ, RQG. A real good year for the Kans. Wx Net was reported by Mgr. WAØLLC with QNI 9052, QTC 1135. WAØMLE, retiring RM, has put tremendous effort into the ham bands to make QKS go. WAØCCW is trying to keep the 2-Meter PI Net open Tue., Thurs., Fri. and Sun. 0305Z, 145.34 Mc. The Kans. PI Net reports 6 sessions, QNI 47 and QTC 4. Other v.h.f. activity nets report 40 sessions, 180 QNI, 43 QTC; ACARA, NCK, Coffeyville 2-Meter and AREC Zones 7, 11, 15 and 6- and 2-meter nets included. Low-band AREC activity Zones 1, 7, 13, 15 report QNI 149 in 15 sessions. Traffic: WØ-INH 641, WAØLLC 281, WAØMLE 202, WØPSN 177, WAØNFP 161, KØMRI 160, WØCGZ 139, KØJMF 131, WAØTHQ 104, WAØLBB 97, KØBXF 93, WØLXA 80, WØHI 73, KØUVH 72, WAØJOG 66, WØQQQ 54, KØGZP 31, WAØOZP 29, KØLPE 27, WØCWJ 26, WAØUTT 26, WAØKPE 25, WAØNDZ 25, WAØOWH 25, WAØCCW 22, WAØJFV 19, KØGII 18, WØICV 16, WØRGX 15, WAØDZI 15, WNØTVH 9, WNØTAS 6, WAØRTK 5, WNØTUS 5, WNØUES 5, WAØLSH 4, WØFDJ 2, WAØKHN 2, WAØRBR 2, WAØRQG 2, WNØTTU 1, WNØUCZ 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØGS—SEC: WØBUL. WØRTO renewed as ORS. WAØFLL and KØONK renewed as ORS and OPS. KØAEM received an RM appointment and is new manager of MON replacing KØYBD, who has been QRL at work. The MoSSB Net has set a new record for activity in 1968 with 308 sessions, 8591 stations checking in and 3934 traffic count. WAØHTN made the BPL for the third time and qualifies for the BPL Medallion. New officers of the PHD ARC are WAØKUH, pres.; WØUQP, vice-pres. and editor; WAØRCL, secy.; WAØRMX, treas.; WAØEMS, act. and pub. chmn. WNØUFT and XYL WNØUFU received a new SB-101 for Christmas. A nylon halyard broke so the antennas at WAØSNE are on the ground. KØORB filed 107 Intruder Watch reports during 1968. Doc has a sked with KC4USN every Fri. evening. WAØKMF has a new HT-46. WØUCK built a coaxial vertical for 6-meter RACES nets. WØBCD received a new SR-2000 and had to rewire his house to carry it. An OVS report was received from WAØITU. Walter Ashe, 70, founder and former pres. of Walter Ashe Radio Co., died in St. Louis Dec. 25. For state and long-haul traffic the Mo. Noon Net (MNN) meets Mon. through Sat. at 1 P.M. CST on 7063 kc. All stations are welcome to check in. Net reports for Dec.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNS*	*Tfc.*	*Mgr.*
MEN	3885	2330Z	M-W-F	13	169	26	WØBUL
MoSSB	3963	2400Z	M-Sat	25	939	370	WØRTO
MON	3585	0100Z	Daily	31	176	293	KØAEM
MNN	7063	1900Z	M-Sat.	25	85	9	WØOUD
SMN	3585	2200Z	Sun.	5	12	11	WØOUD
MoPON	3930	2100Z	M-F	27	87	112	WØHVJ
PHD	50.45	0130Z	Tues. (GMT)	5	113	8	WAØKUH

Traffic: KØONK 4391, KØAEM 376, WAØBJR 321, WAØHTN 279, WØOUD 202, KØRPH 170, WAØQXG 146, KØVVH 103, KØBIX 70, WAØFMD 59, WAØKUH 28, WØBUL 23, WØRTO 17, KØORB 10, WØBVL 9, KØDEQ 7, WØKIK 2.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØODF. Monthly net reports for Dec.: Nebr. Storm Net, WAØLOY, 0030Z session, QNI 1523, QTC 187; 0130Z session, QNI 1101, QTC 55. Nebr. Emergency Phone Net, WAØGHZ, QNI 1395, QTC 820. Nebr. Morning Phone Net, WAØJUF, QNI 1130, QTC 69. West Nebr. Phone Net, WØNIK, QNI 598, QTC 41. AREC Phone Net, WØIRZ, QNI 289, QTC 7. AREC C.W. Net, WAØEEI, QNI 10. Nebr. C.W. Net (NEB), WAØHWR. 0100Z session, QNI 92, QTC 83; 0400Z session, QNI 80, QTC 51. 160-Meter Phone Net, WAØCBJ, QNI 829, QTC 29. WAØDOU made the BPL in Dec. WØLOD now is a member of 5th Army MARS. WØFQB was awarded a life membership in the QCWA. Art now is using a new four-band vertical for higher bands. For application in the AREC, see your EC or contact the SEC. Hastings ARC officers for 1969 are WAØFRT, pres.; WAØJUF, vice-pres.; KØGAV, secy.-treas.; WAØIBB, trustee. Lincoln ARC officers are WAØNKZ, pres.; WAØMFC, vice-pres.; WAØHYE, secy-treas. Traffic: WAØDOU 544, WAØGHZ 398, WAØIBB 294, WØLOD 275, KØOAL 164, KØJTW 80, WØHTA 76, KØJFN 55, WAØCBJ 54, WØGEQ 47, KØFRU 42, KØODF 42, WAØOMY 41, WØAGK 33, WAØFGV/Ø 33, KØHNT 32, WAØPCC 30, WAØTMG 28, KØPTK 27, WØVEA 26, WØNIK 25, WØFQB 24, KØAIE 20, WAØOQX 20, WAØGVJ 17, WAØQLE 14, WAØKGD 11, WØWZR 11, WAØEEI 10, WAØJIH 10, WØPQP 10, WØYFR 9, KØIXY 8, WAØJUF 8, KØDGW 7, WAØIBL 7, WAØNGM 6, WAØTET 6, WØWKP 6, WØLVO 5, WAØMHW 5, KØSFA 5, KØUDW 5, WØHOP 4, WØBFN 3, WAØRPB 3, WØEWZ 2, WAØOVL 2, WØPHA 2, WØRJA 2, WAØRZF 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—SEC: W1PRT. RM: WA1HSN. PAM: W1YBH. V.H.F. PAM: K1SXF. Net reports for Dec.:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845	31	391	440
CPN	3880	M-S 1800 & Sun.	1000	31	505	326
VHF 2	145.98	M-S	2200	22	103	56
VHF 6	50.6	M-S	2100	22	189	56

High QNI: CN—WA1HEW, WA1HSN and WA1HOL. CPN—K1SXF 31, WA1HEW 29, WA1HOL 27, W1LUH/WA1JYK 26, W1GVT 25, K1YGS 24, WA1FXS 22, W1NBP 18, WA2HMX 16 and W8CWE/1 17. SEC W1PRT has 29 ECs in the Conn. section and only 16 are active. Clubs can perform a real public service by providing an active EC for neighboring communities. Our N.E. Director, W1QV, would appreciate "feedback" and reports from all Conn. amateurs. Drop him a line! New officers of K1UAT, Staples High School are WA1FJU, pres.; WA1GOO, vice-pres.; WA1JYU, secy. New England CHC's 3rd Annual One-Land QSO Party will be held Apr. 26 and 27. Contact K1VGM for information. The Central Conn. Repeater Assn. is active on 2-meter f.m.—contact W1AGJ for details. Santa Claus delivered a new SX-101 MK III to WA1FNJ and a new bug to WA1HEW. The sprig of mistletoe for the most successful Christmas Party goes to Murphy's Marauders! W1WEE is active on the Intruder Watch and c.w. classes. Congratulations to: WA1HOL and WA1GGN on Dec. BPL; W1AXV on Extra Class; WA1FXS. WA1JYU and WA1GWS on Advanced; WA1JGA on General and WN1KMR on the only Novice Traffic report! Extra Class operators are encouraged to make use of their restricted frequencies. All others are encouraged to become Extra Class operators! Traffic: (Dec.) W1EFW 591, WA1HEW 437, WA1HSN 351, WA1GGN 277, W1YU 220, K1SXF 138, WA1HOL 124, W1AW 123, W1GVT 63, W8CWE/1 51, WA1FNJ 40, WA1HLP 33, K1TKS 32, WA1JGA 31, W1QV 30, K1YGS 28, WA1GIX 28, W1ARR 27, W1WCG 27, W1YBH 26, W1BDI 25, WA1JCX 22, W1OBR 18, W1BNB/1 12, WA1FXS 12, WA6TZN/1 12, WA1IEG 11, WN1KMR 10, W1NBP 9, W1CHR 4, WA1DUV 4, WA1JGF 4, K1LMS 4, WA1DIU 3. (Nov.) W1WCG 168, WA1IQJ 6, WA1JGA 6.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—We want to extend a big welcome home to K1SCQ, of Milton, who was one of the crew on the USS *Pueblo*. SEC W1AOG received reports from W1s IAU, WA1DXI, K1s PNB, DZG. Silent Keys: W1HCL, K1AKU and WA1AWP. W1MNK is now EC and RO for Manchester. W1JCX is in Tucson, Ariz., for the winter. W1ZSJ's wife is secy.-treas. of the Central New England Net. New YLs: WN1s KMK, KML, of Wellesley. K1IGF and W1QV attended a meeting of the South Shore ARC at which our Director presented me with a "Certificate of Merit" for my work as your SCM. W1CTR is living in a trailer in Raymond, N.H., but working in Boston. W1FMW is living in Lawrence. New officers of the So. Eastern Mass. ARA are W1LE, pres.; W1AIE, vice-pres.; W1LAZ, treas.; WA1FNM, secy. K7JRE/1 has a Ranger and will be on 10-160 c.w. WA1KKU is on 2. K2GLQ/1 has a new keyer and 20-meter converter. The Norfolk County RA has been meeting since 1923, not 1933. K1RUF has a phone patch now. WN1JKJ has WAS, also WN1JRR. WA1KJZ is on 40 c.w. K3QDD is active at W1MX. WA1DJC is busy at work. W1EXI, ex-K2CHQ, is on 2 from Westford. New officers of the Chelmsford ARA are WA1ECN, pres.; WA1GSF, vice-pres.; K1MGP, secy.-treas. The T9 Radio Club met at W1TYP's QTH. W1MVQ has a new receiver. W1WNK and WA1IZF will have rigs for 220 and 420 Mc. W1ISX is working DX. W1IBF has made tapes of song birds. W1KGH is DXing on 15. W1TJP has a Drake receiver. W1MNK is building an SB-401 for s.s.b. WA1DGH is busy at Harvard. Appointments endorsed: W1s RPF, UJF, JVZ, YYZ, K1WVW as ECs; WA1DGH as ORS. New officers of the Quannapowitt RA are K1ZQL, pres.; W1DFS, vice-pres.; K1UUQ, treas.; K1NFW, secy. and *QRA News* circ. mgr.; WA1HPS, *QRA News* editor. The Framingham RC held a meeting. WA1KLG is ex-WN1HMG. The EMN had 31 sessions, 290 QNIs, 241 traffic. WA1KOH is WAØGSA at Fort Devens. The Yankee Radio Club had a representative from Barry Controls. W1JFS is in the hospital. W1AWO has taken over as pres. of the Yankee RC because of the illness of K1ZJK. WA1BVN is DXing on 15. W1AAT has a motorcycle. W1MCX has an HW-100. W1UOH has a new HW-100 kit. WA1FBH is studying transistors. K1EMU has a beam for 6. W1s CFU, ER and LMU are on 160. W1AYA has a transmatch for each band. The Middlesex ARC had W3DQH of Johns Hopkins U. talk about birds with implanted transmitters. The Massasoit ARA has a statewide contest going on. The OOTC gang had a meeting in Wakefield. W1CVO, a minister, has moved to Fairhaven. WA1IBL is active in quite a few nets. The NEEP Net had 5 sessions, 98 QNIs in Dec. WA1HHK has a new v.f.o. for 2. W1DXK has Extra Class. EM2MN had 22 sessions, 159 QNIs, 233 traffic. K1ESG has been endorsed as ORS and is going to Tufts U. WA1JKZ has an HW-100. WA1JDR is on 2 and 6 and is applying for OBS appointment. K1QDR has stacked seven-element beams on 2 and a six-element Long John on 6. Traffic: (Dec.) WA1EYY 734, W1PEX 711, W1OJM 656, WA1FAD 304, WA1IBL 274, W1EMG 254, K1ESG 103, K1PRB 101, WA1GXC 98, K1CLM 76, W1EAE 73, W1CTR 65, W1AOG 60, W1HKJ 47, K1LCQ 46, W1DKD 43, WA1FHU 39, WA1HHK 35, W1DOM 34, WA1IVJ 24, WA1AJN 12, WA1DEC 12, WA1DED 9, WA1DPX 5, WA1JKZ 4, W1NUP 4, W1DXK 2, W1LE 1. (Nov.) K1ESG **44.**

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. PAM: WA1FLG. Traffic nets: Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700. Pine Tree Net meets daily on 3596-kc. c.w. at 1900. W1BJG made the BPL the hard way and all on c.w. on the NTS. Nice going, Duff. W1UOT was the Maine winner of the New York QSO Party. W1OTQ is back and quite active after a little set-back and with a nice s.s.b. rig. Traffic: W1BJG 531, K6CAG/1 192, W1NND 117, WA1FLG 93, K1WQI/1 90.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1DSA—SEC: K1QES. RM: K1BCS. PAM: K1-APQ. We welcome new hams WN1JKS Portsmouth, WN1KKO Hampton and WA1KKT Nashua. Endorsements: K1IIK as ORS, OPS and OO. W1UXS also is K1ATG. Christmas greetings were received from the Nebraska and Eastern New York SCMs. K1KRP, formerly of Laconia, is now W6JTH doing graduate work at Stanford University in radar astronomy. K1DWK reports 143 check-ins for the MVAREC Net. WA1IIH has been nominated for the Air Force Academy. Congratulations, Norm. The Manchester Radio Club, W1-HPM, reports working lots of DX on 20 meters. The NHAREC Net reports 121 check-ins and 23 traffic. The GSPN tally shows 899 check-ins and 94 traffic. The Nashua Mike and Key Club, W1TA, is painting the club house and fixing up the equipment. The Belknap County AREC Net reports 38 check-ins and 4 traffic. W1JB is conducting ham radio classes in Concord. Traffic: WA1IIH 226, K1PQV 52, K1QES 8, W1MHX 6, W1SWX 4.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. Endorsements: K1ABR as OVS; K1-TPK as V.H.F. PAM/EC; W1BTV as ORS; K1NKR as OVS; K1HZN as EC; W1TXL as PAM/OPS/OBS; W1YKQ as ORS; W1FEQ as EC; K1LII as SEC; K1-PAM as EC; W1KMV as OVS; W1QLT as EC; W1-JFF as EC, WA1EEJ as OBS and W1YNP as OO. The W1AQ Club of Rumford held its Annual Meeting and elected K1HMO, pres.; WA1IYF, vice-pres.; K1AGA, secy.; W1DK, treas.; W1FNH, trustee; W1EJ, trustee emeritus. The following were appointed chairman of committees: K1AAV-building; K1LII-publicity; K1KYI-activities; W1FNH-technical; K1LXG-membership; WA1IIM-librarian; WA1IUR-QSL manager. The Fidelity ARC held another exhibit at the Midland Mall and handled 400 originating messages from the exhibit. The club had TV coverage, articles in the local newspaper and a radio interview on WXTR. Traffic: (Dec.) K1NQG/1 401, W1TXL 358, W1BTV 133, K1QFD 65, K1VPK 42, WA1BLC 39, K1VYC 38, K1TPK 20. (Nov.) K1QFD 37, WA1BLC 22.

VERMONT—SCM, E. Reginald Murray, K1MPN

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Net Mgr.*
Gr. Mt.	3855	2230Z	M-S			W1VMC
Vt. Fone	3855	1430Z	Sun.	153	1	WA1EDI
VTNH	3685	2330Z	M-F			K1UZG
VTCD	3990½	1500Z	Sun.	45	8	W1AD
Carrier	3865	1400Z	M-F	319	14	W1KKD
VTSB	3909	2230Z	M-S	679	117	KL7DVP/1
		1330Z	Sun;			

Don't forget to send in your Vt. QSO Party logs to K1MPN. We need them. Welcome to new Novices WN1KLA (Burlington) and WN1KLB (Northfield). W1-MRW was first for Vt. in the Ø QSO Party. WA1GUV was home on furlough at Christmas. Since Jan. 24 you ex-Novices can apply for a new two-year Novice license if your old one has lapsed 12 or more months. Traffic: (Dec.) K1BQB 350, W1FRT 56, K1MPN 51, WA1GKS 19, W1MRW 4. (Nov.) W1FS 2.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM W1DVW reports WMN (3560 kc. daily at 7 P.M.) activity was significantly higher (206 QNIs) during Dec. vs. 161 for Nov. The top ten reporting in (of a possible 31 sessions) are W1DVW 30, W1BVR 26, W1ZPB 26, K1IJV 22, K1WZY 22, W1STR 21, W1EOB 14, WA1JHZ/WA1EXZ 8, WA1IXO 7, W1-IHI 7, W1ZEL 7. K1IJV is back on again and very welcome. WA1JHZ is leaving Westover for California. The HCRAI now has two members with new two-letter calls—W1KK ex-W1MNG, and W1LL, ex-W1POY. W1-ALL has a new FET converter. W1IC recently acquired the original gavel used by the Springfield Radio Club during the early days of radio. WA1IZS managed to work UA1KIA at the North Pole on Christmas day. W1KXM has a son, K1BGG, and two nephews, K1-ANF and K1BNS, in amateur radio. WA1HYI is back on with WA1VXD helping. WA1HRH, home for the holidays, reportedly has his c.w. speed up to 28 w.p.m. K1YLU and K1DPP, of the Montachusett Club, are building a 220-Mc. linear for this year's V.H.F. Contest. Endorsement: W1BYH/K1APR as OPS. The Jan. issue of *QST*, page 58, has a nice picture of one of the area's best contest, traffic and DX men. Congratulations to W1EOB on a fine looking shack. The local Civil Defense units are looking for help in most locations. They need your help for monthly drills. Call or write W1-QFB. Traffic: W1EOB 393, W1ZPB 158, W1DVW 111, W1BVR 76, W1STR 57, W1IHI 52, K1WZY 31, W1UPH 30, K1IJV 23, W1IC 22, W1IAU 17, WA1IZS 4, WA1-ABW 2.

NORTHWESTERN DIVISION

ALASKA—SCM, Albert F. Weber, KL7AEQ—We are happy to announce that KL7EKZ is now functioning as OBS for Southeastern Alaska. He has a new KWM2 and inverted "V" to apply to the project. KL7DIY is back in the Fairbanks area after a couple of years in W6-Land. He is presently on 2, but will be on all bands soon. KL7FHN is currently on SSTV, and madly infecting everyone who will listen with a bug. KL7YU and KL7ERW both had a sojourn at St. Joe's infirmary recently. At this writing we have not received our *NARC News*, so can't report from Anchorage way. How about some club papers from Southeastern et al? KL7-FJW has her Advanced Class license and is now going for Extra. KL7GAQ, thirteen years young, has just received his General Class license, which, I believe, makes him the youngest General in these parts at the present time. Traffic: KL7CAH 486, KL7FON 8.

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7-THX. The FARM Net convenes week days on 3935 kc. at 0200 GMT. The Idaho C.D. Net convenes week days on 3991 kc. at 1515 GMT. The Lewiston-Clarkston Club sponsored a Christmas Dinner Party attended by 48 amateurs and their wives. New Lewiston-Clarkston Club officers are WA7FFZ, pres.; WA7EWV, vice-pres.; WA7HOX, secy.-treas.; W7AOO, K7THX, WN7HPY, WA7ETO, W7ZNN, directors. New General Class hams in Lewiston are WA7JHY and WA7JCP. The Boise Club is conducting a code and theory class again this year. KL7FOZ has a new HA-14 linear. WA7IRA is moving to Idaho Falls. W7QEL is moving to Colorado. K7ORA is moving to Pocatello. W7JFA's wife, Sara, passed away. FARM Net report for Dec.: 21 sessions, 792 check-ins, 206 traffic handled. Traffic: WA7BDD 144, W7GHT 94, WA7ETO 53, W7AXL 38, W7ZNN 20, K7-CSL 6, W7IY 6.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC W7RZY. PAM: W7ROE. RM: WA7DMA.

Net	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
Montana Traffic Net	0100Z	M-F	314	70	W7ROE
Montana PON	0245Z	M-S	308	88	K7PWY
Montana Section	1700Z	Sun.	48	4	W7RZY
Missoula Area	160 Z	Sun.	not reported		

Endorsements: W7LBK as ORS/OO/EC. Appointment: WAØATY/7 as Bozeman Area EC. The Missoula Club has set up a program of technical meetings to be held at various QTHs in the Missoula area. November marked the end of the OO activities in the Montana Section for W7FIS, who is retiring and has moved to the Hayden Lake QTH. New officers of the Butte Amateur Radio Club are WA7FLG, pres.; WA7FBN, vice-pres.; W7ROE, secy.; K7NDV, treas.; W7DB and W7BC, board members; W7DB, trustee. WA7JWF is on in Butte. W7RZY, our SEC, has gone to Milwaukee for some computer schooling. We are in need of an OO and several other appointees along with liaison stations to RN7 to help with the traffic load in the state. Traffic: K7EGJ 46, K7PWY 41.

OREGON—SCM, Dale T. Justice, K7WWR/WA7-KTV—RM: W7ZFH. PAM: K7RQZ. Section net reports: WA7AHW reports for the AREC Net, sessions 30, check-ins 603, traffic 20, contacts 60, QSTs 2, maximum number of counties 17. W7ZFH reports for the OSN, sessions 21, check-ins 140, high 10, traffic 91 high 13. K7IFG reports for the BSN, sessions 60, traffic 247, contacts 296, check-ins 1458. Salem has its own 2-Meter AREC Net now meeting at 7 P.M. on 145.35 Mc. The Portland AREC Net meets at 7:30 P.M. on the same frequency. K7EZP is on 6 meters. K7WWR is on 2 meters. WA7BYP is working on his linear. W7FHX is planning a trip to Mexico. K7QHM is on 75 meters. K7OUF is managing the NSN and looking for more participation. WA7FTN handled 181 telephone relays from S.E. Asia during Dec. W7LXR handled 19 overseas telephone relays. He also was elected director for WESCARS (7255). WA7KIU is studying solid state for his Advanced Class test. The Central Oregon ARA again is conducting classes at the community college. New appointment:

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Two rugged Eimac 3-500Z high-mu triodes are featured in Henry Radio's new 2K-3 linear amplifier. Henry designed the amplifier around versatile Eimac power tubes because these popular triodes are ideal for grounded-grid operation at the 2 kW PEP SSB input level, and at the 1 kW DC input level for CW, AM and RTTY. Users of this new Henry rig will enjoy a conservative plate dissipation rating of 1000 watts for year-in, year-out reliability under key-down service. Henry's choice should be your choice. For more information on the 3-500Z and on Eimac's line of power tubes for advanced transmitters, write Eimac Amateur Services Department or contact your nearest Varian/Eimac distributor.

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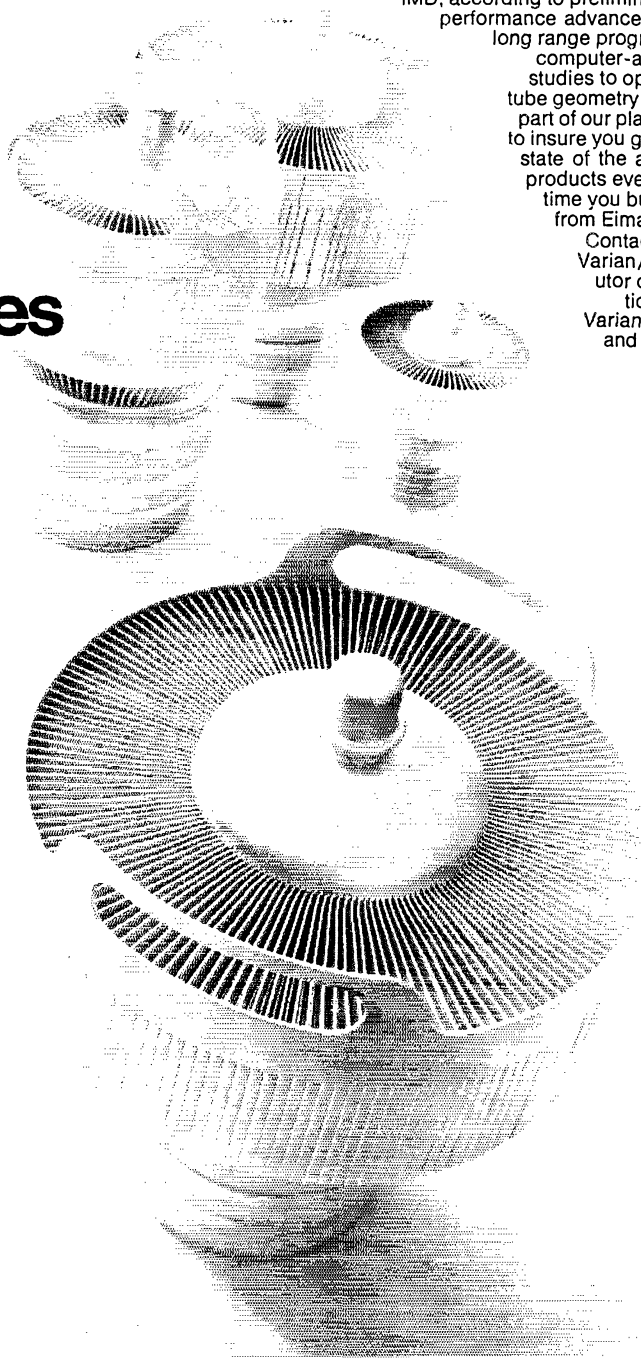

WA7JMD as OPS. Traffic: (Dec.) K7RQZ 589, K7IFG 183, W7WHY 120, K7OUF 99, W7ZFH 79, K7NTS 65, WA7IFS 49, K7GGQ 45, WA7HKV 44, W7ZB 31, WA7-KIU 27, K7WWR 22, W7BNS 21, WA7BYP 18, WA7ICD 14, WA7BOO 12, WA7DOX 12, K7KP T 12, W7MLJ 12, WA7BVB 10, WA7GMI 8, W7PJO 8, K7TWZ 8, W7-VIF 7, WA7DPK 6, WA7FTN 4, WA7HJV 4, K7USZ 3, WA7GFE 2, WA7GFP 2. (Nov.) WA7BYP 13.

WASHINGTON—SCM, William R. Watson, W7BQ—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN	3590 kc.	Daily	0245Z	QNI 323	Traffic 267 Sess. 28
NTN	3970 kc.	Daily	1930Z	QNI 1015	Traffic 737 Sess. 31
WARTS	3970 kc.	Daily	0200Z	QNI 1111	Traffic 165 Sess. 28
NSN	3700 kc.	Daily	0300Z	QNI 198	Traffic 68 Sess. 28

Winding up 1968 we appeared to have had a good year. Highlights were Amateur Radio Week proclaimed by the Governor, filing of Senate Bill #35 to change license plate fees back to $5.00, a big jump from 57th to 5th place in SET ratings in the country, 1st State Hamfest sponsored by the Yakima Club, 300% increase in League Officials (ORS, OPS, OBS, OVS, OO) and many club and individually sponsored training classes for all grades of licenses. Recent figures show the BEARS Club giving Tacoma a run for the largest Washington Club membership. WA7KNI is the new BEARS pres. and WA7BHH new pres. of the Tacoma Club. K7QKG is the pres. of the Walla Walla Club, with W7FMJ as trustee. SEC W7UWT made plans for the 1969 SET with Sun. 1000A meetings with ECs on 3930 kc. RM K7CTP now is holder of an Extra Class license. W7OEB reports Richland now is the windy city (antenna down). W7-KIX is active on 15 meters. K7PVO made it home for Christmas. W7ZSH dropped in from KL7-Land for a visit. W7REC has a Santa s.s.b. rig. W7ZJF trailered to Mexico for the Olympics. W7FQE is among the many reporting record snows in the state. W7BTB plans on a vacation and reports W7ZIW and WA7BZY will keep KL7 contacts alive. K7UDG reports a real simulated emergency for the 1969 SET with all equipment emergency-powered for 4 hours. Requests are coming in for code practice on the air. WA7FHG is hoping to get it going. The BEARS reports 5 Search and Rescue missions in 1968 with 1 stand-by and 2 practice test sessions. The Apple City Radio Club set up a message center for the holidays with instructions to the public about ham radio. We regret the passing of W7ZI and W7OZR. Traffic: (Dec.) W7BA 2839, K7UDG 1229, W7DZX 1059, WA7HKR 962, W7KZ 511, W7PI 450, WA7BZY 416, WA7EYN 218, W7ZIW 214, W7JEY 169, W7BQ 138, WA7ACQ 137, WA7JBM 137, W7AXT 127, WA7EDQ 123, W7BTB 94, K7CTP 69, W7HMA 42, W7-GYF 41, K7JXO 40, W7JWJ 39, K7SUX 39, K7TCY 38, WA7CYY 37, W7FQE 35, WA7DZL 34, W7GVC 33, WB6YPO/7 30, W7BUN 29, W7APS 27, W7RXH 27, W7-AAO 25, K7LRD 25, WA7HSJ 23, W7IEU 21, K7THG 21, WA7GVB 20, K7EFB 18, W7OEB 16, W7AIB 14, K7OXL 13, K7YFJ 11, W7ZHZ 11, WA7BDB 10, K7MGA 9, W7UU 5, K7MWC 4. (Nov.) W7DZX 607, W7ZIW 314, W7AAO 7.

PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM. QSL Mgr.: KH6DQ. RACES nets: (40, 10, 6, 2 meters) Coordinate with Henry Gamache, KH6AIN.

Nets	*Freq. (Mc.)*	*Time (GMT)*	*Days*
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F
Pacific Interisland Net	14.330	0830Z	M-W-F
Boy Scout Ham Radio Net	21.360	1800Z	Sat.
S.E. Asia Net	14.320	1200Z	All
MARIANAS Islands Net	3.850	0830Z	2, 3, 4 Tue.
Pacific DX Net	14.240	0700Z	Fri.

KH6AD has moved into his new QTH. KH6BZF helped KH6AD with his boat anchor transformer. PAM W4UAF/KH6 has been running many patches. Van and KH6BB continue to lead the KH6s in DX. W8DGF, ex-KH6DEM, passed through Honolulu recently on his way back to Cleveland after a year in XV5-Land. KH6GJN has a new TR-4. KH6BX worked 8R1T, using his new FTDX-400. KH6AIO and his XYL, KH6AJD, have a new T4XB to a vertical. KH6GJN reports that the "Confusion Net" meets at 0200 GMT on 14.270. KH6GQI is on with a TR3 to a 14AVQ. WH6GRG is on as a new Novice from Kailua working 80, 40 and 21. KH6FGA/6 is heard from San Francisco. W4EXM/KH6 is back from Taiwan. Ex-KR6UD/ex-WØQBW now signs KH6GQW from Aiea Hts. Ex-WA7-GOW now signs KH6GPV. Western Union has returned K4RAN/KH6, ex-KH6DQV, to the "islands." He runs an S/Line to a newly purchased 30L-1 to a 14AVS. K7-BQI/KH6 purchased KH6GKL's Clegg Venus to get on 6-meter S.S.B. KH6GGD eyeballed ZS5IQ here during the latter's around-the-world-cruise. Recently returned-to-the-air are Wahiawa-nese KH6ABQ and his XYL KH6AFN, who occasionally work ex-Hawaiians W7KD, ex-KH6KS, and his XYL WA7KHD, ex-KH6AFC, in Oregon. KH6GF recently returned from a trip to Washington, D.C. KH6DXB recently retired from Federal Civil Service. KH6IJ has been signing K1PND from Belmont, Mass. KG6AQI reports that a testimonial dinner was held recently for that grand old man of radio, KH6AIG, by fellow members of the Marianas ARC. WB2NZU/KG6 received his Extra Class ticket. Recently KH6CU was honored with the publication of his fine article in *QST* and his ARRL 50-year pin. WA9EEO/KH6 reports Sub Base Pearl Harbor's club station KH6-SP, is manned by the following portable KH6 members: KJ2JT/KH6GQU, K5LTH, WB6NXP, K7ZRZ, WA7-ATM and WA9EOO. KH6GPQ/KH6GNE/K2SIL/KH6 reports that the MAUI ARC elected KH6GGX, pres.; KH6EXQ, vice-pres.; KH6EXI, treas.; and KH6EXR, secy. Traffic: (Dec.) KH6BZF 106, W4UAF/KH6 6, KH6AD 1, KH6GPQ 1, KH6GPV 1. (Nov.) KH6GPQ 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. The Southern Nevada ARC reports outstanding activities for the SAROC. K7ICW now is running high power on 6, 2, 220 and 432. W7YRY is active on RTTY. There is more 2-meter activity on f.m. repeaters in Reno and Las Vegas Area. W7KOI is active again from Elko. W7AKE and W7TVF will schedule anyone needing a Nevada QSL, DX or stateside. W7CSB has formed a Nevada chapter of the QCWA. The Sierra Hamfest at Bowers Mansion is scheduled for Aug. 1969 by the Reno gang, so plan now to attend with your children. W7YDX is active in Ely. More check-ins are needed for the Nevada Emergency Net on 3996.5 kc. Mon. and Thurs. at 1900. Traffic: W7KOI 3.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—The date of the Pacific Division ARRL Convention has now been set for June 13 to 15 at the Hotel El Dorado in Sacramento. W6DOR is chairman, with WA6JDT as co-chairman. From Headquarters at Newington we expect to have W1LVQ and W1CER. All FCC exams will be given—Novice through Amateur Extra. We will have several forums including MARS, QCWA, DX, WCARS and U.H.F./V.H.F. I hope you appointees will support the League functions at the convention. W6GDO (also W6GDD) has been nominated for membership on the V.H.F. Repeater Advisory Committee and was appointed to the committee along with eight other highly qualified amateurs out of approximately 30 nominees. WB6YTX had to resign as asst. mgr. for NCN/2 because of his work load. WB6WJO is sporting a new mobile rig from Santa Claus. WB6-MAE still is busy working in San Francisco and is operating from his camper. The North Hills Radio Club had W6ZRJ, our Pacific Division Director, as speaker at its Dec. meeting. Guests from other clubs included the RAMS, Sacramento ARC and the El Dorado Co. ARC. Traffic-wise, SV dropped from 51st to 56th place, and AREC from 2nd to 11th in Class IV. Overall we dropped from 2nd to 49th place. How about supporting the AREC program so we can get back up there again? Traffic: W8VDA/6 265, WB6WJO 55, WB6-YTX 50, WB6MAE 18, K6YZU 10, WB6EAG 2, W6VUZ 1.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6WLV. The Tamalpais Radio Club held its installation of officers at a dinner meeting Jan. 18. W6EAJ claims the only stream-power rig on the air from the wilds of the Mattole River Country—mostly on 160 meters. W6PZE has been serving as net control on the Western Public Service Net. Seen from the section at the Fresno DX Convention were W6PTS, W6HVN, WA6-AUD and WB6UJO. WA6ALK and W6UDL have been mostly active on u.h.f. K6BI has a new SB-101 on the air and is trying some high-speed c.w. W6BUY has moved to Marin and is putting up antennas for DXing. The Marin Club has continued its association with the Greater Bay Area Hamfest for the sixth year. K6NF is the call of ex-WB6QAT, who also sports an Extra Class license. Anyone interested in Morse code might look for Ned on 7060 or 3755 kc. at 8 A.M. and 7 P.M respectively. The VS6FLU kept WA6BYZ from making the BPL in Dec. but he started the string anew in Jan. WB6AIS and W6JSY are Silent Keys. W1QV, ARRL New England Division Director, passed through the area in Jan. en route from the Fresno DX meeting to the Navy Yard at Mare Island. W6BWV reports the Eel River has gone over its banks a few times but as yet there have been no major problems. K6KQN may be moving to Hong Kong for a position there. W6KVQ made the BPL again in Dec. Traffic: W6KVQ 628, WA6BYZ 222, W6WLV 132, K6TWJ 43, W6BWV 25, WA6AUD 17, W6VIP 15, W6PZE 4.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

K1ADB, Robert H. Mee, Saxonville, Maine.
W1EFR, Earle C. Ruby, Portland, Maine.
W1FEQ, Robert H. Sweeny, Bradford, R. I.
WA1FJR, Robert F. Shaw, Southbury, Connecticut.
W1HSD, Benjamin A. Thorpe, Millinocket, Maine.
W1MCR, James L. Walsh, Dorchester, Massachusetts.
K1OWK, John J. Repetto, Jr., Boston, Mass.
W1QUV, Garnet Harris, West Hartford, Connecticut.
W1SGL, David E. Noble, Vineyard Haven, Mass.
W2AIG, William H. Gaeckle, Shore Acres, N. J.
W2AYL, Wallace Putkowski, Jr., Clifton, N. J.
W2BUY, William R. Simpson, Kew Gardens, N. Y.
W2ER, Charles W. Brown, Oceanside, N. Y.
W2GK, Arnold G. Kastenmayer, Troy, N. Y.
W2JSM, Joseph T. Laird, West Islip, N. Y.
WB2SPV, Michael Goldstein, Brooklyn, N. Y.
WA2TET, Howard J. Page, Endwell, N. Y.
W2WOA, John F. Diesel, Trenton, N. J.
WA3FKL, Edward Murphy, Susquehanna, Pa.
K3IGL, Agnes L. Morrison, New Wilmington, Pa.
W3JGH, Donald R. Phillips, Philadelphia, Pa.
W3LXQ, William C. Bossler, Portage, Pa.
W4BAA, W2DPZ, John B. Roll, Jupiter, Fla.
W4DKP, William H. Aycock, Norfolk, Virginia.
WB4HVX, Jules E. De Loye, Jr., Ft. Lauderdale, Florida.
K4LIH, Danial L. Givens, Sarasota, Florida.
W4LPU, Hans Van Aller, Jr., Mobile, Alabama.
K4TXS, George S. Mayo, Aurora, North Carolina.
K4ZJR, Harry E. Eckland, Edgewater, Florida.
K4ZNV, Franklin M. Edson, Arlington, Virginia.
WA5JNF, Paschal H. Powell, Jr., Pasadena, Texas.
WA5NVF, ex-KZ5LT, Ben Smith, Houston, Texas.
W5PMM, Harold Dare, Houston, Texas.
W5RLZ, James B. Wilson, Victoria, Texas.
W6ADB, Stanley W. Wymar, Turlock, California.
ex-K6DLC, Phillip M. Cruse, Santa Barbara, Calif.
W6DRQ, John R. Wright, Morongo Valley, Calif.
ex-W6JQJ, Gunnar Ahlstrom, San Francisco, Calif.
K6KVY, ex-W1MLJ, Leo A. Dell Amico, Los Angeles, Calif.
W6LD, Byron E. Hammond, No. Hollywood, Calif.
K6TLV, Tsugio, Watanabe, Civina, Calif.
KL7GGO, Walter A. Palmer, Clarks Point, Alaska.
W7GNB, Ferry Fred Fields, Phoenix, Arizona.
W7JDZ, Benjamin W. Hespen, Harve, Montana.
K7KGU, Leonard H. Jorgensen, Salem, Oregon.
W7LTK, Notha H. Jordon, Pullman, Washington.
W7NHL, Austin Francis Haws, Ogden, Utah.
W7OEX, Charles N. Kunz, Seattle, Washington.
W7ZIQ, Robert R. Compton, Mt. Vernon, Wash.
W8ARD, Elmer W. Wolf, Parma, Ohio.
K8CKW, W8HRJ, Edward Greer, Athens, Ohio.
W8FKF, David P. Laszlo, Cedar Springs, Mich.
W8HE, Ralph H. Gaylord, Garretsville, Ohio.
K8QP, Edward B. Yorty, Roscommon, Mich.
WA8RTO, James W. Wilson, Lorain, Ohio.
W8SJH, Lewis A. Young, Pontiac, Washington.
W8WEK, Wilbert J. Porter, Flint, Michigan.
W9BEO, Russell H. Miller, Serena, Illinois.
W9PGW, Robert Carlson, Benwyn, Illinois.
W9PPM, Robert Sommer, Springfield, Illinois.
WØDOR, Edwin G. Brown, Maplewood, Missouri.
KØDUU, Harold G. Johnson, Fremont, Nebraska.
VE3AOY, W. J. Ward, Weston, Ontario, Canada.
G3FRT, Norman E. Evans, Cheshire, England.
G3JHZ, P. J. Brisbar, Wallasey, Cheshire, Eng.
VE6AN, Charles J. Dee, Medicine Hat, Alberta, Canada.

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

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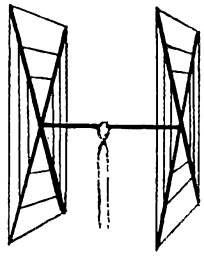
QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3—



CUBICAL QUAD ANTENNAS—these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators)—absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' × 1¼" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' × 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

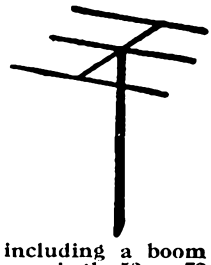
Now check these startling prices—note that they are much lower than even the banboo-type:

10-15-20 CUBICAL QUAD	$35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00
TWENTY METER CUBICAL QUAD.	25.00
FIFTEEN METER CUBICAL QUAD.	24.00
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS!WN4DVN



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 E1 20	$19	4 E1 10	$18
3 E1 20	25*	7 E1 10	32*
4 E1 20	32*	4 E1 6	18
2 E1 15	15	8 E1 6	28*
3 E1 15	19	12 E1 2	25*
4 E1 15	25*		
5 E1 15	28*		

*20' boom

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

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SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, WJPU—It is with deep regret that I have to report the untimely death of W6ADB. Stan was one of the real old-timers and was very active on c.w. and phone. His first love was traffic-handling. He was very active on the traffic nets. He will be missed by all of us. The new officers of the Tuolumne Amateur Radio Society are W6LKJ, pres.; WB6RZI, vice-pres.; WB6WGR, secy. The Tuolumne Co. RACES frequency is 145.8 Mc. and its c.w. net meets every Thurs. at 8 P.M. on 3705 kc. W6JUK and W6DPD are active on 6- and 2-meter s.s.b. using Quad Twist antennas with good results. W6UBK has a Swan station in operation on all bands. WA6CWS is heard on 75-meter s.s.b. W6JPS has a Swan 500 transceiver. K6RGZ has a Galaxy station. WA6FBL is heard on 75-meter s.s.b. K6VSK and WA6ZRZ are on 2-meter s.s.b. The Tulare County Christmas Party was held in Hanford with 22 attending. WN6PRO is a new ham in Jamestown. WB6HVA has a Model 28 and is on RTTY. W6EHN is building a 2-meter kw. amplifier. Traffic: WB6HVA 354, WA6SCE 257, WB6WGR 119, K6KOL 105.

SANTA CLARA VALLEY—SCM, Edward T. Turner, W6NVO—SEC: W6VZE. RM: WA6FLA. Many thanks to W6ZRJ for sending in these reports for the past three months while W6NVO was taking a rest in the hospital most of the time. WA6OXE also is recovering from surgery. WB6FME is recovering from a broken leg. WA6VGR has a new harmonic, Brian David. W6ASH is taking it easy from illness last winter but manages a little traffic. W6AUC is active as OO, OPS and ORS, plus skeds and overseas patches. W6BPT reports poor net conditions in his location. W6DEF is busy with nets and traffic. The SCARS Christmas Party was a huge success. K6DYX's three-month vacation is over and it is back to the traffic nets and slow-scan TV with W6SHK. K6HGV's traffic was light. WB6IZF still is mobiling around on business, with his XYL learning the code so she can get a license and keep track of him. WA6LFA is QRL traffic nets and traffic. W6AMG checks into the PCN Net at 12 noon on 7120. W6OWP has changed jobs. Best of luck, Bart, and we appreciate your years of running the West Coast Qualifying Run. Keep up the good work. W6OIL has a new studio for better service for MTN and NavMARS. W6RFF has a new s.s.b. exciter. W6RSY has his usual high traffic total and reports a fantastic yearly total with hundreds of MARS traffic not counted. W6VK says the new sub-bands are FB and he won 5 trophies in '68. W6YBV sends a nice traffic report but misses old pal W6ADB. W6ZRJ is busy lining up spring meetings and reports the Dec. meeting at the San Jose, Oakland and Sacramento Clubs. WB6ZSE, taking a night class in electronics is a new ORS. Traffic: W6RSY 827, W6YBV 526, WA6LFA 427, W6DEF 117, K6DYX 44, W6AUC 40, W6OIL 36, W6ZRJ 14, K6HGV 13, W6ASH 11, W6RFF 11, WB6ZSE 8, W6BPT 6, W6VK 6.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM/Acting RM: James O. Pullman, W4VTR. SEC: WA4LWE. PAM: W4AJT. V.H.F. PAM: W4HJZ. New officers of the Brightleaf Amateur Radio Club are WP4KJR, pres.; K4SKI, vice-pres.; WB4DWC, secy.-treas. W4OMW continues as editor of *Ham Chatter*, the fine club paper. The following note recently was received from Dick Bell: "From WA4BNO. (Temporarily inactive and currently located in an Asian land with tropical jungle). This is issued in solemn warning to all amateurs. Sometime during the month of June, 1969, WA4BNO will return to Charlotte and make the readjustment to civilian life and in the process will again contribute his share of QRM to the amateur bands." New officers of the Rowan Amateur Radio Society are K4SHU, pres.; WA4CXH, vice-pres.; K4YYJ, secy.-treas.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN (Nov)	3923 kc.	0030Z	Daily	211	W4ZZC
NCN(L)	3573 kc.	0300Z	Daily	34	WA4CFN

Traffic: (Dec.) W4EVN 459, W4RWL 197, W4FDV 157, WA4KWC 75, WA4VNV 72, K4VBG 68, WA4ZPC 55, K4EO 48, WA4GMC 45, W4AJT 28, K4TTN 28, W4ZZC 28, WA4AKX 26, WA4UQC 23, W4VTR 18, WB4BGL 14, WA4VTV 14, K4GHR 9, W4VON 4. (Nov.) W4RWL 150. (Oct.) WB4DPT 7.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. RM: K6QPH/4. PAM: WB4BZA.

SCPN	3930 kc.	0830 and 1530 EST Sun.	12 Noon Daily
SCN	3795 kc.	0000Z and 0300Z Daily	Dec. Tfc. 55
SCSSBN	3915 kc.	0000Z Daily	Dec. Tfc. 109

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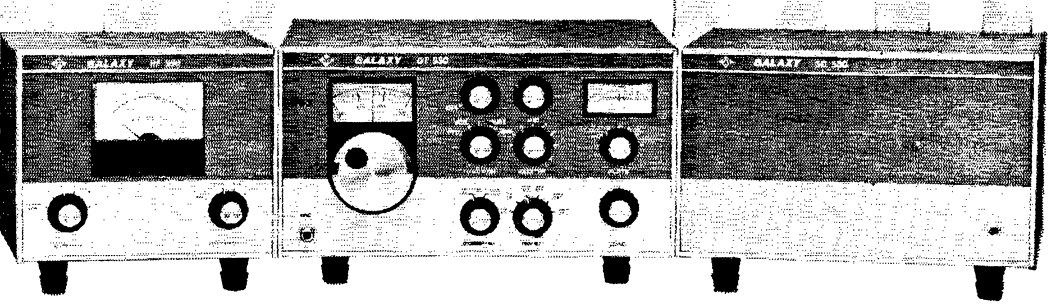

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Our new GT-550 has all those great qualities of the famous Galaxy V's ...and then some! It has new POWER...550 watts SSB, making it the hottest transceiver made! A new single scale VFO Dial makes frequency interpolation child's play...the new skirted knobs make tuning and band-changing a split-second job...and, that slick, king-sized finger-tip tuning knob works like a dream! *Still the most compact—only 11¼ x 12⅜ x 6"!*

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Jan. *QST* listed two S.C. OOs in the top listings for the Sept. FMT—W4NTO with an error of less than 0.4 parts per million and W4ZEQ with an error of only 2.6 p.p.m. Congrats to both! W4NTO also reports sending over 300 OO notices during the year for his 5th consecutive year on the OO Honor Roll. WB4CBJ and W4MAR are doing preliminary planning for 5900-Mc. experiments with a survey of terrain between Pelion and Leesville. The Columbia Hamfest is tentatively scheduled for June 1. Further details later. News was very light this month. Please send in your club and area news every month so we can let the others know what you're doing. Traffic: K6QPH/4 71, K4OCU 68, WB4DXX 50, W4PED 37, W4NTO 30, WB4CBJ 7, WA4HFA 7, W4JA 6.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. PAM: W4OKN. RMs: WA4EUL, K4MLC. We regret to report the passing of W4DKP in Dec. He will be remembered for his DXploits and, during his tenure as PAM, for strongly reorganizing the Virginia Sideband Net. On the brighter side: W4NXE has earned Extra Class and DXCC, while W4GEQ went to Extra and WB4DOY to Advanced. K4KNP, K4TSJ, WB4JEZ and W4RHA made the BPL. WB4FDT continues to send welcoming packages to new net members. W4MXU/KZ5-FX is now in Colorado and manages to check in to 4RN and VN occasionally. WB4GTS has automatic code sending and receiving equipment. WB4BRO earned a VSBN certificate. Mgr. W4OKN reports sending receive and send stations for region liaison for the first time in VSBN history—because of the Christmas traffic load. The VFN is meeting temporarily on 3860 at 1900 daily. The members will decide on a new frequency at their forthcoming picnic meeting. The Virginia QSO Party will be held in Mar. K4EZL is XW8CR in Laos; you are beginning to be an old-timer if you remember him. Our condolences to W4IA, who lost his XYL as a result of a tragic accident. Virginia net frequencies: 3935, 3860 and 3680. Traffic: (Dec.) K4KNP 631, WB4JEZ 515, WB4CVY 447, K4DC 332, WB4JFI 286, WB4FDT 261, W4UQ 260, W4GEQ 247, W4RHA 231, WA4PBG 221, WB4DRB 219, WA4EUL 217, WB4FJK 163, K4TSJ 138, K4JM 127, K4FSS 105, W4SQQ 103, WB4DOY 72, WB4GTS 69, WA4JJF 66, W4OKN 52, WB4GDO 42, W4TE 42, WA4FJT 41, K4GR 40, K4KDJ 38, W4THV 24, W4KX 21, WA4MJF 21, K4CG 20, K4VCY 19, WB4FUJ 18, WA4WQG 18, W4JUJ 17, W4MXU/Ø 14, W4YZC 13, W4KFC 8, W4MK 7, W4SHJ 7, WA4YRH 7, W4ZAU 7, W4IA 6, WB4GYV 4, W4WG 3. (Nov.) WA4WQG 16, W4OP 12, W4IA 4.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8MYU, K8TPF. PAMs: K8CHW, W8IYD. Net Mgrs. Phone, WA8YOF; C.W. K8MYU.

Net	*Time*	*Freq.*	*Days*	*Tfc.*	*QNI*	*Sess.*
WVN-CW	0000Z	3570	Daily	125	225	31
WVN-PH	2300Z	3890	Daily	133	756	31
PON-WV	2215Z	3905	Wed.			4
Regional	2215Z	3905	Mon.-Fri.			8

New Kanawha ARC officers are K8VNF, pres.; WA8UHL vice-pres.; WA8LFZ, secy.; K8HGM, treas.; WA8YPF, K8WMQ, activity, W8HCY, ex-8BJB, is the new Kanawha County EC. WA8SLG has a new mobile rig. K8DZU is active again on s.s.b. WB8BBG has a new SB-401. WA8YHH is a new ORS. WA8YSB has high power RTTY gear. I regret to report the passing of K8WFR and K8VID. WA8EQI has a new three-element beam and also is active on 29.6. Remember the W. Va. QSO Party, Mar. 29 and 30. This may be a good time to get Morgan County. W8NTV is on an extended trailer trip to Mexico operating XEØNTV. W8EV keeps ARPSC activity high in this state. WA8NDY and WA8WCK received a nice write-up in the Buckhannon paper. The club's code and theory classes have graduated many new Novices. How about a regular Novice Net? Traffic: W8SQO 132, WA8RQB 80, WA8POS 71, WB8BBG 62, W8HZA 62, K8MYV 46, WA8NDY 37, WA8YOF 36, WA8YSB 33, WA8YHH 32, W8CKX 25, WA8WCK 16, W8JM 15, W8DUV 14, K8MYU 13, WA8WIX 13, WA8UNP 4, W8WEJ 4, WA8LFW 3, K8VAH 3, W8ETX 2, W8TGF 2, K8CFT 1, WA8GYU 1, W8IMX 1, WA8KQX 1, WA8LFZ 1, WA8MHF 1, K8OQL 1, WA8OXI 1, W8QEC 1, K8QYG 1, K8VNL 1, K8ZDY 1, WA8ZRV 1.

ROCKY MOUNTAIN DIVISION

NEW MEXICO—SCM, Kenneth D. Mills, W5WZK—SEC: W5PNY. RM: WA5FJK. PAMs: W5DMG, WA5FFL. ORSs: K5MAT, WA5UJY (new). W5PNY has been busy putting together plans for the SET. Do you belong to the AREC? The AREC needs you. Write W5PNY or your local EC for application forms. WA5WBS and K5GLJ tied the knot Dec. 21. K5GLJ passed the FAA tests and should be the first woman air traffic controller in Albuquerque. New Caravan Club officers are WA5NHF, K5CQH, W5ALR and K5MGR. W5GAK is back home in Taos after being in Oklahoma City at school the past

a complete amateur radio station

in one portable package

SWAN Cygnet

A 5 BAND 260 WATT SSB TRANSCEIVER WITH BUILT-IN AC AND DC SUPPLY AND LOUDSPEAKER $395

The new Swan Cygnet is a complete SSB transceiver, with self contained AC and DC power supply, microphone and loudspeaker in one portable package. The Cygnet features full frequency coverage of the 10, 15, 20, 40 and 80 meter bands with a power input rating of 260 watts P.E.P. in single sideband mode, and 180 watts CW input. A crystal lattice filter at 5500 Kc is used in both transmit and receive mode, and provides excellent selectivity with a 2.7 Kc bandwidth at 6 db down. Superior receiver sensitivity of better than ½ microvolt makes it easy to pull in those DX signals, and with the Cygnet, if you can hear them, you can work them. Audio fidelity is in the well known Swan tradition of being second to none; providing smooth, natural sounding voice quality. The Cygnet is temperature compensated on all bands, featuring solid state oscillator circuitry with zener regulation which permits wide variation in supply line voltage without frequency shift.

Unwanted sideband suppression is 45 db, carrier suppression 60 db, and distortion products are down approximately 30 db.

The new Cygnet is designed to provide efficient, high quality communications in the 5 most commonly used amateur bands. Its low cost is a tribute to Swan's well known techniques in value analysis, and simple, direct circuit design. Above all, these techniques lead to a high degree of reliability and foolproof performance. Dimensions are: 13″ wide, 5½″ high, and 11″ deep. Weight is 24 lbs.

The transceiver comes complete with AC and DC input cords, and carrying handle; thus making it the most versatile and portable set on the market, and certainly the best possible value.

Amateur net **$395**

P.S. Yes, for our customers who require some of the extra features, there will be a deluxe version of the Cygnet coming soon, which will sell for approximately $495

ASK THE HAM WHO OWNS ONE

SWAN
ELECTRONICS
OCEANSIDE, CALIFORNIA

three months. Welcome to WA5VAL, ex-KØCAV, who is now in Albuquerque as an associate professor of electrical engineering at UNM. Brad is running an HT-32A and a Collins 75S-1 into a trap vertical on 20 through 10. Missouri SCM take note: KØYDW is running his own paper route in Independence and has more time to handle traffic. Congrats on the job change, Bert. W5NSN passed away Dec. 22. Traffic: K5MAT 143, WA5UJY 87, WA5FJK 24, WA5TQP 23, WA7FBV/5 23, W5DMG 18, W8MYM 16, WA5JNC 14, WA5MIY 8, W5NON 8, WA5RVX 7, WA5TWA 5.

UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7WKF. RM: W7OCX. OOs K7ZJS and WA7KUW have been active lately and have sent a substantial number of reports. W7OCX has earned a BPL for Dec. traffic. K7RAJ is now mobile on 75, 40 and 20. Jim also brought his DXCC-worked total to 250 over the holidays. W7OHR, at B.Y.U., logged a DX total of 75 countries in a five-week period. WA7HMS has been awarded the BUN Net certificate. Congratulations! Net traffic for Dec. was up and the SCM received more than the usual number of reports. Keep them coming. W7KSB is now taking a basic electricity course at the VA Hospital in Salt Lake with the hope of passing the 1st-class commercial test. Traffic: K7HLR 349, W7OCX 248, K7SOT 34, W7JQ 6, WA7KUW 3.

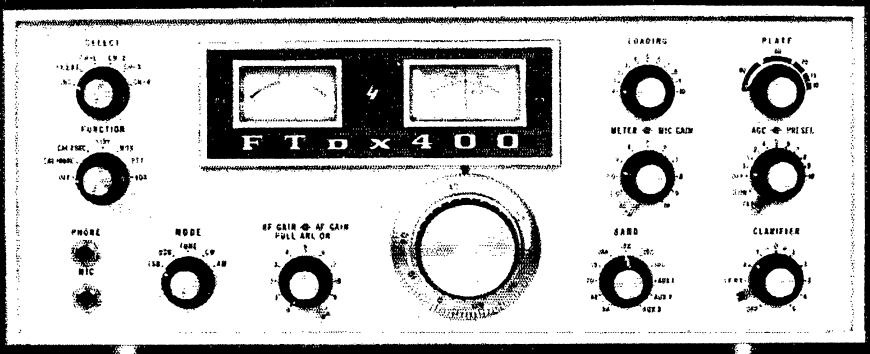
WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX, W7SDA, K7TAQ. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920. WA7AXX has been transferred to Japan. Another Extra Class license in the state—W7LVU. A newly-licensed XYL is WA7LEK, the XYL of K7SDD. WA7DNZ visited in Mexico during Dec. K7TAL (ex-WA7DNP) and WA7HFY were home on leave from Viet Nam over Christmas. HFY is now stationed in Thailand. Wyoming now has its first licensed 2-Mc. repeater station, thanks to the Laramie boys. As soon as the building is finished, the repeater will be installed on Sherman Hill. Don't forget the hamfest at Story this year on July 5-6. The YO Net is looking for more coverage in the state. Traffic: W7NQX 306, W7TZK 103, W7YWW 28, K7VWA 25, WA7FKF 24, W7NKR 23, K7LOH 20, K7OAF 13, W7SDA 12, W7BHH 7, K7AHO 6, W7AEC 4, K7SAR 4, K7BTE 3, K7OVD 2, K7WRS 2, WA7BFV 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Donald W. Bonner, W4WLG—SEC: K4KJD. PAM: WA4EEC. RM: K4BSK. The SET was very successful, thanks to K4KJD, K4BSK, WA4ROP and all the many other hams who helped to smooth out this year's exercise. WA4ROP is the new net manager of AENM and WA4LBL is NM of AENO. The 0100Z session of AENB on 3575 kc. has been discontinued until further notice. A new Novice, WN4LNM, is QRV for traffic for Mobile on 7171 kc. at night, 21.198 days. K4TWJ is a new OO. W4FVY is a new ORS. WA4DYD is a new OO. Code and theory classes are in full swing at the HARC under WA4JSM. Among those participating in a recent tornado alert in Huntsville were K4RSB, WB4KDN, WA4JSM, W4WGI and WA4DBQ. WB4DZK has a new 1-watt 6&2 homebrew transceiver. We regret the death of K4UGP, of Jasper. Thanks for the good traffic report this month. Good luck in the DX Contest. Strange calls on the air again: K4YUD, K4CFD, K4YMB, W4CWF. Traffic: WA4VEK 231, K4BSK 127, WB4EKJ 119, K4WOP 84, K4AOZ 66, WA4ROP 61, WA4FYO 43, K4WHW 42, W4MKU 38, WA4JSM 35, K4KJD 33, WA4GGD 31, W4WLG 28, WB4KDN 20, WN4KDI 19, WA4AZC 16, WN4JMH 12, K4UUC 12, WA4NWI 8, WN4LAO 1.

EASTERN FLORIDA—Act. SCM, W. G. Blasingame, WA4NEV—SEC: W4IYT. Asst. SEC: W4FP. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: WA4BMC. Traffic has really picked up over the holidays. I just wish that everyone who handles any traffic at all would send me a report. WA4OHO is back home and on the air for a while. Bob attends Georgia Tech. on the co-op program. W4DVO is operating on a limited basis. Cy also received his 25-year pin from ARRL. WB4FLW spent nearly three weeks in the hospital, but is back in the swing of things now. Ted is now the new net mgr. of the Novice Hurricane Net replacing WB4DDO, who has gone to Puerto Rico to school. W4EHW has a new inverted "V" dipole, but his work does not leave him much time to operate. W4YNM reports increased activity in the Lake City area, especially on 2-meter f.m. The fellows have formed a club and are working closely with Civil Defense and have submitted a new RACES plan. We understand they also have training twice a month for several new amateurs. The NOFARS is the proud

TOP OF THE YAESU LINE



THE FT DX 400 TRANSCEIVER

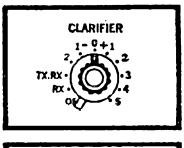
Conservatively rated at 500 watts PEP on all bands 80 through 10 the FT dx 400 combines high power with the hottest receiving section of any transceiver available today. In a few short months the Yaesu FT dx 400 has become the pace setter in the amateur field.

FEATURES: Built-in power supply • Built-in VOX • Built-in dual calibrators (25 and 100 KHz) • Built-in Clarifier (off-set tuning) • All crystals furnished 80 through the complete 10 meter band • Provision for 4 crystal-controlled channels within the amateur bands • Provision for 3 additional receive bands • Break-in CW with sidetone • Automatic dual acting noise limiter • and a sharp 2.3 KHz Crystal lattice filter with an optimum SSB shape factor of 1.66 to 1.

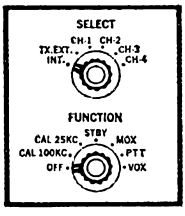
Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in hybrid circuits designed to optimize the natural advantages of both tubes and transistors • Planetary gear tuning dial cover 500 KHz in 1 KHz increments • Glass-epoxy circuit boards • Final amplifier uses the popular 6KD6 tubes.

This imported desk top transceiver is beautifully styled with non-specular chrome front panel, back lighted dials, and heavy steel cabinet finished in functional blue-gray. The low cost, matching SP-400 Speaker is all that is needed to complete that professional station look.

SPECIFICATIONS: **Maximum input:** 500 W PEP SSB, 440 W CW, 125 W AM. **Sensitivity:** 0.5 uv, S/N 20 db. **Selectivity:** 2.3 KHz (6 db down), 3.7 KHz (55 db down). **Carrier suppression:** more than 40 db down. **Sideband suppression:** more than 50 db down at 1 KHz. **Frequency range:** 3.5 to 4, 7 to 7.5, 14 to 14.5, 21 to 21.5, 28 to 30 (megahertz). **Frequency stability:** Less than 100 Hz drift in any 30 minute period after warm up.

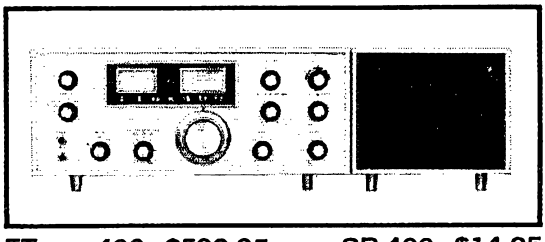


CLARIFIER CONTROL — Does the work of an external VFO — allows operator to vary receive frequency 10KHZ from transmit frequency, or may be used as an extra VFO combining transmit and receive functions.



SELECT CONTROL — Offers option of internal or outboard VFO and crystal positions for convenient preset channel operation.

FUNCTION CONTROL—Selects crystal calibration marker frequency and desired transmit mode of operation.



FT DX 400 $599.95 — SP-400 $14.95

new owner of a van type truck and is in the process of outfitting it for mobile emergency work on 80 through 2 meters. Traffic: (Dec.) WB4AIW 931, WA4SCK 678, WA4NEV 396, WA4IJH 353, WA4FGH 302, W4ILE 301, WA4HED 288, W4FP 168, WA4HDH 153, WB4EPD 121, W8BZY/4 120, WB4HJW 104, WB4GUH 99, K4LEC 83, K4DAX 72, W4KRC 71, W4YPX 67, W4ZAK 60, WA4-TWD 55, WA4NBE 46, WB4DSP 45, WB4IER 45, WA-4BGW 43, W4SMK 39, W4VDC 38, WA4CIQ 35, WA4FJA 34, W4IYT 32, W4OGX 32, WB4ADL 31, WA4YAK 31, WB4FLW 30, W4NGR 28, K4LPS 25, K4IEX 23, W4DFU 20, W4IAD 20, W4GDK 17, W4BKC 16, W4TJM 14, K4SJH 11, K4EBE 9, WB4HZJ 8, WA4OHO 8, W4SOM 7, W4DVO 4. (Nov.) W4EHW 65, WB4FLW 60, WB4DSP 37, W4AKB 18, W4BKC 11, WA4YRU 6.

FLORIDA QSO PARTY

March 29-30, 1969

Florida Skip, the all-Florida amateur radio publication announces the Florida QSO Party, March 29-30, 1969. Participation is open to all. Florida amateurs are urged to work as many out of state stations as possible, as well as those within the state. This year provisions have again been made for multioperator Florida stations.

Times: 1500-2000, 0000-0500, 1400-2400, GMT. No time limit.

Frequencies: c. w., 1815 3560 7060 14060 21060 28060; Phone, 1815 3860 7360 14260 21360 28860. Phone and c.w. count as separate contests.

Exchange: Serial number, RST, county for Florida stations, all others state, province or country.

Scoring: Florida stations count 1 point per QSO times the number of states, provinces and countries. D.C. counts as Maryland. Other stations in Florida may be worked, but only for contact points. Outside stations count one point per QSO times the number of Florida counties worked. Bonus points will be given for working Florida counties as follows: first 15, 100 points; second 15, 200 points; third 15, 500 points; all 67 counties, 1500 points.

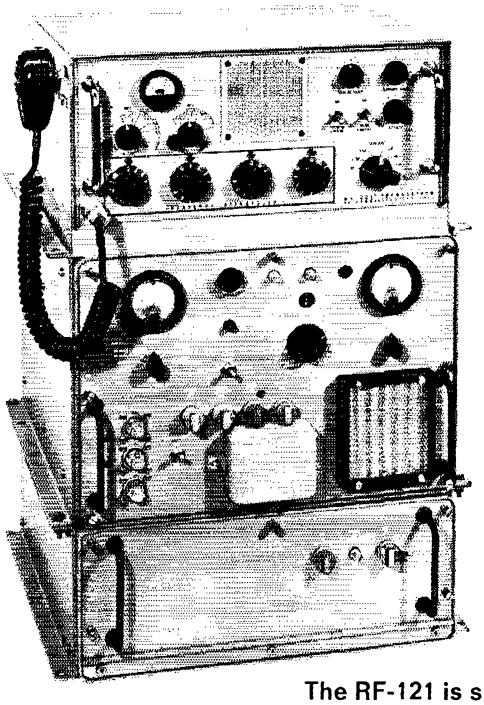
Power: No restrictions.

Awards: Certificates will be awarded to the highest scoring station in each state, province and foreign country (with 5 or more contacts). Certificates will be awarded to the highest scoring single operator and to the highest scoring multi-operator station (single transmitter only) in each Florida county. Multioperator stations must have 50 or more QSOs. Trophies will be awarded to the highest scoring station in the following categories: out-of-state, Florida single operator, and Florida multioperator. C.w. and phone score are *not* to be *summed* for any awards.

Logs: All logs must be postmarked no later than April 30, 1969. A summary sheet with your name, call, address, claimed score, scoring category, station location, and the customary signed declaration *must* be included. A six-cent stamp will bring the *Florida Skip* (June or July) issue with results.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: WA4WQU. RM: W4FDN. PAMs: K4HQI, W4-YDN. W4BGH has a new colinear for 144 Mc. W4ISS will make Savannah his QTH for a few months. W4PYM was mountain-topping in Northeast Georgia during the V.H.F. Contest. Sixteen different stations participated in GTN during Dec., including four Novices. WB6UTC/4, net mgr., reports 24 sessions and 26 messages. WB4DMO, net mgr. of the Ga. S.S.B. Net reports 31 sessions with 763 reporting to handle 182 messages. W4ISS reports extensive tropospheric inversions extending from N.C. to La. K4HQI verifies the report with contacts 5/9 in Ala., Fla. and La. He also logs good 50-Mc. conditions during the month. WB6UTC/4 finally broke the 500 traffic total with his new Drake 2C. K4TXK's XYL bought him a Motorola transistor f.m. rig for Christmas. He worked Tenn., Va., La., Ala., Fla., and N. Ga. during the 2-meter opening, with time out to solo a T-37 twin jet. The Atlanta Area Emergency Net held a practice session on 3972 kc. Dec. 14. Participation indicates that future operation will establish another reliable communications net. W4HYW participated in CHC Chap. 73 and the Tenn. QSO Parties. W4PGU returns to 144 Mc. with a G.E. Progress line f.m. rig. Traffic: WB6UTC/4 536, WA4RAV 232, W4PIM 123, W4FDN 74, W4CZN 71, K4-

A Rugged 1 KW Transceiver



AVAILABLE OFF THE SHELF

- 1 KW P.E.P. and average power output.
- 2.0 to 15 MHz in 1 KC increments plus continuous tuning.
- Frequency synthesizer.
- Designed for marine, fixed station or transportable application.
- Transceiver or transmitter operation with LSB, USB, Compatible AM, CW or FSK (with external adapter).
- Flexible power input.
- Automatic or manual antenna couplers available.
- Exciter can be used alone to provide 100 watt output.
- Dimensions: 33" x 19" x 17".

The RF-121 is small enough for shipboard or shelter installation.

The RF-121 Transceiver is comprised of the RF-301E Transceiver, the RF-110 1 KW Linear Amplifier and a power supply. Power output is a full kilowatt P.E.P. and average in the 2.0 to 15.0 MHz frequency range. Frequency stability is 1 pp 10^6. A frequency synthesizer permits front panel selection of frequency by means of four selector knobs. A VFO is included to provide continuous tuning. The RF-301E can be removed from the rack and used in the normal 100 watt mode.

Choice of power supplies available are:

RF-111 115 V, 400 cps., 3ϕ

RF-112 208/440 V, 60 cps., 3ϕ

RF-124 230 V, 60 cps., 1ϕ

Antenna couplers as follows:

RF-601 Fully automatic antenna coupler, or RF-610 Manual, remote controlled, antenna coupler.

This versatile and rugged equipment is immediately available at a commercial price.

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JFY 68, W4DDY 48, WA4UQQ 48, W4YDN 35, K4TXK 31, WB4EZX 13, WA4KQQ 10, WA4LLI 10, W4RZL 8, W4HYW 4, W4PGU 2.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM V.H.F.: K4NMZ. RM: K4UBR. RM RTTY: W4WEB. Nets:

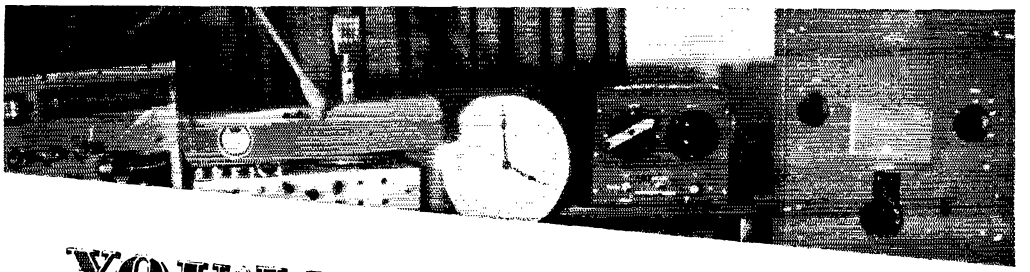
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2300Z	Daily	31	586	60
QFN	3651 kc.	2330/0300Z	"	62	—	350

Pensacola: WB4LJH is on 6-meter s.s.b. with a Swan 250. WB4HKM was appointed OBS and ORS. K4NMZ is a new V.H.F. PAM. WA4AYX took over as WFPN mgr. WB4AZJ is a regular on WFPN. K4DOT was QRT for receiver repairs. WB4DHL has a new 6-db. gain vertical colinear for 2 meters 100 feet up. Fort Walton Beach: WB4EQU raised his tower to 50 feet and put up an inverted "V" for 75 meters. K4QHR has an eight-element Telrex beam for 2 meters. WB4KMM just got on the air with a 2-meter f.m. mobile rig. Defuniak Springs: K4VWE is happy to be back in N.W. Fla. He is on 80-2 meters. Panama City: WA4VIY is a new OVS. He now has 200 watts on 146.94-Mc. f.m. and is experimenting with ham TV on 440 Mc. W4FOX is back on 2 meters with his FRC-27 after repairing his beams. WB4IXK put up a tri-band beam. WA4ZTG is on 6-meter a.m. Apalachicola: K2UGV/4 just moved here, and is active on 75-meter s.s.b. Port St. Joe: W4WEB is looking for RTTY contacts in Fla. Traffic: K4LAN 97, W4BVE 76, WA4WAR 75, WB4DVM 42. W4WEB 32, WA4EOQ 30, WB4IXK 23, WA4JIM 14. W4RKH 9, WB4EQU 6, W4-KCA 4.

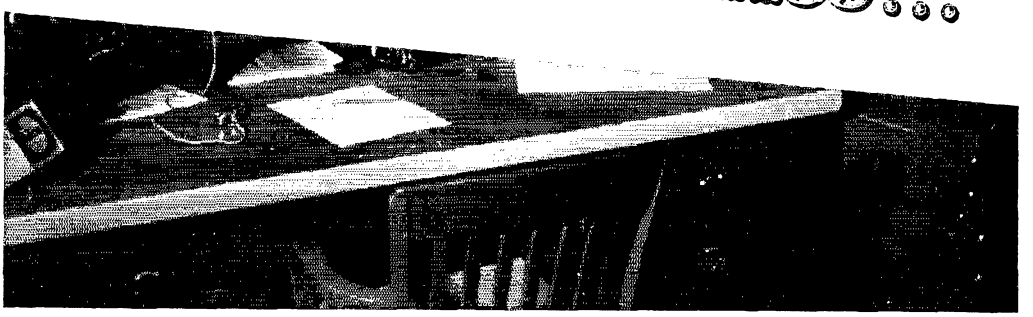
SOUTHWESTERN DIVISION

ARIZONA—SCM, Gary M. Hamman, W7CAF—PAM: W7UXZ. RM: K7NHL. New officers of the Amateur Radio Council of Arizona (ARCA) are W7GJK, chairman; K7MLE, vice-chairman; VE3FCE, secy.; K7CEH, treas. If your club is not a member of ARCA, have a letter sent to ARCA, P.O. Box 6602, Phoenix 85005, for information. The Old Pueblo Radio Club elected the following at its Supper Party: WA7FDN, pres.; WA7-GKL, vice-pres.; K7KNP, secy.; WA7CSN, comptroller. Additional directors are K7BCW and K7BQI. The Arizona Amateur Radio Club elected K7MLE, pres.; W7OIF, vice-pres.; W7GX, secy.; W7UXZ, treas.; K7-JJT, act. mgr. W7CFJ recently moved back to Tucson after being in California as W6GEN for several years. WA7IFD has earned DXCC. K7MTZ, WA7JHK and K7BTB are active again after being off the air for a number of months. WA7GAE is operating 10 meters mobile with 5 watts a.m. and is making lots of contacts. W7AZG and W7FCD still are chasing DX but with new beams. K7CEH and K7PLO each have new cars similar to that of W7UXZ. K7UGA is now running two rigs simultaneously and can handle two overseas calls at the same time. Approximately 1300 calls were completed by K7UGA in Dec. Arizona PON handled 30 and CSN 233 messages. Traffic: K7NHL 285, WA7DUB 132, WA7FNN 98, WA7ISP 75, WA7IFD 58, W7UXZ 24, WA7FEG 22, W7OUE 22, W7YXA 17, W7OIF 16, W7CAF 13, WA7IIF 13, WA7EWH 12, K7RLT 11, K7HGZ 7, K7JFY 7, W7-CSX 6, WA7GAE 6, K7RLL 4, WA7GDC 2, WA7HUH 2, W7KYM 2.

LOS ANGELES—SCM, Donald R. Etheredge, K6UMV —Asst. SCM: Harvey D. D. Hetland, WA6KZI. Los Angeles Council of Amateur Radio Club's 1969 officers include WA6WPX, chmn.; W6TXJ, vice-chmn.; K6SUJ, secy. The Hollywood Santa Claus Parade found W6EQB, K6AEH and WA6TYR involved considerably. W6JJY is now /MM. 1969 officers of the W6JW group include WB6-ROY, prexy.; WB6TPA, vice-prexy.; WA6ULA, secy.; WA6KOE, treas. New WB6ZDI members include WN6-OWA. K6SMF and WA6MZN. Recent slides of PJ-Land have been shown by W6RR. A recent guest of the So. Cal. DX Club was ex-VS1EW. WB6PKA reports working Arizona and Nevada on 2 meters and as running bicycle mobile on 40 meters. The Radio Program "Calling CQ" by W6MLZ, has been discontinued. Cards thanking KPFK-FM for its cooperation are requested. The San Gabriel Valley Radio Club reports work on the f.m. in-band repeater is materializing. Local activity reportedly was low in the Jan. V.H.F. Test. WB6IOM, of Moon-bounce work on 1296, was a recent speaker at the Palisades ARC. 1969 officers of the So. Cal. VHF Radio Club include WA6WKF, prexy.; WA6ZNP, vice-prexy.; WA6ARC, treas. W6INH has finished up a center-fed Zepp and is working on amplifiers for 3.5 and 7 Mc. K6EXO has been active doing jury duty in the San Fernando Valley. WB6WDS has a new 80-meter antenna up and working excellently on SCN. K6EV, W6NSH, W6TN, W6USY, K6YUL and WB6IMV report considerable VS6 activity locally. BPL certificates were earned by W6BHG, W6GYH, W6MLF, W6MLZ, WB6BBO, WB6-GGL and WB6OLD in Dec. K6NA and W6NJU are working hard at DXCC on 3.5 Mc. Microwave cooking



YOU'LL NEVER MISS...



...THE GOOD OLD DAYS

YOU KNOW WHAT WE MEAN UNLESS YOU MISSED US
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at the New York SSB Show, Dayton, Swampscott,
or another major ham convention near you soon.

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keep a sharp eye
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ovens recently demonstrated include one on the 2450-Mc. amateur band. K6THK and K6UMV are both recent recruits of Kenpo Karate. W6GTE reports an AP QSO acquired. *Traffic:* (Dec.) W6GYH 1272, WB6BBO 806, W6BHG 519, WB6OLD 514, WB6GGL 389, W6MLF 329, WB6TQS 169, W6MLZ 158, W6DQX 151, WB6YSG 106, WB6SXY 103, WA6KZI 76, K6CDW 49, W6FD 47, WB6WDS 42, W6DGH 34, WB6USX 32, K6EA 27, W6INH 25, W6HUJ 22, WB6KGK 22, K6CL 20, WB6ZVC 20, K6UMV 18, W6USY 16, K6ASK 13, WB6OUD 12, WB6VZD 12, W6OEO 10, W6TN 9, WB6SLG 3, W6AM 2, W6TXJ 2, W6DMP 1. (Nov.) WB6WDS 4.

ORANGE—SCM, Roy R. Maxon, W6DEY—To those who participated in awarding the plaque to me, many thanks, I appreciate it beyond words. OO W6BUK, W6VT, W6BQP, WA6MQL, WA6KRU, SEC WB6RVM, W6COJ, W6PJU, W6DEY and many others whose calls were not logged attended the SAROC from the Orange section. W8ELW/6 has need of several 50-ft telephone poles. EC WA6TAG reports 3 or 4 new AREC members. Attention Desert RATS and other hams in the vicinity of Palm Springs: WN8AYQ, advises his brother-in-law, W6HSP, has had to give up his station and is now confined to a wheel chair. He is at 2049 McManus Dr., Palm Springs, and would enjoy visits from hams in that area. How about it? Welcome to K9KWV, who just moved to Huntington Beach from Chicago. OO W6BAM is on 160 with an 807 in the final. WB6VWI has installed RTTY receiving equipment. *Traffic:* WB6TYZ 623, W6BNX 345, WA6ROF 262, W8ELW/6 161, W6EIY 89, W6WRJ 63, WB6VWI 36, WA6TAG 15, W6GB 7.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—SEC: K6GV, RM: W6UJ. K6BCE has moved to Westlake (Thousand Oaks) and is on the air with his Galaxie 5. However, the area has a restriction against external antennas and he is using an attic radiator. High scores in the recent Frequency Measuring Test were recorded by WA6MLI and WB6UAX. W6OUL was this section's winner of the New York QSO Party. A new ham in Simi is WA6TQD. Mr. & Mrs. Weber, K6KCI and K6GHU, now reside in Santa Maria. WA6VNQ received certificates for s/b WAC and WAS. WB6LJL has just raised his antenna array with the top beam at 98 feet. W6JTA claims 45 sections on phone during the ARRL Sweepstakes. EC for the Santa Maria area is WB6BWZ. A big traffic-mover in San Luis Obisbo is WA6DEI, as you will see by the score below. WA6WWC is in the process of raising his Hornet beam and 80-ft. tower. *Traffic:* (Dec.) WA6KEI 273, WA6FKY 140, K6AAK 88, W6ORW 7. (Nov.) K6AAK 48.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. E. Harrison, W5LR—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM (?). Highlight of the month was the Arlington Radio Club Christmas Party with an attendance of 100. A certificate of Merit was presented to Mrs. Bea Winnett, K5BNH, of Irving, in recognition of outstanding service to amateur radio from the standpoint of

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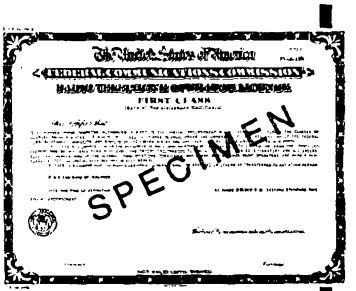

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traffic from overseas. The Arlington Club program was MCed by Guy Coder, pres. W5IQ made presentations. Other Christmas parties included those of the Irving Radio Club at Wyatts Plymouth Park, attendance 65, and the Kilocycle Club of Fort Worth held Dec. 19 at the Seminary South Shopping Center. The Advanced Class license study course began Jan. 30 at the club rooms with K5BIQ, WA5QOJ and WA5IKY as instructors. So. Tex. EC WA5KHE, of Nacogdoches, wishes to contact ECs residing in Rusk, Shelby and Cherokee Counties. He's planning a net. Tex "CW" Net Mgr. W5EZY recommended tour Northern Texas members for net certificates, W5FCX, W5KPB, W5QGZ/5 and WA5FGC. Denton County ARC met Dec. 9 for a tour of Federal Center Loop 288. Also scheduled are code classes Mon. nights at the Civil Defense Center City Hall. W5RHF, ex-W4ZJY/5 from Tennessee, now is residing in Grand Prairie, Tex. Dave is a net man of long standing. W5QGZ/5 moved to Dallas. This information came from West Texas and East Texas. We are pleased to hear from you. The Key City Radio Club (Abilene) submits an interesting report and shows officers as WA5SIO, pres.; WA5PPF, vice-pres.; K5AZP, secy.-treas. The club has the call W5SP honoring Bill Ansley, prominent Western Texas ham. The Tyler ARC has a gang on 2 meters with a repeater. PAM Jim Brown, of Waco, sends greetings to all. The Caprock Amateur Radio Society issues a newsy bulletin. These OOs turn in a grand job: Messrs. Baker, Sartori, Ed Miller. W5MSG reports his time is occupied with monitoring the Delta S.S.B. Net. We have a new AREC request from WN5VDY together with an Asst. EC request from W5RDZ and K5LNM. Traffic: (Dec.) K5BNH 1104, W5RHF 141, W5QGZ 87, W5JSM 54, W5PRN 47, WA5QQR 27, WA5NSJ 22, WA5QQQ 21, W5CTJ/5 20, WA5QWA 12, W5LR 11. (Nov.) WA5CTJ/5 16.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB, RM: W5QMJ. PAMs: W5MFX, K5TEY, WA5JGU, K5ZCJ. The 22nd Annual Lawton-Ft. Sill Hamfest is history, but the local club members are right in the middle of the Ft. Sill Centennial QSO Party and special Centennial QSL cards. The last official act of the former director of the West Gulf Division, W5IQ, was a visit to the Arlington, Tex., Christmas Party and the issuing of a Certificate of Merit to K5BNH for her public service work. W5FW reports that he has been reappointed Assistant Director. Congratulations to new Advanced Class WA5PPB and new Novice WN5WRA. New officers of the Wheat Straw Amateur Radio Club are WA5JHB, pres.; WA5PFK, vice-pres.; K5GBN, secy.-treas.; WA5RLP, reporter. New Officers of the Aeronautical Center Amateur Radio Club are W5HXL, pres. W5FF, vice-pres.; W5JJ, secy.-treas.; W5DV, assistant to the pres. Net reports:

Net	*Freq.*	*Sess.*	*Time*	*QNI*	*QTC*
OPEN	3915 kc.	5	1400Z	195	17
OPON	3920 kc.	21	2300Z	336	105
STN	3855 kc.	25	2330Z	747	280
OLZ	3682.5 kc.	17	0100Z	41	72
S8Z	3682.5 kc.	18	0345Z	29	36

Traffic: K5TEY 3850, WA5RRH 125, WA5IMO 123, WA5KFT 83, W5QMJ 60, WA5SEC 44, W5FKL 43, WA5AOB 39, W5MFX 35, K5SWL 33, WA5FSN 30, W5PML 19, WA5LWD 17, K5CBA 14, K5CAY 13, K5OOV 11, WA5DZP 9, W5FW 9, K5WPP 9, W5QBF 8, W5IQ 7, K5MBK 6, WA5TSJ 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. Congratulations to new appointees: W5QJA and WA5WFR as ORS and WA5QKE as OBS. W5QJA has assumed the duties of net mgr. for TEX C.W. Traffic Net. WA5WFR comes from the New England Division. Nice to have Mike with us. The Texas Southmost ARC, Inc., has elected K5MRT, pres.; W5DX, vice-pres.; W5KR, secy.; WA5ISH, treas.; K5SJA, W5KFI and WA5HBI, directors. Information from *Off Resonance*: EC W5TFW advises the Port Arthur ARC's new officers are W5FCD, pres.; K5YSO, vice-pres.; WA5SEP, treas. Congratulations to the following members of the TEX Traffic Net who earned net certificates: W7WAH/5, WA5MXY, W5EZY, W5ABQ, WA5GZX, K2EIU/5, W5QJA, W5FIW, WA5AUZ and WA5KMY in South Texas, along with W5FCX, W5KPB, W5QGZ and WA5FGC in the Northern Texas section. OO W5NGW reports problems; he has had to move the rig to an "unhandy" location. Rays problems will be going on until the daughters are gone off to school or married, then he can have his "handy" location again. Most of us "Old Timers" fully understand. Speaking of Old Timers we expect to see a good turnout in Feb. at the "Old Timers" Night at Houston ARC. Traffic: WA5AUZ 220, W5QJA 175, W5EZY 125, WA5FJN 113, K2EIU/5 82, W5TFW 79, WA5GZX 58, W5AC 49, W5BGE 49, W5ABQ 44, WA5TXI

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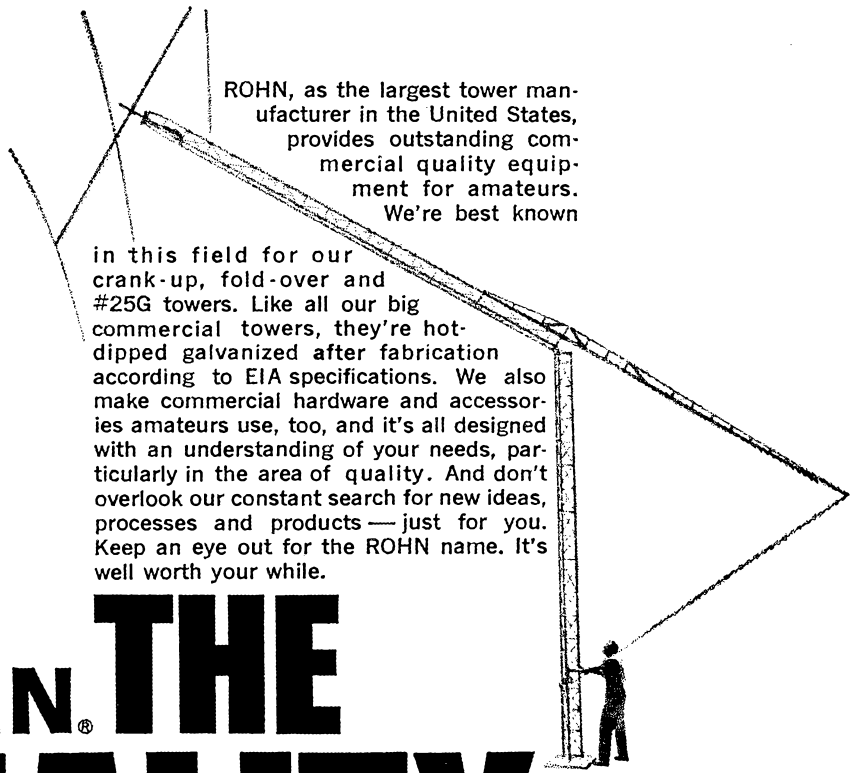
CANADIAN DIVISION

ALBERTA—SCM/SEC: Don Sutherland, VE6FK—PAM: VE6ADS. ECs: VE6SS, VE6XC, VE6AFQ, VE6AWM. ORSs: VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ. OOs: VE6HM, VE6TY. OBSs: VE6HM, VE6AIF. VE6AO is very busy handling thousands of QSLs for the Canadian DXpedition to the South Pacific. George warns that QSLs must contain an SASE or at least enough IRCs to handle mailing. New executives of the Vulcan County Radio Club are VE6-AHG, pres.; VE6AVV, vice-pres.; VE6AJG, secy.-treas.; VE6AFJ, news rept. The 1969 executives of the Edmonton DX Club are VE6MC, pres.; VE6TP, vice-pres.; VE6PL, secy.-treas.; VE6ARG, awards. The NARC and the CARA request that the v.h.f. repeater be *not* used for receiver tune-up. VE6AQZ has announced dates for the 1969 ARLA Hamfest, to be hosted by the NARC, and held in Edmonton Aug. 2 and 3. WA5OHH/VE6 has returned to Louisiana and is looking for Calgary contacts on 3615 Mc. any evening. Approximately 12 mobiles from the CARA participated in the hunt for a missing child in sub-zero weather in early December. The CARA ham classes are well attended and good progress is noted. Traffic: VE6FK 85, VE6FV 8, VE6SS 8, VE6XC 6, VE6XF 6, VE6ABS 5, VE6HN 5, VE6ATG 4, VE6VD 4, VE6VF 4, VE6ALS 3, VE6KS 3, VE6AFW 2, VE6AUT 1, VE6II 1, VE6YW 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —The North and West ARCs Christmas Dinner was enjoyed by many. VE7JN took home the 2-meter transceiver. The SCM and XYL, VE7SH took home their share of the loot. Vancouver ARCs Christmas Dinner, held at Frank Baker's, was most enjoyable. The voice of "Burnaby's Happy Hooligan" has changed to VE7LL and Alan is looking for appropriate phonetics. Also he reports the West CAN RTTY Net operates again on 3610 kc. at 0230Z daily. VE7ASU has his commercial pilot's license. We pried from VE7AQW that in his twenty-one years of being an amateur he has helped more than 150 people to become licensed amateurs. WB6MAY/VE7 is now married and there are reports that it was a cold 46 below at his XYL's parent's home. VE7AFG has won his class "A." VE7AFJ reports that his Model 15 RTTY is in business. VE7AHX has been offered a commission in the Canadian Armed Forces. VE7BXX has won his Class "A." VE7WP is on the sick list. VE7FN has a new HW-100. VE7GG took part in the FMT and did very well. It is reported that VE7-APU's new 70-ft. tower is in psychedelic colors. VE7AC reports the car, tractor, etc., froze but DX is good. VE7BGX is the new Prince George EC. Traffic: VE7AC 117, VE7BLO 88, VE7APF 81, VE7GG 75, VE7LL 38, VE7AMW 23.

MARITIME—SCM, William J. Gillis, VE1NR—Asst. SCM: R. P. Thorne, VO1EL. SEC: VE1HJ. New appointments: VE1AMR as RM; VE1ABS, VE1ARM, VE1RO as ORSs; VE1AAX as OBS. Others are being processed. VE1ABS reports receiver problems. ARC OWL held its Annual Dinner and reports reelection of the full executive for another term. Congrats to the SONRA and president VO1BL on winning the J.R. Smallwood Field Day Trophy, and to VO1IL on winning the C.W. Operator of the year Fred Ezekiel Memorial Award. VE1UT's QTH is now Campbellton and he hopes to be on the air soon. Call letter license plates now are available for N.B. amateurs. Details are in the bulletin issued by the NBARA and the Moncton Club. Traffic: VE1AMR 219, VE1ABS 159, VE1AUD 6.

ONTARIO—SCM, Roy A. White, VE3BUX—Congrats to VE3ERU on making the BPL in Nov. Congrats to the Toronto and district boys who did such an outstanding job in the Toy Drive for underprivileged children this past Christmas. Also, congrats to the Ottawa Valley Mobile Radio Club on its efforts in demonstrating amateur radio at the recent National Museum of Science and Technology. Ontario hams were saddened to hear of the passing of VE3AOY. Thanks



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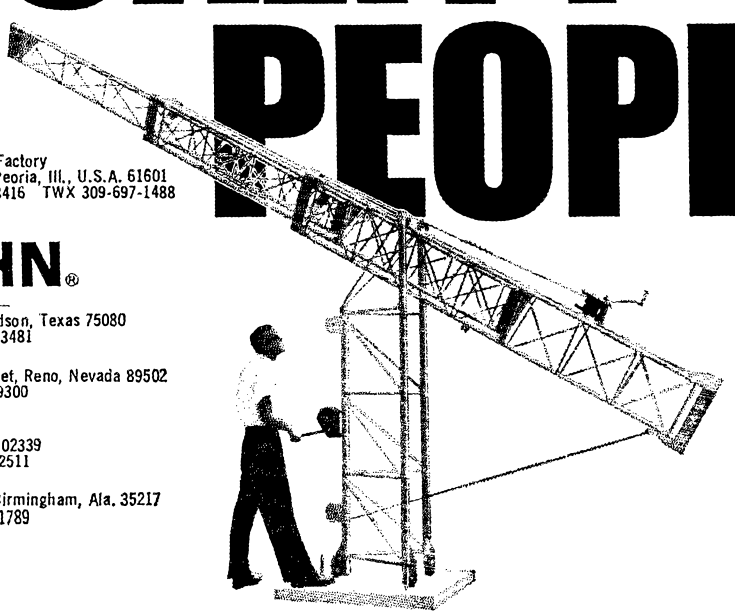

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to VE3CO for letting me know. VE3OE, our SEC, tells me he has appointed VE3EYN, VE3BLR, VE3FXP and VE3FWI as ECs. W4BNM/VE3 is headed for St. Petes for a few weeks. VE3EFX tells me he has been elected RM of the North-West Ontario Phone Net. Ontario hams were pretty scarce in the recent CD Party. How come I got such excellent reception from Apollo 8 200,000 miles away and sometimes I can't get out of my own back yard! Conditions, I guess! Congrats to the RTTY boys on their recent world-wide contest and hats off to VE3GK on the tremendous effort he put into it. VE3ADS just got his license. That makes the 36th White Caner in Ontario. We hear that VE3AN has blown himself to a new 500-w "KW Atlanta." Traffic on the c.w. and phone nets was heavy over the holiday season and gave the boys a real workout. Thanks to VE3VD for his friendly note of appreciation each month along with his traffic count. VE3EFW had a narrow escape when an element on his beam got loose and contacted a primary line. Fortunately, he wasn't home. Keep those antennas *well* clear of power lines, boys! That stuff travels 186,000 miles a second you know! Traffic: (Dec.) VE3BZD 216, VE3GI 207, VE3DV 204, VE3DPO 196, VE3DBG 158, VE3ERU 156, VE3ATI 104. (Nov.) VE3ERU 142, VE3BZB 106.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. RM: VE2DR. PAM: VE2BWL. VE2AFA is active again. VE2ACN is a new amateur and VE2DR has an FTDX-400. VE2YU is heard on 2-meter mobile and VE2BGJ is heard from VE3-Land. VE2AP directs the issuing of VE2 license plates from Quebec City. VE2DGP, ex-VE-2VN, is now very active. VE2KT has a ball recalling old times in amateur radio. How many of us stop to think how we can help handicapped amateurs? Or help handicapped persons to become amateurs? Two observations—newcomers to amateur radio can not sense true amateur radio by going to 2-meter repeater operation and 2-meter repeater operation is not doing its best work so long as each repeater is an entity rather than netted such as the NTS system. VE2ASU sends his usual fine report from the Quebec City gang. Le congrès de l'Association Provinciale se tiendra dans la coquette ville de Granby. Tous les amateurs du Québec sont priés de préparer leurs vacances en vue de ce congrès. VE2-BEJ est de retour sur l'air avec un FTX-100. VE2DFR et VE2BEP se sont procurés un linéaire spécialement pour le 20 mètres. VE2DDG est actif sur 80 mètres avec un Swan 350. VE2ASP a changé son rig pour un TR-4. VE2AB s'est monté un beam. Traffic: VE2DR 83, VE2BRD 78, VE2BVY 48, VE2BXS 41, VE2AJD 30, VE2OJ 26, VE2CP 15.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5HP —A repeater station installed atop the Saskatchewan Power Corporation Bldg. in Regina operates on an input frequency of 146.460 and output frequency of 147.330. The SET exercise in Saskatchewan was held under SEC VE5CU with ECs VE5DO, VE5IL, VE5NX, VE5RJ and VE5BO. Details of "Operation Friendship," a project of the Edmonton Junior Chamber of Commerce being carried out with the help of the amateurs in that province and through the efforts of amateurs across Canada and designed to foster friendship amongst all people throughout Canada and indeed the world, can be obtained from VE6RD. GI3CVH, an Irish ham, will be touring parts of Canada and operating mobile, using 28.350 a lot. His plans call for him to be around Toronto on July 15, around Regina near the end of July. Saskatchewan Power Corporation Staff members who are ham radio operators met on 80 meters recently and conducted a conference type program. Approximately 20 stations took part, with the control station being the shack of VE5HP. The purpose of the get-together was to provide background information for a story to appear in the S.P.C. magazine *High Lines*. In Dec. 20-meter short contacts between Saskatchewan and Manitoba on one side and Alberta on the other were at times extraordinary. 40 meters is being used much more. 80 meters has been spasmodic. The higher frequencies of 15 and 10 meters remain very good. Traffic: VE5GL 107, VE5LQ 27, VE5PX 18, VE5KZ 7, VE5GW 5, VE5KI 5, VE5XL 5, VE5PZ 4, VE5QS 4, VE5UT 2, VE5XG 1.

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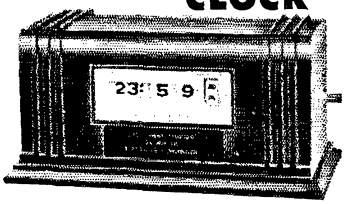

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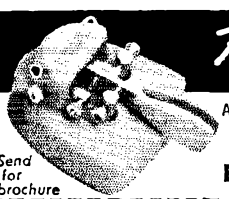

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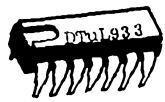

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600	☐ .20	☐ .55	☐ .75	☐ 1.80
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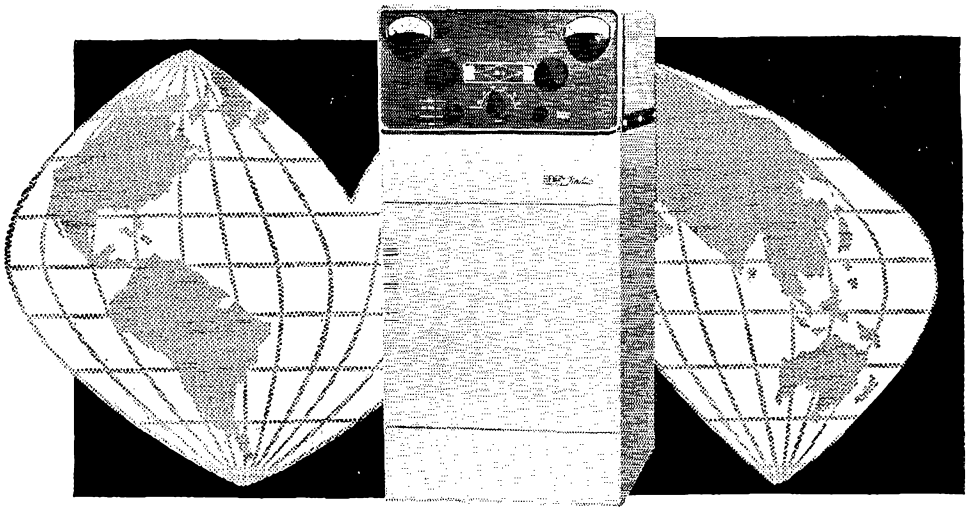

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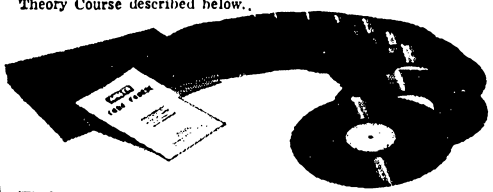

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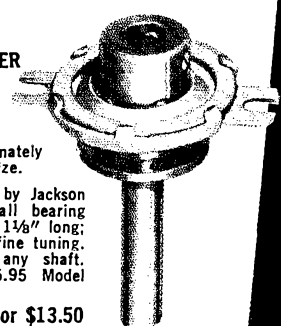

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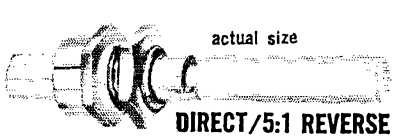

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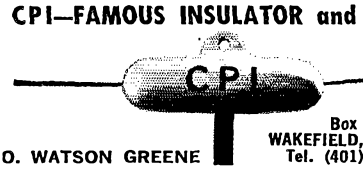

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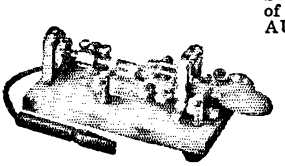

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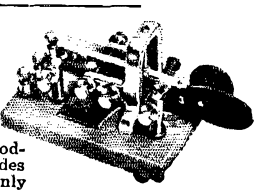

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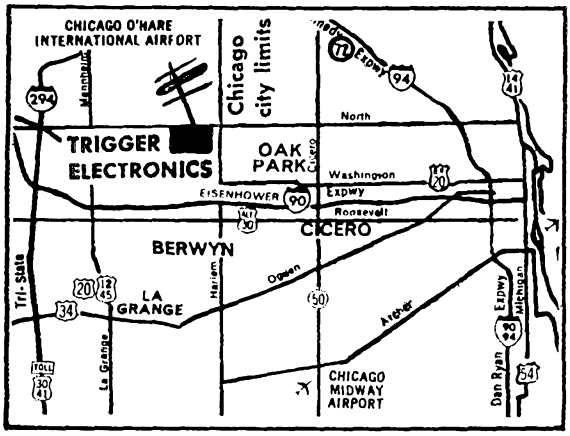

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516F-2 AC	119	SC-1 SPKR. NEW.	18	HQ170A VHF MINT	287
516E-2 28VDC	329	HA650 6MTR TSVR	77	HQ180AC MINT	339
30L-1	390	HT44 & AC	329	HEATH HW12	77
DRAKE R4	279	SX105	79	HEATH HW32	87
DRAKE R4A	339	SX146	229	HEATH HW32A	99
DRAKE R4B	359	WR2000	87	HEATH SB101	395
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(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is no charge for zipcode, which is essential you furnish. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

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(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publshers of QSTare unable to vouch for their entegrity or for the grade or character of the products or services advertised.

"SEE your picture and a thumbnail sketch of your life in wireless along with many of your old buddies in Spark Gap Times magazine published by the Old Old Timers Club. Charter membership is offered to all pre-World War I operators, regular membership to any operator licensed 40 years or more ago. Be a recognized pioneer, join the Old Old Timers by writing the Secretary W5ZC, Bert E. Gamble, 402 Beck Building, Shreveport, Louisiana 71101."

ROCHESTER N.Y. is again Hamfest, VHF meet and Flea Market headquarters for one of the largest events in the East. May 9, 10 and 11th.

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings, the second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM. W2ATT, New York Radio Club. Our April, May and June meetings will be held on the 2nd Monday of the month. Our Annual Auction will be held on March 14, 1969 at the George Washington. (All our meetings are held there.)

HAMFEST: June 8th. Save this date for Annual Starved Rock Radio Club Hamfest at Ottawa, Illinois. Write: George E. Keith, W9QLZ, RFD #1, Box 171, Oglesby, Illinois 61348, or see Hamfest Calendar in May QST.

RAGS-Radio Amateurs of Greater Syracuse annual hamfest on Saturday March 29, 1969. Technical exhibits, speakers, flea markets, ladies programs, and dinner. Advance registration $5; at door $6. Write Lee Delasin WA2DAD, Box 88, Liverpool, New York 13088.

QCWA—Quarter Century Wireless Association is a non-profit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information. A. J. Gironda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10543.

CHRISTIAN Ham Fellowship is now organized for Christian fellowship and witness among licensed amateurs. Free gospel tracts and information on the organization is available on request. Christian Ham Callbook listing members for $1 donation. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan, 49423.

INDIANAPOLIS DX Association will provide a Hospitality Suite for DXers on Friday nite, May 23rd. Write Joe Poston, 309 Benton Dr., Indy, Ind. 46227.

INDIANAPOLIS Ham Convention (Sat.) May 24 (9 to 5) at beautiful Lafayette Square Mall. Indoor manufacturers displays for sale or auction. Free outside flea market. 80+ shops, cinema, for XYL and kids, inside airconditioned Mall. Airports and Interstate ½ mile. Write: Indianapolis Ham Association, 309 Benton Dr., Indianapolis, Ind. 46227.

DAYTON Hamvention April 26, 1968: Wampler Arena Center, Dayton, Ohio. Sponsored by Dayton Amateur Radio Association. Informative sessions, exhibits, hidden transmitter hunt, and ladies program for the XYL. Watch the Ham Ads for information, or write Dayton Hamvention, Box 44, Dayton, Ohio 45401.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104. Tel. NOrmandy 8-8262.

QSL Cards??? America's Finest!!! Personalized made-order!!! Samples 25¢. DeLuxe 35¢. (refunded) Sakkers, V DED. Box 218, Holland, Michigan 49423.

C. FRITZ—QSLs that you're proud to send, bring greater turns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizo 85252.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Pen 18103. Samples 10¢. Catalog 25¢.

QSLS, stamp and call brings samples. Eddie Scott, W3CS Fairplay, Md. 21733.

QSLS—SMS. Samples 25¢. Malgo Press, Box 375, M. Toledo, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trent N.J. 08638. Samples, 10¢.

10¢ Brings free samples, Harry R. Sims, 3227 Missouri Av St. Louis, Mo. 63118.

QSLs, SWLS: Rubber stamps, address labels, and envelop Quality with service. Samples 25¢ (refundable), R. A. Lars Press, Box 45, Fairport, N.Y. 14450.

QSLS. Free samples, attractive designs. Fast return, W7 Press, Box 2378, Eugene, Oregon 97402.

QSL, SWL, cards that are different. Quality Card stock. Sa ples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015

CREATIVE QSL Cards. Personal attention. Imaginative n designs. Send 25¢. Receive catalog, samples, and 50¢ retu coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 9342

QSLS by Jansen. K2HVN. Samples 25¢. 860 Atlantic Lindenhurst, N.Y. 11757.

RUBBER Stamps $1.15 includes tax and postage. Clints' dio, W2UDO, 32 Cumberland Ave., Verona, N.J. 07044

QSLS SWLs Hundred $2.00, samples dime. Garra, Mahoning St., Lehighton, Penna. 18235.

QSLS 300 for $4.35, samples 10¢. W9SKR, George Vesc Rte #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS. Gorgeous rainbows, cartoons, etc. Top quality! L prices! Samples 10¢ refundable. Joe Harms. WA4FJE/W3C 905 Fernald, Edgewater, Fla. 32032.

RUBBER Stamps. Return mail delivery, postpaid. Ba price, $1.00 first line 60¢ each additional line. Request t style chart. Fulton Rubber Stamps, Route 216-A, Fult Maryland 20759.

QSLS. Neat, quick, 10¢. Filmcrafters, Box 304, Mart Ferry, Ohio 43935.

QSLS Kromkote glossy 2 & 3 colors, attractive, distincti Choice of colors, 100—$3.00 up. Samples 15¢. Agent for C D-Cals. K2VOB Press, 457 Chancellor Ave., Newark, N 07112.

QSLS, finest YLRL's, OMs samples 10¢. W2DJH Pres. W rensburg, N.Y. 12885.

QSL cards. Finest quality. Economical prices. Fast servi Free samples. Little Print Shop, Drawer 9848, Austin, Te 78757.

QSLS, SWLS, XYL-OMS (Sample assortment approximat 9¢) covering designing, planning, printing, arranging, maili eyecatching, sedate, fabulous, comic. DX-attractive, prototyr snazzy, unparagoned cards (Wow!). John Patterson carries in the spirit of the late Warren Rogers, KØAAB, adding own. Patterson Printing, 961 Arcade St., St. Paul, Minn. 551

QSLS, Radio Press, 15008 Orchid Ave., Poway, Ca 92064.

3-D QSDS—The modern concept that makes all others o fashioned. Samples 25¢ (refundable). 3-D QSL, Co., Mons 2, Mass. 01057.

QSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & S Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS, samples, 10¢. Fred Leyden, W1NZJ, 454 Proctor Av Revere, Massachusetts 02151.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Co pany, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Servi Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848

QSLS-100 3-color glossy $3.50; silver globe on front; rep form on back. Free samples. Rusprint, Box 7575, Kansas Ci Mo. 64116.

QSLS by K1FF: $2.00 for 100. Others at reasonable pric Samples 25¢ (deductible). K1FF QSLS, Box 33, Melrose Hi lands, Mass. 02177.

PICTURE QSL cards of your shack, etc. from your pho graph. 500, $12.00, 1000 $15.25. Also unusual non-picture signs. Generous sample pack, 20¢. Half pound of samples 5 RAUM's, 4154 Fifth St., Philadelphia 19140.

ORIGINAL EZ-IN double holders display, 20 cards each plastic, 3 for $1.00 or 10 for $3.00 prepaid and guarante Free samples to Dealers or Clubs. Tepabco, John. K4NM Box 198T, Gallatin, Tenn. 37066.

QSLS. Free samples. Cut Catalog 25¢. Raised lettering QS Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSLS by Jansen, K2HVN, custom made, rainbows, pictur maps, large variety backgrounds. Special offer, 300 glos $5.00. Samples 25¢. 860 Atlantic St., Lindenhurst, N.Y. 117

3 Line engraved badges, any color, $1.25. Special rates clubs. Fallert's Engraving, 121 N.C. St., Hamilton, O 45013.

PICTURE of yourself, rig, etc. on QSLs made from y photograph, 250—$7.50; 1000—$14.00 postpaid. Samples f Picture Cards. 129 Copeland, LaCrosse, Wis. 54601.

QSLS, 100, $1.25 and up. Postpaid. Samples, dime. Holla R3. Box 649. Duluth, Minn. 55803.

QSLS. With all this competition, you've gotta have someth different. Try us. Samples 10¢. Alkanprint, Box 5494, M neapolis, Minn. 55408.

QSLS. Neat, professional, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

CANADIANS! National NCX-5 MK II with NCX-A p.s./spkr. Like new condx, in original cartons: $750.00 (typo in my last ad, Sry!). RCA AR88/LF rcvr in cabinet, gud condx, $100. Ameco converters CN-50W and CN-144W., 30.5-34.5 i.f. Brand new and unused. $50.00 each. Will ship F.o.b. Galpin, VE6KD, 5303-114 St., Edmonton, Alta. Canada. Tel: (403)-434-4146.

CANADIANS! The best selection of new and used gear in stock at all times. Drake, Swan, Yaesu, Hy-Gain and others. It will pay you to check our deals. The Ham Shack, 1566A Avenue Road, Toronto 12, Ontario (Tel: 416-789-1239).

FANTASTIC—1969 New England ARRL Convention, May 24 & 25, Swampscott, Massachusetts. Save money! Early bird registration $10.50 including Saturday dinner, dance and night club entertainment. Be a winner! Every major manufacturer will exhibit, plus top speakers from science & industry. Tickets: W1KCO, John McCormick, Berkeley Street, Taunton, Massachusetts.

WELCOME To Maritime Mobile service net. 14313 Khz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

AUCTIONFEST: Broward ARC, March 1. Turn your used equipment into cash. Bargains unlimited. Location: Chaminade High School, 500 North 51 Ave., Hollywood, Florida. Doors open at 8:00 A.M. Auction begins 9:00 A.M. R. W. McCarty, W4RM, Sec'y.

SELL: New Yaesu FT-DX-400 Transceiver. W8AO, 2912 Riverview Blvd., Silver Lake, Ohio 44224.

OFFER $10 for May 1913 Elec. Experimenter, $3, Oct. 1914: $2 May 1919; $5 1919 issues Radio Amtr. News: $10 any 1908 Modern Electrics; $10 gov't. amtr. Callbooks, 1922-26. Less for later dates, or poor condition. For historical library, none sold, Wayne Nelson, W4AA. Concord, North Carolina 28025.

PROP Pitch rotor, WW2, small, excellent, $45.00. Link, 1081 Aron St., Cocoa, Fla. 32922.

NORTHERN California hams: best deals, new and reconditioned equipment. Write, call or stop for free estimate. The Wireless Shop, 1305 Tennessee, Vallejo, Calif. 94590. Tel: 707-643-2797.

SELL: Microwave test set "X" band frequency meter, Signal Generator, power meter, TS-147A with manual, $85.00. RTTY page-printer paper, 3 ply, $7.50/case. WB2PLY, Box 207, Princeton Jct., N.J. 08550. Tel: (609)- 452-9038.

HAM Transformers rewound, Jess, W4CIJ, 411 Gunby Ave., Orlando, Florida. 32801.

ATTENTION Southwestern Hams! Congratulations! You now have your own volume discount hamstore! Never before heard-of cash savings on new Drake, Swan, Hallicrafters, Galaxy, National and BTI equipment. Also save on Tri-Ex, Mosley, Hy-Gain. Get our quote before you buy. Write or phone today. Valley Discount Ham Shack, 4109 N. 39th Street, Phoenix, Arizona, 85018. Tel: (602)-955-4850.

SELL swap and buy ancient radio set and parts magazines. Laverty. 118 N. Wycomb, Landsdowne, Penna.

DUMMY Loads, 1 KW, all-band, $7.95: wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

WANTED: 2 to 12 304TL tubes. Callanan. W9AU. 625 West Jackson Blvd. Chicago, Ill. 60606.

MANUALS for surplus electronics. List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Editions 11, 12. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

TOROIDS, 88 mh uncased. 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

1916 OSTS needed for personal collection. Price secondary. Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred, 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

WE buy all types of tubes for cash, especially Eimac, sublect to our test. Maritime International Co., Box 516, Hempstead, N.Y. 11551.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) 925-7000.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. R388, R390. GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

RTTY gear for sale. List issued monthly, 88 or 44 Mhy toroids, five for $2.00 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

WANTED: Model #28 Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

1000 PIV @ 115 amp. epoxy diodes includes disc bypass, caps and bridging resistors, 10 for $3.75. Postpaid USA. With diode purchase. 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA, no limit. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.

BRAND New factory-sealed cartons. Hallicrafters SR-160, $250.00; P-150-DC, $90.00; MR-160 Mobile Mount for SR-160S, $12.50. All above F.o.b., H D H Sales Co., 170 Lockwood Avenue, Stamford, Conn. 06902.

WE'RE Trying to complete our collection for Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

SELL, trade, or buy Call Books, handbooks, magazines, and old radio sets and parts. Erv Rasmussen, 164 Lowell, Redwood City, California 94062.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts, 617-598-2530 for the gear u want at the prices u want to pay.

ESTATE Liquidation. SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

3000 V @ 3mf brand new GE Pyrano oil capacitors, $3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 113849.

TELETYPE Gears, shifts, keytops, typebars, motors, forks, typeboxes, typewheels, punchlocks, nonoverliners, CR-LFs TRs, TDs, RSRs, ASRs, FSCs, toroids, fresh paper, testsets, SRT subchasses. Buy, too! Typetronics, Box 8873, Ft. Lauderdale, Fla. 33312.

WANTED: An opportunity to quote your ham needs. 30 years a ham gear dealer. Collins, Drake, Swan and all others. Also $20.000.00 inventory used gear! Chuck, W8UCG-Electronic Distributors, 1960 Peck, Muskegon, Mich. 49441.

TEST Equipment wanted: Any equipment made by Hewlett-Packard, Tektronix, General Radio, Stoddart, Measurements, Boonton. Also Military types with URM-( ), USM-( ), TS-( ), SG-( ) and similar nomenclatures. Waveguide and coaxial components also needed. Please send accurate description to Tucker Electronics Company, Box 1050, Garland, Texas. 75040.

SELL-URR389, 390, 390A, 51J4, 75A4, 7583A, NC101X (a classic), HRO-7, HRO-50T1, others, and other gear. List for SASE: W2ADD, 129 Midland Ave., Glen Ridge, New Jersey 07028.

WANTED: Early wireless receivers and transmitters prior to 1926 ofr private collection. Jack Swanson, W5PM, RFD 1, Box 399, Covington, Louisiana 70433.

WANTED: Instruction manuals for Morrow MBR-6 receiver, and MB-560A transmitter. R. O. Cobb, K5CGI; USCG Lorsta, NPO 557; Patrick AFB, Fla. 32925.

SELL: Borg-Warner 8-track portable crt. player, 2 weeks old, inc. 2 cartridges, (trade?) $32.00; Lafayette HA150, 1 watt, 2 channel, portable c.b. xcvr, perfect condx. inc. leather carrying case, $35.00. Johnson KW Matchbox 250-30-3 with meter, directional coupler, manual; excint condx. $100 or swap. Want: HT32, HT32A, 2B-2BQ. Must be reasonable. Joe Rotunno, WA2CKM, 1816 Park View Ave., Bronx, N.Y. 104461.

SELL/Trade: Amplifiers, xmtrs, power supplies, antennas, transmatch, etc. Free list. Need scope. HW-16x Novice and test gear. W3POK, 615 Market St., South Williamsport, Pa. 17707.

IMMEDIATE Sale: Complete station, ready for air! Swan 500 Transceiver, P/S VOX, D-104 make: 1 year old, perfect condition. Cost $675. Asking $500. WA-4EPH, 314 Jamestown, Williamsburg, Virginia 23185. Tel: (229-3561).

SB-200 Linear, perfect condx, $200. Terry R. Appleton, W4-GSM, P.O. Box 1383, Newport News, Va. 23601.

COLLINS KWM-2 with Collins AC supply; RME VHF 126 Converter 55 MC to 240 MC; TS-175/u frequency Meter 85 MC to 100 MC; Gonset GSB 101 Linear Amplifier. All fine condition. Make offer. W5OSG 914 W. Mistleetoe Ave., San Antonio, Texas 78201.

SELL Fast: Lafayette HE-45 (a) 6-meter transceiver and good condx, $50.00. Same day answer on all inquiries. Write R. Alan Hill, 129 No. Arlington Ave., East Orange, New Jersey. 07017.

SB-34 Transceiver with microphone, SWR Bridge, and Mobile mount. Mint condition. $225 or best offer. No shipments. Cash only. W6DTF. 327-3626 Palo Alto, Calif. 94303.

WRL's used gear has trial-guarantee-terms! Gonset G28—$99.95; Heath SB300—$229.95; HW22—$89.95; HW10—$129.95; Hallicrafters SR34AC—$149.95; SX146—$18.95; Globe VHF62—$79.95; Swan 400/420—$299.95; 400/406—$239.95; Galaxy 300—$139.95; V-$299.95; Vmk2—$279.95; Hundreds more—Free "blue book" list. WRL, Box 919, Council Bluffs, Iowa 51501.

HAM, over 18, to instruct at a children's camp in the Pocono Mountains in Penna. Own equipment required. Please explain type equipment and further qualifications to Pocono Highland Camps, 6528 Castor Avenue, Philadelphia, Penna. 19149.

COLLINS 75A-3, CW & SSB filters, $195. Johnson Valiant Factory wired, $100. B&W T-R switch, Knight SWR Bridge, direct-read 24 hour clock, Globe pi-net coupler, $15 each. B&W Coax switches, linear in-out and SP6T, 17 each. M. Montgomery, 2717 Clifton Avenue, Cincinnati, Ohio 45220.

LINEAR amplifier components all new, 4-250A 2 4-400A $12.00 ea 30A Filament choke, 15A Filament choke, Filament transformer, each $5.00. BC 342 Receiver, built in supply, perfect $45.00 W1ICJ, 24 Flower Hill Rd., New Milford, Conn. 06776 (203) 354-2169 evenings.

VALIANT $140.00 mint. BC-312 $50.00. WA8UNP, 1204 Village Dr., South Charleston, WV 25309.

GALAXY V MK3: A/C supply; matching speaker/cabinet; Remove VFO. Package Deal $535.00. KZ5NW, Norman Walker, Box 5061, Cristobal, Canal Zone.

1969 National Zip Code Directory $2. (postpaid USA) (Does not contain large cities complete lists, nor street indexing). Zip Sales, Box 8151, Rochester, New York 14617.

SLIGHTLY Damaged Yaesu FTDX-100, $85.00 takes. WA3-IOJ/6 777 Walnut Ave., Long Beach, Calif. 90813.

CASH paid for direct QRA-QTHs of active "rare DX" SWLs. No bureaus pse. Send cards or list. All postage reimbursed. Joe P. Morris, WPE8AA, P. O. Box 616, Lakewood, Ohio 44107.

MANUFACTURER of custom made parts and equipment. Panels, chassis, antennas, and wiring to your specifications. Braun Engineering Corporation, 66 Dyke Lane, Stamford, Conn. 06902 (203) 348-5117.

SALE: Good, reliable equipment. Hallicrafters SX-96 receiver, $99.00. Johnson Viking II F.W., $82.00. Heath transceiver HW-32, $85.00. B&W-51SB sideband adapter—$95.00. All with manuals. F.O.B. Carlisle, Pa. Hoke Franciscus, W3ELV, c/o Kronenbergs, Carlisle, Pa. 17013.

WANTED: UV-199 tube sockets—state price. Joe Horvath, 522 Third St., San Rafael, Cal. 94901.

NEW Swan 260—We have it! Trade? Sure! We have supplies for the builder, too! Electronics, Inc., Salina, Kansas 67401.

COLLINS 75S-3 and 32S-3 with A.C. supply. Bill, WA4JAY: 6251 S.W. 44th St., Miami, Florida 33155.

SELL: Swan 240 late model. Excellent condition—manual. $160.00. Monitoradio MCA 100H $35.00. K9PYY, 5271 N. Shoreland Ave., Milwaukee, Wis. 53217.

SELL: All excellent Yaesu-Musen FL2000DX Linear Four Spare Finals $190. Drake T4X $300. R4A $300. AC-3 $70. MN-4 $65. Johnson KW Matchbox with SWR $115. Want late KWM2A with DC and AC supply. Swan 500C Drake TR. WB6RQK, Box 433, Sausalito, California 94965.

SWAN 350, with AC and 14X DC power supplies, Selectable sidebands. Mint, late model. $365 no haggling. 1/lt John Sielke, 310 South MacArthur, Panama City, Fla. 32401. Phone 785-5119.

FOR Sale: Nearly complete set QSTs, 1940 through 1965. Fair condition. No reasonable offer refused. You pay shipping. Wanted: Used Gonset GSB-201 linear. Lyman H. Howe, W2TJH, R.D. #1, Big Flats, N.Y. 14814.

SWAN Mk I 2000PEP Linear. Excellent condition. (Less than 50 Hours) $350. Will ship REA Collect. W1KDD, 272 Edgewood Dr., Torrington, Conn. 06790.

QST's: 700 issues 40 full years 1930-1960. 40¢ ea. ppd USA. First come, first served. Inquiries S.A.S.E. Providence Radio Association, Box 2903, Providence, R.I. 02908.

WANTED: SSB Transceiver, AC or DC supply, mobile antenna. Cash deal. State condition and price. All offers answered. Robt. Burns, 128 S. Lincoln Ave., Mundelein, Ill. 60060.

SELL: Homebrew linear (pair 4X250B's) with power supply, also spare 5X150's—$95.00. Paul Bowman, WA4QBM, 210 B Dehart St., Blacksburg, Va. 24060.

WANTED: National AGS receiver. Need not be working. Price, secondary. Philip McCoy, W3SAK, 4212 Franklin Street, Kensington, Md. 20795.

FELLOW Galaxy Owners—Easily modify your III, V, or Mark II to higher power of the New Mk. III. Update your equipment. SASE for details. KP6AQ/W5, 4305 Windsor, Garland, Texas 75040.

NOVICE: DX100 for HW-16, mint. FOB, Write Bob, WB4-BYJ, 310 Noel Rd., Orange Pk, Fla. 32073.

BECKMAN Electronic frequency counters. 6023: transistorized, operated to 2 MHZ $195. Higher frequency units available. Parts. Sundtek, 131 Allen Ave., Springfield, Ore. 97477.

FOR Sale: Collins KWS-1. Serial 1144. Excellent condition. Solid State power supplys. Spinner knob. Relay. FOB first certified check $425.00. E. L. Brady, W4RPC, 6415 Friendly Road, Greensboro, N.C. 27410.

SALE or Trade: RCA TM21 color monitor. 2 RCA TK 10 cameras, video DA's, Etc. Want Arzax or AR3A speakers, tape deck, Lafayette HB 625 Transciever, Etc. Harold Harrington, 908 W. Beaver Ave., State College, Pa. 16801.

COLLEGE: Must sell: EV-600E mobile microphone, $15.00; Vibroplex "Champion" Bug $12.50; Lafayette Model HE-30 rcvr, $25.00; Waters auto-match mobile antenna w/80 and 20 M. coils, plus body-mount, $37.50. You pay postage. WB2-NZA, Herbert Novitsky, 41 Grant Ave., Glens Falls, N.Y. 12801.

QSTS 1964, 1965, 1966, 1967, plus January and February 1968: $20 or $5.00 per year. Knight T-150A, $50.00. WA3-BGC, 247 Coldbrook Rd., Timonium, Maryland 21093.

SELL 75A4, 3.1, 1.5 Kc filters, $395; HT-44 and a.c. supply: $225.00. Both are in mint condx. H. Taubin, W2GCW, 192-15A 69th Ave., Flushing, L.I., New York 11365.

FOR Sale: Marauder HX-10, made by Heath employee (perfect craftsmanship) $225.00. Sixer HW-29A plus two crystals, $35.00. WA9ONZ, Larry Dunville, 18205 Denslow, South Bend, Indiana 46614.

NOVICES! Heath DX-60A xmtr and HG-10 VFO. Used only one year. Gud condx. Manuals. Was $115.00 unassembled. Best offer over $90 takes them both! WB2UQP, 903A Carman, Columbia University, New York 10027.

FOR Sale: Clegg Thor-6, 6-meter transceiver, in excint condx, with Waters low pass filter, $135.00. Sidney Purvis, 1934 Roxie Ave., Fayetteville, N.C. 29304.

FOR Sale: 75A4, modified, excint condx, 3 filters, speaker: $400.00. Walter Reynolds, W1AJG, 40 Fern Avenue, Box 443, Buzzards Bay, Mass. 02532.

SELL Or swap QST in binders, 1932 thru 1952 complete. Dick Shreve, RD 2, Waterford, Penna. 16441.

FOR Sale: Cash and carry! NC-303, in xcint condx: $165.00; SBE-33 and SB2DCP power inverter, $175.00. Gary Schmidt, WA2AVY, 238 East 58th St., New York, N.Y. 10022. Plaza 9-3591.

SALE: SR-150, AC/DC supplies, mobile bracket, 15-meter Hustler, $420; Hy-Gain 6-meter beam, $25.00; Heath signal generator, $8.00, others. SASE for list. Tim Siler, WB4EMF, 754 Pasley Ave., Atlanta, Ga. 30316.

SELL: Drake 2-B with 2AC, $190.00; Ranger II, $145.00. William Adkins, 719 27th St., N.W., Rochester, Minnesota 55901.

FOR Sale: KWM-2, Waters rejection tuning, 516F-2, $750; 312 B-5, cables, $275; 2K-3, spare 3-500-Z, 1600, SW-500-C, VOX, $390; Ranger I, LPF, $75, 75A-4, #3126, 2.1 kcs, 7360/6U8A mixers, #350. Jim Craig, Jr, 29 Sherburne Ave., Portsmouth, N.H. 03801. Tel: 603-436-9062.

FOR Sale: HT44 and SX-117, both 450 dollars. Will separate. DX-60, 50 dollars, TR-3 output tubes B. New. Best offer. M. Theodorou, 16 Fane Ct., Brooklyn, N.Y. 11229. Tel: 212-TW1-3714.

FOR Sale: Heath Apache transmitter and SB-10 SSB adaptor, like new condx: $175.00. Peter Donneau, W1YIX, 11 Blanche Ave., Cumberland, R.I. 02864.

HOUSECLEANING! LHE RF gen., $125.00; 6-mtr. HE-35 xcvr w/mike and xtal, $35.00; S-38 rcvr, $20.00; Precise VTVM, $15.00; Heath sig. gen., $12.50; HB 7 w. 6-mtr rig w/pwr, mike and xtal, $15.00; Dumont 3" 'scope, $20.00; regulated metered pwr supply, 1-15 v., 0-250 ma., $12.00; 6-mtr 2 w. portable 5" x. 7" x 2", with mike and xtal and Superhet rec. $25.00; 10-mtr. xmtr, $20.00. Pix SASE. Want metal lathe, mill, drill-press, etc. for home use. WB2ZAR, H. Denney, 9-15 127th St., College Point, N.Y. 11356.

SELL: HT-37 Hallicrafters in excint condx: $200. Ferd Thiede, W2EC, 8 Nathan Hale Drive, Setauket, L.I., N.Y.

WANTED: 75A-4 with 0.5 or 0.8 or 1.5 KHz plus 2.1 Khz filters. Ser. No. above 4000. Vernier knob, mint condx. State best price. WA2FNY, tel: (516 a.c.)-938-7096.

SELL: Hallicrafters 2000 PEP HT-33A linear, modified per factory specs, to HT-33B, in excellent operating condx $250.00. G. S. Bean, W8KBJ, 613 Asbury Road, Cincinnati Ohio 45230.

SELL: Drake 2-B, 2-BQ, 2-AC, manual; excellent, $220.00. Central 20-A, BC-458 VFO, manual, $100; DX-60, Johnson VFO, coax relay, manual, $85.00. I pay shipping to 48 states. No c.o.d. WA5FTP, manual, $85.00. No c.o.d.! WA5FTP, T. L. Bratton, 2521 Southgate, Houston, Texas 77025.

VHF—Johnson 6N2, factory wired, in mint condx, $80; Aerotron FM xmtr/rcvr, 6/12-115 volt transistor supply, converted to 146.94 Mhz. with crystals and oven, $85.00. Will ship postpaid on receipt of your money-order. W5QMU, 2522 Old Hickory Trail, San Antonio, Texas 78230.

FOR Sale: T-150 $85.00. Superpro commercial version. $60. antique Bretting 1, $70; antique jewel meters, $10 each 4-250, $20. QSTs 25¢ each. Estate W7DDE, Union, Washington. K. Olson, Star Rte 1, Box 398, Belfair, Washington 98528.

WANTED: Power supply for ART-13 transmitter. Must have information for conversion. Robert Kennedy, K9DXB, RR #1, Merom, Indiana 47861.

NCX-3, NCX-A, extras, $200; Hy-Gain 203BA, 20 mtr beam in factory sealed box, $35.00; Ham-M $50.00; 51 ft. crank-up tower RBS-50 vital accessories, $170.00. WA2VLF/2, Dave 86 Glenwood Ave., Staten Island, N.Y. 10301.

INTERCEPTOR "B" with all-band converter, perfect, $325.00. On air. Will deliver NYC-NJ area. Want HT-32B, mint WB2TUG, Box 3, Allamuchy, New Jersey 08720.

ONLY $20 to wire SB-200 1200 w. linear. Postpaid for $240.00 cash. No trades! Harold Greene, W1KO, 377 Oldham, Pembroke, Mass. 02359.

SWAP Homebrew 20-watt xmtr for SWR meter and, or Q multiplier. WN7KTD, 1916 No. Hudson, Tacoma, Washington 98406.

AN/SRR-13A Navy 2-32Mc rcvr. All plug-in module construction, output for 'scope monitor, built-in 200 Kc cal., 3(tubes, complete tech. manual. Working FB as in vy good shape, $300.00. 1 Kw linear, HB-4 811A's, G.G. rack-mounting. Very neat. Has all p.s. except xfrmr. $60.00 or will swap for 6 Mtr. amp. Gary Confrey, Rt. 80, Killingworth Conn. 06417. Tel: 669-8744.

SELL: Ameco TX-62 new spare final, $100.00; Gonset VFO for 6-2 1¼ meters, $50.00; HQ-110C, $100.00. All with manuals. Mechanically and electrically perfect. WB2FGR 516-223-0101, 786 Grand Terrace Ave., Baldwin, L.I., N.Y. 11510.

SELL: Complete station. Galaxy V and all station accessories Plus Mosley MP-33 with AR-22R and SB-200. In fine condx Sell all or separately. Steve Young, 11 Scott Terrace, Kirksville, Missouri 63501.

DRAKE T4X transmitter, R4A receiver, MS4 speaker and power supply, D-104 mike, 20 meter cubical quad antenna All with manuals and instructions. Complete station in perfec condition: $595.00. Bob Morris, WB2PXT, 700 Heritage Road Riverton, New Jersey 08077. Phone: 609-829-0279.

WANTED: AN/URM-25F signal generator. Must be complete, with cables, dummy load, diode loads, manual, etc No junk! WAØIVN, Dr. N. C. Brust, 3875 Newland St, Wheatridge, Colorado 80033.

FOR Sale: Galaxy V, a.c. power supply, speaker. Just back from factory reconditioning work. $240.00. Firm! Gre Wilson, S.P.O. Box 815, Sewanee, Tenn. 37375.

DRAKE R4A w/MS-4, $325; T4X w/AC-3 $375; Swan MK1 $375; All in brand new condition. Also EV 6646G w/stand $40; Astatic 10D w/G-Stand $25. K2MRB, 491 Mayhew Ct So. Orange, N.J. 07079.

HALLICRAFTERS SX-140K, 75 thru 6 meters, in exclnt condx, with manual: $65.00, f.o.b. WA8QEY, Joe Meixner, 2401 Morning Star Ct., Kettering, Ohio 45420.

NCX-3, $159.00; Topaz 300XL, $19.00; Shure 440 SL mic $9.00; transmission tunnel portable mount, $5.00. R. G. Paige, 3235 Dogwood Drive, Salem, Oregon 97302.

HEATH Apache and SB-10, $100; Heath Mohawk receiver, $100. Manuals, exclnt condx. Gaudet, K2ZKU, 161 Evans St., New Hyde Park, N.Y. 11040. Tel: (516)-FL4-3122.

SALESMEN's Samples, perfect: MCX5 MK II w/a.c. power and spkr, $425.00; Galaxy V MK II w/VOX and cal., $350.00; Deluxe console, clock, SWR meter, spkr, $70.00; 2000 linear w/power supply, $360.00; AC-400 power supply, $55.00; d.c. power supply, $70.00. All inquiries answered and terms arranged f.o.b. Gwynn, Va. 23066. K4AET.

HW-22A, xtal calibrator, mike, mobile speaker, built by commercial tone op, $100; National NCX-3 d.c. power supply, $50.00; new 813, $10.00; 4-125, $3.00; 836 and socket, $2 $50.00; new 813, $10.00; 4-125, $3.00; 836 and socket, $2@ plus lots of metal, loctal tubes and many parts. SASE for list. 40M Hustler K.W. mibile ant. and bumper mount, $25.00. Bob Brehm, WB6QFA, 2340 Piedmont, Berkeley, Calif. 94720.

TH3JR Triband beam with balun, excellent condition, $30.00. Can not ship, sry. C. V. Kimball, WA8UNS, 810 W. Jefferson, Ann Arbor, Michigan 48103.

POLICE-Fire radio dispatcher directories! Exclusive official directories: callsigns, frequencies of local, county, state agencies. National. For all VHF fans, CD, AREC, RACES, MARS, VFD's. Catalog for stamp. Communications, Box 56-T, Commack, N.Y. 11725.

VIKING Valiant and NC-125 receiver, in exclnt condx, $225.00 for both. Warner Hinze, KIBHB, 54 West Main, New Britain, Conn. 06051. Tel: (203)-223-3022. Pick-up deal only!

COLLEGE Forces sale: Valiant II, $175.00; NC-190 with installed Johnson crystal calibrator, $135.00; matching speaker, $10.00; Johnson T-R switch, $15.00; all in exclnt condx. Sam Brown, WA4IUM, 2156 Allendale Drive, Clarksville, Tenn. 37040.

HAMMARLUND HQ-180 with matching speaker. Immaculate inside and outside. Will ship. Make an offer. G. Hedworth, WAØGYX, 4114 NE 4. Terr., Kansas City, Missouri 64117.

SWAN 240 Triband transceiver with speaker/a.c. supply. In exclnt condx and appearance and performance: $210.00. Postpaid continental USA. Certified check or money-order only, please. John Belvel, WB6MNS, 440 N. Mentor (#11), Pasadena, Calif. 91106.

SWAN 350 with 117XC supply, VOX, calibrator and spare finals, $350.00; Heath capacitor tester, $10.00; 1-222-A signal generator/frequency meter, $45.00; 8 to 15 Mc, 135 to 230 Mc. Shure 578S dynamic mike, $25.00. Heath XC2 and XC6 h.f. converters, $15.00 for the pair. WA2LIM, tel: 212-428-6133.

80-10 Novice receiver, $75.00; 25 watt transmitter, $25.00. Both in gud condx. After 5 PM: Tel: 516-HU8-2649. Jay Friedman, WA2EXE, 484 First St., Elmont, N.Y. 11003.

WRITE, Phone or visit us for the best deal on new or reconditioned Collins, Drake, Swan, Galaxy, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry Linear, BTI Linear, towers, rotators, other equipment. We meet any advertised cash price on most equipment. We try to give you the best service, best price, best terms, best trade-in. Write for price-lists. Your inquiries invited. Henry Radio, Butler, Missouri 64730.

MINT Clegy Zeus and Interceptor, recently factory-aligned, spare final, $550. Firm. KIYYC, Tonetta Circle, Norwalk, Conn. 06854.

LONG Run of QSTs: 1919-1965 for sale. Excellent history of electronics and ham radio. A few missing issues. Send for list. Best offer over $150 takes. F.o.b. W1PNH, Lord, 5 Chicatabut Drive, Walpole, Mass. 02081.

SELL: Wescom noise-blanker, 28 MHz, i.f., brand new, $25.00; Parks 50-1 six meter converter, 28 MHz, i.f. excellent, $25.00. J-Beam 432 MHz. collinears, brand new with matching harness, $30 for the pair: 32 elements. WB4HIP, 850 N.E. 141 St., N. Miami, Fla. 33161.

FREQUENCY Meter, Dumont Fairco Mark III, field accuracy of .0002%, 5-500 MHz, $195.00. K. Birman, P.O. Box 68, Bedford, Mich. 49020. Tel: (616)-721-3155.

WANTED: Manual for Heathkit Apache Model TX-1. Will pay $4.00. Desperate! Bob Caldwell, 2925 Marquette St., San Diego, California 92106.

NCX-3 Mark II. NCX-AC supply, truly mint condx, no modifications! Original cartons, $185 plus shipping cost. WB6KFI, 30646 Rigger Road, Agoura, Calif. 91301.

COMPACT Ameco TX-86 transmitter with mobile and fixed station power supplies. Very, very little use, appears brand new. $145.00 complete. Jay Leibach, c/o Radio Station WLEC, 3917 Galloway Road, Sandusky, Ohio 44870.

MUST Sell: college expenses! Webcor tape recorder, $60.00; Utica 6M xmt/rcv w/VFO, $130.00; DeVry O'scope $20.00. Hallicrafters SX-99 rec., $60.00. WA8WHG/Ø, 602 L Univ. Village, Columbia, Missouri 65201.

FOR Sale: HW-12A, 75 mtr SSB transceiver, in exclnt condx: $95.00; Lafayette HA-460, six meter transceiver, gud condx, $75.00. WA8IGQ, 1-(616 a.c.)-781-2715. R #4, Marshall, Michigan 49068.

VIKING 1 w/829B final, in A-1 condx, w/VFO R45-ARR7 aircraft rcvr, 550 kc., 43 Mc exclnt condx. $150.00. Bob DeMiranda, 10214 Orange Grove, Whittier, Calif. 90601. Tel: 699-2869.

SWAN 240, $175.00; Hy-Gain, used 203BA, $35.00. BC-640-A 6 meter trade. K6AWO, Tel: 213-675-8608. Dews, 5024 West 130th, Hawthorne, Calif. 90250.

HALLICRAFTERS HA-1 to keyer, Vibroplex chrome, Vibro-Keyer, in exclnt condx: $55.00. Robert Nelson, 110 Morning Valley, San Antonio, Texas 78227.

PAIR BC-1335 transceivers (Dec. '57 CQ). Sell or trade. W8MDN, 814 Oberlin Dr., Heath, Ohio 43055.

HEALTH reasons: Must sell Florida home built by me with hamshack in mind. Three bedrooms central heat and air-conditioning, including basement playroom, hamshack with workshop overlooking lovely lake; hardwood floors, three baths. Hamshack can be used as extra bedroom. Prefer to sell to retiring ham. Fifteen miles gulf thirty miles Silver Springs. Bargain! A. T. Tidwell, W4ASM (the original!) Route A-2, Box 165, Dunnellon, Florida 32630.

COLLINS DX-60 and HG-10-VFO $75.00. WØRTK, Belfield, North Dakota 58622. Tel: 575-4404.

SELL: HW-12, homebrew a.c. power supply and G-76 d.c. power supply, Hustler antenna; Universal bumper mount, microphone, mobile underdash mount, crystal for upper sideband. Power cables included. Surplus speaker, manual. Will sked. $200. W4GKO, 1508 26th St., Haleyville, Alabama 35565.

SELL: DX-100, $50.00; Seneca, $150; AF68A, $80; PMR8, $80; M1070, $20; all these with cables and instruction books f.o.b. Lexington, Mass. Dan MacDonald, W1PEX, 5 Fairland St., Lexington, Mass. 02173.

SELL: General Electric 6-meter FM mobile gear, freq. 52.525 Mc. recvr Model 4ER6A9, Transmitter Model ET5A3, includes control unit, handset, cables and speaker. $125.00. Harris Zuelke, WA9KEJ, 120 Blecke Ave., Apt. 5, Addison, Illinois 60101.

NEW HRO-500 including matching speaker, used only one hour; list price $1725. Sacrifice $1300. 75A4 with three filters good condition, $395. HQ-100A with clock, general coverage receiver, slightly used, $100. W2ADB, 27 Grayson Place, Teaneck, N.J. 07666. Tel: (201)-837-2004.

SWAN 140 and Hallicrafters PS-150 d.c. supply. Will include mount and mast with package deal. Perfect condx. Make offer. WA9WCP, 1525 W. 107th St., Chicago, Illinois 60643. Tel: (312)-239-4708.

SBE-34, $250.00. First check takes it! Will ship. John Mrozinski, WB2EXI, 155 Eckford St., Brooklyn, N.Y. 11222.

DRAKE 2-B, $125.00; Johnson Viking Valiant, $125.00. Both: $225.00; Knight T-60, Heath HG-10, both $45.00. Will deliver within 200 miles radius. K3SKV, 217 Somerset Ave., Cambridge, Md. 21613.

COLLINS KWS-1. Serial No. 742, also Collins 75A4A, Serial No. 3983, with .5—3.1, 6 kc. filters. Other extras! Equipment is modern and up-to-date, and immaculate. Today's greatest DX machine. Sorry, no original boxes. $950.00 for the lot. E. S. Grainter, W2NXZ, Box 186, Brightwaters, N.Y. 11718 or phone evenings: 516-665-4452.

ESTATE of W4MB, John Cain, Jr. Equipment listed below has less 20 hours operating time due to long illness and death of my father. All equipment new condition, purchased in summer of 1967. All equipment F.o.b. Nashville. Collins KWM-2, ser. #15710, $800: Collins 516F-2, power supply ser. #20551: $100.00: Collins 312B-5 control console, ser. #11560, $250; HRO-500 ser. #88-4328, $1,150: BTI LK-2000 and BTI DL-2000 linear amp., with dummy load, $550: Millen Transmatch 92200, $65; Comdel CSP11, $75.; Davco DR-30 rcvr and DR-30S p.s. $250; Intl. Xtal SBA-50 sideband mixer amplfr and SBX-9 Sideband 9Mc exctr, $175.; VHF converter E. T. Clegg Assoc., $50: Tri-Ex tower, mod. HZR-471, $1,750. John E. Cain III, 711 Stahlman Bldg., Nashville, Tenn. 37201. Tel (day) 615-255-0424: (night) 615-352-7805.

TRADE Ameco PT transcvr pre-amp for HW-30, or sell PT, $35.00. Will buy HW-30 for cash. Sell HX-10 Marauder, $125 or trade for HW-12 or HW-32 and p.s. or other small transcvr. William Hall, Widerner, Arkansas 72394.

MERCURY Relays for HA-1 type keyers, $5.00 pp. K3MNJ.

FOR Sale: Heath Electronic Keyer HD-10, new, $35.00; Marc Tartell, WN2GFD, 690 Hawthorne St., W. Hempstead, L.I., N.Y. 11552.

MISCELLANEOUS ham gear and components and photo equipment. Send SASE for list. R. L. Baldwin, 26 Ridge Road, Simsbury, Conn. 06070.

SELL: Collins station: 75S3B-32S3-516F2-312B4-30S1-TA36-Ham-M, 2 spare 4CX1000A-664EV, RME DB23 and P&Hdl-1 'scope. Manuals, foam coax, rotor cable, $2300. W4SEY, C.H. Buchan, 16 Elizabeth Ave., RR #5, Box 259C, Jonesboro, Tennessee 37659. Tel: 615-477-7189.

W8DE W8DE W8DE W8DE W8DE W8DE W8DE wanted: any information on previous holder, pictures, QSL cards, etc. W8DE ex/W8BQH.

WANT to buy unmodified, original HRO-5TA-1 with original bandspread coil set. North Texas area preferred because would like to see before purchase. W5BLU, 1721 N. Tierney Rd., Fort Worth, Texas 76112.

HQ-110, double conversion ham-band receiver, with manual: $99.00. Richard Metz, 7800 Pine Ridge Road, Louisville, Kentucky 40222.

MOVING Sale! Collins 30L-1, $350: Drake R4B, $330: Drake MS4 spkr, $12; ten Drake gen. coverage xtals for R4B rcvr from 160 meters to citizen band, $20; for lot. communicator IV-2 meters, $175.00: Communicator IV-6 meters, $155; Communicator IV-VFO, $55.00; Garrard latest auto record changer, SL-95 with stanton 500 stereo cartridge, $75; Heath deluxe VTVM, IMW13 with 336 w/high voltage probe, $30; Bolex 8 M movie projector with color film and radiant screen (trade?), value $55. Ed O'Brien, W2IW, 86-10 34 Ave., Jackson Heights, L.I., N.Y. 11372.

DRAKE AC-4 power supply in factory carton, unopened: $80, postpaid. W4TKX, 2806 W. Cornwallis Dr., Greensboro, N.C. 27408. Tel: 292-1350.

TRADE For ham gear or good tape recorder: 150 new TV/Radio tubes. Will list. W2WLJ, 17 Coleman, Berlin, N.J. 08009.

FOR Sale: 75A4, Ser #2748, three filters, .8-31-6 kc. Vy vy mint! First $360 takes. No trades! F.o.b. Tuscola, Ill. Ted Anderson, W9UHD, c/o Anderson's Department Store, 101 E. Sale, Tuscola, Ill. 61953.

WANTED: 2 traps for driven elements of Hornet TB500. Sell B&W linear L1000-A with spare tubes 813s and 816s, $200; Globe King 400 with Heath VF-1, coils and links for all bands, $100; Collins 75A4 with two filters, $350; B&W and Johnson TVI filters, $8 each. All are in excint condx. Price, less packing and shipping. Paul Renwick, 325 Ottawa Dr., Oscoda, Michigan 48750.

GONSET Communicator III 2-mtr. transceiver and AR-22 rotator, with cable. Both in gud condx. Sell together or separately. Ray Nahl, WA2ZPD, 90 Bryant Ave., White Plains, N.Y. 10605. Tel: 914-948-5355.

RARE QST for sale! September 1917. Fair condition. Make offer. L. Hardy, Shirley Ave., Franklin Lakes, N.J. 07417.

EICO 753K solid-state VFO 751 p/s, recent factory overhaul; works gud! $160.00. I need c.w. break-in. William Shaw, 508 Alexander Ave., Cape May Point, New Jersey 08212. Tel: (609)-884-7187.

VALIANT. Relay: $130.00. NC-303, calibrator, $185.00, or make offer. John, WA2GMP, 1212 91 St., North Bergen, N.J. 07047. Tel: (201)-869-0517.

SWAN 250, 117XC, power supply, mint condx. Used little, $290.00. Jay Wilson, 1733 Foster Road, Las Cruces, New Mexico 88001.

FINE Stainless, Brass, threaded, washer Hardware. Antenna accessories. Fine highly corrosion resistant stainless steel, brass, bronze monel and some nylon threaded and washer hardware fasteners. Fine antenna accessories, too, including 2" O.D. Many different ceramic insulators, some outer to inner telescoped element stainless round clamps, guy cable clamps and thimbles, guy tension adjusters, etc. List for stamp. Ham Hardware Headquarters, "Walt" Straesser, W8-BLR, 29716 Briarbank, Southfield, Mich. 48075.

SELLING 75A4 Serial #4310; HT32A mike, SWR bridge; T-R switch. All in excint condx. Cash $525. Firm! A. Manchee, Mantoloking, N.J. 08738. K2ALF.

CAMP Counselors: Boy's camp in the Berkshires, Massachusetts has openings for ham radio, electronics programs. Write Camp Mah-Kee-Nac, 137 Thacher Lane, South Orange, N.J. 07079.

SELL: FR-38D/U counter 10 CPS, to 100 MHz, $850; H-P Model 100D 100 KHz frequency standard $110.00. Robert Ireland, Pleasant Valley, N.Y. 12569.

SELL: OSTs July 1952 thru Dec. 1966 complete except Oct. 1959 and December 1961. Best offer. Tubes 807, 809, 812, 813, and 829. Send SASE for list. McHenry, W7PEP, 6225 N. 20th Lane, Phoenix, Ariz. 85015.

SELL: Drake TR-3, AC-3 supply and speaker, like new condx, $395.00. Fred Jackson, W4CEH, 1717 Meredith Lane, Belleair, Clearwater, Florida 33516.

SELL: 246 issues of OST: 1936-1963 run, and 1961 COs, 1948-1963. Best offer plus shipping. SASE For list. Henry Taylor, Star Route, Olga, Washington 98279.

SELL: Utica 650 6 meters, w/VFO, mobile mic, whip antenna, $65.00. Fred Redburn, 1783 North 12th, Abilene, Texas 79603.

WANTED: Johnson Matchstick antenna tuning network and control box. Edward Ramos, W3HQH, 603 4th St., S.W., Washington, D.C. 20024.

KNIGHT Kit TR-108 2-meter transceiver with mobile mount and manuals. Factory aligned and checked. Will ship. Need cash. Roger Sprague, WB2ZLX, RD #1, Falconer, N.Y. 14733.

COLLINS 51S-1 all-band receiver s/n 331. New, $1828; will sell for $1250.00 cash. E. H. Marts, Jr., W3PDK, 729 Outer Dr., State College, Penna. 16801.

LATE Collins S/Line 32S3, 516F2, ac power, $600.00; 75S3B, 500 cyc. filter, speaker, $550.00; $1125 for this package. BTI Linear, $575; $1675 for all. No scratches, perfect, K8IKB, tel: 419-423-5890.

WANT Aeronca Chief or similar aircraft. Will trade or sell HQ-170C, Viking Valiant and CE-10B w/CE-458 VFO. Jack Ashley, K9KHZ, Tonica, Illinois.

HEATH SB-310 receiver, SB-600 speaker. Excelnt condx, well wired. Factory-checked, modified for 15 meters instead of CB. Deliver within 150 miles. $250. Ritter; 348 Broad, Mt. Holly, N.J. 08060. Tel: 609-267-6954.

NYC Area. Hallicrafters SX-71 double conversion receiver, bandspread, speaker. Johnson Challenger xmtr, 80-6 meters, 120W c.w., a.m. w/relay. Both $125.00. In excint condx. WA2GEW, tel: (212)-763-3537.

JOHNSON 6 & 2, Eico 730 Mod. HP-20; John 6 & 2 VFO, $150; Zeus and Interceptor-B, $700. William Gentes, WB2FVU, 9 Columbia Avenue, Atlantic Highlands, New Jersey 07716. Tel: (201)-291-2055.

HW-12A factory wired demo., mint condx, used under 20 hours, plus HP-23 a.c. supply, mike, speaker, $135.00. DX-60 in gud condx, $30.00. Transtenna T-R switch and preamp, $25.00. Jon McAdams, K3MAH, 333 Trimble Rd., Joppa, Md. 21085.

HQ-170AC, absolutely mint condx. HT-37, excint. 250-watt Matchbox, needs work. Over $100 worth accessories, completes station, $395.00 firm. No shipping, sry. Carl Stecker, 1531 Deer Path, Mountainside, New Jersey 07092. SASE, please! Tel: 201-233-6984. weeknites after 9:30.

HAM Radio Counselor, male, for co-ed camp in the Berkshires, Mass. Must be able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave., N.Y. N.Y. 10024.

DX AWARDS Log: This 150-page book just published giving number and type of contacts needed for over 100 major awards for hams and SWLs by clubs world-wide includes cost and how and where to apply. Individual logs provided for each award to keep complete record of contacts and confirmations. Required over two years to prepare. Most complete and up-to-date source of DX Awards available. $3.95 postage paid ($4.95 foreign). The McMahon Co., (W6IZE), 1055 So. Oak Knoll, Pasadena, Calif. 91106.

"Don and Bob" New item specials. Tri-Ex W-67 free-standing crankup. Freight paid. (Reg. 851.50) 725.00; Galaxy GT-500; Hammarlund HQ-215 475.00; Triex W-51 prepaid freight, TH6DXX, Ham-M 589.95; TH6DXX Beam (Reg. 165.00) 139.95; Midland 23-126 FS/SWR Meter 9.95; GE 811A 6.95; 3B28 3.95; Motorola HEPI70 2.5A, 1000PIV Diode 39 cents; RG-22B coax for Polygon Quad Kit 15 cents foot; Swan 260 Cygnet transceiver 359.00; New surplus, guaranteed 1000HZ Crystal HC6/U 3.95; Telex HMY2000 Stethoscope Headset 3.95. Used gear-KWM-2, AC supply 695.00 75S-3 375.00. Authorized Collins repair station. GECC Finance. Prices FOB Houston. Don, K5AAD; Bob, WA5UUK. Madison Electronics, 1508 McKinney, Houston Texas 77002. 713-CA4-2668.

WANTED: FBX National Receiver Coils AB40, FBAA, FBF, or any others. W2QJT, 630 Highland Road, Ithaca, New York 14850.

COLLINS 302C3 wattmeter $85.00. 302E1 wattmeter $45.00. Collins filter 455FA21 $20.00. 30L1 transformer (New) $25.00. 516F2 power supply $85.00. Lafayette HE50 converter $12.50. Criterion 155mc converter $40.00. Pawnee 2 meter transceiver, preamp $140.00. 3B28 tubes $1.00. Collins 51M6 VHF receiver $70.00. Matchbox 250-23 $40.00. Misc items S.A.S.E. Items F.O.B. KØARV, 2925 Wildwood Ct. N.E. Cedar Rapids, Iowa 52402.

CENTRAL 100V mint, orig crate, spare finals $350. RME-6900 w/6901 $150; G76 six band transceiver w/mobile supply $125; HE45B 6M w/mobile & home pwr, $50. Old Viboplex $7; NC100XA $45; Sterlings Radio Manual & Hennys Rdo Eng Hndbk both $4. Hammarlund Noise Immunizer new $22. FOB Art Fort, 6 Stoothoff Rd., East Northport, NY 11731. Tel: 516-FO8-6136.

NOVICES: Knight T-60 AM & CW xmitter; w-relay, filter, excellent condition on all bands, no scratches, $35. Crystals 80-10 meters, free list, postpaid first class! $125. Steve, WA2-FKE, 12 Sanderson, W. Caldwell, N.J. 07006.

SELL Station: AF-68 NC-125 w/speaker, Dow Coax relay; Heath twoer; Heath RF-1 Signal Generator; (2) 4-400's and 938 Bennett, Jackson, Miss. 49202.

SBE-33 Transceiver, late production, perfect condition. With 12 VDC supply, mount. $195. Frequency meter, TS-174 B/U 20-280 MHz. Good condition with internal A.C. supply. $75 K6POU, 2712 Kinney Dr., Walnut Creek, Calif. 94595.

FOR Sale: HRO-500 w/speaker, mint condition, best offer over $1000; Johnson Invader 2000 excellent condition & performance $550; SBE-34 with VOX and calibrator $275; Johnson TR switch $10; Model 28 Teletype $400 and Model 19 $120 both clean and good condition. Moving to new QTH. Tom Austin Jr., K4OTM/4, P.O. Box 2586, Mobile, Alabama 36601.

SPRING Bargains: 30L-1 $395.00; 75S3B-32S3-516F-2-30L-1 1968 Models $1,590.00; 2B $179.00; B&W LPA-1 w/LPS-1 $275.00; HT33A $275.00; HT32A $275.00; AF68 PMR M1070 Pwr $165.00; R-4 $275.00 Howard Radio, 4235 North 1st St., Abilene, Texas 79603. Tele. A/C915-677-1339.

PREPARE for FCC exams! You need Posi-Check, now with addenda to cover latest FCC questions. Multiple choice questions, diagrams, explained answers. IBM sheets for self testing. Same form as FCC exams. New price—General Class $3.50, Advanced Class $3.75, Extra Class, $4.00. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 32¢ per copy for first class mail, 64¢ for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322. Addenda available separately for each class to previous purchasers covering new questions. Send 50¢ per copy in coins or stamps to cover printing and postage.

DRAKE 2B, 2AQ, Mint condition! Set extra tubes, manuals $180, you pay shipping. WB6NUO, 12 Farm Road, San Rafael, Calif. 94903.

HAMMARLUND HQ-110-Excellent condition. $110.00 cash. WA1KKD, 144 Lindley Terrace, Williamstown, Mass. 01267

WANTED: E. F. Johnson SSB Adapter in good cond. Howard Nelson, 729 South Arlington Ave., Reno, Nevada 89502

FOR Sale: Johnson Invader 2000 $500 cash. No C.O.D. K4AUN, Lance H. Strickland, 4916 Bromley La., Richmond Va. 23226.

SELL: Full Rig NC-57, EICO 723, HA-90 vfo, 14AVQ, and Misc. $100 plus postage WB2WII, Snyder Hill Rd., Ithaca N.Y. 14850.

AVAILABLE Now: Mainline TT/L-2 FSK Demodulator with/without phase indicator filters 850 & 170 cycle shift included—ST-3 Solid State TU unit & other TU units—Filters—Accessories. J-J Electronics, Communications Specialist. Canterbury, Conn. 06331.

SELL: Clegg Venus 6 mtr transceiver and AC supply, mint condition $325. WA4VMQ, 614 S. Crescent Dr., Hollywood Fla.

SALE: 75S1, 32S1 & 516F2, $600.00. E. C. Henson, 212 Wolfridge Rd., Mobile, Ala. 36618.

HEATH SB-400. Excellent condition, $285.00, Ward Stephens, 169 Taos, Los Alamos, New Mexico, 87544. Tel 505-668-4180.

COLLINS: KWM-1 transceiver, A.C. power supply, mobile mount $300. 75S-1 receiver with Waters, 2.1 and .5 kc filters $280, without .5 kc filter $250. Gordon Kittel, 1 Jacqueline, Paoli, Penna. 19301.

HEATHKIT SB-300 with SSB, CW Crystals. Mint condition, $239. WB2EY, 2154 57 St., Brooklyn, N.Y. 11204.

SELL: Collins Novice Adapter 399 B-4 with crystals $39.00 Johnson Low Pass filter $7.00, Signal Sentry $8.00, Relay DK60-G2C $8.00. WN2DXY, Bennett, 23 Hampton Road Lynbrook, N.Y. 11563.

DRAKE 2B. Excellent, $170. W2BCG, 24 Pearwood Drive Huntington Station, N.Y. 11746. (516-271-1468.)

SELL: NC-300, Johnson Ranger, Astatic mike, D-104, low pass filter, SWR Bridge, bug. First offer over $200 takes K6SUQ, 5 Rydal Court, Orinda, Calif. 94563.

WRL Duo-bander and mobile supply $150.00 or swap for lage beam and Ham-M WB6PCZ, 7335 Santa Monica Blvd., LA, Calif. 90046.

WANTED: Mint condition NC-303 or NC-300 receiver, quality G.D. Meter; V.T.V.M. Will trade: Quality 6" Astronomical Telescope, perfect Rolleiflex T, Binoculars, Elgin Railroad Watch, B. Devin, 417 W. Park, Okla. City, Okla. 73103. CE-2-4379.

BIRD No. 43 Lab Case $65; Measurements 59 Megacycle Meter $85; Freq Meter 100-10.000MHz $95; Johnson 6N2 Xmtr $85; New HA-144 Transceiver $135; Amplidyne 6N2 Transmitter $149; TD-2 Microwave Generator $75; misc. swap list, stamp. W4API, Box 4095, Arlington, Virginia 22204.

TEKTRONIX 511AD oscilloscope. Clean, works good, bright clear CRT. With manual, $175. Monroe McDonald, 4130 Shorecrest Dr., Dallas, Texas 75209.

WANTED: Drake or Swan transceiver. Trade or sell: frequency counter, digital VTVM, GR uhf generator, HP audio generator, Dumont oscilloscope, etc. W6UTE.

SELL: Spotless Clegg 22'er, and Ameco 621 vfo, both with cables, and instruction manuals $200. Package and pickup deals only sry. Ed Abbott, Phone (212) 641-0502.

MINT KWM2 with 516F-2, $695; Mint 75S-1 w/312B-3, $300, or swap for gud R-388/51J3; HA-2 transceiver w/supply, $115. WA5JXC, 5735 Willowbend Blvd., Houston, Tex. 77035. Tel: (713) PA9-3985.

SELL: New, in original cartons NCX5 MK II with XCU-27 Calibrator $400.00; NC-A 115AC Power Supply $75.00; NCL2000 $425.00. All three for $850.00. Purchased for vacation no longer needed—eight months left on Factory Warranty. SB-34 with Microphone $250.00; P & H LA500M 1 KW Linear $75.00; P & H PS1000B Mobile Power Supply $75.00; Webster Big "K" Mobile Antenna with 80-20 Meter Coils $25.00. All for $350.00 1½ years old but only used one summer in car. Also PR Panadapter, BC 342N, VHF Converters, Transmitter, Antennas, Accessories. Write for List. K2MLB, Frank Grosso, 45 Rock Spring Avenue, West Orange, N.J. 07052. Phone 201-731-5064 (Evenings.)

SELL: Collins 75A2 w/spkr $175.00, Johnson Ranger I w/Ptt $100.00, Lafayette HE-73 Converter, Pre-Amp $25.00. Complete 2 meter station, Gonset II w/Gonset VFO-Pre-Amp, R.F. Pre-Amp, Halo Ant. and Mike $125.00. W1OWD, 1184 Yale Ave., Wallingford, Conn. 06492. Tel: 203-235-3560.

HEATH Apache, 180 watts, $89. Drake 2-B, $179. Both very good. Wire recorder, wires $65. Might trade. WA6ZHI, Terry Holmes, 770 Pacific, Almeda, Calif. 94501. Tel: (415) 523-8987.

SELL: GSB201 linear $135; WRL duo-bander 84 with VOX added, and AC supply, $115; both for $225. Consider trade for SB200, or Galaxy 2000B. W9FDS, 2020 Union St., Columbus, Indiana 47201. Tel: 812-372,5934.

SELL: Entire station & Accs. HT44 & p.s./spkr, SX-115, (make offers) Test gear, Rtty. S.A.S.E. Leon, WB2DLF, 12 Marlyn Terrace, Millville, New Jersey 08332. 609-825-6953.

HEATH SB-300 receiver, mint condition. Dan Mittler, 65-36 Wetherole, Rego Park, New York 11374. Tel (212) IL9-5749.

2KW Linear NCL-2000 trade for SB-101 or equivalent, Galaxy-111 w/AC and cash $50 for 30L1. Will buy SB-101 or KWM2 for cash, write WØBNF, Box 105, Kearney, Nebraska 68847.

FOR Sale: Heath HW-12A, Heath HP-23A Power supply, Hallicrafters HT-40, Heath HR-10. Bruce Styne, WA2HMX, Horse Shoe Hill Rd., Pound Ridge, New York, 10576 Tel: (914) 764-4467.

STILL Have cellar full of surplus RTTY, FAX, FM and test gear I want to clear out. List free. White, 5716 N. King's Highway, Alexandria, Virginia, 22303.

TEKTRONIX 545 scope with type CA dual trace plug in, dc-24 mc., .01 micro sec. rt .05 vcm $1075.00, HT 32 $200.00; SX 101 $125.00; 6 ft. rack cabinet, dolly, desk blanks, $40.00; DOW antenna relay $9.00; D104 $18.00; Johnson Low Pass $8.00; BW 551a coax switch $5.00; HP200AR audio oss. $25.00. K2JYM, J. Byrne, 24 Stillwell Place, Freeport, N.Y. 11520.

TOROIDS: 44 & 88 mhy., center-tapped, not potted, 5/$2.00 postpaid. Model 32KSR complete page printer, excellent operating condition $325. Model 15 page printers $85. NCX5 MkII and NCXA like new $480. Motorola 55 amp alternator, brand new $60. Hallicrafters CSM-20 30 watt hi-band mobile, like-new $95. Hallicrafters SX-101A $160. 11/16" reperferator tape $3/box/10. Page printer paper $5.50 case/12. Wanted: Back covers for RF unit or Measurements Corp. Model 80 signal generator, RTTY and FM gear. Stamp for list. Van W2DLT, 302Z Passaic Avenue, Stirling, New Jersey 07980.

WANTED: Electronics Instructor. General indispensable. Theory and workshops. Science Camp, Lake Placid, N.Y. Write Eppstein, Apt. 4B, 440 Westend Ave., N.Y. 10024.

RC-221-D frequency meter $80.00 shipping prepaid. Heath HD-10 electronic keyer, $35.00 shipping prepaid. Wanted: FM transmitter for 52.525, 12 VDC. B. Thunman, 10641 East M.L. Ave., Galesburg, Mich. 49053.

FOR Sale: Estate WA6JGI. Test Equipt, lowpass filters, Coaxial switches, Drake and Collins Gear. Many more items. Write for list, and prices. Howard Fasold, WAØVOM, 138 Palisade Cir., Canitou Spgs, Colo. 80829.

FOR Sale: Galaxy 300, new finals, power supply, mike. Postage paid, $189.00. Thomas Armour, 472 Georgetown, Sharpsville, Pa. 16150.

SBE-34, SB2 Mike, mobile mounting Plate. Excellent. $275. K8HJM, Spicer, 334 N. Miami St., Trenton, Ohio 45067.

BARGAINS: HT-37, excellent, $180; DB23 $15; Signal generator $10; 810s $2; 815s $1; K2KGU, Phone (212) 666-8513.

HENRY 2K-like new, $475. K4DBH 2957 Meadowlark Dr., East Point, Georgia 30344.

FOR Sale: Hammarlund HQ-170 rcvr, and B&W 5100 xmtr, leaving ham radio. First best offer. O. L. Sanders, Box 853, Idalou, Texas 79329.

CRYSTALS Airmailed: MARS, Marine, SSB, Nets, CD, etc. Novice .05% crystals $1.50. Custom finished etch stabilized FT-243 .01%—any kilocycle or fraction 3500 to 8600 $1.90, (five or more this range $1.75 each), (nets ten or more same frequency $1.45). 1700 to 3499 and 8601 to 20,000 $2.95, overtones supplied above 10.000. 10.001 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/u metal miniatures above 2000. Crystals, singles and groups for ARRL-QST, handbook, SSB Manual. Be specific. Write for order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

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DAH-DITTER Keyer. Integrated circuit electronic keyer. Fully self-completing on both Dit and Dah with automatic spacing. Built-in AC pwr. supply, reed relay output, with sidetone monitor and speaker. Completely assembled and tested. Only $34.95. Dealer inquiries invited. Send your order to M & M Electonics, 6835 Sunnybrook, N.E., Atlanta, Georgia 30238.

VHF Station: Seneca Ameco 6&2 and p/s NC-173; Micro-Match 1000, mike, 6M 3-element 2M, 10-el. rotor-mast, relay, 150 ft. RG/17A and more, $275.00; 80-10 Hustler, 4 BTV trap vert. antenna with RM-75-S, used one week, clean, $40.00 W1WOQ, R. L'Heureux, 66 Meadow Farms Road, West Hartford, Conn. 06107. Tel: 521-9449.

"HOSS Trader Ed Moory" sez if you don't buy your ham gear from him, you might pay too much. Shop around for your best price and then call the Hoss before you buy! New equipment with factory warranty: Galaxy V Mk III, (Reg. $420), cash price, $299.00; Early model new Swan 500C, $409.00; SB-34, $329.00; National NCX-500, $339.00; R4-A receiver, $339.00; FTDX-400 transceiver, $469.00; new Rohn 50 ft. foldover tower, prepaid, $194.00; new Mosley TA-33 and demo Ham-M, $185.00; Used equipment: Ham-M rotor, $69.00; HQ-170, $149.00; Hallicrafters SX-117, HT-44, and supply, $429.00; mint TR-4, $419.00; T4-XB, $349.00; R4-B, $329.00, "like new" Galaxy R-530, $475.00. Ed Moory Wholesale Radio Co., P.O. Box 506, DeWitt, Arkansas 72042. Phone (501)946-2820.

BC-348P, nice appearance, $39.50. Matching speaker, $10.00. Delivered to REA. WA4LNI. Bill Gardner, 210 Onondaga Ave., Palm Beach, Fla. 33480.

SELL: Hallicrafters SX-101A, Mark IV, receiver; like-new, with speaker, $210.00; Johnson Ranger II transmitter, excint condx, factory wired, $200. WB2FOH, 1694 Stewart Ave., New Hyde Park, N. Y. 11040. Tel: (516)-HU 8-3695.

HW-32, $75.00; HP-13 mobile P/S. $40.00 WAØSFJ.

75A4 ser. No. 1-202, vernier dial, 3 filters, speaker, 136C-1 noise blanker, speaker, like-new condx, $410; Heath Monitor 'scope, never used, $45.00; Tunnel dipper, in excint condx, $25.00; Telrex 2 kw. inverted V with balun, $17.00; TA-33 Jr. Tribander, $30.00; CushCraft 6-el. 6 meter beam, xclnt condx, $22.00. All items F.o.n. Durham, N. H. 03855. Tel: (603)-859-4557. K1NXI.

HQ-180C with noise blanker, speaker; HX-500 xmtr, manuals for both. Perfect condx, $500 or offer. No shipping, sry! WB6WHP, 4216 Norris Road, Fremont, California 94536.

SBE-33, late model, perfect. Clean. First check for $150.00 will get it shipped prepaid anywhere in cont. US. K2BJB, 25 Tudor Ave., Pine Beach, N. J. 08741.

MOVING, sacrifice! SX-96 dual conv. rcvr w/spkr, Ranger II, w/D-104 and bug. First $185.00 takes all. W. R. Robinson, WA2DZB, 31 Franklin Ave., Popton Plains, N. J. 07444.

CURRENT Transformer: 15 volts at 20 amps. $7.95. Pyryt, 192 Norman Way, Paramus, N. J. 07652.

VALIANT F/W SN28579, gud working condx, $125.00 W9JIC, 715 North Wheaton, Wheaton, Illinois 60187.

FOR sale: Gonset SB 2-meter 900B with a.c. supply, $230.00 Clegg 66, $130.00. Both in new condx. Less than 5 hours each. Will prepay express in continental U.S.A. Cashier's check or money-order. Calvert Blacketer, WA9UGG, Box 515, Princeton, Indiana 47570.

HEATH Apache, $60.00; DSB SB-175 with power supply, $60.00; Hallicrafters SX-96 receiver, $75.00; HA-5 VFO, $35.00 HT-18 VFO, $10.00. You pay shipping. Raymond Rapp, 14319 Stewart, Riverdale, Ill. 60627.

SELL: Hibander 6 & 2 xmtr, $75.00; Gonset Comm III 6 meters, $80.00; NC-125 rcvr, $70.00. All vy clean and operating. W/manuals. Prefer local deal only. L. Julien, K9DEY, 711 S. Euclid Ave., Villa Park, Ill. 60181, phone 834-3255.

COLLINS, Clean 75S-1, with Waters notch filter. Call Dick after 6 PM EST at 201-444-0804.

MOVING Out of state: Drake TR3 with remote VFO and AC/DC power supply, $450.00; 4-1000A amplifier 10-80 meters, spare tube, power supply 5000V, $250; 70 ft. tower 4-element 20-meter beam, prop pitch motor, $600, or someone looking for house with water location on Great South Bay. Package deal $43,000. For information, Chuck Daidone, 95 Anchorage Drive, West Islip, N.Y. 11795. Phone 581-7837.

FOR sale: National NCX-5 transceiver Mark II, VX-501 remote VFO, NCX-A power supply and speaker, crystal calibrator with 1 mc. xtal. Gud condx. Best offer over $500. You pay postage. KX6FJ, Box 1554, APO San Francisco, Calif. 96555.

TRANSCEIVER HW-16-$95.00: VFO-HG10B, $35.00; great c.w. break-in station. In xclnt condx. F.o.b. San Diego, WA6PMV, 2056 Reed, San Diego, Calif. 92109.

TOWER wanted: Vesto 100 ft. K9CSM. Write or tel: (312)-374-3727 between 1400-2000 GMT.

SELL: AF-68; M-1070 p/s, and cables; Ameco CMA converter, Tri-Band beam, ARC-27, TS-239/UP 'scope, SX-110; DX-60B. WA4CHM, Wayne Burgess, 1310 Radcliff Ave., Lynchburg, Virginia 24502.

SWAP Kodak Carousel 800 with zoom and case. Want HP-13, SB-640, HS-24, SBA-100-1, GH-12A, SB-200. Paul Powell, 100 South McGee, Borger, Texas 79007.

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Versatility... Accuracy... Dependability...

• **Linear permeability tuned VFO** with 1 kc dial divisions. VFO and crystal frequencies pre-mixed for all-band stability • **Covers ham bands** 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished • **Any ten 500 kc ranges between 1.5 and 30 Mc** can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 Mc not recommended) • **Four bandwidths of selectivity,** 0.4 kc, 1.2 kc, 2.4 kc and 4.8 kc • **Passband tuning** gives sideband selection, without retuning • **Noise blanker that works on CW, SSB, and AM** is built-in • **Notch filter and 25 Kc crystal calibrator** are built-in • **Product detector** for SSB/CW, **diode detector** for AM • **Crystal Lattice Filter** gives superior cross modulation and overload characteristics • **Solid State Permeability Tuned VFO** • 10 tubes, 10 transistors, 17 diodes and 2 integrated circuits • **AVC** for SSB or high-speed break-in CW • **Excellent Overload and Cross Modulation characteristics** • **Dimensions:** 5½"H, 10¾"W, 12¼"D. **Wt.:** 16 lbs.

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Use VFO of either R-4B or T-4XB for transceiving or separately.

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Accessories available: 100 kc Calibrator, Q Multiplier, Matching Speaker, Noise Blanker, Crystals for other ranges.

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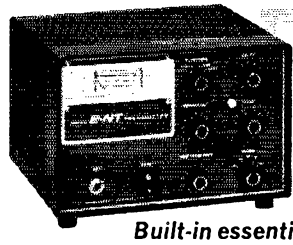

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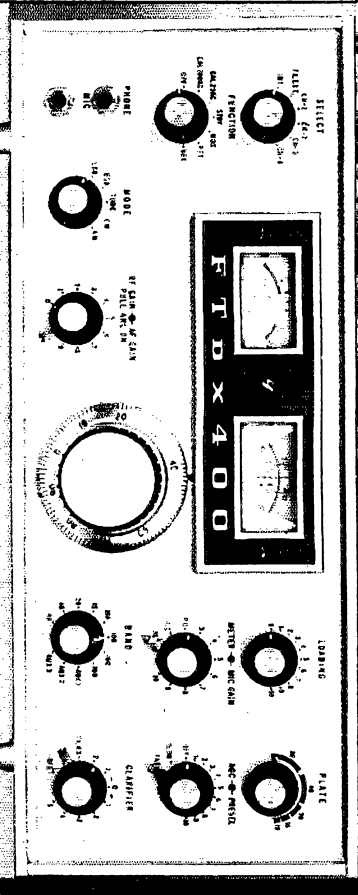

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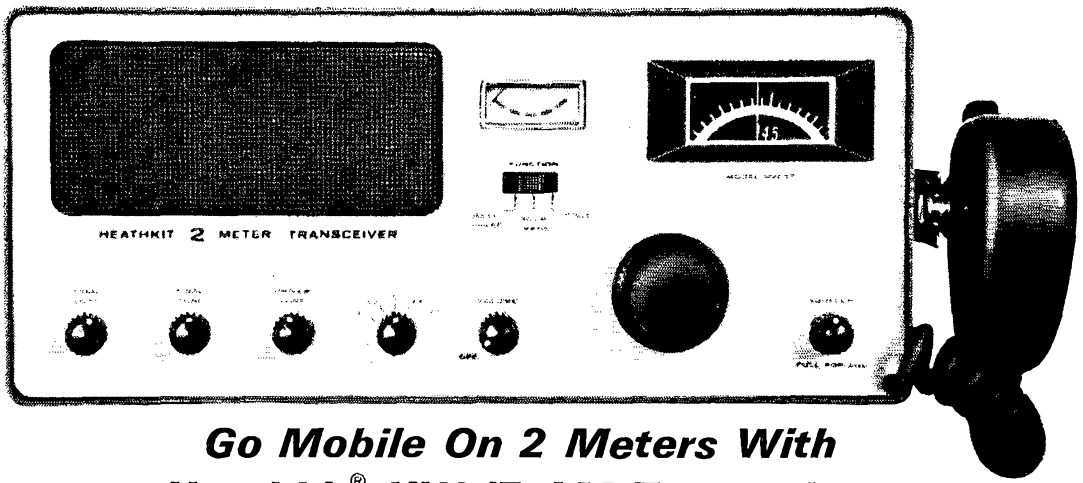

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Been thinking about going mobile, but afraid of expensive rigs, crowded bands and hard to handle antennas? Two meters is the place for you, OM — it's wide open and just waiting for your CQ. And Heathkit has the rig that can put you on "2" in a hurry, for a lot less than you'd expect — the HW-17.

The Heathkit HW-17 in detail. It's really a separate receiver and transmitter in one compact, versatile package (the only common circuitry are the power supply and the audio output/modulator). Frequency coverage is 143.2 to 148.2 MHz. The solid-state dual conversion, superheterodyne receiver with a pre-built, pre-aligned FET tuner has a lighted dial with 100 kHz calibration, automatic noise limiter, squelch, and 1 uV sensitivity. Selectivity is 27 kHz at 6 dB down, a figure that's consistent with band occupancy and easy receiver tuning. The front panel meter indicates received signal strength and relative power output. A 3-position switch on the front panel has a "Spot" position for finding the transmit frequency on the tuning dial, a Receive/Transmit position, and a Battery-Saver position that comes in handy during those long periods of monitoring while mobile (the receiver draws only 8 watts during this time). A 3" x 5" speaker is built in.

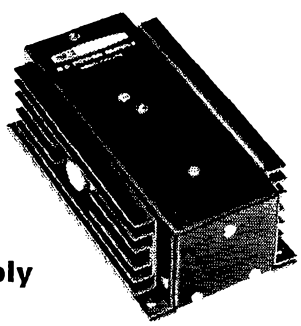
On the transmitting end is a hybrid circuit including transistors and tubes with a 25-30 watt power input and an AM power output of 8 to 10 watts. Modulation is automatically limited to less than 100%. A front panel selector switch chooses any of four crystal frequencies or an external VFO (the Heathkit HG-10B VFO at $39.95 is perfect for this job).

Front panel controls include Final Load, Final Tune, Crystal-VFO switch, Main Tuning, Squelch with ANL switch, Battery Saver-Receive/Transmit-Spot switch; rear panel has S-meter Adjust, Headphone jack, Power socket, VFO power socket, VFO input, and Antenna connector (50-72 ohms, unbalanced).

The 15 transistor, 18 diode, 3 tube circuit is powered by a built-in 120/240 VAC supply. Circuit board construction averages 20 hours. It's all housed in a low-profile Heath gray-green aluminum cabinet measuring 14⅛" W x 6⅛" H x 8½" D with everything in place. A ceramic PTT mic. and a gimbal bracket for mobile mounting are included.

Start moving on 2-meters now, with this low cost Heathkit rig — the HW-17.

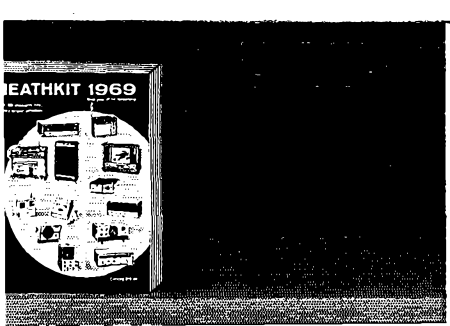
Kit HW-17, 2M Transceiver, 18 lbs.....**$129.95***



HWA-17-1 Solid-State Mobile Power Supply

To run mobile with the HW-17, you'll need this compact, solid-state power supply. Supplies all necessary voltages and uses a "C" core transformer for reliable, efficient operation. Large heat sinks give cool operation with a 50% duty cycle. Circuit breaker protection for your mobile 12 v. battery source too. All cables & connectors are included. Small size (only 3⅞" W x 7 5/16" L x 2½" H) makes installation easy.

Kit HWA-17-1, Transistorized DC supply for negative gnd. systems only, 5 lbs.....**$24.95***



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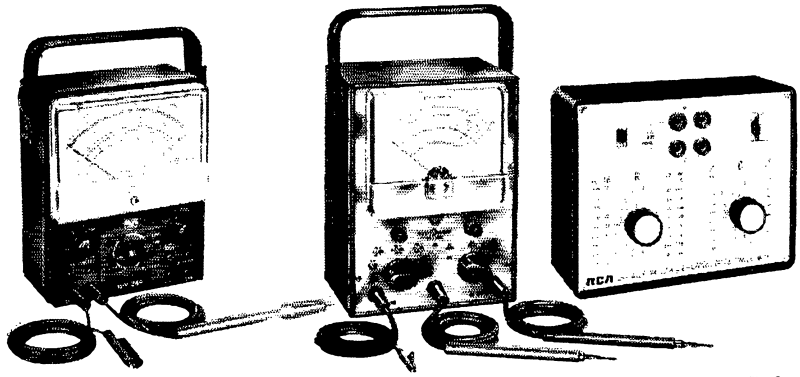
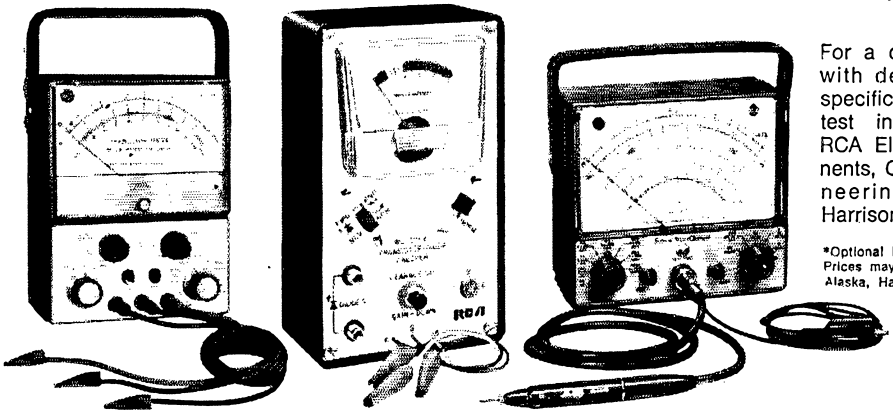


The RCA WV-38A Volt-Ohm Milliammeter is a rugged, accurate, and extremely versatile instrument. We think it's your best buy. Only $52.00.* Also available in easy-to assemble kit, WV-38A (K).

The RCA WV-77E VoltOhmyst® can be used for countless measurements in all types of electronic circuits. Reliability for budget price. Only $52.00.* Also available in an easy to assemble kit, WV-77E (K).

The RCA WG-412A R-C circuit box can help you speed the selection of standard values for resistors and capacitors, either separately or in series or parallel R C combinations. Only $30.00.* It's easy to use, rugged, and compact.

The RCA-500A all soli state, battery operate VoltOhmyst eliminate warm-up time, eliminate zero-shift that can occu in tube operated volt meters. Completely porta ble. Only $75.00.* Come with shielded AC/D switch probe and cables



The RCA-WT-501A in-circuit out-of-circuit transistor tester is battery operated, completely portable. It tests both low and high power transistors, has NPN and PNP sockets for convenient transistor matching for complementary symmetry applications. Only $66.75.*

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The RCA WV-98C Senior VoltOhmyst is the finest vacuum-tube voltmeter in the broad line of famous RCA VoltOhmysts. Accurate, dependable, extremely versatile, it is a deluxe precision instrument. Only $88.50.* Also available in an easy to assemble kit, WV-98C (K).

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