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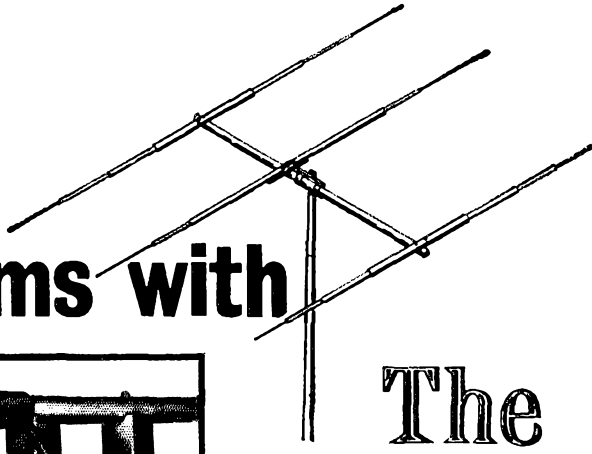
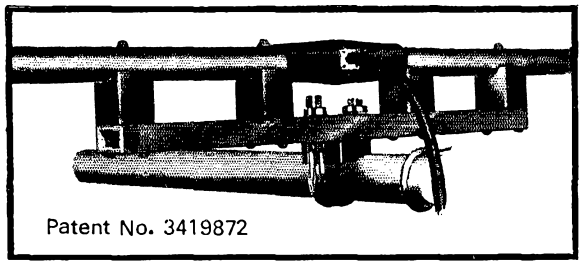
October 1969
OFFICIAL JOURNAL OF THE ARRL

NEW!
FROM MOSLEY

Two Single-Band Beams with





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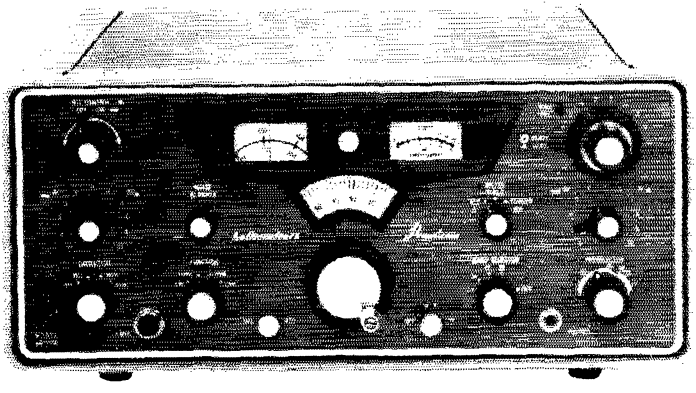

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QST

OCTOBER 1969

VOLUME LIII NUMBER 10

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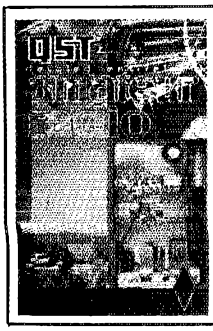
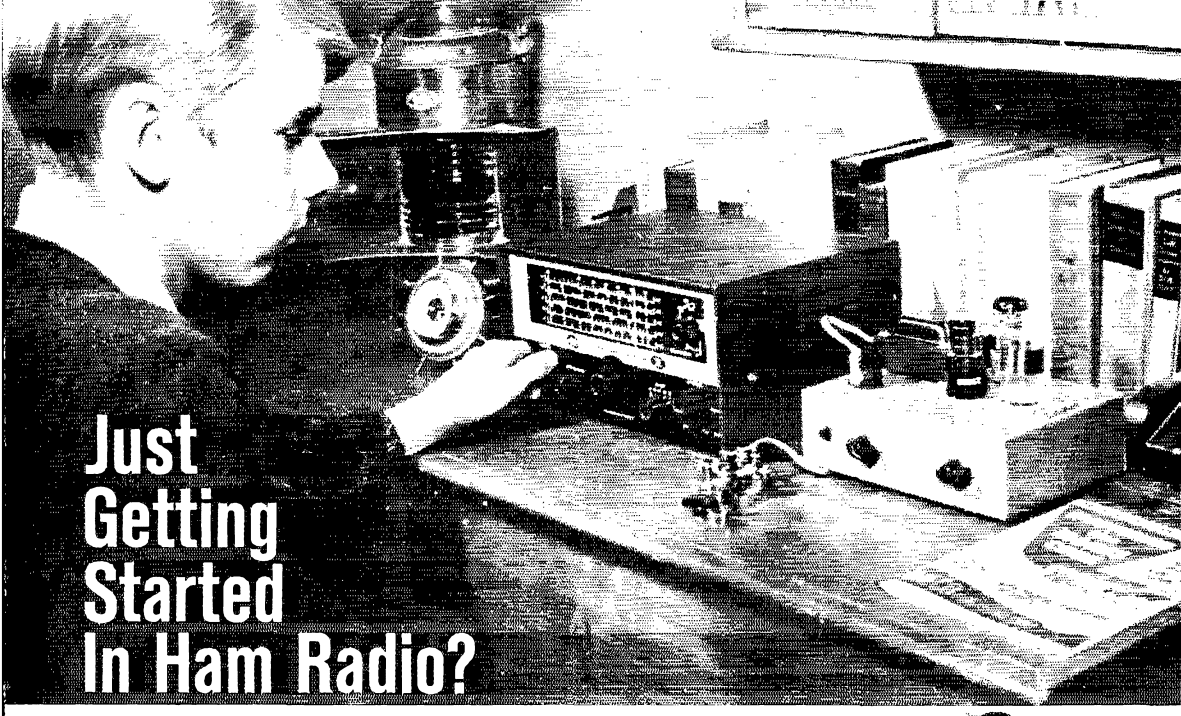


Want to find out more about fm repeaters? See page 11 and 16 for articles on the subject.

—CONTENTS—



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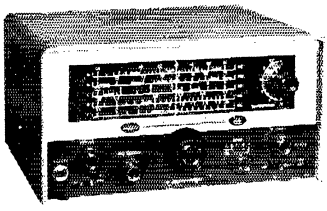

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports 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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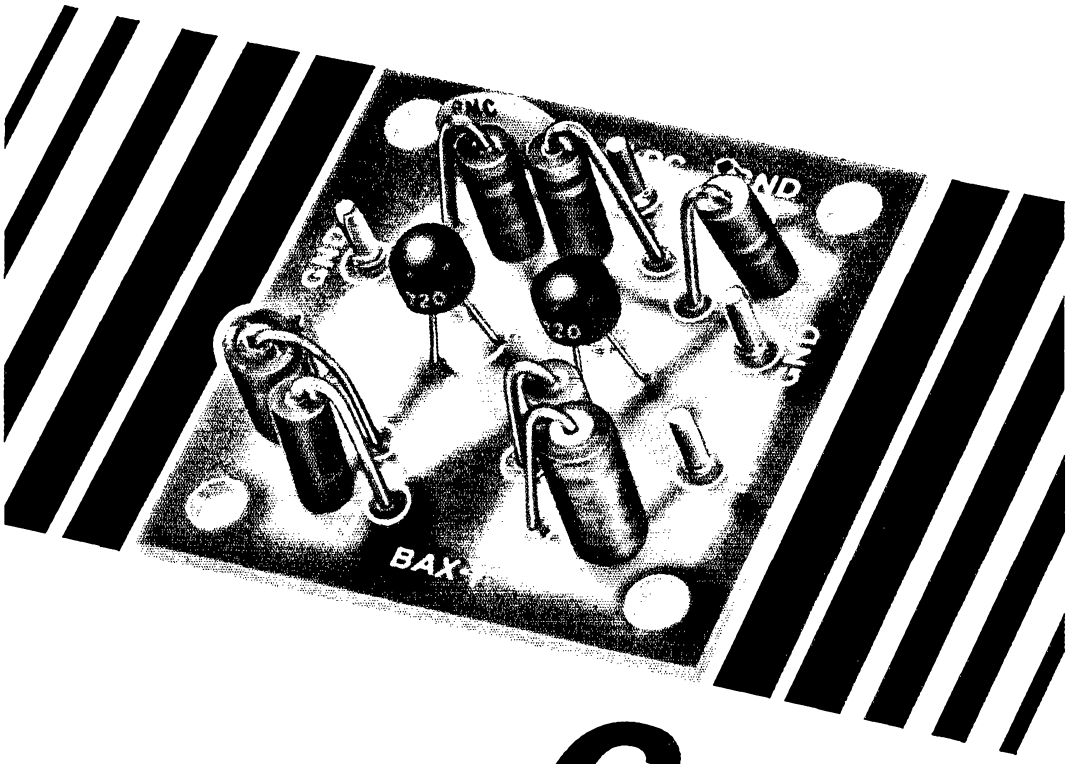

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THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

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.

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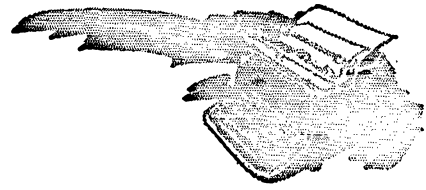
"It Seems to Us..."



CAMILLE

SECTION 97.1(a) of FCC rules, stating the basis for existence of amateur radio, reads as follows:

"Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications."

This language, adopted in 1951, only recognized a situation which had long existed; in the 50 years since 1919, amateur radio has been a principal — if not the only — communications link following a hundred major and a much greater number of less consequential disasters.

Despite lessons learned and improvements made in the official warning systems and other preparations for hurricanes, Camille wreaked death and heavy destruction along the Gulf coast as well as to its northeast. Despite lessons learned and improvements made in the preparations for disaster communications among various *other* radio services, it is still *amateur* radio which fills the gap when plans go awry. As a prime example, the adjacent letter from the New Orleans Chapter of the American Red Cross makes quite plain the extent to which amateurs are fulfilling their responsibilities.

In recent years there has been a tendency among a segment of amateurs — fortunately a small one — to feel that our usefulness in emergency is more and more limited. They argue that modern planning and sophisticated communications systems make us obsolete. They point to the growth of land mobile (taxi, utility company, etc.) and citizens radio as supplanting the traditional role of the amateur in disaster.

Let us hear no more of this kind of talk. And, through enrollment in AREC, NTS, RACES, or other organized amateur group, let more of us dedicate ourselves to preparedness in continuing to successfully fill our role as emergency communicators.

QST

NEW ORLEANS CHAPTER

THE AMERICAN NATIONAL RED CROSS

August 28, 1969

American Radio Relay League
Newington, Conn. 06111

Gentlemen:

The American Red Cross wishes to commend the excellent work done by Amateur Radio Operators during and after the disaster created by Hurricane Camille.

Amateur Radio was the only communication that the American Red Cross had for 10 days following this disaster with four of our disaster centers on the southeast Mississippi Gulf Coast.

The American Red Cross through these Amateur Radio Operators' facilities were able to supply these disaster centers with their medical, nursing, personnel, drugs, food and shelter requirements.

It was by amateur communication also that we were able to inform hurricane victims of time and locations of mass evacuations through local broadcast stations.

Because of the great number of ARRL members and Radio Clubs whose services and skills were used in this connection, it is impossible to thank them individually.

We request that the American Radio Relay League express our appreciation to them.

Only through the dedication of volunteers such as these make the work of the American Red Cross possible in times of disaster.

Yours very truly,

NEW ORLEANS CHAPTER, THE AMERICAN NATIONAL RED CROSS

John B. Smallpage, Chairman

League Lines . . .

As this issue goes to press in early September, Amsat has not yet received a final launch commitment for Australis-Oscar 5. We do know, though, that a launch will not occur before October 15. So, if you're not yet ready to listen to the next amateur satellite, you still have time! An article on tracking starts on page 54 of this issue. In the meantime, listen to WIAW bulletins for possible late info on the launch.

Which reminds us that FCC continues to develop preliminary views on what the U.S. position should be at the space conference scheduled for Geneva in June of 1971. Still in the documents, with strong ARRL support, is a proposal to add to the international definition of amateur radio a broad authorization for space activity (of course within the limits of the allocations table).

Hq. Awards Committee mostly disagree but bows to the recommendation of the Contest Advisory Committee to drop power multipliers in this year's SS for one-time trial. In any event, with your score this year let us know whether the new rule should continue for 1970.

We had long contemplated a tear-out chart in this issue showing the final incentive-licensing band segments. But repeated FCC statements of their intentions to make a last-minute full review raises the possibility that our chart might be wrong, even if only in minor respects. So we'll have to put it off a couple of months and rely on WIAW and other routes for spreading the word on any FCC announcement of change.

FCC has clarified the call-sign identification requirements under its "tail-ending" rule change, and its interpretation avoids some of the hardships in rapid-contact (contest) operation. See page 90.

Old and creaky though it may make us (and some of you!) feel, this month we're starting a 50-years-ago column (page 112). These were some of the most exciting times in ham radio, and we hope you enjoy reading the brief summaries.

Except for continued rumblings about a west-coast case, reports on obscene and profane on-the-air conversations by amateurs have pretty much subsided since a crack-down earlier this year by FCC. Let us hope the trend continues toward a more responsible exercise of our rights to free speech.

Quote-of-the-month, from ARRL Director W4KFC: "In ham radio we have the ultimate hobby, one that offers us another world to escape to, but with the advantage of strengthening, rather than abandoning, our real world involvements. The world is filled with lonely people, but it is hardly possible to be a lonely ham."

Novices/Techs/Conditionals: when taking the General, the same $4 fee will cover the Advanced, too, if applied for at the same time. If you pass the General you get that class, even if you fail the Advanced. Why not try both?

We understand the hams in Phoenix were so enthusiastic after seeing K7UGA's copy of the new ARRL film that they arranged for showing it during intermission at a local movie house -- where it also received acclaim.

AMATEUR FM and REPEATERS

BY LES COBB, W6TEE,*
and JAY O'BRIEN, W6GDO**

ALTHOUGH amateur fm has been the subject of a number of theory and construction articles in *QST* and other publications since before WWII, it didn't get off the ground until recently. The claimed advantages of fm couldn't outweigh the additional receiver complexity required to fully obtain these improved results. The picture was changed, however, as large quantities of used commercial fm mobile equipment became available to the amateur.

This older equipment, some of it made obsolete for commercial service by changes in FCC requirements and by newer solid-state equipment, has become the new "surplus" equipment for hams. The ham tinkering instinct, long fueled by military surplus equipment, has been frustrated recently by the lack of such equipment suitable for modern amateur communications. Fmers, however, have rediscovered the old fun associated with adaptation and modification of inexpensive equipment. But it should not be inferred that fm equipment normally requires extensive conversion for amateur use. With many units, slight padding of certain tuned circuits and retuning to the amateur band is all that is required. Once the rig is on the air, though, much innovation is possible.

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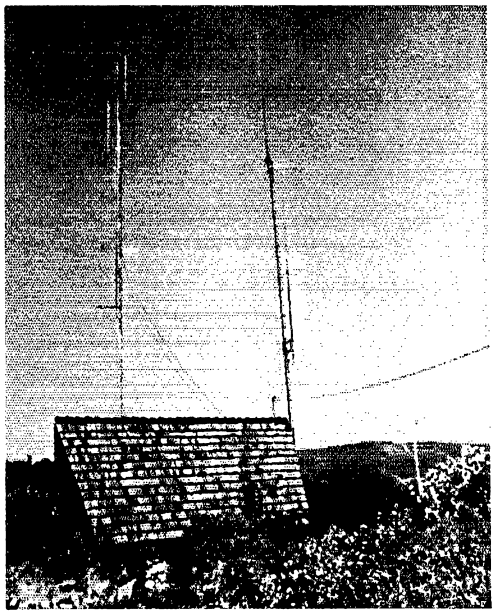
The recent upsurge in fm activity in amateur operating has brought with it new techniques, procedures and standards that provide a perpetual source of questions for the fm newcomer. This article discusses fm operating practices and the closely related subject of amateur repeaters.

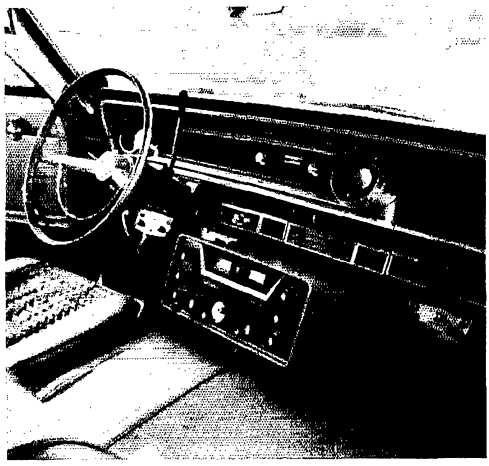


This is a view of the Mt. Vaca Radio Club repeater site on Wolf Mountain (2600 ft), 40 miles NE of Sacramento, Ca. The equipment is installed in a "vault." Several antennas are seen above the building, but only one antenna system is used by WA6UGS for its repeater.

Fm Characteristics

What are the technical advantages of fm? Many misconceptions exist on this subject due to popular oversimplification of fm theory. Fm has a noise advantage over a-m as long as the received signal is above the threshold of receiver sensitivity. The amount of fm noise improvement is proportional to the deviation or bandwidth occupied by the signal. A wide-band fm signal will have a greater quieting effect than a narrow-band fm signal of the same strength. As the deviation is lowered (assuming the receiver bandwidth is narrowed at the same time) the signal characteristics will become more like a-m. An fm signal with ±3-kHz deviation (nbfm) and an nbfm receiver will have a signal-to-noise ratio and threshold similar to a-m. The point usually missed is that the quieting effect of the wide-band signal is at the expense of receiver threshold. In other words, a-m has a greater range in weak-signal work, but fm will provide greater noise suppression in local work.

If this is true, why do amateur fm mobiles have a greater range than the average a-m mobile? The answer to that is simple. Typical 2-meter fm mobile transmitters, for example, are rated at 30 to 60 watts rf output power (50-100 watts input), or about 10 dB more output than most 2-meter a-m mobile rigs. Some writers have also claimed better receiver sensitivity for fm equipment. This is not exactly true, as the pentode rf stage in many vintage fm rigs can



Most fm mobile work is done with trunk-mounted equipment. This means that only the control head, speaker, and tone-signaling box (if used) are mounted in the driver's compartment. In this view of the W6TEE mobile installation one can see the fm controls, plus an hf transceiver for use on other amateur bands.

stand some improvement in noise figure. But, in general, the least sensitive fm receivers are still better than many of the simpler a-m receivers in common use.

Part of the unique nature of amateur fm operating is due to the effect of the equipment capabilities on operating practices. Fm equipment, as obtained from commercial users, is designed for fixed-frequency operation (but not necessarily single-frequency operation) with both the transmitter and receiver crystal controlled. When first faced with this unfamiliar configuration, the early fmers, rather than trying to modify the equipment to fit a preconceived mold of tunable receivers and random frequency operation, developed new techniques to better use the equipment and the mode. They found that channelized operation with squelched receivers permitted continuous monitoring of the active frequencies. They found that long, time-consuming calls and CQs were no longer necessary to establish communications, as all receivers on the channel came alive with their first word. Mobile operation became possible for those with only a short time to spend.

Fm Operating

What operating procedures are followed on an fm channel? Only one generalization can be made. Long transmissions are out. Natural, short transmissions, such as practiced by the better sideband operators, are usually encouraged. The old monopoly switch routine, where the operator gabs to himself for 10 minutes at a time, should have disappeared from ham radio with the antenna knife switch, but still clutters up the vhf bands on a-m. Other than that, operating procedures are a matter to be determined by the local channel users. Some channels are calling channels on which extended rag-chewing is discouraged, whereas other channels, or the same channel in another area, may be alive with chit-chat. This is a matter of local determination, influenced by the amount of activity, and should be respected by the new operator and the transient mobile operator alike.

One question that always comes up in connection with amateur fm involves the use of the "10 code". Some groups, having members who are in the two-way radio repair or law enforcement business, have carried the use of this code over into their amateur operating. However, many feel that this code offers little or no communications enhancement to amateur operating and that its use is an affectation. Plain language in many cases is as fast and requires no clarification or explanation to anyone.

Fm, more than a-m, requires precise frequency netting and high-quality crystals for best results. An off-frequency signal will be received with distortion and will not have full noise rejection. For this reason, fm transmitters and receivers have oscillator adjustments to permit an exact setting of the crystal in each.

Standard channel frequencies have been agreed upon to permit orderly growth and to permit communications from one area to another. On 2 meters, it has been agreed that any frequency used will fall on increments of 60 kHz, beginning at 146.040 MHz. The national calling frequency is 146.940 MHz (or "nine-four"). On 6 meters, the national calling frequency is 52.525 MHz, with other channels having 40-kHz spacing beginning at 52.560 MHz. Ten-meter fm activity can be found on 29.600 MHz. Recommendations for 10 meters and 220 MHz are for 40-kHz channel spacing starting at 29.040 and 220.020 MHz. Usage of the 420-MHz band varies from area to area, as it is used for control channels, repeaters, and remote bases, as will be discussed later. As an example, in California activity begins at 449.950 MHz and progresses down to below 435 MHz in 50-kHz increments.

Deviation

Now that you have read all of these facts about fm, you should know that it is not strictly fm that we have been talking about, but actually pm or phase modulation. The equipment available for amateur use, originally used on commercial vhf "fm" uses pm, not fm. Both fm and pm are forms of angular modulation, but through usage, fm has become the generic term covering both. Since both are easily generated, our only real concern is in the difference in signal characteristics. A phase-modulated signal will have a rising audio response at the higher frequencies when detected by an fm discriminator. For this reason, a simple *RC* circuit is placed on the discriminator output to roll off the higher frequencies to achieve a flat response. A true fm-generated signal must then have a high frequency boost to sound natural on a receiver designed to receive pm. It should be noted that this frequency slope is completely across the

audio bandpass (at least 300 to 3000 Hz) and should not be confused with pre-emphasis in broadcast fm which applies only to a portion of the audio range.

Commercial equipment frequently has speech clipping in the transmitted audio. This not only permits the commercial user to meet FCC deviation requirements, it also permits the amateur to maintain a high audio level without deviating outside the receiver passband. When deviation is excessive, the receiver will actually lose the signal on modulation peaks and the squelch will close. Complementary *RC* circuits are employed before and after the clipper to overcome the rising modulation characteristic of pm to produce a constant peak frequency deviation without altering the basic frequency response. When the audio level is lower than the preset maximum, the clipper and its associated *RC* circuits will have no net effect.

Two deviation standards are commonly found. The older standard — "wide-band" — calls for a maximum deviation of 15 kHz. The newer standard — "narrow-band" — imposed on commercial users by the splitting of their assigned channels, is 5 kHz. The deviation to be employed by amateurs on frequencies where fm (other than nbfm) is permitted is not limited to a specific value by the FCC, but it is limited by the excellent bandpass filters found in fm receivers. In general, a receiver with a filter for 5-kHz deviation will not intelligibly copy a signal with 15-kHz deviation. Although some work is being done with 5-kHz deviation, most amateur work is with 15-kHz deviation. In some areas, a compromise deviation of 7 or 8 kHz is used with some success with both wide and narrow receivers. When necessary, receiver filters can be exchanged to change the bandpass.

Repeaters

A repeater is a device which retransmits received signals in order to provide improved communications range and coverage. This communications enhancement is possible because the repeater can be located at an elevated site which has coverage superior to that obtained by most stations. A major improvement is usually found when a repeater is used between vhf mobile stations, which normally are severely limited by their low antenna heights and resulting short communications range.

Although a-m repeaters are in use in some parts of the country, the recent upsurge in repeater interest was brought about by amateur fm. Proximity effects encountered between a repeater receiver and transmitter are quite troublesome with a-m, but are present to a much lesser degree with fm. Also, a-m repeater performance is degraded by off-frequency operation by some users through the use of inexpensive crystals in oscillators having widely varying characteristics. Fm equipment, however, is designed for spot-frequency operation, minimizing this problem. Although some of the following information will apply to a-m repeaters, much of it is based directly on fm techniques.

The simplest repeater consists of a receiver with its audio output directly connected to the audio input of an associated transmitter tuned to a second frequency. In this way, everything received on the first frequency is retransmitted on the second frequency. As a practical matter, certain additional features will be required to produce a workable repeater. These are shown in Fig. 1A. The COR or carrier-operated relay is a device connected to the receiver squelch circuit which provides a relay-contact closure to key the transmitter, when an input signal of adequate strength is present. As all amateur transmissions require a licensed operator to control the emissions, a "control" switch is provided in the keying path so that the operator may exercise his duties. This repeater, as shown, is suitable for installation where an operator is present, such as the home of a local amateur with a superior location, and would require no special licensing under existing rules.

Unfortunately, most groups intending to install a repeater do not have a suitable location that has a licensed operator on hand. In this instance, a special license for remote-control operation must be obtained and provisions made to control the equipment over a telephone line, or a radio circuit, 220 MHz or higher. The licensed operator must then be on hand at an authorized control point. Fig. 1B shows the simplest system of this type. The control decoder may be variously designed to respond to simple audio tones, dial-pulsed tones, or even "touch-tone" signals. If a leased telephone line is so specified, dc control voltages may be sent directly, requiring no decoder. A 3-minute timer to disable the repeater transmitter is provided for

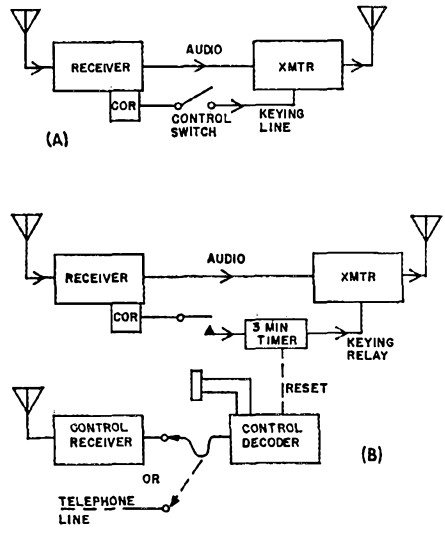


Fig. 1—Simple repeaters. The system shown at (A) is for local control. Remote control is shown at (B).

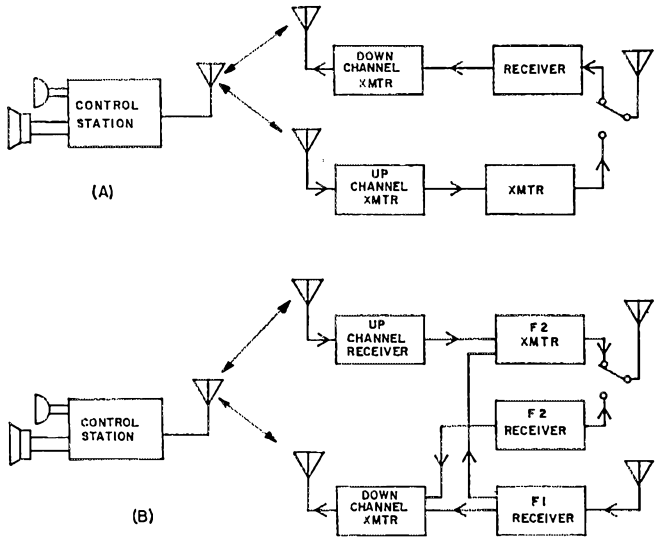


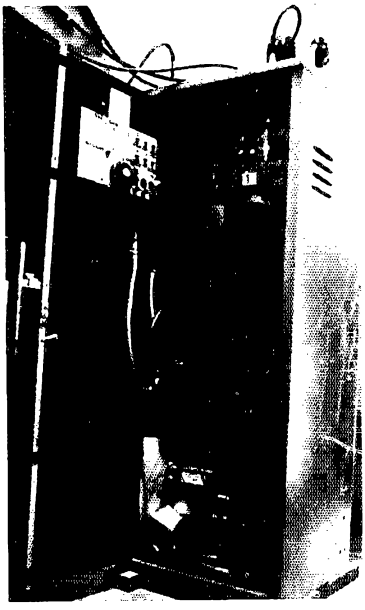
Fig. 2—A remote base is shown at (A). A repeater with remote base operating capability is shown at (B). Control and keying circuits are not shown. Telephone line control may be substituted for the radio control channels shown.

fail-safe operation. This timer resets during pauses between transmissions and does not interfere with normal communications. The system just outlined is suitable where all operation is to be through the repeater and where the frequencies to be used have no other activity.

Remote Base

Before we can discuss more sophisticated repeaters, we must explain the "remote-base" type of operation. The remote base, like the repeater, utilizes a superior location for transmission and reception, but it is basically a simplex device. That is, it transmits and receives on a single frequency in order to communicate with other stations also operating on that frequency. The operator of the remote base listens to his hilltop receiver and keys his hilltop transmitter over his 220-MHz or higher control channels (or telephone line). Fig. 2A shows such a system. Control and keying features have been omitted for clarity. In some areas of high activity, notably Los Angeles, repeaters have all but disappeared in favor of remote base, due to the interference to simplex activity caused by repeaters unable to monitor their output frequency from the transmitter location.

Fig. 2B shows a repeater that combines the best features of the simple repeater and the remote base. Again, necessary control and keying features have not been shown, in order to simplify the drawing. This repeater is compatible with simplex operation on the output frequency because the operator in control monitors the output frequency from a receiver at the repeater site between transmissions. The control operator may also operate the system as a remote base. This type of system is almost mandatory for operation on one of the national calling frequencies, such as 146.940 MHz, because it minimizes interference to simplex operation and permits simplex communications through the system with passing mobiles who may not have facilities for the repeater input frequency.



This photo shows the Wolf Mountain repeater equipment which is rack mounted and neatly placed inside the shared vault. This equipment is a complete working system of the type described in the text. The local control and test panel is mounted on the open door.

The audio interface between the repeater transmitter and receiver can, with some equipment, consist of a direct connection bridging the transmitter mike input across the receiver speaker output. This is not recommended, however, due to the degradation of the audio quality in the receiver output stage. A cathode follower connected to the discriminator after the *RC* compensator provides the best results. A repeater should maintain a flat response across its audio passband to maintain the repeater intelligibility at the same level as direct transmissions. The intelligibility of some repeaters suffers because of improper level settings which cause excessive clipping distortion. The clipper in the repeater transmitter should be set for the maximum system deviation — for example, 10 kHz. Then the receiver level driving the transmitter should be set by applying an input signal of known deviation below the maximum, such as 5 kHz, and adjusting the receiver audio gain to produce the same deviation at the repeater output. Signals will then be repeated linearly up to the maximum desired deviation. The only incoming signal that should be clipped in a properly adjusted repeater is an over-deviated signal.

FM JARGON

Duplex — Simultaneous transmission and reception between two stations using two frequencies.

Simplex — Alternating transmission and reception between two or more stations using one frequency.

Low-band — 30 to 50 MHz. Also, the 6-meter amateur band.

High band — 148 to 174 MHz. Also, the 2-meter amateur band.

Remote base — A remotely-controlled station, usually simplex. See text.

Machine — Either a repeater or a remote base. Also called a "box".

Vault — Building that houses the machine.

COR — Carrier-operated relay. See text.

CTCSS — Continuous tone controlled squelch system. Continuous subaudible tone (250 Hz or lower) transmitted along with the audio to allow actuation of a repeater or receiver only by transmitters so equipped. More frequently referred to by various trade names such as Private Line, Channel Guard, and Quiet Channel.

Down channel — Communications circuit from the machine to the control point.

Up channel — Communications and/or control circuit from the control point to the machine.

Open repeater — A machine where transient operators are welcome.

Closed repeater — A machine where use by non-members is not encouraged. (When heavy expenditures are involved, free-loaders are not popular.)

Channel Frequencies

The choice of repeater input and output frequencies must be made carefully. On 2 meters, 600-kHz spacing between the input and output frequencies is common. Closer spacing makes possible interference problems between the repeater transmitter and receiver more severe. Greater spacing is not recommended if the user's transmitters must be switched between the two frequencies, as happens when the output frequency is also used for simplex operation, either for short range communications, or to maintain communications when the repeater is not functioning. Careful consideration of other activity in the area should be made to prevent interference to or from the repeater. Many "open" or general-use repeaters have been installed on one of the national calling frequencies. On two meters, a 146.940-MHz output is usually paired with a 146.340-MHz input, and many travelers have made good use of this combination where it is found. Where 146.940 MHz simplex activity has not permitted a repeater on this frequency, 146.760 MHz has been used as an alternative. On 6 meters, several choices of input frequency have been paired with 52.525 MHz and no real standard has emerged. Again, the choice and usage is a matter for local agreement. All that can be done here is to report general trends.

In some cases where there is overlapping geographical coverage of repeaters using the same frequencies, special methods for selecting the desired repeater have been employed. One of the most common techniques requires the user to automatically transmit a ½-second burst of a specific audio tone at the start of each transmission. Different tones are used to select different repeaters. Standard tone frequencies are 1800, 1950, 2100, 2250, and 2400 Hz.

Where there is to be much repeater activity in a given geographical area, a coordinating committee or council may be established to resolve problems of common interest. An example is the California Amateur Relay Council (CARC) which originated in the San Francisoco area and now has 32 repeater and remote-base operators in California, Nevada, and Hawaii as members. The CARC, as one of its functions, coordinates frequencies for council members and other users. As an example, the CARC has listed 137 440-MHz control and repeater frequencies in use in Northern California.

Although it is impossible to cover specific details of each subject that has been mentioned here without writing a book on the subject, it is hoped that the organization of the material presented here will help to put relationships in perspective so that a better overall picture of amateur fm and repeater operation can be obtained. We would like to thank the other members of the Mt. Vaca Radio Club that made this article possible, notably W6FRE and WA6DBL. QST

Diode Switching for V.H.F. F.M. Channel Selection

Convenient and Quiet Remote-Control Crystal Switching in Fixed-Frequency Transmitters and Receivers

BY H. D. JOHNSON,* VE4HJ

MANY f.m. units currently available from surplus sources are single-channel models. Others provide 2-channel operation by switching between two first-oscillator crystals with a s.p.d.t. relay. In some, a d.p.d.t. relay is employed, so that the unused crystal and its netting capacitor are grounded. Most often, separate oscillators are used for each channel, selection being made by grounding the cathode of the appropriate oscillator stage.

A convenient solution to the crystal-switching problem lies in the use of diodes, changing the bias on the diode in the desired channel so that it goes from an open-circuit to a conducting condition. This is particularly convenient for remote control of the channel selection in a mobile installation, as up to four crystals can be used, and the system works quietly and with very low current drain. It is most readily applied to equipment in which one side of the crystal is grounded (Marconi transmitters and receivers; Motorola transmitters). The need for more than one or two channels is becoming more acute, as the use of fixed-frequency f.m. by amateurs expands, and the number of v.h.f. repeaters planned or in use increases accordingly.

How It Works

The basic circuit for diode switching of crystals is shown in Fig. 1. With the switch S_1 in the position shown, current flows from the 12-volt source through RFC_4, CR_2, RFC_2 and R_2, to ground. With the diode CR_2 thus forward-biased, the crystal Y_2 is effectively connected to the oscillator grid, for r.f. The chokes RFC_4 and RFC_2 provide r.f. isolation, and RFC_2 and R_2 the d.c. path to ground. With no voltage applied to the other two positions, crystals Y_1 and Y_3 are isolated from the oscillator grid by the non-conducting diodes, CR_1 and CR_3. The resistors limit the current flow, only some 5 to 10 ma. being needed to make germanium diodes function as r.f. switches in this way. The 0.3-volt drop across the diode does not affect the operation of the circuit.

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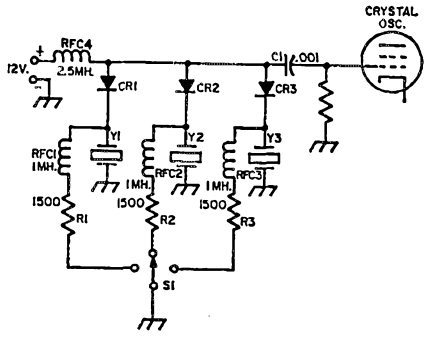


Fig. 1—Basic circuit for switching crystals by means of germanium diodes. Principles of operation are described in the text. The diodes can be 1N270, 1N34A or other germanium types.

The system requires a source of 12 to 14 volts d.c. This poses no problem in mobile installations, except that vibrator hash or generator whine must be filtered out in some instances. This is easy to do in a circuit of such low current drain. Any low-resistance audio choke, with a 40-μf. or larger electrolytic on the load side, should do. Many different diodes will work; 1N270 and 1N34A are recommended. The capacitor C_1 provides d.c. isolation for the oscillator grid. Be sure that it is inserted in any oscillator circuit that may not already have such isolation.

The circuit of Fig. 1 is not satisfactory for f.m. gear in which "netting" capacitors are used across each crystal. Where this is done it is necessary to forward-bias the diode that is switched on, and reverse-bias the others. (Reverse-biasing lowers the junction capacitance of the diode.)

A modified circuit for this, for use in any equipment where one side of the crystal is grounded, is given in Fig. 2. An example is the Marconi DT45. Three circuits are shown, but up to four have been used. The d.c. is shown here being obtained from the 12-volt a.c. line in the receiver, with CR_4, R_7 and C_6 comprising the rectifier-filter circuit. The isolation capacitor C_4 should be added if one is not already in the circuit. The grid-to-ground capacitor, C_5, usually about 10 pf., should be removed if there is a capacitor of this type in the circuit.

The 12 to 14 volts d.c. from the supply is fed through R_9 and RFC_4 to the anodes of CR_1, CR_2 and CR_3. One diode, in this instance CR_1, will conduct, its circuit to ground being completed through S_1, R_1 and RFC_1. Its current, approximately 5 ma., and the resultant voltage drop across R_9, brings the voltage on the diode cathodes to 8 to 9 volts positive. The full supply

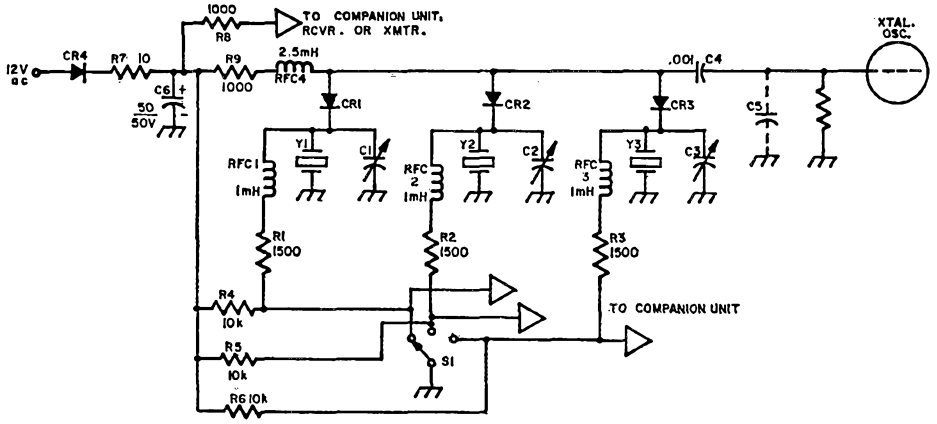


Fig. 2—Diode-switching of crystals having paralleled "netting" capacitors, in circuits where one side of the crystal is grounded. Three positions are shown, but up to four have been used. The d.c. source and the switching circuit can be used for the crystals in the companion unit of a transceiver. Power is shown here taken from the 12-volt a.c. line in one of the units, though an external d.c. source can be used.

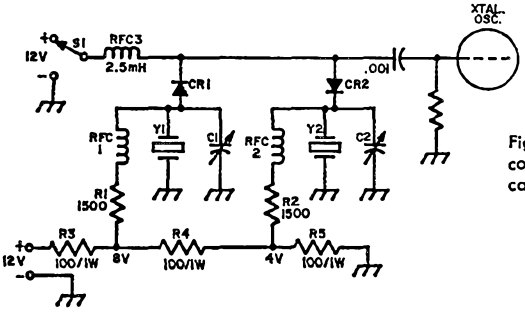


Fig. 3—Crystal switching of two positions with a single control wire. Values of the r.f. chokes RFC_1 and RFC_2 can be set up by experiment, though 2.5 mh. is satisfactory.

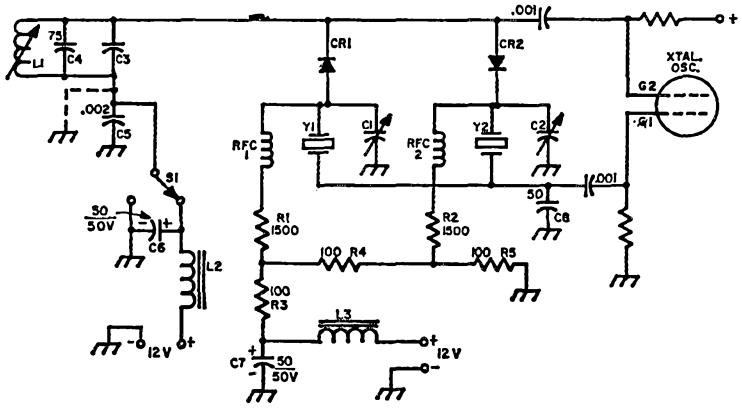


Fig. 4—Switching circuit for oscillators in which the crystal is above ground on both sides. Filtering in the 12-volt leads may be dispensed with if the voltage source is free of hum or other objectionable modulation.

voltage is used to reverse-bias the diodes not selected. (There will be no voltage drop across R_5-R_2 and R_6-R_3, as the only current flow in these essentially-open circuits is the minute leakage current through CR_2 and CR_3.) The diodes being reverse-biased, their junction capacitances are quite low. The switch does two things: it grounds R_4, removing the supply voltage from the cathode of CR_1, and it completes the forward-bias circuit from R_9 through RFC_4, CR_1, RFC_1 and R_1 to ground.

The same power source and switching may be used for both transmitter and receiver, if it is desired to switch both simultaneously. Only separate 1000-ohm isolating resistors, R_8 and R_9 in Fig. 2, are required.

The arrangements discussed thus far require one control wire between the operating position and the equipment, for each channel to be switched. A two-channel system using but one control wire is shown in Fig. 3. It requires that

(Continued on page 122)

A Junk Box Transistor Checker

BY HOWARD J. HANSON,* W7MRX

THE transistor checker shown in the photographs and in Fig. 2 was devised to be an adjunct to my junk box, which is continually falling heir to miscellaneous transistors of uncertain quality, ancestry and type. Basically the gadget consists of three different circuits:

1) A type test circuit to determine if a transistor is npn or pnp.

2) A beta test circuit to determine if a transistor has a dc current gain.

3) A battery test circuit to check the condition of the batteries used in the tester.

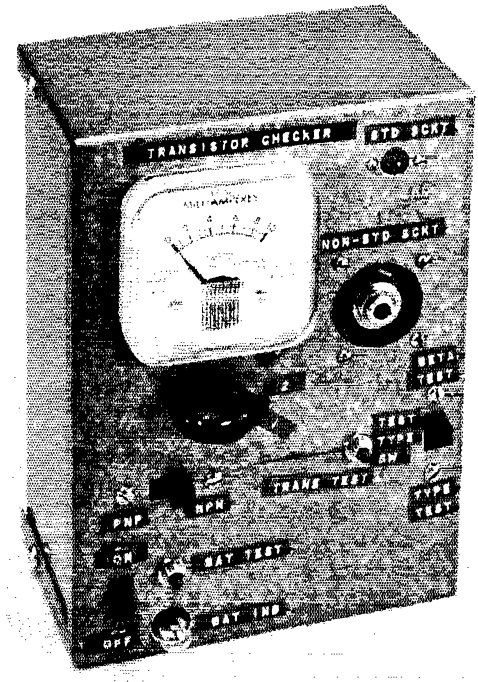
Type Test Circuit

A simplified version of the type test circuit is shown in Fig. 1A. It is based on the fact that when the collector lead is left open the base-to-emitter junction of a pnp transistor will conduct current only if the base is negative with respect to the emitter, whereas the base-to-emitter junction of an npn transistor will conduct current only if the base is positive with respect to the emitter. The type of a transistor is determined by plugging in the semiconductor and finding out whether the NPN or the PNP position of S_2 results in a meter reading. Of course, if the same indication is obtained in both switch positions, the transistor is no good. R_1 limits the current so that the transistor will not be damaged.

Beta Test Circuit

A simplified beta test circuit (set up for npn transistors) is shown in Fig. 1B. It is based on the fact that a transistor will not conduct in the forward direction as long as the base voltage is essentially the same as that of the emitter, whereas it will pass current once the base is biased with sufficient voltage of the same polarity (negative for pnp and positive for npn) as the collector. A transistor is checked for gain by plugging in the semiconductor and observing the meter while S_3 is operated. A good transistor will cause no meter reading when S_3 is open, and it will result in some meter indication when S_3 is closed[1] (closing S_3 applies a base bias of the proper polarity to cause the transistor to draw collector current through the meter).

* 30219–23rd SW, Federal Way, Washington 98002.



Front view of the transistor checker. The phone jack, which is used with a three-conductor plug and clip leads to make contact with transistors that don't have wire leads, is insulated by a piece of Plexiglas from the metal cabinet.

Battery Test Circuit

The battery test circuit is the simplest of the three circuits. As shown in Fig. 1C, S_4 connects flashlight bulb I_1 across battery BT_1. Since the bulb draws about thirty times as much current as the other circuits (300 mA as compared to about 10mA), whenever there's enough juice in the battery to light the bulb there's surely enough juice in the battery to operate the transistor tester.

Combination Circuit

Putting the three basic circuits together with a few auxiliary parts, I came up with the transistor checker shown in Fig. 2 and the photographs. Although the tester was constructed in a $3 \times 5 \times 7$-inch Minibox, any similar en-

[1] The 350-ohm resistance of the meter used by the author limits the maximum current a transistor can draw from the 3-volt battery to about 8.6 mA. — *Editor.*

closure can be used. The transistor socket is one of the standard types found in electronic stores, and it is capable of accepting just about any bipolar transistor having wire leads. To take care of those transistors that don't have wire leads, I wired a three-conductor microphone jack, J_1, in parallel with the transistor socket. Contact to a transistor is made via a three-conductor plug and alligator clips at the end of three short flexible leads.

Power for the tester comes from two D cells mounted in clips inside the box. Other arrangements can be made, of course, but I don't advise going much above 3 volts. M_1 is an inexpensive 0–10-mA unit, and a substitution can be made for it too.[2] The part I'm least proud of is the job I did with one of those sticky-tape labelmakers. Although the labels adequately identify the various functions on the tester, they don't do anything for the looks of the instrument. Decals are more attractive, and they are recommended for those concerned with the outward appearance of the tester.

(*Continued on page 122*)

[2] The resistance of the meter chosen for M_1 determines whether or not R_2 will be needed. To prevent pinning any meter in this circuit, the resistance of the meter plus the resistance of R_2 should be equal to 300 ohms or more. — *Editor.*

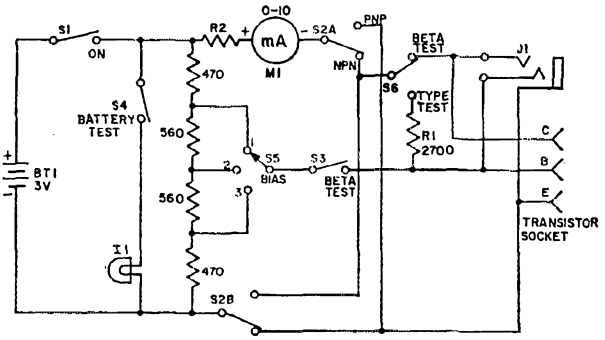


Fig. 2—Schematic diagram of the transistor tester. Resistances are in ohms, resistors are ½-watt composition.
BT_1—Two 1.5-volt flashlight cells (size D) in series.
I_1—2.5-volt, 300-mA flashlight bulb (No. 14).
J_1—Three-conductor open-circuit phone jack.
M_1—0-10-mA dc meter (Emico 2326).
R_1—For text reference.
R_2—Sufficient resistance to prevent M_1 from being pinned if the emitter and collector connections are shorted together. No resistor is needed if the Emico 2326 meter is used at M_1; see footnotes 1 and 2.
S_1—Spst slide switch.
S_2—Dpdt slide switch.
S_3, S_4—Miniature spst push-button switch, normally open.
S_5—One-pole, three-position rotary.
S_6—Spdt slide switch.

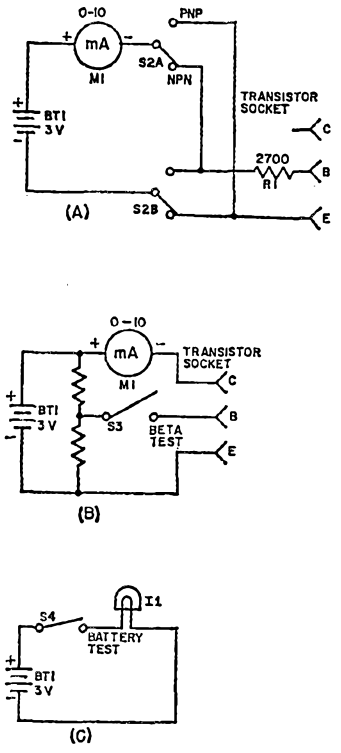
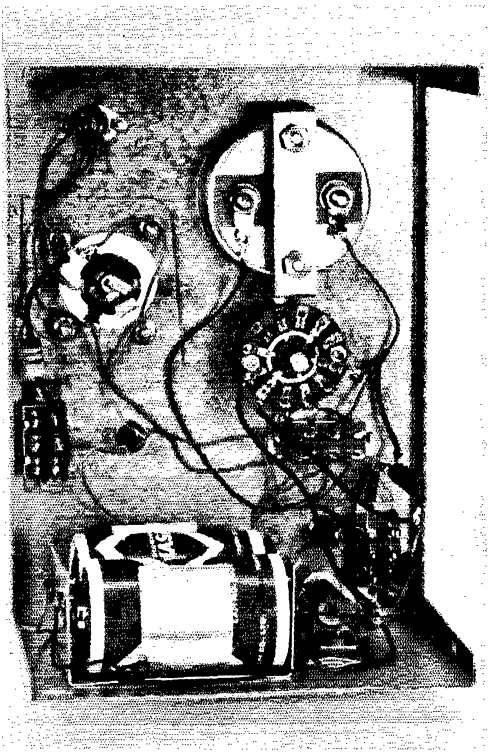


Fig. 1—The three basic circuits used to make up the transistor checker. (A) A type test circuit, (B) a beta test circuit (shown for npn transistors), and (C) a battery test circuit. Component labels are for text reference. Resistance is in ohms.

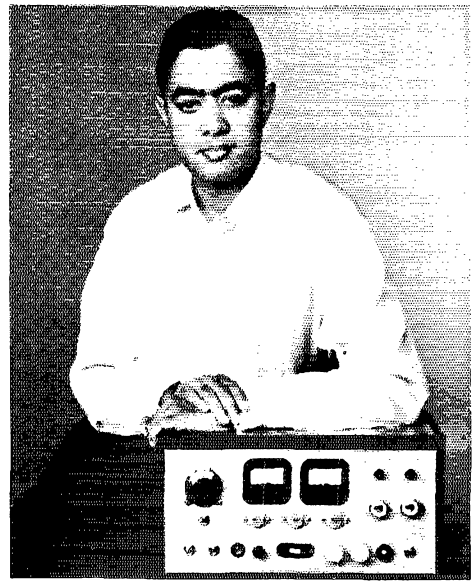


Interior view of the transistor tester. Because the author used available materials from his junk box, several resistors shown here have a larger wattage rating than that specified in Fig. 2 and several of the switches have more sections than are actually needed.

The Transistor Giant[1]

A High-Power Transistor Transmitter from India

BY R. JAYARAMAN,* VU2JN



VU2JN with the 75-watt transistor transmitter.

THIS compact, high-power transistorized transmitter runs with an input power of 75 watts on c.w. and 25 watts on a.m., in the 7-, 14-, and 21-MHz. amateur bands. It features a 28-volt regulated power supply, a stable FET v.f.o., and a 2N3950 power amplifier in the final feeding a T network.

The complete transmitter is built inside a 15 × 8 × 8-inch veneer cabinet with a 2½-inch high aluminum chassis and a ⅛-inch thick aluminum front panel. The front panel doubles as the heat sink for the audio power transistors.

In order to maintain a neat circuit configuration, n-p-n silicon transistors have been used throughout the r.f. section while p-n-p germanium transistors have been used throughout the audio section. The r.f. section works with the negative bus as common, while the audio section works with the positive bus as common. The schematic of the transmitter is shown in Fig. 1.

Power Supply

The fully regulated power supply furnishes four d.c. voltages. A completely shielded power transformer supplies 30 volts r.m.s. to a molded bridge rectifier. The output is smoothed by a 3500-μf. 75-volt capacitor to provide about 42 volts at no load and about 33 volts at a load current of 3 amp. The output voltage is then regulated at 28 volts by a two-stage transistor regulator. Regulation is applied to the negative side of the supply voltage. The regulator is followed by another 3500-μf. capacitor.

The regulator, an improved version of the conventional series regulator, gives good regulation and enables the regulator power transistor to be bolted directly to the chassis. The regulator employs a 29-volt Zener (formed by a 16-volt and a 13-volt Zener in series), a 2N600 p-n-p high-gain germanium transistor as the reference amplifier, and a 2N3716 150-watt n-p-n silicon power transistor as the power regulator. The 2N3716 is mounted on a small heat sink bolted to the chassis.

The power supply features good regulation, the output voltage beyond the ammeter being 28.8 volts at no load, 28.7 volts at 1 amp., 28.5 volts at 2 amp., and 28.0 volts at 3 amp. A scope test showed the ripple voltage to be 0.1 volt peak at a load current of 2 amp. Two 5-amp. fuses have been provided, one on the transformer secondary and another at the regulator, but in the event of a dead short the fuses do not offer much protection to the regulator transistor. The transistor can be protected against a short only by a transistor switch or limiter, which could not be incorporated since the d.c. input voltage under load is not high enough to accommodate the additional drop across a current sensor.

It is no pleasure operating a rig while being haunted by the fear of a short or a transistor burning out, especially when the d.c. voltage goes directly to the final tuning and loading capacitors. Spurred by an irrepressible urge to

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[1] Adapted from "A High-power Transistor Transmitter," by Jayaraman, Parts I to IV, *The Indian Radio Amateur*, June, August, October, and December, 1968.

This article presents a fully transistorized transmitter capable of handling 75 watts input on c.w. In addition to complete construction data, the author presents problems encountered when using solid-state devices at this r.f. power level, and the solutions to these problems.

dispose of an SCR which happened to be lying in the writer's "treasure box" for an unusually long time, the writer added an "emergency fuse-blower" circuit, incorporating a GE C20B SCR and a 16-volt 1-watt Zener diode. Under normal conditions the Zener blocks the positive gate signal and the SCR remains in the OFF state. When a short occurs in the output, the voltage across the 2N3716 transistor momentarily rises to more than 30 volts. Immediately, the Zener starts conducting and triggers the SCR into the ON state. The SCR plunges into heavy conduction, removes the dangerous voltage-current combination from the 2N3716 and maintains a short until the fuse blows. Since the C20B has a peak surge rating of 80 amp., it is hoped that the SCR will be able to bear the brunt of a short until the fuse blows. The writer did not want to lose a fuse (and possibly more!) by testing this protective circuit!

Subsidiary regulated voltages of 6.8 volts and 16 volts power the v.f.o and frequency-multiplying stages, respectively. Another regulated supply of −7 volts with respect to the positive bus powers the speech-amplifier stages.

When used with a power supply operated from 230-volt mains, a solid-state v.f.o. is susceptible to hum pickup. To avoid this trouble, the writer has observed the following precautions, in addition to good power-supply filtering:

a) The main power transformer is completely enclosed in a cadmium-plated steel box.

b) The power transformer is provided with an electrostatic shield between the primary and the low-voltage winding.

c) The power-line leads in the chassis are run throughout as twin-core shielded wire.

d) The v.f.o. is built inside a 3¾ × 3 × 3¼-inch rigid cadmium-plated steel box. All these precautions may not be essential, but the writer did not want to take any chances when building transistorized equipment!

The V.F.O.

The v.f.o. employs a Motorola 2N4416 n-channel JFET as a 3.5-MHz. Colpitts oscillator, followed by a two-stage untuned buffer amplifier utilizing a pair of 2N2369 n-p-n silicon transistors. The similarity of the oscillator circuit with that of a corresponding vacuum-tube version is striking. When the JFET oscillates, it automatically develops a negative gate bias. This is because of the gate current that flows through the high-value gate-leak resistor when the oscillating gate voltage swings positive with respect to the source.

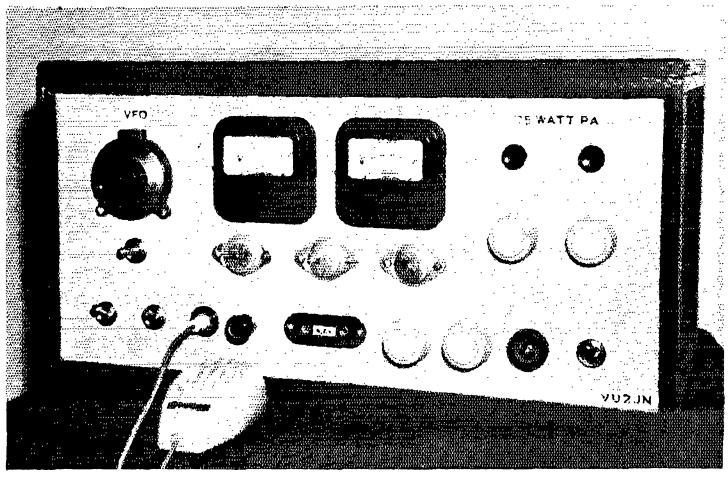
To eliminate pulling of the oscillator, the output is taken from a low-impedance point (the source) and light resistive coupling is used to the next stage. The two-stage buffer amplifier is similar to the circuit that appeared in an earlier article in *QST*,[2] except for the difference in biasing. Because of the direct coupling and d.c. negative feedback employed in the circuit, the performance of the buffer amplifier is critically dependent on the bias level.

The 5-μh. v.f.o. tank coil, L_1, is close-wound on a ⅝-inch diameter ceramic form and is reinforced with four longitudinal strips of Araldite epoxy resin, a polystyrene-type material. The v.f.o. tuning capacitor, C_1, is a 50-μf. double-ball-bearing type with short stiff plates. The 50-pf. bandspreading capacitor, C_2, is a Philips cylindrical air trimmer which, although quite small, is remarkably stable. This trimmer is mounted on a ceramic standoff and is so adjusted that the v.f.o. covers a frequency range of 3.500 to 3.575 MHz. The 150-pf. band-setting capacitor, C_3, is an APC trimmer which is mounted on the side wall of the box so that it can be adjusted from the outside. A small quantity of silicone grease is applied to the wiper contacts of the tuning capacitor and the APC trimmer.

The v.f.o. dial is a Japanese-made 2-inch planetary-drive dial having an 8 to 1 ratio. A flexible coupling is inserted between the dial drive and the tuning capacitor.

The v.f.o. is supplied with 6.8 volts from a Zener-regulated power supply, derived from the main 28-volt regulated supply of the trans-

[2] Hanchett, "The Field-Effect Transistor as a Stable V.F.O. Element," *QST*, December, 1966.



The Transistor Giant transmitter, housed in a 15×8×8-inch veneer cabinet. From left to right, the controls on the bottom are transmit/receive switch, c.w./a.m. switch, microphone socket, microphone gain, key socket, exciter bandswitch, exciter tuning, neon pilot light, and on/off switch. On the upper left are the v.f.o. tuning control and frequency-spotting switch, while on the right are the final tuning and loading controls and the two final bandswitches. Beneath the meters are the audio power transistors.

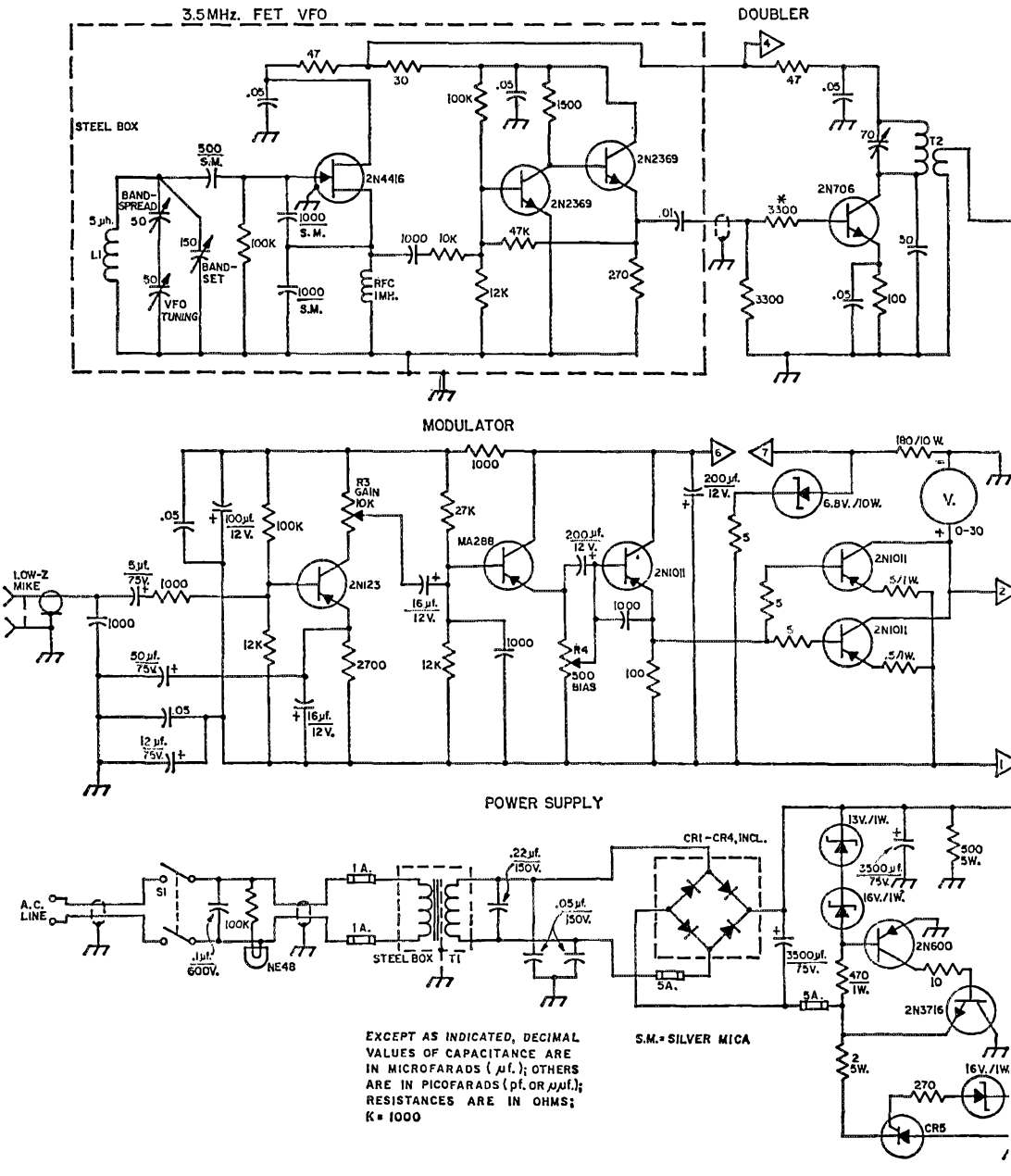


Fig. 1—Schematic of the high-power transistor transmitter. Unless otherwise indicated, resistors are ½-watt, 10-percent tolerance. Capacitors with polarity indicated are electrolytic; S.M. indicates silver mica. The four resistors shown with an asterisk (*) in the doubler, multiplier and driver stages may require slightly different values than shown for obtaining optimum drive to the p.a. on c.w. and a.m. The type of switch used by the author at S_2, S_3, and S_7 is not commonly available in the U.S.; readily available switches performing the same functions are shown in the schematic and in the parts list.

CR_1–CR_4 incl.—Rectifier, molded bridge, 6 amp., p.r.v. per cell 200 volts (Motorola MDA952-3 or similar).

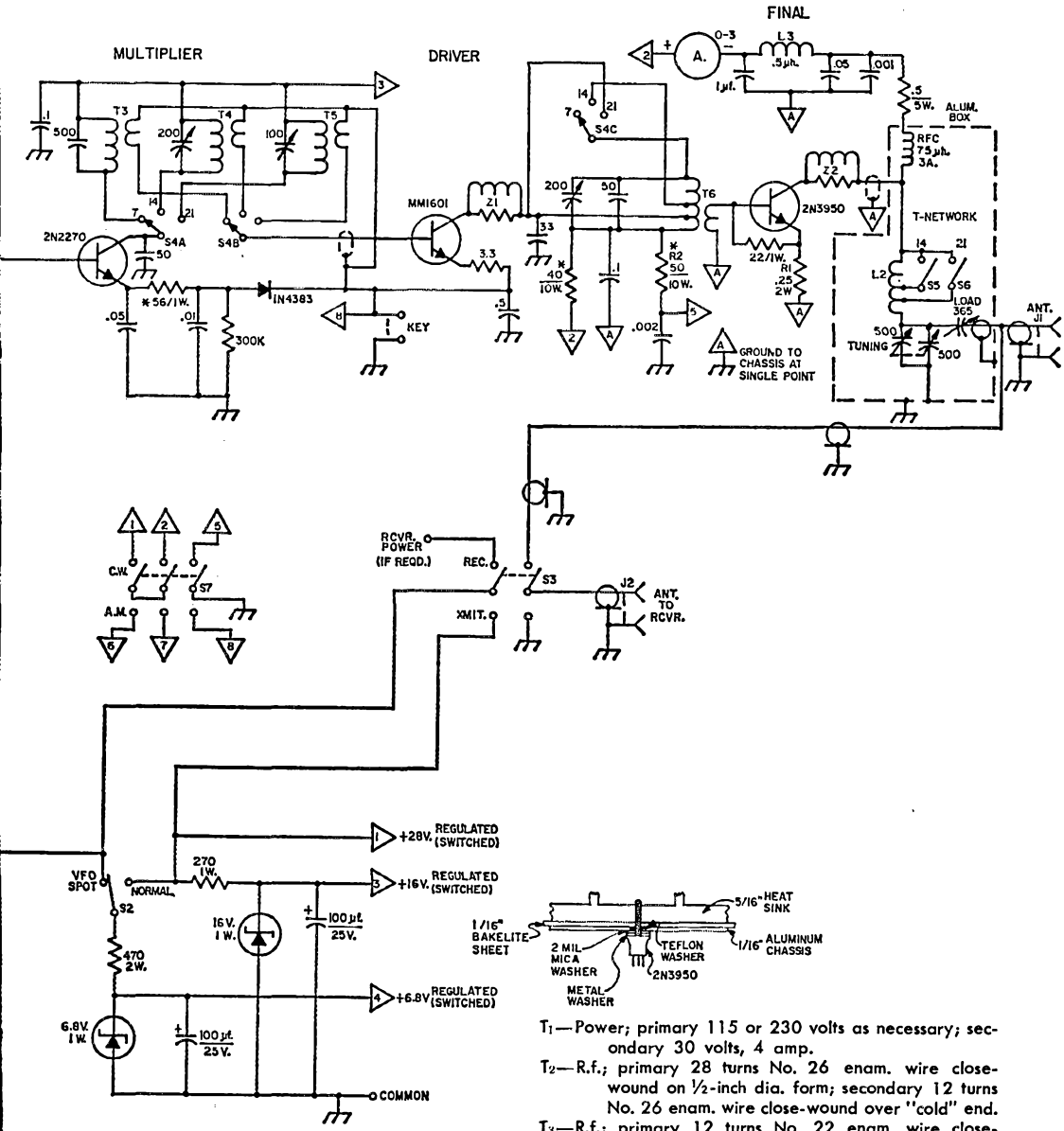
CR_5—SCR, GE20B or equivalent.

J_1, J_2—BNC chassis connector.

L_1—5 μh., 27 turns close-wound on No. 20 enam. wire, ⅝-inch dia. ceramic form.

L_2—1.2 μh., 11 turns No. 12 copper wire wound to a length of 1⅝ inches on ⅞-inch dia. bakelite form. Tapped at 5th turn from collector end for 14-MHz. operation and 7th turn from collector end for 21-MHz. operation.

L_3—0.5 μh., 6 turns No. 12 copper wire wound to a length of ¾ inch on ¾-inch dia. ceramic form.



R_1—0.25 ohm, 2 watts, low inductance; made by paralleling four 1-ohm ½-watt composition resistors.

R_2—For text reference.

R_3—10,000-ohm 2-watt control, audio taper.

R_4—500-ohm 2-watt control, linear taper.

S_1—D.p.s.t. toggle.

S_2—S.p.d.t. toggle, minimum contact rating 4 amp. at 30 volts (Cutler-Hammer 7582K6 or similar).

S_3—D.p.d.t. toggle, minimum contact rating 4 amp. at 30 volts (Cutler-Hammer 7592K6 or similar). One pole, as shown, is used for r.f. switching; the builder, instead, may wish to use this pole to control a coaxial antenna transfer relay.

S_4—Miniature ceramic rotary, 1 section, 3 poles, 3 positions, non-shorting (Centralab PA-6007 or similar).

S_5, S_6—S.p.s.t. push-pull, heavy duty.

S_7—3 p.d.t. toggle, minimum contact rating 4 amp. at 30 volts (Cutler-Hammer 7615K2 or similar).

T_1—Power; primary 115 or 230 volts as necessary; secondary 30 volts, 4 amp.

T_2—R.f.; primary 28 turns No. 26 enam. wire close-wound on ½-inch dia. form; secondary 12 turns No. 26 enam. wire close-wound over "cold" end.

T_3—R.f.; primary 12 turns No. 22 enam. wire close-wound on ½-inch dia. form; secondary 4-turn link No. 20 enam. wire close-wound.

T_4—R.f.; primary 6 turns No. 22 enam. wire close-wound on ½-inch dia. form; secondary 2-turn link No. 20 enam. wire close-wound.

T_5—R.f.; primary 6 turns No. 20 enam. wire close-wound on ½-inch dia. form; secondary 2-turn link No. 20 enam. wire close-wound.

T_6—R.f.; primary 20 turns No. 20 enam. wire close-wound on ⅝-inch dia. form, tapped 6 turns from the R_2 end for 21-MHz. operation and 10 turns from the R_2 end for 14-MHz. operation; secondary 2-turn link No. 20 enam. wire close-wound.

Z_1—Parasitic suppressor; 6 turns No. 20 enam. wire close-wound over a 10-ohm 1-watt resistor.

Z_2—Parasitic suppressor; 6 turns No. 18 enam. wire spaced to a length of ½ inch, wound over a 1-ohm 2-watt resistor.

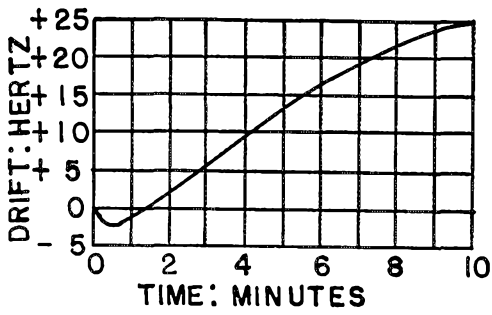


Fig. 2—Typical drift of v.f.o.

mitter. Because of this two-step regulation, the supply voltage remains perfectly constant.

The v.f.o. has been thoroughly tested. Fig. 2 shows the typical warm-up drift pattern as observed on a Hewlett-Packard frequency counter. The total drift during the first ten minutes is +25 Hertz. The v.f.o. was found to be quite insensitive to small voltage fluctuations. A 0.1-volt drop in the supply voltage produced a negligible drift of −6 Hertz.

The r.f. output of the v.f.o. is about 1.5 volts r.m.s. The output is taken by means of a short length of Amphenol 21-597 subminax 75-ohm thin coaxial cable.

The Exciter

Fig. 3 shows a block diagram of the r.f. section of the transmitter. A well-designed Class C transistor r.f. stage will provide a power gain up to 17 db. However, it is not very desirable to reach the power amplifier with the minimum number of stages. With some power to spare, the coupling between stages can be made lighter, thus contributing to better harmonic suppression.

The v.f.o. is followed by two high-efficiency frequency-multiplying stages which deliver more than 200 mw. of r.f. drive to the driver stage on all three bands. The first of these is a 2N706 Class C doubler which provides about 25 mw. r.f. output on 7 MHz. In the VFO SPOT position of S_2, the v.f.o. and the 2N706 stages are both switched on to provide a healthy signal in the receiver.

The 2N706 drives a 2N2270 Class C frequency-multiplier to an input of 400 mw. on 7, 14, or 21 MHz. Separate coils are band-switched on each band. Since the load impedance of the 2N2270 is around 200 ohms, while the input impedance of the driver is around 20 ohms, all the coils have a constant turns ratio of 3:1. The 7-MHz. coil is purposely detuned on the low-frequency side to equalize the output on all bands. The 14- and 21-MHz. coils are carefully peaked to provide the maximum output.

One serious problem in transistor transmitters is that of obtaining enough selectivity in the tuned circuits to give adequate rejection of the harmonic content. Since the tuned circuits are all loaded and work at very low impedance levels, their selectivity is rather poor. For example, when the exciter is delivering power on 14 MHz., there is an annoying amount of output on 10.5, 17.5 and 21 MHz. The selectivity can be improved by reducing the number of turns in the secondary links of the coupling coils to the bare minimum necessary. The writer is now experimenting on a toroidal coil for the doubler tank circuit.

The Driver

The driver stage uses a recently-introduced Motorola v.h.f. transistor, MM1601, capable of delivering 3 watts output at frequencies up to 175 MHz. from a 14-volt supply. This stage operates as a keyed stage on c.w. and as a modulated stage on a.m. Modulation of the driver along with the p.a. is essential for getting deep and clean modulation.

The MM1601 is mounted on the chassis and runs cool at an input of 2 to 2.5 watts in Class C operation, at a collector voltage of about 12 volts on c.w. and 8 volts, modulated, on a.m. These voltages can be modified, if necessary, to provide proper drive to the p.a. on c.w. as well as a.m. It may be noted here that the p.a. requires nearly the same drive for an input of 75 watts at 28 volts on c.w. as it does for an input of 25 watts at 13 volts on a.m. Since ample drive is available from the multiplier stage, negative feedback is provided in the driver stage by leaving the 3.3-ohm emitter resistor unbypassed.

The design of the driver tank coil for a multiband transistor transmitter is quite critical. In order to avoid v.h.f. instability, it is imperative that the coil be located close to the p.a. and that the secondary link run straight to the emitter and base terminals of the p.a. with the shortest possible leads. This requirement precludes the use of separate coils on the different bands or the use of a band-switched link. On the other hand, since the output impedance of the driver is in the neighborhood of 50 ohms and the input impedance of the p.a. is about 5 ohms, a constant turns ratio of 3:1 should be maintained on all bands. The writer has reconciled these conflicting requirements in the coil design shown in Fig. 1. From the viewpoint of stability of the p.a., a high Q is not desirable for the driver tank circuit. The taps are so located that peak drive is obtained on all bands within the range of the tuning capacitor. It is desirable to provide a 50- to 100-pf. fixed mica capacitor in parallel

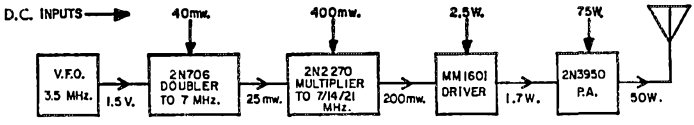
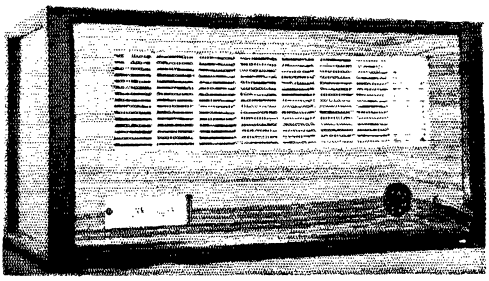


Fig. 3—Block diagram of the transmitter. R.f. levels are shown between blocks.



Rear view of the Transistor Giant, showing the author's method of ventilating the transmitter. The BNC jacks are used for connecting the antenna and the receiver's antenna input cables. The octal plug makes regulated d.c. voltage available for external use.

with the driver tuning capacitor, since reducing the tank capacitance to a low value may throw the p.a. into v.h.f. oscillation.

Although the drive to the p.a. can be controlled by detuning the driver tank circuit, this is not recommended since the harmonic suppression then suffers, especially on 14 and 21 MHz. The best procedure is to peak the driver tuning and adjust the secondary links on the collector coils of the 2N2270 multiplier stage so as to give a peak r.f. drive of 3 to 4 volts, measured at the base terminal of the p.a. The collector lead of the p.a. should be disconnected during the test. If necessary, the drive can be increased by cautiously lowering the value of the emitter resistor of the 2N2270 multiplier stage or the collector supply dropping resistor for the MM1601 driver.

Keying

Because of the feedthrough capacitance of transistors, at least two stages must be keyed in order to get satisfactory keying. The writer has adopted emitter keying of both the multiplier and driver stages.

Emitter keying of two transistor stages is not as safe and simple as cathode keying of two vacuum-tube stages. If one of the two stages fails or starts oscillating in the key-up position, there is the possibility of a positive voltage appearing at the emitter of the other stage, which could end up in destruction of the transistor. As a safety arrangement, therefore, the emitter of the multiplier stage is protected against any positive voltage leaking from the emitter of the driver by a silicon blocking diode.

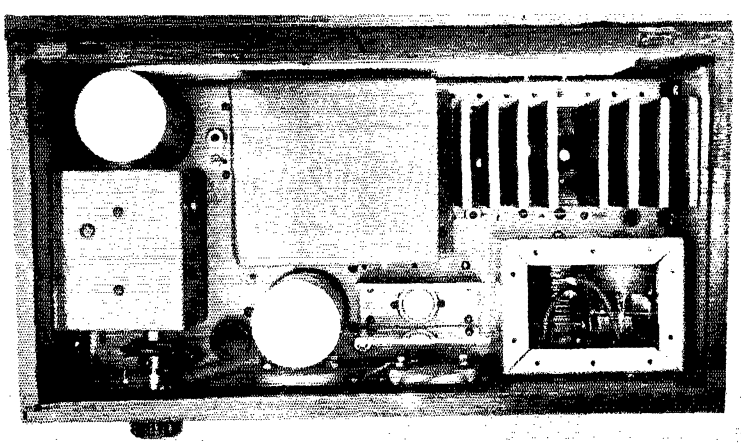
Since the key-up voltage at the key is just about 3 volts, while the key-down current is 200 ma., the key contacts should be solid and clean for getting proper keying. It would have been better to adopt base-block keying (similar to grid-block keying), but unfortunately, there is no provision for a negative supply in the transmitter. The envelope shaping can be controlled by modifying the value of the 0.5-μf. capacitor.

The Final

The final employs a Motorola 2N3950 v.h.f. transistor capable of delivering an output of 50 watts at frequencies up to 50 MHz. from a 28-volt supply. The emitter of the transistor is internally connected to the TO-60 case so as to provide the very low-impedance emitter-to-ground path which is so vital for power gain. The collector voltage is 28 volts on c.w. and about 13 volts modulated on a.m. The drive power necessary to give the full input of 75 watts ranges from about 0.8 watt at 7 MHz. to 2.0 watts at 21 MHz.

The p.a. runs as a Class C stage without any quiescent bias. Although apparently a Class B stage, the p.a. actually runs as a Class C stage with a conduction angle of less than 180 degrees, since the base-emitter junction starts conducting only when the positive base voltage swings above 0.5 volt or so. When there is no drive, the p.a. collector current is zero.

When handling an input of 75 watts, the input impedance of the stage is as low as 5 ohms, and the output load impedance about 8 ohms. The input circuit is a two-turn link wound over the cold end of the driver tank coil, connected straight to the base and emitter terminals of the p.a. The output impedance is stepped up to 50 ohms by a T network, designed for a loaded Q of 6. The T network utilizes a sturdy 1.2-μh. tank coil tapped for 14- and 21-MHz. operation.



Top view of the transmitter. The v.f.o. box is located at the left, while the shielded power transformer is near the center. The two round objects are the 3500-μf. capacitors. The power-regulator transistor and its heat sink may be seen in front of the transformer, and on the right rear is the p.a. transistor and its heat sink. The final T-network compartment is shown with the cover removed.

TABLE I
T-NETWORK SPECIFICATIONS

Input Impedance: 8 ohms.
Output impedance: 50 ohms.
Loaded *Q*: 6.

Freq., MHz.	*Tank coil inductance, μh.*	*Tuning capacitance, pf.*	*Loading capacitance, pf.*
7	1.2	300	200
14	0.6	150	100
21	0.4	100	70

See Table I. Two heavy-duty push-pull switches are used for shorting part of the coil on 14 and 21 MHz. The tuning capacitor is a 2-gang 500-pf. receiving-type capacitor and the loading capacitor is a single-gang 365-pf. receiving-type capacitor. The loading capacitor has insulated mounting and is provided with a stop so that it cannot be turned open beyond a value of 50 pf. This precaution is necessary to prevent accidental decoupling of the antenna by inadvertent rotation of the tuning capacitor to the minimum position.

Two meters on the front panel monitor the performance of the p.a. A 0-30 voltmeter shows the voltage across the p.a., while a 0-3 ammeter shows the p.a. collector current.

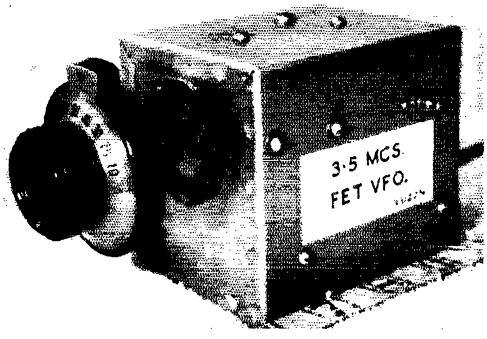
Being a high-performance device, the 2N3950 is highly prone to v.h.f. and low-frequency self-oscillation, the latter being more difficult to tackle. V.h.f. parasitics have been suppressed by the following precautions:

a) Providing negative feedback in the final stage by inserting a 0.25-ohm 2-watt emitter resistor.

b) Loading the base with a 22-ohm 1-watt resistor.

c) Inserting a parasitic suppressor choke directly at the collector pin.

d) Providing an aluminum shield across the transistor and isolating the output network in an aluminum compartment.



The v.f.o. in its steel box. The box is rigidly bolted to the transmitter chassis during the final assembly stages.

e) Adopting single-point grounding of the r.f. returns of the final stage to a brass bolt affixed to the chassis.

RG-58/U coaxial cables carry r.f. into and out of the compartment.

Since the gain of r.f. transistors is frequency dependent, being greatest at low frequencies, the greatest danger to the final comes from low-frequency self-oscillation which can lead to voltage and current swings beyond the safe-area limits. The presence of low-frequency parasitics can often be noticed by carefully listening for any slight ringing or vibration of a series rheostat inserted in the collector-supply line during the initial tune-up of the transmitter. Low-frequency oscillation can be avoided with confidence only by eliminating the collector choke and feeding the collector voltage through an auxiliary tank coil forming part of the r.f. network. The writer did not adopt this arrangement since it leads to complications in band switching, but instead inserted a 0.5-ohm 5-watt wire-wound resistor in series with the r.f. choke so as to provide a certain amount of decoupling and to dampen oscillations due to resonance of the choke with the bypass capacitors.

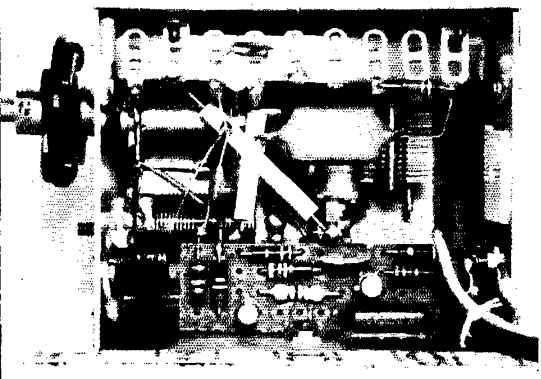
With all these precautions, the 2N3950 remains "quiet" and stable. The negative feedback in the stage does affect the stage gain. But without feedback, the final had wide-spectrum v.h.f. parasitics when run at the maximum collector voltage, possibly due to the final stage components not being located close enough to the p.a. It is no doubt preferable to compromise on the gain rather than risk losing the 2N3950!

The p.a. needs a high-capacity heat sink to take care of a collector dissipation up to 26 watts, assuming a minimum final-stage efficiency of 65 percent. For safe operation at ambient temperatures up to 45 degrees centigrade, the p.a. needs a heat sink with a thermal resistance of about 3 degrees centigrade per watt. To be on the safe side, a heavy (6-pound) integrally-cast copper heat sink is used. The heat sink was cast in a local foundry under the writer's supervision. The $5 \times 2\frac{1}{2} \times \frac{5}{16}$-inch base plate is machined on the bottom and tapped to receive the 2N3950. The heat sink is insulated from the chassis by a $\frac{1}{16}$-inch thick bakelite sheet, and is bolted to the chassis by means of four insulated bolts. Too thin an insulating layer should not be used, as this may result in excessive sink-to-chassis capacitance. The 2N3950 is insulated from the chassis by mica and Teflon washers, and is screwed onto the heat sink. See Fig. 1. Heat conduction takes place through the chassis as well as the heat sink.

Metal washers of different thicknesses should be tried and the correct one determined by trial and error so that when the 2N3950 is moderately tightened with a small spanner wrench, the pins of the transistor maintain the desired orientation.

The Modulator

The a.m. performance of a transistor p.a. is limited by the fact that, unlike a vacuum tube,



Inside view of the v.f.o. box. The FET is mounted on the tie-point strip appearing along the top edge of the compartment in this view.

the power transistor in a practical circuit is voltage- and current-limited, and not dissipation-limited. Full 100 percent modulation of the p.a. doubles the peak collector-emitter voltage and the peak collector current. It follows that on a.m. the collector supply voltage should be halved to prevent voltage breakdown, and the collector current should be limited to about two thirds of the c.w. value so as to avoid saturation effects. Thus, the maximum carrier input on a.m. is limited to about one third of the carrier input on c.w.

Two types of modulators are commonly used in transistor transmitters — the Class AB push-pull modulator and the Class A series modulator. The writer has adopted the series modulator in view of some of its attractive features, such as elimination of supply voltage switching for the p.a., elimination of all audio transformers, less distortion and better linearity of modulation. The chief drawback of the series modulator is the high collector dissipation of the modulator, and this is taken care of by a pair of Motorola 2N1011 90-watt p-n-p germanium power transistors in parallel.

The modulator consists of a four-stage audio amplifier capable of delivering an output of 12 watts. The audio stages work with the positive bus as the common return. The first three stages are fed from a supply of about −7 volts with reference to the positive bus, developed across a 6.8-volt Zener diode and a 5-ohm series resistor. The first stage uses a 2N123 medium-gain transistor, followed by an emitter-follower stage using a very high-gain transistor, Motorola MA288 (β = 320). Hum is minimized by locating the speech amplifier close to the microphone socket and by placing the gain control after the first stage.

The second, third and fourth stages are cascaded direct-coupled stages. The d.c. bias level of the modulator is set by the 500-ohm potentiometer. The 2N1011 modulator transistors have matched 5-ohm base resistors to equalize the audio drive, and matched 0.5-ohm emitter resistors to provide a certain amount of negative feedback. The driver and modulator transistors are mounted on the ⅛-inch aluminum front panel with 0.002-inch thick mica insulating washers.

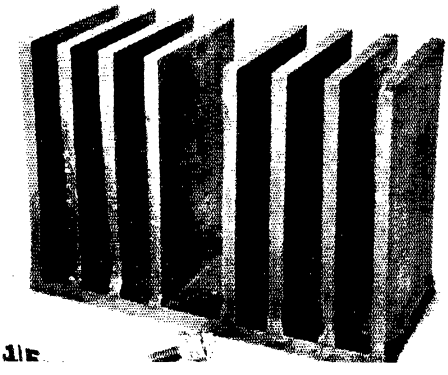
With a series modulator, it is very important to have proper division of the supply voltage between the p.a. and the modulator. A proper arrangement is to drop about 13 volts across the p.a. and 15 volts across the modulator. In the a.m. position, the bias potentiometer of the modulator is set so that the voltage across the p.a. is 13 volts when the p.a. collector current after tune-up is 1.8 amp.

Tune-Up of the Transmitter

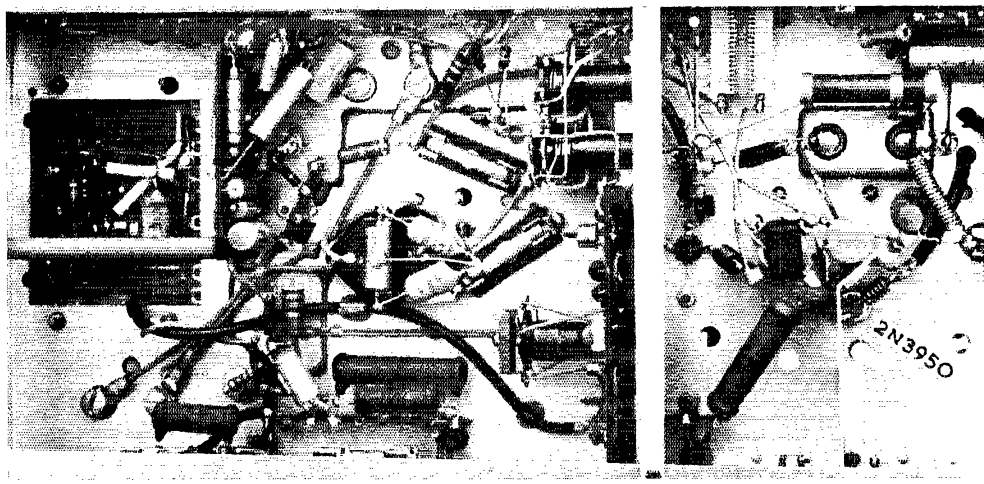
Before attempting to test the transmitter, it is worthwhile to feed the 28-volt regulated supply to an oscilloscope and make sure that the power supply voltage is free from a.c. components. The series regulator, in conjunction with the succeeding filter capacitor, may sometimes give rise to a low-frequency oscillation which will remain superposed on the d.c. supply voltage. Unless adequately suppressed, this parasitic component is almost certain to trigger disastrous low-frequency oscillation of the 2N3950.

The initial tune-up of the transmitter calls for extreme care and the observance of necessary precautions. A 50-ohm 3-amp. rheostat is inserted in the collector supply line to the p.a. A field-strength meter is a must for checking the output on the operating frequency as well as to check for the presence of any harmonic or spurious radiation.

Drive is applied and the T network is tuned for maximum field-strength meter reading on the operating frequency. It is good practice to bring up the drive along with the loading. The collector voltage is then gradually increased to 28 volts in steps by turning the rheostat, retuning the T network if necessary, and *making sure every*



The tiny 2N3950 p.a. transistor and the giant 6-pound heat sink.



Bottom view of the transmitter. The plate covering the bottom of the v.f.o. box has been removed at the left. The partially hidden diamond-shaped object near the center is the bridge rectifier. The frequency-multiplying stages are located on the left side of the shielding partition, with the driver and p.a. stages on the right. The upper partition divides the band-switch (hidden by the chassis lip), providing isolation between the multiplier and driver stages. The location of the 2N3950 p.a. transistor is marked in the photo. Note the shield, which just clears the transistor connecting pins. The shield isolates the input and output portions of the circuit for the final stage.

time that the collector current drops to zero in the key-up position. The p.a. can be loaded to a collector current up to 2.7 amp. on c.w. and 1.8 amp. on a.m.

After initial tune-up, the positions of the tuning and loading capacitors are marked on the front panel so that the T network may be tuned approximately to the band of operation before applying power to the final. Also for operation, the tuning is always checked first in the a.m. position, in which the 2N3950 is comparatively safer.

Since the final is not provided with any sort of automatic bias control, operation with mismatched antennas is not contemplated. The transmitter is operated only with matched antennas of 50- to 75-ohm impedances.

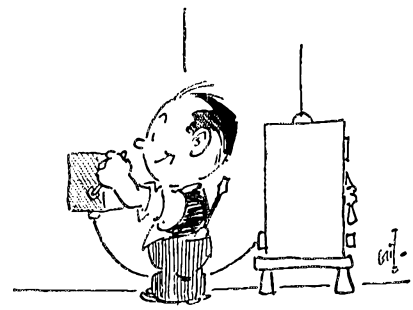
Conclusion

Any experimenter wishing to build a similar transmitter would do well to have a more compact layout for the final stage. The strong fields associated with the heavy currents in the final stage create unusual problems that may not be fully anticipated by the builder. Shielding and grounding assume a new perspective, so to say, in these low-impedance high-current applications.

It was discovered the hard way that the 2N3950 is too delicate to be handled carelessly! The writer is even inclined to believe that operation of the 2N3950 at the recommended 28 volts c.w. does not provide a comfortable factor of safety against base-collector voltage breakdown. The feeling one gets after burning out such a hard-to-get transistor is something that cannot be described adequately in words! Fortunately, a replacement was available to carry the project to completion.

The writer wishes to express his gratitude to Joe Mehaffey, K4IHP, but for whose spontaneous help and encouragement it would not have been possible to embark upon a project of this nature. Thanks are also due to Ed Bissell, W3MSK/VU2MSK, Marv Gonsior, W6VFR, and Bob Irish, K5ZOL, for their helpful cooperation, and to Paul Thorpe of Motorola Inc., U.S.A., for releasing transistor samples for the writer's experimental use. It is hoped that this article has highlighted the unique problems involved in the design and construction of high-power transistor transmitters for amateur-band applications.

Transistor transmitters are becoming increasingly popular in a variety of applications. As r.f. power transistors become more and more popular, their present high cost is bound to come down. The day may not be far off when a 100-watt r.f. transistor will be put in the market at a price well below that of a 6146B tube! QST

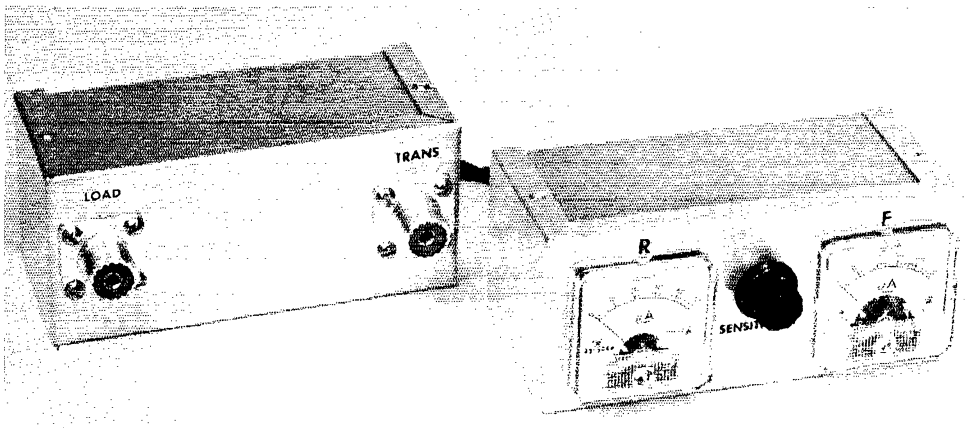


DO YOU KILL ALL TRANSMITTER CIRCUITS COMPLETELY BEFORE TOUCHING ANYTHING BEHIND THE PANEL?

● *Beginner and Novice*

An Etched-Circuit Monimatch For Checking Your Antenna System

BY LEWIS G. McCOY,* W1ICP



Here is the completed Monimatch with the two meters and the sensitivity control in the box at the right. The sensing unit is at the left.

A Novice who reads the instruction manual that comes with his transmitter and uses a 50-ohm dummy antenna can follow the tune-up procedures fairly accurately. With the dummy antenna he will find that the settings for the tuning controls will be fairly close to those specified by the manufacturer. However, when an antenna system is attached to the rig, in many instances the adjustments are far removed from any "book" setting. When this happens the Novice finds that he cannot get proper tuning of the rig, or worse yet, actually damages the equipment by trying to "force" it to work.

Nearly every transmitter these days, whether commercial or home-built, has a final amplifier stage that is designed to work into a 50-ohm load. If the load is something other than 50 ohms it may be impossible to tune the amplifier stage correctly. Of course, an important part of the problem is finding out what the load is — or, rather, how far from 50 ohms it happens to be. The piece of measuring gear described in this article is a device for doing just this. However, before describing the Monimatch and what it can do, let's take a little closer look at antenna-system loads.

*Novice Editor

The "50-Ohm" Load

The evolution of transmitter design since WWII has been influenced by several factors that have led to design that is more or less standard these days. First off, television came along right after the war and the hams quickly discovered that extremely tight shielding of a transmitter was needed to prevent undesired radiation that could cause TVI. However, when tight shielding was installed, band changing without bandswitching became a real chore because there were so doggone many screws to unscrew and rescrew.

The one type of tank circuit that lent itself very well to the problem was the pi network. It was a fairly simple job to design a tightly-shielded bandswitching transmitter, using the pi network, that would work into a 50-ohm load. Why 50 ohms? Simply because at this time 50-ohm coaxial cable had become a very popular type of transmission line. During the war techniques were developed that made the manufacture of flexible coaxial cable a reliable and economical process. So TVI and the availability of coax feed lines were the primary contributing factors that led to our present-day transmitter design.

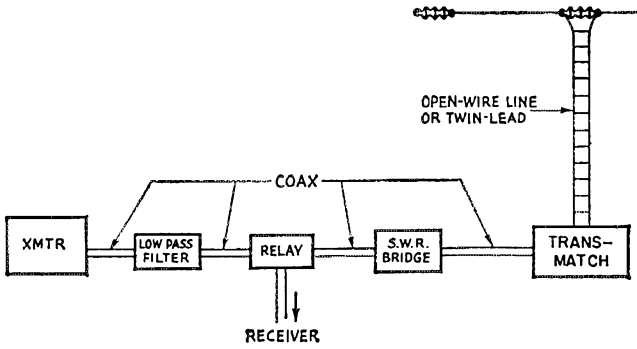


Fig. 1— A typical setup for using a Monimatch in a multiband antenna system using a single dipole. The length of the dipole is not critical but it should be at least ¼ wavelength overall at the lowest operating frequency for good efficiency. The feed line can be any length. The antenna relay and low-pass filter may be omitted if not needed.

If the load that is attached to the transmitter is something other than 50 ohms then the transmitter may be difficult to load, depending on a couple of other factors. While it is possible to design a pi network that will handle quite a wide variety of loads, many present day manufacturers, in order to compete in given price ranges, use a minimum number of parts in the tank circuit of the amplifier. For such rigs to operate properly the load must be between 25 and 75 ohms. This of course means that the user *must* furnish a load that will fall within this range.

Transmission Lines

The output terminal on all rigs these days is a coax fitting, which of course implies that a coaxial line must be attached to the rig. This doesn't mean that the coaxial line has to go all the way to the antenna. It could be connected to a transmatch or a balun. What is important is that the first thing in the antenna system is the coaxial line that is attached to the rig.

Many Novices mistakenly believe that if you attach a 50-ohm coaxial cable to rig you *automatically* have a 50-ohm load. This is not true. The 50-ohm designation on the cable merely means that 50 ohms is the *characteristic impedance* of the cable. The characteristic impedance of a transmission line is determined by the size of the conductors used, the spacing of the conductors, and the dielectric material used to separate and support the conductors. The only time you would have a 50-ohm load using 50-ohm cable is when the line is terminated in its characteristic impedance. In other words, if the antenna has an impedance of 50 ohms then you will have a 50-ohm load on the rig. If the antenna has an impedance of other than 50 ohms then the load at the transmitter will be something other than 50 ohms. This in turn leads us up to a short discussion of standing-wave ratio.

SWR

If a transmission line is terminated in its characteristic impedance, all the power fed into the line from the transmitter will be delivered to the load end — in this case, the antenna. Actually, not quite all the power will reach the antenna because there is always some loss in the transmission line itself. However, what is important is that when the line is terminated in

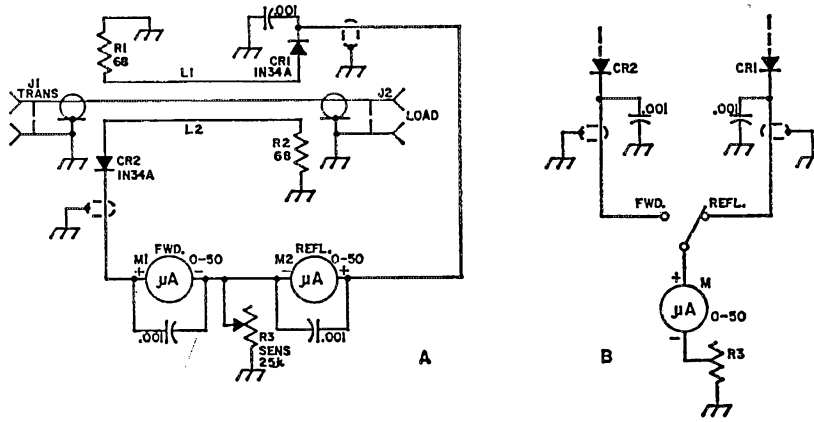


Fig. 2—Circuit details of the etched-circuit Monimatch. The 0.001 μF capacitors are disk ceramic.

CR_1, CR_2—1N34A germanium diodes.

J_1, J_2—Coax chassis fittings, type SO-239.

L_1, L_2—See text and Fig. 3.

M_1, M_2—0-50 uA meter (Lafayette 99 H 5049).

R_1, R_2—68-ohm, ½-watt carbon or composition.

R_3—25,000-ohm control, linear taper.

S_1—S.p.d.t. switch.

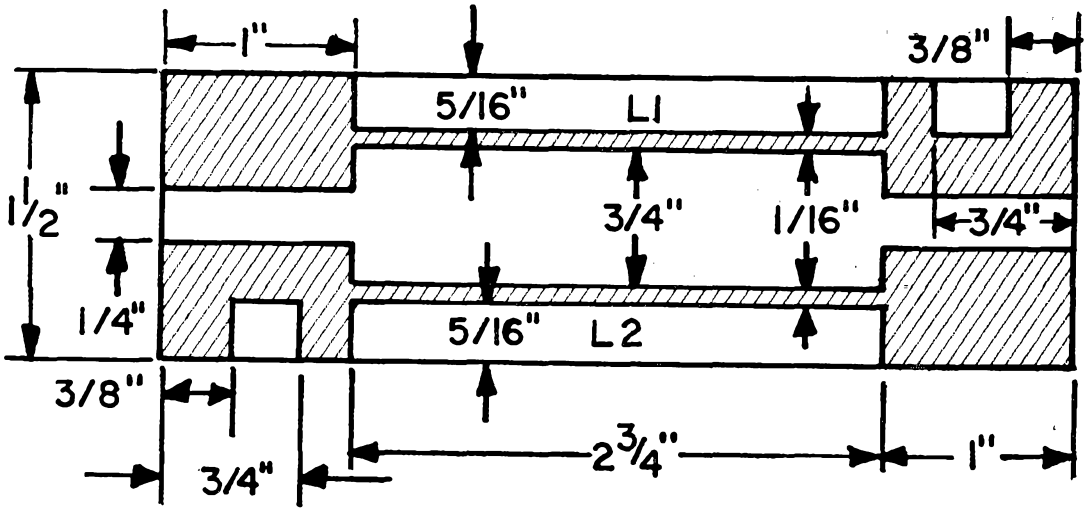


Fig. 3—Etched circuit board template. The foil side is shown, the etched portion is shaded.

its characteristic impedance none of the power that reaches the end is reflected back toward the transmitter; all of it is used up in the antenna.

When the antenna impedance is different from the line impedance some of the power will be reflected back toward the transmitter end. Standing waves of voltages and currents will then exist on the transmission line. When this happens, the transmitter will no longer "see" a 50-ohm load. Exactly what the load will be will depend on several factors,[1] but suffice to say it will be something other than 50 ohms.

The standing-wave ratio on the transmission line is the ratio of maximum to minimum voltage or maximum to minimum current that exists along the line. If the line were matched in its characteristic impedance the voltage would be the same along the line and of course the SWR would be 1 to 1. The SWR is determined by dividing the resonant antenna impedance into the line impedance, or vice versa. For example, if the antenna impedance were 25 ohms and a 50-ohm line were used, the SWR would be 2 to 1.

For a moment, let's assume that regardless of how bad a mismatch exists, we are still able to tune and load our transmitter. The question then arises, how does the mismatch affect the losses in the transmission line? The answer to the question depends on how efficient the transmission line is.

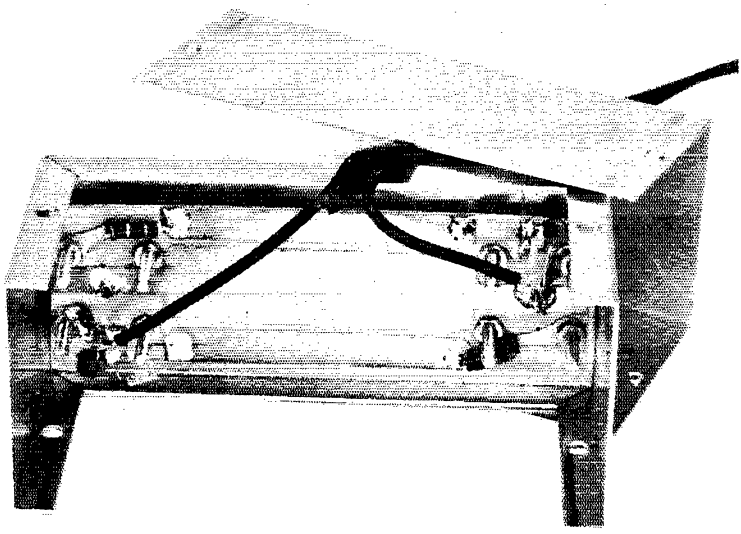
Remember earlier we said there are always *some* power losses in every transmission line. If we have a mismatch at the antenna end, some of the power that reaches the end will be reflected back down the line. In traveling back, some of *this* power will be dissipated in the line, and the higher the SWR the higher these additional losses will be, because a higher SWR means that a greater proportion of the power will be reflected. In a transmission line that is 100 percent efficient (one that has no losses) it follows that regardless of how high an SWR exists, we wouldn't have any losses due to the SWR. Unfortunately, there "ain't no such" line, although some types of lines are much less lossy than others.

Also unfortunately, coaxial lines fall into the class that can be considered to be lossy lines. Just as an example, let's assume that you are using 100 feet of RG-58/U on the Novice 15-meter band, and you are getting 50 watts out of your 75-watt Novice rig. This 50 watts is what is leaving your transmitter on the way to antenna via the 100 feet of line. The loss for 100 feet of RG-58/U at 21 MHz is 1.9 decibels. Translating this figure to power, we would lose about 20 of our 50 watts in the losses in the feed line, leaving only 30 watts to reach the antenna and be radiated. This is assuming the antenna impedance to be 50 ohms, the same as that of the line. If there is a mismatch the losses will be higher, as pointed out earlier. Suppose the SWR is 3 to 1, using the same setup. The *additional* loss in the system because of the SWR would be 1 dB, or a total of close to 3dB. A 3-dB loss represents almost exactly one-half the power — that is, only 25 watts reach the antenna to be radiated. RG-8/U cable has the same characteristic impedance as RG-58/U but has less loss because it has larger conductors and more spacing between the conductors (and of course is more expensive).

The closest thing to a lossless transmission line is open-wire line. An open wire line on 21 MHz has only 0.08 dB loss per 100 feet. Even with a very high mismatch — for example, an SWR of 20 to 1, the additional losses are still less than 1 db!

This should not be interpreted to mean that

[1] Editors note: It is recommended that the newcomer obtain a copy of The ARRL Antenna Book for more detailed information on transmission line operation than can be provided in this article.



This is the sensing unit of the etched circuit Monimatch. As pointed out in the text, be sure to use a heat sink when soldering the diodes and resistors to the circuit board. The two shielded pick up leads are routed out the back of the Minibox, through a rubber grommet.

coax is an undesirable type of line to use. For beam antennas it is difficult to beat the ease and convenience of using coax. However, for a single antenna, such as a dipole that is to be used on all bands and all frequencies, the best system is one consisting of a transmatch and a feed line of open-wire line, such as shown in Fig. 1. With this system you can forget about line losses, SWR on the line, and mismatches between the antenna and feed line. By correctly adjusting the transmatch, you can always give your rig a 50-ohm load regardless of what the load is on the antenna side of the transmatch. If we use an SWR bridge in the short length of 50-ohm coaxial line that connects the rig to the transmatch, we can adjust the transmatch so that the 50-ohm line shows a match, or SWR of 1 to 1, and the transmitter always sees a 50-ohm load.

The SWR bridge in the photographs and drawings is simple to build, and when installed in 50-ohm cable, will show the relative mismatch in the line, and also will indicate when you get the transmatch properly adjusted for a match. The SWR bridge can also be used as an output indicator, which is very handy when tuning up the rig.

SWR Bridge Circuit Details

The etched-circuit Monimatch shown here is a reflectometer that samples the forward and reflected voltage in a 50-ohm line. Fig. 2 shows the circuit diagram. L_1 and L_2 are the pickup lines. In operation, a very small amount of power is coupled into the pickup lines and the r.f. voltages are rectified by CR_1 and CR_2. The rectified voltages are then fed to the two meters, M_1 and M_2, and the SWR then determined from the readings.

While a Monimatch is not a precise piece of measuring equipment, the SWR readings will be close enough for practical purposes. In order to determine the SWR, the forward-reading meter is set to full scale by adjusting R_3, the sensitivity control, and then the reading on the "reflected" meter is noted. The formula for the SWR using this system is $\frac{F+R}{F-R}$. For example, let's assume the "reflected" reading is 5, with the "forward" reading being 10. Then 15 divided by 5 (that is, 10 + 5 divided by 10 − 5) would mean the SWR is 3 to 1. The closer the "reflected" reading is to zero, versus full-scale reading on "forward," the closer you come to 1 to 1, or a matched condition.

In the unit shown, two meters are used, one for the forward and the second for the reflected reading. However, if desired a single meter can be used and switched as shown in Fig. 2 at B. We used two meters in the indicator as this permits constant monitoring of what is happening in the line. The meters are inexpensive ones made in Japan.

Construction Details

Fig. 3 is a full sized template of the etched circuit board. A very recent article[2] in *QST* went into details showing simple methods for making etched circuits so we won't treat the process here. In making this board, it is suggested that the board be covered with masking tape and then the pattern of Fig. 3 transferred to the tape. Using a sharp knife edge or razor blade and a straight edge, the masking tape can be carefully

[2]Schiebold, "Fast'n' Easy Printed Circuit Boards," *QST*, August, 1969.

and accurately cut to the pattern.

After the board is etched, it can be positioned in the Minibox over the chassis connector holes and the board can then be marked at the drilling points for the mounting holes and the center conductor pins of the coax fittings. When installing the mounting screws, be sure they don't short to the center — conductor portion of the foil on the board.

There are a couple of other construction points that should be stressed. The lead lengths on R_1 and R_2 should be kept as short as possible. Also, be sure to use carbon or composition resistors, *not* wire-wound. When mounting the resistor and diode ends to the pickup sections, L_1 and L_2, the connections should be at the very ends of the sections. Also, use a heat sink when soldering the leads on any of the components mounted on the board, as too much heat from the iron can ruin the component.

The Monimatch and meters are mounted in separate Miniboxes, $2\frac{1}{4} \times 2\frac{1}{4} \times 5$ inches. The two connectors on the Monimatch sensing unit, J_1 and J_2, are mounted with their center pins $3\frac{3}{4}$ inches apart, center-to-center. In order to avoid an impedance "bump" in the feed line when the bridge is inserted in the line, the circuit board should be mounted $\frac{1}{4}$ inch above the base of the Minibox. Quarter-inch spacers can be used under the circuit board at the screws holding both the board and the coax fittings to position the board accurately.

Shielded conductors should be used for the connections from the diodes to the meter enclosure. The shields should be grounded to the chassis at both boxes. These lead lengths are not critical, and the Monimatch can be remote from the meter indicator.

Using the Bridge

If you are using coax feed from the rig to the antenna, the bridge can be installed at any convenient spot in the line. If you are using a transmatch, similar to the system as shown in Fig. 1, the Monimatch should be installed on the transmitter side of the transmatch. Any relays or filters should be installed between the bridge and the transmitter, as shown.

Set R_3 so that the arm of the control is at the top of the resistance — in other words, with all the resistance in series with the meter circuit. Tune up your rig in the normal fashion, and once tuned up adjust the sensitivity of the "forward" meter by moving the arm of R_3 until the meter reads full scale. You can then determine the SWR by the formula mentioned earlier.

When adjusting a transmatch, feed just enough power through the system to obtain about half-scale reading on the "forward" meter and then adjust the transmatch controls for a match, as indicated by zero reflected power. You may have to adjust R_3 as you adjust the transmatch to keep the "forward" meter from reading more than full scale. Once you have the transmatch adjusted for a 1-to-1 ratio as indicated by the bridge, the transmitter can be loaded up in the normal manner. We usually reduce the forward reading to about half scale, and then tune the rig for maximum output, as indicated by the meter. When doing this, you may notice that maximum output as indicated by the bridge meter occurs at some setting other than the normal transmitter plate meter "dip" reading. (Normally, the instruction manuals tell you to tune for a plate dip if the transmitter has no output meter.) However, the amplifier stage will work better if you tune for maximum output rather than the dip — keeping the plate loading within the transmitter ratings, of course.

Once you become familiar with the use of the bridge, and interpreting the readings, you'll find it a very valuable device in your station. QST

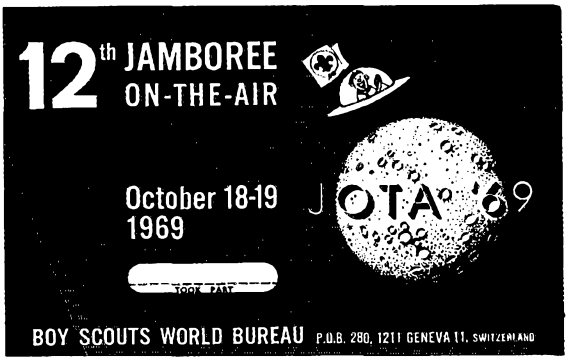
Strays

The 12th Jamboree on the Air, sponsored by the Boy Scouts World Bureau in Geneva, will be held from 0001 gmt 18 October through 2359 gmt 19 October 1969. Not a contest, the event is intended to introduce Scouts to ham radio, and to allow for Scout-to-Scout chats.

Congregating frequencies include: 3590, 3725, 7050, 7175, 14080, 21,140 and 28,190 kHz cw; the attention-getter is CQ JAM. On phone, gather at 3940, 3990, 7240, 14290 or 28,990 kHz and sound off with CQ Jamboree.

To volunteer your services, speak to any Scout leader you may know, call the phone number listed under Boy Scouts of America in your own phone book, or write to W1UED at ARRL Hq for the name and address of the Scout Council nearest you.

Afterward, send your report on the number of Scouts you entertained and the interesting contacts you made, in return for which you'll get a participation certification; the address is Dept. Q, Boys' Life Radio Club, New Brunswick, N.J. 08903.



A Dual-Band Mobile Antenna

80 and 40 Meters Without Switching

BY NORMAN POS,* WA6KGP

LIKE most other mobile operators, the author has stuck more or less to one band in the past because of the nuisance involved in stopping the car and getting out to retune the antenna each time it was desired to change bands. Recently, this difficulty has been overcome to a considerable degree by the use of an antenna loading network that takes care of the two low-frequency bands, 80 and 40, automatically without the need to change coils or otherwise retune the antenna.

The principal is basically the same as that of the two-band system described in the *ARRL Antenna Book*.[1] In the latter system, a network applied to a whip antenna resonant at 28 MHz. provides 10- and 20-meter operation without switching. In the system as used by the author, a similar network, applied to a whip antenna preloaded so as to be resonant at 7200 kHz, provides 40- and 80-meter operation.

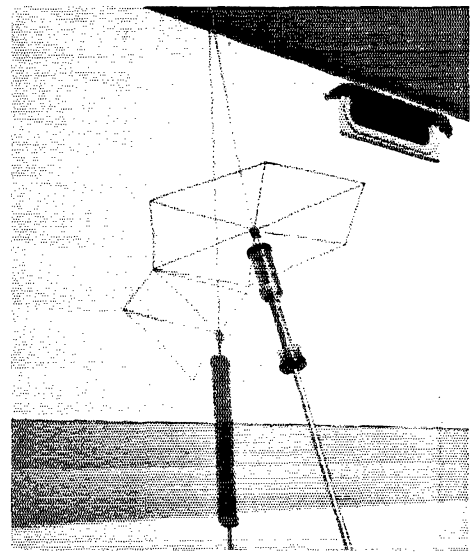
Referring to Fig. 1A, the operation is briefly as follows: The preloaded whip is made up essentially of whip sections ℓ_1 and ℓ_2 loaded by L_1 and the capacitive hat C_H. This combination is made resonant at 7200 kHz. The network consisting of L_2, L_3, L_4 and C_1 has no significant influence on operation at this frequency because L_3 and C_1 are adjusted to series resonate at 7200 kHz, thus providing essentially a short from point A to point B.

L_2 is the additional inductance required to resonate the antenna at 3900 kHz. At this frequency, the combination of L_3, L_4 and C_1 have virtually no effect because L_4 is adjusted to make the $L_3L_4C_1$ circuit parallel resonant at 3900 kHz. The almost infinite impedance of this circuit has negligible effect when shunted across L_2.

Since it can be seen that L_2 and L_4 are in parallel, they can be replaced by a single coil, L_5, having a value equal to the resultant of L_2 and L_4 in parallel, and the network is reduced to the circuit of Fig. 1B. Also, since L_1 and L_2 are in series, they can be replaced by a single coil with adjustable taps (L_6), as shown in Fig. 1C, the portion of the coil above the 40-meter tap being equivalent to L_1, and the portion below equivalent to L_5.

* 1261 Mt. Acora Drive, San Diego, Calif. 92111.

[1] Page 303, 11th edition. Also, Pichitino, "Automatic Multiband Mobile Antennas and Mobile Antenna Characteristics," *QST*, June, 1953.



The finished antenna for 40 and 80 meters, with capacitive hat in place.

Construction

Initially, the author tried various types of ceramic and mica units for capacitor C_1. However, these units failed to stand up satisfactorily at transmitter input power of more than 50 watts or so. The final arrangement uses a tubular air capacitor as part of an assembly which includes the coils, as shown in Fig. 2 and the photographs.

A 12-inch length of fiber glass tubing having an outside diameter of $\frac{3}{4}$ inch is fitted with a brass plug at each end. The plugs are threaded to match the whip-antenna sections. A 6-inch section of brass tubing having an inside diameter of $\frac{3}{4}$ inch, and an outside diameter of $\frac{13}{16}$ inch, is slid over the bottom end of the fiber glass tube. It is held in place by two bakelite rings (one at each end) bored out to a force fit over the fiber glass tube, and turned down to a force fit inside a second brass tube having an inside diameter of $\frac{15}{16}$ inch. This tube has an outside diameter of 1 inch, and a length of 7 inches. The assembly is held in place by retaining screws or pins, as shown in Fig. 2. The two brass tubes,

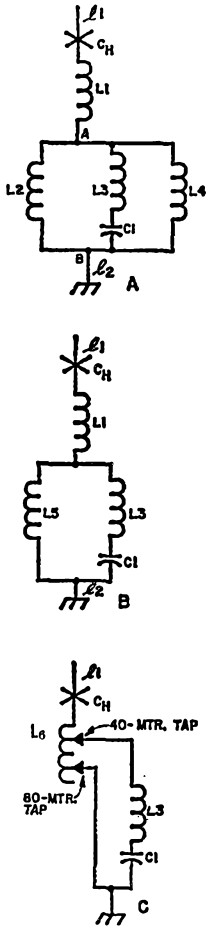


Fig. 1—Circuit diagrams illustrating the development of the two-band automatic-switching network as explained in the text. The final arrangement is shown in (C).

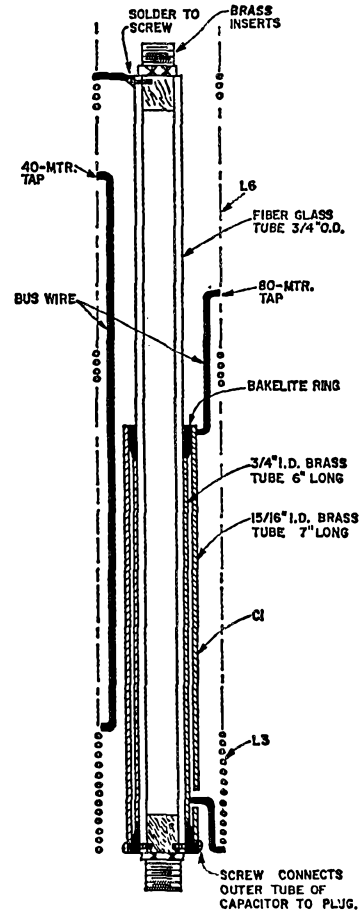


Fig. 2—Constructional details of the coil and capacitor unit of the two-band mobile antenna.

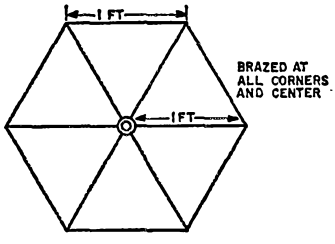
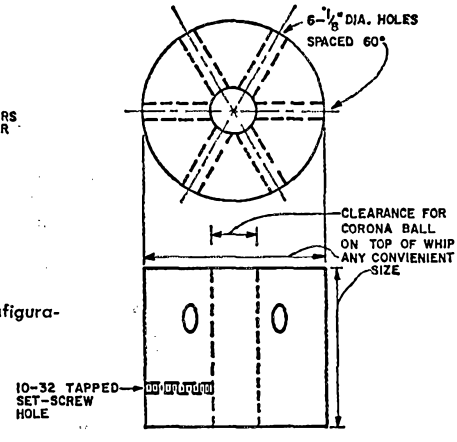
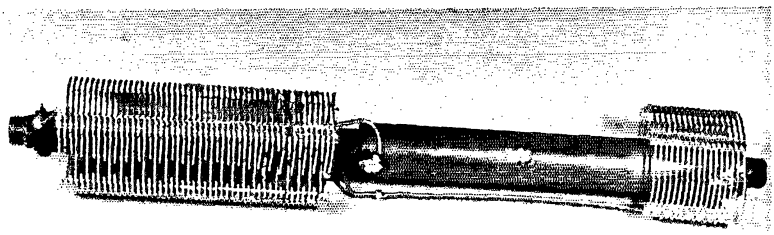


Fig. 3—Sketch showing the dimensions and configuration of the capacitive hat.





A two-band network for a mobile whip antenna. The series-tuned coil, L_3, is at the right, the antenna loading coil, L_6, at the left, with the tubular series capacitor in between.

with 1/16-inch air space between, form the capacitor C_1. The value is approximately 80 pf.

A clearance hole is drilled near the bottom end of the larger brass tubing to permit a connection between the inner brass tube and the bottom end of the series-tuned coil, L_3, as shown in Fig. 2. The top end of this coil is connected to the 40-meter tap on L_6 by means of a length of heavy wire running inside L_6. The top end of the outer brass tubing is connected to the 80-meter tap on L_6 with a similar but shorter lead. A screw connects the top end of L_6 to the top brass plug.

Coils

The coils are sections of standard coil stock (Pic 1771, AirDux 1610T or Miniductor 3907-1) having 20 turns per inch of No. 16 wire, and a diameter of 2 inches. A standard 10-inch length of this stock will be more than adequate. About 20 turns of the stock are cut off to make L_3, and the remainder can be used for L_6. The coils are supported by their leads, concentric with the fiber-glass tube, with L_3 as close to the bottom, and L_6 as close to the top as possible to avoid having the tubular capacitor in the immediate fields. Alternate turns of L_6 can be pushed inward in one quadrant, as is often done to facilitate tapping.

The complete assembly is weatherproofed by enclosing it in a length of large-diameter Lucite tubing ntted with end caps.

Capacitive Hat

The capacitive hat used is shown in the sketch of Fig. 3. It consists of a hexagonal framework made by brazing one-foot lengths of 1/8-inch brazing rod together, and to a brass hub at the center of the pattern. If the corona ball on the antenna is not removable, the hub must be large enough so that a hole to pass the ball may be drilled at the center. One or more set screws should be provided to clamp the hat to the top section of the whip, an inch or two above the coil assembly.

Adjustment

A desirable feature of this arrangement is that the adjustments for the two bands are virtually independent. Before adding the whip sections and the capacitive hat, the two tap leads to L_6 should be shorted temporarily to connect L_3 and C_1 in parallel. L_3 should then be adjusted until a grid-dip oscillator coupled to L_3 indicates resonance at 7200 kHz, after which the short should be removed.

With the antenna completely assembled and installed on the car, preliminary adjustment can be made by coupling the g.d.o. to two or three turns of wire connected between the base of the antenna and chassis. The 40-meter tap should be adjusted first for resonance at 7200 kHz, and then the 80-meter tap for resonance at about 3900 kHz. Final adjustment of the taps can be made by feeding power to the antenna at one frequency and then the other, and adjusting the tap for each band for minimum s.w.r.

The lower section of the whip used is 41½ inches long, while the top section is 59½ inches long. With the antenna installed high up on a Volkswagon bus, the 40-meter tap is set at 23 turns from the top end of L_6, and the 80-meter tap at 40 turns. These settings will vary, depending on the length of the antenna, and its mounting relative to the car body and ground.

After the adjustment is complete, all but a few of the unused turns below the 80-meter tap may be removed. A few extra turns are desirable for possible readjustment in case a change in frequency is made, or the dimensions of the antenna or its location changed.

Bandwidth

S.w.r. plots made on the two bands showed that frequency could be varied plus or minus 65 to 70 kHz relative to the optimum frequency on 40, and plus or minus about 20 kHz on 80, without exceeding an s.w.r. of 2 to 1.

A second 8-foot whip, fed directly with coax line, and mounted on the opposite side of the car is used for 10, 15 and 20 meters. With a coax switch mounted up front, it is possible to cover all bands from the driver's seat by merely switching the coax line from one antenna to the other.

In conclusion, the author would like to thank Jim Cross, K6BQS, for many of the mechanical ideas and for his help in testing the coil. QST

Here are two solid-state vhf converters that can be built in two or three evenings by anyone with a fair amount of practical experience in amateur radio. The circuits were designed for minimum "cross-mod" and low noise figure. Overall converter gain is good, making the equipment suitable for use with almost any communications receiver that can be tuned from 28 to 30 MHz. The 2-meter converter can be built for under $30, using new parts throughout. The 6-meter converter will cost slightly less.

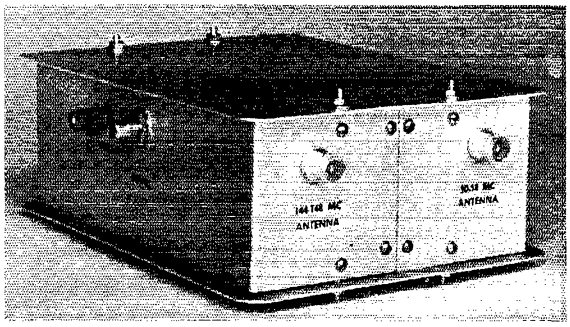
A Solid-State Sandwich for VHF

Twin Converters for 50 and 144 MHz

BY DOUG DEMAW,* W1CER

THE equipment described here uses a mixture of JFETs and MOSFETs to provide good performance at low cost. By eliminating bipolar transistors there is no need for special tuned circuits designed for matching the low input impedance of that type of transistor. FETs permit the builder to work with tuned circuits that are similar to those used with triode vacuum tubes. FETs are superior to bipolar transistors because they can handle higher signal levels without the overloading and cross-modulation problems common to bipolar transistors.[1] This feature should appeal to vhf operators who live in close proximity to other vhf stations.

Of special interest here is the use of a dual-gate MOSFET in each converter's mixer circuit. Although Motorola MFE3008s are used at Q_5 and Q_8, Figs. 1 and 2, an RCA 3N141 will provide comparable performance.[2] The Motorola part, however, is less subject to damage from static charges than are some other brands. This, according to a Motorola representative, results from the silicon-nitride dielectric material used as insulation between the gates and the remaining part of the MOSFET. Earlier types used a metal-oxide film that could be more easily punctured by high electric fields.[3] The 3N141 does not use silicon nitride and requires very careful handling to insure against damage.



The twin vhf converters are housed in a homemade aluminum box which has removable top and bottom covers for easy access to the circuit boards. Each converter has its own input and output jacks so that simultaneous operation is possible.

Both the MFE3008 and 3N141 types exhibit high values of $y$fs (forward transadmittance, gate 1 to drain), thus making them ideal as amplifiers and mixers. The MFE3008 has a $y$fs that ranges between 8,000 and 18,000 μmhos. Its conversion gain is on the order of 20 dB, and the isolation between the oscillator and rf signals is very good because each of the two signals being mixed has its own control element. The foregoing consideration is especially important in receivers which use tunable oscillators and mixers. Although a dual-gate MOSFET would serve as an excellent rf amplifier in these converters, it was not used in the interests of transistor protection from the strong rf fields which are often present when converters are used in combination with vhf transmitters. The JFETs (junction field-effect transistors) can safely handle up to approximately 80 peak volts of rf before being damaged, and perform nearly as well in rf amplifier service as do the MOSFETs.

* Assistant Technical Editor.

[1] Bipolar transistors do not have sufficient dynamic range to accommodate strong signals without overloading; FETs are superior in this regard.

[2] Since these converters were built, RCA has announced the availability of their new 40673 MOSFET which has built-in back-to-back protective diodes. The diodes prevent static-charge damage during handling, and provide in-circuit protection from transients.

[3] Both the MFE3008 and 3N141 MOSFETs should be handled with care to prevent damage from static charges. They should be installed in the circuit board as the last step prior to testing. Sockets are recommended, and the four transistor leads should be kept shorted together until they are installed. If the MOSFET is to be soldered into the circuit board, rather than being plugged into a socket, the tip of the soldering iron should be connected to an earth ground while soldering. Keep the leads away from plastic, styrene, or any material that can collect static charges. Once the FET is installed in the circuit it is quite safe from static-charge damage.

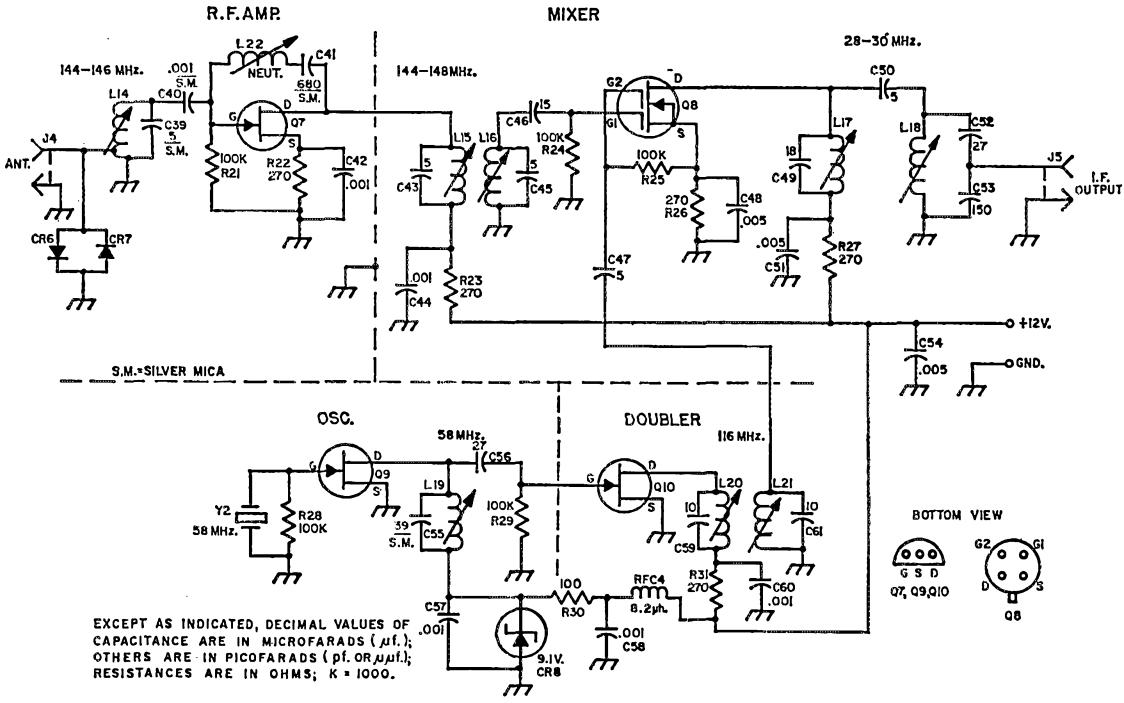


Fig. 1—Circuit of the 2-meter converter. Resistors are ½-watt composition. Capacitors, unless otherwise noted, are disk ceramic. See Fig. 2 for explanation of component numbering.

CR_6, CR_7—1N914 or equivalent.

CR_8—9.1-volt, 1-watt Zener diode (Motorola HEP-104 or equiv.).

J_4—BNC or SO-239-type chassis connector.

J_5—Phono connector.

L_{14}—4 turns No. 24 enam. to occupy ⅜ inch on J. W. Miller 4500-4 iron-slug form. Tap 1 turn from ground end.

L_{15}, L_{16}, L_{19}—5 turns No. 24 enam. to occupy ⅜ inch on same-type Miller form as L_{14}.

L_{17}, L_{18}—15 turns No. 24 enam. wire, close-wound, on J. W. Miller 4500-2 iron-slug form.

L_{20}, L_{21}—Same as L_{14}, but no tap.

L_{22}—9 turns No .30 enam., close-wound, on J. W. Miller 4500-2 iron-slug form (J. W. Miller Co., 19070 Reyes Ave., Compton, Cal. 90221; write for catalog and prices).

Q_7, Q_9, Q_{10}—Junction FET, Motorola MPF102 (2N4416 suitable).

Q_8—Dual-gate MOSFET, Motorola MFE3008 (RCA 3N141 or 40673 also suitable).

RFC_4—8.2-μH miniature rf choke (James Millen 34300-8.2).

Y_2—58-MHz 3rd-overtone crystal (International Crystal Co. type GP).

Bandpass tuned circuits are used in both converters to lessen the chance of spurious responses from nearby commercial stations and from harmonic energy originating in the converter oscillator channels. Zener-diode voltage regulation is used in the drain supply of each converter's crystal oscillator for good frequency stability.

The rf stages of both converters are neutralized for best stability. The neutralizing network, when properly adjusted, assures the best possible noise figure (approximately 2.5 dB) for the 2-meter converter. The foregoing consideration is not especially significant in the case of the 6-meter unit because atmospheric noise on that band is usually the limiting factor in low-noise reception. Either converter is capable of satisfying the needs of beginners or seasoned vhf operators who possess stable, sensitive 28-MHz tunable i-f receivers. The use of circuit boards makes the converters easy to duplicate and get operating. Ready-made boards are available for those who do not wish to etch their own.[4]

The 2-Meter Circuit

Because the converters were designed as part of another project, the component numbering in Figs. 1 and 2 does not start in the low numbers. Each part is numbered (though not all are called out in the parts lists) for the purpose of identification on the circuit-board templates.

Referring to Fig. 1, diodes CR_6 and CR_7 are bridged across the antenna input at J_4 to provide burnout protection for Q_7, the rf amplifier. They will not conduct until the incoming signal level reaches approximately 0.7 volt. They can be eliminated from the circuit if the converter is well isolated from the transmitter by means of a high-quality, shorting-type coaxial relay. *Make*

[4] Stafford Electronics, 427 S. Benbow Rd., Greensboro, N. C. 24701 ($3 per board). Foto-Etch Co., 3311 Citrus Ave., Walnut Creek, Ca. 94598.

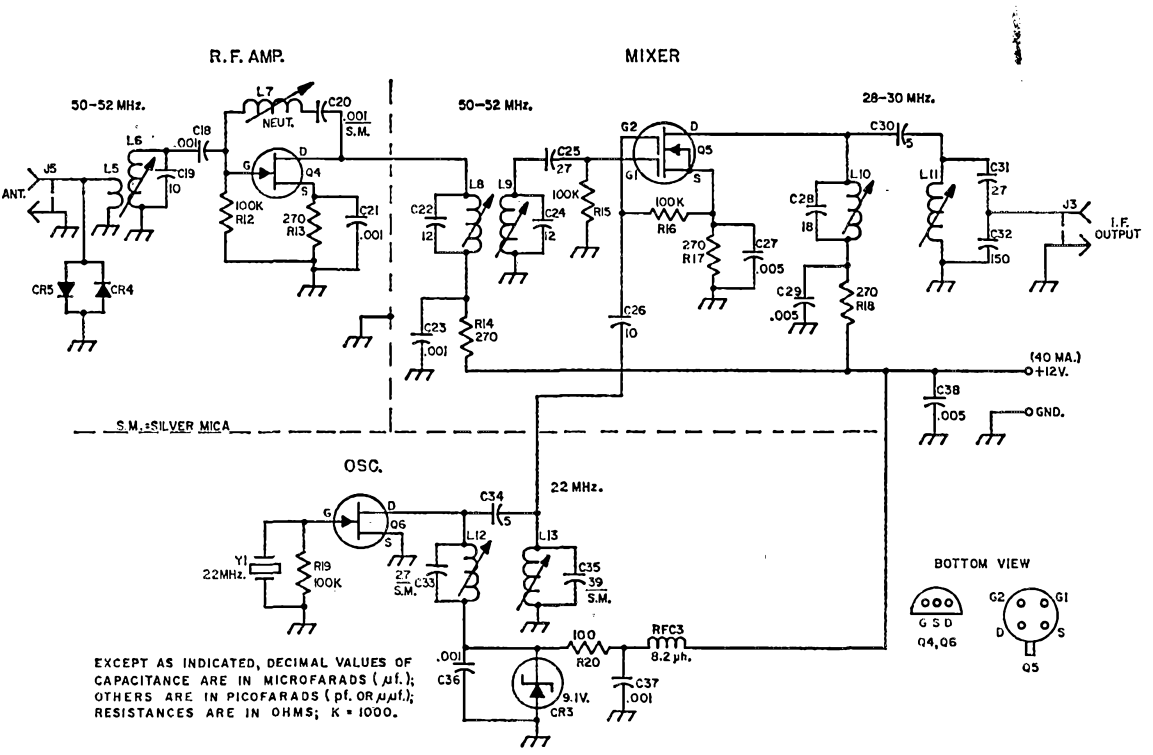


Fig. 2—Circuit diagram of the 6-meter converter. Resistors are ½-watt composition. Capacitors are disk ceramic unless specified differently. Numbered components not appearing in the parts list were so identified for circuit-board layout purposes.

CR_3—9.1-volt, 1-watt Zener diode (Motorola HEP-104 or equiv.).

CR_4, CR_5—Small-signal silicon switching diodes (1N914 or similar).

J_2—BNC or SO-239-type chassis connector.

J_3—Phono connector.

L_5—3 turns of small insulated wire wound over the ground end of L_6.

L_6, L_8, L_9—10 turns No. 24 enam. wire, close-wound, on J. W. Miller 4500-4 iron-slug form.

L_7—25 turns No. 30 enam., close-wound on 4500-2 form.

L_{10}-L_{13}, incl.—12 turns No. 24 enam., close-wound, on J. W. Miller 4500-2 iron-slug form.

Q_4, Q_6—Junction FET, Motorola MPF102 (HEP-802 or 2N4416 suitable).

Q_5—Dual-gate MOSFET, Motorola MFE3008 (RCA 3N141 or 40673 also suitable).

RFC_3—8.2-μH miniature rf choke (James Millen 34300-8.2).

Y_1—3rd-overtone crystal (International Crystal Co. type GP).

sure that the coax relay switches BEFORE *the trans-transmitter activates!*

The antenna lead is tapped down on L_{14}, one turn from the ground end. The exact positioning of the tap can be varied for the best noise figure, though the position given here should be satisfactory. Neutralization of the rf stage is effected by the series coil, L_{22}, which should be adjusted for the lowest noise figure consistant with good stability. Source bias is used at Q_7 to prevent stage overloading in the presence of strong signals.

Bandpass coupling is used between Q_7 and Q_8, the mixer, to keep out-of-band signals from reaching the mixer. The bandpass coils, L_{15} and L_{16}, should be stagger-tuned to give a reasonably flat response from 144 to 146 MHz. The rf signal is coupled to gate 1 of Q_8, and the oscillator signal is supplied to control gate 2. Do not interchange the gates. Bandpass tuning is used at the output of the mixer to reduce oscillator feedthrough to the i-f receiver, and to provide a broad response from 28 to 30 MHz. Coils L_{17} and L_{18} should be stagger-tuned for a broad response over that frequency range. Output to the i-f receiver is taken at 50 ohms from a capacitive divider across L_{18}.

An overtone oscillator is used at Q_9 to provide a 58-MHz signal. Output from the oscillator is doubled to 116 MHz by Q_{10}. Another bandpass tuned circuit is made up by L_{20}, L_{21}, and their associated shunt capacitors. Both coils are peaked at 116 MHz to lessen the chance that 58-MHz oscillator energy, and the 174-MHz oscillator harmonic, will reach the mixer. Tuned traps for both the unwanted frequencies can be added to the injection line of gate 2 by those who desire greater attenuation of those two frequencies. To assure good oscillator starting, L_{19} should be capable of tuning at least 1 MHz *above* the crystal

frequency. When properly adjusted, it will be resonant at approximately 59 MHz. The supply voltage to Q_9 is regulated at 9.1 volts by CR_8, a 1-watt Zener diode.

The 6-Meter Converter

Fig. 2 shows the circuit of the 6-meter unit. For all practical purposes it is a carbon copy of the 2-meter converter, but without the doubler stage in the oscillator channel. The same circuit-board pattern is used for both pieces of equipment, resulting in a few unused holes in the 50-MHz model.

There is no need to tap the antenna down on the input coil, L_6, since noise figure is not a prime consideration in this instance. A 3-turn link is wound over the ground end of L_6, and is used instead of the tap. Neutralizing inductor L_7 is adjusted for stable operation of Q_4, and should be set while the antenna is connected to J_2. The rf and mixer bandpass circuits should be stagger-tuned in the same manner as was done in the 2-meter model. Coils L_{12} and L_{13} are peaked at 22 MHz. For better purity of the oscillator output signal, if desired, tuned traps for 44 and 66 MHz. can be placed in the injection line to gate 2 of Q_5. Normally, this should not be necessary.

Construction

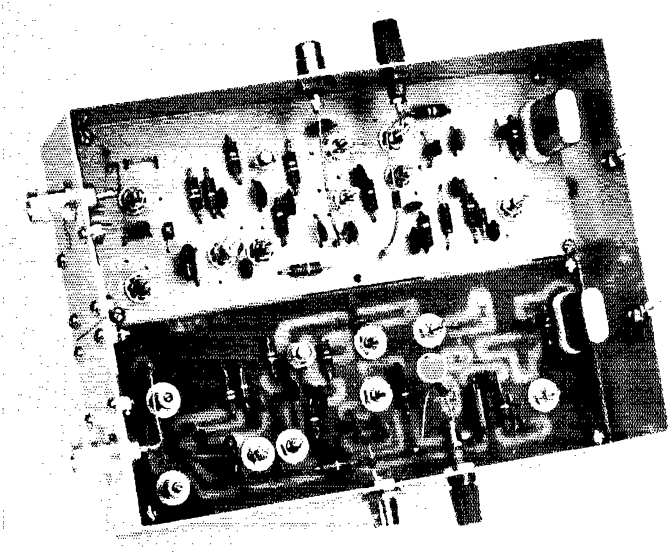
Scale templates for the etched-circuit board are available from ARRL for 25 cents and a SASE. The semiconductors are available from most of the larger mail-order houses, or from any Motorola distributor. The slug-tuned coil forms are made by J. W. Miller and should be only those numbers specified. It will be noted that some coil-form numbers have a numeral 2 at the end (4500-2) while others have a 4 at the end of the number (4500-4). These numbers relate to the core material used, which is designed for a particular frequency of operation. The core material has a significant effect on the tuning range of the inductors, and can seriously affect the coil Q if of the wrong type. If substitute coil forms are used, be sure that they're designed for the frequency range over which they will be used.

These converters can be packaged in any style of box the builder prefers. In this instance, both units are housed in a single homemade enclosure which measures $6\frac{3}{4} \times 5 \times 2\frac{1}{2}$ inches. The top and bottom covers are held in place by No. 6 spade bolts which are attached to the side walls of the box. This style of construction can be handled with ordinary hand tools, and only four 90-degree bends are required. This box was made from a large aluminum cookie sheet purchased at a local discount store. The dull finish results from a lye-bath treatment given the aluminum after it was formed.

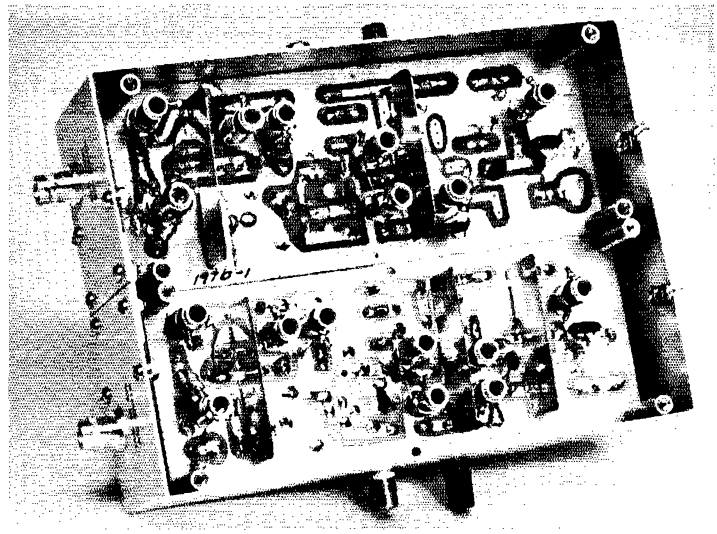
The converters are mounted on the bottom plate of the box by means of 1-inch metal standoff posts. Self-adhesive rubber feet are attached to the bottom of the box. Black decals are used to identify the terminals on the outside of the box.

A 4-terminal transistor socket is used for the 6-meter mixer MOSFET. At the time the 2-meter converter was built a socket was not on hand, but both converters should use sockets for the MFE3008s to minimize the possibility of transistor damage when soldering. The sockets are Elco 05-3308 and are available from Allied Electronics in Chicago (5 for 94 cents). The binding posts used for connecting the + 12 volts to the converters are E. F. Johnson 111-102s.

HEP-56 (Motorola) rectifier diodes are con-



The darker of the two circuit boards contains the 6-meter converter. It is shown at the bottom of the photo in this inside view. Since both circuit boards are identical in pattern, some of the holes are left blank on the 6-meter model, as there is one less stage in its oscillator section. The lighter-colored circuit board (upper) is the 2-meter unit. Both boards are glass epoxy. The upper one is home made, while the lower board was supplied by Stafford Electronics. The protective diodes at the antenna jacks were not installed when these photos were taken.



Looking into the bottom of the converter box, the 6-meter unit is at the top of the photo. Each converter has four 1-inch standoff posts which secure the circuit boards to the bottom plate of the cabinet. Rf shields divide some sections of the converters to prevent unwanted coupling between the tuned circuits. The shields are made from flashing copper and are soldered to the ground foil on the circuit boards. They are notched out wherever they come in close proximity to the non-ground elements of the circuit.

nected from the 12-volt input terminals on the box to the 12-volt terminals on the circuit boards, their anodes toward the Johnson binding posts (Not shown in Figs. 1 and 2.). These diodes prevent damage to the transistors should the operator mistakenly connect the power supply leads for the wrong polarity. Positive voltage will pass through the diodes, but negative voltage will be opposed.

It is strongly recommended that the converters be housed in some type of metal enclosure, as was done here, to prevent oscillator radiation, and to insure against random pickup of interfering commercial signals by the mixer circuit. This precaution is especially important in areas where commercial fm and TV transmitters are nearby.

Adjusting the Converters

After checking for cold-solder connections and unwanted solder bridges across the circuit-board elements, connect the converter being tested to a receiver that can be tuned from 28 to 30 MHz. Using either a signal generator or a weak ham signal, adjust the tuned circuits for peak response. The low end of each vhf band will fall at 28 MHz with the oscillator frequencies given here. (Other segments of either vhf band can be covered by using crystals of the appropriate frequency.) Next, if the rf stage appears to be unstable, as evidenced by popping noises and blank carriers, as the input coil is tuned, adjust the neutralizing coil until the condition ceases. Further adjustment of the neutralizing coil can be carried out to obtain the best noise figure on 2 meters. After these initial adjustments are completed, the rf and mixer bandpass circuits can be stagger-tuned as outlined earlier. If no signals can be heard, chances are that the oscillator stage is not operating. A wavemeter can be coupled to the drain coil of the crystal oscillator to determine if output exists, then the slug adjusted until an output indication is noted. The 2-meter converter draws approximately 40 mA when operating normally. The 6-meter unit will draw approximately 35 mA.

Performance

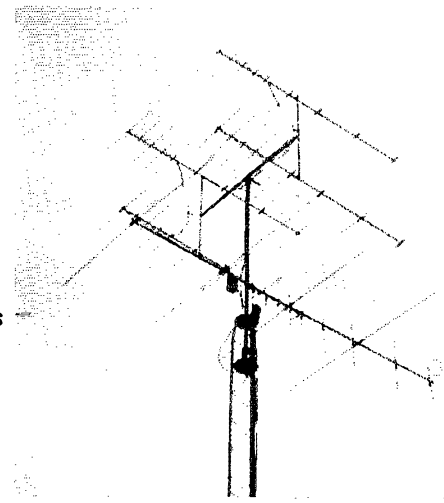
Both converters show excellent immunity to spurious responses and "birdies" in their intended i-f tuning range. While checking with a laboratory-type signal generator, each converter permitted Q5 reception of 0.1-μV cw signals, and signal levels 6 dB below that value were plainly discernable in the converter noise. Both units were tested in the immediate region of several commercial fm and TV transmitters in the Hartford, and Meriden, Connecticut areas. In regions where other channel assignments are being used, it is possible that unwanted responses might show up, but tuned traps for the interfering frequency should resolve the problem. Also, it is always helpful to install a strip-line bandpass filter [5] ahead of any vhf converter in problem areas where such responses are likely. This practice also helps reduce i-f feedthrough of 28-MHz amateur signals.

Anyone wishing to construct converters for use in the hf bands should be able to adapt these circuit boards to that use. Similar circuits can be used, selecting the proper crystal frequencies and designing the tuned circuits for the frequency of operation. The same type transistors can be used in each stage of the converter. QST

[5] Strip-line filters of this type are described in *The ARRL Radio Amateur's Handbook*, 46th Edition, Chap. 23, and in *The Radio Amateur's V.H.F. Manual*, 2nd Edition.

The Swan Multidrive 2-Meter Antenna

Electrical and Mechanical Details of a Popular V.H.F. Array



Four-bay system installed at WB6PDN, Stockton, California. A single vertical bay, and a 4-element 50-MHz array are also on the same support.

THE vhf enthusiast is always looking for ways to improve his antenna performance, and rightly so, for any improvement here works on both transmitting and receiving, and it is often accomplished with less expense than similar improvements made within the station. For Norm Milne, WB6PDN, a marked step up in the antenna department was made possible almost by accident, and as a result an approach new to the amateur vhf field is being used at an increasing number of western stations.

Norm had used an 8-over-8 J-slot array on 2 meters for some time, but was looking for something better to put up on his new fold-over tower. He started on a long-Yagi construction project, but got no farther than a hunt for boom and element materials. This lead him to a long-time friend, Oliver Swan, a local manufacturer of TV antennas. A former ham (ex-W7KPM) recently relicensed as W6KZK, Oliver was interested in trying for 2-meter work an idea commonly used in TV antennas. The antennas shown in the sketches and photographs are the result.

The basic idea for the array, from Jasik's *Antenna Engineering Handbook*[1], is used in TV antennas for gain over a wide frequency range, in an array of relatively simple construction. In the form worked out by W6KZK, with dimensions given at the left side of Fig. 1, frequency response is a secondary consideration, though the array does have somewhat broader coverage than a conventional Yagi of similar proportions. The use of several driven elements also appears to be an efficient way of getting the optimum phasing of currents in the system, necessary for high gain and clean pattern. Results at several California stations, and with an antenna checked by the writer, indicate that the Swan antenna does outperform a conventional Yagi of the same boom length. Phased arrays of two and four bays erected by western 2-meter men have given similarly outstanding results. A four-bay system is reported to have given identifiable echoes from the moon.

[1] McGraw-Hill Book Company, Inc. First Edition, 1961, Chapter 24.

A duplicate of the original single-bay version checked by Ron Hensley, WB6RNH, showed uniform gain from 144 to 145 MHz. It was down 1.5 db. at 146 MHz, and 2.5 db. at 148 MHz. This is comparable to 5-element and 20-element arrays developed by the writer,[2] and considerably broader than long-Yagi systems adjusted for maximum gain.

Jim Brannin, K6JC, was not interested in bandwidth, so he experimented with element lengths and spacings for maximum gain at 144 MHz. His dimensions are given on the right side of Fig. 1. Jim feeds his array with 52-ohm coax and a 52-to-110-ohm balun.[3] The original Swan version aims for 110 ohms impedance, so that two bays may be stacks and fed at the midpoint of the phasing system with 52-ohm coax and a 1-to-1 balun.

Construction and Adjustment

The driven elements of the Swan antenna must be insulated from the boom, as they are fed at their centers. Swan uses and supplies rugged plastic blocks made for the purpose.[4] The parasitic elements are mounted on smaller blocks, and a single bolt runs through the center of the element, the block, and the one-inch boom. The mounting holes in the blocks for the driven elements are 3½ inches apart, and the elements are drilled ⅝ inch in from their inner ends. The transposed line connecting the elements is one piece of heavy aluminum wire, and runs through small U-shaped clips at each element.

[2] Tilton, "Building Your Own Arrays for 50 and 144 Mc.," October, 1966, *QST*. Also *Radio Amateur's V.H.F. Manual*, Second Edition, Chapter 9.

[3] Holladay and Farwell, "*Beer-Can Baluns*," Feb., 1965, *QST*. Also, *Radio Amateur's V.H.F. Manual*, Chapter 8.

[4] Set of 9 mounting blocks, drilled and machined for ⅝-inch elements and 1-inch boom, $4.00, incl. postage and tax, from Oliver Swan, 646 N. Union, Stockton, California 95201.

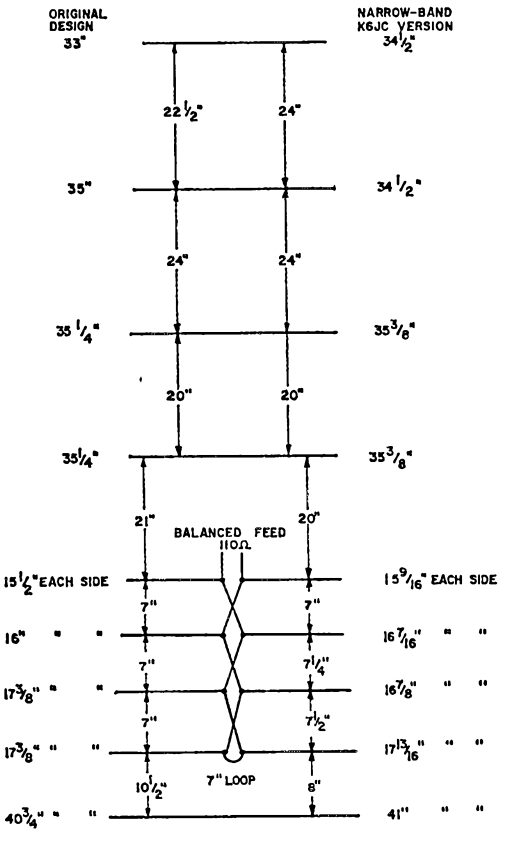


Fig. 1—Basic dimensions of the Swan Multidrive 2-Meter array, broad-band and narrow-band versions.

The loop at the back end is 7 inches long. The line should be separated from the boom, and from the other part of the line at the cross-over point, by at least ¼ inch.

Assuming a feed impedance of 110 ohms, the writer made a Q section of rigid 75-ohm coax, two lengths side by side. This 150-ohm section should match the 200 ohms represented by the main transmission line and its 52-ohm balun to a 110-ohm load, but it did not. Standing-wave ratio across the band varied only slightly, but it was never below about 2:1. Tests with other matching devices not having provision for tuning out reactance resulted in similar degrees of mismatch. It appears that the antenna, as supplied, is reactive at all frequencies within the band, a condition that is not unexpected, in view of the phasing system.

Matching is thus a logical job for the universal stub, which has become almost standard equipment in antenna work by this writer. In this instance a line just over a half wavelength long was made of ¼-inch aluminum tubing, flattened and drilled at one end to take the bolts that hold the forward driven element in place. The upper end is fanned out to the 3½-inch separation of these mounting bolts, and the balance of the line is about 1¼ inches, center to center. A sliding

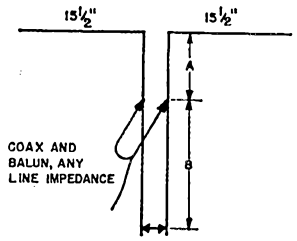


Fig. 2—Forward driven element, with universal stub used in ARRL checks of the Swan antenna. Both the movable short and the point of connection of the balun should be adjusted for zero reflected power in the transmission line. With the stub described in the text and a 52-ohm coaxial line and balun, Dimension A was 11 inches and Dimension B 31 inches, when adjusted at 145 MHz.

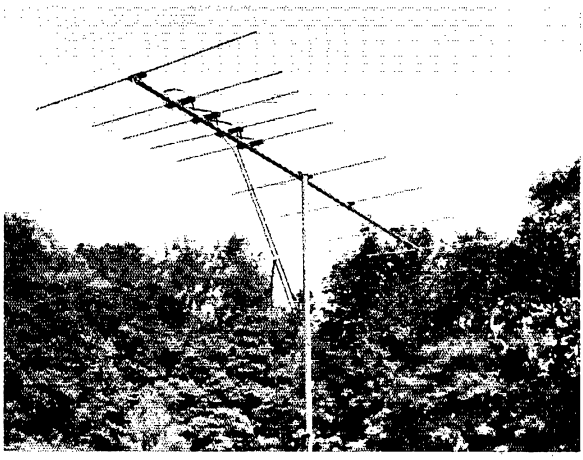
clip is used to close the stub and resonate the antenna system at the operating frequency. The 50-to-200-ohm balun is then slid along the stub until the point of zero reflected power is found. The positions of the shorting clip and the balun connections interact to a degree, so both should be rechecked carefully for zero reflected power at the middle of the desired operating frequency range. If evaluation of the antenna performance is to be attempted, this procedure should be repeated for every frequency change.

These adjustments should be made with the array some multiple of a half-wavelength above ground, and in an area where no trees, wires or other objects are in the line of fire for distances of many wavelengths. If your test site does not meet these specifications, mount the array with the boom pointing straight up, and the reflector about a quarter-wavelength above ground. This will provide a fair simulation of free-space conditions.

Performance

The writer makes no claim as to accuracy of gain measurements, though relative gain can be

(*Continued on page 56*)



Swan antenna as tested by the author, showing the universal stub and balun of Fig. 2.

Hints and Kinks For the Experimenter

SOLID STATE SWITCHING FOR THE ELECTRONIC PADDLE

THE circuit of Fig. 1 illustrates a refinement of the electronic paddle described by Ken Stone in the "Gimmicks and Gadgets" column of *QST* for April, 1969. Basically, the two keying relays in the original unit have been replaced by switching transistors, and the number of dc amplifier stages has been reduced from three to two with no loss in sensitivity. Thus, the modified circuit offers the advantages of being all solid state and having fewer parts than the original version. — *W. D. Fredericks, WA8TMA/4*

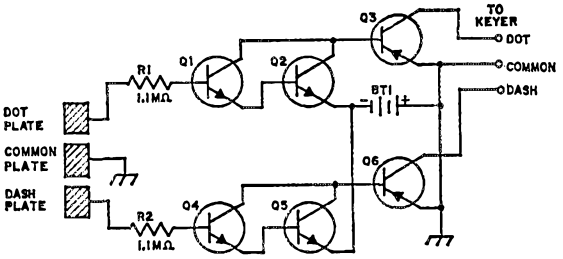


Fig. 1—Schematic diagram of the relayless electronic paddle. For details of the three plates, see the article referred to in the text.

BT_1—9-volt battery.
Q_1, Q_2, Q_4, Q_5—2N1051 or HEP-53.
Q_3, Q_6—2N525 or HEP-253.
R_1, R_2—1.1-megohm, ¼-watt composition.

SIMPLE CURE FOR IGNITION NOISE

AFTER being driven nearly nuts by the ignition noise from my mobile rig, I decided to try the complete shielding system detailed in the *Mobile Manual*. Although the installation took many hours of bloody fingers, greasy fingers, and not so sweet words, the job was worth the effort since the system proved to be very effective.

My rig was completely free of ignition noise for many months. Then after being informed by the local service station that it was impossible for them to service my ignition system, I slowly came to the conclusion that my many hours of work would have to go in order for the secondary things, such as my car firing on all cylinders, to endure.

For the next two months I had a hard time hearing any signal that resulted in an S-meter indication below 40 dB over S9. Then one day the idea came to mind to cover the ignition system with aluminum foil rather than shield braid. After only fifteen minutes, rather than several hours for the previous system, the foil was completely installed. The foil has worked equally as well as the shield braid, and it can be removed easily by any automobile mechanic for service of the ignition system. When I get my car back from the garage, I simply take a few minutes to cover everything with foil again, and I'm in business as before. — *Dennis E. Barrow, WB4GQX*

METER PROTECTION

IT has been pointed out by W9YLD that the movement of the meter in the "Compact Multi-Purpose Test Instrument" (April 1969 *QST*, page 16) can be protected against mechanical shock in transportation by the use of electromagnetic damping. This feature can be incorporated easily by connecting the "0" terminal of S_{1A} to the negative side of the meter, thus causing the meter to be short-circuited when S_1 is turned to OFF. — *Yardley Beers, WØJF*

QSL CARD HOLDERS

BEING unable to find QSL card holders here in Memphis, I came up with the idea of using "Glad-Bag" sandwich bags to hold my QSLs. As shown in Fig. 2, insert one card in each bag, and staple the bags together. Then roll the flap of the uppermost bag around a 6¼ × 1-inch piece of cardboard and staple the two together. Use a tack in the center of the cardboard to hang the QSL collection on the wall.

The best part about using "Glad-Bags" is that a box of 80 bags costs 33 cents compared to 99 cents for a QSL card holder that holds only 20 cards. — *Mickey L. Bradford, WN4LSS*

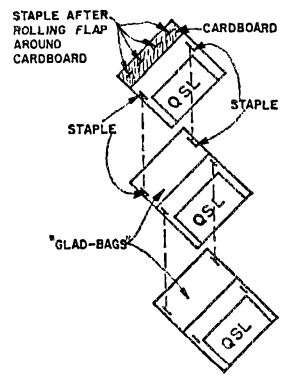


Fig. 2—WN4LSS's method for displaying QSL cards.

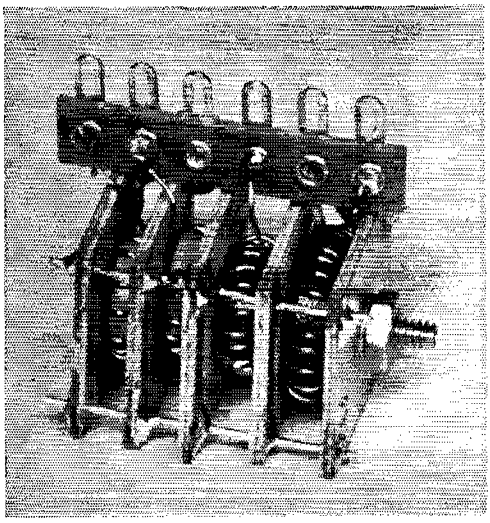


Fig. 3—A space-saving toroidal sandwich.

ASSEMBLING TOROIDAL INDUCTORS FOR BAND SWITCHING

DOUBLE-sided copper-clad circuit board makes a convenient multiple-deck sandwich for stacking two or more toroidal inductors. The assembly shown in Fig. 3 contains four toroids which are used in a four-band transmitter. Small holes were drilled in each corner of each piece of circuit board. Bus wire was passed through the holes and was then soldered in place to hold the toroids snugly against the boards. Masking tape covers the copper surfaces that would otherwise come in contact with the windings on the cores, thus assuring that there will be no shorted turns on the coils should the enamel insulation of the wire become abraded. A standard terminal strip was soldered to one of the bus wires. It provides tie points for the ends of the windings. Because in this model one end of each winding goes to chassis ground, the copper foil of the boards is used as the ground connection. A No. 6 screw and nut were fastened to the bottom piece of circuit board and serve as a mount for the completed assembly.

Since toroidal inductors are self-shielding, they can be mounted close to one another, and close to metal, without interaction effects. The copperclad circuit board sections between the coils act as shields to prevent capacitive coupling between the coils. — *W1CER*

9TO MARK II KEYER

I BUILT the 9TO Mark II keyer described in *QST* for June 1967, and found it to be a fine unit. However, a problem arose when I attempted to send characters that began with a dot. The dot storage tube, V_5, would occasionally stay in the memory state too long, and two dots would be sent when only one was desired. After much experimenting I solved the problem by connecting a 0.005-μF capacitor from Pin 2 of V_{4A} to ground and changing R_{15} from 68,000 ohms to 150,000 ohms. These changes increased the magnitude of the pulse applied to Pin 3 of V_5, and slightly increased the delay time of the relay closure, insuring that memory tube V_5 would be forced back to its quiescent state at the proper instant. Even at the keyer's highest speed, no adverse effects were noted as a result of the modification. —*H. Dale Stricter, W4DQS*

INEXPENSIVE BLOWER

NEED an inexpensive blower for your final amplifier tubes? Try using an old hair dryer. By disassembling the unit and removing the handle and heating element, a satisfactory blower can be fashioned. Fig. 4A illustrates a typical installation, and Fig. 4B shows the details of a suitable mount. A coat of paint on the modified dryer and its mount will make the whole thing look as good as a commercial blower.

Used dryers can be picked up for a dollar or more at junkyards. I was fortunate to get mine for nothing from a neighbor! If a dryer isn't available, a blower for an automobile heater can be used instead. However, a small 12- or 6-volt supply is needed to run an automobile blower from 120 volts ac. Heater blowers can be obtained for a few dollars from most wrecking yards.—*Jim Brenner, WA6NEV*

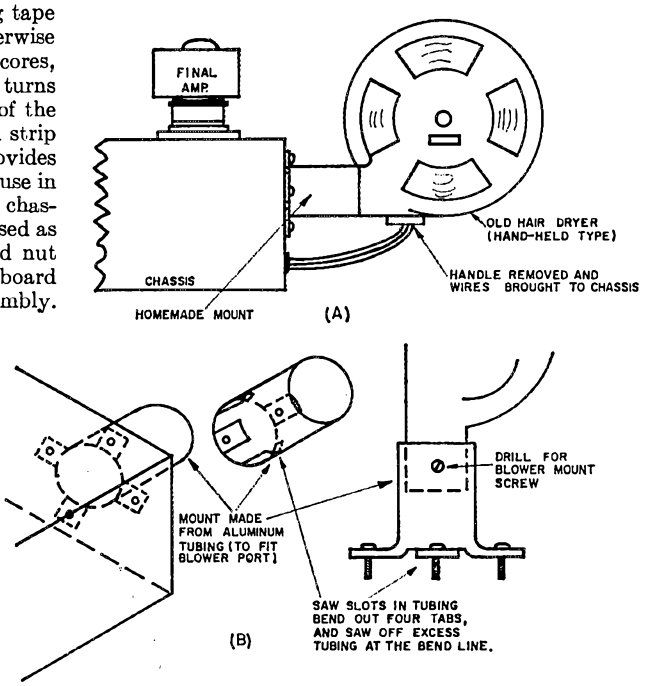
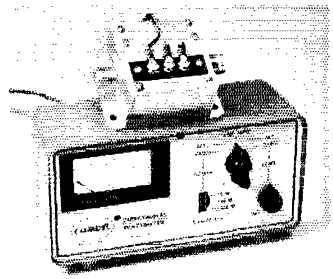


Fig. 4—(A) A modified hair dryer serves as a blower for a final amplifier. (B) Details of the blower mount.

Recent Equipment

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

Comdel DW 1550 Wattmeter



WHETHER you operate a kilowatt or a low-power transistor rig, whether you work 160 or 6 meters or the bands in between, it is likely that you want to know how much power you are putting into your antenna system. The Comdel DW 1550 wattmeter shown in the photographs can give you an answer.

The DW 1550 employs a directional coupler that is similar to one described by Bruene several years ago.[1] A capacitive divider is used to take a voltage sample of the rf on the transmission line, and an inductively coupled toroid coil is used to take a current sample. This arrangement results in a wattmeter circuit whose readings are independent of frequency over the design range, which is 1.5 to 60 MHz for the Comdel unit. The accuracy of the readings is dependent on using the DW 1550 in coaxial lines having a nominal characteristic impedance of 51 ohms.

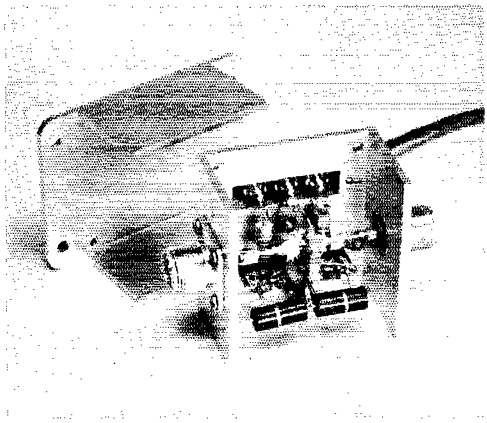
Forward and reflected power is read in three ranges: 0–15 watts, 0–150 watts and 0–1500 watts. On the first range the meter is calibrated from 0.2 watt to 15 watts. For the second range the user must multiply these figures by 10 to get calibration points of 2 watts to 150 watts, and for the third range he must use a multiplication factor of 100 to obtain calibration points of 20 watts to 1500 watts. Accuracy of the readings above one quarter of full-scale power is rated at plus and minus 1 dB (plus 26 percent and minus 20 percent). No accuracy rating is given for readings below one quarter of full scale.

The DW 1550 is not limited to displaying wattage readings. It can be used to measure the VSWR of a feed line, provided the power level is at least 15 watts. For this purpose the meter is calibrated in voltage standing-wave ratios of 1.0:1 to 4.0:1.

Another feature of the DW 1550 is indicated in schematic form in Fig. 1. When the Comdel unit is set up as shown, the meter indicates the approximate difference between the forward line voltage that is rectified by CR_1 and the reflected line voltage that is rectified by CR_2. This permits the user of a transmatch to find an approximate impedance match by merely tuning the transmatch controls for a maximum indication on the meter. The usual practice of switching back and forth between the forward and reflected voltage positions of the meter while fiddling with the sensitivity control is not necessary unless precise adjustment is desired.

Physically the DW 1550 consists of two parts: a directional coupler and a control unit. As shown in the photographs, the coupler is housed in a very rugged box made of ⅛-inch aluminum channel that is 1½ inches high and 2½ inches wide. SO-239/U fittings are used to make connections to the feed line, and a three-contact terminal strip is used to make the dc connections to the control unit. The coupler can be mounted on the back of the control unit or it can be located at a distance. Sheet metal screws are furnished for the former installation, and about

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



Inside view of the directional coupler. The heavy wire connecting the center conductors of the two coaxial fittings passes through the center of a toroidal coil. Gunk on the coil and the wire securely keeps the two components in the same relative position, even if the unit is dropped.

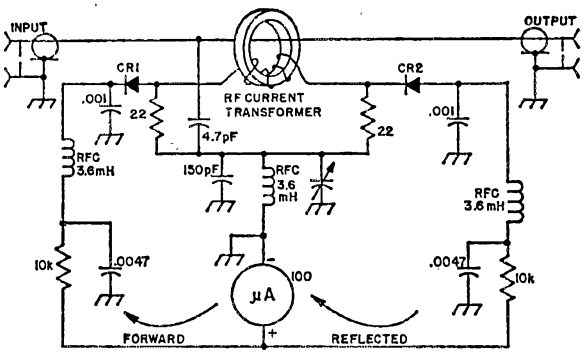


Fig. 1—Partial schematic of the DW 1550 in the ANT TUNE position. As described in the text, this circuit simplifies transmatch adjustment. Resistances are in ohms, k = 1000. Capacitances are in μF unless marked otherwise. Component labels are for text reference.

5½ feet or so of shielded three-conductor cable is supplied for the latter.

The control unit is contained within a 3 × 3 11/16 × 7 9/16-inch aluminum case. On the front panel are a meter with a 1⅛ × 2¼-inch window, a three-position slide switch (15 W, 150 W and 1500 W), a five-position rotary type function switch (FRWD power, REFL power, ANT TUNE, SET VSWR, and READ VSWR), and a sensitivity control for the VSWR positions of the function switch. A three-contact terminal strip for the dc connections from the coupler is mounted on the back of the control unit. — *W1YDS*

Comdel DW 1550 Wattmeter

	Control Unit	Coupler
Height:	4¼ inches	1⅝ inches
Width:	7 9/16 inches	3¾ inches
Depth:	4 inches	2½ inches
Weight:	17 ounces	8 ounces

Price Class: $75

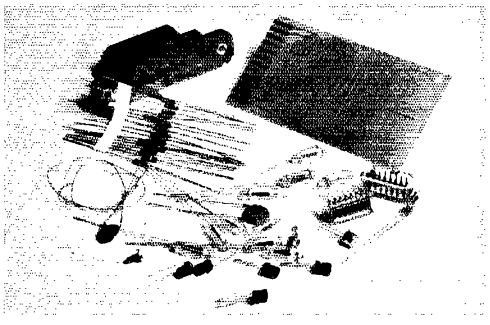
Manufacturer: Comdel Inc., Beverly Airport, Beverly, Mass. 01915.

• *New Apparatus*

Display Electronics Decade-Counter Kit

A new decade-counter kit for the electronics experimenter has recently been announced by Display Electronics. Now one can build professional-looking frequency counters, digital meters, precision clocks, and many other digital projects, using these modules as the heart of the system. The counter module uses two Signetics "Utilogic" integrated circuits, along with a resistive decoding matrix and seven transistors which drive neon-lamp indicators. Eleven lamps, located in a molded nylon housing, display the numbers 0 through 9 and a decimal point. Power requirements for the module are 5 volts dc ±5% at 75 mA, and 105 volts dc ±15 volts at 3 mA, or at 4 mA if the decimal point is used. The input circuit triggers on a dc level, so rise time is not critical. Operation to 10MHz is guaranteed.

The model DC10-1 kit includes all components for assembly of the module, including solder and bus wire, as shown in the photograph. The drilled printed-circuit board is of G-10 fiber glass epoxy material. An etched edge connector mates with a readily available Amphenol printed-circuit connector, or board connections may be made by soldering leads directly. As with any solid-state printed-circuit project, the surface of the tinned coating of the board should be cleaned with an abrasive material before assembly, to remove surface oxidation. (A solvent is not recommended.) This will make the soldering job easier, requiring less heat to properly "flow" solder between the board and the component leads. A low-wattage iron with a small tip is also recommended — as stated in the instructions. Following these precautions, the kit can probably be assembled by most builders in an hour or less.



The overall dimensions of the completed modules are 3 × ¾ × 4 inches. The modules may be mounted adjacent to one another with no spacing needed between. A depth of 3¾ inches is required behind the panel, excluding space for a connector, if used.

The kit, including complete assembly instructions, operating instructions, schematic and logic diagram, is available from Display Electronics, P. O. Box 1044, Littleton, Colorado 80120, for $13.95 postpaid. An assembled and tested version is available for $16.95 postpaid. Display Electronics also produces a power supply kit, model PS-1, designed especially for use with the decade counter. This supply is capable of powering up to seven modules plus other logic circuitry. — *K1PLP.*

Technical Correspondence

RADIO SIGNAL ECHOES

Technical Editor, QST:

Reference your article, "Long-Delayed Echoes . . . Radio's 'Flying Saucer' Effect," May 1969 *QST*. I am a cw weather-intercept operator with the U.S Air Force in southern Europe. I am stationed at the Moron Comm. Annex, located about 5 miles from Seville, Spain. This echo effect to which the article refers has been noted by me more than the "once a year" mentioned by the authors. This is why I write.

The stations which we copy are civilian weather synoptic and marine broadcast stations, using both plain text and five-character number groups. Usually the receiving equipment used is two R-390A/URR receivers with diversity antennas being three-curtain rhombic antennas at a height of about 50 feet. The stations are usually copied with a bandwidth of 2 kHz to 0.1 kHz. The echo effect is still clearly audible at 0.1-kHz bandwidth.

Over the last 15 months, I have noted echo effects on two of our stations. These echoes are consistent as to frequencies and time of day heard. The only "echo producing" frequencies thus far noticed are 2 and 22 MHz. The 2-MHz station is located in Idris, Libya, and the other station on 22 MHz is located in Capetown, S. Africa. The rated power is listed as 250 watts for the Libya station and 5 kW for the station in S. Africa. The echos are usually heard late at night (2130 and 0030 GMT on 2 MHz and 1730 GMT on 22 MHz), and are more frequent on 2 MHz than on 22 MHz. Also, the echo signal follows further behind the original on 2 MHz than on 22 MHz.

On 2 MHz the echo is anywhere from half to five and possibly more characters behind at a speed of around 18 wpm. On 22 MHz, however, the echo is usually only a half to one or two characters behind at a speed of about 15 wpm. These echoes, when they appear, only appear when the frequencies seem "clear as glass."

As a general rule, the echoes appear about once a month, with possibly two or more appearances per month during the winter. When I first noticed these echoes, I was inclined to blame them on the equipment. At the time, they were more of a nuisance than of any interest as phenomena. Even though they were "distant sounding" and not of the same strength as the copied signal, they were quite distinct and at times distracting. The next time that this effect appeared, I checked all position receivers using all antennas available and the echo was still evident, although it was not as evident when the antenna was not pointed in the direction of the transmitter. There is the possibility of the echo being generated by the transmission equipment. As we have no direct contact with these stations, I have been unable to eliminate this possibility. I have copied the echo, and it is, definitely, the same traffic that is being sent. — *Sgt. John M. Geiger, WAØTVZ, 2186 Comm. Sqdn., Box 11636, APO N. Y. 09284.*

MORE RADIO-SIGNAL ECHOES

Technical Editor, QST:

Several months ago I heard some long-delayed echo signals,[1] but not thinking about how fast radio waves travel, I assumed they were coming around both long and short paths. I thought this was normal. Then on June 1, 1969, I heard W2HCW, Long Island, New York, with echoes on his signal, but not with as long a delay as the earlier echoes. I am enclosing a magnetic tape recording of those echoes.[2] The time was 0609 to 0635 EDST (1009 to 1035 GMT), on 14.217 MHz. These times were when I started listening and finished listening; the echo may have been on longer. The signal was quite loud for this time of the morning. I think it had peaks of about S6. The antenna was a 20-meter dipole favoring NNE/SSW, but the echo was also heard on an 80/40-meter V which favors east/west.

I have heard W2HCW at other times, but no echoes. I was under the impression that I could not hear New York on 20 meters, but he was quite readable at about S4 early one morning. He does run high power and a 3-element beam, according to his QSOs. Maybe we have a good path between us. He is the only New York station I have heard on 20 meters. — *Larry M. Frazier, WA3LHG, 1962 Upsher St., N. W., Washington, D. C. 20011.*

ECHO SIGNALS ANALYZED

Technical Editor, QST:

I am enclosing some Sonagrams[3] that seem to show the echo on W2HCW's signal fairly well. See Fig. 1. This one was taken with the analyzing filter in the 200-Hz position.

The narrow bandwidith of Larry Frazier's receiver only gave us a little over one KHz of bandwidth on the tape to work with. You can see a definite repetition of patterns at approximately 135 milliseconds. If this is considered to be a propagation delay, the path difference would be

[1] Villard, Graf, and Lomasney, "Long-Delayed Echoes . . . Radio's 'Flying Saucer' Effect," *QST*, May, 1969.

[2] We requested Mr. Nathan Gold, K1MIA, who possesses the necessary equipment, to spectrally analyze the recorded audio signals. We also corresponded with Mr. Arnold Tamchin, W2HCW, regarding the delayed echoes present on his signal. Excerpts from their replies are also presented above. — *Editor.*

[3] Registered trade mark, Kay Electric Co., Pine Brook, N. J.

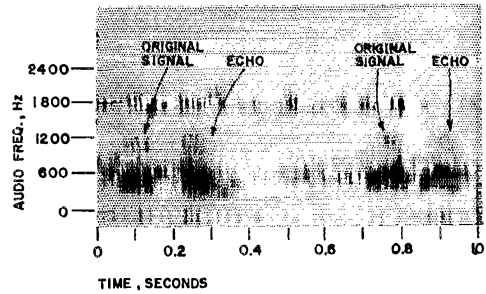


Fig. 1—Sonagram of W2HCW's signals and echoes as received by WA3LHG. The chart displays a spectrum analysis of the audio signals; time is shown horizontally and frequency is shown vertically. The intensity of the patterns shows the amplitude of the individual voice frequencies which are present. The time between the original signals and their respective echoes is approximately 135 milliseconds.

25,000 miles (roughly the circumference of the earth). An important point is that the echo isn't an exact copy of the original signal. Something that is an echo should repeat the identical pattern except for differences in amplitude of frequencies due to selective fading. The Sonagrams show that the patterns of the echos are roughly the same as the original signal, but the detailed frequency structure is different. It's almost as though another voice was repeating the same words. It is possible that if the echo is due to a signal propagating around the earth, the ionosphere might have had some rapidly changing characteristics that could cause enough doppler shift to make the patterns look different. The "around the earth" hypothesis might be argued against by the fact that the original signal and the echo are approximately equal in amplitude, but this could occur if the direct path had very poor conditions and the around-the-earth path had very good conditions. — *Nathan Gold, K1MIA, 4 Lanewood Ave., Framingham, Mass. 01701.*

"ECHO" TRANSMITTING FACILITIES

Technical Editor, QST:

I do not particularly recall conditions on the morning of June 1st, but I do note from my log that contacts were made with VK, ZL, ZS, PY, JA, DU, KR6, and FG7 stations.[4]

On the 20-meter band I use two six-element wide-spaced Yagis stacked vertically. The upper bay is at 105 feet and the lower is one wavelength below. The location of the antennas is on a knoll about 50 feet above Conscience Bay, an inlet of Long Island Sound. The ground falls away at about a 45° angle in most directions. The antenna sees water in all directions, although in the southerly direction the distance is several miles. In general, the location is excellent. The equipment is Collins with a BTI linear operating at near maximum power. — *Arnold Tamchin, W2HCW, Box 932, Setauket, N. Y. 11785.*

STOPPING RUST AND CORROSION

Technical Editor, QST:

In the July 1969 issue of *QST*, Technical Correspondence, KH6FHN asks for comments on combating corrosion in electronic gear.

I find that a good periodic cleaning with a product known as LSC — Lubricates-Stops Corrosion — manufactured by Radiator Specialty Company, Charlotte, N. C., controls this condition quite well. (The frequency of cleaning would depend upon how much trouble you may have with corrosion, and, in my case, is confined mostly to coax connectors and antenna terminals located outside in the weather.) This product meets Mil. Spec. Mil-C-23411, which is concerned with appearance, sprayability, effect on paint, protection afforded, etc. The manufacturer says LSC permits electrical current to flow because it does not insulate. It provides a long-lasting, nonhardening, molecular film barrier that preserves and protects all metal surfaces against rust and corrosion. LSC will stop rust and corrosion that exists and prevent reoccurrence on new or cleaned parts; it seals the surface and blocks rust and corrosion-contributive elements — water, gases, alkali.

LSC is specifically recommended for use on radio and television antennas. A major cause of poor TV reception, and one often overlooked, can be traced to corroded antenna terminals. This product is packed in an aerosol can and may be applied by spraying on, brushing on, or wiping on with a cloth. For new work, all parts — wire, leads, terminal strips, and so on — should be cleaned with an agent that will leave no film (carbon tetrachloride, but handle with care). After the connections have all been soldered, a light coat of LSC will prevent any corrosion from forming. It is excellent for cleaning relay contacts because you don't wear away the plating on the contact surfaces as may happen if you file them clean.

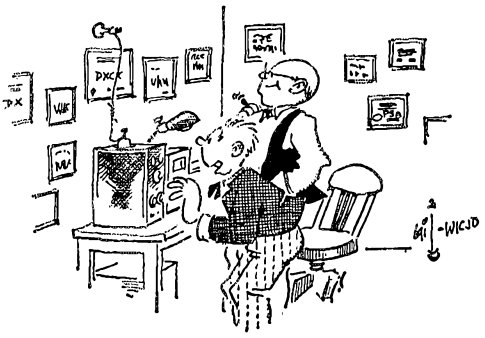
To clean tube sockets it would be best to find a very small spiral nylon (or some other nonconducting material) brush such as used by watchmakers, spray some LSC on the brush, insert into each pinhole in the tube socket, and brush the contact surface clean. Good results can be accomplished by an alternate method; spray the pins of the tube with LSC, insert and remove the tube several times to clean both the socket and the tube pins, wipe any residue from the tube pins, apply a thin film of LSC and install the tube.

For printed-circuit boards, a fairly stiff nylon brush loaded with LSC can be used to scrub the entire surface of the PC board including the conductive areas. Wipe clean with a soft lint-free cloth and apply a light coat of LSC to prevent further corrosion.

I find particularly helpful the fact that LSC will not harm painted surfaces (one of the Mil. Specs.) which makes it ideal for cleaning bright metal trim, chrome, brushed aluminum, etc., on equipment cabinets. — *Sam M. Mooney, WA4WKW, 1116 Brighton Pl., Charlotte, N. C. 28205.*

[4] Countries with these prefixes lie in both directions on a generally west-northwest — east-southeast line from W2HCW's location near Port Jefferson, Long Island. Such contacts indicate that 20 meters was "open" in both directions, supporting the possibility that signals were traveling around the earth. The ESSA propagation prediction charts for June 1969 show that at 1000 GMT it may have been possible to "hop" 20-meter signals around the world along this line. However, rather than by hopping, the generally accepted theory for such propagation is that the energy is ducted through the ionosphere for a good part of the distance, such energy tending to follow the sunrise — sunset line around the earth. In view of this occurrence shortly after sunrise at W2HCW's location, it is probable that the delayed signals were traveling around the earth. (Around-the-world propagation time has been measured as from 138.0 to 139.5 ms, with very little sensitivity to frequency.) The earlier signal was probably reaching WA3LHG by tropospheric or other scattering, or perhaps by sporadic-*E* layer refraction. — *Editor.*

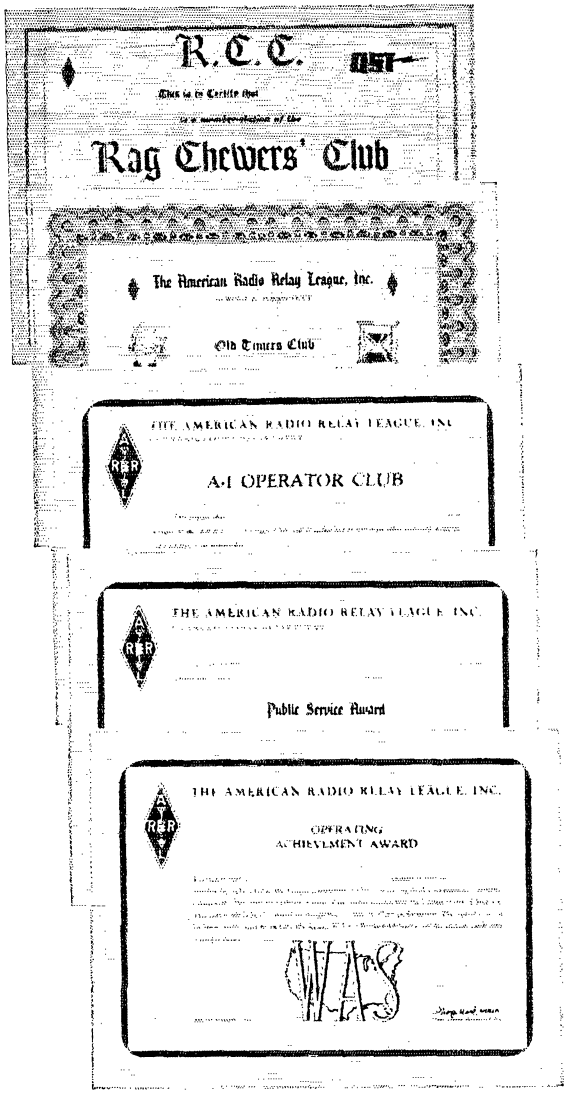
ARRL AWARDS



BY ELLEN WHITE,* W1YYM

A Primer for Certifying Achievement

BPL? OTC? RCC? A-1 OP? To the uninitiated among us this alphabetical soup may seem like gobbledygook! Periodically there seems to be a need to rehash some of those amateur radio ABCs for the OT as well as the tyro. Yes, evolution has taken place — the field of ARRL awards has been no exception! From that coveted Code-Proficiency Award to the brand spanking new 5B-WAS (a start from "go" award effective January 1, 1970) here are the basics. However noble-sounding they may be, don't forget that they're downright fun to go after.



Rag Chewers' Club

Often the first operating award new hams aim for is the RCC. The RCC is designed to encourage friendly contacts and discourage the hit-or-miss variety, bonding together operators interested in honest-to-goodness conversing over the air.

The sole requirement for membership in the RCC is to chew the rag over the air for at least a solid half hour. If you're looking for membership, report the QSO to Headquarters and you'll soon be issued the attractive blue certificate. If you want to nominate someone else for membership in RCC, send the nomination (date and time of QSO and length of chew) *to him*, not to ARRL Headquarters. If he wants the certificate, he can send in the nomination to Hq. This way, no one gets an unwanted certificate and confirmed rag-chewers can still nominate those they think qualified.

Code Proficiency Award

Many hams (and prospectives!) acquire an introduction to League Awards through the CP program. Each month both W1AW (the Maxim Memorial Station) and W6OWP transmit qualifying runs. Five minutes of text is transmitted at each speed, 10-15-20-25-30 and 35 w.p.m. You only have to copy one solid minute to qualify. Yes, typewriters are permitted! (We've seen some of that writing at 35 w.p.m.!) Underline the minute of "perfect" copy, note which station you copied, and ship your paper along to Headquarters.

In the processing, your copy is checked directly against the official tape. We then advise you if you passed or failed. If the news is good, you'll receive either your initial certificate or an appropriate endorsement sticker. If you fail to

*Deputy Communications Mgr., ARRL.

make the grade, you'll be notified to that effect. A full card file is maintained which notes your progress in the program.

You need not be a League member or a licensed ham to participate. To give you an idea of the popularity of this service, over 3000 copies of qualifying runs were submitted in 1968.


THE AMERICAN RADIO RELAY LEAGUE, INC.

Certificate of Code Proficiency

In addition to printed schedules available from Hq., each month the Operating News section of *QST* details the information on upcoming qualifying runs. That's right, no charge, no membership requirement, no fee of any kind.

Old Timers' Club

Undeniably there is more than a little bit of nostalgia when people talk about the good old days — and the good old people. There's a lot of sentiment too when you talk about the old-time hams, particularly those hams still around who held their license "way back" when.

In recognition of the current-day hams who held an amateur license 20-or-more years ago (lapses permitted), a suitable award is available. It's called the OTC Award.

If you can qualify as an "Old Timer" you'll find the necessary paper work pretty easy. Drop a note to Hq. with the date of your first amateur license and your present call. We'd like to have a brief outline of your ham activities over the years, in addition.

If you prove eligible, you'll soon receive your membership certificate in this venerable group. No charge, OMs.

Worked All States

The popular ARRL WAS award is available to all amateurs, (U. S. or foreign). In addition, endorsements are also available for special modes, bands, or other purposes (upon submission of all 50 cards for each endorsement purpose). The WAS award calls for two-way communication on any of the amateur bands with each state. QSLs for contact with the District of Columbia count for Maryland.

Contacts may be made over any period of years. The confirmations must show your call and definitely indicate two-way communication. Contacts with Alaska prior to Jan. 3, 1959, or with Hawaii prior to Aug. 21, 1959, cannot be counted. These are, of course, their effective dates of statehood.

Contacts made through repeater devices or any other power relay method cannot be used for WAS confirmations. Contacts must all be made from the same location, or from locations no two of which are more than 25 miles apart.

Rules require sufficient postage for the return of the confirmations. Additionally, a service charge of $2.00 is made to any applicant in Canada or the U. S. and possessions, and Puerto Rico, who is not a full ARRL member. (No service charge for foreign applicants).

To be on the safe side, ask for ARRL Operating Aid. No. 8 when you're about ready to apply. This convenient form itemizes the rules, supplies the proper space for listing cards, and makes sure you are alerted to all requirements.

An additional handy aid is the WAS "map," which is suitable for posting on the shack wall. Many hams color in the states as they're worked and or confirmed to make a visual presentation of their WAS progress.

5-Band WAS

This is the "newest of the new." So new, in fact, that the effective date of contacts is January 1, 1970. This might be called the reciprocal of the 5BDXCC and the purposes of the award are pretty much the same — to foster more uniform activity throughout the bands, encourage the development of better antennas and provide a new and basic challenge to newcomers as well as OTs.

If the experience gained in 5BDXCC illustrates anything it does show that you better not postpone work on those antennas. Low-band activity in particular is going to be tremendous.

In addition to the basic WAS rules, 5BWAS has a "start from scratch" date of January 1, 1970, and an applications' form fee of $10. This charge will cover the cost of return of your cards by first-class registered mail and a plaque you'll be proud to display in your shack. 5BWAS rules

also requires the applicants in the U. S. and possessions, Puerto Rico and Canada, to be a full member of ARRL.

Unlike WAS, the 5BWAS is a one-time-only awards. No band or mode endorsements will be made.

Public Service Award

Oregon Forest Fires, July 1960, reported in November 1960 *QST*. . . . Hurricane Donna, September 1960, reported in February 1961 *QST*. . . . Alaskan Earthquake, March 1964, reported in July 1964 *QST*. . . . Montana Snowstorm, April 1961, reported in August 1961 *QST*. . . . Kansas-Missouri Tornadoes, May 1957, reported in September 1957 *QST*. The Public Service Award files at Hq. thus record the history of the radio amateur's contributions in the field of public service. That's right, a card file is maintained for each ham receiving a PSA. In addition to the name and call, a brief description of the event, as just noted, appears on the card.

How do you get the PSA? Well, this is one award you won't be asking for. It's a spontaneous one, recognizing outstanding work accomplished during communications' emergencies.

DX Century Club

There is, perhaps, no more prestigious award than ARRL's long-standing DXCC Award. To some, this has become the "open-ended DX contest" of all time. Basically, it is an award issued after confirming contacts with amateurs in 100 or more different countries per the ARRL Countries List.

Two types of award are available, the general type (c.w./F) and the phone type. The first is for all modes. Cards submitted can be either one mode or mixed mode. The phone award is for contacts made by any voice mode of operation.

All contacts for DXCC must have taken place after November 15, 1945. If you achieve the basic award, you can still "add on" to your totals by submitting cards in certain groups and acquiring endorsement stickers." If you've been credited between 100 to 240 countries, rules require you to submit cards for endorsement in groups of 20 (or a sum needed to bring you up to 120, 140, 160, etc.). You'll note, however, that the stickers represent steps of 10. Since a real degree of difficulty starts at the mid-200 country level, the rules are relaxed and permit you to submit cards for endorsement in groups of 10, if you have an accredited total from 240-300. At the 300 mark, you may then submit cards in groups of 5.

Still one other exception is noted when you're really up in those higher echelons! As you may have noted from the periodic listings, there is a DXCC "Honor Roll." This tabulation is composed of the calls of those amateurs who have reached the "top ten" totals in the DXCC. These top ten figures represent a deleted total of countries. Some countries are no longer available to work such as Saar, Sarawak, Ifni, British North Borneo, etc. The number of these are deleted from the over-all totals of those leading the pack to arrived at a deleted number. All deleted countries are clearly indicated on the ARRL Countries List (Op. Aid No. 7).

The rules for DXCC are fairly complex and are noted on the front cover of the Countries List. This DX *Baedeker* is available without charge from ARRL Hq. An s.a.s.e. (addressed-stamped envelope) will help speed it back to you).

If you feel you're close to qualifying, please write Hq. for the appropriate application forms. Issuance of the DXCC is an ARRL membership service without charge to full members in Canada, the U. S. and possessions, and Puerto Rico. It is also issued free of charge to foreign amateurs not included in the aforementioned categories. All others are charged $4.00 for a DXCC application and $1.00 for an endorsement.

Five-Band DXCC

This new challenge to avid DXers became effective January 1, 1969 (or haven't you noticed that increased 80- or 40-meter DX activity!). It is a start-from-scratch achievement calling for ability, tenacity, versatility — *you name it!*

The rules make use of present DXCC regulations and are closely tied to them. There are a few major differences to keep in mind. The 5BDXCC requires DXCC qualification on each of five separate bands. Only contacts made on or after Jan. 1, 1969 count. If you're an applicant in the U. S. and possessions, Puerto Rico and Canada, you must be a full member of ARRL. The award carries a basic $10 forms-application fee. This initially may

sound pretty high, but this in-advance charge insures return of your cards by first-class registered mail and a handsome 7-color plaque. The engraved plate on the award will note the serial number, your call and the award date. No type of endorsements (bands, modes, etc.) will be available.

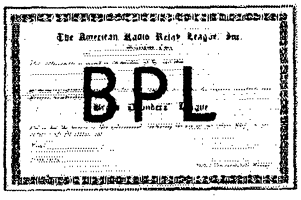
Complete 5BDXCC rules — as well as the ARRL Countries List noting DXCC details, are available without charge from ARRL. Several "prospectives" have paid the forms charge but who will be 5BDXCC #1?

Brass

Pounders

League

The field of traffic handling is as specialized as almost any other within amateur radio. The fun, yes the sport of it has captured the imagination of and occupied the spare time of thousands of hams over the years. The basic system of counting traffic permits a monthly record to be reported to the Section Communications Manager (see page 6) each month.



The BPL is open to all amateurs in the United States, Canada and U. S. Possessions who report to their SCM a message total of 500 or a sum of 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. If you meet the requirements, your SCM will issue one of the distinctive 3½" x 5½" card awards.

Additionally, a special engraved medallion is presented to each individual amateur when he makes BPL for the third time.

A-1 Operator Club

There's hardly an amateur in the world who doesn't want to be considered by his fellow ham as a fine operator. Over the years, in an effort to sustain this noble objective, the League has sponsored the A-1 Operator Award.

Membership attests unusual competence and performance in keying, modulation, procedure, copying ability, judgment and courtesy. Particularly unique about membership in this select group (only about 2800 verified members to date) is the absence of a "list" to aid those desiring an award. You must be recommended for the certification independently by two operators who already belong. If you ask to join you may "fail" the test on a courtesy-judgment basis. This honor is truly an unsolicited and earned one — earned by observance of the very highest operating standards, regardless of mode.

Worked all Continents

Strictly speaking, WAC is **not** an ARRL Award. ARRL is, however, the Headquarters for the International Amateur Radio Union which does issue it.

To qualify for the IARU WAC, you must submit one confirmation from each of the six continental areas. No photocopies are permitted. Contacts must have been made using one call sign from one metropolitan area (i.e., a 25-mile radius). Enclose a stamped addressed envelope large enough to accommodate your cards. Since this envelope will be *mailed* in the U. S., it should either carry U. S. postage or the equivalent in the form of International Reply Coupons (IRCs).

Special endorsements are available for this attractive certificate: all s.s.b., all RTTY, all 3.5 MHz., all 1.8 MHz., or all 50 MHz.

A painless way to conform to the rules is to ask ARRL Hq. for a WAC application form. Non-W/VE applicants must apply to the IARU member society in their country. QST

Strays

The logs of HU1P, single-operator 1969 DX Phone entry from El Salvador, have apparently been lost in the mail. Eloy's claimed score of 5,113,773-261-6531-B-72 undoubtedly will be of interest to many.

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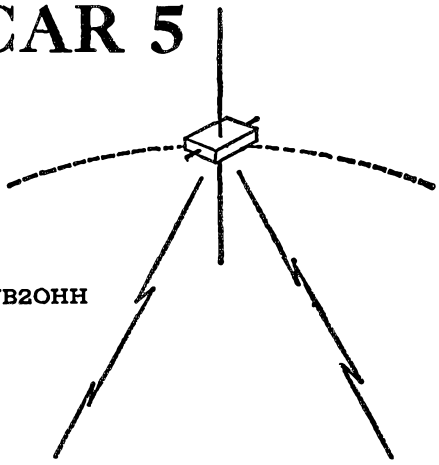
HEADQUARTERS VISITS

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30, on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U. S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule on page 116).

AUSTRALIS-OSCAR 5

WHERE IT'S AT



BY WILLIAM DANIELSON*

and SHELDON GLICK*, WA1IUO/WB2OHH

AUSTRALIS-Oscar 5 contains beacon transmitters operating at 144.050 and 29.450 MHz. The design and operation of the satellite were described in previous articles (see bibliography in *QST* for September 1969, pg. 47). The purpose of this article is to familiarize readers with satellite tracking techniques.

The numbers presented here are based on the TOS (Tiros Operational Satellite) orbit as an example. This orbit is a practical one since many amateurs track TOS satellites to obtain local cloud cover (APT) pictures, using information transmitted by W1AW on equatorial crossings of TOS satellites. News of the actual orbital parameters of Australis-Oscar 5 will be reported either in League Lines or by W1AW bulletin.

To facilitate your hearing Australis, W1AW will transmit, on its normal bulletin schedule (see page 116), the approximate times the satellite will be over selected areas. Additionally, for those interested in more precise tracking, the times and longitude of equatorial crossings will be transmitted. This article describes how to use the equatorial crossing data.

Getting Set Up

In order to track Australis-Oscar, you will need a few items not normally found in a ham shack. First, you will need a clean table. Once over this hurdle the rest is easy! Upon the table you will need a fairly large world map — large enough to be marked off at least every five degrees of longitude at the equator. A north polar stereographic projection is best. This is the type of map with the North Pole in the center.[1] Other types of maps can be used. But, try to avoid Mercator projection maps. Get a piece of clear plastic or glass to cover the map, a protractor, and some grease pencils for writing on the plastic or glass surface. Now, you are ready to start plotting Australis-Oscar's path.

Look at the scale on your map to determine how many miles to the inch. Find your location on the map and draw a circle with a radius of 2135 nautical miles (2455 statute miles) centered on your QTH. Unless you have an obstruction on your horizon, you will be able to hear the satellite when the point on the Earth's surface directly under the satellite (sub-satellite point) is within this circle. The longest pass you will be able to hear is one that cuts the circle in half by going almost directly over your head. Passes to the east or west of you will be of progressively shorter duration the farther east or west they are.

Where and When

The nearest pass to directly overhead will occur at about 1500 local standard time each afternoon, and again at about 0300 local standard time each morning. This is because the satellite will be in a "sun-synchronous" orbit. That is, the orbital plane maintains a constant orientation relative to the sun. Daylight portions of each pass will be from south to north (called the ascending node), darkness portions from north to south (descending node). The period of the orbit, i.e., the elapsed time between two consecutive equatorial crossings on the same side of the earth, will be 114 minutes.

The latitude of your location will determine how many consecutive passes each day and night you will be able to receive. If you live at the North Pole, you can receive every pass since the satellite will be in a near-polar orbit. If, however, you live at the equator, you could hope to hear a maximum of four passes per day — two during daylight and two during darkness. At 40° north latitude, which about bisects the United States, you can look forward to three or four consecutive passes each afternoon and morning, or, up to eight passes each day.

When To Listen

In order to find the satellite, you will need only two pieces of information not supplied by this article: the time of the equatorial crossing (ascending node) and its longitude. This data will be supplied by W1AW bulletins. The longitude of an equatorial crossing will be given in degrees west of Greenwich, the 0° or prime meridian. If

* Talcott Mountain Science Center for Student Involvement, Avon, Connecticut 06001.

[1] This will provide reliable indications for the Northern Hemisphere; amateurs in the Southern Hemisphere should use a South Polar projection. In general, such projections are useable for the hemisphere on which they are centered.

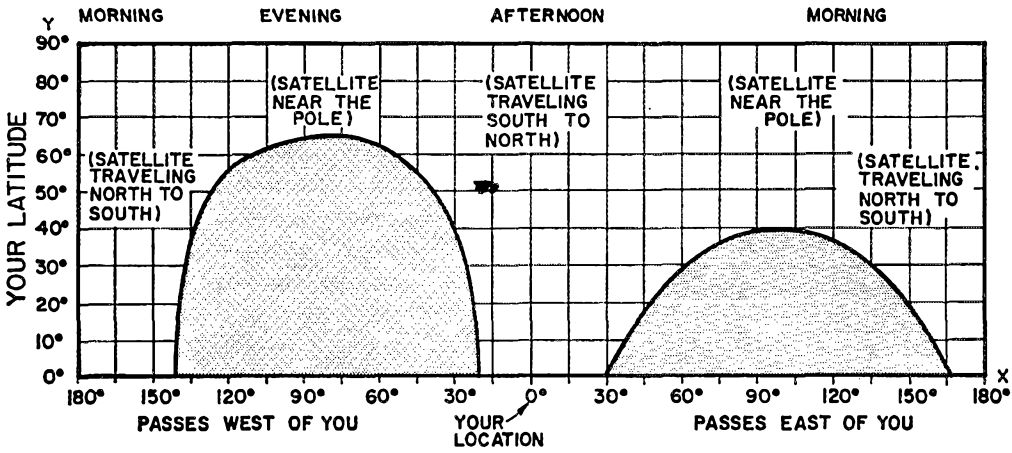


Fig. 1 — How to determine which passes you can hear.

Directions:
1. Locate your latitude on the y axis; draw a line horizontally across the graph from this point.
2. Determine how many degrees east or west of *your longitude* the equatorial crossing (ascending) will occur. Mark this point in the appropriate location on the x axis. Draw a vertical line from this point to the top of the graph.
3. If this line crosses the previously drawn line in an un-shaded area, you should be able to hear this pass. If, however, the intersection occurs in a shaded area, the pass will be unavailable to your location.

The approximate time of day (i.e. morning, afternoon, evening) for all passes is noted at the top of the graph. This is possible since the satellite is in a "sun-synchronous" orbit. The graph also indicates whether the pass is north-to-south, south-to-north, or near the pole at the time when you will hear it. Note that for the passes nearly 180° away from you, the south-to-north equatorial crossing occurs on the opposite side of the earth. Your acquisition of the satellite for such passes, will occur once the satellite has crossed near the pole and begun its north-to-south sweep.

this number exceeds 180°, the satellite then really is in east longitude according to your map. You would then have to subtract the given longitude from 360° to obtain the degrees of east longitude. Example: Ascending node is at 220° west longitude; so, 360° minus 220° equals 140° east longitude. Remember that all times will be expressed in GMT.

At this point we are ready to plot an orbital path. Let's suppose that your QTH is located near St. Louis, latitude 38.5°, west longitude 90°. Draw a circle on your map with a radius of 2135 nautical miles (2455 statute miles) centered on your location. Any satellite pass that crosses any part of this circle, you should be able to hear. The spread of equatorial crossings which will cross your acquisition circle can be found from figure 1.

Choose a pass which you intend to track and put a dot on the map at the point where it crosses the equator. Next, consult Table 1 to see that two minutes after crossing the equator, Australis-Oscar has gone north to latitude 6.2° and is 1.8° west of the equatorial crossing longitude. Find this point on the map and mark another dot. Repeat this step for each two-minute interval as the satellite travels, until you have a string of dots two minutes apart going across your acquisition circle. (Omit dots which occur prior to reaching and after leaving your range.)

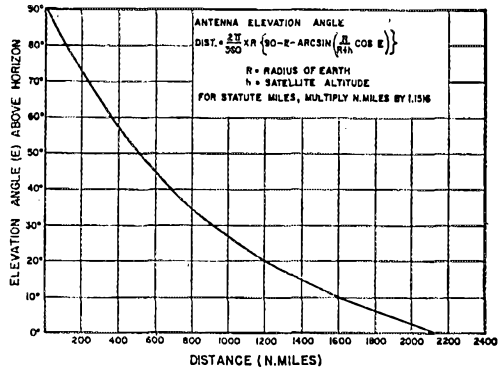


Fig. 2 — Antenna elevation angle *vs.* distance along earth to sub-satellite point.

Antenna Pointing

Now draw a line connecting the dots.

The points at which this line crosses your circle are the acquisition and loss times for this particular pass. Since you know the time of each dot, you can find these times to within about 30 seconds. To determine the azimuth heading for each two-minute point (i.e., the direction in which

TABLE NO. 1

Minutes past ascending node	*Actual latitude ϕ of satellite north*	*Degrees of $\Delta\lambda$ longitude to be added*
2	6.2°	1.8°
4	12.4	3.6
6	18.6	5.4
8	24.7	7.4
10	30.9	9.6
12	37.0	11.9
14	43.0	14.5
16	49.1	17.3
18	55.1	21.5
20	60.9	26.6
22	66.6	33.6
24	71.8	44.3
26	76.0	61.9
28	78.3	89.2
30	77.5	119.9
32	74.1	142.3
34	69.3	156.1
36	63.8	164.5
38	58.0	170.4
40	52.1	174.8
42	46.1	178.2
44	40.0	181.1
46	33.9	183.6
48	27.8	185.9
50	21.6	187.9
52	15.4	189.7
54	9.3	191.5
56	3.1	193.4
57	0	194.5

$$\phi = \text{ARCSIN}\left\{\left(\text{SIN } \iota\right)\left(\text{SIN } \frac{2\pi}{\rho}\tau\right)\right\}$$

$$\Delta\lambda = \text{ARCCOS}\left\{\frac{\text{COS}\left(\frac{2\pi}{\rho}\cdot\tau\right)}{\text{COS } \phi}\right\} + 0.25\,\tau$$

Where ι = orbit's inclination to equator
ρ = satellite period (114 min.)
τ = time after ascending node (in min.)

At indicated minutes past ascending node (equatorial crossing south to north) the satellite will be at north latitude indicated, and the number of degrees of longitude in column 3 must be added to the node longitude. The correction factor for the earth's rotation has been included. Amateurs in the southern hemisphere can use the table by subtracting all figures instead of adding them. This will work the satellite backward in time from the ascending node.

to point your antenna), place a protractor on the map with 0° pointing to the North Pole and the line between 0° and 180° set on your longitude. The midpoint of the protractor base should be on your latitude. If the pass is to your west, have the 90° mark point west; if to the east, the 90° mark will point east. Place a straightedge between your location and the point of the orbit for which you wish to compute, and read the degrees at the point which crosses the protractor scale. On passes to the east, this will be your antenna azimuth in compass degrees. If the satellite is to your west, subtract the protractor reading from 360° to determine the azimuth in compass degrees. Finally, to find the elevation of Australis-Oscar above the horizon, measure the distance from the sub-satellite point you wish to calculate, to your location, using the distance scale on your map and find the elevation angle from figure 2.

You will note that if you live north of about 40° north latitude, you may be able to receive a part of about 80% of the orbits as they pass through the north-polar regions.

One final word about tracking Australis-Oscar 5. The information contained in this article is based on a straightforward mathematical determination of the line-of-sight path between you and the satellite. We wish to re-emphasize the possibility of unusual signal reception as mentioned in a previous article.[2] QST

[2] Dunkerley, "Australis-Oscar 5 and You!" *QST*, August 1969, p. 69.

The Swan 2-Meter Antenna

(*Continued from page 45*)

checked out fairly readily with available equipment. The comparison dipole may be a source of trouble with gain checks, so comparison with a directional system of known gain is often used. In this instance, an optimum 5-element Yagi[5] was used for the reference antenna. The Swan antenna was found to have between 3 and 4 dB more gain, which should put it in the 12-to-13 dB gain range. Reliable figures for optimum-spaced Yagis (Fig. 8-4 of our *Radio Amateur's V.H.F. Manual*) give just over 11 dB as the maximum to be expected from a conventional Yagi of this same boom length, 10 feet. Significantly, we feel, this is the first antenna we've checked in this way that has shown performance in excess of that given by the chart cited above.

Bandwidth and front-to-back ratio are both better than we've seen in single Yagis of anything like this size. Backyard F/B ratio checks are likely to result in lower than true figures, again because of reflection problems. The Swan antenna showed 16.5 dB at the low end, nearly 18 dB at 145 MHz, and above 17 dB at 147 MHz. Gain relative to the maximum observed between 144 and 144.5 MHz was down 0.25 dB at 145, 0.6 dB at 146 and about 1 dB at 147 MHz.

With the universal stub adjusted for zero reflected power at 145 MHz, the SWR at 144 was under 1.5:1. At 147 MHz it was about 2:1.

Stacking

Two-bay and four-bay systems have been erected at several stations. The array of WB6PDN, shown in one of our pictures, has four bays, stacked ¾ wavelength each way. We have not checked results with stacked bays, but the developer feels that closer spacing may be used effectively than with conventional Yagis of the same boom length. It is believed that the smaller number of directors employed is the reason for this. More work is needed before the full story is known. Meanwhile, we have something a little different in vhf arrays, with ideas that show enough promise to warrant serious investigation by the antenna enthusiast among us. — *W1HDQ* QST

[5] See footnote 2.

So You Want to Win an SS Contest

BY STEVE EICHMAN,* WA6IVN

FOLLOWING each Sweepstakes contest, you hear a lot of crying and complaining from some of the participants that they can't compete with so-and-so because he has huge, monstrous antennas, high power etc. They claim that it is a hopeless effort to try to win their ARRL section against such tough competition.

The most significant reason why these people don't win is that they are already defeated before they even get started, on account of their negative attitudes. It is my true and sincere belief that anyone with a reasonable location and station set-up can, indeed, have a good chance to win his section regardless of his competitors if he really wants to make the required effort!

I hope to give some of the other small-time operators a piece of the knowledge, experience, and operating skill that I have accumulated over the past years in hopes that they can take that section home.

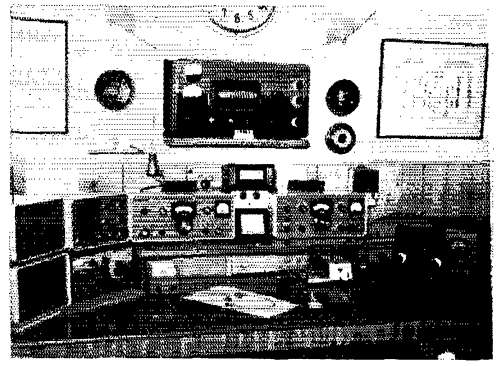
Your Goal

It is imperative that you condition your mind to accept your goal: to take home your section. Convince yourself that your competitors haven't got a snowball's chance in hell of winning that section this year. Your enthusiasm is a very important factor. You are going to make an all-out effort! This means minimal breaks; exercise limited to jaunts down the hall for physical relief. (If you are a heavy coffee drinker, you can count on a lot of exercise!) Now that you are convinced and positive as to the nature of your goal, your foot is already in the door to success.

Important Decisions

Make up your mind whether you are going to run high or low power.[1] Let's examine the pros and cons of both. With high power, it is much easier to hold one's own frequency and, as a result, contacts are usually easier to make and somewhat more frequent. Class-B stations usually (not always) end up with the most contacts. There is a tremendous price to pay for this privilege, however: a multiplier of × 1.25 or 25 percent. That means if you are operating a class A station and have a score of 100,000, you will, in addition, receive 25,000 free points. You can figure on a signal difference of about one to two S units between class A and class B. This is assuming that all other factors are equal (which they seldom are). There are certain disadvantages to running a linear amplifier (class B), however. You sacrifice flexibility in that you have more controls to fiddle with and it is necessary to retune more frequently. It requires more time to change bands and the extra meters to watch sap up a lot of the operator's time and attention. On the other hand, a class A station will experience more difficulty in cracking the huge pile-ups on the rare ones while the high-power boys can raise them by sure saturation (and they usually do). If you are clever, you can time your calls so that you get your John Hancock in there while the QRO boys are busy with their saturation techniques. One major factor to consider is that low power on 40 meters is, quite frankly, tough going. Unless you are so fortunate to have a beam or other high-gain antenna for this band, you can count on a frustrating evening.

It is the author's opinion that class A is the best way to go, providing you play your cards right. Look in some old *QST*s and see who some of the past high scorers were. Yes indeed, they ran low power, class A.



Not too obvious or hidden from view at WA6IVN's operating position are three foot switches (transmit-receive, spotting, dummy load), a microphone suspended from the back of the console directly in front of the operator and an easily-read digital clock. Plans for the 1969 SS include a knee-operated rotator control. EFFICIENCY—*that's* the word!

Antennas, Equipment and Station Operation

Contrary to popular belief, five elements at 100 feet is not the answer to the best signal during the SS. Someone with such a set-up might be 20 dB over S9 in North Africa or the Middle East, but not necessarily in Jackson, Mississippi.

The author's station is designed for DX competition. The location is in the center of a 20-acre field which is located in a large valley approximately 500 miles long and 75 miles wide. My first thought when preparing for SS was that this location, antenna layout, would be superb for the SS contest. It certainly didn't take long to discover that the angle of radiation presented by my big flat top antennas was too low to be

* J-10866 E. Southland Rd., Manteca, Calif. 95336

[1][EDITOR'S NOTE: The 1969 SS will be run on a trial basis without power multipliers, on recommendation of the ARRL Contest Advisory Committee.]

of much use for anything less than about 2000-2500 miles. When comparing signals to the tri-band beam (at a much lower height), the tri-bander won out by a landslide in almost every case (excepting KH6, KV4, VE8). The thought of enduring the SS with a tri-bander didn't appeal to me, especially with my other high-gain arrays roosting almost a hundred feet above well irrigated soil. After countless tests, I became convinced that the tri-bander was going to be the antenna to use.

Therefore, unless you are plagued by high obstacles near your particular location, I strongly suggest a tri-band array of some type combined with an all-band doublet if you reside in the Central U. S. Optimum height in most cases for this type of propagation should be between 35 and 55 feet. If you have high-gain multi-element arrays at these heights you are one step ahead of the rest of us. For 40 and 80, I suggest an inverted-V as high as possible. (Of course, a rotary dipole or beam is highly advantageous; however most participants are not so fortunate to have one.) Verticals are ruled out in my book on account of the extreme low angle of radiation.

Equipment — It is mandatory that you have and *utilize* full break-in operation. If you have a transceiver, it is important to have some control of your receiver frequency (external control). Any receiver with 500-cycle bandpass for cw and 2500-cycle for ssb will be fine. Additionally, there are many audio filters on the market which offer additional selectivity at a very modest cost. They work very well although they introduce a loss in the audio circuit.

Next, a good pair of comfortable stereo-type headphones, preferably the type whereby the ear fits inside the phone entirely. This will be a leading factor in cutting down fatigue.

For cw, an electronic keyer is certainly a great help since you have an instant, positive, and accurate control of your speed as the situation might call for. Again it certainly will cut down on fatigue during the long hours of the contest.

Station Operation — The manner in which your station is set up is more important than the kind of equipment that you will be using. A complete break-in system has to be employed and fully operational for both the phone and cw contests. VOX is too slow and too clumsy. A foot switch for transmit is mandatory. They are easy to make and a pleasure to use.

If you have means of setting your agc., by all means set it as fast as possible so that your receiver will recover from mute instantly with full rf gain. Remember, you don't have much time during an exchange, so use it for filling out your log and check sheets, not fumbling with knobs on your receiver.

Be familiar with your station. Practice band changes until you can change bands and completely retune in 30 seconds or less. If necessary, mark your control settings. Your controls should be within easy reach without changing your seating position. I mentioned the digital clock employed in my station. This is an imperative measure! You don't have time to make up your mind what time of day it is. A digital clock will tell you exactly. You will simply write down four numbers. In fact it is not uncommon to be operating for several hours and not really realize what time it actually is!

Operating — Be familiar with propagation to the different parts of the country from your particular location. This doesn't mean to study all the propagation charts that you can get your hands on. It means to get on the air and use all of the different bands all day and find out when the skip is best for particular parts of the country during the period of one day. If you do this with low power, you will get a very accurate indication. Chart your findings and study them before the contest. Know when to go to what band for the best results. If you should decide to use low power, I cannot emphasize how important this is. This knowledge and experience alone may possibly be the difference between you being at a disadvantage with your low power and being on an equal level with the Class-B participants.[2]

Section vs QSOs — There is no special rule here. Both are equally important. One cannot be sacrificed for the other. Usually the vast majority of sections will come as a result of exposure. That is, if you play your cards right. This is in keeping with your good knowledge of the bands. When the bands seem to dry up or when you feel the need for a cup of coffee or a bite to eat, this is the time to tune and hunt for multipliers. Don't waste time beating your head against a stone wall when conditions are in a null. Go hunt the new ones!

Techniques — What is meant by exposure? Simple, just make a pattern of operating and keep to it. For example: You call a CQ on 21,030 and you get a good following started. After seven or eight QSOs the frequency runs dry; no one answers your QRZ. Now move up the band 10 kHz and start again. Bear in mind that it might take a few CQs to get it going again, but it's worth it if you get another string going (considering that you are able to hold on to your frequency). Keep those CQs short! No one is going to hang around for two minutes while you call CQ. When trying to get started on this new frequency you might not be able to make out any complete call of the stations calling you. If this is the case try this procedure for example: QRZ the W4-Victor station — Go . . . The sta-

[2] Ibid.

tion will usually come back all by himself and give his whole call. He may begin his exchange or he might want an acknowledgement first. When you come back to him, be sure to acknowledge his correct call in its entirety. In time this new frequency will dry up and you will have to repeat this procedure. I find that 10 kHz is just enough to expose you to a completely different group of stations hanging around that frequency. After you reach the upper limit (useful limit) of that particular band, start back down. This time, however, go down 10 kHz at odd multiples, i.e. 21,085, 21,075, 21,065, etc. Using this method, you will have covered every 5 kHz on one complete revolution of that spectrum. If there is a KV4 or VE8 in there somewhere, your odds against running into him, or at least hearing the pile calling him, are very good indeed!

Remember to keep a watchful eye on your schedule of peak times for skip that you charted previous to the contest. Don't guess what times the West Coast will be coming in; know when!

If the pickings get slim and you are unable to raise anyone by the previous method, start hunting, every 5 kHz up and every 7½ kHz back down the band. Don't waste time waiting for a station that just began his exchange (unless you suspect him to be a new section)-move on. You will certainly cross his path again on another sweep of the band.

Don't forget the weak ones. Often they are good operators without favorable skip. It is still possible for an effortless exchange with a reasonable QRM level.

During the beginning of the contest, the strong high-power stations will have huge pile-ups on them. Don't waste a lot of time trying to crack the pile-ups because tomorrow they will be thirsty for new contacts and will gladly listen for the QRP boys.

It is important to match the speed of stations calling you during the cw contest. If you are working stations at 25 wpm and a loud signal calls you at 15-20, grab that keyer and bring the speed down! It will probably pay off in a QSL of your exchange from him. Showoffs only kid themselves. It doesn't make any sense to send your preamble three times at 40 wpm when once at 25 would have been adequate. You will find that if you set the example, the other station will usually duplicate your actions exactly. This also holds true for the phone weekend.

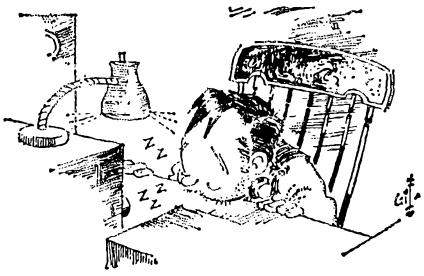
If you are so fortunate to be in a rare section, it is often advantageous to announce your section during a CQ or QRZ, i.e. "QRZ SS, this is WA6IVN, San Joaquin Valley section, go ahead."

From time to time during the course of the contest, you will work stations with more QSOs than yourself. (Well, at least they gave you a higher number.) Don't be upset. It is customary for an occasional crackpot to give a number at least 30–75 per cent higher than yours. Last year I worked two stations claiming to be in SJV who gave me numbers over the 1000 mark (early in the contest). Needless to say that is usually the last time you either hear or see their call letters written down.

It is usually a gentleman's rule that when you call someone else, it is considered his frequency. It is poor operating practice to attempt to take over his frequency by giving out a QRZ yourself. Often this opportunity will come up when repetition is necessary and the sequence gets out of order. If you make this a practice you will gain a reputation for this habit and will lose the respect of all of hamdom. (Say nothing of a couple of the big guns deciding to go out of their way to call CQ on your frequency.)

Fatigue

Any contest is not only a test of operating ability but it is also an endurance trial. If you don't plan to combat it, fatigue just may get the best of you and all of your efforts will be for naught. We assume that you have chosen an operating chair that gives you good back support and an operating table of the correct height.



Control the temperature! I prefer about 60°, and well ventilated. Excessive temperatures will make you groggy and this will reflect on your performance. Your reflexes will slow down and so will your resultant score. If you are a drinking man, lock up all the booze! (And give the key to someone else). Two or three good stiff 'shots' and you might as well shut down and save yourself a lot of grief and disappointment afterwards.

When you really seem to be getting exhausted, stop and quickly jump in the shower. Moderately cold works the best for me. A couple of minutes later you emerge, refreshed and ready to hit it again. This cool shower can take the place of about half an hour in the favorite easy chair.

How about sleep? My rule is twelve midnight to about 6 A.M. or a little before. Reserve a little time for evaluating the previous day's performance and planning for the new day. Using this method, I am able to get a good night's sleep and wake up completely refreshed. At the same time I take the 6 hours "off" time all at once and I don't have to worry about it anymore. Besides most of the bands are either shut down or fairly dead. Of course 12 to 6 won't apply to you if you live in the East. I still suggest the 6 hours be taken at once.

Honesty

A little word for personal honesty. You are

(*Continued on page 97*)

36th ARRL November Sweepstakes Announcement

If you haven't done so already, it's time now to start preparing for that contest of contests, the November Sweepstakes.

For the 36th time the SS is back, this year we hope bigger and better than ever before.

The basic SS rules are unchanged from last year, but please note carefully the following:

LOW-POWER MULTIPLIER DROPPED (on a trial basis)
GOOD IDEA?
LET THE CONTEST ADVISORY COMMITTEE HEAR YOUR COMMENTS AFTER SS

(P. 62 March *QST*)

This change is brought about on a trial basis on the recommendation of the ARRL Contest Advisory Committee. The other changes of last year which will remain the same are: New precedences (A and B) based on power input; minimum criteria for section award; dupe check sheets (Op Aid 6 or similar) required with log of 200 QSOs or more; incomplete entries processed as check logs.

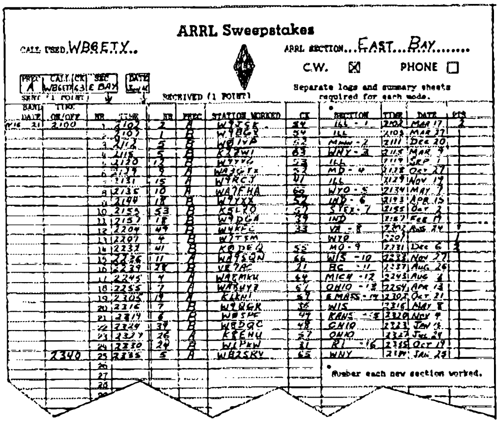
Otherwise, you'll observe that the format is familiar. You may operate 24 hours out of the total 30; your times-off must encompass at least 30 minutes; ARRL-affiliated clubs are eligible to compete for that handsome cocobolo gavel.

Read the rules thoroughly, then send for our "SS Package": log-sheets, summary-sheet, Op Aid 6. (Be sure to specify approximately *how many* log-sheets you'll need.) **Your entry (and, for clubs, the secretary's letter) must be postmarked no later than December 15, 1969.**

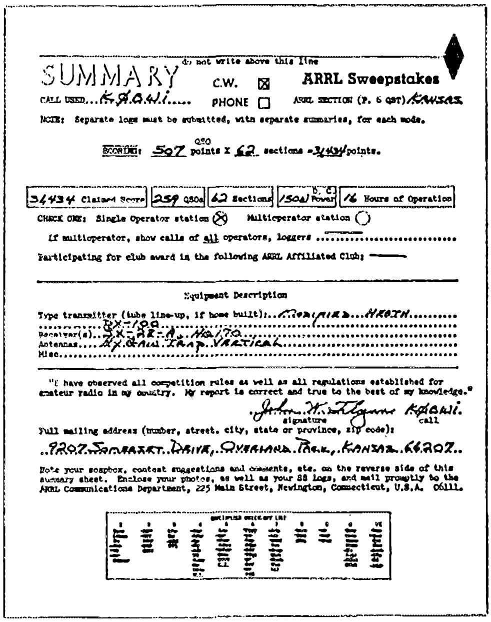
On your mark, get ready . . .

CONTEST PERIODS

Starts		*Ends*
Saturday, Nov. 8 **2100 GMT**	**PHONE**	Monday, Nov. 10 **0300 GMT**
Saturday, Nov. 15 **2100 GMT**	**C.W.**	Monday, Nov. 17 **0300 GMT**


ARRL Sweepstakes
CALL USED W8EFTX.. ARRL SECTION...EAST...BAY.......
C.W. ☒ PHONE ☐
Separate logs and summary sheets required for each mode.
*Number each new section worked.

The log-sheets and summary sheets are now available without charge from your ARRL Headquarters. (Ask for Op. Aid 6, too.) **Unless first-class postage is included with your request, log sheets will be sent by third-class mail.**


SUMMARY C.W. ☒ ARRL Sweepstakes
CALL USED...K0AWI..... PHONE ☐ ARRL SECTION (P. 6 QST) KANSAS
NOTE: Separate logs must be submitted, with separate summaries, for each mode.
SCORE: 507 QSO points x 62 sections = 31434 points.
31434 Claimed Score | 259 QSOs | 62 Sections | 150 Power | 16 Hours of Operation
CHECK ONE: Single Operator station ☒ Multioperator station ☐
If multioperator, show calls of all operators, loggers ....
Participating for club award in the following ARRL Affiliated Club: ———
Equipment Description
"I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge."
signature call
Full mailing address (number, street, city, state or province, zip code):
Note your soapbox, contest suggestions and comments, etc. on the reverse side of this summary sheet. Enclose your photos, as well as your SS logs, and mail promptly to the ARRL Communications Department, 225 Main Street, Newington, Connecticut, U.S.A. 06111.

Rules

1) *Eligibility:* The contest is open to all radio amateurs in (or officially attached to) sections listed on page 6 of this issue of *QST*.

2) *Time:* All contacts must be made during the contest period indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 74 sections. Yukon-N.W.T. (VE8) counts as a separate multiplier, for a possible total of 75 multipliers. Time spent in listening counts as operating time. No more than 24 hours of operation are permitted during the 30 hour period. "Off" periods may not be less than one half-hour at a time. Times on and off must be entered in your log.

3) *QSO:* Contacts must include certain information sent in the form of a standard message preamble, as shown in

EXPLANATION OF "SS" CONTEST EXCHANGES

	Nr	*Precedence*	*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Consecutive Serial Number	Power input less than 150 watts d.c.	Send your station call	CK (Last two digits of year first licensed)	Your ARRL section	Send GMT time of transmitting	Send month and day of birth (not year)
Sample	NR 1	A	WA3FHB	65	MDC	2101	Nov. 15

the example. C.w. stations work only c.w. stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) *Scoring:* Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (plus VE8) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either point(s) or multiplier. If your power is 150 watts or less, send "A" as your precedence; otherwise, send "B."

The final score equals the total "points" X the "sections multiplier."

5) *Reporting:* Contest forms (log sheets, summary-sheets, Operating Aid 6) are available free from ARRL Hq., or you may use forms of your own design provided they follow the indicated format. Every competing entry claiming 200 or more QSOs must have cross-check sheets (Op Aid 6 or similar) attached. To aid us in getting these forms to you as fast as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with zip code. We suggest a minimum of 12c postage attached. This will assure your receiving 1 summary sheet, 1 Op Aid 6, and 4 log sheets, enough for 400 QSOs. Using this as a guide-line you can adjust the postage according to your needs. **ANY LOG OMITTING TIMES ON AND OFF, OR OMITTING CROSS-CHECK SHEETS (WHEN REQUIRED), OR OMITTING A SUMMARY-SHEET OR ANY INFORMATION REQUESTED THEREIN (see sample), WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTINGS OR AWARDS.** Such logs will be classified as "check-logs" and processed accordingly. Entries must be postmarked no later than December 15, 1969 to insure eligibility for *QST* listings and awards. All entries become the property of ARRL, and none can be returned.

There are no objections to one's obtaining assistance from logging, "spotting" or relief operators, but their use places the entrant in the multiple-operator class, and it must be so reported.

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously, whether by single-operator or multioperator entrants, is not allowed.

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

6) *Awards:* Certificates will be awarded to the highest-scoring c.w. entrant and to the highest-scoring phone entrant in each ARRL section, provided that *either* (1) there are at least three single-operator competing entrants from that section, *or* (2) the top single-operator score is 10,000 points or more. Similarly, a certificate will be awarded to the highest-scoring Novice or Technician licensee in a section if (1) there are at least three single-operator competing entrants of that license class in that section, or (2) if, in the opinion of the Awards Committee, the entrant displayed exceptional effort. Multiple-operator entries, regardless of license class of operators, are not eligible for certificate awards and will be listed separately in the final results in *QST*.

A gavel will be awarded to the highest affiliated club entry. The aggregate scores of phone and c.w. reported by club secretaries and confirmed by the receipt at ARRL of contest logs constitute a club entry. Segregate club entries into phone and c.w. totals. Both single- and multiple-operator scores may be counted, but only the score of a bonafide club member, operating a station (his or another club member's) in local club territory, may be included in club entries.

The highest single-operator c.w. score and the highest single-operator phone score in any club entry will be rewarded with a "club" certificate where at least three single operator phone and/or three single-operator c.w. scores are submitted.

7) *Disqualification:* Failure to comply with the contest rules on FCC/DOC regulations or the necessity for avoiding interference with channels handling amateur emergency communication shall constitute grounds for disqualification. In all cases of question, the decisions of the ARRL Awards Committee are final.

Message Credit

Put all that preamble-exchange experience to work and earn 1000 extra points by the following:

1. Within 5 days following the end of each of the SS weekends, check into a net a local or section level[1] and send a message to your SCM (p. 6, *QST*). SCMs may send their message to ARRL Headquarters. The message must be in proper form.[2] To earn this credit for your phone and your c.w. entry you must originate such a message following the corresponding SS periods.
2. An example of a message in proper form[2] appeared in the Operating Aid 9A[3] enclosure in August 1965 *QST*. The message text (in not more than 20 words) should report claimed contacts, sections, mode, power and claimed score. An exact copy (showing station receipting for the radiogram and time-date sent) *must* be **attached** to your SS entry for any credit.
3. It's all or nothing. If all the rules are complied with to the letter, the procedure will net you a stock of 1000 points.
4. The bonus points will be added to your score at Headquarters. QST

[1] If there's difficulty reaching a traffic net in your section, it may be sent to a netter in the region.

[2] Time Filed and Handling Instructions are *optional*, i.e. not a "requirement" for crediting the message started, but all other message parts as shown in 9A are necessary.

[3] Copies available without charge from ARRL Hq., 225 Main St., Newington, Conn. 06111.

AROUND the world in 80 days, in its era, I'm sure was considered a major achievement. In modern times, through the miracle of communications, the world may be spanned in minutes with relative ease. Amateur radio, and in particular the ARRL International DX Competition, seems to illustrate this quite vividly.

Some people may comment as to the declining interest in contests but such was not the case in the 35th ARRL International DX Competition which soared to record heights in 1969 with 2468 logs received from 118 different countries. This represents an increase of over 10 percent as compared to last year and is some 41 logs greater than the previous high of 2427 entrants in 1967. With the exception of DX phone entries which dropped somewhat; all other figures rose considerably.

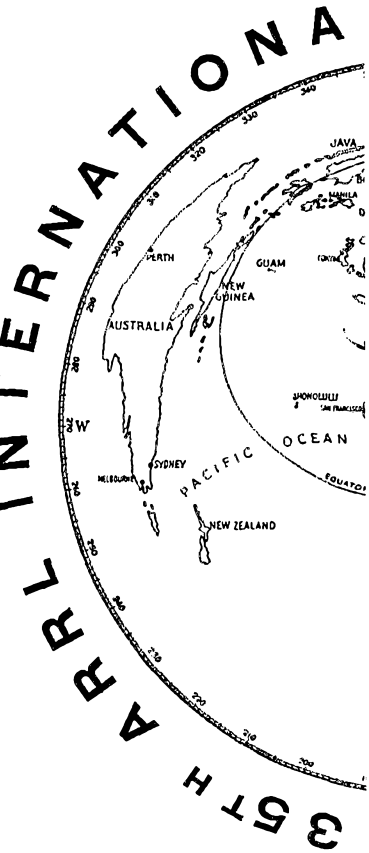
In entering any contest, each of us, by our actions becomes an ambassador of good will for the nation we represent. Suffice to say, our operating techniques should be of the highest caliber. Since I'd like to believe that this is the case almost 100 percent of the time, I feel only comments of a passing nature be given to the individuals who, by either lack of operating skill or just plain disregard for others, cause intentional QRM, tune up on frequency, fail to sign calls properly after each QSO, leave carriers on for long periods, etc., etc., etc. The problems remain the same from year to year, only the names (or, in our case, the calls) have been changed.

CLUBS

Thirty-two ARRL-affiliated clubs amassed 183 million points this year as compared to 27 clubs and 133 million points in 1968. Would you believe the **Potomac Valley Radio Club,** in claiming the usual lead position, increased their score by over 9 million points. How do you beat a group like that? Placing second was the **Frankford Radio Club** trailing some 4.7 million points behind. The **Northern California DX Club** unseated their rivals to the South, the **Southern California DX Club** in the show position; for what must be the upset of the year. The **128 Contest Club** was again 5th by a solid margin, while **Murphy's Marauders** nosed out the **Northern Illinois DX Association** to claim 6th place (up 1 from last year). Completing the Top 10 were the **Order of Boiled Owls of New York** who slipped from 6th place in 1968 to 8th, the **Laurentian DX Club** maintaining 9th and the **Richardson Amateur Radio Club.**

* Communications Assistant, ARRL.

HC1TH, shown at his operation position in Quito, Ecuador. Tom's excellent score of over 4.6 million was good enough to rank him as number 2 in the Top 10 DX phone entries and also to win the South American DX Continental Championship. Sure wish we could increase participation from our neighbors to the South.

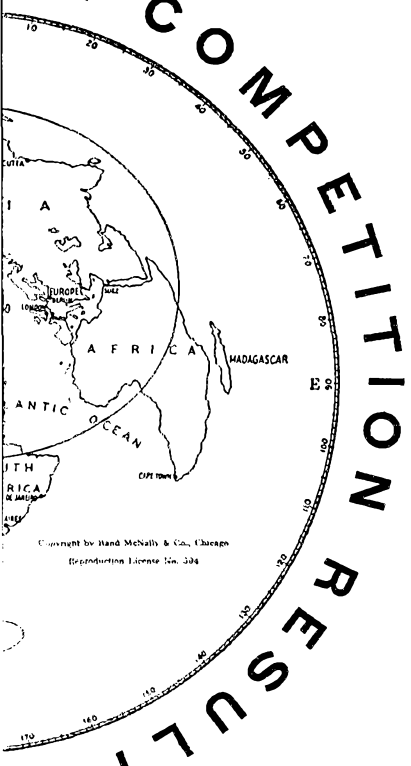


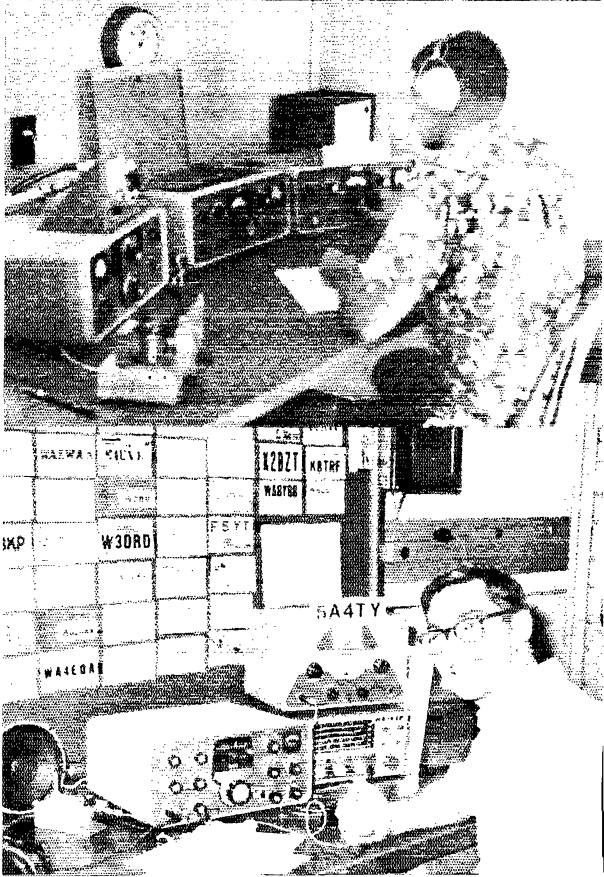
REPORTED

Their sound hath all the earth; unto the ends

QST for

DX COMPETITION RESULTS





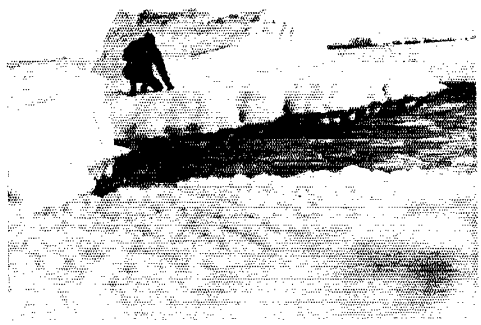
AL NOONE,* WA1KQM/WB6SAZ

gone forth into
and their words
of the whole world.[1]
— Rom. 10:18

[1] Thanks to K9YRA

Among the rare stations which abound in each DX Test, we have (top to bottom): YK1AA, Rasheed in Damascus, Syris; KX6FJ, Stan in the Marshall Islands; KH6GPQ, Willard, Oceania Continental Champion both c.w. and phone from Hawaii; and 5A4TY, Bill (WA2ETP) from Wheelus Air Base, Libya.

October 1969



Here's JX3DH checking ground conductivity on Jan Mayen Island! Main Base, "Olonuin City," was site of JX3P multi-op phone operation.

Breaking down the Top 10 Affiliated Club scores by mode, we are left with an interesting grouping of each club's strong and weak points as shown by their position below:

C.W.	*Position*	Phone
Potomac Valley RC	1	Potomac Valley RC
Frankford RC	2	Frankford RC
128 Contest Club	3	No. Calif. DX Club
No. Calif. DX Club	4	So. Calif. DX Club
So. Calif. DX Club	5	No. Illinois DX Assn.
Order of Boiled Owls	6	Murphy's Marauders
Murphy's Marauders	7	Richardson ARC
No. Illinois DX Assn.	8	128 Contest Club
Laurentian DX Club	9	Laurentian DX Club
Richardson ARC	10	Order of Boiled Owls

SOAPBOX

"Tried more than one band for the first time and was good fun." — *VK5FH*. . . . "After dipping into the pile-ups in s.s.b. test, sure can appreciate c.w. a heck of a lot more." — *K9EUZ*. . . . "Sixteen new countries, very nice contest." — *K2UNY*. . . . "Ever try 7 MHz. phone with no remote v.f.o." — *WA1HNR*. . . . "Had a ball operating in this test." — *K4KLC/KL7*. . . . "Lots of fun, most of the boys cooperated very well." — *HI8XRM*. . . . "Biggest thrill was being called on c.w. by 5A4TY, another highlight was working VR2DK after 3 hours of trying." — *WA3ATX*. . . . "Lack of foreign stations on 3.5 and 7 MHz. made it a bit slow, conditions however were good." — *VE7VP*. . . . "Think check sheets should be only one sided, turning them over and over again is a nuisance." — *W4NJF*. . . . "Next year I hope to have a beam and better rig on all bands." — *KR6FT*. . . . "Set an objective of 100 countries, which I found not too easy." — *K3GJD*. . . . "Sorry it's over, I just enjoy the competition even though I only beat my own scores of other years." — *W2RPP*. . . . "Found 7 MHz. conditions poor here during my operating time. Quite a few of the W/Ks didn't know whose side I was on, hi." — *VO1DC*. . . . "Very first time for any c.w. contest." — *CT2AT*. . . . "My first DX test and although I became hoarse and used many tranquilizers, I thoroughly enjoyed it." — *WAØTAM*. . . . "Too much QRM to keep going on phone." — *K4CG*. . . . "Conditions excellent to all areas of the world." — *WA9UMU*. . . . "It is sure different working the contest from this end. I do not think my exotic call was an asset." — *8R1Y/W4*. "First time in my life I've gotten into Europe." — *WB6YWQ*. . . . "It was a pleasure to take part and we are certain to do that again in the next year under the better conditions." — *UA9KAI*. . . . "Sure was a lot of competition in the Sacred Segment of 15 meters." — *K1GAX*. . . . "Conditions fantastic on 3.5 and 7 MHz. on first weekend, 10 meters extremely good on the second." — *W3MVB*. . . . "Located at Msasani Bay north of Dar es Salaam in Tanzania." — *5H3LV*. . . . "Working eight hour shifts at a local TV station on both weekends is a slight handicap." — *VE3BMB*. . . . "How come so many DX stations working by call areas." — *K9PPJ*. . . . "Wonder whether other fellows have as many breakdowns." — *G2QT*. . . . "Lost all antennas in high winds, c u next year." — *OZ5DX*. . . . "Not as much DX activity as I would have liked." — *W1YRC*. . . . "Still too many W/Ks calling CQ DX right on top of the DX stations." — *W8VZE*. . . . "Until this contest I can truly say that I did not know what a real pile-up was, thanks for the education." — *WAØRXQ/Ø*. . . . "Low power doesn't get the job done, quite hard to compete from Idaho." — *WA7HOX*. . . . "Back next year with an antenna farm." — *W5WMU*. . . . "Good contest, enjoyed the pile-ups, got many new countries." — *WB4IYZ*. . . . "I was unable to enter the first weekend as I was on my way home from operation at VKØJW in Antarctica." — *VK4GU*. . . . "Many thanks for the very nice contest." — *OM3XI*. . . . "USA stations very fine operators, please all stations worked send me your QSL for awards." — *SP9ABE*. . . . "Great contest." — *WB2ZIN*. . . . "My first DX contest in years, had a ball." — *W1HRV*. . . . "Damn good contest." — *W3MSK*. . . . "The rules for this contest work and are accepted, please don't change them." — *W3KT*. . . . "Very interesting contest, biggest thrill working VKØKJ and 5W1AR on 40 phone, a completely new experience for me. Congrats on the new check lists and the smaller page format." — *WA1DJG*. . . . "Hope to be on all bands

AFFILIATED CLUB SCORES

	Aggregate	*Entries*	*C.W. Winner*	*Phone Winner*
Potomac Valley Radio Club	39,573,394	60	W4KFC	W4BVV
Frankford Radio Club	34,858,696	87	W3WJD	W3MWC
Northern California DX Club	18,395,497	66	W6ISQ	K6AHV
Southern California DX Club	15,398,576	50	W6NJU	W6NJU
128 Contest Club (Mass.)	13,230,071	26	W1BPW	W1AX
Murphy's Marauders (Conn.)	9,276,130	42	WA1DJG	K1THQ
Northern Illinois DX Association	8,927,034	17	W9LKJ	W9QQN
Order of Boiled Owls of New York	6,962,365	15	WB2CKS	W2SUC
Laurentian DX Club	4,632,561	17	VE2YU	VE2NV
Richardson Amateur Radio Club (Texas)	4,255,893	22	W5EQT	W5KTR
Niagara Frontier DX Association (N.Y.)	3,988,521	11	K2KNV	K2DJD
Overlook Amateur Radio Society (N.Y.)	3,506,340	9	W2DXL	W2DXL
Oak Park Amateur Radio Club (Mich.)	3,127,218	19	W8DQL	W8DQL
Central Michigan Amateur Radio Club	2,539,134	12	KIZND/8	W8SH
Virginia Century Club	2,198,010	14	W4OPM	W4SYL
Connecticut Wireless Association	2,149,435	8	W1BIH	.....
West Park Radiops (Ohio)	2,028,885	20	K8CFH	W8IPA
Miami Valley Amateur Radio Contest Society (Ohio)	1,908,270	13	W8DB	W8LXU
South Jersey Radio Association	1,783,959	37	WB2ZPB	W2EPA
North Alabama DX Club	853,087	5	.....	W4ZNI
Winnipeg DX Club	731,571	9	.....	VE4FU
Four Lakes Amateur Radio Club (Wis.)	656,634	7	W9BG	.....
Louisville Active Radio Operators	495,735	5	W4LW	.....
Lincoln Amateur Radio Club (Nebr.)	429,792	5	.....	WAØLGR
Brightleaf Amateur Radio Club (N.C.)	338,184	5	.....	K4SKI
Grand Rapids Amateur Radio Association (Mich.)	301,950	6	W8EW	W8HXZ
South Hills Brass Pounders & Modulators (Pa.)	293,397	3	.....	.....
Lake Success Radio Club (N.Y.)	157,260	9	W2MN	W2UFS
New Providence Amateur Radio Club	91,482	7	W2SE	W2YFM
Delta Radio Club (Tenn.)	75,492	7	.....	W4OGG
Suburban Amateur Radio Club (Pa.)	43,161	4	WA3JKO/3	.....
Chicago Radio Traffic Association	8,028	3	W9REC	.....

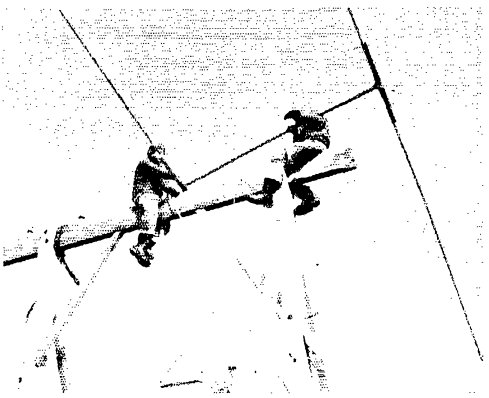
next contest." — *JX5CI*. . . . "I really enjoyed the contest, North Americans are fantastic operators." — *CT1IQ*. . . . "I am strongly inclined to feel that single band entries should be allowed in order to increase participation." — *W6QJW*. . . . "Too bad more of the really rare DXers didn't show up." — *K4II*. . . . "Great contest, we all had a barrel of fun." — *W9EXE*. . . . "Worked 5 new states for my WAS." — *UY5RV*. . . . "First time in the c.w. part of the contest and it was a lot of fun." — *8P6CV*. . . . "Your contest very good, c u agn in 1970." — *UR2LO*. . . . "Suggest the contest be shortened to one weekend each, much renewed interest in the lower bands due to 5BDXCC." — *ET3USA*. . . . "Tired of being called a YL since I'm only 13 years old, maybe I should go to cw." — *WA9ZCP*. . . . "Had a ball, please don't shorten contest." — *W3QQL*. . . . "Excellent conditions made this contest one to remember." — *W1FZ*. . . . "My thanks to the DL4 station who did not want to work an F stn and carefully explained to me the contest rules." — *F3VN/W2*. . . . "Despite limited time had lots of fun. Biggest thrill being called by YBØAAB, also working KA2RM on 80 thru 10 meters." — *WB6SAZ/6*. . . . "I suggest you change the contest to make it world-wide, I know the foreign stations get bored working only W/VE stations and I think this boredom explains the lack of Latin Americans and other countries in this contest." — *W8ILH/VE6*. . . . "Power out the first weekend, had to fly to Sumatra part of the second. W/K stations most cooperative, wait till next year." — *YBØAAC*. . . . "Entertained the local kids watching me try to rotate my beam out of the trees." — *WA7JCB*. . . . "Best DX contest I have ever been in, a lot of pile-ups but I noticed more courteous operating than usual." — *WØUCK*. . . . "I am full of admiration for the excellent operating standards of the W/VE group, their snappy procedure makes the handling of pile-ups so much easier when compared with some of the other major contests." — *EP2BQ*. . . . "My first ARRL DX Test. Sure a pleasure, only sorry I could be with only some 40 hours because of my studies. CU — 70." — *OH8RC*. . . . "Where was Wyoming." — *SVØWP*. . . . "My roommate tells me that I was yelling QRZ Contest in my sleep following the contest, never could raise anybody!" — *WA4UXU*. . . . "Please, please make it just one weekend for each mode." — *WB6URS*. . . . "Conditions to Europe FB." — *K6YRA*. . . . "Almost broke a rib laughing as a DX station called, CQ, won't anyone answer me. . . . There must have been a thousand hams calling him." — *WA2VSQ*. . . . "Special congrats to the DX stations for their patience, looking forward to next year." — *WA3IEM*. . . . "Very pleased to participate in the contest again after an absence of over 10 years." — *G3COJ*. . . . "My compliments to the W/VE gang who were real kind to me in the pile-ups. My first contest, really had a ball." — *KX6GS*. . . . "I'm a fairly new ham and this was my first contest." — *5A4TY*. . . . "What a shock when 5H3KJ said, "Mni tnx first VE1 in test," I gladly replied "Mni tnx first 5H3 ever." — *VE1AI*.

1970 ARRL DX COMPETITION

Phone: February 7–8, March 7–8

C.W.: February 21–22, March 21–22

. . . "This is really the king of all contests." — *WA1IHN*. . . . "Pleased to see so much activity from the U.S.S.R." — *W9KYZ*. . . . "Finally discovered you can work DX on 80 meters." — *WA3HOM*. . . . "Ten meter conditions outstanding the second weekend." — *WB2EUU*. . . . "Worked only 5½ hours, couldn't spend more time due to my job." — *PAØKOR*. . . . "Contest was fantastic." — *LU6ABX*. . . . "My first appearance on 40 meters, so the W/VE stations were the first DX stations I worked at all. Very glad about it." — *DM3TOO*. . . . "How about telling the DX stations there are W/Ks above 7.025 MHz. working the contest." — *WA8ZCO*. . . . "Really got a thrill when I called CQ Test, and worked stations for about 2 hours straight." — *KH6GLP*. . . . "This was my first serious attempt at contest operation and I really enjoyed every minute of it, including the moments when I lost control of my keyer. Hope to do better next time." — *VU2JN*. . . . "W4BVV will be sad to learn that when I answered their CQ on 3.5 MHz. he was 439 here but my signals did not reach him." — *KR6EL*. . . . "Good propagation on all bands, worked my 10,000th W/K station during the test." — *OD5LX*. . . . "Conditions were exceptional on 10 meters, not so hot on 80. Where were all the VE boys?" — *VR2DK*. . . . "Like the revised forms." — *K3QDV*. . . . "Biggest surprise of the contest, ZD7DX on 75 phone, trying out his new rhombic!" — *K9CUY*. . . . "Conditions fabulous, worked my first JAs on 40 meter phone ever." — *W3TLN*. . . . "I like to work in your DX contest." — *YO4KCA*. . . . "Why not separate entries for single-band operations. Thanks for a fine test, see you next year." — *I1BH*. . . . "Conditions great, pile-ups and QRM murder." — *WB2NCS/VP9*. . . . "Conditions of propagation very bad here." — *CR6GA*. . . . "This contest was a ball." — *YBØAAB*. . . . "Pet peeves — tuning up on frequency, leaving carriers on, continually calling regardless of fact DX is trying to transmit." — *W1ESN*. . . . "Thanks for a good test, will be in there next year full swing on all bands." — *VE8ZZ*. . . . "Nice contest, especially 10 meter band activity make nice work during test." — *SP3PL*. . . . "Second weekend best radio conditions I have ever experienced in an ARRL DX Test." — *DL4FS*. . . . "My first participation, real nice thrill." — *PY7VKZ*. . . . "Just returned to the air after 20 years off, my first experience of the ARRL DX Competition was in 1939 and I have greatly enjoyed taking part once again." — *VK7CM*. . . . "Had a great time in my first DX-pedition." — *VP7NA* (*W3AZD, opr.*). . . . "Good to hear some



From the Subantarctic islet of Heard Island in the South Indian Ocean we present VKØWR, by far the rarest DXpedition in many a year. Shown operating is Bill, W7ZFY with Henery, WB4HWP taking a well earned rest. At left the boys are shown wrestling the 2-element 20-meter beam into position. Brrr!

Bold Face = Over 300 QSOs/Band — DX

	80	40	20	15	10
CR6EI	28	61	340	377	404
EL2Y		259	622	340	326
ET3USA*	68	125	650	737	478
ZD8Z	286	898	1617	1587	1316
5H3KJ	17	185	645	842	767
5H3LV		2	248	326	200
9J2MX	11	93	516	619	694
6P2BQ	6	23	334	136	4
8P3AM	3	43	411	272	73
HL9KQ	13	94	243	363	125
JA1AEA	49	163	760	1028	350
JA1LXE		74	32	388	
JA2HO			14	387	
JA2JAA	2	67	279	337	150
JA3DGC		69	313	385	199
JA3GZN		49	174	418	149
UA9KAI*			570		
UA9KOA		3	868	6	
UA9OS			584		
UA9PP			531	83	
UAØKFG*	46	155	757	814	357
UL7KAA		10	433	92	
DJ4ZR	79	297	825	973	490
DL2JO	4	21	73	306	263
DL4QP			98	337	149
DL4QQ	25	140	607	684	412
DL6WD	119	140	495	577	507
EI9J	80	128	534	511	270
F5AH			34	310	
F8CS	71	187	316	326	43
F8TQ	65	120	293	343	138
F8VJ	134	151	194	321	325
F8ZF	130	169	368	180	3
G2QT	93	156	320	280	333
G2RO	204	242	618	767	621
G3ESF	83	132	128	274	306
G3FXB	194	259	477	718	445
G3JYP	7	34	162	489	421
G3KMA	81	100	192	305	380
G3TXF	11	134	395	261	591
GC3IEW	156	165	725	621	703
GW8ITZ	94	100	363	500	273
GW3NJW	6	159	379	448	351
HA5KDQ*	93	159	513	727	196
HA8UD	29	112	353	124	298
HB9AGH	42	149	208	442	174
HB9DX	65	31	152	383	134
HB9UB	71	224	720	970	526
I1ASE		266	580	571	246
LAØAD	72	204	763	776	680
LZ1KAA*	32	135	353	507	13
LZ1KPG*	20	299	215	116	311
OH1AD*	13	73	569	644	163
OH5VT		15	412	328	176
OH8RC		47	497	649	96
OK1AOX		157	234	465	
OK1ARN	1	106	365	502	85
ON4XG	82	74	367	579	440
OZ1LO	139	203	644	820	533
OZ7BG	7	18	332	426	304
OZ7G					319
OZ7X		30	359	532	97
PAØLOU	127	256	623	369	588
SK6AB*	114	427	1166	1189	673
SK6CF*	64	234	831	925	384
SM5CAK		100	170	340	
SM6ARH				483	
SM6DHU		12	346	187	62
SVØWP			575	503	528
UA3KAO*	1	58	457	492	72
UB5MZ		44	93	441	68
UQ2KCT*		1	202	353	
UR2LO		25	387	55	
YU1BCD*	62	262	635	897	290
YU2REB		18	217	403	164
HP1XHG	388	443	883	814	759
KL7IR	99	285	588	811	591
PJ2VD	306	422	849	1141	901
PJ8AA	573	878	780	573	549
VP7NA	101	102	382	265	90
VP9BY			446		
XE2AAG	152	187	607	879	425
XEØGEN	428	789	1181	937	800
XEØGJR	63	128	274	418	596
9Y4DS			559	353	143
9Y4KK		114	435	423	383
DX1AAV		79	508	337	135
KH6GPQ	309	558	873	1265	1115
VK2EO	90	373	925	497	497
VK2GW	25	392	343	225	170
VK3APN*	81	328	397	192	12
VK5FH	16	151	746	114	
VK5FM	17	72	543	236	217
VK2BRJ/9	6	216	501	134	138
VR2DK	12	149	164	40	354
ZL1AFW	4	10	478	220	369
ZL1AMO	74	158	197	532	224
ZL1IL	2	133	456	397	705
5W1AR	1	161	306	128	312
HK3BAE	58	434	1033	855	1121
LU2DKG*		2	307	235	370
LU9DL			12	60	361
OA4DX		158	220	340	565
YV1OB	171	209	214	300	404
YV4OY	310	192	336	505	119
K4PHY/YV5	223	55 8	669	551	339

* Multioperator station.

humor from KH6BZF during very crowded band conditions." — *K8CFH*. . . . "My first DX contest, sure was exciting." — *WB8BLA*. . . . "The operating practices of too many stations reflected unfavorably on amateur radio. — *VE4MP*. . . . "Enjoyed the test very much, rules and organization first rate." — *VE2WA*. "Rotator broke just before the great 10 meter opening on the second weekend. Farewell 28 MHz. DXCC for this sunspot cycle." — *W6ISQ*. . . . "Very good contest." — *LA2Q*. . . . "Working mainly c.w." — *F8UJ*. . . . "We always thought there were 50 states, but now realize there are only 49; Wyoming is a myth! — *G3JOC*. . . . "Great contest." — *W4ONO*.

QRP CHAMPS

(150 Watts or Less at All Times)

C.W.		Phone	
W8QXQ	635,715	WA1DJG	579,880
WA3DSZ	421,971	WA4UXU	337,980
K5ABV	384,462	VE2YU	306,327
W1DXB	376,688	W4ORT	289,152
W4ORT	292,842	WA3EPB	254,667
K2BMI	277,376	W2DKM	248,472
KØDQI/1	269,078	WA5LUM	237,864
W2HUG	265,872	WB2ZPW	236,328
W2HDW	260,475	WB2ZTH	226,284
WB2RKK	260,091	VE6GN	193,167

Thirty-Fifth ARRL

International DX Competition

W/VE scores are listed by ARRL division and section; DX scores are listed by continent and country-prefix. Multioperator scores follow single-operator scores within each section or country-grouping.

Awards: The operator of the first-listed *single-operator* station in each section or country is the winner for that area and receives a certificate award. In a section or country from which at least three valid *multioperator* entries were received, the top-scoring station in that category receives a certificate award. (Awards are scheduled for an October 15 mailing. The top-scoring single-operator DX entrant for each *continent*, each mode, receives an engraved plaque. *Affiliated-club* awards are shown elsewhere in this article.

Scores: In the listing to follow, read (from left to right): *call* of entrant, final *score*, *multiplier* (total countries per band for W/VE; total states and Canadian call-areas per band for DX), *contacts*, approximate d.c. *power* input (*A* represents power up to and including 150 watts; *B*, over 150 and up to and including 500; *C*, over 500), total *time* of operation (to the nearest hour). Example: W3NX 594,156-268-739- C-70 indicates final score 594,156, multiplier 268, contacts 739, power over 500 watts, operating time 70 hours.

A single *asterisk* following a call denotes an ARRL Hq. staff member, ineligible for an award. A double asterisk following the call of a multi-operator entry denotes the use of a spotting-net.

C. W. SCORES

ATLANTIC DIVISION

Delaware

W3NX 594,156-268-739- C-70
W3DRD 202,800-169-400- C-41
W3TGF 176,364-138-426- C-32
W3NNK 153,996-164-313-ABC-44
W3GAU 56,760-120-158- C-30
W3DPA 11,526- 51- 76- C-13
WA3GSM 12- 2- 2- B-

Eastern Pennsylvania

W3WJD 1,233,029-353-1165- C-63
W3MFW 1,046,976-328-1064-BC-70
W3WPG 993,672-296-1119- C-85
W3DQG 929,655-283-1095- C-
W3MWC 869,458-302-963- C-76
K3HTZ 798,270-295-904- C-85
WA3ATX 471,120-208-755-AC-76
WA3DSZ 421,971-209-673- A-35
W3CI 403,236-207-650- C-76
W3BIP 400,020-226-590- C-56
W3KT 345,267-227-507- C-24
K3AIG 333,750-178-625- C-55
W3ALB 290,718-186-521- C-47
W3GRS 263,142-198-443- C-25
K3WJV 230,520-170-452- A-38
K3BUR 207,792-156-444- C-
WA3FFR 179,955-155-387- C-
W3QOR 175,200-146-400- A-28
W3EQA 144,282-139-346- C-24
W3GHD 133,110-145-306- C-
W3MQ 90,207-117-257- C-21
W3ADZ 84,672-108-262- C-22
W3GID 78,000-125-208- C-35
W3ISE 77,250-125-206- B-36
WA3HOM 70,296-101-232- B-58
W3EAN 47,880- 76-210- C-30
W3QLW 42,525- 75-189- B-40
WA3JKO/3 38,448- 72-178- C-18
W3BYX 28,272- 62-152- C-10
W3LTU 26,703- 69-129-BC-
K3BNS 25,032- 56-149- C-10
K3JGJ 21,507- 67-107- C-30
K3JLK 19,776- 64-103- C-30
K3HHY 18,900- 63-100- C-
K3NPC 18,810- 66- 95- A-29
W3JET 16,443- 63- 87- B-17
WA3JLD 13,275- 59- 75- B-23
W3CGS 13,248- 46- 96- C-11
K3RFB 11,232- 48- 78-AB-24
WA3IEM 5040- 35- 48- B-11
K3GYS 3192- 28- 38- C- 4
WA3KEY 2310- 22- 35-AB- 7
W3HUS 1848- 22- 28- C- 2
WA3EGD 816- 16- 17- A- 3
WA3HGX 576- 12- 16- B- 1
W3GM (8 oprs.) 3,956,256-456-2892- C-96

Maryland-D. C.

W3NZ (W3s NZ OV) 869,316-262-1106- C-78
K3JH (K3JLI, W2TLO) 725,196-271-892- C-70
W3EVW (W3EVW, WA3EPB) 218,502-183-398-BC-
W3GRF 1,273,230-329-1290-AC-80
K4GSU/3 1,196,122-346-1155-BC-72
W3GN 820,080-270-1005- C-80
W3EYF 483,140-238-677-AC-73
W3MFJ 467,656-196-799- C-60
K3GJD 402,054-226-593- C-36
W3BQN 387,450-210-615-ABC-70
W3PZW 364,800-190-640- C-30
W3QQL 363,528-187-648- B-57
W3NB 361,000-200-602- C-60
W3AXW 311,850-210-495- C-67
W3CRE 264,654-169-522- C-31
W3FU 152,208-151-336-AB-34
W3AFM 133,062-134-331- C-48
W3KA 102,930- 94-369- C-24
W3LMZ 31,600- 79-134- A-30
W3EPR 27,639- 83-111- B-18
W3YSH 9360- 39- 80- B-22
W3HH 7020- 39- 60- B- 9
W3ML 1152- 16- 24- - 2
WA3ENM 468- 12- 15- B- 4
W3MSK (9 oprs.) 5,479,453-511-3625-AC-96
K3JYZ (WA3HTQ, WØUCE) 1,208,214-301-1338- C-96
W3MVB (W3s FA MVB) 692,982-246-939- C-81

Southern New Jersey

W2BQF 686,370-274-835- C-67
K2DCA 510,237-267-637- C-50
K2QIL 491,400-200-819- C-65
WA2BLV 431,046-231-622-ABC-30
W2HDW 260,475-151-575- A-45
WB2EUU 208,608-164-424- B-37
WB2ZPB 133,650-165-270- A-20
W2PAU 133,023-139-323- C-27
W2FYS 63,603-111-191- A-17
W2KF 58,509- 99-197- C-19
W2RBE 26,352- 72-122- C-31
W2GGT 23,484- 76-103- C- 6
K2BG 22,140- 60-123- B-13
K2PZF 17,400- 58-100- C- 7
W2EBW 9840- 40- 82- B-19
WB2GTE 8127- 43- 63- C-12
K2VU 5280- 32- 55- B-23
W2EPA 4619- 31- 50- B- 7
W2EOT (W2SDB, opr.) 4212- 27- 52- C- 6
K2QPN 3780- 30- 42- B-

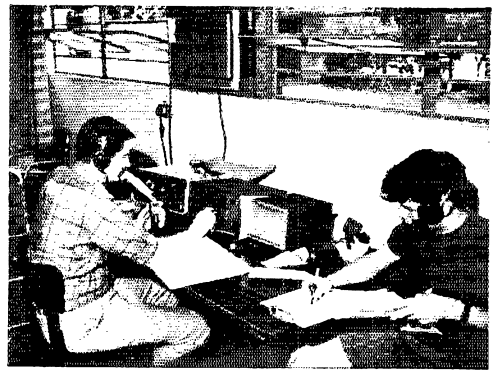
Minimum Number of Countries	30	50	80	70	50
Band	80	40	20	15	10
K1AGB	28				69
K1DIR	37	59	91	81	65
K1KTH	30	48	91	80	53
K1UHY	29	55	70	63	57
K1VTM	4	24	62	55	53
W1AJO			52	56	51
W1ARR	17	51	59	63	51
W1AX	38	64	108	81	68
W1BIH	21	45	82	74	66
W1BPW	44	58	104	79	65
W1CW			130		
W1DXB		29	87	62	30
W1ET	34	66	69	55	55
W1PYM			64	47	67
W1SWX	48				
W1WAI	32	52	80	73	40
W1YK*	22	43	88	69	62
WA1DJG	16	25	87	67	60
WA1FHU	22	50	85	66	43
WA1IRG/1	24	46	86	73	56
K2CC*	1	22	61	72	
K2DCA	22	38	85	62	60
K2DJD	9	44	93	71	59
K2KNV	31	59	99	63	54
K2MME*	30	51	97	75	55
W2BQF	28	48	69	62	67
W2CXM*	24	50	82	64	40
W2DXL	32	62	80	66	63
W2FR	36	66	55	44	
W2FXA	9	33	69	71	54
W2GGE	28	61	95	76	63
W2HO	22	31	82	55	41
W2IRV		29	64	54	52
W2LXK	33	74	86	73	70
W2PCJ	29	60	91	71	53
W2SSC	31	8	32	37	43
W2WD	21	55	93	79	61
W2WZ	16	25	64	54	56
W2YT	17	28	57	59	64
WA2IZS*	16	36	74	66	53
WA2OJD	13	26	72	62	62
WB2CKS	31	61	92	77	64
WB2UZU	2	15	50	56	53
WB2ZPB		24	48	40	53

Minimum Number of Countries	30	50	80	70	50
Band	80	40	20	15	10
K3GJD		22	78	62	64
K3HTZ	25	52	85	71	62
K3JH*	20	52	68	67	64
K3JYZ*	28	68	91	70	44
W3AFM			134		
W3ALB	3	34	77	72	
W3BIP	16	37	76	40	57
W3BQN	15	19	63	60	53
W3DQG	24	47	80	67	65
W3EYF	7	35	83	62	51
W3GHD			83	58	44
W3GM*	49	84	132	106	83
W3GN	4	51	88	71	56
W3GRF	31	63	94	71	69
W3GRS			104	52	42
W3MFJ		11	68	59	53
W3MFW	41	64	85	70	66
W3MSK*	55	100	152	109	90
W3MVB*	15	42	70	64	55
W3MWC	15	69	88	71	59
W3NB		3	72	67	58
W3NU	37	64	110	85	70
W3NX	27	45	71	67	58
W3NZ*	22	51	70	64	55
W3PZW			79	55	56
W3QQL		28	45	61	53
W3TV*	43	75	115	96	71
W3WJD	38	56	104	92	63
W3WPG	34	54	77	73	58
WA3ATX		31	60	57	60
WA3DSZ	12	27	66	54	50
K4GSU/3	39	65	115	70	57
K7ADD/3	23	48	80	65	57
K4AMC	5	22	60	48	55
K4CFB		19		58	54
K4CG*	34	59	94	80	72
K4EZ	7	28	70	67	54
K4FU		10	81	62	43
K4GSS		8	9	75	33
K4II	24	46	90	74	67
K4KQ	28	42	64	53	53
K4THA	31	48	86	78	75
W4BVV*	51	98	148	108	78
W4DXI	12	26	65	70	60

Minimum Number of Countries	30	50	80	70	50
Band	80	40	20	15	10
W4GRG		8	72	75	56
W4HM	18	40	88	77	41
W4HOS	10	36	62	56	52
W4KFC	31	63	98	86	70
W4LCP	27	53	92	74	72
W4NBV	25	42	74	63	51
W4ORT	1	17	59	57	53
W4SHJ	32				
W4UQ	39	40	79	48	37
W4WHK	20	39	23	63	60
W4ZMH			90		
W4ZXI*	44	83	113	83	75
WB4CPE	2	21	24	39	63
WB4EQQ					56
WB4LEH		30	59	59	51
W8BZY/4	1	9	50	54	50
K5ABV	9	36	72	61	56
K5AEU	2		82		12
K5STL			85		
K5YPS*		40	65	61	73
W5AO	3	76	38		
W5EQT	8	49	45	61	53
W5FL	9	32	80	73	70
W5GO	11	32	79	74	69
W5IOU	21	45	80	68	66
W5IAW	15	39	99	73	72
W5KC	11	35	77	66	54
W5KYD		11	97		
W5LJT		14	69	54	56
W5TKB	4		65	55	57
W5WMU	13	29	69	55	70
W5WZQ	25	67	90	77	77
K6AN*	19	57	89	78	55
K6EIV	11	42	81	64	41
K6ERT				85	
K6UYC*	18	49	92	74	50
W6ANN*	23	64	97	84	63
W6ISQ	10	30	82	65	40
W6ITY*	25	56	85	75	56
W6NJU*	25	48	97	80	55
W6RR	15	54	82	69	49
W6UED*	29	51	13	22	55
W6WX*	21	48	91	80	49
WA6UFW*	16	31	83	66	36

Minimum Number of Countries	30	50	80	70	50
Band	80	40	20	15	10
K4BVD/6*	22	50	105	88	62
W7DI	20	53	83	66	38
W7IR	22	60	97	81	63
W7SFA*	23	56	105	69	44
K8CFH			80	62	52
K8EHU	19	34	92	68	55
K8RMK	14	34	74	64	58
W8DB	24	48	78	63	59
W8DZ	25	74	102	79	63
W8GOC			7	34	56
W8JIN	32	56	67	65	61
W8QXQ	8	42	89	76	62
W8ROF	13	21	78	64	51
W8UM	31	56	94	75	54
WA8LYF*	20	45	87	91	64
K1ZND/8	33	57	89	86	65
W3BOQ/8	9	49	90	75	59
K9CUY	25	42	64	68	55
W9EWC	25	57	96	76	58
W9EXE*	13	55	90	70	56
W9GEG*	6	25	38	56	50
W9GIL	7	17	67	63	53
W9JQD			16	29	66
W9KYZ	3	13	61	55	54
W9LKJ	17	44	96	76	65
W9OHH	4	16	82		46
W9QQN		23	90	71	46
W9RER	1	50	79	62	57
W9YT*	28	44	97	81	68
WA9IVL	9	37	85	67	54
KØEKR		3		65	50
WØAIH*	14	52	107	72	53
WØBX	18	49	66	58	54
WØCQC		5	50	57	60
WØOAW	12	43	79	73	58
WAØEMS	22	31	78	71	54
WAØKDI		5	65	58	50
WAØSDC	26	45	90	75	49
VE2BV			82	44	48
VE2NV	24	28	82	64	57
VE2WA	14	26	83	54	52
VE2YU	15	40	83	61	52
VE3BMB		16	31	37	50

*Multioperator Station



6YØA, a special events multi-op station, was located at the Red Cross Building in Kingston which is the permanent QTH of 6Y5RA, the Headquarters station of the Jamaican Amateur Radio Association. Shown to the left is Chris, 6Y5CB, operating the 7/21 MHz. position; to the right, Chuck, W4WXZ and SWL Glen Little at the 3.5/28 MHz. operating table. Congrats to the gang, they have truly earned the North American DX Continental Championship, multi-op phone category.

WB2SCK 1944- 24- 27- C-
WB2UVB 1539- 19- 27- A- 2
WA2IZS (K2CPR, W2UI, WA2IZS)
521,850-245-710- C-80

Western New York

K2KNV
1,038,258-306-1131- C-73
K2DJD 729,468-276-881- C-77
W2FXA 431,172-236-609- C-36
W2FBA 386,043-217-593- C-38
W2FR 209,442-201-348- C-52
W2BJH 193,386-167-388- C-54
W2QIP 138,180-140-329- C-36
WA2ADU 100,206-114-293- B-44
K2CD 90,774-123-246- C-33
W2SSC 80,634-151-178- C-14
W2CUI 77,400-120-215- B-41
WA2BEX 76,860-122-210- A-
W2YRH 60,669-107-189-AC-26
W2FD 60,588-108-187-AC-34
W2RPP 51,198-106-161-AB-23
W2PXL 46,428-106-149- C-30
W2VXA 18,408- 59-104- A-44
W2UJ 9750- 50- 65- B-36
W2FUI 9717- 41- 79- A-60
WB2RXS 6324- 34- 62- B-21
W2ICO 6120- 34- 60- A-14
W2RJJ 1380- 20- 23- B-10
W2STM 840- 14- 20- B- 3
W2CXM (WB2CPV, WA3HRV)
636,740-260-817- C-90
K2CC (4 oprs.)
225,108-156-481- C-75

Western Pennsylvania

W3NU 1,225,734-366-1125- C-68
K7ADD/3
824,187-273-1007- C-82
K3HZL 305,153-197-517- C-68
WA3KOS 131,703-143-307-BC-29
K3VXV 119,970-129-310- A-40
W3UT 111,384-136-273- B-38
W3YLJ 81,360-120-226- C-15
W3CTE 35,640- 90-132-BC-32
WA3EFH 12,834- 46- 93- C-10
W3SN 3844- 31- 42- A-22
W3QEI 3780- 28- 45- B-20
WA3GJU 2376- 24- 33- C- 2
W3VK 1638- 21- 26- A-12
W3TV (6 oprs.)
2,737,200-400-2281- C-90

CENTRAL DIVISION

Illinois

W9LKJ 1,094,256-298-1224- C-76
W9RER 499,743-249-669- C-62
WA9IVL 412,272-252-559- C-64
W9QQN 385,710-230-559- C-70
W9WYB 303,408-196-516- C-
WA9LUD 289,248-184-524- C-53
W9DWQ 219,450-175-418- C-
W9OHH 185,148-148-417- C-
K9KDI 139,425-143-325- C-22
W9UX 114,258-137-278-BC-40
W9QWM 21,483- 63-114- A-15
W9YYG 14,868- 42-118- C- 5
K9JDV 14,847- 49-101- C-22
K9UQN 9324- 42- 74- C-15
W9REC 7128- 44- 54- B-20
W9TCU 2016- 24- 28- A-12
W9WR 504- 12- 14- B-11
W9HPG 396- 11- 12- A- 5
W9KTB 350- 10- 12- A-16
K9YRA 192- 8- 8-AB-16
K9KKX 60- 4- 5- B- 7
W9EXE (4 oprs.)
789,804-284-927- C-82
W9EM (4 oprs.)
323,950-209-521- C-96
W9GEG (5 oprs.)
259,875-175-495- C-96
W9DY (W9DY, WA9OMM)
254,610-230-369- C-
W9BZW (W9s BZW GAZ)
199,656-177-376- C-

Indiana

K9CUY 580,644-254-764- C-79
WA9WBE 66,000-100-220- B-50
W9JQD 64,602-111-194- A-12
W9FN 37,422- 99-126- C-30
K9LVK/9 36,738- 78-157- C-49
K9VQK 20,085- 65-103- A-37
WA9UFO 11,200- 50- 75- A-30

Wisconsin

W9EWC (W9AQW, opr.)
1,100,256-313-1168-AC-85
W9GIL 388,125-207-625- C-65
W9KYZ 293,322-186-526- B-
W9BG 258,888-184-471- C-42
W9EZ 146,982-131-374-AC-51
W9LAX 115,092-138-278- C-35
WA9N8R 93,852-132-237- B-30
W9NLJ 64,800-108-200- C-15
W9WEN 45,684- 81-188- A-27
K9YBC 42,897- 79-181- B-22
W9OW 26,040- 62-140- C-17
W9SDK 13,224- 58- 76- A-15
K9EUZ 6201- 39- 53- A-10
WA9RTU 2916- 27- 36- A-13
W9TXF 3- 1- 1- B-
W9YT (13 oprs.)
1,464,000-320-1525-AC-

DAKOTA DIVISION

Minnesota

WAØKDI 228,552-178-428- C-61
WØDAK 136,512-144-316- C-37
KØEKR 125,316-118-354- A-56
WØBE 89,655-139-215- B-45
KØTPF 82,584-111-248- B-47
KØCNC 60,297-101-199- C-
WAØNHW 43,575- 83-175- B-49
WAØEPG 33,768- 84-134- A-36
WØIYP 26,160- 80-109- C-13
WØPAN 25,380- 60-141- B-20
WØDYA 8077- 41- 66- A-20
WAØPRT 4929- 31- 53- B-27
WØFWN 4278- 31- 46- B-40
WAØBMV 75- 5- 5-ABC-19
WØAIH (6 oprs.)
1,309,620-299-1460-AC-90

North Dakota

WAØELO 3210- 30- 37- B-

South Dakota

WAØOML 588- 14- 14- C-55
WØWUU 189- 7- 9- B-
WAØCPY (WAØs CPX CPY)
167,865-155-363- C-94

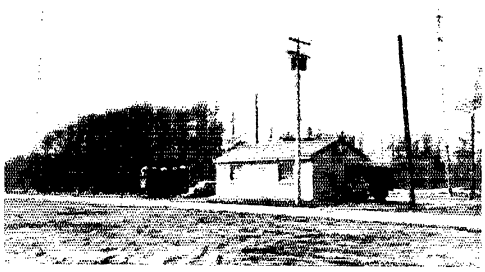
DELTA DIVISION

Arkansas

WA5RTG 128,550-150-286- C-55
W5BED 35,478- 81-146- C-14

Louisiana

W5IOU 751,800-280-895- C-73
W5WMU 683,220-236-965- C-88



If you've worked Asia, odds are you have QSOed one of the gang here at KA9MF. For the third consecutive year they have earned undisputed possession of Asia Continental Champion in the multi-op phone category. The 175-foot tower pictured at the left of their QTH sports a TH6DX and a 2-element 40-meter beam.

W5KC 494,262-243-678- C-55
W5BUK 203,661-171-397- C-64
W5QWY 11,100- 60- 63- C-30
K5BLV 6480- 36- 60- A-23
K5YPS (K5s SNI YPS)
570,015-239-795- C-76

Mississippi

K4RIN/5 181,770-166-365- C-37
K5AEU 79,200- 96-275- -
W5AO 50,895-117-145- C-36
W5MUG 40,020- 92-145- -
WA5SKI 2325- 25- 31- A- 3

Tennessee

W4NBV 517,905-255-677- C-65
K4AMC 264,480-190-464-AC-55
K4FW 140,895-155-303- -44
W4EWR 33,180- 79-140-BC-25
K4UWH 19,965- 55-121- A-11
W4ZWZ 13,992- 53- 88- B-43
W4LHE 9870- 47- 70- B-13
W4OGG 8190- 42- 65- B-10
W4KAT 243- 9- 9- B- 2

GREAT LAKES DIVISION

Kentucky

W4LW 221,892-163-451- C-46
K4FU 115,248-196-196- A-35
W4BCV 19,656- 63-104- C- 8
K4KI 15,309- 63- 81- B-24
WA4WWT 13,446- 54- 83-AB- 7
W4JKC 192- 8- 8- B-

Michigan

K1ZND/8
1,257,960-330-1272- C-88
W8UM (WB2FIT, opr.)
1,000,680-310-1076- C-
W8ROF 499,854-227-734- C-79
W8DA 277,104-184-502-BC-52
WA8ZDT 152,955-135-378- C-38
W8FLO 143,616-136-352- C-33
W8DQL 135,360-141-320-AC-24
W8TJQ 114,912-126-304- A-
WA8VVU 92,856-106-292- A-30
W8EW 91,392-112-272-AC-28
W8VPC 66,744-106-206- C-16
W8WVU 64,893- 97-223- A-34
W8RVD 26,289- 69-127- C-20
W8JJA 23,115- 67-115- C-10
WA8VRB 18,297- 57-107- A-16
W8HXZ 16,245- 57- 95- B-26
WA8OSL 14,628- 53- 92- B-10
WA8GGN 9776- 47- 70- B-37
W8SS 9522- 46- 69- C-16
WB8BZG 6270- 38- 55- B-20
W8FI 4851- 33- 49- B- 7
WB8CDG 3570- 34- 35- B-10
W8FEM 2538- 27- 34- B-
WA8ZZZ 2208- 23- 32- - 9
WB8AYH 1953- 21- 31- B- 6
WA8WGM 1863- 23- 27- B-16
K8UDJ 432- 12- 12- C- 4
K8BGZ 390- 10- 13-AC- 2
WA8ZJM 243- 9- 9- A- 5
W8TWJ 147- 6- 7- B- 2
WB8BSO 36- 3- 4- A- 7
WA8VZK 27- 3- 3- B- 3
WA8LYF (K8HLR, WA8s GUF LYF)
1,215,720-307-1320- C-82
K8HKM (K8HKM, WA8LWK)
351,000-200-585- C-78

Ohio

W8DZ 1,194,669-343-1161- C-80
W3BOQ/8 658,188-282-778- C-77
W8QXQ 635,715-277-765- A-65
K8EHU 613,452-268-763- C-79
W8DB 598,128-272-733- C-61
W8JIN 523,833-283-617-AC-
K8RMK 450,912-244-616- C-75
K8CFH 421,368-194-724-AC-55
W8BDO 314,496-208-504- C-96
W8IPA 307,296-194-528- C-60
W8BQV 225,765-173-435- B-42
WA3BGE/8
222,432-168-442- C-38
W8BOJ 117,888-128-307- C-22
W8KZO 94,392-114-278- C-60
WA8CIA 93,888- 96-326- C-57
W8AJW 88,578-111-266- A-
WA8TYF 81,021-113-239- C-17
W8YGR 79,200-132-200- B-16
W8LHV 74,820-116-215- B-41
W8GOC 67,221- 97-231- A-
WA8MCR 63,030-110-191-ABC-17
W8MJE 59,592-104-191- C-28
W8AQZ 58,446-102-191- B-36
W8GMX 55,692- 91-204- B-51
WA8RCN 50,370-115-146- A-31
W8YCP 48,822-103-158- C-10
K8NMG 36,894- 86-143- B-20
W8GFH 33,108- 89-124- C- 9
K8BSM 30,552- 76-134- C-18
WA8ZGC 26,400- 80-110- C-
W8NPF 22,464- 64-117- C-21
W8DWP 19,845- 63-105-BC-22
W8BSR 18,645- 55-113- A-39
WA8SCZ 14,112- 49- 96-AC-15
W8GMK 12,702- 58- 73- B-21
W8ICF 12,324- 52- 79- B-20
W8DZG 9234- 38- 81- A-19
W8ELB 8178- 47- 58- A-40
W8EE 7920- 45- 60- C-16
W8IRG 5040- 35- 48- B-19
W8CSK 4452- 28- 53- A-12
W8PCS 3774- 34- 37- B- 5
WA8FCH 3744- 32- 39- A- 6
K8GVK 3612- 28- 43- B-10
WA8SLL 3510- 30- 39- B- 6
W8VZE 1944- 24- 27- A- 4
WB8APJ 1632- 16- 34-AB- 8
K8AMZ/8 864- 16- 18- B-12
W8IDM 816- 16- 17- A- 3
K8PYD 75- 5- 5- B- 1
K8SJU (K8s SBZ SJU)
207,192-176-388- B-93

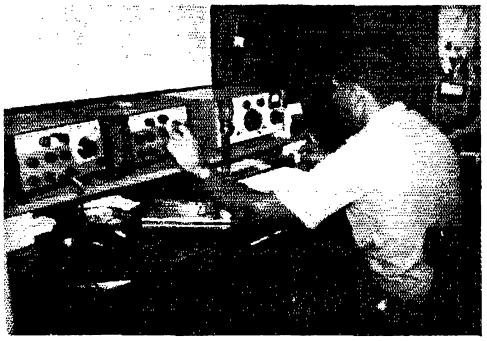
HUDSON DIVISION

Eastern New York

W2DXL
1,176,852-303-1304- C-84
WA2OJD 637,320-235-904- C-62
W2HO 559,251-231-807- C-70
WB2ZPW 163,410-130-419- A-35
W2AMM 100,548-126-266- C-20
WB2SIH 62,604- 94-222- B-33
WA2HAI 23,664- 68-116- A-
WB2HEM 3348- 31- 36- A-55
WA2TIF 3168- 24- 44- C- 9
W2IP 1188- 18- 22- B- 4
WA2EOF 72- 4- 6- B- 1
K2MME (8 oprs.)
972,048-308-1052-BC-96

N. Y. C.-L. I.

WB2CKS
1,220,375-325-1260- C-78
W2GGE
1,161,831-323-1205- C-80
W2PCJ 1,058,832-304-1189- C-72
W2LXK 524,832-336-522-BC-72
W2IRV 358,200-199-600- C-41
W2SUC 354,105-215-549- C-41
W2WZ 342,495-215-531- C-40
K2MFY 233,784-153-514- A-47
WB2UZU 202,752-176-384- C-
W2YCW 168,618-157-358- C-40
W2MN 119,070-126-315- C-40
W2MT 111,804-121-308- A-39
WB2YKU 85,284-103-276-AB-25
W2AFM 66,768-104-214-AB-39
W2CP 34,020- 84-135- C-20
WA2EYW 23,364- 66-118- B-30
W2HAE 22,770- 69-110- B-13
W8IBX/2 15,582- 53- 98- B-
W2DLY 15,486- 58- 89- A-20
W2DUS 11,232- 48- 78- -
WA2CXQ 9855- 45- 73- B-15



Taking the Number 2 spot in Louisiana section, W5TXN, amassed some 614 QSOs on phone for a score of 442K.

W2CKR 4959- 29- 57- B- 9
W2JB 912- 16- 19- A- 3
W2TUK 495- 11- 15- C- 1
WA2HBP 273- 7- 13- A-11
WB2EXS 135- 5- 9- A- 2
W2ZPG 60- 4- 5- A- 3
WA2LQO (5 oprs.)
312,465-185-563-AC-74

Northern New Jersey

W2WD 805,563-309-869- C-69
W2YT 425,250-225-630- B-62
WA2DPT 318,780-210-506- B-65
WA2ATO 302,445-195-517-BC-
K2BMI 277,376-197-471- A-60
W2HUG 265,872-191-464- A-60
WB2RKK 260,091-171-513- A-66
W2ZZ 236,748-181-436- A-33
W2CVW 229,542-201-382-BC-50
W2HL 208,104-184-377- C-46
WA2HIU 166,140-156-355- A-56
W2NUS 109,200-140-260- A-55
W2FPM 86,184-126-228- C-45
WA2VSQ 77,724-102-254- B-30
W2EHN 65,880- 90-244- C-40
W2NEP 57,348-108-177- A-16
W2SQT 50,148- 84-199- B-45
W2SE 46,320- 80-193- C-40
W2IVP 34,611- 83-139- B-22
W2DMJ 30,528- 64-159- A- 9
W2YFM 20,532- 59-116- B-17
WB2AMV 9288- 43- 72- A- 6
W2LKH 1080- 18- 20- A- 7
WA2PXL 612- 12- 17- C-
WB2VLN 585- 13- 16- B- 4
WB2GPG 396- 11- 12- A- 3
F3VN/W2 360- 10- 12- B- 2
W2UL 36- 3- 4- A- 1
W2GLQ (5 oprs.)
162,900-150-362- C-84
WA2CGM (WA2s CGM HSJ, WB2FEH)
40,290- 79-170- B-35

MIDWEST DIVISION

Iowa

WAØSDC 605,340-285-708- C-57
WØBX 433,650-245-590- C-62
WØEL 177,705-165-359- C-34
WØCQC 177,504-172-344- B-61
KØIIR 119,286-141-282- C-56
WØBSY 29,400- 70-140- C-22
WAØPKE 2592- 27- 32- B-12

Kansas

WØWPL 87,703-119-247- B-72

Missouri

WAØEMS 652,032-256-853- C-74
WØOAW 642,095-265-811- C-79
WAØRDJ 35,700- 85-140- A-
KØYIP 22,500- 75-100- A-17
KØGSV 19,296- 67- 96- C-15
WØDSW 11,454- 46- 83- A-13

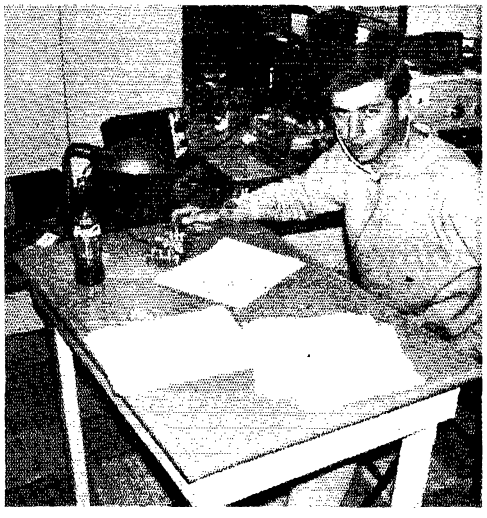
Nebraska

WØHW 12,096- 42- 96- C-11
WAØGVJ 1425- 19- 25- A- 4

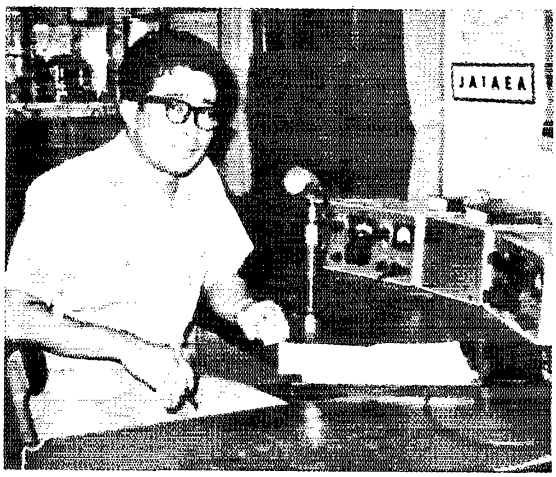
NEW ENGLAND DIVISION

Connecticut

W1BIH 921,888-288-1068- C-59
WA1DJG 698,190-255-918- B-60



South of the border, down Mexico way we find XEOGEN, Top Single-op c.w. entry for North America. Dale also takes 2nd place in the Top 10 DX c.w. operators listing. His three-element tri-band beam and dipoles put out a big signal from Agua Prieta.



JA1AEA, single-operator Asian Continental Champion on both c.w. and phone, shown at his operating position in Tokyo. Hajime sports an envious antenna farm with a 3.5 MHz. G/P, 2 elements on 7 MHz. and a 14 thru 28 MHz. cubical quad.

W1ARR* 494,532-241-686-AB-48
W1ETU* 413,253-219-629-BC-40
K1VTM 375,210-198-632-BC-38
W1TS 373,302-223-558- B-40
W1CW* 274,170-130-709- C-
K1GUD 260,628-148-587- C-31
K1DPB 255,252-178-478- B-48
W1ECH 235,224-198-396-AB-28
K1UDD 224,048-176-425- A-33
W1AJO 197,001-159-413- B-34
WA1FJU 140,448-154-304- A-16
K1JHX 105,651-129-273- C-15
W1HRJ 99,750- 95-350- A-38
W1DIT 90,360-120-251- C-35
W1FBY* 85,680-119-240- C-28
W1CNU 77,283- 93-277- B-14
W1FTX 28,665- 91-105- A-12
WA1IED 14,310- 54- 89- A-12
W1YYM* 11,352- 44- 86- C-
W1TX 9954- 42- 79- B- 5
WA1HNR 8379- 49- 57- A- 5
WA1HSB 6633- 33- 67- B- 8
WA1CQW 5338- 34- 53- A-17
W1LVQ* 3906- 31- 42- -
WA1IQJ 918- 17- 18- A- 3
WA1KQM/1* 918- 17- 18- B- 3
W1NJM* 540- 12- 15- C-
WA1HOL 162- 6- 9-AB- 1
W1BDI 108- 6- 6- A- 1
WA9HHH/1*, (WA1HOL, WB6SAZ, WA9HHH) 44,010- 90-163- B-
WA1IGF (WA1s GIX IGF) 8610- 41- 70- B- 8

Eastern Massachusetts

W1BPW 1,685,250-350-1607-AC-82
K1DIR 1,571,427-333-1573- C-79
W1AX 1,569,189-359-1457- C-68
K1KTH 1,157,868-302-1278- C-77
WA1FHU 888,174-266-1113- C-87
W1WAI 763,689-277-921- C-68
WA1IRG/1 712,215-285-833-AC-72
W1EHT 166,044-137-404- B-36
W1MO 98,559-141-233- B-21
K1AGB 72,168- 97-248- A-38
W1CT 31,752- 84-126- C-20
WA1ION 24,990- 85-100- A-15
W1EQY 21,960- 61-120- A-30
WA1IXL 17,385- 61- 95- B-17
W1BQL 17,280- 60- 96- B-18
KH6IJ/1 7965- 45- 59- A-10
K7JRE/1 7668- 36- 71- A-15
WA1JKZ 6588- 36- 61- B-12
W1ESN 4674- 38- 41- C-
W1FJJ 3813- 31- 41- C- 3
W1PLJ 3675- 25- 49- B-12
W1IUY 108- 6- 18- B- 2
W1BB 12- 2- 2- -
K1SLZ (K1s FHL SLZ) 423,168-232-608-BC-85

Maine

K1GAX 186,480-168-370- C-35
W1MFK 53,568- 93-192- B-26
W1FDZ 14,091- 61- 77- A-17
W1JD 5656- 28- 68- A-19

New Hampshire

W1ET (K1YKT, opr.) 725,679-279-869- C-52
K1UHY 715,140-274-870- C-67
W1DXB 376,688-208-604- A-67
W1FZ 209,496-172-406- C-
W1PYM 173,016-178-324- C-30
W1SWX 12,384- 48- 86- B-20

Rhode Island

KØDQI/1 269,078-194-463- A-36
K1UKC 54,060- 85-212- A-30
W1AWE 35,532- 84-141- -
W1VPY (K1ZKW, W2ECT, WA3IHJ) 142,803-123-387- C-31

Vermont

W1PEG 34,048- 76-150- B-50

Western Massachusetts

W1EZD 290,460-188-515- C-51
K1BZM 30,129- 83-121- B-17
WA1FBX 9462- 38- 83- A-17
WA1BXQ 2691- 23- 39- A- 4
W1HRV 810- 15- 18- B- 5
W1YK (K1s THQ TKS, WA1-ABW) 1,038,588-284-1219-AC-96

NORTHWESTERN DIVISION

Idaho

W7DV 285,087-163-583- C-36

Montana

W6JHV/7 153,990-145-354- C-82
K7CTI 150,258-158-317-AC-35
WØATY/7 5670- 30- 63- C-25

Oregon

W7YEX 75,525- 95-265-BC-45

Washington

W7NP 216,300-140-516-AC-69
K7BSR 163,191-133-409- B-60
K7VPF 126,673-113-374- A-59
VE7ASP/W7 100,512- 96-349- A-46
WA7JCB 55,902- 77-242- B-38
W7DYQ 47,227- 83-190- B-56
W7IEU 27,690- 71-130- A-55
W7VRO 16,416- 48-114- C- 9
WA7GYR 8352- 32- 87- B-13
W7DFO 3300- 25- 44- A-22
W7SFA (7 oprs.) 1,583,205-299-1765-AC-96

PACIFIC DIVISION

East Bay

W6CNA 114,756-131-301- C-40
K6AHV 105,918-139-255- C-12
K6JB 103,635-105-329- C-48
K6AUC 70,965- 83-285- C-26
WA6IQM 10,137- 31-109- B- 8
W6IAM 2898- 23- 42- C- 9
W6EJA 540- 12- 15- C- 3
K6AN (K6s ALH AN, W6RGG) 1,133,294-298-1269- C-90
WA6UFW (6 oprs.) 720,360-232-1035- C-46
W6KG (W6s DOD KG) 428,076-188-759- C-36

Nevada

W7TVF 11,760- 49- 80- B-15
W7GVA 9828- 39- 84- C-13

Sacramento Valley

W6NKR 254,667-181-469- C-53
K6DR 240,524-157-512- -72
W6BIL 17,856- 64- 93-BC-51
K6TWE 8148- 28- 97- B-20

San Francisco

W6WB 270,270-182-495- C-
W6ERS 107,163-147-243-BC-50
WB6YMW 8778- 38- 77- B-22
K6BI 2448- 24- 34- B- 6
W6BIP (W6BIP, WA6DJI) 365,148-189-644- C-52

San Joaquin Valley

K6RTK 224,841-149-503- C-43
W6UZ 101,625-125-271- B-34
W6KEV 14,175- 45-105- C-10
W6CLP 6816- 32- 71- B-18
W6MMH 5394- 29- 62- B-15
W6BYH 450- 10- 15- -
W6YL (7 oprs.) 71,544- 88-271-ABC-46

Santa Clara Valley

W6ISQ 506,664-227-744- C-50
W6HOC 448,704-228-656- C-61
K6DC 253,092-161-524- C-36
W6ATO 118,989-113-351- C-68
K6ERT 92,055- 85-361- C-46
W6EBO 89,424-108-276- C-40
W6ZO 75,285-105-239- C-20
W6IXJ 73,188-144-214- C-25
W6KHS 68,880-112-205- C-26
W6EJ 57,000- 95-200-AC-
W6CLM 30,965- 55-189- C-45
WB6ZHD 18,000- 50-120-AB-20
K6TZX 14,550- 50- 97- B-14
W6GBY 13,677- 47- 97- B-30
W6VK 13,209- 51- 89- C-14
K6AO 13,095- 45- 97- C-16
W6FYM 5814- 34- 57- A-16
W6CEO 5040- 30- 56- C-14
W6QDE 4743- 31- 51- C-10
WA6JDT 4350- 29- 50- A-11
WA6PYS 198- 6- 11- A- 4
K4BVD/6 (5 oprs.) 1,882,539-327-1919- C-96
W6WX (5 oprs.) 1,531,989-289-1767- C-48
W6GFS (4 oprs.) 732,888-234-1044- C-96
W6JKJ** 79,296-112-236- C-25

ROANOKE DIVISION

North Carolina

W4PLL 387,090-230-564- C-45
W4TMR 242,649-117-497-AB-64
W4OMW 190,260-151-420- C-44
K4BBK/4 117,594-139-282-AC-22
K4CIA 90,072-108-278- C-22
W4BQY 31,262- 98-107- C-12
W4VON 20,022- 71- 96- C-16

South Carolina

K4II 880,559-301-953- C-37
WB4CPE 156,450-149-350- A-35
K6QPH/4 31,365- 85-123- C-15
K4AVU 4557- 31- 49- B- 5

Virginia

W4KFC 1,521,108-348-1459-AC-68
W4HM 715,176-264-903- B-60
W4DM 522,576-228-764- C-56
W4UQ 366,201-243-503- C-60
W4EZ 281,050-175-542-AC-42
W4GF 278,740-181-514- C-33
WB4LEH 269,048-199-452- C-50
W4NH 258,516-172-501-BC-37
W4WBC 171,384-148-386- C-37
W4OPM 171,216-164-348- C-27
W4VC 170,655-155-367- C-53
W4WSF 168,516-151-372- C-31
W4YHD 138,281-143-323- C-18
W4DUQ 116,280-152-255- C-28

DJ4WN, operating 28 MHz. phone only, comments that he had real fun out of experiencing good conditions and raising a pile-up on that band.

W4ZM 110,160-136-270- C-17
K4PQL 108,108-143-252- A-27
K4GSS 104,750-125-280- A-48
K4CFB 97,071-131-247- C-37
W4ZMH 96,660- 90-358- B-
W4CQI 88,944-109-272- B-25
K4PGL 85,674-109-262- C-32
W4NQV 60,480-112-180-AB-29
W4ZCY 39,078- 78-167- C-10
W4PHL 38,880- 90-144- A-24
W4NM 27,521- 73-126- A-21
W4KMS 27,258- 77-118-BC-19
K4ORQ 23,760- 66-120- C-11
W4IUO 13,260- 52- 85- C-13
K4ZA 10,650- 50- 71- A- 9
W4NXE 8550- 38- 75- B- 8
W4LXJ 5940- 36- 55- B-12
W4KXV 5040- 35- 48- C- 6
W4SHJ 3744- 32- 39- C- 9
WB4LXF 1950- 25- 26- A-10
K4EJG 243- 9- 9- A- 7
K6ZQB/4 18- 2- 3- B- 1
W4BVV (7 oprs.)
4,890,132-486-3354-AC-96
K4CG (6 oprs.)
1,738,053-399-1709- C-85

West Virginia

W8CDV 75,900-110-230-AC-35
WA8DOY 29,106- 77-126- A-39
WA8VLM 13,260- 60- 74-BC-
W8BJ 12,480- 60- 70- A-38

ROCKY MOUNTAIN DIVISION

Colorado

WA0GUH 221,616-152-486- A-75
WA0CVS/0 93,198- 98-317- C-25
W0JMB 6912- 36- 64- C-15

New Mexico

W5EU 498,128-191-874- C-62
W5QNY 56,133- 99-189- B-35
K5STL 34,680- 85-136- C-32
WA5UAX 23,722- 58-138- C-46
K5ELR 2775- 25- 37- B-36
K5MAT 2772- 28- 33- A-10
WA5ROU 450- 10- 15- A- 4
W5QNQ 90- 5- 6- A- 4

Utah

W7HS 325,413-173-627-AC-67
WA7KUW 180,018-146-411- C-26
W7EZC 18,765- 45-139- A-20
WA7ISO 15,238- 38-134- A-18

SOUTHEASTERN DIVISION

Alabama

W4GRG 474,117-211-749- C-60
K4DV 86,873-109-269- C-44
WB4HJN 18,513- 51-121- B-20
WA4WED 7992- 36- 74- B-31
W4FVY 7920- 40- 66- C- 7
W4WSX 969- 17- 22- A- 7
WB4EOW 672- 14- 16- A-16

Eastern Florida

W4LCP 1,212,534-318-1271- C-73
K4THA
1,027,140-318-1079-ABC-90
K4KQ 407,520-240-575- C-55
W4HOS 359,640-216-555-BC-60
W4ORT 292,842-187-522- A-73
W4WHK 252,126-207-406-AB-64
W8BZY/4 210,904-164-430-BC-48
W4FY 200,880-186-360- C-47
W4BYB 153,408-188-272- C-
WB4JSV 70,059-121-193-BC-40
WB4IAE 56,610- 85-222- A-21
WB4IGL 35,670- 82-145- B-30
W4FFF 33,930- 78-145- C-11
W4GHV 20,519- 71-103- B-25
W4KMG 3441- 31- 37- A-12
W4EEO 1152- 16- 24- A- 6
W4ZXI (8 oprs.)
2,754,956-398-2308- C-96

Georgia

W4DXI 473,223-233-679- C-70
K4EZ 463,300-226-684- C-48
W4RNL 114,972-134-286- A-53
WB4EQQ 25,704- 56-153- A-30
WB4HQA 4966- 26- 64- B-21
WB4KVE 2346- 23- 34-AC-12
WA4EPM 714- 14- 17- A- 5

SOUTHWESTERN DIVISION

Arizona

W7IR 1,057,179-323-1091- C-76
W7DI 660,920-260-848- C-85
W7AYY 359,463-169-709- C-62
W7KS 261,690-195-450- C-58
W7UDG 19,908- 79- 84- A-13
W7UUU 9447- 47- 67- A-17
WA7ISP 5406- 34- 53- B- 9
WA7HRE 4590- 34- 45- B-21
WA7KQL 1905- 15- 43- B-17
W7FCD 1872- 13- 48- A- 3
WA7ISP/7 (WA7s IFD ISP)
167,844-142-394- B-45

Los Angeles

W6RR 1,056,632-269-1310- C-84
K6NA 865,773-249-1160- C-
W6TZD 547,548-206-886- C-
W6DGH 445,170-209-710-AC-75
W6EJJ 196,365-159-413- C-75
K6YFZ 195,657-147-445- C-60
W6RCV 139,440-112-415- C-50
K6OC 116,802-126-313-BC-53
WB6SKJ 114,885-115-333- C-58
W6JKR 94,080-140-224- C-35
K6MP 85,995-105-273- C-33
K6OJ 85,374- 93-306- C-60
K6BEP 80,460- 90-298- B-
K6EV 74,420-122-204- C-24
W6QY 53,766-103-174- C-14
W6ONG 46,098- 78-197- A-42
K6CNV 28,800- 75-128- A-24
WA6DGQ 26,394- 53-166- B-36
OH3UQ/W6
21,168- 56-126- B-26
W6CS 18,177- 73- 83-BC-12
W6GTE 18,144- 48-126- C-25
W6JPH 8964- 36- 83- B-
WB6ZHT 3240- 18- 60- A-34
WB6SAZ 3120- 26- 40- B- 4
WA6JAN 1785- 21- 29- A- 2
W6ECM 60- 4- 5- B- 1
W6NJU (5 oprs.)
1,264,530-305-1382- C-90
W6UED(W6s UED VPH)
307,530-170-603- C-80
WA6GLD (WA6s GLD ISP)
111,804-154-242- C-

Orange

K6EIV 652,470-239-910- C-
K6CH 216,144-158-456- C-30
WA7FHD/6
121,023-113-357- A-54
WA6FIT 11,088- 33-112- A-21
WB6LMN 4498- 26- 58- B- 9
K6OA 231- 7- 11- A- 4
W6ANN (4 oprs.)
1,596,744-331-1608- C-92
K6UYC (6 oprs.)
1,247,181-283-1469- C-90
WB6NRK (WB6s MPE NRK
UDC) 301,455-165-609- C-70

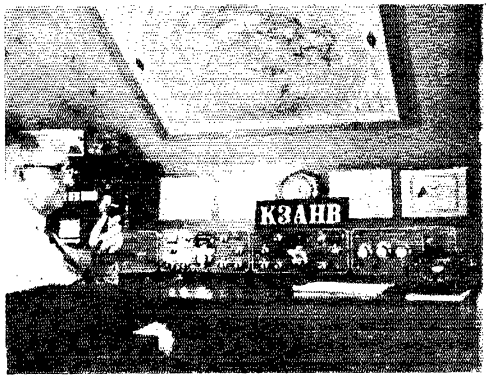
San Diego

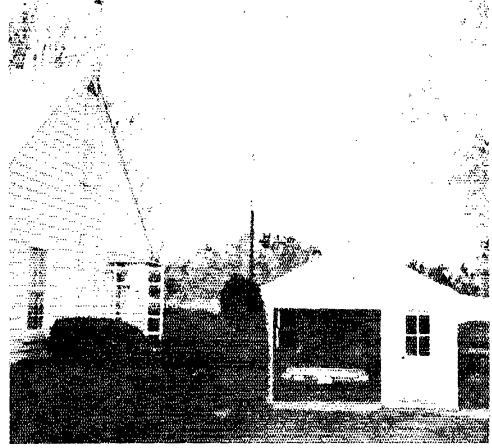
K6HN 407,616-193-704- C-53
WB6OLR 247,950-174-475-BC-55
K6SDR 100,368-123-272- C-26
W5CWQ/6 96,570-111-290-AC-56
W1IS/6 10,998- 39- 94- A-13
WA6DMN 5580- 31- 60- B-13
W6ITY (7 oprs.)
1,473,771-299-1643-AC-

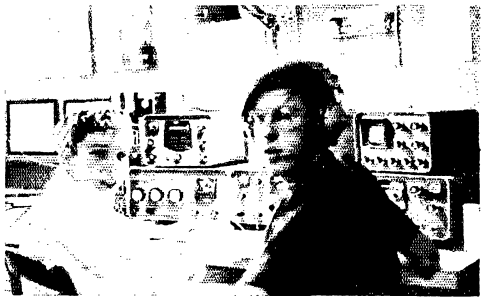
DIVISION LEADERS

C.W.			Phone	
Single Operator	*Multioperator*		*Single Operator*	*Multioperator*
W3GRF	W3MSK	*Atlantic*	W3MVB	W3MSK
W9EWC	W9YT	*Central*	W9ZRX	W9EXE
WAØKDI	WØAIH	*Dakota*	WØHP	KØVVY
W5IOU	K5YPS	*Delta*	W5IOU	W5WMU
K1ZND/8	WA8LYF	*Great Lakes*	W8SH	WA8LYF
WB2CKS	K2MME	*Hudson*	W2DXL	WA2FQG/2
WAØEMS	.....	*Midwest*	KØDQI	WAØEMS
W1BPW	W1YK	*New England*	W1AX	W1YK
W7DV	W7SFA	*Northwest*	W7BJ	.....
W6ISQ	K4BVD/6	*Pacific*	K6AHV	K4BVD/6
W4KFC	W4BVV	*Roanoke*	W4BVV	K4CG
W5EU	.....	*Rocky Mountain*	W5EU	K7RAJ
W4LCP	W4ZXI	*Southeastern*	K4EZ	WA4QPL
W7IR	W6ANN	*Southwestern*	W6RR	W6ISA
W5WZQ	W5AC	*West Gulf*	W5KTR	W5AC
VE2YU	VE3ABN	*Canadian*	VE3WQ	VE3FHO

Representing the Maryland-D. C. section, Cliff, K3AHB had 332 QSOs from this attractive operating position. His Yagi is 53 feet above ground.

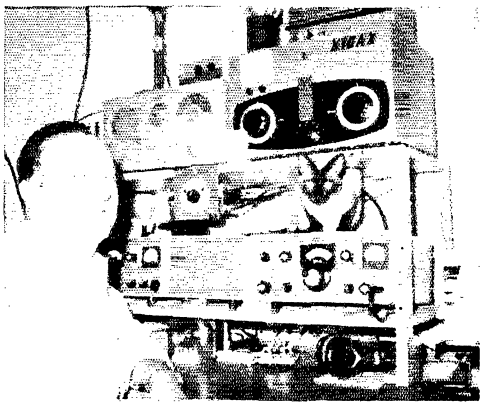






Representing our younger set, WA8WHN went multi-op for a fine score of 95K on phone. Randy, WA8SIL and Charley, WA8WHN lost 8 hours operating time due to a faulty coax relay.

Bob, VK2BRJ/9, on Norfolk Island provided a rare multiplier for 995 lucky W/VE c.w. entrants. His efforts are surely appreciated by the many who QSOed him.



First place in the Maine section goes to Phil, K1GAX, who says he didn't realize how many Extra Class licensees there were until the contest. Contrary to the picture, this was only a single-operator entry!

WB6TSJ (K3YVN, WB6KLL, WN6TNN) 17,670- 57-104-AC-76

Santa Barbara

W6GRX 100,584-127-264- C-48
W6GEB 37,818- 66-191- A-21
WB6WKC 2079- 21- 33- A- 6

WEST GULF DIVISION

Northern Texas

W5FL 574,200-264-725- C-45
W5EQT 467,856-216-737- C-62
K5ABV 384,462-234-548- A-76
W5TKB 332,859-181-613- C-56
K5YAA 247,776-178-464- A-43
W5ZSX 187,440-176-355-AC-40
W5EQ 150,258-158-317- B-55
WA5SGD 138,321-141-327- C-54
W5FCX 121,044-131-308- C-23
WA5VSL 108,945-135-269- C-38
W5KYD 108,324-108-339- C-33
WA5RXT 98,643-131-251-BC-25
W5OBS 91,176-116-262-AC-25
W5QZO 48,300-100-161-BC-18
W5IUW 45,030- 95-158- B-28
WA5UCT 22,032- 68-108-AC-24
W5QGZ 1914- 22- 29-AB- 6
WA5PPZ 300- 10- 10- C- 2
W5MSG 108- 6- 6- A- 3

Southern Texas

W5WZQ 1,061,424-336-1053- C-90
W5JAW 1,011,412-298-1132- C-61
W5GO 757,635-265-953- C-78
W5LJT 299,343-193-517- C-41
W5MCO 206,148-164-419- C-80
WA5AUZ 42,534-102-139-BC-14
WA5SRR 9348- 38- 82- C-15
WA5UHG 3666- 26- 47- A- 7
K2EIU/5 1173- 17- 23-AC- 2
W5AC (5 oprs.) 461,016-228-674-AC-88
K5RLW (K5s LZJ RLW SOR) 205,800-175-392- C-85

CANADIAN DIVISION

Maritime

VO1HH 347,700-190-610- B-33
VE1AI 168,720-148-380- A-49
VE1WP 167,720-140-405- A-28
VO1AW 167,112-132-425- C-27
VE1EK 87,000-116-250- A-24
VE1AE 23,547- 47-167- A-

Quebec

VE2YU 618,966-251-822- C-68
VE2NV 600,525-255-785-AC-65
VE2WA 455,710-229-664-BC-63
VE2BV 301,020-174-578- B-60
VE2AYU 297,540-174-570-ABC-71
VE2AJ 182,214-159-382- B-29
VE2DCW 46,725- 89-175- A-12
VE2BGJ 19,140- 58-110- C-15
VE2DKJ 13,662- 46- 99- B- 9
VE2PJ 5940- 36- 55- A-21

Ontario

VE3DBB 176,154-157-374- B-60
VE3BMB 102,912-134-256- B-45
VE3FXZ 40,572- 84-162- A-40
VE3CWE 38,475- 95-135- B-20
VE3BWL 18,117- 61- 99-BC-15
VE3BS 17,360- 70- 83- C-10
VE3WW 12,690- 45- 94- B-12
VE3FGV 6194- 38- 55- A-14
VE3AIA 2484- 23- 36- A- 6
VE3AYR 1380- 20- 23- A-16
VE3ABN (VE3s ABN GUM, WA9VZS) 222,108-166-447-AB-80

Manitoba

VE4ZX 11,592- 42- 92- C-21
VE4JB (VE4s JB MF) 174,306-139-418- B-86

Saskatchewan

VE5PM 21,390- 62-115- B-
VE5TT 3588- 26- 46- A-25

British Columbia

VE7EH 153,720-122-420- C-48
VE7IQ 25,560- 60-143- C-38
VE7BYG 2880- 20- 50- A- 8

Yukon — N. W. T.

VE8ZZ 25,950- 50-173- C-29

Check logs: W1IUY, W2s EGI HAZ, W3s IPS RF TP, K4TRH/4, W4s FCJ JUK, K6BI, W6EYR, W8OG, KØBYC, VE3ATF, VE7HQ.

C.W. SCORES

AFRICA

Angola

CR6EI 627,990-173-1210- A-
CR6AI 186,645-115-541- B-

Canary Islands

EA8BK 110,952- 92-402- A-11
EA8EY 8910- 27-110- C- 3

Liberia

EL2Y 764,610-165-1547- B-50

Ethiopia

ET3USA (7 oprs.) 1,105,146-179-2058- A-60

Ascension Island

ZD8Z 4,200,408-257-5704- A-87

Rhodesia

ZE1DC 348,480-110-1056- A-

South Africa

ZS6FN 254,100-140-605- A-14
ZS4AK 65,772- 63-348- A-11
ZS10 248- 8- 11- -50

Libya

5A4TY 18- 2- 3- B-

Tanganyika

5H3KJ 1,347,264-192-2456- A-58
5H3LV 323,592-139-776- A-42

Algeria

7XØRW 273- 7- 13- A-

Ghana

9G1HM 2100- 14- 50- B- 2

Zambia

9J2MX 1,020,624-176-1933- A-56

ASIA

Iran

EP3AM 283,908-118-802- B-48
EP2BQ 140,058- 93-503- B-15

Korea

HL9KQ 271,512-108-838-B -59

Japan

JA1AEA 1,357,224-194-2350- C-
JA3DGC 376,740-130-966- A-
JA2JAA 313,125-125-835- B-
JA3GZN 284,400-120-790- C-
JH1CBI 159,528- 92-578- A-29
JA1SR 137,865- 91-507- A-50
JA1LXE 94,720- 64-494- A-
JA3LGG 82,782-.73-378- A-22
JA7ARZ 70,432- 71-332-AB-19
JA2HO 60,000- 50-401- A-
JA2TH 44,289- 57-259- A-
JA1XGI 36,360- 45-271- A-25
JA6TQ 33,390- 53-210- A-23
JA2ITH 32,634- 42-261- A-
JAØED 32,396- 52-210- A-23
JA2WZ 32,240- 52-207- A-19
JH1AWI 29,300- 50-196- A-
JA2EMP 28,690- 38-255- A-13
JA2MVU 27,080- 40-227- A- 9
JA4SZ 25,254- 46-183- A-
JA1SKE 17,815- 35-170- A-
JA1WYQ 16,946- 37-153- A-48
JA8DIM 7722- 26- 99- A-
JA3YBQ (JA3LOK, opr.) 5200- 25- 70- B-
JA8GR 2346- 17- 46- A-
JA1AFF 1404- 13- 36- A-

TOP TEN

Single Operator

C.W.				Phone			
W/VE		*DX*		*W/VE*		*DX*	
W1BPW	1,685,250	ZD8Z	4,200,408	W6RR	1,976,156	KV4FZ	5,927,589
W4KFC	1,521,108	XEØGEN	3,452,625	W4BVV	1,751,718	HC1TH	4,677,981
W3GRF	1,273,230	KH6GPQ	3,225,960	W3MVB	1,242,243	ZD8Z	4,116,735
K1ZND/8	1,257,960	PJ2VD	2,703,393	K6AHV	1,239,672	XE1WS	3,754,976
WB2CKS	1,220,375	LP1XHG	2,553,999	W8SH	1,230,460	KH6GPQ	3,587,034
W4LCP	1,212,534	HK3BAE	2,405,187	W1AX	1,205,820	HI8XRM	2,732,975
W9EWC	1,100,256	K4PHY/YV5	1,660,422	W9ZRX	1,138,686	KH6BZF	2,431,395
W5WZQ	1,061,424	DJ4ZR	1,638,360	W5KTR	1,133,560	HK3WO	2,418,000
W7IR	1,057,179	G2RO	1,585,440	W2DXL	1,040,712	XE1LLS	2,336,605
W5IOU	751,800	HB9UB	1,581,930	WØHP	928,671	VK2FU	2,103,015

JA1BNW 1332- 12- 37- C-
JA3HNV 891- 9- 33- A- 6
JA6DGV 450- 6- 25- A- 4
JA1SMA 240- 5- 16- A-
JAØDVA 126- 3- 14- A- 5
JA2FVF 27- 1- 9- A-
JA1RAW 18- 2- 3- A-
JA1JHF 3- 1- 1- A- 1
JAØYAK (JA2FZL, JAØs ED FOJ) 51,545- 61-304- A-25
JA7YAF (5 oprs.) 42,458- 46-315- A-73

Check log: JA1LWL.

Ryukyu Islands

KR6EL 167,992- 92-609-BC-
KR6NR 56,547- 61-309- C-15
KR8AG 14,454- 33-146- A-
KR8DK 2576- 14- 62- A-
KR6FT 297- 3- 33- B- 8

Lebanon

OD5LX 65,320- 71-307- A-10

Asiatic Russian S.F.S.R.

UAØKCO 351,390-106-1105- B-
UA9KOA 160,491- 61-877- B-
UA9PP 134,466- 73-614- B-
UA9OS 89,623- 53-584- A-
UA9FN 66,156- 74-298- A-
UWØIX 53,985- 61-295- A-
UV9CO 38,280- 44-290- A-
UAØIW 30,384- 48-216- B-
UW9PJ 24,024- 44-182- A-
UA9FI 22,496- 38-199- A-
UWØTB 20,706- 29-238- A-
UA9OO 16,761- 37-151- A-
UAØTD 14,670- 30-163- A-
UA9BZ 13,299- 33-137- B-10
UA9HV 12,636- 26-162- B-
UAØSA 8400- 25-112- A-
UA9JL 6732- 33- 68- A-
UW9ER 6111- 21- 97- A-
UAØKUA 4209- 23- 62- B-
UAØKUV 4200- 20- 70- B-
UAØKCS 990- 10- 33- A-
UWØBA 456- 8- 19- A- 2
UAØSE 450- 10- 15- B-
UA9HL 75- 5- 5- A-
UAØKFG (6 oprs.) 1,100,280-173-2129- B-
UAØKAE (3 oprs.) 96,513-109-607- B-
UA9KAI (4 oprs.) 88,920- 52-570- A-26
UAØKZB (3 oprs.) 22,995- 35-219- B-

Check logs: UA9s DC KHL KJL TS, UV9XN, UAØs TP KCA KCW, UWØs AJ IW.

Turkoman

UH8BO 684- 12- 19- B-

Uzbek

UI8AI 14,214- 46-103- A-
UI8IZ 720- 10- 24- A-
UI8LL 594- 11- 18- B-

Tadzhik

UJ8AC 17,640- 40-147- B-
UJ8AB 7830- 30- 87- B-
UJ8SX 5796- 28- 69- A-

Kazakh

UL7JG 18,462- 34-181- A-
UL7JE 17,604- 36-163- A-
UL7GP 6804- 28- 81- B-
UL7JI 1080- 15- 24- A-
UL7KBA 150- 5- 10- A-
UL7HB 60- 4- 5- A-
UL7KAA (UL7s AIG GI QH) 139,635- 87-547- B-
UL7KBK (3 oprs.) 168- 7- 8- B-

Kirghiz

UM8KAA 9765- 35- 93- B-

India

VU2JN 26,961- 43-209- A-

Ceylon

4S7DA 4104- 18- 76- A- 9

Israel

4X4HT (4X4ZT, opr.) 31,146- 58-179- B-
4Z4AG 10,370- 34-102- A- 4

Singapore

9V1PD 44,202- 53-297- A-30

EUROPE

Portugal

CT1IQ 570,507-147-1295- B-26
CT1MO 179,546-107-563- A-30

Azores

CT2AT 14,841- 51- 99- B- 3

Germany

DJ4ZR 1,638,360-205-2664- B-
DL6WD 1,016,532-187-1838- B-
DL4QQ 980,700-175-1868- B-50
DK1CU 623,448-168-1237- B-
DM2AUO 418,572-151-950- B-
DL8CM 274,536-124-753- A-
DL2JO 230,115-115-667- C-33
DL4EP 189,115-109-579- B-23
DL4QP 176,144-101-582- B-32
DJ4UF 157,192- 98-556- B-
DL8YR 134,724-103-436- B-
DM3XI 114,680- 94-410- A-
DJ5GG 78,120- 70-372- B-
DL7NS 45,504- 64-234- A-
DJ6SI 43,026- 71-204- A-
DJ2YE 35,840- 64-187- B-
DK2RZ 29,964- 44-227- A-
DM3LOG 14,616- 42-117- A-
DL9YC 14,548- 60-148- B-
DL7BQ 11,430- 18-213- B-
DL9EM 6225- 25- 83- B-
DM3PA 8484- 28-103- A-
DM3UDE 8058- 34- 80- B-
DM2DEO 5472- 24- 80- A-
DM6MAO 4200- 28- 50- A-
DM2AUD 3825- 25- 51- A-
DM4SJJ 2346- 23- 34- B-
DM3JMI 2112- 22- 32- A-
DM2BCF 1428- 14- 36- A-
DM4HD 1350- 15- 30- B-
DM3UDM 624- 13- 16- A-
DM2ARE 147- 7- 7- A-
DM3TOO 120- 4- 10- A-
DL4USN (DL4s DK SY, DL5GY) 179,190-110-543- B-12

Check logs: DJs 2RE ØTA, DL1RB DM2s BJD BOB BYO CCM CPL CUL, DM3s SBM TF, DM4s CF PKL ZWL and DM-EA-3991/Ø

Spain

EA2DT 260,372-119-730- A-
EA2HW 171,930-110-521- A-10
EA2HR 12,804- 44- 97- A-27
EA7LY 4836- 26- 63- A- 8

Republic of Ireland

EI9J 885,610-194-1528- A-34
EI5F 15,370- 29-177- A-

France

F8VJ 597,198-177-1125- A-48
F8TQ 495,126-173-954- A-
F8CS 409,530-146-943- A-56
F8ZF 325,390-130-850- B-39
F2PO 197,208-132-499- A-35
F9LT 77,760- 80-324- A-
F5AH 54,696- 53-344- A-36
F9OE 38,136- 56-227- A-
F9BB 15,600- 50-104- A-15
F8TM 13,803- 43-107- A-
F8UJ 1680- 20- 28- A-10
F5CT 304- 8- 13- -

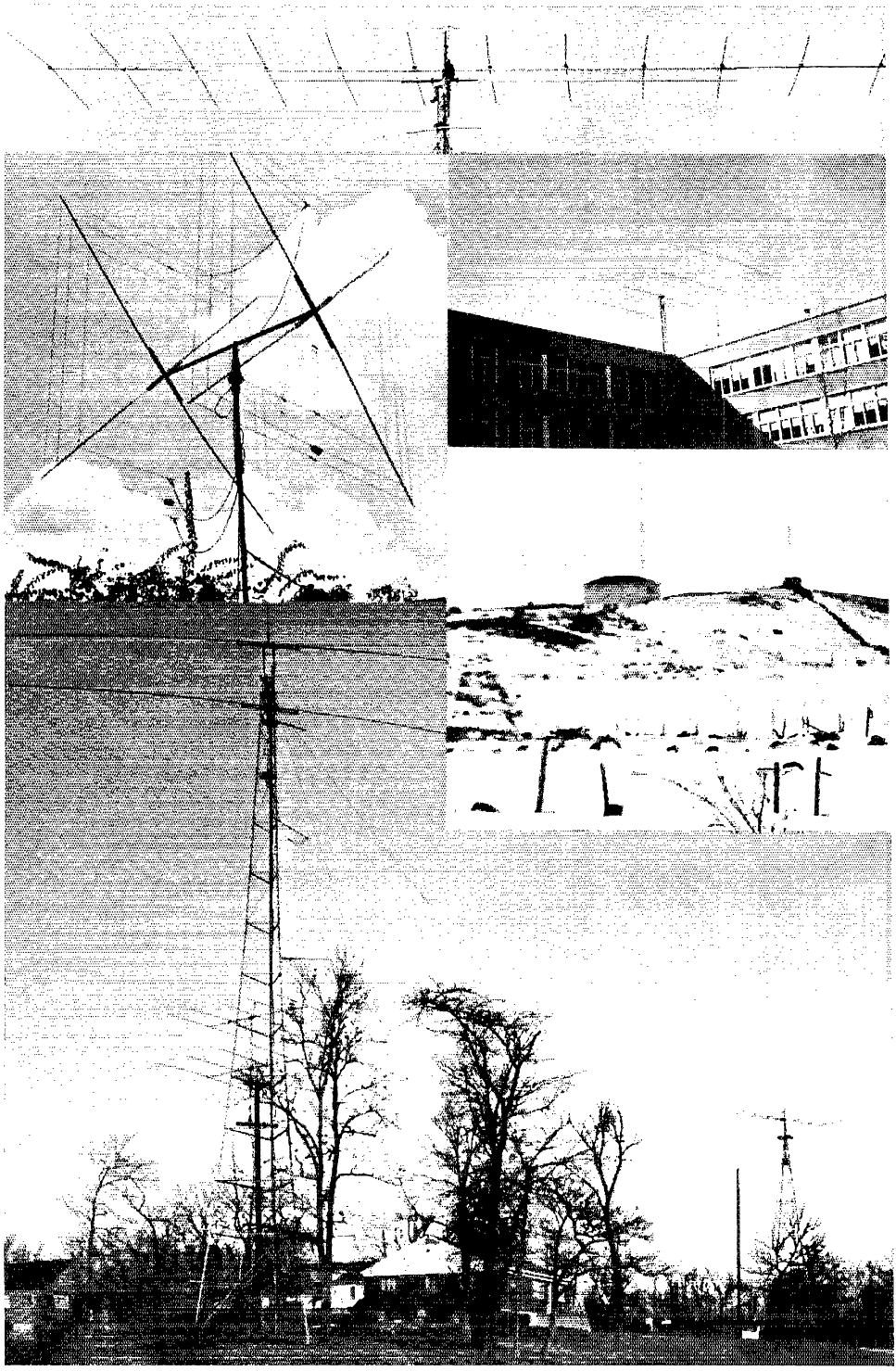
Check log: F2SQ.

England

G2RO 1,585,440-216-2452- A-70

ZD8Z, 1969 Africa Continental Champion on both c.w. and phone, shown riding what appears to be one of Ascension Islands local inhabitants. Do you think this could become a new fad? Bill is also the number 1 single-op DX station on c.w. with a score of over 4.2 million.

KV4FZ shown relaxing after a rigorous contest weekend. Herb takes honors as North American Continental Champion and number 1 single-op DX station, both on phone. What a score, over 5.9 million!!



Behind each good operator there is an efficient antenna system, here's just a sampling; K4SKI's 12 el 15 mtr. beam; 9V1PD's 2-el. tri-band quad; W9YT's 5 el. 20 mtr. Yagi; W8DZ antenna farm consisting of 2 el on 7, 4 on 14, 4 on 21, 5 on 28 and an inverted vee on 3.5 MHz; and LAØAD's TH3 and Hy-Tower.

G3FXB 1,306,032-208-2093- A-80
G3TXF 716,552-172-1392- A-81
G2QT 620,550-175-1182- A-52
G3KMA 517,362-163-1058- A-
G3JYP 453,333-137-1113- A-
G3ESF 445,809-161-923- A-
G3APN 211,629-121-583- A-40
G6VC 136,476-102-446- A-
G3WP 8556- 31- 92- A-

Check log: G3XNG.

Guernsey

GC3IEW
1,578,060-220-2391- A-

Scotland

GM2HCZ 177,905-119-500- A-

Wales

GW3NJW 660,756-164-1343- A-
GW3JJ 399,996-164-813- A-80
GW3ITZ (6 oprs.)
659,149-167-1330- A-96

Hungary

HA8UD 395,712-144-916- B-
HA3GF 227,416-131-579- A-
HA8KUN 43,214- 62-234- B-
HA8UF 39,375- 75-175- A-
HA8KUX 20,970- 30-233- A-
HA2ME 3420- 20- 57- A-
HA8UU 2967- 23- 53- A-
HA8UC 936- 12- 26- A-
HA7LO 880- 10- 30- A-
HA9KPE 780- 10- 26- A-
HA1KZB 459- 9- 19- A-
HA3NB 189- 7- 9- A-
HA5EQ 135- 5- 9- A-
HA5KDQ (5 oprs.)
910,080-180-1688- B-
HA5KFZ (3 oprs.)
198,688-112-603- B-80
HA8KCP (3 oprs.)
69,984- 72-325- A-
HA8KCC (2 oprs.)
57,456- 72-267- A-
HA3KNA (4 oprs.)
56,232- 66-284- B-
HA9KOL (4 oprs.)
27,594- 54-171- A-31
HA8KVC (Multi-op.)
144- 6- 8- A-

Check logs: HAs 1VA 8VM.

Switzerland

HB9UB 1,581,930-210-2511- B-
HB9AGH 454,896-156-1015- B-37
HB9DX 332,775-145-765- B-
HB9KC 221,145-115-641- B-33
HB9AGK 132,165- 99-445- A-27

Italy

I1ASE 811,903-163-1663- B-61
I1BLF 269,591-133-676- A-
I1ZGA 12,285- 45- 91- A-

Jan Mayen

JX5CI (JXs 2BH, 5CI)
25,461- 41-208- A- 8

Norway

LAØAD 1,504,485-201-2495- A-68
LA1OA 227,355-115-859- B-
LA2Q 72,808- 76-320- A-26
LA5GF 2750- 22- 42- A-
LA1P 1800- 15- 40- A- 4
LA6CJ 72- 4- 6- A- 1

Check logs: LA4JL, LA9s JD OI.

Luxembourg

DJ6SI/LX 82,524- 92-302- A-

Bulgaria

LZ1SS 51,084- 54-322- B-
LZ1ZQ 9- 1- 3- A-
LZ1KPG (3 oprs.)
1,180,581-193-2039- C-96
LZ1KAA (3 oprs.)
430,560-138-1040- B-73

Check log: LZ2KPD.

Austria

OE1DEW 306- 6- 17- A- 2

DX CONTINENTAL CHAMPIONS

C.W.			Phone	
Single Operator	*Multioperator*		*Single Operator*	*Multioperator*
ZD8Z	ET3USA	*Africa*	ZD8Z	ET3USA
JA1AEA	UAØKFG	*Asia*	JA1AEA	KA9MF
DJ4ZR	SK6AB	*Europe*	I1BAF	SK6AB
XEØGEN	.....	*N. America*	KV4FZ	6YØA
KH6GPQ	VK3APN	*Oceania*	KH6GPQ	.....
HK3BAE	LU2DKG	*S. America*	HC1TH	.....

(Single-operator continental DX champions win the plaque)

Finland

OH8RC 552,981-143-1289- B-
OH5VT 374,262-134-931- B-
OH5AD 89,052- 82-362- B-
OH2BAH 44,064- 54-272- B-
OH4RH 23,940- 57-140- B-
OH3MK 14,040- 40-117- B-
OH5WH 12,600- 30-140- A-17
OH5RZ 8190- 42- 65- B-
OH2BCD 4071- 23- 59- A-
OH1PG 1350- 15- 30- B-
OH7RM 1232- 16- 26- A-
OH2VZ 576- 8- 24- A- 1
OH8RV 105- 5- 7- A-
OH1UR 45- 3- 5- B- 1
OH1AD (6 oprs.)
727,910-166-1500- B-
OH2BFJ (OH2s BFJ LT)
64,320- 80-275- B-
OH3AG (OH3s SA YU)
6216- 28- 76-AB-

Check logs: OHs 5OD 6RC.

Czechoslovakia

OK1ARN 434,427-137-1059- B-
OK1AOR 225,000-125-639- B-
OK2QX 214,185-131-545-AB-
OK1AOX 112,995- 45-852- A-
OK1KTL 93,010- 71-450- B-
OK1KYS 85,956- 87-330- A-
OK2PAE 81,000- 75-361- A-
OK4CGP/P 77,544- 72-359- B-
OK1ATX 60,341- 83-248- A-
OK1VB 46,032- 48-321- A-
OK1TA 36,363- 69-179- A-
OK2WDC 19,008- 48-139- A-
OK3KGI 11,600- 25-155- A-
OK2PAY 9933- 43- 77- A-
OK1STU 5229- 21-249- A-
OK1OO 3648- 16- 76- B-
OK3ZMV 3610- 19- 64- A-
OK2BCJ 3330- 18- 69- B-
OK1AQO 3111- 17- 65- A-
OK1EP 2184- 14- 52- A-
OK1NW 2100- 14- 51- B-
OK2DB 1935- 15- 43- A-
OK1AES 1890- 14- 45- B-
OK1AIA 1392- 16- 29- A-
OK3CGI 714- 14- 17- A-
OK2ZU 600- 10- 20- A-
OK3CEX 516- 12- 15- A-
OK2BPE 432- 6- 24- A-
OK2YL 357- 7- 17- A-
OK1CIJ 301- 7- 16- A-
OK1BBJ 3- 1- 1- B-
OK3KAP (Multi-op.)
25,431- 49-173- A-

Check logs: OK2s BFT SFS, OK3-TAH.

Belgium

ON4XG 809,550-175-1542- A-44
ON4EG 7260- 30- 82- A-

Denmark

OZ1LQ 1,410,417-201-2339- B-85
OZ7HG 482,332-148-1087- B-
OZ7X 412,290-135-1018- A-
OZ3F 140,686- 91-519- A-30
OZ5DX 104,040- 85-408- B-
OZ3PO 100,674- 91-362- A-
OZ4H 51,504- 74-232- A-
OZ7G 37,323- 39-319- A-
OZ5WQ 27,300- 52-175- A-
OZ2UA 17,370- 30-194- A-
QZ7BQ 7560- 21-105- B-
OZ2NU 3750- 25- 50- A-7

Check logs: OZs 2LW 7ON.

Netherlands

PAØLOU
1,153,600-200-1963- A-60
PAØKOR 38,688- 52-248- A- 5
PAØWAC 29,889- 41-243- A-14
PAØPHK 6231- 31- 67- A-
PAØUV 4698- 27- 58- A-

Sweden

SM6DHU 207,594-114-607- B-
SM5CAK 188,490-103-610- B-
SM6BZE 155,628- 99-524- A-27
SM5BXT 143,514-102-469- B-
SM5UU 113,313-107-353- B-66
SMØBDS 85,656- 86-343-AB-
SM6ARH 66,787- 47-483- B-
SM5BNX 51,354- 54-317- B-
SM6CJK 28,764- 68-141- B-
SM3EWB 28,320- 59-160- A-
SM3ARE 21,780- 55-132- B-29
SM5XX 17,952- 44-136- A-20
SMØFY 17,640- 35-168- A-12
SM5EXE 17,040- 40-142- A- 5
SM2COL 15,700- 50-105- B-
SM3AUS 13,930- 35-133- B-10
SM6ASI 13,504- 32-141- A-
SM4DPB 11,745- 29-135- B-
SM5BRS 10,989- 37- 99- A-
SM5APS 10,560- 33-107- A-
SM3CJD 9384- 34- 92- A-
SM5BNZ 3657- 23- 53- A-
SM5CFH 3477- 19- 61- B-
SM7BBV 2394- 21- 38- B-
SMØEIH 1080- 15- 24- B-
SM5UH 540- 10- 18- A-
SM7CMV 352- 8- 15- A-
SK6AB (6 oprs.)
2,228,343-221-3569- B-
SK6CF (7 oprs.)
1,513,998-207-2438- B-90
SK5AA (SM5s ACQ CMP)
191,748-116-551- B-22

Check logs: SMs 2COR 5BDY 5BFJ 5BXP 6BSM 7DMT 7TV ØGM.

Poland

SP9AI 166,816-104-550- B-
SP6BZ 156,630-115-468- A-
SP3AIJ 140,277-107-437- A-
SP8AQN 139,842-102-461- A-53
SP6BCA 26,712- 53-168- A-
SP8AFS 17,787- 49-121- B-
SP6BAA 13,572- 39-116- B-
SP6AXF 13,489- 41-112- A-
SP3KBW 12,573- 33-137- A-
SP9BQX 12,510- 45- 93- A-
SP2AOB 10,152- 24-141- B-
SP1CNW 8928- 32- 93- A-
SP5ATO 8316- 36- 77- A-
SP6BFK 6930- 30- 77- A-
SP5ZA 5957- 23- 87- A-
SP2PI 3900- 20- 65- A- 3
SP9AGS 2363- 17- 48- A- 1
SP9ABE 2340- 15- 52- A-
SP5ATO 2205- 15- 49- A-
SP4DCR 108- 6- 6- A-
SP7CKF 54- 3- 6- A-

Check logs: SPs 1CTN 2RW 4AVG 6CDP 8BXT.

Greece

SVØWP 700,336-148-1606- C-33

Iceland

TF3OJ 10,890- 33-110- A-12

European Russian S.F.S.R.

UA1ZL 157,950- 90-585- A-
UA1IA 91,800- 51-600- B-
UW3KBI 60,300- 67-300- B-
UW3CM 52,341- 73-239- B-
UA4SM 47,328- 58-272- A-
UV3TA 44,928- 52-288- A-
UA4KHW 28,800- 64-150- B-11
UA1TQ 21,240- 40-177- B-
UW3HV 21,204- 38-206- B-
UW1KAT 17,556- 38-154- A-
UA3DB 17,250- 50-115- B-
UA1AJ 17,220- 41-140- A-
UA4QK 14,784- 32-154- A-
UA1DF 14,523- 47-103- A-
UW6CY 10,920- 35-108- A-
UA3TA 9030- 35- 86- B-20
UW3NE 7665- 35- 73- B-
UA1OE 7392- 32- 77- A-
UA3UH 6885- 27- 85- A-
UW3FW 6804- 27- 84- B-
UA4QM 6549- 37- 59- B-
UW3HY 4032- 21- 64- B-
UA1YH 3366- 22- 51- A-
UA6UO 2964- 19- 54- A-
UA3MV 2520- 21- 40- A-
UA3YR 720- 10- 24- A-
UA3KAO (4 oprs.)
482,313-149-1080- B-56
UA1KAG (3 oprs.)
68,228- 74-313- B-
UA3KAG (3 oprs.)
60,864- 64-317- B-
UA1KAQ (2 oprs.)
23,517- 39-201- B-
UA4KHP (3 oprs.)
10,296- 33-104- A-
UA4KHA (3 oprs.)
7446- 34- 73- B-

Check logs: UA1s TL ZZ, UA3s FT OL KRO, UA4LK, UA6KOD UN1s CQ KAL, UW4IK.

Ukraine

UB5MZ 186,048- 96-662- A-
UB5KAB 11,124- 36-103- B-
UT5XB 6390- 30- 71- A-
UY5RV 3300- 22- 50- A-
UB5IU 2775- 25- 37- A-
UY5UI 2580- 20- 43- A-
UY5TE 690- 10- 23- A-
UY5AB 18- 2- 3- A-
UT5KDP (3 oprs.)
186,624- 81-768- A-
UB5KFF (3 oprs.)
81,852- 76-359- B-

Check logs: UB5s ES NS KKO.

White Russian S.S.R.

UC2BB 45- 3- 5- A-

Azerbaijan

UD6BW 2940- 20- 49- B-

Georgia

UF6AU 57,408- 52-368- A-
UF6HS 5376- 28- 65-AB-

Lithuania

UP2CG 21,520- 40-182- B-
UP2NX 17,028- 44-129- B-
UP2KBA 14,715- 45-109- B-
UP2KCB 10,914- 34-107- B-
UP2OX 6216- 28- 74- A-

Bold Face = Over 300 QSOs/Band — DX

	80	40	20	15	10
CR6GA		3	**1078**	**1106**	**812**
CR6GM			**913**	**553**	**824**
CR7DS			**474**	**470**	**550**
EL2BD	2	153	**498**	**647**	**619**
ET3USA*	4	29	**566**	275	292
ZD8Z	131	**432**	**1801**	**1839**	**1617**
ZS3S			165	**328**	**523**
ZS6ACK			52	192	**662**
ZS6DW	12	97	**471**	**1115**	**1339**
5H3KJ			**496**	**788**	**1065**
7P8AR		96	**844**	**964**	**1110**
7Z3AB			**472**	32	12
EP2BQ		8	**376**	129	213
EP3AM	2	21	**821**	**401**	296
JA1AEA	11	148	**651**	**607**	**1178**
JA1CG		43	**404**	292	**468**
JA1DXE	1	16	197	**372**	**362**
JA3LGG		12	66	227	**382**
JA7FGA				68	**306**
KA2RM	60	149	**542**	**692**	**746**
KA7CW*		58	222	**459**	236
KA9MF*		84	**814**	**477**	**647**
UA9KAI*			**1204**		
4Z4HF			**311**	158	
CT1BH	14	119	**769**	**524**	**1131**
CT2AT	177	213	**337**	169	**1122**
DJ5GI			**451**	**812**	**512**
DL2JO			24	191	**427**
DL4AP	2	36	**530**	**938**	**554**
DL4FS*			**432**	**822**	**525**
DL4QP			105	**368**	**537**
DL4QQ	20	179	**659**	**897**	**886**
DL4USN*	3	54	**835**	**1007**	**785**
DL6WE					**628**
DL7LJ					**675**
EA1FD	17	57	**362**	**537**	**638**
EA1IY			**394**		
EA3QW	2	35	201	222	**476**
F3KW	39	75	**738**	**897**	**823**
F5OJ*	43	116	**646**	**1029**	**644**
G2QT	55	102	**554**	**648**	**638**
G3IAR	17	156	**602**	**466**	**1055**
G3JOC*	47	**327**	**1389**	**1474**	**818**
G3KMA			157	121	**554**
G3UQR					**1205**
G3WTV	2	27	288	**368**	**728**
G3XYP		27	328	108	**443**
GW3NWV	22	76	**456**	**348**	**1339**
I1BAF	36	160	**1425**	**925**	**463**
I1BBZ			139	**353**	70
I1BH				**332**	
I1CZW*	14	164	**1091**	**439**	**741**
I1DFE*			104	**332**	263
I1FLD	14	88	**950**	**604**	**1000**
I1MOL	12	118	**643**	**522**	**531**
I1TAE*	28	**332**	**1396**	**1195**	**1438**
JX3P*			**445**	174	4
LAØAD	48	93	**692**	**600**	**962**
OE2EGL			**336**	**764**	**908**
OHØNI	2	3	225	**310**	268
ON4XG		1	191	**393**	**593**
ON5GQ		19	**461**	**543**	**407**
OZ1LO	35	135	**328**	**834**	**919**
OZ1RH	11	17	**347**	**419**	**876**
OZ7X		14	**362**	**744**	**340**
SK3BP*		27	236	**527**	**370**
SK6AB*	50	266	**1489**	**1373**	**1161**
SM5CAK		67	24	184	**364**
SM5EAC	40	17	**549**	**803**	**768**
SM6CKU	23	68	**560**	**653**	**425**
UA1CS			**324**		
UA1WW			1	**362**	51
UA2KBD*	20	40	229	**525**	1
UT5KTH			**333**		
UW3BV			**382**		
YU1BCD*	5	110	**656**	**987**	253
YU3EY*		15	**1005**	**919**	136
FG7XL			**1152**	**1131**	**1483**
HI8XRM	172	**355**	**1023**	**1108**	**1064**
HP1JC	280	195	**443**	**647**	**577**
KL7WAH		55	**368**	**785**	237
K4KLC/KL7			219	**584**	
KP4AN	75	81	49	111	**405**
KV4FZ	**391**	**768**	**2078**	**2125**	**2159**
KZ5NF		161	**1160**	**1092**	**941**
PJ7JC	203	123	**674**	**364**	**624**
VP9MI		1	**330**	**676**	58
VE3BS/VP9	56	31	**342**	**460**	**453**
WB2NCS/VP9			428	2	
XE1LLS	78	**409**	**743**	**1178**	**910**
XE1WS	168	**661**	**943**	**885**	**1962**
YN1GLB	254		**850**	**560**	**1156**
6Y0A*	**442**	**553**	**1241**	**1311**	**2034**
9Y4KK		16	113	272	**363**
DU1ZAG		45	**410**	**381**	**447**
KH6BZF	30	183	**599**	**1539**	**1454**
KH6GPQ	185	**362**	**981**	**1249**	**1949**
KX6FJ			**642**	**547**	**778**
KX6GS			**360**	**348**	**690**
VK2FU	60	**429**	**1079**	**495**	**920**
ZL1AGO	54	233	**305**	**325**	215
ZL1HW			**546**	**350**	**726**
5W1AR	31	183	**373**	13	246
CP1HW		1	**511**	**991**	**1095**
CX2CN			21	221	**514**
HK3WO	62	275	**738**	**727**	**1422**
LU2FAO			**376**		
LU6EAR			**315**		
LU8DKA		53	**373**	**938**	**1809**
OA4BS			**335**		
OA4YW			131	222	**379**
OA6BU	2	72	**388**	**442**	**771**
PY1CHP			58	**313**	114
PY4KL			**392**	**457**	**668**
PY7ASQ		28	**1047**	**789**	26
PY7VKZ		80	**325**	**413**	
PZ1CK				**712**	**715**
YV5CGT/3	29	82	**604**	**520**	**423**
YV7AV			**787**	**718**	**562**
WA3HXR/YV5	34	207	**546**	**623**	**855**
8R1G	153	129	**710**	**651**	**697**

* Multioperator station.

UP2BL 63- 3- 7- A-
UP2KMU (4 oprs.) 59,220- 47-420- A-
UP2KAG (2 oprs.) 882- 14- 21- A-

Latvia

UQ2KCN (UQ2AO, opr.) 56,700- 63-302-AB-
UQ2PZ 11,526- 34-113- A-
UQ2CC 7332- 26- 94- B-
UQ2KAY 324- 9- 13- B-
UQ2KCT (2 oprs.) 444,717-117-1267- B-
UQ2KCR (UQ2s PP PW) 72,996- 79-308- B-
UQ2KBC (2 oprs.) 26,850- 50-181- A-

Estonia

UR2LO 53,048- 38-467- B-
UR2FU 13,284- 41-108- A-

Rumania

YO8AP 86,997- 47-617- A-
YO8MH 26,235- 55-160- A-
YO4CT 24,450- 50-163- A-
YO8DD 20,350- 50-136- C-
YO8FZ 19,656- 36-182- A-
YO6AW 12,675- 25-169- B-
YO9APJ 9450- 30-105- A-
YO7DL 7335- 15-163- B-
YO8AEZ 3024- 24- 42- A-
YO4KCE 2280- 20- 38- B-
YO6GZ 1488- 16- 31- A-
YO9HO 588- 7- 28- A-
YO4YT 294- 7- 14- A-
YO4KCA (YO4s AIP HW) 480- 8- 20- A-

Check logs: YO3s AC QO.

Yugoslavia

YU2REB 276,575-115-802- B-
YU1SF 32,984- 62-178- A-55
YU1BCD (YU1s HQW QBC, YU3BU) 1,100,010-185-2146- B-67
YU3DUV (2 oprs.) 39,246- 62-212- A-

NORTH AMERICA

Cuba

CO2DR 87,120- 88-330- A-14
CO2KW 8424- 26-108- A-

St. Pierre & Miquelon Is.

FP8AP 109,026- 54-673- A-

Panama

HP1XHG 2,553,999-259-3287- C-69

Alaska

KL7IR 1,566,840-220-2374- C-53
W3UEQ/KL7 154,938- 98-527- C-19

Virgin Islands

KV4GA 46,980- 60-262- A-14

Canal Zone

KZ5KN 14,400- 30-160- A- 6

Netherland Antilles

PJ2VD 2,703,393-249-3619- A-64

Sint Maarten

PJ8AA 573,363-171-1117- A-33

Dominica

VP2DAP 57,470- 70-275- A- 5

Bahama Islands

VP7NA 501,960-178-940- B-31

Bermuda Islands

VP9BY 12,488- 28-149- A- 8

Mexico

XEØGEN 3,452,625-275-4185-AC-85
XE2AAG 1,476,279-219-2250- A-
XEØGJR 869,652-196-1479- A-

Barbados

8P6CV 756- 12- 21- A- 2

Trinidad

9Y4KK 699,180-172-1355- B-24
9Y4DS 341,820-108-1055- B-48

OCEANIA

Philippine Islands

DX1AAV 409,833-129-1059- C-70
DU1ZAW 129,720- 94-461- C-18

Hawaii

KH6GPQ 3,225,960-261-4120- C-60
KH6GQB 779,006-178-1459- C-
KH6GLP 29,463- 61-162- B- 8

Marshall Islands

KX6HC 42,120- 65-216- B-17

Australia

VK2EO 1,528,692-222-2382- A-
VK2GW 627,165-181-1155- A-58
VK5FM 527,310-162-1085- A-21
VK5FH 397,320-129-1027- A-52
VK2VN 66,033- 87-253- B- 8
VK5KO 64,260- 84-255- A-
VK7CM 63,784- 68-313- A-14
VK2RA 15,132- 52- 97- A- 5
VK4UA 9858- 31-106- A-
VK4GU 7475- 25-102- A-
VK3APN (4 oprs.) 448,144-148-1054- A-83

Norfolk Island

VK2BRJ/9 447,750-150-995- A-35

Fiji Islands

VR2DK 260,513-121-719- A-30

Indonesia

YBØAAC 10,770- 30-120- B-12

New Zealand

ZL1IL 914,220-180-1693- A-49
ZL1AFW 463,749-143-1081- A-45
ZL1AMO 220,410- 62-1185- A-37

Western Samoa

5W1AR 430,392-158-908- A-37

SOUTH AMERICA

Chile

CE2CR 68,024- 88-262- A-13

Uruguay

CX1JM 246,984- 82-1004- B-

Bolivia

CP1BE 54,468- 68-267-BC- 5

Colombia

HK3BAE 2,405,187-229-3501- B-65
HK4ALE 361,305-155-777- A-

Argentina

LU6ABX 178,310-110-54C- B-20
LU9DL 96,126- 74-433- A-28
LU2DKG (LU1DAY, LU2DKG) 362,558-133-914- B-24
Check log: LU8FBH.

Peru

OA4DX 607,984-158-1283- A-32

Brazil

PY7SR 104,469- 97-360- A-32
PY1ADA 76,680- 90-284- B- 8
PY1CKV 9417- 43- 73- A-
Check log: PY2SO.

Venezuela

K4PHY/YV5 1,660,422-237-2336- C-61
YV4OY 807,024-184-1462- A-60
YV1OB 758,716-196-1298- B-
Check log: YV5BPG.

PHONE SCORES

ATLANTIC DIVISION

Delaware

W3NX 468,270-242-645-BC-65
W3NNK 128,019-139-307-BC-38
W3DRD 75,960-120-211- C-35
WA3LIW 26,928- 66-136- A-41
W3GAU 14,322- 62- 77- C-12
WA3GSM 3132- 29- 36- B-

Eastern Pennsylvania

W3MWC 915,948-297-1028- C-74
W3WPG 511,116-223-764- C-66
W3NZ 501,966-237-706- C-71
K3EUR 476,634-226-703- C-60
W3BYX 459,459-221-693- C-67
WA3ATX 425,646-221-642- B-67
W3DQG 404,376-232-581- C-50
W3KT 373,728-229-544- C-24
K3HHY 291,438-189-527- C-20
W3GRS 279,096-232-401- C-26
K3JLK 274,944-179-512- C-72
WA3BZA 272,175-191-475- C-60
WA3EPB 254,667-181-469- A-44
WA3ATP 229,140-201-380- C-
K3AIG 211,599-153-461- C-75
K3BNS 211,128-152-463- C-48
W3ALB 187,200-160-390- C-42
W3EVW 164,640-160-343- C-
W3KCS 129,336-136-317- B-33
W3DHM 116,109-133-291- C-20
W3EQA 113,152-128-296- C-32

Minimum Number of Countries	15	30	80	70	70
Band	75	40	20	15	10
K1AGB					72
K1CSJ*			8	15	92
K1GUD		5	29	53	79
K1JHX		18	74	78	84
K1THQ	26	37	81	89	79
K1UHY	30	27	60	66	35
W1AX	34	41	92	93	88
W1BIH	20	22	77	81	83
W1CW			117		
W1DO			43	80	41
W1ETU	22	19	47	59	41
W1OKG	17	40	92	82	73
W1PYM			56	36	92
W1YK*		1	42	57	70
W1YRC	1	16	80	65	73
WA1DJG	12	27	80	81	80
WA1FBX					71
WA1IHN	17	28	96	78	77
WA1IJC			11	70	32
KØDQI/1	20	21	41	50	54
W9MIJ/1	14		92	75	57
K2DCA	20	37	66	64	61
K2DJD	7	30	89	89	77
K2GXI		65			
K2UNY				94	
K2UQT		31	46	50	56
K2BHK		42			
W2DKM		10	39	52	73
W2DXL	32	48	84	79	68
W2EPA	8	17	50	55	72
W2GLQ*		9	77	70	54
W2JSX		26	97	86	77
W2MB	23	22	80	73	65
W2SUC	3	18	79	76	76
W2WZ	17	12	53	55	68
W2YT					100
WA2BYJ	3	17	65	52	80
WA2CMV		10	95	77	82
WA2FQG/2*	26	37	87	93	78
WA2IZS*	19	33	75	76	81
WB2CKS	31	33	72	60	57
WB2RXS			39	51	72
WB2SIH	4	30	16	25	33
WB2UDQ*		30	84	89	73
WB2UZU	10	24	82	80	80
WB2YQH	1	15	89	92	74

Minimum Number of Countries	15	30	80	70	70
Band	75	40	20	15	10
K3GJD		2	54	41	70
K3HHY		5	97	87	
K3JLK			52	57	70
W3AES*	12	19	84	93	72
W3BQN	12	31	75	81	84
W3BWZ	9	33	98	80	67
W3DQG	19	21	60	76	56
W3GHD			60	74	7
W3GM*	50	63	128	123	110
W3GN*	11	39	77	70	79
W3GRF	1	15	59	72	67
W3GRS			107	78	47
W3KT	2	20	63	82	62
W3MSK*	63	85	157	136	126
W3MVB	34	42	84	86	85
W3MWC	16	47	78	83	73
W3NU	26	37	81	93	81
W3NX		20	77	76	63
W3NZ	16	30	61	63	67
W3TLN	14	25	80	81	85
W3WJD*	50	67	130	119	104
WA3ATP		8	82	62	49
WA3ATX		17	64	64	76
WA3DCG	16		30	50	57
WA3GJU	16	31	95	98	79
WA3KEG	24	21	85	81	78
K7ADD/3	25	36	86	87	75
K4CG*	30	42	95	101	91
K4EZ	8	15	74	80	80
K4FU	2		61	74	66
K4HJE			72	70	66
K4II	15	17	81	74	72
K4SKI				74	47
K4TTA		9	81	52	49
W4BVV	28	45	98	102	86
W4BYB		62	11	30	30
W4CRW	1	5			85
W4DFK	6	9	66	52	92
W4DQD	3	3	49	36	42
W4DXI	3	5	59	63	70
W4EZ		15	53	74	75
W4LVV	19	20	50	51	50
W4NBV	17	38	85	74	58
W4NJF		8	79	70	76
W4NPE		3	80	18	3
W4ODR*	14	32	79	77	80
W4ONO	19	13	2	7	21

Minimum Number of Countries	15	30	80	70	70
Band	75	40	20	15	10
W4SYL	16	37	96	88	85
W4VAN			58	53	74
W4YWV					77
W4ZCY	22	27	73	73	89
W4ZNI	7	4	72	66	80
WA4NYJ	11	36	46	35	44
WB4DJQ			69	84	74
K5AEU	17	4	83	8	24
K5BOC	11	16	77	65	71
W5AC*	10	31	76	73	90
W5EQT	20	17	34	63	67
W5FL	6	8	63	77	79
W5IOU	14	29	93	78	81
W5KTR	20	46	100	86	88
W5KYD		4	93		
W5NMA	6	29	88	82	74
W5NOP			86		
W5OBS	18	24	60	43	35
W5OGS	26	34	97	70	77
W5WMU*	3	25	89	74	91
WA5EFN	10		76	70	77
WA5LOB	12	27	71	70	74
WA5RXT	5	19	37	74	77
K2EIU/5	18	9	2	12	18
K6AHV	27	45	103	74	65
K6AN*	15	33	101	79	75
K6AO	22				2
K6CH		8	86		38
K6ERV*		17	80	49	24
K6UYC*	26	43	114	88	78
K6YRA			116		
W6DGH	20	25	72	69	63
W6ESI	16	31	57	73	68
W6ISA*	28	42	107	89	85
W6JPC	8		100	29	7
W6NJU	22	38	90	78	64
W6QJW	9	25	97	73	66
W6QY	23	13	38	26	48
W6RR	26	47	116	89	86
W6UED	22		1	6	71
W6UUI*	1	29	71	79	64
WA6UFW*	14	30	97	65	64
WB6UDC	13	28	88	68	59
K4BVD/6*	33	41	114	98	70
K7RAJ*	22	32	81	74	58
WA7GFT		12	82	61	54
K9LBQ/7	23	27	51	67	40

Minimum Number of Countries	15	30	80	70	70
Band	75	40	20	15	10
K8AXG	11	18	51	75	69
K8DOC	22	35	82	80	73
K8HZU	17	22	83	79	77
K8UDJ	19	20	52	31	32
K8YBU	32	42	94	75	77
W8BDO	23	30	77	64	41
W8GEG		21	74	70	61
W8LXU	7	29	93	72	72
W8NGO*		41	94	96	76
W8RXY	19	17	38	52	42
W8SH	21	37	98	95	89
W8TWA	11	34	73	74	66
WA8LYF*	26	36	96	99	73
K9CUY	23	48	86	75	70
K9PPJ*	6	28	97	76	65
W9BZW*		8	86	85	94
W9DWQ		8	79	77	83
W9EWC	23	37	74	68	69
W9EXE*	34	47	103	96	100
W9GIL	9	11	71	71	75
W9JQD			12	21	73
W9LKJ*	18	40	104	98	98
W9QQN		15	94	85	90
W9ZRX	19	41	100	81	104
WA9JDT	9	30	74	79	72
WA9NSR*			12	75	46
KØVVY*	10	27	68	74	49
WØBE	16	14	9	49	59
WØHP	20	41	86	93	73
WAØCPX	6	7	61	79	66
WAØEMS*	18	25	54	75	63
WAØLGR		15	52	44	73
W9ECV/Ø					96
VE1AHK*	9	30	77	75	50
VE2NV	19	15	100	50	65
VE2WA	24	19	92	58	64
VE2WY	21		89	62	64
VE2YU	10	7	80	56	50
VE3FHO*	20	32	133	104	78
VE3WQ	28	17	91	71	48
VE4FU	6		94	48	37
VE4SD		3	92	28	16
VE6GN	3	5	83	44	34
VE7BQF			89		

* Multioperator Station

W3GHD 105,750-141-250- C-
K3UZY 98,670-130-253- C-
K3JH 87,639-131-223- C-24
WA3JLD 83,520-116-240- B-59
K3QDV 75,000-100-250-AC-30
W3VHV 58,800-100-196- C-
K3GYS 39,312- 78-168- C-12
W3CI 34,632- 74-156- C-22
W3MQ 26,937- 73-123- C-10
WA3KEY 23,958- 66-121-AB-18
K3WJV 15,048- 57- 88- A-22
W3EAD 15,042- 46-109- A-12
WA3FOQ 11,931- 41- 97- B-10
WA3IIA 10,836- 42- 86- B-12
W3EAN 10,707- 43- 83- C- 6
WA3IEM 7791- 49- 53- B-11
W3CGS 5544- 33- 56- C- 6
WA3JKO/3 3321- 27- 41- B- 5
WA3AHQ 3300- 25- 44- A- 7
WA3IXF 1653- 19- 29- B-20

W2EPA 318,756-202-526- C-54
K2QIL 294,690-190-517- C-65
W2QKJ 249,900-170-490- C-
W2EOT 241,113-179-449- C-29
K2PZF 231,363-209-369- C-42
W2EHB 220,365-177-415- C-35
W2CME 154,878-166-311- C-35
W2PAU 77,490-126-205- C-24
WB2CGW 48,594- 89-182- B-20
W2KF 36,855- 91-135- C-14
W2ZUL 33,069- 73-151- C-26
WB2EUU 32,400- 75-144- A-13
W2ORA 24,948- 63-132- B-22
WB2SCK 19,530- 62-105-BC-12
WA2DYZ 13,545- 43-105- B-16
K2SQM 13,254- 47- 94- B-18
W2SDO 12,768- 56- 76- C-17
W2PFQ 12,720- 53- 80- B-12
W2BHK 9954- 42- 79- C-35
WA2DVU 7626- 41- 62- C- 6

WA2ADU 120- 5- 8- B- 2
WA2BEX/2 105- 5- 7- A- 1
WA2BEX 75- 5- 5- A- 1
WA2SSJ 12- 2- 2- -

Western Pennsylvania

WA3GJU 977,097-319-1021-ABC-62
K7ADD/3 877,251-309-955- C-88
W3NU 738,396-318-776- C-60
K3HZL 260,253-189-459- C-70
K3OTY 199,398-167-398- C-
W3YLJ 107,586-129-278- C-21
WA3EJG 41,724- 76-183- A-43
W3PIX 31,005- 65-159- B-26
W3LNE 22,656- 59-128- A-17
WA3LJW 18,172- 59-103- A-40
W3KVS 16,182- 58- 93- C-30
WA3GLA 14,760- 60- 82- A-17
WA3KOS 11,319- 49- 77-BC- 9
K3JVT 11,130- 53- 70- C-23
WA3EFH 8694- 42- 69- C-11
W3VK 1425- 19- 25- A-11
W3UT 720- 15- 16- B- 4
W3TV (4 oprs) 162,792-133-408- C-12

CENTRAL DIVISION

Illinois

W9QQN 662,004-284-777- C-76
W9DWQ 425,334-247-574- C-
WA9HJM 411,312-209-656- C-71
W9WYB 213,192-168-423- C-
W9JJV 187,605-165-379- C-62
W9OHH 174,660-164-355- C-
W9TFY 131,703-143-307- C-45
WA9TFM 107,100-140-255- A-45
WA9NJB 57,288- 88-217- B-22
W9MZP 33,534- 81-138- C-27
K9JDV 30,024- 72-139- C-20
K9MNT 27,816- 76-122- A-17
WA9NFL 27,720- 77-120- C-15
W9DY 26,568- 82-108- C-26
W9GYN 20,100- 67-100- A-34

Indiana

W9ZRX 1,138,686-346-1097- C-90
K9CUY 802,112-302-886- C-84
WA9RQY 87,846-121-242- C-47
K9ODF 80,040-120-223- C-48
K9BUG 66,933-111-201- B-30
W9JQD 36,570-106-115- A-14
WA9WBE 28,314- 78-121- A-24
K9VQK 16,740- 62- 90- A-31
W9FN 12,780- 60- 71- C-20
W9VDB 8178- 47- 58- B-11
W9UEM 396- 11- 12- A- 5

Wisconsin

W9EWC 730,048-272-895- C-65
WA9JDT 563,904-264-712- B-74
W9KYZ 469,350-225-696- C-
W9GIL 405,981-237-571- C-60
K9YBC 36,450- 75-162- B-21
W9BG 32,058- 78-137- C-19
W9NLJ 31,152- 88-118- C-12
K9EEQ 13,680- 60- 76- A-32
K9DIN 10,857- 47- 77- B-22
W9SFK 4608- 32- 48- C-14
WA9ZCP 4590- 30- 51- A-17
WA9RTU 2754- 27- 34- A-12
W9OW 1140- 19- 20- C- 3
K9EUZ 216- 8- 9- A- 2
WA9UMU (WA9s TBA UMU UVE) 335,699-221-507- B-85
WA9NSR (WA9s NSR OTH) 106,134-133-266- B-32

DAKOTA DIVISION

Minnesota

WØHP 928,671-313-989- C-
WØPAN 338,832-208-543- B-60
WØIYP 160,392-163-328- C-39
WAØKDI 118,860-140-283- C-36
WØBE 108,927-147-247- B-42
WAØNHW 74,910-110-227- B-77
WAØUGI 51,948-111-156- B-40
WAØRUE 32,760- 78-140- A-6

Not one, but two entries from rare and exotic Indonesia. Gene, YBØAAB (above) on phone and Jack, YBØAAC (below) on c.w. are the 1st and 2nd U. S. hams licensed under the U. S.-Indonesian Reciprocal Operating Agreement. Back home they are WB4GCL and K1EJT respectively.

W3QIR 1404- 18- 26- B- 4
WA3GNL 72- 4- 6- A- 1
W3GM (8 oprs.) 3,634,260-476-2545- C-96
W3WJD (4 oprs.) 3,293,760-470-2336- C-91
W3AES (5 oprs.) 726,600-280-865- C-96

Maryland — D. C.

W3MVB 1,242,243-331-1251- C-88
W3TLN 884,070-285-1034- C-68
W3BQN 767,496-283-904-ABC-80
W3BWZ 657,804-287-764- B-79
WA3KEG 628,575-289-725- C-53
W3GRF 439,770-214-685- C-50
W3IN 265,974-194-457- C-44
W3AXW 186,558-186-335- C-56
K3GJD 136,773-167-273- C-20
K3AHB 135,456-136-332- C-44
W3CRE 101,277-121-279- C-21
W3HVM 90,390-115-262- C-30
W3FU 81,792-128-213-AB-37
WA3DUG 73,440-153-160- C-31
W3HH 39,360- 82-160- C-24
W3PZW 20,832- 56-124- C-25
W3ML 16,461- 59- 93- A- 8
W3GBB 8856- 41- 72- C-11
W3PWO 7128- 44- 54- C- 8
W3MFJ 6624- 32- 69- A- 8
W3DPJ 1311- 19- 23-AB- 3
WA3ENM 459- 9- 17- B- 4
WA3JRA 243- 9- 9- B- 1
W3MSK (9 oprs.) 7,023,736-569-4152- C-
W3GN (W3s CBJ GN KMV) 693,036-276-837- C-80

Southern New Jersey

K2DCA 389,112-248-523- C-53

W2HDW 6528- 32- 68- A- 7
W2ITG 6300- 42- 50-AC-19
WB2UVB 5940- 36- 55- A- 2
W2OWA 5664- 32- 59- B-16
W2TQ 3978- 34- 39- B- 8
W2DMR 3192- 28- 38- C- 8
WB2MNM 2553- 23- 37- A- 3
WB2DRG 1056- 16- 22- B- 9
W2FYS 969- 17- 19- A- 5
K2PPQ 510- 10- 17- A- 5
WA2IZS (K2CPR, W2UI, WA2-IZS) 712,272-284-836- C-90
WA2BPL (2 oprs.) 103,740-130-266- B-33
WB2WRP/2 (WB2s WRP ZPB) 30,100- 86-117- A-11
W2GGT (W2s GGT SDB) 12,900- 43-100- C- 7

Western New York

K2DJD 741,972-292-847- C-75
WB2YQH 708,936-271-872- C-55
WA2BYJ 524,706-217-806- C-64
WB2RXS 240,084-162-494- B-50
W2SNI 180,600-172-350- C-50
K2KNV 148,281-161-307- C-31
WB2VQG 131,274-143-306- C-32
WA2YCA 122,508-123-332- B-42
K2UNY 104,625- 93-375- C-46
W2FDI 72,885-113-215- C-21
W2QIP 40,629- 87-157- C-32
W2SSC 32,760- 91-120- C- 8
K2GXI 30,030- 65-155- C-12
W2ABV 22,620- 58-130- B-22
W2RPP 11,322- 51- 74- B-16
W2STM 10,754- 38- 95- B-16
W2UJ 8208- 48- 57- B-24
W2NZA 1650- 22- 25- C-
K1DIK/2 192- 8- 8- C- 1
WB2GJQ 168- 7- 8- C- 3

K9BJM 16,335- 55- 99- B-18
W9PFD 15,456- 56- 92- B-16
W9EVX 5406- 34- 53- A- 7
W9JJT 2622- 19- 46- C- 9
W9ISF 2400- 20- 40- B-27
K9KKX 352- 11- 11- B-30
K9YRA 48- 4- 4-AB-15
W9EXE (4 oprs.) 1,544,700-380-1355- C-96
W9LKJ (K9KDI, W9LKJ) 1,418,754-358-1321- C-95
K9PPJ (K9PPJ, WA9UFV) 700,944-272-859- C-47
W9BZW (W9s BZW GAZ) 652,743-273-797- C-65
WA9WXN (WA9s WAP WXN) 148,770-145-342- A-68
W9YYG (W9YYG, WA9QNU) 45,825- 65-235- C-20
W9YH (3 oprs.) 13,260- 60- 74- C-27

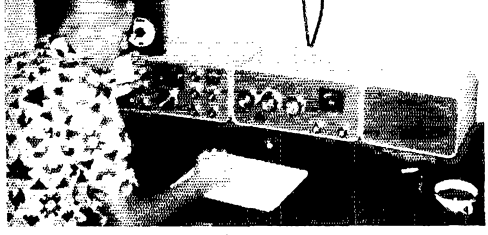
WØIJM 27,132- 76-119- B-17
WAØEPG 23,958- 66-121- A-33
WØFWN 22,344- 56-133- B-63
KØEKR 17,472- 64- 91- A-13
KØIJL 4116- 28- 49- A- 3
KØCNC (KØs CNC IJL) 43,596- 84-173-BC-

North Dakota

WØJWL 44,550- 90-165- B-30

South Dakota

WAØCPX 377,118-219-574- C-62
WØACT 241,902-178-453- C-59
WAØCPY 75,597-113-223- C-30
WAØOML 32,307- 89-121- C-70
WØWUU 90- 5- 6- B-
KØVVY (6 oprs.) 440,496-228-644-ABC-88



DELTA DIVISION

Arkansas

WA5EFN 440,370-233-630- C-64
WA5RTG 114,080-155-246- C-55
W5PBZ 30,960- 86-120- B-25

Louisiana

W5IOU 857,565-295-969- B-76
W5TXN 442,080-240-614- C-67
W5KC 271,920-206-440- C-35
W5NOP 58,824- 86-228- C-28
W5QWY 4879- 41- 41- C-15
W5WMU (K5YPS, W5WMU, WA5OIH) 776,628-282-918- C-88
K5YPS (K5s SNI YPS) 101,700-113-300- C-40

Mississippi

W5OER 122,031-149-273- C-32
K4ZDK/5 117,957-137-287- B-25
K5AEU 100,368-136-246- -
W5MUG 68,265-123-185- -
WA5TTG 8556- 46- 62- C- 7

Tennessee

W4NBV 606,040-278-727-AC-65
K4TTA 231,492-191-404- C-48
W4FCJ 93,324-154-202- B-24
W4EWR 53,550-102-175- C-23
W4OGG 28,080- 72-130- B-17
K4UWH 16,500- 50-110- A-15
WA4QPM 15,000- 50-100- C-14
W4LHE 5265- 39- 45- B- 6
K4YPX 5244- 38- 46- B-10
W4VSV (WA4ZZU, opr.) 4794- 34- 47-AC- 9
WB4IYZ 3483- 27- 43- A-11
W4ODR (10 oprs.) 712,332-282-842-ABC-96

GREAT LAKES DIVISION

Kentucky

K4RZK 151,209-159-317- C-41
K4FU 123,627-203-203- A-37
K4KI 28,359- 69-137- B-27
WA4LMD 15,312- 58- 88- C- 7
W4FIN 2553- 23- 37- C- 6
WB4DQM (5 oprs.) 7320- 40- 61-BC-24

Michigan

W8SH (K1ZND, opr.) 1,230,460-340-1207- C-85
K8HZU 794,802-278-953- C-70
W8TWA 521,676-258-674- C-85
W8DQL 191,070-165-386-AC-36
K8PAO 172,692-156-373-BC-50
W8HXZ 166,320-144-385- A-60
WA8ZDT 163,751-157-348- C-35
W8RXY 158,256-168-314- C-44
WA8OSL 155,958-139-374- B-30
WB8BLA 145,860-143-340- B-63
W8QQL 131,655-131-355- C-
K8UDJ 119,505-155-257- C-38
K8BGZ 102,180-131-260- C-
W8FRJ 47,571-101-157- C-28
WA8ZCO 44,226- 81-182- C-15
K8IDE 33,654- 71-158-AB-16
W8JJA 30,099- 79-127- C- 8
WB8BZG 16,758- 57- 98- B-19
WA8VVU 15,480- 60- 86- A-12
WB8CXW 14,220- 60- 79- C-19
WA8GGN 11,700- 52- 75- B-33
WA8ZZZ 10,656- 48- 74- -17
WB8CDG 10,620- 59- 60- B-13
W8MKO 7788- 44- 59-BC-23
K8ATU 5640- 40- 47-AB-
WB8BEG 4884- 37- 44- B- 9
W8EGR 4386- 34- 43-BC- 6
W8TWJ 1566- 18- 29- B- 3
WA8QJK 1368- 19- 24- A- 4
WA8ZAA 1368- 19- 24- A- 5
W8SS 1275- 17- 25- C- 4
WA8VZK 663- 13- 17- B-10
W8RVD 336- 8- 14- C- 1
WA8VRB 264- 8- 11- A- 1
WA8LYF (K8HLR, WA8s GUF LYF) 1,275,120-330-1288- C-82
W8NGO (4 oprs.) 915,474-307-994-BC-78

Ohio

K8DOC 664,008-292-758- C-
W8LXU 588,861-273-719-AB-62
W8GEG 450,192-226-664- C-36
K8AXG 355,284-213-556- B-61
W8IPA 354,855-205-577- C-70
W8BDO 322,890-235-453- C-96
K8CFH 304,128-192-528-AC-53
WA8MCR 216,999-171-423- C-25
W8ZOK 207,360-162-428- C-64
W8BVF 193,800-170-380- C-34
W8DKI 159,408-162-328- C-34
W8LAX 158,436-163-324- C-52
W8IR 157,785-157-335- C-58
W8BF 111,612-142-262- C-27
W8AQZ 109,752-136-269- C-45
K8GVK 104,910-130-269- B-
W8HQK 91,212-132-231- C-43
K8BSM 90,684-132-229- C-18
W8NPF 72,207-113-213- C-38
W8YGR 65,148-122-178- A- 8
W8OG 62,457-109-191- C-12
K8MMH 62,418-103-202- A-43
WA3BGE/8 58,656-104-188- C-16
W8KC 58,509- 99-197- C-19
WA8YXE 53,631-101-177- A-
W8GMX 41,820- 82-170- B-50
W8MBB 39,990- 86-155- C-26
W8AJW 39,342- 79-166- A-
W8WUO 35,334- 78-151-BC-15
W8YCP 34,122- 94-121- C-10
K8NMG 33,078- 74-149- B-24
W8RZG 26,196- 74-118- C-30
W8DWP 25,920- 72-120-AB-22
WB8APJ 21,228- 58-122-BC-15
W8GFH 19,092- 74- 86- C- 6
W8NCV 17,820- 60- 99-BC-30
W8BQV 16,653- 61- 91- B-17
W8QXQ 15,936- 64- 83- A- 5
W8KZO 12,852- 51- 84- C-28
W8ELB 11,880- 55- 72- A-24
WA8TYF 11,880- 44- 90- C- 6
WA8SLL 10,098- 51- 66- A-11
W8DZG 8100- 36- 75- A-18
W8IRG 7371- 39- 63- A-20
W8MJE 6960- 40- 58- C- 9
W8VZE 4182- 34- 41- A- 6
WB8BZX 3876- 34- 38- A- 9
K8PYD 468- 12- 13- B- 1
W8IDM 429- 11- 13- A- 4
W8CSK 126- 6- 7- A- 2
K8PXD 48- 4- 4- B- 1
WA8ZGC 36- 3- 4- B-
K8AMZ/8 12- 2- 2- B- 4
WA8UQH (K8RMK, WA8s SLW UQH) 250,800-176-475- C-46
WA8WHN (WA8s SIL WHN) 95,226-118-269- C-80

HUDSON DIVISION

Eastern New York

W2DXL 1,040,712-309-1130- C-84
WB2ZPW 236,328-172-458- A-40
WA2OJD 214,200-168-425-BC-31
WB2ZAV 185,574-157-394- B-40
K2JMY 100,500-125-268- C-23
WA2WYS 83,475-105-267-AB-28
WB2SIH 77,112-108-238- B-29
WB2MOI 70,200-104-225- C-37
W2AMM 58,464- 96-203- C-15
WA2TIF 31,200- 80-130- B-17
W2EFE 12,402- 39-106- B-11
WA2CAC 5145- 35- 49- B-12
WA2ECF 4284- 28- 51- A-13
WB2BXL 3150- 25- 42- A- 7
VE7BNE/W2 2366- 26- 31- B-16
K2KNL/2 546- 13- 14- A- 4
WB2ABJ (WB2s HEM UVD WHW) 175,560-154-380- -65

N. Y. C.-L. I.

WA2CMV 578,952-264-731- C-65
WB2UZU 542,340-276-655- C-56
W2SUC 505,008-252-668- C-60
WB2CKS 443,762-253-587- C-41
W2CP 311,022-222-467- C-60
W2FSK 273,465-177-515- C-69
W2WZ 266,295-205-433- C-41
W2DKM 248,472-174-476- A-50
WB2ZTH 226,284-173-436- A-59
W2PCJ 209,118-182-395- C-34
K2UQT 205,326-183-374- C-55

WAØEMS (WAØEMS, WNØTSI) takes over the Midwest Division leader spot for a multi-op entry. Larry (shown operating) with the assistance of Frank, WNØTSI as logger, made an impressive score of over 443K.

W2LEJ 146,700-150-326- B-46
WB2EXS 144,840-136-355- A-45
WB2YKU 144,738-129-374-AB-31
WA2QEB 51,294-103-166- A-60
W2IRV 32,412- 73-148- C-15
W2YCW 20,979- 63-111- C- 9
W2CKR 18,900- 50-126- B-27
W2UFS 18,792- 58-108- A-12
WB2WXR 14,400- 50- 96- A-20
W8IBX/2 10,486- 48- 72- B-
W2BNS 9159- 43- 71- A-18
W2NBI 5445- 33- 55- B-13
WB2TBP 4992- 32- 52- A- 7
W2ZPG 2160- 24- 30- A-26
W2JB 1500- 20- 25- A- 6
W2TUK 1449- 21- 23- C- 2
WB2ZIN 1104- 16- 23- A- 5
WA2FQG/2 (4 oprs.) 904,257-321-939-AC-96
W2YKQ (W2s BNS CZZ KGR) 630- 14- 15- C- 1

Northern New Jersey

W2JSX 710,424-286-828- C-80
W2MB 639,090-263-810- C-70
WB2CKB 220,941-167-441- B-48
W2YT 175,800-100-586- B-49
WA2VSQ 134,055-135-331- B-50
WA2DZU 68,478-101-226- B-50
W2ZZ 58,812-116-169- A-14
W2DMJ 45,318- 83-182- A-14
W2FFQ 25,149- 83-101-BC-23
W2CKK 16,020- 60- 89-BC-42
W2YFM 14,805- 47-105- B-17
WA2MYB 9504- 48- 66- A-18
W2SE 8160- 40- 68- C-30
W2UL 4725- 35- 45- A-14

F3VN/W2 4680- 30- 52- B- 5
WA2DFB 3300- 25- 44- A-28
WB2DYB 1848- 22- 28- B-10
WB2YBA 1080- 18- 20- C- 3
K2SKV 1026- 18- 19- C-
WA2HEJ 819- 13- 21- A- 9
WB2GPG 243- 9- 9- A- 3
WB2RKK 144- 6- 8- A- 1
WB2UDQ (WA2ATO, WB2UDQ) 649,152-276-784- C-69
W2GLQ (5 oprs.) 338,940-210-538- C-76
K2BMI (K2BMI, WA2DPT) 4851- 33- 49- A- 5

MIDWEST DIVISION

Iowa

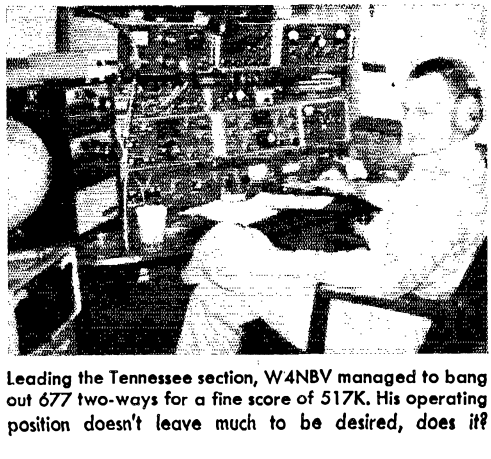
KØDQI 302,100-212-475- C-39
WAØSDC 121,635-153-265- B-19
KØIIR 11,100- 50- 74-BC-16
KØWSR/Ø 2880- 30- 32- B-18
WAØRXQ/Ø 2808- 26- 36- B-27
WAØPKE 2550- 25- 34- B- 9

Kansas

WØPAH 146,475-175-279- C-38
W9ECV/Ø 114,048- 96-396- C-48

Missouri

KØJPG 205,530-170-403- C-70
WØNZY 48,480-101-160-AC-15
KØGSV 38,916- 94-138- C-26
WAØTVC 37,120- 80-156- C-40
KØETY 30,336- 79-128- C-18
WØUCK 26,220- 76-115- C-30
WØBA 19,200- 64-100-AC-14



Leading the Tennessee section, W4NBV managed to bang out 677 two-ways for a fine score of 517K. His operating position doesn't leave much to be desired, does it?

WØDSW 13,932- 54- 86- A-15
WAØEMS (WAØEMS, WNØTSI) 443,445-235-631- C-52
WAØTKV (16 oprs.) 75,030-122-205- C-45

Nebraska

WAØLGR 257,232-184-466-ABC-60
WØIDW 152,712-168-303- C-47
WØYOY 16,356- 58- 94- B-14
KØQKW 11,250- 50- 75- C-24
KØLFA 3102- 22- 47- C- 7
WAØGVJ 390- 10- 13- A- 2

NEW ENGLAND DIVISION

Connecticut

K1THQ 1,082,952-312-1157- C-75
W1OKG 996,816-304-1093- C-89
K1JHX 773,430-254-1015- C-50
W1BIH 729,008-283-861- C-52
WA1DJG 579,880-280-691- A-58
K1GUD 290,832-166-584- C-32
K1VTM 282,308-178-529-AB-57
W1DO 229,272-164-466- C-36
W1ETU* 213,756-188-379-AC-30
K1DPB 212,394-182-389- B-42
W1CW* 164,268-117-468- C-
WA1IED 138,150-150-307- A-29
WA1IWD 93,456-132-236- A-60
W1ZUQ 32,250- 86-125- C-19
WA1HSB 31,824- 78-136- B-19
WA1FJU 30,573- 79-129- A-13
W1ICP* 27,729- 79-117- -
W1CNU 25,785- 45-191- B-16
W1DIT 18,600- 62-100- C-17
W1ARR* 9792- 48- 68- A- 6
WA1DIU (K3LSX, opr.) 4929- 31- 53-ABC- 9
W1YYM* 2760- 23- 40- C-
WA1JYU 2664- 24- 37- B-
WA1HNR 1794- 23- 26- A- 2
K1TKS 1296- 18- 24- A- 7
WA1KQM/1* 1020- 17- 20- B- 4
W1LVQ* 462- 11- 14- -
WA1CJE (WA1s CJE JAD) 204,768-158-432- A-25
WA9HHH/1* (WA1KQM, WA9HHH) 30,480- 80-127-BC-18

Eastern Massachusetts

W1AX 1,205,820-348-1155- C-65
W9MIJ/1 467,670-238-655- C-66
W1UYU 165,375-147-375- B-59
W1EHT 119,520-120-332- B-29
W1MO 47,736-102-156- B-18
K1DIR 41,160- 98-140- C- 7
K1AGB 27,432- 72-127- A-17
W1FJJ 24,624- 72-114- C-10
W1ESN 21,900- 73-100- C-15
WA1LXL 21,018- 62-113- B-14
WA1FHU 20,001- 59-113- C-14
W1EJE 16,968- 56-101- A-12
W1CT 12,654- 57- 74- C-19
W1PLJ 5445- 33- 55- B-18
WA1ION 4788- 38- 42- A- 6
KH6IJ/1 1914- 22- 29- A- 8
K1CSJ (K1CSJ, W1FSJ) 127,305-115-369- C-40

Maine

K1GAX 199,260-180-369- C-40
W1PCD 142,308-134-354- C-53
W1MFK 41,280- 86-160- B-32
W1JD 18,192- 48-127- A-42

New Hampshire

K1UHY 309,342-218-473- C-38
W1PYM 214,728-184-389-AC-41
W1FZ 202,104-168-401- C-
W1KJL 111,438-123-302- C-38
W1IXL 33,441- 71-157- C-14
W1DXB 1008- 16- 21- A- 4
W1ET (K1YKT, WA9WKO) 41,454- 98-141-AC-20

Rhode Island

W1YRC 425,820-235-604- C-46
K1IKN 415,380-230-602-AC-62
KØDQI/1 201,438-186-361-ABC-28
WA1IJC 107,463-113-317- B-45
W1RFQ 87,526-107-274- B-22
K1HMO 72,186-106-227- B-25
W1AWE 37,044- 84-147- -
K1UKC 9675- 43- 75- A-16
W1FEO 1581- 17- 31- A- 9

Vermont

WA1IHN 946,608-296-1066- B-68

Western Massachusetts

W1RF 150,052-161-314- C-27
WA1FBX 39,831- 71-187- A-35
WA1ABW 17,316- 52-111- A- 7
W1HRV 3024- 28- 36- B- 5
W1YK (K1TKS, WA1ABW) 239,190-170-469- A-27

NORTHWESTERN DIVISION

Idaho

W7DV 89,358-106-281- C-28
WA7HOX 31,563- 63-167- A-21
W7KK 2448- 24- 34- C- 5

Montana

W7EOI 116,820-132-295- C-45
K7CTI 12,600- 50- 84- A-10
WAØATY/7 330- 10- 11- B- 6

Oregon

WA7IHN 12,978- 42-103- A-36
W7YEX 11,088- 48- 77- B-12

Washington

W7BJ 165,480-120-460- C-63
W7MSI 146,280-115-424- C-54
WA7JCB 23,088- 52-148- A-21
WA7JRY 12,720- 53- 80- A-22
W7VRO 10,098- 33-102- C- 9
WA7GYR 1170- 13- 30- B- 5

PACIFIC DIVISION

East Bay

K6AHV 1,239,672-314-1340- C-82
K6AUC 349,332-172-677- C-
WA6AHF 147,396-142-346- C-28
K6MHD 31,500- 70-150- C-17
WA6IQM 7752- 34- 76- C- 5
W6IAM 7344- 34- 72- C-18
W6EJA 150- 5- 10- C- 1
K6AN (K6AN, W6s RGG VNH) 962,631-303-1059- C-94
WA6UFW (W6BH, WA6s IQM UFW) 821,340-270-1014- C-90
W6KG (W6s DOD KG) 573,306-214-893- C-36
K6ILG (5 oprs.) 374,574-163-766- C-48

Nevada

W7TZL 157,687-137-387- C-50
W7GVA 11,421- 47- 81- C-13
K7TLB 6549- 37- 59- A-26
W7TVF 3444- 28- 41- A- 9

Sacramento Valley

W6SIA 125,424-134-312- B-32
W6KNR 16,287- 61- 89- C-18
WA6JDT 1566- 18- 29- A- 9

San Francisco

W6PTS 276,960-160-577- C-48
WA6CPY 83,592- 86-324- C-30
W6ERS 8040- 40- 67- B-25
WB6YMW 3294- 27- 41- B-14
W6BIP (W6BIP, WA6DJI) 287,271-177-541- C-37

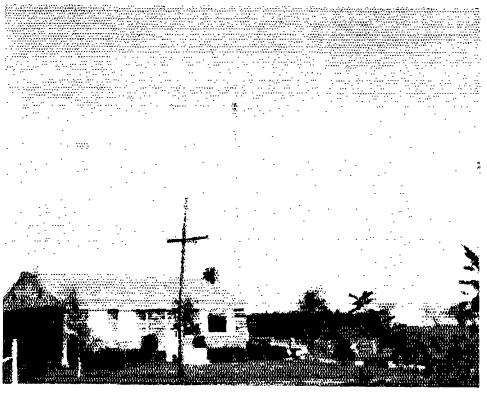
San Joaquin Valley

W6JPC 185,328-144-429- C-35
WA6MMH 5376- 32- 56- B-17

Santa Clara Valley

W6ESI 313,110-245-426- C-60
WA6BKN 309,870-165-626- B-70
W6ISQ 249,900-175-476- C-33
K6TXR 219,294-186-393- C-56
W6NTQ 202,623-137-493- C-42
WB6CCV 192,708-159-404- C-43
K6PIH 177,708-118-502- C-40
K6ITL 177,165-155-381- A-49
W6ZBS 120,060-145-276- B-57
W6EBO 73,509-107-229- C-40
W6ZM 72,600-110-220- C-
K6ALH/6 65,508-106-206- C-22
W6BHH 54,900-100-183- C-21
W6WX 50,400-105-160- C-17
W6VK 31,416- 84-139- B-19
K6UXV 21,777- 61-119- B-27
W6AOI 19,008- 48-132- C-17
W6EJ 16,929- 57- 99- C-20
W6HPG 11,250- 50- 75- C- 6
W6ZKM 10,455- 41- 85- C-11
WA6BVY 10,206- 42- 81- B-40
W6MVL/6 5832- 36- 54- B-10
K6DC 4158- 33- 42- C- 3

YU1BCD, multi-op c.w. group from Pancevo, managed an excellent 2146 QSOs for a score of just over 1.1 million. Shown at the operating position are from left to right, YU1s NGX, BCD, NQW, QBC and NQM. The Radio Club "M. Pupin" QTH sports a 2-element tri-band quad which does an excellent job judging from the many awards seen on the wall.



Claude, VE3WQ, paced Canadian phone entries with a score of 578K, quite sufficient for Canadian Division leadership. He comments that he learned a lot in this contest and is hoping to improve his score next year.

W6KHS 2850- 25- 38- C- 3
WB6UOM 2688- 28- 32- A-10
K6AO 2448- 24- 34- C-16
W6CLM 2337- 19- 41- C-11
WB6ZHD 2250- 15- 50-AB-10
W6GBY 1248- 16- 26- B-23
K6TZX 1200- 16- 25- A- 5
K4BVD/6 (7 oprs.)
1,807,056-356-1692- C-96
K6ERV** 260,100-170-510- C-45
K6CQF** 250,101-177-471- C-48
W6JKJ** 205,275-161-425- C-41

ROANOKE DIVISION

North Carolina

WA4UXU 337,980-215-524- A-90
K4HJE 285,168-208-457- C-70
W4TMR 147,840-154-333-AB-57
K4AJR 140,553-161-291- C-27
K4SKI 125,598-121-346- C-32
WB4EEM 105,501-139-253- B-37
W4BQY 42,120-104-135- C-14
K4BBK/4 41,223- 91-151- C-11
W4OMW 17,568- 61- 96- C-17
W4WWD 8844- 44- 67- C-14
WB4IRD 3948- 28- 47- B- 5
K4CIA 3108- 28- 37- C- 4
W4YDY 2697- 29- 31- C- 4
W4VON 1170- 18- 22- C- 6
WB4MHF 810- 15- 18- B- 4

South Carolina

K4II 557,109-259-717- C-72
WØDAD/4 112,665-145-259- C-20
K6QPH/4 38,916- 94-138- C-18
WB4CPE 30,600- 68-150- A-18
K4AVU 2142- 21- 34- C- 4
WB4GGA 1920- 20- 32- B-18
W4ULY 1848- 22- 28- A- 7

Virginia

W4BVV 1,751,718-362-1613-AC-74
W4SYL 865,536-322-896- C-66
W4ZCY 815,648-284-958-BC-64
W4NJF 407,517-233-583- C-62
W4DFK 369,900-225-548- C-66
W4EZ 312,000-200-520-AC-42
W4VAN 301,735-185-545- C-58
W4OPM 286,272-192-497- C-36
W4WSF 218,241-177-411- B-40
WB4LEH 145,545-155-313- C-60
W4DM 141,570-143-330- C-20
K4PCL 105,096-116-302- C-34
W4LRN 91,884-124-247- C-16
W4CRW 91,728- 91-336- A-50
W4JVU 88,893-119-249- C-48
K4ZA 81,900-130-210- A-24
W4WBC 80,724-124-217- C-30
W4ZM 64,872-102-212- C- 8
W4GF 60,795-105-193- B-19
W4FPW 58,080-110-176- B-24
K4CFB 57,036- 98-194- C-22
W4ZMH 48,336- 76-212- -
W4IUO 33,741- 69-163- C-18
W4IF 29,304- 74-132- B-60
WB4HNV 27,144- 87-104- C-15
WB4AMT 23,562- 66-119- C-16
W4KMS 22,638- 77- 98-BC-14
W4YHD 20,646- 62-111-AC- 5
K4ORQ 7980- 38- 70- C- 4
W4EXI 3567- 29- 41- B-11
K4CG (7 oprs.)
1,574,640-360-1458- C-90
W4KFC (K4OKZ, W4KFC)
422,688-224-629-BC-46

West Virginia

K8YBU 1,013,760-320-1056- C-91
K8QYG 83,490-121-230- B-40
WA8VLM 5781- 41- 47-BC-
W8BJ 3876- 34- 38- B-30

ROCKY MOUNTAIN DIVISION

Colorado

WAØGUH 114,540-115-332- A-52
WAØTAM 25,773- 71-121- B-48
WAØNOS 20,679- 61-113- B-19
W4UDS/Ø 1242- 18- 23- A- 8
WAØCVS/Ø 1083- 19- 19- C- 2

New Mexico

W5EU 433,528-188-770- C-52
K5FHL (WA5VPY, opr.)
260,568-154-566- B-78
K5STL 47,586-103-154- B-30
W5QLC 24,948- 54-154-AC-26
W5QNY 21,420- 68-105- A-30
WA5ROU 4896- 34- 48- A-16
W5QNQ 1701- 21- 27- A- 7
WA5VAL 1152- 16- 24- A-20

Utah

K9LBQ/7 399,984-208-641-BC-36
W7HS 270,000-180-500-AC-65
WA7GQA 76,320-106-240- C-30
WA7DTG 31,688- 58-182- A-26
K7RAJ (K7s NXH RAJ)
720,900-267-900- B-88

SOUTHEASTERN DIVISION

Alabama

W4ZNI 354,034-229-516- C-70
WB4HJN 48,825- 93-175- B-28
K4DV 12,027- 57- 71- C-16
K4DOY 11,457- 57- 67- B-19
W4FVY 11,094- 43- 86- B- 6
W4GRG 5922- 42- 47- C- 4
W4WJV 816- 16- 17- B- 4
WB4EOW 363- 11- 11- A- 5

Eastern Florida

WB4DJQ 377,955-227-555-AC-58
W4ORT 289,152-192-502- A-76
W4AZK 225,720-190-396- C-33
W4LVV 213,920-191-375- C-
WA4NYJ 146,716-172-285- C-34
WA4IIO 140,688-144-327-BC-44
W4GZD 126,567-147-287- B-70
WA4LFP 108,585-127-285- B-35
W4NPE 84,864-104-272-BC-49
WB4IAE 74,580-110-226- A-30
WA4UFW/4
72,072-104-231- A-19
W4BYB 64,239-133-161- B-
WB4JSV 53,280-111-160-BC-32
W4FFF 42,021- 87-161- C-16
W2FCR/4 40,890- 94-145- A-26
W4UF 23,214- 73-106-BC-12
W4ONO 14,880- 62- 80-BC-17
W4GHV 1500- 20- 25- A- 6
W4EEO 300- 10- 10- A- 5
W4HOS (K4SHB, W4HOS)
195,300-175-372- B-56
WB4LFV (K4TRH, WB4LFV)
28,500- 76-125-AC-25

Georgia

K4EZ 646,098-257-838- C-62
W4DXI 282,600-200-472- C-65
W4DQD 161,370-163-330- A-44
K4HMX 41,499- 87-159- B-20
K4VUD/4 21,630- 70-103- B-22
WA4QPL (7 oprs.)
385,065-215-597- A-92

Western Florida

K4OSE 265,221-209-423- C-28
WB4JCV 214,896-176-407- C-56
WA7JAN/4 64,995-105-207- B-35
W4YWV 63,525- 77-275- C-42
8R1Y/W4 9308- 52- 61- A-29

SOUTHWESTERN DIVISION

Arizona

W7AYY 350,175-175-667- C-61
WA7GFT 341,715-209-545-BC-42
W7FF 157,942-157-337-AC-58
W7UDG 89,586-126-237- A-24
W7FCD 62,727- 87-241- A-22
WA7DRG 32,886- 63-174- A-22
W7GKV 32,361- 67-161- A-16
WA7HRE 5760- 40- 48-BC-22
WA7ISP 2553- 23- 37- B- 9
W7AUN 165- 5- 11- B- 2

Los Angeles

W6RR 1,976,156-364-1816- C-84
W6NJU (K9ZMS, opr.)
1,036,308-292-1183- C-
W6DGH 625,986-249-838- C-65
WA6ZCO 344,448-184-624- C-76
K6SVL 316,064-166-651- B-72
W6EJJ 183,219-157-389- C-70
K6IPV 162,702-138-393- B-75
WB6WIT 121,539-127-319- C-36
WB6URS 117,150-142-275-AC-36
K6EV 116,508-133-292-BC-39
K6YRA 114,492-116-329- C-31
W6CS 110,400-160-230-BC-28
W6QY 107,892-148-243- C-29
W6UED 83,100-100-277- C-60
W6RCV 71,289- 89-267- C-39
WB6FRD 70,983- 99-239-AC-16
W6JKR 62,292-116-179- C-25
K6MP 58,752-102-192- C-25
WB6SAZ/6 46,224- 72-214- B-16
W6WLH 44,361- 93-159- C-
K6BEP 38,076- 76-167- B-
K6YFZ 31,356- 78-134- C-22
K6OC 20,242- 58-117-BC-21
W6NWQ 20,184- 58-116- C-22
WB6ZHT 2808- 26- 36-AB-80
WA6JAN 1320- 20- 22- A- 2
W6ECM 12- 2- 2- B- 1
W6UUI (7 oprs.)
686,616-244-938- C-
WB6VFJ (4 oprs.)
356,400-180-660-BC-71

Orange

WB6UDC 698,112-256-909- C-80
K6CH 146,124-132-369- C-25
WB6LMN 108,300-100-361- B-68
W6YMV 106,080-136-260- C-24
WA6FIT 26,622- 58-153- A-40
WA7FHD/6
26,622- 58-153- A-24
K6YNB 19,800- 60-110- C- 8
WB6YWQ 11,424- 51- 78- B-21
K6UYC (6 oprs.)
1,577,829-349-1507- C-90
WB6FCR (WB6s FCR RQM)
160,545-139-385- B-48

San Diego

W6QJW 866,700-270-1070- C-79
WB6GGI 110,094-118-311- B-56
W6ISA (15 oprs.)
1,932,255-351-1835- C-96

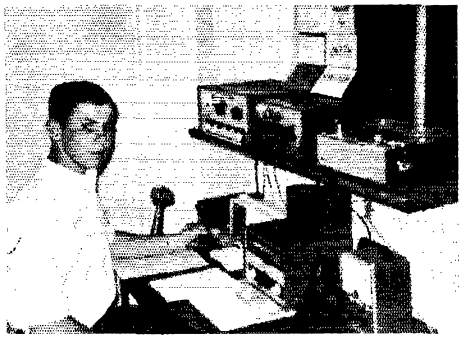
Santa Barbara

W6TA 124,752-138-302- C-40
W6GRX 79,968-112-238- C-36
W6GEB 9594- 41- 78- A-10
WB6WKC 1275- 17- 25- A- 7

WEST GULF DIVISION

Northern Texas

W5KTR
1,133,560-340-1112- C-81
W5OGS 821,712-304-901- C-88
WA5RXT 388,596-212-611-BC-60
W5EQT 301,500-201-508- C-37
WA5LUM 237,864-187-424- A-57
WA5SGD 176,472-152-387- C-60
W5OBS 163,620-180-303-AC-38
W5QZO 86,198-131-220-BC-25
W5KYD 79,055- 97-273- C-39
W5FCX 64,419-109-197- C-13
WA5VSL 56,430-110-171-BC-51
WA5QEU 53,106-106-167- B-55
K5MFA 17,160- 65- 88- C-30
W5HDD 14,400- 60- 80- B-17
WA5UCT 8004- 46- 58- A-24
W5OHE 7560- 36- 70- B-12
WA5TET 6642- 41- 54- B-11
W5KND 3225- 25- 43- B-19
W5QGZ 675- 13- 15- A- 3
W5MSG 507- 13- 13- A- 5
WA5PPZ 27- 3- 3- B- 1
W5FL (W5s FL OPZ)
398,663-233-571- C-55
W5TKB (W5s EQT TKB)
179,829-159-377- C-23



One of many Southern California entries, here's WB6ZHT operating from San Pedro. From the cards on his wall my guess is that Bill's DX6OB puts out a nice signal.

Oklahoma

K5BOC 506,160-240-703- C-63
WA5LOB 480,822-254-631- C-56
W5PAA (7 oprs.)
9555- 49- 65-AC-16

Southern Texas

W5NMA 817,749-279-977- C-70
W5MHV 191,520-168-380- C-60
W5LZZ 70,920-120-197- B-27
W5LJT 59,940-108-185- C-24
WA5AUZ 31,395- 91-115-BC-16
W5OP 17,199- 63- 91- C-21
W5ULN 14,514- 59- 82- A-20
W5ELN 14,160- 59- 80- A-50
K2EIU/5 12,921- 59- 73-AB- 7
W5EDX 10,472- 56- 64- B-30
W5RO 8190- 39- 70-BC-23
WA5SXR 2511- 27- 33-BC- 7
W5AC (WB2HEY, WA4ARV, K5SBR)
782,040-280-931-BC-93

CANADIAN DIVISION

Maritime

VO1AW 61,824- 92-224- C-18
VO1DC 23,100- 50-154- B-14
VE1EK 16,200- 50-108- A-12
VO1CM 3528- 28- 42- B-
VE1AHK (VE1s ACU ASJ DH)
552,486-242-761-AB-36

Quebec

VE2NV 551,286-249-738-AC-60
VE2WA 459,516-257-596- C-
VE2WY 380,196-236-537- C-46
VE2AYU 378,684-201-628-ABC-69
VE2YU 306,327-203-503- A-52
VE2BV 274,034-181-508- B-49
VE2BGJ 226,746-171-442- C-48
VE2AJV 115,311-113-289- A-
VE2DCX 78,921-111-237- B-32
VE2AJ 9984- 52- 64- B-
VE2BTQ 405- 9- 15- B- 3
VE2BJ 270- 9- 10- B- 5

Ontario

VE3WQ 578,340-255-756- C-69
VE3HJ 177,833-163-367- C-46
VE3BMB 99,225-135-245- B-36
VE3BS 20,160- 80- 84- B-10
VE3FGV 6450- 43- 50- A-19
VE3ALF 2296- 28- 28-BC-16
VE3BWL 1500- 20- 25-BC- 8
VE3FHO (VE3s EUC FHO GCO)
1,580,302-367-1436- C-93
VE3CFP (2 oprs.)
25,149- 83-101-AC-25

Manitoba

VE4FU 237,540-185-428- B-50
VE4SD 136,359-139-328- B-58
VE4MP 127,140-163-260- B-54
VE4ZX 89,352-136-219- C-
VE4SK 53,631- 59-303- B-20
VE4RP 37,947- 91-145- C-50
VE4AS 28,290- 69-138- B-36
VE4BJ 21,165- 83- 85- B-26
VE4CJ 147- 7- 7- B- 3

Alberta

VE6GN 193,167-169-381- A-50
VE6AP 151,302-151-334- B-55
W8ILH/VE6
120,663-123-327-ABC-52
VE6AGV 99,534-106-313- A-44
VE6GB 24,480- 68-120- A-35
VE6MJ 675- 15- 15-BC- 3
VE6AVR (VE6s AED AVR)
57,321- 99-193-AB-41

British Columbia

VE7EH 89,760-110-272- C-46
VE7BQF 45,123- 89-169- B-23
VE7IQ 32,565- 65-171- C-39
VE7VP 2808- 24- 39- B-27
VE7AZG 1776- 16- 37- A-18
Check logs: W1FK, W2s CVW EGI, WB2SIH, K3CBW, W3TP, KØYWG/4, K6s AUC JXH, W6CFG, WA9AQE, VE3CEA, VE5KK, VE7AAA, VO1HI.

PHONE SCORES

AFRICA

Angola

CR6GA 1,475,508-164-2999- C-86
CR6GM
1,023,630-149-2290- A-49
CR6LX 259,257- 89-971- B-
CR6GS 145,152- 96-504- B-26

Mozambique

CR7DS 640,563-141-1515- A-
Check log: CR7s FR JQ.

Liberia

EL2BD 995,788-173-1919- C-60

Ethiopia

ET3USA (7 oprs.)
478,952-137-1166- A-30

Ascension Island

ZD8Z 4,116,735-245-5820- A-60

Rhodesia

ZE8JY 128,898- 93-464- A-22

South Africa

ZS6DW 1,674,768-184-3034- B-
ZS6ACK 290,719-107-906- A-24
ZS6FN 150,246-102-491- A-10
Check log: ZS6YB.

Southwest Africa

ZS3S 405,384- 48-1016- B-

Libya

5A4TY (2 oprs.)
16,422- 46-119- B- 7

Tanganyika

5H3KJ 1,081,920-160-2349- A-45

Lesotho

7P8AR 1,690,854-187-3014- A-51

Saudi Arabia

7Z3AB 95,976- 62-516- B-

ASIA

Iran

EP3AM 656,466-142-1541- B-48
EP2BQ 224,334-103-726- B-18

Korea

HL9KQ 86,130- 66-435- B-29

Japan

JA1AEA
1,487,808-192-2595- C-
KA2RM
1,300,266-198-2189- C-58
JA1CG 560,945-155-1207- A-
JA1DXE 389,628-137-948- A-
JA3LGG 185,490- 90-687- A-26
JA1IZZ 116,130- 79-491- A-22
JH1CBI 79,395- 79-335- A-12
JA2JAA 75,600- 72-350- B-
JA7FGA 58,830- 53-374- A-
JA7ERJ 32,292- 46-234- A-
JA2BVZ 32,058- 39-274- A-
JA6AFL 29,832- 44-226- A-
JA2WZ 29,069- 41-237- A-
JA4ERX 28,200- 47-200- A-15
JA8EKU 15,390- 38-135- A-
JA7GDW 14,926- 34-147- A-
JA2HGA 7614- 27- 97- A-
JA2FJP 5652- 12-157- A-
JA2ITH 5400- 25- 75- A-
JA7EDM 4731- 19- 83- A-14
JA1JHF 4425- 25- 59- A-
JA1SKE 2873- 17- 57- A-
JA8SQ 990- 11- 30- B-
JA8FBM 552- 8- 25- A-
JAØBXU 145- 5- 10- A-
JAØANO 6- 1- 2- A-
KA9MF (10 oprs.)
1,000,890-165-2022-BC-90
KA7CW (4 oprs.)
368,550-126-975- C-72

Ryukyu Islands

KR6NR 43,524- 54-269- C-

Lebanon

OD5BA 20,952- 54-131- A- 9

Asiatic Russian S.F.S.R.

UA9FU 22,260- 35-212- B-
UV9PP 12- 2- 2- A-
UA9KAI (4 oprs.)
195,048- 54-1204- A-

Syria

YK1AA 3504- 16- 73- B-10

Israel

4Z4HF 88,306- 67-469- B-13
4Z4AG 5126- 22- 78- A- 3

EUROPE

Portugal

CT1BH 1,449,819-189-2557- B-
CT1MO (CT1s MO TD)
23,822- 43-186-AB- 8

Azores

CT2AT 1,142,854-194-2018-AB-39

Germany

DL4QQ 1,449,726-183-2641- B-
DL4AP 976,440-158-2060- B-
DJ5GI 803,773-151-1775- C-
DL4QP 351,480-116-1010- B-27
DL2JO 179,118- 93-642- C-20
DL7LJ 81,000- 40-675- B-22
DL6WE 79,044- 42-628- A-
DJ6WX 44,415- 35-449- A-
DL8MY 25,575- 55-157- B-16
DJ4WN 22,089- 37-199- C- 3
DL2QB 21,195- 45-157-AB- 6
DL6WD 8400- 28-102- B-
DM2ARE 2737- 17- 60- A-
DL4USN (4 oprs.)
1,384,944-172-2684- B-75
DL4FS (DL4s ER FS)
675,567-131-1779- B-36
Check log: DJØTA.

Spain

EA1FD 819,060-170-1611- B-60
EA3QW 351,000-125-936- A-
EA1IY 139,590- 47-990- B-33

France

F3KW 1,419,744-184-2572- B-
F9RM 117,180- 93-420- A-
F2JE 38,001- 53-239- A-
F5OJ (5 oprs.)
1,408,850-190-2478- A-
Check log: F5PW.

England

G3IAR 1,262,608-184-2296- B-77
G2QT 1,156,263-193-1997- A-62
G3WTV 576,232-136-1413- B-43
G3XYP 342,468-126-906- B-
G3KMA 259,584-104-832- A-
G3UQR 169,905- 47-1205- B-23
G3COJ 18,585- 35-177- A-
G3JOC (G3s IOR JOC LDT MPN)
2,680,509-221-4055- B-90
Check log: G3XQP.

Wales

GW3NWV
1,122,407-167-2241- B-43

Hungary

HA5CQ 68,688- 72-318- A-
HA5AM 30,240- 40-252- B-
HA3MB 18,816- 49-129- A-

Switzerland

HB9QD 59,469- 43-461- B-
HB9UD 3150- 25- 42- B-

Italy

I1BAF 1,778,319-197-3009- B-70
I1FLD 1,473,155-185-2656- B-
I1MOL 898,392-164-1826- B-48
I1BBZ 160,170- 95-562- A-
I1BH 44,775- 45-332- A-
I1TAE (5 oprs.)
2,765,070-210-4389- B-90
I1CZW (I1s AJ CZW)
1,307,766-178-2449- B-70
I1DFE (4 oprs.)
220,185-105-699- B-30

Jan Mayen

JX3P (4 oprs.)
160,734- 86-623- A-36

Norway

LAØAD 1,382,832-194-2395- B-38
LA8RL 74,088- 72-343- A-
LA3K 26,640- 37-240- A-
LA4ZB 22,722- 42-183- A-13
LA4AF 12,540- 38-110- A-13
LA3BG 7308- 29- 84- B-
Check logs: LAs 1YM 4R and 9OI.

Bulgaria

LZ1KAA (2 oprs.) 1170- 15- 26- B-

Austria

OE2EGL 746,976-124-2008- A-36

Finland

OH4RH 54,000- 72-253- B-
OH5VT 10,656- 32-112- B-
OH8OW 5808- 24- 81- B-
OH2BHU 3120- 20- 52- A-
OH5UX (OH5s QX UX UY) 138,471-101-457- B-
Check log: OH5SM.

Aland Islands

OHØNI 305,424-126-808- B-
OHØNJ 540- 10- 18- B- 4

Czechoslovakia

OK1AGQ 94,764- 53-596- B-
OK2DB 19,116- 27-236- A-

Belgium

ON5GQ 677,820-158-1430- A-
ON5MG 664,242-149-1553- A-
ON4XG 441,750-125-1178- B-31

Denmark

OZ1LO 1,249,305-185-2251- B-80
OZ1RH 816,141-163-1670- C-
OZ7X 617,580-141-1460- A-
OZ3KE 129,360- 88-490-AB-18
OZ4IA 41,004- 68-201- A-15
OZ7HM 6048- 12-168- A-
OZ7DX 1632- 16- 34- A-
OZ4H 1134- 14- 27- A-
Check logs: OZs 1CZ 2LW and 5KF.

Netherlands

PAØNV 45,630- 65-234- B-

Sweden

SM5EAC 1,169,049-179-2177- B-51
SM6CKU 1,001,091-193-1729- B-27
SM5CAK 212,787-111-639- B-
SM5GA 75,945- 83-312- B-13
SM5FC 69,498- 78-297- B-
SM7ALA 32,154- 46-239- A-
SM2COL 1539- 19- 27- B-
SMØBDS 1488- 16- 31- A-
SM2CSA 231- 7- 11- A-
SK6AB (6 oprs.) 2,824,038-217-4339- B-
SK3BP (4 oprs.) 510,825-147-1160- B-
Check logs: SMs 4DPB 5CFH and 5DQG.

Poland

SP5CJT 144,780- 95-508- A-
SP3PL 68,328- 78-292- B-

European Russian S.F.S.R.

UA1WW 299,766- 94-1063- B-
UA1CS 84,624- 48-591- B-
UW3BV 53,721- 47-382- A-
UA4KHW 34,916- 58-202- B-3
UA4QM 9984- 32-107- B-
UW6LC 3612- 28-129- A-
UA1IG 1014- 13- 26- B-
UA3KOB 165- 5- 11- B-
UA1KBB (2 oprs.) 11,414- 26-147- B-12
heck logs: UAs 3DB 3FF 4SH, UVCFD.

Kaliningrad

UA2KBD (5 oprs.) 259,170-106-815- B-

Ukraine

UT5KTH 44,415- 45-333- A-
UB5KIW 28,602- 42-229- A-
UT5LY 4836- 26- 62- A-

Georgia

UF6CW 1215- 15- 27- B-

Lithuania

UP2WN 648- 9- 24- A-

Estonia

UR2OV 12,180- 29-140- A-

Rumania

YO3ZM 1078- 14- 26- A-

Yugoslavia

YU1BCD (YU1QBC, opr.) 838,584-152-2011- B-50
YU3EY (YU3s EY TBM) 800,028-142-2075- A-65

NORTH AMERICA

Guadeloupe

FG7XL 2,035,870-163-4166- B-68

St. Pierre & Miquelon Is.

FP8AP 66,378- 37- 598- A-

Dominican Republic

HI8XRM 2,732,975-245-3722-AC-50

Panama

HP1JC 1,619,352-252-2142-AB-43

Alaska

KL7WAH 684,930-158-1445- C-14
K4KLC/KL7 221,628- 92- 803- B-
W3UEQ/KL7 3195- 15- 71- B- 2
Check log; KL7GJX

Puerto Rico

KP4AN 287,679-133- 721-AB-16

Virgin Islands

KV4FZ 5,927,589-303-6521- B-63

Canal Zone

KZ5NF 2,062,710-205-3354-AC-33

Greenland

OX3KM 164,115-105- 521- B-24

Sint Maarten

PJ7JC 1,264,368-212-1988- B-33

Iceland

TF2WLM 47,850- 58- 275- B-

Costa Rica

TI2PAS 13,230- 35- 126- B-

Bermuda Islands

VE3BS/VP9 623,720-155-1342- A-26

VP9MI 345,060-108-1065- B-23
WB2NCS/VP9 59,386- 46- 439- A-16

Mexico

XE1WS 3,754,976-271-4619- B-55
XE1LLS 2,336,605-235-3318- B-

Nicaragua

YN1GLB 1,742,760-206-2820- B-
YN1HF 69,296- 71- 326- B-

Jamaica

6YØA (11 oprs.) 4,719,114-281-5598-AB-96
6Y5AK (2 oprs.) 1584- 16- 33- B- 1
6Y5LA (2 oprs.) 936- 12- 26- A- 1

Barbados

8P6CV 8748- 12- 243- A- 5

Trinidad

9Y4KK 291,084-127- 764- B-12

OCEANIA

Philippine Islands

DU1ZAG 546,558-142-1283- C-26

Fr. Oceania

FO8BS 342,519-127- 899- C-

Hawaii

KH6GPQ 3,587,034-253-4726- B-60
KH6BZF 2,431,395-213-3805- C-65
KH6GQB 461,472-152-1012- B-

Marshall Islands

KX6FJ 896,952-152-1967- C-29
KX6GS 619,084-148-1398- B-27

Australia

VK2FU (VK2FZ, opr.) 2,103,015-235-2983- B-
VK3QV 39,648- 59- 224- A-10
VK4UA 23,436- 36- 217- A-

Papua Territory

VK9RY 1254- 11- 38- B-

Macquarie Island

VKØKJ 93,018- 74- 419- B-

Heard Island

VKØWR 26,676- 36- 247- B-

Fiji Islands

VR2DK 1008- 8- 42- A- 2

Indonesia

YBØAAB 236,037-101- 779- B-21

New Zealand

ZL1HW 720,168-148-1622- B-
ZL1AGO 675,804-199-1132- A-

Western Samoa

5W1AR 342,630-135-846- A-24

SOUTH AMERICA

Bolivia

CP1HW 1,215,864-156-2598- B-49

Uruguay

CX2CN 242,676-107- 756- A-
CX1JM 26,028- 36-241- B-

Ecuador

HC1TH 4,677,981-263-5931-BC-70
HC1WZ 92,520- 90- 343- B- 6

Colombia

HK3WO 2,418,000-250-3224- B-

Argentina

LU8DKA 1,523,040-160-3173- -
LU2FAO 53,016- 47- 376- B-11
LU6EAR 39,690- 42- 315- B-10

Peru

OA6BU 914,550-182-1675- C-27
OA4YW 269,985-123- 732-AC-10
OA4BS 43,172- 43- 335- C- 8

Brazil

PY7ASQ 1,161,940-130-2980- B-34
PY4KL 641,691-141-1517- B-
PY7VKZ 279,756-114-818- B-15
PY1BAR 241,360-112-756- B-30
PY1CHP 134,850- 93-485- B-26
PY2BGO 48,240- 67-240- B- 7
PY2PH 23,850- 53-150- B- 6
Check log: PY7VJS.

Surinam

PZ1CK 362,739-131- 923- B-32

Venezuela

WA3HXR/YV5 1,460,925-215-2265- C-44
YV7AV 967,356-156-2067- B-40
YV5CGT/YV3 964,956-194-1658- B-35
YV5BPG 220,966-134- 550-BC-10
Check logs: YV1SA, K4PHY/YV5.

Guyana

8R1G 1,595,901-229-2340- A-52

Shown left to right are the gang at ET3USA. Jerry, W4EJP; Dick, WA7LIP and Rosie his XYL; Marguerite, XYL of Milt, W4DIW shown seated at the 14/21 MHz. position; and Danny, WA5UKR. Their contest effort this year netted them the envied title of Africa Continental Champion, both c.w. and phone, for a multi-op entry.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY GEORGE HART,* W1NJM

Let's Stick To Communicating

It often seems that some amateurs will do almost anything to get away from the humdrum, everyday activities of a communicator. What is a communicator? In our application, it is one who performs communication on behalf of a third party. *We* don't originate the communications; all we do is pass along the communications originated by others, in as close fidelity as possible to the original communication.

But many amateurs apparently don't see it this way. They are thinking, perceiving, intelligent human beings who want to be aware of what the communication is about, what it portends, what significance it has, and who want to see the results and effects of it. They are not machines, or automatons who merely relay or parrot what they are given. It is very difficult, if not impossible, to tell some amateurs that they should send what they are given to send — nothing more, nothing less. They should not make improvements, corrections or interpretations. If what is sent is incorrect, this is not our business. If it is poorly written, it's not our fault. If it is subject to misinterpretation, this will be a fallacy of others but not of us.

Too bad that all amateurs are not just communicators. Too bad so many of us want to *originate* traffic, participate in the emergency itself instead of just its communications aspects. But we suppose this is only human nature, one of the biggest failings of any communications machine.

W8ZCQ recently told us of a CBer who was killed as he drove his mobile-equipped car into the middle of a race riot. No one instructed him to go in there, but he "wanted to help." As it happened, he performed no communications service and succeeded only in getting himself shot dead by a sniper. This could just as easily have been an amateur. Other incidents tell of amateurs who, doing some patrol work for the police, took it upon themselves to apprehend criminals rather than just performing communications duty relative to their activities. Other less-serious practices which are far more common have amateurs "correcting" texts of messages, changing spellings and making comments on the side as to what he "guesses" a message means or should say.

"Now here's one to the CD Director of Podunk," says an amateur communicator to his contact. "It says, 'Advise status of Mudville relative Red Cross caravan' and is signed 'Kelly.' He must mean Meadville. Mudville is just a section of Podunk, and I know Meadville has been having some troubles, seems to me Red Cross is mixed up in it somehow, so better make that Meadville. Besides, I know Kelly and all his relatives live in Meadville, not Mudville."

Is he right? Maybe. In fact, the chances are good that he is. But if he's *wrong* and the text should read "Mudville," it's the communicator (and amateur radio) who gets the black eye for inefficiency for changing it. Whereas, if the text is incorrect as originated, the blame attaches to the originator.

Sometimes a communication makes so little sense that the operator receiving it doubts that he received it right. Of course he can always ask the transmitting operator to repeat, but this is wasteful of time, especially when he got it right the first time. So he simply asks, "Does that make sense to you?" If the sender responds "Negative" (the long way to say "No"), then it's "Roger, go ahead," without further ado. Only if he answers "Affirmative" (the long way to say "Yes"), is it advisable to check the text.

Another thing you hear a lot are off-the-record discussions of the emergency situation, during lulls in the flow of messages.

"How are things up there?" one operator asks.

"Oh bad, bad," replies the other. "Thousands of people killed."

A seemingly innocent conversation between two amateurs, nothing official about it; and yet a reporter happens to be listening, and next

W8ETU/8 operated from the Buckeye Building of the Ohio State Fair from August 21 to September 2 handling more than 1000 messages. In the front are W8IMI and W8GKN ready to help the enthusiastic crowd with their originations.

*Communications Manager, ARRL.

day in the paper one reads that "according to amateur radio sources thousands of people were killed in Podunk." So amateur radio gets it in the neck again, when it turns out that this report was exaggerated out of all proportion to the true figure.

Yes, we amateurs are human beings with all the natural failings of the species, but when we get on the air during an emergency let's stick to communicating. That's our job. Providing the content and interpretation and points to be communicated with are non-communicating functions belonging to those we serve. Let's do *our* part and let them do theirs. — *W1NJM.*

Public Service Diary

Heavy rains caused flash flooding in central Tennessee on June 23. Especially hard hit was the small resort community of Red Boiling Springs.

At 1430Z the Nashville-Davidson County Red Cross requested communications assistance. Since there were no stations on the air from the site of the disaster, W4OOA, WA4JSX and WB4JFT drove from Nashville and had a 75 meter station operating from the Red Boiling Springs City Hall by 2000. Communications were maintained until June 25, with W4PRY, WA4BXI, WA4WEN, WB4IXB and WB4JKH handling things from the Nashville end along with club station W4PQP that had been set up in the Red Cross Headquarters building. — *W4WJH, SEC Tenn.*

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At 0930Z on July 2, the Boeing Employees Amateur Radio Service emergency group was notified by the 4 X 4 Search and Rescue Council that a Navy jet had crashed near Snoqualmie Pass, Washington and that the crew of two were missing. WA7GYD, a member of both organizations, went into the field and communications were established by 1130Z. The operation required communications between search helicopters and ground parties as well as phone patches to the Coast Guard in Seattle. W7CJL operated the Seattle link. The operation was cancelled at 1900 when both crewmen were found safely. — *W7JWJ, SCM Wash.*

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At 0200Z only July 22, EC W8ERD of Columbus, Ohio was notified by civil defense authorities that a civil disturbance was in progress, and was asked to activate AREC/RACES on a standby basis. A telephone alerting tree was used to alert members of the organizations. W8IMI assumed control of the ten meter net while WA8VVP performed the same function on six meters. Assignments to monitor all Columbus radio and television stations were made. K8EHU and W8ERD installed six and two meter equipment in the police station, thus establishing the necessary liaison. The Emergency Operations Center was activated with K8DDG, W8AKH, W8DWP, W8KJM, WA8ZTV and WA8VVM present.

A number of messages from civil defense officials at the police command post were handled until 0700 when the all clear was sounded. — *W8ERD, EC/RO Columbus, Ohio.*

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On August 4, when an airplane having a crew of four Canadians crashed while delivering relief supplies to Biafra, amateurs were responsible for supplying the necessary communications. At 0511Z VE3GCS called VE3CFP to ask his assistance in communicating with VE2DHA/aeronautical mobile who had all the details of the accident in which the four men died. By 0623 the emergency traffic was cleared with the aid of VE3CFP's higher power. — *VE3BUX, SCM Ontario.*

K4UDZ (left) and WN4MQR aboard a launch belonging to civil defense at Addison, Kentucky just before the start of the annual Boy Scout Canoe Derby. The RACES organization has been supplying communications for the event for several years with message counts reaching 300. The boat is equipped with 2 meter f.m. gear and K4UDZ has a walkie talkie.

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At about 1700Z on June 1, severe weather and tornado alerts were announced for Monroe County, Mich. WA8MTX in the Red Cross building was activated along with the county's AREC net and liaisons were established with areas around the county by 2 meter links. No emergency situation developed, however, so the operation was secured at 0200Z of June 2. — *W8NDM, EC Monroe County, Mich.*

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On June 12, the Columbus, Ohio, area was alerted for possible severe weather. W8ERD started the alerting tree and the AREC/RACES nets on six and two meters were activated with W8IMI, K8IIF, WA8YTH and WA8VVN serving as net controls. The nets were not held in formal session, but the channel was open and status checks were made at frequent intervals. No severe storms developed and the nets were secured at 0130Z the following day.

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The Oklahoma Storm and Weather Net was active on June 22, 23, 25 and 26 during severe weather alerts for various parts of the state. On June 25, K5CGD and WA5LKS tracked separate tornadoes for several miles while relaying information to WA5SOD/5 at the Oklahoma Weather Bureau on 75 meters. However, no damage was apparently caused. — *WA5FSN, SEC Okla.*

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On August 5, two dams on Greenwood Lake in Northern New Jersey were in danger of breaking

Here is part of the Redwood City (Calif.) Civil Defense and Disaster Communications group, who along with members of Explorer Scout Troop 831 helped with Marshalling duties for the annual Fourth of July Parade. In the back row are W6UOK, K6MPN, WB6ZXP, WA6FXB, WN6FFC, Mario an unlicensed helper, and Bill WA6VGR. Kneeling in front are K6GXH, K6ANN and Mike, another unlicensed helper. Also active in the exercise, but not pictured, were WB6HIX, W6TFT, W6VQV, K6UKF, K6DRN, W6DEF and W6CTH, who took the picture.

because of heavy rains. The Passaic Valley Civil Defense was alerted and the Passaic Valley Traffic and Emergency Net was activated. Approximately 150 families were evacuated from the immediate area of danger. Mobile units were at the dam sites and the Red Cross was standing by. However, by 0200 the situation had eased, the dams were holding and many of those evacuated were returning to their homes. The operation was secured with no emergency having developed. — *K2KDQ, SEC NNJ.*

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On April 27, the Civil Defense Communications Officer for Waseca County, Minnesota, called a simulated tornado watch for the area. Predesignated personnel manned the base communications center, WAØUSJ, while others manned five mobile units. After the drill, which lasted one hour, a debriefing was held to discuss the particular problems of such an operation. — *WAØMZW, SEC Minn.*

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The Portland (Ore.) Area AREC two meter net provided communications for a mountain rescue exercise on May 3 and 4. All stations were on the air by 1400Z and two meter contact was established even though the radio paths involved were from 50 to 130 miles in length and were over mountainous terrain ranging in altitude from three to ten thousand feet. Twenty two pieces of traffic were handled with a total of sixteen amateurs taking part in the two day operation. — *W7DDH, Asst. EC, Multnomah County, Ore.*

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On May 4, the Canton, Ohio, chapter of the Red Cross held a simulated disaster test in which a school bus full of children was assumed hit by a train. The Red Cross Director monitored the communications from the Stark County Emergency Operations Center and was very pleased with the results of the communications effort in which ten amateurs participated. — *K8DHJ, EC/RO Stark County, Ohio.*

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On May 10, as in past years, the Orange Section AREC provided communications for the California Interscholastic Federation tennis tournament. Two meters was used under the direction of EC WB6TYX. Communications involved tourney coordination, rulings on defaults and substitutions and getting participants to the proper places on time. W6JTZ, WA6UBW and WB6WOO provided mobile coverage while W6WRJ, WA6YOK, WB6CQR and WB6VJO helped with relays from their home stations. — *WA6ROF, Acting SEC Orange Section.*

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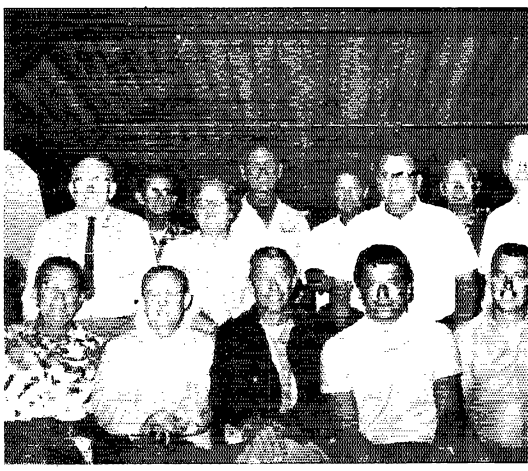
For the month of June, 1969, *thirty-nine* SEC reports were received indicating activity by 14,726 AREC members. This is one report less, but 223 members more, than June, 1968. Reports were received from the following sections: Ala, Alta, Ariz, Ark, BC, Colo, Del, EFla, EMass, EPa, Ga, Ind, Iowa, Kans, Ky, LA, La, Mar, Mich, Minn, Mo, Mont, Nebr, Nev, NLI, Ohio, Que, SDgo, SF, SCV, Sask, SDak, SNJ, STex, Tenn, Utah, Va, WVa, and WFla.

The time has again come for our semi-annual tabulation of perfect reporters. During the first six months of 1969 we have received 242 SEC reports (251 last year) from 48 different sections (50 last year). Those sections having perfect reporting records thus far in 1969 are: Alta, Ariz, Ark, Colo, EFla, EMass, EPa, Ind, Iowa, Kans, Ky, Mar, Mich, Mo, Mont, Nebr, Nev, NLI, Ohio, Que, SF, SCV, Sask, SDak, SNJ, STex, Tenn, Utah, Va, WVa, and WFla; a total of 31 sections (28 last year). Ver-r-r-y interestink. Fewer sections seem to be reporting more often. Why don't some of you SECs who have not reported yet this year give it a try? It can be lots of fun.

Traffic Talk

Old time traffic man W7BA and Washington SCM W7JWJ remind us that s.s.b. nets not "affiliated" with NTS are doing a lot of traffic work and getting not a heck of a lot of credit for it in *QST*. The implication is that we blow up our own organization, ignore others.



On May 10 an eyeball meeting of the Metropolitan Traffic Net of Los Angeles was held. L.A. SCM WA6KZI made a number of glowing comments about the group's fine work in the public service fields. Left to right, in the front row are K6VVT, WA6SNJ, WA6DSN, WB6ZKY and WA6PCT. Second Row: K6RO, WB6BNP, WA6TWS and WB6PWA. Third Row: WB6VJV, WB6ZLP, WA6AWL and WA6SXK.

A veritable army of "CAN Men" were present at the Des Moines National Convention of June 20-22. Kneeling left to right are WA9VZM, WAØIAW, WA9OTD and WA9SFB. Standing in the same order are WØZHN, WØGEI, K4QCQ, W5MI, KØAEM, W4SQE, WØLCX, WØINH, WAØTGM, WA9RAK, W9HRY, and K4DZM, Wonder what the rep on the net was like that weekend! (Photo by WØQXA)

This is true, to an extent. At least the first part of the sentence is true. The ARRL-sponsored organization gets its statistics and data presented monthly in *QST*, just as the staff of *QST* magazine appears on the front pages of each issue. The analogy is not quite accurate, however, because many of the s.s.b. net members *are* ARRL members, so when they report details to us we ought to publish them. W7BA and W7JWJ have come through with some claims and statistics, and here they are:

W7BA says that "with its long haul traffic nets, its local s.s.b. nets and its overseas phone patches, s.s.b. is doing an outstanding job of building public good will for amateur radio. Examples? The long-haul s.s.b. nets, the local s.s.b. nets such as WARTS, NTN, CBN or California's three big divisions of the Golden Bear Net, traffic and phone patches to Alaska, to Hawaii, to Okinawa, the two hospital ships *Repose* and *Sanctuary*." He says that "(a) Cross-country s.s.b. with its fewer relays is handling traffic with more speed and accuracy, (b) with the growth and advancement of s.s.b. there are fewer operators available for the c.w. nets, (c) coverage by s.s.b. nets is much better to all sections of the country, (d) s.s.b. nets are doing a more effective job for Alaska, Hawaii, the APO's and FPO's."

W7JWJ tells us that the 20 Meter Interstate Single Sideband Net was started late in 1958 by W9IDA (now W5OBD). Most of the QNI were military, with QTC in the thousands per month during 1959 and the early 60's. Total QNI for 1968 was 634, traffic 59,366 with a maximum of 7687 for a single month. In 1969 through June the highest month was March with 9168, and a total through June of 46,399 and a QNI of 2787. Traffic is still mostly military, with originations from K6BPI and W6YDK in San Diego. Says W5OBD: "We try to keep our traffic off of MARS and NTS because this type of traffic needs to be delivered as soon as possible, so if it gets on MARS or NTS it can be as much as 10 days late. I have heard traffic being handled on some state nets that was 3 to 10 days old." W7JWJ estimates that in the ten years of its operation ISSB has had 5000 different stations check in handling an estimated traffic total of over 500,000.

National Traffic System. NTS Area Staffs in two areas held formal meetings so far in 1969. The PAS met at Sacramento on June 13–14, 1969 and the CAS met in Des Moines, Iowa, on June 21–22. EAS is planning a meeting on Sept. 20–21, which will also be history by the time you read this.

Complete minutes of the PAS meeting were furnished by Chairman WA6BRG. Present were all three region net managers (WA6ROF, W7BQ, K7NHL), the TCC director (W7DZX) and three members-at-large (WA6BRG, W6HC and W6BGF). The PAN manager, W6VNQ, had recently resigned, so the first order of business was to select a new PAN manager; W6BNX was recommended to headquarters as the man to succeed W6VNQ (this appointment has since been completed.)

During the meeting which ensued, many crucial subjects were discussed: (1) APO/FPO and Hawaiian outlets for RN6; (2) channels by means of which section net managers may consult the PAS; (3) discussion of the problems raised in "Traffic Talk," June *QST;* (4) anti-NTS propaganda by NTS nets; (5) NTS incentives; (6) Denver Convention Center traffic routing; (7) more *QST* articles on NTS; (8) use of NTS travel expense for recruitment and promotion at club meetings; (9) a PAS bulletin.

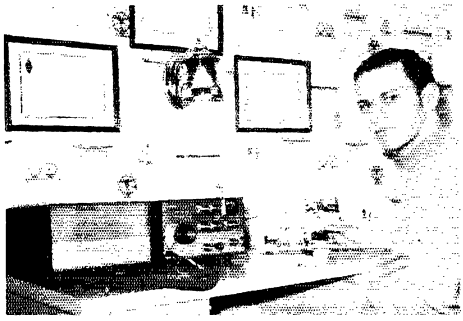
Quite a few recommendations resulted and are under study. On point No. 3 above, a number of shortcomings of NTS were pointed up, such as inadequate local delivery capability, no daytime coverage, poor liaison from section to region, poor AREC liaison, low percentage of interest among hams in participating, poor emergency capability, poor propagation of the NTS "species." Two of the most-discussed topics were daytime operation and general ham preference for voice operation. The PAS ultimately recommended that study be given to the possibility of establishment of some kind of daytime NTS capability, integrated with the present system, and creation of new NTS-oriented section phone nets for the specific purpose of working into the system. Those existing nets which purport to be part of the system but fail to fulfill the requirements should be dropped.

The PAS recommended a good educational program to deal with anti-NTS propaganda, but was not more specific. It also recommended that BPL be left unchanged but to set up an NTS incentive award giving credit to those things mentioned in Minute 65 of the May '69 Board Meeting *except* no credit for phone patches and eligibility for the award be restricted to bona fide NTS participants, or a *separate* award for NTS participants.

The staff also criticized present NTS promotional materials and recommended that they be updated and put in more interesting form, including major *QST* articles. Travel for NTS managers should be liberalized to permit attending club meetings and other amateur gatherings for promotional purposes. Staff members should receive copies of official bulletins, annual reports and minutes of the Board Meetings.

Much less can be said about the CAS meeting, because the chairman has not yet submitted a report. However, all but the TEN manager were present, along with the League's communications manager who participated strictly as an observer. Discussion was informal in nature and the meeting lasted approximately three hours. More details later when the chairman submits a formal report.

July reports: W2FR reports that 2RN certificates



K1ESG. Bruce is a high speed c.w. operator who holds the A-1 Op and BPL Medallion awards and has been active in all levels of NTS since 1963.

have been issued to *WA2s* BAN BEX CBX, *WB2s* DRW RKK WID. According to manager K3MVO, 3RN wallpaper has gone to *W3s* AIZ AXA EEB EML LOS NEM NNL, K3KTH and WA3HTQ. W4SHJ says K4BSS and WB4HJW have earned 4RN certificates. WA6ROF says some of the MARS stations are "rogering" incoming traffic when they shouldn't be. W7BQ reports the best rate on RN7 in recent years mainly because of the heavy load of Boy Scout Jamboree Traffic. W8CHT says he has been unable to schedule W8IZ and W8IMI on the same evening as EAN rep, but that he's working on it. WB4KPE received a 9RN certificate from W9HRY. WA9RAK reports the move to forty meters was made without incident and that CAN made the best rate for July on record. Doug also sent a CAN certificate to WØHI.

Most of the managers also commented on the poor conditions, the moonwalk and Boy Scout Jamboree traffic. One manager, who shall remain unidentified, also advised that he followed the advice in last month's column. He says he cheered up and sure enough, things got worse.

July statistics:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	31	1652	1.071	53.3	91.9
CAN	31	1160	.943	37.4	100.0
PAN	31	1393	1.009	44.9	100.0
1RN	62	465	.346	7.5	89.9
2RN	62	531	.723	8.6	97.7
3RN	62	511	.370	8.2	96.8
4RN	56	543	.362	9.7	83.4
RN5	62	544	.328	8.8	81.7
RN6	62	978	.621	15.8	98.2
RN7	53	964	.783	18.2	26.8
8RN	62	493	.322	8.0	95.2
9RN	61	683	.500	11.2	87.1
TEN	60	595	.531	9.9	51.8
ECN	54	192	.198	3.6	68.3
Sections[1]	1683	9344		5.8	
TCC Eastern	124[2]	2408			
TCC Central	93[2]	1550			
TCC Pacific	131[2]	2742			
Summary	2432	26748	EAN	14.3	—
Record	2890	23372	1.267	15.2	---

[1]Section and local nets reporting (50): CPN, CN (Conn.); VSBN (Va.); TN (Tenn.); AENB, AEND, AENH, AENM, AENT (Ala.); NYS, NLI (N.Y.); WFPN, VEN, FMTN, GN, TPTN, FPTN (Fla.); NJEPTN, NJAN, PVTEN (N.J.); PTN (Me.); BN, OSSB, Franklin County (Ohio); MSN, MJN (Minn.); QMN (Mich.); SSZ, OLZ (Okla.); LAN (La.); RISPN (R.I.); NCNL, NCNE (N.C.); EMNN (Mass.); PTTN, EPA, EPAEPTN, PFN (Pa.); KYN, KTN (Ky.); SCN (Cal.); GSN (Ga.); ILN (Ill.); QIN (Ind.); BUN (Utah); OZK (Ark.); QKS (Kans.); OQN (Ont.-Que.); MSBN (Miss.).

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

Transcontinental Corps. W3EML has issued TCC Eastern certificates to *W1s* BJG EOB NJM YKQ ESG, *W2s* FR GKZ PU, K2RYH, *WA2s* BHN BLV UWA, K3MVO, *W4s* NLC UQ ZM, K4KNP, K6CAG/1, *W8s* AHZ IXJ, K8KMQ, WA8s POS ZGC. WØLCX reports that most functions are working well with the Boy Scout Jamboree giving a big boost to function F. W7DZX says the Boy Scout traffic gave TCC Pacific a big boost too, but that a much better job would have been done with a little advance warning.

July reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	92.7	2408	983
Central	93	94.7	1550	762
Pacific	124	94.7	2742	1371
Summary	341	94.0	6700	3116

The TCC Roster: Eastern Area (W3EML, Dir.) — *W1s* BJG EJI NJM YKQ, K1ESG, *W2s* FR GKZ PU ZVW, K2RYH, *WA2s* BHN BLV CAL, WB2RKK, W3EML, K3MVO, *W4s* NLC UQ ZM, K4KNP, K6CAG/1, *W8s* AHZ CHT, K8KMQ, *WA8s* POS ZGC, WØUCE/3. Central Area (WØLCX, Dir.) — W4OGG, K4AT, WB4AIN, *W5s* MI RHF, *W9s* CXY DND VAY, *WA9s* BWY RAK VZM, *WØs* HI INH LCX ZHN, KØAEM, *WAØs* IAW MLE RVR. Pacific Area (W7DZX, Dir.) — *W6s* BGF BNX EOT IPC IPW VNQ VZT, K6DYZ, *WA6s* BRG LFA ROF, WB6HVA, W7KZ, K7HLR, WA7CLF, KØJSP.

Independent Net Reports:

Net	Sessions	Check-ins	Traffic
North American SSB	26	623	579
Interstate 20 Meter SSB	22	463	7308
7290 Traffic	44	1653	1136
Eastern U. S. Traffic	29	143	49
Mike Farad E & T	27	356	270
Clearing House	27	396	263
All Service	4	70	41
Hit & Bounce	31	318	442

QST

Strays

Up-to-date information on the standard frequency and time broadcast services from WWV, WWVH, WWVB and WWVL is contained in the 1969 edition of NBS Special Publication 236, issued in mid-August. Available for 25 cents per copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

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The Merit Award Committee of the Canadian Amateur Radio Teletype Group (CARTG) is anxious to receive nominations (from clubs or individuals) for the 1969 CARTG RTTY Merit Award. The nominators must state fully the reasons why they feel their nominee should be considered by the Committee. If the committee considers that two or more nominees equally warrant the award, multiple awards may be issued. Send your nomination(s) to: Alan E. H. Venning, VE7LL, Chairman CARTG Merit Award Committee, 6171 Brantford Avenue, Burnaby 1, B. C., Canada.

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SOUTHWESTERN DIVISION CONVENTION

San Diego, California **October 17–19**

The 1969 ARRL Southwestern Division Convention will be held in San Diego, California, as a special event in the San Diego 200th Anniversary celebration this year. The convention will take place at the Hilton Inn in Mission Bay Park, October 17-19. Activities will be many and varied and will cover all phases of the amateur radio and electronics fields. Forums and talks are expected to cover: homebrew, DX, cw, fm, a-m, ssb, MARS, ATV, NTS, RTTY, QRP, ARRL, ARPSC, YLs and XYLs. John Huntoon, ARRL General Manager, will host the ARRL open forum along with John Griggs, W6KW, ARRL Southwestern Division Director, and Arnie Dahlman, W6UEI, Vice Director. Bob White, W1CW, Assistant Communications Manager from Hq. will conduct a DX forum.

K6SD, the "Official San Diego 200th Anniversary Radio Station" is in operation throughout the year and will be for the convention also. There are a number of special awards for contacting K6SD so watch for it on the bands.

The convention banquet will take place Saturday evening, October 18 and Charles Cordell, W6SAG, the President of the San Diego 200th Anniversary will be one of the speakers. The Wouff Hong initiations will take place at midnight, Saturday. Special YL and XYL activities have been planned so bring the gals along. The telephone Company will bring their new interface device which makes phone patches legal and Signal/One personnel will hold a special technical session on their new unit.

Convention registration is $12 each for all convention activities and the grand banquet too. For tickets and information write to: Registration Desk, P. O. Box 1469, San Diego, CA 92112. Include your "handle" and indicate if you want some hotel-motel information sent by return mail. Your check made payable to the 1969 ARRL Southwestern Division Convention, will be your receipt. Don't miss out on the convention; send for your tickets NOW.

COMING A.R.R.L. CONVENTIONS

October 11–12 — Roanoke Division, Huntington, West Virginia.
October 17–19 — Southwestern Division, San Diego, California.
January 17–18 — Southeastern Division, Miami, Florida.

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.

Hamfest Calendar

California — The Greater Bay Area Hamfest will be held October 18 at the Richmond Memorial Auditorium. General admission tickets at the door $1.50, students 75¢. For Hamfest information and directions monitor 7255 kHz (West Coast AR Service), 145.1 MHz, K6GWE (a-m repeater VHF Expeditionary Society), 146.8 MHz, WB6AAE (fm repeater Grizzly Peak VHF ARC), and Channel 11.

California — The Crescenta Valley Auction is scheduled for October 9.

Indiana — The Eighth Annual Hamfest held by the Hossier Hills Ham Club will be held on October 12 at scenic Spring Mill State Park near Mitchell, Indiana. Coffee and doughnuts, Jr. ops activities, ladies bingo, playground, swapshops and coffee Saturday night. Hamfest registration is $1.00. Talk-in on 3.910 MHz lsb and 50.4 MHz a-m. For Hamfest advance registrations, hotel or motel reservations write Hoosier Hills Ham Club, Inc., P.O. Box 375, Bedford, Ind. 47421.

Kansas — Dates for the 5th Annual Tec-Ni-Chat Amateur Radio Club garage sale will be October 25 and 26. Designated left-overs will be auctioned at 2:00 P.M. on Sunday at the close of the sale. For more information write Ernie Wilborn, WAØRKY.

Michigan — Announcing the Fifth Annual Tawas Hamfest, October 3-5 in East Tawas, Michigan, 60 miles north of Bay City on US 23. Demonstrations, displays, swap-n-shop, and more. For further information contact Jerry Mertz, W8DET or Joseph Bennett, WA8CHN.

Michigan — The Iosco Radio Club is hosting another Hamfest October 3 and 4.

New Jersey — The New Jersey Emergency Phone and Traffic Net Dinner will be held this year at Barretts Restaurant, River Road, Trenton on Saturday, October 25. Send your reservations to WA2TAF, chairman.

New York — The annual dinner/banquet of the Central New York Chapter of the QCWA of N.Y. will be held at the Hotel Oneida at Oneida, N.Y. on Saturday, November 1. The Finger Lakes Chapter and the Mohawk Chapter will join us in this occasion. Tickets are $5.00 per person. All reservations should be in no later than October 26. Write to your chapter secretary for full particulars and tickets. Cocktail hour 5 to 7 P.M. Dinner at 7:00 P.M. Make checks payable to Central Chapter of QCWA.

New York — The Syracuse VHF Roundup is to be held at the Three Rivers Inn, Route 57, 10 miles north of Syracuse, N. Y., Saturday, October 11. Speakers include Walt Bain, W4LTU, with new information on weak-signal detections; Bob Jeffers, W2ALL, on s.s.b. systems for vhf and uhf service; and probably *QST* VHF Editor, Ed Tilton, W1HDQ. Reservations from Charles Sellwood, W2RHQ, 902 1st North St., Syracuse, N. Y. 13208.

Pennsylvania — On October 25 at 6:00 P.M., Tamaqua Area Side Band Amateur Radio Assn. is sponsoring a dinner in honor of William Gordon, W3ORJ. A Penn. Dutch Ham and Turkey dinner will be served at the New Ringgold Community Hall, New Ringgold, Penn. Donation is $5.00, reservations must be made prior to October 18. No tickets will be sold at the door. Send for tickets from Anthony Sarli, W3CMA, 164 Spruce St., Tamaqua, Pa. 18252.

Texas — The Terry County ARC Brownfield Swapfest will be held at the Armory on October 26. QST

Happenings of the Month

GROUND RULES FOR IDENTIFICATION

The FCC has set forth some guidelines as to which forms of identification of an amateur station will be acceptable for short QSOs such as DX and contest exchanges. The letter is especially important in view of recent citations issued to contest operators. Here is the letter:

> Since the fall amateur contest activity will soon be here, I believe you will be interested in a resume of a recent explanation of what the Commission considers to be an acceptable station identification, as follows:
>
> For compliance with rule Section 97.87(a), the last transmission of the exchange of transmissions with another station must include that "other" station's call sign. For example "BK 589 CAL TU DX1DX de W6XYZ K" would be in compliance with §97.87(a). When there is a need for identification of the "other" station in an exchange for the benefit of our monitoring facilities, it is most likely to be heard if it is in the last transmission or at the end of a long single transmission.
>
> Where the transmissions of an exchange are very brief, such as the typical contest exchange, if it is less than 30 seconds duration, the entire last transmission is considered the "end of the exchange" for the purpose of compliance with §97.87(a). Provided there is no mistaking which is the transmitting station's call sign, the call signs may be anywhere in such last transmission. While the rule no longer gives examples, continuation of the traditional practice of placing the transmitting station's call sign last or preceding it by "de" is acceptable for this purpose.
>
> Examples of acceptable end-of-exchange transmissions of less than 30 seconds are:
>
> "DX1DX de W6XYZ 589 CAL BK"
> "DX1DX W6XYZ 589 CAL K"
> "DX1DX 589 CAL de W6XYZ K"
> "DX1DX 589 CAL W6XYZ K"
> "589 CAL DX1DX W6XYZ K"
>
> For telephony, the voice equivalent of the foregoing examples may be used, substituting "this is" or "from" for "de", etc.
>
> JAMES E. BARR
> *Chief, Safety and Special Radio Services Bureau, FCC*

SIDEBAND POWER IN CANADA

Canadian Director Noel B. Eaton has been corresponding with the Department of Communications regarding the measurement of power input to amateur transmitters on single sideband. The problem arises from the fact that manufacturer's ratings are given in somewhat hazy terms, and the General Radio Regulations Part II are not particularly clear as to what is required.

Section 47 of the Regulations limits the power input to amateur transmitters and Section 61 requires the use of meters when the input exceeds 400 watts. The recent introduction of many transmitters with p.e.p. ratings in excess of that figure has led several people to believe that they should be equipped with meters.

Letters from the Department have straightened out the matter. What it boils down to is the Department agrees with the generally accepted definition that average power input is one half of the input on voice peaks, and that meters or one switchable meter are not required until the average power input exceeds 400 watts.

HIGHWAY REPORTS BY CB STATIONS

As a matter of interest only, we report that FCC has proposed a change in Citizen Radio Service Rules which would permit Class D stations to furnish such groups as AAA and broadcast stations with road condition information. Live retransmission by broadcast stations still would not be permitted. Comment deadline for Docket 18625 was September 15, with reply comments due September 25.

Bigelow Green, W1EAE

We are saddened to have to report the sudden death, on August 11, 1969, of Bigelow Green, W1EAE, vice director from the New England Division since 1961. We understand Big was at the key participating in the Eastern Massachusetts net when stricken.

First licensed in 1928 with the call W1AKG, Big was past chairman of the Greater Boston Amateur Radio Society, was a member of RACES in Acton, Mass., and held appointments as route manager and official relay station. He was employed as a senior technical writer with RCA, held the Extra Class license and resided in South Acton. He was 63 years old.

WØ QSL MANAGER RETIRES

Alva A. Smith, WØDMA, has turned in his rubber stamps and pigeon-holes after serving more than thirty years as manager of the ARRL W9 and then WØ QSL Bureaus — a long time in a volunteer, unpaid, service job! Al has earned the warm thanks of all DX-minded amateurs in mid-America, partially expressed by an ARRL Certificate of Merit recently awarded to him.

Carrying on the QSL chores is the Des Moines Radio Amateur Association, Box 88, Des Moines, Iowa, 50301.

ARRL ASKS CHANGES FOR EXTRA

In July *QST*, we announced FCC Docket 18540 which would let FCC licensees count time as a foreign licensee toward the two years needed for

Extra Class and toward the 25 years needed by an Extra Class licensee seeking a two-letter call.

The League has endorsed the docket as it stands, but has added three other matters raised at the 1969 ARRL Board meeting. First, the directors feel the waiting period for Extra Class should be reduced from two years to one year; second, they have renewed the request made in the "incentive licensing" docket 15928 that former holders of the Amateur Extra First Grade license now be given Amateur Extra Class licenses without further examination (The earlier Extra had a similar 20 w.p.m. code test, a two-year experience requirement and technical knowledge equivalent to the First Commercial of its day, the twenties and early thirties; the license was discontinued in 1933 as an economy measure, being renewed only as Class A, now called Advanced); third, that newer Extra Class licensees be made eligible for 1 × 3 calls.

The text follows:

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

In the Matter of	
Amendment of Part 97 of the Commission's Rules regarding licensing and operating experience requirements for the Amateur Extra Class license.	DOCKET NO. 18540 RM-1311

To: The Commission

COMMENTS ON AND COUNTERPROPOSALS TO NOTICE OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, by its General Counsel, respectfully submits the following comments on and counterproposals to the Notice of Proposed Rule Making released May 9, 1969 (FCC 69-491).

The Commission is fully aware of the many studies made and proposals submitted by the League over the years in a continuing effort to revitalize interest in the higher classes of amateur operator licenses. At the recent annual meeting of the League's Board of Directors in May of this year, the eligibility requirements and operating and other privileges of the various classes were examined at considerable length. The views and recommendations of the Board are reflected in the minutes of the meeting, copies of which have been made available to the Commission as well as to all League members. The comments, suggestions and counterproposals submitted herein are limited to the Amateur Extra Class license and are so closely related to the subject and scope of the Notice of Proposed Rule Making that they may be considered in this proceeding.

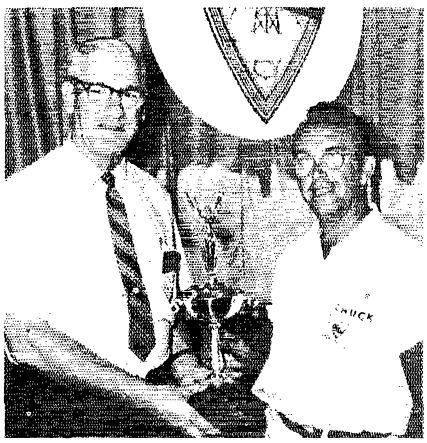
I.

Section 97.9(a)(1)

Section 97.9(a)(1) of the Commission's Rules and Regulations now requires that an applicant for the Amateur Extra Class license must have held for at least two years a valid Commission-issued amateur operator license of other than the Novice and Tech-

Behind the Diamond

Number 19 of a Series



(Photo by W9QKE)

We've run several pictures of this month's subject presenting awards to others — it's nice to turn the tables and show **Philip E. Haller, W9HPG,** accepting the Illinois Amateur of the Year 1969 Award from Hamfesters Radio Club president Charles T. Borkowski, WA9-TWA.

Phil started as 9ATG back in 1925, and he's been active in amateur radio affairs ever since.

Let's take ARRL offices first: director, Central Division, 1963-present; vice-director, 1959-1963 and assistant director, 1955-1958. Club work? Lots — president, Chicago Radio Traffic Association, 1933-present (how's that for tenure!); director, Hamfesters Radio Club and trustee of its station; past president, Illiana Teleprinter Society; past president, past secretary, Chicago Area Radio Club Council; alternate radio officer, Chicago Civil Defense Corps and emergency coordinator for the Amateur Radio Public Service Corps in Cook County.

Conventions/special events? Quite a few — Phil helped organize and run amateur radio activities at the Chicago World's Fair, 1933-1934; the ARRL National Conventions at Chicago, 1938 where a close associate was John Huntoon, W9UKJY, now W1LVQ, our secretary-general manager and 1957; and such occasional affairs as the National Shrine Convention parades.

Director Haller lives in Chicago, and works as a principal engineer for Commonwealth Edison Company in Maywood. (Longevity here, too — he's been with the utility since 1926!) He's a charter life member of ARRL, official observer, and member of the A-1 Operator Club. Phil and his wife Marge have two married sons and several grandchildren.

Wayne Overbeck, K6YNB, receives the June Cover Plaque Award from Walt Larson, K6DM, assistant director from the Southwestern Division. Wayne's article, "Three Innovations for Field Day," was picked by ARRL directors as the best in June *QST*.

nician Class. The purpose of this rule, as stated by the Commission, is to help assure that applicants for the highest class amateur operator license have acquired practical operating experience for a reasonable period of time at an intermediate license level. One effect of the rule is to deny recognition for such experience when acquired under amateur licenses issued by other authorities. The Commission has invited comments upon a proposal to amend Section 97.9(a)(1) to extend the eligibility for an Amateur Extra Class license to Commission licensees who submit proof of having held an amateur license issued by a foreign government equivalent to at least a General Class for a period of two years.

The League not only supports the amendment proposed by the Commission, but also respectfully requests that the eligibility requirement be further amended to reduce the present waiting period for Commission-issued operator license of other than the Novice and Technician Class from two years to one year.

The present rules for operator licenses were adopted by the Commission's Report and Order in Docket No. 15928, issued August 29, 1967, the so-called "incentive license" proceeding, 9 Federal Communication Reports, Second Series 814, 11 Pike & Fischer Radio Regulation, Second Series 1563. The view has been expressed that the present two year waiting period actually tends to decrease rather than increase interest in advancement to the Amateur Extra Class license because the momentum generated by a well qualified and conscientious newcomer to the amateur ranks may well be lost if he cannot proceed to the highest class of license rather promptly. One year's experience by such an enthusiastic operator can be and often is far more meaningful than the mere holding of a Conditional, General, or Advanced Class license with little, or at least less, experience. It is respectfully submitted that the adoption of a one year waiting period, as proposed herein, will actually aid in achieving the basic objectives of the revitalized incentive license plan and policy.

II.

The Plight of the Old Timers

Section 97.25(b)

One of the most frequent complaints about the present incentive licensing rules comes from those who have held amateur licenses for thirty-five and more years. Most of the individuals are sixty or more years old. The substance of the complaints is that the average person sixty or more years old has great difficulty in preparing for and passing the Amateur Extra Class license examination, because their learning capabilities and the ability to write legibly at a speed of 20 words per minute, particularly under the stress of an examination, have declined with the passing years. Some also note that they once held Amateur Extra First Class operators licenses after having successfully passed equally difficult examinations equivalent to the present Amateur Extra Class examinations.[1]

[1] The Extra First Grade Amateur Operator's License was first established by the Department of Commerce in 1923 at the suggestion of the League, and required two years experience as an amateur operator, 20 words a minute code proficiency, and a written examination similar to that for the Commercial First Grade. Operating privileges in various bands, varied from time to time. In November 1929, at the request of the League, the Federal Radio Commission opened up 14,100-14,300 kHz for operation by holders of Amateur Extra First Grade licenses who had obtained special permission for such operation. In 1931, the League proposed two revised radiotelephony bands, within the 3.5 and 14 MHz bands for use by holders of a new class of license. In April 1932, the Federal Radio Commission adopted the League's proposal to the extent of establishing an endorsement of unlimited radiotelephony on regular licenses. The endorsement required twelve months amateur experience and was issued without additional examination to holders of Amateur Extra First Class and certain commercial licenses. In June 1933, the Federal Radio Commission abandoned the Temporary, First Class, Extra First Class, and Unlimited Phone Classes and established Classes A, B and C. Class A carried special phone privileges and was issued without further examination to Amateur Extra First Class licensees. The last Amateur Extra First Class licenses were issued in 1933. Although the present Amateur Extra Class license was established in 1952 and, for all practical purposes was identical to the old Amateur Extra First Class, there was no incentive to obtain such licenses until the rules were revised in November 1967 by the Report and Order in Docket No. 15928.

[2] Section 97.1 of the Commission's Rules and Regulations.

One of the reasons for having the higher classes of licenses is to provide "a reservoir within the amateur radio service of trained operators, technicians, and electronics experts."[2] A very high percentage of those who once held an Amateur Extra First Class operator license already have served their country in the armed forces, the laboratories, and the electronic manufacturing plants during or since World War II. Because of their ages, the possibility of their being recalled for such service is very slight. Thus, requiring re-examination of those who once qualified for the equivalent class of license does little to achieve the purposes and objectives of the incentive license plan.

The League recognized these simple truths when it included in its comments to the Notice of Proposed Rule Making in Docket No. 15928 the suggestion that "grandfather rights" be granted to former Amateur Extra First Class licensees who have held Class A and later Advanced Class licenses continuously since the Amateur Extra First Class was abolished in 1933. It is understood that one of the reasons the suggestion was not adopted was because the records of the Federal Radio Commission and earlier licensing authorities are not readily available and the search of the files would require an inordinate amount of time by Commission personnel.

The League's Board of Directors, at its last annual meeting, directed the filing of an appropriate

petition requesting the Commission to again review the hardships facing this relatively small group of active and dedicated amateurs and to grant certain examination credits to former holders of Amateur Extra First Class licenses. Specifically, the Board directed that the Commission be requested to amend Section 97.25(c) to include former holders of Amateur Extra First Class licenses within the waiver provisions of that section.[3]

[3] Section 97.25(c) provides as follows:
§97.25 *Examination Credit*
(a) .....
(b) .....
(c) An applicant for the Amateur Extra Class operator license will be given credit for examination elements 1(C), 4(A), and 4(B), if he so requests and submits evidence of having held a valid amateur radio station or operator license issued by any agency of the U. S. Government during or prior to April 1917, and qualifies for or currently holds a valid amateur operator license of the General or Advanced Class.
Section 97.21 provides as follows:
§97.21 *Examination Elements*
Examinations for amateur operator privileges will comprise one or more of the following examination elements:
(a) .....
(b) .....
(c) Element 1(C): Expert's code test at twenty (20) words per minute;
(d) .....
(e) .....
(f) Element 4(A): Intermediate amateur practice involving intermediate level radio theory and operation as applicable to modern amateur techniques, including but not limited to, radiotelephony and radiotelegraphy;
(g) Element 4(B): Advanced amateur practice involving advanced radio theory and operation as applicable to modern amateur techniques, including, but not limited to radiotelephony, radiotelegraphy, and transmissions of energy for measurements and observations applied to propagation for the radio control of remote objects and similar experimental purposes

Accordingly, and for the reasons stated, the Commission is respectfully requested to include in its report and order in this proceeding the addition of the words "or an American Extra First Class operator license issued by the Federal Radio Commission" following "April 1917" to Section 97.25(c). For administrative convenience, the Commission can place the burden upon the applicant to establish that he once held an Amateur Extra Class license, thus making unnecessary a tedious and time consuming search of the old files.

III.

Section 97.51(a)

The Notice of Proposed Rule Making also invites comments upon a proposed amendment of Section 97.5(a)(5) to extend eligibility for two-letter call sign assignments to Amateur Extra Class licensees who were first licensed at least 25 years earlier by a foreign government. Section 97.51(a)(5) now provides, in part, as follows:
§97.51 Assignment of call signs.
(a) The call signs of amateur stations will be assigned systematically by the Commission with the following exceptions:

* * *

(5) ..... Additionally, a two-letter call sign may be assigned to an Amateur Extra Class licensee who first held an amateur radio operator license issued by the Commission, or one of its predecessor agencies, 25 years or more prior to the receipt date of an application for such assignment....

The proposed amendment, in most instances, would extend eligibility to naturalized citizens of the United States, but some native born citizens who for various reasons were amateur licensees in foreign countries would also be involved.

At its last meeting, the League's Board of Directors voted to request the Commission to amend Section 97.51 to permit the issuance of a three-letter call sign with a single letter prefix (1x3) to an Amateur Extra Class licensee (regardless of tenure) upon request and payment of the appropriate fee.

The advantages and prestige of a two-letter call sign is so well recognized as to require no comment. Conversely, disadvantages of a call sign with a two letter prefix and a three letter suffix (2x3) are apparent. In every day communications, in contests, and in amateur net operation, the operator with a 2x3 call sign almost always finds himself at a disadvantage with the operator having a 1x2 or a 1x3 call sign. One of the reasons Section 97.51(a)(5) provides for the assignment of call signs with a single letter prefix and a two letter suffix is to provide incentive to an amateur to attain the highest grade of license and to recognize the many years of service.

In recent years, most of the newly licensed amateurs have been issued 2x3 call signs. Under the present rules, there is no way for the holder of such a call to obtain the more desirable 1x3 call sign even if he earns his Amateur Extra Class operator license. None of these amateurs will be eligible for a two-letter call for many years. The end result is that one of the incentives for advancing to the highest class of license is nonexistent for this younger group.

To make the incentive licensing program more meaningful, it is respectfully suggested that Section 97.51(a)(3) be amended to permit the assignment upon request and on a random basis of a 1x3 call sign upon payment of the appropriate fee.

WHO THE DEVIL IS WHO?

18th 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*
W1AP	W1DEF	W3VW	W3LMM	W5OT	W5IAU	W9HD	W9INM
W1LL	W1POY	K4IV	W4KAP	W5OV	W5PDX	WØIU	WØWUA
K2AK	W2LLQ	K4JL	W4DWZ	K6MP	W6SBB	WØIV	WØLDT
W2IC	WA2OKK	K4JX	W4PCT	K6MZ	K6HNX	WØKQ	WØWEF
W2VG	W2HSZ	K4LJ	WB4GYY	K6PK	W6BII	WØLJ	WØIFX
W3TR	W3LGK	K4LP	W2CDP	W9EX	W9VPD		
W3VN	W3UPG	W5NM	W5NOH	W9GH	W9VDT		

Just too late for last month's story, "The Outstretched Hand," we received these two photos of "Whitecaners" and their coaches. At left, Gerard Miron, VE3AZM, tunes up aurally using the relative power reader (on top of desk) while instructor Don Shervington, VE3EMX, observes. At right, Earl Schwanz, VE3BLE reads the Braille dial with his fingertips, under the eye of his sponsor Mike Waters, VE3BYO. (Landman photos)

Wherefore, the premises considered, the Commission is respectfully requested to adopt not only the proposals set forth in the Notices of Proposed Rule Making in this proceeding but also the additional proposals set forth herein.

THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

August 26, 1969

BY ROBERT M. BOOTH, JR.
Its General Counsel

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.*)

Recent changes are in **boldface.**

1 Boston, Mass. 02109; India & State Streets; Thurs.-Fri., **9–11** A.M. **Exams with code test, Friday only.**
Also conducts examinations at Bangor, Me. in May; Hartford, Conn. in March and Sept.; Portland, Me. in Apr. and Oct.

2 New York, N.Y. 10014; 641 Washington Street; Tues.-**Thurs.,** 9-12 A.M.
Also conducts examinations at Schenectady, N.Y. in Mar., June, Sept. and Dec.

3 Philadelphia, Penn. 19106; 2nd & Chestnut Streets; **without code test, Mon.-Wed., 10–12 A.M.; with code test, Tues.-Wed., 8–9 A.M.**

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

5 Norfolk, Va. 23510; Granby & York Streets; with code, Thurs., 9 A.M.; others, Wed. and Fri., 9 A.M. to 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 Avenue, Thurs., 9 A.M.
Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

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

8 New Orleans, La. 70130; 600 South Street; with code, **Tues.,** 8:30 A.M., others, **Tues.–Wed., 8:30–12 A.M.**
Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug. and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; Wed. 8 A.M. 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 Street; Fri., Extra & Advanced, (no code) 8:30 A.M.; General and Advance (with code) 10 A.M.
Also conducts examinations at Fresno, Calif. in Mar., June, Sept. and Dec.

13 Portland, Ore. 97204; 319 S.W. Pine St.; Fri. 8:45 A.M.
Also conducts examinations at Boise, Idaho, in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 909 1st Avenue; Fri. 8:45 A.M.
Also conducts examinations at Billings, Mont. in May; Missoula, Mont. in 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 and Robert Streets; Fri., 8:45 A.M.
Also conducts examinations at Jamestown, N. Dak. in Oct.; Marquette, Mich. in May; Sioux Falls, S. Dak. in Mar., June, Sept. and Dec.

17 Kansas City, Mo. 64106; 601 E. 12th St.; **Thurs., 1 P.M.**
Also conducts examinations at Des Moines, Iowa in Mar., June, Sept. and Dec.; Omaha, Nebr. in Jan., Apr., July and Oct.; St. Louis, Mo. in Feb., May, Aug. and Nov.; Wichita, Kans. in Mar. and Sept.

18 Chicago, Ill. 60604; 219 South Dearborn Street; Fri., 9 A.M.
Also conducts examinations at Davenport, Iowa in Jan., Apr., July and Oct.; Fort Wayne, Ind. in Feb., May, Aug. and Nov.; Indianapolis, Ind. in Feb., May, Aug., and Nov.; Louisville, Ky. in Feb., May, Aug. and Nov.; Milwaukee, Wisc. in Jan., Apr., July and Oct.

19 Detroit, Mich. 48226: Washington Blvd. & Lafayette Street; Wed. and Fri., 9 A.M.
Also conducts examinations at Charleston, W. Va. in Mar., June, Sept. and Dec.; Cincinnati, Ohio in Feb., May, Aug. and Nov.; Cleveland, Ohio in Mar., June, Sept. and Dec.; Columbus, Ohio in Jan., Apr., July and Oct.; Grand Rapids, Mich., in Jan., Apr., July and Oct.

20 Buffalo, N.Y. 14203; 121 Ellicott; 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.

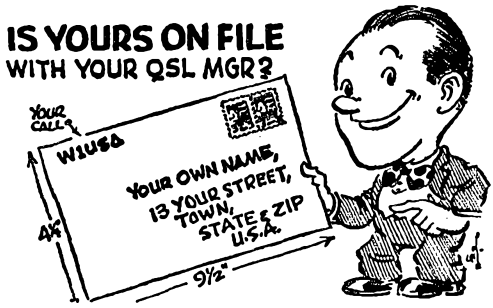
21 Honolulu, Hawaii 96808; 502 Federal Building; Tues. and Wed., 8 A.M. and by appointment.
Also conducts examinations at Hilo in Oct.; Lihue, Kauai in Nov.; Wailuka, Maui in Oct.

22 San Juan, P. R. 00903; 322 Federal Building; 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 Street, N.W.; Fri. 9:00 A.M. and 1:30 P.M.
Gettysburg, Penna. 17325; 334 York Street; 1st & 3rd Tues., by appointment only. 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, Balley 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 — Willamette Valley DX Club, Inc., P.O. 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, W8MSG, Box 519, Elmhurst, Illinois 60126.

WØ, KØ, WAØ, WNØ — Des Moines Radio Amateur Association, P.O. Box 88, Des Moines, Iowa 50301.

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*

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Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (*only*) can be furnished at $1.50 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order — we do not bill nor ship c.o.d.

Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless *specifically* mentioned in the article.

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 MEMBER

We are pleased to announce admission of a new member to the International Amateur Radio Union. The *Western Samoa Amateur Radio Club* will now provide representation for 5W1 amateurs in the Union. Election of *WSARC* was by unanimous vote of the IARU member-societies participating in the election. Union membership now stands at eighty-one.

JA STUDY GROUP VISITS HEADQUARTERS

A closer relationship between amateur societies in Japan and the U. S. was advanced through the visit of *Japan Amateur Radio League* representatives to IARU/*ARRL* headquarters during August. The group of five *JARL* members were on a tour of the U. S. to study the condition of U. S. amateur radio and to meet American amateurs.

The *Japan Amateur Radio League* is the national association of amateur operators in Japan. Its membership includes over 25,000 of the 76,000 licensed operators in the country. Each member receives the tri-monthly *JARL News*, and enjoys use of the society's QSL bureau. *JARL* also provides an information service by mail for members. They answer about 500 inquiries per day — all hand written because of the complexity of typewriting in Japanese!

Since mutual understandings among IARU societies are important, this productive visit will not end the information exchange with Japan. In fact, IARU/*ARRL* president WØDX plans to personally visit *JARL* during 1970!

Headquarters staffer W1IKE (right) welcomes the *Japan Amateur Radio League* representatives to IARU/*ARRL* headquarters. From left are Mr. Yoshida (interpreter), JA1BAU, JA1ETB, JA1AP, JA1BYJ, JH1IGM, and W1IKE.

To commemorate the tenth year of the presence of the Saar district in the *Deutscher Amateur Radio Club*, the *Deutsche Bundespost* (German Post Office) will issue the special post mark shown above. The post mark will be in use on October 18 and 19—the days of the DARC district meeting in Saar.

NOTES

The *Malaysian Amateur Radio Transmitters Society* reports that during the period from August 9, to September 9, 9V1 amateurs were given special permission to use the prefix 9VØ. Use of the special prefix was to commemorate the 150th anniversary of the founding of Singapore by Sir Stamford Raffles.

A club station at the Surinam Trade Fair is being organized by the *Vereniging van Radio-amateurs in Suriname*. The station will be in operation from September 25 until October 8, signing the call PZØAA. A special QSL card will be issued.

CONTESTS

The Interamerican Union of Radio Amateurs — IARU Region II will hold its annual contest, this year organized by the *Radio Club Argentino*, from 1200 GMT October 11, until 2359 GMT October 12. Participants should call "CQ Region II Contest" or "CQ Region II" on any hf band using any mode. Count one point for each station worked; each country worked counts as a multiplier. Cross-band contacts, and QSOs with stations outside of Region II (North and South America) do not contact. Contacts between sta-

tions of the same country do not count except for one multiplier. Exchange a five or six digit serial number composed of the RST or RS, plus a progressive contact number starting 001. Logs indicating time, station, band, country and serial number sent and received should be sent, before December 31, to: Gustavo Reusens, OA4AV, Secretary of IARU Region II, P.O. Box 4079, Lima, Peru.

The *Radio Sports Federation* of the USSR will sponsor the USSR-50 competition from 0000 GMT October 15, to 2400 GMT November 15. To qualify for a certificate, amateurs need contact 50 different USSR stations; any of the hf bands and any modes can be used. European amateurs must additionally make at least one contact with each of the 15 USSR republics including 2 contacts with Moscow and 2 contacts with Leningrad; amateurs on other continents need contact at least 5 of the republics and complete 1 contact with each Moscow and Leningrad. U. S. and Canadian applicants for the USSR-50 award should submit a list of claimed contacts, showing dates, types of emission and bands to the Central Radio Club, P.O. Box 88, Moscow, USSR. The list should first be certified, for U. S./Canadian applicants, by an ARRL affiliated radio club.

DX OPERATING NOTES

Reciprocal Operating

United States Reciprocal Operating Agreements currently exist *only* with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guyana, Honduras, India, Indonesia, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Surinam, Sweden, Switzerland, Trinidad and Tobago, United Kingdom and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, Israel, Luxembourg, the Netherlands, Nicaragua, Norway, Senegal, Switzerland, United Kingdom, U. S. and Venezuela.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Argentina, Barbados (only U. S. stations/8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or K/8P XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U.S. and Venezuela. Permissible prefixes are: CE CP HR K OA TI W XE YS YV and 4Z.

DX Restrictions

U.S. amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia and Vietnam forbid radio communication between their amateur stations and such of other countries. U.S. amateurs should not work XU XV or 3W8. Canadian amateurs may not communicate with Cambodia, Laos, Thailand, Vietnam and Jordan. Prefixes to be avoided are HS JY XU XV XW8 and 3W8.

So You Want to Win An SS Contest

(Continued from page 59)

on your honor of course, to claim class B if you operated your transmitter over the 150-watt limit at *any time* during the contest. This means 150 watts d.c. input. There is no such thing as cheating a little. Either you are honest or you're not; it is as simple as that! Any award that you might win by this method is as worthless as the paper it is written on. The same thing applies to those few who are disappointed that they didn't achieve a "clean sweep" (all 75 sections) and they look up an apparently typical call in the *Call Book* and Squeeze it in somewhere. Remember if you are caught in such an act you *will* make the listings in *QST*. However this listing is at the end of the results. It is called the disqualification column. Also keep in mind that if you make that column it will be your last SS!

If you make it, a hearty congratulations! Of course, not everyone can win. The reason that awards are given is so that everybody will have some goal to strive for. Therefore if you didn't make it this year, at least you know you gave it your best; and you did it on the proving ground for the country's best operators, the ARRL Sweepstakes.

Summation

There are probably many items in the previous text that you might consider unnecessary or even ridiculous. This is only the author's opinion. These methods and painstaking care in planning are adapted for use in DX contests as well; and these efforts have paid off in several contest awards each year.

It is my sincere hope that through this article I will stir up new interest and added competition and better operating techniques. Without good 'stiff' competition your ability will remain stagnant. QST

Correspondence From Members-

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

OLDER AGE GROUP

¶ In your discussion of youth among newcomers you seem to have overlooked the fact the number of new licenses in the 45-and-over age group has also risen substantially along with the very sharp rise in the very young age group. Indeed this rise in "senior citizen" licenses is consistent with the result that the median has changed very little.

This rise in participation of the older age group is no surprise to me. Independently, I have been amazed at the number of older amateurs on the air, both newly licensed and otherwise. Apparently an increasing number of people are turning to amateur radio in their retirement years. Probably a number of the alledgedly "new licensees" are really not new but those who had let their licenses lapse many years ago and now, finding less pressure from developing a career or in raising a family, have obtained new licenses. I have had a number of former and potential amateurs of intermediate age express a wish to me that later when they expected to have more time that they would become active amateurs.

While certainly the ARRL should aim its major educational and promotional efforts to the younger age group, it should also launch secondary programs aimed at the senior group. An enlarged senior group could provide a valuable source of manpower with maturity, experience, and time to serve as officers and members of committees of the ARRL and local clubs. Also, your report has shown that many of the younger group are attracted by personal contacts, and an increased senior group might result in further increases in the younger group. — *Yardley Beers, WØJF, Boulder, Colorado*

AMATEUR Q

¶ A point was brought out in August *QST* that seems to completely resolve the incentive licensing issue. William S. Grenfell, W4GF, Chief, Rules and Standards Branch, Amateur and Citizens Radio Division, FCC, quoting the Commission said "It is altogether clear that justification for the continued allocation to the amateur radio service of a substantial portion of the (radio frequency) spectrum in the face of important demands by other radio services can not be founded on anything other than a continuing movement of the amateur service toward the goals specified in Section 97.1 of the amateur rules."

To me, the above quotation leaves no doubt, no argument, no issue, no nothing! We must upgrade the amateur service or lose some of our frequencies. I urge all amateurs to read W4GF's very informative article, and ponder the many points he brought to our attention. — *Al Jones, K4GZT, Rural Hall, North Carolina.*

FM FREQUENCIES

¶ There is a definite need for standardization of repeater input and output frequencies and simplex channels. Anyone who travels a bit can tell you how frustrating it is to arrive in a large city where you know there should be some fm activity, yet be unable to find the locally used frequencies. I have no suggestions to make on particular frequencies, after all, someone will have to buy some new crystals. I am only interested in the ARRL establishing standard frequencies, at least for future installations of repeaters. In areas where there are a number of repeaters, obviously they cannot all operate on the same frequency, but the fm people in these areas should not overlook the possibility of multiple input and output frequencies or connecting a number of repeaters together for simultaneous operation. The main idea of my suggestion is that no matter where a ham with an fm rig may find himself, he will know that there are some standard frequencies which are being monitored by the local bunch. — *Glen Reid, Jr., KõHGB, Pasadena, Texas.*

NOVEMBER 22 — ACT II

¶ This is my farewell to ARRL. At 79 years I am no longer able to compete in incentive licensing.

I note the membership is dropping, and that fewer people are showing interest in ham radio. I also note that the developing nations and others are hungry after the amateur frequencies — well, so be it!

Good bye, ARRL! — *E. W. Sears K6QQI, Santa Rose, California.*

¶ In response to your column, "It Seems to Us," appearing in the August issue of *QST*, I should like to submit the following: Accordingly and in all probability, phase II of the incentive licensing program will go into effect in approximately three months, and once again, a large segment of our amateur operators will be affected by the changes.

While it is certainly recognized by many involved in our hobby that incentive licensing has increased the number of up-graded licenses, it has also dampened the spirits of many other long-ago licensed hams. I particularly speak in behalf of the many old timers. While I believe all amateurs desire the highest grade license available, some of these old timers, who are very knowledgeable and have contributed much to the advances and successes of electronics, just find it impossible to upgrade their skills. It is a well known fact that age, physical condition and emotional factors enter into and play a major role in attaining various degrees of achievement. Some old timers cannot pass an examination — not because they lack the information required, but because the emotional pressure of nervousness, apprehension and lack of confidence become overriding influences. — *V. L. Mandelstamm, W3ADS, Silver Spring, Maryland.*

¶ . . . Please let discussions on reserved spectrum space for higher licensees bear in mind that there is a gain for incentive in not having the reserved space very much used. It is a pleasure to go into that space when QRM is rough, and that is a good reason for up-grading one's license! — *Michael D. Lyons, WØPG, Broomfield, Colorado.*

¶ My XYL, W1IQT, and myself wish to say we are against incentive licensing. We now both hold

General licenses. Listen on the bands most anytime, and you will hear most Advanced and Extra Class amateurs in the General portion of the bands. I talk with hundreds of Extra Class and Advanced men and most of them agree with us. — *Elwood W. Brewster, W1CCM, Grafton, New Hampshire.*

I know the League feels somehow obliged to make a recommendation to the FCC . . . and this will be touchy. My hope is that the FCC will go ahead as scheduled with the full incentive program . . . at least for a year faced with the loss of another 25 kHz, I think at least half of the active hams who are sitting it out will give upgrading a try. If after a year the number of Extras and Advanced has not shown significant growth, then perhaps the FCC could roll back the limits to their current specifications. — *Edward Yadzinski, W2DNZ, Buffalo, New York.*

I strongly feel the new licensing laws are a wonderful thing for our hobby. They are having the desired effect and will continue to do so in the coming years. It was a difficult and unpopular position for you to take, but I feel you made a very wise decision and I thank you.

I also think it would be a terrible mistake *not* to continue the band subdivision this Fall. The final phase of the band splitting was planned, I feel, to add incentive for those who are seeking the higher grade licenses. To fail to give additional privileges to higher grade license holders as originally announced would tend to depress and discourage those of us who have obtained or are seeking extra band rights. — *John Teetor, W8SSL, Marion, Ohio.*

I know that in the past you have mentioned some amateurs 13 or 14 years old and others 70 to 75 who have passed the Extra Class examination and to all those amateurs, my congratulations. However, this amateur has taken his last FCC examination of any kind, including the Amateur Extra Class. Your incentive licensing plan has caused this amateur to lose all interest in amateur radio as I have not had a QSO on the ham bands in over a year. — *Walter Mayer, Essexville, Michigan.*

It seems that amateurs radio is being turned into a profession where the best technicians and the most skillful operators are mollycoddled at the expense of the average everyday John Q. Ham.

I was always under the impression that amateur radio was a hobby which anybody could enjoy but now you are limiting its full enjoyment to the aforementioned people. Come November another 25 kHz will be taken from the Generals on 40 meters. This will leave a total of 50 kHz for the Generals. The resultant QRM will be of gigantic proportions. Anybody who would like to sample this can do so ahead of time by tuning through the 40-meter Novice cw band during early winter. Imagine how much worse it will be with the wider bandwidths of phone compared to the smaller cw bandwidth. — *Bernard A. Poskus, WA9ZDO, Kankakee, Illinois.*

Let's face it, OMs, incentive licensing seems to be the only way to keep everyone from crowding into the lower 10 kHz of the cw and phone bands. Now instead of griping about lost privileges why not study a little bit and see how much more gratifying an Extra Class ticket can be than spouting off all that hot air about unfair rules and regulations. *Dennis Wallace, WA5GLY, Corpus Christi, Texas.*

I think most of the hams are like myself; ham radio is just a hobby which we all enjoy. I do not desire to become an expert at radio; I don't have the time nor do I care knowing much about it.

For my part you can forget incentive licensing all together. I'm from Missouri and you have to "show me" how taking away something I already have is doing me some good. — *Dave Rust, WAØLKF, Cabool, Missouri.*

I think that it is the second 25 kHz that gives the real incentive. You can live without 25 kHz but 50 is another story. I think the number of Extra Class operators will increase greatly after November 1969. — *Jan Williams, K2PLT, Buffalo, New York.*

I have tried not to add to the din, but will respond to your invitation in August *QST* to comment on the incentive (or insensitive) licensing program. I think the whole thing is an ineffective and valueless piece of thinking. Twenty-five kHz have been squeezed out of the bands and those who have qualified themselves to use these "exclusive" segments are not doing so, but simply adding to the QRM in the General Class domain.

If the directors want to intelligently serve the hams let them explore ways to expand the bands — not contract them! *Harvey J. Hanreddy WB6ENE, Walnut Creek, California.*

W6ZH

I would like to tell you of the first time I met W6ZH, and of a story he told me at the time.

This was in the early 1950s, HHjr. was Undersecretary of State, and I was a civilian employee of the military. My boss, a Colonel, had an appointment with HHjr., and asked me to go along. We were admitted on schedule for our audience. The business dragged on past the time allotted, and other visitors were kept waiting; finally we concluded the official discussions. As we were rising from our chairs the Colonel mentioned that I was a ham. At this point our host reseated himself and he and I talked while the Colonel just watched and listened!

When HHjr. discovered that 144 MHz was my favorite band, he told me of his station in California, which included 2-meter teletype facilities. Then he got to talking about hearing aids. He told me that while his father was in the White House and he was attending college, he used a home-made hearing aid assembled in a cigar box. The mike was a "single-button carbon" acquired at a drugstore just a block from the White House! — *William L. Smith, W3GKP, Spencerville, Maryland.*

BROAD RECEIVER?

Three years ago this month I retired and at the time I got away from strictly 75-meter phone and went to chasing DX as I did before the war. This time on phone. What a rude awakening! The very reason we pioneered ssb was to cut down the bandwidth required for communication and to listen to and examine some of these boys on 20-meter phone is a sickening thing. On many occasions I have talked to some of these boys with 6 and 8 kHz bandwidths and have been told that they have to make noise to be heard in pile-ups, etc. Many times they tell me it is my receiver. After 21 years of sideband ing. I can tell them better but it seems to do no good. Every time you hear them, they still are 6 to 8 kHz wide with their speech clippers and processors. — *Dick Long, W3ASW, Hummelstown, Pennsylvania.* QST

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* K4AYO

Odds and Ends

THIS is one of those months when an editor wonders what he should write about in particular — and nothing comes to mind except a few rambling thoughts.

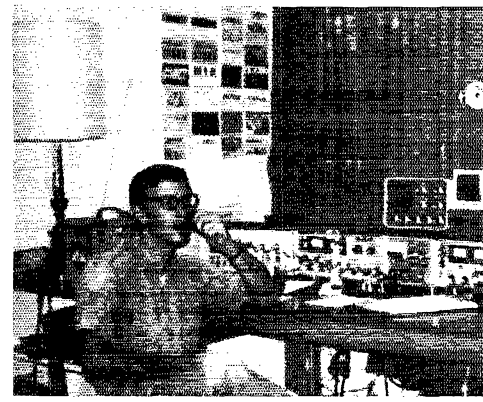
An autumn launch of the Australis-Oscar 5 ten- and two-meter-beacon satellite is presently being scheduled by Amsat. An earlier launch had been pursued by Project Oscar, but unfortunately, a launch did not materialize on the West Coast. Operating details of the satellite were given in August *QST*, pages 69 through 72. While this package is not a repeater satellite, as were Oscars 3 and 4, many useful results may be achieved through observation of the signal characteristics and study of the telemetry data. Australis-Oscar 5 will also serve to introduce a whole new crop of vhfrs to amateur satellites. An article on tracking the satellite appears on page 54 of this issue; watch League Lines and W1AW for launch information.

FCC remains silent on the November 22 implementation of the remainder of the so-called incentive licensing act. Despite rumors to the contrary, there is no reason at this time to believe FCC will not go ahead with the act. Technician and General Class licensees will be moved above 50,250 leaving the lower 250 kHz. of the six-meter band to the Extra and Advance Class. There is widespread disapproval of this action among six-meter operators, but FCC had not responded favorably to filings requesting a freeze on the present six-meter allocations.

Six-meter watchdog, Bob Cooper, also notes a FCC variance allowed the Utah State University College of Natural Resources. FCC directed its Chief Engineer to issue temporary experimental authorization for the college to use 50.0 to 50.7 for *jackrabbit* telemetering transmitters during the month of October. The school is doing a study on jackrabbits in a remote area of southwestern Utah and small six-meter transmitters will be attached to the animals. FCC noted the school's project was well underway before learning the frequency range was allocated to the amateur service. Mr. Cooper queries, "How do you QSL a jackrabbit?"

We also note strong favor to allow Technicians c.w. use of 144.0 to 144.1, but mixed reaction to their use of a portion of the 10-meter band.

The Central States Vhf Society held its annual conference in Boulder, Colorado the third weekend of August. Ninety-nine vhfers registered for the third annual session. A breakdown of the call area participants indicates the scope of this conference: W1 — one (W1HDQ), W2 — two, no W3s, W4 — one, W5 — eleven, W6 — nine, W7 — eleven, W8 — two, W9 — nine and forty WØs. There were no VEs or other DX present. Those who totaled those numbers didn't get 99, the other 13 were portable types.



John, KH6GHC, provided much DXcitement from Hawaii during the past two years. Look for him now as he travels through South America armed with a 50-MHz. transceiver.

F.m. interest was in evidence at the conference, and a discussion of its merits was included in an after-dinner talk by *QST* Vhf Editor, W1HDQ. You will note later in this column a light treatment of the f.m. scene. This is because of little response thus far from the f.m. operators F.m. news is beginning to trickle in, however, and we shall endeavor to give coverage to the field whenever information is made available.

Another area of discussion was the organization of DXpeditions to the more "rare states," where there is little permanent v.h.f. activity. This is a controversial proposal in that it appears to favor stations within normal tropospheric range of the temporary station. Perhaps missionary work in the interest of permanent operation in these states is to be preferred, as in the case of W7ZC in Utah.

Next year's conference will be returned to its state of origin, Oklahoma. We'll have a pictorial report on this year's conference next month, and I look forward to similar treatment of other v.h.f. meetings if the pictures are made available.

Each month I'm faced with the problem of lead material. I have attempted to present a well-balanced column aiming towards different interest segments of v.h.f. Those who have written monthly columns know the difficulties in

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presenting something fresh and interesting each month. I would welcome such material, especially in the area of time domain reflectometry measurements of coaxial cable and connectors, unusual propagation, f.m., amateur television, new communication techniques, and so forth. The material need not be in finished form.

OVS and Operating News

50-MHz. Es has ended for another summer. Generally speaking conditions were good, but not quite as favorable as the past two or three years. Here's a check of conditions around the U.S. by call area WA1DPX, Mass., caught many July openings, highlighted by a contact on the 8th with K8CLA/Ø in North Dakota, VO1DW on the 9th, and XE1PY on the 19th. WA1DFL, also Mass., nailed W6ANN, K3GAU/KP4 and heard XE1PY in July. WA2BBS did well during July, working W7VDZ, Wyoming; K7TLX, Utah; K5EFW, New Mexico; WØIT, South Dakota; K3GAU/KP4 and HI8XDS! W2MPK found a Caribbean opening July 26, working KP4DEC, K3GAU/KP4 and HI8XDS. WB2RBG caught the same opening, and CO2DI on the 21st. Howard also worked 7s on four days in July. WB2VFX worked Utah's K7TLX on July 4. WA3JDT noted several openings. No reports were received from the 4th and 5th call districts. In California, WA6WKF had a contact with W1HDQ/7, Wyoming.

Activity reporting from 7s has increased. K7ICW, Nevada, reports openings on twelve July days. Al worked VE2AIO on the 10th, and XE1PY on the 13th. W7JWJ, ARRL SCM for Washington, says July openings produced contacts into Alaska and as far east as New York and Pennsylvania. WA7FVT, Tacoma, worked KL7GLL on August 3. WA7GFP, Oregon, reports a July 30 contact with Colorado. WA8YHN had July contacts with several Seattle stations on the 4th, KP4BCY and K3GAU/KP4 on the 26th and again to Puerto Rico on August 1. WA8VBK's July activities produced California contacts on the 4th and 10th. Late reports of June contacts were received from WA8RCN, K8HXW, W8NOH and WG8BOI. No 9s report *Es* openings, but Iowa's WØPFP notes Colorado, Nevada, Utah, New Jersey, Washington and VE6AHE on July 4th and 5th. Jim says K8CLA/Ø North Dakota, wants 50-MHz. scatter schedules. Write Tom Case, 3200 Whiteman, Grand Forks, AFB, North Dakota 58201.

At Sitka, Alaska, KL7GLL says previous reports that he had Arizona contacts on June 19 were incorrect. On August 4, between 0327 and 0447 GMT, KL7GLL worked W7OI, K7GWE, K7BBO, K7VNU, K7IEY, W7BOM, K7NDF, W7ZOW, W7ZPS and W7FN. Gene nearly worked WAØLIK, Colorado, who didn't acknowledge Gene's report. Gene has done much to give us a crack at an elusive KL7 contact. VE2DFO, Quebec, noted multi-hop openings to W7s on July 4 and 7.

WA6SXM has sent QSL proof of a May 27 contact with Australian VK8KK. Signals were marginal, and VK8KK, using a 9-element 30-foot Yagi, confused the WA6 with JA6, which he works fairly often from Australia. The contact was made on two-way s.s.b. on 52 MHz.

A lengthy letter from G3JVL describes 6 and 4 meter activity in Europe and Africa during the past several months. Mike reports logging ZE1AZC and ZS3B, both Africa, in March. In April, Mike again heard ZE1AZC, and says that SV1AB, Greece, logged ZB2BC and ZS3B, on March 23. Around the same time, ZS3B heard the beacon of ZK1AA. On

2-METER STANDING

W1JSM	35	8	1400	W5HFV	27	10	1285
K1ABR	34	8	1478	W5MCC	25	8	1430
W1AZK	34	8	1412	K5PTK	18	6	1330
K1HTV	32	8	1310				
K1WHT	31	8	1300	W6GDO	18	5	1326
K1WHS	29	8	1300	W6WSQ	15	4	1390
K1UGQ	29	8	1280	K6HAA	13	4	1380
K1BKK	28	7	1275	W6NLZ	12	5	2540
W1VTU	26	8	1296	K6JYO	12	4	1240
W1FJH	24	7	1100	K6HMS	11	4	1258
W1HDQ	24	7	1040				
K1MTJ	20	7	1225	W7JRG	27	6	1320
K1JIX	18	6	800	K7NII	24	5	1290
K1RJH	17	7	1450	K7ICW	16	4	1246
W2NLY	37	8	1390	W8PT	41	9	1260
W2CXY	37	8	1360	K8DEO	32	8	----
W2ORI	37	8	1320	W8IDT	31	8	1150
W2BLV	36	8	1150	W8IDU	27	8	1150
W2AZL	36	8	1380	W8NOH	26	8	1165
WA2FGK	33	8	1340	*W8TIU*	24	8	1000
K2RTH	32	8	1215	K8ZES	22	8	675
W2CRS	26	8	1270	WA8VHG	13	6	465
W2CNS	23	8	1150				
W2DWJ	23	6	860	K9SGD	42	9	1300
WA2EMB	22	8	1335	WA9DOT	41	9	1303
W2DNR	22	7	1200	K9AAJ	41	9	1200
WB2FXB	21	6	915	K9UIF	41	9	1150
K2YCO	20	7	750	W9AAG	39	9	1200
WA2PMW	19	6	1000	W9YYF	35	8	1050
				W9IFA	33	8	1060
W3RUE	36	8	1100	W9PBP	32	8	820
W3KWH	35	8	1335				
W3GKP	32	8	1108	KØMQS	45	10	1590
K3CFA	25	8	1200	WØBFB	15	10	1380
W3BDP	25	8	1100	WØNXF	42	10	1326
W3BHG	22	8	1140	WØDQY	41	9	1300
W3HB	21	8	1310	WØLFE	38	9	1040
K3OBU	21	7	930	WØLER	36	9	1250
W3LHF	19	6	700	WØEYE	35	9	1380
WA3GPL	19	6	625	WØENC	33	9	1334
W3TFA	18	8	1342	WØLCN	28	8	*1000*
				WØDRL	25	9	1295
W4HJQ	39	9	1150				
W4WNH	38	9	1350	F8DO	1	1	5100
W4HHK	38	9	1280	KH6UK	2	2	2540
K4EJQ	37	8	1125	OH1NL	1	1	5850
K4IXC	36	8	1403				
K4GL	36	8	1325				
K4QIF	35	8	1225	VE1AUC	7	2	500
W4CKB	34	8	1325	VE2BGJ	17	6	975
W4FJ	34	8	1150	VE2DFO	13	5	960
W4VHH	33	8	1100	VE2HW	11	5	800
W4AWS	29	8	1350	VE3EZC	33	8	1283
				VE3BQN	31	7	1250
W5UGO	42	10	1398	VE3AIB	29	8	1340
W5RCI	42	9	1289	VE3ASO	28	8	1285
K5WXZ	36	10	1450	VE3EVW	25	8	1100
W5AJG	33	9	1360	VE7BQH	6	2	1248
W5UKQ	29	8	1150				
W5LO	28	7	1254	VK3ATN	3	3	10417

The figures after each call refer to states, call areas and mileage of best DX. Revised August, 1969.

RECORDS

Two-Way Work
50 MHz.: LU3EX — JA6FR
12,000 Miles — March 24, 1956
144 MHz.: W6NLZ-KH6UK
2540 Miles — July 8,1957
220 MHz.: W6NLZ — KH6UK
2540 Miles — June 22, 1959
420 MHz.: WØDRL — K2CBA
1185 Miles — July 16, 1969
1215 MHz.: W6DQJ/6 — K6AXN/6
400 Miles — June 14, 1959
2300 MHz.: W2BVU/1 — K1DRB/1
225 Miles — Aug. 30, 1968
3300 MHz.: W6IFE/6 — W6VIX/6
100 Miles — June 9, 1956
5650 MHz.: WA6KKK/6 — WB6JZY/6
179 Miles — October 15, 1966
10,000 MHz.: W7JIP/7 — W7LHL/7
265 Miles — July 31, 1960
21,000 MHz.: W2UKL/2 — WA2VWI/2
27 Miles — Oct. 24, 1964
Above 30,000 MHz.: W6FUV/6—W6ICJ/6
2.3 Miles — Feb. 9, 1969

April 6 and 10, SV1AB worked ZE7JX and ZS3B, crossband, 21 to 50 MHz. G3JVL and G3PLX have built a solid-state triple-frequency 5-watt beacon. The transmitter is on Gibraltar, beamed north on 50.009, 70.311 (Europe's 4-meter band) and 145.130. Mike says a group of South England vhfers have asked their government for use of 50 MHz. during non-television hours, but the result of their petition is uncertain. Mike also wonders if some North American could put a beacon on 50 MHz. aimed towards Great Britain.

On June 24, G3JVL worked TF3EA, Iceland, on 4 meters, running 50 and 15 watts respectively to 4-element Yagis. This contact was on *Es* and Mike says *Es* this summer in Europe was poor, not at all comparable with the past two years. Thanks for your letter, Mike, we look forward to your next one.

Our printer gremlins have been at work, but let it be known that W6ABN *has* worked and confirmed 50 states on six meters, regardless of the *missing* asterisk in the April states worked box.

Swany, HI8XDS, left the Dominican Republic in late August. He has returned to Vancouver, British Columbia and his old call of VE7AFL. Swany says he enjoyed much being 50-MHz. DX from the Republic, and that he has answered all QSLs. I wish there was some way to encourage more operation on six from the Caribbean. Conditons there are excellent, but there is little interest on behalf of the islanders.

In Canada, VE2DFO mentions poor QSL returns from the United States, and even less return to requests for 144-MHz. schedules. VE2HW has a new 6-element Yagi perking on six, and worked into Nebraska in July, running 5 watts of s.s.b.

W6YKM says the West Coast 6-meter Scatter Net is looking for new blood. Stations from Seattle to Los Angeles participate, but Fred didn't mention the days, times or frequency.

K7ICW is writing off six meters for the remainder of this sunspot cycle maximum. Al says indications to him don't look favorable for any *F-layer* farther north than 30 degrees latitude. He says his tip-off is the total lack of triple-hop *Es* this summer at his latitude of about 35 degrees north.

From Florida, I note multi-hop *Es* this summer three-to-one better than last summer, with numerous openings to the west coast, below 30 degrees, and still a good number to northern California, Oregon and Washington. Stations in New England also enjoyed good periods of multi-hop to the Far West. Al says he expects aurora conditions to greatly improve this fall in the northern latitudes.

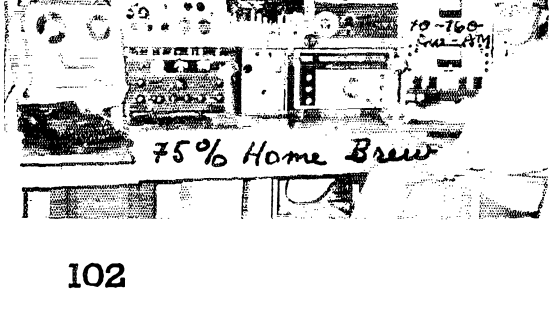
144-MHz. DXers were well treated by the August Perseids meteor shower. Although the shower wasn't as good this year as it can be, the peak on the 12th was sharp and produced several excellent bursts. By call area, here's a look at the results.

Connecticut's K1HTV climbed to 32 states from his new location. Rich worked KØMQS, on both c.w. and s.s.b., and WØNXF, Nebraska. W1FJH clicked with KØMQS, K4IXC and K9IMX/4, Alabama. Schedules with W5HFV and W5UGO, both Oklahoma, produced poor results. K1ABR, Rhode Island, worked KØMQS, WØRLI, WA9DOT and W9VWY. W9VWY was running 120 watts of s.s.b. and stacked 11-element Yagis. K1HTV's neighbor, W1VTU, worked four new states, W9VWY, WØRLI, K9IMX/4, and WØLFE, all on s.s.b. John monitored the f.m. broadcast band for meteor activity indication. He suggests this as a means to keep check on random meteor activity. K2RTH worked WØEMS, Nebraska, W5HFV and W5RCI. WA2CJK worked North Dakota's KØAWU. No 3s report contacts.

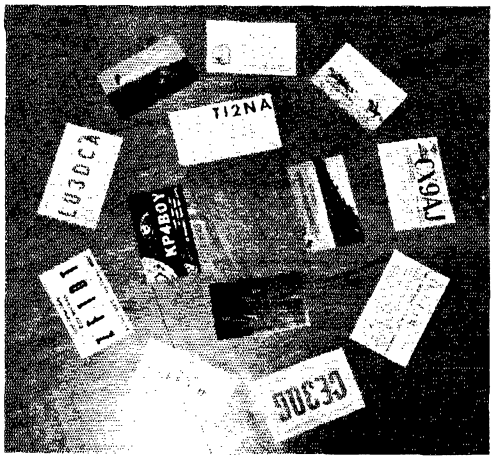
In South Carolina, K4GL moved to 36 worked by virtue of K1BKK; WØENC, South Dakota, and W5LO, New Mexico, 1325 miles. Jack says new business activities may slow his v.h.f. activity for awhile. The Oklahoma Cowboy, W5ORH, worked K7VTM, Wyoming, and K6JYO and W2CUX on s.s.b. Jay remains secretive on his states totals, but I bet he is about to surprise the current leader. K6JYO reports, also the contact with W5ORH on a 45-second burst. And K6JYO worked W5UGO which, he reports, is Larry's 44th state, but no word from Larry on this. Take note, Cowboy. Other Perseid contacts by K6JYO include VE7BQH on s.s.b. and K7VTM, Wyoming. Now here's a good one,

220- and 420-MHz. STANDING

420 MHz.				K2YCO	8	6	550
W1HDQ	13	5	450	W2CN8	7	5	525
K1JIX	12	4	600	W2SEU	6	4	220
K1BFA	8	3	225	W3RUE	14	7	585
				K3UV	10	4	310
K2CBA	17	5	1090	W3UJG	9	4	400
W2DWJ	15	5	740				
K2DNR	13	5	600	W4FJ	20	7	995
W2SEU	12	5	325	K4QLP	17	6	1065
K2RTH	12	4	600	K4EJQ	12	5	550
W2CRS	10	4	440	K4NTD	9	2	835
				W4HJZ	6	3	560
W3UJG	14	5	460	K4GL	5	2	—
W3RUE	10	5	480	W4VHH	5	1	450
K3UV	10	4	310				
				W5RCI	19	6	880
K4IXC	3	3	1090	W5ORH	12	4	700
K4GL	3	2	—	W5AJG	7	3	1010
				W5UKQ	6	2	590
W5RCI	10	5	910	W5AWK	3	2	222
W5AJG	3	2	1050				
W5LO	2	2	660	W6DQJ	4	2	360
W6WSQ	4	4	945				
K7ICW	4	2	250	K7ICW	4	2	225
W7JRG	2	2	959	W7JRG	2	2	420
W8PT	11	6	660				
				K8DEO	17	6	625
WØEYE	8	4	910	K8REG	16	6	625
				W8HVX	15	5	660
VE3AIB	7	4	450	W8MNT	13	7	600
				W8RQI	10	6	425
420 MHz.				WA8VHQ	7	5	415
K3EAV/1	14	6	700	W8FWF	7	4	450
K1BFA	10	4	470				
W1QVF	10	5	400	W9WCD	18	7	825
K1JIX	10	4	460	WA9HUV	16	7	780
K1HTV	10	4	400	W9AAG	14	5	800
W1HDQ	10	3	250	WA9NKT	12	6	560
WA1JTK	9	3	490	K9AAJ	12	5	425
				K9CNN	12	5	—
K2CBA	16	8	2670	W9JIY	8	4	500
K2ACQ	16	8	925				
K2UYH	16	6	718	WØDRL	18	6	1185
W2CLL	15	6	693	WØLER	8	3	709
W2BLV	13	5	500	WØEYE	6	2	425
WA2EMB	12	6	720				
W2DWJ	11	4	330	VE2HW	4	3	750
K2YCO	9	6	525	VE3DKW	12	7	940
WA2EUS	9	4	260	VE3EZC	7	5	510
K2RIW	9	3	—	VE3AIB	5	4	450



ZP9AY in Paraguay has been a popular fixture on 50 MHz. for years. His mostly homebrewed station is shown here as pictured on his QSL. (photo via KH6GHC)



DX similar to this will be workable again this fall on 50 MHz. from the lower-latitude states via the *TE* mode. How many can you add to this small collection?

W6GDO worked KL7GMB, Alaska, on August 12! Need we point out that this is the first California to Alaska 144 contact? KL7GMB is WA7DUL from Reno, Nevada and was vacationing near Ketchikan.

WA9DOT had an August 4 m.s. contact with VE2DFO. W9YYF worked VE2DFO, W1FJH and K1BKK. W9YYF offers m.s. schedules to anyone, but doesn't appreciate 70 per cent of those he asked for schedules ignoring his letters. Jack suggests a column listing of 2-meter frequencies and schedule candidates. Jack, with all the v.f.o. use nowadays, I doubt the list would be of much value — and I don't know the answer to getting schedules other than the 75-meter net or a telephone call.

Just before moving to his new home near Delta, Iowa, (There's an unheard of town, even to this Iowa native, which will soon become famous!) KØMQS called a Perseid CQ on 144.1 early the morning of August 12th. He then proceeded to work K1HTV, W1FJH, K1ABR, and W1VTU in the next 90 minutes! Dick also identified replies from W2AZL, K2RTH and WA1JTK. Not bad for an idle CQ on 2 meters. D8ck also worked W7UBI, Idaho, for his number 45 and top spot nationally on 2 meters, squeezing past WØBFB. That's going some in four years! Dick says W7RQT is now active in Salt Lake City with a kw. and collinear.

From Canada, VE3BQN reports Perseid contacts with WØDRL and K5WXZ. VE7BQH worked K6JYO and adds that W7EKI, Oregon worked W6GHV. During a schedule between W7EKI and KØMQS, VE7BQH logged a burst from KØMQS, with complete calls, a 1520 mile path! For those who want to schedule W7EKI, write Larry Liljequist, Route 1, Box 792, Salem, Oregon 97304, or phone him at 503-363-3014. VE2DFO worked KØMQS and offers schedules. Don runs a kw. and 40-element collinear. Write Don Falle, 598 Chester Road, Beaurepaire, Quebec, Canada, phone 514-695-9392.

Another report on that mid July tropo session comes from WA2BCY. Ross worked Illinois, Wisconsin and Ohio with 20 watts. Other tropo reports were received from W1MX, W3BDP, K4EJQ and WØMOX.

432-MHz. was examined during the Perseids by WØDRL and K2UYH. They proved the experts wrong, there *is* useable m.s. at this frequency, and although they didn't make a contact, their results are highly encouraging. WØDRL writes that they began schedules on August 10, 0900 to 1000 GMT. Both he and K2UYH heard weak pings and bursts, but nothing identifiable other than signal characteristics — Al says who else would be on 431.998 at 4 a.m.? On the 11th, little was heard, but at 0945 GMT on the 12th, WØDRL got an 11-*second burst* from K2UYH consisting of complete calls! The signal was 20 to 25 db. above the noise. K2UYH heard pings and the "52" report WØDRL was sending him. The 13th produced nothing. The path distance is 1142 miles. WØDRL runs a measured 300 watts output and a 44-element Tilton Yagi array. K2UYH has 500 watts output and sixteen 6-element Yagis.

In the standings, we have three new call area leaders. K3EAV/1 in Rhode Island enters the box with 14 states and submitted the cards as proof. Bill runs 500 watts and a 64-element collinear. Competition is tough in the second call area. Jud, K2CBA, is now atop the heap, with 17 states, by working W3UJG, Maryland. He is closely followed by K2ACQ who worked WØDRL and K3EAV/1. K2UYH has been bumped to third place, but probably not for long.

In Ohio, K8REG moved to 16 states during an August 20th tropo session by working Maryland's W3UJG. Vince also worked W3NG, VE3DSE and VE3BQN the same evening. K9CNN entered the box via mid July session. He has worked 12 states from hear Chicago. WA9NKT raised his standing to 12 also during the same period. He added K4EJQ, W3RUE and K2ACQ.

And a new Canadian leader emerged. VE3DKW worked the July opening to reach 12 states. A 940-mile contact with WØDRL was his best DX. VE3DKW runs a 4CX250B cavity and 32-element colinear.

Lightning Protection for V.H.F. Repeaters

Many v.h.f. repeaters located on remote mountain tops have been subject to lightning coming in on the power lines. This will generally appear as a fat spike in the power supply, which can easily knock out some components. Commercial lightning arrestors installed at WAØSNO, the Pueblo repeater, did not keep the station from being put off the air in the summer months by lightning coming in on the power lines. There has been no further trouble of this kind since the installation of two big 24-volt transformers back-to-back, as shown in Fig. 1.

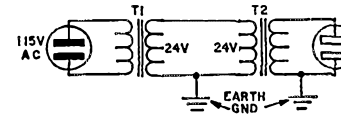


Fig. 1

Any matched pair of transformers with low-voltage secondaries can be used; just be sure that they are big enough to handle the repeater load. The earth grounds shown are separate ground rods, and should not be connected to the existing ground system. *Robert D. Shriner, WAØUZO, PO Box 969, Pueblo, Colorado 81002*

A FET Tone-Keyer

Norm Foot, WA9HUV, has designed the first FET tone-keyer that has been brought to my attention. Such a device is useful to the DXer who runs c.w. schedules or calls numerous CQs. It rectifies the audio output from a pre-recorded tape and keys the transmitter, allowing automatic transmission.

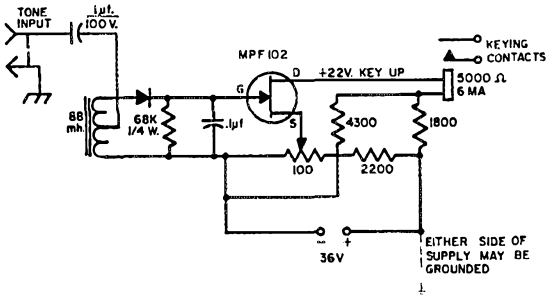


Fig. 2—An FET tone-keyer designed by WA9HUV. Construction of the device is described elsewhere in this column.

The circuit, Fig. 2, is quite simple. The 1-μf. d.c. blocking condenser and the 88-mh. toroid step up the recorder audio output and provide d.c. isolation. The diode rectifies the tone signal, and drives the FET from cut-off to saturation. The 4-ma. drain current is enough to operate the relay. The 100-ohm bias control adjusts the zero-signal current drain. WA9HUV says careful adjustment will allow keying speeds of up to 30 w.p.m.

Norm powers the circuit with the 36-volt d.c. supply he uses for antenna switching and safety inter-lock circuits on his 432-MHz. kw. The MPF-102 is rated at 25 volts source-drain voltage maximum so in Norm's case the resistive dividing network is necessary, but a lower supply voltage or a zener diode could also be used QST

Contest Handicapping

BY ALBERT KAHN, K4FW,* exW8DUS

Most competitive sports have handicaps to equalize the chances of the players. Golfers average their historical scores, sailors use a complicated formula based on boat dimensions to determine sailing time. Even professional football teams use draft selection to favor the weakest teams. Why not handicap amateur radio contesters?

Not power or antennas, for these seem to make little difference between contestants. The psychological factors are what really count. Balancing these by score multipliers would make an even contest and narrow the gap between high and low scores.

The state of mind transcends one's physical well being. Contesting is a breeze if one can concentrate on the business at hand with joie de vivre rather than a feeling of guilt for neglecting family or job. If the bands are hot, the XYL and family happy, you have just had a pat on the back from the boss, your 100 watts and dipole will turn into 10kw. and rhombics. In sailing competition there is an old saying, "A happy boat is a winning boat." This is also true in amateur radio.

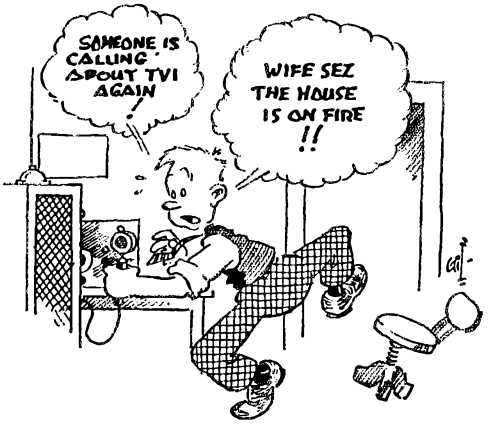
The multipliers are well known by all contest men. As a starter I shall recommend that the following be considered by the contest committee:

1) The XYL yells through the din, "My folks just dropped in for a visit. You know they don't understand amateur radio. You better come in visit with them." Add 10%.

2) You are getting ready to leave the office for an early dinner before a DX contest. Your boss calls you in and regrets to tell you that you are fired. Add 15%.

3) Your daughter walks in just as you start to run a string and says, "Mother said you should drive me to play practice and pick me up at eleven." Add 5%.

4) You decide to sleep late on Saturday morning and be fresh for SS contest. So you read until



3:00 A.M. At 7:30 A.M. you get a long-distance call from an insistent customer and you can't go back to sleep. Add 5%.

5) Friendly visiting hams drop in "to see you operate." Add 1% for each half hour.

6) As you start the contest a bearing falls out of your key paddle and evaporates. You half fix it. Add 2%.

7) "The furnace is out, "the car won't start, "someone is calling about TVI again, "a man is at the door about the car payment." Add 2% for each.

8) A couple of days before the big contest your XYL says sorrowfully, "Dear, I have some terrible news. I forgot all about the contest and accepted a dinner and bridge invitation at the Smiths. It is too late to refuse. You'll just have to give up a few hours." Add 20% or consider a new hobby such as collecting china dogs.

With these additions to contest rules, everyone will have an equal chance. With the way things have been working for me these days, 10 QSOs plus these proposed multipliers, I would be world high. QST

* Old Cartertown Road, Gatlinburg, Tenn. 37738.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

When:

What has amounted to scarcely more than an inconvenient tease becomes really incentive on the 22nd of next month when the Federal Communications Commission's Advanced/Extra frequency suballocations enlarge according to plan. If you're about set to hop down now for your exam you should be able to beat the deadline okay. If not, bandmarkers will need revision.

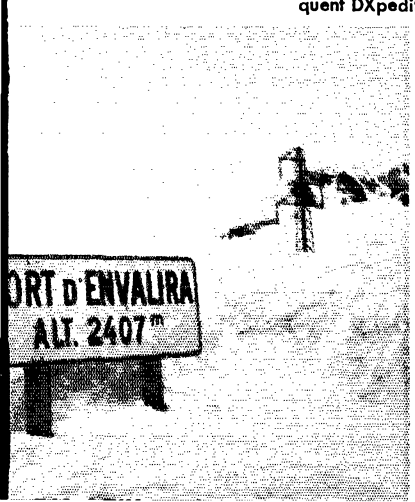
The DX gang seems to be taking our new regs in stride, long-haul interest and action booming as ever. No question, though, that the multiband hunt is much easier for A/E diggers and will become deliciously more so. If you have your reserved-seat ticket already, credentials soon doubly desirable, congrats! Not yet? Then good luck on your next try.

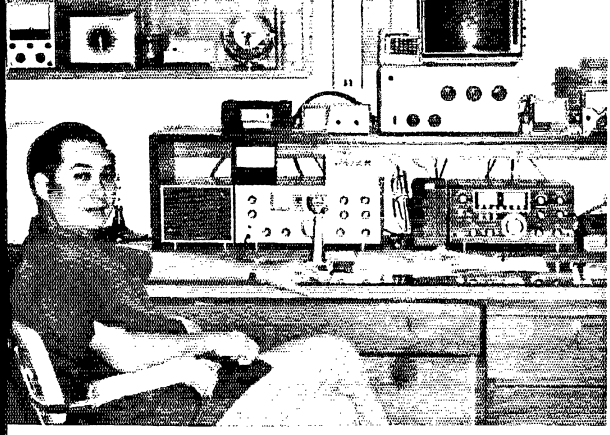
What:

The readers speak! Time to cool our Bandwagon in the barn and eavesdrop on the vast "How's" roundtable, your *vox* DX *populi*. QRM is a frantic blast, man, but there's comment comin' through the din.... "W8FXP, my friend of 20 years, visited me in Bucharest." — **YO3RF.** ... "Glad to be one of your info sources while an editor of the Newark News Radio Club *Bulletin*." — **L. Waite.** ... "This is the first time I've written to any department of *QST*." — **W5EJ.** ... "Now 115/77 — getting close to DXCC!" — **WA3JRA.** ... "Futile attempt to get KM6-BI's QSL came back postmarked by lunar landing ship *Hornet*." — **DJ1CG.** ... "Help! Missed 3V8NC's handle and address." — **W8RFZ.** ... "We'll try to enlist friendly cooperation to help keep 1825-1830 kHz. clear during DX periods." — **W1BB.** ... "The 'AC4' I worked couldn't even spell Lhasa." — **W7EKB.** ... "Phone-patch stations over here seem to me more 'commercial' than amateur." — **KR6NL.** ... "A Rio Muni EAØ was a rather hot one for this poor DXer." — **K3DFX/Ø.** ... "Will try to forward more DX data in the future." — **WB2GVE.** ... "As you say, 15 c.w. really is a bucket of worms, short skip and DX." — **WA9SQY.** ... "I'd rather rag-chew on 40 c.w. but DX *can* be fun." — **WB4LAL.** ... "Line noise and home projects keep me almost QRT." — **W7BE.** ... "No 'donations' accepted for my KA1 Iwo Jima operation." — **KA9RC.** ... "Hope to be a regular reporter to your absorbing pages." — **VE2DKJ.** ... "I'm willing and able to be a QSL manager." — **W6EKN.** ... "Lots of 40-meter c.w. DX goodies here in the land of big snows." — **VE3GHO.** ... "HB9AKJ usually operates every Thursday around 14,250 kHz. at 1900 GMT." — **WA3HUU.** ... "No takers yet on my QSL managerial offer." — **WB2BHJ.** ... "Overseas contest managers are reminded to give ARRL and *QST* at least two months advance announcement of forthcoming activities." — **W1YYM.** ... "Madras Amateur Radio Society colleague VU2AI now works with W2AIW in the U.S.A." — **VU2MV.** ... "WA7MKC's XYL Linda helps Joe with my Stateside QSL chores." — **DL1RB.** ... "I'll try to report monthly." — **WA1JHQ.** ... "When K4PHY gets on from TJ-land I'll handle his QSLing." — **K4ZCP.** ... "Department of State's W4KIL is on special assignment covering all Africa north of the Congo." — **W1IKE.** ... "Fs 2YZ 5HN 5OJ and 5QQ of 3V8AA fame sure made me feel welcome in France." — **K9HKJ.** ... "Those post-war '40s were good old DX days." — **PA0FLX.** ... "VK6-RS and XYL visited c.w. friends around the States this summer." — **WA3EFH.** ... "Quite a chore to immediately answer all cards pouring through the ARRL Bureau but prompt reply is a ham's duty." — **W8YGR.** ... "After repeatedly missing YA2HWI on c.w. in 20-meter pile-ups *he* called *me* on 15!" — **W9BF.** ... "Back in DX biz down Mississippi way after return from Vietnam." — **W3JZJ.** ... "Joined DXCC last week after seven years of hamming and a new Extra." — **WA9AQE.** ... "Milano time is one hour ahead of GMT." — **I1ER.** ... "Big DX signals botch up my Novice QSOs." — **WN2IBO.** ... "Columbus Day will see solemn ceremony in Genoa." — **IØIIC.** ... "Use of illegal EP callsigns by stations elsewhere is a threat to amateur radio in Iran." — **EP2CB.** ... "KV4EY recovered his health okay and tried a trip to VP2VY." — **W3HNK.** ... "Should have W4AAV back on the air before long." — **ex-DX1AAV.** ... "KX6EQ/KC6 made about 150 contacts from Yap." — **W2GHK.** ... "Band analyses (my favorite is 20) rotate too slowly in 'How's' but I can appreciate the space problem." — **W5JPC.** ... "Decided to erect a beam and finish off DXCC on my summer break from N.Y.U." — **WB2DZZ.** ... "Back on from Connecticut as W1HM." — **ex-KV4GA.** ... "W9YYG/9 used 1810 kHz. from last month's 160-meter Reunion at Joliet." — **W9UCW.** ... "Fifteen is still *very* open." — **WN5YMV.** ... "Signed FW8AH on 20 sideband from May 23 to June 5, 1969." — **FK8AH.** ... "Twenty-two years, 200 countries, and still no QSL from Sardinia." — **W8BQV.** ... "Hope something is soon done about the Thailand QSO ban." — **HS2JR.** ... "Just finished my 5B-DXCC hundred for 28 MHz." — **WB4-EPJ.** ... "Grabbin' a few on 20 c.w. and 15 phone." — **W9LNQ.** ... "Bands so hot I barely find time for these reports." — **K8DHT.** ... "Thought C31CI was the figment of an overactive imagination until I checked *QST*." — **W5BZK.** ... "Postal regulations prohibit sending currency into many countries and it could be legally confiscated." — **W2SAW.** ... "When I get my KP4 call I'll plan DXpeditions to neighboring islands." — **WB4DLA/-KP4.** ... "Poor location, 150 watts and dipole good

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

DL4QQ/PX (WA6PMK) and WA6QGW/PX provide your QTH of the Month, views of the picturesque Pyrenees republi of Andorra. Alan and Oliver ticked off 2800 c.w. and 200 voice QSOs on 3.5 through 28 MHz. in early May. Subsec quent DXpeditioners to these mountains now sign the C31 prefix.





9M2KR rolls through on short or long paths with this effective DX layout at Ipoh. Dr. Ho needs only a few more states for ARRL's WAS diploma. *(Photo via KØJX(H)*

enough for 152/146 countries worked/confirmed." — **K3CRC.** . . . "Jacked-up prices of postage and *Callbooks* may make me try a less expensive hobby." — **W5QPX.** . . . "Have QSLs for WAC but still need Miss., S. Dak. and Nev. for WAS." — **WA1JKZ.** . . . "I'm WA3JHB in Pittsburgh now and the DX bug has the better of me once more." — **ex-WA8PKG.** . . . "Many inquiries from W/K/-VE/VOs concerning our new Cornish Award." — **G2AYQ.** . . . "About ten years since I last reported to you." — **K2JWZ.** . . . "I'm convinced that c.w. gets through when all else fails but accuracy is far more important than speed." — **WNØVJG.** . . . "My XYL astutely observes that anyone as fiendish as Murphy must have a cult of disciples and followers — beware!" — **VE7BAF.** . . . "Wild-life movies are my second hobby." — **ZS1JH.** . . . "Nevada boys say it's DX magic when they tack NEV on the end of a c.w. CQ." — **W6EAY.** . . . "5B-DXCC generates high interest in rare 3.5-MHz. activity." — **TF2WLW.** . . . "Eighty quite impossible here due to interference from navigational aids." — **JX3DH.** . . . "When I receive my call from FCC I'll organize a club to help serve as a 'welcoming committee' for foreign amateurs visiting New York." — **ex-YO2BO.** . . . "HA5AM/am, QSOd over the Indian Ocean, works as an airline radioman." — **WA1FHU.** . . . "Retired from the Army a year ago but I've been too busy to get much DXing done." — **W2BJQ.** . . . "OX5 calls are issued only to U.S. personnel at Thule Air Base." — **OX5BG.** . . . "WA1LHD/VE8 of the Baffin loran station wants New England QSOs." — **WA1HAA.** . . . "Up to 31 countries on 15 c.w." — **WN4JYB.** . . . "Been studying 10-, 15- and 20-meter DX patterns at UCLA's W6YRA." — **WA6EQW.** . . . "One of these nights I'm going to try WCSI's 300-ft. tower on 160." — **WB9BUV.** . . . "As a non-DXer why *do* I read your pages?" — **W9IWI.** . . . "One of those W9DY 'Gus Machines' will let me sign off gracefully with my left foot." — **K3AC.** . . . "After reading 'How's' for a year I finally began DXing on 15." — **WN8-DSF.** . . . "Oh-oh — XYL now getting her license to out-DX the OM." — **K4TWJ.** . . . "S.a.s.e. to me will obtain details on Northern Illinois DX Association's DX-oriented NIDXA Award." — **W9DY.** . . . "DX stations may be interested in W-10-U, Georgia Southern Area Amateur Radio Society's certification for confirmed QSOs with ten university stations." — **W4DQD.** . . . "Worked South America and Oceania from college on 75 with an HW-12 and Topper." — **WA5IIS.** . . . "Very busy at work so DX activity is slow down here." — **W1SWX.** . . . "Fifteen-meter DX is my bag, man." — **WN2HPB.** . . . "Passed 172/121 barefoot sans beam." — **W1ARR.** . . . "Still trying to confirm 12 of my 160 countries on sideband." — **W2DY.** . . . "DL4RM clubbers will DXpedite to Liechtenstein on the 11th-12th of this month, HBØ call as yet unknown." — **DL4ER.** . . . "Hit your junkbox and deck out the XYL in some of the homebrew rigs on pp. 44-45, August 26th issue of *Look*." — **WN9CJS.** . . . "Missing *QST*s for January, February and March." — **IICTL.** . . . "Signed W9FLH from 1928 to '67; JAs and Oceania come harder in Florida." — **WB4IGL.** . . . "Wish every 'new one' QSLd as fast as W7HST/8R1, seven days from QSO." — **W3BBO.** . . . "ARRL should issue awards to short-wave listeners." — **B. Tindall.** . . . "W3KT is my close neighbor." — **K3UXY.** . . . "Sorry for the long silence, Jeeves, but things have been pretty hectic here." — **WA5PPZ.** . . . "Interesting gleanings on 20 c.w." — **K3CUI.** . . . "Spent a year in Morocco so I've been watching for CN8s on ten." — **K1HDO.** . . . "My DX interest has recently rekindled." — **WA1JMR.** . . . "Piece of wire in the attic works most continents on 20 c.w." — **K9-SRR/2.** . . . "My thoughts are turning to 5B-DXCC." — **K1UHY.** . . . "Time to dump another load of multiband DX on your overburdened desk." — **W1BGD/2.** . . . "First QSO with my indoor dipole was FB8XX." — **WA2-YWR.** . . . "A month on 75 told me I was better off on 40." — **WB4GTI.** . . . "My HX-20 really goes for 80 c.w. DX." — **WA1FNJ.** . . . "Reached 143/118 without QSLs from France and Belgium." — **WA6JVD.** . . . "UA1KAE/7 gave his location as 'Sauth Schetlands.'" — **W8IBX/2.** . . . "That DX bug bites *deep* on 20 c.w." — **WA1KEX.** . . . "TF2WLS often can be found on the 14,332-kHz.'ISSB spot." — **WA5RTB.** . . . "We're working plenty of DX from W6BAB, Pasadena City College station." — **WB6-VVS.** . . . "QRP is much more challenging (and cheaper!)." — **K8TRF.** . . . "QSLs from South America and Japan will complete my WAC." — **WN2DRS.** . . . "Good signal-to-noise ratio on 160 with a three-foot-high DDRR hoop." — **W2RAA.** . . . "Bands *beautiful* lately." — **WN2FEL.** . . . "Hope ten-meter DX conditions keep hanging on." — **KØGVA** . . . "One once hooked can hardly give up DX completely." — **WA7BOA.** . . . "Raised YN1CW on 20 while keying my 5-watt SB-10." — **K9YRA.** . . . "4X4FQ instructs a youthful electronics class thrice weekly." — **K2BYB.** . . . "YK1AA learned his English back in the '20s." — **WB2WOW.** . . . "Our power came from a generator loaned by DL4AP." — **WA6QGW/PX.** . . . "There's room for *good* tail-ending when working DXpeditions." — **DL4QQ.** . . . "VS6AA plans on Labuan (9M6) this fall if the political situation permits." — **K8UDJ.** . . . "Trying for NCDXC, San Francisco and San Diego DX awards." — **9M2KR.** . . . "First meeting of our Camel Drivers Radio Club was June 29th." — **YA5RG.** . . . "OARC's KR6 Contest gives everyone a chance at Okinawa the 18th-19th of this month." — **KR6TAB.** . . . "The nine-day duration should minimize contest pressure during RAL's October 4th-12th Lebanese DX Test." — **OD5FB.** . . . "Many thanks to our League for what it is." — **EL2-BT.** . . . "Operated at VK9s AM and FH in April and May." — **WB6AUH.** . . . "C.w.-only here." — **W6RXT.** . . . "Just got ZD5G's card for an August '67 QSO." — **KØHWB.** . . . "Yours for more and better DX." — **WØIDW.** . . . "C31s BC and BT, the F5KAE boys, also used 6 and 2 meters." — **W1BTU.** . . . "QSL to 'HH2VA' came back marked 'unlicensed and unknown.'" — **W3-EKZ.** . . . "I note more and more DX operators employing Stateside QSL managers." — **WA9ZAK.** . . . "Receipt of U.S. postage is quite a problem for QSL managers in Canada." — **W1ETU.** . . . "Card from TA1RF via DJ4SK arrived in seven days." — **K3GKU.** . . . "Worked 113 c.w. countries in eight months with a mediocre vertical." — **W5IB.** . . . "Enjoyed 103 QSOs from VP7NA in May." — **WA3ATX.** . . . "Have some snapshots of good old W6SR for anyone interested." — **K6OZL.** . . . "Hope to find time some day to resume publication of our club DX bulletin." — **KP4RK.** . . . "Was W1ZGH from 1950 to '68." — **W5RBO.** . . . "Haven't used my G3OGA call since '62." — **VP9BK.** . . . "Already an eight-year 'How's' reader." — **WA2VWG.** . . . "Here's another newcomer who likes DX." — **WA9VBG.** . . . "Operated KR6QW for eighteen months." — **K4WAG.** . . . "Ex-SVØWM intends a kilowatt from the Philippines." — **K9CSM.** . . . "I offer to correspond from Colombia on amateur matters here." — **HK7UL.** . . . "I previously did all my own QSL work but now need the assistance of W3GJY." — **ex-EP3AM.** . . . "RST 459 from VK3AZY on 0.1 watt." — **W6OA.** . . . "W1EVT's multiband antenna system is hard to believe." — **WAØGQI.** . . . "I'm sure many ARRL members will be interested in our Worked All Britain award." — **G3ABG.** . . . "Some day I'll write a set of hints on such operations as EA6ITU and what we learned about QSL handling." — **W3MR.** . . . "About a thousand Boy Scouts at VO1BSJ this summer." — **VO1BL.** . . . "We'll double our 40- and 80-meter 5B-DXCC efforts this month." — **PJ8MM.** . . . "Short Caribbean DX trips take on great 5B-DXCC importance." — **KV4FZ.** . . . "Wonderful time at Sint Maarten as PJ8NN this year." — **K9GCE.** . . . "One can catch plenty of c.w. DX without commercial gear, linears, towers, etc." — **WA4ZZU.** . . . "Europeans and VKs surely boom through here on 20 c.w." — **WA9ZCP.** . . . "This five-band DX business has me spending considerably more time on 80." — **W9EXE.** . . . "G3PNF will sign a DL5 call soon." — **W3RX.** . . . "TA2E works Europeans on 160 and has heard W1BB." — **K4UCQ.** . . . "Constant European QRM hampers TA2E's efforts on 80." — **VE3ABG.** . . . "New 65-ft. tower gave my hamming a big DX jolt." — **W8ROF.** . . . "I remember the good DX days of 1947-'49 B.C. (before competition)." — **WA5MYR.** . . . "'How's' QSL info is most helpful." — **F3VN/W2.** . . . "Looking for the fall pick-up on 80 and 40." — **W3NB.** . . . "It's my turn to help other readers with some DX dope." — **W6FL.** . . . "JA1CQR's QSL arrived three days after QSO." — **WB4JXN.** . . . "HMF, Pyongyang, is sometimes heard on 7011-7016 kHz. out here." — **K6IDV.** . . . "Twenty c.w.'s been great for Europe." — **K4RON.** . . . "Glad to win VK/ZL Test certificate for Two-land last year." — **W2LWI.** . . . "We're

expanding Utah DX Association *Bulletin* tips and sources." — **K7DEQ**. . . . "Haven't been able to decipher all of those hieroglyphics in 'How's' yet." — **WB6DAS**. . . . "Give more prominent mention to ARRL's 5B-DXCC program." — **YV5BPG**. . . . "New job, new house and new harmonic all but eliminate ham radio." — **W4BRE**. . . . "PJ7JC's former call is PJ2MI." — **VE3EUU**. . . . "Hope you found a little space for our little island's 'big' contest." — **VP9BY**. . . . "New batch of prefixes in every DX test." — **W2CVW**. . . . "VU2DK is former VU2DKZ." — **K4JC**. . . . "The passing of mutual ham friends W6BES and W9VES means we're getting on, OM." — **WØBE**. . . . "My WAS is No. 19,579." — **WB2CGE**. . . . "I glance through 'How's' each month for scoop on QSLing." — **K4OHK**. . . . "I try to qualify for 'QSLers of the Month' in my efforts as a QSL manager." — **WA2RSX**. . . . "H.f. DX is a new thrill for me after seven years on v.h.f." — **K8SYH**. . . . "Best DX wishes to all from our gang at KA9MF." — **WA5VNE**. . . . "Remiss in not keeping you informed on VE6AJT DXpedition activities but there were times when I was not sure what was going to happen next." — **VE6AO**. . . . "My Indonesian license is No. 0001." — **VE7IR/YB1**. . . . "*QST*s at our base exchange quickly disappear." — **OX5BE**. . . . "Life's too short to rise at four A.M. for that Pacific stuff." — **W3KNG**. . . . "Worked my way through college as transmitter operator for KOIL, Omaha." — **HI8XRM**. . . . "Your April 'appliance operators' commentary expresses my own feelings of many years." — **WØINH**. . . . "An ARRL member since '57." — **HB9AAA**. . . . "Hoping for .future South Sandwich activity." — **W3DJZ**. . . . "No opportunity to work much DX but I do enjoy reading about it." — **W2DU**. . . . "First licensed in '37 as G3AH." — **ZL1AH**. . . . "Pile-ups are terrific but W/Ks are very cooperative." — **SVØSV**. . . . "Most of my ham friends in Germany read and enjoy *QST*." — **ex-DL4ZS**. . . . "This one-time prolific contributor is temporarily silenced by medical schooling." — **WA4CZM**. . . . "Close to 5B-DXCC now." — **W4BRB**. "Particularly interested in your 160-meter notes." — **W2BP**. . . . "Somewhat disappointed that my earlier DX info didn't make the past two *QST*s." — **WØDAK**. . . . "Famed QSL printer Fritz is my neighbor." — **W7FCD**. . . . "How's does 'How's' keep up with all these reports?" — **W4VSW**. . . . "Made about 300 QSOs as ZD8CS." — **VP5CS**. . . . "Became intested in ham radio tuning 160 on a homebuilt one-tuber back in the '40s." — **VK3IQ**. . . . "Seven YA s.s.b. stations participated in an Afghanistan field day early last month." — **W1VRK**. . . . "Without the help of emcees many rare DX stations would have to QRT." — **W3ICQ**. . . . "VK7KJ and I have been corresponding for four years." — **W1BPY**.

GANDERS

Back on the DX road again next month, shoved along by (20 c.w.) **Ws** 1ARR 1FK 1TAT 3HNK 3JZJ/5 3KNG 4YOK 5JPC 6BAB 6EAY 7BE 7EKB 8BQV 8IBX/2 8YGR 9BF 9LNQ, **Ks** 1LWI 1UHY 4TWJ 5MHG/6 6GAK 6TWT 8DHT 8PYD 8TRF 9SRR/2, **WAs** 1FHU 1JKZ 1KEX 2BHJ 2YWR 5PPZ 6JVD 9SQY 9ZCP, **WBs** 2DZZ 4GTI 6VVS 9BUV, **VEs** 3GHO 3GLG 7BST, I1ER; (20 phone) **Ws** 1ARR 1BGD/2 2DY 2VOZ 3HNK 3ICQ 4YOK 6YRA 8YGR 9BF 9LNQ, **Ks** 1UHY 4TWJ 6TWT, **WAs** 1FHU 1JHQ 1JMR 2BHJ 2YWR 5PPZ 5RTB 6EQW 8YXE, **WBs** 2DZZ 6VVS, **VE7**BST, I1CTL, P. Kilroy; (15 c.w.) **Ws** 1ARR 3HNK 3JZJ/5 4LQC 4YOK 5BZK 7BE 7EKB 8BQV 8YGR 9BF, K5MHG/6, **WAs** 1FHU 1JKZ 3KSQ 9SQY, **WBs** 4LAL 9BUV, **WNs** 2HPB 4JYB 5YMV 8DSF ØWOW, I1ER; (15 phone) **Ws** 1ARR 1VRK 2DY 3HNK 4YOK 6YRA 8YGR 9BF 9LNQ, **WAs** 1FHU 1JHQ 1JKZ 6EWQ, K4TWJ, **WB2s** BHJ DZZ; (40 c.w.) **Ws** 7BE 8YGR, **Ks** 2JWZ 8DHT, **WAs** 1FHU 1JKZ 2BHJ, **WBs** 4LAL 6VVS, VE3GHO; (40 phone) W8YGR; (80 c.w.) W1SWX, K8DHT, **WA**1s FHU FNJ; (75 phone) **WA**5IIS; (160 c.w.) W1BB, K8DHT; (10 phone) W3HNK; (10 c.w.) W3JZJ/5 and **WB**4EPJ. *More* autumn DX fun ahead!

Where:

ASIA — From YA5RG, Camel Drivers Radio Club prez: "We seek addresses of all past YA stations. If you've ever been QRV from Afghanistan please write us giving fullest details." Wolfgang not only wants to move QSLs, he's interested in the documentary angle . . . . . "I'm receiving many QSLs for EP/mm calls," remarks EP2CB (WA6GZZ), running the Iran bureau. "The Iranian PTT, licensing authority here, advises they have never authorized mobile-marine operation, and no EP mobile operation is permitted at this time. DXers can assist us in this problem by refusing to QSO such stations." . . . . . While the convenience of self-addressed U.S.-stamped envelopes is generally preferred by APO-type DX stations, KR6KL and West Coast *DX Bulletin*'s WA6AUD urge us to clarify that Army Post Offices do redeem International Reply Coupons on Universal Postal Union stipulations available from your P.O. KR6NL adds, "I QSL in the same way I receive cards, and the expense is out of our own pockets, not paid for by the military." . . . . . Those recent 9VØs were participating in a month-long Singapore anniversary commemoration, suffixes unchanged. 9VØNR, for example is 9V1NR, according to *DX News-Sheet*.

AFRICA — "I've taken up duties as QSL manager for EL2D/5L2D," affirms W5EJ. "Also have a few cards and most logs for Harold's previous EP2HB operation in Teheran. Up to the limit of this supply I'll be glad to QSL any contact that can be verified." . . . . . CR7BC, a 100-per-cent QSLer for forty years, deplores a meager response from W/K/VEs. Are you late with yours to Manuel? . . . . . West Coast *DX Bulletin* understands that 7C1CG QSL possibilities are zero, also that no Botswana bureau is extant, and furthermore that VQ8CU's QSLing may be held up pending the OM's return to Florida . . . . . K8UDJ issues QSLs for 5Z4LW on the customary basis, direct in response to self-addressed stamped envelopes, otherwise via bureaus at leisure.

EUROPE — "WA7MKC will be my QSL manager for contacts with the U.S., its possessions, and Canada," verifies DL1RB . . . . . W3HNK's responsibility for CT1UA QSLing commenced in July . . . . . "As of April 5, 1969, I'm QSL manager for PAØKOR," notifies WB6YNK . . . . . W3AVJ tends YU3EY's QSLs for QSOs on and after July 20, 1969 . . . . . HB9AKJ's contacts with North America can be confirmed through WA3HUU . . . . . QSLs for PI1LC/mm QSOs dating from July 9, 1969, are available from WB8BTU . . . . . "I believe K6VVA and WA6QGW planned to mail all WA6QGW/PX and DL4QQ/PX QSLs at once and soon," says DL4QQ (WA6PMK) . . . . . "W/K/VEs should QSL DLØTD/LX via WA9HYS, others via DLØTD," instructs DL4ER. "We've been waiting for more s.a.s.e. but I think we'll

YK1AA remains the only regularly active amateur in Syria from ancient Damascus. Rashid, whose son holds the call YK1AM, is especially active on 20 sideband Fridays at 0400-0800 GMT. There's a TA-33 jr. spinning overhead. *(Photo via WB2WOW)*

complete things via the bureaus. DL4s and DL5s at present may be reached through QSL Bureau, 97th Sig. Bn., APO, New York, N. Y., 09028." . . . . . Resident Andorran C31s AA AH and AY are former PX1s YR JQ and MA, respectively, addresses the same. Other recently licensed visitors include C31s CA (F2PY), CD (DL6SZ), CJ (F1XM) and CN (F8VQ) as listed in *DX News-Sheet* . . . . . *DX-MB* of Germany's DARC indicates that CT3/s DLs 30J 9VQ and DJ5JK vow 100-per-cent QSL . . . . . VERON's *DXpress* reveals that the PD3 prefixed borrowed by PAØs commemorates some 1919 Dutch radio pioneering.

HEREABOUTS — "My QSLing is somewhat in abeyance due to logs and cards being somewhere en route," explains ex-KV4GA, now busy setting up camp as W1HM. "No QSLs every reached me via the V.I. bureau so those who tried to use that route should reapply to [the address in the listings to follow]." . . . . . W3HNK takes on VP2VY's QSL chores world wide as of July . . . . . "I don't know why W/Ks haven't already received PYØBLR's cards for last year's operation," writes PY4AP who means to keep trying to clear the board . . . . . VP2DAI awaited a shipment from the printer to catch up on his backlog, notes West Coast *DX Bulletin*, and the same organ is told by VP8IY that continuing volcanic activity makes chances for recovery of abandoned logs slim indeed . . . . . HH9DL disclaims recent c.w. action under his tag . . . . . W8ZCQ of *CARAscope* endorses the efficacy of W2SAW's foreign mint postage enclosures, and we note that W6GSV's periodic *QSL Managers Directory* is rapidly fattening. . . . . QSL aide K8UDJ posts an explanatory form letter to applicants who display unfamiliarity with s.a.s.e. procedures C21JW, ET3USA, FY7YQ, GD3KDB, GI3OLJ,

VS5MC (VS6AA) dispensed some 1500 QSOs from Brunei Town this summer while visiting VS5MH. At right VS5s PH TJ MH and MC enjoy a conversational interlude. *(Photos via K8UDJ)*

HB9ZL, KG6ARV, KH6COB, KV4s AA AM, LZ2KKZ, OE6RSG, OX5BA, SU1IM, TA2E, UA1AJ, UC2KSB, UO5s AP PK, UP2s CV KBI, UY5ZX, VK9LB, VPs 1CP 2LZ 2MQ, VQs 8CC 8CDB 8CP 8CPR 9GA, VR1L, VSs 5MC 6AA, YA2HWI, YJ8RG, ZD3A, ZS6JK, 3A2CL, 5A3TX, 6W/W4BPD, 6Y5UC, 7P8AB, 7Q7WW, 7X0WW, 8R1J, 9H1BA, 9M2KR and 9U5CB, together with QSL pushers Ws 3EVW 3GRS 4BRE 6NJU 7VRO, Ks 8UDJ 9GZK 0ETY, WAs 3HUP 4GWM 4UOE 4WIP 5LES 6AHF, WB2YQH, VE3s ABG and IG, are enthusiastically endorsed and applauded as your "QSLers of the Month" in correspondence from Ws 1SWX 3JZJ 6YRA 8BQV 8YGR 9BF, Ks 3CRC 5WUF 8DHT, WAs 2BHJ 3JHB 9SQY 9ZCP, WBs 2DZZ 4KZG, VEs 2DKJ and 3GHO for unusually fast QSL shipments. Any praiseworthy punctuality over your way? . _ . _ . *Halp*! The following italicized brethren hunt hints that may lead to the capture of fugitive QSLs from holdouts mentioned: *W5JPC*, ZK2AB; *W6OJW*, PAØLHW, PZØAA; *W8BQV*, 6W8s BL CQ DQ DW; *W8YGR*, KH6EDY; *W9BF*, KS4CA; K5-*BYV*, CE9AO '66, CR3AB '67, FP8AD '64, FY7YJ '66, IS1SEL '67, SV1AB '66, UA2AA '65, VR4ED '65, YA3-TNC '66, 4S7LB '67; *WA1JKZ*, IS1BDO, FP8CS, SVØWP, 9H1AV; *WA9ZCP*, HU1P, CT2AP and YS1HUKE. Any 'alp? . _ . _ . _ W6EKN, K8DHT and WA2BHJ are still available as QSL helpers for busy ops at the DX end.

OCEANIA — The Australian Tourist Commission, according to WIA's *Amateur Radio*, will turn loose 100,000 blank QSLs for our VK friends to spray world wide during 1970, year of Australia's bicentenary. VKs also will be authorized to employ the AX prefix . _ . _ . _ WA8DXA's logs for VK9TB date back to 1966, says Mr. Watt's *DX News-Sheet* . _ . _ . _ West Coast *DX Bulletin* hears that VKØWR's Heard isle QSLing should be completed this month, also that the Kermadecs see but one mail boat yearly . _ . _ . _ More specifically, let's check the mailsack for items of possible usefulness, being mindful that each datum is not necessarily "official", complete nor accurate. . . .

A2CAU, J. Large, P.O. Box 120, Lobatsi, Botswana
C31s AA AH AY (see text)
C31s CK CL (via W7CRT)
CT1UA (via W3HNK; see text)
DL4ER, R. Eslaire, Box 88, APO, New York, N.Y., 09057
DL4QQ, A. Higbie, Box 552, USASA FS, Berlin, APO, New York, N.Y., 09742
DL4RM, Gateway to Europe Radio Club, P.O. Box 2474, APO, New York, N.Y., 09057
ex-DX1AAV, L. Eisler, W4AAV, 255 Roebling St., Warrenton, Va., 22186
EA9ER, A. Cuervo, Legion Estranjera, P.O. Box 227, El Aaiun, Spanish Sahara (or via REF)
EL2D-5L2D (via W5EJ)
ET3XL, Box 2342, Addis Ababa, Ethiopia
FW8AH (via W2CTN or to FK8AH)
GC5s AOJ AOK (via F9MD)
GC5s AOM AON (to DJ3YL)
HBØs XVR XVU (via W7CRT)
HC2GG/I, G. de Miranda, Box 244A, Quito, Ecuador
K4PHY/YV5 (via K4ZCP)
K6JGS/HKØ (via W4VPD)
KA1C-KA1IJ (via WA8NZH)
KV4EY (via W3HNK; see text)
LAØAF, R. Jedlicka, APO, New York, N.Y., 09085
LU4VL, Aptdo. 121, Allen, Rio Negro, Argentina
OX5BM, Box 1187, APO, New York, N.Y., 09023
PAØKOR (via WB6YNK; see text)
PI1LC/mm (via WB8BTU; see text)
PJ9BG, c/o Transworld Radio, Bonaire, N.A.
PS2ASO-PY2ASO, A. Oliveira, P.O. Box 31, Sao Paulo, Brazil
PY7AWD, c/o PY7PO, Box 842, Recife, Brazil
TI8NAM, Box 2412, San Jose, C.R.
VP2KC, K. Carson, St. Kitts, Leewards
VP2VK, P.O. Box 1737, St. Thomas, V.I., 00801
VP5CS, K. Collins, RCA MTP, Grand Turk Comm., Patrick AFB, Fla., 32925
VQ8CU, Box 13562, Tampa, Fla., 33611
W4UBN/mm, USS *Yorktown* (CVS-10), FPO, San Francisco, Calif., 96601
W4ZYH/mm, USS *Shangri-La* (CVA-38), FPO, New York, N.Y., 09501
WA1KPJ/8P6, USNavFac, FPO, New York, N.Y., 09553
WA5YRG/VE8 (via WA9VBG)
WB2WYX/HS, Capt. R. Heron, Central Mail Rm., Box 3752, APO, San Francisco, Calif., 96310
WB4DLA/KP4, W. Roig, P.O. Box 726, Hato Rey, Puerto Rico, 00919
XT2AA, B.P. 75, Ouagadougou, Upper Volta (or via REF)
YA1EXZ, C. Green, Box 279, Kabul, Afghanistan
YN1GLB, via G. Black, WA5GFS, P.O. Box 165, Decatur, Texas
YU3EY (via W3AVJ; see text)
9J2BR, P.O. Box 1186, Lusaka, Zambia
9U5CE, Box 1920, Bujumbura, Burundi
9VØs NR PA PC (see text)

C31BL (to F3KT)
C31BS (to ON5FD)
C31CE (to HB9UP)
C31CH (to F8YY)
C31CI (to HB9SJ)
C31CM (to F9ET)
CN8HL (via AAEM)
CT3AO (via CT2AK)
DL1RB (see text)
DL1RQ (via WB2CGE)
DLØTD/LX (see text)
DU1ZAE (to W4JNR)
ex-EP2HB (see text)
GB2LS (via G3MCN)
GB3JBF (via GC3GS)
GC3YJI (via RSGB)
GC4AR (to G4AR)
HB9AKJ (via WA3HUU)
HBØXVQ (to DJ4WG)
HBØXVW (to DL2MY)
HBØXVX (to DJ9MH)
HBØXWS (to DK1YK)
HS2JR (via DK1RR)
ITØARI (via IT1TAI)
JW1CI (via LA3T)
KF7BSA (via ARRL)
ex-KV4GA (to W1HM)
PY7AWB (via PY7APS)
VP2GTL (via WA5LES)
VP2LD (via WA5LES)
W4VPD/KC4 (to W4VPD)
ex-ZD8CS (to VP5CS)
ZF1AA (to K2OLS)
3V8NC (via G3TXF)
4MØA (to YV1QG)
5W1AD (to ZL1AAP)
5Z4LW (via K8UDJ)
8P6DD (via WB6FGT)
9Y4AA (via W6CUF)
9Y4VV (via WA5WBK)

For the preceding specs a "How's" bow goes to Ws 1AX 1CW 1VRK 3JZJ 4LQC 5BZK 5JPC 5QPX 8BQV 9BF 9DY 9LNQ, Ks 2JWZ 3CRC 5BYV 8DHT 8PYD, WAs 1JHQ 1JKZ 2BHJ 3JHB 6PMK, WBs 2BHJ 2GVE 4EPJ 4KZG, VE3GHO, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, Nor. 72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4-BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham 20, England), Long Island DX Association *DX Bulletin* (W2-GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39

Hannum St., Ballston Spa, N.Y., 12020), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025), Southern California DX Club *Bulletin* (WA6GLD), UBA's *On the Air* (ONs 4AD 5VA), Utah DX Association *Bulletin* (K8DEQ), VERON's *DXpress* (PAØs FX LOU TO VDV WWP) and West Coast *DX Bulletin* (WA6AUD). Your turn?

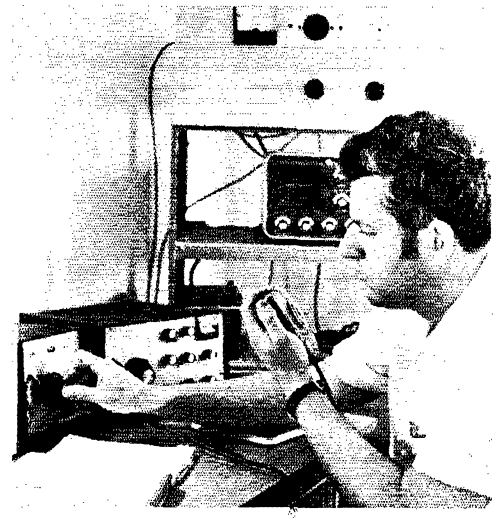
Whence:

EUROPE — From 0000 on the 11th to 2400 the 12th of this month International Institute of Communications, Genoa, invites world-wide participation in its multimode 1969 Columbus Contest on 3.5 through 28 MHz., no formal serial exchange specified. QSOs with stations (a) inside one's own International Amateur Radio Union Region count one point each, (b) outside one's Region count two points, (c) in I IS IT 9A M1 and HV areas count five points, and (d) with special station IØIIC count thirty points — one contest contact per station and no intracountry QSOs allowed. For final score multiply total QSO points by the number of DXCC countries worked. Log entries sent to Cristoforo Colombo Contest, Istituto Internazionale delle Comunicazioni, Genoa, Italy, by January 31, 1970, may qualify for awards of merit. Then, too, East Germany's WADM DX do, a code-only stomp, comes off on the 18th-19th of this month as described in the previous "How's" ._._._ Ex-YOs 2BO 3LM and 4AAC now reside in New York. Ex-YO2BO says ex-YO4ALT lives in Montreal, ex-YOs 3FT 3RA and 5BT in western Europe, and ex-YO3GL in Israel ._._._ Research by WA1FHU reveals YL PAØULA now signing WA1ANR, that OT PAØFF started sparking in 1918, YU1YE is working his first W/Ks on s.s.b., and SP6WM is off to India and a possible VU2 call for two years ._._._ "I'm ready for 80 meters with a quarter-wave vertical and HW-100," warns TF2WLW, awaiting official clearance for 3.5-MHz. 5B-DXCC fun. "Got most of my first 1700 QSOs, 110 countries and 47 states on 20 and 15 meters but I take occasional spins on 40 and 10." ._._._ "Accommodation for bona fide amateurs is still gratis," invites proprietor Les Hard of the Forest Hotel, Guernsey, C.I. ._._._ National Amateur Radio Union of Greece, P.O. Box 1442, Athens, sponsors various certifications of DX prowess on a European motif, and G2AYQ will fill your s.a.s.e. with details on Cornish Radio Amateur Club's new diploma for QSOs with Cornwall. If you're still not busy enough, try I1VCG of ARI for the scoop on Diploma Liguria, a trophy based on 15 QSOs with specified I1 regions, or consult YO3RF concerning the half dozen Roumanian Amateur Radio Federation awards available for working sufficient YOs. Still hungry? All right, PZK, P.O. Box 320, Warsaw 1, Poland, issues a fresh Polska Award for working all 17 SP provinces ._._._ DLØTD/LX, with DJ7KH, DKs 1BN 1OS 1XS, DLs 4ER 8RH and 9WN aboard, had about a thousand QSOs from Luxembourg city in May, some 450 with W/K/VEs.

ASIA — Remember there's a Lebanese DX happening on the 4th-12th of this month, and OARC's phone-c.w. KR6 fling on the 18th-19th ._._._ EP2CB informs 5B-DXCC aspirants, "I have 10 through 40 meters available, and EP2BQ is on 10 through 80. We're c.w. types." Chuck says EP2s BI DA and HL are also active although licensing prospects have dwindled since EP3AM's departure ._._._ W8QWI reports AP2AR attending the University of Kentucky. Arif will be lost to DX hunters for about three years ._._._ K6JXH is told by VS6AL that the HKARTS Firecracker Award will call for six VS6 contacts, up from the present four, after 1969 ._._._ Tokyo's Fighting DX Club sponsors a Transpacific Award of possible interest to sheepskin hoarders. Check with JA1QGC ._._._ "The 50th anniversary of formation of the Royal Corps of Signals occurs next year," observes K8UDJ. "VS6s and others consequently may mount a couple of DXpeditions in the near and far east." ._._._ KR6RL (W4NUL) mentions a large group of stations out his way who congregate regularly on 14,340 kHz. at 1100 GMT. "We welcome all comers and are most happy to talk to every checker-in." ._._._ "Hopefully," as politicians like to put everything, Laccadives time approaches for VU2DK.

HEREABOUTS — "DXCC-squared" No. 60 goes to VE3UR, by golly, the third for Canada. Right on Ray's flying heels comes K8UDJ with the 61st, a photograph of QSLs confirming QSOs with ARRL DX Century Club members in 100 or more DXCC countries, the fourth from Eightland ._._._ VP5CS (K1BTD) hails from Grand Turk on 15, 20 and 40 c.w. ._._._ K6s KA JGS and associates are whomping up a T19 Cocos thing for January or later ._._._ WA9VBG expects WA5YRG/VE8 to hold out on Baffin isle till his Coast Guard status expires in December ._._._ W4BPD interrupted his popular African rovings for Carolina respite in August ._._._ It's not easy to record the passing of W1DQF, beloved XYL of Mr. 160, W1BB. "Alice was always rooting for top band," remembers Stew ._._._ NJDXA's W2JT/2 will radiate from New Jersey's Warren county from 1600 GMT the 18th to 2000 the 19th of this month on 10 through 80 meters, c.w. and voice. Tune 55 kHz. inside each band's low edge ._._._ Gripes of the Month are piling up: WNØVJG is irked by RST 599 reports coupled with QRM SO PSE RPT. WN4JYB is just as nettled by repetitious transmission of mailing addresses on Novice frequencies. W3JZJ/5 nominates as Lids of the Month those cads whose overly long calls are smackdab zero beat with DX targets. K8DHT protests use of 1825-1830 kHz., 160's only good DX slot for easterners, for ill-timed Stateside rag-chewing. K3AC could get along without so many self-styled DXpedition frequency-guard stations who illegally omit identification while spewing errant instructions and general misinformation during pile-ups ._._._ OX5-BG's TR-4 will be workable on 15 and 20 at least until February ._._._ WA1FHU says HK1ZU hunts c.w. QSOs with Rotary Clubbers ._._._ PY7s AWB and AWD represent Fernando de Noronha on 40 and 80, sideband and c.w. ._._._ XE1J is due for the Revilla Gigedos any old time now ._._._ Don't forget this month's VK/ZL/Oceania go on the 4th-5th (phone) and 11th-12th (c.w.), always a worthy test of anyone's beams and screams.

QST



4X4FQ feeds a 2-element 21-MHz. beam with this gear in a Ramat-Gan highrise. Aron, a DX chaser since '58, is an electronics technician for Hebrew University in Tel-Aviv. *(Photo via K2BYB)*

Strays

Feedback

The transistors in the exciter section of the QRP 80–40 Transmitter, Q_1 and Q_2, June 1969 *QST*, page 11, are mislabeled. They should be 2N4124s.

—•••—

The protective diodes shown at the input terminal of the DC 80–10 Receiver (CR_3 and CR_4) in May 1969 *QST*, page 11, are incorrectly specified. They should be 1N914s or similar. In some instances it is possible to use 1N34As, but not in areas where strong local broadcast stations are nearby.

—•••—

Stolen Equipment

Collins 51J4 receiver, serial No. 3234, removed from USWB Office, Norfolk, Va. Municipal Airport. Contact Jack K. Thomas, W4PXG, 909 Five Forks Rd., Va. Beach, Va. 23455.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Break Away!

ARE you bored? Has operating lost its zing? Has the fun gone out of turning on the equipment, and the pleasure worn thin? Do you think of it as the same old voices with the same old habits? Are you ready to scream if you hear them just one more time? No, it isn't that well known case of "The Blahs:" you've just picked up a plain old-fashioned dose of too much of the same thing -- the amateur doldrums, and it is time for a change. It's time to try something different and climb out of the rut you have made for yourself, and the cure is as simple as moving the dials on your gear.

Amateur radio is as varied as a smorgasbord with the only drawback being our inability to taste everything that is spread out for us. So, if we tire of one phase, there are many more just waiting for us to sample. What is more appealing is the fact that we can adapt the techniques we have acquired in one activity to some other that pleases our fancy.

The contest addict, who finds time dragging between hassles, can find plenty of challenge in the search for the tremendous number of certificates that are available. A form of operating that requires the same patience, and knowledge of when the various bands are open to acquire multi-colored wall paper so many of us exhibit in our shacks.

The traffic operator who tires of the rigidity of net participation could apply the skill of being able to dig down deep through conditions that cause the best of us to give up in disgust and chase those weak elusive signals to log rare DX prefixes instead of counting the words in a message.

The people who are bored with round-tables, and wish there were something just a little more exciting than the regular chat with the same people who always seem to say the same things, but hate to slip away from that type of operating, might find a change in the local AREC net where the drill becomes a round table at the words "net is finished," yet could turn back into a serious operation involving a community disaster while they were still casually talking.

No one who has gone after DX ever feels it cloys or is dull, but when the pile ups get disgusting, and the total of countries worked has risen to the point where the list of possibilities will soon be completed, the switch to traffic could be an easy one. It requires the same stubborn sticktoitiveness, the same demand for accuracy as the hunt through everything that the ionosphere can devise to log Lower Slobbovia.

Sister Mary Cletus, WAØJIE with Dot Abel, VE3DXZ at the recent Mid-West YL Convention in Toronto.

The change of pace into something different can apply not only to our type of activity, but we might even make a full break by changing the mode. The phone operator has often learned, thanks to laryngitis, that c.w. not only can be fun, but has a special flavor all its own, and that there is as much personality in our sending style as in our voices. We find that just because we are seemingly "permanent" calls on the BPL lists, thanks to our NTS activities, there is a whole new experience in handling traffic by voice. People who love traffic but prefer voice operation, yet want something different, would find that they are badly wanted, and needed to handle the wonderfully rewarding work of the MARS phone patches between servicemen and their families.

None of us ever gets to the point where we really believe we are in "Dullsville" because we do have that ability to break away if we want to. But just when we think we've had it with our chosen form of operating and decide

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

to change the traffic load suddenly gets terrific, new rules appear for contests, and certificates blossom from unexpected places, or, the telephone rings and a friend says "Get on ten, it's wide open and the DX is rolling in!" And there it is waiting for us with all the old appeal of new worlds to conquer.

30th YLRL Anniversary Party

Cw		
Start	October 15, 1969	1800 GMT
End	October 16, 1969	1800 GMT
Phone		
Start	November 5, 1969	1800 GMT
End	November 6, 1969	1800 GMT

Eligibility: All licensed women operators throughout the world are invited to participate. YLRL members *only* are eligible for the cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs will not be counted. Contacts on nets do not count.
Procedure: Call "CQ YL."
Operation: All bands may be used. Cross band operation is not permitted. Only one contact with each station will be counted in each contest.
Exchange: Station worked, QSO number, RS or RST, ARRL Section or Country. Entries in logs should show time date, band, transmitter and power. All logs must be signed.
Scoring: A. Cw and Phone sections will be scored as separate contests. Submit separate logs for each contest.
B. All YLs within an ARRL Section score one (1) point for each QSO with another station located within an ARRL Section. Score two (2) points for each contact with a station not located within an ARRL Section (DX) Definition of DX all stations not located within an ARRL Section. DX YLs shall score two (2) points for each contact with a station located within an ARRL Section. (Note: ARRL Section lists are available from the YLRL Vice President, or on page 6 of *QST*.) Multiply number of contacts by total number of different ARRL Sections and/or Countries worked.
C. Contestants running 150 watts dc input at all times may multiply the results of (B) by 1.25 (low power multiplier.)
D. Ssb contestants running 300 watts pep or less at all times may use the low power multiplier (results of B by 1.25.)
Awards: Highest cw score
Gold Cup (YLRL member only)
Highest score phone
Gold Cup (YLRL member only)
Highest cw and highest Phone logs from each YLRL District, and Country will receive a certificate.
Corcoran Award: Highest combined cw, and Phone score (YLRL member only.)
DX Only: Highest combined cw and Phone scores from North and Central America, including the Greater and Lesser Antilles, will receive an Award from Arlie Hager, W4HLF. Highest combined score from any other part of the world will also receive this award.
Logs: Copies of all logs showing claimed score and signed by the operator, must be postmarked not later than November 19, 1969, and received by the Contest Chairman, no later than December 6, 1969. Mail logs to: Ebba Kristjansson, VE5DZ, Box 71, Colonsay, Saskatchewan, Canada.

Floridora Net

A new Floridora net now meets on Wednesdays at 8:00 PM EDST, on 7620 Khz. K4UIZ is the net manager, and all YLs are invited to check in with this new group, as well as with the one on Tuesday mornings at 9:00 AM EDST, on 3933 Khz.

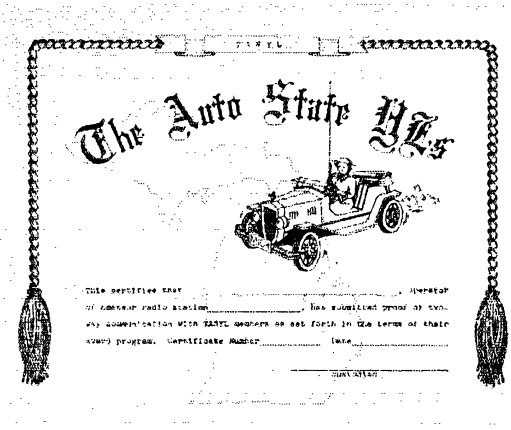
TASYL — The Motor Maids of Radio

Almost anyone can say to friends "Lets start a club," but those words spoken on and off the air among Michigan YLs meant: we speak the same "language," we know each other from constant contact although most of us have never met, so we really want to organize a group that represents the women amateur radio operators in our state. The words became reality in December 1965 when WA8ENW, K8VCB, WA8CTE, WA8ARJ, WA8HYL, WA8CXE, K8IAI, and WA8LMR met at the home of K8ZJU, to discuss the qualifications, by-laws, dues, and other things that are so necessary to an effective organization. They wanted an appropriate name that would identify this 100 percent YL club, and finally settled on The Auto State Young Ladies, because, despite the many things for which Michigan is famous, the name connotes automobiles to everyone.

Membership is open to all YLs living within the state who are licensed Amateur Radio Operators. Because of the wide area that it covers, the TASYLS are an on-the-air club, however, the personal touch is maintained by scheduling get-togethers at all conventions and picnics. At present 32 women belong to TASYL, and all Michigan YLs are welcome to join.

Tasyl is affiliated with YLRL, and sponsors an adoptee under the YLRL "Adopted YLs" program.

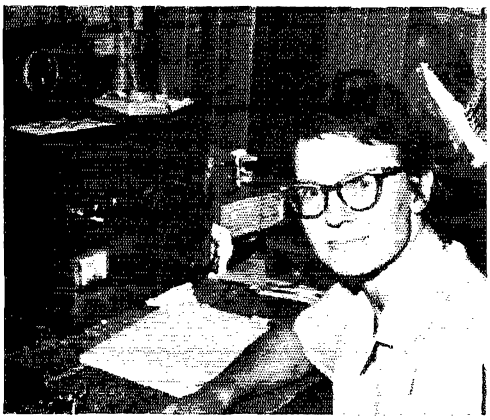
The TASYL certificate is available upon receipt of log information of communication with members of the club. The full rules are available from the Certificate custodian, Betty House, K8VCB.



TASYL Certificate.

Alaska Lassies Certificate

For those who are interested in acquiring the Alaska Lassies Certificate, the address of the custodian has been changed. The new address is: Rose Rybachek, KL7FQQ, 4½ Mile Badger Road, Fairbanks, Alaska, 99701.



Alice McCullough, K7RQZ

Alice McCullough, K7RQZ

She learned the code while still in highschool, and then she promptly forgot it. The years brought marriage, and a family, and then came Civil Defense, and another bout with the code that resulted in an amateur radio license in 1963, and Advanced Class in 1968.

For a year Alice was almost pure cw, and then she got into CD, MARS, and Traffic fone nets, and there she has stayed. She seems to always be involved in some public service activity such as forest fires, traffic accidents, traffic pile ups in the mountain passes, lost mountain climbers, and similar incidents that need communications. As one of the few YLs in Oregon Army MARS, she spends about 13 hours a week in that service. Her preoccupation with the public service end of amateur radio has resulted not only in her regular appearance on the BPL list, but she holds the distinction of having handled more traffic than any other YL in Oregon. In addition to BPL, CP-20, and PAM for Oregon, Alice is originator of the Beaver State Net that proved its effectiveness during the severe snow storm in January of this year. She holds ARRL Public Service Awards, as well as those from the Oregon State Police, Forest Service, and commendations for her work from State and County CD directors.

When not on the air, Alice is equally busy with her family of five children ranging in age from 4 to 19. QST

Feedback

VE5DZ, YLRL Vice president, advises that UA3KBO should have been listed among the YL Phone scores with a total of 11,252 points in the 1969 YL—OM Contest.

Changes of Address

Please advise us *direct* of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

25 years ago in QST amateur radio

October 1944

. . . The status of the radio amateur after the war is discussed by K. B. Warner editorially. In spite of distressing rumors being circulated, he is firmly convinced that we shall resume operations in due time and with ample allocations. Not many amateurs have had the time or knowledge to overhaul their pre-war rigs with a view to stabilizing the signal, eliminating key clicks, harmonics and other faults. But with some open sky showing ahead, he thinks it is high time we took a real hard look at our rigs. A few remarks are addressed to holders of WERS permits. Many of these who are not licensed amateurs would like to become same and Warner urges them to get busy, learn to operate the code and prepare for the written examination.

. . . Walter E. Bradley, W1FWH, describes an advanced and versatile design for a two-tube regenerative receiver. It uses small plug-in coils to cover from 550 kc. down through the amateur bands. It uses a 6JT7GT for the detector and a 6V6GT as pentode audio amplifier.

. . . The American Standards Association has a new set of schematic symbols and they are published in this issue.

. . . The FCC's Radio Intelligence Division in action is described by Oliver Read, W9ETI. Here all unidentified signals are monitored. Fixes by direction finders locate the station. — *W1ANA*

50 Years Ago this month

October 1919

. . . At the very last minute before mailing, the official announcement from Washington arrived. "Ban Off" was the caption of the little pink sheet enclosed with the mailed copies. It took a good deal of doing to get Secretary Daniels to lift the restrictions on amateur operation. The Canadians had been operating for months. In fact, a committee from ARRL got a resolution into Congress requesting Secretary Daniels to lift the ban. Nothing happened until the Hon. William S. Greene got a joint resolution through Congress *directing* the Secretary to remove the restrictions. There then followed, as we know, the tremendous boom in all sorts of activity—broadcasting, etc.

. . . The new Connecticut vacuum tube, the invention of H. P. Donle, is described. The anode is plated on the outside of the glass envelope — the current passes through the hot glass by ionic conduction. The tube thus avoided some bothersome patents. (The tube did not enjoy great popularity.)

. . . No articles on tube transmitters yet. Everything is still spark. There are some articles on spark transmitters. Thordarson not only supplements its line of transformers but advertises components, rotary gap, plate condensers, etc. The condensers are glass plate with sheet bakelite as dielectric! The Amrad quenched gap makes its appearance. Price $17.50. — *W1ANA*

Operating News

GEORGE HART, W1NJM,
Communications Manager

ELLEN WHITE, W1YYM,
Deputy Comms. Mgr.

DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

Administration: LILLIAN M. SALTER, W1ZJE
Public Service: WILLIAM O. REICHERT, WA9HHH

Identification. Some of us amateurs give the regulations regarding identification a pretty severe beating. This has been the subject of discourse before, but it seems to bear repeating, because recently it has come to our attention that at least two amateurs have been cited for not identifying the station with whom they were in contact. Oh yes, they identified themselves all right, but there is more required than this. You have to identify the other guy, too, before you stand by for him.

Perhaps many of you had the impression that this requirement had been rescinded. Not so. What was rescinded was the requirement of having to send the call of the station being contacted at the *beginning* of the transmission. Most of us send this call anyway (otherwise, how in hades would the guy know we were calling *him*?), but the principal purpose of this change was to legalize "tail ending" in working DX.

Many others had the impression that the FCC monitors pay no attention to this rule. Maybe they don't, most of the time — but don't assume that this makes you immune. No sooner do you get that comfortable feeling that what you are doing (or not doing) may not be technically legal but nobody pays any attention to it, and — bang! In comes that "pink" ticket.

What, specifically, do the regs say? Well, as a licensed amateur you're supposed to know that. Ignorance of the regs is no excuse for violating them, and they are printed in full in every copy of the ARRL *License Manual*. Nevertheless, here is the pertinent regulation:

"97.87(a) An amateur station shall be identified by the transmission of its call sign at the beginning and end of each single transmission or exchange of transmissions and at intervals not to exceed ten minutes during any single transmission or exchange of transmissions of more than ten minutes duration. Additionally, at the end of an exchange of telegraphy or telephone transmissions between amateur stations, the call sign (or the generally accepted network identifier) shall be given for the station, or for at least one of the group of stations, with which communication was established."

So, you can *start* your transmission with only your own call (e.g. "This is W1NJM," or DE W1NJM), but in ending it you *must* identify whom you are in contact with (e.g. "W3NF from W1NJM" or W3NF DE W1NJM). Whether this makes any sense or not, you better believe it's the rule. See page 90 for further samples of FCC approved identification procedures.

We believe that nine out of ten amateurs violate this rule in contests. Better make that 99 out of a hundred. Those engaged in network operation also violate it consistently. Most of

OPERATING EVENTS (Dates in GMT)
ARRL-IARU-SCM-Affiliated Club-Operating Events

October	November	December
1 **Qualifying Run, W6OWP**	1-2 Massachusetts QSO Party (rules same as p. 122 Sept. 1968, logs due Dec. 1, 1969)	3 Qualifying Run, W6OWP
4-5 VK/ZL phone, p. 93 Sept.		16 Qualifying Run, W1AW
4-6 RTTY Medallion SS, p. 54 Sept.	1-3 Delaware QSO Party, p. 119	Jan. 10-11 VHF SS
California QSO Party, p. 126 Sept.	Zero District QSO Party, p. 132	Feb. 7-8 DX, phone
4-12 Lebanese DX Contest, p. 93 Sept., p. 109 Oct.	5-6 YL/AP phone, p. 111	21-22 DX, cw
11-12 CD Party, phone*	6 Qualifying Run, W6OWP	Mar. 7-8 DX, phone
VK/ZL cw, p. 93 Sept.	8 Frequency Measuring Test for ARRL Official Observers	21-22 DX, cw
Columbus Contest, p. 109	8-9 SS phone, p. 60	
Region II Contest, p. 96	9 OK DX Contest	
15-16 YL/AP cw, p. 111	15 SS cw, p. 60	
17 Qualifying Run, W1AW		
18-19 CD Party, cw*		
KR6 Contest, p. 93 Sept.		
WADM, p. 93 Sept.		
Boy Scouts Jamboree, p. 33		
* League Officials and Appointees, only.		

NOTE; Possible W6OWP Qualifying Run "alternate" (same times/frequencies) is W6ZRJ.

the time, you get away with it. If you get tagged, however, all we can do is "punch your card."

SCM Lifers. Approximately 800 ARRL members have signed up for life — that is, either plunked down their $130 for life membership or signed up for quarterly payments toward that end. This is approximately 1% of the full membership. Nothing so outstanding about this, although we hope and expect this percentage will keep going up as more and more dedicated amateurs realize how sound an investment it is. What *we* want to brag about is the percentage of our elected CD officials who are "lifers." There are *nine* of them, out of 74, a percentage of 12.2. Of the nine, four are *Charter* Life Members: W2ZI (S.N.J.), W9PRN (Ill.), K2SJN (E.N.Y.) and WØBV (Mo.). The othe ƨɹW9BUQ (Ind.), W7JWJ (Wash.), KH6BZF (Hawaii), W4PED (S.C.) and W7CAF (Ariz.).

Nice to know that so many of those elected to high office have made sure that their ARRL membership won't expire until they do!

Staff Note. We don't believe we've previously mentioned that Bob Hill, W1ARR, is no longer on the CD staff. Bob departed in July, and we're going to miss those sprightly contest writeups of his.

Meanwhile, Al Noone, WB6SAZ, who left us in February, returned in May (he just couldn't stand being away) and resumed his old job under W1CW in DXCC — and also acquired a new call, WA1KQM. With W1ARR's departure, Al is being given a crack at the contest job and a chance at assistant communications manager status.

This again leaves a vacancy as assistant DXCC. Anyone interested? Young, single amateurs preferred. — *W1NJM.*

ELECTION NOTICE

To all ARRL members in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must meet the following requirements prior to deadline date listed below: (1) Holder of amateur Conditional Class license or higher. (2) A licensed amateur for at least two years immediately prior to nomination. (3) An ARRL full member for at least two years immediately prior to nomination. Petitions must be received on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, *zip code* and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their memberships status, etc.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence names of all eligible candidates.

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code.)

Communications Manager, ARRL [Place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year-term of office.

You are urged to take the initiative and file nominating petitions immediately.

— *George Hart, W1NJM, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Wisconsin	Oct. 10, 1969	Kenneth A. Ebneter	Dec. 10, 1969
Oklahoma	Oct. 10, 1969	Cecil C. Cash	Dec. 11, 1969
Ontario	Oct. 10, 1969	Roy A. White	Dec. 12, 1969
Illinois	Oct. 10, 1969	Edmond A. Metzger	Dec. 15, 1969
Western Florida	Oct. 10, 1969	Frank M. Butler, Jr.	Dec. 15, 1969
New York City & Long Island	Oct. 10, 1969	Blaine S. Johnson	Jan. 2, 1970
South Dakota	Nov. 1, 1969	Seward P. Holt	July 3, 1969
Arkansas	Nov. 1, 1969	Curtis R. Williams	Resigned
Indiana	Nov. 1, 1969	William C. Johnson	Oct. 14, 1969
Orange	Nov. 10, 1969	Roy R. Maxson	Resigned
Southern New Jersey	Dec. 10, 1969	Edward G. Raser	Mar. 4, 1970
Maritime	Jan. 9, 1970	William J. Gillis	Mar. 11, 1970
Georgia	Jan. 9, 1970	Howard L. Schonher	Mar. 26, 1970
Ohio	Jan. 9, 1970	Richard A. Egbert	Mar. 28, 1970

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	6738	1406	1574	168	9886
W3CUL	277	1787	1671	102	3837
W7BA	11	1307	1190	111	2619
K5TEY	4	1249	1127	3	2383
K5BNH	3	935	840	52	1830
KØONK	155	752	673	43	1623
W3VR	129	743	701	18	1591
WA7HKR	30	730	730	30	1520
WØLCX	6	707	638	10	1361
K7UXS	0	600	600	0	1200
K7LRD	10	525	525	8	1068
WA6OXE	32	497	490	39	1058
W9UEM	16	502	439	88	1045
W7DZX	7	526	481	4	1018
W1OJM	5	503	503	0	1011
WA7BDD	5	318	610	45	978
W7KZ	11	388	386	1	786
W7GHT	13	381	376	9	779
K8LNE	10	369	337	15	731
W3EML	29	397	300	1	727
WA7GVB	5	352	331	21	709
W8UPH	11	352	303	40	706
KØZSQ	0	348	0	348	696
WØIES	0	326	326	0	652
WA8ETX	193	203	224	24	644
WA6LWE	14	313	128	171	626
WA8WZF	14	304	296	7	621
WA4SCK	33	277	279	10	599
W7PI	21	271	262	11	565
W6VNQ	24	264	259	4	551
W9JYO	229	161	151	10	551
WA2CAL	49	262	191	43	545
WA3IYS	24	269	211	37	541
WB2RKK	33	261	208	16	518
WAØHRM	13	260	135	106	514
W7JWJ	36	237	214	20	507
K7HLR	165	168	146	26	505
W3MPX	118	231	146	9	504
WA6BYZ	26	239	116	123	504
Late Reports:					
W7BA (June)	12	1216	1143	74	2445
W7BA (May)	11	1109	1056	49	2225
K7UDG (May)	18	721	718	3	1460
WA7HKR (May)	6	570	570	17	1163
WA7HKR (June)	12	565	565	12	1154
WA8WZF (June)	16	567	546	21	1150
WØLXA (June)	298	379	28	351	1056
W8UPH (June)	3	393	330	61	787
K8LNE (June)	6	333	287	8	634

BPL for 100 or more *originations-plus deliveries*

WA8DWL 173	WA3IUV 119	WAØRVR 111	
WAØHQR/Ø 127	WA6DIL 118	W9EQO 107	
WA8ETX/3 126	WA2BHJ 113	WA5KIV 101	
WA4PDM/2 126	K2DEL 112	Late Reports:	
WA3IHV 121		W6MLF (June) 224	

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: W4SQQ, WA6LWE, WA8DWL, WA8ETX.

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.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

West Indies	José Medina-Hernández, KP4CO	May 1, 1969
Oregon	Dale T. Justice, K7WWR	July 1, 1969
San Diego	Richard E. Leiffer, WA6COE	July 10, 1969
W. Mass.	Percy C. Noble, W1BVR	Aug. 11, 1969
Kansas	Robert M. Summers, KØBXF	Aug. 18, 1969
Delaware	John L. Penrod, K3NYG	Oct. 10, 1969
Rhode Island	John E Johnson, K1AAV	Oct 12, 1969

In the West Virginia Section of the Roanoke Division Mr. Donald B. Morris, W8JM, and Mr. David L. Mays, K8MYU, were nominated. Mr. Morris received 166 votes and Mr. Mays received 123 votes. Mr. Morris' term of office began Sept. 18, 1969.

JULY CD PARTIES

The following are high claimed scores; they read, from left to right: appointee, total score, number of QSOs, number of sections, number of hours of operation. Final adjusted scores will appear in the October CD Bulletin. — *WA1KQM*

C.W.

K2KIR	247,515-702-67-15	WA2ATO	173,565-551-63-20
K4PUZ	238,550-727-65-20	WØUCE/3	173,440-535-64-20
W6DGH	232,220-676-68-20	W8AHZ/8 (WA8POS, opr.)	163,682-523-62-19
K8HKM	216,745-643-67-19	WA2CAL	146,190-437-66-16
K3HKK (K3AHT, opr.)	213,200-649-65-20	W8GAI	143,220-462-62-16
K4BAI	209,880-629-66-20	WØINH	141,900-423-66-13
WA9AIB	200,000-620-64-17	W2FR	140,480-432-64-15
W8LT (WA8GYT, opr.)	199,040-615-64-15	WA3IUV	140,420-470-59-19
KØORK	192,510-615-62-16	K4FU	132,370-420-62-11
WB2RKK	188,825-574-65-18	W4GEQ	126,480-405-62- 8
W5WMU	178,870-577-62-13	WØLRW	125,660-408-61-15
		K3GJD	123,795-386-63-11
		WAØMLE	123,220-400-61- 9

DX CENTURY CLUB AWARDS

From July 1, 1969 through July 31, 1969, DXCC certificates based on contacts with 100- or-more countries have been issued by ARRL Headquarters to the amateurs listed below.

New Members

W7LFA....224	WB4KZG...120	HB9DI.....108	JA4FM.....104	WA3BZO...102	K8LUH.....100
OH2BAD...221	K6GUN....116	WA9QAL...108	9Y4LO.....104	WA5QEW...102	KØBXI.....100
SP2AJO....202	K8RWL....114	VE6AVR...107	JA1PAQ....103	WA9AQE...102	VE3DNR....100
KZ5TW.....161	WA1JHQ....114	W2BE.....106	JA3IVA....103	K6ZMZ.....101	WB2CZN....100
UA9FJ.....145	WA9WJE....111	WA5QFQ...106	K6GAK....103	UA3HE.....101	WA3HUU...100
OE1ZRC....134	JA1FNA....110	WA9WJF...106	SM7BBV...103	WA9QJW...101	WB4EPJ....100
K2GLI.....129	K4TAG.....110	ZL1AV.....106	W4DPR....103	JA1FGB...100	W8NDP....100
WAØGUH...127	UA9FN.....110	W9GHO....105	G3UBE.....102	K2MFG.....100	WB8ANW...100
I1ZKJ.....124	W2FCR....109	UAØML....105	OX5AP.....102	K6OL.....100	WAØTVC...100
WB2BNJ...124	W8HXZ....109	EA8FJ.....104	UP2KCB...102		

Radiotelephone

W1EGT....281	OH2BAD...203	DL2IX.....119	DL7OD.....108	WA5QFQ...104	K6GAK....101
I1KN.....266	K1CMI.....196	WA1HJZ...114	W2FCR....108	W7DOZ....104	LU2BU.....101
G3UML....265	WB2JGO...155	W4TJF/3...114	9K2CF.....108	K1JHX.....103	I1ECF.....100
W7LFA.....224	WA3JDA...143	WA1JHQ...112	W2IOZ.....107	SV1BY.....103	K6EIV.....100
TG9UZ.....222	UA3AVV...125	WB2BNJ...110	CT1RR.....106	WA1BFD...102	KØBXI.....100
OH2BR.....216	OE1ZRC....124	WØIKD.....110	KØBJM.....105	K4DHZ.....101	VE3DNR...100
					WB4GTC...100

Endorsements

Endorsements issued for confirmations credited from July 1, 1969 through July 31, 1969 are listed below. Endorsement listings from the 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

335
W6ANN
W9FKC

330
W6IBD

325
W2BMK
W6CAE

320
K1SHN
WA2RAU

315
PY2CQ
PY2SO
VK3AHQ
W1TS
ZL3IS

310
W1BPY
W7BA
W9NLJ

305
K1HVV
W1BPW
W2NUT
W4HOS

300
K4YYL
W8ILC
W9GDI

290
HK3AFB
W2FXE
W8IBX

YV5BZ

280
JA8ADQ
W6AAO
W6BS

270
F9RM
K1JHX
W1ECH

250
W2OBX
WA2BRI
W3BWZ
W3NB
WØBL

260
DL3ZA
K4RSY

K6LAE
OE2EGL
OH2BR
VE3AIU
W5LJT
WA5REU
W6HVN
WØCAW

240
CE6GS
JA1MIN
VE6ABP
W3AES
W9EXE
W9OW

230
DL1LZ
I1IR
K4RSM
K8PYD
UW3DR
VE3UR
VE5GG
W2N1N
W8BIE

W9IGW

200
K3SGE
PY4AP
SM5BZH
VE2DCY
WA2TIF
WB2RBG
WØBE
WØDAK

180
DLØFT
G3KAA
I1CTL
JA1OCA
K2EUR
K4HJJ
K4YXJ
W3HNK
W6VD

W7GVX
W8MKE
W9EH
WA9OVU

160
K2UFM
OK1JD
W1RFQ
WA2HJF
W6GC
W6JNM
W7BJ
WAØOTE

140
I1BOL
K9CVO/1
K3CRC
K3ILC
K6TVL

KØDEQ
W1SWX
WA3JDA
W6AYQ
WB8ANV

120
DL9OL
K3LGM
KL7CZ
UA6KAE
VE8ZZ
WA1HJZ
WA1HNR
WA3CSF
W4UHI
WB4JCV
W6EIF
W7NP
W8JJA

Radiotelephone

320
WA2RAU

290
PY7YS
WA4WIP

280
HK3AFB
W1BPY
W2FXE
W3AEV

270
VO1BD

260
F9RM
WA5IEV
WA5REU
W6PTS

250
HP1JC
VE3AIU

W8GUZ
W8VHY

240
YV4UA
W8GKM
WØMGI

230
K1HVV
K1LHT
VE3UR

VE6ABP
VS6DR
W2SSC
WØBL
WAØOAH

200
CE6GS
JA1MIN
K2AB
VE3CUS
W3AES

W4BA
W5WJQ
WB6RMZ
W9EXE
W9NLJ

180
G5AFA
W2NQR
WA2CGD
WA5REB
WA8YBB

160
JA1OCA
WA2TIF
WA2VEG
WB4BAP
W7BJ
WAØOTE

140
VS6AL
K2EUR

K8PYD
W1DWQ
W2LCW
WA2IWH
WA2VSQ
WB2CDF
WB6DXU
W7ELU
W9KRU
WA9NFJ

120
DL9XR
W2ELW
WB2MOI
W3SEJ
WA3EQY
WB4JCV
W4WVF
WØPAN
ZL1AAP

W4SQE	121,500-400-60-14	KØYVU	73,950-251-58-12
K4CIA	120,475-389-61-12	W6DGH	68,200-241-55- 7
WA2BAN	119,180-400-59-18	W8DQL	60,155-222-53- 8
K6CAG/1	118,400-370-64-17	W8GAI	59,670-221-54- 9
W5EKF	117,490-379-62-15	K4FU	58,320-209-54- 8
W1AW (K6OSO, opr.)		K3AKR	57,375-221-51-15
	115,920-364-63-13	WA9BWY/9	54,340-205-52-10
W4TYE	113,390-369-62-14	W3DPJ	41,760-167-48- 2
WA7ISP	105,530-341-61-10	WB2SIH	41,595-173-47- 6
K7WWR	105,280-329-64-11	K8HKM	41,580-185-44- 6
W8DQL	104,500-340-60-12	K4BSS/4	40,800-154-51- 5
W4KFC	103,700-333-61- 4	K6BWD	38,250-146-51-12
W6NKR	103,320-321-63- 9	W4KFC	35,860-156-44- 3
KØRPH	103,200-338-60-11	WAØMLE	32,430-134-47-
KØAZJ	102,955-345-59- 7	W7TVF	30,550-124-47- 9
K1ZND/Ø	102,000-333-60- 6	W8AP	30,530-137-43- 6
WA8AJZ/Ø	102,000-333-60- 7	W5MQ	29,375-121-47- 9
WAØSDC	102,000-334-60- 5	WA4WSW	26,455-123-43- 6
W7GHT	101,680-322-62-19	K4TTN	24,510-114-43- 8
K2EIU/5	101,400-331-60- 4	W1NJL	24,400-115-40- 5
W1BGD/2	101,100-330-60- 6	W1ETU	23,800-140-34- 5
W5OB	100,595-334-59-15	W4MXU/Ø	23,400-113-39- 6
PHONE		WA9YQT	21,935-103-41- 6
K1ZND/Ø	106,495-354-59-13	K9GEL	21,060-104-39- 7
K3HKK (K3AHT, opr.)		WØPAN	21,000- 97-42- 4
	95,700-323-58-15	WB2RKK	20,475-110-35- 4
WA2BAN	91,800-336-54-18	WØKB	20,295- 92-41- 5
WA2ATO	89,775-315-57-12	W8DYF	20,140-105-38-10
WAØOTE	87,300-286-60-14	WA3JKO/3 (WA3s HGX JKO)	29,610-141-42- 6

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 0130 GMT October 17. (In converting, 0130 GMT October 17 becomes 2130 EDST October 16.) **W6OWP** (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. 0400 GMT October . (In converting, 0400 GMT October 1 becomes 2100 PDST September 30.)

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. (Each type carries a checking reference.)

Speeds	Local times/days	GMT times/days
10, 13, 15	7:30 P.M. EDST daily 4:30 P.M. PDST	2300 daily
5, 7½, 10, 13, 20, 25	9:30 P.M. EDST \ SnTTh 6:30 P.M. PDST ∫ Sat	0130 MWFSn
"	9:00 A.M. EDST MWF	1300 MWF
"	6:00 A.M. PDST	
35, 30, 25 20, 15	9:30 P.M. EDST MWF 6:30 P.M. PDST	0130 TThSat
"	9:00 A.M. EDST TTh	1300 TTh
"	6:00 A.M. PDST	

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 August QST
Oct. 13:	*It Seems to Us*, p. 9
Oct. 16:	*Fixin' The Station Receiver*, p. 17
Oct. 21:	*Building A Novice Rig . . .*, p. 37
Oct. 23:	*Amateur Radio Public Service*, p. 60
Date	Subject of practice text from *Understanding Amateur Radio*
Nov. 5:	*Odd Harmonics*, p. 112
Nov. 7:	*Using the Transmatch*, p. 113

W1AW FALL-WINTER SCHEDULE, EFFECTIVE OCT. 26

(The W1AW Spring-Summer schedule, through Oct. 25, appears in Sept. *QST*.)

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]	.....	.....	3.700[6]	14.020	14.020	7.150[6]	14.020
0130	.....	.....	3.700[6]	14.100	14.100	7.150[6]	14.100
0200	.....←PHONE OBS[2]→						
0205-0230[4]	.....	.....	3.820	50.120	145.600	1.820	21.270
0230	←CODE PRACTICE DAILY[1] (35-15 w.p.m. TThSat), (5-25 w.p.m. MWFSn)→						
0330-0400[4]	.....	.....	3.555	.....	1.805	.....	3.555
0400	RTTY OBS[3] .....←RTTY OBS[3]→						
0410-0430[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]	7.020	3.945	7.150[6]	3.520
0530-0600	.....	.....	3.700[6]	7.080	3.945	7.150[6]	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
1400	.....←CODE PRACTICE[1] (5-25 w.p.m. MWF), (35-15 w.p.m. TTh)→					.....	
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] CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 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, K6OSO. * Times-days in GMT. Operating frequencies are approximate.

Ted Henry needed a rugged linear triode. So he came to us.

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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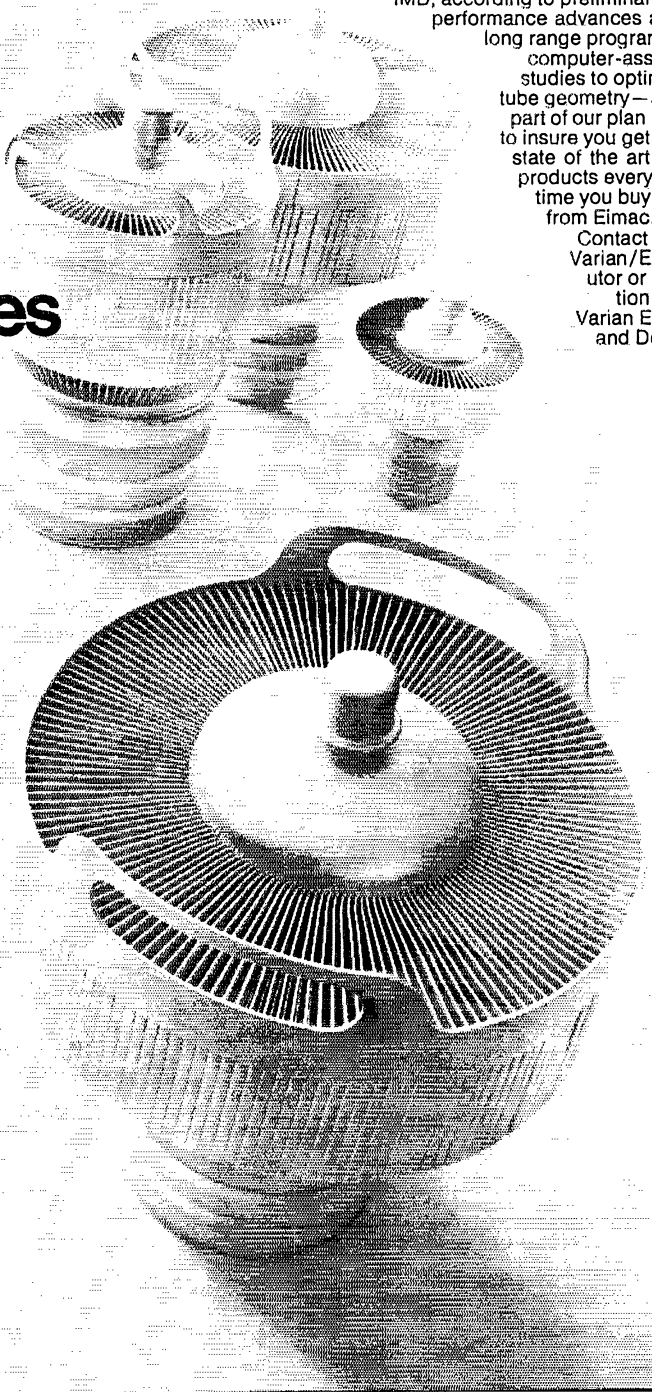
No tetrodes with higher linearity.



In the power tetrode field we're defining the state of the art by demonstrating intermodulation distortion better than any other known tubes. In 1966 we introduced the 4CX1500B, a 1.5 kW tetrode with the highest linearity then known: better than —40 dB 3rd order IM distortion. Since then we produced the 4CX600J, a 600 watt tube with —45 dB 3rd order IM products—without feedback—and later a 5 kW tetrode with the same figure. Now the latest tetrode in our program, a 15 kW tube, exhibits —40 dB 3rd order IM products. We can show IM distortion improvements from 10 to 20 dB in a practical quiescent plate current range.

Other tetrodes now under development will deliver up to 40 kW with linearity as high as —45 dB IMD, according to preliminary data. Such performance advances are part of a long range program employing computer-assisted design studies to optimize internal tube geometry—all part of our plan to insure you get state of the art products every time you buy from Eimac.

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Contact your nearest Varian/Eimac distributor or ask Information Operator for Varian Electron Tube and Device Group.

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: K3KAJ as ORS, WA3DUM as ORS, W3EEB as ORS/RM, WA3HWC as OVS, W3RDZ as OO, K3GKF as OO. K3GKF is a very busy OO, having sent some 250 notices the first six months of the year. K3OBU has moved to the E. Pa. section. We welcome our 2-meter NCS back on the air. Bill had a slight stroke which disabled him for a short time. The U. of Del. station will be back on the air this fall. The emergency power plant came in handy recently. K3NYG watched the moon landing strictly on emergency power. We are going to bring W3FEG out of retirement so that he may keep the juice on. It's the season for club activity. Have you attended a club meeting recently? DEPN reports QNI 48, QTC 6, bulletin 3. K3EPN reports QNI 33, QTC 0, DTMN reports QNI 19. Traffic: W3DKX 30, WA3GSM 17, W3TRC 9, WA3DUM 8, K3NYG 2.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3ICC. RMs: W3EML, K3MVO, W3MPX, K3SLG, WA3GLI, K3MYS. V.H.F. PAM: W3FGQ. OBS reports were received from WA3HMK, WA3JKB, WA3AFI, K3RDM, WA3EEC, K3WEU, WA3IHV, W3CBH and WA3JKO! OVS reports from K3VAS, K3WEU, WA3JWL, WA3IOB, W3CL, WA3EEC, WA3KTP and WA3BSV; OO reports from W3KEK, K3WEU, W3NNC, WA3EEC, WA3IUV, WA3FBD.

Net	*Freq.*	*Operates*	*QNI*		*QTC*	*RM/PAM*
EPA	3610	Daily	6:45 P.M.	266	274	W3MPX
PTTN	3610	Daily	6:00 P.M.	250	179	W3MPX
PFN	3960	Mon.-Fri.	5:30 P.M.	453	302	K3SLG
ENTN	3740	Daily	7:15 P.M.	157	78	WA3IUV
EPAEP&TN	3917	Daily	6:00 P.M.	391	173	WA3GLI
VHF (6)	50.64	Mon.-Fri.	7:00 P.M.			W3FGQ
VHF (2)	145.35	Mon.-Fri.	8:00 P.M.			W3FGQ
Novice	7170	Daily	4:30 P.M.		67	WA3JWF

W3CUL, W3VR, W3EML, W3MPX and WA3IHV made the BPL. WN3MHD passed the General Class exam. W3EML reports the Boy Scout Jamboree perked up traffic a bit. W3MPX is working hard keeping two nets on the go. WA3JWF reports his Novice net will need help after school starts. K3MVO visited Hq. WA3ATQ reports a balun antenna sure helps signals. WA3IYC got his 20 w.p.m. certificate. WA3AFI is learning how to use his new R-4B. WA3JKB joined Army MARS. WN3LVC got his big G ticket. K3RDM has a new HW-22A. WA3IOB went mobiling in VE3-Land. The v.h.f. nets need liaison to h.f. K3WEU is back from the hills in Maine. WA3CKA has a home-brew rig for s.s.b. working now. WA3HMK has a new SB-500. WA3FBP built an HW-100 for a blind ham friend. WA3EWV will be operating from W3AEQ at Lehigh U. W3EU says he likes retirement. Work is interfering with W3BNR's skeds. W3BUR vacationed in VE1-, 2- and 3-Land. WA3HIT, new Philadelphia Co. EC, held his first organization meeting and things look like they may get started again. Summer is over and I hope all the repair work on antennas was completed! WA3KKM has a new NCX-3 in his VW. WA3FVK, now in the Merchant Marine Academy, would like to hear from the gang in EPa. Address Midn DeHaven, Section 73-370B, USMMA, Kings Point, N.Y. 11024. Traffic: W3CUL 3837, W3VR 1591, W3EML 727, W3MPX 504, WA3EXW 250, WA3IHV 237, WA3IUV 222, WA3JWF 134, K3MVO 116, K3OIO 113, WA3JGN 104, W3HK 82, WA3ATQ 70, WA3EEC 66, WA3GLI 65, WA3IYC 52, W3NNL 46, WA3AFI 40, WA3GUK 33, WA3JKO 29, W3HNK 26, WA3JWL 26, WA3JZB 24, K3VBA 23, WA3GAT 22, WA3JKB 22, W3AIZ 19, WN3LVC 19, W3FPC 18, WA3IOB 15, K3RDM 15, WA3HGX 14, WA3GAP 12, K3WEU 12, WA3IAC 11, W3JSX 11, WA3BSV 8, W3VA 6, W3CBH 5, WA3CKA 4, W3CL 4, K3KTH 4, WA3BJQ 3, WA3HMK 3, WA3EWV 2, WA3FBP 2, WA3IAZ 2, W3ADE 1, W3BNR 1, W3BUR 1, W3EU 1, W3KEK 1, WA3KTP 1, W3OY 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, John Munholland, K3LFD—SEC: W3LDD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI Ave.*	*Mgr.*
MDD	3643	2300Z	Daily	31	248	10.2	W@UCE/RM
MDDS	3643	0030Z	Daily	20	23	3.7	W3CBG/RM
MDCTN	3920	2200Z	STTS	18	75	14.7	W3ATQ/PAM
MEPN	3920	2200Z 1700Z	MWF	22	68	21.3	K3IAG
MSTN	50.400	0000Z	M	4	5	5.5	WA3EOP
MTMTN	145.206	0100Z	T-S	25	50	10.8	W3IFW

Appointments: WA3AJR as EC Prince Georges County. Endorsements: W3IN as OO, W3GEB as ORS, W@UCE/3, W3ATQ, W3CBG and the MDD-MDDS-MDCTN gangs enjoyed eyeball QSOs in Patapsco State Park at their Annual Picnic July 27. The highlight of the occasion was the award to W3TN by the MDD gang of a nickel-plated handkey inscribed "Iron Man Award presented to Dave B. Fell, W3TN, in appreciation of his long service to Amateur Radio and the MDD Net." WA3HEN, W3LQY and K3TBD awarded the title of "Mr. Twinkletoes" to K3GZK in the name of the MTMTN. Your SCM had the pleasure of awarding a total of 67 Section Net certificates to stations active in MDD, MDDS and MDCTN. W3JPT reports that AMSAT hosted a NASTAR group from New York and heard speakers on the Amateur Moon Relay Project.

(Continued on page 124)

DELAWARE QSO PARTY

November 1-3, 1969

The Delaware ARC, W3SL, announces its 14th Delaware QSO Party and invites all amateurs to participate. Delaware hams are urged to work as many out-of-state stations as possible so that those interested can earn credit toward WAS and the W-DEL certificate. *Rules:* The contest will take place in the 30-hour period from 2300 GMT Nov. 1 to 0500 GMT Nov. 3. There are no power restrictions. Del. stations score 1 point per contact and multiply the total by the number of states, Canadian Provinces and foreign countries worked. Outside stations score 5 points for each Del. station worked and multiply the total by the number of counties in Delaware worked during the contest period. Credit will be given for contacts with the same station on more than one band, but not for contacts with the same station using two modes on the same band. A certificate will be awarded the highest-scoring station in each state, Canadian Province and foreign country (with 3 or more contacts) and to the highest-scoring station in each Delaware county. In addition, a W-DEL certificate will be sent to any station working all three Delaware counties. Party logs showing required date will be accepted in lieu of QSLs. Suggested frequencies are cw 3560 7060 14060 21060 28060, phone 3975 7275 14325 21425 28650, vhf 50 50.4 and 144 MHz. The general call will be CQ DEL, Delaware cw stations should identify themselves by signing DE (call) DEL K. Phones say Delaware calling. Del. stations send QSO number, RS(T) and county (New Castle, Kent or Sussex). All others send QSO number, RS(T) and state, province or country. Logs and scores must be postmarked no later than Dec. 1, 1969 and should be sent to the Del. ARC, c/o Ross Hawkins, 125 Greenbank Rd., Apt. B-4, Wilmington, Del. 19808. (Applications for the W-DEL certificate also go to this address.)

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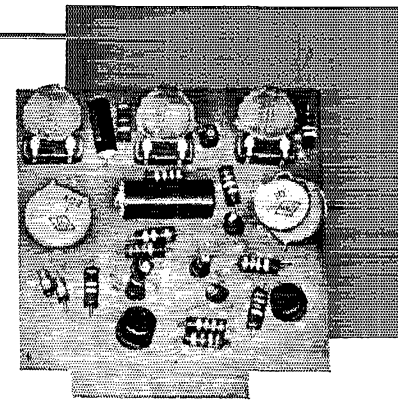

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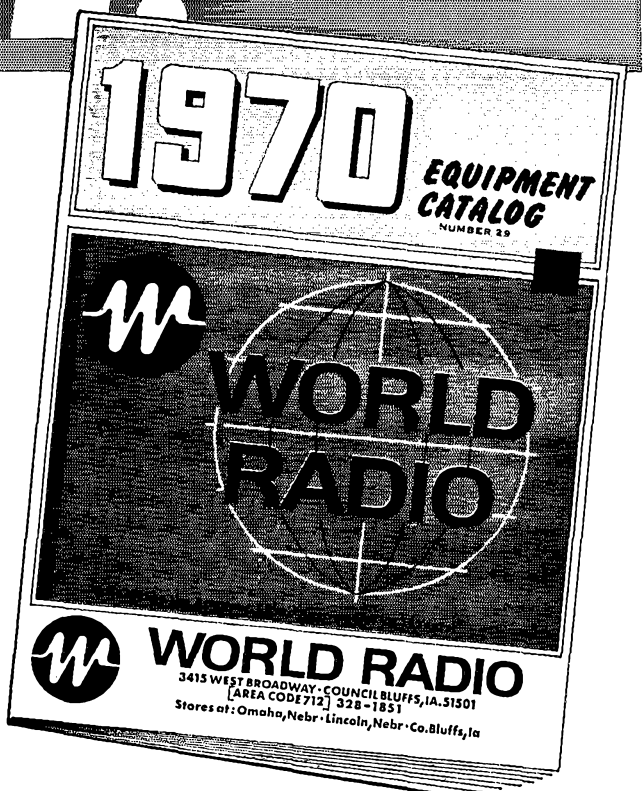

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Diode Switching for VHF FM Channel Selection

(Continued from page 17)

12 volts d.c. be available at the control position, as well as in the equipment itself. A voltage divider, $R_3R_4R_5$, is tapped at 4 and 8 volts. The remote control switch S_1 connects the switching matrix to either + 12 volts or ground. In the position shown, the d.c. voltage is applied through RFC_3 to the diodes. Note that it is applied to the cathode of CR_1 and the anode of CR_2. The anode of CR_1 has 8 volts on it, from the voltage divider, so it is reverse-biased. The cathode of CR_2 has 4 volts on it, so it is forward-biased, connecting crystal Y_2 into the circuit. The situation reverses when S_1 is in the other position, CR_1 being forward-biased and CR_2 reverse-biased.

The r.f. chokes RFC_1 and RFC_2 affect the operation. It is easiest to get working if 2.5-mh. chokes are used, but smaller ones, or TV peaking coils, may work. Oscillator output level can be checked by measuring bias developed at the first multiplier grid (or grid current) and chokes selected for best results.

This modification is easily used with Motorola or Marconi transmitters, but may be more difficult with G.E. Progress-Line transmitters and receivers. The G.E. units have their crystals working into a lower capacitance (10 pf.) than the other two, and the modification introduces some stray capacitance, which tends to lower the frequency of oscillation. Motorola crystals, for 24-times frequency multiplication, may be used in the Progress-Line transmitters, to get around this problem. It may also be necessary to increase the value of the screen-to-cathode capacitor in these units.

Diode switching can be used in circuits where both sides of the crystal are above ground, but providing for individual frequency adjustment may be difficult. A modification for the Motorola 5V transmitter is shown in Fig. 4. The tuned circuit L_1C_4 is as in the original, with C_3 added to tune down into the 2-meter band. The extra capacitance required is 30 to 40 pf. The netting capacitors C_1 and C_2 are added, for individual crystal-frequency adjustment. The chokes and electrolytic capacitors, L_2-C_6 and L_3-C_7 are to be used only if necessary to remove hum or other modulation from the d.c. leads. Otherwise, the circuit is similar to that of Fig. 3. QST

Transistor Checker

(Continued from page 19)

Test Procedure

To test an unknown transistor with this unit, proceed as follows:

1) Place the transistor in the socket or connect it to an appropriate cable-and-plug assembly inserted in J_1.

2) Move S_1 to ON.

3) Set S_6 to TYPE CHECK. The S_2 position that results in a meter reading indicates the transistor type. If the same reading is obtained in both positions, the transistor is no good. However, if meter indications are obtained in both positions and one reading is much higher than the other, the transistor is probably okay. The smaller reading is a measure of leakage currents, and it varies from transistor to transistor.

4) With S_2 set at the appropriate position determined in step 3, put S_6 in the BETA TEST position. If M_1 doesn't read zero, the transistor is bad. If the transistor appears to be okay so far, close S_3. The meter needle should move up scale. If no reading is obtained, set S_5 at a different position and close S_3 again. If no setting of S_5 will cause the meter needle to move above zero when S_3 is closed, the transistor is defective.

5) Return S_1 to OFF. QST

Silent Keys

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

W1EAE, Bigelow Green, South Acton, Mass.
W1FKQ, Richard Warren, New Haven, Conn.
W1GMR, Stanley E. Warner, Rocky Hill, Conn.
W1JQK, Walter M. Shorthouse, Hamden, Conn.
W1JU, Ralph M. Bray, Brookfield, Conn.
W1NVV, Oliver I. Morin, Jr., Randolph, Mass.
W1TCR, Norman J. Butler, Tilton, N.H.
W1WOO, Stowell R. Fenn, Middlebury, Vt.
WA2FNX, Frederick A. Lewis, Rock Tavern, N.Y.
W2KK, George D. Nicholson, Ocean City, N.J.
WB2LAM, Edward Mulroy, Piscatway, N.J.
W2LGI, Joseph W. Stachnik, Hempstead, N.Y.
K2SIJ, Fr. Roch J. Mullin, Garrison, N.Y.
WA2TTB, Lt. Ronald L. Warnett, Morristown, N.J.
W2UOH, ex-W8NTZ, Walter A. Krieman, Tonawanda, N.Y.
W3CER, Denvil O. Compton, Washington, D.C.
WA3DQT, Robert A. Ghelardi, Bloomsburg, Pa.
W3FOC, Joseph J. Heindl, Jr., Baltimore, Md.
W3JP, Dr. Leon Freedom, Baltimore, Md.
W3PGV, Archie F. Wittenberg, Wilkinsburg, Pa.
W4MUP, Wiley R. McKellar, Jr., Goldsboro, N.C.
W4RLQ, Robert L. Buyea, Coral Gables, Fla.
W4TFC, Lloyd Fishbeck, Lake Worth, Fla.
K4VQD, John H. Keaton, Elizabeth City, N.C.
W5DCV, William N. Broman, Austin, Texas.
W5JQ, Richard W. Keeling, Houston, Texas.
WA5MZB, Sam O. Harter, Grove, Okla.
K5OCM, Joseph T. McConchie, Natchez, Miss.
K5ZCU, Elmo C. Parnell, Beaumont, Texas.
K6BID, Adrian A. McCroskey, Riverside, Calif.
W6CQS, Edna D. O'Donnell, Long Beach, Calif.
W6HN, John Kaye, Redlands, Calif.
WB6MZI, Jesse C. Kelley, Woodland Hills, Calif.
WB6OHH, William L. McKee, Riverside, Calif.
W6OTC, Richard A. Froney, Glendale, Calif.
W7IVT, James C. Woods, Seattle, Wash.
WA7KBJ, Dellmere J. Peterson, Port Angeles, Wash.
W7OKX, Richard W. Nuttall, Midvale, Utah.
W7VNE, Malcolm J. Juring, Anaconda, Mont.
W7VUD, Marvin E. Youker, Auburn, Wash.
K8AAG, Emmett M. Gant, Fairview Park, Ohio.
W8CRM, William O. Gassett, Dearborn, Mich.
K8DII, Harley R. Chaffin, Canton, Ohio.
K8SFZ, Richard Baxter, Dearborn Heights, Mich.
W9TC/K4GB, Oral H. White, Franklin, Ind.
WA9VHI, Henry R. Werts, Alton, Ill.
KØURQ, Jessee E. Comer, Grant City, Mo.
VE1AZ, G. M. Howell, Riverview Heights, N.B.
EI7L, Andrew J. Kettle, Dublin, Ireland.

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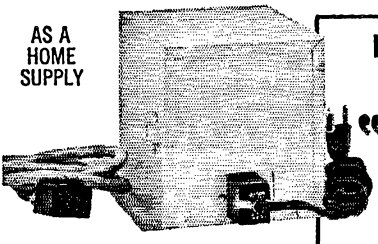

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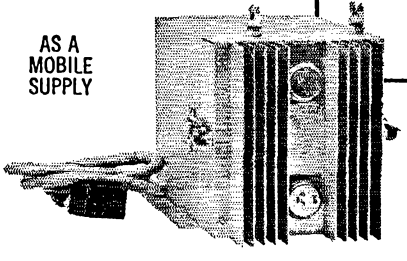

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"SERVING THE AMATEUR FOR OVER 33 YEARS"

K3TEZ, a newcomer to MDC from WPA, plans to give local traffic circles a whirl when he completes his new HW-100 kit. WA3LFL lost his v.h.f. antennas in a storm July 6. Glad to hear that W3BWT is well again after hurting his back in a fall. K3IYJ and W3ZGJ now hold Advanced Class tickets. W3CSZ is on RTTY, all bands. W4TFX/3 enjoyed the July CD Party. WN3KQV qualified as WA3KQV with a General Class ticket while Apollo 11 raced for the moon. W3ZNW enjoyed seeing the gang at the MDC picnic. W3EEB was a senior delegate from Delaware. Thanks to K3QDC for taking good care of the "QNC Kitty" for the past year and to K3GZK for taking it over for the next year. Nice to hear K3JYZ in good voice at the picnic. WA3LQM is a new Technician. Hats off to K3RGB and his pace-setting Baltimore City AREC gang which held a local SET to make ready for the 1969 hurricane season. Good luck to K3OAE at W9YT with the Wisconsin gang. Traffic: WA3IYS 541, W3ATQ 250, WØUCE/3 189, WA3-IJR 175, W3DYA 130, WA3GUI 125, W3TN 113, K3GZK 97, K3OAE 68, WA3HEN 51, K3LFD 48, WA3IAQ 47, W3ZNW 24, W3ECP 21, K3RGB 21, W3EOV 20, K3QDC 18, WA3GXN 15, W3PRC 13, W3ZSR 12, K3TBD 7.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2-YPZ. SEC: W2LVW. RMs: WA2BLV, WA2KIP. PAMs: WA2UVB, W2ZI. Be sure to get your monthly traffic reports and other interesting section news to me not *later* than the 5th of the month. The New Jersey Emergency Phone & Traffic Net Dinner will be held this year at Barretts Restaurant, River Road, Trenton on Sat. Oct. 25. Send your reservations to WA2TAF, chairman. The SJRA will hold its Annual Hamfest at Molia Farms, Malaga, N.J. Sept. 7, rain date the 21st. NJPEN reports 31 sessions QNI 490 stations and 257 traffic. W2HX recently retired from the Plasma Lab., Princeton U., after 15 years service. W2WI has a minibeam and gets out real well for an apartment installation. WA2HQE, in Princeton, is now Navy MARS NØHAC. A new one in Pennington is NØTPL. W2-ZVW is moving to New Mexico and has a new job with the State Police Radio Division. W2ZQ participated in the July CD Party. K3CPF reports 34 sections, total of 13,000 points. Newly-appointed OPSs are WB2WHB, WA9PRE/2, W2DNF, W2CDZ, W2BLM and W2ZQ. A newly-appointed ORS/OO is WB2DRG. He has organized the 40-Meter Novice Training Net on 7190 kc. WA2FGS reports the Penn-Jersey YLRL Club operated Field Day using the call WA3MOI with 11 YL operators. Bob Schroeder passed the Tech. Class exam and is now WA2JZF in Trenton. The following endorsements were made: W2GOK, WB2TEN, W2KGM, W2ORS, WA2DVU, K2RXB, W2LVW, WB2SFX, W2EIF and WA2KAP. Traffic: (July) WB2DRG 147, W2PU 106, WB2VEJ 74, W2ZVW 30, WA2KIP 20, W2BLM 16, W2-JI 14, W2ZI 14, W2DNF 12, W2ORS 10, W2YPZ 5, W2-ZQ 1. (June) W2PU 36, W2BLM 11, W2JI 2.

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—Asst. SCM: Rudy W. Ehrhardt, W2-PVI. SEC: W2RUF. RMs: K2KIR, W2FR, W2MTA, W2RUF. PAM: WB2VSL. The list of section nets appears in the June column. A new appointee is WB2VVZ as OO. WB2OYE renewed as ORS. K2DNN reports a new emergency 6-meter antenna system installed at St. Josephs Hospital in Elmira. W2RX, commercial pioneer in facsimile, a.m., f.m. and TV has retired. His newspaper articles on ham radio date back to the early '30s. Ernie has taught several thousand in amateur and commercial operations. Elected officers of the Niagara Radio Club are WA2PYT, pres.; WA2VZD, vice-pres.; WA2KXG, secy.; W2UMS, treas. WA2ARB has moved to Niagara Falls, and W2DXE QSYed to Cheektowaga. The Erie County Emergency Net has now become the Western New York Emergency Net, with W2PVI, K2CZN and WB2HCT as officers. WA4-PDM operated /2 at Camp Idylwood in Essex County. K2DNN remodeled the shack. Now all he has to do is make the rig work again. The Chemung County AREC group worked FD as WB2VPY/2 from Langdon Hill near Breesport. The powerful Niagara Frontier DX Assn. crew scored big in FD with some 2100-plus QSOs from a mountain top near East Otto. After a vacation in Canada, WB2WGF is rompin' and stompin' with a new pair of 813s. W2CFP arranged and coordinated activities at WB2VHX/2 at the Tompkins County Fair. WA2AWK reports the Onodaga County AREC Net has completed over 140 consecutive Mon. night AREC sessions. WB4GTS vacationed at home as WA2UFI. W2-MPM has obtained a new utility van and has offered use of same to the Monroe County C.D. Radio Officer. Ed also reports progress on an FET front end for his 2-meter f.m. receiver. WA2AWX has 6 elements on 6 meters at 45 feet and 11 elements at 50 feet for 2 meters. WB2QKQ is doing a fine job in his post as editor of the *RAGS Review*. Congrats to BPLers WA2CAL and WA4PDM/2. Traffic: (July) WA2CAL 545, W2FR 339, W2OE 285, W2MTA 235, W2RUF 185, WB2SMD 165, K2KQC 163, WA4PDM/2 152, WB2VND 109, K2RYH 108, W2FEB 90, WA2UFI 67, WA2BEX 57, W2PVI 40, W2RQF 37, W2HYM 32, K2UIR 29, WB2 RWR 28, W2CFP 26, WB2OYE 24, WB2YEM 23, WB2-WGF 21, K2FMI 20, K2SPO 18, WB2HLI 16, W2PRY 14, K2KTK 12, WB2YEE 11, W2PNW 10, WA2GLA 1. (June) K2BWK 12, WB2YEM 12. (May) K2BWK 9, WB2YEM 5. Total traffic reported: 2900.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3KPJ. PAM: W3WFR. RMs: WA3AKH, W3KUN, W3NEM. Traffic Nets: WPA, 0000 GMT: KSSN, 2330 GMT 3585 kc. The WPA traffic this month shows 30 schedules, 198 QNI with 101 pieces of traffic handled. Power and telephone lines were down because of a severe storm in the Monongahela/Youghegheny Valley, which activated K3SMB, EC for Allegheny County, K3CHD/mobile, K3IXB/mobile, WA3-CHC/mobile, W3DGK/mobile, W3OFI, W3RFH, WA3JFL, K3VCV, WA3BLW, K3IXB, K3QHM, WA3DFM, K3GFO and WA3GUN, who stood by at their respective stations ready to provide emergency communications if needed. This column is sorry to record the passing of W3QFR of the Tydings Store in Pittsburgh. W3LGK, ex-W8IOI/W8KAI, is now W3TR and acquired his Extra Class license. Teaching at Clarion State College this fall will be K2BBK/3. WA3IYA phone patches with his SB-630. We take this opportunity to thank W3MFB, former RM and WPA traffic net mgr. for his tireless efforts on behalf of the traffic net for so many years. He now resides in Minnesota. K3HCT, on vacation in Montana, attended a hamfest in the Glacier National Park. Members of the FootHills Amateur Radio club held a Junior Field Day to augment the ARRL National FD with much success. WN3MAD and WN3MAE have new Knight T-60 transmitters. WA3BGE studies electrical engineering. The Nittany ARC 2-meter repeater, WA3KUW, on 146.34 (input) and 146.76 (output) is now operational. WA3JDT resigned as EC because of schooling chores in Ohio. K3SMB and K3CHD are doing fine jobs with AREC work in the Allegheny-Westmoreland area. W3UHN put up a 1/2-wave 80-meter vertical dipole with a Hy-Gain balun for low-band DXing. W3YLJ has moved to Florida. New officers of the Breezeshooters are K3IXB, pres.; WA3CHC, treas.; W3TZW, checker; K3VYO, K3FGQ and W3OFI, windgagers. Condolences to the family of W3SYU who passed on to the land of Silent Keys. WN3MVA and WN3MVD are new Novices in the Indiana area. Winter will shortly be upon us. Check your antennas before it's too cold. Endorsements: W3SN as ORS. Does *your* license expire soon? Traffic: (July) WA3IPU 228, W3-LOS 99, WA3AKH 86, W3KUN 70, W3GJY 40, K3SMB 37, WA3BLE 11, W3YA 10, K3SJN 7, W3SN 4, W3IDO 2. (June) K3SMB 28, W3SN 28, W3RSB 7.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDL (v.h.f.). Cook County EC: W9HPG. Our sympathy to the family and friends of WB41GL formerly W9FLH who passed away July 4 in Florida. W9HRY reports that the 9RN had a traffic count of 683 during the month. A new Novice heard was WN9AJA. WA9VJQ is on 2 meters and WA9-QAD is stacking 2 seven element Cush Craft beams for 2 meters. WA9TCW's new QTH for the next few months will be the U. of Wyoming and WA9ZPR will attend Ohio Northern. WA9UNR received his Advanced Class license. WA9AKR received all three QSL cards from NSS, AIR and WAR for s.s.b. and c.w. contacts on Armed Forces Day. W9RYU has gone s.s.b. with a new Swan 500. W9KFQ is the new Wheaton Community Radio Amateurs Club paper. WA9ZSY is now an Advanced Class licensee, and WN9YUH is General Class. WN9CFW is a new call in the Clinton area. W9LNQ is back in the traffic swing. W9HPG, Central Division Director for the past six years, was named Ham of the Year at the 35th Annual Hamfesters Picnic held in the Chicago Area Aug. 10. W9LDU, Lee County EC, reports that his county has been selected as an honor county for Civil Defense. The Moultrie Amateur Radio Club will handle communications for the National Pony League Series being held in Matoon. An amateur radio station and a promotional public relations group will staff the station. W9ZTK has a new linear on 2 meters. WN9BVS, WN9-BVT and WN9BYO are graduates of the Chicago Suburban Radio Assn. Novice class conducted by WA9VYM. A new OBS appointee is WA9ZTJ. Our very deepest sympathy to Chuck Baer, ex-K9TVA, on the death of his father Melvin J. Baer. W9ACE/4 who became a Silent Key July 20 in Miami Shores, Fla. He will be sadly missed by all the Central Division gang. His was

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The deluxe Cygnet is a complete amateur radio station including AC and DC power supply and loudspeaker, beautifully integrated into one package. It contains all the features required for home station operation with enough power to work the world. Yet the 270 is compact and light enough to make an ideal 'traveling companion' on those business or vacation trips (second only to the XYL, of course). Incidentally, a carrying case for the Cygnet will soon be available.

For temporary mobile installation, either in your own or someone else's car, Swan will soon offer an installation kit, including antenna, which will put you on the air in 5 minutes (no holes). Thus, you'll be able to operate mobile from a rental car! For permanent mobile installation, your Swan dealer has mounting kits and 5 band antennas in stock.

For those who feel they need higher power to climb above the QRM level, Swan will soon announce a matching 1 KW Cygnet Linear. It will also come with a handle just in case you decide to take its 25 pounds along on a trip. With this much power of course, it works only on AC.

SPECIFICATIONS: **Power Input:** 260 watts P.E.P. in SSB voice mode, and 180 watts in CW mode ● **Frequency Range:** 3.5-4.0 mc, 7.0-7.3 mc, 14.0-14.35 mc, 21.0-21.45 mc, 28.0-29.7 mc ● **C.F. Networks:** Crystal Lattice Filter. Same as used in the Swan 500 C. 2.7 kc band width at 6 db down. 4.6 kc wide at 60 db down. Ultimate rejection exceeds 100db ● **Unwanted** sideband suppressed. 50 db. **Carrier** suppressed 60 db. 3rd order distortion down approx. 30 db ● **Audio Response:** flat within 3 db from 300 to 3000 cycles in both transmit and receive modes ● **Pi Antenna coupler** for 52 or 75 ohm coaxial cable ● **Grid Block CW keying** with off-set transmit frequency ● **Solid state VFO circuit** temperature and voltage stabilized ● **Receiver sensitivity** better than ½ microvolt at 50 ohms for signal-plus-noise to noise ratio of 10 db ● **100 kc Crystal Calibrator** and dial-set control ● **S-meter** for receiver, P.A. Cathode meter for transmitter tuning ● **Improved** AGC and ALC circuit. Separate **R.F.** and **A.F.** gain controls ● **Sideband selector** ● Provision for **plug in of VOX** accessory, as well as headphones and/or Cygnet Linear ● **Tube complement:** 12BA6 VFO amp, 12BE6 trans. mixer, 6GK6 driver, 6LQ6 pwr. amp., 6BZ6 rec. R.F., 12BE6 rec. mixer, 12BA6 1st I.F. amp., 12BA6 2nd I.F. amp., 12AX7 prod. det. A.F. amp., 6AQ5 A.F. output, 12AX7 mic. amp., 6JH8 bal. mod., 12AV6 AGC-ALC amp. **Dimensions:** 5½ in. high, 13 in. wide, 11 in. deep. Weight: 24 pounds.

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VX-2 Plug-in VOX Unit		**35**
5 Band Mobile Antennas	Model 45	**65**
	Model 55	**95**
		125

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a familiar face at most of the division hamfests whether large or small. His son Eddie preceded him in death by a few months. This writer was privileged to have had him and his family as very personal friends. The Big Thunder Amateur Radio Club's bulletin had a very interesting article on W9CPD, a real old-timer in hamming. The Peoria Amateur Radio Club's hamfest was a very FB outing, and was enjoyed by all attending. Traffic: (July) WA9SFB 375, WA9OTD 223, W9NXG 221, W9JXV 197, W9HOT 155, W9ZUE 73, W9DOQ 63, WA9BRQ 62, K9RAS 62, WA9AKR 48, W9LDU 26, WA9UXF 26, W9LNQ 20. W9PRN 20, WA9ZPL 13, WA9YQT 10, K9HSK 7, WA9LHU 2. (June) K9RAS 46.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9BUQ.

Nets	*Freq.*	*Time*	*July Tfc.*	*Mgr.*
IFN	3910	1330Z Daily 2300Z M-F	471	K9IVG
ISN	3910	0000Z Daily 2300Z S-S 2130Z M-Sat.	218	K9CRS
QIN	3656	0100Z Daily	235	WA9FDQ
Ind. PON	3910	1245Z Sun.	36	K9EFY

W9PMT, mgr. Hoosier V.H.F. Nets, report July traffic as 128. WA9NLE is having antenna trouble. K9LSB, pres. of the Allen County Amateur Radio Technical Society, reports its repeater frequencies are 146.46 Mc./146.88 Mc. The call is WA9YJV. W9RTH received the Outstanding Amateur Award at the IRCC Picnic at the Brown County State Park. Don't forget the IRCC fall meeting Oct. 5, 1969, will be held at Atherton Hall, Butler University, Indianapolis, Ind. The Hoosier Hill Hamfest will be held at Spring Mill State Park Oct. 12, 1969. WB9BSN passed his first phone and is now studying for his General. W9BUQ will retire Oct. 1, 1969, and will have more time for amateur radio. W9KFM is running a kilowatt on the 2-Meter repeater station at Griffin, Ind. WA3HTS/9 passed the Advanced Class exam. K9RGY, EC of Tippecanoe County, reports they are putting their trailer in operation once each month using emergency power. QIN Honor Roll: K9HYV 22, K9VHY 21, WA9MTY 21, W9QLW 20, WA9BUV 18, WA9VZM 18, K9AJC 18, WA9KAG 16. *Amateur radio exists because of the service it renders.* BPL certificates went to W9UEM, W9JYO and W9EQO. Traffic: (July) W9UEM 1045, W9JYO 551, K9IVG 410, WA9VZM 388, W9HRY 284, K9HYV 197, W9FWH 156, W9EQO 154, W9JBQ 137, WA9QOQ 129, W9QLW 121, K9RWQ 87, W9BUQ 64, K9CBY 63, K9FZX 60, K9CRS 58, WA9OHX 50, K9AJC 45, K9YBM 44, W9ICU 42, WA9GJZ 39, WA9QEQ 35, K9VHY 34, W9CMT 30, WA9BVL 18, W9HWR 18, K9EFY 17, WA9CHY 16, K9ILK 15, W9SNQ 15, W9YYX 15, WA9BHG 14, W9PMT 12, W9DOK 11, W9EJW 10, WA9OAD 10, WA9BRD 8, W9DZC 8, K9JQY 6, WA9TJS 6, WA9AXF 5, WA9YXA 2. (June) W9QLW 71, WA9TJS 38. (Apr.) WA9YXA 40, WB9AMB 2. (Mar.) WA9YXA 1. (Feb.) WA9YXA 1.

WISCONSIN—SCM Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: K9DBR, WA9IZK, W9NRP, WA9QNI and W9AYK. RMs: K9KSA and WA9TXN.

Nets	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1145Z	Mon.-Sat.	333	170	W9AYK
BEN	3985 kc.	1700Z	Daily	623	100	W9NRP
WSBN	3985 kc.	2200Z	Daily	1119	191	WA9QNI
WIN	3662 kc.	0015Z	Daily	168	99	WA9TXN
WSSN	3780 kc.	2330Z	Daily	68	26	K9KSA
SWRN	50.4 Mc.	0200Z	Mon.-Sat.	163		
SW2RN	145.35 Mc.	0230Z	Daily			WA9IZK

New appointees: WA9TXN as RM for WIN, W9DND as ORS. Renewed appointments: WA9LHJ, K9FHI and W9BCH as ECs: K9GSC as OO; K9GSC, W9APB, W9CXY, W9RTP, K9GDF, W9DM and W9NLJ as ORSs. W9CBE, W9AVM, WA9QNI and K9KSA are representing the Madison Eye Bank in the Eye Bank Net. WA9RAK is a TCC operator. WA9YCY received his General Class ticket. K9GDF led the OOs with 8 notices sent. From the looks of the reports everyone is enjoying the summer and taking vacation trips. Traffic: W9CXY 419, WA9RAK 273, K9CPM 241, WA9QKP 129, W9ESJ 120, W9RTP 75, W9AYK 65, W9NRP 57, W9KRO 52, W9DM 47, W9DND 44, K9KSA 39, K9TBY 38, K9LGU 36, WA9TXN 31, WA9UNN 29, W9BCH 27, K9FHI 22, W9CBE 16. WA9HFB 16, W9UCR 14, K9GSC 12, W9IRW 7, WA9PKM 4, W9DXV 2, K9GDF 1, WA9YCY 1.

DAKOTA DIVISION

MINNESOTA—SCM, Larry J. Shima, WØPAN—SEC WAØMZW. PAMs: WAØMMV, WAØOEJ, WAØHRM, KØGYO. V.H.F. PAM: WAØDWM. RMs: WAØIAW, WAØRRA.

Section Nets	*Frcq. (Mc.)*	*Time (GMT)*	*Days*
MSPN (noon)	3.945	1805Z	Mon.-Sat.
MSPN (noon)	3.945	1500Z	Sun.-Holiday
MSPN (evening)	3.945	2345Z	Daily
M8N	3.685	0030Z	Daily
MJN	3.685	0100Z	Tue.-Sun.
MSTN	50.400	0430Z	Daily
Minn RTTY	3.620	0200Z	Sun.
Minn AREC (ECs)	3.912	2300Z	Sun.
PICO Net	3.934	1900Z	Sat., Sun.
SCM Info Net	3.945	2230Z	Sat.

Please note the new GMT times which are effective when Minnesota shifts to CST. Also the MSPN evening session time has shifted to 1745 CST on a year-round basis. The Minnesota Amateur of the Year Award announced in Aug. *QST* has a new nomination closing date of May 1, 1970. WAØQMP is in Basic Training at Ft. Lewis, Wash. WAØHRM is a New A-1 Op. WAØURW recently passed the Advanced Class exam. The Minnesota Severe Weather Net is activated on 3912 kc. whenever a weather alert is broadcast on commercial radio or TV. Volunteers are needed for the ARRL Intruder Watch program. Let the SCM know if you are interested. There is a continuing need for active OOs. More coverage is needed on the c.w. nets. Appointments renewed: KØFLT, WØBUC as OPSs. New appointments: WØIYP as OO (Class III and IV); WAØRAG, WAØTQT, WØRQJ, WØZHN as ORSs: WAØUWL, WAØDWM as OVSs; WAØRKV, KØVPM as OBSs. Traffic: (July) WAØHRM 514, WAØTQT 183, WAØIAW 144, WAØVAS 135, WAØOEJ 132, KØORK 83, WAØRRA 76, WAØLIS 74, WØBUC 57, WAØTGM 57, KØZRD 57, WØPAN 51, WAØRAG 43, WAØVYV/Ø 42, KØGYO 39, WAØVEB 39, KØMVF 38, WAØVTZ 38, WAØIAD 35, WAØMMV 31, WØUMX 28, WAØEPX 27, WØBE 21, WØEQO 19, WAØDWM 17, KØWXH 16, WAØPZY 14, WAØVHX 14, WAØVQX 14, WAØACI 13, WØIYP 13, WAØJPR 13, WNØYAH 13, WØKNR 12, WAØNQH 12, KØSXQ 12, WAØCJU 11, KØFLT 11, KØZBI 11, KØZXE 11, WAØUNS/Ø 10, WØBUO 9, KØJTA 9, WAØURW 8, WAØUWL 8, WAØPMM 7, WAØVKP 7, WØKLG 6, WØTCK 4, WAØWDX 4, KØZWG 4, WNØTFC 3, WNØWWM 2, WAØUPD 1. (June) KØZRD 77, KØIJL 31, WAØDWM 18, WAØRKV 13, WØBE 4.

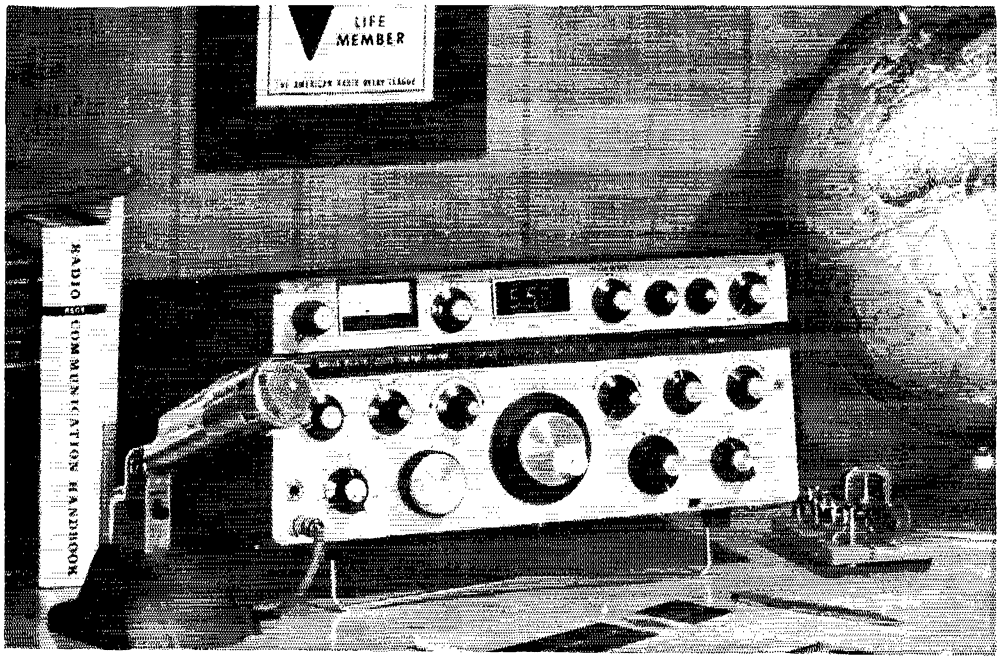
NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. PAM: WØCAQ. RM: WAØRSR. The International Peace Garden Hamfest held in the Centennial Pavilion on the Canadian side, was a decided success. WØBUO, Dakota Div. Director, attended. WØTLE and his XYL came up from the Twin Cities. WA6MIW, W6JHG, ex-WAØPPK and KØOVE came around this way on their vacation from El Centro and camped with WØGB, WAØGRX, WØEFJ, WAØMND and W7BAG and XYL. WAØGRX and WAØMND were presented a small token of appreciation for their work on the WX Net by WØDM. KØTYY, WAØJIE and W6MIW, won the hidden transmitter hunts. While on vacation KØPVG visited the Heath Co. and picked up an HW-100 and d.c. supply and a Hustler antenna. A new call at GAFB is WNØVEA. WAØHUD worked mobile while in northern Minnesota and Rainy River country. KØQYD, of Fargo, has been transferred to South Dakota. KØTYY took a vacation to southwest and southern N. Dak., through Grand Forks and to southern Indiana. He stopped off in St. Paul and visited WØBUO. WAØOGQ was in Grand Forks making plans for the U. this fall. An antenna party got WØCAQ back into business again. WAØTBR is back from an extended trip to the West Coast, by boat to Alaska and return by Alcan Highway. WØDM worked portable from the farm down in La Moure County. WAØSDQ has a new mike. New calls in Grafton are WAØWBL and WAØBWV. WAØRSR has a new QTH with a new homebrew tilt-over tower of 4" well casing 50' up there for a tri-bander and his dipoles.

N.D. RACES Net	18 sessions 394 check-ins 76 QTC	KØSPH	RO
N.D. C.W. Net	10 sessions 20 QNI	WAØRSR	RM
N.D. PON	12 sessions 173 check-ins tfc. 76		

Traffic: WØNMV 62, KØSPH 60, WAØHUD 31, WØWWL 13, WØDM 12, WAØJPT 3.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WAØCPX. PAM: WAØCWW. RM: WØIPF. Net Managers: WØHOJ, WAØLLG, WAØPNB, WAØOYT. New General Class licenses are WAØWNE, Winner, and WAØYAK, Colome. A new Novice at Bruce, WAØTMI, has a new Swan. WAØUNE is now on phone with an HT-32 exciter. WØHOJ, WAØPSN and WA7EDC met for an eyeball QSO in the Black Hills area. KØTXW wishes to thank all for their cooperation during his

COMPARE IT?



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two terms as SCM and hopes that you will cooperate as well with WAØCPX, who will be Acting SCM until an election has been completed. Net reports: Morning Net, 339 QNI, 94 QTC, 20 informals. Noon Net, 224 QNI, 34 QTX, 50 informals. Late Phone Net, (June) 979 QNI, 79 QTX, 95 informals; (July) 759 QNI, 58 QTX, 82 informals. Traffic: WØIG 59, WØHOJ 48, WAØFUZ 36, KØAIE 26, WAØRIQ 24, WØZWL 8, WØFJZ 5, WØDVB 2.

DELTA DIVISION

ARKANSAS—SCM, Robert D. Schaefer, WA5IIS—SEC: W5PBZ. RM: W5NND. PAM: WA5QMQ. The Arkansas Ham Picnic held in North Little Rock July 27 was a big success. New appointees: WA5QMQ as PAM and WA5UMP as OVS. Welcome to new Novice WN5YSD in Kensett. Congratulations to WN5WTZ and WN5VNT on passing the General Class exam, to W4FQT/5 and WA5YMX on passing the Advanced, to WA5QPI on passing the Extra and to WA5EFL on making the DXCC Honor Roll. New equipment: W5-KGJ, Drake 4-line; WA5TAF, DX-60; WA5QMQ, homebrew keyer; WA5RBH, 2-meter quad. W5AAI made CP-20. WA5TJB is the new pres. of the Russellville club. Net reports for July:

Net	*Freq.*	*GMT*	*Days*	*Tfc.*	*QNS*	*Mins.*	*Mgr.*
RN	3.995	2330	Dy.	37	505	431	WA5QMQ
OZK	3.790	0000	Dy.	20	166	609	W5NND
APN	3.937	1100	M-S	5	405	1385	W5VFW
PON	3.925	2130	M-F	?	522	551	W5ELF
Teenage	3.995	2230	Dy.	30	227	434	WA5QMQ
DX Info	3.860	2345	Mon.				WA5EFL
VHF	145.05	0130	Mon.				
VHF PON	51 Mc.	0100	W-S				

Traffic: W5NND 136, WA5QMQ 75, W5ELF 30, K5AJM 29, WA5TJB 22, WA5QCI 12, WA5EIT 9, W5OEO 7, W5MJO 6, WA5KEF 5, WA5LYA 5, K5VBF 5, W5QFU 3, WA5SJJ 3, W5QOO 2.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5OB. RM: K5ANS/5. V.H.F. PAMs: W5UQR, WA5DXA. The Westside ARC officers are W5LHS, pres.; WA5TPS, vice-pres.; W5OB, secy.; W5MQ, treas.; W5OUD, act. mgr. W4OGG, up Tennessee way, says there is now available a Memphis Sesquicentennial Award for working five stations in Shelby County. Try 3635 and 3980 kc. WA5NYY is setting up a new shack and also reports the Jefferson ARC is holding Advanced Class instruction. W5CEZ has been with MARS activities to the extent his fishing is falling behind. K5ANS/5 spent his vacation in California and urges LAN members to send him their LAN Award reports. WA5OVX has been handling phone patches. W5GHP says he still is busy with RTTY. WA5QVN has put up a two-element quad and hopes to snag some DX. Up Bastrop way WN5ZIZ, WN5ZJA (father and son) and WN5EJH are all new! W5JYA says he is back at USL and will be there one year. Incidentally, the Loyola AR station is being operated by WA5QZH. W5EA handles a little traffic. I regret to report that W5BZ passed away. WA5NUK, W5IOU and W5GZR were the guests of the LARC during FD. Yours truly just put up TH6 and is back on 15.10 after some ten years on 20! K5JBC spent his vacation up in Yankee Land. The GNOARC reports its 2-meter repeater has been reworked and is operating much more efficiently. The CLARC Hamfest was cancelled. An additional Louisiana Alligator Net has been launched by the Ozone ARC on 14,260 at 0030 GMT Wed. W5PFT is Net Control. Traffic: W5MI 247, W5CEZ 79, K5ANS/5 60, W5GHP 59, WA5WBZ 47, W5MXQ 45, W5MBC 20, W5EA 14, WA5QVN 12, W5JYA 1.

MISSISSIPPI—SCM, Clifton C. Comfort, WA5KEY—SEC: WA5JWD. WA5JWD's new address is P.O. Box 1125, Oxford, Miss. The MSBN Net Manager election resulted in WA5SIM being elected for a full term beginning Aug. 1. Net Control stations for the new quarter are: Sun. WA5QQT. Tue. WA5KEY, Wed. WA5UBQ, Thurs. W5LL. Fri. WA5TOD, Sat. WA5UYW. We welcome WA5YYU/W4PJB to Mississippi. Thanks to W9JXV for relaying for the MSBN. WN5ZNU and WN5ZGG, sons of WA5UBQ and WA5KPS, are our newest hams. WN5ZNU is 7 years old. K5UBL's son is recovering nicely from a broken leg. WA5PTE is expecting a job transfer out of state. WA5UHI, at Camp Winrock, Tex., came home in Aug. K5ZFM has had a full summer schedule working with boys camps. WA5-VFP has been handling much of the traffic into Jackson this summer. No one has reported getting the Sesqui-Centennial Award certificate from Memphis, Shelby County, Tenn., at this writing. Try 3980 kc. on your dial. Check into one or more of our nets.

GCSBN	3925 kc.	2330Z	Daily	W5JHS	Net Mgr.
MSBN	3990 kc.	0015Z	Daily	WA5SIM	Net Mgr.
CenGCHN	3935 kc.	0100Z	Daily	WA5GOH	Net Mgr.
RACES	3985.5 kc.	1345Z	Sun.	W5IZS	RO

Traffic: (July) K4RIN/5 73, WA5FII 47, WA5KEY 28, WA5CAM 12. (June) K4RIN/5 48.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—SEC: W4WJH. PAMs: W4PFP, WA4YBT, WA4EWW, WB4HMA. RM: WB4GSS.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	M-Sat	2330Z	25	1198	150	WA4YBT
TPN	3980	M-Sat.	1145	31	1160	91	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	23	499	41	WA4EWW
TCN	3980	Thurs.	0100	5	27		
TPON	3980	Sun.	2330	4	82	25	K4RTA
TTN	3980	Daily	2100	31	293	132	WB4HMA
TN	3635	Daily	0000	31	143	80	WB4GSS

The Crossville Hamfest was better than ever with very good attendance. The "Field Day" award was presented to the Mid-South ARA for its efforts in 1968 by the Tenn. Council of Amateur Radio Clubs. The "Ham of the Year" award was presented to WA4NEC. The Oak Ridge Radio Operators Club was presented with the "CD Party Award." The Tenn. Council of Clubs elected WA4BSL, chairman; WB4ANX, vice-chairman; K4MQI, secy.-treas. OPS WB4EHD reports the Teenage Amateur Radio Society has a 2-meter repeater in Nashville. ORS WB4JFT reports lots of KF7BSA traffic. ORS/EC, WA4YFG reports many new stations giving TN good participation. The Johnson City Radio Assn. has been reissued its original call, W4ABR, ". . . to so conduct club programs and activities as to advance the general interest and welfare of amateur radio in the general community."—R.A.C.K. (Knoxville). Traffic: WA4UAZ 219, WB4DJP 202, WB4JFT 142, K4AT 119, WB4GSS 108, W4SGI 108, W4SQE 88, W4WBK 75, WB4HMA 48, WB4HYY 47, WA4URA 47, WA4GLS 46, WB4GTI 42, WB4ANX 41, WB4HLH 32, WB4HSS 23, W4CYL 21, WB4JTS 21, W4PFP 21, WB4FUR 19, W4OGG 18, WA4WVW 15, WB4DGI 13, WB4JDD 12, W4TYV 11, K4UMW 11, W4PRY 8, W4IGW 7, W4LHE 7, WB4EHD 6, WA4JZE 6, WA4YFG 6, WA4EWW 5, WB4EHK 4.

GREAT LAKES DIVISION

KENTUCKY—SCM, George Wilson, W4OYI. SEC: W4VYS. Appointed: W4NWT as OO.

Net	*QNI*	*QTC*	*Net*	*QNI*	*QTC*
KRN	187	20	KYN	322	346
MKPN	347	87	FCATN	96	38
KTN	711	135			

Everyone is proud of K4YZU and the Kenvention staff. WN4NKJ is new at Sacramento. W4BAZ had a bout with mother nature and came out second best to a lightning bolt. He's back on. Kentucky State Fair traffic was really wild. We'll see it in the traffic totals next month. W4VYS spent a bunch of time at Fort Benning. Louisville's Telco ham club is scheduling some public service projects. More 2-meter hand helds are expected at Owensboro. It looks as if the Louisville repeater will be on the "big stick" at WHAS by the time you read this. These repeaters, while fun, have proved most valuable in local emergencies. There is evidence that state and local authorities are turning increasingly to hams for help when efficient communications are needed in a pinch. This is another good reason to keep up your liaison with local officials. Emergency service is the most valuable service we can render. Traffic: (July) WA4DYL 305, WB4KPE 232, WB4FLA 174, WA4VZZ 116, W4NBZ 102, W4BAZ 89, WA4AGH 83, W4UK 61, WB4FDK 58, K4TRT 48, W4CID 45, W4OYI 45, K4MAN 44, WA4MXD 42, K4YZU 42, WB4EOR 33, K4UMN 30, W4KJP 21, WA4GHQ 20, WA4FAF 13, K4MPT 12, K4FPW 11, WB4HTN 10, WB4GCV 9, WA4WSW 9, W4JUI 4, K4YCB 3. (June) WB4ILF 25, K4MPT 17, W4SZB 14, WA4WSW 14, WB4HYV 12, K4YCB 6, K4YZU 5, W4BTA 4.

MICHIGAN—SCM, Joseph L. Pontek, K8HKM—Asst. SCMs: Rodger C. Phillips, WA8LWK; Howard A. Walker, W8JTQ. SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ, W8GAI. PAMs: K8GOU, K8JED. V.H.F. PAM: W8CVQ. Appointments: W8GAI and W8WVL as ORSs; W8BEZ and W8NOH as ECs; K8ETU as OBS. WB8ANR as OPS. Silent Keys: W8HNU.

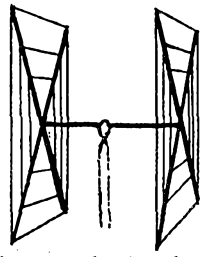
K8SLK was married recently and is moving to Anaheim, Calif. W8AAM visited Kansas. WA8MDK made Advanced Class. K8HLR/WB8DKZ is recuperating from a

AHA! YOU THOUGHT GOTHAM

was a giant, automated, mechanized, computerized factory. No, no, no. Just two brothers, making thousands of the best antennas possible at low, low, low prices that reflect the tiny overhead. In QST since '53 without missing an issue!

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.

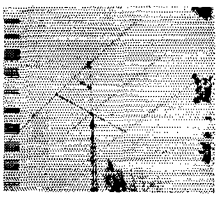
Now check these startling prices—note that they are much lower than even the bamboo-type:

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

"Just a note to let you know that as a Novice, your 3-E1. 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36′ of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 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, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN,FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . $18.95

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect. *DEALERS WRITE!*

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

back operation and says he worked WAC on 40-meter c.w. with low power and low dipole. W8HKT claims that 75 feet of coax between the "Twoer" and the antenna eats up his already scarce r.f. W8DQL has been growing a higher tower. I look forward to your competition in the SS and CD, you bet. There were 125 present at the Phone Net Picnic in Lansing. The Wolverine V.H.F. S.S.B. Net meets at 0200Z on 50.115 Mc. each Mon. Remember to convert to GMT. WA8LAY retires from the Central Mich. ARC *Scope* editor's job and WA8VRB takes over. WA8ZDR also is growing an antenna. The Iosco Radio Club is hosting another hamfest Oct. 3,4,5. WA8PRJ and WA8ZXP are proud parents of a new baby boy. WA8PQO is home recuperating. WA8UFK is going up 60 feet for 2 f.m. I hear there is a roving Barbados Ice Cream Man around Lansing. Traffic: (*July*) K8LNE 731, WA8WZF 621, W8JTQ 342, K8KMQ 332, K8ZJU 196, WA8MGM 188, W8MO 116, W8IZ 99, W8NOH 73, W8ACW 69, WB8DKZ 55, K8JED 53, W8VIZ 50, K8MXC 48, WA8ONZ 46, W8GAI 43, K8GOU 41, WA8VGQ 38, WA8SQC 34, K8HKM 31, WA8ZPH 31, W8TBP 30, W8IUC 29, WB8ANR 21, WA8VXE 19, WA8LXY 17, WA8MCQ 16, W8ZBT 16, WA8MDK 14, W8FX 12, W8AGQ 11, W8BEZ 9, W8DQL 5, W8HKT 4, K8HLR 4, W8AAM 2, W8CVQ 2. (June) WA8WZF 1150, K8LNE 634, K8KMQ 210, W8JTQ 147, K8ZJU 104, WA8MGM 91, K8GOU 87, WA8ONZ 83, W8EU 73, W8IZ 73, W8NOH 58, W8IUC 54, WA8LXY 54, K8HLR 45, W8GAI 41, WA8OGR 39, WA8ZJM 35, WA8SQC 33, WA8QGI 28, K8MXC 25, WB8ANR 22, WA8VXE 22, K8HKM 21, W8ZBT 21, WA8VGQ 17, WA8ZPH 17, WA8MCQ 16, W8MPD 16, K8JED 13, W8VIZ 12, W8BEZ 9, W8TBP 9, W8FWQ 8, W8FX 8, WA8WGM 8, K8HXW 5, WA8PZT 5, W8DQL 4, WA8TDY 3, W8AAM 2. (May) WA8SQC 131, K8MXC 38, W8SWF 5.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IMI. PAM: K8UBK. V.H.F. PAM: WA8ADU.

BPL certificates go to W8UPH, WA8ETX and WA8DWL for July traffic and to W8UPH for June traffic. OSSBN net certificates went to K8ZBL, K8PBE, W8GRT, K8IQB, WA8YLW, W8LRE, WA8GAK, WA8GYP, WA8ETW, WA8ETX, WB8BZX and K8UBK. The Ohio Traffic Nets Picnic in Worthington was a dandy affair with *BN, OSSBN, OSN, O6MtrN, 8RN* and *Apricot* represented. The newborn Ohio Section Emergency Plan was presented and distributed. Attendees received the plan well, and if their enthusiasm and interest are any indication, we'll have lots of support from our traffickers. The plan will be sent to all known members of NTS traffic nets in the section, all appointees, ECs and members of the AREC. Others wanting copies need only send me a radiogram or card. July appointments: WA8ZNO as OBS and K8BPX as OO. Appointees, please check the dates on your certificates. Appointments need to be renewed each year. Congratulations to new Extra Class WA8ULF and to new Advanced K8BPX and WA8YHN. EC K8PBE reports a Van Wert Co. AREC drill in July to check Control Center equipment. WA8OCG tells us that the Portsmouth ARC is setting up a 2-meter repeater for Southern Ohio use. OO W8GRG has completed a frequency counter to help in his OOing. W8QXQ's XYL presented him with a pair of twins July 21. ORS WA8NTA leaves the section for a new job in Detroit. Columbus ARA had reports and slides from six area clubs on this year's Field Day for its July program. Speaking of Field Day, messages were received from WA8ZPF, W8SGT, WN8DCX, W8VPV, WA8OXS, WA8VOE, K8DHD, K8QIK, W8TFZ, WA8ROF, W8EQ, W8LT, W8SSL, W8NP, W8FY, W8VP, W8VVL, WA8VNU, WA8ZNC, K8HKB, W8BAE, WB8DCC, W8CQK, W8GET, W8UDG and K8UZW, all /8. The Westpark Radiops has the new club station call W8VM. Congratulations to K8QPW, who won the Toledo RC "Area Ham of the Year" award. Reports on July's Northern Ohio storm disaster still are trickling in. A good many instances of "beyond the call of duty" and even downright heroism come out of the reports. We would like to hear comments on the Ohio Section Emergency Plan. Address them to W8OUU. The Third Annual Eighth Region Amateur Radio Public Service Forum will be held in Huntington, W. Va., Nov. 8. All amateurs with an interest in ARPSC are urged to attend. This will be a series of work-out-the-problems sessions as before. Contact W8CHT for details. Traffic: (July) W8UPH 706, WA8ETX 644, WA8DWL 378, WA8NOQ 242, W8IMI 215, WA8UPI 192, K8ONA 155, WB8DHS 137, WA8ETW 136, W8UDG 136, WA8DUL 131, K8UBK 124, W8GNL 121, W8OUU 97, WA8SED 91, WA8ULF 91, WB8AKW 87, WB8ALU 81, W8JD 80, W8QZK 76, WA8YUB 76, WA8CXY 73, W8LT 71, W8TV 66, WA8WAK 63, WA8VNU 62, K8PBE 61, WA8ZTV 61, W8CHT 60, WA8MHO 59, W8PMJ 59, WA8OCG 58, W8QCU 58, WB8DSV 56, WA8LAM 51, WB8CHW 50, W8DAE 50, W8GRT 47, W8ETU 45, WA8TKM 45, W8UX 45, WA8ZNC 45, WA8ADU 42, W8NAL 39, WA8ZJF 38, W8ERD 37, WA8PPK 37, WA8SXI 33, WA8SHP 31, WA8YLW 29, WA8RUO 28, K8BYR 25, WA8KPN 24, W8LZE 24, WA8YHN 24, W8OE 23, WA8TYF 22, WA8QFK 21, W8DWP 19, WA8JEH 18, W8JH 17, WA8WJR 17, WA8ETV 16, WA8GRR 16, WA8MCR 14, WA8VVN 12, W8GOE 11, W8YGR 10, WB8BED 8, W8ARW 7, WA8BZR 7, K8DDG 7, WB8EHI 7, W8AL 6, K8DHJ 6, K8BPX 5, W8EEQ 5, K8CKY 3, W8GDQ 3, W8GRG 3, W8IO 2, W8QXQ 2, W8WEG 1. (June) W8UPH 787, W8GVX 91, WA8VVN 61, WA8GRR 31, W8JH 31, W8LZE 6, W8VND 5, WA8ZBU 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Graham G. Berry, K2SJN—Asst. SCM and RM: Ruth E. Rice, WA2VYS. SEC: W2KGC. PAM: WB2VJB. V.H.F. PAM: WB2YQU. Section nets: NYS on 3675 nightly at 2300Z; ESS *nightly on 3590 at 2300Z*; NYSPTN&EN *on 3925 at 2300Z each night. Appointment renewals:* W2QFR as OBS (RTTY); W2EAF as OO, ORS, OPS; W2HO as EC for Monroe Township; WB2FOA as OVS; W2KGC as EC; WB2VJB as PAM. *Station activities:* WA2OJD reports he's building a 3.5-7.0-Mc. vertical for the Overlook Radio Society in Ulster Cy; he also reports a very successful FD in June for the club in class 3 hilltopping in Woodstock. W2YPN, Albany HS, and Pres. WA2EAH report semi-activity during the vacation period. W2CRS is active on 220-Mc with a total now of 11 states. WA2EAH will be at R.P.I. and W2SZ come fall. V.H.F. PAM WB2YQU lost his tower in June, but now is back with a five-element 6-meter yagi up 65 feet. He added Mississippi and Louisiana on 6 over the summer. W2VAQ, of Intruder Watch fame, lacks Asia on RTTY for WAC. K2JMY is chasing 20-meter DX with a 70 ft. beam—his total now is 283 confirmed. Welcome to W3-WLF/2 from Poughkeepsie. Don't miss the Poughkeepsie Club's auction Oct. 21. WB2RBG reports a big month on 50 Mc., including XE1PY, KP4DEC and CO2C1, and his seven-element beam on a 28-ft. boom is working FB on both sporadic E and aurora openings. The Albany Club Picnic held July 20 was very successful. WB2PUH chaired the Albany AREC Picnic in July in Thatcher Park. Suggestion from W2CUC to transceiver owners—add a warning light on "transmit" section and avoid accidental out-of-band operation when chasing DX. Correction: The renewal of W2URP as OO was mislisted. WB2ICI acted as NCS for the Chatham Centennial Parade communications group in June. Albany County RACES now has at least one operator on the net from each hospital in the county. Help *wanted:* Any *old QSL cards, back logs,* etc., to help Albany HS station W2YPN put together a club history. Recent records are OK. The ECARS Net now has over 700 members and has handled "dozens of emergencies" since its start 12/28/68. WA2CRW's new Swan racked up 55 countries in the first four weeks on the air. Traffic: W2EAF 241, WA2VYS 88, WA2CRW 65, WA2VYT 61, W2ODC 54, W2URP 44, W2ANV 28, WB2VJB 28, WB2FUV 27, K2SJN 25, WA2MID 10, K2UYK 9, WB2RBG 7, WA2GQW 4.

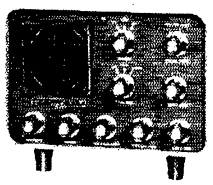
NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OCN. PAM: W2EW.

NLI*	3630 kc.	1915/2200 Nightly	K2UAT	RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF	PAM
NLIPhone*	3932 kc.	1600 Daily	WA2UWA	PAM
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

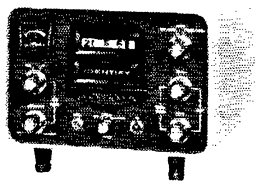
* *Section Nets. All times above are local.*

There now I've gone and missed another deadline which tends to explain the paucity of NYCLI pattering prose in Sept. *QST*. Not only that, but I'm perilously close to this deadline. My apologies to one and all. Listen, good old W2PF is at it again and this time it's the Radio Club of America that he's helping to rebuild. W2HAE reports the Huntington AREC group has been working with the police for over eight weeks on the automobile arsonist problem which hit that area quite severely. W2HAE also says he is now on phone of all places with an SR-160! WB2TDK has gone all-band with a GSB-201. WB2FRE is playing with a new SR-400, and K2PHS a new HA-410. About this time every year, W2BCB starts thinking about training carrier pigeons for traffic delivery duty. WB2PGH picked up a 1st-class radiotelephone license with radar endorsement. WA2BRF stumbled into a 2-meter opening

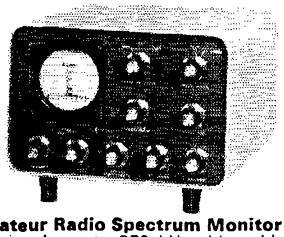
Heathkit® Amateur Station Accessories



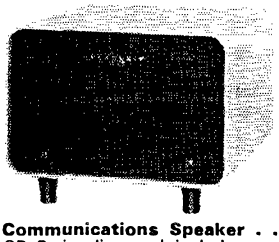
SB-610 Signal Monitor Scope ... operates with transmitters on 160 through 6 meters at power levels from 15 watts through 1 kw. Shows transmitted envelope. Operates with receiver IF's up to 6 MHz. Spots signal distortion, overmodulation, etc.
Kit SB-610, 14 lbs..... **$79.95***



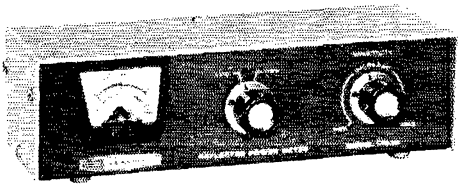
SB-630 Amateur Station Console ... including 24-hour clock, SWR meter, 10 minute timer with audio-visual signaling, and more. Styled to match your SB-Series station.
Kit SB-630, 10 lbs..... **$79.95***



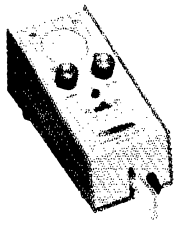
SB-620 Amateur Radio Spectrum Monitor ... displays all received signals up to 250 kHz either side of receiver tuned frequency. New narrow sweep function shows 10 kHz for single signal analysis.
Kit SB-620, 15 lbs..... **$119.95***



SB-600 Communications Speaker . . . matches the Heathkit SB-Series line and includes space for HP-23A fixed-station power supply. Features an 8 ohm 6" x 9" speaker with 300 to 3000 Hz response.
Kit SB-600, 6 lbs..... **$19.95***



HM-15 Relative Power SWR Meter ... indicates forward and reflected power and SWR. Band coverage is 160 through 6 meters. Handles peak power well over 1 kw. Wiring options permit operation with either 50 or 75 ohm transmission lines.
Kit HM-15, 2 lbs..... **$14.95***



HD-10 Electronic Keyer ... all solid-state circuitry for perfect characters. Two speed ranges — 15-60 wpm or 10-20 wpm. Solid-state switching ... no sticking relays or contact bounce. Built-in sidetone & speaker. Grid-block keying, -105 V. @ 35 mA. max. only.
Kit HD-10, 6 lbs..... **$39.95***

HN-31 "Cantenna" Transmitter Dummy Load ... provides 50 ohm non-inductive load with SWR less than 1.5:1 for frequencies from 1.5 to 300 MHz. Coax fitting for transmitter line; phono jack for relative power measurements. Oil coolant (not supplied) permits power up to 1 kw.
Kit HN-31, 3 lbs..... **$10.95***

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to 7-Land in July, but before he could zero-beat it split and left him wiping away the drool. The summer doldrums have WB2WFJ crying into his 807s, but he really suspects the summer job is the culprit. WA2QJU is operating portable from Bell Labs during lunch-break, coffee-break, recess, etc. Last July W2UAL jumped into the Advanced and then skipped right off into the Extra with several laudatory remarks for the Incentive Program. A homebrew receiver is undergoing design and construction at the QTH of WA2HBP. For some reason, WB2PJH thought it would be a peachy-keen idea to pour some good old concrete into that bodacious old beam hole. So, a half ton was immediately dispatched into the aperture, but to that voracious old beam hole it was naught but a skimpy appetizer. Our good old friend, WB2PJH, is understandably vexed about what the main course might comprise. K2CMJ and the Mrs., K2DNY, have moved into a new QTH and are as busy as the proverbial old bumble bees getting everything organized. WA2HOP is putting together a homebrew phasing-type s.s.b. exciter. K2RLW says he finally tired of his good old Tech. Class ticket and traded it in for Advanced Class and a new Cygnet which is on a shakedown cruise on 20-meter phone. The Polytechnic Radio Club, which dates back to the 1920s with the call 2KT, has traded its recent call of W2BXK for a new one, which is K2KT. W2NXB has rebuilt his 160-meter final and kicked out the rascally TVI.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2ZZ—SEC: K2KDQ. RM: WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF and WA2TBS.

ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695 kc.	7:00 P.M.	Dy				WA2BLV
NJN	3695 kc.	10:00 P.M.	Dy				WA2BLV
NJSN	3740 kc.	8:00 P.M.	Dy	31	231	64	WB2RKK
NJEPTN	3950 kc.	6:00 P.M.	M-Sat.	31	490	257	W2PEV
NJPON	3930 kc.	6:00 P.M.	Sun.	4	69	12	WA2TBS
NJAN	50,425 kc.	8:00 P.M.	M-F	23	180	43	WA2KZF
PVETN	145,710 kc.	7:30 P.M.	Dy	31	165	218	K2KDQ
ECTN	146,700	9:00 P.M.	Dy	28	170	77	WA2TBS

New appointments: K2KDQ as SEC. WA2DNB and WA2BHJ as ORSs. WB2DYB as OBS. Endorsements: WA2TBS as PAM for ECTN. WA2NJB as EC for South Amboy. K2DQT, K2PBP, WB2DRJ, WB2VFW and WB2VFX as OVSs. Drop me a line if interested in an appointment. We wish to welcome to ham radio, WN2KDM, in Basking Ridge, and WN2KME, in Scotch Plains, who is a recent graduate of Boy Scout Troop 203 code and theory class. WN2EBW, WN2FIV, WN2JAE and WN2JFX passed the General Class exam. WN2FWA, who passed the Advanced, found it easier than the General. WA2IHV and WB2EYD received Advanced Class tickets. WA2HPM added a matchbox to his 350-ft. long wire. WB2DRJ applied for DXCC with 103. W2TP enjoyed his trip to VK/ZL-Land, as did W2COT to PA-Land. WA2ATO enjoyed his first CD Party. WB2ZSH had to rebuild his t.r. switch. W2EHL finally is getting back on after a long layoff. WA2HSJ now has a Model 15. WA2CGM is planning for NCX-5. WN2JAE and WN2EBW received 20-w.p.m. stickers. K2GLI has his GG working on v.h.f. again. WA2CGM reports using a three-element quad on 20. WA2BHJ added a 6-meter rig to his shack. WA2-CRF is home from 4X4-Land and still single. WA2ACP has a new tower. WA2DNB took first place in the recent Vt. QSO Party. W2JDH is back from a vacation in Arizona. WA2EUX is collecting old ARRL *Handbooks*. WA2UES is back on 6. WB2RKK was in the recent N.H. QSO Party. WB2BYQ is a new member of the PVETN. WA2CAI is working on RTTY gear. WB2YXJ is 6-meter mobile. WB2KKO has a new TX-62. WB2VFX passed the Advanced Class exam and has a new Swan 350C. WB2ERH got his 1936 call back and is now W2KAE. Will the groups holding code and theory classes please let me know? I have requests for this information. Traffic: (July) WB2RKK 518, WB2-FUW 316, K2DEL 260, K2KDQ 238, WA2BHJ 209, WB2DDQ 169, WA2IGQ 168, WB2NSV 123, WA2BAN 93, WB2FEH 90, W2PEV 71, WA2TBS 69, WB2WID 59, WB2ZSH 40, WA2ACP 39, WA2DNB 39, WB2YPQ 34, WB2TUL 33, W2ZZ 30, WA2EUX 27, WA2GLI 23, WA2NJB 21, WA2CCF 18, WB2YXJ 17, WA2DND 15, WB2BXK 13, W2TFM 12, WA2KZF 11, WA2EBU 8, WB2EYC 7, WB2WNZ 7, W2CU 6, WA2DAX 6, WB2-ZWU 6, WB2BCS 5, WB2HEO 5, K2PBP 4, WB2DRJ 2, W2JDH 2. (June) WB2YPQ 79, WB2FUW 13, W2DRV 12.

MIDWEST DIVISION

IOWA—SCM, Wayne L. Johnson, KØMHX—SEC: KØLVB, PAM: WØPZO. RM: WØLGG. OBSs: WØLCX, WØJAQ, WAØMIT. New appointees: WAØODB as OPS transferred from Minnesota; WAØGVJ as ORS transferred from Nebraska; WAØMLE as ORS transferred from Kansas. WØLGG and WØEFL vacationed in Minnesota. Tom and Bertha expect to be back on s.s.b. this fall. WØPZO and wife enjoyed a much-deserved vacation in California. We hope the local noise cleared up while Joe was away. WØLCX has collected 83 BPL cards since '54. Red has been a traffic man since '31. WØPFP reports some good openings on 6 to both coasts and Canada. Recent elections of club officers: Central Iowa ARC—WAØAVX, pres.; KØ-LVB, vice-pres.; WØEFL, secy.-treas. Story County ARC—WØIII, pres.; WØCGG, vice-pres.; WØRSO, secy.; WAØMUG, treas.; WAØEYG, comm. mgr. Ottumwa ARC—WAØJCE, pres.; WAØRYI, vice-pres.; WNØUPS, secy.-treas. My apologies for duties postponed this month. Because of a consolidation of mail routes my rural carrier duties are now at Leon.

Net	*Freq.*	*Day*	*GMT*	*QNI*	*QTC*	*Mgr.*
Iowa 75	3970	M-Sat.	1730	1359	302	WØPZO
Iowa 160	1815	Daily	0000	600	5	KØTDO
Iowa SSB	3970	M-Sat.	2300			WØYLS
TLCN	3560	Daily	2330	175	290	KØAZJ
PON	3915	Tu-Th	2330			WAØDYV

Traffic: WØLCX 1361, WØUPX 439, KØAZJ 289, WAØYVR 260, WAØBSF 154, WAØKZL 126, WAØMLE 124, KØJGI 81, WAØOTQ 59, WØLGG 51, WØKB 28, WØMOQ 28, KØTDO 25, WAØQZL 22, WAØVDC 19, WAØGMZ 14, WAØMIT 14, WAØDMX 11, WAØGVJ 7, WAØUVH 7, WAØIYH 4, WAØVDP 3, WAØRUF 1.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RM: KØMRI. V.H.F. PAM: WAØCCW. WARC is proud of the ten new Novices from its recent code class: WNØZEM, WNØZEX, WNØZDF, WNØZEN, WNØZBL, WNØZIG, WNØ-ZDI, WNØZEL, WNØZKA and WNØZAW. The June report for KWN showed QNI 650, QTC 58 in 30 sessions. Two clubs have been formed into one. It's now the Air Capitol Tee-Ni-Chat Amateur Radio Club, Inc., Wichita. The Wheat Belt Net now meets Sun. on 3910 kc. and each Sat. at noon. WAØLSH has requested to be relieved of his V.H.F. PAM position as he is planning to start college in Manhattan. Kansas QNI Ten reports 52 sessions to tie Iowa led by WØHI 24 times KØMRI 15, WØINH 13, WAØJII 8, WØCGZ 1. QKS did not miss a session the first half of 1969, compiling a total of 362 sessions, 1987 QNI, 1162 QTC in 6841 minutes. Why not join your Kansas C.W. Traffic Net on 3610 kc. at 7 P.M. and 10 P.M. local time daily. The net mgr. is RM KØMRI, of Selden. New appointment: WØLYC as ORS. WAØOZP recently acquired an NCS-5. WØHI has received his TCC certificate for traffic-handling.

ZERO DISTRICT QSO PARTY

Nov. 1-3, 1969

sponsored by
The Roosevelt H. S. ARC of Des Moines

Rules: 0000-0400 GMT Nov. 1, 0000 GMT Nov. 2 to 0400 GMT Nov. 3. Stations may be worked once per band (phone and c.w. are considered separate bands). Call CO Ø.

Exchanges: Ø stations send QSO number RS(T) county and state, all others send number, RS(T) and ARRL section or country.

Scoring: For Ø stations there are two multipliers. First, the total number of ARRL sections and foreign countries (not including Canada) contacted in the contest. Second, the total number of Ø district counties contacted in the contest. To calculate your score, multiply the first multiplier times the second multiplier times the total number of QSOs.

For stations outside of the WØ district there are also two multipliers. First, the total number of Ø district counties contacted in the contest. Second, the total number of Ø district states contacted in the contest. To calculate your score, multiply the first multipliers times the second multiplier times the t otal number of QSOs.

Awards: Certificates to first in each Ø district county, ARRL section and foreign county.

Frequencies: 3575 3975 7075 14,075, 14,300 21,075 21,300 and 28,600. Novices try 3720 7170 and 21,120.

Any s tation interfering with traffic will be disqualified.

Logs showing dates, times, stations worked, exchanges, bands and modes and claimed score should be sent no later than Dec. 1, 1969 to the Roosevelt H.S. ARC. WAØQJX, 4th and Center Street, Des Moines, Iowa 50312, please include s.a.s.e

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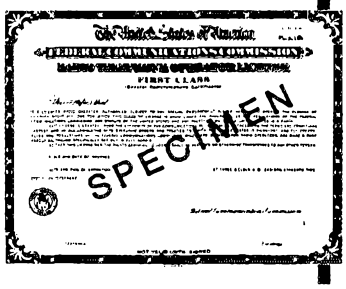

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	QNI	QTC	Sess.		QNI	QTC	Sess
KSBN	541	139	27	QKS	304	163	62
KPN	117	11	12	June			
KPON	997	308	31	KPON	949	310	30

Zone 1, 75 mtr QNI 31 QTC 1; 2 mtr QNI 72 QTC 4

Traffic: (July) WØHI 306, WØINH 181, WAØLLC 150, KØBXF 130, KØJMF 92, WØCGZ 70, KØMRI 69, WAØUTT 48, WØLXA 45, WAØOZP 43, KØLPE 40, WØSPF 29, WØGUR 16, WØBGX 13, KØGZP 13, WØLYC 12, WØGCJ 8, KØKVF 8, WAØJOG 7, KØUVH 6, KØFPC 4, WØPB 4. (June) WØLXA 1056, KØEMB 31, WAØSEV 29, WØRBO 12.

MISSOURI—SCM, Robert J. Peavler, WØBV—SEC: WØBUL. New appointments: KØAEM as OBS; WAØRVR as ORS, OPS, OBS and *RM*; WAØTAA as PAM. MON certificates went to WØJKF and WAØRVR. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2230Z	M-W-F	13	161	12	WØBUL
MNN	7063	1800Z	M-Sat.				WØOUD
MON	3585	0000Z	Daily	25	102	81	KØAEM
MoSSB (June)	3963	2300Z	M-Sat.	25	793	160	WØRTO
MoSSB (July)	3963	2300Z	M-Sat.	26	777	90	WØRTO
MoPON	3933	2200Z	M-Sat.	27	219	148	WAØTAA
SMN	3585	2100Z	Sun.				WØOUD
PHD	50.45	0030Z	Tue. (GMT)	4	59	3	WAØKUH
MWN	3585	0300Z	Daily	19	90	83	WAØRVR

Note that most of these nets will meet one hour later GMT with the shift back to Standard Time. MWN is the Missouri Watermelon Pickers (!!!) Net, started by WAØRVR and WAØSKP to move traffic back from the late session of TEN. WAØVLV, ex-WA2YRP, wishes to hear from all amateurs interested in starting a 6-meter net in the Springfield area. Contact John F. Reustle, WAØVLV, Route 1, Box 83, Buffalo, Mo. 65622. The PHDARA will hold an auction Sept. 30 at 7:30 P.M. at 124 N. Main, Liberty. KØONK was interviewed by KUON-TV about her project in experimental theater. KØETY and KØRPH were interviewed by KWOS radio on ham radio, *Field Day and emergency* preparedness. WAØELM and WAØEXF passed the Extra Class exam. WAØZCQ has an Advanced Class license. WNØWOW passed the General and Advanced Class exams in one session. New Novices: WNØYBB, WNØYBO, WNØZCC, WNØZIK. Traffic: KØONK 1623, WAØRVR 280, KØAEM 249, WAØVRI 177, WAØHQR/Ø 150, WØBV 99, WAØHTN 55, WØJKF 36, WAØTOD 30, WØBUL 24, KØRPH 18, WAØQIA 17, WAØFMD 15, KØORB 14, WAØFKD 10, WAØKUH 8, WAØTAY 8.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØODF.

Net	Freq.	GMT	Days	QNI	QTC	Mgr.
NEB 1	3590	0000	Daily	9	2	WAØFGV
NEB 11	3590	0300	Daily	21	16	WAØHWR
NSN 1	3982	0030	Daily	927	34	WAØLOY
NMN	3982	1230	Daily	994	84	WAØJUF
WNN	3950	1300	M-Sat.	549	29	WØNIK
AREC	3982	1330	Sun.	176	37	WØIRZ
CHN	3982	1730	Daily	896	196	WAØGHZ
NSN 11	3982	2330	Daily	824	28	WAØLOY

Traffic: WAØQEX 131, WAØHWR 51, WAØIBB 47, WAØBOK 42, WØFQB 38, WAØJTU 36, WAØGHZ 35, WAØJTW 35, WØBFV 30, WAØIXD 29, WØNIK 25, WAØPCC 24, WAØTMG 16, WAØDXY 13, KØJFN 12, KØMUF 10, WØOOX 9, WØHTA 8, WAØPIF 8, WAØEEI 7, KØDGW 6, KØECH 6, WØFCE 6, KØHNT 6, WØRJA 6, WØSWG 6, WAØKGD 5, WAØQEI 5, WAØJUF 4, KØODF 4, KØSFA 4, WØURC 4, WAØVJI 4, WAØATU 3, WAØJAV 3, WAØOQX 3, WØVEA 3, KØFRU 2, WØHOP 2, WAØOKC 2, WAØIBL 1.

NEW ENGLAND DIVISION

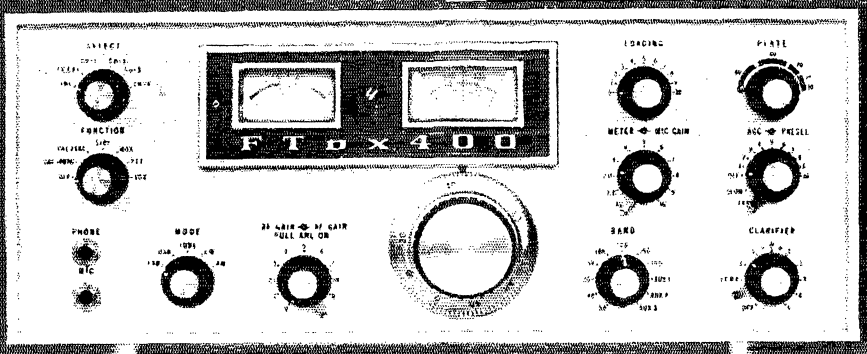
CONNECTICUT—SCM, John McNassor, W1GVT—RM: WA1HSN. PAM: K1YGS. V.H.F. PAM: K1SXF. July activity report:

Net	Freq.	Days	Time	Sess.	QNI	QTC
CN	3640	Daily	1845	31	241	234
CPN	3965	M-S	1800 Sun 1000	31	466	103
VHF 2	145.98	M-S	2200	23	69	20
VHF 6	50.8	M-S	2100	23	151	18

High QNI: CN—W1EJI, WA1HSN, K1EIR and WA1HOL. CPN—K1SXF 27, W1LUH 25, W1GVT and W1YBH 24, W1DQJ and WA1JMR 22, K1EIC and K1YGS 21, K1BSB 19, *WA1HOL* and *WA1JGF 18 and* WA1IEG 17. On Aug. 1, W1YBH retired after 14 years as PAM. My sincere thanks for his dedicated devotion and many favors. His efforts on behalf of CPN are appreciated and will be long remembered. Our new PAM, K1YGS, is a long time CPN member, well-known and recognized for his ability and fine signal. Best of luck to both Bills, W1YBH and K1YGS. With sorrow we add to Silent Keys: W1EAE, *New England Division* Vice-Director, and W1JU, an active member of the Candlewood ARA. Traffic operators should recognize the potential offered by repeater stations. MARS nets use this to good advantage. W8CWE/1, with Navy MARS, has worked out a complete EC Plan for Connecticut and our thanks to him for sending a copy to all ECs. Congratulations to: WA1JGF and WA1JYE on Advanced Class; WN1LOU and WN1LPB on Novice Class licenses. WA1JUL now is at the Air Force Academy. W1GVJ is on a 32-day cruise. W1EJI is back in Connecticut working CN/EAN again. K1HTV is the new CWA president. Communications for the Womens Golf Tournament in Danbury again was handled by Candlewood ARA members. Please read and answer Director W1QV's letter at the next club meeting. WA1JTB, Trumbull repeater is active on 146.31 in and 146.88 out. CU on 2 f.m.! Traffic: (July) W1EFW 266, W1EJI 176, K1EIR 158, WA1HOL 123, WA1HSN 122, W1GVT 71, K1EIC 70, K1SXF 52, WA1JVV 42, WA1JGA 39, W1AW 38, WA1JMO 25, WA1JQC 21, W8CWE/1 15, WA1GFW 14, K1YGS 14, W1QV 13, WA1FXS 12, W1OBR 11, W1LUH 10, W1BNB 8, W1CUH 7, WA1JGF 7, WA1KMR 7, W1YBH 7, W1CTI 3, W1BDI 2, WA1IEG 2. (June) W1OBR 18, WA1FXS 4.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from K1DZG and WA1DXI. Please note that San Diego, Calif., in commemoration of its 200th anniversary this year has designated the week of Oct. 27 to Nov. 2 as "Massachusetts Week." An award will be presented to the amateur who contacts the greatest number of San Diego amateurs. Write to K6VZA. W1s JLI, BB and DFS were in and out of the hospital. W1NF went to N.Y.C. K1NLQ is now Advanced Class. W1YCV is back on the air with a Swan 500C. W1ZFD has a 2-meter net certificate. W1AYG is out in the Pacific. W1ZW is retiring from WHDH and moving to Vt. *New YL's: WN1LLH Newton, WA1LKG* Stoughton. W1BDU went to Italy. W1NJV is up to 334 in DXCC. EMN had 48 sessions, 251 QNIs, 158 traffic. K1JIY, now in Danvers, is on 10. News from New Bedford: WN1LQN is new, WA1BZJ is in the Navy, K1TVY is in Pa., WN1FKM retired. WA1KAG has an HW-100 on 15 working DX and wants to know where WA1IET is. WA1JLX, our EC/RO, and W1MNL, K1VGU, W1ZQM, W1LTC, W1ONM and K1GPH helped during the 4th of July Parade on 6. EMNN had 11 sessions, 5 traffic 29, QNIs. K1ESG is acting mgr. for the summer. W1EMG says fishing is good. WA1IRY is on 20, building a 6er. WA1GXC is in Navy-Marine Corps MARS. WN1LIX has 19 states. WA1KOW has an EICO 753. A nice write-up about "Rooster Network" on 6, organized by W1MEU, on Route 128, appeared in a Boston paper. WA1DPX worked XE1PY on 6 s.s.b. WA1DFL worked W6ANN on 6. The Yogi Bear V.H.F. Soc. Award is to raise money for the "Jimmy Fund." Work 5 members, send list, 35 cents and an s.a.s.e. to W1DKD. Those in the Boston area, get on 51.150 kc. at 10 P.M. a.m./m.c.w., W1DFS. W1LN, WA1BOS. WA1FNM is on 10, 20, 40. WA1CBI and XYL were house guests of DJ2RF in Idstein, W. Germany, while on an auto trip. The 6-Meter Cross Band Net had 17 sessions, 36 QNIs. EM2MN had 23 sessions, 140 QNIs, 130 traffic. W1NZP had an operation. W1YYI talked with his daughter thru EL2BR in Monrovia on 15 s.s.b. W1IMA is moving to Swansea. K1HFW, a Silent Key, was in the 6-Meter Cross Band Net. W1FJI is mobile on 40. K4GGI/1 ran some one-way tests on 1296 Mc. with K9AQP/1. G8ATV and *SM6CSO visited W1MX. New appointments:* WA1JMR as OPS and OBS, W1HKJ as ORS. Appointments endorsed: W1MX as OVS. W1s SMO, EAE, UE, K1CLM as ORSs, W1s NZP, UE, YYI, IU, K1NLQ as ECs. W1DOM as OPS. W1s TZ, DFS, AYG as OOs. W1EAE as RM for 80 c.w. W1TZ as OBS. The Whitman ARC is putting out a bulletin called *The Spectrum*. WA6-CQF's wife and daughters visited the W1ALPs. New Novices: WN1s LNX, LNZ, LNV, LNY, LNR, LNS, LOE, LNE, LNP, LNM, LNB, LNO, LNH, LMS, LMU, LMM, LMQ, LMJ. New Techs.: WA1LMH, LMY. Welcome back to W1BVR as SECM for Western Mass. Traffic: (July) W1OJM 1011, K1ESG 352, WA1-IBL 307, WA1EYY 140, WA1FAD 117, W1EMG 81, W1HKJ 72, WA1IRY 63, WA1JVL 54, W1BUF 46, K1-PRB 46, W1EAE 44, W1DOM 28, WA1IFE 28, W1CZB 25, WA1GXC 24, W1CTR 23, WA1DPX 20, WA1IJL 10,

TOP OF THE YAESU F LINE



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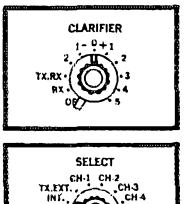
Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in hybrid circuits designed to optimize the natural 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.



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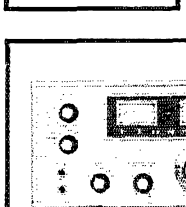

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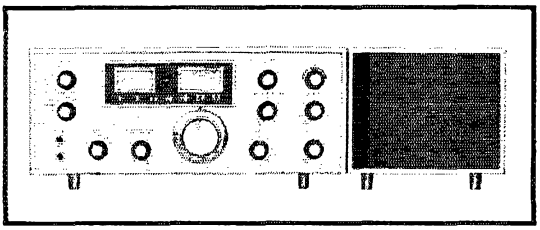

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— PROFESSIONAL EQUIPMENT FOR THE AMATEUR —

W1AOG 8, K1LCQ 8, W1ZFD 8, WA1CEO 5, K7JRE/1 5, WN1LIX 4, WA1KOW 2. (June) W1EAE 74, W1-EMG 73, W1NUP 17. (May) W1EAE 62. (Apr.) W1EAE 82.

MAINE—SCM, Peter E. Sterling, K1TEV—WA1-KNX is a new Advanced Class licensee in the Portland area. WN1JFX is operating the New England Novice Net on 3712 kc. It operates from 2300 GMT to 0000 GMT, Mon. through Fri. W1FZD is a Silent Key, and will be missed by many a ham. New hams in the state are WA1LLM, WN1LMA, WN1LLS, WN1LLZ, WN1-LLF, WN1LNG and WN1LND. WA1KLO is on 20 meters with a new two-element quad. W1PLB and K1-OVP are on 2-meter RTTY and are looking for contacts. K1RQE now has 301 countries toward DXCC. Net controls for PTN are needed. We would appreciate hearing from some c.w. operators who would like to join the net. W1AI is moving to Saco. WA1JTT is on with a new T4X-B. The Portland Amateur Wireless went out on FD for the first time in three years. I am still looking for more news to put in my column. Any news of happenings in the state will be appreciated. Traffic: W1BJG 246, WA1FCM 119, WN1JFX 6, W1-OTQ 6.

NEW HAMPSHIRE—SCM, Donald Morgan, K1QES—SEC: K1RSC. RM: K1BCS. PAM: K1APQ. Welcome to new hams WN1LKW, WN1LKH, WN1LKY, WN1LMO, WN1LMT, WN1LNC and WN1LNU. It is with regret that we note the passing of W1TCR, of Tilton, a ham for many years. An avid c.w. man and the Radio Officer for the local civil defense, he will be missed by all who knew him. K1PQV needs contact with Cheshire County. W1BYS/K1TXC left this month for a trip to Germany, Switzerland, England and Norway. W1SWX has three sloping 80-meter dipoles on a 90-foot tower ready for the DX season. WA1JTM is changing from DX to NTS on c.w. The CNEN and GSPN Picnics are all set to go. The GSPN reports 902 check-ins and 102 traffic. It has been brought to my attention that maybe the Pine Tree net will join with the Vermont-New Hampshire Net and give us three-state coverage on c.w. We need it. Many are studying to upgrade their licenses. Remember that courtesy and assistance helps build the respect of your station both on and off the air. NHAREC reports 115 check-ins and 19 traffic. Traffic: (July) K1BCS 93, W1MHX 47, K1PQV 28, WA1JTM 25, K1QES 6, W1BYS 2. (Apr.) W1MHX 9.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. RISPN report: 31 sessions, 427 QNI, 72 traffic. The W1AQ Club of Rumford reports that the annual fishing trip was held recently with the only fish being caught by K1AGA. The party was organized by WA1IFY and WA1KCP. WA1IUR has been working with K1HMO and W1WAC installing the communications table for the club station. WA1IYF has completed the installation of new windows and the communications room should be completed soon. WA1CVF is back at the club while on vacation from Colby College. W1FNH has returned from the State of Washington for the U.S. Navy. K1LXQ is motoring to California for vacation. WA1ICQ is working lots of DX with his new Classic 36 antenna and his Swan 500C rig. K1PEL is operating on 6 meters and looking for DX stations. K1AMG has returned from a vacation in New Hampshire. W1TXL and W1BTV have applications for OPS and ORS appointments which will be sent to the SCM for processing. Traffic: W1TXL 205, W1YKQ 71, K1VYC 36, W1BTV 34, WB2HPW/1 21, WA1BLC 15, K1QFD 15, K1TPK 15.

VERMONT—SCM, E. Reginald Murray, K1MPN—

Net	*Freq.*	*Days*	*Time*	*QNI*	*QTC*	*N. Mgr.*
Gr. Mt.	3955	M-S	2130Z	353	41	W1VMC
Vt. Fone	3955	Sun.	1300Z	49	—	WA1EDI
Vt. CD	3990½	Sun.	1400Z	44	5	W1AD
Vt. PO	3909	Sun.	2200Z	74	6	K1BQB
Carrier						W1KKD
VTSB	3909	M-S	2130Z	505	74	KL7DVP/1
		Sun.	1230Z			

Welcome to new Novices WN1LOC (Williston) and WN1LNI (Plymouth). Word is that the VTNH Net doesn't have very many Vermonters check-in. Can you help? Hope all had a good time at International FD. WA1JGK has been appointed ORS. Anyone interested in appointments or endorsements, please let me know. Traffic: K1BQB 323, WA1JGK 68, WA1IZO/1 16, K1-MPN 13, WA1GKS 8.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—C.W. RM: W1DVW. SEC: —. PAM: —. Sincere congratulations to W1STR on a job well done as SCM these past two years. The West. Mass. C.W. Net, on 3560 kc. daily at 7:00 P.M., had 113 QNIs during July handling 95 messages. Attendance of the top four was: W1BVR 26, W1DVW 24, W1ZPB 22, K1-WZY 17. W1EUB, of Pittsfield, pres. of the Northeastern States 160-Meter Amateur Radio Assn., would like to hear from hams wishing to join. We have many application blanks and certificates here for various League appointments, and now that I am retired I haven't much else to do except to make out certificates! There are Official Phone Station certificates for you good-quality phone operators; Official Relay Station certificates for you c.w. traffic-minded operators; Official Observer certificates for those who like to listen; Official Bulletin Station certificates for those who like to transmit; Official V.H.F. Station certificates for those of you on 50 Mc. and higher; Emergency Coordinator certificates for those in communities without an EC; and Amateur Radio Emergency Corps cards for everybody! Take your pick! Yes, we'll have news next month with the return of the vacationers and the receipt of club bulletins. Maybe you think nobody is interested in what you are doing, but I'll bet some are. How about a note from you for information for this section? New address here is: Bailey Road, P.O. Box 5, Lanesboro, Mass. 01237. Traffic: W1ZPB 111, W1DVW 73, W1BVR 67, W1KK 35, W1IC 23, K1WZY 20, W1STR 3.

NORTHWESTERN DIVISION

ALASKA—SCM, Albert F. Weber, KL7AEQ—KL7-FHF is finding out what it takes to come up with an issue of *NARC News*. We have a feeling he may not say "yes" the next time KL7FLS calls for help. KL7-CAH and KL7BJD have moved their house and were off the air for a spell but are back on again with the old Sourdough Net. KL7EWH, EC for the Fairbanks area, is now situated in Tasmania, and plans to stay for a year or so. KL7EUW has taken over the EC slot. The BC-610 has left the shack at KL7AEQ/AZJ-ville and has been replaced by a Swan lineup. KL7DIO and KL7GJC used up two helicopters this summer at their Katmai location. No one was hurt in either mishap, fortunately. KL7GFT and KL7GFU are joining the mountain-toppers out on the Nenana Road. KL7IS and KL7DDB have moved into their new QTH at Lake Minchumina and Dick is hunting for the best place for the 2-meter antennas.

IDAHO—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes week days on 3935 kc. at 0200 GMT. The RACES Net convenes week days on 3991 kc. at 1415 GMT. W7DQU, Bonneville County EC, reports that K7PGG has been appointed Asst. EC. W7CJ is recuperating from an operation. K7CVB was injured in an airplane crash. W7GHT qualified for a BPL award with a traffic total of 779. Two stations were set up at the National Boy Scout Jamboree at Farragut using the call KF7BSA. One station had several operating positions for use of the Scouts who were amateurs, and the other station was used strictly for traffic. The traffic station consisted of a 2-meter RTTY link with Spokane, Wash., through a repeater station, and a 2-meter f.m. link with WA7BDD at Hayden Lake, Idaho, who relayed the traffic to W7GHT and W7KZ, who in turn relayed the traffic to TWN and RN6 through RN7. Spokane Amateurs relayed the traffic by using all area nets. Other amateurs who played a major part in handling the Scout traffic were K7CTS, K7LRD, W7COI, K7OEY, K7UXS, K7MRJ, W7DEQ, WA7GUA, WA7IKZ, K7WNE, WA7BDL, K7-VNB, WA7IPG and W7JWJ. W7GSS and W7WIL operated the traffic station at Farragut. FARM Net report: 20 sessions, 459 check-ins, 416 traffic. Traffic: W7DEQ, WA7GUA, WA7IKZ, K7WNE, WA7BDL, K7-ZNN 11, W7YON 9.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAM: W7ROE.

Montana Traffic Net	3910 M-F	0100 GMT
Montana PON	3950 Daily	1345 GMT
Montana Section Net	Down for summer.	

Hamfest time has come and gone. K7DCH and K7DCI did a great job at Glacier. K7UAE did a great job down at the WIMU Hamfest as well. The WIMU Hamfest will be sponsored by the Utah Council of Radio Clubs. W7RZY is in Florida going to school. A new call in Anaconda is WN7NAA. New calls in Bozeman are WN7MIM, WN7MIN, WN7MZV, WN7MZW and WN7MZX. The Butte Amateur Radio Club held

How to get into one of today's hottest money-making fields—*servicing 2-way radios!*

More than 5 million two-way transmitters have skyrocketed the demand for service men and field, system, and R & D engineers. Topnotch licensed experts can earn $12,000 a year or more. You can be your own boss, build your own company. And you don't need a college education to break in.

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its summer get-together at the QTH of Thelma, WA7-DMA is working in Seattle this summer. Well, that's it for this month. We still need more news on activities.

OREGON—SCM, Dale T. Justice, K7WWR/WA7KTV—SEC: W7HLF. RM: W7ZFH. PAM: K7RQZ. July net reports: K7IFG reports for the BSN, sessions 58, traffic 171, check-ins 960. K7YQM reports for the Oregon AREC Net, sessions 31, traffic 43, check-ins 822, maximum number of counties 20, contacts 101. K7YIA reports for the Salem AREC Net, sessions 28, traffic 63, check-ins 265. K7GGQ reports for the OSN, sessions 16, traffic 10, check-ins 32. WA7GFP reports some fine openings on 6 meters and a very successful V.H.F. Picnic. WA7GCS and WA7GFP are building some 432-Mc. gear. W7HLF reports seven stations are on the local v.h.f. net in the Medford area. K7OUF is spending a lot of time in bed, but still hands in his traffic reports. K7QHM dropped his mike and was off the air for awhile. A new ham in Ashland is WA7MUY. WA7-FTN handled 239 phone patches in S.E. Asia, in spite of exciter trouble during the month. Traffic: K7RQZ 454, WA7IFS 229, WA7IJV 62, K7YQM 32, WA7HKV 32, K7WWR 31, W7BNS 20, K7OUF 18, W7HLF 13, W7MLJ 11, WA7JMD 8, W7CPK 5.

WASHINGTON—SCM, Harry W. Lewis, W7JWJ—Net reports:

Net	*QNI*	*QTC*	*Sess.*
NSN	239	85	29
WARTS	1334	674	29
WSN	310	464	31
NTN	674	830	31
AREC	25	4	3

SEC W7UWT has organized the EC structure in Washington to include ten areas with more than one county in each. New EC certificates have been issued to K7-PZA, WA7CYY, K7WTG, W7RJW, K7NKZ, W7AXT, W7AJV, K7UDG, WA7JMP, W7GVC, W7CTS, W7RXH and K7LRD. W7UWT is in Boston for the summer. W7DZX sends in a late traffic report for June with 296 handled. W7KZ has now made the BPL three times and qualifies for a BPL medallion. WA7KOB now is an NCS on the Novice Slow Speed Net which meets at 0300Z on 3700 Mc. WA7KWY submitted a monthly traffic report with zero for the total. This should qualify him for the enthusiasm certificate. W7AIB reports his RN7 activity down because of family summer activities. The Code Practice Net meets on 3728 kc. (W7LEC) at 1600Z. OO W7AXT noted one violation of a Novice being out of the band. W7BQ is taking time out to rebuild the shack, repaint the house and take a vacation. W7PI spent part of his vacation painting. W7PGY, Northwestern Division ARRL Director and W7MCW attended the Annual Glacier Hamfest in Montana. WA7DXI soon will be back on the air with a new Swan Cygnet. OO K7LET submitted his July report with a letter to our Director and ARRL requesting delay by FCC in implementing the incentive license program. "Greetings from the 7th National Boy Scout Jamboree located at Farragut, Idaho." This was a common message to be heard in July with 2601 originations from Farragut and KF7BSA. Traffic-handling was a joint effort by three Spokane radio amateur clubs, the Inland Empire V.H.F. Club, the Spokane Dial Twisters and the Spokane Radio Amateurs. Traffic from KF7BSA went out on 146.34 and 146.76 RTTY to Spokane and Hayden Lake, Idaho. Amateurs in the Spokane and Idaho area taking part were K7-UXS, WA7BDD, WA7BDC, K7CTS, K7MRJ, K7LRD, W7DEQ, WA7GVA, WA7IKZ, K7WNE, W7COI, K7-VNB, WA7IPG, K7OEY, W7GSS, W7WIL, W7HCF and others. Across the Northwest additional stations picked up the traffic and relayed it through several traffic networks. Participating stations were W7BA, W7PI, W7GHT, W7KZ, WA7HKR, K7UDG, W7JWJ, W7DZX, W7BQ, W7AXT and others. Traffic: (July) W7BA 2619, WA7HKR 1520, K7UXS 1200, K7LRD 1068, W7DZX 1018, W7KZ 786, WA7GVB 709, W7PI 565, W7JWJ 507, W7DEQ 401, W7AXT 390, WA7IKZ 288, W7BQ 286, W7-ZIW 237, K7JXO 186, W7GYF 157, WA7DZL 150, WA7-IPG 150, W7MCW 60, W7GVC 56, WA7GVA 52, K7KPA 45, WA7KOB 42, WA7EDQ 39, W7IEU 31, K7SUX 20, K7TCY 18, WA7JFX 17, K7BBO 16, K7YFJ 12, K7EFB 11, WA7HSJ 10, WN7KPK 10, WA7LTF 10, W7AIB 9, W7UU 8, W7ZHZ 8, W7BUN 2, WA7DBQ 1, W7FQE 1, WA7KWY 0. (June) W7BA 2445, WA7HKR 1154. (May) W7BA 2225, K7UDG 1460, WA7HKR 1163.

PACIFIC DIVISION

EAST BAY—SCM, Paul J. Parker, WB6DHH—Well, everyone says that the summer months bring about a

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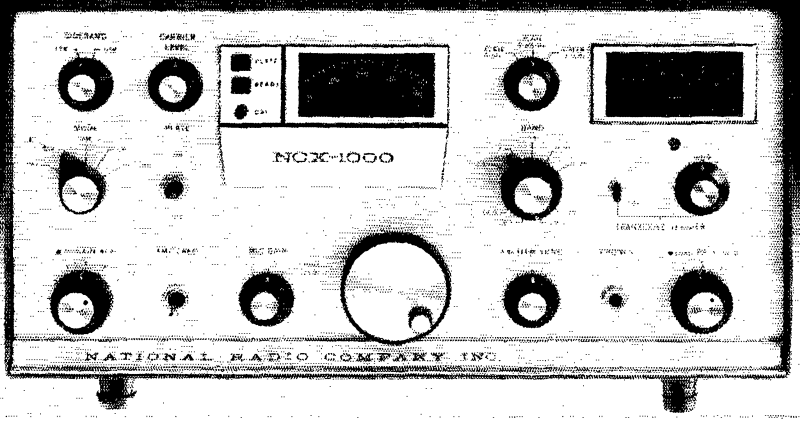

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lull in station activity but I don't believe it and I have a stack of activity report forms this month. Official appointments this month go out to W6IPW, and WA6DIL, and endorsements to W6UZX and W6OJW. Good work, fellows, and keep the station activity reports coming in. Gene Dotson sent a nice letter. W6CBF had a gay time in the CD Phone Party with a score of 7425. Cylde also received his Armed Forces Day certificate after a long wait. W6IPW reports that traffic is somewhat light this month. Oh, and I almost forgot, K6PJ has just been appointed ORS and spent July on vacation. WA6DIL made the BPL again, even with a vacation thrown in there. Dave also was liaison for RN6 and PAN in July. K6PMG has been pretty busy with outside activities these past few months and has not been on the air much. W6UZX seems to have a pipeline into Europe these days. Jim says the bands are constantly alive with the people on the other side. W6TTS has been building a linear to go along with his other homebrew gear. Well, it sure was good to hear from all the people in the section. I hope all who are on vacation return safely and see you all next month. Traffic: W6IPW 361, WA6DIL 313, W6UZX 80, K6PMG 10.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: KH6GQW. RM: KH6AD. V.H.F. PAM: KH6EEM. QSL Mgr.: KH6DQ. RACES Nets: (40, 10, 6 and 2 meters). Coordinate with KH6AIN.

Nets	*Freqs.*	*Time (GMT)*	*Days*
Friendly Net	7,290	2030Z	M-F
Boy Scout Ham Radio Net	21,360	1800Z	Sat.
Pacific Interisland Net	14,320	0830Z	M-W-F
S.E. Asia Net	14,320	1200Z	All
Marianas Islands Net	3,850	0830Z	2, 3, 4th Tue.
GECKO Net (Marianas Is.)	14,240	0930	Tue. & Thurs.
Pacific DX Net	14,270	0700	Tue. & Thurs.
Marine Corps Net	21,380	1900Z	All
Confusion Net (Phone Patches)	21,400	0200Z	All

Remember, if you are on the West Coast plan to attend the Southwestern Division Convention Oct. 17-19 at the Hilton Inn in San Diego, Calif. Write P.O. Box 1469, San Diego, Calif. 92112, for more details. KH6IJ returned from the Mainland and JA-Land. KH6GPP was chosen to participate in the US Navy's Associate Degree completion program. Bob will attend Grossmont College at El Cajon, Calif. WA7LFD/KH6, passed the General Class exam, as did KH6GRG. KH6GHZ, our SEC, won a new award—grandfather. Miss Kimberly Michel Taylor weighed in at 7 lb. 3 oz. We welcome the arrival of KØQZP, who will be /KH6 for the next few years. Traffic: (July) KH6BZF 15, K1HNO/KH6 8, KH6GRG 1. KH6LG 1, KH6VG 1, KR6FT 1. (May) KH6GQW 6, KH6GPQ 1, W4UAF/KH6 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. The ARRL Nevada QSO Party rules are being formed. Watch for full details in a later issue of *QST*. K7RKH is operating portable/6. W7DMI is no longer a bachelor. WA7IPA is a bug collector. K7YXX is back to work after a skiing accident. K7LBQ may become a million-miler on TWA before the summer ends. K7UGT, the Reno area 2-meter f.m. repeater, also will transmit on 147.480. K7ZOK reports working Albuquerque, Amarillo, Tulsa and Memphis 2-meter f.m. repeaters on his vacation.

SACRAMENTO VALLEY—SCM, John F. Minke, III, W6KYA/WA6DJT—ECs: K6RHW, W6SMU, WA6TQJ. RMs: W6LNZ, W8VDA/6

Net	*Freq.*	*Time*	*Days*	*Mgr.*
NCN	3630 kc.	0200Z	Daily	WA6LFA
NCN/2 (slow speed)	3630 kc.	0330Z	Daily	WB6WGR
Calif. Novice (CNN)	3737 kc.	0300Z	Daily	WB6UHF
WCARS	7255 kc.		Daily	
Yolo County CD	145.68 Mc.	0200Z	Tue.	WA6TQJ

Your SCM recently was informed by WA6AUD, the S.F. SCM, that a bill (AB60) was introduced to raise the cost of our license plates to $20 for stamping and an additional $10 a year. Included in this was plates for the CBers. I was then informed by WB6AUH that a hearing was to be held at the capital. Those amateurs who attended were K6DLL, W6FRE, W6KYA, WB6KZN and WA6AUD. The bill was amended July 22 by striking out all references to amateur radio. WA6FWU, of Soda Springs, lost his antennas last winter. W6DOR now has 36 states confirmed on 50 Mc. K6GG, our OO from Willows, hears many signals but not many faulty ones. If you worked FØMR, that was fellow SVer WB6EAG. A recent membership check of

This new generation IKW HF/ISB Transmitter is Automatically Tuned—for ship, shore and transportable shelter use.

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Power output from the RF-130 is 1 KW p.e.p. *and* average over the 2.0000 to 29.9999 MHz frequency range. Up to four audio channels (applicable to DCA specifications) can be supplied. If only one or two channels are presently required, the balance may be subsequently installed in the field. The RF-130 HF/ISB Transmitter is fully compatible with Models RF-601 Automatic and RF-610 Manual Antenna Coupler Groups to provide loading into a 15-35 foot whip antenna.

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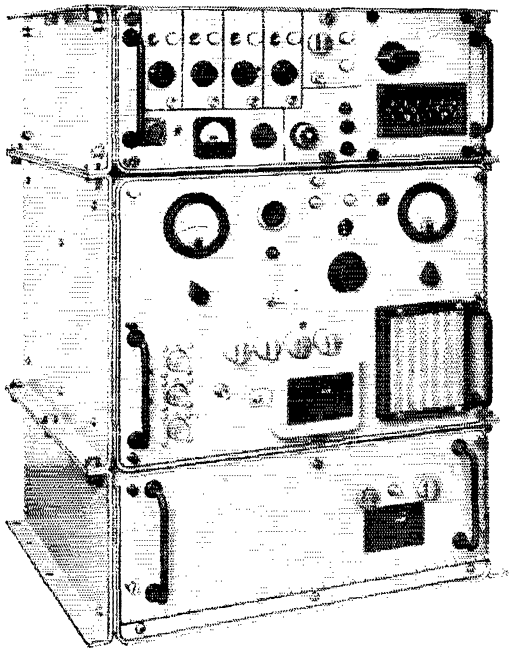

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Frequency Range: 2.0000 to 29.9999 MHz in 100 Hz increments.

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ARRL lists members in 19 out 20 S.V. counties, the hold-out being Alpine County. It would be appreciated if those of you who participate in the California QSO Party the first week end in Oct., would please send me your logs. Traffic: (July) W8VDA 234, W6LNZ 41, WB6MAE 12, W6VUZ 2. (June) W8VDA 131.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD —SEC: W6WLV. WA6BYZ made the BPL again in July for the seventh month in a row in 1969. W6EAJ is working on a solid-state 160-meter transmitter in the wilds of Ettersburg. K6TWJ still continues to be the section mainstay on the Golden Bear Net while WA6-IQP, in San Francisco, is checking into the Mission Trail Net. W6WLV was in the hospital but is out working traffic again. WA6QXV is getting ready to relinquish his fire duties at Imola and will have time for more operating in the future. W6BIP visited ARRL Headquarters during Aug. New in DX activity from the Novato area are K6UFT, K6MHO and WB6SRA. W6BJO, Loleta, passed away June 23. Heard in the July CD party were W6WLV, W6RQ and W6BIP. WB6UJO attended the Western Washington DX meeting in Seattle in Aug. W6ZC has returned from a trip through Western Europe. WB6JQP has been doing a lot of fishing but continues to get in some sessions with the NCN handling traffic. While mobile to Missouri on vacation, WA6ALK and W6UDL managed to work all states. W6LNZ visited some NCN members while over on the coast from the Sacramento Valley. Quick action by WB6CIE in noting the legislation to increase the costs of call-sign license plates some 2000% started action which killed the possibility. WA6AUD, on being notified, alerted all of California to the danger and appeared before the State Senate Transportation Committee at which time all references to amateur plates was deleted from the legislation. The Marin Club handled communications for a Jaycee Orange-Crate Derby and the Dipsea Race during Aug. Traffic: (July) WA6BYZ 504, WB6JQP 54, W6WLV 39, K6TWJ 33, W6BWV 19, WA6AUD 10, W6BIP 4, WA6QXV 2, W6CYO 1. (June) WA6AMH 4. (May) WAWLV 59, WB6QPG 8.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WB6YXB is a new v.h.f. appointee. WA6UQV is being heard on 75 s.s.b. WB6RZI has moved to a new QTH and it is on a ridge 3000 ft. high. W6UBK is running a kw. on 10-15-20. WA6NRV is building a 4-1000 amplifier for 6 meters. W6OWL is mobiling with a Swan 260. W6SVM has a GT-550 and is back on the air. W6KOB, the voice of Hardwick, is on the air with a Drake Line. W6JMP is on 75 and 40 s.s.b., and is holding daily skeds with K6DG. W6DC is pres. of the Central Calif. Single-Sideband Assn. WB6ZBX is putting up a four-element tri-band beam. W6YKS is active on the high frequencies. WB6GJG is back on the air. K6KOL is putting up antennas at his new QTH. WA6-SCE reports that additional stations are needed in Fresno, Tulare and Bakersfield to handle traffic. You can help by checking in on NCN on 3630 kc. at 0200Z and 0330Z every night, and also on RN6 on 3655 kc. every night at 0245Z and 0430Z. K6GTI went salmon fishing on his vacation. WA6UVI operated out of Mono County in Aug. The Delta Amateur Radio Club meets the 3rd Tue. in Stockton at the Dan Webster School. Traffic: (July) WA6SCE 233, W6YKS 47, K6KOL 40. (June) WB6GJG 30, WB6ZBX 17.

SANTA CLARA VALLEY—SCM, Albert F. Gaetano, W6VZT—SEC: W6VZE. RM: WA6LFA. W6AUC has a sort of family net. he keeps skeds with two of his brothers, W6BEU and W6JAO, and his nephew, K7UIO. In between times he handles phone patches for the servicemen on Guam and Okinawa. WA6LFA reports that traffic is picking up on NCN as of late. K6DYX worked in both the Phone and C.W. Parties in July. He had plenty of time because the XYL was away. WB6ZSE was elected secy.-treas. of the Monterey Bay Radio Club. She also passed the Advanced Class exam in July. The DX bug has hit WA6FKZ and he has been doing quite well, that is, when the XYL gets him out of the sack early enough. W6BPT has been active on the MARS c.w. nets lately. The North Peninsula Electronics Club has filled two vacant offices with WN6IZU as vice-pres. and W6KHM as act. chairman. By the reports from the various clubs in the section, it appeared that everyone had a great time on Field Day. W6VZE, who is SEC for the section, has a regular net every Sun. morning at 10:30 PDT on 3900 kc. This is a public service net and anyone is invited to check in. Traffic: WA6OXE 1058, W6RSY 257, WA6LFA 235, W6YBV 215, W6DEF 102, K6DYX 87, W6VZT 48, W6AUC 23, W6NW 22, W6BPT 18, WB6ZSE 17, W6ZRJ 4, WB6IZF 2.

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ROANOKE DIVISION

NORTH CAROLINA—SCM, Calvin M. Dempsey, WA4UQC—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: W4IRE. PAM: W4AJT. V.H.F. PAM: W4HJZ. We are getting some nice reports from our OOs. Thanks for the fine job. Clubs taking part in Field Day are the Rowan Amateur Radio Club, Raleigh Amateur Radio Society, Seymour Johnson AFB MARS group, Forsyth Amateur Radio Club and Buncombe County Radio Club. The Yadkin Valley Amateur Radio Club is setting up an emergency net on 10 meters.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3923 kc.	0030Z	Daily	133	WA4VNV
NCN(E)	3573 kc.	2330Z	Daily	91	W4IRE
NC SSB	3938 kc.	0030Z	Daily	11	WA4KWC
NCN(L)	3573 kc.	0300Z	Daily	65	WA4CFN
June					
NCN(E)	3573 kc.	2330Z	Daily	77	W4IRE
NC SSB	3938 kc.	0030Z	Daily	7	WA4KWC

Traffic: (July) W4EVN 240, WA4VNV 58, WB4HGT 53, WA9JSX/4 50, WA4AKX 46, K4EO 41, W4OTE 36, W4FDV 27, K4VBG 25, K5TGA/4 20, WA4UQC 15, WB4KXL 13, WA4KWC 6, K4TTN 4. (June) WB4GAN 245, WA4KWC 1.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. PAM: W4VFO. RM: K4BSS/4.

SCPN	3930 kc.	0830 and 1530 EST Sun.,	12 Noon Daily
SCN	3795 kc.	2345Z and 0300Z Daily	July Tfc.: 29
SCSSBN	3915 kc.	0000Z Daily	July Tfc.: 109

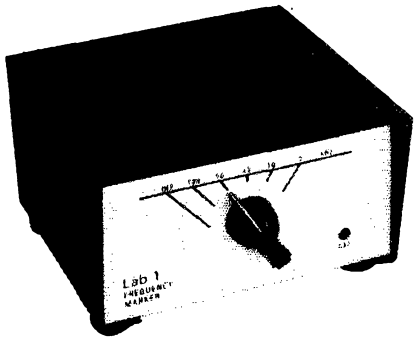
From Spartanburg, W4NTO reports OOing is down. WN4LAM, now WB4NNY, is getting his feet wet on phone. WB4KPN had a slight explosion in an 820-R. The SCPN Quarterly Dinner Meeting in Greenville was hosted by W4AZT, who is the new S.C. Army MARS director. W4EZF reports from Seneca that Mickey Wood, who learned radio by correspondence from the National Radio Institute, has been licensed. His call?—WN4NRI! K4II spent two weeks vacation at Edisto Island and racked up 614 QSOs with 104 countries. Bill reported 166 QSOs in the July CD Party and was anticipating operation at GC4AGA during Aug. WA4NIG and his Navy MARS cohorts are successfully implementing a statewide 2-meter net, something your SCM has advocated for years. Congrats, guys! Don't forget the Roanoke Division Convention in Huntington, W.Va., this month Oct. 10-12. Traffic: K4BSS/4 148, W4PED 44, W4NTO 39, K4OCU 26.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: WA4EUL, K4MLC. PAM: W4OKN. We regret to report the passing, in July, of W4FF. In addition to his amateur activities, Joe will be remembered as a pioneer in the development of audio for the motion picture industry. WB4LQV received his General Class license and is joining the traffic nets. W4ZM and K4FSS were in Europe for the summer. The new SCM will assume office in Oct., but since the election has not been held at this writing, we cannot announce the outcome. When the identity of the new SCM is known, W4SHJ will make every effort to have all material in his hands by late Sept. Oct. also is the month in which standard time is reinstated; keep this in mind as it may apply to changes in net meeting times. Virginia traffic nets meet as indicated.

3680	1830–1930	local	daily
3935	1800–2200	local	daily
3947	1930	local	daily

Traffic: (July) W4SQQ 400, WB4FJK 358, W4TE 267, W4ZM 171, WB4CVY 155, W4QDY 141, K4KNP 130, W4UQ 108, W4NLC 71, K4CG 67, WA4JJF 64, WB4DRB 62, WB4FDT 60, W4RHA 57, WB4DOY 47, W4OKN 41, WA4MJF 35, K4JM 33, K4GR 31, K4LMB 29, W4YZC 25, W4THV 22, WA4NJG 20, WA4PBG 20 W4SHJ 16, W4ZYT 13, WA3IYS/4 10, WA4WQG 10, WB4LQV 7, W4KX 6, K4TSJ 6, W4JUJ 5, W4MK 5, W4GEQ 4, K4BRQ 3, W4IA 1. (June) W4NLC 92, W4UQ 63, K4CG 62, W4YZC 17.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8TPF, K8MYU. PAMs: K8CHW, W8IYD. Net Mgrs.: C.W.—WB8BBG; phone—WB8AQE. New Novices: WN8ELO, Elkins; WN8EDU, Mill Creek; WN8EDV, Harman; WN8CBJ, Charlton Hgts. WA8ZZI is a new ORS. WA8PFB has a new top-loaded 160-meter vertical, operating on 1830. The



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Frequency marker identical to above, less cabinet & switch

- **Keep your receiver calibrated**
- **Locate those sub bands**
- **Readouts at 5, 10, 25, 50, 100 KHz.**
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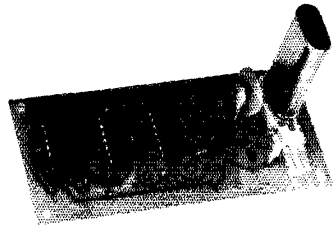

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Opequon Radio Society, of Martinsburg, received a tape and slide from ZS1AX on South Africa. W8HVB is a new OPS and OO. Weirton ARC reports over 1000 contacts on Field Day. W8WVM, WA8NDY, WA8WCK, WA8YHH, WA8YHJ, WA8YHL and WN8OXF operated W8WVA during the State Convention and will supply a special QSL card. WA8UQX is active on the C and O Nets. Remember: The Roanoke Division Convention at the Hotel Frederick Oct. 11 and 12 sponsored by the Tri State ARC of Huntington, with WA8HSZ and W8DUV as co-chairmen. The QCWA plans a dinner meeting during the convention and will have a booth. The 8RN Net meeting is scheduled for Huntington in late Oct. The Black Diamond ARC held another successful Ham-Picnic in Bluefield. The Tri-State ARC has a repeater working on 2 meters in Huntington. The WVN Phone Net reports 31 sessions, 566 stations, 59 messages. The C.W. Net reports 50 sessions, 254 stations, 84 messages. Traffic: WA8POS 215, WB8BBG 84, WA8RQB 34, WA8LFW 32, WA8NDY 31, WA8YHH 21, W8CKX 18, W8JM 17, WA8ZZI 11, WA8WCK 7, W8-DUV 6, WA8WIX 6, K8MYU 2, WA8YSB 2, WA8ZNH 2, W8HZA 1, K8IUD 1, W8KNG 1, K8MYV 1, WA8-THX 1, W8WEJ 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Charles M. Cotterell, WØSIN—Asst. SCM: Neal Morris, KØTIV. SEC: WAØHLQ. RM: WØLRN. PAM: WØCXW. V.H.F. PAM, Denver area: WAØLIK. WAØHLQ has renewed the EC appointments of KØWGC of Delta, KØDXF of Poncha Springs and WØFA of Englewood. New OOs are WØFD and WØGW. WØWYX has a new mobile on the 2-meter repeater. KØJSD has been out of town but still racked up a good traffic count. WAØLIK with WAØLVM and many others provided communications for the Burro Race. WØLRW and W4UDS were in the July CD Party. WAØQFY has moved to Craig and several amateurs were on vacations. OO KØHWB sent out 12 cooperative reports for July and WØLRW is getting started with 1. WØMOX is active again as an OVS and is busy on antennas. He reported some tropo on 144 and 432 for stations above 8000 feet. The Central States V.H.F. Society plans to meet in Boulder. We have a total of 324 registered AREC members. Why not you, Mr. ARRL member? The Colorado Code Net is kind of dormant and Columbine and Hi-Noon are down. Columbine reports QNI of 869, QTC of 104. Hi-Noon had a QNI of 839 and a QTC of 165 for 31 sessions. W4UDS has a new Extra Class license. Traffic: KØZSQ 696, WØIES 652, WØWYX 128, KØJSP 120, KØTIV 27, WØSIN 17, WAØLIK 8, WØLRW 8, WAØPGM 8, WAPKOQ 2, WØLCE 2.

NEW MEXICO—SCM, James R. Prine, W5NUI—At a joint meeting of the three Albuquerque radio clubs on July 7, George Hart, W1NJM, presented a program of our League activities. The increasing interest in f.m. repeater operation is very much apparent in the state. Groundwork is being done to establish a multiple link from El Paso, Tex., to Denver, Colo. The Roadrunner Net desires participants from Santa Rosa, Hobbs, Las Vegas, Farmington, Truth or Consequences and Socorro. Check in on 3915 kc. at 1800 Mountain Time and get acquainted. WA5UJY has completed installation for emergency communication capability. Traffic: W5DMG 50, W5NUI 28, WA5UJY 16, W5LQH 13, WA5MIY 10, W5-PNY 9, WA5JNC 4, WA5OHI 4.

UTAH—SCM, Thomas H. Miller, W7QWH—The present status of appointments in the Utah section is as follows: SEC—W7WKF. RM—W7OCX. ORSs—W7OCX, K7HLR, W7FM, K7RAJ. OOs—K7ZJS, K9-LBQ/7. OVSs—W7RQT, WA7IAW. EC—W7GPN. ORS K7HLR made the BPL. This is no easy task for the Utah section, especially during the summer months. The fete was accomplished primarily on the region level net, TWN. The Rocky Mountain Division Convention held in Salt Lake July 4-6 was considered successful. Our Vice-Director, W5HJ, was in the hospital and could not make the trip to Salt Lake. Robert Jay Harmon, ex-W7KSB, is a lifetime ARRL member. OO K7ZJS has been active during the summer. He sent out 61 reports during July alone. Hams should appreciate more the work done by OOs in saving many from getting a "ticket" from the FCC. Traffic: K7HLR 505, W7EM 108, W7OCX 102.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX, W7SDA, K7TAQ, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO,

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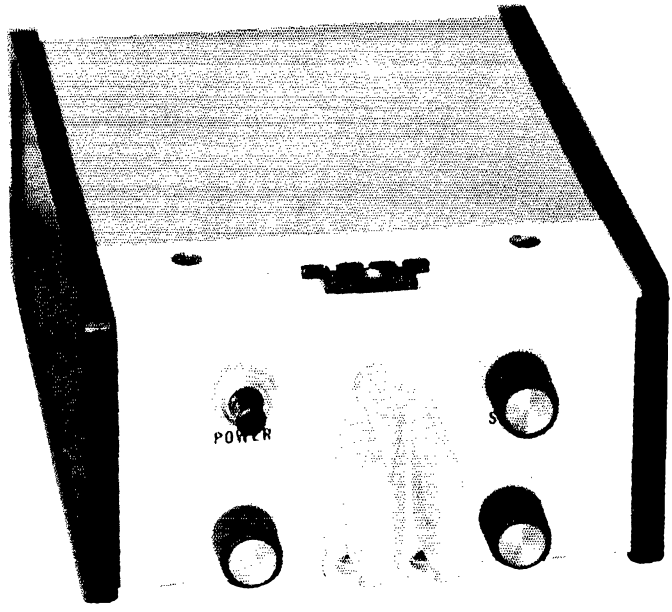

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daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920; PO Net, 1900 Mon. through Fri. on 3950. New appointment: WA7EGK as EC for Laramie. Another newlywed—K7STN was married the first part of Aug. W7YWW is out of the hospital and back on the air again. K7TAL is in the service in Germany. We got an ex-Wyomingite back—W6-DJB, ex-W7LZM, is now in Casper. The Wyoming Mobile Club held its first picnic near Cheyenne Aug. 2 with contests, eats, etc. There are plans in the making to have the Wyoming Hamfest every year on the third week end in July at a place to be chosen each year. Drop me a line with your comments. Traffic: W7SDA 61, W7TZK 52, K7VWA 28, W7AEC 10, K7AHO 8, WA7GYQ 5.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Donald W. Bonner, W4WLG—SEC: K4KJD. RM: W4HFU. PAM: WA4EEC. The Alabama 6M Early Bird Net is operating now on 50.11 at 1100Z Tue. and Thurs. You can contact any five hams in Shelby County (Memphis) and get their Sesquicentennial certificate. WA4WME is in Germany and wants some phone patches into Huntsville. Contact the SCM for details. K4UMD now has mobile and emergency power capabilities. Good to have K4-WHW back after a long vacation. WA4TMY has his Extra Class ticket. K4KJD is back on the air after over 20 days in the hospital and some surgery. We had a real sick boy there at times but it's good to have you back, Billy. WA4JSM has a new TR-3, 70-ft. tower and TH-6. Traffic: W4HFU 130, K4-BSK 92, WB4EKJ 90, K4AOZ 86, W4FVY 75, WB4JMH 60, WA4MIN 37, K4WOP 34, WB4LAL 21, WA4GGD 18, W4WLG 18, WB4LAO 17, WN4KSL 15, WN4NJG 15, WB4ADT 12, K4UMD 12, WB4KSM 8, W4DGH 5, K4WHW 3, K4KJD 1, WA4TMY 1.

CANAL ZONE—SCM, Russell E. Oberholtzer, KZ-5OB—A recent visitor to KZ5-Land was W4NMK. Dan is well known for his tour of duty on the *Cutlass* a few years back. While in the Zone he operated as KZ5DR. KZ5IK is off stateside on a vacation—hamming, too. The CARC held a farewell dinner for KZ5WR and his XYL, who are now in Alaska. KZ5LM now is pres. of the CARC with KZ5BR as vice-pres. KZ5SS and KZ5SN are happy with their son and his XYL visiting from the states.

EASTERN FLORIDA—Acting SCM, Ronald J. Locke, W4YPX—SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EHY, c.w.; W4RWM, RTTY. W4OGX, PAM 75; W4SDR, PAM 40; WA4BMG, PAM V.H.F. Official Bulletin reports were received from WA4EYU, K4LPS and K4DAX. Good news from Indian River County RACES. W4LEP, ex-W2OBU and ex-Hudson Division Director, now is back in action as Radio Officer for that county. Notice how the real workers don't fade away—they find new fields to help. K4-EHY, RM for c.w. now at the U. of S. Fla., has rented a house especially for ham activities between classes, according to his Pop, W4DVO. Multi-appointee W4ILE exults at the fact that XYL Angie is now General, WB4JJH, FAST Net mgr.; WA4NBE, announces new NCSs are WB4HVE and K4SCL. Vero Beach ARC and Jacksonville's NOFARS both announce new Novice classes starting after school begins. Jacksonville's 2-meter repeater, W4IZ, hopefully is on the air by this time, in on 146.34, out on 146.76. WB4EPD is trying to figure out all those cables in his new 2-meter f.m. rig. The massive power outage from Ft. Lauderdale to Miami early in Aug. gave an opportunity for vital emergency practice for the Florida Side-Banders Emergency Net on 3940. Mobiles and generator-powered base stations in the affected area gave Net Mgr. W4OVE reason to be proud of the highly organized disaster control set-up sponsored by the Florida Side-Banders Assn. Ex-Atlanta OOT, W4FQX, now is Jacksonville-based with a new call, K4LQ. WA4BMG, the star of the John and Barbara Show several years ago, now is communicating with beautiful XYL, Nancy, in Orlando, from the Navy complex in Brunswick, Ga., with a new Swan. John provided the SCM with mobile-installation blisters. Traffic: (July) WA4SCK 599, WB4AIW 427, K4EHY 270, WB4HJW 218, WB4-GHD 126, WA4FGH 117, WA4IJH 115, K4DAX 114, W4EHW 92, W4SDR 85, WA4NBE 82, W4YPX 77, WB4FLW 73, WA4HED 67, W4ILE 60, W4ZAK 53, W8BZY/4 53, W4SMK 51, W4OGX 48, K4IEX 44, WN4IIV 40, WA4CIQ 38, W4NGR 37, W4TJM 37, K4LEC 35, WB4EPD 32, WA4HDH 30, W4DVO 29, WB4IER 28, K4LPS 26, WB4ADL 23, WB4HNL 20, W4IYT 20, WB4JDA 19, W4BNE 11, W4LK 11, K4-

EBE 10, WA4EYU 10, WB4IUJ 9, W4LEP 8, K4SJH 8, WB4LEQ 7, WB4IAG 3. (June) WN4IIV 60, W4SOM 6.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: WA4WQU. RM: W4FDN. PAMs: K4HQI, W4YDN. The Atlanta Area Emergency Net held a most successful drill Aug. 3 on 3975 kc. Participating and reporting were WA4VWV (EC), WB4GQX (mobile), WA4LLE, K4AHO, W4GKR, WA4CWU (mobile), WB4NQA, WN4JRL, W4YDN, WB4HYX, WB4CMZ, WB4HXE, WB4HLX, W4UVP, WB4DTY, W4HZA. Augusta area AREC members as reported by W4DDY, EC for Richmond County. The Georgia Single Sideband Assn. held a quarterly meeting in Eastman. Amateur of the Year was selected and a plaque will be awarded in Oct. Members attending were WB4HLX, WB4HXE, WB4HXF, K4PIK, WA4LHE, W4BQU, WB4DCY, WA4GHD, W4GKR, WA4WQU, WB4QMO, K4TXK, W4YDN, W4BOL, W4JCA, WB4NQA, WB4FCE, W4WKP and WA4VWV. W4GKR demonstrated his frequency counter and K4TXK a solid state VOM. W4YDN passed the commercial FAA flight test and will be flying to Nebraska. WB4DTZ is operating from Camp Dixie. A nice letter was received from HL9VR—details in the section bulletin. I have realized a life time ambition—tied K4BAI for traffic! GSN reports 267 QNI, 155 QTC; GSSN reports 840 QNI, 165 QTC; the Atlanta Area Emergency Net reports QTC 120. W4BGK has a TR-6 and a 6-meter s.s.b. rig. WA4FNY is on 2. W4MVD is on with a 753. WA4ARS has a new Swan 250. New officers of the Ga. Southern ARC are WB4FTZ, pres.; W4WRY, treas.; W4DQD, secy. Traffic: (July) W4TYE 132, W4NQA 126, WA4RAV 65, W4FDN 58, W4NSO 54, WA4GXZ 33, WB4HYX 33, K4TXK 32, W4YDN 31, WB4DMO 26, W4PIM 26, WA4WQU 24, W4DDY 21, W4UVP 21, W4YDN 20, WB4BOJ 9, WB4HLX 9, WA4UQQ 7, K4PIK 3, K4BAI 1, W4RZL 1. (June) K4TXK 48.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM: W4MQQ. RM: K4UBR. RM-RTTY: W4WEB. Nets:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2200Z	Daily	30	413	60
QFN	3651 kc.	2230/0200Z	"	62	—	—

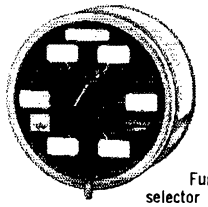
New area hams are WN4NNC and WN4NWV in Pensacola, WN4NMP in Ft. Walton, WB4NHH in Destin and WN4NHQ in Panama City. NHH is a former SCM, ex-W6CMN. Pensacola: WB4DHL used his vacation to get the repeater back on the air! The *FFARA Newsletter* was a big 11 pages this month. Milton: K4HOX renewed his EC appointment. Ft. Walton: K5UUN is back in the area, working for Keltec. K4QHR moved to a new QTH. WB4EER sends greetings from Thailand. Bonifay: WA4GTA has settled on a 900-acre farm north of here; he is active on 80- and 20-meter s.s.b. and hopes to be on RTTY soon. Chipley: W4IKB, XYL WA4ZFK and family made a trip to Los Angeles. Apalachicola: EC K4BDY is working with c.d. officials to set up a county emergency station. He also is putting up two seven-element beams for 2 meters. Cross City: W7NQY/4 has been transferred to Viet Nam. Tallahassee: The TARC was reorganized, with W4MQQ as pres.; WB4AWU as vice-pres.; and WB4GTY as secy. WB4LOQ did a fine job of digging out QTHs of all local hams, and running off the list on a computer! Traffic: (July) K4VFY 245, W8RIY/W4 106, K4LAN 102, WB4EQU 27, W4IKB 16, W4RKH 14, K4BDY 6. (June) W8RIY/W4 72.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Gary M. Hamman, W7CAF—SEC: K7GPZ. RM: K7NHL. PAM: W7UXZ. The Ft. Tuthill Hamfest, sponsored by the Amateur Radio Council of Arizona, showed 98 calls registered. On the program was an Open Forum conducted by Southwestern Division Vice-Director W6UEI. WA7LPR explained the operation of the repeater of the Arizona Repeater Assn., the Apollo 9 film was shown and K7AAB led the group in a sing-along. A swap table was run by K7REA as usual and K7YAE and K7YAG handled registrations. WB6LHE is now WA7-NAR in Oatman. WA7IIF is attending college in Oregon. W7SBZ has mobile equipment operating on h.f. now and K7HIS recently put his homebrew linear in operation. W7DLF now has the Heath line, SB-200, SB-301, SB-401. W7EBJ and K7NHR visited Hawaii, while WA7EDI, WA7EHD, K7JKG and K7WUG made trips to the Midwest the latter part of the summer. K7CEH and WA7DGY vacationed in the Pacific Northwest. The harmonic of K7BDD is now operating as WN7NDA. W7UXZ has added a Tektronix 453 oscilloscope to his test equipment. Make plans now to attend the Convention in San Diego Oct. 17-19. Contact your SCM for more information. The K7UGA operators ran 3413 overseas phone patches in July. The Copperstate Net handled 285 QTCs. Traffic: (July) W7GEP 296, K7NHL 186, W7LLO 50, W7CAF 39, WA7IIF 38, W7AMM 30, W7UXZ 28, WA7GAE 23, W7DLF 20, W7SBZ 20, WA7ISP 13, W7JMQ 12, K7RDH 12, K7UOY 4, (June) WA7IIF 24, WA7ISP 21.

LOS ANGELES—SCM, Harvey D. D. Hetland, WA6KZI—Asst. SCM: Don Etheredge, K6UMV. RM: W6MN. PAM: W6MLZ. As the end of July ECs included WA6ILI, WA6JXG, W6TXJ and W6MLZ. More ECs are needed. Individuals interested in the AREC are urged to contact their nearest EC or WA6KZI. The LACARO now meets monthly on the last Tue. at 7 P.M. at Lemon Grove Park near Hollywood Fwy and Melrose. The East San Gabriel Valley AREC Net meets Wed. at 7 P.M. on 146.82-Mc. f.m. The So. Cal. Slow Net, SCSN, meets nightly at 8:30 P.M. on 3600 kc. WN6FWU is building a 15-meter quad and 40-meter QRP rig. W6HUJ sports a newly-painted shack. W6ERC has a new quad. W6DQX is moving to West Covina. K6QPH may soon move to W. Fla., perhaps in time for the SS. W6OEO has an 80-meter antenna up. WA6WKF reports good 50-Mc. skip during June and July. W6HCD advises good activity at JPL's ARC. WA6TIY was elected corr. secy. for the YLRC of L.A. W6JPH says the new tower and beam works great. WN6ABP has 25 states toward WAS. K6ASK is slowly getting back on the air. K6BPC is handling phone patches with the USS *Sanctuary* each week end with members of the So. Calif. V.H.F. Club at the controls. W6AM reports good progress toward 5BDXCC. WB6OLD has a new keyer. K6QPH received his Advanced Class license. WB6UHF is looking forward to the contest season. WB6WDS enjoyed his first try at the voice part of the CD Party. K6UMV is busy with activities at W6IN. WB6OBO vacationed in VK-Land. The LERC ARC 4th Annual Prizefest is scheduled for Dec. 4. Contact W6LS for information. The San Gabriel Valley RC auction is scheduled for Oct. 7 and the Crescenta Valley auction Oct. 9. Groups with coming activities of general interest are invited to advise the SCM so they may be noted. In many parts of the section AREC nets are needed. Clubs looking for a worthwhile activity might give serious consideration to the possibility of a club net which could also double as an AREC net. Such a net could be used to generate a stronger bond between the club membership, to generate membership interest in the coming meeting's program, to attract new members to the club, etc. Interested individuals or clubs are asked to contact WA6KZI or K6UMV regarding such a possibility. Many section amateurs active in voice nets are eligible for appointment as Official Phone Station (OPS). As an OPS you are asked to provide your SCM with monthly traffic totals, and you will receive quarterly publications of the League's CD Bulletin. Information and applications for OPS are available from your SCM. WA6KZI. Traffic: (July) WA6LWE 626, WB6BBO 240, W6QAE 135, WB6ZVC 69, WB6UHF 65, K6CDW 62, W6FJT 43, W6RHG 39, W6INH 38, WA6TWS 36, W6HUJ 32, WB6WDS 25, W6DQX 24, W6OEO 22, K6CL 14, WB6OUD 14, WB6KGK 10, W6USY 6, W6TN 4, WA6KZI 3, W6AM 2, WB6GGL 1. (June) W6MLF 397, WB6HTY 64, W6FJT 56, W6USY 17, W6JPH 16, WN6ABP 7, W6RO 2, WB6OLD 1, W6TXJ 1. (May) WA6AWL 10, W6USY 10, W6TN 4. (Apr.) WB6OLD 27.

ORANGE—SCM, Roy R. Maxson, W6DEY—The Barstow ARC operated FD at Owl Canyon using the call of W6DSL, antenna by W6ZGC with generator and information supplied by WA6CMZ. The Barstow Club meets the 3rd Thurs. of each month at the Police Facility. OPS W6BUK, Hemet, is active on MTN and spent most of July, mobile and portable in Northern Arizona. Thanks to ORS WA6ROF and others who took the time to write our California Legislators re the proposed excessive charges for ham call plates, with the result we were taken off the hook. EC K6CID Riverside Area, advises that WB6OHH and K6BID are now Silent Keys and will be missed in that area. ORS WB6ZEC and WA6BLA are starting a net on 7150 at 0100 GMT. Give them a hand. ORS W8ELW/6 passed the Extra Class exam and hopes to get a good c.w. call for W6-Land. RM W6BNX is now PAN Mgr. Welcome to WN6-ZOK in AREC and soon in NTS. OO WA6IZZ passed the Advanced Class exam 7/8/69. ORS K6OT put in four hours in the CD Party. Visitors cut his time down. OPS W6GB advises he was not too active in July. Traffic: WA6ROF 258, W6WRJ 88, W6BNX 80, W8ELW/6 80, WB6ZEC 23, K6OT 18.



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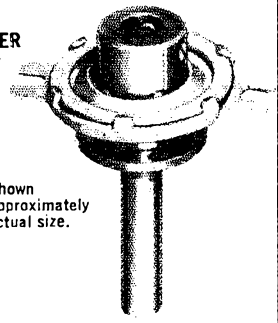

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SAN DIEGO—SCM, Richard E. Leffler, WA6COE —SEC: WA6KHN. RMs: W6EOT, W6VNQ, W6BGF. I wish to thank WB6KSA and others for their petition nominating and electing me to the SCM position for the next two years. The biggest event for Oct. is the convention! The main speaker at the Hilton for the 17th-19th get-together is the S.D. 200th Pres. Charles Cordell, W6SAG. *Clubs:* The El Cajon ARC has rules and logs for your WAMO Award. North Shores has conducted a "Name the Paper" contest. A new specialized group has begun under the sign of SDFMARRA. Chairman for this f.m. group is K4AFS/6. V.H.F. held its 8th anniversary meeting in Aug. Look for S.D. County Amateur Directory sales by the Palomar RC. K6TVI, WN6HAM and WN6-HCQ and all members of the ARC of El Cajon. *Section News:* We're sorry to note the passing of WA6OYE. Look for satellite information on the Astro Net at 3885. WA6PFP is now chief operator at W6AIB (Pendleton). WA6KHN got his quad up for 20. WAPCY is kept busy visiting clubs for CHP. The new EC for the 2-meter net is WA6TJK. The EC for Imperial County is W6DLN. K6BPI has received a BPL certificate every month for more than 13 years! K6BTO and WB6TFC are OVSs. Would like to have more of you reporting in each month. Ask for Form 1 cards from me. Everyone in this section is invited to contribute station activities reports to me. Listen to S.D. OBSs for the latest convention news. Remember: Oct. 17-19. See you there! Traffic: (July) K6BPI 9881, W6VNQ 551, K6-HAV 18, WA6COE 14, K6YRF 2. (June) W6EOT 326.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: K6GV. RM: W6JUJ. WB6DPV has received his EE degree and is now working for the Navy at Port Heuneme. WB6BWZ has built the AD-1 a.f.s.k. which was described in a recent *QST* article. WA6DEI is busy at summer school but not too busy to work on an all-band rhombic antenna. WB6QLY devotes his spare time to civil defense efforts. WB6-WKC is trying for a record with his 1 1/2-watt QRP rig. The Santa Barbara ARC operated 4 transmitters during Field Day covering 80 through 2 meters (excluding 10). The site of activities was Bell Tower Hill and the report indicates it is a great location for all bands, including v.h.f. WB6BWZ (EC for the Santa Maria Valley) has originated a letter to all potential ARPSC members. Those interested in the Santa Maria area should call WB6BWZ at 866-5531. The Mission Trail Net Roundup was held in June at the Santa Maria Inn, reports K6EVQ, who is the newly-elected secretary. The Mission Trail Net meets seven days a week at 1900 local time on 3928 kc. Traffic: WA6DEI 60, WB6DPV 44, W6UJ 25, WB6-WKC 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. E. Harrison, W5-LR—Asst. SCM: Gene Pool, W5NFO. SEC: W5JSM. PAM: W5BOO. PAM (v.h.f.): WA5KHE. RM: W5-QGZ. Asst. SEC: WA5KHE. Field Day messages for extra points continue to come in. The SET is due in Jan. This test covers many facets of club work similar to FD. If you do not understand SET ask W5JSM, he's the man. Our new Asst. SEC East Texas, WA5KHE, is looking for Emergency Coordinators. W5HT is most interested in League affairs. The Garland Amateur Radio Club personnel is developing computer applications for the North Texas membership list. The July issue of *CapRock Radio Society* carried an editorial entitled, *"You owe me your license,"* that raised many an eyebrow and *told it like it was.* W5JSM and Division Director W5EYB attended a RACES meeting in Austin Aug. 2. Our SEC says that 125 amateurs are now participating in EC work, including 40 AREC members attending 48 drills. OOs W5GWF, W5QPX, W5MSG, W5PBN, W5KYD and WA5KIV continue their fine reports. We understand the Lake Merval Hamfest in Panola County had an attendance of about 250. A new OO certificate, Class I and II was issued to W5PBN, The Brownfield Swapfest is set for Sun., Oct. 26. The East Texas Emergency Net reported a total of 51 sessions, 655 check-ins, 280 messages cleared from Sept. '68 to July '69. K5QKM, Athens, Texas is Net Control. The Arlington Christmas Party will be held Dec. 15. The Panhandle Amateur Radio Net, which takes the place of former Panhandle Weather Net, meets on 3940 kc. 6:00 P.M. daily. Net Mgr. is WA5PEO. The Shaw family, K5PCW Bill, W5ARV Will, his XYL (ham) of Arlington are all very happy. W5ARV is back from his Merchant Marine travels. WA5JMK checked

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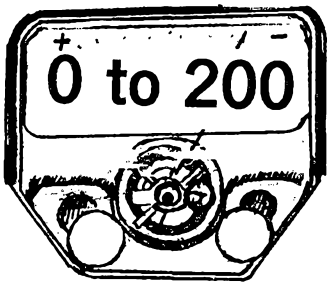

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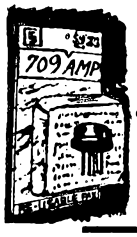

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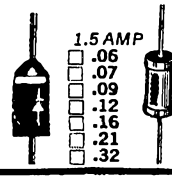

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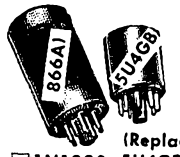

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in. The Big Springs Club certified. What happened to our 2-meter people? Traffic: (July) K5BNH 1830, WA5KIV 119, W5JSM 62, K1ZAT/5 55, W5LR 30, W5PBN 26, W5FCX 6, WA5FRJ 4, WA5QWA 4. (June) K5LZA 75, WA5FRJ 4.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—Asst. SCM: W. L. (Smoky) Stover, K5OOV. SEC: WA5FSN. RM: W5QMJ. PAMs: W5MFX, K5TEY, WA5JGU and K5ZCJ. Your SEC, SCM and Director made a three-day whirlwind swing through north central and eastern Oklahoma during July, visiting clubs in Tulsa, Enid and Oklahoma City. Another such trip is planned for the northern part of the state about the time this report reaches you. I hope to see all of you at the Texoma Hamarama at the Lake Texoma Lodge Nov. 15-16-17. You may write to P.O. Box 246, Kingston, Okla. 73439, for reservations. I left Aug. 8 for a two-week vacation in North Carolina and regretfully missed the Division Convention in Amarillo. New officers of the Miami Club are K5JOA, pres.; and WA5RYM, vice-pres. W5JJ working for five-band DXCC, reports working EA8FF on 7 Mc. 0.1 A-1. W5IQ received lightning damage to his beam but it has been repaired and is back in business. K5ZCJ has just moved into a new five bedroom house. Congratulations to new or upgraded licensees: Extra Class—W5KLH. Advanced—WA5YRO, K5CBG and WA5SBP. General—WA5PHN, K5LLX, WA5PDH and WA5NUM. Novice—WN5ZCG

Net	*Freq.*	*Time*	*QNI*	*QTC*
OPEN	3915 kc.	1300Z Sun.	151	2
OPON	3920 kc.	2200Z M-F	356	167
STN	3855 kc.	2230Z M-Sat.	684	145
OLZ	3682.5 kc.	0001Z Tu-Sat.	31	48
SSZ	3682.5 kc.	0245Z Tu-Sun.	22	30

Traffic: (July) K5TEY 2383, WA5QIQ 149, WA5IMO 88, WA5KFT 63, W5MFX 45, WAØNFP/5 36, WA5LWD 33, W5QMJ 26, WA5SEC 23, W5PML 22, K5OOV 14, WA5FSN 13, W5IQ 6, K5CBA 2, K5OCX 2, W5JJ 1. (June) WA5RYM 6.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. K5SBR is a new OO appointee. K2EIU/5 is moving from San Antonio to Kansas City, Mo., for flight training with TWA. Best luck, Ken, the South Texas traffic nets will be anxious to hear from you. EC W5TFW alerted the 2-meter net with seven stations reporting after a small tornado created some damage in the southeastern part of Jefferson County. From the South Texas Emergency Net Bulletin *Stenscope* we learn that WA5ABA mobiled in Memorial Park, Houston, and WA5OON, who answered his call for help, got an ambulance to pick up and take a seriously injured man from the park to the hospital just in time to save his life. Congratulations to all amateurs involved. The Texas Southmost ARC, *Off Resonance*, by EC, W5KR, reports the CARCOB ARC now has SB-200 power just finished by W5HBL, also that the club is keeping theory and code classes going. The *El Paso W5ES Bulletin*, by W5OVH, reports that WA5RCT now is operating a new SB-401 and that K5TML is on an extended tour in Okinawa. Traffic: (July) WA5THM 211, W5QJA 140, W5EZY 104, W7WAH/5 63, W5TFW 21, W5EYB 20, W5ROZ 17, WA5TXI 15, K2EIU/5 10, WA5WFR 8, WA5AUZ 4, K5WYN 4, W5KLV 3. (June) WA5THM 75.

CANADIAN DIVISION

ALBERTA—SCM/SEC, Don Sutherland, VE6EK—PAM: VE6ADS. ECs: VE6SS, VE6AFQ, VE6XC, VE6AWM. OOs: VE6HM, VE6TY, VE6MJ. OPSs: VE6ATH, VE6SS, VE6AFQ, VE6HM, VE6TG, VE6ADS. ORS: VE6ATG. OVS: VE6MX. At the Waterton-Glacier Hamfest VE6ABS won the mobile contest and the hidden transmitter hunt. Congratulations and thanks to former SCMs VE6TG and VE6MJ on their appointments as OPS and OO. VE6AIK/6 has become a highly competent c.w. operator. VE6PL has returned to Calgary and we sure are delighted to have him back. Hamfest '69, hosted by the NARC, was an outstanding affair. The committee deserves full praise for an exceptionally interesting and well-coordinated program. The Saturday evening pyrotechnical display and banquet waterfall will never be duplicated. I certainly enjoyed meeting so many old friends at Hamfest '69 and seeing their interest in all things beneficial to amateur radio. The Alberta Motor Assn. BEBA was run on the same week end as Hamfest '69. Although our forces were pretty thin a commendable job was done. Deaths were high on the

VHF COMMUNICATIONS

VHF COMMUNICATIONS

The quarterly magazine for amateurs interested in VHF and UHF technology and equipment construction. An international edition of the well-known German publication UKW BERICHTE.

VHF COMMUNICATIONS provides sixty pages of modern, but practical construction articles in each issue. Described are transmitters, receivers, converters, tranceivers, antennas, test equipment, etc. The designs truly reflect current technology. Solid state devices and printed circuits are used extensively. All mechanical construction data are included. However, for the amateur without fabrication facilities, special components, such as p.c. boards and stripline cavities are made available.

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highways! Can't we do better? I am sure we can. Past accomplishments only lull us into a secure feeling. Let's hear your ideas for 1970. We must improve. Traffic: VE6FK 27, VE6FS 4.

MANITOBA—SCM, John Thomas Stacey, VE4JT—SEC: VE4IA, PAM: VE4QJ, RM: VE4EI. It is a pleasure to announce that VE4IA has accepted the position of SEC. John will be contacting many stations for assistance in reorganizing the AREC. All inquiries for membership, etc., should be directed to John Fallows, 259 Glenwood Cr., Winnipeg 5. Activity reports are nil this month; guess summer doldrums have set in. Nil reports MTN, sessions 9, QNI 25, QTC 6; Phone Net sessions 31, QNI 461, QTC 6. Traffic: VE4QJ 11, VE4CR 9, VE4FQ 8, VE4RO 6, VE4YQ 4, VE4JA 2.

MARITIME—SCM, William J. Gillis, VE1NR—SEC: VE1HJ. Two-meter mobiling highlights much of the summer activity. F.m. repeaters are operating at Moncton and Halifax and several VE2 and VE3 visitors have checked in while on vacation. APN would like to see more stations calling in. VE1MF reports snagging a few rare ones on 20 meters. VE1AKT is planning some aeronautical mobile work. With summer drawing to a close let's have more individual and club reports. APN reports QNI 250, QTC 61, sessions 61. Traffic: VE1ACO 70, VE1RO 50, VE1AMR 41, VE1AAX 10.

ONTARIO—SCM, Roy A. White, VE3BUX—SEC: VE3EWD. It would be appreciated if the VE2 boys would be good enough to avoid 3770 at 2300Z week days when the Ontario Phone Net tries to operate. It's only for 30 minutes or so. A hearty welcome to VE3FWS, who is now a controller on the Ontario Phone Net. We need more people like Diz! If you are eligible, and want an ARRL field appointment, drop me a line. Please insure that traffic and other reports reach me not later than the 5th of the following month. *My* deadline is the 7th. VE3DMU has been transferred to the East Coast from Ottawa and we are losing a tower of strength. Gord was EC for Carleton County and we would very much like to find a replacement. Will you help? Another loss is VE3HW, who has moved to VE2-Land. VE3ERU, in Windsor, probably is going to form a c.w. traffic net on 3545 to serve the southwest portion of Ontario. It would operate at 2200Z. Dick's FTDX-400 broke down in April and he hasn't got it back yet! Glad to hear VE3MS active and putting in a dandy signal with his new HW-100. You should see the snazzy award medals CARTG has for the 9th World-Wide DX RTTY Contest Oct. 4-6. About 250 turned out for the CJ Picnic in July and FB weather was the order of the day. VE3AW tells me that no less than 56 blind amateurs are now licensed in Ontario. Lots of the VE3 boys contacted WB4CIJ following the launching of Apollo 11 both on phone and C.W., and await their certificates. Summer vacations, gardening, static, etc., hit the bands during July and news from clubs and individuals hit a real low. I am disappointed beyond words to note that no club in Ontario wanted to sponsor an ARRL convention in 1968 and 1969. Why this apparent reluctance to become involved? Tell me because I'm curious. Traffic: (July) WA8ETX/3 266, VE3GI 175, VE3DPO 112, VE3ERU 64, VE3FAE 42, VE3GCE 25, VE3DV 20, VE3EWD 19, VE3VD 19, VE3GHO 16, VE3EHL 12, VE3AWE 8. (June) VE3GMQ 76, VE3BZB 70, VE3APL 10. (May) VE3GMQ 12. (Apr.) VE3GMQ 12.

QUEBEC—SCM, J. W. Ibey, VE2OJ—VE2ALE is almost settled in his new QTH. VE2DEA is now EC, replacing VE2CA now located in VE3-Land. The Quebec Phone Net (RPQ), on 3780 kc., is very active and looks for your traffic. After a long absence VE2BB makes his presence felt again. VE2DR hints at giving up traffic-handling. VE2RT is 2-meter mobile and VE2AFA soon will be. Out of the Quebec area the strongest signal is VE2SD. One time OQN Manager VE3CYR paid us a visit in August. Trying to make a sensible report when most are vacationing in hot July and have it sound right in Oct. is not easy! VE2AKI is a newcomer—welcome. VE2AUS is the new director for RAQI, Three Rivers District. VE2BLM and VE2DEU keep very active and VE2AGP contacted LG5LG for a rare one. VE2DBN now lives in Donnacona. VE2EC has several local skeds which keep the newcomers busy. Now that fall and winter activity is with us, please consider how you will help if you accept appointments. We require PAM for h.f. and v.h.f. OO all classes and, of course, ORS, OPS and OVS appointment. Traffic: VE2DR 58, VE2OJ 45, VE2CE 24, VE2ALE 2.

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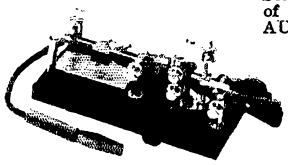

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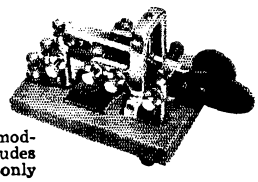

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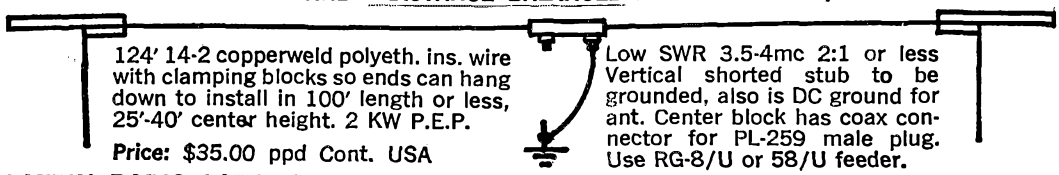

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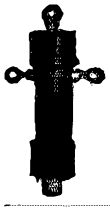

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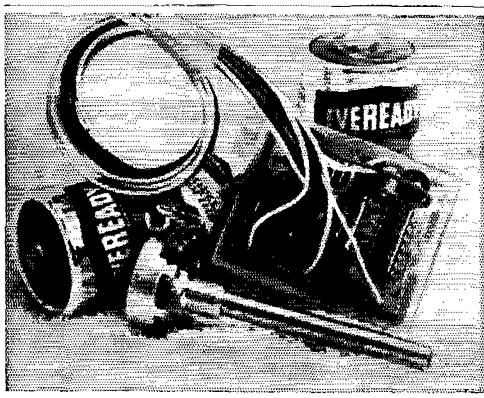

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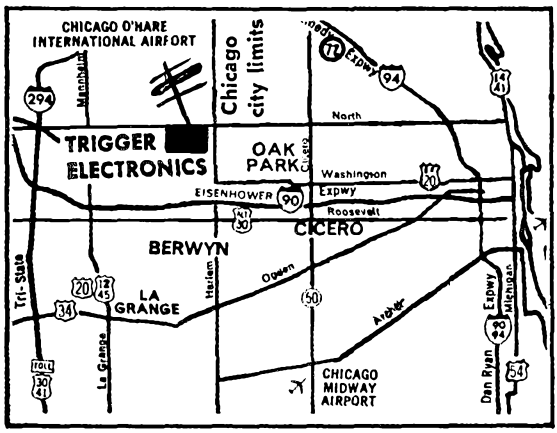

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QSL, SWL, cards that are different Quality Card stock, Samples, 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

QSLS. Radio Press, 15008 Orchid Ave., Poway, Calif. 92064.

CREATIVE QSL Cards. Personal attention. Imaginative new designs. send 25¢. Receive catalog samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

QSLS, SWLS, XYL-OMS. Sample assortment, 25¢. All the fabulous designs of the late Warren Rogers. KØAAB. Patterson Printing Co., 961 Arcade St., St. Paul, Minnesota 55106.

QSLS 300 for $4.35, samples 10¢. W9SKR, George Vesely Ret. #1, #100 Wilson Road, Ingleside, Ill. 60041.

QSL cards Finest quality. Economical prices. Fast service. Free samples, Little Print Shop, Drawer 9848, Austin, Texas 78757.

QSLS-100 3-color glossy $3.50; silver globe on front; report form on back. Free samples. Rusprint, Box 7575, Kansas City Mo. 64116.

QSLS, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WAFJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

QSLS SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS, finest YLRL's. OM's samples 10¢ W2DJH Press. Warrensburg, N.Y. 12885.

QSLS. Neat, Quick, 10¢, Filmcrafters, Box 304, Martin's Ferry, Ohio 43935.

QSLS Kromekote glossy 2 & 3 colors, attractive, distinctive. Choice of colors, one hundred—$3.00 up. Sample 15¢. Agent for Cal-D-Calls. K2VOB Press, 457 Chancellor Ave., Newark, N.J. 07112.

3-D QSLS—The modern concept that makes all others old-fashioned. Samples 25¢ (refundable), 3-D QSL, Co., Monson 2, Mass. 01057.

EMBOSSED QSL's. Free Samples, with cut catalog 25 cents. Ace Printing Service, 6901 Clark Ave., Cleveland, Ohio 44102.

ORIGINAL EZ-IN double holders display. 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free samples to Dealers or Clubs, Tepabco, John K4NMT. Box 198T, Gallatin, Tenn. 37066.

LOW Priced QSLs! Free samples! K.L.L. Press, Box 258, Martinsville, N.J. 08836.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

RUBBER Stamps, badges, nameplates. Fast accurate delivery. Request price info and style charts from Fulton Rubber Stamps. Route 216-A, Fulton, Maryland 20759.

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.00. 1000, $15.25. Also unusual non-picture designs. Generous sample pack. 20¢. Half pound of samples 50¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

RUBBER Stamps. 2 for $1.00. E. Mack, Box 8151, Rochester, N.Y. 14603.

PROP Pitch rotor, WW2, small, excellent, $45.00. Link, 1081 Aron St., Cocoa, Fla. 32922.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

FILTER-Condensers: Aerovox oil-filled 100 mfd. @ 3000vdc condensers, $30.00 each. Basil J. Weaver, 1821-C Ave. M, Lubbock, Texas 79401.

CANADIANS: Drake 2-B receiver, in exlnt condx, with manual: $250.00 VOIIL, 558 Topnil Rd., St. John's, Nfld. Canada.

NOVICE Crystals: 40-15M $1.33, 80M $1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

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 swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Lansdowne, Penna. 19050.

DUMMY Loads, 1 KW, all-band, $7.95; wired, $12.95. Ham Kits, P. O. Box 175, Cranford, N. J. 07016.

POLICE Fire Radio Dispatcher directories! Exclusive official directories: Call signs, 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. 11752.

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: 2 to 12 304TL tubes. Callanan. W9AU, 625 West Jackson Blvd., Chicago, Ill. 60606. (Note new address, fellas!)

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY. 1329 N. E. 4th Ave., Fort Lauderdale, Florida 33304.

WANTED: For personal collection: How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 12. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

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 08032.

QST's Wanted: December 1915 to December 1916, 1913, IRE Proceedings. Any unreasonable price! 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, subject 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.

TOROIDS, 88 mh uncased, 5/$2.50, Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

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 $2.50 postpaid. Elliot Buchanan & Assoc. Inc. Buck, W6VPC, 11067 Mandana Blvd., Oakland, Calif. 94601.

FOR SALE at sacrifice prices. Am reducing size of station. Collins cabinet model 51-J-4 serial 5676 with 3kc and 6 kc mechanical filters. $575. Collins external PTO for KWM-2 $90. Both equipments in perfect condition. Ferris Model 22-D A-M 85 kc to 40 mc signal generator. Perfect operation but could use recalibration. $100. Sorry cannot ship. Equipment must be picked up. John F. Rider W2RID, 350 West 57 Street, New York, N.Y. 10019. (212) 583-0038.

WANTED: Tower, give details in first letter. Ray Ziminski, W2BZV, 1634 Warren St., East Meadow, L.I., N.Y. 11554.

HEATH HW-16 C.W. transceiver, excellent condition. Asking $87.00. Phil Goodman, WA9VWE, 347 Hampton Road, Hoffman Estates, Ill. 60172. Tel: a.c. (312)-529-9410.

FOR Sale: DX-60 Novice transmitter, $55; HQ-110 AC, $110.00; HG-10 VFO, $20.00; Dow-Key DK-60 antenna relay, $10.00. Walt Edge, WA2ICN, 104 Forest Ave., West Caldwell, N.J. 07006.

HALLICRAFTERS SX-71 double conversion receiver, bandspread, speaker, Johnson Challenger xmtr, 80-6 meters, 120 W. C. W., A.M. w/relay. Both $130.00. NYC area only. WA2GEW, tel: a.c. (212)-763-3537.

SELL: Drake TR-3, AC-3, MS-3, microphone, $350.00; RV-3, $70.00 or $50.00 if sold with above package. Clean, modified at Drake factory, new type relay, etc. Original cartons. W8BZR, 763 Winterberry Place, Mansfield, Ohio 44905.

THOR 6 with 417 AC p/s, $140.00; 22'er like-new, $150.00; 3 BC-611-D with book, $20.00; TS-382 AF gen., $100.00; Lamda O-30 VDC @ 2 a solid-state regulated p/s $70. Late Swan 500, $320.00; 117XE, $65.00; 405X, $30.00; DC module, $40.00; package $430.00. Reid, 405 4th Place, Merritt Island, Fla. 32952.

SELL OSTS 1943 to date; CQ 1946 to date; 73, Ham Radio. Heavy linear parts, 4-1000As, vacuum variables, power supplies to 7500 at 1.5 amps. SASE for list. J. E. McGraw, W5QB, 7964 San Jose Road, El Paso, Texas 79915.

EIMAC 4CX250Bs, new-sealed containers, $27.00 each, plus shipping. Write for discount prices on new amateur equipment. Nova Electronics, 3012 Ross, Dallas, Texas 75204.

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, R. McMahon) 1055 So. Oak Knoll, Pasadena, Calif. 91106.

SELL: Factory aligned TR-108, brand new, best offer. WA9-BYR, 627 Dundee Ave., Barrington, Ill. 60010.

RARE Like-new 51J4 Collins w/3 filters and SSB Product Detector, cabinet, non-military. Best receiver made. Serial 4432, $850.00. VHF/UHF gear. List stamp. Send yours. W4API, Box 4095, Arlington, Virginia 22204.

HALLICRAFTERS SX-111 in like-new condition, $120.00. WB2YCT, Michael Mari, 1460 Gun Hill Road, Bronx, N.Y. 10469. Tel: a.c. (212)-652-9383.

WANTED: Collins 32S-1, 3 w/a.c. power supply, 75S-3, B, C; Hallicrafters HT-44 w/a.c. power supply. Must be mint condx w/manuals. WA6JWK/4, 2304 N. Florida St., Arlington, Virginia 22207.

JOHNSON 500, 10 thru 80, AM, 500 watts, clean, excellent condition, $250.00. Prefer local pick-up. Elmer Turner, WITF, Box 87, Melvin Village, N.H. 03850. Tel: a.c. (603)-544-3421.

UNCLE Sam calls: Must sell NCX-3 and NCX-A, D-104 mike; SB-610 monitor 'scope, Millen Grid Dipper, 14AVQ vertical, all manuals, cables, $275.00. WA9EBS, 1123 Fairview, Lombard, Ill. 60148.

SWAN 500. Best offer over $350.00; excellent condition. WA3EYM, 5944 Doris Drive, Erie, Pennsylvania 16509.

JENNINGS Variable capacitor, 20 PF, 30 K.V. w/tuning head, Varian #220B. Both excellent, $50/ea. Wollensak T-1500 w/remote control and accessories. Exclnt. $100.00. Robert Yarmus, 5900 Arlington Ave., Riverdale, N.Y. 10471. Tel: a.c. (212)-884-6336.

COMPLETE CREI Radio Broadcast course, 1944 vintage, but in excellent condition; radio principles taught are applicable today. Will swap for amateur radio equipment, including favorite surplus items SCR-522 or TCS-series. Bill Ussery, WA5SCQ, P.O. Box 40, Pearl River, La. 70452.

WANTED: 160-meter fone transmitter good condition 100 to 300 watts, also 5-band mobile transceiver in good condition. Will pick up if within 250 miles radius. When writing give phone number. Jack C. Castle, P.O. Box 709, Painsville, Kentucky 41240.

SELLING Out: NC-300, $125.00; Viking Valiant II, $150.00; TA-33 beam, AR-22 rotor and 40 ft. tilt-over tower, $100.00. Electro-Voice mike 623, B-W filter, SWR, etc. All are in A-1 condx. Entire package much cheaper! W4FKA, 339 Sierra Dr., Lexington, Ky. 40505.

RCA Receiver AR-77, 540-31,000 Kcs, in six bands, vy clean, $77; Heath Twoer, $26.00; Lunch box mobile p/s, $9.00; Globe Model 6-2 VFO for 6 and 2 meters, $13.00; Lettine model 242 6-meter AM xmtr, $35.00. W2ZN, 3 Puddingstone Ct., Morristown, N.J. 07960.

GOOD Deals on new and used ham gear. Write Steve Habovstak, 514 Yellowstone, Billings, Montana 59102.

SELLING As is Globe Chief, $15.00; Lafayette HA-230, $75.00; Eico 722, $35.00; UM-1 Globe modulator, $20.00; Heath Sixer, $30.00. WB2KDP. Tel: a.c. (212)-HA8-2746.

W5BOC Estate. Make offer on following: 32S-3, Drake 2B, 2AC, 2AQ, two Simpson 270, leather case; two Weller D-440, Craftsman #5401 soldering iron, Craftsman vise #6182; Craftsman tap and die, #5504; BC-221 with book and power supply; Heathkit vacuum tube voltmeter, Heathkit 10-12 'scope, Heathkit capacity checker, B&W grid dip meter 600, RME 45, 813s final, two commercial dummy loads, two new 3-400Z, one new 4-400A, B&W 850A, 5 variacs, 200 new and used meters, transformers, filter condensers, Logan 820 lathe, Delta 60-5342 table saw, Oliver #173 jig saw, Delta Drill Press. SASE. Jim Stroman, Lometa, Texas 76853.

TELETYPE Picture for sale. 50 pictures for $1.00. Perforated and audio tapes also available. Pictures for Volume Two solicited. Grene, W9DGV, 2210-30th St., Rock Island, Illinois 61201.

WRL DB-84 and 400 watt a.c. power supply, both factory-conditioned and unused Mic and antenna, all for only $199.00 postpaid. Hammarlund HQ-110C with speaker and Mosley RD-5 80-10M antenna, all for $110.00 postpaid. Mosley 40-D dipole loading coil for 40 meters, $7.00 postpaid. K7BGU, Adolph, Box 744, Provo, Utah 84601.

TOROIDS 88 or 44 mhy. center-tapped, not potted 5/$2.00 postpaid, FRXD 14 typing reperf-TD combination, sync motor, $25.00. Deskfax #6500 complete facsimile transceiver including receiving converter, $20; LO-15 page-printer, with all covers, table, reperf and TD built-in like Model 19 set, $100. 11/16" reperf tape (fresh) $3.00/box/10 rolls. Drake 2B & 2BQ receiver, $170.00; Hammarlund HQ-140X general coverage, $100.00; CD Gonset Comm IV two-meters, $150.00. Wanted: Ham-M, tower, AR-3 speakers, 525 plug-in for HP counter. Stamp for list. Van, W2DLT, 302Z Passaic Ave., Stirling, N.J. 07980.

RME-6900 and matching speaker 6901, mint condition, all new tubes, instrument aligned, guaranteed, $200.00; GR-64 $30.00; Globe Chief 90, $30.00. All with manuals. Paul Peterson, WN8DGQ, 15 Woodward Ave., Athens, Ohio 45701. Tel: 614-593-3600.

SALE: NC-303, $225.00; NC-400, $375.00, both excellent. Michael A. Sciotto, 98 Southlawn Ave., Dobbs Ferry, N.Y. 10522. Tel: 914-OW-3-1946.

CENTRAL Electronics 20A; CE458VFO, cabinet model, $100 F.o.b. Central Electronics 10B, 458VFO, rack-mount mounted in brand new Bud cabinet, 4-sets band coils, mint condx. $75.00 F.o.b. Drake 2A, xtal calibrator, in mint condx, converted for MARS, WWV reception, $150.00 F.o.b. Will ship any or all. Don Whitney, K5GKN, P.O. Box 249, Osceola, Ark. 72370.

PREPARE For FCC Exams! You need posi-check. Not a copy of anything. Original, expertly devised, multiple-choice questions covering materials used in FCC exams, in the same form as FCC exams, with keyed answers, explanations, IBM sheets for self-testing. Over 300 questions and/or diagrams for each class. Each class complete in itself. Basic questions duplicated where they apply. General Class $3.50. Advanced Class $3.75, Extra Class $4.00. Third Class postage prepaid. Add 32¢ per copy for first class mailing, 64¢ for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa, 50322.

SELL: All kinds of plate and fil. transformers, chokes, capacitors 4-250A, 4-125A, 4-65A, 813 tubes, new, BC-610E parts. Best offer. W3KZ, 441 W. Stafford St., Philadelphia, Penna. 19144.

ANTIQUE Wireless collection for sale: sets, books, magazines, catalogs, etc. Send SASE for list or send listing of your wants. John Walker, 67-61 Alderton St., Rego Park, N.Y. 11374.

HEATH DX-60 with HG-10 VFO, $60.00; 275W Matchbox with SWR bridge, $40.00 mint condx. Harold Chinery, K2-AFW, Box 32, Flagtown, N.J. 08821. Tel: 369-4776.

DX-60, HG-10 VFO, Dow-Key relay. Package deal for $75.00 or best offer. Will sell separately. R. Wanat, 443 Atlas Dr., Madison, Alabama 35758.

SELL: HW-12A, $75.00; HP-13A, never used, $50.00. Both are in mint condx. Selling for college expenses. WB4NLW, 2618 South Bay, Georgetown, South Carolina 29440.

WANTED: Vibrating Reed 117 VAC frequency meter. All offers answered. K60CT, 1226 ½ Olive, El Centro, Calif. 92243.

AMECO Code Course with key and oscillator, $10.00; ICS color TV course, $30.00; McGraw Hill electricians' course, $5.00; CIE slide-rule course with Pickett 101C, $5.00; CREI Electronics Engineering Course, $55.00; Geniac Calculator $5.00; Ultrasonic remote control, $10.00; Ultrasonic leak detector, $10.00; Ultrasonic intrusion alarm. Best offer. Witmer, 3122 N. Harding, Chicago, Illinois 60618.

TUBES 4D32, $17.00; 5894, $13.00 postpaid. Collins 75A2, 32V3 manuals, $5.00 each postpaid. W8UPG, 651 Sanford Ave., Akron, Ohio 44305.

OPERATOR Consoles, surplus, standard 19-inch racks, top quality, cheap. Walt Becker, 302 Woodland Ave., Cherry Hill, N.J. 08034.

WRLS used gear has trial-terms-guarantee! KWM-1, $249.95; KWM-2, $695.00; SR-150, $299.95; HW-12, $89.95; Swan 250, $249.95; WRL DuoBander 84, $119.95; TR-3, $369.95; NCX-3, $169.95; NC-200, $249.95; SB-34, $299.95; Galaxy VMK2, $279.95; Ranger, $99.95. Many more! Free "Blue Book" list from WRL, Box 919, Council Bluffs, Iowa 51501.

STOLEN Swan 400 from Haffmans, 234 E. 4th St., N.Y.C. June 18th 1969. $100 Reward.

SELL: NC-300 receiver with xtal, calibrator and speaker, good condition $150.00, or will trade for Clegg 22'er. Jean Anania, WA2QHI, 10-30 River Road, Fairlawn, N.J. 07410.

SELL Or trade: Hallicrafters SR-160/p.s. 120/150 factory aligned (1969); guaranteed performance. Want: SB-101, HW-100, HW-32A, HP/23 and SB-600 (separate or combo). Send price and condx. K4NIX, 4724 S. Court, Montgomery, Ala. 36105. Tel: a.c. (205)-288-0268.

HENRY 2K, $500.00. William H. Jay, K4TWK, RFD 3, Box 261A, Douglasville, Georgia 30134.

COLLINS 32S-1, 75S-1, 70K2, mint condition; $825.00. Jack Woodrow, 6805 Rosemead Blvd., San Gabriel, Calif. 91775.

HALLICRAFTERS HT-37 for sale, and SX-101A. Best offer over $100 each. W8INV, 11025 Helmut, Chardon, Ohio 44024.

HENRY 2K-3, new, for details and price write: Mel Marsley, 2242 Stevens Ave., Kalamazoo, Michigan 49001. Phone 616-342-8838.

SELL: TR-3, RV-3, AC supply. In excint operating condx. Will ship collect. First m.o. for $350.00. W. P. Steinhauer, W3LHZ, R.D. #1, Dallas, Penna 18612.

SELL: HA-350 Ham-band rcvr, fine condition, including matching speaker and 100 Kc. calibrator. $80.00. Mosley MCQ-3B Triband quad, half-year old, like new condx: $85.00. Cash please. You must arrange shipping. WN4MGA. 4307 Wyncliff Dr., BrewerPedin., Richmond, Va. 23235.

HAMMARLUND HQ-170C in perfect condition, with manual, speaker. $150.00. Will ship collect. David Gillman, Detroit Street, Los Angeles, Calif. 90036.

DRAKE 2-NT xmtr, 2-C rcvr (100 Kc calibrator and noise blanker) 2-Cq spkr (Q-multiplier and notch filter) 5 xtals. All cables and instruction booklets. Absolutely mint condition. $350.00. Will sell together or separately. Mark Wenig, WA2GAV, 18 Vita Road, Totowa, N.J. 07512. Tel: a.c. (201)-256-4577.

WANTED: Good used Mosley TA-32 JR or TA-33 JR Triband beam. Robert Newman, K4UWS, 1407 Pinedale Dr., Opelika, Alabama 36801.

HALLICRAFTERS SX-117 rcvr. With all crystals and 100 kc. calibr. Also matching speaker and manual. $200. Will ship REA. Sam Whitworth, WA4OTC, 402 Concord Ave., Anderson, S.C. 29621.

SELL Or swap: Hallicrafters SX62A. Will add cash for HQ-180A or other. Bill Keasler, 311 Shannon, Elburn, Illinois 60119.

FOR Sale: HRO-50T1, $140.00; 70H2 Collins PTO, $20.00; .5 and 2.1 K.c. mechanical filters, $10.00 each and set of HRO coils, $25.00. Charles Rothrock, K3NBC, 408 Waverly Avenue, Clarkes Summit, Penna. 18411.

TR-4, AC-3, nominal use, cartons, manuals. $450.00. Bill Strong, WA5KPE, Box 15352, Millsaps College, Jackson, Miss. 39210.

SELLING Out: Hallicrafters HT-37, Drake 2B, 2BQ, Collins 75A4, 32S1, 516F2 power supply, teletype gear, digital frequency counter, 50 ft. crank-up tiltover tower, Ham-M rotator, TC99D Telrex antenna, best offer. Can ship. K5KTQ, 10420 Bellamah, N.E. Albuquerque, New Mexico 87112.

TRADE: 10 year old 75S1 and 32S1. Operating now, in excint condx, for similar KWM-2, preferably with mobile equipment. David Blacklock, K5SBQ, 334E Mulberry, San Antonio, Texas 78212.

WORLD QSL Bureau. See ad page 164.

WANTED: Used Johnson Kilowatt Matchbox. State whether with or without SWR Bridge; condition, and price. Dom Macaione, 183 School St., Franklin, Mass. 02038.

STOLEN Equipment: General Electric Master Executive NFM 2-way radio. Serial Number 903 0485. G.E. type number RG64TAS11. Stolen from my car at 905 Elm Street, New Haven, Conn. 06511 between 2100 EDT July 23rd 1969, and 1400 EDT July 24 1969. Single frequency 26.41 MHz. Thieves removed radio, control head, control cable and antenna. Rig is FCC registered for use on remote pick-up for AM radio station broadcasting. Has FCC Call Sign KM4048. Contact Richard Ertman, W1NMZ, at Radio Station WELI, tel: 203-288-6405. Return of radio will not result in prosecution.

TR-3 factory reconditioned, AC, DC, power supplies: D-104 mike and mobile mikes, phone patch, Nutronics antenna 20, 40, 75; $495.00. Also, Drake 1-A, excint condx, $100.00. K6PEF, 44347 North Glenraven Road, Lancaster, California 93534.

COLLINS KWM-2 with a.c. and d.c. supplies, $750.00; 75A4, with three filters and spinner knob, $450.00; HA-2 transverter, with built-in Mosfet preamp, $225.00. HT-41 linear, $200.00. All of the above equipment is in excint condx. No shipping, sry. K10JQ, 187 Phipps St., Quincy, Mass. Tel: 773-0284.

WANTING To buy: Collins 62S-1. For sale: 500C Swan Transceiver, less than six months old, with a.c. power supply. 117XC, $525.00. Dr. H. F. Schluntz, WB6HZI, 1134 Tormaline St., San Diego, Calif. 92109. Tel: 488-4784.

SWAN 350C transceiver, 117X power supply, 454X mike, $350.00; Hallicrafters SX-117 receiver, $190.00 Ship REA. WB2CKU, 7 Bowen Place, Stony Brook, N.Y. 11790. Tel: a.c. (516)-751-8792.

WANTED in trade: Railroad, streetcar slides, negatives, books, old photos. Trade for ham gear. WA5UYM, Box 441. Bellaire, Texas 77401.

I.C.'s factory-fresh Fairchild UL914, 70/. 3 for $2.00. Motorola MC790P dual flip-flop $1.75, 3 for $5.00. Add 15¢ for postage. Logic Components, Box 224, New Canaan, Conn. 06840.

SELL: Eico 753 Transceiver, solid state VFO a good worker, $125.00. W5IW, 2418 Dinah Drive, Port Neches, Texas 77651.

WANTED: Parks 2-meter converter, IF-28-32 Mc., with manual. J. Gysan, W1VYB, 53 Lothrop Street, Beverly, Mass. 01915.

CHRISTIAN Ham Fellowship is now organized for Christian fellowship and witness among licensed amateurs. Free gospel tract sample and details on the organization on request. Christian Ham Callbooks, listing members, $1.00 donation. Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.

SELL Apache xmtr, and Mohawk rcvr. $200.00 firm. Free delivery within 100 mile rad. K. Hamilton, 7640 Larkspur, Stockton, Calif. 95207.

COMPLETE station to highest offer. Hallicrafters SX-115, Johnson Invader and Thunderbolt. T-R sw., mike and phone patch. Beautiful handcrafted upright rack on castors. Station had little use. In perfect condx, with all operating manuals. Write to Eastman F. Speed, W4JGL, 377 Marshall Ave., Roanoke, Virginia 24016.

FOR Sale: Swan 250 and 117 power supply, $350.00, or first best offer. Henry Darrell, 2506 64th, Kansas City, Kans. K0LXU.

WANTED: Drake MN-4; Johnson low-pass, Hustler 4BTV, E-V 727SR or Turner 454, Carsner, 1845 Hornblend, San Diego, Calif. 92109.

RTTY For sale ASR 28 also Electrom F S C. With T.D. Morris Cohen, 400 Brookhaven Road, Wallingford, Penna. 19086. W3JZR.

HALLICRAFTERS SX101 Mark IIIA receiver in excellent condition with R42 bass reflex speaker—$150.00. Bob Eckert, 133 East 7th Street, Clifton, New Jersey 07011.

SELL/Trade: NLS digital voltmeter Model 450R complete with book. Need CV-60, SRR-13, TTY gear, WX equipment. Thompson, 5 Palmer, Gorham, N. Hamp. 03102.

SELLING Out: SX-117 rcvr and Johnson Ranger xmtr with VFO which needs work. Make offer. WA1IZS, 179 Knollwood Street, Springfield, Mass. 01104.

NOVICE Conar 500 receiver, transmitter, key, crystal and manuals. $50.00 prepaid. Cutter, Box 1074, Glenwood Springs, Colorado 81601.

COLLINS KWM-1 with AC supply $350. Mint condition. No shipping. R. Lauth, 105 Earnshaw, Dayton, Ohio 45429.

SONY voice controlled microphone like new $20, Shure Commando microphone, like new, $7, Telrex Twinset $7, Simpson 262 V.O.M., like new, best offer, EICO burglar alarm $5. "People Detector" $7, Radar sentry $15, Mohawk midgetape 300 with ampl 402 & leather case like new best offer, Olson wireless remote control 2 TX & 1 RX $10, Emerson Wondergram Phonograph like new best offer, Witmer, 3122 N. Harding, Chicago, Illinois 60618.

EICO 753 SSB transceiver and 751 AC P.S. F/W $115 no ship. Carmody, RD3, Canandaigua, N.Y. 14424.

WANTED: Operation Manual for an RME-4300. Art Lynch, WN2IPD, Box 39A, RD No. 1, Ovid, N.Y. 14521.

WANTED: All band vertical tower; tri-band beam, rotator and tower—quality stuff only, please. Also want KSR or/ASR model 28 or 35. For sale: Best HRO-60R you've seen, 9 coils in factory wood boxes, original rack, speaker, xtal, calib. FM, book etc. Ship anywhere F.O.B. $350.00. W1UGH/3, Box 114, Arnold, Md. 21012.

WANTED to buy for cash: Heath SB620 Spectrum analyzer in mint cond. Tom Dornback K9MKX, 19 W 167 21 St., Lombard, Ill. 60148.

SELL: Heath DX60, 25W HiFi amp., VM760 recorder, HBR receiver, turntable, etc. SASE for details. Moluneux, 5801 Shadesview Drive, Mobile, Ala. 36608

KWM-1, AC, DC supplies, mobile mount $375. Monitoradio M-160 high band FM 12v receiver $100. Norman Fertel, WB2-DEC, 1200 Van Nest Avenue, Bronx, New York 10461.

EXCELLENT Ham location hilltop, wonderful view, 3 bdrm, den, 1¾ baths, patio, 2 fireplaces, on 2 large lots, 220 in shack, room for antennas, owner will carry, low interest. W6FEX, 4900 La Calandrai Way, Los Angeles, Calif. 90032.

FOR Sale: Hy-Gain TH 4 beam $70.00. Two TT/L-2 demodulators. One with AN-FGC-1 filters. Both have CRT. Photos on request. Heathkit SSB 401, New, $250.00. Wm. S. McFadden, W8DFA, 17th & Eoff Sts., Wheeling, W. Va, 26003. Telephone 304-232-2326.

SWAP: Hallicrafters S-120 for Heath DX-60, HW 16, Knight T-60 or similar. Bob Felix, 23 Mary Ann Drive, Pittsburgh, Pennsylvania, 15227.

SBE34 with mike and mobile brackets mint condx. Built in A/C D/C supplies. Best offer over $250.00. Larry Langevin, 42 Prospect Street, Ludlow, Mass. 01056.

TRADE: camera and darkroom outfit for ssb, cw transmitter or transcvr. Consists of Yashica-mat twin lens reflex camera, Mity-lite strobe with high voltage pack, Vivitar enlarger with 2 lenses, Leitz valoy enlarger without lens, Gra-lab timer, plus trays, lab glassware, scales with wts., etc. Write for complete list and description. Bob Swaine, P.O. Box 81, Ocala, Fla. 32670.

KWM2 with AC and mobile supplies; 30L1 with extra tubes; 312 B-4; Monitorscope; Hytower; Teletype printer. $1175 FOB. 8553 Broadway, Indianapolis 46240. Tel: 317-257-6110.

COLLINS 32S3. Good condition. For sale $500. K6NA. 780 South Grand Avenue, Pasadena, California 91105 (213) 682-2915.

BLDICO xmitter—300 watt cw & am 80 thru 10—8 xtal pos. VFO—spare final 4-125A—Gud condx—(no shipping) $110.00. John Jankowski (W2EYR), 2288—2nd St., East Meadow, L.I. N.Y. 11554.

FM 450 mc Motorola T44-A $40. 150 mc 41v $20. Heath capacitester CT-1 $5. Pick up only. W1EMP. 203-655-0475. A. J. Ruska, 24 Dickinson Road, Darien, Ct. 06820.

32S-3 No. 13351—75S-3B No. 17641 with mechanical filter—516-F2 AC supply No. 23158—306 1 linear No. 2604. This Collins gear in mint condx. $1500.00 firm. Cash or money order. Joe Tomazic, WA8JUY, 3103 Washington Boulevard. Cleveland Heights, Ohio 44118.

DRAKE T4X (with B style knob), R4B with five extra crystals, and compact power supply. Excellent condition $575. Going Signal/One. W8GIF, Gerald L. Park, 517-351-5106. 1022 Cresenwood Road, East Lansing, Michigan 48823.

HRO-60 low frequency coils wanted—G.H.J, Don Voigt, W4-HQF, Box 72, Dallas, N.C. 28806.

JOHNSON Viking kilowatt amplifier pedestal and desk, excellent condition, spare tubes, $550. Sepessy, Piermont, N.H. 03779. Phone 272-5809.

WANTED: Collins S/Line 70K-2 PTO. Good condition. Write giving best price to Mildred France, 121 Seal Drive, Arabi, La. 70032.

WANTED: Leica M-2 or M-3. Will trade ham gear or pay cash. C. Galbreath, W6BWA, 3234 Jaylee Drive, Santa Rosa, Calif. 95404.

SACRIFICE complete station, Drake TR-3, RV3 remote VFO, AC3 P/S, Turner 450C mike $400. For $50 extra with above Heath keyer, Vibrokeyer, Knight SWR Bridge, 24 hr. Numechron. Phila. area Tel: 215-489-4275. W3STA, 133 E. First Avenue, Trappe-Collegeville, Pa. 19426.

PERSONALIZE your gear, auto, shirt, belt etc. Self adhering ¼" thick 24K. gold finished letters, 1" or 2", 49 cents each. ¼" —29 cents each. State call letters. Mel, W5DNL, Box 30173, Dept. 101, B'Ham, Ala. 35222.

SELL: HT-9, all coils, $75.00; SX-25, $75.00; Viking I and Heath VF1, VFO, $100, Zenith Trans-Oceanic, $25.00. J. P. Hyde, W4BGS, Nokesville, Va. 22123.

HT-44, 200 w, SSB-CW xmttr. New pair matched finals. In excint condx. Original owner. WB2GQK, 252 Westville Ave., W. Caldwell, N.J. 07006.

COLLINS 755-3, 325-3; both immaculate condx, little used and in original cartons, $400, and $550, respectively. Also beautiful matching, rack-mount solid-state "brute" power supply for 325-3, $65. DA iambimatic keyer, $70; Timeter 24-hr. digital clock, $10.00. First certified check or cashier's check takes each item, except 325-3 and power supply inseparable. Robert Nelson, 2758 Canyon Creek Dr., San Ramon, Calif. 94583.

FOR Sale: Navy RBB and RBC rcvrs with power supplies and manuals. Cash pick-up only. Both for $100. W3EON, 137 Forge Rd., King of Prussia, Penna. 19406.

FOR Sale: 75S3-B, #85530, 1.5, 2.1 kcs, $625.00; KWM-2, #12,731; 516F-2, $775; HO-13, $35.00; Henry 2K-2, spare 3-400-Z, $575. F455J-05, $45.00; F500R-31, $35.00. C-E OT-1, $10.00; SW-350, 14-117, 117-XC, $395.00. J. W. Craig, 29 Sherburne Ave., Portsmouth, N.H. 03801. Tel: (603)-436-9062.

EICO 720 transmitter, excellent condx, $50.00; also Heath Twoer with DC supply, $35.00. Jim Stimson, WA6ONK, 1430 Old Mill Road, San Marino, California 91108. Tel: a.c. (213)-793-9011.

ESTATE: HW-22A w/manual, $80.00; HD-20 100 Kc. xtal calibr. $10.00; gud condx. Will ship. Don Lomax, WA7GWF, Rte 4, Box 92-B, Olympia, Wash. 98501.

VALIANT II, $175; Hallicrafters S-108 rcvr, $49.00. Mackay 128AY 15-650 Kc., $25.00. Ken Cossaboom, 47 Wild Rose Dr., Andover, Mass. 01810.

SELL: DX60-A and HG-10B, $70.00. Dow relay, Shure 444. WA9VEF, 403 E. State, Huntington, Ind. 46750.

WANTED: Lorch HR-240 or Racal 6217. Condition, price, SN, accessories available. Write to: Boris Malinowsky, 169 East 32nd St. 6. Paterson, N.J. 07514.

HEATH SB-400 SSB-CW transmitter, all crystals, with 401 LMO, relays and tube setup. Factory aligned and setup. Used for 56 QSOs. $205. Hammarlund HQ-170AC 160-6 SSB-CW receiver, top shape, $165. Heath SSB mike, $15. Heath 10-12 lab scope, brand new, $70. Fred, 716-873-5739.

FOR Sale: 99'er $59.95; HQ-129X, $59.95; DX-20, $20.00; Craig 212 w/ac, $24.95. Heath Twoer $24.95. K4JCX, Box 162, Oak Ridge, Tenn. 37830.

HEATH HR-10B with HR-10-1 crystal calibrator. New condition used less five hours. Excellent alignment and performance on all bands. Will ship parcel postpaid. $75.00. KL7-GJM, Mendenhall Apts. No. 911, Juneau, Alaska 99801.

FOR Sale Hallicrafters S-120 and external vacuum tube s-meter operating on V & VM principles, $60.00. Ameco PCL 160-6 meter preamp, $20.00. Package deal, $70.00. Eico 720 Grid dip meter, $30.00. I pay shipping. Kenneth Iles, 419 Chicago St., Litchfield, Michigan 49252.

HALLICRAFTERS HT-32, HT-33, SX-101A. Superb condition. New pair of spare 4CX300's. $600. Professor Colton Tullen, K2PXQ, Department of Physics, County College of Morris, Dover, New Jersey 07801.

POLY-COMM 6 including original "individual-test-data-sheet", 110v or 12v. Hallicrafters SX-101A, matching R-48 speaker. Both immaculate, excellent working condition, including manuals. Going SSB, first $180. each or trade for SSB transceiver. Own-no-junk; want-no-junk! Globe King 500C, manual, new 4-400A, excellent working condx, $150.00. Certified checks only. You pay postage. WB4HEM; 300 Racetrack Road, Ft. Walton Beach, Florida 32548. Tel: 904-242-8303.

SELLING HA-350 with crystal calibrator, matching speaker, original carton $85. DX-40 with assorted crystals $35. Charles Vlahos, WN2ICV, 15 Indian Drive, Woodcliff Lake, N.J. 07675.

DISCOUNT Prices. New equipment, factory sealed cartons, full warranty. New Drake T4X-B, $382.00; R4-B, $365.00; L4-B, $645.00; TR-4, $510.00. New Galaxy R-530, $590.00; GT-550, $404.00; Swan Cygnet $365.00; CDR Ham-M, $99.95; TR-44, $59.95. Big discounts on all brands of equipment, towers and antennas. New Hy-Gain TH6DXX, $140.00; TH6DXX, $140.00; TH3MK3, $113.00; New Mosley TA-36, $143.00; TA-33, $113.00; CL-33, $123.00; CL-36, $146.00. Big savings on Tri-Ex towers. New W-51 (reg. $393) $333 prepaid. New W-67 (reg. $851) $724 prepaid. Send for quote on all types new equipment. Terms: Cash—no trades. Full manufacturers warranty. Edwards Electronics, 1316-19th Street, Lubbock, Texas 79401.

RTTY—Mainline TT/L-2, 850 and 170 bandpass and discriminator filters. $110.00 or your best offer. Would consider trade for 2-meter FM gear within state. WA9CWE, Steve Riley, RR #2, Box 377, Alexandria, Indiana 46001.

COLLINS 75A3, $250.00. Prefer local deal. Call 201-676-0626, Verona, N.J. 9-5. Helfrick.

SELL: Drake 2NT transmitter. Make offer. Marv Aden, WB9AAT, 1400 East Lyn Ct., Homewood, Illinois 60430.

GONSET GSB-100, $150.00; NC-300, $125.00; Knight T-150, $35.00, excellent! Jack Firkins, 406 West Maple, Centerville, Iowa 52544.

SELL: Collins 75A1, $150.00. Teletype Model 19 EW HB RTTY converter, $150.00. Will not ship, sry. K1FNP, Clayt, 184 Burton Street, Bristol, Connecticut 06010. Tel: a.c. (203)-583-2345.

SELL: Unused new Drake TR-4, AC4, DC-4, MS-4, mobile mount and Astatic hand mike. $859 value for $750.00. Buyer to pick up. W2EQQ/4, Carnett, 4 Stanford Street, Johnson City, N.Y. 13790.

WANTED: Very low frequency Navy receiver. Must be in good condx. State cash price and model number. Archie Chevalier, P.O. Box 314, Friday Harbor, Washington 98250.

GOOD Old runs, QST, Handbooks, COs. SASE for details. R. W. Woodward, W1VW, 41 Middlefield Drive, West Hartford, Conn. 06107.

INTEGRATED Circuits: New Fairchild MicroLogic; epoxy TO-5 package. 900 buffers, 914 gates, 60¢ each. 923 J-K flip-flop, 90¢ each. Guaranteed. Add 15¢ postage. HAL Devices, Box 365Q, Urbana, Illinois 61801.

SELL: Heath SB-401, $280; SB-301 with c.w. filter, $270; SB-600, $15.00. All like-new and professionally wired. 4CX-1000A, $65.00. W7AVS, 7818 E. Oak St., Scottsdale, Ariz. 85257.

HY-GAIN TH3-JR and BN-86 balun purchased new 8-7-69, $56.00. Going mobile S. Kurtzman, K6RMM, 4919¼ Gloria Ave., Encino, Calif. 91316.

SELL: Immaculate HQ-170A, Ameco 6M preamp, $210.00; SB-301 AM filter, $14; SX-99, $55. W1ZPB, Mount Hermon, Mass. 01354. Tel: 413-498-2729.

ANTIQUE/Classic auto wanted. Swap 2KW Hallicrafters SR-2000, power supply and remote v.f.o. plus a couple 'a shekels. Bob Rinaldi, W1CNY, c/o 225 Main Street, Newington, Conn. 06111.

SWAN 500C—117XC, 12 VDC, 508VFQ, MARS Oscillator, mint, $685 complete. WA3HMQ, 301 Blacksmith Road, Camphill, Penna. 17011. Individual prices by s.a.s.e.

BARGAIN! 65-foot tilt-over tower, quad and TR-44 rotor, $100.00; SB-100 and HP-23 factory-aligned and used yy little, $350.00. HQ-110 and manual, $99.00. Bruce Dahl, WAØGQJ, 2114 First Ave., South, Fargo, N. Dak. 58102.

TRADE: PMR6 for Twoer; sell: KW Matchbox, $125.00, and Gonset 500W amp, $200.00. Scott Anderson, General Delivery, Kerby, Oregon. 97531.

GALAXY III with AC; 80-40-20 SSB xcvrs, $160.00. Aron Faegre, Reed College, Portland, Oregon 97202.

SWAP F/W Vallant I, in FB condx, for linear amp or rcvr. WAØUAG, P. O. Box 97, Bird Island, Minn. 55310.

LAMPKIN PPM Meter, immaculate, and 105-B frequency meter. Both for $250.00. Paul C. Crum, W9LC, 6272 N. Cicero Ave., Chicago, Ill. 60646.

NOVICE, Tech, General, HQ110-AC Hammarlund receiver, 160 to 6 meters, c.w., a.m.-s.s.b. In xcint condx. $140.00. T. R. Troike, WA8VOE, 909 5th St., Sandusky, Ohio 44870.

FOR Sale: Gonset GSB-100, SSB, AM, CW transmitter, $120.00; Drake 2A rcvr, $140.00. Both are in like-new condx. Richard Morin, 121 Fort Meadow Drive, Hudson, Mass. 01749.

GALAXY GT550 A.C. Supply, Speaker, VOX, calibrator, VFO, and watt-meter. Like-new condx. $575.00 complete. F.o.b. WAØAUB, 8600 Crystal, Kansas City, Missouri 64138. Tel: a.c. 816-356-2458.

FOR Sale; or trade: SX-140 rec, best offer. Wanted: Johnson VFO or equiv. Tom Lesher, K3NCU.

FOR Sale: 50-watt, 2 meter base station, full metering, single frequency, more can be added: Motorola, 140-D transmitter, Sensicon receiver, new heavy-duty relay microphone included, in gud condx, $90.00. Jere Bruning, WAØUQA, White Cloud, Kansas 66094.

SELL: Johnson Viking 500, 10 thru 80 M, on SSB with CE-204 exciter, 458 VFO, HB attenuator, Drake 2B and Collins 75A1 receivers; Jensen speaker, manuals, cables. See in working condx; pick-up deal only, Sry. No shipping. First reasonable offer accepted. Ted Weiss, K2SBE, 3508 Kings College Place, NYC 10467. Tel: OL53743.

HEATH HW-16 c.w. transceiver and HG-10 matching VFO; Monarch semi-automatic key, speaker, phones and small items: $90.00. Also Hallicrafters SX-130, General coverage receiver $110.00. F.o.b. Write to: Bill Santee, WN9ZMF, 70 S. Lake St., Mundelein, Illinois 60060.

FOR Sale: Drake L-4B amplifier, like new condx: $425.00. K1PNL. Tel: a.c. 203-583-5433.

HALLICRAFTERS SR-400 and P-500, $695, xclnt condx; SX-117 receiver, $229.00, also xclnt: 4X150A's, $6.00; 4CX-250K's, $19.00; Heath QF-1, Q-multiplier, $7.00 and MT-1 xmtr and power, $39.00. International Crystal FCV-2 meter converter and power, $15.00. Postpaid 48 St. USA. Offers OK. WA6BWB, 13241 Eton Place, Santa Ana, Calif. 92705.

AMECO TX-62, in perf. condx, used only 6 months, $105.00. Also CN-144 14-18 Mc i.f., plus PV-144 preamp, plus PS-I power supply, $35.00. Ameco CB-6 7-II Mc. i.f., $15.00. Hallicrafters HA-5 VFO with 2 meter xtal, $50.00. Sixer, $25 00. All are in excint condx. Entire setup: $215.00. John Young, WB2RIR/WA1HVW, Phillips Exeter Academy, Exeter, N.H. 03833.

CRYSTALS: Amateur, MARS, Commercial, Marine, etc. Novice 40 or 80 meter bands Type FT-243 etched to freq. .02% accuracy, $1.50 each; 3400 kc. to 10,000 kc. .01% accuracy Type FT-243, $1.90 each. 2000 kc. to 3399 kc. .01% accuracy $2.50 each; add 50¢ for .005% accuracy. Add 50¢ for Type HC6U metal holder. State your frequency and type. Postage prepaid. Quality crystals since 1929. Precision Piezo Service, 427 Mayflower St., Baton Rouge, La. 70802.

PHOENIX Area, or will ship f.o.b. Swan Mark I linear 2000 watts P.E.P. recently factory updated, new Elmac finals, all in sealed cartons, now strictly mobile. $315.00 first certified check. Also, complete Novice station, HQ-160, matching spkr, DX-40, Monitor, HQ10 VFO, SWR Bridge, Dow relay, Shure mike, weighted key, ear phones, manuals, connecting cables. First certified check $250. F.o.b. Solid packing. Wkd VK, ZL. Ken Stroud, 4139 E. McDowell Rd., C-102, Phoenix, Ariz. 85008.

SELL: Apache/SB-10, $130.00; SB-200, $180.00; HQ-170C, with speaker, $160.00; HD-10, $30.00; all manuals. Taker of all also gets AR-22 rotor, Vibroplex key, Bud low-pass filter, Johnson T-R switch, antenna relay, coax switch, 100 ft. of RG-8/U. K1PAD/5, 104 South Bowser, #18, Richardson, Texas 75080. Tel: a.c. 214-235-1426.

HEATH KW linear, SB-200, in xclnt condx, two spare tubes included: $185.00. William Corl, 20789 Halworth, Shaker Heights, Ohio 44122. Tel: 561-6833.

SWAP Ham Gear for U.S. military insignias/medals. W2-WLJ, 17 Coleman, Berlin, N.J. 08009.

HALLICRAFTERS SX-62, clean, $150.00. Ed Passier, P.O. Box 126, Uptown, Hoboken, N.J. 07030.

SELLING: HT-32, $195.00; SX-101A, $155.00. You pay shipping. Howie, WB2PUI.

NATIONAL NC-183D, general coverage receiver, one owner only; in mint condx: $150.00. Frank Law, W8SET, 2001 Parkwood Road, Charleston, W. Va. 25314.

TRANSMATCH Millen 2Kw, like new condx. Original carton, $115.00. K7SPH, Box 4099, Tucson, Ariz. 85717. Tel: a.c. (602)-296-6466.

COLLINS 75A-4, #5811, $375.00. With 1.5, 0.5 filters, $425.00; 32S-1, 516F-2 with speaker, $395.00. Want 30L-1. K2KIR, 112 Kennedy Lane, North Syracuse, N.Y. 13212. Tel: a.c. (315)-458-0940.

SELL: ARRL Handbook 200 w. linear, DX60B, HG10B, Lafayette HA-700 rcvr w/spkr, 40 m. dipole, 50 ft. coax, Dow-Key relay, all xclnt condx! New, $350.00. Now: $225.00. Kirby Kautz, WA2DZG.

WANT 16 mm gear or cash. Have 1300 V. p/s with SSB linear parts, $30.00; rack cabinet, $10.00, "Signal Splitter", $15.00; mobile xmtr with Heath p/s, $35.00; OSTs, etc. Offers? Glenn Metzler, R. 1, Box 39, Manheim, Penna. 17545.

APACHE TX-1 and SB-10 adapter, $95.00; Hammarlund HQ-180 24-hr. clock, speaker, $150.00; TH3, Jr. $25.00; 10-meter Hy-Gain mono 3-el. beam, $10.00. All equipment excint condx with manuals. W2LAM, 132 Myrtle Ave., Cedar Grove, N.J. 07009. Tel a.c. (201)-239-6025.

BEAT Rust-corrosion! Fine stainless steel, brass, bronzes, theaded, washer, hardware for Antennas-Towers, equipment building. Indoors. outdoors! Antenna, guying, accessories. Boom mount. Lists, dime! Walt, W8BLR, 29716 Briarbank, Southfield, Michigan, 48075. Ham Hardware Headquarters.

SELL: Galaxy V Mk III, VOX, calibrator, AC-400 power supply, deluxe accessory console. In mint condx. $400. Thomas Cann, 1555 Black Road, Joliet, Ill. 60435.

DRAKE R4 with manual and speaker, like new condx, $275.00 Viking I xmtr for Novice or General use, manual and Dow-Key coax relay, $45.00. S. A. Dalyai, 105 Bentley Ave., Old Bridge, N.J. 08857.

FOR Sale: Complete amateur radio station, Galaxy V transceiver, like-new condx, also accessory console. Hy-Gain vert. 20-15-10 antenna, mike and bug. Bob Christiansen, WØZPM, P.O. Box 312, Humboldt, Iowa 50548.

HT-45 KW amp w/pwr, $175.00; Thunderbolt amp. $195.00; RME-4350A, $75.00; HE45B w/HE61A VFO halo, $65.00; HE80 w/Internal 2M, $50.00; UTC pwer S-48, $20.00; BC610 plate xmfrmr, $25.00; Astatic 10-D p.t.t. stand, $13.00; Vibroplex Blue Racer, $13.00. PR-4CX300A w/sockets, $25.00. Art Ford, 6 Stoothoff Rd., East Northport, L.I., N.Y. 11731. Tel: a.c. (516)-FO8-6136.

WANTED: HA-14 and HP-14. E. Rolek, 1166 Ridge Road E., Rochester, N.Y. 14621.

DRAKE 2NT, Drake 2-C with cables, manuals, xtals (new in April): $300.00. Nicholas Veltri, 225 Davies St., Lower Burrell, Penna, 15068.

SWAN 350, a.c. supply, calibrator, c.w. filter and RTT, in gud condx, $350.00. B. A. Penners, W6HLV, 1183 Van Nuys St., San Diego, Calif. 92109.

CRYSTALS Airmailed: Novice .03% all bands any frequency $1.50. Fast service from Mid-America. MARS, Marine, SSB, Nets, CD—. Custom finished etch stabilized FT-243 .01% any kilocycle or fraction, 3500 to 8600 kilocycles $1.90, (five or more this range $1.75), (nets, ten same frequency $1.45). 1700—3499 and 8601—30,000 $2.95, overtones above 10,000. 10,001 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ for HC-6/u hermetic miniatures above 2000. Singles and groups for QST, Handbook—other construction articles. Be specific. Free order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri. 65706.

SELL: Ameco R5 receiver, in excint condx. Factory calibrated and checked: $40.00. James Seery, 21 Mount Pleasant Parkway, Livingston, N.J. 07039.

WANTED: Collins 32S-3 transmitter with or without 516F-2 power supply. O. K. McCullough, 917 Avalon Drive, Phoenix, Arizona 85013. Tel: a.c. (602)-277-0798.

HALLICRAFTERS SX-130 with R-51 speaker. Won in contest by non-ham. Never used. In original carton w/manual, $175.00. Peter Minerva, 1517 So. Fairview, Park Ridge, Illinois 60068. Tel: a.c. (312)-825-5953.

LM-13 freq. meter, calibrated book, power supply, excint, $45.00; Heathkit HO-10 Monitorscope, like new condx, $40.00; Heathkit C-3 condenser, capacitor checker, $12.00. B C-221-N freq. meter, comete with calibrated book, power supply. All in one original cabinet and in A-1 OK condx, $65.00. K6ATS, Hardy Rotheschild, K6ATS, 238—4th Ave., Chula Vista, California 92010. Tel: a.c. (714)-420-4478.

NEMS-CLARKE receivers wanted. 1400 series crystal controlled telemetry models covering 215-245/260 MHz preferred, but all models in 1300, 1400, 1500, 1600 and higher numbered series also of interest. Please send accurate description of what you have to Tucker Electronic Co. P.O. Box 1050, Garland, Texas 75040.

HQ-150 with matching speaker, $100.00; 20-A with QT-1, $85.00; both in excint condx. BC458 VFO w/p.s., $15.00; new BC-458, $5.00. Johnson Signal Sentry, $5.00. H. Malder, K2HWW, 7 Willard St., Greene, N.Y. 13778.

COLLINS 75A-4, late model, serial 5173, with 500 cycle and 3.1 kilocycle mechanical filters, in excint condx, $375; Heathkit SB-301 receiver, purchased Nov. 1968, aligned in University of Illinois lab, used less than 10 hours, absolutely mint condx, $250.00. Joe Johnson, 300 North Walnut, Clinton, Illinois 61727. Tel: a.c. (217)-332-1774.

SWAN 500C, 117 XC, mike, all mint condx. First best offer. WB2ZXZ, 371 Jackson Ave., West Hempstead, N.Y. 11552. Tel: a.c. (516)-481-2021.

HAMMARLUND HQ-145, clock, matching speaker; operation, condition perfect: $110.00. Surplus "Command" 80-meter receiver: $10.00. Earl Dridge, WB2GRB, 14 Duryea Place, Lynbrook, N.Y. 11563. Tel: a.c. (516)-LY9-3440.

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.

TELETYPE Wanted: Models 28, 32, 33, 35, Receivers R-390A, R-388. Cash, or trade for amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: a.c. 617-742-0048.

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 Electronics, 6835 Sunnybrook, N. E., Atlanta, Georgia 30238.

TELETYPE Wanted—M28 typing units any condx, keyboard perforators—reperforators, cast aluminum TD bases, all unused parts. Sell, too! Typetronics, Box 8873, Ft. Lauderdale, Fla. 32150.

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R389, R390, R390A 51J4, 75A4, 75S3A, NC101X, HR050T1, HR060T1, SP600, KWM-1, KWM-2, 62S1, 312B5, HA-2, and others. List for SASE. W2ADD.

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SAFE. 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.

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TOROIDS. Uncased 88 or 44 mhy. 5 for $1.50 ppd. M. Wenschenker. K3DPJ, Box 353, Irwin, Penna. 15642.

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TOROID Coils 88 mh uncased postpaid. 5/$2.00. La Von Zachry, P. O. Box 845, Apple Valley, Calif., 92307.

HALLICRAFTERS SR-150, Mobile Mount, Antenna, $375.00; SX-117W/spkr, $225.00; Heath SB-200 Linear, $195.00; HW-29, $45.00; CB GW14A, $89.00, All in excellent condition. W2ERV, 14 Bernice Dr., Freehold, New Jersey 07728.

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NOVICE Crystals, 75 cents. Free list. Gregory Ginn, 1240 21st, St., Hermosa Beach, Calif. 90254.

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Model TR-6 **$599.95** Amateur Net

• Exclusive Features
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• Unmatched Performance

COMPARE THESE FEATURES

- **Full coverage of 6 meter band plus MARS.**
- **Four IF band widths:** 2.4 kHz upper sideband (supplied), 2.4 kHz lower sideband, 6.0 kHz AM, 0.3 kHz CW, all selectable with front panel switch.
- **Function switch selects product or envelope detector as well as built-in AM screen modulator.** Compatible with linear amplifiers.
- **No carrier balance or carrier insertion adjustment for AM or CW**
- **Shift carrier CW system for compatibility and versatility.**
- **Ultra-stable linear VFO.** 600 kHz in one range. 1 kc readability.
- **Built-in PTT, VOX, ANTI-VOX, 100 kHz calibrator.**
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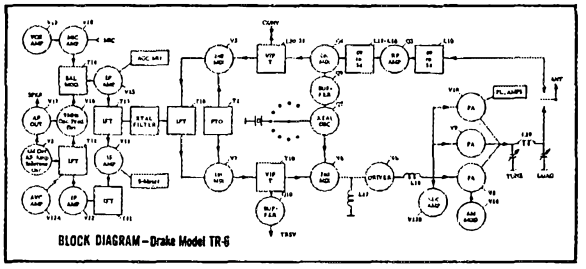
- **RV6 External VFO allows split-frequency operation.** (RV3, RV4 usable).
- **Fast or slow AGC for receiving.** For meteor scatter work, selectable from front panel.
- **Ultimate receiver front end performance using FET's.** Less than 1/10μV required for 10 dB S/N ratio on SSB.
- **Input and outputs provided for Drake TC-2 or other 2-meter transverters.** All switching done internally with band switch.
- **300 watts CW and PEP input.**
- **6JB6 final tubes eliminate replacement problems.**
- **Extra input and output jacks for converters and/or outboard receivers.** Permits monitoring of more than one frequency simultaneously.



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Model 9NB Plug-in noise blanker accessory: $95.00

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GENERAL SPECIFICATIONS

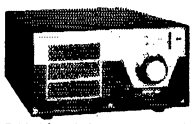
SIZE: 5⅞" high, 10¾" wide, 16¼" deep (plus feet and knobs). **WEIGHT:** 15¾ lbs.
FREQUENCY COVERAGE: 49.4 to 54.0 MHz (crystals supplied for 49.9 to 51.1 only).
VFO DIAL CALIBRATION: 1 kHz divisions; dial accuracy is within ±1 kHz.
CALIBRATOR: 100 kHz calibrator built in.
FREQUENCY STABILITY: Less than 100 Hz overall drift per hour after 15 minutes warm-up; less than 100 Hz for 10% supply voltage change.
SPLIT FREQUENCY OPERATION: Xmt and Rcv frequencies may be separated by up to 600 kHz by use of the RV-6 or FF-1 accessories.
MODES: SSB, AM, and CW.
POWER SUPPLIES: Drake AC-3, AC-4, DC-3, DC-4 or DC-24.
TUBES AND SEMICONDUCTORS: 19 tubes, 7 bipolar and 3 field effect transistors, 12 diodes.

RECEIVER SPECIFICATIONS

SENSITIVITY: Less than 1/10 microvolt for 10 db S+N/N ratio at 2.4 kHz band width.
SELECTIVITY: 6 dB bandwidth 2.4 kHz with USB filter provided. Accessory filters available for LSB, AM (6 kHz) and CW (.3 kHz).
AUDIO RESPONSE: 400 to 2800 Hz at 6 dB.
INPUT: 50 ohms unbalanced.
OUTPUT: 4 ohms to speaker or headphones.
AUDIO OUTPUT POWER: 2 watts at 10% HD.
AVC: Output variation less than 3 dB for 60 dB input change. Fast attack. Release time selectable.
MANUAL GAIN CONTROLS: RF gain control sets threshold for AVC, AF gain control.
DETECTORS: Switch on front panel. Product detector for SSB and CW Envelope detector for AM.
NOISE BLANKER: On-off switch for accessory noise blanker on front panel.
INPUT: 13.9 to 14.5 MHz receiving input/output jack for converters and/or outboard IF receivers.

TRANSMITTER SPECIFICATIONS

POWER INPUT: 300 W PEP on SSB, 300 W PEP on AM. 300 W CW (50% maximum duty cycle).
OUTPUT IMPEDANCE: 50 ohms nom. unbalanced, 2:1 max. SWR. Adjustable loading.
MODES: SSB (USB provided, LSB with accessory filter), AM (controlled carrier system), CW (semi-break in, Sidetone).
AMPLIFIED AGC: Prevents flat-topping.
CARRIER INSERTION AND SHIFT: Automatic on AM and CW, shifted carrier CW system.
VOX AND PTT: VOX and Anti-VOX built-in.
AUDIO RESPONSE: 400 to 2800 Hz at 6 dB.
40 dB SIDEBAND SUPPRESSION above 1 KHz. 50 dB carrier suppression.
DISTORTION PRODUCTS: Down 30 dB minimum from PEP level.
MONITORING AND METERING: Final plate current, AGC action, and relative output can be read on meters. Sidetone for keyed CW.
14 MHz OUTPUT: 13.9 to 14.5 MHz output for Drake TC-2 and other transverters.



TR-6 ACCESSORIES

RV6 Remote VFO. Separates receive and transmit frequencies within the same range **$99.95**
FF1 Fixed frequency adaptor **$24.50**
MMK-3 Mobile mounting kit **$6.95**
Power supplies
AC-4 120 V 50/60 Hz **$99.95**
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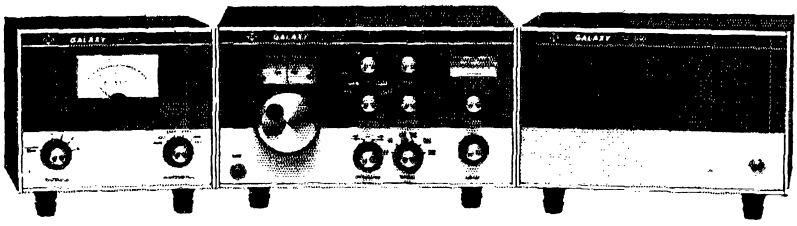

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GALAXY GT550 TRANSCEIVER. Highest power in a compact design, 550 watts SSB, 360 watts CW, with tune power provisions for longer life — Solid-State circuits where they provide maximum performance and reliability — Selectable Sideband without frequency jump — Audio derived AGC — Sharpest filter for minimum QRM — King size finger-tip VFO tuning knob — Size: 6″ X 11¼″ X 12½″ (HWD) — Weight: 17 pounds ... $475.00

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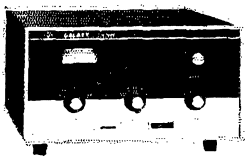
VOX35C. Plug-in VOX control unit **$29.95**
F3. Plug-in 300 Hz CW filter **$29.95**
RF550 R.F. CONSOLE. A precision wattmeter in the range of 3.5/30.0 mHz — Contains switch to select 5 antennas or a dummy load (not supplied) **$69.00**
SC550 SPEAKER CONSOLE. A matching speaker with headphone jack — AC400 power supply will mount inside **$25.00**
AC400. Full power, heavy duty state supply for 115/230 volts **$89.95**



GALAXY LA550 LINEAR AMPLIFIER. 200 watts PEP input on SSB, 1000 watts DC input on CW/RTTY. Band switching 80 thru 10 meters, with some adjacent MARS and special frequencies.
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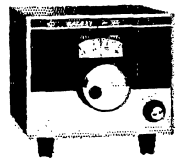

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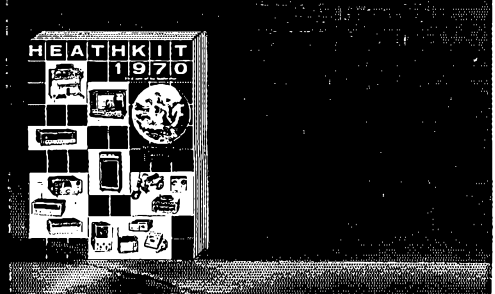
SBA-301-2, 400 Hz CW Crystal Filter, 1 lb.....**$21.95***

SB-101 SPECIFICATIONS — RECEIVER SECTION: Sensitivity: Less than 1 microvolt for 15 dB signal-plus-noise to noise ratio for SSB operation. **SSB selectivity:** 2.1 kHz minimum at 6 dB down, 5 kHz maximum at 60 dB down — 2:1 nominal shape factor — 6:60 dB. **CW Selectivity:** (With optional CW filter SBA-301-2 installed) 400 Hz minimum at 6 dB down, 2.0 kHz maximum at 60 dB down. **Input impedance:** Low impedance for unbalanced coaxial input. **Output impedance:** Unbalanced 8 and 600 ohm speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt. **TRANSMITTER SECTION: DC power input: SSB:** 180 watts P.E.P. continuous voice. **CW:** 170 watts — 50% duty cycle. **RF power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). **Output impedance:** 50 ohms to 75 ohms with less than 2:1 SWR. **Oscillator feedthrough or mixer products:** 55 dB below rated output. **Harmonic radiation:** 45 dB below rated output. **Transmit-receive operation: SSB:** Push-to-talk or VOX. **CW:** Provided by operating VOX from a keyed tone, using grid-block keying. **CW side-tone:** Internally switched to speaker in CW mode. Approx. 1000 Hz tone. **Microphone input impedance:** High impedance. **Carrier suppression:** 50 dB down from single-tone output. **Unwanted sideband suppression:** 55 dB down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 dB down from two-tone output. **Noise level:** At least 40 dB below single-tone carrier. **RF compression (TALC):** 10 dB or greater at .1 ma final grid current. **GENERAL: Frequency coverage:** 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.0 to 29.5; 29.5 to 30.0 (megahertz). **Frequency stability:** Less than 100 Hz per hour after 20 minutes warm-up from normal ambient conditions. Less than 100 Hz for ±10% line voltage variations. **Modes of operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Dial accuracy — "resettability":** Within 200 Hz on all bands. **Electrical dial accuracy:** Within 400 Hz after calibration or nearest 100 kHz point. **Dial mechanism backlash:** Less than 50 Hz. **Calibration:** 100 kHz crystal. **Audio frequency response:** 350 to 2450 Hz ±3 dB. **Phone patch impedance:** 8 ohm or 600 ohm receiver output to phone patch; high impedance phone patch input to transmitter. **Front panel controls:** Main (LMO) tuning dial; Driver tuning and Preselector; Final tuning; Final loading; Mic and CW Level Control; Mode switch; Band switch; Function switch; Freq. Control switch; Meter switch; RF gain control; SSB-CW filter switch. Audio Gain control. **Internal controls:** VOX Sensitivity; VOX Delay; Anti-Trip; Carrier Null (control and capacitor); Meter Zero control; CW Side-Tone Gain control; Relative Power Meter Adjust control; P.A. — Bias; Phone Vol (headphone volume); Neutralizing. **Rear Apron Connections:** CW Key jack; 8 ohm output; Spare A; Spare B; Phone patch input; ALC input; Power and accessory plug; RF output; Antenna switch; Receiver Antenna. **Power requirements:** 700 to 800 volts at 250 ma; 300 volts at 150 ma; —115 volts at 10 ma; 12 volts at 4.76 amps. **Cabinet dimensions:** 14⅞" W x 6⅝" H x 13⅜" D.



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AM-223

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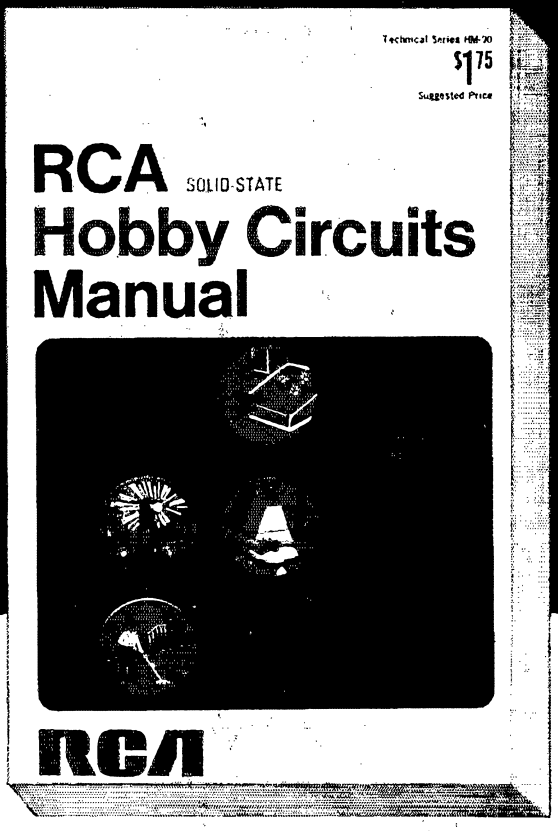

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