

QST

October 1968

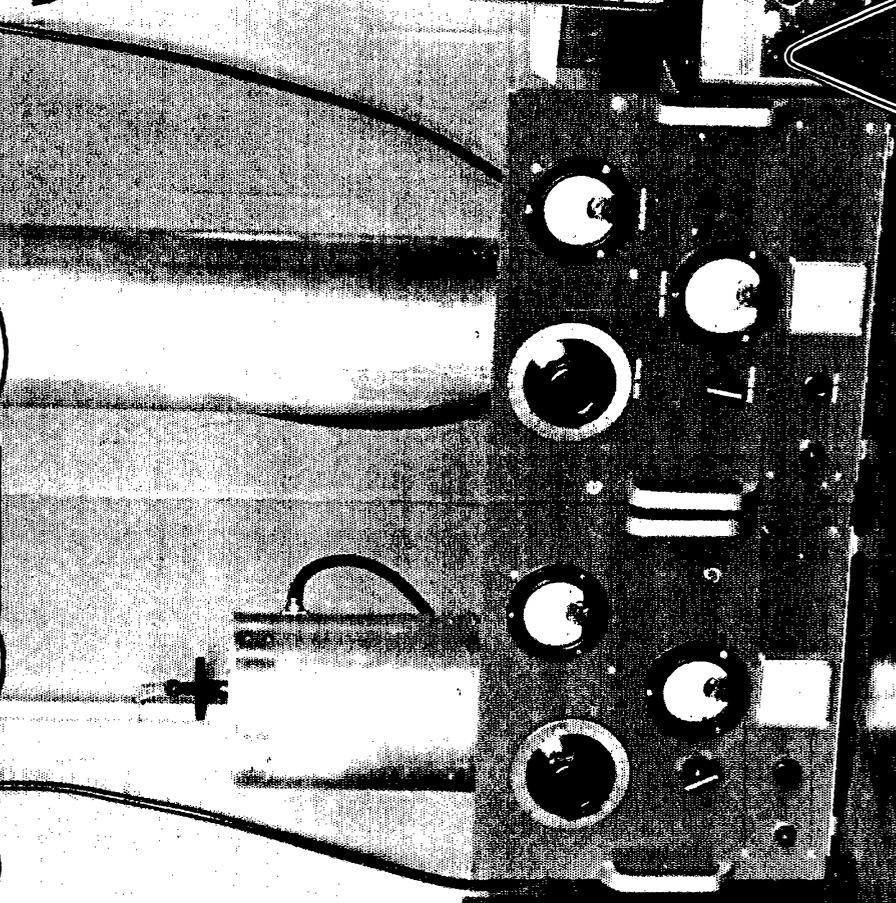
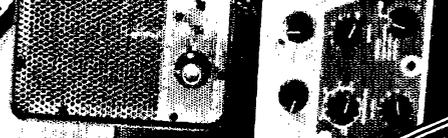
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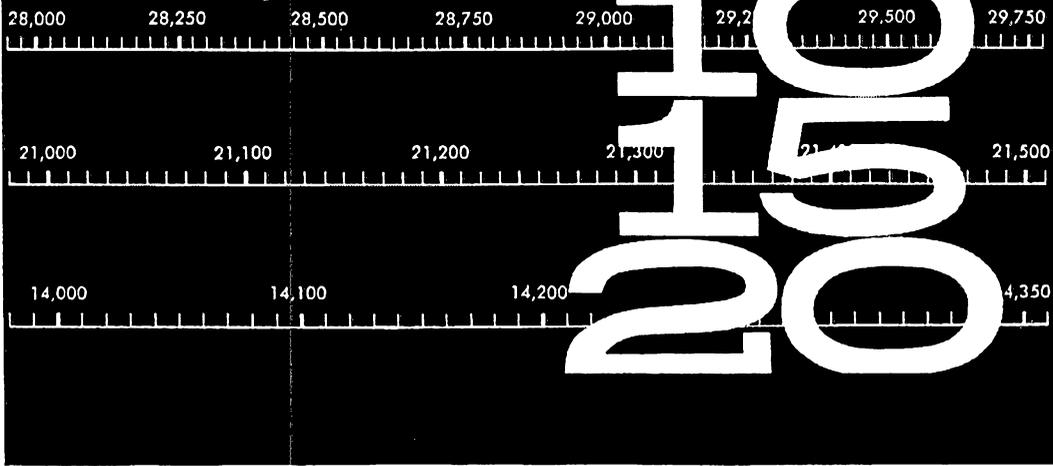
amate radio

WF



850

NEW | **Cubical Quads** by *Mosley*



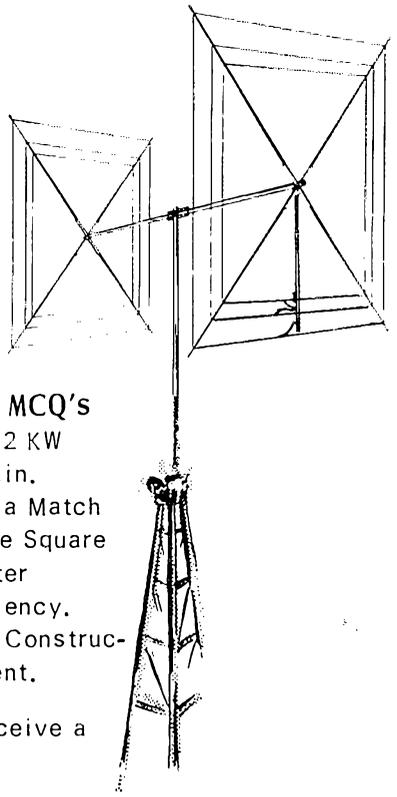
Four NEW Two-Element QUADS

SINGLE BAND QUADS

- Model MCQ-10 for 10 meters
- Model MCQ-15 for 15 meters
- Model MCQ-20 for 20 meters

TRI-BAND QUAD

- Model MCQ-3B for 10, 15 & 20 meters



Designed and Engineered for Superior DX, the new MCQ's (Mosley Cubical Quads) are rated to 1 KW AM and 2 KW P.E.P. SSB. Maximum Front-to-Back and Forward Gain. A Single 52 ohm Line feeds the Quads via a Gamma Match resulting in a low SWR over the full bandwidth. The Square Configuration of the MCQ Series guarantees better performance by providing optimum electrical efficiency. The Durable, Lightweight, Weatherproof Aluminum Construction yields a lifetime of maintenance-free enjoyment.

For detailed brochure, Write Dept. 169 . . . and receive a FREE 1968/69 Mosley Antenna Catalog.

10 reasons to buy Hallicrafters' new SR-400 Cyclone

FEATURE	Hallicrafters SR-400	Collins* KWM-2	Drake* TR-4
Power Input	SSB=400 watts CW=360 watts	SSB=175 watts CW=160 watts	SSB=300 watts CW=260 watts
Accessory "dual receive" VFO available	Yes	No	No
Noise Blanker	Yes	\$135.00 Accessory	No
Receiver Incremental Tuning	Yes	No	No
Built-in notch Filter	Yes	No	No
Sharp CW Filter	Yes 200 cycles	No	No
Sensitivity	.3 uv for 10 db S/N	.5 uv for 10 db S/N	.5 uv for 10 db S/N
1 kHz dial readout	Yes	Yes	No
Carrier Suppression	60 db	50 db	50 db
Unit Price	\$799.95	\$1,150.00	\$599.95

*Data from published specifications.

Now: can you think of one reason why you shouldn't?

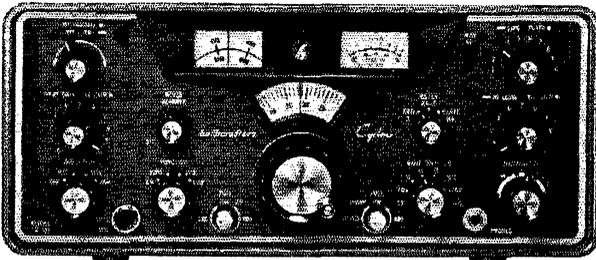
Superb sensitivity, 400 watts RF, 200 cycle CW selectivity, receiver incremental tuning, 1 kHz readout, amplified automatic level control, exclusive notch filter! There's even the HA-20 dual receive VFO for sensational, award winning DX operation. No matter what specifications or features you choose as a standard of comparison, the exciting new SR-400 fixed/mobile transceiver is unsurpassed. Unsurpassed feature for feature. Unsurpassed for rugged dependable performance in all environments. Unsurpassed in value and versatility. Prove it to yourself. Write for complete specifications in a four page brochure. See your Hallicrafters' distributor today.



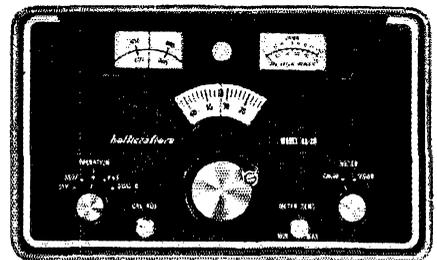
hallicrafters

600 Hicks Road
Rolling Meadows, Illinois 60008
A Subsidiary of Northrop Corporation

SR-400 Cyclone Transceiver



HA-20 VFO



Export: International Dept. Canada: Gould Sales Co.



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OUR COVER
Transmitting converters for 6 and 2 meters using stovepipe coaxial tank assemblies. See page 30 for the details.

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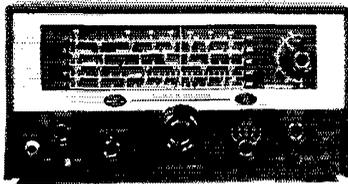
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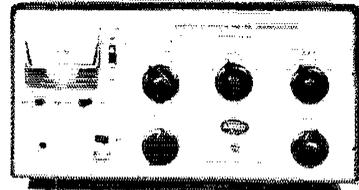
An exceptionally fine receiver for the short wave listener and beginning amateur operator. Fully transistorized—solid state. Covers .54 through 54.0 Mc. in five continuous bands. Includes standard broadcast band, all foreign broadcast bands, all amateur bands from 160 through 6 meters, all 27 Mc CB Channels,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

Kit \$64.95
 Wired and tested 79.95



VFO-621

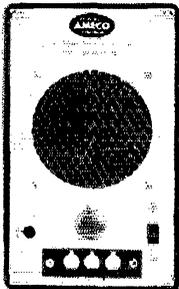
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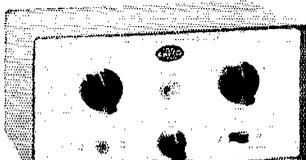
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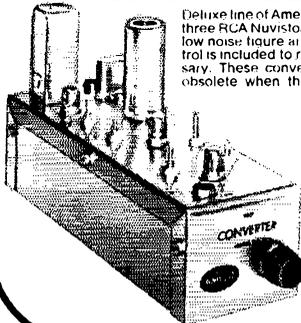
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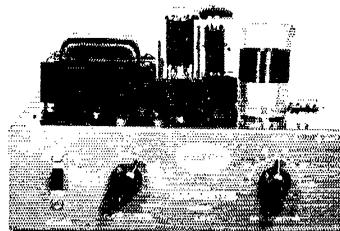
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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports 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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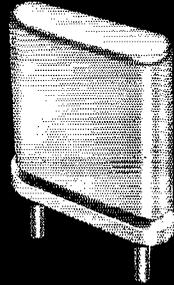
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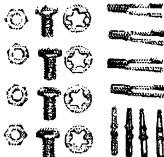
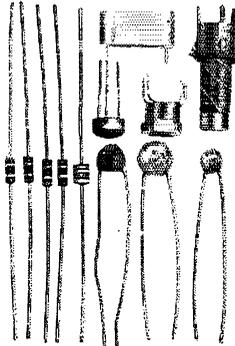
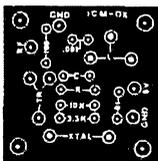
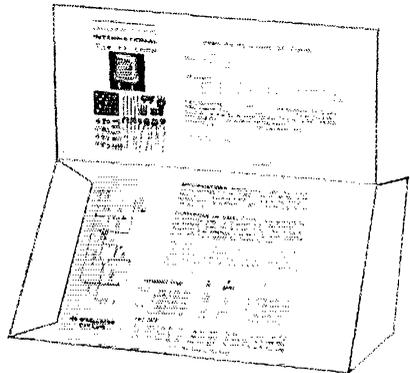
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

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

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

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"It Seems to Us..."



DXCC

Withdrawal of the "Miller suit" by W9WNV—and his admission that certain claims and statements by him to the Awards Committee and to the Board were, in fact, untrue—confirm the position taken by the Awards Committee and its actions concerning Dr. Miller's DXpedition operations.¹

Of far greater importance, however, it marks the end, hopefully, of an unfortunate episode that benefitted no one. The incidents cast a shadow not only on DX and those who pursue this particular aspect of amateur radio, but raised questions in the minds of many about the basic values of our fraternity itself.

What is at stake, we would submit, is not at all our values, but our current perspective. Let's not, as happens all too often in so many aspects of our society, allow what involved only a tiny minority to color our judgment of an activity in which many thousands of amateurs of unquestioned integrity have participated with great pleasure and satisfaction for so many years.

DX has its own special appeal to many of us and its own unique rewards. It affords a great sense of accomplishment and achievement. It satisfies the urge to set and reach visible goals, to widen our horizons, to acquire recognized stature. This, perhaps, is why those of us who are DXers can become so ardent in the pursuit of our particular interest, and it helps to account for the development of DXpeditions, an activity which many non-amateurs find difficult even to comprehend!

The consequence of all this is that what was once an occasional, incidental aspect of amateur radio has become a major activity, involving many people, a lot of time, a great deal of effort, and very substantial amounts of money. DX is serious business for those involved in it. At the very core of DX is the League's DXCC. It provides the framework for organized DX activity, establishes the goals and standards, and is the source of recognition for achievement—all of which have evolved through a long tradition. It is no exaggeration to say that without DXCC there would be no DX as we know it.

DXCC could not have achieved this position, and it would have little meaning or value, if its integrity were not absolute and its adherence to established rules as unassailable as administratively possible. This is what thousands of members over the years have built and what they are entitled to have maintained. This is what the Awards Committee refused to compromise.

If nothing else, the Miller situation made inescapable our recognition that circumstances and requirements do change. The traditional Awards Committee policy of accepting DXpeditions and their related credit submissions at face value unless challenged and evidence of non-validity presented was a fine, gentlemanly basis of operation until it became evident that this was no longer adequate. DX has simply become too big and involves too many people of all types for so informal a policy. As a result the rules have now been revised to require validation of DXpedition operations in advance of granting credits so that the majority of DXers can continue to be assured that DXCC standards are being adhered to by all.

This is what is important now: that the efforts and accomplishments of DXCC members have not been undermined, that DXCC is and will continue to be what it always has been, and that the actions of an irresponsible few shall not be allowed to reflect on the majority or deteriorate the standards we all wish to maintain in amateur radio. QST

¹ See p. 83 this issue.

League Lines . . .

The Joint (IEEE-EIA) Technical Advisory Committee has issued a mammoth volume reporting a 4-year study of spectrum engineering principles and practices. In a substantial section dealing with frequency coordination and monitoring, the report says of TVI committees: "usefulness . . . beyond question . . . valuable service to the community at no expense to the users . . . committees should be publicly recognized, congratulated, and publicized."

One purpose of Hq. staff overseas travel is to establish better relations with telecommunications officials of other countries. This policy had an unusual by-product recently when W1IKE (who visited Cyprus in 1966) was asked to design a QSL card for their government broadcasting corporation!

Good opportunity coming up to expose youngsters to ham radio -- the 11th World Scout Jamboree-on-the-Air, October 19-20. Idea is for us to invite Scouts into our shacks and let them talk with brother Scouts around the world. The local Scout office should be listed in your phone book.

An anonymous note a few weeks ago asked why we hadn't done "something about the absurd, stupid FCC reg limiting RTTY to 60 w.p.m." If he'd signed his name, we could have reminded him that FCC for good cause will grant special temporary authorizations (STAs) to amateurs wishing to conduct serious investigations into almost anything not specifically permitted by the rules.

During fiscal 1968, ending the last of June, 11,480 persons took the General Class exam -- 5,425 passed and 6,055 failed (4,753 of them having trouble with the code). For advanced, 4,867 passed out of 6,780 attempting the test. Of 3,604 applicants for Extra Class, 957 failed the code and 804 the written; the remaining 1,843 were successful. But it does look as if some of us ought to bone up a bit more on code before we chance a waste of four bucks and a trip to the engineer's office. W1AW is still doing business every night of the week.

Speaking of exams, normally FCC engineers do not permit the use of a typewriter for amateur code tests except by the handicapped -- to the dismay of some Extra candidates who haven't practiced their longhand lately. Reason: room noise which bothers other applicants.

Got that tired, jaded feeling about DX? See "OpNews" this month for announcement of a new award from ARRL, for working 100 countries on each of five different bands. Contacts must be after January 1 next year, so everyone starts on an equal basis. If enough hams set their mark for the new 5BDXCC, activity on the lower-frequency bands may cause a boom in antenna wire production.

Hams at the Southwestern Division convention in Phoenix were treated to the breaking of the 40-GHz amateur DX record -- formerly 700 feet, now 3,700. New Arizona SCM W7CAF was kingpin of the group undertaking the project. Details next month.

There's still time to comment on FCC's proposed rulemaking to allow ex-amateurs another chance at the Novice test. See page 83, September issue.

Increasing the Accuracy of Frequency Measurement



Improved Gate Control for the Frequency Counter

BY ROYDEN C. GOLDING,* VE3CUS

DESIGNING equipment for frequency measurement suffers a major disadvantage when compared with designs for home-brewed transmitters and receivers. In the latter, an unsatisfactory stage can often be redesigned and rebuilt. It is seldom that this can be done with frequency-measuring equipment. If the equipment as a whole does not give the desired degree of accuracy, then there is little you can do about it, other than start again from the beginning. This, of course, is expensive, so any method of starting small and building on in the future is desirable for the newcomer to the game.

"Starting small" was the object in the design of the pulse generator to be described. The overall frequency-measuring setup eventually to be arrived at is shown in simplified form in Fig. 1. The beginner can commence with a straight 100-kc. source for use with his receiver. Later he can add a 10-kc. divider, which will add greatly to his ability to estimate actual frequencies. Then when the time comes he can

extend the equipment, on the same chassis, to incorporate an accurate gate control to be associated with a frequency counter. Thus he can experiment with highly-accurate beating of WWV signals right from the early stages of injecting 100-kc. signals into his receiver. While high accuracy is of course not *necessary* at this stage, the experience is invaluable later when there will be other sources of possible error to deal with.

Thus even for the initial 100-kc. beating process we have to decide on the accuracy we desire to achieve eventually. We also have to decide whether to go solid-state or not. In frequency-measurement work the tube still has advantages over the transistor, unless a general-service portable laboratory-type instrument is the target. One tube will divide by ten, while eight transistors (four flip-flops) are required for the usual solid-state decade. Also, one could run into difficulty with the voltage required to energize neon lamps for display (though I have not checked this). One of the great advantages of transistors is that they can be assembled on plug-in boards, so spares can be plugged in to facilitate trouble shooting. This is a definite advantage for a commercial instrument, but an amateur is not likely to construct a spare board to get a quick result in the face of trouble. All in all, the balance appeared to be in favor of tubes, in the writer's case.

The fact that the equipment is eventually to be used for gate control of a counter means that the 100-kc. standard cannot be tucked

* 69 Gordon Road, Willowdale, Ontario, Canada.

By using a gate control tied in with the 100-kc. frequency standard, the accuracy of the audio-frequency counter described in January 1965 QST can be increased. This article also discusses some of the philosophy of accurate frequency measurement, and describes an equipment setup more-or-less typical of what those who place high in the ARRL Frequency Measuring Tests are using.

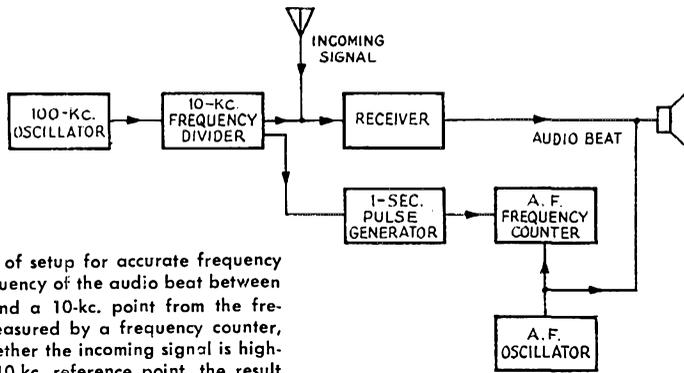


Fig. 1—Block diagram of setup for accurate frequency measurement. The frequency of the audio beat between the incoming signal and a 10-kc. point from the frequency standard is measured by a frequency counter, and depending on whether the incoming signal is higher or lower than the 10-kc. reference point, the result can then be either added to or subtracted from the frequency of the 10-kc. point. The audio-frequency count could be obtained directly from the receiver output, but to overcome noise, interference and fading the counter usually is driven by a variable audio oscillator which is set to the same tone as the beat, either by ear or with an oscilloscope.

The accuracy of the audio-frequency count is set by the accuracy with which the counter is "gated" by the one-second pulse generator, and by the inherent plus-minus-one-count uncertainty in a gated counter.

away in the receiver, as with some models. It becomes a piece of ancillary equipment in its own cabinet, and is connected to the receiver antenna terminal by a piece of coax cable.

Suppose we decide to design for an eventual accuracy within 2 parts per million. Holding the error to 2 parts per million in the final result means that we can have no more than a 20-c.p.s. error in beating the 100-kc. harmonic with the 10-Mc. signal from WWV. With the equipment to be described no difficulty is found (after experience) in obtaining a beat of 2 c.p.s. at this stage, or about ten times the accuracy we have set for ourselves.

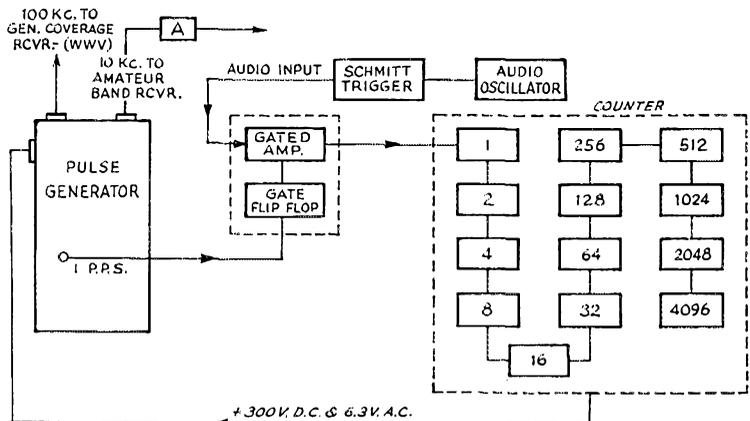
The technique of beating the signal to be measured against harmonics of the standard appearing at 10-kc. intervals means that no audio beat will exceed 5 kc., which therefore is as high as the counter needs to go. In view of

the accuracy with which the standard can be set to WWV, we are going to assume that any inaccuracy in actual measurement of frequency will be in the beating techniques and in the equipment we shall build later—specifically, in the gate control, since it can be assumed that the counter circuits themselves will have no error.

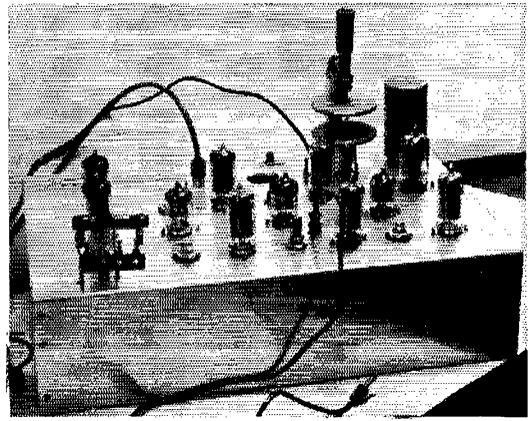
The pulse generator shown here was designed for use with the electronic counter described by Skeen.¹ It replaces the 100-kc. oscillator and harmonic generator, and also the 6-to-1 and 10-to-1 dividers, shown on page 33 of the January 1965 issue. In the course of doing so it steps up the accuracy of the 10-kc. signal used for beating in the receiver, and also the gate-control timing. Fig. 2 is a reproduction of Skeen's overall diagram showing the changes made. In order to use a common power pack for all circuits, plus-B of 300 volts is applied to the counter circuits instead of the 250-volt supply in the original design. (This voltage is necessary for firing the VR tubes in the new pulse generator to obtain regulated 216 volts.) Of course, if the reader has already constructed such a counter a separate power pack can be used.

¹ Skeen, "Low-Cost Precision Frequency Measurement", *QST*, January, 1965.

Fig. 2—The system used by VE3CUS, a modification of the counter described in January 1965 *QST*. A major difference between this and the referenced circuit is the use of a pulse generator actuated by the 100-kc. crystal oscillator in the frequency standard, thus improving the gating accuracy. A tuned circuit, A, is used between the receiver and the 10-kc. divider (in the pulse generator) to increase the harmonic strength in the amateur band in use.



The circuits described in the text are contained in this chassis. The crystal oven is at the right rear, with the oscillator tube in front of it and the capacitor for fine frequency adjustment to one side. Voltage regulator tubes are at the left. The remainder of the tubes are in the frequency-divider circuits for developing the 10-kc. output and 1-second pulses. Lead at left rear is the pulse output. Rear right is a test lead feeding 100 c.p.s. to the counter for checking purposes. Front lead 60 c.p.s. input (test) for calibrating last two stages (see text).

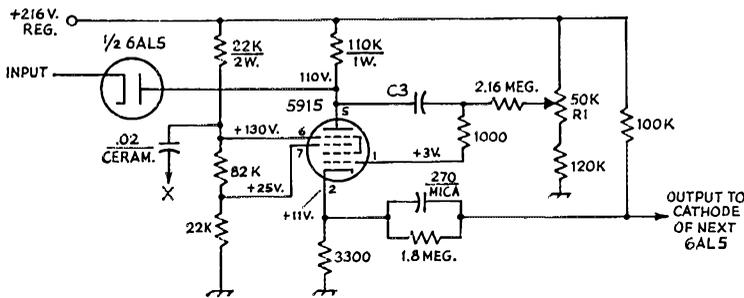


The first frequency-reduction stage is now adjusted correctly, and we have four more to do. We now adjust the last two stages, the 100/10 and the 10/1 cycle steps. Pull the 6AL5 tube which feeds the fourth stage. Connect to the fourth 5915 tube anode (one of the 6AL5 socket pins will do this) a lead which supplies 115 volts, 60 cycles, through a 1-meg. resistor (preferably through an isolating transformer, too) to the anode. The last two dividers should commence to pulse. This can be checked by a voltmeter connected to the output of the last stage. Or, if you have constructed the gate flip-flop, then feed this with the 1 p.p.s. and the neon lamp connected with it should commence to flash. Time the voltmeter or the flashes, which should go "on" thirty times and "off" thirty times exactly in 60 seconds. Set the controls, R_1 , in both divider circuits reasonably near the center of their range. When the output timing is correct the first divider is dividing by 6 and the last one by 10. If the potentiometers adjust to the cor-

rect timing at their extreme ends, one is dividing by 5 and the other by 12. Another adjustment which gives the correct timing should be found.

Leaving these pots now at their settings, uncouple the 115-volt supply and replace the 6AL5 tube. Energise the whole pulse generator. We know the 10-kc. supply is correct, and it only remains to adjust R_1 in the second and third circuits, while keeping the output of the last stage at exactly 1 p.p.s. This can be done by trial and error. It is true that we left the fourth stage dividing by 6, and we are now expecting it to divide by 10 without further adjustment. However it was the output which was really adjusted (by the RC time constant) to produce pulses at ten per second. It will continue to produce at the same rate when fed by 100 c.p.s.

Other means of checking each stage will come to mind if an oscilloscope is available. By feeding the horizontal plates with 60 cycles, a sweep of 600 c.p.s. will give a Lissajous



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ($\mu\text{f.}$); OTHERS ARE IN PICOFARADS (pf. OR $\mu\mu\text{f.}$); RESISTANCES ARE IN OHMS; K = 1000.

Fig. 4—Frequency-divider stage in the pulse generator. Five of these are required, the fifth being modified as shown in Fig. 5. X indicates 10-kc. output (on first divider only) to the receiver. The 2.16-megohm resistor is a Welywn N15; similar units can be obtained from the Electra Co., Kansas City, Mo. Other fixed resistors are $\frac{1}{2}$ watt.

C_1 —First divider (100/10 kc.): 39 pf. mica.
 Second divider (10/1 kc.): 390 pf. mica.
 Third divider (1000/100 c.p.s.): 0.0039 $\mu\text{f.}$ mica.

Fourth divider (100/10 c.p.s.): 0.039 $\mu\text{f.}$ paper.
 Fifth divider (10/1 c.p.s.): 0.39 $\mu\text{f.}$ paper.
 R_1 —50,000-ohm control, linear taper.

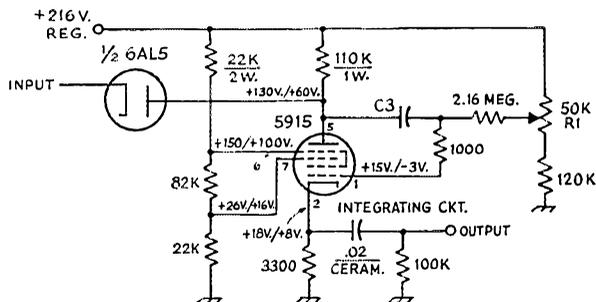


Fig. 5—The output circuit of the fifth divider (10/1 c.p.s.) is modified by incorporating an integrating circuit as shown. The output goes to the gate flip-flop circuit (C₃, Fig. 5, page 35, January 1965 QST).

figure having a 10-to-1 ratio. Retaining this sweep, feed the 100-cycle output from stage three to the horizontal plates, and adjust R₁ to give a Lissajous figure of 6. Of course, if you have built the counter first you can drive the last two division stages by 60-cycle current as above. If you then pass the outputs, in turn, of the two previous stages, 1000 cycles and 100 cycles, through the gate, the counter will count them for you, and do away with trial and error altogether.

It now remains to beat the oscillator with the WWV signal, in this instance probably with the 5- or 10-Mc. signal. The procedure here is quite normal: feed the 10-ke. signal from divider circuit 1 to the antenna terminal of a receiving set tuned to WWV, observing the necessary precautions as laid out in the chapter on measurements in the *ARRL Handbook*. Some ham-band receivers do this by an auxiliary mixer tube which converts the 10-

Mc. signal into one of the ham bands. The same happens to the 100th harmonic of the 10-ke. signal, in theory, and the two can beat together and be heard in the audio circuit of the receiver. The author has had little luck with this system; in some sets the convertor produces too many spurious beats which are difficult to recognise. I favor using a continuous-coverage receiver, receiving the WWV 10-Mc. signal direct. One of the \$75 Japanese receivers with capacitive bandspread works very well. A separate 100-ke. signal is provided in Fig. 3 to feed this receiver.

Measuring Frequency

Now comes the real test, the peak we have set ourselves to attain in all we have built so far. A dead beat is heard as a null, but the null is probably at least 60 cycles wide, depending upon your hearing and the audio response of the receiver. It is not sufficient to set to this null; it must be dissected and the exact center found, and it must be kept there (exactly) as long as the measuring period lasts. All circuits should be operated for 24 hours before calibrating, and this should be 24 to 48 hours before the test, as all circuits will be left operating for that period.

For fine adjustment of the 100-ke. oscillator frequency the National neutralizing capacitor specified in Fig. 3 was chosen over a dozen others tried. It is bulky, and a miniature type which would be equally good for the purpose would be welcome, if found. Rough adjustments are made on C₁ and final adjustment on C₂. C₂ has a loose shaft (no backlash) and needs a trimming tool at least 12 inches long. (Bind two 6-inch rods together.) A metal-tipped

(Continued on page 160)

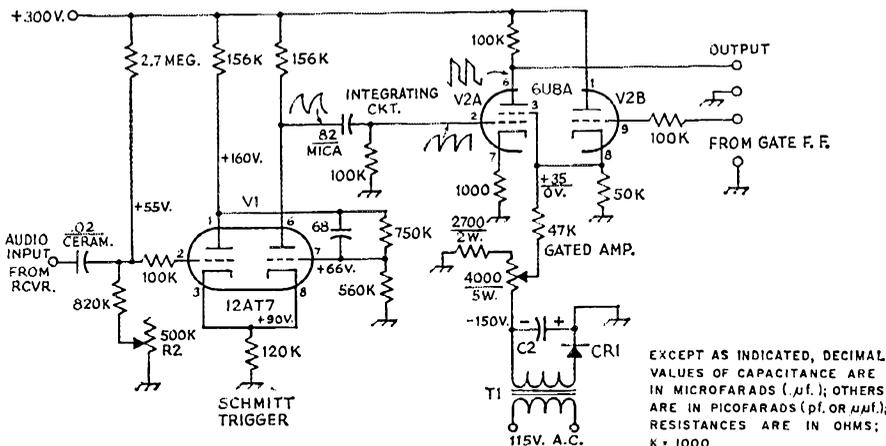


Fig. 6—Squaring and integrating circuit for applying the audio signals to the gated amplifier, V₂. This circuit also shows the modifications to the original gated-amplifier circuit given on page 34, January 1965 QST. Fixed resistors are 1/2-watt except as indicated. Adjust R₂ for steady operation of the counter. Adjust the 4000-ohm variable resistor to give the voltages shown on pin 3 of the 6UBA: +35 volts, gate open; 0 volts, gate closed.

C₃—40-μf. 250-volt electrolytic.

CR₁—Any silicon rectifier, p.i.v. 350 volts or more.

R₂—0.5-megohm control, linear taper.

T₁—Power, 125 v., 50 ma.

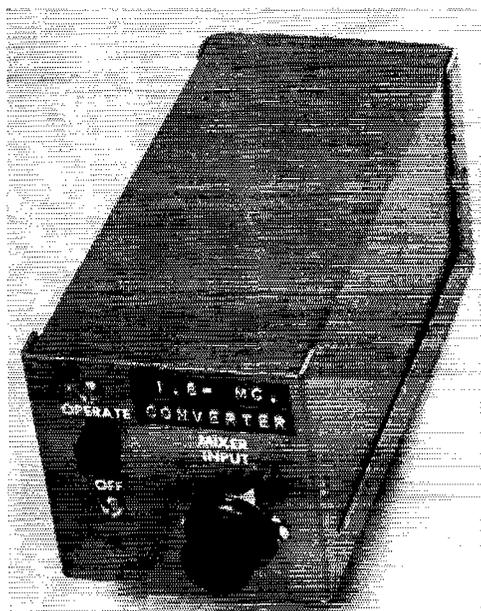
Solid-State Mobile Fixed Converter For 1.8 Mc.

BY DOUG DeMAW,* W1CER

This converter can be used either for mobile operation, by feeding its output into the automobile b.c. receiver, or for fixed station use as an "up" converter using a receiver covering the 75- or 40-meter bands as a tunable i.f. A double-tuned hi-Q input circuit provides good front-end selectivity, and an FET mixer greatly reduces cross-talk from strong nearby signals.

WITH the new 160-meter regulations in effect it is quite likely that there will be a resurgence of activity on that band, possibly leading to increased activity by 160-meter mobile stations. Certainly, this is a band that should not be overlooked by those operators who desire reliable point-to-point communication, mobile to mobile or mobile to fixed station, over paths up to 50 miles or more. Ground-wave communication on "160" is superb when compared to other bands in the 1.8 to 30-Mc. range. Natural barriers such as mountains and forests have little effect on 1.8-Mc. signals. Tall buildings have a similar lack of effect on the signals. It is not uncommon for two mobile stations to have Q5 communication over a 30-mile path (ground wave) with but a few watts of transmitter power and base- or center-loaded 8-foot whip antennas. Another boon to mobile operation on this band is the lack of ignition noise as compared to that on the higher

* Assistant Technical Editor, QST



Top-front view of the converter showing the location of the on-off switch and the input peaking control. Input and output jacks are on the rear and bottom sides of the 2¼ x 2¼ x 5-inch Minibox.

bands. All is not pure joy, however, in that atmospheric noise is quite prominent in the summer months, at times a deterrent to good reception. Nighttime propagation conditions permit "skip" (skywave) contacts as far away as a few hundred miles when operating mobile.

This converter can be an effective tool in obtaining good mobile reception. Similarly, it can be used as an "up" converter for fixed-station reception on 1.8 Mc. by making the modifications described in the text. Whatever its intended use, it is easy to build and put into service, and performs well despite the simplicity of the circuit.

Circuit Data

Only two stages are used in the circuit of Fig. 1. A double-tuned high- Q input circuit is used between the antenna and the JFET mixer, Q_1 , an MPF105. Coils L_2 and L_3 are tuned for a peak at the receiving frequency by C_1 , a two-section variable capacitor which is accessible from the front panel of the converter. Loose coupling is used between L_2 and L_3 to provide good tuned-circuit selectivity, an aid to image rejection and attendant interference from stations in the b.c. band.

A source-bias resistor, R_2 , establishes approximately 0.8 volt of mixer bias — a value which is recommended for best conversion gain and minimum cross-talk with this transistor. Other brands and types of N-channel FETs can be used at Q_1 , but the value of R_2 might require empirical derivation to obtain best mixer performance. Any FET with medium to high transconduc-

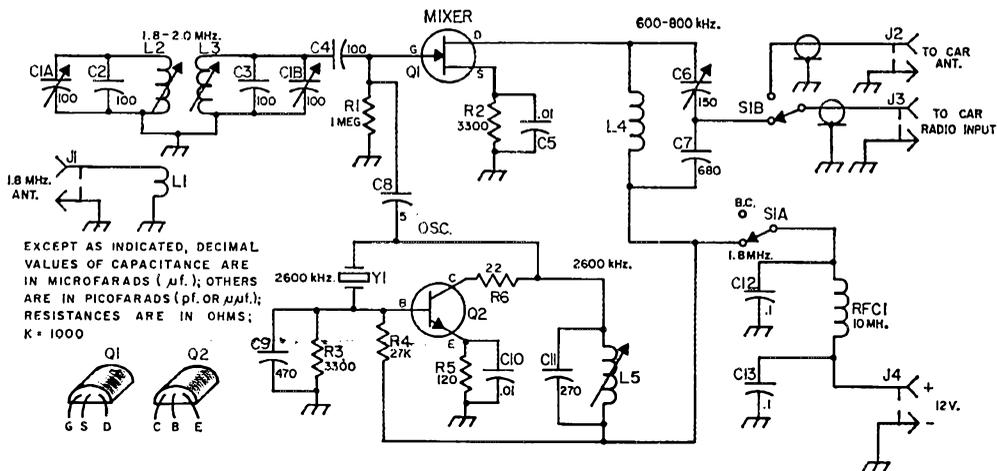


Fig. 1—Schematic of the solid-state mobile converter. Resistors are $\frac{1}{2}$ -watt composition. Fixed decimal-value capacitors are 50-volt disk ceramic for greater compactness. Other types can be used, but should be disk or tubular ceramic. Some mylar 100-volt miniature capacitors can also be used. Non-decimal-value capacitors are standard disk ceramic units.

C₁—Two-section miniature variable (James Millen 26100RM or equiv.).¹
 C₂—C₁₃, inclusive, except for C₆—For text reference.
 C_n—10-160-pf. padder capacitor (J. W. Miller 160-D).²
 J₁—J₄, inc.—Phono jack.
 L₁—10 turns No. 30 enam. wire over ground end of L₂.
 L₂, L₃—27.5 to 58 μh , slug-tuned (J. W. Miller 42A-475CB1).
 L₄—500- μh . subminiature r.f. choke (J. W. Miller 70F-504A1).

L₅—9 to 16 μh . slug-tuned (J. W. Miller 4506).
 Q₁—MPF105 (Motorola).
 Q₂—2N4124 (Motorola) or similar.
 RFC₁—10-mh. subminiature r.f. choke (J. W. Miller 70F102A1).
 S₁—D.p.d.t. slide switch.
 Y₁—2600-kc. fundamental-cut crystal (HC-6/U style holder).

tance and rated to at least 30 Mc. should work nicely at Q₁.

An i.f. output of 600 to 800 kc. is used with this circuit because most car radios have greater bandwidth on the low end of the b.c. tuning range. L₄ is tuned to whichever 50-kc. segment of the b.c. band permits reception of the part of the 160-meter that is desired in any given geographical location. The i.f. tuned circuit has fairly low Q, resulting in sufficient broadness to cover the entire 1.8- to 2.0-Mc. range without a serious loss in the overall gain of the converter. It is a good idea, however, to peak it for the portion of the band that will most frequently be used. A capacitive divider, consisting of C₆ and C₇, matches the output of the converter to the input of the car radio. C₈ tunes L₄ to resonance in the i.f. range.

A bipolar transistor, Q₂, is used in a crystal-controlled oscillator circuit. Y₁ is a fundamental-cut crystal and is soldered directly into the etched-circuit board. C₉ is part of the feedback circuit for the stage and its value may have to be made somewhat smaller if a sluggish crystal is used at Y₁. The value given in Fig. 1 proved to be ideal for use with several crystals tried in the test circuit.

A 22-ohm resistor, R₆, prevents low-frequency parasitic oscillations—a common occurrence

¹ Available from the James Millen Co., 150 Exchange Street, Malden, Mass.

² If not available from local wholesale outlet, contact J. W. Miller Co., 5917 S. Main St., Los Angeles, California 90003.

when high-beta transistors are used as oscillators. Experience has shown that it is a good idea to include such a resistor as a matter of course when designing crystal-controlled and variable-frequency oscillators. A further aid to the reduction of spurious responses is assured by the use of a high-C collector tuned circuit at Q₂. This practice improves the selectivity of the collector tank, thus reducing the harmonic currents in that part of the circuit. Ideally, only the 2600-ke. signal from Q₂ should be injected into the gate of the mixer in the interest of the best image ratio attainable.

A switch-through feature has been added to the circuit to permit the car radio to be reinstated when the converter is not being used. By means of S₁ the auto-radio antenna is reconnected to the car receiver when the converter is turned to OFF. A brute-force filter, consisting of C₁₂, C₁₃, and RFC₁, keeps ignition pulses out of the converter by filtering the 12-volt lead. The filter also prevents broadcast-band, or other out-of-band signals, from entering the converter via the power lead.

Construction Methods

Almost any kind of a metal container can be used for a converter box. In this instance a $2\frac{1}{4} \times 2\frac{1}{4} \times 5$ -inch Minibox was used. There is nothing particularly "sticky" about the layout except for keeping the input and output leads electrically isolated to prevent b.c. signals from leaking through the system. Coaxial cable (RG-174/U,

or other subminiature 50-ohm coax line) should be used for all wiring between S_1 and J_1 , J_2 , and J_3 to assure good isolation between the input and output circuits of the unit.

Most of the small components are assembled on an etched-circuit board which mounts vertically near the rear wall of the Minibox. Metal spacers are used between the board and the back wall of the case to hold the etched-circuit assembly securely in place.

Details for the design of the circuit board are given in Fig. 2. There is no reason why the builder could not use standard construction practices and eliminate the circuit board. If this were done, Q_1 and Q_2 could be plugged into transistor sockets and point-to-point wiring could be used on a pegboard or aluminum sub-chassis. The circuit board, however, is neater and more compact.

L_2 and L_3 are mounted on an aluminum bracket and are spaced one inch apart, center to center. This spacing allows sufficient mutual coupling between them, eliminating the need for a coupling capacitor between their high-impedance ends. The bracket allows the tuning screws to be inside the case, preventing accidental damage which might occur if they were protruding from the box.

The i.f. inductor, L_4 , is suspended between the circuit board and one of the terminals of C_6 . Capacitor C_7 is mounted between the remaining terminal of C_6 and ground. L_5 is mounted on the rear wall of the box and C_{11} is attached to its two solder posts.

Capacitors C_2 and C_3 are mounted directly at the terminals of L_2 and L_3 and are grounded to a solder lug which is bolted to the bracket between the two coils. J_1 and J_3 are located on the bottom of the converter case, toward the rear. J_2 and J_4 are on the rear wall of the box.

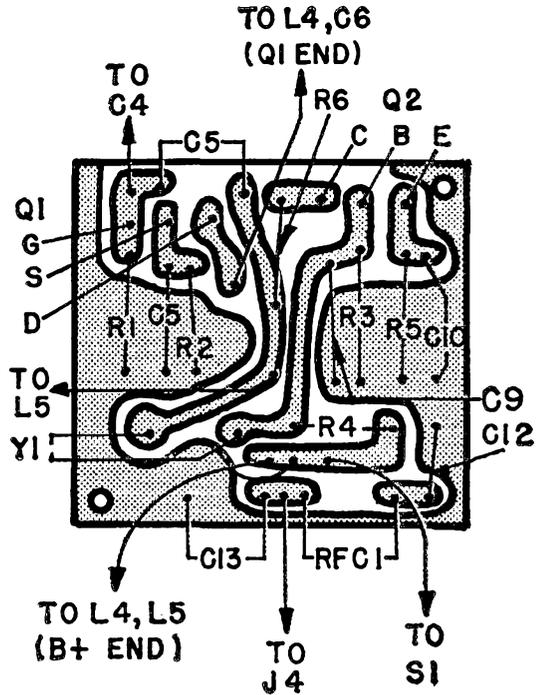
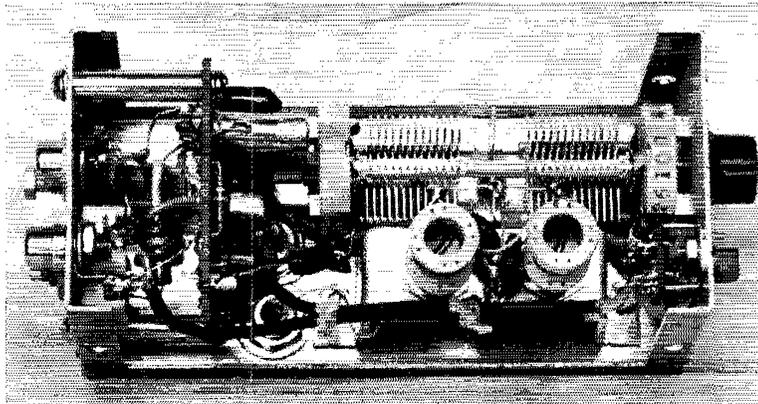


Fig. 2—Layout of the etched-circuit board showing location of most components. Drawing scale is 1:1. Dark areas represent copper strips which remain after etching. Drawing is shown with component side facing the reader. The copper sections are on the opposite side of the board and are shown for purposes of clarity.

Changes For "Up-Converting"

It is not unusual these days to use an i.f. which is *above* the signal frequency. Many s.s.b.



Looking into the converter, the two-section input-peaking variable is at the upper right. The two slug-tuned input circuit coils are at the lower right, mounted on an aluminum U bracket. An etched-circuit board contains most of the small components and is mounted vertically by means of two spacers near the rear wall of the Minibox (left side of photo). The peaking trimmer for the i.f. tuned circuit is mounted on the rear wall of the box along with two of the phono jacks and the oscillator slug-tuned coil.

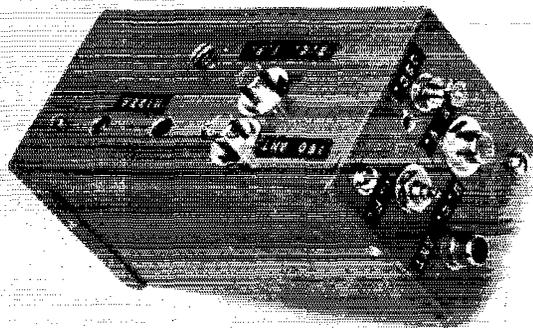
receivers that operate, say, from 3.5 to 4.0 Mc., use a 9-Mc. i.f. Since most modern-day ham receivers do not include the 160-meter band, it requires that an external converter be used in order to have coverage from 1.8 to 2.0 Mc. The "up-converting" scheme can be used effectively for this by tuning the i.f. from 3.8 to 4.0 Mc., or from 7.1 to 7.3 Mc., for example. In order to use the circuit of Fig. 1 in this manner, certain small changes are required. To tune "160" on 75 meters (2.0 Mc. being at 3800 kc., and 1.8 Mc. appearing at 4000 kc.) a 5800-ke. crystal must be substituted at Y_1 . Feedback capacitor C_9 should not need changing. Coil L_5 should be changed to one whose value is approximately 3 μ h. A J. W. Miller 4307 can be used for L_5 and will provide an inductance range of 2.7 to 4.2 μ h. L_4 should be changed to a value of 15 μ h. A J. W. Miller 70F155A1 subminiature r.f. choke will serve nicely there. No other circuit modifications should be required for up-converting. If 75-meter leak-through is noted, it may be coming in via the antenna lead and leaking across S_1 . If this happens a low-pass filter, designed to roll off just above 2 Mc., can be installed ahead of the converter. Details on filter design are given in the *Radio Amateur's Handbook*, Chapter 2.

Adjustment

Apply power to the converter and listen on the main station receiver for output from the oscillator stage, Q_2 . It may be necessary to couple an r.f. probe to L_5 and connect it to the antenna terminals of the receiver in order to hear the signal. Adjust L_5 until the oscillator signal appears. Cycle S_1 several times to make sure the oscillator starts each time. If it doesn't, adjust L_5 to a point where the crystal kicks in reliably. If a general-coverage receiver is not available for this test, a wavemeter can be placed near L_5 to show when the oscillator starts. Next, connect an antenna to J_1 , and connect the i.f. receiver to J_3 . Apply power and tune in a weak station (nighttime may be best for this if there is no activity in your area). For operation at or near 1800 kc., set C_1 to almost full mesh. Then, alternately adjust the slugs of L_2 and L_3 for peak response of the signal. C_1 will be at near midrange for peak response at 2000 kc. Adjust C_6 for peak response in the portion of the band where operation will take place.

Operation

When checked in an area where several strong local b.c. stations operate, this converter showed good immunity to cross-talk and image responses. The sensitivity is good — the overall gain of the converter checked out at roughly 8 decibels. A 0.1- μ v. test signal (unmodulated) provided a perfectly audible c.w. note in the speaker of the station receiver. A 1- μ v. 30-percent-modulated test signal produced a room-volume signal with audio gain to spare. Since atmospheric and man-made noise levels are



A view of the rear wall (right) and bottom surface of the converter. The signal input and output jacks are mounted on the bottom of the case. Also on the bottom of the box are two access holes for aligning the slugs of the two input coils.

usually well above a few microvolts on 1.8 Mc., this converter should perform as well as the best tube-type equivalent, yet with considerably less d.c. power required. Actually, a 9-volt transistor-radio battery should be satisfactory for powering the converter. At nine volts the total current drain is only 8 ma. Good performance resulted when the supply voltage was varied between 6 and 15 volts, but slightly less converter gain was noted at the lower voltages. The converter draws 10 ma. when operated at 13.6 volts, the usual car-battery voltage. Q57

Strays

Stolen Equipment

On August 6, my NC-200 transceiver and a.c. power supply were stolen from my house. The transceiver serial number is 105 434. Glen Hedderig, WA1CFQ, 175 Cocasset St., Foxboro, Mass. 02035.

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The Delaware Valley, Central New York, and New England Chapter of QCWA nets will change their frequency from 3810 kHz. to 3917 kHz. as of August 25. These QCWA nets operate from 0900 hours through 1030 hours every Sunday morning.

.....

A recent Army MARS bulletin makes a good point. "To be of maximum benefit to MARS or any other amateur radio organization, an individual radio amateur should be knowledgeable about amateur radio affairs in general. He should not immerse himself so deeply in any one activity that he loses contact with amateur radio as a whole." That's a pretty good philosophy for any person of whatever interest.

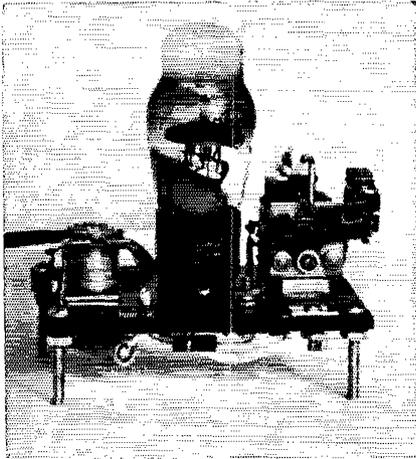
I would like to get in touch with . . .

those who have interesting old-time radio experiences that could be included in my book on this subject. My thanks to those who have already made contributions. Col. Haydon P. Roberts, 2015 Louise Lane, Los Altos, Cal. 94022



Touch To Talk

BY COL. CHARLES FELSTEAD,* KH6CU



The t.t.t. unit is assembled on a piece of insulating material large enough to accommodate the tube and two relays. It can be mounted in any convenient spot where it cannot be touched accidentally (the 115-volt line is on some of the exposed connections).

MANY different methods have been devised for switching back and forth from receive to transmit for voice operation of a rig, but each one has some disadvantages. A push-to-talk (p.t.t.) switch on the microphone requires that it be held closed as long as the operator is speaking. A push-on, push-off switch is a nuisance to operate, and a foot switch has the annoying habit of never being twice in the same spot. VOX operation requires steady talking to prevent the carrier from popping off and on.

The touch-to-talk (t.t.t.) system described here overcomes all those disadvantages. To switch between receive and transmit, it is merely necessary to touch a metal plate, Fig. 1, located in any convenient spot. Body capacitance to earth makes the 0A4G gas triode conduct, and the current passing through the tube actuates the 2500-ohm plate-circuit sensitive relay, K_1 . The contacts of this relay are connected to control the receive-transmit relay in the rig through the p.t.t. contacts. A 1000- or 2000-ohm relay will also work very well.

* Colonel, AUS-Ret., Suite 2043, 1777 Ala Moana Blvd., Honolulu, Hawaii 96815

This same principle is used in the contact buttons of modern elevators that control the stopping at floors. The elevator buttons, however, employ gas diodes, and the ionized gas that appears in the diode when it is conducting serves also to provide the light which indicates that the button has been touched.

With the basic circuit shown in Fig. 1 it is necessary to keep contact with the metal plate to hold the relay closed. When the fingers are removed from the contact plate, the tube ceases to conduct and relay K_1 opens. This simple circuit is recommended only as an economy measure.

By adding a single-coil impulse latching relay (K_2 in Fig. 2), such as the d.p.d.t. Potter & Brumfield PC11A, which operates on 120 volts a.c., TTT operation becomes a pure joy. A momentary touch on the contact plate causes the impulse-operated relay to close and remain closed until another brief touch on the contact plate causes its contacts to open.

The second set of contacts on K_2 may be used to turn on an "On the Air" light. This has an extra advantage, for the contact plate may previously have been accidentally touched, and when the rig comes on it may be in the transmit mode without the operator otherwise being aware of it.

Resistor R_1 is necessary to limit the initial current surge; without it in the circuit the tube will be destroyed.

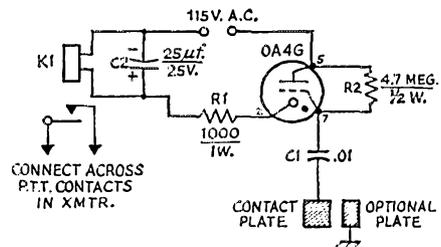


Fig. 1—The basic touch-to-talk circuit.

C_1 —0.01 μ f. or larger, 200 volts working; paper or mica.

C_2 —Electrolytic.

K_1 —Plate-circuit relay, 2500-ohm coil, 60-mw. d.c. (Potter & Brumfield RS5D or equivalent).

R_1, R_2 —Composition.

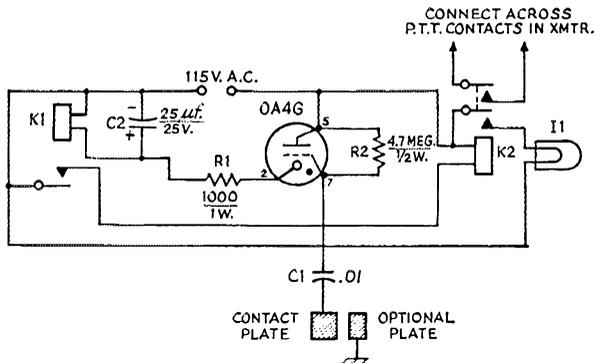


Fig. 2—The TTT circuit. Components listed below are in addition to those shown in Fig. 1

- I₁—115-volt lamp ("on the air" indicator).
- K₂—Latching type, 120-volt a.c. coil, d.p.s.f. (Potter & Brumfield PC11A or equivalent).

The capacitor C_1 is not critical in value; it could be left out of the circuit, although this is not recommended. It should be Mylar, paper, or equivalent, with a 200-w.v.d.c. rating or higher. The electrolytic capacitor C_2 also is not critical in value; however, a larger capacitance will cause a slight delay in the closing and releasing of K_1 .

The 110-volt a.c. supply to the t.t.t. unit must be correctly polarized to ground to make the unit operate. If the tube does not conduct when the cord is plugged into the a.c. outlet and the contact plate is touched, pull out the plug, reverse it and plug in again.

If there is a thick rug on the floor, if the operator wears rubber-soled shoes, or if he has a habit of resting his feet on the desk while operating, relay K_1 may not pull in, since it is the capacitance to ground that causes the t.t.t. unit to operate. The solution to this problem is simple: fasten the metal contact plate to a piece of insulating material, and next to it, spaced just far enough away so that they do not touch, attach another small metal plate that is connected to ground. Touch both plates at the same time and the relay will snap closed.

The lead to the contact plate may be extremely long if required, and the contact plate can be of any shape and be placed wherever it is most convenient. It may be a long metal strip fastened under the edge of the operating desk or on the arm of the chair, or it can become ornamental and be a metal ashtray on the desk.

Operators who pick up and hold the microphone during each transmission can experiment with a contact plate secured to the side or back of the microphone where the hand will touch it when the microphone is held. With a metal-encased microphone, the contact plate must be insulated from the metal. A piece of plastic for insulation and epoxy glue could be used. In this case, the simplified circuit of Fig. 1 should be employed.

If the 0A4G gas triode tube in the t.t.t. unit is installed so its upper half is visible, when the tube is conducting the ionized gas is a beautiful flickering lavender—quite a conversation piece for visitors!

No power is consumed when the 0A4G tube is not conducting as it does not have a filament, so it may be left connected permanently to the a.c. line.

There is an added bonus when a small fry visits the station. Tell him to hold onto the contact plate. If he is small enough, or if his feet do not touch the floor, his body capacitance will not cause the tube to conduct. Have him touch you, or some metal that is grounded, with his other hand and the tube will glow. You can keep a youngster amused this way for an amazing length of time.

Many other uses for this unit can be devised, such as switching the rig on and off, turning on the room lights, or temporarily turning off the sound of a TV set that is located near the operating position.

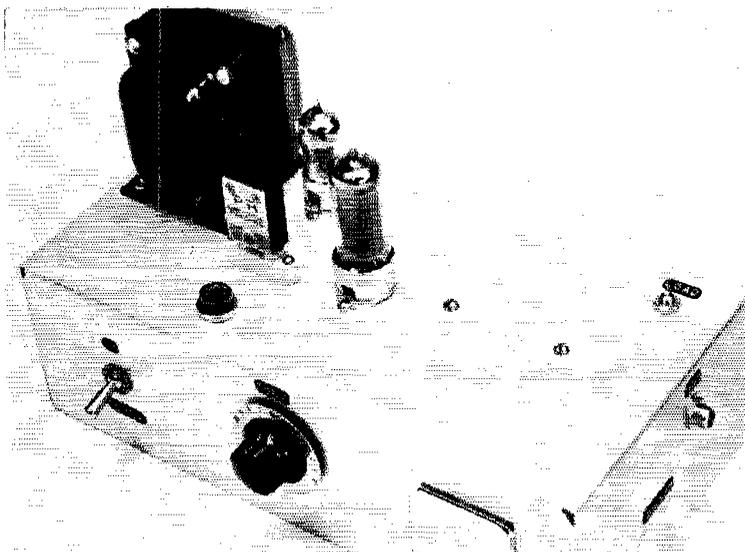
Q57

NEW BOOKS

RCA Solid-State Hobby Circuits Manual, HM-90. Published by RCA Electronic Components, Radio Corporation of America, Harrison, New Jersey 07029. 5¾ by 8¾ inches, 224 pages, including index. Paper cover, price \$1.75.

Although written primarily for the electronic hobbyist, this manual should prove to be a valuable asset to the beginning amateur's library. The manual begins with a well-written, concise discussion on the theory and operation of solid-state devices. Of particular interest should be the general circuits chapter where such things as power supply regulators, oscillators, and switching circuits are discussed in a non-technical and comprehensible manner. Basic construction practices are discussed along with testing and troubleshooting procedures. Of the 35 projects described, 13 apply directly to amateur radio. Typical projects covered in the ham radio field include power supplies, two keys, several audio circuits, a Dip/Wavemeter, and a v.f.o. Each project is described with text, a schematic diagram, photographs, and a drilling template.

• *Beginner and Novice*



The oscillator-tube socket, crystal socket and pilot lamp are centered on a line 1 inch to the right of the power transformer. The amplifier tube is centered on a line $1\frac{1}{2}$ inches to the right of this line, and $2\frac{1}{4}$ inches back from the front edge.

A Simple Transmitter for the Beginner

12 Watts on 40 or 80

BY DON MIX,* WITS

Most transmitters consist of an oscillator to generate the desired frequency, and one or more amplifiers to increase the power output. But, for low-power operation, and where the cost must be kept down, the amplifiers are sometimes omitted, and the oscillator power fed directly to the antenna. However, with the antenna load imposed directly on the oscillator, the keying characteristics of the oscillator may depend quite critically on the way the transmitter is tuned in coupling power to the antenna. With one adjustment, the keying may be satisfactory; with a slightly different adjustment, the keying may become "chirpy" or "yoopy." In some cases the oscillator may key only intermittently, or not at all. More often than not, the adjustment that gives satisfactory keying will be one that results in considerably less power output than the maximum of which the oscillator is capable. In any event, the necessity for fiddling around to find the right combination can be quite a nuisance.

At the cost of only a few additional inexpensive components, this condition can be avoided

*Assistant Technical Editor, QST.

by using an amplifier between the oscillator and the antenna. With such an arrangement, the oscillator can be operated at lower power input, where satisfactory keying is easier to attain, since the amplifier, which now supplies the power to the antenna, requires only a small amount of driving power from the oscillator. Furthermore, the amplifier isolates the oscillator from any effect that adjustment of antenna loading might otherwise have.

In the transmitter shown in the photographs (circuit shown in Fig. 1), a 6C4 Pierce crystal oscillator drives a 5763 amplifier. The two stages are keyed in the common cathode lead. Trimmer capacitor C_1 permits adjustment of oscillator feedback for best keying characteristics. The pi-network output circuit is arranged to offer a choice between operation in the 80-meter band, and 40-meter operation. C_{10} is the "tuning" capacitor, and C_{12} is the "loading" capacitor. C_{11} adds loading capacitance for 80-meter operation. As shown in Fig. 1, the connections are for 80-meter operation. If 40-meter operation is desired, the arrowhead lead is transferred to the coil tap. This one operation

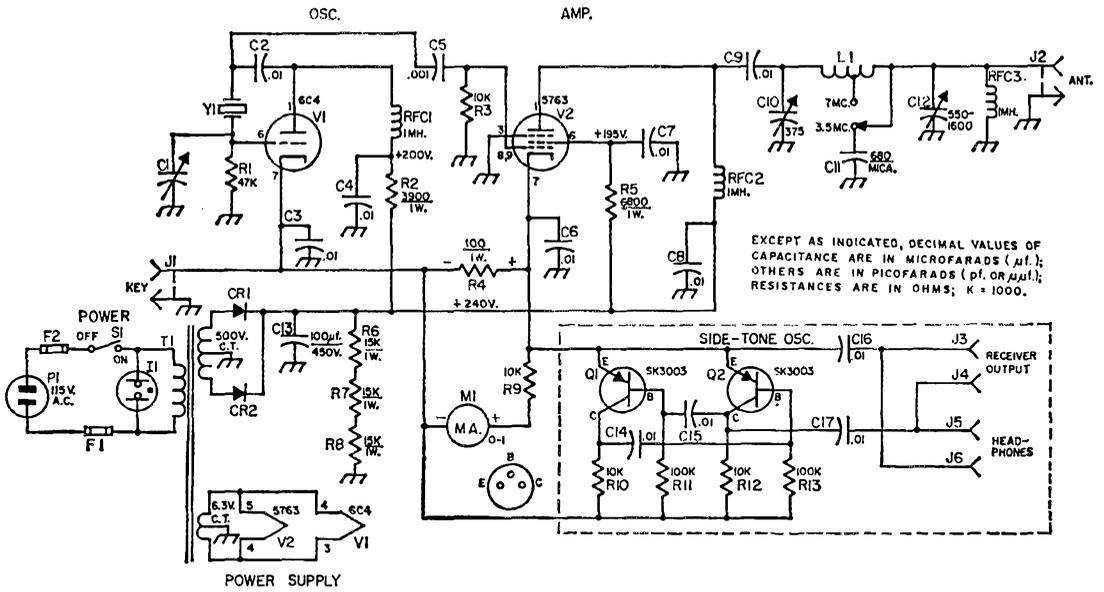


Fig. 1—Circuit diagram of the beginner's transmitter.

- C_1 —Compression trimmer capacitor, 3-30 pf. (Elmenco).
 C_{10} —Variable capacitor, single section, approx. 375 pf. maximum, receiver t.r.f. type.
 C_{11} —680-pf. mica.
 C_{12} —Similar to C_1 , 550-1600 pf.
 C_{13} —100- μ f. 450-volt electrolytic.
 All other capacitors are disk ceramic, 500 volts min.
 CR_1 , CR_2 —Silicon diode, 1000 p.i.v., 300 ma. (RCA 1N3563).
 F_1 , F_2 — $\frac{1}{2}$ -ampere fuse (Littlefuse 3AG).
 I_1 —Neon panel lamp, 115 volts (Leecraft 32-2111, or similar).
 J_1 , J_2 —Single-hole-mounting phono jack (Switchcraft 3501-FP).
 J_3 , J_4 —Insulated banana jack (Johnson 108-901).
 J_5 , J_6 —Insulated tip jack (H. H. Smith 202).

- L_1 —27 turns No. 20, 1 inch diam. 16 turns per inch, tapped at center (Barker & Williamson 3015 Miniductor, Illumitronics 816T Airdux, Polyphase 1748 Polycoil).
 M_1 —0-1 d.c. milliammeter (Lafayette 99 H 5052).
 P_1 —Fused plug (Eagle, or similar).
 Q_1 , Q_2 —P-n-p transistor SK3003 (RCA).
 R_1 - R_{13} —Composition resistor, $\frac{1}{2}$ -watt unless specified otherwise, R_1 and R_6 preferably 5% tolerance.
 RFC_1 , RFC_2 , RFC_3 —1-mh. r.f. choke (Millen 34300 1000).
 S_1 —S.p.s.f. toggle switch.
 T_1 —Power transformer: 500 volts, r.m.s., center-tapped, 40 ma.; 6.3 volts, 2 amperes (Knight 54 B 2551).
 Y_1 —Quartz crystal, 0.486 pin spacing, 0.95-inch pins, specify frequency (Peterson Z-9C, or similar).

disconnects C_{11} and shorts out part of L_1 , to reduce its inductance so that the circuit will tune to the higher frequency.

The portion of the circuit enclosed in dashed lines is a transistor audio oscillator, which serves as a keying monitor. Inclusion of this part of the circuit is optional, but you'll find it highly useful if you have no other means of monitoring your keying. Sometimes you can monitor your sending by listening to your transmitter signal on the receiver. But some receivers will "block" when tuned to the transmitter frequency, and all you will hear is a series of clicks or thumps when the transmitter is keyed. In any event, if you are working another station whose frequency is not the same as the one you are using, you cannot monitor without retuning the receiver to your own frequency each time you transmit.

The monitor gets its operating voltage from the voltage drop across the cathode resistor, R_4 . When the transmitter is loaded normally

and keyed, the cathode current flowing through R_4 results in a voltage drop of about 6 volts, with the cathode end of the resistor positive in respect to the other end. This voltage is fed to the monitor circuit, the positive going to the emitters of the p-n-p transistors, Q_1 and Q_2 , and the negative to the collectors.

The voltage drop across R_4 is also used to actuate the meter, M_1 . The combination of M_1 and R_6 in series actually constitutes a voltmeter, although the reading is in terms of milliamperes of current. If a current of 50 ma. flows through R_4 , the voltage drop across R_4 , according to Ohm's law, will be $E = RI = 100 \times 0.05 = 5$ volts. This 5 volts is applied to R_6 , and the meter in series. Since the resistance of the meter is negligible, the current through R_6 and the meter will be $I = E/R = 5/10,000 = 0.0005$ ampere = 0.5 ma. So, the cathode current flowing through R_4 at any time can be determined by multiplying the meter reading by 100 (0.5 \times 100 = 50 ma.).

Additional Components

- 1 7-pin miniature-tube socket (Amphenol 147-505).
 - 1 9-pin miniature-tube socket (Amphenol 59-410).
 - 1 3 × 5 × 10-inch aluminum chassis.
 - 1 Type 6C4 tube.
 - 1 Type 5763 tube.
 - 1 Crystal socket, 0.486-inch pin spacing, 0.95-inch pin diameter (National CS-7).
 - 2 Phono plugs.
 - 2 Insulated banana plugs.
 - 7 Terminal strips (see Figs. 2, 3, 4 and 5).
 - 1 Key.
 - 4 No. 4 machine screws, 1/4-inch long (for tube sockets).
 - 2 No. 4 machine screws, 1/2-inch long (for crystal socket).
 - 14 No. 6 machine screws, 1/4-inch long.
- Nuts for above screws.
A few feet of lamp cord.
Several feet of insulated hookup wire.
Wire for antenna.
Pipe clamp for ground connection.

Note: All components used in the construction of this transmitter are listed in the combined current catalogs of Allied Radio, 100 N. Western Ave., Chicago, Ill. 60680, and Lafayette Radio Electronics, 111 Jericho Turnpike, Syosset, L. I., New York 11791. Catalogs may be obtained by writing to these addresses.

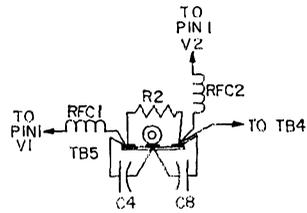


Fig. 3—Sketch showing subassembly TB_5 and connections thereto. (Terminal strip is H. H. Smith 864.)

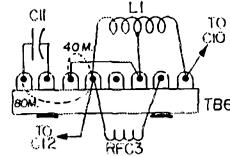


Fig. 4—Sketch showing coil mounting. (TB_6 is H. H. Smith 870).

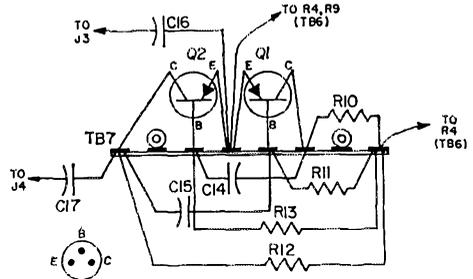


Fig. 5—Sketch showing subassembly TB_7 and external connections. (Terminal strip is H. H. Smith 870).

Construction

The transmitter is built on a 5 × 3 × 10-inch aluminum chassis. The layout of components isn't critical, and you'll come close enough by locating the major components only approximately as shown in the photographs. Most of the small components are mounted on terminal strips as subassemblies that can be prepared outside the chassis, and then mounted in the chassis as a unit. These subassemblies are indicated in the sketches of Figs. 2, 3, 4 and 5. The locations of most of the components not included in the subassemblies are pointed out in the bottom-view photograph. Don't forget that a 3/8-inch hole in the chassis will be required for the transformer leads. This hole

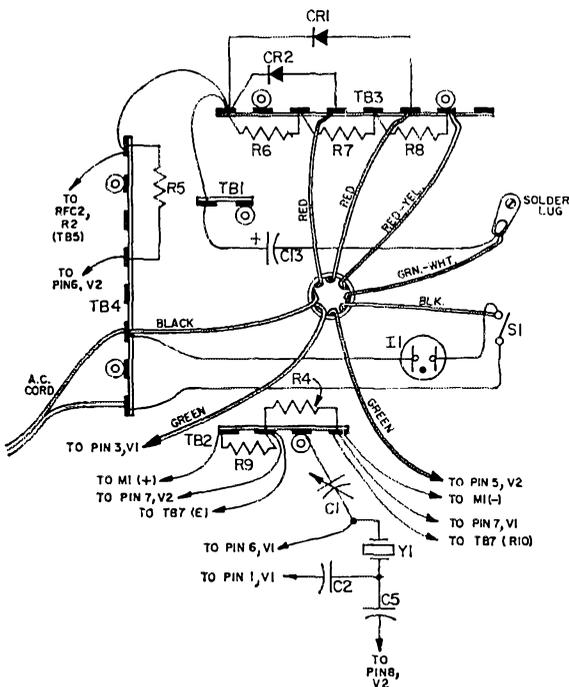
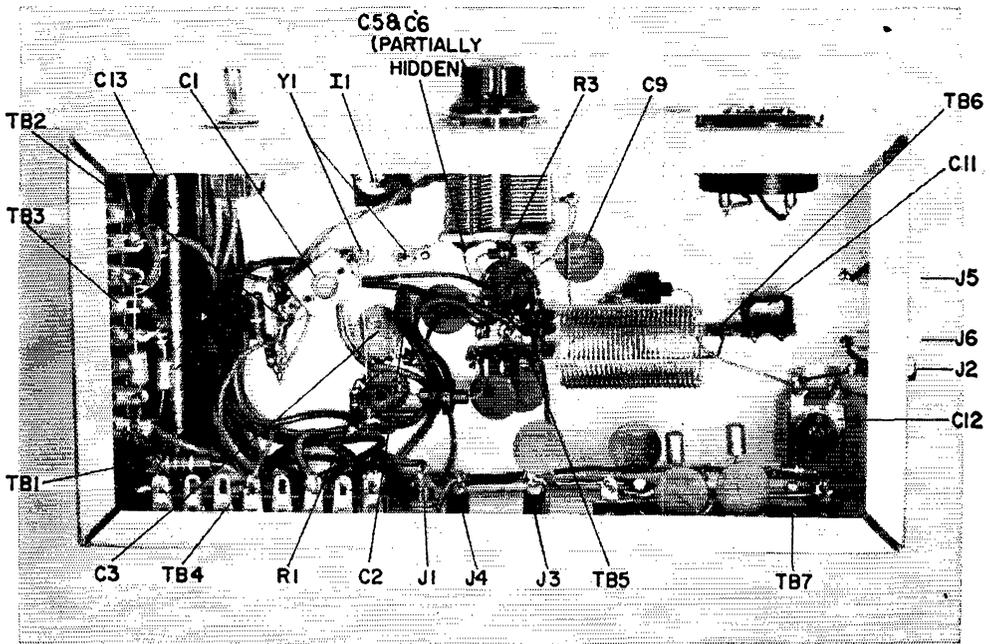


Fig. 2—Sketch showing subassemblies TB_1 , TB_2 , TB_3 and TB_4 , and the connections to be made to each. (TB_1 is type 861; TB_2 is type 866, one contact not used; TB_3 and TB_4 are type 870. All are H. H. Smith types).



Bottom view of the beginner's transmitter.

should be fitted with a rubber grommet.

The capacitor used for C_{10} in the original model has threaded mounting holes in the front side of the frame, so the capacitor was mounted against the front apron of the chassis, using $\frac{1}{4}$ -inch tubular spacers on the mounting screws. Other capacitors of this general type may have mounting holes on the bottom side of the frame. This type may be mounted against the under side of the top of the chassis, using spacers of the proper length to line the shaft up with the shaft hole in the front apron. With either type of mounting, be sure that the mounting screws are short enough so that they do not make contact with the plates of the capacitor.

In mounting the tube sockets, turn them so that the No. 7 pin of the V_1 socket and the No. 9 pin of the V_2 socket are toward the front of the chassis. Place a soldering lug under each socket mounting screw so that you'll have convenient points for grounding bypass capacitors and grid resistors.

The filter capacitor, C_{10} , is mounted in the corner of the chassis, at the left-hand end, by using an insulated terminal strip (TB_1) at the positive end, and a grounding lug at the other (see Fig. 2). You'll have an easier time if you mount this capacitor before mounting T_1 , or any of the other components underneath the chassis. Then connect C_3 , C_6 , C_7 , R_1 , and R_3 between the respective tube-socket terminals indicated in Fig. 1, and the nearest grounding lug. Keep these components close to the chassis. Connect Pin 3 of V_2 to the nearest grounding lug. Connect Pin 7 of V_1 to J_1 . Connect C_9

between Pin 1 of V_2 and a stator terminal of C_{10} ; connect C_2 between Pin 8 of V_2 and the nearest terminal of the crystal socket.

Now make up subassemblies TB_3 and TB_4 (Fig. 2) and mount them. When soldering to the diode leads, hold the leads with a pair of long-nose pliers to conduct the heat away from the diodes. Any solid-state device can be easily ruined if it is subjected to appreciable heat.

Bunch the transformer leads together and feed them down through the grommetted hole, and mount the transformer. Make the connections shown in Fig. 2, dressing the leads to follow the contour of the chassis as closely as possible. Connect TB_3 to TB_1 and TB_4 , as shown. Connect Pin 5 of V_1 to Pin 4 of V_2 , and Pin 3 of V_1 to Pin 4 of V_2 . Make the connection from TB_4 to pin 6 of V_2 .

Make up subassembly TB_2 (Fig. 2). Mount TB_2 in the chassis using the right-front transformer mounting screw, and make the external connections indicated, except those to TB_7 . Make the connections to the meter with a twisted pair of different-colored wires, so that the plus and minus connections can be identified.

Make up subassembly TB_5 (Fig. 3). Leave about $\frac{1}{8}$ inch of lead between TB_5 and RFC_2 , and about $\frac{3}{8}$ inch between TB_5 and RFC_1 . Mount TB_5 and make the external connections indicated in Fig. 3.

Connect one terminal of C_{12} to the center terminal of J_2 , and the other terminal of C_{12} to the ground lug of J_2 .

Make up subassembly TB_6 (Fig. 4). Cut the coil stock to the specified number of turns,

adding one turn at each end. The extra turns are to be unwound and used as connecting leads. Locate the center turn on the coil. Insert the turn on either side of this turn by pushing inward firmly with the narrow blade of a small screwdriver. Remove the insulation from a few inches of hookup wire; bend a small hook in one end. Coat the hook, and the spot on the center turn of the coil, where the tap is to be made, with solder. Fish the hook around the turn, and solder fast. Make sure that no turns are shorted. Mount the coil on TB_6 , as indicated, and complete the assembly. If the 80-meter band is to be used, wire a jumper between the first and fourth terminals of TB_6 , as indicated by the dotted lines. If operation is to be in the 40-meter band, wire the jumper from the third to the fourth terminal, instead. Make the other connections indicated. The lead to C_{12} should go to the terminal of C_{13} that is already connected to the center terminal of J_2 .

Make up subassembly TB_7 (Fig. 5). Leave plenty of lead length on the transistors so that they will reach the proper terminals without stretching. Be sure to hold the leads with pliers while soldering. After the subassembly is finished, examine it closely to make sure that no leads are shorted to each other, or to the mounting lugs, which will be grounded to the chassis. Mount the assembly in the chassis, and make the external connections indicated in Fig. 5. Connect J_3 and J_4 to J_6 and J_5 , respectively.

If you have followed instructions carefully, this should complete the construction and wiring of the transmitter. However, as a precaution, it is always a good idea to run through the connections once more, before applying power, since a wrong connection may cause damage to one or more components. Check the wiring against the circuit diagram.

Testing the Transmitter

Caution: The voltages required for the operation of any transformer-powered tube transmitter, including a low-power transmitter such as this one, are always high enough to be lethal. No danger is involved in normal operation, since the transmitter is designed so that high voltage appears at no point on the outside of the chassis. But it is a different matter when it comes to probing the inside. *Never* touch anything inside the chassis until you have turned the power switch to off, pulled the power plug out, and made sure that the filter capacitor C_{13} is discharged. The filter capacitor becomes charged to the full supply voltage as soon as the power switch is turned on, and it will hold this charge for hours after the power has been turned off, unless it is discharged by some means. The bleeder, consisting of R_6 , R_7 , and R_8 will automatically discharge the capacitor to a safe level in about 30 seconds, but a defective resistor, or a poor soldered connection can render the bleeder useless. Therefore,

always make doubly sure that the capacitor is discharged by shorting the high-voltage terminal to the chassis momentarily with a long screwdriver having an insulated handle. (The high-voltage terminal is the one on TB_3 to which *both* diodes, and R_8 are connected.) Wait at least 30 seconds after the power has been turned off before making the short, to give the bleeder a chance to do its job. Otherwise, the short may result in a large and loud spark. If this occurs after waiting the required time, it indicates that the bleeder is defective and should be investigated. Normally, after waiting 30 seconds, the spark on short will be small and make little noise. After a delay of a minute or so, there should be no spark at all.

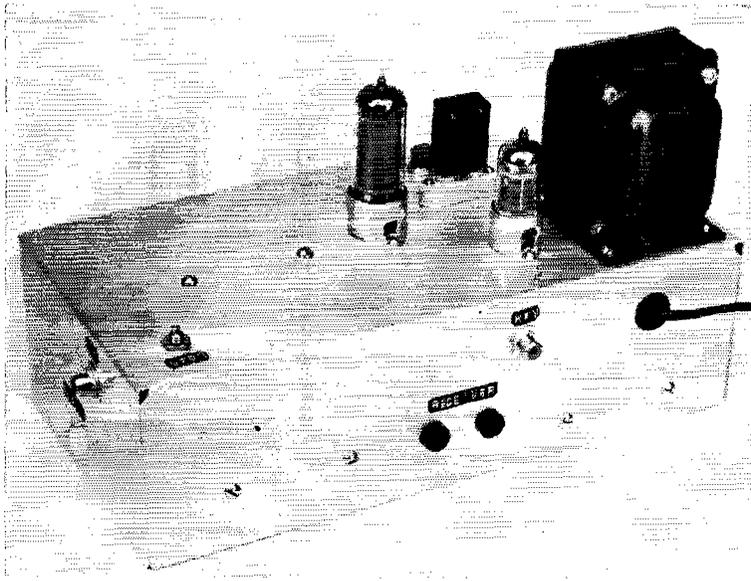
To test the transmitter, use a 15-watt 115-volt lamp as a dummy load. (The transmitter should always be operated with a load of some sort.) Unless you want to make up a phono plug to fit J_5 for the purpose, insert a long No. 6 machine screw into J_2 until it makes contact. Clip one lamp connection to this screw, and the other to some point on the chassis.

Plug the tubes into their sockets, a crystal for the desired band into the crystal socket, and a key into the key jack. Make sure that the jumper on TB_6 is in the right position for the crystal being used.

Insert two $\frac{1}{2}$ -ampere fuses in the power plug, and plug it into an a.c. outlet. Turn the power switch to ON. Allow about 30 seconds for the tube heaters to warm up. Turn both C_{10} and C_{12} to maximum capacitance. To set C_{12} to maximum capacitance, turn the adjusting screw all the way in the direction in which friction increases. (When turned toward minimum capacitance, the screw will go quite loose.) C_{10} is at maximum capacitance when the plates are fully meshed.

When the key is closed, the meter should show a deflection somewhere above half scale—about 0.6, indicating a cathode current of 60 ma. Now turn C_{10} very slowly toward minimum capacitance. At some point, the meter deflection should dip to a lower value, and then rise again. Set C_{10} at the center of this dip. If the load lamp lights at all, it will probably be quite dim.

Now decrease the capacitance of C_{12} a bit—one turn or less of the adjusting screw—and readjust C_{10} again for the dip in deflection. This time, you will probably find that, although it is still there, the dip is not as pronounced as it was on the first trial. Repeat the process, decreasing C_{12} a bit at a time, and retuning to resonance with C_{10} , until the current dips only about 5 ma.—say from 60 to 55 ma. By this time, the lamp should be lighting fairly brightly. Go through this procedure several times, until you are thoroughly familiar with the adjustment that gives the greatest power output to the lamp. (This is important, because the transmitter will be tuned in the same manner when the antenna is substituted for the lamp, and the meter readings will be the only means



Rear view. All labels are made with a Tapewriter.

you will have for determining when the transmitter is tuned properly.) During the adjustment with the lamp load, you will notice that if the loading is carried too far—to the point where the current dip is very slight, or disappears entirely—the power output indicated by the lamp will fall off. This is a result of overloading.

Whenever you tune the transmitter up, *always* start with C_{10} at maximum capacitance. The reason for this is that if C_{10} is turned down near minimum capacitance, a second dip in current may be found. This second dip indicates resonance at twice the crystal frequency, and this adjustment should be avoided, of course. With proper adjustment, C_{10} will always be set at at least 30% of maximum capacitance.

With the antenna disconnected from the receiver, listen to the transmitter signal as you key the transmitter. Back the receiver r.f. gain control off until the signal is fairly weak. If the keying sounds "chirpy" or "yoopy," try adjusting C_1 , using an insulated screwdriver. (Don't put your hands into the chassis.) All crystals tried with the original model keyed well with C_1 at maximum capacitance, but you may find some other adjustment necessary.

With the transmitter tuned up and working into the lamp load, plug a pair of headphones into J_k and J_n . You should hear a clear crisp tone each time the key is closed.

Antenna

This transmitter is designed particularly to work into one type of antenna—a quarter-

wave wire in conjunction with a connection to earth ground. For 80-meter operation, the wire should be approximately 60 feet long. The transmitter should be located as close to a window as possible, so that a minimum portion of the antenna will be indoors. It can be fed to the outside by lowering the upper sash of the window, passing the wire out, and reclosing the window. If the sash is of metal, or if the wire must also pass a metal screen or storm-window frame, wrap the wire with a layer or two of plastic tape so that it will not make contact with the metal. Once on the outside, the wire can be run in any manner that will result in getting as much of it as possible as high as possible above ground. Best results should be obtained with the wire running vertically. However, good results should be obtained with the wire running diagonally upward to the top of a tree, or other support. The wire may also be bent, part running vertically, and part horizontally. Any bend, however, should not be less than a right angle. Those living above the ground-level floor should get good results with most, or all, of the wire running horizontally.

A quarter-wave wire for 40 meters is about 30 feet long. Such a wire will work, but the shortness of the wire makes it impossible to get very much of it at a good height above ground, unless the transmitter is located above the ground-level floor. Much better results will usually be obtained on this band, if the antenna is made $\frac{3}{4}$ wavelength (about 90 feet).

Ground Connection

A ground connection to a cold-water piping system is preferred. However if the connecting

lead to such a system must be over 10 feet for 80-meter operation, or over 5 feet for 40-meter operation, connection may be made to a hot-water pipe, or to pipes of a heating system, if they can be reached without exceeding these lengths. A connection to a hot-air heating system may also be satisfactory. A series of two or three TV ground rods driven into the soil may also be used. If no ground connection can be made without exceeding the lead lengths mentioned, a counterpoise may be substituted. This consists of a second wire running more or less horizontally at a height above ground that will avoid obstruction to pedestrians or vehicles. Those living above first-floor level can drop the wire down vertically, or slant it downward to a support. The counterpoise wire should have the same length as the antenna for 80-meter operation. However, the length can be 30 feet for 40 meters, regardless of whether the antenna is a quarter wave long or three quarters.

The station end of the antenna should be connected to the center pin of a phono plug to fit J_2 . Make sure that the wire does not make contact with the metal shell of the plug. The ground connection may be made to the shell of the plug, or to a convenient point on the chassis.

If the keying monitor is to be used, make up a two-wire cable terminated at one end by a plug to fit the receiver headphone jack, and banana plugs at the other end to fit J_3 and J_4 . Then, when the headphones are plugged into J_5 and J_6 , you will be able to hear both the signal from the receiver and the signal from the monitor without switching of any kind.

With the antenna and ground connected to the transmitter, the tuning procedure should be exactly the same as for the lamp load. Be sure not to carry the loading beyond the point where the current dip shown on the meter is less than 5 ma., as mentioned earlier.

Receiving Antenna

The same antenna may be used for both transmitting and receiving. This will require a single-pole double throw switch. This switch should be of the rotary type. However, a separate antenna for the receiver permits break-in operation, and makes it unnecessary to do any switching in going from transmit to receive. This antenna need not be an elaborate one. It can be a random length of wire run to any available outdoor support that will space it several feet from the transmitting antenna, or it may even be an indoor antenna strung up in the attic, or run around the picture molding of a room.

Although the final amplifier in this transmitter runs at a normal input of only about 12 watts, with a reasonably-located antenna, you should have no trouble in making good contacts within a radius of several hundred miles on either of the two bands.

QST

Tidewater Handicap

Something for the Chesapeake Bay Area

THE indefatigable Lew Gilmer has come up with another set of computer-calculated DX predictions—inspired, perhaps, by his recent move from W2-land to the small town of Sarah, Virginia. This time they should interest an Eastern concentration of DXers. They differ in approach from those in the earlier "Los Angeles Handicap" (May 1968 *QST*) which, it will be remembered, covered the probabilities between two fixed points, Los Angeles and Athens, Greece, for two-way phone and c.w. under four grades of noise background. The "Tidewater Handicap" picks out eighteen spots, most of them exotic DX, spread around the compass at a variety of great-circle distances.

Complete calculations for each of these to develop the same type of information that was presented in the Los Angeles Handicap tables would make even a computer sweat. So to keep the thing within reason the predictions shown here are based on hearing a c.w. signal using a receiver bandwidth of 500 Hz. A "residential" noise level and unity (0 db.) signal-to-noise ratio are assumed, along with a transmitter power output of 100 watts at the DX station, and 3-element Yagis about 30 feet high at both ends.

The tabulation shows the probable percentage of days during October on which reception could be expected from the selected point. It gives no indication of *which* days will be good and which poor; that is beyond anybody's prescience. Where the tabulation says "00" a signal *may* get through, but where you see "--" it means that suitable skip is so extremely unlikely that the chances are negligible.

If the noise level is lower than "residential," phone may be usable. "Rural" noise, which means a pretty quiet location, would be low enough to make phone reception possible with a 2.1-kHz. receiver bandwidth, in most cases. So even though the probabilities are based on narrow-band c.w. reception they may be useful for phone—if your location is a good one.

As always, higher-gain antennas at greater height will do better. So will more power at the transmitting station, but the 100 watts assumed for the DX station in the calculations is a pretty fair average. Your chances of being able to transmit to the given point depend on the same factors, of course, plus the added one of competition.

If you're in the general area of Washington, D.C., you could have an interesting time this month checking out the predictions in the tabulation. We'd like to know how you make out, and so would W4VXD. His new postoffice address is Lewis B. Gilmer, Onemo, Virginia 23130.

QST

TIDEWATER HANDICAP
(October, 1968)

Man-Made Noise
"Residential"

SIGNAL FROM	BRG. AT XMITR	BRG. AT SARAH	DISTANCE, KM
ANCHORAGE	82.8	323.0	5,579.2
AMKARA	310.1	47.6	8,789.7
BUENOS AIRES	345.3	164.8	8,213.4
CAPTOWN	300.5	115.9	12,583.6
EDINBURGH	281.1	43.8	5,645.6
HONG KONG	9.5	348.9	13,289.4
HONOLULU	56.3	282.6	7,869.8
LHASA	349.3	11.7	12,437.4
LIVINGSTONE	304.1	97.5	12,251.6
LONDON	286.6	48.7	5,961.4
MOSCOW	309.9	32.9	7,926.0
PERTH	57.9	295.2	18,749.9
RANGOON	352.6	8.9	13,935.3
SINGAPORE	0.2	359.8	15,712.7
SRINAGAR	336.7	24.4	11,516.0
TEHRAN	321.0	40.0	10,264.5
TOKYO	28.3	331.0	11,076.8
WAKE IS.	45.6	301.9	10,911.0

Band	Percentage of Days CW Signals Copiable at Sarah, Va.																GMT			
40	02	51	19	31	55	89	00	00	00	55	88	31	00	00	00	06	00	00	02	
	04	65	18	26	55	86	00	00	00	51	85	33	00	00	00	06	00	00	04	
	06	61	00	00	00	87	00	00	00	00	88	15	00	00	00	00	00	00	06	
	08	59	00	00	00	92	00	00	00	00	87	02	00	00	00	00	00	00	08	
	10	69	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10	
	12	60	00	00	00	00	61	00	00	00	27	00	00	00	00	00	00	00	12	
	14	05	00	00	00	00	00	00	00	00	00	00	01	00	00	00	00	00	14	
	16	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	16	
	18	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	18	
	20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	20	
	22	00	05	00	00	09	19	00	00	00	12	00	00	00	00	00	00	00	22	
	24	12	19	26	47	89	81	00	00	00	10	19	16	00	00	00	01	00	24	
	20	02	75	35	71	66	22	00	87	06	80	33	23	00	00	00	33	40	00	07
04		56	47	69	55	00	00	00	00	74	00	00	00	00	00	11	45	04	04	
06		61	00	00	00	00	00	00	00	00	00	50	00	00	00	03	22	18	06	
08		00	12	41	11	09	01	00	00	00	14	21	03	00	00	01	04	27	08	
10		00	00	33	00	08	08	00	00	00	56	39	09	01	00	02	02	14	01	
12		00	00	00	00	83	20	62	10	00	76	19	51	08	05	02	00	31	12	
14		09	00	00	00	00	02	51	01	00	00	04	02	00	00	00	00	15	14	
16		52	00	00	00	70	00	58	01	00	58	07	00	00	00	00	00	07	16	
18		47	08	00	00	80	00	00	02	00	76	22	00	00	00	05	04	03	18	
20		43	37	00	32	91	03	00	09	00	90	42	00	02	00	17	25	03	20	
22		61	46	33	83	70	08	01	20	00	71	50	00	10	05	27	41	00	22	
24		79	46	78	79	36	00	49	34	87	87	35	40	00	12	00	34	00	24	
15		02	13	36	00	00	10	69	16	24	00	00	00	12	01	20	04	24	29	02
	04	00	31	00	44	05	00	15	27	00	00	00	05	00	17	11	11	00	04	
	06	00	31	00	00	03	00	06	35	00	00	00	01	00	00	04	09	00	06	
	08	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	08
	10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10
	12	00	48	66	02	75	14	00	29	12	81	51	09	25	10	38	38	03	12	
	14	00	11	11	00	00	00	00	13	04	92	56	46	29	14	40	27	00	14	
	16	08	51	03	03	91	27	66	33	04	90	52	33	25	29	21	41	00	16	
	18	00	42	09	09	88	12	00	13	33	80	52	06	15	09	08	19	00	18	
	20	56	42	09	56	84	13	81	12	00	87	55	06	15	09	08	49	00	20	
	22	70	00	43	73	49	00	76	11	88	56	19	00	17	19	10	04	18	22	
	24	76	69	82	68	18	25	83	09	33	00	00	02	00	01	04	39	52	24	
	10	02	00	00	00	00	00	03	00	00	00	00	00	00	00	00	00	01	00	02
04		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	04	
06		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	
08		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	08	
10		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10	
12		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	12	
14		00	17	29	74	27	12	00	09	76	41	35	04	00	19	25	55	00	14	
16		00	47	66	81	60	00	27	16	81	69	47	08	35	30	24	00	00	16	
18		05	00	72	84	39	00	73	00	85	48	00	00	22	39	00	00	00	18	
20		25	00	82	12	00	04	80	00	85	00	00	00	05	12	00	00	78	20	
22		33	00	76	00	00	00	72	00	64	00	00	00	03	00	00	54	74	22	
24		09	00	37	00	00	22	74	17	00	00	25	13	10	00	32	33	33	24	

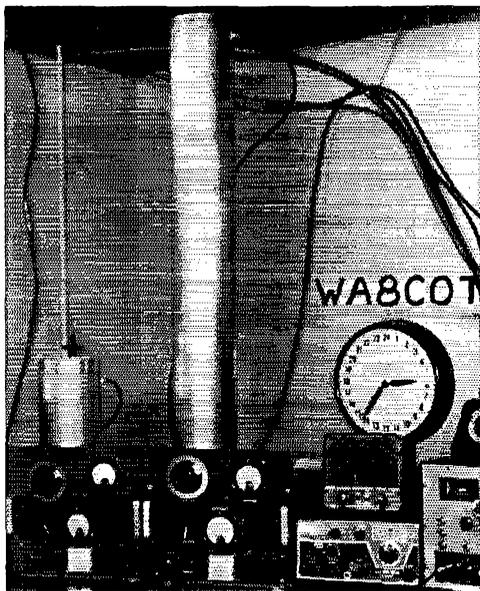
Performance Computed With Al. Barghausen's ITSA Program

Lewis B. Gilmer - W4VXD

"Stovepipe"

Transmitting Converters For 50 and 144 Mc.

BY AL MOORE,* WA8COT



THIS picture story shows how a low-power 1 v.h.f. transmitting converter and a medium-power 4CX250 linear amplifier can be combined on a single chassis. Similar units were built for 6- and 2-meter operation, the main difference being the dimensions of the 4CX250 coaxial tank assemblies—or "stovepipes."

These two units are excited by 28-Mc. s.s.b., c.w., or a.m. energy (low-level) taken from a Heath Marauder transmitter which is part of the low-band station. Also, the operating voltages for the transmitting converters are borrowed from the Marauder. Operating voltage for the 4CX250 is taken from the power supply of the main-station linear amplifier, a Heath Warrior. A small d.c. supply provides screen voltage for the 4CX250s, though it could be obtained from one of the Heath units. The screen voltage is removed from the power-amplifier stage of the Marauder by means of a toggle switch when it is used to excite the "stovepipe" units. This reduces the Marauder's power output to a practical value.

The builder claims no particular originality for the basic design of these units. They were inspired by earlier good results obtained when the author and Gordon Douglas, W8PMK, built lower-power units which used the same general circuit for the transmitting-converter sections. The 2-meter section is an adaptation of a circuit described by Hall, *QST*, January 1966. Ideas for the 6-meter transmitting converter came from an article by D. Crowell, K6RIL, 73, November 1967.

The coaxial-tank design was decided upon in the interests of good p.a. efficiency and reduced harmonic and spurious output to the antenna—sometimes a problem where TVI is

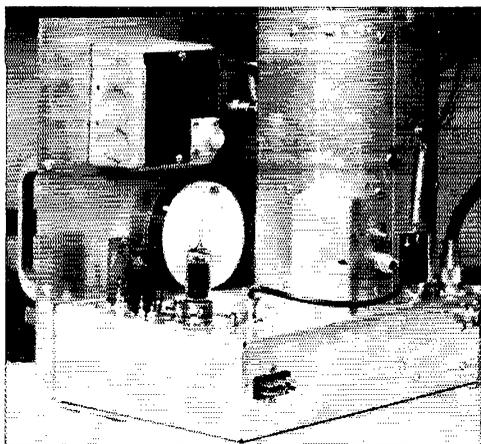
*RFD 1, Box 46, Branch, Mich.

Though some might call the two units at the left, "the ridiculous and the sublime," it would be in name only. Both work extremely well and are very stable. The 2-meter section is at the left with its 6-inch diameter, 17-inch-high tank assembly projecting up from the main chassis. The top cap is perforated to allow forced air to flow out through it. The inner element of the coaxial tank is made from a section of 1½-inch diameter copper tubing. The outer conductor is a section of aluminum irrigation pipe which has a wall thickness of approximately ⅜ inch.

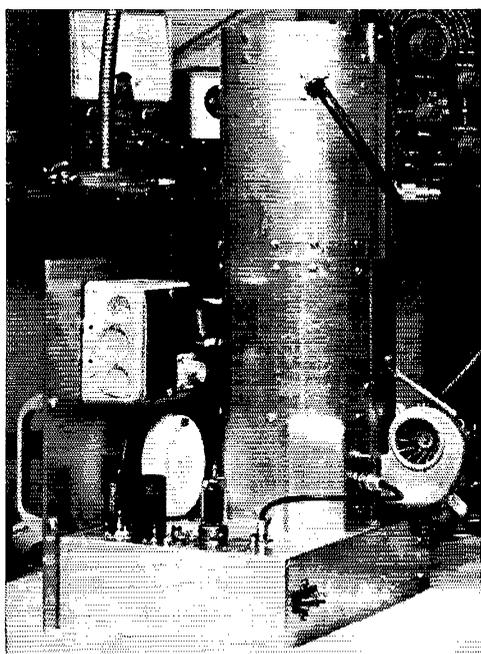
To the right of the 2-meter assembly, with its ponderous 49-inch high coaxial tank towering above the chassis, is the 6-meter unit. It is similar to the 2-meter model except for the design of the transmitting-converter section. Construction details for the 4CX250 tank assembly were given by W4GJO in another magazine (see text). Both units have plate-current meters at the upper right of their panels. Screen-grid current is monitored by the meters at the center of the panels. At the lower center of each panel is a small meter for reading r.f. output voltage (rectified) for tune-up purposes. Plate tuning for the coaxial tanks is done with home-made disks which are controlled by adjustment of a threaded shaft, accessible at the upper left of each panel. Directly below the plate tuning knobs (large) are the controls for grid tuning.

concerned. The results obtained since putting the "stovepipes" in service has been excellent, thanks to the earlier efforts by W4GJO, who described a 6-meter coaxial-tank amplifier in May 1964 *CQ*. His design was used as a guide when building the 6-meter tank, and the scaled-down 2-meter version. Both amplifiers run at approximately 500 watts p.c.p. input when fully excited. High voltage from the Warrior is 1600. Peak plate current for normal operation of the 4CX250 amplifier stages is approximately 300 ma.

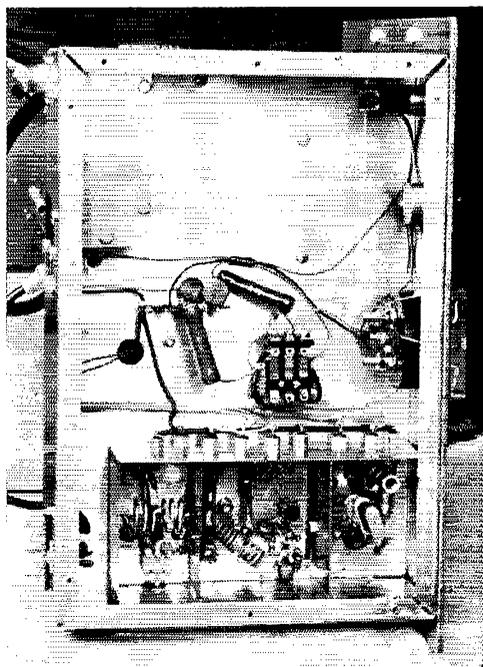
QST



A closeup view of the 2-meter tank shows the hole where the blower motor attaches. The same motor is used for both the 6- and 2-meter units, and is switched back and forth as needed. The spring is used as a retainer. An r.f. input jack and the shaft for the input link tuning capacitor are just to the left of the blower hole. R.f. output is taken from the connector at the far right of the chassis.



Looking at the back of the 2-meter unit, the plate-current meter is enclosed in an electrical-outlet box to prevent accidental contact with the high voltage. The 1600-volt bus is fed in and out by means of RG-8/U, shield grounded, for safety reasons. Directly below the plate-meter housing is a plastic cap from a household product. It prevents the operator from coming in contact with the screen-voltage meter terminals. The small rectangular can on the side of the coaxial tank (lower) is part of an old i.f. can. It is used to cover the filament and bias terminals where they enter the tank assembly.



Looking into the underside of the 2-meter assembly the transmitting-converter section occupies one side of the chassis (bottom of photo). Shield partitions divide the stages of the converter, and feedthrough capacitors filter all incoming power leads. Disk ceramic bypass capacitors are used on each terminal of the power socket (lower left) for TVI reduction. A bottom plate is used to contain the r.f. during operation. The chassis size for both assemblies is 12 x 8 x 3 inches. The panels are 13 inches wide and 12 inches high.

Strays

Arch Doty, K8CFU, was working some VKs one evening when there came a knocking at his door. A traveler, who had lost his way, turned out to be Neil Pollard, VK5WX, attracted by the 6-element quad in the yard! Since the VKs were coming in strong, Neil talked to several of his countrymen before returning to his motel.

W6OWD expresses gratitude to all hams who did such an outstanding job in handling traffic during the maiden voyage of the Apollo Tracking Vessel *Redstone*. Stations who are still in need of a QSL may write Wesley Wiley, W6OWD, Apollo Tracking Vessel, *Redstone*, Fed. Elect. Corp., P.O. Box 436, Port Hueneme, California 93041.

The *Richmond* (Va.) *News Leader* 2-column headline, "Feeding Quads is Next Problem," struck W4ZSH as unusual newspaper emphasis on ham antenna problems until he discovered the article actually concerned the Irvine quadruplets of Wheatfield, Ind., and a meal schedule.

Perfect Teletype at Your Fingertips

Modifying the Keyboard Morse Machine for RTTY

BY PAUL HOROWITZ,* W2QYW

About a year ago W2QYW modified his keyboard code generator to make it usable for RTTY as well as Morse, and this is the story of the rather simple changes that result in this dual-function operation. In addition to generating the Teletype code pulses, it includes an end-of-line warning device to remind the sender that the machine at the other end of the circuit needs to be told when to change lines. Some useful modifications to the original circuit are described, too.

SINCE the article on the Morse typer-keyer appeared¹ nearly a hundred letters have been received, asking for parts or explanations, or suggesting possible changes or additions. The most interesting one in the last category came from Bill Johnson, W6MUR, of the Codamite Corp., suggesting a combined Morse and teletype sender; this article describes the rather simple circuit modifications necessary to make the keyer send either Morse or 5-unit (standard RTTY) code, selectable by a switch on the front panel. First, though, there are a few corrections and alterations to be made to the original Morse circuit, motivated mostly by letters from confused readers and by the twenty or thirty amateurs who have actually constructed the keyer

*31A Sacramento St., Cambridge, Mass. 02138.

¹Horowitz, "Perfect Code at Your Fingertips," *QST*, August 1965.

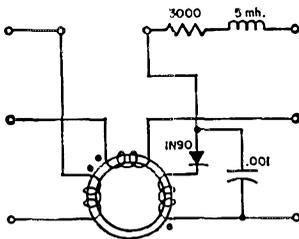


Fig. 1—Internal wiring of the A67C module. Dots indicate similar winding direction. Terminal arrangement corresponds to that shown in Fig. 7, August 1965 *QST*, page 18.

(among these the following are reported to use their keyers regularly on the air, incidentally: W3UCU, W3LOS, W4DGC, W5FRE, W5FRZ, W8RMH, W9TO, W0DCP, DJ3VY).

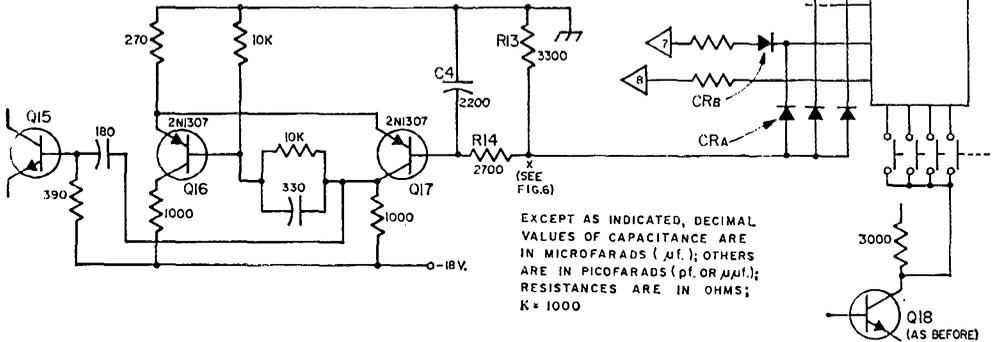
Corrections to the Original Keyer

In Fig. 4 on page 16 of the 1965 article the cores should have been labelled 1-10 going from left to right; in addition, the general method of figuring out the wiring of the rest of the matrix apparently escaped quite a few readers: Starting from the left side of Fig. 4, and from the beginning of the Morse character, insert a diode for each dot, and a space followed by a diode for each dash, in the order in which they appear in the Morse character. Try it out for the characters in Fig. 4 to see if you've got it. In Fig. 7, use a 1N90 (or other germanium diode), which has much lower capacitance than the original silicon unit, for CR_8 and CR_{10} through CR_{16} , inclusive, as well as for homemade shift register modules. The circuit of the A67C, incidentally, for those who wish to wind their own, is shown in Fig. 1 here. Also, in Fig. 7 of the original article the rather expensive 2N1132s can be replaced by a 2N3703, a recent TI epoxy-case p-n-p silicon which presently goes for 39 cents.

The main correction is a modification, shown in Fig. 2, in the keyboard disconnect circuit. Instead of driving all the cores to be magnetized with a constant total current and using this current pulse to start a monostable delay, as in the original circuit, this circuit drives each core individually through an 1800-ohm resistor from a voltage source; and AND from the matrix outputs to cores 1 and 2 (one of which must *always* be magnetized for any Morse character) senses the voltage change, which is integrated in $R_{11}C_1$ to switch Schmidt trigger $Q_{10}Q_{17}$ at a predetermined level which corresponds to 10 microseconds of integrated read-in current. The advantages over the original circuit are that the shift-register cores need not be matched to give reliable operation, the magnetizing current per core is independent of the Morse character, and the delay cannot be triggered by spurious pulses, since it integrates the input for 10 μ sec. before firing—all of which combines to give completely trouble-free operation.

The last change is necessary only if a remote keyboard with a long interconnecting cable is used; in that case the capacitance between

Fig. 2—Modified keyboard lockout circuit. CR_A and CR_B are necessary for RTTY operation; if only Morse operation is desired, CR_A may be omitted and CR_B replaced by a direct connection.



keys may cause extra cores to magnetize. The cure is to connect a 2200-pf. capacitor from each of the ten matrix outputs to ground, and then include a diode in series with the 1800-ohm resistor in all ten leads as is already done in the first two. This forms a voltage divider which reduces capacitive coupling effectively to zero, but leaves the normal d.c. magnetizing signal unaffected.

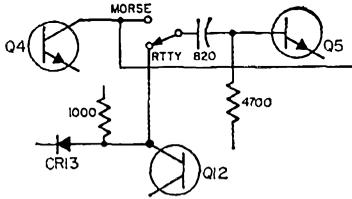


Fig. 3—Core 11 driver change. Connections not shown explicitly remain as shown in Fig. 7, August 1965 QST.

Converting the Keyer to RTTY Operation

Those unfamiliar with Teletype should probably stop at this point and read an introduction to the subject—for example, the excellent review by K8DKC in *QST* for February, 1965. Briefly, each character is represented by a serial code of 5 bits, each either “mark” or “space”, preceded by a start (space) and followed by a stop (mark). Because the teleprinter is started anew by each character, no long-term synchronization is necessary; the printer comes to a full stop between each character and remains dormant until the next character is initiated. In the system used by amateurs the start pulse and the five code pulses are each 22 milliseconds long, and the stop pulse is a minimum of 31 msec., though it may be longer. In the system here it has been made twice as long as the other pulses, or 44 msec., for convenience. The only effect is to

reduce the maximum possible sending speed from 61 w.p.m. to 57 w.p.m., with some compensating improvement in the presence of noise, as described in the article mentioned above.

In RTTY operation of the keyer, the code is inserted into cores 2-6, magnetizing for each mark, with core 7 always magnetized. Cores 1-10 are shifted, and then, using the trailing edge of the shift pulse, core 11 is cleared 2 μ sec. later. Shifting of cores 1-10 results in a space, if any of them were magnetized, but clearing core 11 immediately changes the output to a mark, if core 11 contained a “1”. Two microseconds is far too short for the relay to follow, so the net effect is to produce a mark for each “1” in the register and a space for each “0”. Since core 1 is not read into, each character begins with a start pulse. Because core 7 is always read into, a stop pulse is begun following the character code, and, by virtue of the gating action of Q_{10} upon Q_{12} 's reset pulse to flip-flop Q_{13}, Q_{14} , is caused to last exactly one more pulse length, for a total of

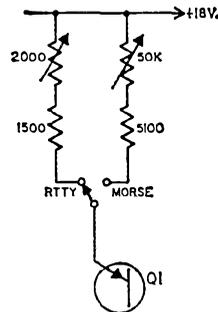


Fig. 4—Time-base change. The 2000-ohm variable resistor is adjusted for a 22-millisecond period, as described in the text.

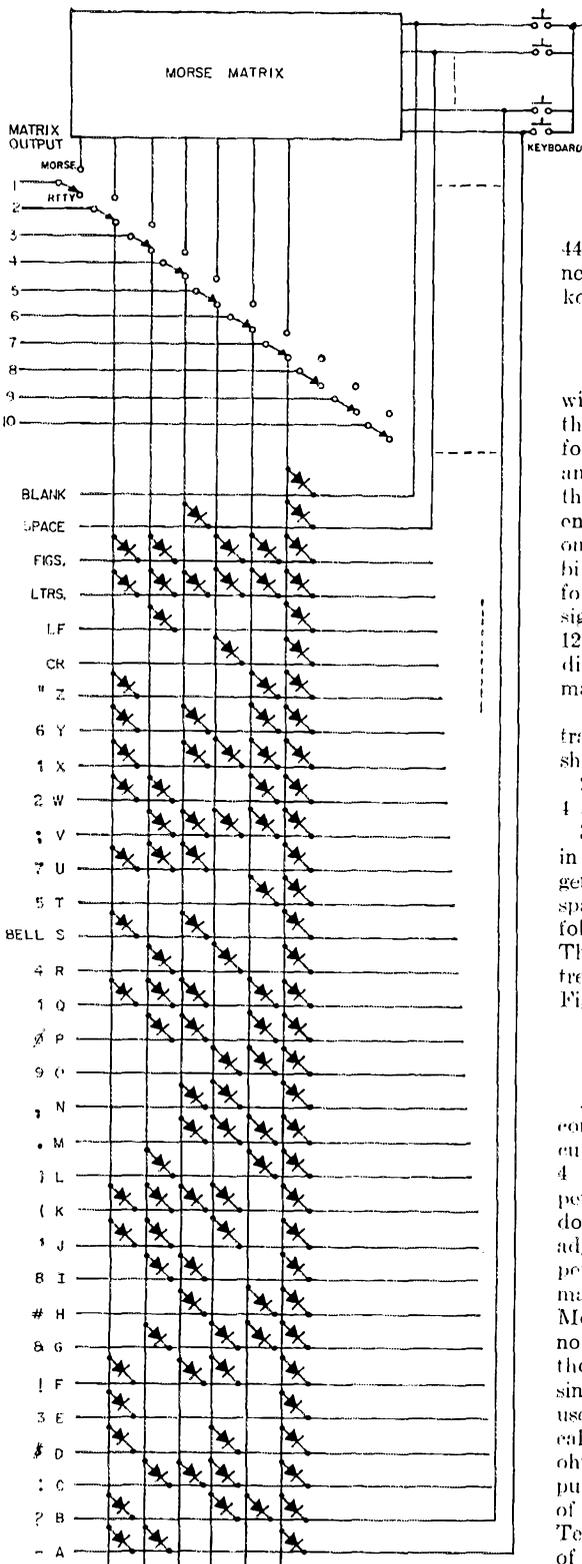


Fig. 5—Complete RTTY matrix. The inputs from the keyboard are paralleled with the corresponding Morse matrix inputs and the outputs are switched between the two matrices with ten poles of a 12-pole two position switch (the other two poles are connected as shown in Figs. 3 and 4).

44 msec. At this time the keyboard is reconnected, but the mark output persists until a key is actuated, beginning a new cycle.

Circuit Changes

There are four circuit changes associated with conversion to RTTY: 1) Re-timing of the core 11 shift pulse; 2) a fixed higher speed for the time base; 3) a new encoding matrix, and 4) a character counter to indicate when the other fellow's teleprinter is nearing the end of its carriage. This last feature may be omitted if desired, though we take no responsibility for the tempers that may be inflamed by forgetting to send a carriage return/line feed signal. The first three changes are made with a 12-pole 2-position rotary switch so that immediate switching between Morse and RTTY may be made.

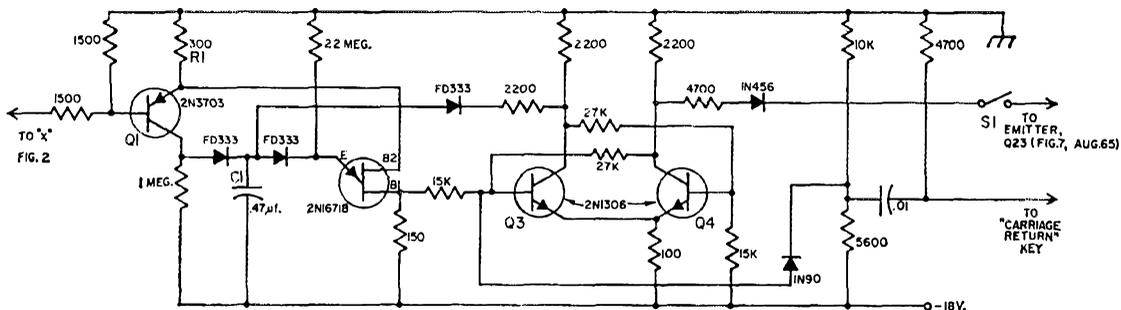
1) Core 11 driver Q_2 is driven from the trailing edge of Q_2 's collector pulse. Fig. 3 shows the change.

2) The time base must be speeded up; Fig. 4 shows the change.

3) The encoding matrix for RTTY is shown in full in Fig. 5. For each character a diode generates a mark, and no diode generates a space. In addition, a diode is always inserted following the five encoding diodes, as shown. The outputs from the ten switch poles are treated exactly like the ten matrix outputs in Fig. 2.

Adjustment of RTTY Speed, and Character Counter

At this point the change to RTTY is almost complete, with only the character-counter circuitry remaining. The 2000-ohm pot in Fig. 4 must be adjusted to a 22-msec. oscillator period; probably the easiest way is to hold down V, M, O, T, or the letter shift and adjust the pot until the output has a 176-msec. period, with the weight control set at approximately unit mark/space, as observed with a Morse "5". Note that the weight control has no effect on the RTTY mark/space ratio, though it has a slight effect on the speed, since only one oscillator pulse per cycle is used. The 60-cycle line power can be used to calibrate the scope sweep, adjusting the 2000-ohm pot so that one cycle of the teletype output from the relay corresponds to 10.6 cycles of the 60-cycle sine. The keyer will now send Teletype, using the normally-closed contact of the relay; as with Morse operation, holding



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

Fig. 6—Analog counter circuit for end-of-line warning indicator. R_1 should be adjusted to give a count of 62. S_1 cuts off the counter when no count is desired. C_1 is a mylar capacitor; see text. Resistors are $\frac{1}{2}$ -watt composition. The FD333 is a low-leakage diode made by Fairchild.

down a key causes the character to repeat, with proper spacing.

4) The character counter is shown in Fig. 6. Each time a character is read into the shift register, a 10- μsec . 5-volt pulse is applied to Q_1 's base; Q_1 acts as a current source and dumps a standard amount of charge into C_1 (the 1-meg. resistor and the diode keep the leakage current from charging C_1). When the voltage on C_1 reaches the firing point of Q_2 , a pulse is generated which flips Q_2 , raising the pitch of the monitor several octaves as an end-of-line indicator; C_1 is then clamped down until the carriage-return key is pressed, resetting the flip-flop. Note that Q_1 serves the dual purpose of an emitter follower, reducing the base-2 voltage and hence the firing point of Q_2 for 10 μsec . for each character; this keeps the average emitter current of Q_2 very low, while still sampling the level of C_1 each pulse.

Emitter leakage current flows through the 22-meg. resistor, the back-biased FD333 decoupling this from C_1 . The use of ultra-low-leakage diodes in combination with resistors to solve the leakage problems of Q_1 and Q_2 , along with the base-2 sampling technique in Q_3 , result in extremely long storage times; the circuit was found to "keep its count" to within one count in 62 even when the characters were read in over a period of 20 minutes.

In operation the keyer is perhaps a bit easier to use with RTTY than with Morse, since every character has exactly the same length and one soon gets into the rhythm of things. It should be pointed out, however, that, unlike a regular RTTY machine, this keyer doesn't have mechanical feedback to the keys, nor does it provide the usual symphony of chugging machinery.

QST

Strays

The San Bernardino Microwave Society, Inc. has moved to a new meeting place, the second floor of the Security Pacific National Bank, 204 East Sixth St., Corena, California. Entrance is to be made at the south side of the building. All hams and non-hams are invited to attend the meetings which start at 7:30 and are informal and technical in character. Club interest is primarily in communications above 1000 MHz.

Want to get the "drop" on the other guys when starting a contest? You'll need one of the new atomic clocks developed by the Army Electronics Command. The new clock is portable and measures 7 x 7 x 16 inches and weighs, including its battery, 38 pounds. It is extremely rugged and can be carried around casually in any kind of weather. Using the natural atomic resonance of rubidium, tests show a stability of a single second in 3000 years. Battery life has been extended from 15 minutes in an older model to eight hours.

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Radiation Resistance of Inverted V Antennas

And Some Observations on Resonant Length

BY DALE W. COVINGTON,* K4GSX

This theoretical and experimental study of the feed characteristics of the inverted V antenna supplements the same author's earlier analysis (QST, May, 1965) in which the radiation patterns of the antenna were worked out. Together, the two articles give a comprehensive picture of the effect of bending a dipole at its center.

"RES ANT IS INVERTED V ABT — FT ABOVE GND . . ." Phrases such as this form an integral part of many 80- and 40-meter QSOs. The following discussion deals specifically with the radiation resistance of this popular antenna as a function of the antenna's height above ground. With such information it becomes an easy matter to select combinations of V heights and angles which approximately match the antenna resistance with the proper transmission-line characteristic impedance, or to select a transformer to go between the antenna and the feed line.

Technique

A basic problem in calculating the input impedance of the inverted V rests in the fact that the antenna is commonly used on the lower frequency bands, and hence is usually installed just fractions of a wavelength above ground possessing finite conductivity and a dielectric constant other than 1. Thus the V analysis described by King¹ for the isolated antenna is of limited value. Even if the case of perfectly-conducting ground is assumed, a strictly formal treatment of the problem remains quite difficult as the calculations must account for that part of the total current in the antenna which is induced by current flow on the ground plane.

On the other hand, a rather straightforward numerical solution can be obtained by utilizing a specialization of the method of moments.² Here the radiated power including the mutual radiation terms along with the self-impedance terms is evaluated from a spatial distribution of small current elements representing the antenna and its image. The radiation resistance follows from the computed value of the radiated power, once a current distribution is assigned to the antenna. Such was the approach taken in the present analysis.

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¹ King, *Theory of Linear Antennas*, University Press, Cambridge, Massachusetts, 1956, p. 389.

² Schelkunoff and Friis, *Antennas, Theory and Practice*, John Wiley and Sons, Inc., New York, 1952, p. 162.

Of course, the antenna impedance includes an inductive term which varies with V height, angle, and conductor length/diameter ratio. For the isolated V this component ranges between 15 and 40 ohms for included V angles between roughly 90 and 180 degrees¹. By shortening the antenna slightly the inductive reactance is reduced to zero, leaving only the more slowly-varying real component. Consequently the antenna resistance measured at resonance is slightly smaller than the real part of the input antenna impedance or actual radiation resistance.³

Fig. 1 illustrates the general model and nomenclature. The inverted V symmetrically located over perfectly conducting ground is replaced by current elements positioned in the center of $\frac{1}{2}$ -wavelength intervals along the antenna and its image. The elements are weighted by the assumed cosinusoidal current flowing on the thin wire filaments. Certainly, subdividing the antenna into more than four current elements would add both toil and accuracy to the computation. As will be shown in the next section, however, the even cruder two-element approximation, with just one current element in the center of each leg of the antenna, compares well with the radiation resistance as determined by a continuous current distribution.

Computed Results

The initial calculations considered the self- and mutual-resistance terms for the current elements of the antenna alone. This effectively represented the isolated V far removed from ground, and afforded an immediate check on the

³ *The ARRL Antenna Book*.

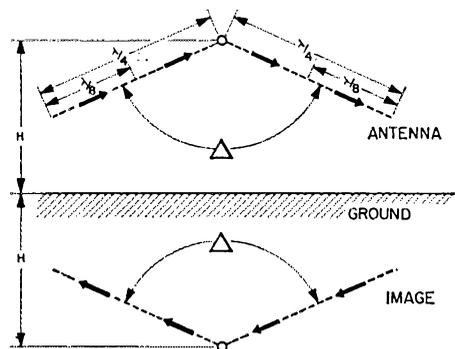


Fig. 1—Mathematical model used for the calculation of radiation resistance of the inverted V antenna and its image in perfectly conducting ground.

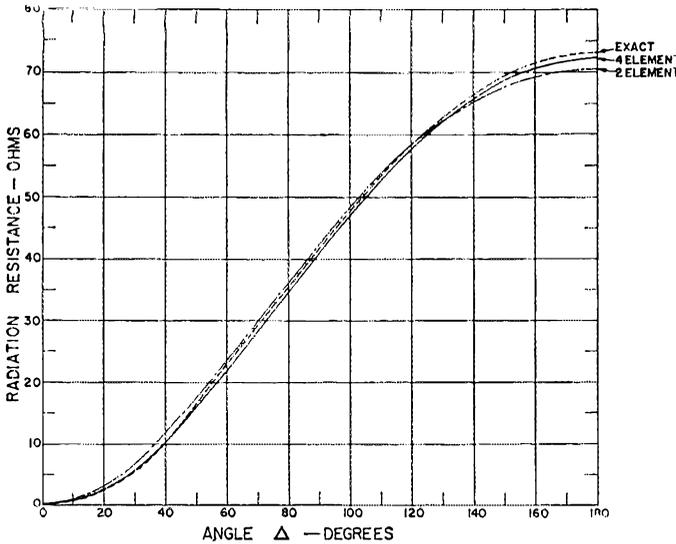
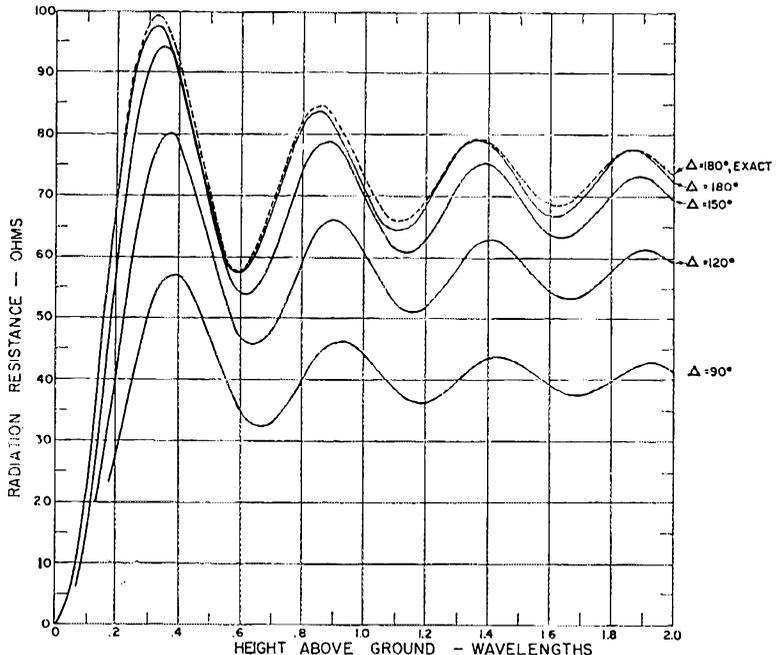


Fig. 2—Calculated free-space radiation resistance as a function of delta. Solid curve—model using four current elements as in Fig. 1; Dot-dash curve—model using two current elements; dotted curve—continuous current distribution.

accuracy of the model. A plot of the radiation resistance versus V angle is given in Fig. 2. The solid line and the broken line correspond to the four- and two-current-element models respectively. The dotted line is taken from King's results for a continuous current distribution. Agreement between the three cases is good. Note the rapid and almost uniform 0.6 ohm per degree decrease in radiation resistance as the V angle sharpens from 130 to 30 degrees. The radiation resistances at the extreme values of delta are intuitively correct; namely, 73 ohms for delta of 180 degrees and zero when the legs of the antenna are parallel.

The image antenna was introduced in the second set of calculations. Fig. 3 portrays the dependence of the radiation resistance upon the apex height above perfect ground. Again a reference benchmark was available for delta equal to 180 degrees. The dotted line in Fig. 3

Fig. 3—Radiation resistance vs. height above perfectly-conducting ground for representative values of delta. Dotted curve is the variation in radiation resistance of a horizontal half-wave dipole as usually given in texts.



indicates the influence of ground on the horizontal dipole radiation resistance.^{3,4} As delta decreases, the radiation resistance initially begins decreasing rather slowly, but for angles smaller than 120 degrees the radiation resistance quickly falls to fairly low values. In fact, for delta much smaller than 90 degrees some form of step-up transformer would be required for best matching to 52-ohm coax. Interestingly enough, 73-ohm coax suitably coupled to the balanced antenna appears to be a good feed-line choice for a wide range of delta at heights near one-half wavelength. Increasing the apex height finds the radiation resistance for a particular delta indeed oscillating about the corresponding isolated antenna values given in Fig. 2.

Like most theoretical curves based on simple models, the curves of Fig. 3 must be evaluated with a grain of salt when compared to the real antenna world. It will be useful to draw upon past experience with horizontal dipoles to define the character of the approximations involved in the results of Fig. 3. First, an element of approximation is introduced by equating the antenna resistance measured at resonance to the radiation resistance, particularly as the antenna deviates from the thin-wire type. When the perfect ground of the model is replaced by actual ground with finite conductivity, the magnitude and phase of the image-current elements must be suitably altered in accord with the

⁴ Kraus, *Antennas*. McGraw Hill, New York, 1950, p. 305

ground reflection coefficients. Real ground has the effect for horizontal dipoles of shifting the entire curve slightly to the left and reducing the amplitude of its oscillations.⁵ Finite ground conductivity also causes the radiation resistance to increase instead of dropping to zero as the dipole height falls below 0.2 wavelength.⁶ Perhaps this is the explanation for Johnson's figure of 82 ohms for a 145-degree V at a height of 0.114 wavelength.⁷ No increase was observed experimentally for the sharper V's described in this note.

Measured Data

It seemed appropriate to press beyond the computed curves of the model into some actual experimental results. Measurement of the radiation resistance of an 80-40 meter cage V⁸ using a homemade bridge⁹ yielded the values shown below.

Ant.	Angle Δ	Height	R_{RAD}
80 m.	110°	.17 λ	38 ohms
40 m.	95°	.32 λ	54 ohms

To check the resistance variation over ground, an inverted V with delta of 105 degrees was constructed for 20 meters using $\frac{1}{8}$ -inch aluminum

⁵Jordan, *Electromagnetic Waves and Radiating Systems*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1950, p. 524.

⁶Proctor, "Input Impedance of Horizontal Dipole Aerials at Low Heights Above the Ground", *Proc. I.E.E.*, 97, part II, 1950, p. 188.

⁷Johnson, "Antenna Feedpoint Investigation", *CQ*, March 1968, p. 36.

⁸Covington, "Inverted V Radiation Patterns", *QST*, May 1965, p. 81.

⁹Strandlund, "Amateur Measurement of R + jX", *QST*, June 1965, p. 25.

tubing. This gave an L/D ratio that was similar to the cage antenna. A G3HJP balun¹⁰ was inserted between the RG-58 feed line and the antenna terminals. Fig. 4 contains both the experimental 20-meter data and the curves for a 105-degree V computed from the 2- and 4-current-element models. Certainly at the higher elevations these curves should bracket the radiation resistance as determined by a continuous current on the antenna. The points denoted by triangles were measured on the homemade bridge and the circled points were obtained using a u.h.f. GR Type 1602 bridge. While the experimental points do not fall on the computed curves, they do cluster in a range of values consistent with the previous observations on antennas in theory and in practice.

Length of the Inverted V

The pruning necessary to tune out the reactance of the half-wave antenna can be estimated by introducing a variable K into the half-wavelength formula.

$$\text{Length (feet)} = \frac{492 \times K}{f (\text{Mc.})}$$

Into K has been lumped information on the influence of the conductor diameter, loading by end insulators, height above ground of arbitrary conductivity, feed-line effects, etc. Normally, a representative value of 0.95 is assigned to K , which immediately leads to the familiar formula

¹⁰James, "The G3HJP Balun", *RSGB Bulletin*, July 1966, p. 459.

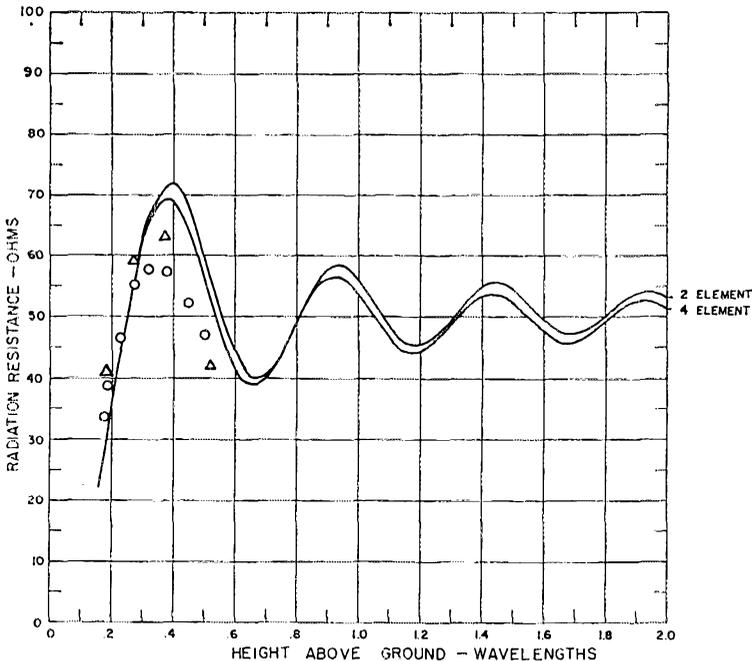


Fig. 4—The triangles and circles represent measured values of radiation resistance of an experimental inverted V having an included angle, delta, of 105 degrees. Curves based on two mathematical models are shown for comparison.

for the length of the horizontal resonant half wavelength antenna.

$$\text{Length (feet)} = \frac{468}{f \text{ (Mc.)}}$$

The very geometry of the inverted V indicates that some limitations must be accepted in assuming a single, universal number for K . Moreover this is confirmed by the maze of conflicting values for resonant lengths of inverted Vs reported in the literature. Some of these reports can be untangled by focusing attention on K in relation to the antenna height.

A 10-meter balun-fed inverted V was built with delta of 105 degrees and an L/D ratio of 230. The resonant frequency was determined from the minimum of the s.w.r. plots taken as the antenna was raised to various heights above ground. This data was then used to compute K as given by the first formula. The results are shown in Fig. 5. Perhaps the most surprising aspect of Fig. 5 was the discovery that, given the antenna height, the value of K read from the curve predicted (using the first formula) the resonant lengths of both the 80- and 40-meter cage Vs to within 1.6 feet. Several tentative conclusions are suggested by the figure. The initial rise followed by an oscillatory behavior is similar to that noted for horizontal dipoles.⁶ Larger angles of delta should witness a steeper decline in K at the lower heights. As the distance above ground increases, K assumes a value that is slightly larger than the corresponding value for a dipole. This lends weight to the argument that the dipole has the larger reactive component. Using a d.c. three-ground-rod technique, the local ground conductivity was found to be 2.7 millimhos/meter under the antenna. Since the conductivity over much of the U.S. is several times greater than this¹¹ it would be reasonable to expect, in general, values of K which move into the 0.95 region more quickly than Fig. 5 indicates. A larger L/D ratio should increase K slightly.

Summary

Basically, this study has examined two questions:

1) What is the most efficient way of feeding an inverted V given an arbitrary V height and angle? Fig. 3 supplies an approximate answer in the case of a thin-filament V and perfect ground. Practically speaking, the framework of the idealized curves was confirmed experimentally. A more exact confirmation would require a better mathematical model of the physical antenna and ground. Nevertheless Fig. 3 does suggest some guidelines for feeding inverted Vs. The simplest approach, particularly for multiband operation, is to use tuned feeders and not really worry about the antenna impedance. But tuned feeders do not offer the convenience and portability of coaxial or Twin-Lead feed. In this case the best match will depend on height and V angle. With 73-ohm coax or 75-ohm Twin Lead an s.w.r. of 1.7

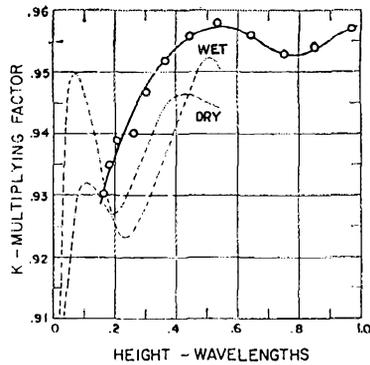


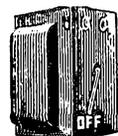
Fig. 5—Experimentally determined values of K at various heights above ground. The circled points were measured for a 10-meter, 105-degree inverted V with L/D of 230 and ground conductivity of 2.7 millimhos/meter. The dotted lines were taken from Proctor's 6-meter, horizontal-dipole results (L/D of 390) over wet and dry ground.⁶

or better at resonance is predicted for any height above 0.25 wavelength and delta greater than 120 degrees. Roughly the same could be said for a 300-ohm folded-dipole inverted V. Feeding with 52 ohm-coax requires judicious selection of height and delta if the lowest s.w.r. is to be maintained. The standard deviation of the s.w.r. about 52 ohms for heights from 0.2 to 1 wavelength is minimum for delta near 110 degrees. This would represent a good compromise for a multiband trap inverted V. The purist approach to the feed problem would be to select the antenna height that optimizes the radiated power for a given set of angles of elevation, then to match the antenna impedance at that height to the coax using a balun transformer.

2) Given a frequency, how long is a corresponding inverted V antenna? With much sagacity comes the three-word reply, "cut and try." While an inverted V installed high and in the clear can be longer than a horizontal dipole, especially if delta is less than 90 degrees, the cramped conditions prevailing for the usual 80/40-meter antenna will cause lengths computed by the $468/f$ formula to be too long. The author has found Fig. 5 to be a useful supplemental guide in zeroing in on the resonant frequency for Vs near 100 degrees.

Correspondence with G3HZP has been especially valuable and much of the prerequisite enthusiasm and elbow grease in all phases of the experimental measurements came from W4LKB. Special thanks go to both amateurs for their help in the presentation of the above ideas on inverted Vs. QST

**SWITCH
TO SAFETY!**



¹¹FCC Rules and Regulations, Section 73, p. 107.

IVI

Transceive With Instantaneous Voice Interruption

BY H. ROMMEL HILDRETH,* M.D., WØIP

In his original article, the author mentioned that there were still a few bugs to be eliminated for satisfactory transceive operation. These problems have now been solved. The small changes involved also result in tune-up and mode-switching procedures essentially the same as normally followed with unmodified equipment. The author also discusses operation without an electronic t.r. switch.

PUBLICATION of the author's original article on an instantaneous voice-interruption (break-in) system¹ aroused considerable interest, made evident by the volume of mail that has been received since the appearance of the article. One of the things that this correspondence revealed is that familiarity with the electronic t.r. switch is not as widespread among voice operators as it is among c.w. operators. This is probably natural, since rapid antenna switching

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¹ Hildreth, "An Experimental All-Electronic VOX System for S.S.B.," *QST*, March, 1968.

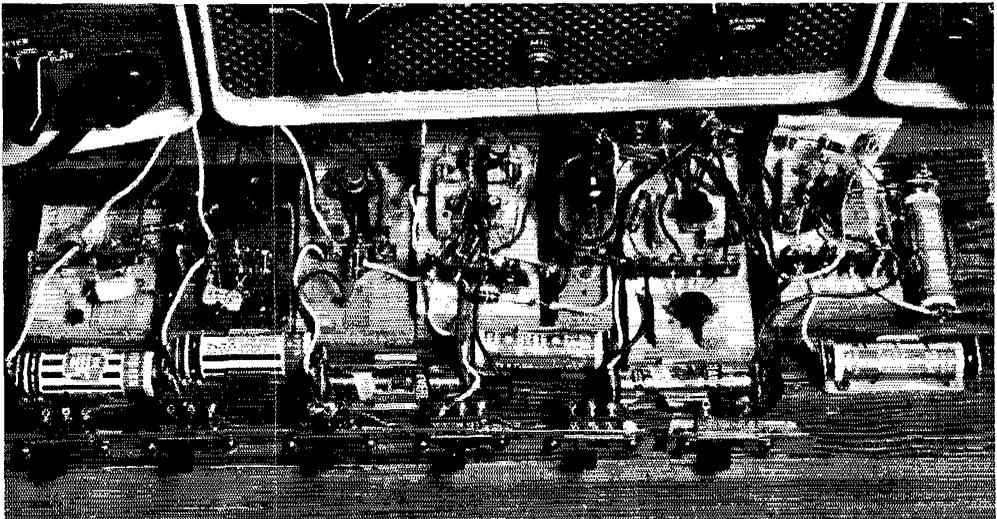
alone does not speed up the other switching operations usually required in conventional voice change-over systems.

Electronic t.r. switches are available on the market, or one can be made quite simply.² However, let the author hasten to say that such a device is not at all necessary to try the system out, nor is it necessary for a considerable amount of practical operation on the air. For some time before the acquisition of a t.r. switch, the author used a 12-foot length of wire running along the baseboard of the operating room as a separate receiving antenna. This antenna gave entirely satisfactory results in working from one end of the country to the other. The noise from such an antenna is usually quite low, so the receiver gain control can be run up to compensate largely for any reduction in antenna pickup. If the system proves to be attractive, which the author feels sure it will, a t.r. switch can be added later.

Control Simplification

Further work with the system, as applied to the Collins 32S-3 exciter and 75S-3 receiver, has solved the problems that were mentioned in the previous article in reference to transceive

² McCoy, "Antenna Switching for Beginners," *QST*, October, 1967.



The author's experimental setup. The two boards at the left contain the Q_1 and Q_5 controls for the first mixer. In succession to the right are the control units for V_6 (Q_{10}), and the 6146 screens (Q_3), the 12AT7, and the control unit for the linear amplifier (Q_7 , Q_8 , Q_9). The slide switch at the extreme left (first-mixer control) is turned off for c.w. spotting, and the one at the extreme right (linear amplifier control) is turned off during c.w. operation. At all other times, all switches are left closed during normal operation. The units partially visible in the background are the 32S-3 at left, 312B control at center, and 75S-3 receiver at right.

operation. Also, the control system is now arranged so that it requires no adjustment or plug shifting, either for tuning or for changing modes, so the control circuitry can be left permanently installed. By applying the Q_4 and Q_5 controls to the first mixer, V_4 , instead of to the second mixer, as was done originally, the system works for both c.w. and s.s.b. without change. Furthermore, the audio control, Q_6 , described in the original article is no longer needed. Thus, all one needs to do to operate is to turn on the battery circuits of the control unit, and proceed to tune up and operate in the usual manner, regardless of the mode selected.

With the original arrangement, there were annoying clicks from the speaker when operating on s.s.b. with a t.r. switch. (This did not occur with c.w. operation, nor on s.s.b. if a separate receiving antenna was used.) The clicks were eliminated by applying a switch control, Q_{10} , to the screen of the 32S-3 r.f. amplifier, V_6 , as shown in Fig. 1.

An attempt to introduce this switch through a tube-socket adapter, as described in the earlier article,¹ was not successful at frequencies above 7 Mc. However, it is necessary only to unsolder the 100K screen resistor, R_{38} , from Pin 6 of the 6AH6 amplifier-tube socket to avoid this difficulty. To get at this connection it is necessary to disconnect L_7 (a small coil the size of a 2-watt resistor) temporarily from the near-by terminal strip, and bend it upward. The switch leads are then connected between the resistor and Pin 6, after which L_7 is replaced. The original connections are easily restored, of course, should this become desirable.

C.W. Operation

As already stated, the changes described above render the unit suitable for either c.w. or s.s.b. operation. The panel controls of the Collins units are used in conventional manner in either case, but for one exception. The CAL button normally introduces a carrier for zeroing in on another station. With the control circuit in operation, the circuit controlled by the CAL button is inoperative. However, the same effect is obtained by turning off the battery of the Q_5 switch. If one forgets to switch the battery on again before transmitting, the carrier will be heard as a back wave in the receiver, but the transmitted signal is unaffected. The microphone gain control should be set so that the meter deflection, in the

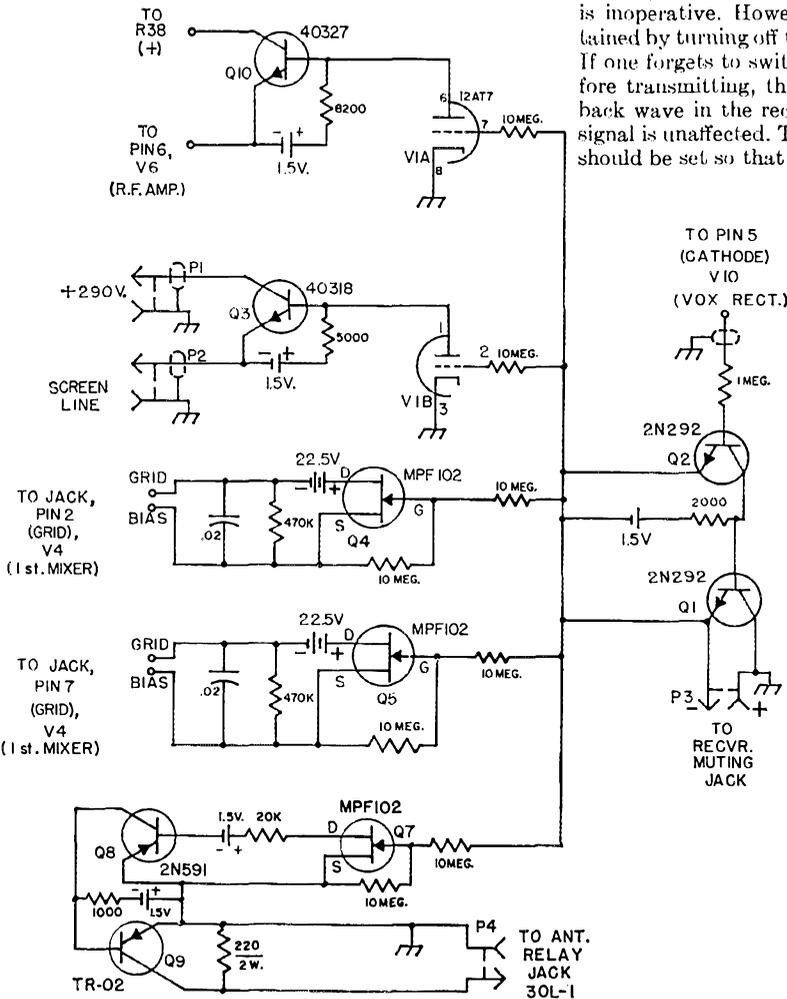


Fig. 1—Complete revised circuit of KØHZF's all-electronic I.V.I. system for Collins 75S-3 receiver, 32S-3 exciter, and 30L-1 linear amplifier. Unless indicated otherwise, capacitances are in $\mu\text{f.}$, and resistances are in ohms ($K = 1000$). Capacitors may be any type, 150 volts or more. Resistors are $\frac{1}{2}$ -watt. P_1, P_2, P_3 and P_4 are phono plugs. Q_1 and Q_2 are G.E.; Q_3, Q_8 and Q_{10} are R.C.A.; Q_4, Q_5 and Q_7 are Motorola; Q_9 is International.

Connections to V_4 , and to the 6146 screen circuit are made as described in the original article. Connections to V_6 are described in this article. The Q_{10} circuit is required only for s.s.b. operation with a t.r. switch (see text). The $Q_7/Q_8/Q_9$ circuit is needed only if the 30L-1 linear is used on s.s.b. (The original Q_6 circuit has been eliminated.)

P.A. GRID position, is one third to one half of full scale.

C.w. transceive operation was not feasible earlier because of the strong beat that was present until the crystal-oscillator cable was moved to the "silent" jack, and the exciter oscillator used. With V_4 cut off, there is no signal to mix in V_5 with the receiver crystal-oscillator output, hence the undesirable beat is eliminated, and the receiver oscillator may be used at all times.

In transceive c.w. operation, it should be remembered that the carrier is placed 20 db. down on the skirt of the filter, so if two Collins-equipped stations are working each other, it is necessary that they work on slightly different frequencies. This might be important to remember if the two operators decide to switch from s.s.b. to c.w. when conditions deteriorate. To operate on the same frequency, it is necessary to turn off the Q_5 battery, so that the exciter signal can be heard, and then to turn on the exciter v.f.o. and tune until the carrier beat matches that of the received signal. This places both carriers precisely on the same frequency. Then, Q_5 is turned back on to operate. For c.w. operation, with the 30L-1 amplifier, it is not necessary to turn on the amplifier control described in the earlier article since, for this mode, the amplifier will work at least as well, if not better, if the bias is left at cutoff.

Construction

No constructional details were given in the original article, since there is nothing particularly critical about the layout. In the experimental setup, the author assembled each of the switch circuits shown in Fig. 1 on a separate small circuit board, as shown in the photograph. A terminal strip was mounted on each of these for making the necessary external connections. The boards were then mounted on a baseboard large enough to hold all of them, as well as the batteries which are mounted in clips. The battery switches were mounted on a strip running across the front of the baseboard.

It was found that only the lead to the cathode of V_{10} required shielding. However, to avoid hand-capacitance effects, leads between the control unit and the transmitter should be no longer than necessary, and should be kept away from the front panel of the transmitter by dressing them along the end of the cabinet and passing them into the interior through ventilation holes in the cabinet.

In the permanent installation, the author did not use the probes mentioned in the first article in making connections to the adapter jacks. Instead, a control lead was soldered to each side of the jack, and the jack held open by inserting a thin piece of plastic material between the lips.

Tuning and Operating

Before turning on either the Collins equipment or the control-unit switches, the VOX gain control and the time-constant control should both be set to about "11 o'clock," and the anti-

VOX control set fully clockwise. A shorted plug should be inserted in the p.t.t. jack. If the 312B-1 station control is used, remember to have the FUNCTION switch at NORMAL. Then turn on all control-unit switches, and the power switches of the receiver and exciter. As soon as the tubes warm up, the VOX relay should be heard as it closes. From then on, the exciter may be tuned up in the usual fashion. The only time that the control unit has to be touched is when Q_5 is turned off momentarily to permit c.w. "zeroing," as described earlier. The a.g.c. switch is at OFF.

In tuning up with the 30L-1 linear (meter switch in the TUNE position), it might be well to remove the control-unit plug at the ANT. RELAY jack and substitute a shorted plug, at least until the operator becomes familiar with the operation of the system. After tuning, the control plug can be replaced.

Batteries

The battery voltages in the control unit should be checked occasionally. Failure of a battery will cause no damage to equipment; it will simply mean that the stage controlled by the switching having the defective battery will not be turned on fully. In over a year of operation with the system, only the 1.5-volt battery supplying Q_1 and Q_2 has required replacement. When the voltage of this battery dropped to 1.3 volts, neighboring operators reported that the voice was "chopped," indicating that the switch was not operating reliably.³ A falling off of the battery voltage in the 30L-1 control would eventually cause the linear-amplifier bias to increase. This would increase distortion, but it is probable that the reduced battery voltage would be indicated earlier by a decrease in power output. Failure of the battery in the Q_{10} switch would have a similar effect.

Occasionally, the author has reverted to conventional operation and has rediscovered how decidedly unnatural it is to communicate in this fashion. With the improvements in the system described here, and the realization that an electronic t.r. switch is not necessary to try the system out, it is hoped that more operators will make use of it. Its greatest value is probably in net operation and ragchewing, for it puts an end to "doubling" and does away with a good bit of unnecessary interference. **QST**

³Since writing the article, the author has replaced the 1 megohm resistor in series with the base of Q_2 with a 2-megohm variable. This permits adjustment to compensate for a decrease in battery voltage. He also suggests replacing the 2N292 at Q_2 with a type 6E-7.

Strays

VE/W CONTEST REMINDER

Starts: 2300 GMT Saturday, September 28, 1968.
Ends: 0200 GMT Monday, September 30, 1968.
Additional rules appear on p. 63, Sept. QST.

Technical Correspondence

ANTENNA TYPE VS. DISTANCE

Technical Editor, *QST*:

The table below, which condenses results of experiments conducted over a period of about six months with three types of simple 7-MHz. antennas, may be of interest. Four basic items become apparent when the table is reviewed. These are:

1) Vertical antennas are very ineffective for short-skip operation.

2) Little real-life difference exists between coverage obtained with a low quarter-wave horizontal antenna and that obtained with a low half wave horizontal antenna.

3) Simple polarization diversity assists long-haul communications in cases of bad QSB.

4) The best simple all-around antenna for 7-MHz., giving coverage for both long-haul and short-haul communications, appears to be a half-wave inverted L antenna.

All $\frac{1}{2}$ -watt contacts were made with only the $\frac{1}{2}$ -watt transmitter on line. None were made first

with higher power. On this basis, contacts could not be made over more than 150 nautical miles with E-layer skip, nor less than 150 nautical miles with F₂-layer skip.

Apparently these two limitations reflect the angular points where high E- and F₂-layer attenuation occur, except at certain short time periods which I never happened to operate in. — *Dave Hardacker, W6IT, 1547 Wellesley Ave., Los Angeles, California 90025.*

NOISE STORY — HAPPY ENDING

Technical Editor, *QST*:

For several years, I had been plagued by a strong noise source located to the southwest of my QTH. This noise was on 24 hours a day, 7 days a week, and was very severe on 7, 14, and 21 Mc. I live in an industrial area; right across the street from me is a steel castings company, and to the N.E. is the main manufacturing plant of Scott Paper Company (1000 feet away). In front of my house is a 22,000-volt hi-line. A railroad spur line runs 30 feet in front of my house. Starting from my house and running S.W. along the Delaware River are chemical plants, cement manufacturing, textile plants, sheet-metal fabrication, welding shops, an oil refinery and numerous other huge industrial concerns.

When this noise started, about three years ago, I was unconcerned about ever locating it among the

(Continued on page 154)

A cross-reference guide to various simple 7-MHz. antennas with consideration given to distance between stations, polarization of signals, angle of radiation and polarization diversity. Maximum antenna height $\frac{1}{4}$ wave.

Type antenna	Polarization	Vertical Angle of radiation	Ground wave propagation	E (probable) layer short skip propagation (to 150 n.m.)		F ₂ (probable) layer short skip propagation (150 to 500 n.m.)		Long skip (500 to 2500 n.m.) and multiple skip (to 7000 n.m.)	
				No QSB	Bad QSB	No QSB	Bad QSB	No QSB	Bad QSB
$\frac{1}{4}$ wave vertical, ground rods and no counterpoise	vertical	low	excellent	poor	poor	fair	poor	satisfactory to excellent (better at longer ranges)	satisfactory
$\frac{1}{2}$ wave horizontal dipole, $\frac{1}{4}$ wave above earth.*	horizontal	high	poor**	excellent	excellent	excellent	excellent	fair to good (better at shorter ranges)	poor
$\frac{1}{2}$ wave inverted "L", $\frac{1}{4}$ wave ver. $\frac{1}{2}$ wave hor.	horizontal and vertical	high and low	excellent	good	good	good	excellent	good to excellent (better at longer ranges)	excellent

Ratings: 1. Excellent
2. Good
3. Satisfactory
4. Fair
5. Poor

Comments: Ground wave and short skip ratings were made with $\frac{1}{2}$ watt d.c. input to a c.w. transmitter. Long skip and multiple skip ratings were made with 100 watts d.c. input to a c.w. transmitter.

The same antenna was used in receiving and transmitting. The signal-to-noise ratio was higher in receiving when the $\frac{1}{2}$ -wave horizontal antenna was used. There were fewer "lost" contacts with the inverted L antenna than with the vertical or horizontal antennas in conditions of severe fading.

References: "Performance of Diversity Receiving Systems", *Proceedings of the IRE*, March 1951.

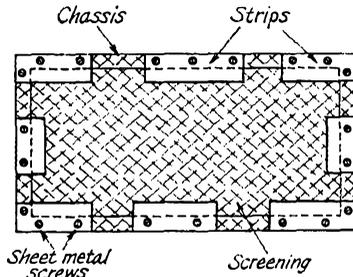
"Polarization Diversity Reception of High Frequency Signals", *Granger Associates Technical Bulletin* No. 4, 1964. (Copyright)

"300 KHz — 30 MHz MF/HF", *IEEE Transactions on Communication Technology*, December 1966.

* No appreciable directional effects were noted. This is because of the low antenna height.

** No "end-on" vertically polarized ground or sky wave propagation was noted. This effect generally occurs when the horizontal antenna is less than $\frac{1}{16}$ wave above ground.

Fig. 2—A chassis bottom plate made from aluminum screening and small strips of aluminum.



ADAPTING THE SB-101 FOR USE WITH THE SB-640 WITHOUT LOSING CRYSTAL-CONTROLLED OPERATION OF THE TRANSCEIVER WHEN THE SB-101 IS USED INDEPENDENTLY

SHORTLY after I had bought a crystal for operation of my SB-101 in a mobile net, the Heath SB-640 external linear master oscillator (LMO) arrived that I had ordered for home station use with the transceiver. To my dismay I found that installation of the LMO entailed disabling the transceiver's 6EAS auxiliary crystal oscillator, V_{5B} , by removing R_{220} , L_{202} and C_{222} . In addition a 56-ohm resistor was supposed to be installed in the transceiver.

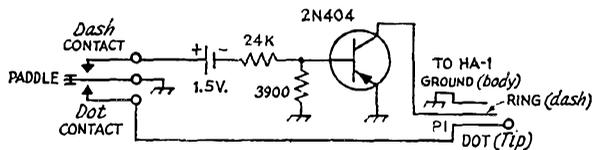
Considerable head-scratching and some experimentation resulted in the following entirely satisfactory solution. Do *not* interfere with R_{220} , L_{202} or C_{222} in any way. Instead, disable the triode section of a spare 6EAS by removing pins 1, 8 and 9 with sidecutters. Do *not* install the 56-ohm resistor in the SB-101. If you do, it will degrade the performance of V_{5B} . Instead, connect the 56-ohm resistor from lug 2 of the LMO-XTAL switch at W (see Pictorial 6 of the SB-640 manual) to solder lug P.

Now to operate mobile with your favorite crystal, unplug the SB-640 and leave it at home. Remove the crystal from the external LMO, plug it into its socket in the SB-101, and insert a complete 6EAS in V_5 . To operate at home, plug in the SB-640 and transfer the crystal to it if you wish to use the crystal at home as well as in your car. In place of the complete tube, insert the modified 6EAS in V_5 , but take care that you correctly plug it in, as the guide pins will be missing.—*R. T. Woodfield, ZL2VN*

HANGING QSL CARDS

I had found it difficult to hang QSL cards on the shack walls until I remembered that my wife had a sewing machine. Using the wide setting, she zigzag stitches my cards together. If I ever wish to remove the cards, they can easily be folded for storage.—*Edgar Von Trotha, WA5TXH*

Fig. 3—Diagram of a transistor switch that overcomes the undesirable effects of excessive contact resistance in paddles used to key the HA-1. Resistance is in ohms; K = 1000. Resistors are 1/4-watt composition. P₁ is a standard 1/4-inch, 3-conductor phone plug.



BOTTOM PLATE SOURCE

A good material for making chassis bottom plates is ordinary household aluminum screening. It is inexpensive, easy to obtain, and can be cut to shape with seissors. Besides providing r.f. shielding, the screening permits the ventilation of the enclosed components. Other uses include making ventilation holes in equipment cabinets r.f. tight, and acting as grills to protect speakers.

If a small area is to be covered, only screws, washers and nuts need be used to secure the screening. For covering larger areas the screening should be held to the chassis lip with metal strips and sheet metal screws as shown in Fig. 2. This results in a better mechanical connection and more complete r.f. shielding than hardware alone.—*Mal Crawford, WA2IPC*

CABLE FOR REMOTE PICKUP

LONG extension cords used with electric hedge trimmers, lawn mowers, and snow blowers are just dandy for remote reading of field-strength meters or other instruments.—*W. P. Munro, W2HCP*

PREVENTING THE HA-1 KEYS FROM GENERATING SPURIOUS DOTS

MANY users of the Hallicrafters HA-1 tube-type keyer (9TO) have eventually encountered trouble in making characters that start with a dash. Investigation has shown that any resistance of more than about 800 ohms in series with the lead to the dash contact of the paddle will cause an unwanted dot to precede an initial dash. The discharge of the 0.02- μ f. capacitor shunting the dash-lever contacts results in pitting of the contacts, and the contact resistance usually becomes high enough to cause spurious dots unless the contacts are cleaned frequently. A way to avoid this difficulty is to use a transistor switch, actuated by the dash-lever contacts, as shown in Fig. 3. The switch should be enclosed in a metal box to avoid r.f. pickup.—*Harold P. Microp, K2ANW*

Matching with Homemade Baluns

Simple Balun Adaption for Hy-Gain Beams

BY RICHARD C. FENWICK,* WSKTR

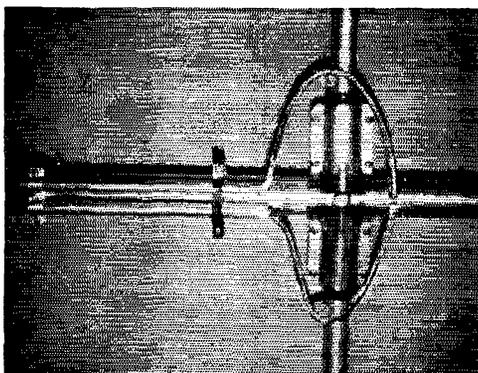
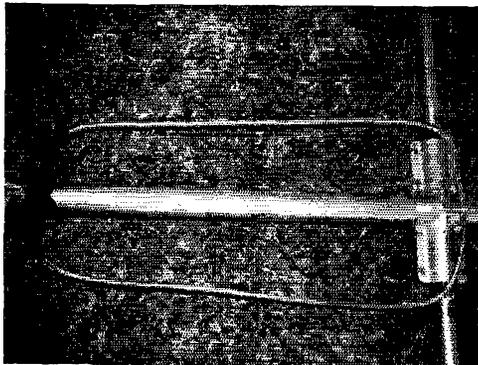
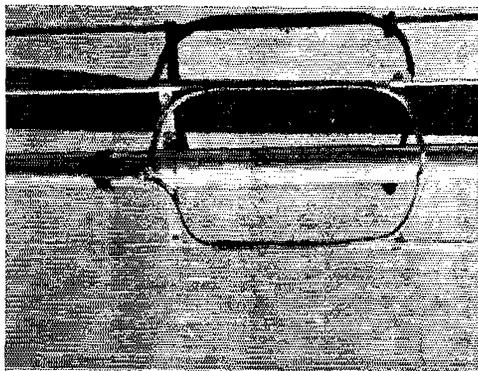
A balun between a coax feeder and the driven element is one of those things that, while it may not be necessary under all circumstances, will make the difference between good and poor performance when it is needed. If your antenna is one using the matching system variously known as the "beta match" or "hairpin," the system described here is so simple and inexpensive that, as the author says, there's no point in arguing whether or not to use it.

Most Hy-Gain beam antennas use a "Beta Match" matching arrangement, which is an inductive stub across the feed point, used to resonate a shorter-than-resonant driven element. A balun is not supplied with the beams, and probably more often than not is not needed. However, it is possible to replace the "Beta Match" with a loop of coaxial cable which serves both as a balun and as the matching stub, with so little effort and cost that the question of the need for a balun becomes not worth debating. A balun of this type is well known,¹ and will not be explained further here.

The author recently used this type of balun on antennas in a new installation consisting of a 402BA 40-meter beam, a 204BA 20-meter beam, and a DB-1015 10- and 15-meter beam. The modifications required to the "Beta Match" were different in each case, so they will be discussed individually. What changes the modifications may have made in the v.s.w.r. of the beams is not known, since the beams were never used without the built-in baluns. Stacking may have affected v.s.w.r.s also — the beams are stacked 10 feet apart, in the order listed, with the 40-meter beam at the top at a height of 92 feet. Only the 40-meter beam was tested without the others present; no change in v.s.w.r. was observed.

*1601 Provincetown Lane, Richardson, Texas 75080.

¹ ARRL *Antenna Book*, ninth or tenth edition, page 110.



The three impedance-matching baluns before weather-proofing. Top, 40-meter (402BA) balun; center, 20-meter (204BA) balun; bottom, 10-15 (DB-1015).

402BA Balun

In the case of the 40-meter beam the "Beta Match" was retained in its entirety, and the balun, made of RG-8/U coax with the jacket removed, was electrically paralleled with it, as shown in Fig. 1. The coax was taped to the "Beta Match" but otherwise no connection was made between the two except at the feed point and at the boom as shown. The distance from the feed point to the shorting bar was increased from the original 11 inches to 11½ inches, to compensate for the decreased inductance per unit length of the inductive stub conductor. The extensions of the "Beta Match" rods past the shorting bar were left as is, although they appear to serve no purpose.

After assembly, the coax braid and connections should be weatherproofed—for example, by wrapping with Scotch Type 33 electrical tape and coating that with clear Krylon spray. Silicone rubber sealants, such as "RTV" or "Silastic", are useful for sealing connections. "Dow Corning Silicone Rubber Bathing Caulk", available at Sears, Roebuck stores, seems to be the same material but for some reason, perhaps a good one, outdoor uses are not mentioned on the package. Weatherproofing remarks apply to the 204BA balun and the DB-1015 balun as well.

The antenna v.s.w.r. as measured at the end of a 135-foot piece of foam-type RG-8/U cable is shown in Fig. 2. (The v.s.w.r. is, of course, somewhat higher at the beam itself.) The minimum v.s.w.r. occurred at about 7.2 MHz., although the element lengths were adjusted to instruction-book lengths for 7.15-MHz. resonance. Whether or not the shift in resonant frequency is due to the addition of the balun is not known, but the author was happy with the results, so no further experimentation was done. Of course, modifications to the matching network can have no effect on the radiation patterns of the beam, so long as balance is maintained.

204BA Balun

In the case of the 20-meter beam the "Beta Match" was discarded and replaced with a loop of RG-8/U coax, as shown in Fig. 3. Again a longer stub was used to compensate for the larger diameter of the coax outer conductor relative to the diameter of the "Beta Rod" supplied with the beam. A section of the "Beta Rod" was cut to serve as a stiff spreader at the end of the coaxial loop, as shown in Fig. 3.

Fig. 4 shows the measured v.s.w.r. of the beam at the end of a 125-foot piece of foam-type RG-8/U cable. ("Phone" element-length settings were used.) It is probably worthy of mention that this is by far the lowest v.s.w.r. across the band that the author has ever seen in a 20-meter beam, and is surprising for a close-spaced 4-element beam. The explanation seems to be that director lengths are recommended which are shorter than that which give maximum gain. However, this is not to say that the beam gain is low, since its performance seems to be com-

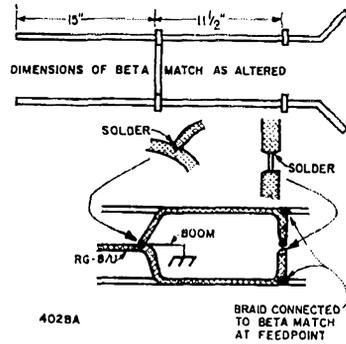


Fig. 1—Altered dimensions of the 40-meter Beta Match (above) and construction of the balun arrangement which parallels it.

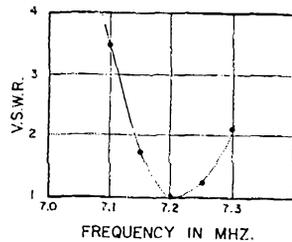


Fig. 2—Measured standing-wave ratio on the 40-meter beam.

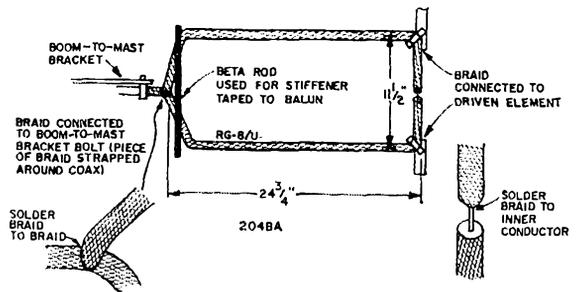


Fig. 3—Dimensions of the 20-meter balun which replaces the original Beta Match.

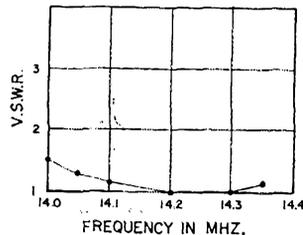


Fig. 4—Measured standing-wave ratio on the 20-meter beam.

parable to that of other beams of comparable size (boom length).

DB-1015 Balun

The "Beta Tubes" for the DB-1015 beam were retained, as shown in Fig. 5, but moved one inch farther away from the driven element to compensate for the larger diameter of the coax relative to the discarded pigtails that normally connect the driven element to the "Beta Tubes." The coax is run through one of the "Beta Tubes."

Fig. 6 shows the v.s.w.r. as measured at the end of 115 feet of foam-type RG-8/U coax, and the v.s.w.r. curves from the instruction book. ("Low phone" element and "Beta Match" settings were used.) As in the case of the 40-meter beam, the v.s.w.r. did not turn out quite as expected, but the author was quite pleased with the results, so that no further experimentation was done.

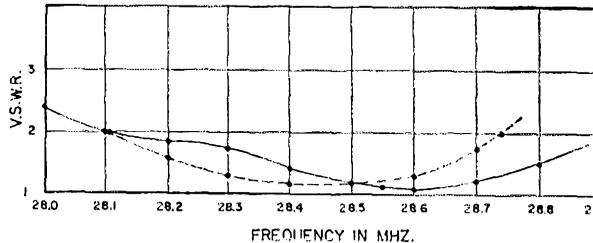
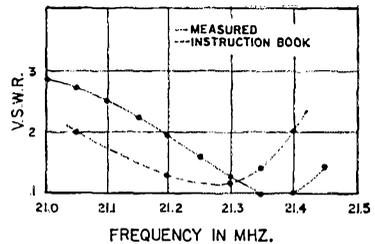


Fig. 6—Measured standing-wave ratios on 10 and 15 meters with the balun installed.

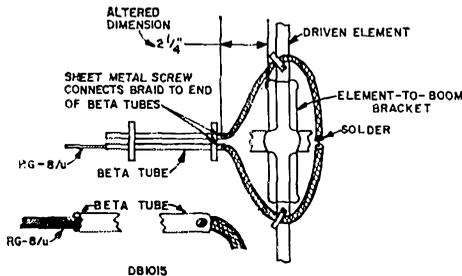


Fig. 5—Construction of the 10-15-meter balun.

Conclusions

For very little cost and effort, homemade baluns can be made from short pieces of coax cable for Hy-Gain 402BA, 204BA, and DB-1015 beams. Although the author is not familiar with other Hy-Gain beams, except through brochures, it appears that the techniques illustrated above are applicable to all Hy-Gain beams using the "Beta Match." Baluns of this type should be more effective than the coax-cable chokes recommended in the instruction books. They should be at least as effective as commercial baluns, either of the ferrite-core or air-wound type, and are likely to be both more efficient and more immune to damage from operating at excessive v.s.w.r.



Strays

Feedback

Because of some incorrect figuring on our part, several V.H.F. QSO Party scores were wrongly revised downward in the September writeup of the June contest. In some cases the corrected score will result in a change in section standing.

W3CCX/3 (Eastern Pennsylvania, multioperator): correct score 67,896; correct multiplier 82.
W9YT (Wisconsin, multioperator): correct score 9945, correct multiplier 51; leads section (multioperator category).
W1QVF/1 (Connecticut, single operator), correct score 48, correct multiplier 4.
W110X (Connecticut, multioperator), correct score 33,660, correct multiplier 66; wins section award (multioperator category).
K7AUO/7 (Oregon, multioperator): correct score 7285, correct multiplier 31.
WB6NDJ/6 (East Bay, multioperator): correct score 8064, correct multiplier 28.
W6ASH/6 (Santa

Clara Valley, single operator), correct score 65, correct multiplier 5. In addition, **W9YT** and **W110X** are division leaders in the multioperator category for the Central and New England Divisions, respectively. Our apologies to all concerned.

Even after we corrected it on two consecutive sets of proofs, the call in the caption to the picture of **W7VDZ** still was printed as **W7VDA**. Vy sri, Jim.

The single-operator section award for Northern New Jersey is being withheld pending conclusion of an inquiry.

**SWITCH
TO SAFETY!**





Recent Equipment

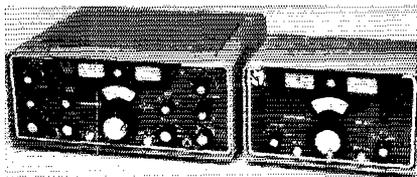


To acquaint you with the technical features of current amateur gear.

Hallicrafters SR-400

Transceiver and

HA-20 Adapter



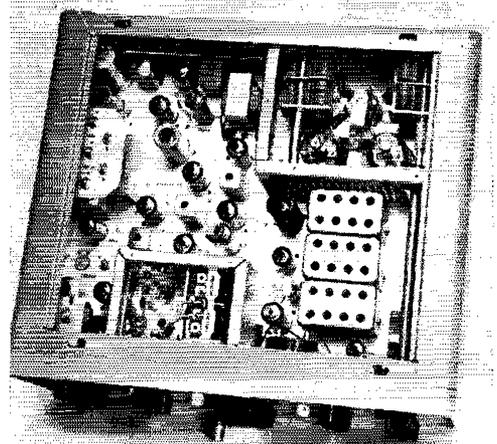
It would be easy to call the SR-400 transceiver a "baby brother" of the SR-2000¹ because in many ways it is identical with the latter. Aside from the final amplifier and power supply, the transmitting sections of the transceivers are the same. In the receiver line-up, the similarity is there but in the SR-400 additional selectivity for c.w. operation has been added, plus a "notch"-type filter. All in all, the SR-400 is designed with both the side-band and c.w. man in mind.

Frequency coverage of the transceiver takes in all of the 3.5-Mc. through 28.0-Mc. amateur bands in 500-ke. segments. The 28-Mc. band is covered in four sections of 500 ke. each. One

rotation of the tuning knob covers 25 kilocycles and the tuning dial is calibrated in 1-ke. divisions with a total of 100 ke. for the dial. The 1-ke. divisions are 1/8 inch wide. This dial drives a second dial which is calibrated in 50-ke. steps starting either from 0 or 500. For a band starting at a multiple of 1000 ke. the 0 is used, and for ones beginning at a 500-ke. point the dial starting at 500 would be used. A 100-ke. standard is supplied and a variable panel-mounted control is provided in order to set the band edges precisely. Fig. 1 is the block diagram of the transceiver as given in the SR-400 instruction manual.

The receiver is a dual-conversion unit, with the first i.f. tunable over 6.0 to 6.5 Mc. Incoming signals are amplified and then converted to the first-i.f. range using a crystal-controlled high-frequency oscillator. The signals are then converted down to 1650 ke. after being mixed with the v.f.o. output. The v.f.o. range is 4350 to 4850 ke.

Preceding the high-selectivity section of the i.f. there is a noise blanker to remove interfering noise of the "ignition" type. The first i.f. tube at 1650 ke., a 6GX6, is a combination noise blanker and i.f. amplifier stage. The signal is applied to grid No. 1 and the noise blanking pulses to grid No. 3. These pulses are formed by amplifying noise "spikes" in a 7059 pentode stage at the 6.0-Mc. i.f. The noise output from this stage is rectified and then applied to another 7059 for additional amplification before being fed to the noise blanker at 1650 ke. The noise blanker should prove of great value to any amateur using the SR-400 in a mobile installation or in a noisy location. In one test we tuned in a weak c.w. signal, about an S3, and then fed the harsh noise from the brush sparking of an electric drill into the receiver at an S9 noise level. When the noise blanker control was then adjusted, the noise was reduced to a point where the c.w. signal was 100 percent copy. Without the blanker it was impossible to copy any part of the c.w. signal.



Covers for the v.f.o., lower left, and amplifier compartment, upper right, have been removed in this top view of the SR-400. The two dual variables in the amplifier compartment are the plate tuning and loading units. A screw-down perforated cover for the amplifier provides tight shielding of the circuit for TVI suppression.

The large shield cans contain the r.f., mixer and driver tuned coils. The ganged tuning capacitor for these circuits is mounted below deck, along with the band switch.

¹ "Recent Equipment," QST, May 1967.

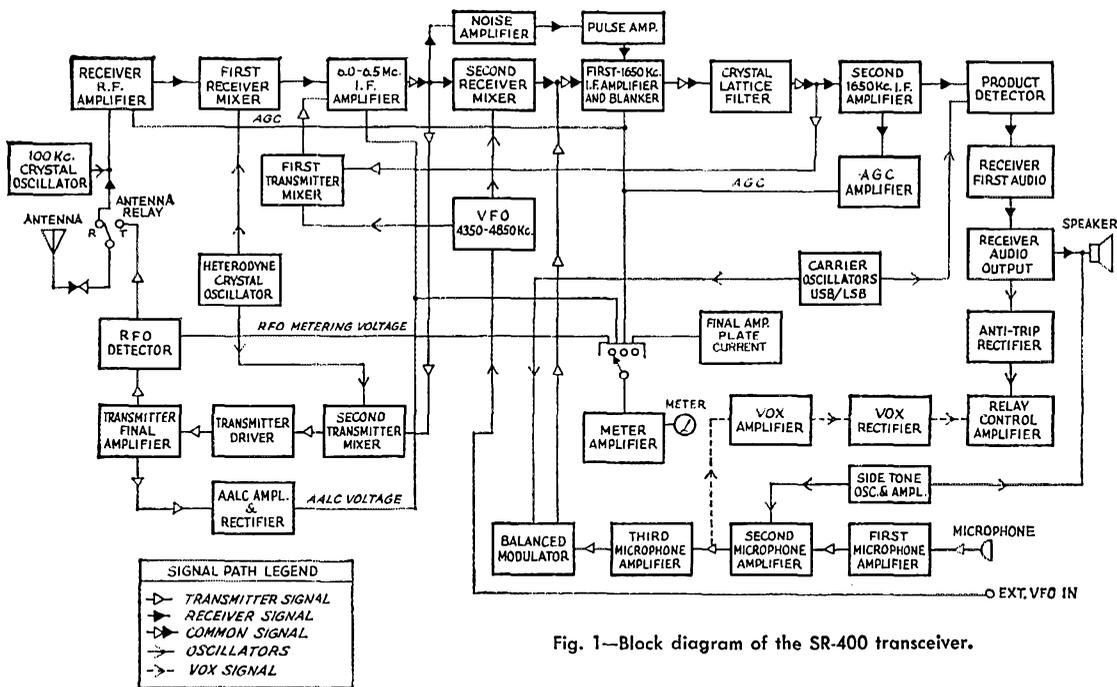
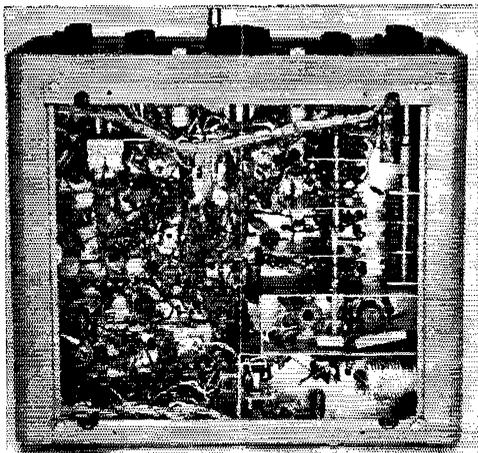


Fig. 1—Block diagram of the SR-400 transceiver.

After the noise blander, the signal goes through a set of crystal filters as shown in Fig. 2. There are two degrees of selectivity available, one using a six-crystal lattice filter for s.s.b. reception. The second is a sharp c.w. position in which the signal goes through a single crystal at 1652.2 kc. The manufacturer rates the sharp selectivity at 200 cycles at the 6-db. points, and the s.s.b. position at 2.1 kc. 3-db. bandwidth.



As evidenced by this view, it takes a lot of parts to put together a transceiver! The amplifier bottom compartment consists of two sections, visible at the lower right-hand corner. The upper section contains the bases of the 6HF5 amplifier tubes and the lower section the pi-network tank coil and the antenna changeover relay.

After the signal passes through the lattice network it is fed to the grid of the second i.f. amplifier. Connected in series from this grid to ground is a 1651-kc. crystal and a Varicap. Changing the bias on the Varicap changes the series-resonance frequency of the crystal, permitting the frequency to be moved across the i.f. passband. This provides a "notch" for reducing undesired heterodyne interference.

After the filter network, the signal is fed to a product detector and then into two audio amplifier stages. The audio output transformer has two output impedances available, 500 ohms for headphones and 3 ohms for a speaker.

In addition to the features outlined above, the SR-400 also has *rit*, "receiver incremental tuning," which has been available on earlier Hallierafter transceivers. *rit* permits you to tune about 3 kc. either side of the transmitting frequency, a very handy feature if you are working c.w., or if a received signal tends to drift off the transceive frequency. When the *rit* control is switched on, a red panel indicator light comes on, as a reminder that you are operating *rit*. The *rit* only works on receiving, as the transmitting frequency is controlled by the setting of the main tuning knob.

Transmitting Line-Up

Fig. 1 shows the line-up on transmitting. For voice operation, the microphone signal is amplified in three audio stages, the output being fed to the balanced modulator. Also coming into the balanced modulator is a carrier from

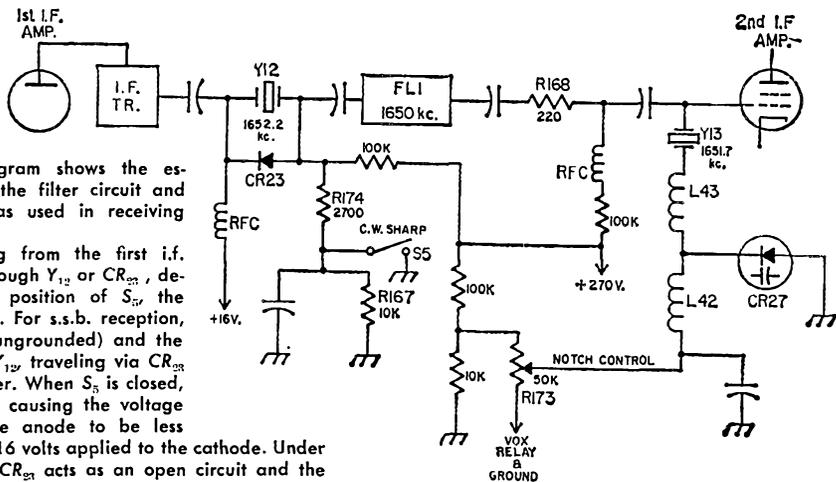


Fig. 2—This diagram shows the essential parts of the filter circuit and rejection notch as used in receiving with the SR-400.

Signals coming from the first i.f. stage are fed through Y_{12} or CR_{23} , depending on the position of S_5 , the c.w. sharp switch. For s.s.b. reception, S_5 is left open (ungrounded) and the signal bypasses Y_{12} , traveling via CR_{23} to the 2.1-kc. filter. When S_5 is closed, R_{174} is grounded, causing the voltage appearing at the anode to be less positive than the 16 volts applied to the cathode. Under these conditions, CR_{23} acts as an open circuit and the signals are routed through Y_{12} .

Connected in series from the grid lead of the second i.f. to ground is the notch circuit, Y_{13} and the Varicap, CR_{27} . When the notch control R_{173} is adjusted, the bias voltage on CR_{27} is varied. This changes the capacitance of the unit sufficiently to change the series resonance of Y_{13} , moving the resonance across the i.f. passband. The circuit is capable of up to 30-db. notch rejection.

the carrier-oscillator stage, carrier frequencies being provided for either upper or lower sideband, as desired. Output from the balanced modulator is directed to the 1650-ke. first i.f. amplifier and then through the 2.1-ke. lattice filter. From there, the signal is fed to the first transmitter mixer, a 7059 pentode section, along with a signal from the v.f.o. The signal is mixed with the v.f.o. frequency and converted to the 6-Mc. range. It is next amplified, and then in the second transmitter mixer it is combined with the output of one h.f. crystal oscillator for conversion to the desired amateur band. From there the signal is fed to the driver stage, a 12BY7A, amplified, and then to the final amplifier, a pair of 6HF5s.

The tank circuit for the 6HF5s is a conventional pi-network arrangement designed to work into a 50-ohm load. The manufacturer specifies that the tank circuit will handle non-reactive loads in the 40- to 70-ohm range.

For c.w., the transmitter second mixer and driver stages are keyed. Grid-block keying is used. Also keyed is a neon side-tone oscillator and amplifier. The side-tone signal is fed to the receiver audio stages and the speaker or headphones for monitoring purposes, and also to the second microphone-amplifier stage, the output of which operates the VOX circuits and antenna relay. The VOX circuit can be adjusted for hold-in periods for either phone or c.w. operation.

The rated power input of the transmitter is 400 watts p.e.p. for s.s.b. and 360 watts for c.w. In the metering setup, a single meter is used. When receiving, it is an S meter. On transmit, it can be used either to read relative r.f. out-

put, a.a.l.c. (amplified automatic level control) voltage, or amplifier plate current.

Power Supplies

If you could obtain the transformers, it would be possible to build your own power supplies for the SR-400, since the power supply is a separate unit. The transceiver requires 750 volts d.c. at 500 ma., 280 volts d.c. at 100 ma., 12.6 volts a.c. at 5.0 amp., and a bias voltage of -80 to -135 volts. The PS-500A-AC supply designed for the SR-400 also includes a speaker.

The d.c.-to-d.c. converter for mobile operation (12.6 volts d.c. input) is designated the PS-500-DC. Output voltages and currents are

(Continued on page 156)

Hallicrafters SR-400 Transceiver

Height: 6½ inches.
Width: 15 inches.
Depth: 13 inches.
Weight: 18 pounds.
Price Class: \$799.

PS-500A-AC Power Supply

Price Class: \$119.

PS-500-DC Power Supply

Price Class: \$149.

HA-20 V.F.O. and S.W.R. Bridge

Height: 7 inches.
Width: 10 inches.
Depth: 7 inches.

Manufacturer: The Hallicrafters Co.,
600 Hicks Road, Rolling Meadows,
Illinois 60008.

The ARRL Museum of Amateur Radio

JUST when the Museum started is uncertain. Doubtless there were a few pieces of old gear around earlier, but in the late twenties and early thirties, there appear to have been enough items to put all in one place and call it a Museum. Some of the League employees brought in their choice pieces; cabinets were made and a permanent display was an accomplished fact.

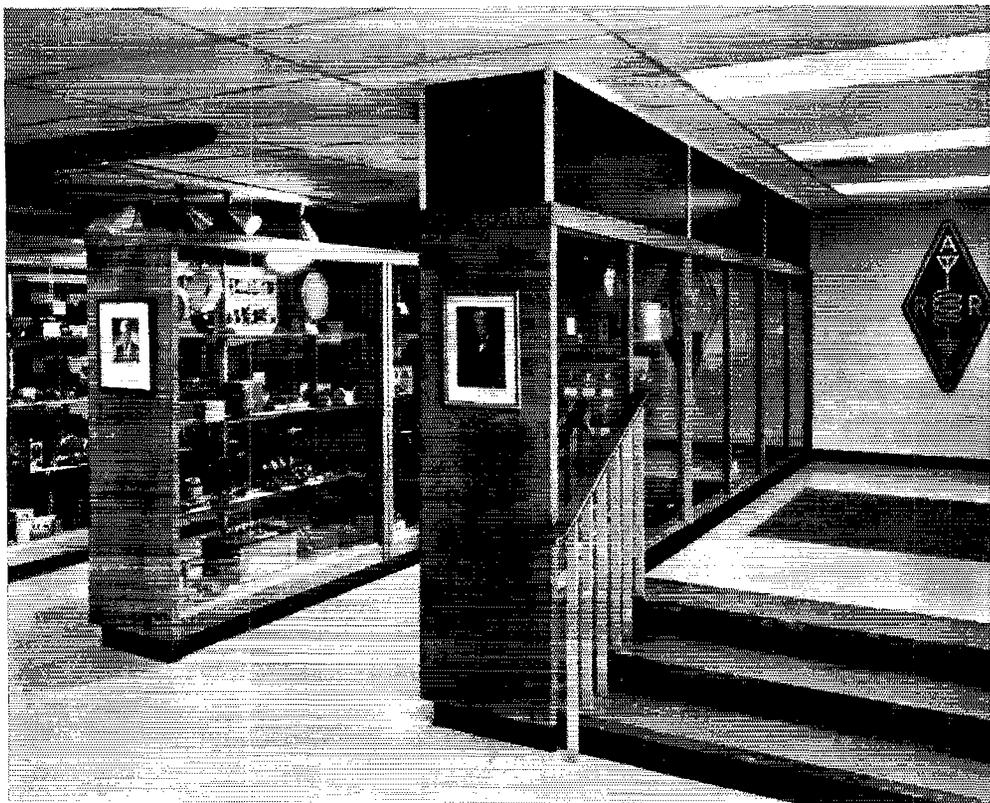
... From then on, the number of items grew steadily and soon additional cabinets were installed, and wall space both on the main floor at 38 La Salle Road, W. Hartford, as well as on the second floor was pretty well filled. Descriptive cards with the name of the donor gave a running account and of course, one can read all the cards and get a very good idea of early amateur radio.

... In 1963, upon completion of our present building, the Museum was afforded considerable space in the lobby. Beautiful new cabinets having about 1400 sq. ft. of shelf area were installed and the Museum commenced to take on a mature aspect. With very few exceptions, all the pieces were refinished but not necessarily put in working order. About four hundred items have been restored. Some required as much as fifty hours work; others were just cleaned or dusted.

... The photo below shows the entrance to the lobby and some of the cabinets. On the ends are

photographs of Clarence D. Tuska and Hiram Percy Maxim, co-founders of the ARRL. Most of the items in the first case are better viewed from the inside, since it has been found that most visitors pay little attention to this first cabinet upon first entering. It does contain the original copy of the *N.Y. Journal* describing the first wireless reception across the Atlantic by Marconi in 1901. This old newspaper is permanently preserved between heavy plastic sheet. There is some very interesting reading on the back of it, as well. Other items in the cabinet will be described in a later issue.

... Going to the second bay, at the left and referring also to the photo on the next page, there are four shelves displaying the collection of the late Edwin H. Armstrong. On the top shelf are some loud speakers, including a mutilated early cone speaker which figured prominently in a patent suit. The vertical panel shows a number of old tubes, including three DeForest round audions. More tubes are mounted on the rear of the panel. The second shelf shows the famous DeForest Audion box which was so popular with amateurs. It is serial number 41. To its right is one of the gems in our collection. It is a hand-made super-regenerative "squelch" oscillator, strictly breadboard and unrestored. It is almost certainly the first super-regen made by Armstrong. Other items on this shelf are an experi-





mental magnetic modulator, a Manhattan inter-stage transformer housed in their 1-inch spark-coil box and miscellaneous transformers and condensers. . . . On the third shelf are a number of large vario-couplers of several types including panekes, single and in multiple. Also, there is a De Forest three-coil honeycoil mount and coils, a pair of Baldwin phones and some crystal detectors. The bottom shelf houses a partially completed superheterodyne receiver, believed to have been made by Armstrong and Houck as their No. 3. An E. I. Co. sliding plate variable condenser which figured in a Patent Office interference suit, a W. E. Type 3-A audio amplifier and a Chaffee quenched gap are at the lower right. . . . The second bay features a number of receivers including an I.P. 501-A, Schnell's receiver used on his history-making trip on NRRL to Australia, a Paragon RA 10, Mignon, Sodian, Tuska 225, Pilot SuperWasp, Hallierafter S-2, Hallierafter HT 1 and a British shortwave receiver of 1918 calibrated down to 50 meters. . . . The shelf space is pretty well used up at present without serious crowding, but room can always be made for choice items. The League favors material which is truly amateur, especially if

described in *QST*. Large home-built transmitters cannot be accommodated at present.

. . . This series will continue in an early issue.

WLANA, Curator

Fifty Years of ARRL

A bound 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of *QST* is available from the ARRL for one dollar postpaid. Titled *Fifty Years of ARRL*, the book covers the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, and will make a companion piece to the classic *200 Meters and Down*, a reprint of which is also available from the ARRL for one dollar.

Announcing the 35th ARRL November Sweepstakes

YOU can always tell when those mid-November weekends have arrived; football dominates the TV screen—and "CQ SS" dominates the ham-bands. Our tremendously popular Sweepstakes is back again for the 35th time; and, to celebrate the joyous event, we've devised new, improved 8½x11 log-sheets and a separate summary-sheet. Samples can be found on this page.

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

- 1.25 low-power multiplier for BOTH modes**
- 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**

These changes have been prompted by a combination of popular sentiment from the field, a desire to endow the section award with more meaning, and the necessity of cutting down on excessive Contest-Branch paperwork so that we can spend the time more productively on crosschecking logs and preparing the contest writeup for *QST*. We think the changes will make for a better SS all around.

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 coco-bolo 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, 1968.**

Minus one month—and counting . . .

ARRL Sweepstakes

CALL LETTERS: WB9ETJ SECTION: EAST. Bay

CW: PHONE:

DATE	TIME	MODE	CLASS	PREC	STATION	WARRANTY	OP	SECTION	TIME	DATE	CLASS
11-21-68	2100	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2107	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2112	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2115	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
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11-21-68	2131	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2135	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2138	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2140	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
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11-21-68	2144	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2146	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2148	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
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11-21-68	2450	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2452	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2454	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2456	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2458	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2500	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2502	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2504	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2506	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21-68	2508	A	1	2	WB9ETJ	50	WJL	100	15	11-21-68	A
11-21											

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 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. Apply a "power multiplier" of 1.25, **regardless of mode**, if the d.c. input to the transmitter output stage is 150 watts or less at all times during contest operation. If your power is 150 watts or less, send "A" as your precedence; otherwise, send "B."

The final score equals the total "points" \times the "sections multiplier" \times the "power 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. **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, 1968, 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

CONTEST PERIODS

Starts	PHONE	Ends
Saturday, Nov. 9 2100 GMT		Monday, Nov. 11 0300 GMT
Saturday, Nov. 16 2100 GMT	C.W.	Monday, Nov. 18 0300 GMT

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 or FCC/DOT 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 at local or section level¹ 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 form² appeared in the Operating Aid 9A³ 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 receiving 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 Filled 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.

34th ARRL DX



C.W.

COMPETITION

Phone

February 3-4 and 17-18, March 2-3 and 16-17, 1968

REPORTED BY BOB HILL,* WIARR

JUST to confirm the validity of that ancient Aristotelian axiom "What goes up must come down" (except for the cost of living, of course), we hereby restore gravity to its rightful place in the scheme of things by offering Exhibit A: the 1968 DX Competition. Dizzy from soaring to the rapturous record heights of 2427 logs in '67, the Hq. Contest Branch feels relatively earthbound after a mere 2225 from this year's Test. Yet even a near-10-percent dive in altitude still leaves us high enough so that we have to fumble for the oxygen masks. *Decrease* and all, it is nevertheless the all-time *second-highest* number of entries, comfortably exceeding 1959's figure of just under 2000. Any more "flops" like this one and we may need to vanish into a complete vacuum somewhere for a couple of weeks.

Scores, in general, were also down. We're not really sure why, though the demise of ten meters the second c.w. weekend was one noticeable factor. Even more puzzling was the drop in number of countries reporting: only 116 this year vs. 135 for the previous affair.

This was our second year of experience with the new format (no quotas; states and provinces as multipliers for DX; KH6 and KL7 counting as DX), and nearly everyone considers it a vast improvement over previous systems. There was no decrease in one category: the number of comments to the effect that the ARRL DX Competition is still the King of Contests! There were scattered complaints that the Test is too long and should be reduced to one weekend per mode; a few QRPers wistfully longed for a low-power multiplier—but the vast majority now seems content. So don't expect any startling changes for the 1969 fracas (except in your station, of course, which you're going to improve so that you can beat that so-and-so in the next county).

Your reporter gratefully acknowledges the help of K1ZND and W1DGL, who patiently plowed through stacks and stacks of logs and typed most of the scores. Processing this contest is no one-man job.

* Assistant Communications Manager, ARRL



Two merry gentlemen are W1AX (left) and K1DIR (right), as they reminisce about their exploits in the Test. Bob and Roger ran one-two in EMass, pouring 5½ million points into 128 Contest Club coffers. (Or it could be that they're thinking about next year . . .)

Clubs

Twenty-seven ARRL-affiliated clubs rang up 133 million points this year, compared to 25 clubs and 147 million points the year before. Faithful readers will not be astonished to learn that the **Potomac Valley Radio Club** juggernaut continues to flatten everything in its path. (We'd tell you who topped PVRC both modes, but we swore this would be one writeup in which W4KFC wouldn't get mentioned.) What a bunch of Gavel Gerties! Perennial rival **Frankford Radio Club** had to settle for the Avis spot again in 1968, with W3WJD heading the gang on both c.w. and phone. The **Southern California DX Club** again was third, and again was chased hard by that enemy to the north, the **Northern California DX Club**. With only ten entrants (but *what* ten entrants!), the **128 Contest Club** ground out almost seven million points and took the 5th niche. New York's **Order of Boiled Owls** flew out of the cauldron and roosted in 6th, not

"The ecstasy and the the agony — with the latter predominant!" — W4KFC



Two famous G-men pose for a snap. That's **G2RO** on the left; Bob had no trouble looking happy after rolling up Europe's second-high c.w. score after a tough battle with **G4CP**. Al, **G3FXB**, took third place; no doubt you've worked him on 40 meters at one time or another.

far behind. Organized after two of the four weekends were already over, the Connecticut-West-Mass **Murphy's Marauders** aggregation stormed to a 7th-place finish—what a demonstration of enthusiasm! what a formidable foe for future Tests! (What a coincidence that your reporter started the club!) The **Northern Illinois DX Assn.** needed just 13 entries to go over the 4-meg mark and capture 8th position. The new **Laurentian DX Club** of Quebec showed that it must be taken very seriously in years to come. And the **Connecticut Wireless Assn.** rounds out the top ten.

It's always interesting, and often revealing, to break down the club scores by mode—not many clubs can boast of having equal versatility on both phone and c.w. Here's how they stack up when reckoned in this manner:

C.W.	Position	PHONE
Potomac Valley RC	1	Potomac Valley RC
Frankford RC	2	So. Calif. DX Club
So. Calif. DX Club	3	Frankford RC
No. Calif. DX Club	4	No. Calif. DX Club
Order of Boiled Owls	5	123 Contest Club
123 Contest Club	6	No. Illinois DX Assn.
Conn. Wireless Assn.	7	Laurentian DX Club
Murphy's Marauders	8	Murphy's Marauders
Niagara Frontier DX Assn.	9	Central Mich. ARC
Laurentian DX Club	10	Golden Triangle DX Club

Disqualifications

The calls listed in this paragraph are all deemed ineligible for score listings or awards. In each case, disqualification was under Contest Rule #14 in view of non-adherence to FCC rules as reported by at least two accredited Official Observers, or by a single FCC citation or advisory notice. Such violations as out-of-band operation (carrier or sidebands), spurious emissions, etc., were the basis for these disqualifications. C.w.: **W1BPW**, **W2CP**, **W2GGL**, **W2WZ**, **W3YUW** (K3: **FGO** **FPY**, **W3s** **BGN** **YUW**, ops.), **W4AATX/3**, **W4SLUM**, **K6MIG**, **W6SRF**, **W9LKL**, **Phone**: **W12YPM**, **K3MIG**, **K3HTZ**, **K3NND**, **W3BGN**, **W3KVV** (**W3EYV**, **W3-EPB**, ops.), **W3HHK** (**W12APG**, **W3HHK**, ops.), **K4OSE** (**K4ZLE**, **W4GKHA**, **W7ZUX**, **W4OCWA**, ops.), **K4YYL**, **W4BVV** (**W4DYE**, **K3NPV**, **W3BQV**, **W4BVV**, ops.), **W4HKU**, **W5KTW**, **K6NA**, **W6EWN/3**, **W6UUI** (**DL7JY**, **W6BXL**, **W66s** **AWS** **FID**, ops.), **W66MPP**, **K7ADD/3**, **W47AB** (**K17FSJ**, **W7RDR**, **W47FAB**, ops.), **K8CGD**, **K8HZZ**, **W8UAM** (**W82FT**, **W8CQN**, **W48s** **H10** **LYF** **RGT** **ROJ**, ops.), **W8-WPC**, **W8OSE**, **W88PWZ**, **W0KHL** (**W0s** **KHL** **LDB**, ops.)



AFFILIATED CLUB SCORES

	Approximate	Entries	C.W. Winner	Phone Winner
Potomac Valley Radio Club	30,256,682	57	W4KFC	W4KFC
Frankford Radio Club	21,520,115	75	W3WJD	W3WJD
Southern California DX Club	16,825,739	55	K6NA	W8RR
Northern California DX Club	13,699,205	65	K6OHJ	W6WX
			(W6BHY , opr.)	
123 Contest Club (Mass.)	6,897,161	10	K1DTR	K1DTR
Order of Boiled Owls of New York	6,140,611	16	W42KSS	W2CP
Murphy's Marauders (Conn.)	4,118,477	48	W4IDG	W4IDG
Northern Illinois DX Assn.	4,083,164	13	W9QQN	W9HZW
Laurentian DX Club	3,519,435	13	V62YF	V62NV
Connecticut Wireless Assn.	3,379,484	11	W1BGD/2	W1BII
Niagara Frontier DX Assn. (N.Y.)	2,954,163	12	K2KNV	K2DJD
Central Michigan Amateur Radio Club	2,808,625	10	W8SH	W8SH
			(K1ZND , opr.)	(K1ZND , opr.)
Golden Triangle DX Club (Fla.)	2,438,162	5	W4QPK	W4QPK
South Jersey Radio Assn.	2,174,361	33	W2GGT	W2CME
Miami Valley Amateur Radio Contest Society (Ohio)	1,952,401	10	W8ZFM	W8LXU
West Park Radlops (Ohio)	1,619,082	22	K8CFH	K8CFH
Arine Amateur Radio Club (Md.)	1,149,921	5	W8BQF	W8BQF
Ohio Valley Amateur Radio Assn.	1,091,073	11	W8HVF	W8HVF
Suffolk County Radio Club (N.Y.)	921,567	4	W2ZY	W82TON
Order of Boiled Owls of Ohio	893,536	4	K8FHU	.....
Grumman Amateur Radio Club (N.Y.)	656,713	6	W2DKM	.....
Westchester Amateur Radio Assn. (N.Y.)	512,571	4	.....	W8ZMK
Delta Radio Club (Penn.)	181,311	1	.....	W45RCM
Four Lakes Amateur Radio Club (Wis.)	157,701	4	W98CZ	.....
Springfield Amateur Radio Club (Ohio)	135,672	7	W8ZGC	W8QG
Oak Park Amateur Radio Club (Mich.)	63,939	4	.....	W8DGL
Irving Amateur Radio Club (Tex.)	38,340	3	.....	W5TFY

TOP TEN
Single Operator

C.W.		DX		Phone			
W/VE				W/VE	DX		
W9WNV/2	1,833,352	ZD8J	3,277,116	K1DIR	1,145,715	KH6IJ	3,799,962
W3WJD	1,526,220	HK3RQ	3,230,166	W7ESK	1,113,666	HK3RQ	3,755,000
K1DIR	1,177,350	VP2VL	3,084,300	W6RR	1,374,078	YS1XEE	2,721,888
W4KFC	1,120,650	KH6IJ	3,051,270	W3WJD	1,326,150	CE6EZ	2,451,456
W1AX	1,396,850	PY2SO	2,809,131	W4QBK	1,125,884	EA3JE	2,052,819
W2VJN	1,395,240	HK3BAE	2,638,725	W1AX	1,125,408	8R1G	2,050,428
W3GM	1,350,734	PY2BGL	2,603,259	W8SH	1,079,154	XE1AE	2,039,688
W3MYB	1,254,176	PZ1AH	2,074,698	W9AQW	979,209	DJ6QT	1,872,000
K4BAI	1,156,872	VK2EO	1,962,900	W5KTR	946,158	KH6BZF	1,651,209
W9AQW	1,091,232	GI3OQR	1,746,528	K8YBU	933,660	PY7AKQ	1,640,520

Manners & Morals

(A Play in Three Acts and Too Many Performances)

As the curtain rises, the Chorus intones: "Nothing in life is certain except death and taxes—and plenty of Rotten Operating in the DX Contest. Excessive duplicates; calling DX stations in pileups without knowing their calls; barging in on call-area CQs when another call area has been specified; improper signing (or no signing at all); calling banned countries. . . Old soldiers just fade away; old habits apparently don't."

Act I: The Persistence of (Poor) Memory; or, Unpack Your Troubles From That Old DupliKit Bag. In this Act, we proffer the suggestion that, while it is laudable to renew old friendships, there is a limit. Here is a sample of the dialogue: "I thought QST was quite clear about avoiding duplicates and was sure surprised when so many fellows couldn't keep track of their VQs! Words cannot fully express my venomous thoughts over those duplicates—snarl!"—YQ9B. How true, but words are the only vehicle we have right now. Let's tune in on a few from ZD8J, who, as might be expected, comes through loud and clear: "Clearing my log of duplicates this year required between 20 and 30 hours. In another contest, if I am again in the DX position, and not sufficiently cooled off over all this, I plan to delete *completely* from my log all stations having duplicate contacts. Instead, they will be specially listed as stations with which I was definitely *not* in contact: no credit allowable." Hw epy, OMs? And KL7R, tongue lodged firmly in cheek, offers words of "praise": "To the lads that I worked twice (and sometimes thrice) on each band, I can only say 'thanks.' But to the rest of the gang that I worked only once on each band, I can only marvel. They must have access to UNIVAC for instant elimination of duplicate Test contacts!" In the former category are those who think Op Aid 6 is some kind of soft drink. . . "I still burn at the thought of jerks who jump first and find out who they've worked after I've logged the (usually) duplicate," fumes K2SH/KH6 (now KH6GNE). But wait! 'Tis BDI BGD12 and W5BUK, to mention a few, have just rushed onstage carrying a sword that cuts both ways, and protesting, "Why don't some of these DX stations ever sign their calls?" For sure that's one reason for much of the inadvertent reworking, no? At any rate, the fences on both sides could use a little mending.

Act II: The Identity Crisis; or, Who Was That Masked Man Anyway? We present a sensible soliloquy by W9GFF: "There shouldn't be a very long list of acceptable W/K scores to print in QST if failure to observe regulations causes disqualifications. 97.87 is a sad-ly neglected or misunderstood regulation. Almost no one transmitted the other guy's call even once, and very rare to find anyone signing even his own call at the end of QSO as the new, simplified(?) regs require."

. . . "Super break-in" is ZD8J's wry appellation for this ploy of dubious legality. Man, these guys are as elusive as Howard Hughes.

Act III: Forbidden Fruit; or, Strike Out the Banned. Another entrant from Nine-Land has the floor: "I heard stations calling HS and XV5. Remind the boys that the multiplier is band-countries, not banned-countries!" Yes indeed, and three of the boys (1) called K8NHW/XV5, (2) worked him, and (3) blithely put him in their Test logs. Eeech!

Epilogue: Brickbats and Bouquets; or, Virtue, Though Battered and Bleeding, Is Triumphant. Sort Of. W49NSR complains that too many W6Bs were 89 plus 20—20 kHz., that is. . . W41GF, W41KU, W5BUK, K8OUA, and a cast of thousands, all wonder why W/VE stations persistently bray CQ TEST, thereby effectively clobbering four AC5s, three 4S7s, two 9M8s, one VR6, and a partridge in a pear-tree. . . While most of the participants agreed that the call-area CQs by DX work nicely on phone, W0BTJ stipulates that it ain't so hot if the DX station absent-mindedly skips a district. And W4EFFI vents a bit of wrath on the ones who specify the district they want, then proceed to work anybody that calls, regardless of whether or not they happen to be in that district. . . South of the border, down South America way, a couple of the top scorers blended puts on the back with pats lower and harder: "Activity showed to be improved this year, with the same good ops as ever and a few not so good—as the W2 who gave us 599 on 80, then asked five times repetition of serial number. Or W4—, who need a memory tonic, for he repeated four times his QSO on 20."—LU8DLK, *opr.* at LU8DQ. . . "Operating practices were superb from almost all the participants. The 'almost' means a few guys still insisting, in the middle of the contest, in passing their names, QTHs, power, kind of transmitter and receiver, mikes, aerials, and almost the brand and color of their refrigerators and typewriters. On 10 meters a 9-plus-40 very persistent fellow, after the few words contest QSO, insisted more than six consecutive times, when I said QRZ, in asking my name and QTH. With such a big signal the QRM was tremendous and I couldn't copy anybody, so I finally came back and told him my QTH is OK in the *Callbook* and my name is NABUCODONOSOR. He came back very fast and begged, 'Please, how do you spell it?' Of course, I moved to 15 meters."—HK3RQ.

Our grim drama has a happy ending, however. W5-QHD, *opr.* at ET3USA, "would like to compliment the Stateside boys on their courteous operation." . . "Was fun to hear TP8AR and KH6BZF handle the pileups—they blended a little humor and common sense into what otherwise would have turned into nasty fights."—K1GUD. . . "Thanks to W6QFU, who sent me an airmail letter apologizing for a duplicate QSO."—ZL1HW. And so, as the curtain falls and the setting sun sinks slowly into the east, we can hear only a confused babble of voices angrily muttering, "The DX Test is fun! The DX Test is fun! The DX Test is fun! The DX Test is FUN!!!" . . . EXEUNT OMNES.

—♦♦♦—

Doodles

Scramble Two (or More): 5H3KJ wound up in several dozen c.w. logs as "RH3KJ." Anybody seen a whole batch of missing dits? ... HB9UR's distinctive Swiss swing resulted in many loggings of "VS9UB" and, even more improbably, "4S9UB." One W8 worked two 4S9s. ... Phone men were not exempt from the alphabet-soup syndrome, either: "CR8RA" appeared more than once, while 8P6 QSOs seemed scarcer than "HP6s" and "XP6s." Our favorite comment, even though it left us totally bewildered, came from a W3: "My biggest thrill was working XP6AY long-path!" ... Sore-fingered but still smiling, PV2SO admits: "Among the exotic calls heard during the last hours of each c.w. weekend, JY2SO, PK2SO and WY2SO were all me." ... KOUJN strongly suspects that the "OU1JA" he worked on phone may not have been entirely genuine.



A superb score and a flawlessly-typed log were the contributions of CR6CK. With this modest but attractive layout, Tony sent code to over 2100 W/Ve contesters; his 1.1 meg was a solid top for mainland Africa, second only to ZD8J for plaque honors.

The World Below 14 MHz.: "Six new countries on 40 in this contest make 182 on 7-MHz. phone: CR4BC, DU1FH, SVQWL, VK9GN, VU2MSK, 7P8AR."—K2GXL. ... "40-meter phone U.S. were terrific on longpath."—VU2MSK. ... "5W1AT was my #141 on 3.5 MHz. I'm still stuck at 245 countries on 7 MHz." announced W3MFW, for whom we can work up only limited sympathy. Russ uses a 3-element switched array on 80 and a 2-element whirly on 40. ... "Heard many W1s and W3s on 3.8-plus during second weekend, but unfortunately I did not break through despite much calling on 3.799. I guess I picked a bad channel."—ZD7KH. ... "This year KAs were authorized on 80 meters for the first time and this was a great help in the multiplier department. All my phone QSOs with the East Coast were first-time contacts between there and Japan. The highlight of the phone portion was working Sam, W1FZJ/KP4, even though it didn't count for the contest."—K4TAB (now back at K1KTH). ... "Three new ones on 80: 5W1AT, W6GEB/KS4, KG6-ALV. Missed VS6DD, the one I needed most. Best 80-meter sigs were JA1BRK, VQ9W/P, G3LP, OA4PF, FP8DZ and VK2EO for contest WAC."—W5WY. ... "I did not hear one W/Ve signal on 1.8 MHz., although I QSOd JA2CLI and JA4IO for their first VK 'top-band.'"—VK5KO. "We beg the pardon of W9YB, W4-BVV, and W6RW, but their sigs failed to reach Buenos Aires on 160, being the band very noisy."—LU8DQ.

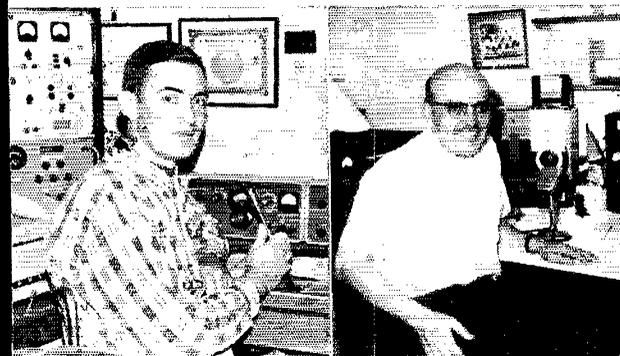
Triumphs and Tragedies: With ten meters completely dead between the East Coast and Europe the second c.w. weekend, W6s got an unexpected dividend: a fantastic opening to Eu between 1700-1900Z on Sunday. ... "I am very sorry that I was just one QSO short of one million points."—5H3KJ. ... "20M s.s.b. netted 102 countries in the first 24 hours." W3ZKH/3. ... "Why do the G/VK/ZL boys wait till the contest to comment on my call?"—W49B4T. ... "Thought the week ended at W6 for a long time but eventually got through the W6 curtain."—VK5FH. ... "Many CQs

were needed to entice the DX to tune above 21.1 MHz."—WNI0V. ... "Sure needed VO for my broom!" (I drank some later.)—FR3D). ... Then you could have had a call like KH6GIZ/W6 to sign. ... "Yahoo! The one-million goal is reached!"—UAB3BO. ... "I operated from an apartment house which I own and had lots of interference from my tenants paying rent, etc." W0ACT. What a nuisance all those people shoving all that money at you. ... "We probably had the youngest operator. Our logger, WN0TSI, is only ten years old."—W10EMS, *opr. at K0BXI*. Don't the child-labor laws cover this sort of thing? ... "A 10-minute ragechew with PX1PA was required to get his power." W0HGX. ... "I am receiving many QSL cards from the contest QSOs and they are leaving off the 'G' in HPIXHG, so they automatically go into the circular file."—HPIXHG. ... Much confusion during the second weekends as Stateside entrants with their new twenty-buck two-letter calls had to struggle to avoid duplicate QSOs with DX stations they'd worked the previous weekend under the old calls. ... "Noticed activity to be down considerably from last year."—W3TMZ. ... "Once again another vy FB contest bites the dust. Several of our ops also bit quite a lot of dust, fighting with the antennas in an 80-m.p.h. wind during the second leg."—G3SNZ, *opr. at G6VC*. ... "Two weekends in contest and two weekends making a clear log."—XZ2.1/G. ... "My low power, low antenna and low operating skill didn't hinder me at all—still did terrible."—W4TJC. ... "It's necessary to be a Hercules to do the contest, hi."—CT1MW. Or a PZ1AH—check out Andre's last name in the Callbook. ... "So vy tired." J1C/G. ... "Sure is tough trying to work into W/Ve with an American accent, low power and poorly-placed antennas. To make it worse, many W/Ve stations thought FQ was a pirate call."—FQDA. ... "Four out of seven straight weekends is just too much to ask the NYL to tolerate! The first weekend she was very pleasant, the second weekend she made facetious remarks about my steadfastness to get a good score, by the third weekend the flavor of her comments was sarcastic; when the fourth weekend arrived, her sarcastic attitude changed to downright vicious anger!"—K4WUM. ... "Had to QRT during an 80-contact-an-hour session on 10 meters the first weekend when the next-door neighbor banged on the door, pushed past my pregnant wife almost knocking her down, stomped into the radio shack, tore the earphones off my head and flung them on the floor, announced I was interfering with *Daktari* on his TV, and stomped out before I had a chance to get out of my chair. The NYL got hysterical and would not let me continue despite the fact that our own TV in the next room was not affected in the slightest!"—LAQAD.

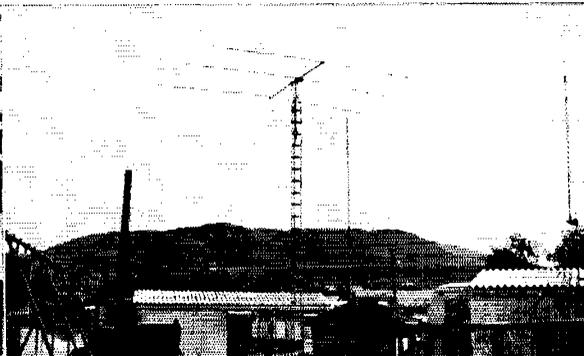
Californifornia: "First in war, first in peace, and last in Santa Clara Valley?"—W46QQL. Nope, Doug, not even close to last, but it was a good line anyway. ...

Knocking them off faster than a speeding bullet—a 75-watt Ranger signal more powerful than a locomotive—able to leap huge pileups in a single bound—it was PZ1AH gathering in more than 2 million points via the code route. Andre knocked off 6-band exchanges with WA3EPT, W3MFW, W3TMZ and W4BVV.





A couple of SVs who have been around: **SVØWL** (ex-DL5CL, currently W3CJK) and **SVØWP** (formerly W2EYQ, KH6HAA, K4HAA, now W6CMH), both hotly pursued by eager W/VEs in the Test. Some of the Cretan Mediterranean at SVØWL is visible at right. SVØWP thought the contest was terrific except for marginal 10-meter conditions.



Shown here holding a microphone, **VOTHH** keyed his way to nearly 300 thou in the c.w. portion of the Test. Max advocates one weekend per mode, says it would increase the number of DXpeditions.



From the mysterious Orient, operators James (pictured here) and Tim of **BV2A** inscrutably doled out a 20-meter Taiwan multiplier to 53 panting W/VE combatants and softly, enigmatically padded away . . .

"Durocher was right: nice guys never win," says W6-KJS, who won. . . . Some of the NC'DXC boys still resent the fact that use of a spotting-net puts the user in the multiplier category. Come on, fellas: what's the difference between leaving a friend feeding you multiplier information over the air and feeding you multiplier information from a second receiver right in your shack? . . . There's QRM and there's QRM, 'twould seem. San Francisco's K6KQN found his hearing hindered by firecrackers going off in the street during Chinese New Year.

Barbed Wireless: Candidates are now being considered for the Contest Branch's "Schlump-of-the-Month Club." To be nominated for this award, you must have committed one or more of the following atrocities in connection with your DX Test log: (1) Pounded no less than 38 staples into the log, sticking them in randomly so that we would have the maximum amount of trouble removing them and reassembling the log after inspecting it. Bonus points awarded if you inserted at least one staple in such a way that it severely gouged a thumb or other digital extremity of the log-checker. (2) Entered your section as N.Y., Cal., Fla., Tex., if you happened to live in one of those states. This enabled us to spend many happy hours looking you up in the Section Finder so that we could list your score under the proper section heading. (3) Sent us a card or radiogram—preferably at the very last minute before the start of the contest—asking for "some" (sic) log-sheets (being careful not in any way to indicate how many sheets you wanted or how many QSOs you expected to make)—then (and this is important) scrawling a sarcastic note on your log something like this: "Thanks a lot for the three log-sheets—they were only 25 less than I needed!" This gives us a warm feeling, because obviously you credit us with extra-sensory perception; we should have *known* how many you were going to use. . . . Okay, now we feel better. Guess what we're trying to say is this: (1) Go easy on the staples—one or two is perfectly adequate. (2) Put your *section*, not your state, on the log-sheets. (3) Don't wait till the last minute to request log-sheets—and please specify how many you want. It's 100 two-ways per sheet (50 to a side).

Stuff Left Over: In the Who-Was-Who Dep't., you might have run across such ex-DX as W4SYL (ex-KP4AOO), VE7YB (ex-DL2DM), W4SKW (ex-KZ5-GN), WA6BOU (ex-VP5AR/VQ9AR), W9ENE (ex-VR5AR), and W6CZY (ex-KP4UB). . . . Another ex is Fred, formerly H8XAL, who, as H83AL, is now QRL trying to unThai that knotty ITU ban. . . . "Everyone wanted to know why the four letters: in Mexico, 'P' is used for portable." *W6KQJ, ops. at NE2-PTBC.* . . . What better way to end things than with this little note from OT W2NO: "I wonder how many contestants remember the first ARRL DX Contest—little 'raumer' messages, etc.? Like the world itself, this contest was more hectic than the first—but, like the world, still a lot of fun."

Thirty-Fourth 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 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.e. 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: W3DRD 166,668-172-323- C-38 C-38 indicates final score 166,668, multiplier 172, contacts 323, power over 500 watts, operating time 38 hours.

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

C. W. SCORES

ATLANTIC DIVISION

Delaware			
W3DRD	166,668-172-323-	C-38	
W3TGF	70,092-99-236-	C-28	
W3IYE (W3s IYI TGF)	660,528-278-792-	C-70	
Eastern Pennsylvania			
W3WJD	1,526,220-366-1391-	C-81	
W3GIM	1,350,734-343-1319-	C-80	
W3MFW	1,047,812-323-1082-AC-78		
W3NOH	757,857-281-899-	C-44	
W3MWC	726,726-286-847-	C-64	
W3WPG	715,626-249-958-	C-40	
W3HHK	671,370-278-805-	C-40	
K3HTP	586,332-267-732-	C-78	
W3RMP	442,510-220-519-	C-51	
W3M2M/3/1	301,938-192-553-	B-64	
W3DBX	299,673-197-507-	C-71	
W3GHM	242,004-172-469-	C-38	
K3AIG	227,010-161-470-	C-40	
W3GRS	221,808-215-344-	C-20	
W3INE	213,921-171-417-	B-40	
W3GGS	204,435-177-385-	C-38	
K3EUR	195,888-154-424-	A-65	
W3KVV	180,980-145-416-	C-40	
W3EYV	175,794-166-353-	C-	
W3ALB	162,855-165-329-	C-26	
W3KDF	160,272-159-336-	C-40	
K3RNS	154,800-129-404-	C-50	
W3QUR	152,760-134-380-	A-28	
W3HYX	130,824-138-316-	C-	
W3EQA	121,992-138-299-	C-23	
W3EOP	112,260-132-285-	C-30	
W3INH	95,040-120-264-	C-15	
W3CAA	82,497-107-257-	C-20	
W3PN	78,207-131-199-	C-	
W3QLW	39,096-72-181-	B-20	
W3JET	39,060-84-155-	A-41	
W3AFR	34,611-83-139-	A-37	
W3RAN	34,380-60-191-	C-14	
K3MINT	33,136-63-124-	C-17	
W3EER	22,311-67-111-	A-	
W3GHD	16,920-60-94-	C-	
K3RFB	14,994-51-98-	B-28	
W3GUL	9448-41-76-	A-16	
W3CRF	8109-51-53-	B-9	
K3NPC	3567-29-41-	A-8	
W3NCW	3534-31-38-	A-8	
W3IPS	840-15-20-	A-4	
K3JH (K3s JH JLD)	1,072,904-322-1112-	C-82	
W3ECR (4 oprs.)	1,014,922-274-986-AC-62		
W3GHS (3 oprs.)	652,383-262-830-	C-81	
W3KT (K3MCO, W3KT)	595,920-260-764-	C-	

Maryland-D. C.

W3MYB	1,254,176-352-1189-	C-79	
W3GN	649,740-238-910-AC-76		
W3EYF	536,549-277-647-AC-		
W3MJJ	116,658-214-660-	C-62	
W3BQ	412,074-234-587-	C-73	
W3QQ	307,458-186-551-	B-54	
W3AXW	295,431-213-463-AC-69		
W3HQ	269,325-189-475-	B-50	
W3AYD	199,668-166-101-	C-36	
W3QTX	188,309-187-336-	A-	
W3AFM	136,875-125-365-	C-40	
W1QMM/3	104,130-133-261-	B-50	
W3A2SD	80,649-103-261-	A-40	
W3KA	66,048-86-256-	C-31	
W3RNY	54,684-98-186-	C-17	
W3HVM	45,600-95-160-	C-40	
W3CSZ	39,150-87-150-	B-18	
W3FSP	37,062-87-142-AB-34		
W3AEL	26,649-63-141-	C-14	
W3EPR	25,650-75-114-	C-21	
W3CZM	14,268-58-82-	A-	
W3OIE	12,750-50-85-	B-15	
W3LMZ	12,744-54-79-	A-20	
W3FC	8386-34-43-	C-14	
W3ADYW	2574-26-33-	A-5	
W3ML	396-11-12-	A-	
W3TMZ (10 oprs.)	4,716,630-486-3235-AC-96		
W3AEP (11 oprs.)	1,376,690-355-1295-ABC-96		
K3JYZ (K3JYZ, W3HTQ)	625,300-260-802-	C-93	
W3FA/3 (W3s FA GFE)	500,422-247-676-	C-40	
W3AGLP/3 (W3s GDB GLP)	8160-40-68-	B-30	

Southern New Jersey

K2QIL	451,329-211-713-	C-65	
W2GTT	446,880-224-665-	C-80	
W2HDW	250,066-151-552-	A-37	
K2GPR	204,561-191-357-	B-	
W2PYS/2	185,265-179-345-	A-55	
W21ZS	184,800-176-350-	B-	
W2EJU	109,620-126-290-	B-28	
W2HQF	91,872-132-232-	C-20	
W2QDY	63,891-93-229-	B-	
K2DCA	51,510-101-170-	C-12	
W2SDB	34,080-71-160-	C-22	
K2BG	32,631-73-149-	B-30	
W2DT	29,475-75-131-	C-30	
W2BZV	23,064-62-124-	B-	
W2QKJ	12,696-46-92-	C-28	
W2PHY	11,607-53-73-	B-37	
W2PFW	11,340-42-90-	B-22	
W2SDO (W2SDB, opr.)	11,070-41-90-	C-7	
WR2NBL	10,140-52-65-	A-	
K2SQM	4620-28-55-	B-15	

1969 ARRL DX COMPETITION

Phone: February 1-2, March 1-2

C.W.: February 15-16, March 15-16

WB2BYF	3906-31-42-	B-7	W9GFF	113,399-143-265-AC-32	
WB2UVB	3483-27-43-	A-5	W9KIM	112,812-119-316-	
W2DAJ	2376-18-44-	B-2	W9YVM	105,270-121-290-	
K2OEA	2160-24-30-	A-2	W9UX	70,560-112-210-	
W2HAZ	264-8-11-	A-2	W9GRAT	47,250-90-175-	
K2VTU	240-8-10-	B-14	W9WYB	34,164-78-146-	
K2IEO	168-7-8-	A-2	W9TFM	31,740-92-115-	
WA2BLV (WA2BLV, WB2s AIG MOQ)	1,535,100-350-1462-	C-80	W9HJM	28,542-71-134-	
WB2TEN (W32s TEN VHU)	326,304-206-528-	C-80	K9UCR	24,453-57-143-	
W2PAU (W2s ESK PAU)	300,490-199-506-	C-58	W9QWM	23,391-69-113-	
Western New York				19,110-65-98-	
K2KNV	667,317-301-739-	C-66	W9EJK	7938-49-54-	
K2DJJ	528,273-237-744-	C-70	K9MDK	7548-37-68-	
W2FXA (W2YQH, opr.)	380,184-217-584-	C-60	W9BVB	5499-39-47-	
W2FR	156,800-175-299-	C-48	W9RRF	4410-30-49-	
W2SSC	121,737-119-341-	C-23	K9IUN	2079-21-33-	
W2CUI	50,024-104-161-	B-33	W9FHU	1500-20-25-	
WB2YVP	28,260-60-157-	A-	W9TCU	810-15-18-	
W2FUI	19,824-56-118-	A-52	K9MNT	714-14-17-	
WA2VSO	12,567-59-71-	C-22	K9YRA	370-9-10-	
W2VXA	11,900-50-83-AB-37		W9EXE (K9YOE, W9EXE)*	923,788-314-982-	
W2ICO	11,868-46-86-	A-17	Indiana		
W2EJ	11,040-46-80-	C-8	W9AQV	1,091,232-324-1123-	
WA2BPH	8880-37-80-	A-12	K9CIV	585,312-268-735-	
WA2OIL	3045-29-35-	A-20	K9PFL	218,124-166-438-	
WB2EDW	510-10-17-	B-5	K9DVK	162,582-158-343-	
WA2BEX (WA2s BFX CYQ)	313,038-186-561-	B-72	K9HIG	140,238-159-294-	
Western Pennsylvania				121,401-141-287-	
W6EWN/3	598,306-293-682-	C-59	W9HKT	70,452-103-228-	
K7ADD/3	405,072-232-585-	C-74	K9VOK	19,404-66-98-	
K3VXV	76,050-90-283-	A-40	W9VDB	14,448-56-86-	
W3IXN	32,994-78-141-	A-12	Wisconsin		
K3PZU	30,186-78-120-	C-17	W9GTH	478,626-241-662-	
W3BENR	29,082-74-131-	B-35	W9VZP	466,572-236-650-	
W3AWR	16,616-62-90-	A-48	W9RQM	348,348-203-572-	
K3HKK (K3AHT, opr.)	15,660-60-87-	C-4	W9HIN	280,835-194-498-	
W3VK	12,168-52-78-	C-	W9OTF	70,110-114-205-AC-	
W3EFH	6840-38-60-	C-6	W9EAM	60,816-112-181-AB-	
K3KMO	4224-32-44-	C-7	W9SIZ	56,331-82-229-AC-52	
W3CFE	2871-29-33-	B-12	W9OW	50,220-92-180-	
W3VKD (4 oprs.)	1,199,577-303-1321-	C-68	W9IUP	42,075-85-105-BC-70	
CENTRAL DIVISION				W9RKP	36,750-70-75-
Illinois				W9NSR	20,370-70-97-
W9QQN	287,046-222-431-	C-60	W9CJA	11,550-50-77-	
W9BZW	276,016-208-443-	C-44	W9LJR	9072-42-72-	
W9YYQ	156,006-162-321-	C-30	W9YTT (8 oprs.)	1,383,048-337-1368-AC-64	
W9DWQ	138,853-143-327-	C-25	W9ODD (5 oprs.)	208,791-171-407-	
DAKOTA DIVISION				208,791-171-407-	
Minnesota					
W9QAK	36,735-79-155-	C-8			
W9RAG	20,880-72-97-	A-68			
WA9EPG	18,645-55-113-	A-23			



From a QTH on top of a 600-foot hill overlooking San Francisco Bay, **K6OHJ** was multiopned on phone by **K6OHJ** (left), **W6BHY** (right), and **K6ERV**, to become the first NCDXC entry to crack the one-meg mark. **W6BHY** currently holds forth at Z8BZ.

K9CNC 8400-40-70-C-9	W5MUG 52,221-103-109-	W8VPC 76,560-110-232-C-30	W8AJW 106,335-139-255-A-
W0PAN 462-11-14-B-4	W45OYU 1650-22-25-B-9	W8PBO 65,952-96-229-C-43	W8KMD 97,104-119-272-C-47
W8QCU (7 ops.)	W45SKI 630-14-15-A-2	K8CGD 61,800-103-200-B-57	W8RSW 79,905-119-272-B-26
W0AIIH (K8s IJL ZXE, W8AIIH)		W8RVD 47,151-93-169-C-25	W8ACIA 66,834-79-283-C-63
298,258-197-506-C-83		W8EEZ 28,917-63-153-C-33	W8YGR 64,125-125-171-B-17
381,664-192-489-C-39		W8DQL 22,440-68-110-C-12	W8ATYF 54,735-89-205-C-16
<i>North Dakota</i>		W8TJQ 17,298-62-93-A-25	W8AZGC 38,880-90-144-C-
W490VW 20,100-67-100-A-9	W4N8V 356,694-221-538-C-60	W8HXZ 94,500-45-70-B-25	W8ASRQ 34,272-84-136-B-24
W490ELO 546-13-14-B-4	W4ZVW 14,127-51-93-B-60	W8RUSU 7832-44-60-A-39	W8RPA 29,889-81-123-C-48
	W4R4V 12,054-49-82-C-11	W8EJP 6912-48-69-B-15	W8ARCN 28,782-82-117-A-30
	W49CG 6264-36-58-B-10	W8VJT 4500-30-50-A-16	W8JAQ 27,027-63-143-B-19
		W8WVU 2025-25-27-A-3	W8RNO 17,490-53-110-B-40
		W8AOFW 1134-18-21-C-4	W8GMX 14,544-48-101-A-28
		W8VRB 147-7-7-A-	W8RIF 13,920-58-80-B-27
		W8AGGN 48-4-B-2	W8RPS 13,629-59-77-B-10
		W8DOI (W8s DOI TJQ) 42,579-83-171-C-27	W8GMK 13,398-58-77-B-17
			K8GVK 12,672-48-88-C-
			W8IBX 12,430-55-76-B-4
			W8DWP 11,457-57-67-B-18
			W8AQZ 9546-37-86-B-24
			W8CKR 8442-42-67-A-28
			W8VZE 6372-36-59-A-9
			W8WPC (W8GPH, opr.) 5814-38-51-B-4
			W8SLL 5661-37-51-B-8
			K8BSM 4830-35-46-C-3
			W8FCH 4725-35-45-A-7
			W8ALVT 4608-32-48-A-7
			W8DZT 3384-24-47-B-12
			W8ATG 1914-22-29-B-5
			W8RUM 1872-24-26-A-

GREAT LAKES DIVISION

Kentucky

W4LW 255,420-172-495-C-36	W4CVT 127,920-164-260-A-50
W4JBQ 28,350-70-135-C-22	W4UAZ 12,087-51-79-C-
W4ZXR 5904-36-55-C-	W4ZFN 624-13-16-C-3
W4PIN 429-11-13-B-3	W4SAMS 27-3-3-B-
W4JKC	

Michigan

W8SH (K1ZND, opr.) 1,037,658-326-1061-C-82	W8RUL 644,613-263-817-C-60
W8UCI 395,514-219-602-B-55	W8DUS 364,968-222-548-C-75
K8HZU 240,534-166-483-C-51	W8KSR 99,750-125-266-C-44
W8SCU 85,320-120-237-C-25	

Ohio

W8ZJM 531,202-266-667-C-58	W8ZCT 507,936-264-642-C-53
K8CFH 421,590-230-611-A-C-	K8EHU 415,224-219-632-C-70
W8QXQ 407,700-225-604-A-65	W8ZCQ 278,778-194-479-C-80
W8APDL 212,433-169-419-B-52	W8BVF 207,009-153-451-C-45
W8RNYB 203,580-180-377-B-43	W8RKP 141,984-144-329-C-4
W8NPP 117,786-134-293-C-54	W8LHV 107,019-141-253-B-40

DELTA DIVISION

Arkansas

W45RTG 75,240-120-209-C-46	K8TYW 21,090-73-110-C-12
K5BLV 585-13-15-A-12	

Louisiana

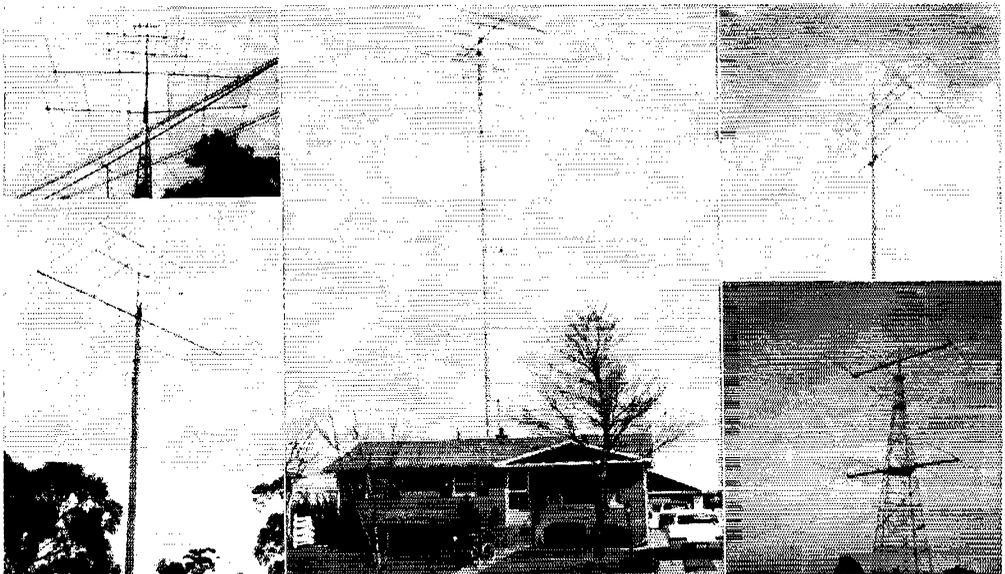
W5IOU 582,900-268-727-C-68	W5KC 331,785-219-505-C-60
W5BUK 242,379-191-423-C-64	W5DRR 29,925-75-133-C-31

Mississippi

K5RFJ 522,870-290-601-C-58	W5AO 82,698-154-179-C-38
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Minimum Number of Countries						Minimum Number of Countries						Minimum Number of Countries						Minimum Number of Countries									
Band	30	50	80	70	40	Band	30	50	80	70	40	Band	30	50	80	70	40	Band	30	50	80	70	40				
W1AX	45	66	98	83	58	W8EYF	53	83	50	W4LCO	30	W6WX*						76	43								
W1AXA					40	W3FA/3*			45	W4LCP	65	86	68	W7AYY					42								
W1BH	31	56	90	79	62	W3GHS*	31	51	49	W4LVV	50	42	W7RKE			50	86	71									
W1BLC					76	W3GM	39	67	98	88	51	W4LV			62	43	W7SFA*			66	91						
W1CW					127	W3GN			81	W4MW	50	W8AJW							45								
K1DIR	49	63	98	81	59	W3GRS			90	72	53	W4UQ	40	W8RQH*			53	103									
W1DIT	30	W3GTX			57	K4YZFQ			57	K4ZA/4*	40	61	100	80	53	K8CFH					43						
W1DJG				84	75	58	K3HTX			50	80	58	W4ZK1*	44	65	113	88	71	W8DUS					45			
W1ECH	31	W3IYE*			40	K3JH*			66	92	74	62	K2EU/5	35	50	41	W8REZ			63							
W1EHT						K3JYZ*			56	72	W5AO							83									
W1FHU	33	W3KDF			40	W5BRR												74									
W1SWX	63	W3KMO			32	W5BWK												50									
W1TS				99	47	W3KT*			58	W5DWT			86	W5BUC			43	W8LYF					87	44			
K1YKT	39	63	70	W3MPJ					46	W5EQT			55	82	61	W8MCR*			82	75	41						
W1BGD/2	47	50	88	80	58	W3MFW	48	61	74	56	W5IOU			53	88	49	W8NPF						40				
K2AHQ*	30	W3MVB			47	K8MNT	39	W3MWC			85	47	W5JAW			50	98	60	W8QXQ					74	41		
W42BEX*					82	W3NOH	36	W3QQL			77	60	W5BUC			5	W8SL	39	69	100	73	45					
W42BLV*	53	68	95	73	61	W3QML*	59	W3RVD*			61	85	74	63	W8UCI					85	67	45					
W82CKS	38	59	83	75	40	W3VKG*	61	85	74	63	W3WJD	45	74	101	82	64	W8ZCQ					88					
K2DCA					42	W3WPG	33	50	W3WJ	45	74	101	82	64	W6ANN*			52	96	70	50	W8ZCT	30				50
K2DJD					83	70	W6EWN/3	32	K7ADD/3	33	64	93	84	69	K6DXM*			86	76	45	W8ZJM					50	
W2DKM					46	K4BAI	33	64	93	84	69	W6ERS							44								
W2FR	39	61	W4BRB			60	W6ERT											81									
W2FKA					80	74	W4BVB*	62	79	127	107	89	K6EVR							88	72						
W2FYS/2					52	W3WJ	45	74	101	82	64	W6FSJ							89								
W2GGE	50	88	W4BVC			88	K1CG*	54	84	75	58	W6GBI							83	71	47						
W2GHT					48	W4CRW	50	K1CL	52	W4CRW								84									
W2GKZ					43	W8DJT												90									
W2HO					80	W4DXI												74									
K2KNV	31		106	77	41	W4EEO												45									
W2LKK					67	K4EZ	31	W4GRG										77	47								
W2PAU*					44	W4HOS												42									
W2PCJ	34	53	91	W4JKU			30	W4KJ	36	54	W4KFC	36	63	97	83	71	W6LX					44					
K2QLL					51	W4KVC												43									
W2QKJ					46													51									
W2NSC					119													41									
W2SUC					81													42									
W82TEN*					48													70									
W2VJN	50	79	95	88	73													42									
W9WNV/2	51	75	104	93	73													42									
W3AFM					125													86									
W3BQN					46													87									
W3FCR*					54													64									
W3EOP					60	72												51									
W3EPT*	41	69	108	77	55													41									

* Multioperator Station



These brownie aerial arrangements are likely to make you even more dissatisfied with your feeble dipoles. Upper left, the fine homebrew lashup of **JATINDO**: the 45' tower (not counting mast extension) supports 6L for 15 at 49', 4L for 20 at 50', 4L for 10 at 65', 6L for 6 at 68', 5L for 2 at 71'. Lower left, using a 100-foot ungued mast as superstructure, **VK2FU** has a 40-meter two-element fixed quad at 55', 75-meter dipole at 75', 20-meter 5L at 81', 15-meter 4L at 92', 10-meter 5L at 100'. A super structure indeed! Upper right, the Big Bertha at **K3JH** manufactures some authoritative signals. What it is, exactly, is 3L on 40 at 77', 6L on 10 at 86', 5L on 15 at 96', 5L on 20 at 104', 15L on 2 at 109', 6L on 6 at 113'. K3JH has been known to be S9. Lower right, **W9DUB** himself tells it best: "All elements driven; top stack turns; bottom stack fixed on Europe; each stack has 8 elements, voltage-fed at center for 10 and 15 meters, and 4 elements for 20 meters current-fed; stacking spacing 36'; tower height 70', L-networks for matching each or both at base of tower." Center, right in the middle of suburbia grows this 120-foot tower at **W9EXE**, no doubt startling unwary visitors in the neighborhood. At the top is a **TH6DX** for 10-15-20; at the 100-foot point is a 1/2-wave 40-meter dipole fixed at 60/240 degrees; a 4-over-4 array for 2 meters roosts at 110'; and an 80-meter slanted vertical (erected for contests only) runs to the tree in front of the house. The black spot in the center is a plastic-bottle balun.

K4ZA/4 (5 oprs.)	1,511,895-357-1413-AC-50
W4KXV (7 oprs.)	1,415,232-336-1408-AC-48
K4CG (K3WUW, W44WJJ, W4TFX)	868,296-299-958- C-96
W4JK (4 oprs.)	658,208-268-822- C-91
<i>West Virginia</i>	
W8AZD	100,068-124-269- B-33
W43HAN/8	67,912-104-218- B-18
K8MYU	54,999- 97-189- B-18
W8BJ	1662- 37- 42- A-20
W8TFY/8	429- 11- 13- A- 2
W8VLM	210- 7- 10- B- 5

ROCKY MOUNTAIN DIVISION

<i>Colorado</i>	
W8OCVS	400,428-227-500- C-59
W8NBSZ	17,304- 56-103-A3-30
K9JJB	1980- 20- 33- A-12
<i>New Mexico</i>	
W50DJ	260,370-165-526- C-96
K6STL	21,420- 84- 85- C-23
K5MAT	972- 18- 18- A- 6
W5QNQ	12- 2- 2- A- 1
<i>Utah</i>	
W7NPU	247,923-169-489- C-61
K7RAJ	17,340-105-196- C-19
<i>Wyoming</i>	
K7AYF (K6QPH, opr.)	24,975- 75-111- B-

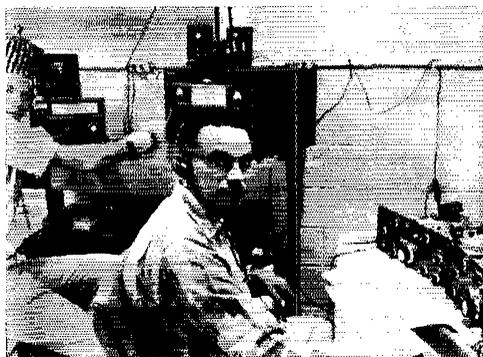
SOUTHEASTERN DIVISION

<i>Alabama</i>	
W1GRG	658,944-256-858- C-71
W4KVC	213,120-185-384- C-65
W4USM	14,220- 60- 79- A- 9
<i>Eastern Florida</i>	
W4LCP	963,072-304-1056- C-79
W4BRB	495,158-259-902- A-85
W4FY	227,430-190-399- C-53
W4HOS	226,995-185-409-A3-57
K4YFQ	225,624-158-476- C-30
K4CL	194,220-166-300- C-72
W4LVV	189,805-187-339- C-38
W4WYJ	134,994-149-302- C-38
W4CHA	93,366-126-247- B-22
K4DSN	82,026-126-217- A-28
W1AGP/4	49,875- 75-222- B-
W4RTX	40,020- 92-145- B-18
W4ALCO	39,015- 85-153-AC-39
W4SDK	35,721- 81-147- A-34
W4BYB	34,320- 88-130- C-
K4ZD	31,920- 80-133- C-27
W4WFF	29,130- 61-110- C-11
W4EEO	15,552- 72- 72- B-30
W4ILE	9030- 43- 70- C- 6
W4BGL	7308- 42- 58- B-14
K4ZRU	6993- 37- 63- C-16
W4TF	6750- 45- 50- C-11
K4GJ	4830- 35- 46- A-20
W4DJ	516- 13- 14- A-
W4LEP	193- 6- 11- B- 2
W4ZXI (6 oprs.)	2,229,993-381-1951- C-96
<i>Georgia</i>	
K4BAI	1,156,872-344-1121-AC-90
K4EZ	477,644-268-547-BC-45

WESTERN FLORIDA DIVISION

W4DXI	116,976-238-587-AC-72
<i>Western Florida</i>	
K4OA	199,950-155-430- C-50
SOUTHWESTERN DIVISION	
<i>Arizona</i>	
W7EKE	612,300-260-785- C-80
W7AYY	326,550-175-622- C-69
W7ATV	218,370-174-419- C-53
K7TVS	6572- 31- 71- A-27
W7UUU	918- 17- 18- A-14
K7HQN	675- 15- 15- B- 4
<i>Los Angeles</i>	
K6NA	678,249-221-1023- C-
W6PZD	539,136-216-832- C-59
K6EVR	498,090-169-850- C-
W6GEN	311,298-169-614- A-90
W6RSJ	301,936-162-621- C-50
W6VNI	258,570-169-510- C-
W6AMT	256,224-157-544- C-61
W6LJJ	176,580-135-336- C-64
W6SJK	118,080-123-320- C-51
W6BHDG	97,308-102-318- C-56
W6RUD	81,096-109-248- C-40
W6AKR	80,250-107-350- B-39
W6AFH	66,256-103-214- C-56
K6YFZ	55,800- 90-207- B-30
W6AWQ	50,880-106-169- C-
W6ONQ	25,893- 63-137- A-
K6CNY	22,500- 60-125- A-23
K6BEP	20,022- 47-43- B-25
W6LWY	14,256- 48- 99- C-35
W6LDA	13,536- 47- 96- C-11
DL7Y/K6	4935- 35- 47-BC-11
W6AKK	4464- 31- 48- A-19
W6PW	4050- 30- 45- C-12
W6RXXE	3750- 25- 50- C-

W6YCT	2574- 22- 30- B-20
W6HS	1650- 11- 50- C- 4
W6RW (7 oprs.)	2,563,146-393-2174-AC-96
W6NJU (W6NJI, W6HGU)	268,752-176-509- C-
W6UUI (4 oprs.)	235,620-165-476- C-
<i>Orange</i>	
W6DFY	579,510-235-822- C-84
W6LXX	252,252-156-539- C-62
W6TLL	124,992-124-336- A-53
W6QPU	65,160- 90-212- C-39
W6PLD/6	53,172- 84-211- A-51
W6RRTJ	15,360- 40-128- C-16
W6LHZ	3598- 27- 68- B-22
W6ANN (4 oprs.)	1,068,210-288-1215-BC-92
W6CCP (W6S AOA C/P)	375,060-188-665- C-65
W6CWD (W6BS CWD WEG)	189,700-140-452- C-37
<i>San Diego</i>	
W6GRT	350,811-183-639- C-51
K6SDR	318,618-187-568- C-
W6HS	276,108-173-532- C-39
W6OLR	106,227-111-319-BC-15
W6ADMN	13,728- 41-104- B-23
W6PTY (W6TY, W6AZQU)	628,560-210-873-AC-
W6BFLR (W6AS CZR LBP, W6BFLR)	106,704-117-304- C-
<i>Santa Barbara</i>	
W6GRX	309,672-187-552- C-68
W6GEB	16,650- 50-111- A-20
W6BDFV	13,440- 40-112- A-21



ET3FMA, wheeled around by **K4FMA** (left) and **W6-HOH** (right), took multioperator honors from the Dark Continent on c.w.; in fact, only **LUBDQ** had a higher score in that category from anywhere outside W/VE. Don, **K4FMA**, has returned to the States; Charlie, **W6-HOH**, now languishes in Ethiopia in SWL status.

WEST GULF DIVISION

Northern Texas

- W5DWT 656,820-267-821- C-55
- W5LGG 597,840-265-752- C-56
- W50GS 579,510-282-685- C-80
- K5QMC 69,216-103-224-B-C-65
- WA5RQA 65,076-116-187- C-43
- W5PQY 13,230- 42-105- C-21
- WA5QEZ 6732- 33- 68- C-
- W5QGZ 5250- 35- 50- B- 5
- W5MSG 240- 8- 10-A-B- 5
- W5EQT (W58 EQT OBS TKB) 796,073-281-945- C-88

Oklahoma

- K5BOC 361,335-221-545- C-68
- W5SIH 107,640-138-260- C-47
- W5PWG 2079- 21- 33- B-10
- K5CYK 462- 11- 14- B- 8

Southern Texas

- W5JAW 999,192-316-1054- C-82
- W5BRR 674,262-282-707- C-58
- W5WZQ 515,916-306-562- C-55
- K2ETU/5 304,416-224-453- C-42
- W5LJT 178,017-173-343- C-30
- W5MCO 146,475-155-315- B-56
- K5YUR 15,138- 58- 87- C-27
- W5QNY 9682- 47- 69- A-45
- W5ACL 864- 16- 18- C- 8

W5KFL (K5LZO, W5KFL, WA5LES)

697,788-284-819- C-90

CANADIAN DIVISION

Maritime

- VO1AW 342,633-181-631- C-45
- VO1HF 290,079-187-590- C-49
- VE1BK 52,800- 88-200- A-26
- VE1AE 20,250- 45-150- A-
- VE1AJJ 14,448- 56- 86- A-31
- VE1DB 8568- 34- 85- B-10
- VE1WP 5046- 29- 58- A- 7

Quebec

- VE2YU 508,326-247-686- C-64
- VE2VA 379,992-223-568- C-
- VE2NV 361,020-220-547- A-70
- VE2BV 303,952-176-578- B-72
- VE2DCW 180,885-155-389- A-51
- VE2AYU 113,283-123-307- A-69
- VE2BGJ 62,856-108-194- A-
- VE2BFS 22,680- 56-135- B-17

Ontario

- VE3BMB 158,064-148-356- B-52
- VE3DBB 125,244-142-294- B-65
- VE3BWA 63,260-102-210- B-34
- VE3ES 62,376- 92-226- B-29
- VE3WB 48,510- 98-165- B-49

Over 300 QSO's/Band — DX

	80	40	20	15	10		80	40	20	15	10
CR6CK			535	714	761	OK1ARN				313	
CR6EI					359	OK1GT			554	769	
EL2Y			303	346		OK1KTL*	383	514	657		
ET3FMA*			1198	742	541	OK1VB				334	
ET3USA*			748	488		OK2RZ				436	
TJ1QQ			311		301	OK3CEG	327		426		
ZD8J		680	1113	1522	1111	ON1XG			378	419	
ZS6BMD					384	OZ1LO			572	538	308
5H3KJ			661	742	791	OZ5DX				429	
9G1HM			473			OZ7BG			509	193	
9J2MX					417	OZ7OF			510	420	
EP3AM			690			PA6LOU	320	643	385		
J1BRK			516	763		SM6CKV	356	1000	565		
J1CWZ	303		509	667		SV0WP			770	697	
J1JAA			143	505		UA1IA			331		
J1LGG				352		UA2KAP*			368		
KA2NY*			428			UA3KBO*			705	561	
KA7AB			101	946		UA4KHV*			609		
UA0AG			542			UA5KKA			777		
UA0KCO*			121	362		UQ2KCR*			323		
UA0KFG*			631	663		YU1BCD*	385	601	919		
UA0KZB*			484								
UW90A			713								
VU2KV			432								
DJ5BV			705	774		U81BC			533		
DJ3WU			412	474		U81LC			457		
DL1VU*	303		520	718		U81RV	366	902	380		
DL1BG			181	686		U81AR	326	893	593	381	
DL5JX				458		HP1XHG			421	689	
DL6WD			461	611		KL7R			421	689	
DL7GK				311		XE2AAG	361	537	722	560	
EA2DT				322							
EB9J			185	540							
F8VJ			354			KH6LJ	586	758	1067	1133	
F8ZF			330			K2SIL/KH6	432	353	452	396	
G2DC			448	306		VK2EO	363	1063	679	774	
G2RO			754	104	47	W3RAPJ	320	1243			
G3APN			323			W3RAXK		471			
G3FNB			516	517		W3IQM				451	
G4CP			656	487	310	W5FHI			620		
G6VC*	328		634	304	319	W5FPM			375		
GC3LEW			410	548	359	YL1AFW			365		399
GIBOQR	438		825	645	435	YL1AMQ			612		
GM5MI				386		ZL1HW			404		628
GW3ITZ*			475	144	305						
HA5KJQ			427	352		CX1BRV			332		
HA8UD			372			HK3RAE	394	1219	1059	1035	
HB9DX				315		HK3RQ	494	1236	1254	892	
HB9JG			129	721		KC4USM			433	614	
HB9UB	373		563	1102		LU8DQ*			1070	875	985
HB9Z			522	651		OA4PF			420	600	641
HA1O			357	562		PY1BCA				345	
HA5E				419		PY1NO			312	146	490
HB1F				432		PY2BRO			300		
LA0AD			520	467		PY2BGL			1045	1069	1161
OE4SZW			306	737		PY2SO			1107	1099	1063
OH2TI*			849	663		PZ1AH			841	739	931
OK1AHZ				417		YV1DP/5			419	493	486
OK1A0X				301		YV1OB	307	348	403	428	
						YV5ROA		648	429		
						9Y4LA			337		

* Multioperator station.

VE3IJ 11,868-46-86- C-20
 VE3CAZ 1738-22-27- C-5
 VE3DEI 1539-19-27- A-11
 VE3FGV 1344-16-28- A-11
 VE3BS 507-13-13- B-2

Manitoba

VE4FQ 105-5-7- A-2

Saskatchewan

VE5PM 15,219-57-89- B-
 VE5DP 2277-23-33- B-7
 VE5DZ 1188-16-31- A-11

Alberta

VE6LU 136,188-117-388- C-50
 VE6AVR 9600-40-80- A-27

British Columbia

VE7EH 207,636-143-484-AC-60
 VE7BDM 15,390-38-135- A-22
 VE7IQ 12,426-38-109- A-
 VE7HQ 4752-24-66- A-22

Yukon-N. W. T.

VE8BB 52,875-75-235- B-38

AFRICA

Morocco

CN8FV 5425-25-73- A-

Portuguese Guinea

CR3AD 8920-35-84- A-

Angola

CR6CK 1,137,780-180-2107- A-
 CR6EI 340,224-128-886- A-61
 CR6AI 203,712-134-657- B-21

Mozambique

CR7IZ 150,465-95-549- A-45

Canary Islands

EA8FJ 56,280-70-268- A-

Liberia

EL2Y 350,142-134-871- B-

Ethiopia

ET3FMA (K4FMA, W6HOH)
 1,513,920-190-2656- A-
 ET3USA (W5QHD, WA8TIX)
 613,785-145-1411- A-85

Cameroun

TJ1QQ 222,099-101-733- B-18

Seychelles

VQ9B 165,240-102-540- A-

Ascension Island

ZD8J 3,277,116-258-4234- A-96

Rhodesia

ZE1CY 21,570-35-234- A-33

South Africa

ZS6FN 24,030-127-630- A-
 ZS6BMD 151,620-95-532- A-
 ZS10 11,037-39-99- A-34
 ZS6BT 7560-42-60- A-

Tanzania

5H3KJ 999,510-162-2210- A-

Senegal Republic

8W8BF 8550-30-95- A-8

Ghana

9G1HM 201,495-101-665- A-27

Zambia

9J2MX 266,781-112-794- A-44

Sierra Leone

9L1TL 332,442-138-811- A-

ASIA

Formosa

BV2A (2 oprs.)
 3287-19-58- B-

DX CONTINENTAL CHAMPIONS

GW

Single Operator Multioperator
 ZID8J ET3FMA
 KA7AB UA8KFG
 GI3OQR SM6CKV
 VP2VL PJ5MJ
 KH6IJ VK3APN
 HK3RQ LU8DQ

Phone

Single Operator Multioperator
 ZS6DW ETSUSA
 KA7AB KA9MF
 EA3JE DL0WR
 YSI XFE XE2PTBC
 KI6IJ VK2FU
 HK3RQ CR6AE

(Single-operator continental DX champions win the plaque)

Iran

EP3AM 359,775-123-975- B-

Japan

KA7AB 1,157,760-201-1920- B-
 JA1BRK 1,150,817-199-1928- B-68
 JA1CWZ 1,007,304-188-1786- A-
 JA2JAA 544,872-146-1244- C-
 JA3LGG 249,090-115-722- A-31
 JA7FC 163,590-95-575- A-
 JA2IPE 55,770-66-282- A-
 JA1LXE 40,434-46-294- A-
 JA7JW 36,672-48-263- A-
 JA2LA 33,360-48-232- A-
 JA7ERJ 30,015-45-224- A-
 JA8BYP 25,110-45-186- A-
 JA2FCR 15,768-36-146- A-13
 JA4FZ 15,674-34-156- A-
 JA2ITH 14,550-30-164- A-
 JA2DXZ 12,093-29-140- A-
 JA1SMA 8613-27-109- A-29
 JA8CGZ 7566-26-97- A-19
 JA1VPT 6042-19-106- A-18
 JA6GRP 5454-18-101- A-22
 JA4SZ 5280-22-80- A-
 JA7CQB 4977-21-81- A-7
 JA1BNW 4820-20-81- A-
 JA1SKE 3468-17-68- A-
 JA0DJE 2240-18-60- A-
 JA1WVY 3159-13-81- A-
 JA3LOK 2520-14-60- A-49
 JA1XRH 2196-12-64- A-6
 JA1LGH 550-5-37- A-10
 JA4FQZ 384-4-32- A-
 JA1VDA 356-4-30- A-9
 JA3LRR 300-5-20- A-
 JA1BZM 180-5-12- A-2
 JA8GR 180-4-15- A-
 JA2BSD/2 54-2-9- A-
 KA2NY (K6ZBV, WB6QVS,
 K9ZYS) 227,520-96-790- C-80
 JA7YAF (5 oprs.) 60,062-59-342- A-96
 JA0YAN (JAs 2DHL 3KUD
 #CHD) 16,490-34-163- A-21

Lebanon

OD5LX 12,300-41-100- A-

Asiatic Russian S. F. S. R.

UW9OA 152,559-67-759- B-
 UA0LH 89,631-69-433- A-
 UA0AG 86,178-53-542- B-23
 UA9FN 32,292-46-234- A-
 UA0TD 22,002-38-193- A-
 UA9HM 17,353-37-123- A-
 UA0TR 11,362-28-154- A-15
 UA0LS 11,107-29-128- A-17
 UA9RZ 9306-29-112- B-8
 UA9CC 8568-28-102- B-
 UA0DV 7176-26-92- A-
 UW9PT 6048-28-72- A-
 UA9KHA 3312-24-46- B-
 UA9KCA 3300-11-100- B-
 UA0MD 1584-11-48- A-
 UW0BA 1554-14-37- A-3
 UA0SA 168-7-8- A-
 UA0KCS 12-2-2- A-1
 UA0KFG (6 oprs.) 1,088,256-192-1907- B-

UA0KCO (3 oprs.)

393,822-117-1124- B-

KZB (5 oprs.)

343,710-114-1005- B-96

Turkoman

UH8BO 7482-29-86- B-

Uzbek

UI8CD 14,625-39-125- B-
 UI8AI 9828-39-84- A-
 UI8LL 8004-29-75- A-

Tadzhik

UJ8AB 1452-28-53- B-

Kazakh

UL7GW 11,349-39-97- A-
 UL7GR 2018-21-32- A-

India

VU2KV 142,434-82-597- A-
 VU2MSK 38,802-58-223- A-

Ceylon

487DA 9472-32-99- A-

Israel

4Z4AG 51,408-51-336- A-
 4X4YY 27,615-35-263- A-
 W2PDC/4X 20,511-43-159- B-18

West Malaysia

9M2LN 51,092-53-322- A-

EUROPE

Portugal

CT1OI 22,416-48-168- A-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
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 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

France

F8VJ 530,376-164-1079- A-45
 F8ZF 320,634-141-758- A-
 F2PO 301,740-141-716- A-40
 F8TQ 211,344-112-629- A-20
 F8TM 86,130-99-290- A-
 F9RM 41,072-68-202- A-
 F8VO 6003-29-69- A-
 F9BB 4140-30-46- A-

Republic of Ireland

EI9J 716,047-173-1387- A-

Spain

EA2DT 248,292-121-684- A-
 EA3KT 38,220-70-182- A-24
 EA3NA 19,530-30-222- A-
 EA2CR 12,408-44-94- A-
 EA2HW 10,125-25-135- A-
 EA2IR 2850-25-38- A-13

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

France

F8VJ 530,376-164-1079- A-45
 F8ZF 320,634-141-758- A-
 F2PO 301,740-141-716- A-40
 F8TQ 211,344-112-629- A-20
 F8TM 86,130-99-290- A-
 F9RM 41,072-68-202- A-
 F8VO 6003-29-69- A-
 F9BB 4140-30-46- A-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
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 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

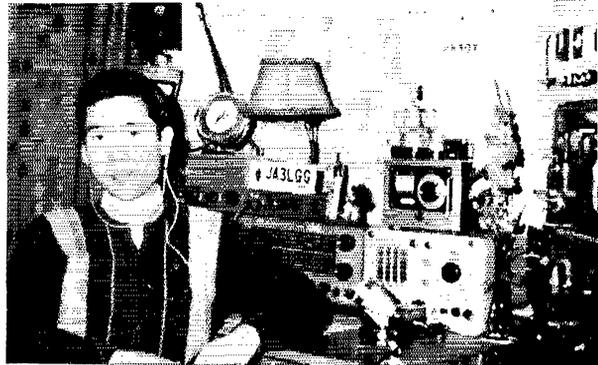
Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-
 DL8AM 152,562-94-541- B-
 DL4AP 127,500-85-502-AB-30
 DJ4UP 96,135-87-376- B-
 DL3CM 79,376-88-302- B-
 DL7NS 73,278-46-531- A-
 DL8CM 71,136-76-314- A-
 DL9EM 70,766-82-291-AB-
 DM3YPD 61,337-83-249- A-
 DJ6OM 41,968-61-230- A-
 DL9YP 37,737-63-210- A-
 DL7NP 34,594-49-236- B-

Germany

DJ5BV 1,160,352-204-2055- B-61
 DL6WD 877,965-187-1565- B-
 DL4EG 861,300-174-1650- B-53
 DJ3WU 515,319-159-1153- A-
 DL5JX 265,965-119-745- B-
 DI7GK 171,093-107-535- A-

Seems like nobody can make more noise with less power than a JA. Versatile **JA3LGG**, for example, ran 20 watts on phone to amass 203K, then fired up the linear to run 30 watts on c.w. for 249K. Cake was helped by a TA-33 and an inverted Vee.



<i>Guernsey</i>		<i>Bulgaria</i>	
GC3IEW 957,972-194-1646- A-71	L22KKZ 38,304- 48-266- B-	LZ1YW 25,920- 54-161- A-	L22RF 4017- 19- 71- B-
<i>Ile of Man</i>		LZ1KSA (2 oprs.)	22,278- 47-158- B-
GD3AIM 35,902- 54-221- A-	L22KDO (2 oprs.)	21,996- 39-188- A-	
<i>Northern Ireland</i>		<i>Austria</i>	
GR0QR 1,746,528-226-2576- A-	OE4SZW	417,756-124-1124- B-	
<i>Scotland</i>		OE2EGL 47,475- 75-211- B-	
GM5AII 177,840- 95-624- A-		<i>Finland</i>	
GM5AIW 124,815- 87-480- A-		OH3MK 35,319- 61-193- B-	
<i>Wales</i>		OH6VP 15,255- 15-113- B-	
GW3JI 139,680- 97-480- A-		OH3NY 12,558- 16- 91- B-	
GW3ITZ (7 oprs.)		OH5AA 5363- 21- 58- B-	
805,680-180-1511- A-		OH5VT 5166- 21- 84- B-	
<i>Hungary</i>		OH4RII 1956- 28- 59- A-	
HA8TD 148,764- 77-644- A-		OH2YL 3042- 26- 39- B-	
HA3GF 127,218- 91-466- A-		OH3XZ 3013- 23- 44- B-	
HA8TH 58,944- 64-307- AB-		OH3MU 1260- 15- 28- B-	
HA8FI 28,500- 50-190- A-		OH5VQ 714- 14- 17- A-	
HA3MB 22,230- 57-130- A-		OH3MM 306- 11- 12- A-	
HA8KCQ 19,000- 16-139- A-		OH2TI (8 oprs.)	1,094,238,186-1961- B-
HA7KPH 0639- 16-133- B-		<i>Czechoslovakia</i>	
HA3GA 8418- 32- 88- A-		OK1GT 922,376-182-1691- B-	
HA1ZH 8118- 33- 82- A-		OK1ARN 208,060-101-693- A-	
HA7LO 2086- 14- 50- A-		OK3CEG 189,840- 84-770- A-39	
HA9LL 297- 9- 11- A- 2		OK1AHL 173,700-100-582- B-	
HA5KQD (6 oprs.)		OK1AOX 133,164- 81-548- A-	
167-010-130-1120- B-		OK2QX 127,200-106-400- A-33	
HA1KSA (multiopr.)		OK3CCJ 111,930- 91-424- A-	
220,476-114-616- B-		OK2RZ 104,328- 63-552- A-	
HA3KNA (HA3s NH NC) 7,650- 34- 75- B-		OK3ER 91,920- 80-383- A-	
HA3KGC (multiopr.) 2,148- 16- 51- A-		OK2YF 75,740- 70-394- A-	
HA7KLB (multiopr.) 12- 2- 2- A- 1		OK1XW 66,597- 79-293- A-	
<i>Switzerland</i>		OK1VB 55,600- 50-371- A-	
HB9UT 1,023,610-167-2167- AB-		OK1VK 45,717- 49-311- B-	
HB9JG 900,900-182-1653- B-		OK2BHX 30,096- 38-264- A-	
HB9DX 307,428-137-718- B-		OK1TA 16,575- 51-109- A-	
HB9KC 142,592- 98-485- AB-		OK2BMF 15,372- 42-122- A-	
HB9AGK 25,112- 43-195- A-12		OK2BPF 9486- 31-102- A-	
HB9Z (HB9s AGH AFG QH) 819,156-178-1534- B-		OK1BV 8580- 20-143- B-	
<i>Italy</i>		OK2BHV 7872- 32- 82- A-	
IHAMO 626,652-156-1347- B-62		OK1KWR 5616- 24- 78- A-	
IHASE 370,830-141-877- B-63		OK3BT 4221- 21- 67- A-	
IHLFP 262,737-111-789- A-		OK1CJ 3510- 18- 65- A-	
IPIPR 105,084- 84-417- B-25		OK1QZ 2784- 16- 58- B-	
<i>Norway</i>		OK2KGP 1596- 14- 38- A-	
JA6AD 820,416-192-1426- A-80		OK1AMT 2451- 19- 43- A-	
JA6U 52,316- 82-213- A-		OK2HTH 1680- 16- 35- A-	
LA2Q 6480- 37- 80- A-16		OK1BP 897- 13- 23- A-	
LA1P 1953- 21- 31- A- 6		OK2BFX 384- 8- 16- B-	
		OK3DP 379- 9- 14- A-	
		OK1AKW 210- 7- 10- A-	
		OK1AVG 3- 1- 1- A-	
		OK1KTL (multiopr.)	871,401-173-1682- C-

OK3KAP (2 oprs.)	33,966- 51-222- A-	UA1ZW 27,648- 48-192- B-	UA4SG 13,578- 31-146- B-
		UA1ZX 12,834- 46- 93- A-	UA1KMF 10,647- 39- 94- B-
ON4XG 618,168-172-1198- A-41		UV3HF 8466- 34- 83- A-	UV3CM 4929- 31- 53- B-
ON4NM 49,680- 60-276- A-		UA1TL 4788- 28- 57- B-	UA1TQ 4125- 25- 55- B-
ON5TO 8550- 38- 75- A-		UA3TA 3885- 21- 62- A-10	UA6KLA 2394- 19- 42- A-
<i>Denmark</i>		UA4QQ 1260- 10- 42- A-	UA3BK 1254- 11- 38- A-
OZ1LO 887,184-183-1616- B-		UV6AO 828- 12- 23- A-	UA3VQ 720- 12- 20- A-
OZ7OF 716,566-173-1383- B-		UA3MV 603- 11- 21- A-	UA3GO 120- 5- 8- B-
OZ7BG 575,586-153-1254- B-39		UA4HA 30- 2- 5- A- 1	UA6ACA 45- 3- 5- A-
OZ5DX 501,837-161-1039- B-		UA4ZA 3- 1- 1- A- 1	UA3KBO (2 oprs.)
OZ7X 180,840-120-505- A-			684,520-157-1499- B-
OZ1W 169,635-129-440- A-40			UA4KTV (2 oprs.)
OZ3VO 105,999- 89-406- A-			166,050- 82-675- B-37
OZ4H 10,656- 32-111- A-22			UA1KAG (3 oprs.)
OZ2UA 1640- 20- 79- A-			103,194- 91-378- B-
OZ7G 3780- 20- 63- A-			UA1KAC (3 oprs.)
<i>Netherlands</i>			73,125- 75-326- B-
PA8LOU 1,009,428-197-1750- A-58			UA1KFT (3 oprs.)
PA8FLX 45,276- 49-312- A-			68,112- 66-344- A-
PA8VB 27,360- 60-152- A-			UA6KOE (2 oprs.)
PA8AAC 21,828- 34-214- A-			21,543- 43-167- B-
PA8LO 13,455- 39-115- A-21			UA6KBS (3 oprs.)
PA8JR 3960- 24- 55- A- 6			17,325- 35-165- A-
PA8TA 2346- 17- 46- A-			UA1KCU (3 oprs.)
PA8PT 418- 8- 19- A-			103,194- 91-378- B-
<i>Sweden</i>			UA1KAC (3 oprs.)
SM5UJ 80,631- 93-289- B-57			73,125- 75-326- B-
SM7BK 50,292- 66-254- B-			UA1KFT (3 oprs.)
SM5ZZ 46,176- 74-208- B-			68,112- 66-344- A-
SM3CX 28,800- 48-200- B-			UA6KOE (2 oprs.)
SM6CX 18,564- 42-148- B-			21,543- 43-167- B-
SM5HN 17,550- 39-150- B- 8			UA6KBS (3 oprs.)
SM5BDS 13,248- 46- 96- B-19			17,325- 35-165- A-
SM5XX 7140- 35- 68- AB-			UA1KCU (3 oprs.)
SM7RV 5394- 29- 62- B-			11,232- 36-107- A-
SM1CJV 5049- 33- 51- B-			UA3KIB (2 oprs.)
SM1CXE 324- 9- 12- A-			3243- 23- 47- A-
SM6CKV (7 oprs.)			<i>Kaliningradsk</i>
1,351,560-210-2327- B-68			UA2CA 65,475- 75-291- A-
			UA2DM 54,621- 63-289- A-
			UA2WO 5382- 26- 60- B-
			UA2KAP (2 oprs.)
			54,096- 49-368- B-
			<i>Ukraine</i>
SP3AJ 182,834-113-540- A-			UB5TR 15,225- 67-228- B-
SP8AG 97,632- 72-450- B-			UB5MZ 10,902- 23-158- A-
SP8BAJ 12,804- 58-246- A-			UB5DW 6400- 25- 86- B-
SP8AEG 13,923- 39-120- B-			UB5KMF (UY5R, opr.)
SP8MJ 5880- 28- 70- B-			576- 8- 24- A-
SP7GH 4212- 26- 54- B- 5			84- 1- 7- B- 1
SP9NH 2952- 24- 41- A- 7			UB5UR 576- 8- 24- A-
SP6BAA 2040- 17- 40- B-			UB5KBA (3 oprs.)
SP2PI 1596- 14- 39- A- 3			288,214-106-907- B-
SP9AGS 924- 14- 22- A-			UB5KKA (2 oprs.)
SP3BES 36- 3- 4- A-			146,034- 63-827- B-
SP9AQY 60- 4- 5- A-			UB5KED (3 oprs.)
SP9DH (2 oprs.)			126,132- 92-457- B-98
38,999- 59-221- A-			UB5KFF (3 oprs.)
			119,000- 85-167- AB-
			UB5KAW (multiopr.)
			34,968- 47-248- B-
			UT5KDP (3 oprs.)
			7800- 26-100- A-
			<i>Iceland</i>
TF2WKS 17,556- 44-133- A-			
<i>European Russian S.F.S.R.</i>			
UA1ZL 84,660- 68-415- A-			
UA1KUZ 64,386- 73-294- A-			
UA1IA 63,216- 48-439- A-			
UA1KUA 43,719- 59-250- B-			
UA1DH 33,516- 57-196- AB-			
			<i>White Russian S.S.R.</i>
			UC2KSB 96,120- 89-360- B-
			UC2SE 36,018- 58-207- A-
			UC2Y 6831- 33- 69- A-
			UC2DN 360- 8- 15- A-
			UC2CY 54- 3- 6- A- 1



Second place among Italy's mikesmen went to **ITCAQ**, whose 41-hour stint resulted in 1405 log entries. To cut down on the "marathon" aspect of the brawl, AI would like to see a limit of two QSOs per multiplier per band.

UC2KMZ (3 oprs.)
14,070- 35-134 - A-

Azerbaijan
UD6AX 1540-14- 37- B-
UD6BW 120- 5- 8- A- 2

Armenia
UG6EA 1998- 18- 37- A-
UG6JJ 750- 12- 21- A-

Lithuania
UP2KBA 22,002- 38-193- B-
UP2BU 36- 3- 4- A- 1

Latvia
UQ2KBC 1820- 18- 30- A-
UQ2PM 420- 10- 14- A-
UQ2KBE 162- 6- 9- A-
UQ2KCR (3 oprs.)
184,739- 80-617- B-

Rumania
YO3RF 13,717- 29-158- B-15
YO2AFB 2640- 16- 55- A-
YO8CP 288- 8- 12- A-
YO9HI 27- 3- 3- A- 1

Yugoslavia
YU1SF 27,507- 53-174- A-50

YU1KO 6003- 29- 69- A-
YU1BCD (YU1a HQW PCF
QB) 1,061,226-174-2035- B-76

I.T.U. Geneva
4U1TU (DJ2SL, W0AV)
60,102- 53-378 - C-

NORTH AMERICA
Dominican Republic
HI8RV 853,142-163-1802- A-
HI8LC 542,358-174-1041- B-
HI8RC 365,562-138-887- A-
HI7JMP 106,425- 75-473 - A-

Panama
HP1XHG 1,662,236-234-2368-BC-64
HP1BR 320,640-128-835- B-
HP1LR (4 oprs.)
351,120-154-760- A-

Alaska
KL7IR 1,154,592-228-1689-AC-46
KL7FRZ 210,273-119-589- B-

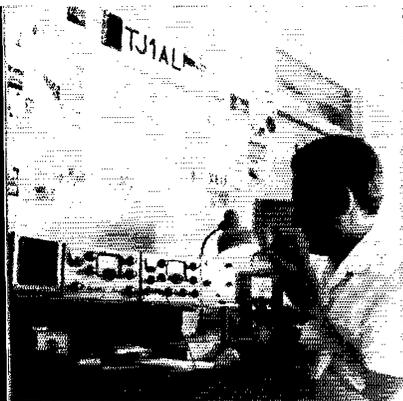
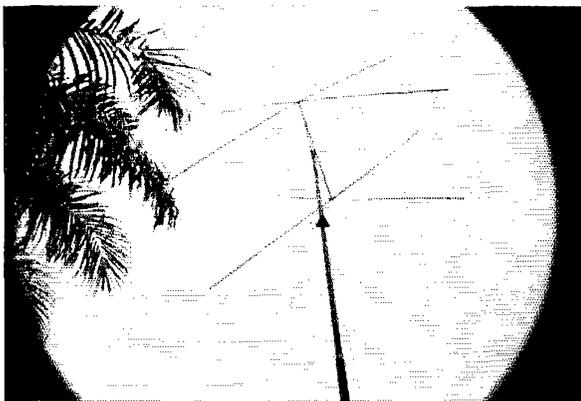
Virgin Islands
KV4AM 60,630- 86-235- C- 5

Canal Zone
KZ5GN 280,407-151-619- A-

Over 300 QSOs/band — DX

	80	40	20	15	10		80	40	20	15	10
CN8FV			363	1163		OZ1LO			691	480	573
CR6GM				556		OZ1RH					479
CR6GS				524	721	OZ2KT					416
CR7DS				388	443	OZ5JT			565	555	
E12E			433	111	423	OZ7DII*			526	566	820
ET3FMA*			355	418		PA0NPQ			458	660	616
ET3USA*			690	692		SM4CAIG			553		403
ZD8HAL			463	685	416	SM5EAC			678	391	443
ZF8JY				319	184	SM5EZZ					427
ZS6BMD					592	SM6AEK			587	305	354
ZS6DW			678	682	1155	SM6CAS*			1814	1071	986
ZS6RM			418		388	SM7CRAW			511		
ZH3KJ			370	563	486	SP5AKG				386	
5N2AAF				397	721	SV0WL			516	568	620
7P8AR			781	843	483	UA2KBD*			148		
						UA3HO			529	438	
EP3AM			906	410	333	UA3KBO*			1320	689	308
JA1BAR				301	349	UA4KHV*			183		
JA1CG				308		UB5WF				833	
JA1DXE			401			UP2OV					439
JA1NDO				369	460						
JA2JAA			385	360		VO8RA				598	
JA3CXN				374		HI8LC			757	436	
JA3GZN				360		IP1JC			407	768	629
JA3LGG				440		KL7AIZ*			418	858	1073
JA6AFY				368	429	KL7RFR					496
KA2JP				416		KP1CSW				820	
KA5MC				847		KP1DBJ				401	632
KA7AB				1046	640	KP4DBU*			170		
KA9MF*			640	611	787	KV4AM			699	742	1165
VU2DKZ			378			KV4EY			430	307	
ZC4CN			555	349	1224	KZ5EH				192	
Z4HP			770	300		KZ5NF			379	1035	511
						TG9UZ			939		
CT1BI			446	745	815	TP2AC				554	452
CT1LN			338	685		TP7NA			455		
CT1MW			385	887	743	TE1AC*			965	1008	1531
DJ5BV			558	1014	954	TE1AE			476	777	1151
DJ5GI				507	334	TE2PTB*	449	783	1454	1555	1629
DJ5HI				563		YN1TP					423
DJ6QT			550	1120	1126	YS1XE			1005	1687	1584
DL1LK				542							
DL4AP*			575	635	318	DU1FH			843	385	481
DL4DK				399		KG6AA*					416
DL4EG			463	1032	698	K0LLI/KG6				783	685
DL4RM*			545	1345	490	KH6RZF			455	501	1690
DL5JX				315		KH6GCF*					390
DL9EM					496	KH6GJW					626
DL0WR			1189	1459	1464	KH6GLJ				363	371
EA3JE			1270	1105	655	KH6LI			1057	1256	2422
EA3QW				706	1170	VK2APK			944		702
F2SI			407	689	860	VK2FU*		333	1368	626	1100
F5OJ*				142	558	VK3ATN			674	325	487
G3IAR			419	697	662	VK3ANX			368		
G3KMA				681		VK4JE					563
G3SME*			540	814	810	VK9GN					655
G3WVO*			751	1394	779	VR3DY			601	572	579
G4JZ			370	737	886	ZL1AGO			843	470	529
G6LK				762		ZW1AS			311	450	892
GB2SM*			868	1220	634	ZW1AT			859		451
GW3NVV				467							
HC2KRD				1003		CE6EZ			1084	944	1239
HB4F			881	1037	396	CE0AL*			575	672	
HB8Z				341		HC1PC			409	577	747
HC4Q			463	550	390	HCFTB			465	517	1195
HCZV*			492	500	654	HK3RQ			1297	1403	1875
HL4G				368		HK5BDS			596	531	
HR1Z			385			KC4USM			792	732	
LA0AD			685	734	633	LUBEX					1060
OE2EGL			636	781	727	OA4BR			723	635	845
OH2RH			939			OA6BU			360	495	751
OH58M*			1763	1413	765	PY1CK			326		
OK1MP				375		PY7AKQ			677	712	971
ON1XG				421	452	8R1G			570	556	1316
ON4ZU			350	493	483	9Y4LA				506	385
ON5GF				591	358	9Y4LO			479	607	

*Multioperator station.



TJ1AL was a popular item on 21-MHz. phone with a homebrew 3L quad 35' skyward; Gerard and friend are at right. S.s.b. and a triband quad arrived too late for Test purposes.

<i>Sint Maarten</i> PJ5MJ (PJ2ME, W2BBK) 560,205-177-1055- A-	<i>Territory of New Guinea</i> VK9GN 233,376-136-572- A-	PY2BBO 170,046- 94-603- A- PY1CKV 66,112- 27- 82- A-	<i>Maryland, D.C.</i> W3RQN 682,722-269-846- C-88 W3PYS 293,763-181-541- B- W3BWZ 279,600-200-466- B-42 W3GRF 186,372-167-372- C-30 W3AXW 185,562-183-338- C-69 W3AYD 164,754-162-339- C-33 W3AGTX 156,372-157-332- A- W3KDD 118,050- 94-525- C-43 K3VAB 104,949-117-299- C-45 W3HVM 101,106-123-274- B-59 W3ADCG 80,250-161-166- C-33 K3AHB 62,916-107-196- C-28 W3AJEA 30,750- 82-125- C-12 W3PWO 22,791- 71-107- C-14 W3AGLP 19,314- 58-111- A-30 W3PX 14,706- 57- 86- C-13 K3CBW 3600- 30- 40- C- 6 W3CSZ 1767- 19- 31- A- 4 W3AWN 1584- 22- 24- C- 8 W3RNY 1350- 18- 25- C- 3 W3ZKH/3 (9 oprs.) 4841-424-504-3202-C-96 W3MVB (W3s JVA MBV) 357,600-300-596- C-51 W3GN (W3s KMV) 341,396-216-527- C-73 WA3EPT (6 oprs.) 237,120-190-416-AC-67 K3JYV (K3LCH, W3DVA) 126,630-134-315- C-43
<i>British Virgin Islands</i> VP2VL 3,084,300-298-3450- B-	<i>Fanning & Christmas Is.</i> VR3DY 37,620- 57-220- A-	<i>Nicaragua</i> YV1OB 999,775-203-1643- B-61 YV5AGD 779,259-169-1537- B- YV1DP/5 608,130-145-1398- B-28 YV5ROA 480,187-127-1261- C-	<i>Virginia</i> W3RQN 682,722-269-846- C-88 W3PYS 293,763-181-541- B- W3BWZ 279,600-200-466- B-42 W3GRF 186,372-167-372- C-30 W3AXW 185,562-183-338- C-69 W3AYD 164,754-162-339- C-33 W3AGTX 156,372-157-332- A- W3KDD 118,050- 94-525- C-43 K3VAB 104,949-117-299- C-45 W3HVM 101,106-123-274- B-59 W3ADCG 80,250-161-166- C-33 K3AHB 62,916-107-196- C-28 W3AJEA 30,750- 82-125- C-12 W3PWO 22,791- 71-107- C-14 W3AGLP 19,314- 58-111- A-30 W3PX 14,706- 57- 86- C-13 K3CBW 3600- 30- 40- C- 6 W3CSZ 1767- 19- 31- A- 4 W3AWN 1584- 22- 24- C- 8 W3RNY 1350- 18- 25- C- 3 W3ZKH/3 (9 oprs.) 4841-424-504-3202-C-96 W3MVB (W3s JVA MBV) 357,600-300-596- C-51 W3GN (W3s KMV) 341,396-216-527- C-73 WA3EPT (6 oprs.) 237,120-190-416-AC-67 K3JYV (K3LCH, W3DVA) 126,630-134-315- C-43
<i>Habamca Islands</i> VP7DX 1,263,339-231-1823- A-32	<i>New Zealand</i> ZL1APW 519,048-162-1068- A-45 ZL1HW 514,608-142-1208- A- ZL1AMQ 334,995-115-971- A-55	<i>Venezuela</i> 608,130-145-1398- B-28 480,187-127-1261- C-	<i>Virginia</i> W3RQN 682,722-269-846- C-88 W3PYS 293,763-181-541- B- W3BWZ 279,600-200-466- B-42 W3GRF 186,372-167-372- C-30 W3AXW 185,562-183-338- C-69 W3AYD 164,754-162-339- C-33 W3AGTX 156,372-157-332- A- W3KDD 118,050- 94-525- C-43 K3VAB 104,949-117-299- C-45 W3HVM 101,106-123-274- B-59 W3ADCG 80,250-161-166- C-33 K3AHB 62,916-107-196- C-28 W3AJEA 30,750- 82-125- C-12 W3PWO 22,791- 71-107- C-14 W3AGLP 19,314- 58-111- A-30 W3PX 14,706- 57- 86- C-13 K3CBW 3600- 30- 40- C- 6 W3CSZ 1767- 19- 31- A- 4 W3AWN 1584- 22- 24- C- 8 W3RNY 1350- 18- 25- C- 3 W3ZKH/3 (9 oprs.) 4841-424-504-3202-C-96 W3MVB (W3s JVA MBV) 357,600-300-596- C-51 W3GN (W3s KMV) 341,396-216-527- C-73 WA3EPT (6 oprs.) 237,120-190-416-AC-67 K3JYV (K3LCH, W3DVA) 126,630-134-315- C-43
<i>Mexico</i> XE2AAG 1,655,698-233-2370- A-	<i>Samoa</i> 5W1AT 1909- 23- 28- A-	<i>Trinidad & Tobago</i> 9Y4LA 315,248-136-778- A-	<i>Virginia</i> W3RQN 682,722-269-846- C-88 W3PYS 293,763-181-541- B- W3BWZ 279,600-200-466- B-42 W3GRF 186,372-167-372- C-30 W3AXW 185,562-183-338- C-69 W3AYD 164,754-162-339- C-33 W3AGTX 156,372-157-332- A- W3KDD 118,050- 94-525- C-43 K3VAB 104,949-117-299- C-45 W3HVM 101,106-123-274- B-59 W3ADCG 80,250-161-166- C-33 K3AHB 62,916-107-196- C-28 W3AJEA 30,750- 82-125- C-12 W3PWO 22,791- 71-107- C-14 W3AGLP 19,314- 58-111- A-30 W3PX 14,706- 57- 86- C-13 K3CBW 3600- 30- 40- C- 6 W3CSZ 1767- 19- 31- A- 4 W3AWN 1584- 22- 24- C- 8 W3RNY 1350- 18- 25- C- 3 W3ZKH/3 (9 oprs.) 4841-424-504-3202-C-96 W3MVB (W3s JVA MBV) 357,600-300-596- C-51 W3GN (W3s KMV) 341,396-216-527- C-73 WA3EPT (6 oprs.) 237,120-190-416-AC-67 K3JYV (K3LCH, W3DVA) 126,630-134-315- C-43
<i>El Salvador</i> YS10 10,800- 48- 75- C- 3	SOUTH AMERICA		PHONE SCORES
<i>Guam</i> K9JLL/KG6 49,104- 66-248- C-11 KG6AAV (K8RXd, W6E1F) 58,536- 72-271- C-11	<i>Chile</i> CE2CR 143,397-113-430- A-		ATLANTIC DIVISION
<i>Hawaiian Islands</i> KH6J 3,051,270-270-3767- C-69 K28IL/KH6 1,401,048-244-1914- C-27 KH6AA 4500- 25- 60- A- 9	<i>Uruguay</i> CX1OP 48,960- 72-227- A- CX1BBV 39,840- 40-332- A-	<i>Colombia</i> HK3RQ 3,230,166-263-4095- C- HK3BAE 2,638,725-233-3775- B-58 HK3ASJ 25,772- 34-253- A-	<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
<i>Australia</i> VK2EO 1,962,900-225-2908- A-73 VK3AFJ 1,271,411-199-2133- A-83 VK3AXK 528,372-156-1129- A-42 VK5FM 274,701-127-721- A- VK4FH 225,587-117-637- A-48 VK2VN 140,784-112-419- A- 9 VK5FH 100,332- 64-620- A- VK4QM 68,100- 50-454- A- VK2AND 30,912- 56-186- A- 3 VK5KO 1950- 33- 50- A- 3 VK3QV 3940- 20- 66- A- 5 VK3APN (VK3s APN OP QK) 179,760-106-571- A-	<i>Antarctica</i> KC4USM 467,775-135-1155- C-49	<i>Argentina</i> LU8DQ (4 oprs.) 2,210,264-232-3200- C-86	<i>Eastern Pennsylvania</i> W3WJD 1,326,150-350-1263- C-83 W3GM 655,134-274-797- C-50 K3JH (K3JLL, opr.) 601,398-258-777- C-80 W3MWC 386,529-221-583- C-48 K3PQO 256,680-155-552- C-24 W3BYX 251,991-183-459- C-47 K3QDV 216,630-145-498- A-68 W3GHM 187,011-142-439- C-32 K3P8W 186,589-146-426- C-44 WA3ATX/3 167,400-150-372- A-62 W3GRS 150,804-177-284- C-14 W3CGS 150,150-154-325- C-42 W3EQA 127,463-139-307- C-31 W3ALB 121,704-139-292- A-16 W3NOH 81,144- 98-276- A-16 W3KDF 72,750- 97-250- C-25 W3AFC 70,296-101-232- C-25 W3VFG 63,934-101-211- A- W3ECR 61,200-102-300- A-31 W3CAA 56,682- 94-391- C-30 W3VHV 56,430- 90-590- C-12 W3RQJ 50,912- 86-198- C-14 W3INH 13,011- 81-177- C-25 W3CHD 29,820- 82-120- C-1 W3GHI, 20,400- 50-136- A-27 W3YUF 20,130- 61-110- C- W3GLI 15,411- 49-103- A-30 W3NM 15,066- 54- 93- C- 8 W3EAD 8064- 32- 84- A- 9 W3CBF 2871- 29- 33- A- 4 K3MNT 975- 13- 25- C- 2 K3EUR 900- 15- 20- A- 7 K3GYS 576- 12- 16- A- 2 W3EAN 351- 9- 13- C- 2 W3KT (K3MCO, W3KT) 526,176-252-606- C- W3GHS (K3VOV, W3GHS) 451,143-217-693- C-64 K3BNS (K3BNS, W3DHM) 327,698-178-615- C-53
<i>Peru</i> OA4PF 1,163,076-206-1882-BC-	<i>Brazil</i> PY2SO 2,809,131-247-3956- C-70 PY2BGL 2,603,250-243-3598- C- PY1NO 638,608-167-1278- A- PY1BCA 171,304- 92-622- B-	<i>Peru</i> OA4PF 1,163,076-206-1882-BC-	<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
ORP CHAMPS (150 Watts or Less at All Times)			<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
C.W.	Phone		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W4BRB.....695,156	WA1DJG.....434,340		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W8QXQ.....407,700	VE2NV.....373,434		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
VE2NV.....361,020	W8ECA.....344,925		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W6GEN.....311,298	K4OLC.....310,128		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W4CRW.....285,600	VE2BV.....300,390		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W2HUG.....281,184	W1DQD.....287,532		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W2DKM.....250,860	W2DKM.....262,980		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W2HDW.....250,056	K1THQ.....252,480		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
W1DXB.....215,712	WA1ANR.....219,948		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50
WB2RKK.....208,824	WA4UXU.....237,357		<i>Delaware</i> W3DRD 75,327-119-211- C-33 W3JLD 1296- 18- 24- B-12 W3GSM 1170- 15- 26- A- 6 W3IYE (K3KOZ, W3IYE) 203,940-165-412- C-50

Western New York

W2FZJ	348,153-237-510	C-50
K2DJD	332,904-194-572	C-62
WB2YQH	301,800-203-503	C-51
K2KNV	95,760-133-240	C-28
W2SSC	85,068-102-278	C-20
K2GXI	70,455-105-224	C-42
WA2CYQ	54,747-79-231	B-22
WA2BEX	50,007-79-211	B-17
W2FXA	23,328-72-108	C-8
WB2WSP	21,825-75-97	A-
W2EJ	20,160-60-112	C-15
WB2SJT	24,12-22-37	A-9
WA2OHL	867-17-17	A-15
WB2HZG (WB2s ERE HZG)	155,820-140-371	C-37

Western Pennsylvania

W3BVP	273,513-173-527	B-44
WA3GJV	102,555-129-265	A-26
W3QZH	92,520-120-287	C-49
W3OJW	45,465-105-149	A-
WA3ENR	15,408-86-176	A-40
K3AKR	23,184-69-112	C-44
K3PZU	14,396-59-82	C-16
WA3EJG	11,742-38-103	A-46
K3HKK (K3AHT, opr.)	11,610-43-90	B-4
W3KVS	9288-43-72	A-30
W3VK	7236-36-67	-
WA3EFH	3645-27-45	C-15

CENTRAL DIVISION

Illinois

W9RZW	556,920-255-728	C-65
W9QQN	444,744-261-568	C-50
W9JVV	186,465-155-401	C-65
W9DWQ	159,390-161-330	C-26
K9ZJV	166,848-158-352	C-53
K9BJM	132,132-143-308	B-57
WA9TFM	105,570-138-255	A-
W9QLD	88,059-149-197	C-36
W9FHL	81,151-127-213	C-37
K9DTZ	80,496-129-208	C-38
WA9HJM	68,355-105-217	A-51
W9CFP	64,092-109-196	C-42
W9ARV	58,500-100-195	A-32
WA9NPL	52,143-91-191	A-34
K9QFR	48,654-102-159	B-18
K9KOD	41,496-91-162	C-26
W9WYB	34,800-80-145	C-
K9KDI	33,150-78-142	A-
WA9NJB	27,537-67-137	AB-24
WA9TUM	26,130-67-130	A-12
W9JLT	19,764-61-108	C-20
K9IDQ	19,404-66-98	B-
W9CRN	18,156-68-89	B-
K9UCR	16,611-49-113	-
W9WKU	11,076-52-71	B-10
W9KVV	8772-43-68	A-14
K9MNT	5850-39-60	A-19
WA9UHD	585-13-15	A-15
W9HGX (K4HNA, K9WEH, W9ICF)	1,033,604-338-1020	C-96
W9EXE (K9YOE, W9EXE, WA9RAT)	991,452-319-1036	C-92

DIVISION LEADERS

C.W.

Single Operator

Multioperator

Phone

W3WJD	W3TMZ	Atlantic	W3WJD	W3ZKII/3
W9AQW	W9YTT	Central	W9AQW	W9BGX
W0BLZ	WA0CJU	Dakota	WA0CPX	W0LOI
W5IOU	.....	Delta	W4NBV	WA5RAMC
W8SH	WA8MCR	Great Lakes	W8SH	W8NGO
W9WNV/2	K2AHQ	Hudson	W2J8X	W82CKS
W0TDR	.....	Midwest	W0LBS	W0BAA
K1DIR	W1MX	New England	K1DIR	W1ADCE
W1V1V	W7SFA	Northwestern	W7ESK	W7SFA
W6HVN	K6DXM	Pacific	W8YU	K6OIJ
W4KFC	W4BVV	Rosnoke	K8YRI	WA4IFTR
WA0CVS	.....	Rocky Mountain	K7RAJ	W0ICH
K1BAI	W4ZXI	Southeastern	W4QBK	WA4QPL
K6NA	W6RW	Southeastern	W6RR	W6CCTP
W5JAW	W5EQT	West Gulf	W8KTR	W5AC
VE2YU	.....	Canadian	VE3BHS	VE3FHO

K9PPJ (K9PPI, WA9UFV)

118,011-139-283	C-30	
W9YYG (W9YYG, WA9s NVF QNU)	15,552-54-96	C-14
K9QFZ (K9S QFZ RJP)	7385-35-71	A-20

Indiana

W9AQW	979,209-297-1099	C-79
K9TZH	760,674-291-872	B-80
W9ZRX	711,072-288-823	BC-79
K9CIY	705,740-284-829	C-87
W9LKI	355,506-193-614	C-57
W9JQD	295,236-236-417	B-36
K9FAP	237,354-179-442	C-
W8CPO/9	51,000-100-170	A-45
W9MUR	33,465-97-115	C-
K9BHG	33,352-88-127	B-22
W9UEM	31,833-81-131	A-19
K9ODT	10,395-55-63	A-27
K9VQK	7695-45-57	A-32
WA9TJK (K9DYZ, WA9s ONZ TJK)	131,672-133-330	A-34
WA9SXR (WA9s RLM SXR VXT)	40,545-85-159	A-

Wisconsin

W9EWC	896,148-292-1023	C-72
W9DUB	639,132-241-884	C-30
W9RQM	221,160-152-185	B-40
W9GIL	199,800-150-444	C-
WA9JDT	67,035-109-205	C-28
WA9ETL	35,421-82-144	A-33
W9ODD (W8A PN, opr.)	23,424-64-122	C-9
W9CMV	10,972-52-71	B-10
WA9NSR	2088-24-29	A-8
W9CIA	1764-21-28	A-
WA9JDK	630-14-15	B-4
W9WEN	231-7-11	A-4
W9YTT (4 oprs.)	679,758-277-818	C-68

DAKOTA DIVISION

Minnesota

WA0KDI	232,800-194-400	C-62
WA0GCP	216,300-175-412	C-45
WA0LDK	142,884-147-324	C-42
W0IJM	140,220-164-285	C-41
WA0OZB	18,048-64-94	B-24
WA0EFP	13,959-47-99	A-20
W0AA (WA0SEN, opr.)	5856-32-61	C-10
WA0RUE	1848-22-28	A-25
W0LOL (W0s LOL PAN)	715,600-284-840	C-
WA0CJU (9 oprs.)	450,288-236-636	C-
WA0NOJ (4 oprs.)	118,706-122-343	B-55

North Dakota

WA0PPK	1008-16-21	A-4
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South Dakota

WA0CPX	288,768-188-512	C-
W0ACT	61,380-99-208	AC-64

DELTA DIVISION

Arkansas

WA5LLX	92,907-111-279	B-88
WA5RTG	90,171-129-233	C-42
WA5SDT	89,010-129-230	A-51
K5BLV	297-9-11	A-7

Louisiana

W5KC	319,815-207-515	C-60
W5AJY	310,635-195-531	C-55
W5LDD	91,575-111-275	C-
WA5RMC (WA5s OZH RMC)	45,675-87-175	AB-25

Mississippi

WA5RCM	112,464-132-284	B-40
W5MUG	54,609-109-167	-
K5EXW	43,992-94-156	C-40
K5MDX	38,890-90-144	A-14
WA5OYU	37,224-88-141	B-38

Tennessee

W4NBV	619,776-269-768	BC-80
W4PEW	277,500-185-500	C-34
W4GGG	60,075-75-267	B-28
W4ZPJ	2538-18-47	B-4

GREAT LAKES DIVISION

Kentucky

WA4LMD	539,358-241-746	C-59
W4CVT	29,484-91-108	A-21
W4FIN	23,400-65-120	C-12
W4ZXR	17,136-68-84	B-
K4ZQR	168-7-X	C-2
W4BCV	6-1-2	C-1

Michigan

W8SH (K1ZND, opr.)	1,079,154-334-1077	C-75
W8TWA/8	444,165-249-595	C-87

K8BGZ	155,811-167-311	C-
W8RXY	153,117-159-321	C-
W8KSR	76,398-107-238	C-30
W8QQJ	70,305-109-215	C-
W8RVD	62,274-97-214	C-
WA8OSL	51,894-93-186	B-48
W8HXZ	31,098-73-142	C-16
W3TBF/8	33,726-77-140	A-40
W8DQL	23,010-65-118	C-11
WA8GIG	18,900-63-100	B-30
W8FRJ	12,936-49-88	C-15
W8EEZ	12,561-53-79	C-24



Alaska's top dogs (huskies, of course) were phone on **K17GAC** (left), who QSO'd 1194 people in 45 hours, and Morse whiz **KL7IR** (right), with 1688 contacts in 46 hours. GAC has been transferred to North Carolina, will be on the wrong end of pileups next year. IR built W1CER's "Softboomer 160" (August 1966 QST) but had to listen to KH6IJ working multipliers on 1.8 MHz, that Marty couldn't even hear.

WRTWJ 11,664-18-81-C-9
 WRAJE 6825-35-65-C-10
 WARMGO 3192-28-38-A-30
 WAMNRR 2115-23-35-B-9
 WREFP 693-11-21-A-5
 WNRGO (4 oprs.)
 957,177-303-1057-B-
 KRHP8 (9 oprs.)
 22,374-66-113-
 W8NDM (WRNDM, WNR8YHB)
 510- 9-20-A-4

Ohio

W8LXU 374,976-217-576-AB-60
 W8MCA 344,925-219-525-A-63
 KRAXC 342,042-218-523-B-70
 WA8MCR 319,032-211-504-C-51
 KRCCFH 303,195-205-493-A-C-
 W8DKI 276,450-194-475-C-69
 WRBF 241,686-174-463-C-43
 W8HYV 230,850-190-465-C-59
 W8XCR 201,372-173-388-C-71
 KR8KA 155,124-124-117-B-46
 W8RBR 120,096-114-278-C-22
 W8UO 115,920-120-322-C-30
 W8RNYB 88,803-119-249-B-44
 KRGVK 85,365-105-271-B-43
 W8YGR 80,010-127-210-A-20
 W8KFR 77,556-92-281-C-55
 W8KPO 76,002-106-239-C-22
 WRNPF 71,190-113-210-C-37
 W8TQL 54,810-105-174-B-36
 W8JAU 51,759-81-213-C-26
 W8OG 11,124-92-149-B-12
 KR8SM 40,020-92-145-C-15
 W8LJZ 37,908-81-156-A-10
 W8XQX 34,365-79-145-A-14
 W8BYF 31,968-72-148-C-16
 W8TYF 30,660-70-146-A-11
 W8AJW 29,502-66-149-A-21
 W8IPA 23,328-72-108-C-48
 W8SLW 20,790-66-105-A-18
 W8PCS 20,679-61-113-A-11
 W8NHO 18,144-56-108-B-47
 W8ARRX 17,484-62-91-B-21
 W8VZE 14,952-56-89-A-15
 W8DZG 12,726-42-101-A-20
 W8TKM 10,716-47-76-A-17
 W8WHN 9,516-52-61-A-29
 W8AQZ 9,159-43-71-A-14
 W8GAK 8,526-47-58-B-8
 W8DWP 7,944-49-51-A-17
 W8RZG 6,588-36-61-A-C-
 W8SLL 3,510-30-39-A-11
 KR8MH 1,958-21-31-A-12
 W8LAT 1,800-21-30-A-5
 W8SZF 1,836-17-36-B-5
 KR8PZ 1,800-20-30-C-2
 W8ZGC 1,800-20-30-B-
 W8NRQ 1,404-18-26-A-7
 KR8PYD 816-16-17-A-C-3
 W8HQX 630-14-15-A-6

K8PXD 75- 5- 5- A-
 KR8KJ 72- 1- 6- B- 1
 W8ZJM (KR8JY, W8ZJM)
 120,324-148-271-B-22
 W8EDU (WA3BGE, W8AZA,
 WA8MGI)
 69,930-111-211-C-20

HUDSON DIVISION

Eastern New York

WB2ZMK 302,304-188-536- B-60
 WB2PPP 263,760-157-560- C-36
 W2AMK 114,210-94-105-A-
 WB2MO1 61,677-89-231-C-
 W2AH 34,380-60-191-C-
 W2GTQ 7488-32-78-B-11
 W1BGD,2 5100-34-50-C-5

N.Y.C.-L.I.

WA2CFD 407,904-224-607- C-49
 WB2FON 370,266-202-611- B-42
 W2CP 311,085-223-465- C-54
 W2DKM 262,980-180-487- A-58
 W2FSK 232,128-156-496- C-60
 WB2UZU 226,320-104-460- A-40
 WB2ZTU 213,192-189-376- B-42
 W2WZ 190,560-160-397- C-56
 W2GKW 150,837-137-367- B-45
 W2LEJ 150,672-146-344- B-75
 WB2ZTH 146,316-137-356- A-63
 W2GKZ 97,020-147-220- C-16
 W2YCW 85,680-119-210- C-26
 W2AZS 51,840-96-180- C-34
 WB2OB0 28,050-85-112- A-20
 WB2YKL 26,112-68-128- A-12
 WAZUWA 22,113-63-117- B-20
 W2ZV 20,412-51-126- A-35
 WB2ZBM 18,468-54-114- C-14
 WB2ZJN 12,375-45-92- B-20
 W2TUK 11,664-48-81- A- 6
 W2RDN 8100-36-75- C- 7
 W2KGN 7938-42-63- B-10
 WB2VQR 4928-32-52- B-10
 W2CKR 4620-28-55- A-11
 W2ZJKT 3393-29-39- A- 6
 WA2LQO (WA2JKT, opr.)
 468-12-13- C- 3
 WA2KSD 294-7-14- C- 3
 W2JB 30-3-5- A- 1
 WB2CK8 (WB28 CK8 VBT)
 830,636-281-986- C-70
 WB2ZYY (7 oprs.)
 189,805-145-438- B-96

Northern New Jersey

W2J8X 665,847-271-819- C-75
 W2JKH 363,130-215-594- C-
 W2FFQ 161,553-157-343- B-48
 W2VNSQ 122,112-128-318- B-48
 K2DNL 120,414-141-286- C-42
 WA21FS 69,915-79-295- A-49

W2FCR 56,448-98-192-AC-35
 WB2OUZ 54,600-91-200- B-30
 W21UV 32,706-79-138- C-23
 W2CY 28,350-70-135- B-19
 WB2WTD 24,705-61-135-AB- 8
 W2MNV 9102-11-74- A-20
 WB2YBA 8127-13-63- B-7
 WB2AMV 6270-38-78- A-12
 WB2YJS 6156-38-51- B-5
 F3VN/W2 3432-26-44- B-9
 WB2RKK 675- 9-25- A- 1
 WB2ZKD 75- 5- 5- A- 2
 WR28SQ (6 oprs.)
 476,748-228-697- B-72
 K2BPP (5 oprs.)
 178,670-170-351- C-52

MIDWEST DIVISION

Illinois

W8LBS 523,776-256-682- C-62
 KR8KN 329,511-221-497- C-60
 KR8YU 188,083-162-387- A-58
 W8BLR 110,160-135-272- C-42
 W8AVR 26,566-74-120- B-22
 W8AJOK 13,110-46-95- A-17
 KR8R 1296-46-27-
 W8ASU (W88 KRG PKLH)
 68,770-211-690- C-30
 W8TYK (4 oprs.)
 304,500-203-500- C-96

Kansas

W8YUQ 480,690-218-735- C-
 W8SEA 288,204-188-511- C-58
 W8LEM 256,224-157-544- B-62
 W8ECV,0 111,245-95-395- A-36
 W8P8A 70,914-106-223- C-40
 W8BAA (W88AA, W88MSD)
 528,759-231-763- C-63

Missouri

W8LBB 300,696-187-536- C-72
 W8GNX 271,281-184-481- B-58
 W8LQN 77,871-101-257- C-18
 KR8JPL 61,812-102-202- B-45
 KR8YIP 41,822-97-12- A-16
 W88ELM 21,552-66-124- A-22
 KR8GSV 21,528-69-104- A-18
 W8DSW 5508-36-51- A- 8
 W8UCK 2310-22-35- C- 2
 W88XV/0 1404-18-26- C- 6
 KR8BX1 (4 oprs.)
 55,890- 81-230-AC-42
 W88EMS (W88EMS, WN8TSD)
 31,236-76-137- C-10

Nebraska

W88LXD 62,208-96-216- A-40
 KR8LFA 19,872-46-144- C-
 W88OVL 741-13-19- C- 6
 KR8CVA (KR8 BLT CVA,
 WA8MOB)
 512,569-252-678-C-

NEW ENGLAND DIVISION

Connecticut

W1OKG 840,324-284-987- C-86
 W81DH 676,736-272-890- C-58
 WA1DJG 431,310-228-635- A-59
 K1VTH 362,385-202-59-8- C-65
 K1PTHQ 252,480-160-526- A-60
 K1GUD 222,762-137-542- C-30
 K1JHX 167,406-155-360- B-20
 K1DPB 87,756-101-284- A-
 W1CW* 76,653-101-251- C-30
 W1ONT 67,803-97-233-AB-18
 WA1JED 57,459-107-179- A-23
 W1QEC 51,300-90-190- C-20
 K1QY 34,020-70-162-AC-9
 W1DT 31,374-83-126- C-32
 WA1EJU 30,102-58-173- A-10
 K1HT 23,718-59-134- A-
 W1CP** 22,815-65-117- C-15
 W1ECH 20,490-56-122- A- 8
 W1LKE** 17,820-60-99- C-
 K1TK8 14,628-46-107- A-16
 W1ARR/1**
 44,100-47-100- C-7
 W1LVO** 9000-46-70- A-10
 WA1CJE 7788-14-59- A- 5
 W1AYR 4098-27-58- 3
 WA1CCT 4450-25-60- A- 4
 W1EJN 2025-25-35- B-3
 W1CJJE/1 1725-23-25- A-2
 W4NQA/1** 1567-18-29- A-4
 W1EJN** 351- 9-13- A-4
 W1EJL 312- 8-13- A-
 W1YYM** 6- 1- 2- C-

Eastern Massachusetts

K1DIR 1,445,745-343-1405- C-77
 W1AX 1,125,408-304-1234- C-63
 W1UOP 359,358-202-593- B-35
 W1ORV 319,362-202-527- C-50
 W9MJJ,1 286,117-169-565- C-
 WA1ANR 249,948-150-524- A-60
 W1FJJ 235,224-198-396- C-24
 K1KNI 111,891-151-247- A-32
 K1YRG 79,866-102-261- A-26
 W1MO 44,838-94-150- A-17
 W1EHT 39,183-107-123- B-30
 W1EJE 35,490-91-130- A-15
 W1UZY 35,112-77-152- A-
 W1BZT 24,924-67-124- C-20
 W1BPW 4128-32-43- C-3
 W1PLJ 1800-20-30- B-10

Maine

W1PCD 124,131-161-257- C-54

New Hampshire

K1ORT 323,361-183-580- B-19
 WA1DZX 276,672-193-478- C-50
 W1EZF 112,718-120-308- C-
 WALDCE (WA18 C'OH EAH
 BXH) 115,560-120-321-AC-45

Rhode Island

W1YRC 331,335-199-555- C-29
 K1VNSJ 205,128-148-462- C-52
 W1RFB 175,950-150-391- B-60
 K1KKN 162,960-140-388- A-67
 K1AJQ 58,077- 81-239- A-31
 K1UUX 18,135- 65- 93- A-24
 W1AWE 13,083- 49- 89- A-

Vermont

WA1HHN 382,302-201-634- B-64
 WA1HXU 86,718- 97-298- B-30

Western Massachusetts

K1KNQ 227,385-163-465-ABC-30
 K1DKX 169,200-114-495- C-42

NORTHWESTERN DIVISION

Idaho

WA7JUR 136,275-115-395- A-41
 W7IY 27- 3- 3- A- 3

Montana

W7EOL 44,109- 87-169- C-32
 W7FFN 4020-20- 67- A-30
 K7CTI 1173- 17- 23-AB- 5

Oregon

W7YEX 172,638-138-417- B-55
 K7VYU 75,684-106-238- C-30

From the land of Mozart, **OE2EGL** composed a phone symphony in the key of 1.3 megapoints, orchestrated with 2262 QSOs, 191 mults. At left we note a 3L quad at a height of 60 feet; at right, operator Gene appears very gemülich over the results.



W7HIA 51,336-92-186- B-40
 K7RLS 40,680-60-226-AB-45
 W7AQG 31,050-69-150- B-48
 K7WVG (5 oprs.)
 280,308-142-658- C-
 K7WWR (57s 1FG WWR,
 WA7GFE)
 190,494-129-492- A-73
 W7YG (4 oprs.)
 65,844- 93-236- B-60

Washington
 W7ESK 1,413,666-282-1671- C-
 W7BJ 139,776-104-448- C-60
 W7MST 100,548- 98-342- C-53
 W7AJCB 10,080- 32-105- A-14
 W7GYF 1470- 14- 35- A- 2
 K7INE 75- 5- 5- C- 1
 W7SPA (5 oprs.)
 1,178,190-265-1482- C-96

PACIFIC DIVISION

Last Bay

W6KJS 213,780-170-478-BC-30
 W6VNH 81,432-104-261- C-21
 W6EJA 108- 4- 9- C- 1
 W6AVN* 630,894-242-869- C-49
 W6AHH* 121,905-135-301- C-24
 W6LDD* 100,035-117-285- C-20
 W6RGG (W6RGC, W6AVN)*
 96,012-126-254- B-30
 W6AUFW* 68,310- 90-253- C-23

Nevada

W7CRT 432,755-205-705- C-81
 WA7GES 42,735- 77-185- A-25
 W7TVF 19,260- 60-107- B-25
 W7TZL 6475- 35- 62- -

Sacramento Valley

W6SIA 205,827-157-437- C-41
 WA6JDT 5046- 29- 58- A-18
 W6NKR 3105- 23- 45- C- 7

San Francisco

K6KQN 212,148-106-426- C-80
 WB6UJO 459- 9- 17- -
 W6ERS* 85,140-120-238- C-40

San Joaquin Valley

WA6BOU 199,815-173-385- C-48
 W6KTW 13,677- 47- 97- C-16
 W6MMH 528- 11- 16- B- 5

Santa Clara Valley

W6WX 184,512-196-824- C-76
 WB6KRW/6
 421,470-210-669-AC-63
 W6ZKM 250,368-163-512- B-50
 WB6THT 213,774-174-467- C-77
 W6LSP 220,284-174-422- C-28
 K6PHJ 150,087-123-423- B-45
 W6NTQ 153,090-126-405- C-39
 W6ZBS 73,218-112-218- B-39
 W6CBE 62,250- 83-250- C-30
 W6AO1 26,070- 55-158- B-18
 K6UXV 20,862- 57-122- B-25
 W6VG 14,157- 39-121- C-
 K6MJ 13,764- 37-124- A-
 W6EJ 13,674- 43-106- C-17
 W6HVN 13,161- 41-107- C-15
 W6KIG 8712- 24-121- B- 4
 W6PHS 3510- 26- 45- B- 5
 K6OHJ (K6SERV OHJ,
 W6BHY)
 1,028,304-284-1207- C-96
 K6DXM (7 oprs.)
 609,522-226-899- C-96
 W6JKJ (W6KJ, K6YGS)*
 286,572-167-572- C-58
 K6CQP* 249,872-184-453- C-40
 WB6UKO (WB6s QYL UKO)
 171,696-112-511-AB-20
 WB6CCV (WB6s ABL CCV)*
 136,500-140-325- C-41
 W6DAD/6
 116,022-122-317- C-40
 W6GQK* 57,312- 92-199- B-30
 W6CUP* 46,800- 78-200- C-17

ROANOKE DIVISION

North Carolina

WA4UXD 237,357-177-447- A-80
 W4OMV 20,352- 64-106- C-18
 W4OVQ 8415- 45- 63- C- 7

W4VON 280- 10- 10- C- 6
 W4OIX (K4PRJ, WA4ULE)
 100,548-114-294- C-
South Carolina
 WB4CPE 6480- 40- 54- A- 6

Virginia

W4SYL 532,650-274-648- C-61
 W4KFC 499,872-254-656- C-44
 K4WUY 358,800-200-598- C-57
 W4VAN 285,441-169-563- C-65
 W4EZ 230,112-188-408- C-50
 W4AKQO 188,209-161-390- C-59
 W4WBC 128,169-141-303- C-41
 W44AMT 109,134-129-282- C-48
 W4DM 95,233-124-256- C-
 K4WTM 51,798- 97-178- A-32
 W4GF 49,608-104-159- B-
 K4PCL 35,280- 80-147- C-19
 W4ZM 34,383- 78-157- C-11
 K4CAU/4 30,810- 65-158- B-15
 W4BHNV 30,702- 86-119- C-
 K4ZA 12,408- 47- 88- A-13
 K4PRT 9243- 39- 79- C-18
 W4KOR 6630- 34- 65- C- 6
 W4KMS 3690- 30- 41- B-10
 W4PHL 2925- 25- 39- A-14
 W4TKN 1056- 16- 22- A- 8
 W4HTR (10 oprs.)
 1,494,000-360-1386-BC-96
 K4CG (K3WUW, W3PPT) 1,079,391-331-1087- C-96
 W4KXV (K4ZA, W4KXV,
 WA4GHV)
 199,398-167-308-AC-29

SOUTHEASTERN DIVISION

Alabama

W4ZNI 230,472-194-306- C-64
 W4GRG 83,790-114-245- C-24
 W4BEX 69,120- 96-240- A-36
 W4DS 51,207-101-169- C-28
 W4BSM 11,178- 54- 60- C- 7

Eastern Florida
 W4QBK 1,125,884-346-1088- C-84
 K4YFT 791,268-283-932- C-49
 W4HOS 211,464-178-401- A-49
 W4SD 208,590-170-409- C-40
 W4LCP 149,420-173-288- B-25
 W4DJT 93,226- 86-364- A-60
 W4XPJ 64,740- 83-260- C-
 W4DJQ 56,250- 75-250- B-
 W4BYB 28,800- 64-150- B-
 W4UW 26,676- 78-114- C-16
 W4FFF 21,504- 64-112- C-14
 K4EJ 9900- 50- 66-AC-30
 WA4VPF (WA4GP, opr.)
 8970- 46- 65- C- 8
 WB4CVU 3666- 26- 47- A-11
 W4ILE 663- 13- 17- C- 2

Georgia

K4BAI 791,934-286-923- C-78
 K4EZ 476,532-244-659-BC-53
 W4DQD 287,532-196-489- A-45
 W4DXI 277,440-204-454- A-70
 WB4EEM 208,800-174-400-AC-60
 WA4QPL (9 oprs.)
 49,305- 95-173- A-48



Shown holding each other up after a grueling grind, W2BBK (left) and PJ2ME (right) racked up 1055 QSOs from PJ5MJ the first c.w. weekend. Theirs was the first DX log to hit the Hq. Contest Branch.

West Virginia

K8YBIU 933,660-260-1197- C-90
 K8QYQ 13,936- 52- 90- B-24
 W4SHAN/8 1152- 16- 24- -

Western Florida

W4YWV 313,740-210-498- C-80
 K4OLC 310,128-182-568- A-63
 WA4VY 213,435-155-450- B-96
 W9WKT/4 1500- 20- 25- A- 7

ROCKY MOUNTAIN DIVISION

Colorado

W0GAA 198,450-175-378- C-
 W0LPH 21,924- 58-126- B-16
 WA6NBZ 20,700- 60-115-AB-30
 W0BWB 3960- 30- 44- A- 9
 WA6NOS 3192- 28- 38- B-11
 W0TCH (K0VYN, W0TCH)
 577,437-217-887- C-93

New Mexico

W5ODJ 257,526-171-502- C-96
 K5SPL 67,590-131-172- B-32

Utah

K7RAJ 323,532-209-516- C-60
 W7NPU 184,128-137-448- C-46
 WA7DTG 16,560- 46-120- A-28

Wyoming

K7AYP (K6QPH, opr.)
 3444- 28- 41- A-
 WA0PFC/7 180- 5- 12- A- 4

SOUTHWESTERN DIVISION

Arizona

W7AYY 225,882-141-534- C-45
 K7NEQ 168,324-168-338- C-53
 K7PXL 103,659-109-317- A-32
 W7ATV 35,964-108-111- C-30
 K7RDH 34,932- 71-164- A-32
 W7CFD 12,558- 42-100- A-14

Los Angeles

W6RR 1,374,078-298-1537- C-88
 K6QVT (W6HGU, opr.)
 789,888-242-1088- C-78
 WA6EKL 728,884-262-928- C-64
 W6BRZH (W6BNW, opr.)
 546,840-210-868- C-76
 K6SVL 357,840-168-710- B-71
 W6LDA 227,643-169-449- C-47
 W6BUHJ 214,461-141-507- C-
 W6VNJ 178,044-148-401- C-
 WA6ZCO 163,047-139-391- C-69

W6TZD 136,836-126-362- C-33
 K6IPV 100,344-113-296- B-71
 W6EJZ 68,094- 97-234- C-50
 W6AM 66,348- 97-228- C-53
 K6ETD 63,063- 91-231- C-31
 W6QMA 52,416- 84-208- B-16
 W6GEN 48,216- 82-198- C-35
 WA6GLD 44,625- 85-175- A-
 W6BUD 39,564- 84-157- C-25
 K6YRA 37,536- 68-184- C-18
 W6VY 18,711- 63- 99- C-14
 W6FV 13,860- 42-110- B-25
 W6DKGH 13,803- 43-107-BC- 8
 K6YVZ 13,248- 48- 92- A-17
 W6HS 9504- 36- 88- C-16
 W6EHA 7326- 37- 66- B-
 W6APH 4860- 30- 54- A-30
 W6PKL 4860- 30- 54- C-
 W6WYQ 504- 12- 14- C-
 W6EYCT 462- 11- 14- B- 7
 K6EYR (K6s EYR SEN)
 423,720-132-1070- C-
 W6UED (W6 UED VPH)
 377,328-112-1123- C-
 W6NJU (W6Bs IQI UBH YKA)
 111,201-101-367- C-30
 WB6KPN (W6Bs KPN UHF)
 77,847- 77-337- A-58
 WB6RXE (W6Bs QLM RXE)
 9324- 37- 84- A-48

Orange

W6SRF 247,680-172-880- C-55
 W6MYV 150,192-149-336- C-55
 W6CCWD 61,560- 95-216- C-18
 W6QVU 18,000- 50-120- C-27
 W6WU 168- 6- 12- A-40
 W6CCP (K6YNB, W6CCP,
 WB6SFA)
 477,565-239-945- C-70
 WB6YPX (W6s DLG HXW,
 W6WRX)
 127,900- 98-437- C-44

San Diego

WA6ZQU 640,740-236-905- C-74
 WB6LFR 490,155-205-797- -
 WB6EFA 453,288-187-808- C-
 W6QJW 151,914-218-691- C-74
 W6GGI 80,640- 96-280- C-55
 K6AVT 59,760- 83-240- C-40
 K6SDR 34,776- 72-161- C-
 W6GLR 2106- 18- 39-BC-

Santa Barbara

W6GEB 384- 8- 16- A- 2

WEST GULF DIVISION

Northern Texas

W5KTR 946,158-309-1021- C-79
 W5TKB 452,991-259-583- C-72
 W5EQT 340,956-198-574- C-46
 WA5LUM 204,828-169-404- A-56
 W5DWT 145,431-143-339- C-21
 W5TMZ 128,754-138-311- C-25
 WA5RQA 127,032-158-268- B-43
 K5QMC 109,000-125-292- C-74
 K5MFA 67,200-118-190- C-60
 W5ORS 40,248- 86-156- C-22
 W5TTY 38,106- 73-174- C-29
 W5GQZ 765- 15- 17- A- 5
 W5MSG 324- 9- 12- A- 7
 K5ATV 216- 6- 12- B- 2
 WA5QFZ 105- 5- 7- C-
 K5ZSB 18- 2- 3- B- 3

Oklahoma

WA5LOB 384,039-213-601- C-50
 K5BOC 157,191-151-347- C-56
 W5TKS 92,394- 87-354- C-31
 W5PWG 8820- 42- 70- B-16

Southern Texas

W5JAW 722,982-299-806- C-50
 W5NMA 565,503-251-751- C-76
 K2ETU/5 175,082-179-326- B-32
 W5MHV 92,208-113-272- C-55
 W5LJT 67,461-113-199- C-22
 W5ULN 44,109- 87-199- B-31
 W5LZZ 38,916- 92-141- B-14
 W5RO 12,255- 43- 95-AC-
 W5ZVU 8742- 47- 62- A-12
 W5EDX 507- 13- 13- A-12
 W5AC (W5BHEY, WA4ARV)
 623,475-255-815- C-93
 WA5DOS (6 oprs.)
 105,672-136-259- C-92

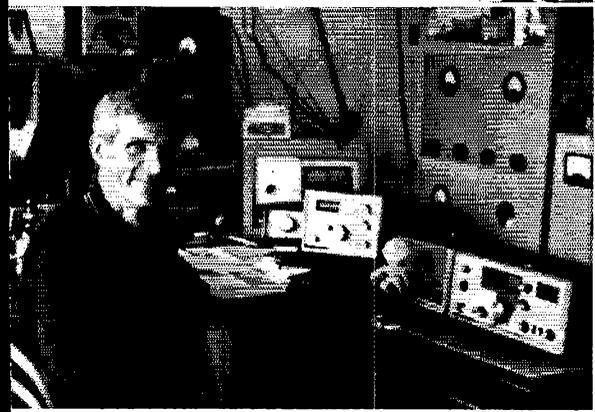


From Tokyo, **JA1BAR** rang up 265K with 777 exchanges on 10-15-20; **XYL JH1GMZ** chipped in another 13 grand.



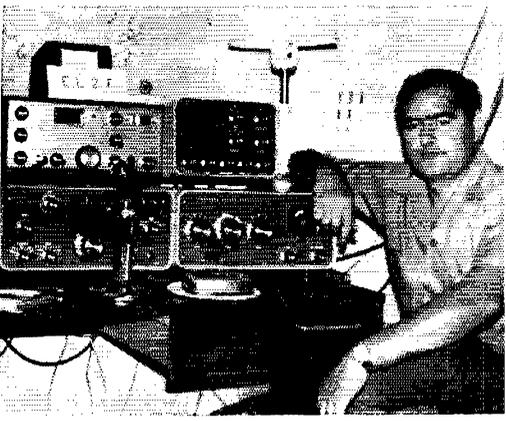
↑ **VP2AC** says "Chasing DX is my line," but Jerry buys the groceries by working for the *Antigua Star* as a photo-journalist; he wrung ten meters dry during the phone Test.

CE6EZ used a 2L quad and inverted Vees to accumulate 2.45 meg and the No. 2 spot in the South America listings.



↑ **EA3JE** paced Europe on voice by socking it to 'em with 2-million-plus points and the 5th-highest DX score worldwide.

Employed by the Voice of America in Monrovia, **EL2E** played Voice of Liberia in the Test and wound up with 500K



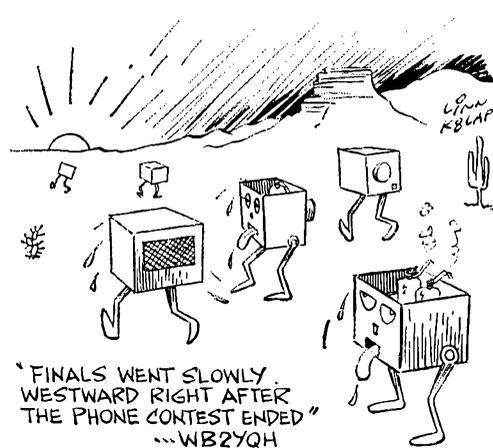
↑ **5W1AS**, a visitor to Hq. this summer, had to struggle with a 26-foot-high beam surrounded by towering palm-trees; Ron had words to say about sleazy W/VE operating techniques.

CANADIAN DIVISION

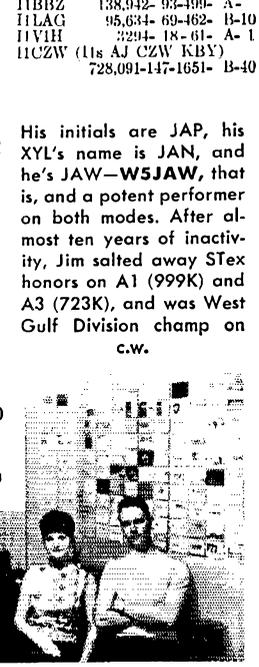
<i>Maritime</i>	
VE1NV	324,819-193-561- C-51
VE1ANT	27,539-67-139- A-32
VO1DC	24,360-58-140- B-19
VO2AB	18,792-58-108- A-28
VO2AC	14,180-40-121- B-18
<i>Quebec</i>	
VE2NV	373,434-218-571- A-53
VE2WA	303,888-208-487-A-C-52
VE2BV	300,390-190-527- A-72
VE2WY	278,628-214-434- C-68
VE2AK	147,576-143-344- B-44
VE2AYU	72,114-101-238- A-38
VE2AJ	30,807-84-150- B-20
VE2BU	35,856-83-144- A-24
VE2ALA	20,352-53-128-AB-28
VE2YU (VE2s DCX YU)	406,980-228-595-A-C-64
VE2DCW/2 (VE2s 1BGJ DCW)	51,285-45-263- A-32
<i>Ontario</i>	
VE3BHS	424,296-212-666-AB-46
VE3HS	199,815-165-404- A-
VE3BMB	142,788-146-326- B-46
VE3ES	40,545-85-159- A-28
VE3OU	17,298-62-93- A-40
VE3HJ	26,013-69-127- C-
VE3DYB	7,680-40-64- A-13
VE3SH	507-13-13- A-4
VE3FHO (VE3s FHO GCO)	841,635-295-951- C-88
VE3CSN (VE3s CSN CTR)	18,650-50-125- C-64
VE3CFP (2 oprs.)	3024-24-42- A-13
<i>Manitoba</i>	
VE4SD	75,319-109-231- C-48
VE4RP	22,320-60-124- C-58
<i>Saskatchewan</i>	
VE5GF	30,420-78-130-AC-21
VE5DP	26,118-74-119-AB-25
<i>Alberta</i>	
VE6LU	104,013-127-273- C-46
VE6AP	63,336-91-232- A-50
VE6MC	18,414-62-99- A-20
VE6TK	15,444-52-99- B-25
VE6TP	13,530-55-82- C-6
VE6AKV	1200-16-25- A-12
VE6IN	240-8-10- C-1
VE6ANR (VE6s AJT ASD AVF)	215,040-160-452- C-96
<i>British Columbia</i>	
VE7EH	115,290-126-305- C-46
VE7NW	67,158-91-248- C-39
VE7BQP	63,756-77-272- C-35
VE7YB	57,312-90-199- B-96
VE7AXM	7134-41-58- A-20
VE7VP	1314-18-25- C-12
VE7IQ	720-10-24- A-
<i>Fukon N.W.T.</i>	
VE8BB	63,000-84-250- B-36
AFRICA	
<i>Morocco</i>	
CR8FV	913,275-165-1845- A-70
<i>Angola</i>	
CR6GS	458,430-118-1295- B-
CR6GM	451,044-132-1139- A-30
<i>Mozambique</i>	
CR7DS	425,040-132-1075- A-
<i>Liberia</i>	
EL2E	497,931-131-1267- C-
<i>Ethiopia</i>	
ET3USA (W5QHD, W80TX)	817,236-161-1692- A-80
ET3FMA (K4FMA, W6HOH)	132,888-136-1061- A-25
<i>Cameroun</i>	
TJ1AL	29,748-37-268- A-
TJ1IQ	2100-20-35- B-
<i>St. Helen</i>	
ZD7KH	728,502-138-1760- B-

<i>Ascension Island</i>	
ZD8HAL	836,703-171-1631- B-32
<i>Rhodesia</i>	
ZE8JY	394,196-124-1060- A-
<i>South Africa</i>	
ZS6DW	1,439,670-185-2594- B-
ZS6RM	291,060-105-924- A-
ZS6FN	133,566-105-424- A-
ZS6BMD	88,800-50-592- A-
<i>Tanganyika</i>	
5H3KJ	593,020-149-1367- A-
<i>Nigeria</i>	
5N2AAF	476,898-122-1303- A-
5N2ABK	63,552-64-332- A-
<i>Niger Republic</i>	
5U7AL	149,682-101-494- B-
<i>Lesotho</i>	
7P8AR	1,005,993-159-2100- A-
<i>Ghana</i>	
9G1KT	21,978-54-136- A-11
<i>Turkoman</i>	
UH8BO	3060-15-68- B-2
<i>Uzbek</i>	
UI8AG	1989-13-51- B-
<i>Tadzhik</i>	
UJ8KAA (3 oprs.)	432-9-16- B-
<i>Hong Kong</i>	
VS6AJ	32,800-50-221- B-
<i>India</i>	
VU2DKZ	146,664-84-582- A-96
VU2MSK	46,359-51-303- A-
<i>Ceylon</i>	
ZC4CN	236,208-111-710- B-
<i>Israel</i>	
4Z4HF	414,597-113-1223- B-
W2PDG/4X	1414-14-35- B-6
<i>West Malaysia</i>	
9M2PO	66,864-56-398- A-

<i>Spain</i>	
EA3JE	2,052,819-211-3243- A-
EA3QW	192,045-93-701- A-
EA2EL	67,230-83-270- B-
<i>France</i>	
F3KW	1,382,400-180-2560- B-
F2NI	915,705-153-1995- A-
F8UM	172,530-90-639- A-
F9NL	34,304-47-244- A-
F2JE	31,443-47-223- A-
F9RM	21,957-59-141- A-
F9DA	13,386-46-97- A-35
F9KF	12,210-37-110- B-
F3JJ	3864-28-46- A-
F5BV/P	3360-28-10- B-
F0FC	2451-19-43- A-5
F50J (4 oprs.)	581,018-151-1285- A-
<i>England</i>	
G4JZ	1,107,540-180-2051- B-45
G3JAR	981,948-172-1903- B-58
G6LK	471,546-138-1139- B-4
G3KMA	336,720-115-976- A-
G5AGN/A	101,979-81-420-AB-
G2NH	8787-29-101- A-
GB2SM (16 oprs.)	1,839,786-206-2977- A-96
G3WWO (G3s JOU MPN)	1,595,700-180-2965- B-76
G3SME (G3s SME UQR)	1,285,438-187-2292- B-87
G3VZT/A (7 oprs.)	1,090,890-170-2139- B-
<i>Scotland</i>	
GM5AIW	197,085-105-626- A-25
GM3CSM	6696-36-62- A-
<i>Wales</i>	
GW3NWV	298,584-132-754- B-
<i>Switzerland</i>	
HB9UD	54,656-64-285- B-
HB9DX	19,458-47-138- B-
<i>Hungary</i>	
HG2KRD	156,468-52-1003- C-
<i>Italy</i>	
I1BAF	1,598,148-206-2586- B-49
I1CAQ	572,560-136-1405- B-41
I1RIZ	148,148-91-545- A-30
I1BBZ	138,942-93-499- A-
I1LAG	95,634-69-462- B-10
I1VH	3294-18-61- A-1
I1CZW (I1s AJ CZW KBY)	728,091-147-1651- B-40



ASIA		EUROPE	
<i>Iran</i>		<i>Portugal</i>	
EP3AM	700,500-140-1668- B-	CT1BH	1,039,248-168-2062- C-
<i>Japan</i>		CT1MW	864,149-143-2017- A-44
KA7AB	1,295,364-196-2203- B-	CT1LN	726,773-173-1401- A-
JA2JAA	476,136-136-1167-AC-	<i>Germany</i>	
JA1ND	401,220-135-993- A-26	DJ6QT	1,872,000-208-3000- B-55
JA1CG	356,451-131-907- A-	DJ5HV	1,613,040-208-2585- B-67
KA2JP	297,540-114-870- B-19	DL4FG	1,129,089-169-2227- B-53
JA1DXE	274,833-117-783- A-	DJ5CI	379,730-127-997- C-
JA1BAR	265,734-114-777- C-	DL1LK	355,272-131-904- B-
JA6ATY	212,872-88-809- A-	DL4DK	278,103-119-779- B-11
JA3LGG	203,391-93-729- A-35	DJ9J1	235,872-112-702- B-
JA1MML	152,500-100-510- A-	DL6WE	154,300-100-517- A-
KA5MC	137,214-54-847- C-11	DJ5TH	145,425-75-649- B-
JA3ERN	117,087-93-422- A-31	DL5JX	137,100-100-458- B-
KA2HC	72,171-81-297- C-	DL1DH	111,909-73-511- B-
JA3CXN	56,791-49-387- A-	DL9EM	75,735-51-499- A-
JA6AFL	50,976-59-288- A-73	DL8EM	36,855-65-189- B-
JA3GZN	13,120-40-360- B-	DJ1IP	22,680-42-180- B-
JA1BAL	23,127-39-198- A-	DJ4UF	15,435-35-147- A-
JA8AHM	17,424-44-132- A-	DL2ZS	1104-21-57- C-
JH1GMZ	13,311-29-153- A-	DL0WR (DLs 4AX 8SW 9Y)	2,577,222-201-4274- B-90
JA4ERX	6780-20-113- A-18	DL4RM (6 oprs.)	1,292,994-174-2477- B-
JA1DFQ	3600-15-80- A-	DL4AP (DLs AP Z1)	670,761-147-1528- B-49
JA5CBI	528-8-22- A-	<i>Switzerland</i>	
JH1DYL	504-8-21- A-5	<i>Italy</i>	
JA3OUV	264-6-15- A-4	<i>France</i>	
JA2DCI	255-5-17- A-	<i>Spain</i>	
JA1AAT	231-7-11- A-	<i>Germany</i>	
JA2PTH	190-5-13- A-	<i>Portugal</i>	
JA3ADW	108-3-12- A-	<i>Switzerland</i>	
JA4YBV	18-2-3- A-	<i>Italy</i>	
KA9MP (6 oprs.)	1,190,700-180-2205-AC-80	<i>France</i>	
<i>Asiatic Russian S.F.S.R.</i>		<i>Spain</i>	
UA9FU	20,790-42-167- B-	<i>Germany</i>	
UA9KHA	1008-14-24- B-	<i>Portugal</i>	



His initials are JAP, his XYL's name is JAN, and he's JAW—W5JAW, that is, and a potent performer on both modes. After almost ten years of inactivity, Jim salted away Stex honors on A1 (999K) and A3 (723K), and was West Gulf Division champ on c.w.



Participating for the first time in an ARRL DX Test, WA4LMD scored 539K in 59 hours of phonsmanship. Antennas were as spiffy as this console: a 4L quad up 75' and a 300-foot-per-leg rhombic. Fred got kind of pooped during the brawl, would like to see a compulsory rest-period added to the rules.

<i>Norway</i>		OH5VT	7908-31-87- B-
LA0AD	1,151,280-180-2132- A-80	OH3NY	7068-31-76- B-
LA3QG	113,004-86-438- A-	OH3XZ	5382-26-69-AB-
LA4ZB	28,560-34-280- A-16	OH5UX	3036-22-46- B-
LA3K	8700-29-100- A-40	OH5SM (7 oprs.)	2,259,912-191-3944- B-
LA4LG	5880-28-70- A-4	<i>Czechoslovakia</i>	
LA6U	3402-27-42- A-	OK1MP	197,094-107-614- B-
LA4AF	3000-25-40- A-	OK1AMZ	40,002-59-230- B-

<i>Bulgaria</i>		OK2ABU	20,202-37-182- B-
LZ2KKZ	5475-25-73- B-	OK2ABU	7922-34-81- B-
LZ1KSA	3-1-1- B-1	OK2WCG	7425-25-99- A-
<i>Austria</i>		OK2DB	2160-16-45- B-

<i>Belgium</i>		ON4ZU	541,008-136-1326- B-
OE2EGL	1,296,126-191-2262- A-	ON4XG	401,625-125-1071- B-32
OE3GSA	390,439-119-1094- B-	ON5GF	271,795-95-954- B-

<i>Finland</i>		ON4NM	23,520-35-224- A-
OU2BH	504,444-127-1324- B-	<i>Denmark</i>	
OH1VR	83,781-87-321- B-	OZ1LO	878,625-165-1775- B-
OH2BAQ	19,305-55-117- B-	OZ1RH	408,534-137-1001- A-
OH3SN	14,060-38-124- A-	OZ2KT	135,954-83-546- A-

Haifa's W2PDG/4X faced the perennial problem of W/VE ops trying to gain the attention of Statesiders with their slant-DX callsigns. Barry doesn't look too disturbed, however.



OZ3Y	89,262-87-344- A-
OZ7BG	60,912-72-282- B-4
OZ7DX	8181-31-88- A-
OZ7HM	1848-14-44- A-
OZ2CE	159-9-17- A-
OZ7DH (4 oprs.)	923,949-150-1937- A-
OZ5JT (OZs HRT 5JT)	528,756-139-1268- A-
<i>Netherlands</i>	
PA0XPQ	956,550-175-1832- A-50
PA0FE (PA0HBU, opr.)	735,969-167-1469- B-
PA0QT	157,878-98-537- C-
PA0LOU	123,210-90-458- A-9
PB7WX	99,450-50-863- A-
PA0SCH	50,589-77-219- A-

<i>Sweden</i>		<i>Romania</i>	
SM5EAC	681,750-150-1515- B-	YO3ZM	108-3-12- A-
SM6AEK	579,348-154-1254- B-34	<i>I.T.U. Genoa</i>	
SM4CRG	511,188-148-1152- B-25	4U1TU (4 oprs.)	859,908-174-1652- C-
SM7CRW	447,678-154-969- B-	NORTH AMERICA	
SM15ZZ	172,563-97-593- B-	<i>Cuba</i>	
SM7BKZ	90,210-97-310- B-	CO8RA	534,534-154-1157- A-
SM6CMK	56,880-80-237- B-	<i>Dominican Republic</i>	
SM6CKU	51,192-72-238- B-6	HI8LC	703,890-165-422- B-
SM5BPJ	39,336-44-298- B-	HI8BC	31,270-54-198- A-
SM1CJV	18,240-48-127- B-	<i>Panama</i>	
SM4DPB	11,340-45-84- B-	HP1JC	1,362,753-222-2037-AB-
SM9CER	7560-24-105- B-	<i>Alaska</i>	
SM5BKV	192-8-8- B-	KL7GAC	562,374-157-1104-BC-45
SM6CAS (9 oprs.)	2,091,300-190-3670- B-96	KL7EPR	88,578-57-518- A-12
SM5DTM (8SMs 5FC 6DL)	34,344-53-216- B-	KL7ATZ (multiopr.)	1,437,450-185-2590-AC-
<i>Poland</i>		<i>Puerto Rico</i>	
SP5AKG	158,166-101-522- B-	KP4DBJ	429,312-128-1118- B-13
SV0WL	798,790-151-1767- C-	KP4CSW	318,340-110-966- C-28
<i>Iceland</i>		KP4DBU (2 oprs.)	60,544-43-470- A-18
TF2WKS	2628-18-49- A-	<i>Virgin Islands</i>	
<i>European Russian S.F.S.R.</i>		KV4AM	1,420,440-178-2661- C-80
UA3HO	258,000-100-860- B-29	KV4EY	539,856-163-1104- C-31
UA1CS	25,398-51-166- B-	<i>Canal Zone</i>	
UV3TP	6789-26-87- A-	KZ5NF	1,037,160-172-2010- C-41
UA3KBO (UA3-27308, DM210G)	1,091,810-160-2275- B-	KZ5EH	75,276-51-492- A-8
UA4KHV (2 oprs.)	113,022-69-551- B-31	<i>Guatemala</i>	
UA3KND (3 oprs.)	30,960-60-172- B-	TG9BU	157,752-56-939- B-16
UA1KBB (2 oprs.)	6,840-20-119- B-6		



YLs and New Hampshire stations are about equally scarce in a DX contest. We present both in one package: Mary, WA1DZX, active in the phone section. A phased vertical on 40 and a 60-foot shunt-fed tower on 80 helped low-band radiation immensely.

<i>Kaliningradsk</i>		<i>Antigua</i>	
UA2KBD (6 oprs.)	213,303-97-733- B-	VP2AC	579,912-146-1324- B-28
<i>Ukraine</i>		<i>Bahama Islands</i>	
UR5WF	124,950-50-833- B-	VP7NA (K4HF, opr.)	577,638-171-1126- A-
UR5KAW	33,825-55-205- B-	<i>Bermuda Islands</i>	
UR5FG	6864-22-104- A-	VP9GB	2067-13-54- A-
UR5SJ	3078-19-54- A-	<i>Mexico</i>	
UR5KTF (2 oprs.)	11,259-27-139- A-	XE1AE	2,039,688-252-2698- C-
<i>White Russian S.S.R.</i>		XE8LDD	43,542-59-246- A-12
UC2BF	9758-31-96- B-	XE2PTBC (15 oprs.)	4,701,870-207-5870- C-96
<i>Azerbaijan</i>		XE1AC (XE1s AC G1W OOL)	2,994,179-251-3977- B-
UD6CC	6102-22-97- A-	<i>Nicaragua</i>	
<i>Lithuania</i>		YN1TP	107,019-69-517- A-40
UP2OV	50,046-38-439- A-	<i>Salvador</i>	
<i>Estonia</i>		YS1XEE	2,721,888-208-4362- B-44
UR2KBG	11,004-28-131- A-		

(Continued on page 173)

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINIM

Signal Quality of Traffic Stations

SOMEONE recently commented that the quality of the signals of some of our traffic regulars is not all it might be. A little listening around will show that there is something to this. Some of the signals on nets leave a lot to be desired. Of course this can be said of all amateur signals in general, and it is to be doubted that netters' signals are worse than the average; but the average can stand a lot of improvement, and traffic netters should set the example.

Several theories have been advanced to explain why signal quality on traffic nets might be bad, once in a while. One is that traffic is an operating, not a technical, game, and consequently the traffic man doesn't have the technical expertise to keep his signal clean. Another is that in the rapid shuttling back and forth from one frequency to another in order to meet his commitments, the average traffic man's rig becomes detuned. Still another refuge is that since traffic handling is a public service, so what if one of the signals is not quite a T9, or has clicks, or is distorted? We ought to be lenient with these people; after all, they are doing something for the benefit both of the public and of amateur radio.

But the good amateur PICON enthusiast does not go along with any of these. Having a good signal is even more important, from a regulatory standpoint, than observing good operating procedure. From an operating standpoint, having a high quality signal is the mark of the "complete" traffic man.

So let's keep those signals clean on the traffic nets. If Average Joe Amateur comes along with a not-so-hot signal, that's one thing. When Joe Traffic puts one such on the bands, this is more noticed; he is an amateur with some experience and should know better. Once in a while you will hear it said that some individual "is a good operator, but his signal is lousy." In a way, this is a contradiction in terms, because your signal quality is a part of your on-the-air operation and is your responsibility as an operator. Therefore, if the signal is bad, how can the operating be good? Shall we go to work on those signals, gang?

The 1968 SET

What does SET mean? The Simulated Emergency Test, we thought everybody knew that. No doubt many old timers are still looking for the announcement of it in this October

* Communications Manager, ARRL.

issue, because for years it was traditional to hold the SET in October. Last year we changed that, held the 1967 SET in January, 1968.

It appears that the January dates were an improvement over the October dates, and so the dates for the next SET are *January 25-26, 1969*. Please make a note of this, and don't say you were not notified of it. It will also start appearing in the Operating Events calendar, in *Operating News*, November *QST*. It's going to be tough getting the bulletin out very much in advance, but no drastic changes in the procedure are envisioned (although some have been proposed) for this year. Start now getting your AREC or RACES group in shape for the 1968/9 SET.—WINJM.

Diary of the AREC and RACES

As promised, our SET report in July *QST* fell somewhat short of perfection here and there. A couple of these reports mentioned below never reached us, however.

Kentucky: SEC W4OYI notes that District 4 (WA4FMY reporting) should have been credited with 354 scoring-points, not 234. *Louisiana:* Via EC W5SKW we learn that the report for Calcasieu Parish, totaling 284 scoring-points, was inadvertently omitted from the section list. Our goof, Roger.



WA7AEL, right, receives an award for "extreme competence" in his emergency operation to provide the only link with flood-stricken Fairbanks, Alaska, in August of '67. The award was presented by an official of the HEW Department, Philip Lee (l.) at a ceremony in Bethesda, Md. (Official Photo, U.S. Public Health Dept.)

A crew of amateurs provided communications during the annual Redwood City (Calif.) Fourth of July Parade. That's RO K6ANN at the mike, with assistant K6DRN looking over the crowd. Call used was W6WWJ.

Michigan: Kalamazoo County RO W8NWW advises that their local SET was very successful, with fine participation by the Red Cross, Civil Defense Reserve Police, CD Medical Unit (including both Kalamazoo hospitals and ambulances), Area 5 RACES Net, Kalamazoo County RACES Net, County CD Field Hq. van, and Texas Corners Township Fire Department, Zone 5. *Missouri:* SEC W0BUL wants it known that he submitted a detailed report covering many aspects of the Test in his section.

Our fault, your fault, or somebody else's fault — regardless of who drops the ball, we sincerely regret any inaccuracies in the writeup. You can be sure that all concerned deeply appreciate the hard work that went into the preparation of your reports.

— . . . —
On May 5 the AREC in Portland (Ore.) was requested by the Mountain Rescue Service to provide communication for a rescue effort of a party of people lost on Mt. Hood. Contact was established between Timberline Lodge on Mt. Hood and Portland, which was the main control point. Both 2 and 75 meters were used, the latter as a statewide net to contact members of the rescue organization. Throughout the day (May 6) much traffic was handled on behalf of the several searching parties, and by noon the word was passed over these amateur facilities that the missing party had been found, frostbitten but for the most part unharmed. Had it not been for the availability of rapid communications it is a certainty that the search would have required much more time, so it is likely that the efforts of the amateurs were instrumental in saving lives. Principles in the operation were K7s MMK BYH ZQU, W7s DDH CMR MCQ, W47s DCC FVK DVJ. The Oregon AREC Net on 3875 kc. and the Portland 2-Meter AREC Net were the principal organized facilities used. — K7WWR, SCM Oregon.

— . . . —
Again on May 19 amateurs of the Oregon AREC participated in communications for Mountain Rescue, this time on Mt. St. Helens. Contact was established between the mountain and Portland on 75 meters. The operation lasted from 1 to 10 p.m. when the rescuers reached the fallen climber and brought him down off the mountain. On the air were K7s MMK ZQU RQZ, PHP, W7HUY and WA7BOO, with many other stations "on frequency" (3875 kc.) to help if needed. — K7WWR, SCM Oregon.

— . . . —
The following is a resume of activities of the West Coast Amateur Radio Service on 7255 kc.

May 27: KC4USP in Antarctica called in with traffic. NCS WA7HHY arranged to handle it off frequency.

June 2-3: WB6WST requested help for an injured person in a remote mountainous area of San Diego County. The County Sheriff's Rescue Squadron was called and contact maintained by amateur radio until the rescue was complete. Stations known to have helped include W6s YSP FJT, W6s THL MDN, WA7HHY.

June 23: W6SGW/mm on a tanker northwest of Seattle requested help contacting San Pedro for communications between the captain and his head-



quarters following an explosion aboard the ship. The facility was set up with the aid of NCS W6KZI, W7MKW and a multitude of stations who stood by.

June 23: Request for WCARS assistance in the search for a lost plane north of Ventura, Calif. A number of mobiles and base stations maintained communications liaison for two days between CAP, Forest Service, private search parties and relatives. The frequency of 7255 kc. was primary, 3952 secondary. The plane was found totally demolished. Participants included sixteen amateurs.

July 22: WB6UUR/6 at a camp in the Sierras requested assistance in getting help to a camper who had been seriously cut. NCS WA6BWD designated WA6GQJ to call the Forest Service to get help.

In addition to the above, in the period from April 26 to July 25 fifteen highway accidents with injuries were known to have been reported, along with four unreported fires and at least 30 incidents involving freeway obstructions, cars needing assistance and other miscellaneous incidents. Publicity Chairman WB6IZF lists 73 amateurs as having been mainstays in these operations. The total membership of WCARS is now 570.

— . . . —
Quebec SEC VE2ALE reports three car accidents in the Montreal area in which amateurs were able to be of assistance in summoning aid. The first was on June 4 when VE2AUD/mobile called via the VE2RM repeater about an accident on the Trans-Canada Highway. VE2AVP answered the call and relayed it to the provincial police in Montreal, who then dispatched a vehicle. On June 18 VE2AVP/mobile was engaged in a routine schedule with his NYL, VE2DGD, when he came upon an accident in the Montreal area. VE2DGD immediately telephoned Montreal Police. On July 8, VE3GKR/mobile en route from Ottawa to Montreal came upon an accident at the Ile Au Tort Bridge. He was in contact at the time with VE2DFE on the VE2MT repeater, with VE2DEA on standby. All units shifted to the VE2RM repeater and VE3GKR passed all information to VE2DFE who called the Montreal office of Quebec Provincial Police who relayed the information to their Dorion office and a cruiser was dispatched.

— . . . —
AREC members of the Genesee County (Mich.) unit and members of the Genesee County Radio club assisted police, on July 10, in apprehending armed holdup men who took \$15,000 from a jewelry store in Flint. Walkie-talkies built by the GCRC and mobile units were used on the ten-meter fre-

quency. W8CO set up a portable station at work to establish contact with Flint. The men were captured after a three-hour hunt. Also taking part were W8JAC, WA8TCY, WB8BCF and W8VGC. — *W8JAC, EC Genesee County, Mich.*

On Aug. 1, K7TAQ, EC of Casper, Wyo., was the relay to the highway patrol to obtain assistance for a very serious auto accident. W9KRV/mobile reported the accident from the scene and with the help of K7YDO, W9TLU and WA6KNL to relay, assistance was obtained promptly. — *W7CQL, SCM Wyoming.*

On Aug. 1 WA6VMD heard a "Mayday" call from K2GYY/mobile at Marker 244 on the Alcan Highway in northeastern B.C. There was an accident involving a pickup truck loaded with live ammunition, with two people seriously burned. WA6VMD contacted the Coast Guard at San Francisco and the Royal Canadian Mounted Police were notified. Within ten minutes of the first call, an RCMP vehicle with assistance was on the way. — *WA6VMD.*

On Mar. 11 WA8NDY, EC for Upshur County, W.Va., was notified by a local BC station that AREC assistance was needed in a search for a missing light plane. Ten minutes later assistant EC W8WVM and part of the local AREC were activated, with mobile and fixed stations on 75 and 2 meters. Monongalia County EC W8GUL at Morgantown established operations under club call WA8BCP and maintained contact with the CAP center. Relay service was provided by W8EEO and W8KBM. Within the hour, this intercounty net had contact among all stations and remained on duty until the afternoon when the missing plane was found smashed with the pilot dead. — *WA8NDY, EC Upshur County, W.Va.*

On April 27 an official of the Johnson City (Tenn.) Rescue Squad requested AREC assistance in obtaining information with regard to a rescue mission being conducted in Clay County, to determine whether or not the Johnson City group's assistance was still needed. K4UWH was alerted and later joined by WB4s EHK and CXM in efforts to contact someone in Clay County. WA4YBT in Crossville was finally contacted and made inquiries. Later, WA4YBT advised WB4CXM that assistance was no longer needed in Clay County. WB4CXM relayed the information via the 2-meter net to WB4EHK and the Rescue Squad official informed. Although not really an emergency operation, the communications could not have been handled in any other way. — *WB4EHK, EC Johnson City, Tenn.*

On May 8 VE2BU received information that a search was in progress for a missing youngster in the Pencourt Ile Perrot area of Quebec. He made calls on VE2RM and VE2MT for mobile units to assist in the search. VE2AGQ and VE2ALE responded and reported to the scene while many others stood by on the repeater frequencies. However, shortly after their arrival the boy was found. The three mobiles then deployed to encircle the search area and advise searchers that all was well. VE2ADE served as NCS on VE2RM. — *VE2ALE, SEC Quebec.*

A tornado alert covert most of Ohio on June 11, and the Ohio Emergency Net on 3972.5 kc. was alerted. Weather conditions were reported to NCS

W5ED/8 and relayed to the Weather Bureau. The Weather Bureau in Mansfield was particularly pleased to have the information supplied by WA8MHO. Eighteen stations were active. — *W8OUU, SEC Ohio.*

The Queen City Emergency Net (Cincinnati area) was alerted on June 11 and 15 for weather watches, at the request of the Cincinnati Chapter, American Red Cross. Local conditions were reported periodically to the NCS by each station and relayed to the Red Cross disaster chairman for possible action. Several storm cells were monitored passing through the area, but no severe storms developed. — *W8OUU, SEC Ohio.*

The Passaic Valley Traffic and Emergency Net (N.J.) was alerted on June 12 for possible flooding conditions. K2KDQ (EC) at his place of business received reports from 1900 to 2100 (local), then reported to the emergency center at K2DFL. Contact and liaison were made and maintained with Oakland C.D., Wanauke Reservoir, Wanauke C.D., Passaic River Bridge Master at Passaic, Passaic County RACES and Bergen County RACES. Both



The Montgomery County, Md., RACES took part in a children's fund telethon on Feb. 17. Here are Montgomery County RO W3YAG (l.) and W3NME (r.) manning two of the operating positions.

the Passaic and Bergen County ROs checked into the net, and preparations were made for full activation of all amateur facilities if needed. Eight 2-meter units were on standby, liaison to long haul nets was available, and everything was in readiness. All facilities stood by pending clarification of reports that the dam at Wanauke reservoir was weakening, and the operation was secured at 2300 local time, four hours after the initial alert. — *K2KDQ, EC Passaic, N.J.*

The Central Kansas Amateur Radio Club activated its 2-meter emergency net on June 18 at 11:15 p.m. at the request of the Salina Police Department. Pending severe weather conditions were the reason. The net was set up and in operation fifteen minutes after the initial call and was secured at 12:30. — *W10PSF.*

At 2330Z on July 16 the RO (WB2HXZ) of Dutchess County, N.Y., was notified that supplemental communications were needed between the



Some of the "brass" at a meeting of ECs and RACES officers in Southern Texas are, from left, SCM W5AIR, Asst. SEC W5YCK, Cameron County EC W5KR, Dist. 20 RO K5YLO. SEC K5QQG was also present, but someone had to take the picture.

sheriff's office and police agencies surrounding Poughkeepsie to aid auxiliary police in the search for a criminal. At 2300Z WBSUI opened the net under the RACES-authorized call of W2RTE from the Sheriff's office and by 2340Z all police stations were manned and on the 2-meter net with additional e.d. stations monitoring 145.23 Mc. The search was called off at 0100Z because of darkness. Five additional amateurs participated. — *WB2HXZ, RO Dutchess County C.D.*

We are so far behind with reporting of non-emergencies that we will have to summarize, then hope space will permit more details in the future.

Feb. 12: The East San Gabriel Valley (Calif.) AREC provided school bond election return communications from the polls to the school district office, under the leadership of Acting EC WA6JXC.

Feb. 22: Amateurs set up to supply communications with the Plaisted Polar Expedition to the North Pole over the ice cap on Ski-doo's. VE8YL was the station on the ice, while WA4UTV handled the contact from the Eureka Weather Station. VE2s AUU FY and AWY handled the Montreal end, on frequencies of 14,193 and 14,245 kc.

Feb. 22: Amateurs provided communications for a sports car rally in Montreal under the leadership of VE2BML.

Mar. 2-3: Amateurs in Quebec turned out to assist in supplying communications for the Annual Dog Sled Races in Hudson, Que., under the leadership of VE2DEK.

Mar. 17: Members of the Western Penna. Mobilizers, under W3MIF, provided communications for the Annual St. Patrick's Day Econo-Run. Seven amateurs took part.

Apr. 18-19: Amateurs of Northeast Louisiana and Southeast Arkansas furnished communications for a telethon benefitting the Cerebral Palsy Fund. — *W15QVY, EC Ouachita Parish, La.*

April 25: From 0830 to 1400 hours members of the Kings and Queens County (N.Y.) ARPSC nets supplied communications for the "Salute to Israel Day" parade in New York City.

May 4: Orange County AREC provided communications, as it has each year for many years, for the annual tennis tournament matching high school

players from a wide section of Southern California. SEC W6RYM did the coordinating.

May 4-5: AREC members of the Glens Falls (N.Y.) area provided timing and communications for the White Water Derby Slalom Kayak and Canoe races on the Hudson River near North Creek, N.Y.

May 16-18: The Spokane AREC and the Inland Empire VHF Club provided communications facilities for the annual Lilac Parade in Spokane, under the leadership of EC K7LRD.

May 11: The Edison Amateur Radio Net joined forces with the East San Gabriel Valley AREC to provide communications for the Third Annual Edison Golf Classic in Palm Springs, Calif. Sixteen amateurs participated.

May 18: The East San Gabriel Valley AREC provided communications for the Western Days parade of the Monrovia Day Association in Monrovia, Calif.

May 18: Another parade, this one in Berrien County, Michigan, where AREC and RACES amateurs utilized their 2-meter f.m. gear to link positions throughout the parade route with ambulance services. EC was W8LUH.

May 25: A Boy Scout canoe race down the Raisin River from Dundee to Monroe, Mich., brought out assistant EC W8EYK and four others to serve as a surveillance team, and later to set up an exhibit station.

May 25: Kansas was visited by a simulated tornado as part of a four-county test. Called Mo-Kan II, the test was supplied with communications by Clay County EC WA0FLL and his crew.

May 25-26: A group of amateurs operated an exhibit station at the North Orange Council Scout-O-Rama at La Palma Stadium in Anaheim, Calif., under the leadership of WB6TYZ and WB6RJX.

May 26: Glens Falls (N.Y.) AREC provided communications for the Little League Parade in Glens Falls. EC K2AYQ was the ramrod.

We have forty SEC reports for June activities, representing 14,502 AREC members. This is two reports up but about 1500 AREC members down from June of 1967. Sections reporting: Ga., Mo., Alberta, Ind., E.Mass., W.Fla., Del., Nebr., Wash., Que., Okla., E.Fla., Ohio, S.C.V., Ala., La., San F., San D., Colo., S.N.J., W.N.Y., Conn., Orange, Kans., Tenn., Utah, S.Dak., S.Tex., Ark., Nevada, N.N.J., Mont., W.Va., Ky., N.C., Va., N.H., NYC-LI, Mar., Sask.

This brings us to the mid-year point, and we find we have received 251 (249 last year) reports from 50 (52 last year) different sections. So, we gained two reports but lost two sections, and this should make things pretty even. The following sections have 100% reporting records so far in 1968: Okla., Que., W.Fla., Mo., Colo. Alberta, S.N.J., S.Dak., N.C., Utah, S.Tex., N.N.J., Conn., La., Tenn., Wash., E. Fla., W.Va., Ala., Mont., S.C.V., N.H., Nev., Nebr., Orange, Maritime, Del., NYC-LI. Let's keep going, gang!

National Traffic System

One of the basic principles of NTS has always been that no one man (or woman) is indispensable. Every participant has a definite and specific function to perform on a certain night or nights of the week. If he cannot perform that function, someone else will do it. If a NCS or liaison fails to show (doesn't happen very often), someone will QNG within the set three minute limit. If a net manager finds he

can no longer do the job, someone will take his place.

Time was when our traffic activities were built around the "iron man" tradition. If a fellow couldn't be on deck every night to handle his schedules, he didn't amount to beans as a traffic man. He couldn't even hold status as a Trunk Line Station. But the inexorable march of time and the concomitant diversification of amateur interest changed all that, and NTS was built to accommodate the occasional traffic man as well as the every-day enthusiast. Many of the latter have felt that NTS is not sufficient challenge to their talents and have taken their business into independent channels utilized by others such as themselves. Thus, we now find ourselves with two kinds of traffic facilities in the amateur bands — the NTS facility, which operates according to a set schedule and through which traffic flows in a set way, and independent facilities through which traffic can often flow speedily from point to point but on pretty much of a catch-as-catch-can basis.

As an example, a message from Gardiner, Calif., to Jibib, Vt. by NTS would flow from the Northern Calif. Net through RN6 to PAN, thence via TCC to the East Coast, then either direct to the Vt.-N.H. Net to a delivery point, or down through EAN-IRN-VTHN. It's a set pattern. If, however, the originating station in Gardiner happened to be an independent, he might get on 40 or 20 meters with the message, find someone among his circle of fellow traffic-handlers who would take it, and that would be that. The station he gives it to might be also on the west coast, in the midwest or on the east coast; it would all depend on who is around and who is willing. The big difference between the two is that the former can be described in terms of net or station functions, while the latter must be described in terms of individuals.

Understand, we are not running down the independent facilities. They claim that their traffic gets through quicker than NTS traffic and they are hard-working zealots who are dedicated to traffic work. Most of them are ARRL members. Their work is recognized in the BPL, in SCM reports, through the awarding of official appointments, and their nets are listed in the net directory. When they perform during an emergency operation they get full credit and Public Service Awards if indicated. If they prefer their method of traffic handling to participating in the ARRL-sponsored system, this is their privilege and prerogative.

Which method is the better is strictly a matter of opinion. Traffic originating on NTS would, assuming nets function normally, reach its destination the same day as originated if in the same time zone or going from east to west, one day later if going the opposite direction into another time zone. By the independent route a particular message might reach its destination and be delivered within five minutes, if lucky, or it might bounce around for several days and finally land in a section or local NTS net for delivery. Each has the possibility of breakdown, each its advantages and disadvantages. The so-called independent facilities are concerned only with getting the traffic quickly to its destination, and many of them do an admirable job of this. NTS goes a little deeper into basics in that it provides participation for amateurs at nearly all ability and availability levels, and stresses training as an essential part of traffic handling — training in message format, message-handling and net procedures, orderliness and discipline.

So whether you participate in NTS or an independent facility, you are performing a public service, and the decision as to which one you are most interested in is entirely yours. Did someone say the League favors NTS over the independent facilities? You bet it does; NTS is the official ARRL-sponsored traffic system. But this isn't the same thing as discriminating against the independents. This magazine is also an officially-sponsored ARRL function, and the League favors it over other amateur publications, but it doesn't discriminate against the latter. Get the parallel? — WINJ.M.

July reports:

Nets	Ses- sions	Traf- fic	Rate	Aver- age	Represen- tation (%)
EAN	31	1458	1,020	47.0	98.4
CAN	31	1056	.782	33.8	98.9
PAN	31	1260	.889	40.6	97.8
IRN	62	494	.357	8.0	93.9
2RN	62	546	.628	8.8	97.1
3RN	62	507	.369	8.2	98.1
4RN	51	400	.364	7.4	76.2
RN5	62	575	.310	9.3	90.9
RN6	62	1193	.888	19.2	90.2
RN7	61	552	.321	9.1	48.9
SRN	62	462	.346	7.5	91.5
QRN	62	540	.448	8.7	91.9
TEN	62	364	.422	5.8	52.3
ECN	54	193	.198	3.6	66.2
TWN	47	193	.207	4.1	60.3
Sections ¹	1823	11316			
TCC Eastern	124 ²	779			
TCC Central	93 ²	543			
TCC Pacific	124 ²	941			
Summary	2625	23372	EAN	8.9	—
Record	2890	21814	1.267	15.2	—

¹ Section nets reporting (59): VEN, FMTN, GN, TPTN (Fla.); Falls City, KTN (Ky.); NCN, SCN (Calif.); NCNE, NCNL (N. C.); BUN (Utah); ILLN (Ill.); MD-DC, MDD, MDDS (Md.-Del.-D. C.); Badger, WBSN, WSSN, WIN (Wisc.); OSN, OSBN, RN (Ohio); Mich 6 Meter, QMN (Mich.); QIN (Ind.); VBSN, VN, VSN (Va.); OZK (Ark.); TTN, TEX (Tex.); Passaic Valley, NJEPTN, NJN (N. J.); EPAPT, PFN, E. Pa., PTTN (Pa.); AENB, AENH, AENM, AENR, AENT (Ala.); NYS (N. Y.); PTN (Me.); SSZ, OLZ (Okla.); Color, HN (Colo.); MNN (Mo.); WSN (Wash.); GSN (Ga.); OQN, GBN (Ont.); MSN, MLN (Minn.); WAIN (Man.); CPN (Conn.); RISP (R. I.)

² TCC functions, not counted as net sessions.

K2KIR feels more traffic could be handled on EAN. W9DYG reports worst QRN ever and asks to be relieved of CAN managership after eight years. W6VNQ says rate is up 50 percent from same time last year and issues PAN certificate to WA7DMA. W1EFW sends special commendation to W1BTV for his representation of Rhode Island.

(Continued on page 152)



At a recent meeting of the Brookings Amateur Radio Club, three South Dakota officials got together for a picture. Left right are KØTXW (SCM), WAØCPX (SEC) and WAØCWW (PAM).

COMING A.R.R.L. CONVENTIONS

October 12-13 — Hudson Division, Tarrytown, N.Y.

January 17, 1969 — Southeastern Division, Miami, Florida.

June 20-22, 1969 — NATIONAL, Des Moines, Iowa.

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.

California—7th Greater Bay Area Hamfest, Thunderbolt Motel, Millbrae, Calif., October 19, 20. Just south of San Francisco International Airport on Bayshore Highway. Technical discussions, contests, etc. Information from Box 545, Hayward, California 94543.

Connecticut—The Tri-City Radio Club, Inc. 21st Annual Hamfest will be held on October 19, at the Crocker House Hotel, State St., New London, Conn. Tickets are \$6.99 each which includes a steak dinner and registration. Activities include technical talks, swap and shop table, and visits to local military activities. Registration and information available from General Chairman Robert York Chapman, W1QV, 28 South Road, Groton, Conn. 06340.

Indiana—The Hoosier Hills Ham Club is holding its seventh annual Hamfest at Spring Mill State Park near Mitchell, Indiana, October 13. Contact the club at P.O. Box 375, Bedford, Indiana 47421 for further information.

New Jersey—The Irvington Radio Amateur Club will hold their Annual Club Dinner on October 19. For more information write David Rettig, K2VOB, 240 W. Kinney St., Newark, N.J.

New York—The 21st Annual Dinner-Meeting of the Quarter Century Wireless Association, Inc. will be held Friday evening, October 25, at the Statler-Hilton Hotel, New York City. Mr. W. Walter Watts, W4VI, Senior Executive Vice-President of Radio Corp. of America, will be the Banquet Speaker. Tickets at \$8.75 each may be procured from QCWA General Manager, A. J. Goronda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10543. QCWA members, their ladies and guests are invited.

Ontario—The Radio Society of Ontario annual Amateur Radio Conference will be held in Branford, November 1, 2, and 3. On Friday, Nov. 1, there will be a sumptuous smorgasbord and a dance (\$3.75 per person). Saturday morning will start with a breakfast and speaker (\$1.50) followed Saturday evening with the banquet, speaker and dance (\$4.75). The farewell breakfast is Sunday morning. Advance registration is \$3.50 single, \$6.00 a couple. After October 18, registration will be \$5.00 and \$8.00 respectively. For more information write the Branford ARC, P.O. Box 756, Branford, Ontario, Canada.

Pennsylvania—The Reading Radio Club is holding its annual banquet on Saturday, October 26, starting at 6:45 P.M. at the Reading Motor Inn on the Warren Street Bypass. For more information contact R. E. Ahrens, W3WJC, 3404 Reading Crest Avenue, Reading, Penn. 19607.

Texas—The Brownfield Free Swapfest will be held October 26 and 27 at the National Guard Armory in Brownfield, Texas. Everyone is invited to attend. There will be meetings for ARRL, MARS, RACES, Nets, and demonstrations and displays. Free coffee. Bring your own gear to swap. A noon lunch will be served at a reasonable cost. More information from E. C. Pool, W5NFO, 1003 East Buckley St., Brownfield, Texas 79316.

Texas—The Houston ARC will hold their 10th Annual Hamfest and celebrate their 50th Anniversary as an ARC at their club house on November 2, and at Spring Creek Park near Tomball, Texas on November 3. For more information write Houston ARC, 7011 Lozier, Houston, Texas 77020. QST



October 1943

... Editorially, K. B. Warner philosophizes on the coming of Autumn, with its clear crisp nights, cessation of static and DX perking up. He points out, though, that there are many returning veterans, some disabled, disfigured and at loose ends, finding it difficult to get adjusted to an entirely new way of life. Ham radio offers great possibilities in rehabilitation and local hams are enjoined to do all possible, for there will surely come a day when the bands are re-activated.

... The use of Supersonics for Communication is discussed by S. Jonathan Weitzer, ex-W2FSP. Several sources of sound waves of from 10,000 cycles to 20,000 cycles per second are described. They range from open spark gaps to high powered magneto-striction oscillators. A 500 watt job could be "heard" up to two miles. For receiving these inaudible frequencies, a scope may be used, thus reading code by sight. An interesting article and it might provoke some experimenting even today.

... There appear to be some 225 CD-WERS organizations in the country and the most comprehensive of them all is the one in New York City. Frederick A. Long, ex-W8BSL and Vincent T.

Kenney, W2BGO co-author an article describing this system. After considerable floundering around, the organization was finally set up, together with assigned frequencies and operating procedures. The organization charts look and are somewhat complicated, but they are necessarily so in a city of several million people.

... Edward M. Noll, ex W3FQJ, gives us a nice bit of math. The title is "Meet Mr. j!" Whether we understand just what the square root of minus one means or not, it is with us all the time. Called an imaginary quantity, it is simply a mathematical operator and indicates a rotation of phase of ninety degrees. A complex quantity does not necessarily mean that it is complicated. It is just an association between a real quantity and another real quantity 90 degrees ahead or behind it in angular rotation — vectors. Have at it. It's fun.

... The Japanese Morse Radiotelegraph Code is amply discussed by James E. Holden, a recognized authority on the Japanese language. This article follows an introductory article which appeared in QST in September 1942. So much interest in the original article was manifest that a more comprehensive treatment was indicated. I don't think I'll go in for this one!

... Paul J. Palmer, W8UGR describes a WERS Hand set for WERS. He calls it "Handy Andy." A photo of it in use appears on the front cover of this issue. It uses 6V6GT tubes and is reasonably compact, although the power pack has to be in a separate case which one ordinarily rests on the ground. — W1ANA

THE MILLER SUIT: A SPECIAL REPORT

THE W9WNV lawsuit against the League, freely discussed in DX circles but only briefly reported in *QST* for May (p. 81) and August (p. 10), has been resolved without going to trial under the terms of an agreement signed by Dr. Donald A. Miller, W9WNV, and ratified by the Board of Directors. Under this agreement, he has withdrawn his suit, dropping his charges and his claims for damages. During formal testimony in June in Hartford, Dr. Miller conceded under oath he was not in fact at one location (St. Peter and Paul's Rocks) claimed earlier, and that some of his statements to the Awards Committee (which administers DXCC), to League Directors, and in various published statements and documents, were untrue.

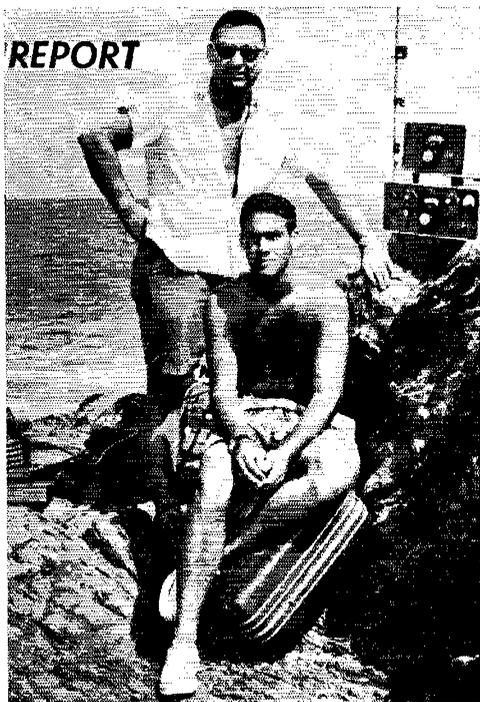
Dr. Miller first threatened suit in early 1967, shortly after the Awards Committee began its investigation of many complaints and charges of irregularities in Dr. Miller's DX operations. This did not deter the Awards Committee from taking action, appropriate in its judgement, to protect the integrity of DXCC. However, on advice of the League's General Counsel, *QST* refrained from publishing any details while the suit was imminent or in process. It was frustrating not to be able to counter the many misconceptions, inaccuracies and downright distortions which flew about on the air and in other publications during this period. Here at last is the story.

DXpeditioner W9WNV's lawsuit was filed in February 1968 against the League and against John Huntoon personally, alleging defamation and seeking \$550,000 damages. In essence the suit revolved around the Awards Committee's refusal to allow DXCC credit for certain of his claimed operations, as outlined in a series of bulletin announcements of such actions which were sent to DX clubs, bulletin editors, IARU societies and others having a primary interest in DX. Specifically, the Awards Committee had, during 1967, refused DXCC credits (or withdrawn credits previously granted in good faith) for operations claimed by the doctor at Chagos, Heard Island, Laccadive Islands, Navassa, and St. Peter & Paul's Rocks. These actions had been taken because in the investigation of complaints concerning a number of his DXpedition operations, documentary evidence (including correspondence from several governments) submitted to the Committee strongly suggested either insufficient license or other authorization — or that he was never, in fact, actually at the locations claimed. He was unable, in the Committee's judgement, to refute such evidence satisfactorily, despite much correspondence, a personal meeting with the Committee (March 1967), and the unprecedented opportunity to present his case to the League directors (May 1967).

There follows a tabulation of the DXpedition activities for which DXCC credit was withdrawn (or withheld), along with a summary of the reasons for action:

Navassa Island

This was an operation in the autumn of 1966 by Dr. Miller and Herb Kline, KIIMP, under the latter's call/KC4. Cards received at Hq. were originally granted full DXCC credit, in good faith on the assumption the required Coast Guard permission



One of several photographs submitted in the autumn of 1966 by W9WNV of his and KIIMP's "St. Peter & Paul DXpedition" PYØXA. This picture and others were published by *CQ* and *73* Magazines (December 1966). Under oath, Dr. Miller later admitted he had not been on the Rocks and these pictures are of some entirely different area.

had been obtained. (Miller later denied any advance knowledge of the need for CG permission.) Acting on queries from other amateurs who had recently applied for Navassa operation and been turned down, the Awards Committee determined from the Coast Guard that the necessary permission had not been obtained, and that it was still CG policy to allow only government employees on official business on the island. Dr. Miller was aware of this investigation as early as October 1966, and the Committee was subsequently in receipt of voluminous correspondence and documents from him on this and other subjects. He took the position that the legality of his presence on the island was "none of the ARRL's damned business." Nevertheless, in mid-January Hq. informed Mr. Kline and Dr. Miller that DXCC credit would have to be withdrawn because the League could not be a party to an activity labeled by an agency of the U.S. government as unauthorized. Dr. Miller countered with a demand that no discreditation take place or he would file a "major lawsuit" against the League; the Committee nevertheless acted to withdraw the credits. The Committee was somewhat startled a few days later to receive from Dr. Miller (in Africa) a photocopy of a letter on Coast Guard stationery from "Vice Admiral R. C. McCleary, Acting Commandant," stating the Coast Guard had no objection to his activity on Navassa; however, it was later discovered that there is no such person in the Coast Guard and no such letter had been written. Dr. Miller challenged the CG's

jurisdiction over the island and its right to deny him permission to land; at one point he threatened to "take the matter up in person in Washington with the Departments of State, Interior and Treasury" if the Coast Guard again attempted to deny any amateur permission to land at Navassa. The Commandant of the Coast Guard replied that his visit was a trespass upon Government property, and that "any further unauthorized visits may result in a referral of the matter for appropriate action by the Department of Justice".

St. Peter & Paul Rocks

This was an activity in late August, 1966, again with K1IMP as a companion. Once again cards received at Hq. were granted full DXCC credit, in good faith. However, word shortly reached Hq. that Dr. Miller had been in Caracas, Venezuela, "within hours" of the claimed PYØXA operation and thus could not possibly have reached the Rocks some 2000 miles away. Accordingly, the Awards Committee in early October 1966 requested both him and Mr. Kline to furnish information on the journey — name of vessel, itinerary, etc. Mr. Kline responded, simply deferring to W9WNV. The latter wrote in late October (from the Indian Ocean) saying he was "not going into details on transportation, visas, passports, port clearances, etc. — that's my business and not the ARRL's." (In the same letter he did say, however, that this and the Navassa operation were "two of the best and most legal DX operations I've ever been connected with.") Later he agreed to furnish such documentation as was feasible; but little of substance was ever received. He told the Awards Committee in Newington in person on March 3, 1967, "... there can't be any evidence that anything was wrong with the St. Peter & St. Paul because that expedition was 100% okay license-wise and everywise." He told the ARRL directors in Hartford on May 4, 1967, "... Herb Kline and I are both willing to sign affidavits that we were on St. Peter and Paul Rocks . . . We were there and the pictures we took were from there. It couldn't have been anywhere else . . . I was there and I won't have anyone saying I wasn't there . . ." Nevertheless the Awards Committee was not convinced and so acted in July to withdraw DXCC credits for the PYØXA operation, despite continuing threats of a lawsuit. The suit was actually filed, in February, 1968, in the federal district court of San Francisco. To make a long story short, during Dr. Miller's deposition in Hartford in June, 1968, under oath he admitted that the PYØXA operation actually took place from a vessel in sight of the South American coast in the vicinity of Trinidad or Tobago, some 1800 miles from St. Peter & Paul's Rocks.¹

Laccadive Islands

This was an operation in late January, 1967. In early February the League received an appeal from the Amateur Radio Society of India to warn Dr. Miller that his operation from the Laccadives was unauthorized, since no amateur operation was permitted there, and it would certainly cause difficulty in amateur/government relations. Dr. Miller had been granted a license, VU2WNV — in fact the first to any U.S. citizen under the reciprocal agreement. He claimed it authorized Laccadives operation (although he never actually saw the license); the government said it was good only for

¹ A point noticeably absent from the April 1968 "Don Miller Rebuts Fraud Charges" instalment of the DXpedition series by W9WNV in *CQ Magazine*.

Bombay. By a statement dated February 20, 1967, the League announced (among other things) suspension of any DXCC credits for the VU2WNV operation until further notice. The Awards Committee was somewhat startled a few days later to receive from Dr. Miller (in Africa) a photocopy of a letter to him on Indian government stationery dated January 3, 1967, granting him authorization to operate on the Laccadives (and thus disputing the ARSI statement)! This and other material was furnished ARSI, who in turn forwarded it to their government. After an intensive investigation, the Department of Communications of the Government of India informed the League: "The letter of January 3, 1967 . . . has not been issued under the authority of the Govt. of India . . . Amateur licenses/permits are never issued by us in this form and the letter head of the forged document is an old one which was in use in 1963 . . . It has been confirmed by the authorities in India that Dr. Miller never landed in any of the islands in Laccadives during the period . . ." The Awards Committee thus rejected Dr. Miller's appeals to credit the VU2WNV operation.

Chagos

This was part of the January 1967 itinerary which was claimed to include the Laccadives, being a stop enroute from the Seychelles. Several amateurs in Mahe (Seychelles) expressed to the League strong opinions that Dr. Miller did not actually go to the Chagos, as their direction-finding activities on his VQ9AA/C signals showed them coming from the west, rather than the east as would be expected from any Chagos operation; and the signals were consistently strong around the clock, not showing any day-night variation as would be expected from a transmitter 1,000 miles away. It was also asserted that the trimaran on which Dr. Miller departed from Mahe was much too slow to have made the voyage in the time claimed. This evidence the Awards Committee found significant but not conclusive. The subject was discussed in considerable detail, along with the Laccadives, at the meeting with directors in May 1967. Dr. Miller at that time described his trip as by trimaran only for a few miles from Mahe, then transferred next day to a "fast yacht" which took him to Chagos, Blenheim Reef and Laccadives, then re-transferred him to the trimaran for the return to Mahe. Neither in the meeting with directors, nor in the depositions under oath, could Dr. Miller recall for certain the exact name of the "fast" boat, its country of registry, its last port of departure, its size or color, names of captain or any of the crew. He "thought" it was Dutch-owned and might have one of two names — the "Viana Princess" (which the League found on investigation was a vessel in the Pacific Ocean at the time) or the "Voyageur," (the League could locate only one vessel of that name, in the Mediterranean at the time). Taken together with the information obtained on the Laccadives, the Awards Committee found the explanation unacceptable and so acted in July 1967 to withdraw credits for VQ9AA/C.

Heard Island

This was an activity in July 1966 under the call sign VK2ADY/Ø. Reports received by Headquarters that the operation had not actually been conducted at Heard prompted questions concerning the operation during the meeting of directors in Hartford in May 1967. Dr. Miller identified the "S. Capetown" as the ship which took him from Durban (he

thought) to Heard; he claimed it was a rescue vessel, but was not registered in South Africa (he didn't know where). Hq. investigations located several vessels with the name "Capetown," none in the service claimed. Checks with the Postmaster General's Department of Australia indicated Dr. Miller was issued a license but it was valid only in New South Wales (he claimed otherwise). Investigating at ARRL's request, the Wireless Institute of Australia (which took no position in the matter other than obtaining information) received a response from the Australian Department of External Affairs as follows:

In reply to your letter of 11th May, our department was approached first by Mr. Charles N. Swain, on 10th January 1966, and later by Dr. Miller on 21st February 1966, who sought permission to visit Heard Island to establish an amateur radio station there.

Early in March the Department advised that they were not able to approve the request because of their inability to demonstrate to us that the arrangements they proposed to adopt would be adequate to cope with the very severe weather conditions likely to be experienced at the island.

Incidentally, in making his representations, Dr. Miller advised our department that the French authorities had approved his visit to Kerguelen near Heard Island, subject to their accepting no responsibility for the safety of the party. However, the French authorities advised that they had had no such request. . . .

In the circumstances, there seems reason to doubt whether Dr. Miller did, in fact, visit Heard Island in July 1966. The Island is very exposed and the anchorage at Atlas Cove is extremely treacherous. In July the weather is particularly violent and would be very dangerous in a small ship. *Yours sincerely, D. F. Styles, Acting Director.*

Under the circumstances the Awards Committee felt it had no choice but to withdraw credits for the operation, and did so in July 1967.

Case Settled

Before the taking of depositions was even completed, attorneys reached the stage of specific proposals for settlement of the case. After many hours of consultation among and between the attorneys for both sides and discussion by telephone among the League's officers, an Agreement was signed by Dr. Miller and Mr. Huntoon as League Secretary (subject to ratification by the League's Board of Directors) and in his own behalf. The full text of the Agreement follows:

WHEREAS, the Awards Committee of the American Radio Relay League, Incorporated, reported in statements dated February 20, 1967, March 10, 1967, May 4, 1967, and July 6, 1967, certain decisions and actions taken by it concerning certain amateur radio activities and operations of Doctor Donald A. Miller, W9WNV; and

WHEREAS, Dr. Miller instituted suit against the League and its Secretary and General Manager, John Huntoon, in the United States District Court for the Northern District of California on February 19, 1968, Civil Action File No. 48726, alleging that the statements and actions of the Awards Committee and certain related statements and actions of Mr. Huntoon were malicious and libelous and requesting judgement in the maximum amount of five hundred fifty thousand dollars (\$550,000.00); and

WHEREAS, service has been obtained on the League but not on Mr. Huntoon; and

WHEREAS, the League, in an answer to Dr. Miller's complaint, filed on May 7, 1968, denied each and every allegation of said complaint of which it had knowledge; and

WHEREAS, Dr. Miller, the League's Secretary, the League's General Counsel, and California Counsel (or both parties to the action have met in Hartford, Connecticut, for five (5) days, beginning June 11, 1968, to prepare for trial of the action; and

WHEREAS, the parties recognize that this and similar actions and controversies are not conducive to the advancement and enhancement of amateur radio in the United States and throughout the world; and

WHEREAS, the parties, being desirous of terminating, once and for all, their differences and the related controversies, have explored at length during the said five day period the manner in which this action and their differences and related controversies may be resolved by mutual agreement; and

WHEREAS, there are no unresolved complaints concerning any of Dr. Miller's operations now pending before or known to the League's Awards Committee;

NOW THEREFORE, in consideration of their mutual promises and other valuable consideration, the parties hereby agree as follows:

1. Dr. Miller shall dismiss with prejudice his suit against the League and Mr. Huntoon within ten (10) days after the conditions precedent hereinafter contemplated have occurred; and

2. Dr. Miller shall not institute any suits or other litigation in any other jurisdictions against the League or any of its Officers, Directors, Employees, or Agents based upon any of the actions or matters which were the basis for or subject of the instant suit; and

3. The parties hereto shall execute appropriate releases to carry forth the intent of this agreement; and

4. Except for certain expenses incurred in connection with or related to the said meetings, which shall be the subject of separate agreement between counsel, each of the parties shall bear and pay its own costs, including attorneys' fees; and

5. Copies or reports of this agreement may be published in the League's official journal, *QST*, and/or in any other publications should either Dr. Miller or the League so desire; and

6. This agreement shall not be binding upon any of the parties hereto unless and until the following conditions precedent have occurred:

(a) The Awards Committee has approved as separate country credits for the D.X. Century Club the 1968 operations of Dr. Miller from Ikenheim Reef, Geyser Reef, and Chagos Is. (Nelson's Island); and

(b) Ratification and approval of this agreement within forty-five (45) days of the date of this agreement by either or both the League's Executive Committee or Board of Directors.

This agreement, entered into this 15th day of June, 1968, at Hartford, Connecticut, by the following:

DONALD A. MILLER, M.D.: THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED by Its Secretary JOHN HUNTOON; JOHN HUNTOON.

By way of explanatory comment, it should perhaps be noted that the legal language of Items 1 and 2 in the Agreement ("with prejudice") preclude Dr. Miller from at any future time re-instituting suit against the League or any of its personnel for any actions or statements prior to execution of the Agreement. Item 4 provides that each party shall bear its own costs except that the League agreed separately to underwrite the costs incident to the taking of the depositions in Hartford solely as a concession to avoid dragging out the litigation into even more extended time and expense. This concession was made upon the strong advice of ARRL counsel and after thorough discussion among the Executive Committee and the Board. No money was paid to Dr. Miller in settlement. Item 6 covers Awards Committee approval of 1968 (actually year-end 1967) operations by Dr. Miller at three locations for which he had earlier supplied complete documentation and against which no complaints had been received. The Awards Committee's 1967 actions in withdrawing credits for the locations described earlier still stand of course.

The agreement became effective with (1) the release of Awards Committee action on the three most recent DXpeditions (See p. 108, September *QST*); and (2) ratification by the Board of Directors, in a mail vote — which incidentally, was 11 in favor to 5 opposed. Those in opposition, it should be mentioned, were mostly against the League's underwriting any deposition costs.

QST

Happenings of the Month

EXAM CREDITS DENIED

FCC has rejected three petitions for rule-making which asked for credit toward higher classes of license based on past records.

W8ZHB, in RM-1252, urged that Conditionals and Generals who once held Class B and Class C licenses be granted Advanced Class without further examination. W8DBK wanted the same privileges (via RM-1256) for former holders of Advanced, Class A or Amateur Extra First who now hold only General because of a lapse in license-holding. RM-1251, submitted by W3EIQ, sought automatic General Class licenses for those who had held Conditional for ten years continuously without receiving a "pink ticket" (Official Notice of Violation) in that time.

In denying the petitions, FCC said that the various proposals were either largely repetitive of matters recently considered and resolved in Docket 15928, or were inconsistent with the decisions of that docket.

STAFF NOTES

Sharp-eyed readers of page 3 may already have noted the name of our new advertising manager, Robert J. Rinaldi, W1CNY/K1AFC, on the masthead for September. Bob came to Hq. in June, 1965, as purchasing agent and assistant circulation manager, and joined the advertising department in March 1968. He has a bachelor's degree in economics from Fairfield University, and spent six years in the Naval Reserve, two of them on active duty. As a carry-over into ham radio, Bob holds Navy MARS call N0ZVK; is a past Connecticut area n.e.s. and former area editor of *The Kilowatt*. A past secretary of the Connecticut Wireless Association, he uses c.w., s.s.b and RTTY on 80 through 10, and holds appointment as an ARRL official bulletin station. He started as a Novice in Waterbury, Conn., twelve years ago.

A new communications assistant at Hq. is William O. Reichert, WA9HHH, of Dupu, Illinois. Bill was first licensed in 1963 while a sophomore in high school. He's been net control station on the Illinois c.w. net and Ninth Regional Net; operates in Central Area Net and has filled in as the Transcontinental Corps liaison to Eastern Area Net. He runs a homebrew linear to a pair of 6094s, gets in most of the contests and is getting gear ready for RTTY. He'll be assisting Communications Manager George Hart with public service matters.

FCC DENIES STAY ON 50.1 MHZ.

The Federal Communications Commission has turned down a petition filed by Robert B. Cooper, Jr., K6EDX and Robert D. Grimm, K6RNQ which requested continuation of Technician, Conditional and General Class operations in 50.0-50.1 MHz. after the present cutoff date of November 22, 1968 and in 50.0-50.25 MHz., after November 22, 1969.

The League, incidentally, at its 1965 and 1968 Board meetings favored continuation of these privileges for these licensees; the Board did not feel that subdivision of the bands by class would work on v.h.f.

The Commission, in denying the petition, reiterated its intention of sticking with incentive licensing as announced a year ago, until practical experience dictates a change. Even in the face of two FCC rejections, the League will continue to seek maintenance of the Technician privileges by filing a petition for reconsideration of the ruling.

The text of the Order follows:

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

In the Matter of

Amendment of Section 97.7(a) of the Amateur Radio Service rules relating to operation in the 50-50.25 MHz. frequency band.

RM-1287

ORDER

Adopted: August 9, 1968 Released: August 13, 1968

1. A petition for the institution of rule making in the Amateur Radio Service has been filed by Robert B. Cooper, Jr. (K6EDX), Fresno, California, and Robert D. Grimm (K6RNQ), Pleasant Hill, California, proposing that Technician, Conditional and General Class licensees be permitted to operate in the 50-50.25 MHz frequency band.

2. Petitioners' proposal would require amendment of a portion of Section 97.7(a) of the Commission's Rules which was revised on August 24, 1967, in Docket 15928 (FCC 67-978) as part of the Amateur Radio Service "incentive licensing" program. Section 97.7(a) now provides that, effective November 22, 1968, operation in the 50-50.1 MHz band and, effective November 22, 1969, operation in the 50.1-50.25 MHz band will be limited to the Advanced and Amateur Extra Classes of licenses as reserved privileges for these higher licensee classes.

3. To support their proposal, petitioners state that they "are wholly in accord with the principles set forth in Docket 15928," but that they believe that the reservation of the 50-50.25 MHz band



Is there "magic" in pipe smoke? We've noticed that George Grammer, W1DF, is seldom without his pipe—and seldom without a good clear explanation of whatever technical problem is at hand! Our photo, while far from recent, is typically George checking on an antenna experiment.

For those who came in late, we'll say that George is technical editor of *QST* and technical director of the League. He's author of two publications, *A Course in Radio Fundamentals* and *Understanding Amateur Radio*, wrote the March-to-August *QST* series, "Those Higher Class Examinations," and has a hand in most other technical writing or editing chores at hq.

GG was first licensed as a teenager in Philadelphia with the call 3A1H. He graduated from Drexel Institute in 1926 and went to work for a transit company as an engineer. In 1929 he took over the Technical Information Service at ARRL. His first article for *QST*, in December, was "A Single Control Trans-

mitter," widely built by beginners of that day. By May of 1930 GG was assistant technical editor, acting t.e. in 1938 and t.e. in 1939. After wartime leave for classified technical work, George resumed the t.e. job, but with the additional title of technical director.

Not long thereafter, George testified at an FCC hearing on television: channel 1 vs. channel 2; TVI potential and so on. At the completion, the audience broke into applause in appreciation of his lucidity, a virtually unheard-of reaction in the decorous atmosphere of a hearing chamber!

About this time, under his perceptive direction, *QST* began intensive exploration of new modulation techniques including narrow-band i.m. and s.s.b. In recognition particularly of the latter, George was elected a Fellow of the Institute of Radio Engineers (now IEEE) in 1959. GG has also belonged to a couple of more exotic organizations, The South Lyme Beer, Chowder and Propagation Society (actually a Field Day club) and the JERKS, which back-forms into something like Junior Engineering Radio Knowledge Seekers. But contemplative pastimes are attractive, too; with Mrs. Grammer and often the grandchildren, George attends many of the symphonies, ballets and other musical performances. He's also doing some amateur astronomy these days.

And on October 5, W1DF will receive the Amateur of the Year plaque of the Antique Wireless Association during its convention at the Smithsonian Institution—a well-deserved recognition from hams who know.

"will result in serious and irreparable (sic) consequences to the amateurs."

4. It is difficult to reconcile the petitioners' contention that they adhere to the principles of incentive licensing with their proposal. The particular change to which they object reserves a very small segment in the 50 MHz frequency band to the highest classes of amateur licensees. This segment, which is only about 2% of the VHF frequencies available to Technician, Conditional, and General Class licensees, was deleted in order to provide an incentive for lower class licensees to "upgrade" their license status. Petitioners do not discuss these considerations, nor do they clearly indicate the nature of the undesirable consequences which they maintain results from this provision. They do present comments to show the desirability of this reserved frequency segment for a number of purposes, and the relationship of the 50 MHz band to television interference (TVI). However, similar comments were carefully considered in the Docket 15928 proceeding and were not found to require a

different determination. Moreover, the Commission stated in Docket 15928 that it is its intention to review the extent to which the reserved frequencies are occupied, and to make necessary changes if the effective utilization of the frequencies involved is threatened. Initial implementation of these frequency reservations is scheduled for November 22, 1968, with full implementation one year later. So that Commission review may be meaningful, it is planned to gauge the results following each stage of implementation.

5. As can be seen from the foregoing, petitioners' proposal is repetitive of a matter which has been recently fully considered and resolved. It is concluded, therefore, that the institution of rule making is not warranted. Accordingly, the Chief, Safety and Special Radio Services Bureau, under delegated authority set forth in Section 0.332(m) of the Commission's Rules, ORDERS that the petition filed by Robert B. Cooper and Robert D. Grimm is DENIED.

FEDERAL COMMUNICATIONS COMMISSION

EPISTLE TO A QRM-MAKER

Here's a copy of a letter sent by FCC some time ago to an amateur who had been accused of intentional interference. Some mighty good advice for all of us is included therein. (Thanks to the Amateur Radio News Service and Boeing Employees' ARS for bringing the letter to light).

Interference to Other Stations—An F.C.C. Letter

Interference involving the operation of your amateur radio station has been reported to the Commission. Accordingly, this letter will advise you of the Commission's rules and policies applicable to general interference between stations licensed to operate in the amateur service.

As you are undoubtedly aware, frequencies allocated to the Amateur Radio Service must be shared by all licensees. Consequently, interference between stations is most likely to occur during periods of heavy activity on, and occupancy of, an amateur frequency band. Experienced amateur operators are expected to anticipate and minimize this interference. Their failure to do so indicates either ignorance of the practical realities of amateur communications or a selfish lack of consideration for others. Assuming that it is your desire to alleviate interference between amateur stations, the following guidelines and considerations are presented.

Licensees of stations which are already in operation should remember that no amateur licensee, group or network has a right to the priority or exclusive use of a given frequency nor may freedom from interference be expected (exception is provided under the emergency provisions of rule Section 97.107). In addition, common courtesy, as well as good amateur practice, dictates that incessant or continuous non-emergency operation so as to preclude others from operating is highly undesirable and unwarranted, and if willful or malicious, could result in the imposition of punitive measures.

Licensees of stations who are attempting to utilize an occupied frequency should note that Section 97.125 of the rules provide that: "No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal." Moreover, observance of good amateur practice requires the avoidance of attempting operation of a frequency where it is obvious or likely that such operation will result in harmful interference.

All licensees should avoid the following frequently observed improper practices, some of which constitute willful interference for which severe penalty is provided:

- A. Knowing and repeated operation on, or unreasonably close to, a net frequency at times when the net is obviously active.
- B. Requesting or demanding protection of a net frequency at times when the net is inactive.
- C. Requesting or demanding protection of a net frequency over a long period of time in the absence of an emergency situation.
- D. Calling, testing or tuning on a frequency without first determining that the frequency is not already being used.
- E. Carrying on an exchange of communications on two (or more) separate frequencies when there is no technical or operational necessity for such multi-frequency usage.

As noted, the foregoing is furnished for your guidance. From long experience, the Commission has found in most instances neither party to an incident of alleged deliberate interference in the use of frequencies is entirely blameless. The keynote to resolution of these interference problems, therefore, is cooperation and consideration by all persons involved.

You are permitted and encouraged to read and discuss this letter via your amateur radio station. You may be assured that any effort on your part to contribute to better amateur radio practices and operations will be greatly appreciated.

BEN F. WAPLE, *Secretary*
Federal Communications Commission



One of several ways Illinois hams celebrated the sesquicentennial of their state was by sponsoring a Central Division convention in Springfield. Posing for a photo are: ARRL General Manager W1LVQ, Illinois S.C.M. W9PRN, ARRL President WØDX, Acting Mayor James A. Dunham, Central Division Director W9HPG and Indiana S.C.M. W9BUQ.



The QST article, "An Experimental All-Electronic VOX System for S.S.B." won for its author, H. Rommel Hildreth, M.D., KØHZF the Cover Plaque Award for March, 1968. The plaque was presented to KØHZF, right, by Raymond L. Keller, WØDU. The winner is picked each month by a mail vote of directors as to the best article.



W4FUM has put into action his ideas on "house-breaking" the ham shack. As shown above, John has done a good job making his rig blend with the contemporary decor—or, as he says, giving it wife-appeal.



The St. Louis Amateur Radio Club presented its Amateur of the Year 1968 plaque to Kenneth Lohmeyer, WAØERG; club prexy WAØEFB does the honors.

Scouts On The Air. The 11th Jamboree-on-the-Air of the worldwide Scouting movement will be held from 0001 GMT October 19 to 2359 GMT October 20, 1968. Object is for hams to invite local Scouts into the shack and let them talk to their fellow Scouts elsewhere. It's not a contest, but an outline of activity should be sent to: B.S.A., New Brunswick, N. J. 08903.

WHO THE DEVIL IS WHO?

Fourth 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
W1CH	W1JLJ	W2TV	W2MEK	W5GV	K5MAZ	K6JA	WA6VTY
W1GL	K1VRO	W2ZZ	W2LOP	W5HS	W5PHI	W6RM	WA6UQ
W1JE	W11KU	W3NU	W6EWN	W5IB	W7FTU	W6TB	W6CTO
W2GX	WB2BLI*	W3PG	W3HEC	W5IK	K5CWE	W7KF	W7RJA
W2JA	WA2MMY	W3QD	W3VA	K6BR	W6WSM	W7KS	W7ATV
W2LA	W2PXR	K4DF	WA4STD	W6DR	W6HMP	W7LJ	W7HA
W2PM	K2RNA	K4FU	W4GVL	K8FO	W6WLI	W8DI	W8GKX
W2PY	WA2SFP	K4HJ	W4GGX	K6GG	W6ZJW	W8FE	WA8HAN
W2QK	W2CZF	K4H	W1RCQ	K6HN	W6GBI	W9BL	W9CJC
W2SN	W2FCQ	W3NW	K4AEV	W6HN	WB6NCD	W9CU	W9CPZ
W2SX	W2PRQ	W4VZ	W2LER*	K6IM	W6BLDC	W9IJ	W9RRS
W2TD	W2NOS	W5DM	W5GGV	K6IR	K6BNJ	W9LJ	W9VBK
W2TS	WB2QCO	W5GO	W5BRR	W6IT	W6PIZ		

* Correction from Sept.

I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION

IARU REGION II CONTEST

The first annual IARU Region II Contest will be held October 12 and 13, starting at 0001 GMT on Saturday, and ending 2359 GMT on Sunday. Participating stations should call "CQ Region II Contest" on phone, and "CQ 2 Contest" on c.w. Exchanges for both modes shall consist of the signal report followed by serial contact number.

The contest is open to world-wide amateurs. Operation is permitted on any band using any mode. Cross-band, cross-mode, and contacts with stations located in the same country as the participant are not valid. Stations within Region II (Western Hemisphere) may count one point for each contact made with other Region II stations, and 6 points for contacts made with stations outside of Region II. Stations located in Regions I and III receive credit only for contacts with Region II stations for which they count 6 points per contact. Total score is obtained by multiplying the total number of points by the number of countries worked.

Entries will be accepted from single- and multi-operator stations. Separate logs should be kept for phone and c.w. and submitted before the last day of the year to the Secretary of IARU Region II, Box 4097 Lima, Peru. A summary sheet should be included with all scoring information, category (multi- or single-operator), and the name and address of the participant. Awards will go to highest scorer in



WA3HXR is congratulated by Dr. Angel Landaeta, chief of the Radio Broadcasting Department of the Ministry of Communications on receiving the first permit under the U.S.-Venezuelan reciprocal operating agreement signed September 18, 1967. Also shown in the picture are Menotti Fraino, YV5AMF, and Eduardo Cabrera, YV5AXU, Vice-President and President respectively of the Venezuela Radio Club, and Miss Marie Richardson, First Secretary of the American Embassy, Caracas.

Region II, outside of Region II, and in each country for each kind of participation.

INDONESIA

A new national organization of amateur radio operators has been formed, with the approval of the Indonesian Telecommunication Council—the *Organisasi Radio Amatir Republik Indonesia* (ORARI). We hope that with this official authorization of amateur radio in Indonesia we will soon have another member of the IARU.

Three prefixes will be heard being used by Indonesian amateurs—YB (high-class certificate), YC (mid-class certificate), and YD (lower-class certificate). Only the holder of the high-class certificate will be allowed to make contact with radio amateurs outside of Indonesia—thus, only the YB Indonesian call signs will be working DX. The holders of YC call signs are permitted to QSO other Indonesian amateurs, while the YD prefix is only for local work. No PK prefix is now legal.

The call sign areas are: 0—Djakarta; 1—West Java; 2—Central Java; 3—East Java.

Amateurs are warned that the government of Indonesia has not yet removed their notice filed with the International Telecommunications Union which gives objection to Indonesian amateurs contacting amateurs of other countries. Such communications, therefore, are still illegal for both parties involved. A list of DX restrictions appears on page 91.



Here delegates to the recent IARU Region III inaugural Congress are shown being greeted by then Wireless Institute of Australia President VK3ZS at WIA headquarters.

AMATEUR RADIO BOOKLET

A booklet entitled *Amateur Radio*, explaining the "reasons for the continuation and expansion of amateur radio as a service of self-training, intercommunication and technical investigations," contributed by G6CL has been published by IARU Region I Division. Distribution will be to international telecommunications officials to acquaint them with the history and accomplishments of the amateur radio service.



amateur radio



The idea of producing the booklet arose at the IARU Region II meeting at Opatija, Yugoslavia, May, 1966. The result of the effort is a well-organized, well-illustrated booklet which should do an effective job for amateur radio.

EXHIBIT IN IVORY COAST

The *Association des Radio-Amateurs Ivoiriens* reports that during American Week in Abidjan, November 18-24, 1968, they will sponsor an amateur radio exhibit at the Hotel Ivoire. American Week is sponsored by the American Business Club of the Ivory Coast. Through this exhibit, *ARA* hopes to acquaint many people with amateur radio.

QSL BUREAU CHANGES

The following are new QSL bureau addresses; a complete bureau list will appear in the December issue. Algeria: (7X2, 7X3 and 7X0) *ARA* QSL Service, P.O. Box 2, Algiers. Trinidad and Tobago: (9Y4) Trinidad and Tobago Amateur Radio Society, P.O. Box 1167, Port of Spain, Trinidad. American Samoa: Utulei High School Amateur Radio Club, Department of Education, ETV, Pago Pago, American Samoa 96920.

NOTES

Hiroshi Murai, JA1AC has been elected President of the Japan Amateur Radio League, succeeding Kenichi Kajii, JA1FG who has served as President since 1953. Roy is ex-J2MI and has been an active radio amateur for more than 34 years.

In July, 1968, this column announced that visitor licenses are now available for operation in Ireland. Application forms for such may be obtained by writing the Secretary, Radio Section, Department of Posts and Telegraphs, Hamman Buildings, O'Connell Street, Dublin.

DX OPERATING NOTES

Reciprocal Operating

United States Reciprocal Operating Agreements currently exist *only* with: Argentina, Australia, Austria, Belgium, Bolivia, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guyana, Honduras, India, Israel, Kuwait, Luxembourg, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Switzerland, Trinidad and Tobago, United Kingdom and Venezuela. Several other foreign countries grant FCC licensee amateur radio operating privileges on a courtesy basis; write headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, Israel, Luxembourg, the Netherlands, Senegal, Switzerland, United Kingdom and U.S.

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 4X and 4Z.

DX Restrictions

U. S. amateurs 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, Indonesia (including West New Guinea), Thailand and Vietnam forbid radio communication between their amateur stations and such of other countries. U.S. amateurs should not work HS XU XV 3W8 or 8F. Canadian amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Vietnam and Jordan. Prefixes to be avoided are HS JY XU XV XW8 3W8 and 8F.



Correspondence From Members-

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

GETTING THE WORLD IN TUNE

Just read the August *QST* article by Ambassador Meyer, W3ACE/EP2AM. This is an in-depth report, an excellent writing. In my opinion this address will be remembered for many years.

Seems to me that the inscription on those certificates which are issued for copying the "Armed Forces Day Message" by the Secretary of Defense each May are saying the same thing: "Power for Peace."

The message I get from this article is that we should cultivate the art of listening. Not to just so much sound, but to the full meaning of what the other person is saying.

W3ACE seems to be speaking in parables: "The world in which we live is a world of diversity and change, requiring v.f.o. techniques rather than a fixed crystal frequency." And, the quotation from Kipling at the end puts the whole address in capital letters.

I am thankful that you as an Editor saw the beauty of this writing and published it. It is truly a masterpiece. — *Joe Rice, W4RHZ, Florence, Ky.*

AN ARRL WORKING FREQUENCY?

The idea expressed by Mr. Hart, W1NJM, in Operating News in the August *QST*, is worthy of the consideration by all hams. Such a frequency would help world, as well as national communications along the lines of Mr. Meyer's Banquet Address as printed in the same *QST* on page 62. A roundtable having no membership requirements other than being a ham would also help those who are having trouble making contacts or who would like to make friends with a wide range of people of this country and others. It will also "apease" those who are irate about "hello-goodbye" DX contacts. I am definitely in favor of this proposal and feel that it is a true service to both the public and hamdom the world over. It goes without saying that the frequencies chosen will be in the General sub-band so that the greatest number of hams as possible are attracted. — *Carcy Heckman, W4HSU, Bethesda, Md.*

I whole heartedly agree that we should have an ARRL working frequency. It would be good to know that someone could be contacted at anytime of the day or night on a particular frequency for any reason whatever, emergency, rig testing, message relay, or just plain wanting to talk.

Such a plan could possibly encourage more mobile operation because traveling amateur operators would know that they could work someone in the locality they happen to be in at the time.

Amateurs in general were criticized recently, by a local CB group that had banded together for mutual assistance, as being primarily talkers. There could be a grain of truth in this if we take a hard look at ourselves, especially in our day-to-day activities.

Why the working frequency plan has not been established before this is a bit of a puzzle; the sooner we get on with it the better. — *Calvin S. Bryant, W4FQZ, Miami Shores, Fla.*

I heartily endorse the idea. May I suggest a c.w. and s.s.b. frequency on 75-80, 40 and 20 meters. Too many frequencies set up will only defeat the purpose of having an instant response to a call for assistance. — *Joe Lynch, K9IFE, Northlake, Ill.*

LET'S UNIFY!

Ham radio is a hobby with multiple facets — each of which is sufficient to absorb the full interest of a particular individual. This is clear from the letters in *QST* which repeatedly extol the singular virtues of one aspect of ham radio.

Rather than attempt to move everyone to one of these aspects I propose that every individual try, or be shown the different aspects and be allowed to decide which is the most interesting for himself. I believe that *QST* should present a fair view of the various ham subcultures and provide sufficient support, or events, on a published basis to permit folks to sample each. This activity cannot be limited to the League but should be carried out vigorously by clubs to emphasize these various aspects.

I suggest that *QST* continue to devote one or two pages each issue to brief notes and significant events concerning each aspect of the hobby, as reported by a ham who is qualified in that field. Topics could be contests, traffic, v.h.f., construction and all the rest we know about. Only items of significance should be reported however; activities of a detailed nature would be better left to specific columns. I have had a chance to investigate many of these subcultures while operating as a KX6. They have included traffic handling, DXing, rag chewing, net operations and even some tinkering. The thing that has amazed me is the challenge and pleasure available from each.

Rather than tear each other apart, why not recognize these different hobbies, unified by the common title ham radio and the need for an FCC ticket. This realization, coupled with concerted League action could unify the hobby on a sound basis. — *Stanley Fierston, KX6FJ/W1BRJ, Box 1554, APO San Francisco.*

OPEN-BOOK EXAM?

Years ago, old timers tell me, all amateur tests were extremely hard and maybe then this would have had some justification. Now, except for the Extra, the tests are so basic and simple if you can't pass it without another source besides your head, you don't deserve to be a ham. Especially with the ARRL *License Manual* and other study guides it almost all is memorization.

With an open-book test the only preparation needed would be to know where to look in the book for the answers. — *Doug Kay, W4ZEMP, Bellcross, N. Y.*

☐ My compliments to WB2MCP for finally suggesting open book exams for ham licenses. This is something that the FCC should have tried long ago.

The exam should not be a test of how much one can memorize, but of how well and with how much skill one can use information that he has made available to himself. This, I think, is easily supported by the fact that a ham will soon forget the mountain of facts he's memorized for the test and will, by necessity, build up a library of needed info; or, he will still have the sources from which he studied for the test in the first place. — *Daniel S. Klein, WN2GJH, Yonkers, N. Y.*

☐ WB2MCP does not know what he is asking for when he wants the ARRL to petition the Federal Communications Commission to give open-book examinations. Speaking as one who has lived with open-book exams, as well as closed-book exams, not only through a Master's Degree, but also in courses towards a Doctor of Philosophy degree, I know open-book examinations can be rough and tough and it is not unusual for the failure rate to be higher than for closed-book exams.

I have passed the State Board examinations for Registered Professional Engineer. Even though I was permitted to take all of the texts, notes, and other aids into the examining room, and was well prepared, it was the hardest examination of all.

Therefore, speaking from a wide range of experience over many years, at different universities, before the Federal Communications Commission and the Federal Aviation Agency, I would rather take a closed book examination. They are easier to pass. My eighth grade teacher once wrote the spelling examination on the blackboard. Many of us failed it. Yes, even an open-book spelling examination may be dangerous. — *Lester C. Harlow, P. E., WB6ZNV/W4CVO, San Diego, California.*

☐ A recent correspondent has suggested open-book amateur exams. As one justification for his stand he says, "Professional engineering examinations are conducted in the manner suggested." As a registered P. E. in Ohio and Kentucky, I wish to point out that this is only partially true. While the Ohio P.E. examination does include two 4 hour open-book examinations, it also includes two 4 hour closed-book examinations. I might also add that open-book examinations are almost always much more difficult than closed book examinations. — *John R. Truitt, P.E., W8RTH, Cincinnati, Ohio.*

APPLIANCE OPERATORS

After reading the correspondence pages in August *QST*, I would like to know more about appliance operators.

Is this a new class of license?

I've looked through all the tech. manuals. I see spark, continuous wave, amplitude modulation and single sideband, but nothing on appliance operations.

I can get r.f. to the telephone, radio, stereo and the television set, but son-of-a-gun if I can get the stove, electric iron, refrigerator or can opener to show any signs of r.f.

How about a *QST* article on this mode? — *Howard McCall, W8TNF, Canton, Ohio.*

DELIBERATE JAMMING

☐ Am not an amateur — plan to go to Dallas FCC soon. However, just as a citizen I am puzzled and a little disturbed about this interference and what

seems to me deliberate jamming of an educational thing like your code practice transmissions. Am not angry at anyone, or trying to raise hell with any one about anything, and surely do not want to be quoted on something I really don't know anything about, but it does make one wonder what the devil is going on and why it is allowed to continue. Are some of the amateurs upset with you — jamming your transmissions surely does not bother that machine you transmit with — jamming could only harm or discourage some kid without equipment and the experience to cope with trouble. It all seems a bit cowardly to me.

Don't know how large a segment of the amateurs you represent but amateurs had better have a strong, effective spokesman for a united group of voters. I do not mean to imply that anyone has to agree with you on everything, or any thing for that matter, but in these days you surely do need influence at the right places. — *Tom Winston, Abilene, Texas.*

ANTENNA LENGTH

☐ I disagree! (August *QST*, p. 41.)

With an antenna, it's how long you make it, not how you make it long. — *Martin E. Berman, K3IZQ, Pittsburgh, Pa.*

QSO MANAGERS—Continued

☐ W9EXE may have a point in his letter re QSO Managers but has he offered a better scheme? Has he ever operated from the DX side of the fence with a transceiver? Has he ever tried to untangle a pile-up on his transmitting frequency from away out yonder? Or does he have the super-set-up which pierces the pile-ups and always is heard?

The QSO Manager is a FB scheme if it is worked correctly and equitably. It gives the DX station a chance to hear a station rather than be interrupted constantly by "eager beavers" trying to tail-end. If the DX station desires to carry on longer with the U.S. operator with whom he is in contact at the moment he is able to do so. He can then go on to the next fellow on the list. Is it much different than writing for a schedule? Furthermore, it certainly gives the "little" fellow a chance to make a QSO with a rare DX when he otherwise would be snowed under. — *Gay E. Milius, Jr. W4NJF, Norfolk, Va.*

☐ This new method seems fair to me. All have a chance to work the QSO manager by chance not power of equipment. If the DX can not hear him on schedule, he will go to the next. Seems to me it puts more hams on an equal footing. Seems like it must be agreeable to the DX station or he would not do it. I like it. — *R. J. Almeida, WASHBI, Cornwell Heights, Pa.*

☐ Bob Stark, W5OLG has just such an arrangement with Tom Christian, VR6TC, Pitcairn Island, for quite some time with few if any complaints. Hams write Bob or get in touch with him on the air and ask to work Tom. Once a week, after a short chat, Bob gives Tom a list of possible QSOs and Tom works them systematically.

To say that this system avoids pileups is only a small part of the story. Incidentally, it's a sad commentary on the future of c.w. to note that these sessions used to be conducted exclusively via c.w. Now it's strictly s.s.b. because c.w. requests to work VR6TC dropped to zero. — *Sam LeBow, WB6FJZ, Long Beach, California.*

Q57



CONDUCTED BY BILL SMITH,* WB4HIP

Cayman On Six

MOST of us are dreamers at times, and I'm no exception. The thought of a 50-MHz. DXpedition outside the United States had long intrigued me. Finding the right location to visit and then the time to do so was not easy.

I had planned a trip to Grand Cayman Island in the British West Indies, 500 miles south of Miami, during the June contest. There had been no previous 50-MHz. operation from this small island, and Cayman is fair DX, even on 14 MHz. The Grand Cayman Government, through its Postmaster Wentworth Bodden, has issued a few licenses to Canadians and Americans. I mailed my application several weeks before the contest, but nothing was heard in time, so I abandoned my plans temporarily. A month later a letter arrived from Mr. Bodden. My application had been misplaced among requests for Cayman postage stamps. (The Cayman government derives considerable revenue from the sale of its

colorful stamps to collectors.) My license was now ready for issue, I began planning an early fall Cayman trip. Then I thought, perhaps even a late July venture might be worth the gamble for Es. I wasn't sure, but then if the band didn't open I would still enjoy being away from television news for three days. I told my wife it was "go." She telephoned British West Indian Airways, \$59 roundtrip from Miami was reasonable and a cottage at the Beach Club Colony was only \$12.50 per day with two meals. July 19th was selected as the departure date. I began searching for someone to accompany me. No one in Miami was free, but K4OCK, president of International Electronics Systems Incorporated, offered a fresh Swan 250 and arranged for the loan of a portable beam and mast from WA4RRP. I was all set, except for a last evening stop for a smallpox vaccination.

Friday, July 19th, I arrived at Miami International Airport two hours ahead of flight time, 40 pounds over my allowed luggage weight. I hid the power supply, wattmeter and a can of insect repellent in a locker while I checked another grip

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

220-MHz. M.S. First

The first recorded 220-MHz. meteor scatter contact has been made. And the second. And the third.

On August 9, after two months of daily schedules, Mel Baer, W6WSQ, and Don Hilliard, W0EYE, completed the first 220 m.s. contact on record. The contact was made between 1130 and 1315 GMT. They began scheduling on June 10 hearing pings and bursts of up to 12 seconds on nearly every day. The distance is approximately 825 miles. Signal levels were typically 10 to 15 db. above the noise and the maximum burst duration was about 15 seconds.

K4IXC and K2CBA made the second 220 m.s. contact two days later, August 11 at 1600 GMT, on several similar bursts. Their exchange establishes the 220 m.s. distance record at approximately 1090 miles. On August 12, W6WSQ and W0EYE worked for the second time, between 1130 and 1430 GMT.

W6WSQ also scheduled W7JRG August 11 through 13. No contact was completed, but W6WSQ received three bursts from the Montana station on the 12th and W7JRG heard W6WSQ briefly on the 13th.

Power input at the successful stations varied from 400 to 1000 watts, antennas were Yagis. W0EYE, at Boulder, Colorado, used 400-watts input, a single 13-element Yagi and a Nuvisor converter. W6WSQ, near Los Angeles, was running a pair of 4CX250Bs at a kw., a single 13-element Yagi 45 feet high and a 417A converter. K4IXC, Melbourne, Florida, runs a kw. and a pair of 17 foot long 12-element Yagis stacked 3 wave-lengths at 100 feet. K2CBA, near Albany, New York, has a pair of 4CX300s at a kw., a single 13-element Yagi 110 feet high and a 417A converter. While high power was used by those making contacts, we also note that K4IXC heard W4IHHK, near Boston, running approximately 15 watts output.

Says W0EYE, "220 m.s. is not easy." But it has been done. We salute these four operators for yet another in the long series of amateur radio "firsts."

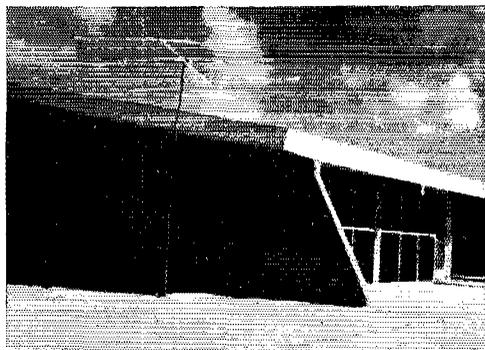
containing the 250, a swim suit, coax and connectors, and a package holding the 3-element Yagi and mast. I was still 12 pounds heavy on the scales, but the agent said nothing. I retrieved the other 25 pounds from the locker and walked to the boarding area. One hour later the 727 rose over Miami and turned south.

Fidel Castro allows no American planes to overfly his communist Cuba, but BWIA is of foreign registry and over Havana we flew. Those who fly are accustomed to picking out objects on the ground, such as cars or other signs of life. Over Havana I saw nothing. There was a city, streets and a harbor, but nothing was moving, not even a whisper of smoke. One would think Havana was a dead city, but living in Miami I know it is only sleeping. The 300,000 Cuban refugees in southern Florida have not forgotten their homeland.

The 727 covered the 500 miles to Grand Cayman in one hour -- and a glass of island fruit punch. We hopped, literally, onto the short Cayman runway at 1600 GMT. Many bronze faces with wide smiles awaited the new arrivals. These are genuinely friendly and honest people. A policeman, one of the five or six on the island of nine thousand persons, asked what I was carrying. I handed him an itemized list and the letter from Postmaster Bodden. He read them and handed both back, calling a taxi driver to assist me. I cleared customs without an inspection or having to post a bond assuring I'd not sell the radio equipment on Cayman.

The airport is three miles south of the capital city, George Town, and seven miles from the cottage I had rented. I stopped first at the post office to get my license, but Mr. Bodden was not there. We drove on to the cottage where I received a warm welcome. Thirty minutes later the beam was pointed stateside overlooking the clearest blue water I've ever seen. I turned on the 250; no TV birdies, ignition or power line noise, nothing, not even a signal. But I didn't have the license yet, either.

I telephoned the post office; yes, the Postmaster was there. Into town I went, arriving just as he drove off. Someone waved at him and he turned around. He remembered my letters and asked that I come with him to the power station near the airport. The utilities advisor has to approve anything electrical on Cayman, but he was gone and an assistant didn't know when he would return. You have to know these people to accept their informality. Nothing bothers them and they know everything will take care of itself. I returned to George Town with Postmaster Bodden, a most cordial gentleman. He drove about the small town and then offered to take me back to the cottage. On the way he apologized for the original application being misplaced and for the present problems. "Go ahead and use ZF1DT. We can do the paper-work tomorrow," he said. ZF1DT went on the air at 1730 GMT, with a quiet band and optimistic CQ. Nothing. There was still nothing when I retired at 0230. Saturday morning wasn't much better, except for



A 3-element portable Yagi 2 feet above sea level was used at ZF1DT. The beam and cottage overlooked the Caribbean Sea.

some meteor scatter which satisfied me that the receiver was working even though line voltage changes caused the transmitter output to vary between 70 and 130 watts. At 1400 GMT I flagged a taxi for town and found Postmaster Bodden. The license was waiting. I paid the \$12 fee, thanked him and went for a four-hour taxi ride about the island.

Cayman is a lovely Caribbean island still unspoiled by American influence and money, but that will change in the next few years because land speculators are already at work plying their trade. The Caymanians welcome the American dollar because they know it will help develop their roads, fresh water supply (collected rain water is now used domestically) and other needed utilities. But they are *not* greedy, not in the least, and they *do not* take advantage of a visitor. They are fair, honest and courteous, and a verbal deal is a deal, no haggling later. My driver, a 51-year old man who came to Cayman as a lad of three, gave me *the* tour and helped select some prized shells on the beach for my five-year old daughter. While we drove he fiddled with an old shortwave converter which he said had been in four cars. The ignition noise was so bad it almost drowned out even HCJB in Quito. I'm told there is a radio station on Cayman that broadcasts deaths, births and fishing results on an irregular schedule, but I didn't see it. The nearest television is in Cuba and the driver was proud that he had one of the half dozen or so TV sets on the island. It, too, is old, but a 13-element Yagi 80 feet in the air brings in Cuban channels 4 and 6 fairly well. They're showing old, old British movies! Claude told me that he sees American TV quite often during May, June and early July, especially Houston and Cincinnati. Love 'em *Es!*

Returning to the Colony, he said he'd be pleased to drive me to the airport the next night. I accepted and went to my cottage to check 50 MHz. Still nothing doing and even the meteor scatter had disappeared. At 2137 I briefly heard a station on 50.110 calling "CQ DX the Caribbean." He faded before I could get an identification but I believe it was W3KWH, at least it sounded like Gary. (After I returned to the states



Compact and simple, ZF1DT used a Swan 250 from Grand Cayman Island. Erratic line voltage caused r.f. output to vary considerably, but caused no rig damage.

I learned that hundreds had been calling me blind all day after hearing from K4RNG, W5SFW and others that I was on Cayman.) A few minutes later I heard another W3 call CQ, I got his call and replied, "W3— this is ZF1DT on Grand Cayman calling." Back he came, "who are *you* kidding?" He refused to work me! Nuts! At least there was finally *Es*, now to find someone who would believe there really is a ZF1 on six. W4HJZ, a North Carolina two-meter man, took the bait at 2155 with S9 signals. Carl became the first to work ZF1 on six. I'm sure he wasn't impressed, but I was — buck fever struck like when I worked my first G as KN0CER quite a few years ago. Then WB4HHH called, we worked, but business wasn't brisk. It was the dinner hour on the east coast and W4HJZ stuck with me sending "QST, QST, ZF1DT is on the frequency." Business started to improve with more contacts in North Carolina, Georgia and Florida. Suddenly VE1AFB, another two-meter buff, in Nova Scotia called faintly from beneath the strong 4s. My request for the 4s to cool it was honored and I worked Charlie for a nice 2000-mile contact. Back to the 4s, then W9YT in Wisconsin followed by the only 2 I worked, W2CNS in western New York. More 4s called from along the Gulf Coast and then Grid, W4GJO, over a 650-mile path. The skip shortened more and I worked a handful of my Miami friends, 500 miles, but I could hear 9s calling also. For the next two hours I worked 4s and a few 5s as the band faded in and out. Signals would come roaring through in typical *Es* style and then disappear in less than five seconds. It was frustrating, and I know how the fellows stateside felt. At 0150, K0GHC in Colorado appeared from beneath a pile of 4s, and we worked. I worked more 4s for 10 minutes and then another Colorado station, W0AJY, was contacted. A good pileup was beginning, all s.s.b. except for one c.w. signal. I dug through the layers and identified W7FN in Tacoma, Washington, but it took more than five valuable minutes to work him because many 4s and 5s kept calling each time I'd stand by for the seven. I wanted that 3200-mile contact in the log, I finally got my S2 report from him. Then I worked more 4s and 5s including another station in Miami, five minutes after working Washington. Very erratic conditions and *most* frustrating.

This lasted for 20 more minutes before the band became quiet except for W5SFW calling CQ DX on c.w. I answered, but he didn't hear me. I wanted to work Phil who had done so much publicizing my weekend jaunt. A few minutes later conditions improved somewhat and we worked. After that I chatted with W5RAG and WA5TXI for 30 minutes, but nothing else was heard. I crawled into the sack at 0500 GMT, tired, hoarse and hoping Sunday would be better.

It was worse. I was up early — good m.s. activity, but not sufficient to make random contacts. By 1600 GMT the meteors quit and until I lowered the beam at 0100 GMT Monday I heard no more signals, even though I checked constantly except for eating and a skin-diving exploration of two coral reefs about 200 yards off shore from my cottage. W5QQY, who along with his family, occupied the cottage next door, loaned me fins and mask and gave me a five-minute course on how to not swallow the salty Caribbean Sea. But that's another story. W5QQY operates only 20 meters nowadays, but recounted his days of cross-town contacts on the old 5-meter band.

I was eating a fine steak at 0200 when Claude appeared, ready to drive me to the airport. All along the road we passed Caymanians riding bicycles or walking toward the airport. Claude told me the biggest attraction for the natives was the arrival and departure of airplanes. The Sunday night affair was the largest of the week. He was right. Young Caymanian boys surrounded the taxi as we stopped. One lad, about 12, asked to carry my bags and was off with them before I could answer. At the scales I gave him the remaining shillings I had in my pocket, some 72c American. I'll never forget the look on his face. These people don't expect tips, but do things for you because they want to. Claude didn't want anything for driving me the seven miles to the airport. He just smiled, and then helped me purchase a quart of rum for \$2. That and the shells were the only things I brought back to the states, except a deep respect — yes, even love — for the Caymanians. The island-hopping plane from Trinidad to Miami was late arriving on Cayman. I spent the time talking with Claude and watching the hundreds of Caymanians who had come to the airport to see the airplane. An hour later, as I parted, I told Claude I hoped his people never let the Americans spoil the jungle beauty of Cayman. He nodded and said, "you're the second American to tell me that today."

I've never enjoyed three days more in my life. It is hard to believe such a place exists a mere 500 miles from Miami, but it does, believe me! One hour later, after again flying over the still sleeping Havana, I landed at Miami International. I was greeted by a health officer who told me my 5-day old smallpox vaccination was no good because the certificate wasn't stamped by the Dade County Health Department. I showed him my now itching vaccination, he mumbled something and waved me through. The customs officers wanted to see the Oceanside, California stamp on

the Swan 250 to make sure I was bringing American-made products into the states. It was under my still wet swim trunks. He shook my quart of rum and I was free. Into a cab and then the seven-mile ride to my home in north Miami with the driver telling me what a big shot he used to be in South American business. His cigar smelled cheap. We pulled up in front of my house at 3:30 A.M. Miami time. "That'll be six bucks." I was home in Big City, U.S.A. But I'm going back to Cayman and present plans call for another trip yet this fall and next June for the contest.

I have sent Claude a set of noise suppressors for his Chevy.

50-MHz. Petition Denied

FCC, on August 9, denied a petition requesting the exclusion of the 50-MHz. band from the original so-called incentive licensing Docket 15928. See page 86 for details.

Stage one of Docket 15928, affecting 50 MHz., becomes effective November 22, 1968 when 50.00 to 50.10 is reserved only for holders of Advanced and Extra Class licenses. After November 22, 1969, the 50.00 to 50.25 segment becomes reserved for Advanced and Extra Class licensees.

1296 MHz. E.M.E. Test

The Crawford Hill V.h.f. Club, W2NFA, has scheduled another in its series of moonbounce tests. The dates and operating times are 0100 to 0600, October 12 and 0600 to 1400, October 13. The alternate test periods will be 0100 to 0600, November 9 and 0600 to 1400, November 10. All times are GMT.

W2NFA will run 400 watts into a 60-foot dish having a gain of 44 db., over isotropic. The mode of transmission will be f.s.k.; 1296.00 plus or minus 2 kHz., key down, or 1296.02 plus or minus 2 kHz., key up.

All correspondence should be addressed to Dick Turrin, W2IMU, Box 45, R.R. 2, Colts Neck, New Jersey 07722. WB2NDH is the test liaison station: 14.235, 21.385 or 28.690 MHz.

2304-MHz. Harmonic Generator

Paul Wilson, W4HHK, designed and built this signal source for the 2300-MHz. band. A $2\frac{5}{16}$ -inch length of 4 GHz. copper waveguide houses the two tank circuits. The waveguide is $1\frac{1}{8}$ by $2\frac{3}{32}$ inches inside. A partition of $\frac{1}{16}$ inch thick brass separates cavities L_1 and L_3 . A $\frac{5}{16}$ inch diameter hole in the partition permits connecting diode 1N82A between L_2 and L_3 with minimum lead length. The inside dimensions of cavities L_1 and L_2 are $1\frac{1}{8}$ by $1\frac{1}{8}$ by $2\frac{3}{32}$ inches. Cavities L_1 and L_3 are centered in their respective cavities. End plates of $\frac{1}{16}$ inch thick brass are soldered in place at the open ends of the waveguide stock. J_1 and J_2 mount on the end plates. C_2 mounts in the center of the 2304-MHz. cavity end plate. A $1\frac{3}{4}$ by $1\frac{3}{4}$ inch opening cut in one of the larger waveguide walls allows access to both cavities. A cover plate of $2\frac{5}{16}$ by $2\frac{15}{16}$ by $\frac{1}{16}$ inch brass is attached to the remaining flange with 6-32 machine screws.

Two milliwatts of crystal-controlled 153.6-MHz. r.f. are fed at J_1 . 2304-MHz. output at J_2 is approximately 500 millivolts (-52 dbm) into a 50-ohm load. The generator, a simple waveguide antenna and an 18-foot dish on a crystal-controlled converter with a 1N21F mixer front end and 3 kHz. selectivity produces a signal over a half mile line-of-sight path.

2300-MHz. Record Returns to U. S. A.

Things are happening on 2300 Mc. There was talk of moonbounce prospects for this band at the Central States V.h.f. Conference at Osage Beach, Mo., Aug. 16-18, and now we have a new record for the band. On Aug. 30, W2BVU/1, operating on Mt. Wachusset, Princeton, Mass., worked K1DRB/1 on Cadillac Mountain, Acadia National Park, Maine, on 2415 Mc. Equipment used was the pulse gear described by W2BVU and W1QMN in *QST* for February through May, 1963. This equipment is also in both editions of *The Radio Amateur's V.h.f. Manual*, Chapter 10. More on this work next month. The new record is 225 miles, more than 100 miles beyond line of sight from the two ends of the path.

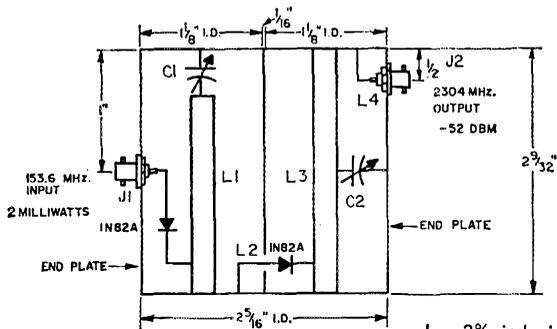


Fig. 1—Schematic diagram of the W4HHK 2304-MHz. harmonic generator.

L_1 — $1\frac{1}{8}$ -inch long $\frac{3}{16}$ -inch diameter brass rod, connected to C_1 by copper strap $\frac{1}{4}$ -inch long by $\frac{1}{4}$ -inch wide bent in the shape of a "U." Tune this circuit to 768 MHz.

L_2 —1-inch long $\frac{1}{4}$ -inch wide copper strap spaced $\frac{1}{8}$ -inch from L_1 and parallel to L_1 for $\frac{1}{2}$ -inch. Bent in shape of "J."

L_3 — $2\frac{3}{32}$ -inch long $\frac{3}{16}$ -inch brass rod, connect diode $\frac{1}{16}$ -inch from ground end of L_3 adjacent to partition access hole for L_2 . Tune circuit to 2304 MHz.

L_4 — $\frac{3}{4}$ -inch long $\frac{1}{4}$ -inch wide copper strap spaced $\frac{1}{8}$ -inch from L_3 and parallel to L_3 for about $\frac{1}{2}$ inch.

J_1, J_2 —BNC chassis mounting connectors.

C_1 —0.5 to 5.0 pf piston trimmer, mounted in line with L_1 , Johnson or equivalent.

C_2 —No. 10-32 brass machine screw with locking nut on outside of cavity wall. End of screw projects into cavity at mid-point of L_3 .



Mr. Moonbounce, Sam, W1FZJ/KP4, frequently heard on 50 MHz., will soon offer Puerto Rico to 432 moonbouncers with his recently completed 100-foot dish antenna. (VK3ATN photo)

Moonbounce Times

The fixed-window e.m.e. (moonbounce) antenna proposed in the August column by VK3ATN is receiving much support. Apparently antenna position and moon times are the most perplexing problems to would-be moonbouncers. Fixed windows of 37, 157 and 277 degrees west longitude were suggested by VK3ATN. Here are the October, November and December window times for those three positions, compliments of W0DET.

Crossing times for window at longitude 37° west between 20° and 28° declination

Date	GMT	Declination
10 Oct.	0454	23.7
11 Oct.	0543	26.6
14 Oct.	0817	27.3
15 Oct.	0907	24.7
16 Oct.	0957	20.9
6 Nov.	0249	22.3
7 Nov.	0337	25.6
8 Nov.	0427	27.7
10 Nov.	0610	27.8
11 Nov.	0700	25.8
12 Nov.	0749	22.5
3 Dec.	0046	21.0
4 Dec.	0133	24.6
5 Dec.	0223	27.1
8 Dec.	0456	26.4
9 Dec.	0545	23.5
30 Dec.	2330	23.7

Crossing times for window at longitude 157° west between 20° and 28° declination

Date	GMT	Declination
9 Oct.	1223	21.1
10 Oct.	1310	24.7
11 Oct.	1400	27.2
14 Oct.	1634	26.6
15 Oct.	1724	23.6
6 Nov.	1105	23.4
7 Nov.	1154	26.4
10 Nov.	1427	27.2
11 Nov.	1517	24.8
12 Nov.	1605	22.1
3 Dec.	0902	22.2
4 Dec.	0950	25.5

5 Dec.	1040	27.5
7 Dec.	1222	27.6
8 Dec.	1312	25.6
9 Dec.	1401	22.3
30 Dec.	0659	21.1
31 Dec.	0746	24.6

Crossing Times for window at longitude 277° west between 20° and 28° declination

Date	GMT	Declination
9 Oct.	2039	22.5
10 Oct.	2126	25.8
11 Oct.	2216	27.9
13 Oct.	2400	28.0
15 Oct.	0051	25.8
16 Oct.	0141	22.4
5 Nov.	1834	20.9
6 Nov.	1921	24.6
7 Nov.	2010	27.1
10 Nov.	2244	26.7
11 Nov.	2333	23.8
3 Dec.	1718	23.4
4 Dec.	1806	26.3
5 Dec.	1856	28.0
7 Dec.	2039	27.1
8 Dec.	2129	24.7
9 Dec.	2217	21.0
30 Dec.	1515	22.4
31 Dec.	1602	25.6

Rob Larson, W0DET, has offered to make these computations available for column publication every three months. They will appear as long as there is evidence of their usefulness.

WA0EKO and K8IWA have pointed out a positioning error in the August antenna suggestion. As presented, the antenna would face the moon only if the array was located at 26° north latitude. At that location the antenna would be exactly horizontal. To determine the correct inclination you subtract the moon's 26° declination from your latitude. Example: if you live in Memphis, Tennessee at a latitude of approximately 35° the array inclination would be 35° minus 26° or 9°. The north end of the array would be elevated 9° higher than the south end.

WA0EKO further states that the 26° north declination selection is alright for this year, but that in about four years the declination range of the moon will be plus or minus 23½° and in nine years, the range will be at its minimum of plus or minus 18 degrees. The fixed array at 26° would be reasonably accurate for the next two or three years. After 1970 a suitable adjustment would be necessary, but then you'll probably have developed a better system yourself.

OVS and Operating News

Because of the column length this month, OVS reports will highlight activity during the past reporting period. The states worked boxes will appear next month after the Perseids reports are received.

50-MHz. Es continued to be excellent with almost daily openings until late August. KV4FU, Virgin Islands, reports working dozens of stations particularly in the southern tier of the United States. He says the double-hop signals from Texas and Louisiana are always strongest. Three reports were received from Alaska. K8SBN has moved to Sitka, about 550 miles closer to the "lower 48" than is Anchorage. He probably has his KL7 call now and has crystals for 50.1, 50.15, 50.22 and 50.4 c.w. or a.m. For those who might wish schedules, write

Gene Buck, Box 479, Sitka, Alaska 99835. W8KNC/KL7 reports poor *Es* from Fairbanks, his only contact in July being K7SVI, Seattle. And KL7FNL, whose wife is KL7FNM, writes they have a 6-element Yagi fed with RG-17/U at 60 feet. Says Bob, "everyday is Field Day here, we run our own generator!"

Three notes of interest to 50-MHz. DXers: W4ZNXI has shipped a HA-6 and 4-element Yagi to 5W1AR on Samoa in the South Pacific. The Samoan will be operating in the lower portion of the W/K phone band. W4ZNXI will handle the QSLs. John Patrick, ZB2BO, on the island of Gibraltar, says he and ZB2BC will be looking state-side beginning October first. Both stations are running 50 watts of c.w.

ZF1DT will be active again October 25-27. WB4HIP will be accompanied by K0GJX.

There was much activity from the Caribbean during July and August. CO2QR, 50.012 with chirpy c.w. note, and CO5CN provided Cuban contacts. Puerto Rican stations W1HOY/KP4, KP4s AHI, AIS, and of course KV4FU, were in much demand. The period of July 27 through the 30th was excellent, and it was on the 30th that W8GZ worked LU8AY in Argentina. August 15 found *Es* between the Caribbean and Gulf states exceptional. KV4FU watched TV channel 5, Palm Beach, Florida, for 30 minutes and then worked dozens of 4s and 5s for the next 2½ hours. KP4s BOY, CPR and W1HOY/KP4 were also active that evening.

Does anyone know where stations HLM and SZNG are located? Either their fundamental or harmonic frequencies have been appearing on 50.144, 50.168, and 50.280 (HLM) and 50.158 (SZNG).

Thanks to WA1DPX, WB2RBG, K3HKK, W3KWH, K4GL, K7RWT, K8TOW, W8NOR, WA0JYK and others for their *Es* reports.

14-MHz. activity is highlighted by the July Aquarids and August Perseids meteor showers. I don't have a complete tally at this writing, but meteor activity was exceptional the last week of July and first two weeks of August. Here are the reported contacts.

K1ABR: W0DRL (first Rhode Island/Kansas 2-meter contact), W5ORH (1478 miles), W9MAL, W0LFE.
WA1GMN: W5UGO, K0MQS.
K1HTV: W0DRL, WA9DOT, W0LFE, W4WDH, W4WSR, W0RLI, W5RCI, W5UGO, W9UNN.
K1UGO: W4CKB, W5RCI, W4WDH, W8AEC, W0LER, K4GL, W0LFE.
K1WHS: W0LER, WA4CGA, K4GL, W4WDH, W0DRL, W5RCI.
K1WHT: W0LER, WA4CGA, K4GL, W5RCI, W0DRL.
K1MTJ: W9MAL.
W3KWH: W5WAX, W0DRL, K5WXZ, VE1AFB, W0LFE, W5UGO, K0MQS, W0ENC, W4WDH. (34 states during 1968!)
VE3EZC: W0DRL, W0NXF, W0ENC, W5GVE.

VE7BQH has some suggestions for those wishing to work British Columbia on 2-meters. He has a kw., a 32-element collinear and 13-element Yagi on 144.110. VE7BBG has a kw. and stacked 8-element Yagis, and VE7BBA runs 700 watts to stacked 8-element Yagis.

K0MQS, Iowa, has completed a copy of the VK3ATN rhombic with the top rhombic at 50 feet. The array is bi-directional, east and west. He is using it for meteor scatter schedules and is also

attempting moonbounce with K6MYC. K6MYC says he and W0DNG are scheduling SM7BAE, Sweden, on e.m.e. with some success. SM7BAE has sixteen 10-element Yagis and 1500 watts input. SV1AB, Greece, has diverted his e.m.e. interests towards meteor scatter and has been quite successful working Europeans by meteors.

230-MHz. news is topped-off with the first three m.s. contacts on this band. 220 may well be the highest frequency where amateur meteor scatter is possible. A study of radio echoes from meteors done at the Massachusetts Institute of Technology indicates m.s. signals at 432 would be some 13 db. below the 144 return. This is not to say we shouldn't try, but those of us with less than the absolute optimum in 432 equipment might as well stay in bed. Who is going to prove me wrong? K4IXC and VE3EZC may be scheduling by now.

After several weeks of schedules, K4IXC and K4GL worked by tropo on August 24, 500 miles. W0DRL, Kansas, has 300 watts output, and is ready for schedules. A detailed letter received from George Kass, 7-17 Parsons Blvd., Malba, New York 11357, described his station built around a kw. and 13-element Yagi. George forgot to give his call, but says he will accept 220 m.s. schedules.

430-MHz. schedules and random operating have been rewarded handsomely the past several months. W8VWF at Garden City, Michigan runs 300 watts into a 64-element collinear. He reports numerous 200-mile plus contacts with W3BTI, W9WCD, W9PBP, WA9HUV, and VE3EZC. K4QIE, Virginia, and K8DEO, Ohio, worked on July 24 over a 460-mile path, a new state for each. W4FJ, also Virginia, continues his assault on 432 having worked 15 states in the past year. Ted's latest successes were W1CAN, Massachusetts, July 27; W9JLY, Indiana, August 11; and WA9HUV, W9WCD and W9ZIH, all Illinois, on August 12. The maximum path distance was 665 miles! WA9HUV also worked K4EJQ, Tennessee. And K8REG caught the August 11-12 tropo, working K4EJQ, W9ZIH, W4FJ and K0DOK in Missouri. K8REG says his experience shows morning tropo 20 db. or more better than night. He suggests more random operating Saturday mornings.

Moonbounce news from the west coast includes a joint project by K6HCP and K6MYC. Mike, K6MYC, says the Siliconix 2N5397 and 2N4416 look good on 432 in both gain and noise figure. Data are available from Siliconix, Sunnyvale, California. W6FZJ and W6CCS are working towards a contact with VK3ATN. They have a 256-element extended collinear.

1215-MHz. and *Up* interest continues to grow. ZL2CD writes W1DTY, of *Ham Radio*, of his interest in 1296 moonbounce. W9JLY, Indiana, worked W9ZIH, Illinois, over a 160-mile path July 30th. W9WCD, also Illinois, heard W9JLY, a 225-mile path. W9JLY uses a 5894 at 20 watts output driving a varactor tripling from 432. His antenna is a 64-element extended collinear. He says lightning causes momentary signal increases of about one "S" unit over the path to W9WCD. WB2VQK and WB2WVY have converted APX-6s following the data given by W0PFP in the February column. They say the conversion works fine, giving an output more than double that using the feedback loop conversion.

K2GRI continues work to improve his 2400 MHz. transmitter, now running 12 to 15 watts output. The final is a 7289 doubler with three-quarter wave coaxial line input and output. His antenna is a dipole-fed 6-foot dish mounted at 30 feet. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Where on:

Five-band ARRL DX Century Club possibilities serve to remind many a DX hound that there *are* amateur frequencies below 14,000.00 kilohertz. The standard triband beam, heretofore so entirely sufficient for a hotshot DX man's arsenal, may gain more mature status as top-loading material for 7- and 3.5-MHz. verticals.

Plenty of DX chasers long ago discovered the lower-frequency challenge of DX sport, learning that a G3 on 80 c.w. can carry more punch than a batch of 9K2s on 20. Their contributions bulk large in each month's "How's" mailbag. For example, here's a fresh dispatch on the subject from OASV whose picture graced page 101, April '68 QST. . .

This is the first year I have attempted much operating during our jungle "winter" season. I'm really surprised at conditions on 75 meters. On July 3rd I worked four continents within an hour. First came DL5XU with a 5/4 report at 0315 followed by CP5CS, VE3OE and KC4USP. all Q5 on two-way s.s.b.

During the next week or so I worked ten VE3s, six W1s, three W2s, six W4s, two W5s, six W6s, an Oregon seven, four W8s, four W9s and W0EHE in Denver. At about 1115 I find good openings into New Zealand and Australia. I've worked seven VK2s, eleven VK3s, two VK4s, a VK5, three VK7s and VK9GN, as well as eighteen ZL1s, thirteen ZL2s, six ZL3s, five ZL4s and ZL5AA. On July 8th I QSO'd a ZL who was running five watts p.e.p. to a Class-A 6BQ5.

I plan to concentrate on 80 during the next year, adding to my total of 63 countries. Hope to improve my 60-foot vertical. With a new 220-volt line I can now run a full gallon from Peru on 75. I'm especially interested in QSOs with Asia, Africa and the Pacific.

Good going, Paul. Oh, sure—it's easy when you have a fancy call, you say. Well, OM Jack Lyon is an ordinary U.S. eight. Let's see what W8YGR has to say about another "d.c. band." . . .

I've just discovered a whole new world with a ten-cent 40-meter dipole. On July 5th I heard and worked VK3HW for the first time, and have

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

since spoken with him five times. He had a beam at first, then lost it in an 80-m.p.h. gale. Now, dipole to dipole, he's S8-9 and I'm S8-8 with my wire only 25 feet above ground. I've also been QSOing VKs 2FU 3ZL and ZL1AGO, all two-way s.s.b. Jaded Jack really enjoys his new world of 40-meter DX!

WB4GTI, writer of our August guest editorial, rather sums it up. John says, "There's something very special about low-frequency DX. For one thing, you get to *know* your DX. And, since it doesn't come so easily, the sense of accomplishment is far greater than in routine high-frequency DXing." Those long quiet autumn nights are here again. Got *your* long-wires and/or verticals set for the 40, 80- and 160-meter DX fun ahead?

What:

Can't pass up the other end of our h.f. DX circus, either, with ten meters snapping back to life for the day shift. Paraphrasing Stevenson, "DX is so filled with a number of things, I'm sure we should all be as happy as kings." Twenty c.w. is still around, too, as this month's activity analysis plainly shows. Those numbers in parentheses go for kHz, above bandbottom, the other digits for Greenwich whole hours. Let's spin the dial. . . .

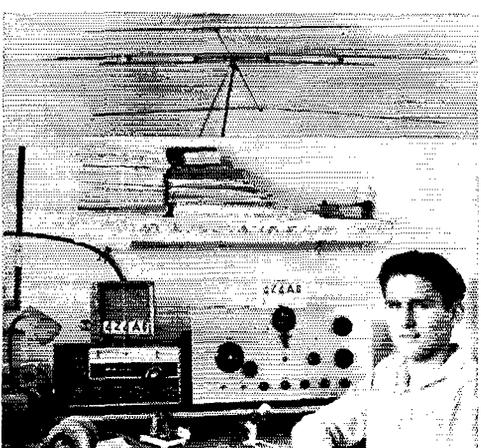
20 c.w., happy DX hunting ground for Ws 1AYK 1DAL 2ECO 2ICO 3HMR 3HNK 4YOK 6EAY 7BE 7ZC 8IBX 8YGR 9LNQ, Ks 4CFB 4IEX 8BCK, WAs 1CJE 1DJG 1GHU 1HVL 1HON 2APG 3GVP 3HRV 3IID 5MIN 5PPZ 5PUQ 5NOX 6JDT 8MCO 8NGD 8QJK 8VBY 9MQJ 9TFM, WBs 2BCI 2UEHZ 2ZNZ 4GSS 8VVS, KP4DBJ, VE3GTW, Hs DFE and ER, sparkles with the presence of AP5HQ (16) 17-18, BV2A (36) 11, CEs 2PN (15) 6, 3ZK (4) 23, 3ZW (86), 4AA (12) 23, 4AD (14) 0, 6GS (39) 8LF 9AA 9AT (56) 16, 0AJ (48) 6, CM3HA (67), CN8s BK (75) 23, FV (19), MI (60) 9, COs 2FA (30) 5, 2FC 2LD (50), 2XX (20) 1, 8AH (35) 23, 6PF, (50) 22, 6RM (49) 22, CRs 3KD (60) 23, 4AR (40) 1, 6AR (56) 23, 6BX (51) 18, 6CA (53) 23, 6EI (42) 6, 6CK 6 CN (74) 20, CTs 1AA 1EE 1IT (66), 1TT (16) 22, 2AA (53) 1, 2AH (28) 9, 2BG (8) 23, 2BO (21) 1, 3AS (10) 22, 3AV, CXs 1BBG 1 DZ (62) 23, 1JM 2AZ 5PV 4, DMs 2ADC 2ATD 2AVG 2BGI 2BOB, 2BPB 2CUL 2DDN 3CK 3LOG 3YVL 3XI 3ZCC 4PJJ 4PQL 4SJJ 4YEL 9ADL, DU s ICE (51) 53, 1OR (30) 19-23, 9JO 15, EAs 6BD (72) 21, 6BH (72) 7, 8EJ (11) 7, 8EO (50) 0, 8FB 8FE (28) 22, 8FF 8FG (20) 7, 8FJ (15) 16, 9EO (45) 6, EIs 5HV 7AB 8BF 8BS 9BG 9J 9KA 9Q 9, EL2s R (14), Y, EPs 2EE 3AM, ET3s FMA (63) 2, USA (23) 3, Fs 8TT/FC (50) 10-23, 9VN/FC (25) 22, FB8s WW (37) 12-13, XX (20) 4, ZZ (5) 11-15, FG7s TD 17, TE (19) 2, TG (20) 11, XF (15) 22, XJ (35) 21, XL XX (30) 21, FK8BG 7, FM7s WD (21) 11, WH 20, FO8s BG 5, BQ (84) 5-10, BV 3, FP8s CS 11, GT (20) 22-23 DY (56), DZ, FR7s ZD (42) 12, ZF (25) 14, ZS (20) 13, FW8RC



KS6CQ looks comfortable in his lava-lava, the Samoan garment for all seasons. An HT-41, HT-37 and 45-foot-high TA-33 have accounted for eight kiloQSOs from Pago Pago since last October. (Photo via WIAPU)

QST for

(66) 8, FY7, many GB specials, GC3s AAU (68), EML (9) 6, LEW, GD3s AIM FBS (60) 15, HQR VWN (15), HAs IKSA ISB ISX IVB IVI 2MU 3KGC 3MB 3MJ 4KYB 5AK 5AT 5AW 5DA 5DI 5DH 5E 5HI 5KBM 5KDQ 5VE 5VK 7LF 7LO 7LP 7PS 8UD 8UN 8UJ 8HN, HC3s IMF IRR 2RZ (4) 2, 2SB (72), HIs 3PC (36) 10, 3ELJ 7JMP (30) 3, 8IBC 4, SRV 8XPAI (41) 23, HKs 3AVE 3CEI (33), 3RQ (32), 4AOV 5CH 5MO 6, 5MO 6, 5RQ (17) 23, 7UL 7XS 18, 8AI (30) 15, 8BKW, HL9s KA (6) 12, KK (52) 12-18, KQ (22) 20, US 10, HMLAJ, HP1s AC (10) 0, BR EE 1E (10) 12, JC XHG (4) 23, XYZ (50) 0, HR2VFB, taboo Hs1TM (5) 14, IS1s PEM (15) 22, PPB (35) 0, IT1s AGA (19), AI AUA (75), SBT, JAs ICIB ICWZ 1FI 1FQW 1KRIV 1NRE 1QFX 1RSM 1UDP 2HTI 2LC 2YEK 3BIP 3BN 3IG 3KEM 4EFG 5AWT 5LI 6APA 6GV 6FN 6TL 7BVS 7ND 8BKW 8CYU 8MS 8QA 8CZC, JFs 1AB 17, 1AD 1AE IAG 16-17, 1KAA, 2AB 17, JW2AP (6) 12, Ks 1FNA/KG6 (32) 10, 0TFFP/KS6 (54) 5, KA2sJP (40) 5, NY (58), KC4USM, KGs 4AM 4CX (27), 4DK (30) 2, 4DO 8ALV (20) 12, 6AQI (38) 10, 6NAC (56) 3, KL7s CVX (14) 12, CZ 6, FRX GDS (20) 6-7, GFN (15) 10, KM6BI (40) 10, KRrs 6EA (25) 16, 8KQ 8OD (51) 11, 8BY 8CY (25) 11, 8DE 8DK (25) 10-11, 8EA 8ED 18, KSs 4CG (15) 7, 4CR, 6AX 6CU (25) 6, 6CU (60) 10-11, 6CU 6CV, KV4s AA (79) 23, AM EU (68) 22-23, KW6s EK 2, GH, KX6s ER (49) 10-14, FN/KC6 14, GD, BU, KZ5s AH (70) 23, GI 6, HC (50), JQ LAQAD, LGL5L (20) 17, LU 1SE 0AA and others, LXs IRG (12) 13, 2HU (30) 20, LZs 1HK 1FJ 1HJ 1KAA 1KSD 1KSF 1VM 1ZX 2DC 2GV 2IM 2EAF 2KIF 2KXZ 2KPD 2KRO 2KSF 2LU 2RC 2RN 2XX, M1B (19) 6, MP4s BEU (10) 7, BGU (33) 3, DAT (5) 22, TCD, OAs 4BR (21) 5, 4FW 6, 4JR (14) 22, 4UZ (47), 4XN 4ZS (39) 23, 7BI, ODSs BZ (20) 15-16, EJ (27) 22, LX (12) 4, OEs IHGW (6), 1KRW 3CN 3JBW (29), 3PWW (12), 4SZW (40), 5PHL (70), 5PWL (35), 6KSG (52), 7OY (7), OXs 3DX (46) 23, 3MB (42) 23, 3SA (38), 3UD (1) 1, 3ZO 4AB 5AY, OXs IR (4) 20, 2EL (66) 20, 2IE 6FRA (25) 22, 9IM, PA6A, PHLC/mm (20), PJs 2MA 18, 2MI (54) 10, 2ME (70) 11, 3CC (72) 4, 3CJ, PY4s UG (20) 21, ZG ZR and others, PZIs AH (6) 6, AV 23-0, BL (20) 10-22, BW (5) 5, CQ (13), SKs 4AV (20), 5AA (22), 6AB (8), SL7AZ (16), SMXZA (45) 7, dozens of SPs, ST2SA (64) 22, SVs 1BX (68) 23, 1BZ (57) 5, ICA 0WB (33) 6, 0WN (34) 23, 0WP (4) 1, TA-5AV (57) 19-20, 1HY 1KT (1) 0-23, 1QR (12) 3, 2BK (30) 22, 2EA (4) 0, 2FM (18) 22, 2SC (50), 0, 3AR (30) 20, TFs 2WIC (84) 18, 2WKI 2WKM (63), 2WLK (16) 17, 3AB (50) 23-0, TGs 4SR (31) 23, 8HL 9EP, TIs AB DO WR 14, TJs AS (4) 22, QJ (3) 23, TT8AN (70) 14-23, USARTEK (77) 13, UA1KA/E1 (5) 14 of antarctica, UA2s AB (35) 18-17, AC (11), DL (25), DO (26), KAP (5) 21, KAQ (56), KAS (43) 2, KAT KAW LC (30) 16, WO, UA9s CM (68) 5, ES (62) 1, FN (8) 3, GE (39), KCA (16), KDA (57), VQ, UA0s AB (40), AI CF (30) 15, EF (30) 5, EI 5, EQ (11), EU (22) 11, EW (15) 7, FC (45) 4-5, IW 2, KAE 21-22, KCA (30) 3, KFG KFS (5) 4, KQU MO (22) 4, MX (10) 15, NR PJ SA WF YT (52) 23, ZB (21) 12, UB5s AF CU DV EC EM HA JW KAA KAW KBA KBV KDS KEP KKA KKM KLD KQV LR RS SK TZ WF VY YD, UC2s AB (79), DN (34), KAA KBC (30), KKU KSB (48) 22, LM (35) 7, OG (70) 5, OR (20) 3, SE TA WP, UD6s AM (12) 2, AR AX (64) 2-3, BQ (22), DX (9) 2, KAB (60) 1-3, UF6s AD (40) 4, AM (17), AS (40) 2, CX KAR (40) 7, LA (17) 7, PK, UG6s AD EA JJ (45), KAO LK, UH8s BO CS (83) 22, DC (15) 23, DL (3) 12, UB8s AB (34) 7, AI 2, AM AQ (54) 12, CX 1Z (3) 13-23, KAB (17) 6, KAD (43) 7, KBA (50) 19, KBF (40) 16, KDA (11), MU UG (20) 19, UJ8s AB (37) 1, AC (69) 3, AZ KAA, UL7s AM (66) 5-8, GW (46) 3, KAA 2, KBA KKB (60) 13-14, OA (14) 19, OE (12) 14, PJ (30), RL 3, XG (5) 6, YP (71), UM8KAA (29) 3-6, UN1s AB BR, UO5s AP (38), PK (41), UPO1-15 and 16, UPs AE AY (6), BV DX (57) 6, KAB (60), KAG (38) 1-2, KBA (44), KBF KBI KBC (45) 5, KMU (8), KPA (85), KTV NA (40), UO2s HT (20) 5, GW (40), KBC KCS (5) 0, KBP KDM (57) 7, LL (20), NW NX (72), UR2s AT FR (34), FU KAD KAW (55) 12, UT5s AQ (33), BQ BX FE HF KSA KTH PK QE, UVs 9CO (55) 8, 9CU 9OV (14), 0BK (25) 12, UWs 9AA (15) 3, 9DB (13) 1, 9GU (27) 1, 9EA 9OH (61) 2, 0AJ (7), 0AP (11), 0BQ 0BX (9) 0FI 5, UY5s AJ (30) 7, OP XB XH XO (6), ZI (21) 5, ZM (20), ZX, UZ0EA (49) 9, VE8s CR (3) 1, GC 7 MK (35), RCS RE YB (58), YM (40), YP VKs 1EK 6-7, 1GD 13, 1RY 12-13, 8HA (4) 7, 9GN (18) 10, 9RJ (33) 7, 0JW (40) 10-12, VO1GX (63), VPs 1GB (4) 9, 1WEB 1XY (36) 0, 2AR 2AZ (23) 22, 2GL (80) 22, 2MF (65) 3, 2MQ (17), 2VL 7DL 7DX 0, 7NA (40), 7NF (30) 23, 7NP (57) 5, 8DJ (19) 13, 8JH (26) 12, 8JX, 9Bys (30) 3, 9ED (48) 0, 9EC 9FW 9GC (10) 17-22, VQs 8CC (30) 12, 8CJ (50) 12, 9B (63) 15-20, VRs 2DK (30) 6, 4CR (17) 7, 6TC, VSs 6VA (1) 10-14, 6AD (81) 18, 6FX (25) 12, 9MB (34) 11, VU2s FR (15),



4Z4AG finds his uncommon Israeli prefix in considerable DX demand. Aron is a high school senior in Tel-Aviv. (Photo via WB4FJO)

GW JA (66) 12, JN (28) 1, KZ (25) 18, KV (20) 2, LE (10) 0.1, LN LOZ (3) 12 LW 17, QB (50) 6, QV (44) 1, RQ (38) 1-2, SR (42) 6, SV (41) 19, TAU (40) 16, TS (15) 12, VZ (20) 1, W2PDG/4X, a dozen XNCs, VP1s AA AB, XW8s BP 14, Cal (40) 15, YA 3TNS (1) 13, 5RG, YN1s AA (22) 12, GLB, YO 2BV 2IR 2JF 3FR 3YZ 6AW 7DL 7KAJ 8KA SMF 8NB 80K 9AFE, YS1AG (69) 23, two dozen YUs, YV 1AB 3, 4RE (13), 4OE 8AS and a dozen fives, ZB2s A AP (25) 23, BO (2) 6, ZDs 5M (30) 12-13, 5X (15) 15-21, 7DI (23) 23-0, 7GS (23) 7, 8CC (23) 22, 8J (26) 3, 8Z (34) 21, ZC4JM 7, ZEs 1 CU (20) 6, 1CY 1JU (83) 12, 4JS (40) 18, 8JV (30) 15, 8JW (43) 13, ZL5A of Ross, ZP5s OE (47) 23, KA (41) 23, JB OG (37) 22, ZS3XQ (50) 18, 3A2s CP (15) 14, EM (23) 22, MJC (80) 19, 4A1s EK RM WS, 4LIA (25) 5, 4S7s DA (68) 13, EC (21) 17-18, NE, 4UIITV (43) 6, 4X4s PF (72) 23, QA (60), so ve vl (45) 2, YR, 4Z4s HG (59) 21, DL HF, 5H3KJ (50) 1-5, 5M1A 2, 5Y8s AF (90) 17-18, BB 18, 5U7AL, 5Z4s LE (18) 22, SS (72) 5, 6W8s DQ (15) 0, DT DY XX (5) 22, 6Y5s GB JB SR, 7G1IX (14) 18, 7P8s AB (60) 18, AR (45) 18, 7Q7AM (75) 23, 7X0AP (47) 23, 8P6s AO (30) 2, AY BU (30) 12, CU (20) 21, 8R1S, 9G1s DY GC GI (68) 12, KT 3, 9H1s AE (21), AG (30) 16, AZ AB (63) 22, 1 T (80) 23, 9J2s CL (30) 4-5, HZ (28), MX (25) 22, 9K2CD (37) 7, 9LITL (33) 5, 9M2s CL LN (51) 17, OV (15) 16, US (64) 15-16, YL (90) 14, 9Q5s EH SS, 9V1s MK (40) 15, OC (25) 10, OK OS (20) 18-18, OV OY (40) 14, 9Y4s AT (48) 22, BS (20) 10, DS (31) 2 and RA. Must be the Extra's inventive or something—c.w. reports all over the place this month.

Tentatively we'll scrutinize the phone segments next month, skipping 20 which was investigated in the previous column, with the assistance of (15 phone) Ws 2DY 4AJJ 4GTS 4YOK 8YGR 9LNU, K9CSM, WAs ICJE 1DJG 3GVP 3HRV 3IHD 5MIN 5PPZ 6JDT 8QJK 9MQI 9TFM 0FRM, WB4GSS, KP4DBJ, F3VN/WB2; (10 phone) Ws 2VOZ 4YOK 8YGR, Ks 4TWW 8BCK, WAs IED 3HRV 8MCC 8MGD 9TFM; (40 phone) W8YGR, K4FCB; (75 phone) K4IEX and OA8V. Later we'll do more c.w. bands thanks to (15 c.w.) Ws 1DAL 3HMR 4YOK 7BE SYGR 9GXR 9LNU, Ks 4FCR 8BCK, WAs ICJE 1DJG 1FHU 1IDP 2APG 3GVP 5PPZ 5SOX 8MCC 8VBV, WBS 2BCT 4GSS 6VVS, WNs 2REI HIF 4YX KP4BBJ, 1Is DFE ER; (10 c.w.) Ks 1HDO 8BCK, WAs 1DJG 8MGD, KP4DBJ, 1IDFE; (40 c.w.) W3HNK, K4FCB, WAs 1DJG 1FHU 2APG 3Y5 5SOX 8MCC; (80 c.w.) W1SWX, K4IEX; and (160 c.w.) W1BB & Co. Later than that we'll be back on the 14-MHz. voice subject with Ws 2DY 3HNK 8YGR, WAs 3HD 5PUQ, WB4GSS, P. Kilroy and other "How's" correspondents to file. Next month, by the way, FCC sponsors its Advanced/Extra Round-up. Should be v-e-r-y interesting.

Where:
HEREABOUTS — "It has come to my attention that the call sign KZ5B1N or KZ5BB is being used by a station operating in the maritime mobile service,"

writes C.Z. Coordinator KZ5FX. "This is to notify all concerned that Canal Zone amateur radio licenses are valid for use only within the Panama Canal Zone. The call sign KZ5BHN has been invalid since April, 1967, and neither KZ5BBN nor KZ5BB will be reissued until March, 1970." NCDXC's DXer indicates that WA2JW took a turn at PJ3CC in late July. "No word from my QSL manager since January," deplores WA3DVO/8P6, "so there must be a lot of lost cards floating around. I now request that all QSLs be sent to [the address in the list to follow]. Because I average almost 200 QSOs daily, I must insist on self-addressed stamped envelopes." "I really appreciate the role played by QSL managers, XYLS, etc., who confirm so many QSOs for stations who just never would find time to QSL otherwise," writes K8MMH to WA6MWG. WA8TYF completes the cycle: "I'm prompted to ask you to give more recognition to stations who handle their own QSLs. In my experience I have had better results sending QSLs via bureaus to stations who do not have managers." Timothy credits many QSL tenders with fine records but encounters those who don't even keep up with their own station's QSL obligations. I now have authorization to sign 4ADFCR," notifies W6FCR, planning much fall contest action south of the border. Your "QSLers of the Month" this month are CT3AS, DU1FH, PG7XX, FR7ZG, HB0ADP, HK0BKW, HP1XYZ, HA1MO, KC4USM, LX1CF, PZ1AH, TF2WKR, TJ1AL, VKs 4ZK/VK9 9KS, VP8JX, ZL2ANX, 5R8BA, 5U7AN and 9Y4CR, plus QSL aides WS 1YRC 2CTN 2GHK 2MES 4DQS 4WHF 9BN, Ks ITWK 6UJW and GD3-HQR, all applauded by "How's" correspondents W8-YGR, WAs 1HSB 2BPL 5PPZ 5SXC 8TYF and P. Kilrov for unusually rapid transmissions. Any commendable queekies over your way? *Help!* These italicized brethren seek hints toward running down pasteboards from holdouts mentioned: W1APU, 9M2CL; K4HNA, HCs SS '63, WW '64, Ron of KH6VW '56, KJ6CC '64, KZ5KK '64, VP7CC '65, 5A3TT '67; K9-ONJ, 5V4EG; W4A7YF, VQ8CC, V86YE; W4HSL, OYIZ, SP8CA '67, 8R1G '67; and W6PGK, VP2VL Clews? G. Funk, 3508 Elliott St., Baltimore, Md., 21224, would like to tackle some DX op's pressing QSL problems.

OCEANIA — "I will be QSL manager for KN6s DC and DR as of August 1, 1968," announces WB6THT. "Since coming out here last October I have confirmed more than 8000 QSOs," figures K86CQ. "It's very much of a full-time job to answer each and every request." WA6MWG observes, "KG6IG's Bonins operation ended June 23, 1968, with a W6NUK QSO at 0237 GMT. I have all logs and QSLs are up to date. W6BCT, bound for Israel, turned over to me logs and QSL responsibility for VK7SM and VU2LE." Pete stresses that QSL managers who perform for several stations can get your card back faster if QSO data also appear on the outer envelope of each submitted s.a.s.e. set. K8WXY tells KH6BZF, "Those who did not receive KG6IG QSLs for contacts from October 1, 1967, to June 26, 1968, and KAIJ cards for QSOs from June 26 to August 22, 1968, should send s.a.s.e. to my home address." *DX News-Sheet* notes that ex-PKts SH TA and HN now respectively sign YBOs AB AC and AD. 9V1NR is said to be printing up 3000 QSLs for future VE7IR/YBI (9V1OQ) operations but W/Es still need the green light from ITU/FCC for communication with Indonesians.

EUROPE — PX1BW, due for multiband action this month, declares, "I will answer all QSLs received.

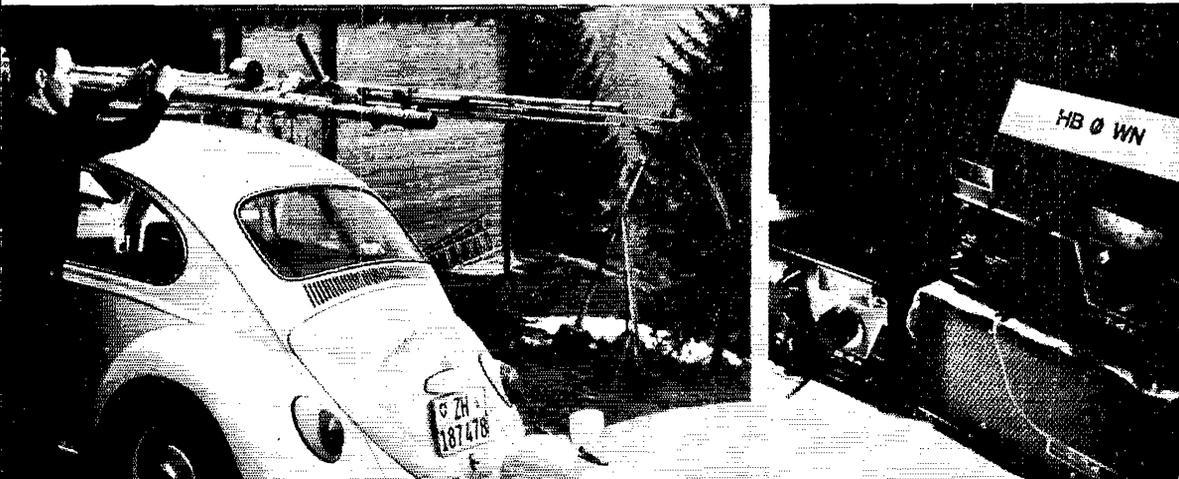
Those arriving without s.a.s.e. or International Reply Coupons will get replies via bureaus." Jim is regularly active as DL15NJ and signs KQ6WN when back home. DL4FS finds G3KMA busy with QSL honors for July's ZB2BQ DXpeditionary do. G3SEA iterates his lack of CT2AY QSL connections. QSOers desiring direct cards from FOCV can mail s.a.s.e. to the address in the listings to follow. Others may use Dan's WA9FZQ address. G. Watt's *DX News-Sheet* suggests DK1KH as a QSL source for 3A0EJ's April c.w. operation, and DL2WB for cards confirming April 3A0EK s.s.b. QSOs. The same periodical points out that SM5WLOY promises 100-per-cent QSL, and that DL3SA had a hand in OY6FRA output over August 14-21, 1968. West Coast *DX Bulletin* lists DL7FT's QSL managerial clients as EA6AR, HB0LL, KL7EBK, M1FT, TG9EP, W4UAF/KH6, XE2YP, 3A0CU, 3V8BZ and 4A2YT. LA5EE acknowledges, "I operated as JW5TE from Svalbard in April for two days. Cards are on the way through bureaus." "Still have QSLs left for my DJ0GB operating in '62," invites K4HNA.

SOUTH AMERICA — From WA1FHU: "PZ1CQ, due to leave Surinam in the near future, will expedite QSLs for all QSOs." WB2MTP, emphasizing the need for s.a.s.e., took over PZ1BI QSL duties in July. "I am no longer QSL manager for CEO-AE," reminds WA5PUQ. "They now QSL all first contacts via bureau. I sent out some 3000 cards while I had the job." In similar vein WA9MQJ writes, "I must discontinue QSLing for CE3s ACV OE OF and ZK. It has been impossible to get logs from Orlando and sons. All unanswerable QSLs are being returned to senders." 9Y4MM (ex-VE4SK) of Trinidad & Tobago Amateur Radio Society hears that 9Y4RA's call has been used for more than a year without authorization by licensee Lt. R. Archbald. "He personally has not been on the air during the period and is therefore unable to reply to QSLs received." K2JXY may be of some assistance toward QSLs from VP8s KD and KQ, according to Northern California DX Club's DXer.

AFRICA — "I have 9Q5EB QSLs for U.S. eights and A nines," notifies WA8PVZ, "for QSOs from November 8, 1967, to March 10, 1968. Self-addressed stamped envelopes, please." Jim has contracted to handle future 9Q5EB contacts as well. W3HNK writes, "Former 5A3TX now is W4VOH in Hampton, Va. Both of us can confirm his 1964-'65 Libya contacts." "FR7ZG states there is no Reunion QSL bureau," relays W3FTU. "QSLs for all FR7s should be sent direct or via REP, France." According to 5U7AL, Niger and Upper Volta authorities find no record of any XT2A, 5U2s AB or WS. Now let's check individual recommendations in the mailsack, remembering that each specification is necessarily neither "official," complete nor accurate.

- CE3s ACV OE OF ZK** (see text)
CT1RS, P.O. Box 210, Coimbra, Portugal
DJs 2IB/CT3 5JK/CT3 (via DJ21V)
DL1SU/YB, Box 2469, Djakarta, Indonesia (or to DL1-SU or via DL3AR)
DL4FS, R. Welch, CMR Box 4488, APO, New York, N.Y. 09057
DL4QP, Sgt. C. Carter, Box 388, 1946th Comm. Sdn., APO, New York, 09611
DL5NJ, J. McVay, Box 5034, 23rd TFS, APO, New York, N.Y. 09132; or Box 5034, Flugplatz, 552 Bitburg, W. Germany
DUIAT, P.O. Box 4083, Manila, P.I.

HB9WN joined the annual Swiss stampede to Liechtenstein this year as HBØWN. With return of Alpine snows the country becomes a DX rarity once more, represented only by resident HBØs AG and LS. (Photo via W1CW)



HK5BFJ's interesting decor, with comfortable yet fold-away operating position, is "How's" Hamshack of the Month. It's the pride of a prominent YL/OM DX duo in colorful Cali.



F0CV, D. Weinstein (WA9FZQ), c/o Year-in-France Program, 14 rue du Quatre-Septembre, 13-aix-en-Provence, France (or to WA9FZQ)

JT15 AG KAA, c/o V. Kaploon, P.O. Box 2, GPO, Leningrad, U.S.S.R.

JX4EJ, c/o Norwegian Embassy, Reykjavik, Iceland

K0TFP/KS6, Box 788, Pago Pago, U.S. Samoa, 96920

KH6CXP/Y01 (to KH6CXP)

KH6BZF/KM6/Kure (to KH6BZF)

KR6BU, Box 164, Koza, Okinawa

KX6s DC DR (via WB6THT; see text)

KX6FN/KC6 (via W2GHK)

KX6GT, P.O. Box 8515, APO, San Francisco, Calif., 96355

OH3UQ/W6, T. Kuokkanen, 1205 Washington Av., Santa Monica, Calif., 90403

OY4HQ, Box 217, Torshavn, Faeroes

PZ1BX, P.O. Box 2003, Paramaribo, Surinam

TAs 1KT 1HY 2ZZ, TRAC, Box 699, Karakoy, Istanbul, Turkey

TL8GL, P.O. Box 872, Bangui, C.A.R. (or via VE2-DJY)

VP1GB, 151 New Road, Belize, British Honduras

VP2s DAL DOC MF/d (via VE3GCO)

VS6DR, P.O. Box 4083, Hong Kong, Asia

WA6AHF/HK0 (to WA6AHF)

WA8KOO/HCI (to WA8KOO)

WF0ITU, ESSNA, Boulder, Colo., 80302

ZB2BQ (via G3KMA; see text)

ZD9BK, J. Bothma, Dunwoodie Av., 30 Waverley, Pretoria, South Africa

ZF1DT, Bill Smith (WB4HIP), 68 NE 87th St., Miami, Fla., 33138

3A0s EJ EK (see text)

6W8XX, J.-C. Jupin (F2XX), B.P. 3013, Dakar, Senegal

9K2CB, W. DeLong, c/o ConCo, Box 509, Kuwait

9O5BY, Y. Hondroit, P.O. Box 1459, Kinshasa, R.C.

9O5EB (via WARPWZ; see text)

CE0AE (see text)

CR6CK (via WB2UHZ)

CT2BG (via DJ1QP)

E12VAL/p (via G3VPQ)

E1LQ (via WB6TEE)

F9CH/FC (to H9HTL)

F0EV/FC (to DL7BV)

F0HI/FC (to G3KFT)

F0HEB (via VE2AFC)

F57RT (to W6TTH)

GS4JR (to SM5CKL)

GB2LO (via RSGB)

GB2NI (via G3UGF)

GB3NEW (via GW3VKL)

GC3KNZ (to G3KNZ)

GC3LDH (to GW3LDH)

GC3TTN (to G3TTN)

GC3JIN (to G3JIN)

GM3GIZ/p (to G3GIZ)

HP9A (to HP1AC)

IP1BPD (to IP1BPD)

JW2AP (via NRRL)

K11J (see text)

KA2BZF (to KH6BZF)

ex-**KA2CN** (to DL4QP)

ex-**K6G6C** (see text)

K54CG (via W4XTI)

LG5LG (via NRRL)

OK8AAA (to G3LQB)

ON8IV (to G3PWV)

OZ2X (via WB6TEE)

OZ8RO (to LA5HE)

PA9BZ (to ON4QV)

PX1BW (to DL5NJ)

PX1UP (to H9UP)

PY7BG (to K8WNU)

PZ1BI (via WB2MTP)

SM5WI/OY (to SM5WI)

TA6A (via DJ2PJ)

TG4TL (via CRAG)

TI3AL (via W2MES)

VK7SM (via WA6MWG)

VP2DAI (via KP4DBU)

VP8KE (via W4NIF)

VP8KF (via G3TWV)

WU2LE (via WA6MWG)

W4LFF/mm (to W4LFF)

WB4IBA/mm (to WR4IBA)

XE0FFN (to WA2EFN)

YU7LDB (to OK2DB)

YV5CIL (via WB6TEE)

ZD8GA (via WA6AHF)

ex-**5A3TX** (see text)

9K2CC (via K9CSM)

9M2AH (via MARTS)

ex-**9M8RS** (to 6Y5RS)

Canadian DX Association *Long Skip* (VE3DLC), Columbus Amateur Radio Association *CARscope* (W8-ZCQ), DARC's *DX-MR* (DL3RK), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, Nor.72.T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham, 20, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y., 12020), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025; attn. K6CQP), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB), VERON'S *DXpress* (PAOs EX LOU TO WYLE) and West Coast *DX Bulletin* (WA6AUD).

Whence:

ASIA — From 0000 GMT November 2nd to 2350 the 3rd. OARC (Okinawa) invites DXers world wide to frolic in its KR6 DX Contest, c.w., and phone. The usual RST001, RST002, etc. (no "T" on voice, of course) serials will be exchanged with KR6s at 4, 3, 1, 1 and 2 points per QSO on 80, 40, 20, 15 and 10 meters respectively, final score equivalent to total QSO points. For possible certificate recognition ship your log accompanied by a signed summary sheet showing each station worked, bands and modes used, QSO points as claimed, total claimed score, whether single-op, multi-op, multiband or monoband entry is desired, and transmitter description including power input, to Contest Committee, Okinawa Amateur Radio Club, APO, San Francisco, Calif., 96331, postmarked no later than November 15, 1968. . . . My next unit will be in Portland, Maine, . . . discloses K8WVJ of KG6IC-KA11J. "Keep an ear open for me as I expect to operate there as K8WVJ for a year or so, . . . EP2KB's 30L-1 is checked out and his quad is pointed Statesward," remarks W3HNK. "He's WA5VEJ back home." . . . Via aforementioned clubs and groups: KA1s LJ and MI plug away from Iwo and Marcus on 15 and 20 s.s.b., . . . W4IADO's shutdown leaves the Yemen too rare for comfort, . . . 9K2s BG and BY want to stir up more 9K3 DX'itement, . . . W4LDF will be signing a Pakistan call around 14.332 kHz, if plans check, . . . 4Z4HF may soon show from the Sinai as a 4X9. . . . Ex-KA2CN scans the kHz, for old buddies as DL4QP. In a few months Curt's Germany DX total already exceeds the 119 countries he worked during four years in Japan, KA2IC is another recent departure from EARL ranks, KA9AK and neighbors plan furiously for the 1968-'69 160-meter DX season and Transpacific Tests, details upcoming here shortly.

EUROPE — Czechoslovakia's Central Radio Club offers its International OK DX Contest, a c.w.-only affair, on the second Sunday in November, 0000-2400 GMT, 160 through 10 meters. Everybody works everybody outside one's own country in this one, swapping serials consisting of RST plus two digits equal to the number of years the sender has been licensed; e.g., 56909 for a fellow licensed in '59. Each QSO with an OK counts 3 points, others count one point each, and this point total is multiplied by the number of world-wide prefixes accumulated—G2 G3 OK1 OK2 would be four—for final score. There are categories for multiop, single-op, multiband and single-band. Ship your entry, a separate sheet for each band, listing GMD, GMT, station worked, serials sent and received, points

For the preceding glossary we thank Ws 1CW 3FHU 3HMR 8BX 8YGR 9DY 9GFF, K2YJL, WAs 1FHU 5PPZ 5SXC, WB2UHZ, DL4FS, KH6BZF, 5U7AL,

claimed, and each new multiplier claimed, to CRC, Post Box 69, Prague, Czechoslovakia, postmarked no later than December 31, 1968, for possible certification of meritorious performance. At the same time you might make inquiry re CRC's 100-OK and S&S certifications, worthy sheep-skins of long standing. . . . As detailed here last month, RDDR (E. Germany) flings its annual WADM affair on October's third week end. Set? . . . "My operations from Andorra will begin the evening of the 22nd of October or the morning of the 23rd and continue through the 28th or 29th," warns PX1BW (DL5NJ-KOBWN) . . . DM3CK/HAISY, 14,005 kHz., is an example of reciprocal licensing in the U.S.S.R. orbit, according to WA1FHU. HAISY is temporarily employed in the G.D.R. WA1FHU also notes



M1B, WB6JKQ and M1H consider interesting aspects of European geography on a rare hillside. M1B is frequently workable on 10-, 15- and 20-meter sideband and c.w., WB6JKQ is with the 11DFE staff, and M1H is a c.w.-forever type.

that YO2JF, another 20-c.w. fan, is ex-YR5BF of the 1930s . . . W3HNK comments, "GW3DZJ is now so busy with an antenna manufacturing venture he's getting behind on QSOs." . . . WB6JKQ of 11DFE understands that San Marino licensing of noncitizens may be liberalized after the next MI elections in April. . . . "I plan to operate mostly 10 and 15 s.s.b.," alerts FOCV (WA9FZQ), preparing to spend a year in the south of France. . . . LA5HE says, "The LG5-LG working from a strange 'country' between Sweden and Norway is genuine. The location is Morokulien, a border area considered as a kind of fairyland commemorating the long peace and brotherhood between LA- and SM-lands." LG5LG was put into operation by Norway's NRRL, and qualified guest operators are welcomed. LA5HE, incidentally, now holds the call QZ8RO, the first LA reciprocal in Denmark. . . . FQ reciprocals hit Corsica hard this season as the "Where" QTH list shows. The G and GM gangs invaded GC-land in similar numbers, and Italian DXers converged on such Mediterranean islets as Pantelleria where IIBPD picknicked as IPIBPD.

SOUTH AMERICA — LCRA (Columbia) hosts an International Amateur Radio Union Region II Contest slated to run from 0001 GMT on the 12th of this month to 2359 the 13th. Stations outside our hemisphere work North and South Americans at six points each; we work stations outside Region II at 3 points each, stations inside at 1 point each (no intra-country QSOs) exchanging the customary RS- or RST001, RST002, etc., serials via any mode on any band. Total score obtains from multiplying QSO points by the number of band-countries collected. Logs, separate entries for phone and c.w., should be postmarked before 1969 and addressed to the Secretary, IARU Region II, Box 4097, Lima, Peru, indicating single- or multioperator entry. Argentina will sponsor next year's affair, and our turn will come later. . . . OA8V testifies, "K1-GZL puts one of the loudest 75-meter phone signals down this way with his wire beam. K4UCQ also has a nice one with his 70-ft. vertical. I copy VE3OF's ARRL Bulletins solid frequently at 0330 GMT." . . . From WB2MTP we hear that PZ1BI, an electrical

supervisor in the aluminum industry, uses an SR-150, SX-117 and homespun linear near 14,150 and 21,200 kHz., mostly week ends at 2000-2300 GMT. Willy's ten children may occasionally trip the VOX. . . . W8-IBX figures WA8KOO/HCI should be back home by now after summering at Quito's HCBJ where antenna heights are some 10,000 feet a.s.l. . . . PY7QBG is said to be K8WNU on a year-long Fernando de Noronha assignment, single-sideband on 15 and 20, 2000-2400 GMT.

AFRICA — 5U7AL gives us his viewpoint: Licensed amateur stations include 5U7s AC AK AL AN and XYL, the latter inactive. Fred holds the call 1L8AL for future C.A.R. action, TYBATE for Dahomey, and has a 1T8 license pending. "At present there are no amateur operations authorized in Upper Volta despite the appearance of NT2A." . . . DJs 21B and 5JK employed an F6-100B, 75S-1, inverted Vee and 2-element quad during their April CT3 sortie. . . . "9Q5EB is finishing a three-month U.S.A. leave," reports WA8PWZ. . . . CR6s KT and LF hunt Statesiders on 14,332 kHz., beginning at 2100 GMT," reveals W3HNK. "ZE4JS has a new 4-el. quad in Salisbury on 14,060 or 21,060 kHz." . . . African addenda courtesy the clubs press: FL8AO (F3AO) resumes 21,180-kHz. a.m. action around 1000 GMT with a TR-3 and TA-33. . . . 5TAAD pops up now and again near 14,250 kHz. . . . 5As 1TG 2TR 2TS 3TW 5TE and 5TP bring forth Libya again on several bands, phone and code. . . . ZD9BK, 14,180-kHz. non-s.s.b., 1500 daily, is expected to be available till next July. Neighbor ZD9BE continues sideband and c.w. schedules on 7040, 7070, 14,260, 21,260, 21,380 and 28,550 kHz.

OCEANIA — "I do about as much c.w. as s.s.b.," estimates K86CQ in lines to WIAPU, "maintaining regular schedules and network traffic. I also hold the MARS call M9CQ and instruct regular radio classes. Samoan nationals are learning the use of c.w. equipment, some of the boys now approaching capability of becoming amateurs. High heat and humidity are problems here. The desk encasing my equipment is equipped with lamps to help keep the gear from rusting; the lamps come on when the rig goes off." . . . ARRL's Hawaii SCM intends to radiate as KH6BZF/KM6 and KH6BZF/Kure later this month. . . . Don't forget that October's first two week ends are reserved for the gala annual VK/ZL/Oceania DX dance, details last issue. . . . Pacific patter via club newsletters: VE1R/YB (9VIOQ) should be in the Indonesia area for a year or so but YB QSOs are still on the ITU/FCC no-worker list for W/Ks as of this writing. "Monitor W1AW! . . . KH6EDY/Kure's new op will be there a few more months. 14,230-14,240 kHz. at 0500-1200, possibly also 21,300 and 7240 kHz. . . . FW8-RC still likes 14,245-14,265 kHz. around 0500. Thursdays and Fridays. . . . WB6KRW has been sampling the DX end from DU1FH. . . . VK8AV still is determined to make Tuaoi glimmer. . . . FK8BB brings a 350 and vertical back from France for 14,160-kHz. sport. . . . VK9s DJ GN HR KS NMC RH RJ VM and others can sew up half a dozen DXCC entries for you with heavy phone and code activity on 15 and 20.

HEREABOUTS — "I operate c.w. around 14,055 kHz. between 2300 and 0400 GMT," informs WA3DVO/-8P6. "I'm also net control for the Maritime Mobile Service Net on Mondays." . . . ARRL v.h.t. scribe WB4HIP-KOCER-W1DVE gets in DX ticks as ZF1DT, naturally concentrating on 50 MHz. "Cayman is only an hour and fifty-nine dollars away." . . . D. Heil of Kentucky, awaiting his General call, goes into the USAF with a DX-60 and R-100 plus hopes of semi-rare DX status when the shipping papers come through. "I'll be using c.w. on 20 and 15." . . . WA1FHU enjoyed his recent rendezvous with W7s ACK CRE DQH KH PHO. K7DSA and other northwest DX guns at their traditional Doghouse luncheon in Seattle. . . . Judging from DM3IGY's 10-meter beacon signals, WA8-TYF feels that many U.S.A.-Europe openings were missed this summer due to inactivity. . . . "HP1-RC shuts down this month for a year of schooling in the States," learns DL4FS. . . . "I'm quite active on 20 meters," notifies visitor OH3UQ/W6. . . . "What a ball I'm having with DX on 15 meters these days," exclaims WN2FEH. "It's really fantastic what you can work with 50 watts, a house-mounted vertical, two crystals and an 11-year-old receiver!" WA1DP feels the same way about 21 MHz. after his first 25-watt CQ brought back G3IDG, and WB4GSS finds enough a.m. DX on 15 to keep his non-s.s.b. 30-wattter busy. . . . HP0A was a multiband project of HPS IAC IXEC 3MC and 5MV from Coiba isle. . . . W0VXO is mentioned in connection with an early VP2-type 160-meter-oriented DXpedition, and W4BPD of DX Magazine is said to be mulling over 1969 DX-peditionary possibilities. Gus-hunters, as ever, are QRV!

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The Floridora Girls

"GOLDWYN Girls," "Ziegfeld Girls," "Powers Girls," and the "Floridora Girls," all connote femininity, but of all the glittering symbolic names that automatically spell out YL when they are mentioned, none is more adaptable for a YL amateur radio club than the one given to the gals in Florida by W6FE, now a "silent key," — Floridoras.

This very active group started as an informal, on-the-air net made up of W4WPD, Shirley, W4BWR, Ruth; W4BIL, Fran; all on 3.850 MHz. Later Blanche, W4GXZ, (now K1IZT) and "Little Bo," W4HRC, joined them. From this nucleus of an idle gettogether the club has expanded into a membership of 60 to 75 members. They have recently received the YLRL Associate Club Certificate.

Originally, the Floridora Club Call was WA4RXP, but when W4FE the "godfather" of the group became a "silent key" they were able to secure his call to perpetuate the memory of the man who gave them their distinctive name.

Because it is statewide in scope the Floridoras are not a club with a meeting room, but a Net

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



1968 Floridora Officers: W4EHN, Betty; K4WXS, Lee; W4BAV, Cathy. Vice president, WA4BMC missing when the picture was taken.

that meets every Tuesday morning at 1300 GMT, on 3933 kHz. Most of the membership operate s.s.b., but all modes of emission are used and the net is open to all YLs who wish to join with the group. But this net is not limited to voice operation, when there are enough interested Novice members of the Floridoras they activate their c.w. Novice net on 7185 kHz. Something for everyone who is interested is their by-word.



Floridora YL Certificate.

We have all sorts of "months" and "weeks" set aside for special purposes, so these gals have set October as "Floridora Month." This is when the membership are encouraged to be active on all bands to give contacts towards the Floridora Certificate, and to keep these club members on the air it is also a within-the-club contest.

The club certificate with the graceful, frilly, feminine emblem is copyrighted and was designed for the Floridoras by Dot Davison, K4LFA. It is available to anyone who submits proof of contact with ten members in good standing, who are in Florida at time of contact. A gold sticker is issued for each additional contact. To obtain the certificate mail either QSLs or a list of QSLs that has been notarized and



Floridoras at their 11th Anniversary Party at the Orlando Hamfest. Front row: W4IUR, W4BAV, W4WPD, W4HRC, K4RNS in back of W4HRC. Second row: W4EHN, K4WXS, W4FSF, K4RHL, W4CWV, K4UIZ. Back row: W4BWR, WA4YNX, W4BIL, WB4GZN, WA4SII, WB4FVN, W4KZT, K4ZXS, W4WYR, WB4FYD.

witnessed, with 15 cents to cover postage, to the custodian: Marge Campbell, K4RNS, 1700 Nova Road, Ormond Beach, Florida, 32074. This certificate is available to OMs as well as YLs: so far over 300 have been issued in this country, as well as around the world.

In April 1968, the Florida YLs celebrated their eleventh anniversary at the Orlando Hamfest. The following gals have served as president over the past eleven years: W4BIL, Fran, two terms; W4UF; K4RNS, Marge; K4RED, Luey; W4HRC, Florence; K4RDX, Ann; K4RHL, Ellie, now the Club Trustee; K4UIZ, Evalyn; WA4FJF, Ellen; W4WPD, Shirley; and the present president is Cathy, W4BAV.

Marge Campbell, K4RNS

Nothing can lure us into amateur radio so easily as an enthusiastic friend who is obviously having a wonderful time on the air. Marge, K4RNS, and OM Jim, K4RNR, (who became a "Silent Key" in July of this year) were infected with the radio "virus" through an active friend, and the result in 1957, was call letters for both.

Marge is extremely active on the nets because her "number one love" is meeting and talking to YLs. She is busy on Tangle Net, YL Open House, and of course the Florida Net each Tuesday morning. A Charter member of CHC, she is number



K4RNS, Marge Campbell.

34 and holds 200 awards from that group. Marge is also Charter member #6 of ISSB, and the auditor of that club.

She is a past president of Florida YL Club, and has been their certificate custodian since 1962. She is also YLRL Membership Chairman, and is a former DC for the 4th YLRL District. Marge holds the 10-year YLRL membership certificate, is a member of ARRL, and A-1 Operator Club. Some of her awards include YLCC-950 and DNCC, in addition to her CHC awards.

When she isn't up to her ears in Howdy Days, AP, nets, traffic, talking to YLs, Marge is busy: keeping in touch with her Navy son and his family in Hawaii, whom she hasn't seen for four years; with her daughter and her children, working in the garden, knitting, and trying out new dishes. But if it is amateur radio, you'll find K4RNS right there in the front. The enthusiasm of a friend not only rubbed off on her, it has become incurable and is one thing she would never care to cure.



Barbara Delhotel, WA0PYP, Hi-Plains Amateur Radio Club Hamfest Queen. Barbara was crowned in recognition of the part the ladies play in amateur radio activities. (Photo courtesy K0CJL.)

29th YLRL Anniversary Party

C.w.

Start: October 16, 1968 1800 GMT (Wednesday)

End: October 17, 1968 1800 GMT (Thursday)

Phone

Start: November 6, 1968 1800 GMT (Wednesday)

End: November 7, 1968 1800 GMT (Thursday)

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* count. 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. C.w. 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) 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 (i.e. DX). Definition of DX is all stations not located within an ARRL Section. DX YLs shall score two (2) points for each contact with a station located in an ARRL Section. Score one (1) point for each contact with another DX station. (Note ARRL Section lists are available from the YLRL vice president, or located on page 6, *QST*.) Multiply number of contact points by total number of different ARRL Sections and/or Countries worked.

C. Contestants running 150 watts d.c. input at all times may multiply the results of (B) by 1.25 (low power multiplier.)

D. S.s.b. contestants running 300 watts p.e.p. or less at all times may use the low-power multiplier (results of B, by 1.25.)

Awards: Highest c.w. score

Gold Cup (YLRL member only)

Highest phone score

Gold Cup (YLRL member only)

Highest c.w. and highest phone logs from each District and Country will receive a certificate.

Corcoran Award: Highest combined c.w. and phone score (YLRL member only.)

DX only: Highest combined c.w. and phone scores from North and Central America, including the Greater and Lesser Antilles, will receive an Award from Arlie Hager, W4HLE. Highest combined score from any other part of the world will also receive this Award.

Logs: Copies of all logs must show claimed score, and be signed by the operator, and postmarked *not later* than November 20, 1968. Mail copies to: Claire E. Bardon, W4TVT, 2238 Morgan Lane, Dunn Loring, Virginia, 22027.

Annual Floridora Contest

For the entire month of October YLs in Florida will be competing in the Annual Floridora Contest. Contacts are YL to YL, and not necessarily Floridora members, but both operators **MUST** be located in the State of Florida at the time of contact. All bands may be used. So, if you are on vacation and using the mobile, or operating portable, so long as you're within the boundaries of Florida you may have a ball in the contest.

Logs should be sent to the Floridora vice president Bertha Eggert, WA4BMC, 1510 17th Avenue, Lake Worth, Florida, 33460. Deadline for logs is November 15, 1968.

TOT Net Changes

Effective September 28, 1968, the Ontario Trilliums have made two changes in net schedules.

40 meter net will change to Wednesdays 7:30 p.m. on 7.115 MHz.

20 meter net will meet **ONLY** on the last Saturday of each month on 14.210 MHz. No time change.

And don't forget these changes during the Trillium Memorial Week coming up November 23-25, 1968. Start planning now, and see November YL News and Views for full details.

Like all YLRL Members QRV means WASARJ is ready to serve.

One morning last March a woman called WASARJ and asked if she were still working with her radio. The woman's son had been home in August, 1967. After a tour in Vietnam, he was sent on to train others for service in Vietnam and had gone on a three day pass in October and hadn't been heard from since. Needless to say, with the State Police, Army, and FBI looking for him, the parents were frantic.

A friend suggested that they get in touch with an amateur radio operator, and although the FBI seemed to think that this wouldn't do much good, the woman was willing to try anything. She called Bobbie, WASARJ, whom she knew from having delivered traffic to her. She explained the situation and although Bobbie wasn't too sure it would be of much help she decided to try.

At one p.m., the same day she received the request, Bobbie put a bulletin on the North Central Phone Net with all details, as well as the parents' name, address, and telephone number. Later her OM, Bob, put the same bulletin on the Breakfast Club Net the next morning. It was a long shot, but amateurs don't know how to say "no." Well, about noon the next day the woman called Bobbie that she had definite information on her son. He was working in a town in a nearby state, and was now back in the Army undergoing treatment for what was suspected to be partial amnesia. He had been located from the description picked up by a local amateur.

We gals in YLRL may wonder why we have that International Abbreviation "QRV" for a motto, but when the chips are down, and someone needs the assistance of our facilities and skills there we are ready, and willing to help. QST



Doing some work on the DX Contest Result our Bob Hill, W1ARR, found the log of ICAQ full of handwritten comments . . . in Italian. Bob checked the entire office crew for someone to translate, with no luck. Back at his desk, up walked a tour guide and introduced a visitor, TIMY — who graciously offered to make the translation.

Feedback

W4TVT, YLRL vice president, advises that an error was made in the YL-OM Contest listings of the OM c.w. winners. W9LNQ with a score of 3,317* was third place in the OM c.w. contest and not W1PYM as listed in *QST*, July 1968.

Referring to the V.H.F. Sweepstakes writeup in June *QST*, WASREM, top scorer in Michigan with 3458 points, was inadvertently listed in Ohio as placing fifth in that section.

Footnote 3 in the article "Try The FMT" in *QST* for July 1968 refers to an article by Lange in July 1967. It should read July 1966.



Operating News



GEORGE HART, WINJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE
Contests: ROBERT HILL, W1ARR

DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

The Five-Band DXCC. A brand new challenge for avid DXers comes into being officially on January 1, 1969 with the inauguration of the *Five-Band DXCC* award. This new award has been created in response to many requests at the direction of the Board of Directors in its May 1968 meeting.

This is a start-from-scratch achievement. You can't use any of your present DX cards. You can't use contest logs. You can't use active repeaters, either on the ground or in space, to reach the goal on the v.h.f. or u.h.f. What you do is start all over to "make DXCC" on each and every band, 80 through 10 meters, or any other five amateur bands.

The rules (see box elsewhere in this column) make use of the present DXCC rules and are tied closely to them. The Official "countries" list (Operating Aid No. 7) will be used. The big difference between DXCC and 5BDXCC is that for the latter you have to do on each of five different bands what for the former you need do only once on all amateur bands.

Note that in the ARRL Field Organization (U.S. and possessions, Puerto Rico and Canada) the applicant must be a full ARRL member. The cost of processing applications (plenty) is born by the League for your benefit. The \$10 charge for application forms covers the cost of returning your 500 cards by first-class registered mail and having made, especially for you, a handsome engraved plaque to attest your outstanding achievement. Your Board of Directors, by authorizing the Communications Department to make this award available, thus recognizes DX operating achievement and presents a new challenge especially to those DX men who are getting so close to having "done it all."

Those interested, please read the rules carefully. No doubt it will be several months before even the most energetic DXer, even with the assistance of the early-1969 ARRL DX competition, will have acquired the necessary 500 cards to qualify for the award. We suggest you wait until you are well under way before sending for the application form, which in any case will not be available for some time to come, at least not until after the first of the year.

Okay, DXers? Let's get those antennas up for 80 and 40 meters, and maybe also that ten-meter beam, so you'll be ready to dive into this grind come the first of the year. Making the contacts will be hard enough; getting the cards to confirm them will be something else!

New RCC Policy. Throughout the years, the headquarters has received many times the suggestion that RCC be dropped, because it really doesn't mean anything and is so easy to obtain. Compared to the above 5BDXCC, for example, it's ridiculously simple. All you have to do is chew the rag with another ham for a half hour or more, report it to headquarters and back comes your RCC certificate. Over 6000 of these were issued in 1967.

But now comes the complaint that there is duplication and waste. Some amateurs are getting two or more certificates, some don't want the one they get (we got one back all torn into little pieces, with no comment!), others have asked why they received one or who nominated them. The procedure of granting an RCC certificate to anyone asking for it, either for himself or a friend, has had this result, as might have been expected.



A familiar call on an unfamiliar mode: that was K7RAJ, scoring a hefty 105K in his first phone CD Party. Jim becomes the second CD appointee from the 7th call-area to exceed that magic hundred-grand total, and one of only seven Partyers ever to surpass that figure on voice. His DX-Contest tallies are chronicled elsewhere in this issue.

QST for

Hence, the new procedure. If you want to nominate someone for RCC, send the nomination information (date and time of QSO and length of chew) to him, instead of to headquarters. If he wants the certificate, he can send in the nomination. This way, no one gets a certificate he doesn't want and confirmed ragchewers can still nominate those they think qualified. A s.a.s.e. with your application will be appreciated.

FMT Honor Roll. It has been called to our attention that a supplementary list of amateurs who qualified for the list of leaders in last February's FMT (see p. 95, June '68 QST) has never been printed. We're mighty sorry about that, OMs! It represents a double goof—first in omitting the calls, then in omitting correcting the omission. Therefore, let it be known that the following measured WIAW, last Feb. 10, to an accuracy of 4 parts per million (.00004%). W1PLJ, W2JQJ, WA2WOM, W3WXB, W4ZGR, W5LNL, W6AXV, K6-MZN. That's mighty close measuring!

Miscellany. Quite a few have asked that the boundaries of some of our "split" sections be defined, presumably for CD contest purposes. This information is now printed in the booklet *Operating an Amateur Radio Station*, free to ARRL members. Send 12¢ postage if you want it first class.

Staff Note: Your newest CD staffer is William O. Reichert, WA9HHH, who started his indoctrination in the Public Service Branch Aug. 15. Bill is a high speed c.w. man and has been active on ILN, 9RN and CAN, so he has a head start on NTS matters.

All you other aspirants for jobs at headquarters, don't give up. There are still three other vacancies right in this department.—W1NJM.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	319	2169	2146	133	4767
K5TEY	13	1952	1902	5	3872
W7RA	17	1138	1009	124	2288
K0ONK	184	1020	995	67	2266
WA3CNV	1	920	917	3	1841
W6GYH	57	921	558	6	1222
W0LCX	17	453	358	23	851
W3VR	109	347	384	3	843
K5BNH	7	421	339	38	805
W0RBY	7	372	262	104	745
WA2UWA	15	360	350	3	728
WA5TYH	5	382	273	35	695
W6BBO	13	339	338	1	691
K3MYS	36	331	302	15	684
W2RKK	49	308	254	17	628
W3PIH	13	307	257	46	624
W2FUW	187	237	185	8	617
W6MLF	396	110	98	0	604
WA9QKP	28	288	261	1	578
WA9MHU	30	275	163	101	569
W3EML	34	312	216	2	564
W6GAI	10	271	238	23	548
W0LXX	34	251	231	28	544
WA7DZL	8	249	237	12	506
W4GTG	21	242	233	6	502
K7RQZ	33	235	188	44	500
Late Reports:					
KH6GYZ (June)	128	237	185	46	596
K9EZX (June)	3	3	249	266	511

BPL for 100 or more *originations-plus-deliveries*

K3NBN	194	WA3AOM	111	WA6BYZ	104
WA9QNI	175	W3TN	111	WA1DFI	163
KH6GYZ	147	K4YZU	110	W0ESJ	102
K5GDH	142	WA6AUD	109	W4FP	101
WA1GGN	137	W6KVQ	107	W8MO	100
WB6IVA	128	WA7JBM	107	Late Reports:	
WA8MCQ	128	W8ZUVB	104	WA5RQI (May)	167
WA2GPT	122	WA3IYS	104	WA2ZDA (June)	103

More-Than-One-Operator-Stations

K0WBD 336 K6MCA 233 WA0HQR. 0 114
 BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listing: W2FUW, WA3AFT, K3WEU, WB4DX, WB4FDT, WB6SQZ, WB6UMT, WA7BDD, WA9QNI
 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.

Note: Rules for the new Five-Band DXCC Award appear on the following page.

OPERATING EVENTS (Dates in GMT)

ARRL-IARU-SCM-Affiliated Club-Operating Events

October	November	December
2 Qualifying Run, W6OWP	2-3 KR6 DX Contest (p. 103, this issue).	4 Qualifying Run, W6OWP
5-6 Massachusetts QSO Party (p. 122, Sept. QST). VK/ZL/Oceania DX Contest, phone (p. 105, Sept. QST).	3 OK DX Contest (p. 103, this issue).	13 Qualifying Run, WIAW
5-7 California QSO Party (p. 130, Sept. QST). RTTY SS (p. 70, Sept. QST).	6-7 YL/AP, phone (p. 87, Aug. QST).	
12-13 VK/ZL/Oceania DX Contest, c.w. (p. 105, Sept. QST). IARU Region II Contest (p. 90, this issue).	7 Qualifying Run, W6OWP	
12-14 CD Party (phone)*	9 Frequency Measuring Test, OOs only.	1969
16 Qualifying Run, WIAW	9-11 SS, phone (p. 54, this issue).	Jan. 4-5 VHF SS 25-26 SET
16-17 YL/AP c.w. (p. 87, Aug. QST).	10 International OK DX Contest	Feb. 1-2 DX, phone 15-16 DX, c.w.
19-20 Boy Scout Jamboree WADM Contest	14 Qualifying Run, WIAW	Mar. 1-2 DX, phone 15-16 DX, c.w.
19-21 CD Party (c.w.)*	16-18 SS, c.w. (p. 54, this issue).	
* League Officials and Communications Dept. Appointees, only.		

Rules for 5BDXCC

The purpose of the 5BDXCC Award is to encourage more uniform DX activity throughout the amateur bands, encourage the development of more versatile antenna systems and equipment, and provide a new challenge for old timers as well as newcomers to DXing. The award does not supersede the basic DXCC award, but is in addition to it.

- 1) The 5BDXCC Award is available to all licensed amateurs, except that in Canada, the United States and possessions, and Puerto Rico the applicant must be a full member of ARRL.
- 2) DXCC Rules 6, 7, 8, 9, 11, 12, 15 and 16 (see attached) shall apply to 5BDXCC; DXCC Rule 10, with substitution of a date of Jan. 1, 1969, shall also apply. Anyone disqualified from 5BDXCC under DXCC Rule 11 shall automatically be disqualified from DXCC. Anyone disqualified from DXCC is not eligible for 5BDXCC.
- 3) The 5BDXCC Award will be issued after checking submission of a minimum of 500 different confirmations representing two-way communication with 100 different "countries" (per the ARRL Countries List in effect

at the time of application) on each of five amateur radio bands. Phone and c.w. segments of the band do not count as separate bands for this award.

- 4) Confirmations showing contacts by any legal mode will be accepted. However, no contacts made by cross-mode or cross-band are acceptable, nor will endorsement for mode be given or indicated. Contacts using repeaters or repeater satellites are not acceptable.
- 5) Application for 5BDXCC will be accepted only if submitted completely on a standard form supplied by ARRL headquarters. A charge of \$10.00 (U.S.) will be made for each such form. This charge will cover cost of return of cards by first class registered mail and purchase and forwarding of a personalized plaque commensurate with the difficulty and effort required to achieve this award.
- 6) Only QSL card confirmations will be accepted. No credits will be given for confirmations via DX contest or other logs.
- 7) Only confirmations showing a contact date of Jan. 1, 1969, or later will be accepted for credit for this award.



DX CENTURY CLUB AWARDS



From July 1, through July 31, 1968, DXCC certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

HLA G 260	W6HPG 134	W3LH 110	DL2FY 103	WA4KQO 102	KG8AQI 100
DL8NU 225	WA5R6M 129	W8AXO 110	K2QMF 103	W6BB 102	LA3K 100
H8XAL 225	DL1CP 126	HMI AJ 109	W86RAW 103	WA8QTG 102	LA9OI 100
W9ZRX 191	WI4YK 119	W6ZGM 109	DL1QY 102	JA1JXU 101	WB2BIMQ 100
W4QR 189	DL6OL 117	K6YRD 107	DM2BD 102	K7ADD/3 101	WB2RBG 100
W2YA 186	OK2ABU 117	LA6C 106	H8AABO 102	K7AXK 101	W8LU 100
W6KJS 162	4X4KM 116	K3MZY 108	K2IEF 102	VE2BFS 101	W3RRV 100
W6RFF 162	YU1NAJ 115	W43DCM 106	K1OCE 102	W9GIM 101	W43EPI 100
WB2WOW 157	K0DVK 114	W4CHC 105	K8MGF 102	W9YDQ 101	W4NXXE 100
JH1ANB 139	DM3LOG 111	H89AA 104	W2OVX 102	W8AGK 101	W40WE 100
W8CWN 137	G3TZU 110	J438SD 104	WB2VAS 102	DL5AQ 100	W46KTK 100
DL9WX 134	PA1ALO 110	WB2VYA 104	W3FBE 102	K1GXTU 100	W480IN 100
				K5MBS 100	Y08OP 100

Radiotelephone

DL8NU 221	W6HPG 134	W6DJA 110	TLAKJ 105	K6RXZ 102	G3XBR 100
K5LNN 205	W8CGQ 121	W4CHC 110	W4CHC 105	W2LQW 102	11HBP 100
H8XAL 183	WA9WOR 118	DM2BEA 109	RSJEF 104	W3A7B 102	KG6AQI 100
W9ZRX 178	W4ER6M 115	W4SGT 108	W9HNV 102	W9EIV 102	VK3AN 100
K6CWS 149	VE108 112	HMI AJ 106	W5LVQ 103	K7RDH 101	W1LFE 100
WB2WOW 147	DL3HJ 111	WA1FN8 106	YV1EC 103	W2HXF 101	W1MDO 100
K1DJC 115	DL7HJ 111	W12YRU 106	4X1KM 103	WA2YDQ 101	W42RKU 100
KH6BVS 140	1T1US 110	WA8YTD 106	K4KMX 102	W3KVS 101	ZD8HAL 100
				W48GBE 101	2L1AAP 100

Endorsements

Endorsements issued for confirmations credited from July 1, 1968 through July 31, 1968, are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

345 W1GKC	315 LA5HE W8CUT	300 DJ7ZG K1TWK	K7CHT VE3WT W2LJE	W3EYF WA3ATP	W8AO WB2PWU	180 JA2TH K4CFB	W8CGQ 160 D49SB	WA9UFR G3JFF	W8EXS WA4ERF ZD8HAL
330 W9PKC	310 W4UKA	260 W2PZI W40KA	240 K1IJK K5LNN	200 K6CWS K9WEH	200 SM5FC SM7ANE	160 D99SB DL1LF	140 G3JFF HB9AGO	120 K1KNO K1ZND	110 DL5HL K2YFK
325 W1JNV W6DZZ	280 W4BFR W6GRX	260 W6RGG Z86YQ	220 K6ALH K6HOR	200 OH5UQ W4RLJ	W3IOP WA3CQF	160 W21P W1JWZ	140 G3JFF K1ZND	120 K1KNO K1ZND	110 K2YFK K4DSN
320 W9TKD	305 K4YYL WB2HXD	280 HB9PL K4YYL	240 LA1K VE3NE	200 W4R1J W5DMR	W4DVT W4GFB W5TKB	160 W1JWZ W2MB W4CRW W6QB	140 G3JFF K1ZND	120 K1KNO K1ZND	110 K2YFK K4DSN

Radiotelephone

325 W5KBU	310 EA7JD 11KDB	280 G3WUW 0B1PF Z86YQ	WA3ATP WA5IEV W6DZZ W8NCG	200 JA8ADQ K4RQZ G48Y	W6ZBS ZL3RF	WA5REU W6FXB W8CFG W9CAI	WA1IHN W4MLF W4R1J W5TBH W8YZQ Y4YQ	K8BIT K6YIP W4DQD WA4GUZ W8FQZ W9CCK YA5RG	E2HER K6VEH W42YA WB2UZU W8FQZ W4EKF W7CRT W8DRL W9PFM W9PWQ
320 W1MMV ZL1KG	305 W6VUW	260 W8GMF	220 11ANE K7CHT VE5JV	200 TN8AA VE3NE WB2BBZ WB2PWU W4SFX WA4WTG	180 W2LJE WB2RLK WB2ZW W43CCE W5DMR	160 D13CN K4SDW K4YFQ	140 K5TGI K6PTH	120 W4EKF W7CRT W8DRL W9PFM W9PWQ	
315 W1CLX	300 CT1PK DJ7ZG LA5HE	240 K4YYL	200 W6ABJ						

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 one year 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 membership 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, WINJM, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Santa Barbara	Oct. 10, 1968	Cecil D. Hinson	Aug. 10, 1969
West Indies	Oct. 10, 1968	Albert R. Crumley, Jr.	Jan. 10, 1968
East Bay	Oct. 10, 1968	Richard Wilson	Feb. 10, 1968
New Hampshire	Oct. 10, 1968	Robert C. Mitchell	Oct. 26, 1968
Southern Texas	Oct. 10, 1968	G. D. Jerry Sears	Dec. 10, 1968
Mississippi	Oct. 10, 1968	S. H. Hairston	Dec. 15, 1968
Maryland-D.C.	Oct. 10, 1968	Carl E. Andersen	Dec. 19, 1968
Alabama	Oct. 10, 1968	Edward L. Stone	Dec. 26, 1968
Kentucky	Nov. 12, 1968	Lawrence F. Jeffrey	Deceased
Arkansas	Nov. 12, 1968	Curtis R. Williams	Resigned
Colorado	Dec. 10, 1968	Richard Hoppe	Feb. 14, 1969
Eastern Florida	Dec. 10, 1968	Jesse H. Morris	Feb. 25, 1969
Sacramento Valley	Dec. 10, 1968	John F. Minke, III	Feb. 25, 1969
Orange	Dec. 10, 1968	Roy R. Maxson	Mar. 1, 1969
North Dakota	Jan. 10, 1969	Harold L. Sheets	Mar. 8, 1969
Missouri	Jan. 10, 1969	Alfred E. Schwaneke	Mar. 11, 1969
Minnesota	Jan. 10, 1969	Herman A. Kopischke, Jr.	Mar. 15, 1969

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.

Maritime	William J. Gillis, VE1NR	Mar. 11, 1968
Alaska	Albert F. Weber, KL7AEQ	July 10, 1968
Iowa	Wayne L. Johnson, KBMHX	Aug. 17, 1968
Idaho	Donald A. Crisp, W7ZNN	Aug. 17, 1968
Montana	Joseph A. D'Arcy, W7TYN	Sept. 9, 1968
Northern Texas	L. E. Harrison, W5LR	Sept. 12, 1968
Nevada	Leonard M. Norman, W7PBV	Oct. 22, 1968

In the Arizona Section of the Southwestern Division, Mr. Gary M. Hamman, W7CAF, and Maxwell G. Smith, W7CAL, were nominated. Mr. Hamman received 204 votes and Mr. Smith received 134 votes. Mr. Hamman's term of office began Aug. 9, 1968.

In the Western Pennsylvania Section of the Atlantic Division, Mr. John F. Wojtkiewicz, W3GJY, and Mr. Robert E. Gawryla, W3NEM, were nominated. Mr. Wojtkiewicz received 351 votes and Mr. Gawryla received 257 votes. Mr. Wojtkiewicz's term of office began Aug. 13, 1968.

In the San Joaquin Valley Section of the Pacific Division, Mr. Ralph Saroyan, W6JPU, and Stanley R. Babcock, WB6HVA, were nominated. Mr. Saroyan received 203 votes and Mr. Babcock received 82 votes. Mr. Saroyan's term of office began Aug. 20, 1968.

JULY CD PARTIES

Hey, guess what, gang! You know that swell VE4ZZ that gave you a Manitoba CD QSO for the first time in umpteen years? Well, it would have been even better if he had had an appointment! Scratch one, Oh, and you say you also landed VE5OA for rare Saskatchewan? Forget it: SCM VE5HP says he's as piratical as Bluebeard.

Just to keep pace with K2KIR, K2EIU/5 missed three active sections on both c.w. and phone. WA9ITB prepared for a hitch in the Navy by weighing anchors for big scores on both modes. K2KIR fell asleep at the key Saturday night so decided to put in ten hours for 200K.

It's astonishing how phone scores have zoomed in the last few years. Four CDers over 100 thou in a July Party? Who'd have ever think it! And K2EIU/5 is already day-dreaming about 200K this winter! Wasn't too long ago that 5000 points was good enough to make the high-claimed listing.

Three entries (two c.w., one phone) have been omitted from our tabulation because of massive logging "irregularities." We can only pity anyone who would resort to such tactics just to run up an impressive score, especially in a purely fraternal contest such as this. What a waste of time — ours and theirs.

The following are high claimed scores (VE4ZZ and all); 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. — WIARR

C.W.	K3EXE	109,440-342-64-20
K2EIU/5	258,400-753-68-20	W1MX (K3QDD, opr.)
WA9ITB	242,640-717-67-19	107,360-354-61-7
W6RW (W6DQX, opr.)	234,600-680-69-18	K3WWP
WA9AUM	207,900-624-66-16	106,305-366-57-16
K2KIR	207,365-612-67-11	W4KFC
K4RIN/5	202,950-611-66-19	105,400-333-62-4
K3HKK (K3AHT, opr.)	202,300-588-68-16	W8RYP
WA8SDC	191,730-575-66-14	104,780-331-62-13
W6DGH	187,340-544-68-19	WA1GYP/5
K2LWR	182,000-560-65-15	104,400-348-60-19
VE7BDJ	179,520-521-68-20	K4PUZ
WB2RKK	173,195-510-67-18	104,220-379-54-8
WB2UHZ	167,210-500-68-20	K2KNV
W3GN	162,825-501-65-13	103,395-333-61-7
W2FR	151,420-445-67-16	WA8ZG
K4FU	146,560-451-64-13	100,005-332-59-7
W8GAI	145,390-469-62-19	WB4ALN/4 (WA4WWT
W3IN	144,000-444-64-11	WB4ALN)
W5BUK	139,520-429-64-16	178,425-543-65-17
W4BZE	136,407-428-63-12	WI4W (K1ZND, WIARR,
W2GKZ	131,520-404-64-12	WAIUL)
K1THQ	129,015-418-61-17	169,920-528-64-9
W8QXQ	128,205-400-63-10	
K9AZJ (WA8MLE, opr.)	126,575-411-61-11	
WA8OCG	126,555-423-59-15	
K8DDG	124,620-395-62-16	
WA5HS	124,200-408-60-13	
K1TKS	123,830-400-61-17	
W6ISQ	123,200-378-64-11	
W2PU (K8JLF, opr.)	122,850-383-63-16	
W8INH	122,140-387-62-9	
W6GEN/6	121,075-390-62-19	
W43CFK	119,700-414-57-20	
K8HMK	118,300-360-65-17	
W84GTG	116,815-381-61-17	
W8LT (WA8AJZ, opr.)	115,500-378-60-6	
WA1ABW	114,600-376-60-17	
WB20HK	113,400-371-60-18	
KH6GNE	112,960-346-64-14	
KZ5FX	109,740-365-59-11	

PHONE

K2EIU/5	129,015-416-61-18
W1BGD/2	122,450-388-62-12
W9AQW	115,345-387-59-20
K7RAJ	105,525-335-63-18
WA9ITB	99,120-329-59-15
K1CEC	94,400-315-59-15
K1THQ	82,350-300-54-14
K4FU	66,825-236-55-11
K3HKK (K3AKR, opr.)	61,020-222-54-19
WA8OTE	60,950-225-53-15
W6DGH	60,200-208-56-8
VE3OE	55,275-201-55-10
WA4U4	53,350-189-55-8
WA8MLE/8	47,520-194-48-5
W8LT (WA8AJZ, opr.)	41,520-166-48-6
K1TKS	39,270-181-42-14
K7WWR	37,200-150-48-15
WA8SDC/5	36,015-141-49-5
W8N0H	35,500-137-50-5
W3GN	34,650-147-45-6
K4TTN	34,350-145-46-13
WA8TU	33,525-146-45-8
W1ETU	31,320-174-36-7
W4KFC	30,825-130-45-3
WB2DRW/2	30,525-160-37-14
K3WUW	28,350-126-45-5
W6PWG	27,300-125-42-8

W1AW SCHEDULE, OCTOBER ** 1968

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EDST, Saturday 7 P.M.-2:30 A.M. EDST and Sunday 3 P.M.-10:30 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0020-0100 ⁴	3.555 ⁶	14.1	1.805	7.08 ⁶	14.1
0100	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0105-0130 ⁴	145.6	3.945	145.6	50.7	1.82	21.41
0130	Code Practice Daily ¹ 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.					
0230-0300 ⁴	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS ³	.....	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³
0310-0330 ⁴	3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS ²	.....	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0335-0400 ⁴	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS ¹	.....	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0420-0500 ⁴	3.555 ⁶	7.08	3.945	7.08 ⁶	3.555
1700-1800	21/28 ⁵	21/28 ⁵	21/28 ⁵	21/28 ⁵	21/28 ⁵	.....
1900-2000	14.28	7.255	14.28	7.255	14.28	.....
2000-2100	14.1	14.28	14.095	21/28 ⁵	7.08	.....
2200-2300	21/28 ⁵	21.075 ⁶	21/28 ⁵	7.255	14.28	.....
2330	RTTY-OBS ^{3,7}	.....	.....	.....
2330	Code Practice Daily 10, 13 and 15 w.p.m.					

¹ C.W.OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 28.08, 50.7 and 145.6 MHz.

² Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 28.7, 50.7 and 145.6 MHz.

³ RTTY OBS (bulletins) on 3.625, 7.045, 14.095 and 21.095 and 29.015 MHz. 170/850 cycle shift optional in RTTY general operation.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 MHz.

⁶ W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.

⁷ Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1QIS W1WPR.

* All times/days in GMT, general operating frequencies are approximate.

** November QST will carry the W1AW fall-winter schedule, which will become effective October 27, 1968.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Oct. 16 at 0130 GMT. Identical texts will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Oct. 2 at 0400 Greenwich Mean Time on 3590 and 7129 kHz. **CAUTION!** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT Oct. 16 becomes 2130 EDST Oct. 15. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP for the coming 3-month period.

Any person can apply. Neither ARRL 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 through 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.

Code practice is sent daily by W1AW at 2330 and 0130 GMT, simultaneously on listed c.w. frequencies. At 0130 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 2330 GMT daily, speeds are 10 13 and 15 w.p.m. The 0130-0220 GMT runs are omitted four times each 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 on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130-0220 GMT practice on those dates:

Date Subject of Practice Text August QST.

Oct. 18: *It Seems to Us*, p. 9

Oct. 22: *A 65-Foot Crank-Up*, p. 18

Oct. 23: *An FET Preselector For 20, 15 and 10*, p. 42

Oct. 31: *Amateur Radio Public Service Corps*, p. 57

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Nov. 4: *Frequency Modulation*, p. 92

Nov. 6: *Phase Modulation*, p. 94

⁵ Speeds will be sent in reverse order, highest speed first.



QST Congratulates . . .

Henry H. Cannon, W4BAC, who received the U.S. Forest Service "Cooperative Forest Fire Control Outstanding Service Award."

Mark Hansen, WNØRXR, a finalist in the National Merit Scholarship Examination.

— * * * —
The recently-organized "Society of Wireless Pioneers" invites those who have held commercial radio operator's licenses and who, at one time or another, made their living handling commercial traffic, to join the organization. The group publishes a newspaper chronicling the news of members, ships and radio gear, both old and modern, and anecdotes and memorabilia of by-gone days. For more information write Frank Geisel, Society of Wireless Pioneers, P.O. Box 530, Santa Rosa, California 95402.

K4GOP—or “How to Succeed in Politics Without Getting Involved”

As most everyone knows, South Florida—and Miami Beach in particular—has become a mecca for conventions. Until this year major political parties had given it the brushoff. Political conventions are held in the summer, and who wants to go to Miami in the summer? It's so HOT! Apparently someone checked the weather reports and discovered that this is another myth. Miami is likely to have fewer days in the 90's than many northern cities! So here we were with the Republican National Convention right in our backyard—what a chance to show off ham radio to people from all over the country!

The idea was born in the shack of W4IYT, Eastern Florida Section Emergency Coordinator. Members of the Dade County ARPSC went for the plan wholeheartedly and started rounding up equipment and potential operators. At the outset, there was some thought of locating the station at one of the Convention hotels, possibly in a small van. There was a slight let-down in morale when the group discovered that one of the broadcasting networks was paying a four figure rental for the kind of space needed for the ham station. Some thirty or forty phone calls later, the “hotel QTH” thinking was abandoned. Fortunately, there are hams in many, many occupations. Thanks to K4ONY of the Miami Beach Police Department, who knew just about all the hams in various businesses in that city, and K4BNZ, a Miami Beach businessman, the station was finally located right on Lincoln Road Mall. With a QTH only a block from the Convention Hall, no automobile traffic to cause ignition noise, maximum exposure to all pedestrian traffic and a three element beam within reasonable coax distance, success was assured—so long as outlets for message traffic held up. Forever reliable W3CUL agreed to be on hand to take the bulk of the traffic load. Eastern Florida RM, W4ILE, alerted the Section Nets. Copies of “standard form” messages with related numbers were distributed to key stations and the station was effectively ready for business.

Special Call Sign

Somewhere along the way there was a discussion of what call to be used. W4LVV, Division Director, had been called on to arrange for a WIAW bulletin about the station and the thought occurred that the call should be indicative of the event. A check of the *Callbook* showed K4GOP to be open for assignment. With fingers crossed, authority for use of the call for a limited period, under the “spe-



cial event station” paragraph of Part 97, was requested and granted.

K4GOP was in operation Monday through Thursday from about 1800 GMT until 0100 GMT. Since the station was set up on the sidewalk, it had to be dismantled each night. Baron's Slack Bar, which provided the base for the three-element beam as well as the display space for the station signs, again came to the rescue with overnight storage space for the tables, chairs and station accessories.

How many thousands of people who saw an amateur station in operation for the first time is anyone's guess. 847 messages were filed, 468 of which were transmitted through K4GOP. The balance was moved through the operators' home stations during the hours when K4GOP was not in operation. It usually required two to four of the staff to assist the visitors with message writing or to explain just what was going on. It was most difficult to make the visitors believe that there was absolutely no charge for messages—particularly in Miami Beach at Convention time!

The operating staff believes this may have been a “first”—first amateur radio station designated as the “Official Convention Amateur Radio Station” by a major political party!

All of this could not have occurred without the helping hands of many. A K3 visitor filled in at the message desk for two evenings during the “rush period.” Some have no doubt been missed but the recorded list shows the following: W4EHW, WA4PWF, WB4RRB, WB4HIS, K4KIC, W4ILE, K4FMA, WA4BAW, K4BNZ, K4TCV, WB4JDG, WB4EIZ, WA4DHU, WA4TWD, WN4JFA, W4IKG, W4YP, K4ONY, W4LVV and W4IYT.

Roughly 250 stations were contacted and a special QSL will be available to these stations upon receipt of their card at Convention, P.O. Box 501, Miami Springs, Fla. 33166.—W4LVV

• 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. WA3DUM requests that anyone with knowledge of use of s.s.b. in broadcasting write him. WA3DYG has added 2 meters to his many mobile frequencies. WA3GSM is in Columbia, South America, visiting HK3AIR. Ex-K3UON, from the Dover area, is now operating from Florida as W4WVB. W3BDP added state No. 24 to his list on 2 meters. K3NYG vacationed at his Kansas home. W3RDZ reports a very busy summer and hopes to be observing again soon. K3NVV has moved from the Harrington area and will be active soon from a new QTH somewhere in Delaware. DEPN: QN1 59. QTC 11. Traffic: W3DKX 33, WA3GSM 8, WA3DUM 7, K3NYG 4.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3AES, RMs: W3EML, K3-MVO, K3YVG, W3MPX. PAMs: K3MYS, K3WAJ, V.H.F. PAM: W3FGQ. OBS reports were received from WA3AFI, WA3EEC, W3CBH, WA3INC, K3RDM and WA3HDI; OVS reports from K3WEU, WA3BJQ, WA3-EEC, WA3HDI and WA3IAZ; OO reports from W3-KEK, K3WEU, W3NNC, K3MYS, W3ID.

Net	Freq.	Operates	QNI	QTC	RM/PAM
EPA	3610	Daily 6:45 p.m.	269	235	K3YVG
PTTN	3610	Daily 6:00 p.m.		205	W3MPX
PFN	3960	Mon.-Fri. 5:30 p.m.	400	506	K3MYS
EPEPTN	3917	Daily 7:00 p.m.	583	207	K3WAJ
VHF (6)	5025	Mon.-Fri. 7:00 p.m.			W3FGQ
VHF (2)	145.6	Mon.-Fri. 8:00 p.m.			W3FGQ

W3CUL reports heavy convention traffic. W3VR says he is all set for the winter blows. W3EML went on vacation and nearly forgot the code. WA3INC needs 3 states for WAS. W3MPX is invading the 2-meter band. WA3IUV got his A ticket and a new T4XB. WA3ATQ still is busy with her eye bank and personal assistance type nets. W3HINK adds EP2KB to his growing list of DX. W3CID is back on at a new QTH. WN3JCI got his big G and is going for the A next. K3WEU is back from Maine and getting ready for the fall season on the Book Review Net. W3AES still is begging for ECs. WA3CFU now is mobile on 6 meters. WA3GUL got a new HW-100. WA3AXU got his 2nd-class commercial ticket at 16 years! K3KXJ got a new Clegg 22er. W3KEK has a new boomless quad operating. WA3EUY is visiting CB clubs and giving instructions to convert to hams. WA3EEC says work is interfering with his hamming. WA3HEU got his CP-15. W3KQE popped up at the bullet factory, Frankford Arsenal, where W3HK works. The fall EPA Dinner Meeting will be held Sat., Oct. 26 at the Towne & Country Supper Club, Scranton, Pa., near Exit 52 on Route 81. Time 7 p.m., donation four (4) pesos. Please let WA3-FCP know of your intentions as early as possible. Traffic: (July) W3CUL 477, W3VR 843, K3MYS 684, W3EML 584, WA3CTP 329, WA3INC 316, K3NSN 313, WA3AOJ 217, W3MPX 138, WA3IUV 113, WA3ATQ 100, W3KJJ 86, K3YVG 86, W3HINK 75, W3CID/3 58, K3-WAJ 57, W3HK 54, WA3AFI 50, WN3JCI 41, W3ALZ 39, WA3HIT 36, W3KQE 36, W3CBH 35, W3FPC 35, WA3HDI 33, K3WEU 28, K3MDG 20, K3FOB 16, W3-NNL 15, W3VAP 15, W3AES 10, WA3CFU 8, WA3EEC 8, WA3IOB 8, W3OML 7, WA3HEU 5, WN3JRD 3, K3KXJ 2, W3OY 2, W3ADE 1, WA3AIZ 1, WA3BJQ 1, WA3BSV 1, W3EU 1, WA3EUY 1, W3FAF 1, W3ID 1.

W3KEK 1, K3NPC 1, W3YFP 1. (June) K3WAJ 138, WA3EEC 34, WA3EXB 17, W3NNL 12. (May) WA3AOJ 134.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3LDD.

Net	Freq.	Time	Days	Sess.	QTC	QNI	Mgr.
						Ave.	
MDD	3643	2300Z	Daily	31	278	13.8	WA3HTQ, RM
MDDS	3643	0030Z	Daily	31	73	8.9	W3CBG, RM
MDCTN	3920	2200Z	S-T-T-S	17	43	11.8	W3SRC, PAM
MEPN	3920	2200Z	M-W-F	22	49		K3IAG
			1700Z S-S				
MTMTN	145.206	0100Z	M thru S	22	12	8.8	W3IFW
CVTN	145.620	0200Z	Tb.-Sa.	6	15	4.7	WA3CFK

W3OBC, of Baltimore, became a Silent Key July 19 because of a plane crash in N.Y. New appointees: WA3IRQ as ORS. Endorsed appointments: W3GN as OVS and OO, Class I; K3LFN as OPS. W3TN and WA3IYS earned BPL certificates via the originals and deliveries route in July. W3FA has his home dug for planting antenna towers. W3GRF has mounted a small 10-meter beam (ten elements) 150 feet in the air. A Section Traffic Men's Picnic was held at Patapasco State Park with members of MDD, MDDS and MIDCTN in attendance. The common theme was traffic and how the phone and c.w. nets can work together to get traffic delivered promptly. A new liaison system was worked out between the managers of the three nets. Each of the three managers took their turn in the barrel to make comments and answer questions. The low-light of the picnic was a taped replay of MDD in operation. The Anne Arundel County AREC drill must have been a success, as W3LQY reported handling 24 messages during the drill. W3GEB and WA3IRQ have found the droop-in dipole antenna a real signal booster. WA3GAU stepped up to Extra Class only 732 days after getting his General Class. WA3HEN reports handling 54 messages in 3 hours in the AA County AREC drill. W3DPJ has a new R-4B and T-4XB. WA3JBY defeated Murphy and now has his keyer working. Good luck to WN3KQV on his try for General Class. K3LFD reports the addition of SP-800 and HA500 receivers. K3FQF has overcome school and a new XYL and has returned to the traffic nets. The Springbrook High ARC has a new station call, WA3-KOQ. WA3DYW has departed the MDC area for California as WB6OJG. W3ZNW is traveling through W7 and W8-Lund on an Aug. vacation. WA3IRQ is a new Advanced Class licensee. W3GKP is so QRL with his 2304.000-Mc. operation that he hardly has time to report activities. W3LDD reports W3SNC as another Silent Key. Traffic: (July) WA3IYS 227, W3TN 189, WA3HTQ 149, WA3CFK 101, W3ATQ 86, W3CBG 86, K3GZK 61, WA3JBY 57, WA3HEN 54, K3FQF 46, W3PRC 30, WA3ERL 29, WA3IRQ 28, W3LQY 24, K3-JYZ 21, K3LFD 21, W3GEB 16, W3FA 13, K3LFN 13, W3ECP 10, K3QDC 10, W3UCE/3 7, WA3DYW 5, WA3IAO 1, W4TFX/3 1. (June) W3ZNW 22, WA3IAQ 17, K3LFN 16, W3FA 11.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, WA2BLY. PAM and NJPN Net Mgr.: W2ZL. NJPN reports a total of 354 messages with a QNI of 427. NJPN reports 137 traffic

(Continued on page 117)

ARE YOU LICENSED?

• When joining the League or renewing your membership. It is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, that we may verify your classification.

EIMAC

zeroed in on some grid problems so you can get higher power gain.

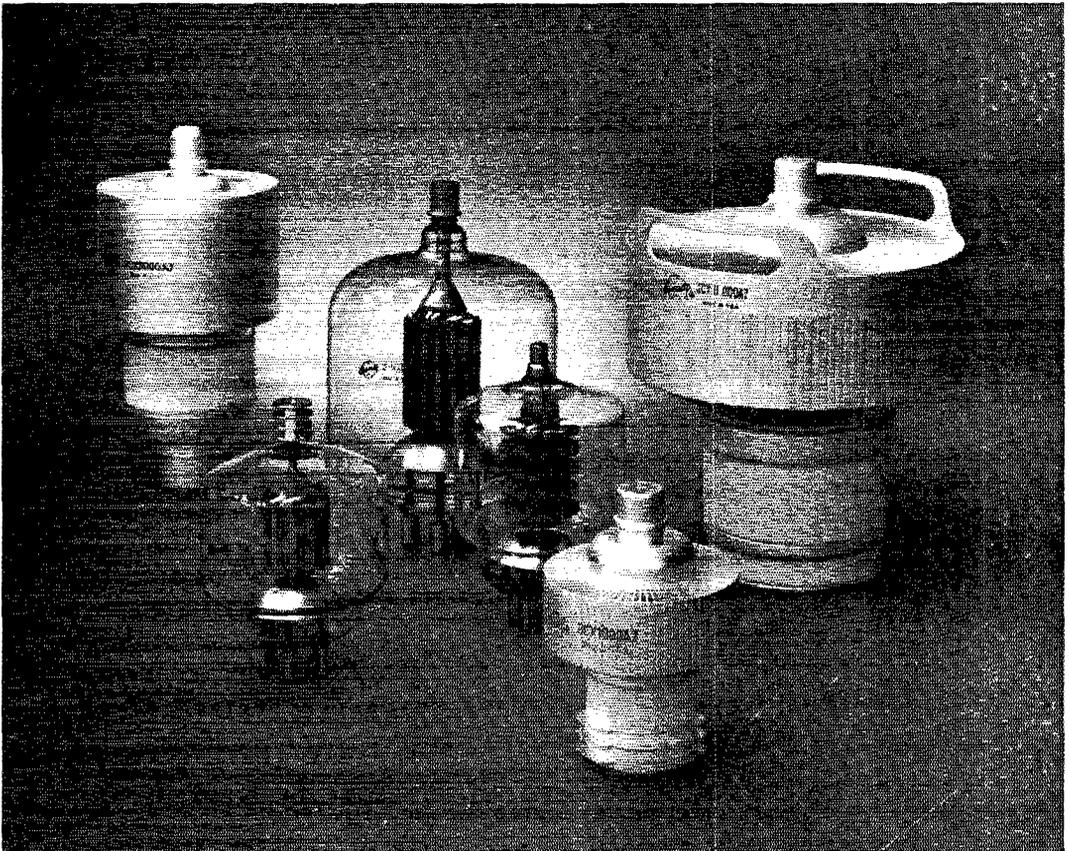
Want up to 20 times power gain in a cathode driven circuit? Try one of the tubes in our complete zero-bias power triode line. While you're solving problems, throw out the bias power supply. Forget some of the associated circuitry. And don't worry about destroying the tubes if you lose grid voltage. They don't need any.

These triodes are designed for use as Class B or C amplifiers in audio or radio-frequency applications. We've got zero-bias triodes ranging from 400 watts to 10,000 watts – the most complete range of zero-bias triodes available.

For more information on EIMAC's line of zero-bias power triodes, write Amateur Services Department, or contact your nearest EIMAC distributor.

	TYPICAL OPERATION					
	CLASS B RF LINEAR POWER AMPLIFIER, GROUNDED GRID					
	GLASS			CERAMIC		
	3-400Z	3-500Z	3-1000Z	3CX1000A7	3CX3000A7	3CX10000A7
Plate Voltage, Vdc	3000	3000	3500	2500	5000	7000
Max Signal Plate Current, A	0.333	0.333	0.75	0.800	1.56	5.0
Drive Power, W	32	35	85	60	215	1540
Output Power, W	635	644	1770	1170	5500	24,200
Filament Voltage, V	5.0	5.0	5	5.0	7.5	7.5
Filament Current, A	14.5	14.5	21.5	28/33	51	94/104

EIMAC
Division of Varian
San Carlos, California 94070



EIMAC

**new 3-500Z offers
high power gain,
less circuitry.**

EIMAC's new 3-500Z is a compact, heavy-duty power triode with 500 W plate dissipation, designed for operation in zero-bias Class B r-f or audio amplifiers. The tube can be used as a cathode driven (grounded grid) linear amplifier where low distortion, high plate dissipation, and great thermal anode reserve are desired. The 3-500Z may be operated at plate potentials up to 3000 Vdc, and eliminates expensive, bulky screen and bias supplies. The 3-500Z will replace EIMAC's 3-400Z where additional plate dissipation or greater reserve is desired. Forced-air requirement is approximately equal to that of the 3-400Z, and a blower capacity of only 13 cfm at a back pressure of 0.2 inch is satisfactory for a single tube. The 3-500Z's zero-single plate current is somewhat higher than that of the 3-400Z. When used as a replacement for the latter tube, the 3-500Z's zero-signal plate current can be reduced by addition of a simple zener diode in the cathode return. This technique is particularly suggested if plate potentials over 3000 Vdc are contemplated, or if the tube is used in equipment that is power supply limited.

3-500Z TYPICAL OPERATION*

(Minimum Distortion Products at 1 kW PEP Input)

DC Plate Voltage.....	2500 V
Zero-Sig DC Plate Current**	130 mA
Single-Tone DC Plate Current	400 mA
Single-Tone DC Grid Current	120 mA
Two-Tone DC Plate Current.....	280 mA
Two-Tone DC Grid Current	70 mA
Peak Envelope Useful Output Power	500 W
Resonant Load Impedance	3450 ohms
Intermodulation Distortion Products	-33 dB

*Measured data from a single tube

**Approximate

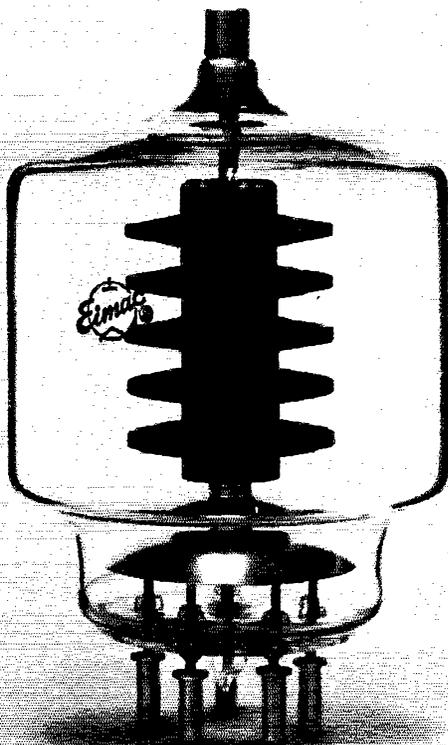
EIMAC

Division of Varian

San Carlos, California 94070



For additional information, write Amateur Services Department or contact your nearest EIMAC distributor.



and 448 QNI. Call letter license plates became a reality in New Jersey effective July 1. Send for application to Courtesy Plate Unit, Motor Vehicle Dept., 427 North Montgomery St., Trenton. WB2CHO was elected pres. of the Princeton U. Radio Club, W2PU. Dave Tyon is secy. W2FEK was in the hospital with a heart attack. WB2VEJ is a new OPS, 81 years young and a crack operator. W2ZHN received his Extra Class ticket. K2BG resigned from ARRL after many years. The DVRA held its Annual Picnic July 17. W2IU was heard on N.J.N. at last! The SJRA Annual Picnic will be held at Molia Farms Sept. 8, rain date Sept. 22. W2VX is chairman. W2ORS has a new SB-301. WA2GAA is interested in AREC. W2PU was high man in the April CD Party, with W2ZVW tops on phone. WB2MRD graduated from college. W2CUC, secy. of the Burlington Co. RC, is doing a good job on the Intruder Watch. Congrats to Dave, of W2PU, who was married July 20. WB2FJE is working all bands with a homebrew 813 linear. WB2MNF will enter Lehigh U. this fall. The West Jersey Radio Amateurs is a new repeater on the air. WN2CIF is now WA2CIF. WN2CHY took the Tech. Class exam. W2ZI made a trip aboard WMDT, S.S. *Brasil* to ports in Iceland, North Cape (450 miles above the Arctic Circle) Norway, Sweden, Denmark, Finland, Germany, Holland Russia. Traffic: WA2BLV 280, WB2UVE 155, W2PU 86, WA2KIP 67, W2YPZ 53, WB2BGH 55, W2ZI 46, WB2VEJ 39, WA2ANL 24, W2ORS 21, W2IU 16, K2SHE 15, WB2SFX 9, WB2MRD 3, WA2HJF 7, K2MBW 5, W3FK 4, WB2MNF 2.

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—SEC: W2RUF. PAM: W2PVI. RMs: W2MTA, W2RUF. K2KIR, W2FR. NYS C.W. Net meets on 3675 kc. at 7 P.M. local time; ESS on 3590 kc. at 6 P.M. local; NYSPTEN on 3925 kc. at 2200 GMT; NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun. and 3510 kc. at 1930 Wed.; TCN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT on Mon. Thanks from all of W.N.Y. certainly goes out to K2HUK, who served as SCM for six terms. Chuck did an exceptional job during that time. The W.N.Y. column did not appear last month because of the transfer of materials from Chuck to me. Our congratulations go to K2SJM, the new SCM of E.N.Y. WB2RHF, recuperating from 2 weeks in the hospital, wishes to thank all who sent cards. K2TXB is working on a remote control v.h.f. station to help him work out of his valley. W2FR reports 2RN operating successfully on its new time schedule. WA2AEZ is active on RTTY. The GASSERS Net had 55 hams attend its picnic. WB2OYE reports that he is settled in his new QTH. The Ithaca crew is waiting for FCC action before going ahead with its repeater plans. Congrats to WB2FPG on his Advanced Class license. W2CFP attended the ARRL National Convention in San Antonio. WA2PZD is the new pres. of the RIT Amateur Radio Association, with WB2PNN the new secy. K2EE is 85 years young and back on the air from a no-antenna apartment. W2RKL has built a new SB-200. The Glens Falls Area AREC Net elected WB2PBP net mgr. and WB2YMY asst. net mgr. WB2ZTP is a new Warren County Asst. Ec. W2AFB has been touring England and Ireland. K2BKU also just returned from a European tour. K2KIR, mgr. of EAN, and W2FR, mgr. of 2RN, have been appointed RMs. Congratulations to W2OE on making the BPL in May, June and July. Traffic: (July) W2OE 325, W2FR 269, WB2OYE 217, WB2SMD 199, W2RUF 198, W2QC 178, W2MTA 136, WA2CAL 102, W2FEB 101, K2DNN 50, W2HYM 45, K2KIR 45, W2AFB 25, K2OFV 19, WA2ANE 17, K2IMI 15, WB2RWR 13, W2PVI 9, W2PNW 8, WA2GLA 4, WB2NNA 2. (June) W2FR 402, W2MTA 345, W2OE 338, WB2OYE 224, W2QC 212, WB2SMD 128, W2FEB 81, WB2YU 80, W2HYM 67, W2RUF 61, WB2VND 59, WB2RHF 29, K2OFV 22, K2IMI 17, WA2ANE 16, W2PVI 12, WA2VFX 10, W2PZL 8, W2PNW 6, K2DNN 5, WB2RWR 3, W2BLO 2, WB2NZA 2, K2TXB 2. (May) W2OE 306.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: W3KPI. PAM: K3VPI (v.h.f.). RMs: W3KUN, W3MFB, W3UEN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 7 P.M. local time. KSSN, 3585 kc. Mon. through Fri. at 6:30 P.M. local time. K3AHT finally broke the 200K barrier during the July C.W. CD Party. He ran up 203K in 16½ hours at K3HKK. The following week K3AKR managed to run up 61K in the July Phone CD Party, also from the facilities of K3HKK. The Two Rivers ARC reports via the *Spark Gap* that WA3IMV is a new Advanced Class licensee; WA3HQM, WA3HMV, WA3FLB and WA3HAE operated portable from WA3PIC, Boy Scout Camp, Alqueippa, near Champion, Pa., during the summer. K3RZE has transferred back to Eastern Pennsylvania after two years of operating as a W. Pa. ORS from

Altoona. W3KNQ finally made the change and is now W3SN. A reminder to all club stations: After November 22, 1968, all members of the club are limited to the operation of the club station at the class of license held by club station trustee plus your own license limitations. Tell your trustees to up-date their classifications so full capabilities may be realized. News and traffic hit a hot summer low during July. Traffic: (July) W3NEM 169, WA3IPU 124, W3KUN 107, W3LOS 65, WA3AKH 63, K3HKK 59 (W2KAT/3, K3AHT/3, W3NEM ops.), K3SOH 50, W3KPI 30, WA3HSI 25, K3ASI 20, K3SMB 12, W2KAT/3 7, W3KNQ (W3SN) 6, K3SUN 6, W3YA 6, W3GJY 4, W3LOD 2, K3RZE 1. (June) WA3BLE 66, K3SMB 9.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU, RM: WA9OTD. PAMs: WA9CCP and WA9RLA (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	T/c.
IFN	3940 kc.	1400Z	Sun.	7
ILN	3760 kc.	0000Z	Daily	238
NCPN	3915 kc.	1200Z	Mon.-Sat.	340
NCPN	3915 kc.	1700Z	Mon.-Sat.	
Ill. PON	3915 kc.	1615 CDT	Mon.-Fri.	700
Ill. PON	3915 kc.	1645 CDT	Mon.-Fri.	
Ill. PON	3915 kc.	0830 LDT	Sun.	0
Ill. PON	145.5 Mc.	0200Z	MWF	

New Novices heard on the band are WN9YLE, WN9YXZ, WN9VZN, WN9ZBJ, WN9ZDM and WN9ZGN. WA9EZ is a new call on 2 meters from Palos Heights. WA9WLM is a new Technician Class licensee. W9NAG and W9BLB are the new pres. and secy. of the Illinois Emergency Net. WA9OTD has been appointed RM of the Illinois section, succeeding retiring RM W9EVJ. Thanks, Lloyd, for a job well done and hope to see you on the bands from time to time. The Hamsters (Chicago) held its 34th hamfest Sun., Aug. 11, at Santa Fe Park with the usual fine attendance and with many an eyeball QSO. WA9WPF has temporarily QRT since he was inducted into the Armed Forces. WA9TCW has the new Drake R-4B, T-4XB, MS-4 and AC-4. WA9QZE also is using new Drake R-4B and MS-4. WA9WNH passed the Advanced Class exam. K9KZB reports that the North American Net had a traffic count of 275 during July. W9LNQ is now the proud grandfather of his 6th grandson. K9IFE suffered a heart attack on July 6 but says that he is feeling fine and will be back on the airways with limited activity. WA9FZR had his equipment stolen from his car while vacationing. The Six Meter Club of Chicago, Inc., held its Annual Picnic Aug. 4 and a good time was had by all attending. The Chicago Area Two-Meter Nightly Traffic Net had a traffic count of 163, as reported by K9BAO. K9RZP has a new HW-100 on s.s.b. WA9CNU and WA9MHU are BPL certificate recipients for traffic handled in July. Traffic: (July) WA9CNU 1841, WA9MHU 569, K9KZB 289, WA9OTD 267, W9EVJ 173, K9AUD 187, W9NXG 163, W9HOT 115, WA9TUM/WA9VYO 89, W9DOQ 79, WA9TUN 69, WA9WNH 59, W9LDU 46, W9JXV 43, K9FRZ 41, W9QSV 36, WA9LDC 28, W9PRN 12, WA9SPA 12, K9HSK 9, K9TXJ 9, W9LNQ 6, WA9VPO 6, K9HIRC 5, W9IDY 1, WA9POZ 1. (June) WA9TK 1.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: WA9KWH.

Net	Freq.	Time	T/c.	Mor.
IFN	3910	1330Z Daily	249	K9IVG
ISN	3910	0000Z M-F 2130Z M-S	484	K9CRS
QIN	3856	0000Z Daily	186	W9HRY
IPON	3910	1250Z Sun.	75	K9EFY
IPON VHF	50.7	0200Z Mon.-Thurs.		WA9NLE
Indiana V.H.F. Nets			32	W9PMT

All V.H.F. nets should report traffic to W9PMT, 1225 Wall St., Fort Wayne, Ind. 46804. Lake County ARC's new officers are K9KFM, pres.; K9ULU, vice-pres.; WA9RMT, secy.; WA9PZY, treas.; WA9SSV, editor. W9EGQ has ordered a new keyer. WA9RMT has a new ir. operator. K9LPZ has 42 states on 6-meter phone. New officers of the Purdue ARC, W9VB, are WA9FGT, pres.; W9JXT, vice-pres.; WN9VZQ, treas. W9YB would like to receive some QSL cards. The club has a new SR-150. W9HRY QIN 100% both May and June. W9IRY and W9QLW headed up the traffic program at

(Continued on page 120)

Some Hams Still Prefer A Separate Receiver



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We're One Of The Few Places You Can Come To

The HEATHKIT® SB-301 amateur band receiver

Performance-Plus Features, Top Dollar Value And Sophisticated, Quality Engineering Have Made The SB-301 The World's Largest Selling Receiver

• 80 through 10 meter coverage on AM, CW and SSB with all crystals furnished • Famous Heath factory assembled and aligned Linear Master Oscillator for truly linear, high stability tuning • Crystal-controlled front end for same rate tuning on all bands • 1 kHz dial calibration — 100 kHz per dial revolution • Less than 50 Hz backlash • Less than 100 Hz drift per hour after warm-up • Bandspread equal to ten feet per megahertz • Tuning dial to knob ratio approximately 4 to 1 • Three speed AGC

Plus These Extra-Performance Features That Put The SB-301 In A Class By Itself

• RTTY position on mode switch — SB-301 is a fully capable RTTY receiver • 15 to 15.3 MHz coverage for WWV reception • Built-in 100 kHz crystal calibrator • Built-in switch selected ANL — a real help if your QTH is in a high noise location • Front panel switching for control of optional 6 and 2 meter plug-in converters — enables complete 80 through 2 meter amateur band coverage • Front panel switch selection of optional AM and CW crystal filters • Circuit board, wiring harness construction make assembly fast and simple

Kit SB-301, Amateur Band Receiver, less speaker, 23 lbs. \$260.00
SBA-301-1, Optional AM crystal filter (3.75 kHz), 1 lb. \$20.95

SBA-301-2, Optional CW crystal filter (400 Hz), 1 lb. . . . \$20.95
Kit SBA-300-3, 6-Meter Plug-in Converter, 2 lbs. . . . \$19.95
Kit SBA-300-4, 2-Meter Plug-in Converter, 2 lbs. . . . \$19.95
Kit SB-600, Communications Speaker, 5 lbs. \$18.95

Look over the specs and find out why thousands of hams have chosen the SB-301 for their shack!

SB-301 PARTIAL SPECIFICATIONS — Frequency range (megahertz): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 15.0 to 15.3, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. Intermediate frequency: 3.395 megahertz. Frequency stability: Less than 100 Hz per hour after 20 min. warmup under normal ambient conditions. Less than 100 Hz for $\pm 10\%$ line voltage variation. Visual dial accuracy: Within 200 Hz on all bands. Electric dial accuracy: Within 400 Hz on all bands after calibration at nearest 100 kHz point. Backlash: No more than 50 Hz. Sensitivity: Less than 0.3 microvolt for 10 db signal-plus-noise to noise ratio for SSB operation. Modes of operation: Switch selected; LSB, USB, CW, AM, RTTY. Selectivity: RTTY; 2.1 kHz at 6 db down, 5.0 kHz at 60 db down (crystal filter supplied). SSB; 2.1 kHz at 6 db down, 5.0 kHz at 60 db down (crystal filter supplied). AM; 3.75 kHz at 6 db down, 10 kHz at 60 db down (crystal filter available as accessory). CW; 400 Hz at 6 db down, 2.0 kHz at 60 db down (crystal filter available as accessory). Spurious response: Image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. Audio response: SSB; 350 to 2450 Hz nominal at 6 db. AM; 200 to 3500 Hz nominal at 6 db. CW; 800 to 1200 Hz nominal at 6 db. Audio output impedance: Unbalanced nominal 8 ohm speaker and high impedance headphone. Audio output power: $\frac{1}{2}$ watt with less than 8% distortion. Antenna input impedance: 50 ohms nominal. Muting: Open external ground at Mute socket. Crystal calibrator: 100 kHz crystal. Power supply: Transformer operated with silicon diode rectifiers. Power requirements: 120/240 V AC, 50/60 Hz, 50 watts. Dimensions: 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{3}{4}$ " D.

The HEATHKIT® SB-401 5-Band SSB Transmitter

Imaginative Engineering and Rugged, Reliable Performance Capabilities Have Made The SB-401 The World's Largest Selling Transmitter

• Ideal power level for barefoot operation — 180 watts PEP SSB, 170 watts CW • Makes a perfect driver for any linear, like the SB-200 • Built-in power supply and small, compact size make it an excellent self-contained desk top transmitter • Famous Heath pre-built & aligned LMO for rock solid frequency control — less than 100 Hz drift per hour after warm-up • ALC for more talk power means better DXing through QRM • Crystal filter sideband generation • Built-in antenna change-over relay • Operates upper or lower sideband • VOX and PTT control • 1 kHz dial calibration — 100 kHz per dial revolution • 500 kHz per band switch position • Maximum TVI protection from completely shielded and isolated circuits • Relative power meter • Clean signal characteristics — carrier and unwanted sideband suppression of 55 db

The Versatility You Need For DXing, Round Tables, Nets Or Rag-Chews

• Just a flick of a switch to select transceiver or independent operation of the SB-401 and SB-301 (or SB-300) combination — no troublesome, time consuming cable changing . . . ideal for cross band work • Can be operated as an independent transmitter with any receiver when the SBA-401-1 crystal group is installed • Fast, clean

break-in CW keying • Meter checks grid current, final plate current, ALC maximum modulation, final plate voltage and relative power, all at the flick of a switch.

Kit SB-401, 34 lbs. \$285.00
SBA-401-1, Crystal Pack, 1 lb. \$29.95

Check the specs and see the many reasons why you hear the SB-401 on the air more often than any other transmitter!

SB-401 SPECIFICATIONS — Emission: SSB (upper or lower sideband) and CW. Power input: 170 watts CW, 180 watts P.E.P. SSB. Power output: 100 watts (80-15 meters), 80 watts (10 meters). Output impedance: 50 to 75 ohm — less than 2:1 SWR. Frequency range: (MHz) 3.5 — 4.0; 7.0 — 7.5; 14.0 — 14.5; 21.0 — 21.5; 28.0 — 28.5; 28.5 — 29.0; 29.0 — 29.5; 29.5 — 30.0. Frequency stability: Less than 100 Hz per hr. after 20 min. warmup. Carrier suppression: 55 db below peak output. Unwanted sideband suppression: 55 db @ 1 kHz. Intermodulation distortion: 30 db below peak output (two-tone test). Keying characteristics: Break-in CW provided by operating VOX from a keyed tone (Grid block keying). CW sidetone: 1000 Hz. ALC characteristics: 10 db or greater @ 0.2 ma final grid current. Noise level: 40 db below rated carrier. Visual dial accuracy: Within 200 Hz (all bands). Electrical dial accuracy: Within 400 Hz after calibration at nearest 100 kHz point (all bands). Backlash: Less than 50 Hz. Oscillator feedthrough or mixer products: 55 db below rated output (except 3910 kHz crossover which is 45 db). Harmonic radiation: 35 db below rated output. Audio input: High impedance microphone. Audio frequency response: 350-2450 Hz ± 3 db. Power requirements: 80 watts STBY, 260 watts key down @ 120/240 V AC, 50/60 Hz. Dimensions: 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{3}{4}$ " D.



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Springfield, WA9MITY has been handling both phone and c.w. traffic. The Outstanding Amateur Award went to W9JBE, of Jeffersonville. K9HYV reports a 6-meter AREC net for La Porte County. The Central Division Convention at Springfield was very good. The ARRL officials present were WODX, pres.; WILVQ, secy. & Gen. Mgr.; WHCP, ARRL Staff; W2TUE, Hudson Division Director; W3YA, Atlantic Division Director; W9HPG, Central Division Director; W9ERN, Central Division Vice-Dir.; W6KW, Southwestern Division Director. QLN Honor Roll: W9BDD 30, W9QLAV 26, K9VHY 26, WA9FDQ 25, WA9MKG 24, WA9MITY 24, K9HYV 17, WA9KAG 16, W9UQP 16, K9FZU has a TA-33 up and is running a new Drake line. K9IVG is in the hospital, and the IPN net will be partial. Endorsements due in Oct.: PAM W9PMT; ORSS W9-BFP, WA9FDS, W9PMT; OPSs WA9FDQ, W9PMT, K9DHN, WA9VDC, WA9RBQ, W9YYX; OYS WA9-QMIV, W9LLU, mgr. of the Great Lakes Emergency Net, reports May traffic as 68, June traffic as 96, W9-PMT, mgr. of the Hoosier v.h.f. nets, reports July traffic as 32. *Amateur Radio exists because of the service it renders.* Traffic: (July) WA9LIT-WA9MITY 275, W9MAM 201, W9FRY 186, WA9MKG 157, K9HYV 89, W9BUQ 79, K9QVT 72, W9UQP 71, K9CRS 67, W9-HEM 50, K9KYB 46, K9RIVQ 35, K9CIBY 33, WA9-MFY 26, K9JQY 25, W9EQO 24, W9CMT 23, K9VHY 22, K9HZY 19, WA9HHG 18, WA9KYG 18, W9YYX 18, WA9VZAI 16, W9SNQ 15, W9DOK 13, K9LLK 13, K9-EFT 12, W9CUC 9, W9FJI 9, K9WGN 9, W9FWH 8, WA9ITB 8, WA9IPS 7, WA9WME 7, WA9AXF 6, WA9-BDP 6, W9DGA 4, WA9ALM 3, WA9QW 1. (June) K9FZX 511, WA9FDQ 200, K9QVT 32, WA9ITB 30, W9QUH 11.

WISCONSIN—SCM, Kenneth A. Ebner, K9GSC—SEC: W9NGT, PAMs: W9NRP, WA9QNI, WA9LZK and K9DHR. RMs: K9KSA, W9CBE and W9DND.

Net	Freq.	Time	Days	QNT	QTC	Mgr.
BWN	3985 kc.	1200Z	Mon.-Sat.	404	229	W9NRP
BEN	3985 kc.	1700Z	Daily	671	117	
WSBN	3985 kc.	2200Z	Daily	1254	376	WA9QNI
WIN	3662 kc.	0015Z	Daily	224	90	W9DND
WSSN	3780 kc.	2330Z	Daily	140	22	K9KSA
WRN	3625 kc.	0030Z	Sun.			W9CBE
SWRN	50.4 Mc.	0200Z	Mon.-Sat.			K9DHR
SW2RN	145.35 Mc.	0130Z	Daily	247	33	WA9LZK

Net certificates went to: WA9TXT for WIN; WA9-DAMT, WA9VIV, and WA9NZB for WSBN; WA9UMT and WA9FFV for BWN; WA9UMT for BEN. New appointments: WA9WOC and K9KSA as ORSS. Renewed appointments: K9FPM as OVS; K9GSC as OO; WA9GJU as OBS; WA9QNI as PAM; K9GSC, K9-ZMI, W9CXY and WA9MIO as ORSS; W9NRP, WA9-QNI and WA9MIO as OPSs; W9LAL, W9OSK, K9PHI, W9RCH and WA9LILJ as ECs. Winners of the Wisconsin QSO Party: WA9GJU—phone, W9NUW—c.w. and WA9PKM—v.h.f. WA9AQE passed the Extra Class exam. WA9VCK and WA9WAW just received their General Class tickets at the ages of 11 and 12. K9DHN has moved to Heloit. WA9NBU has a new HW-12 mobile. WA9VNJ reports his QSL card won first prize at the Belgium Hamfest. BPL for July traffic went to WA9QPK, WA9QNI, and W9ESJ. Traffic: (July) WA9-QKF 578, WA9QNI 360, W9CXY 223, W9ESJ 207, K9CPM 182, WA9UMT 130, W9DND 116, W9DYG 103, WA9RAK 101, K9PHI 47, K9DPS 47, W9AYK 46, W9PKM 45, W9NRP 43, K9TBY 37, K9KSA 34, WA9NDV 32, W9GXU 31, WA9XBU 24, K9DHN 23, WA9EAN 21, K9GSC 21, WA9OFF 20, WA9OW 19, W9BCH 19, W9DM 19, W9IRZ 8, WA9TXN 8, WA9LRW 7, W9CBE 2. (June) K9LQU 22, WA9LRW 7, WA9VNI 7. (May) WA9LRW 23.

DAKOTA DIVISION

MINNESOTA—SCM, Horuan R. Kopschke, Jr., WOTCK—SEC: WA9EIE, RMs: K9ORK, WA9EPX, PAMs: WA9MIV, WA9HRM. MSN meets daily on 3685 kc. at 2330Z. MJN meets Tue.-Sun. on 3685 kc. at 0000Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1705Z. Sun. and holidays at 1400Z. Evening MSPN meets daily on 3945 kc. at 2315Z. Congrats to WA9-UNS, newly appointed EC for Yellow Medicine Co. K9FLT renewed his OPS appointment. It is with deep regret we report the passing of WA9TYM on July 18. WA9DOT has acquired an Apache and an SB-10. WA9KFJ will be operating WA9RYN from Wisconsin State University until May '69. K9SNC has moved from Duluth to Chicago. WA9DFT has gone mobile with an HW-12A. The annual Pionet P. pic at Rochester was attended by 103 amateurs and their families. The Pionet Handi-ham System, which was organized to assist handicapped people to get an amateur license and then help them get on the air, recently held a suc-

cessful "white elephant sale" to raise funds for equipment. Traffic: WA9QJ 280, K9ZRD 103, WA9MIV 61, K9ZBI 57, WA9EPX 54, W9OUC 47, K9ORK 42, W9UAM 38, W9TCK 26, WA9HRM 33, K9ZXE 29, W9BE 20, WA9ODB 18, W9FDK 16, W9ATO 15, W9AZR 15, WA9JEN 13, WA9OQH 12, W9HEN 11, W9KLG 10, W9BOI 9, WA9DOT 9, K9FLT 9, WA9SSN 9, W9PHO 8, W9KNR 8, WA9JPR 6, WA9PMM 6, WA9VYN 5, K9ZWG 4, WA9DFT 2.

NORTH DAKOTA—SCM, Harold L. Sheets, W9DM—SEC: WA9AYL, ORS: K9SPH, PAM: W9CAQ, RM: WA9OEL. The International Hamfest held July 20-21 was well attended with 125 registrations. The Brandon Radio Club sponsored the social gathering and dancing on Sat. evening. WA9KRI and K9RSA are co-chairmen for next year's to be held July 12-13 on the Canadian side. K7BAG and NYL K7KHU read of the hamfest in QST and came from Washington to be there. Also W6UKR was the guest of WA9TBR for the event. KOOVE won the mobile installation prize and also won the hidden transmitter hunt. W9GB and NYL WA9GRX spent five days camping at the Gardens and worked mobile while there. WA9SDQ has gone mobile with an NCX-3. WA9AYA is grandpa again, while W9AYJ acquired a new son July 5. WA7GVT 0 will be in Texas during the school year with an SB-101 on all bands. WA9BIT recently was married. W9BIT is busy as the new pastor at Rolla. W9TBR took a 3-week trip in Aug. while K9SPH makes it out to the lake quite often. W9ZRT, the Bismarck Club station, is active again. W9GNS has returned from an electronics training school in Texas. W9QNI 0 has been transferred to the Kansas City area. KOOVE and NYL WA9PPK have transferred to El Centro, Calif. Be looking for them on 20 meters. W9ETQ did a bit of trading and came up with a Viking 500 and a tower and then added a new HW-12A. W9MQA is on with a Twoer now. W9DM spent a month in Oregon visiting with his family and W9NQi in Eugene as well as other ham friends. W9OUSA is a new call in Grand Forks. Three new Conditionals have been added, WA9TXZ, WA9TYA and WA9RWB. WA9QVW rebuilt the quad and is DXing again. N.D. RACES Net reports 19 stations, 398 stations, 54 traffic, NCSS, K9SPH, W9GFE, W9HJU, K9PZK. Traffic: K9SPH 29, WA9HUD 19, WA9JPT 8, W9DM 6, WA9TBR 6.

SOUTH DAKOTA—SCM, Seward P. Holt, K9TXW—SEC: WA9CPX, RM: W9IPE, PAM: WA9CWW. A well-deserved award goes to K9VYY as "Ham of the Month." Section Net certificates have been earned by 85 net members in the c.w. and phone nets of our section. Your continued participation through the summer is appreciated by the net managers. The emergency test conducted by your SEC with the aid of the ECs and NCS made a very good showing with 114 stations participating from all parts of the section, many with auxiliary or mobile stations. W9AEN has our sympathy on his recent bereavement. Net reports: WA9PNE, Late Phone Net, 1070 and 58; WA9LLG, N1Q Net, 472 and 239; WA9RIQ, Early Phone Net, 310 and 14; W9HOJ, Morning Net, 405 and 14. Traffic: WA9PNE 466, WA9MYS 52, WA9RIQ 43, WA9LLG 24, K9VYY 19, WA9CKH 12, WA9FUZ 10, WA9PBI 6, WA9FUZ 4, WA9BMG 3.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5HS, PAM: WA5PPD, RM: W5NND. This is my last report as SCM. I have resigned effective Aug. 15 to attend school in Colorado this fall. I would like to thank all appointees for their help and all League members for their cooperation. I have recommended Dennis Schaffer, WA5HS, of Brinkley, as Acting SCM until an election can be held. The Central Arkansas ARC held a very successful Ham Picnic in North Little Rock July 27. K5ZQT, WA5DAMT, W5MJO and WA5KUD have been endorsed as ECs. W5DRW and WA5PKO have been endorsed as ORSS. The North Arkansas ARS has produced an excellent bulletin with W5WEE as editor. Net reports for July:

Net	Freq.	Time*	Secs.	T/c.	Stations	Mgr.
OZK	3790	0900Z	31	57	224	W5NND
RN	3815	2330Z	31	77	659	WA5PPD
APN	3885	1100Z	(no report)			K5ABF
APON	3925	2130Z	23	135	305	W5MJO

RACES 3990 and 50.5 During severe weather alerts K5YTR

*Nets will meet one hour later in GMT after Daylight Saving Time ends. Top stations on OZK in July were W5QOO 29, W5NND 25, WA5NOC 22, and W5MYZ 20.

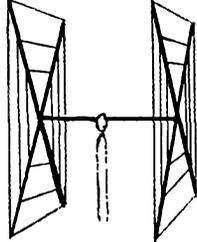
GOTHAM ANTENNAS ARE MUCH BETTER! OF COURSE YOU PAY MUCH LESS

How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

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 fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 7/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD	\$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

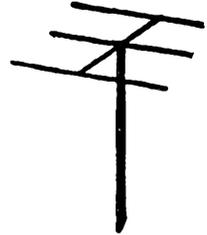
(all use single coax feedline)

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! WN4DYN

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; 5/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.



2 El 20	\$16	4 El 10	\$18
3 El 20	22*	7 El 10	32*
4 El 20	32*	4 El 6	15
2 El 15	12	8 El 6	28*
3 El 15	16	12 El 2	25*
4 El 15	25*		
5 El 15	28*		

*20' boom

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, WIWOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MIV, K8HGY, K3UTL, W8QJC, WA2IVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWI, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, 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

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

Traffic: (July) W5NND 214, K5AJM 146, WA5PPD 06, W5MJO 52, W5MYZ 47, WA5HS 45, W5DTR 42, WA5-KEF 36, WA5QMQ 20, W5ELF 10, WA5LYA 7, WA5-
QPI 1. (June) WA5BQI 1. (May) WA5BQI 294.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—
SEC: W5BUEK. RM: K5ANS/5, V.H.F. P.A.M.s: WA5-
DXA, W5UQR. All of you, I know, join with me
in expressing our sympathy to W5CEW on the recent
passing of his XYL. We also wish the XYL of
W5BUEK a rapid recovery. W5JYA works 2 meters.
W5LGO has joined the ranks of the Extras. W5CEZ
has had a busy summer what with attending the
National, Boy Scout Camp work and ramrodding a
Zone Army MARS meeting. W5NYY has been ap-
pointed OPS. W5A5EID is another who has joined
the Extra ranks. W5SUUM and W5VVOE are new to
our hobby and public service work. K5ANS/5 has
been busy this summer with the LAN Bulletin. The
GNOARC is now working with state and local e.d.,
Red Cross and NODP. Its 6-meter net meets Wed. at
8 p.m. CDST on 50.25 Mc. W5JFB reports tremendous
activity on 2! W5SKW had a ball working W5SKW/LX
from Luxembourg this past summer but worked only
five of the gang from La! W5PWX is winding up
his rig for some great activity this fall. W5GVB
spent his vacation in our Nation's Capital. The gang
up at Bastrop made headlines in the recent KTYE-TV
Cerebral Palsy Telethon. W5MXQ says the Jefferson
Club will be on 2 meters shortly. Welcome to K5BLV,
on 80 and 10, who has returned to Louisiana after
a couple of years in Ark! Another reminder that
the Louisiana QSO Party will be held Jan. 18 and
19. A trophy to the Louisiana winner! W5GZR op-
erated for LARC on FD and did an outstanding job
according to the LARC gang. The CLARC gang was
especially busy during FD and chalked up over 1000
contacts on phone/c.w. W5OMH is working with a
new beam and tower. W55H1M spends his air hours
ragchewing. I have just returned from a two-months
tour of Maine, Canada, Lake George, etc. The only
mobiling was to N.O. each Sun. on 14 Mc. A re-
minder—check the regulations going into effect in Nov.
as regards frequencies! Traffic: W5GVB 154, W5-
CEZ 146, W5MXQ 107, W5A5EID 25, W5NYY 22,
W55EA 4, W5LGO 2, W5OJG 1.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—
I was sorry to miss the Jackson Hamfest, but the
XYL and I were on a 3000-mile 12-state trip. W5-
CGU said he had a big time seeing all of his and
my friends. W5MUG still is working lots of DX.
Everyone was very sorry to hear that W5BW lost
his XYL. Tom is one of the most faithful of the
traffic-handlers in Mississippi, along with W5WZ,
W55JWD now is in Indiana with a good signal.
W58WVK/5 is using a Heath HW-100 fixed and
mobile on 80, 40, 20, 15 on s.s.b. and c.w. with
RTTY on 80 meters. Mississippi can be proud to
have the following: Novices—W55VME, W55VDG,
W55VBD, W55VBN, W55VBO, W55VBS, W55UYV,
W55UZZ. Technicians—W55VGG, W55VFF, W55-
VAX. Generals—W55VHF, W55VAY, W55RTY. Mis-
sissippi Sideband Net report: 31 sessions, 931 checking
in, 102 formal completed, 38 minutes average time.
We are proud that W5NLO has received an ap-
pointment to the Naval Academy and the Meridian
group really will miss him.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—
Asst. SCM: Lloyd Shelton, W4YDT. SEC: W4WJH.
RM: W44YEM. P.A.M.s: W44CGK, W4PFP, W44EW, W44CRU.

Net	Freq.	Days	Time	Sess.	QNI	QTC	Mgr
TSSB	3980	M-Sat.	2330Z	27	1272	228	W44CGK
TPN	3980	M-Sat.	1145	31	1033	152	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	23	542	99	W44EW
TCN	3980	Thurs.	0100	5 (Wed. night CDST)			W4YTY
TPO	3980	Sun.	2330	4	69	19	W4AST
TN	3635	Daily	0000	31	184	162	W44YEM
TTN	7290	Daily	2100	31	117	24	W44CRU
ETVHF	50.4	M-W-F	2300	13	242		W44TJ
ETVHF	145.2	Tue.&Th	2300	9			K4FKO

All EC reports and AREC information should be
sent to W4WJH, our new SEC, at 200 Old Fort St.
Tullahoma, TN, 37388. The Tennessee Council of ARC
"Outstanding Amateur Award" was presented to
WB4CXL of Greenville. The annual meeting of the
Tennessee Council was held July 20, at Cookeville.
The new officers are W4YTY, chmn.; W44BSL, vice-
chmn.; W44NEC, secy.-treas. Thanks for a fine job
to outgoing officers, W4OGG, W4PHQ and W4PRY.
The Council presented the 1967 1st-place Field Day

award to the Kinesport ARC. Oak Ridge placed
second. Thanks to W4WHN for serving as FD award
chairman. All ECs are requested to contact the rescue
squad in your area and work out a plan to assist
them. For information contact W4YTY. K4RCT won
the Twin-City award while visiting in Bristol. W4-
HIV and WB4HPO got their Advanced Class tickets.
Please note my new address on page 6 of QST
Traffic: W4FX 354, W4OGG 286, W44YEM 177,
W44YDT 136, K4AT 125, W4SQE 92, W44ZBC 88,
W44WVW 58, WB4GTI 56, K4AMC 41, W44GLS 41,
K4MQI 36, W4PRY 36, WB4ANY 32, W44WBK 31,
W44YSX 30, W44TWL 26, W4PFP 25, K4RTA 25,
W4ACRU 23, W44CGK 22, W44NEC 22, WB4HYT
20, W44YHO 20, WB4EHD 12, W44EWW 12, K4LTA
12, K4PUZ 8, W4YTY 8, WB4EHK 6, W4SGI 6,
K4FKO 4, W4WJH 4, W44YFG 2.

GREAT LAKES DIVISION

KENTUCKY—Acting SCM/SEC: George S. Wil-
son, III, W4OYI—

Lawrence J. Jeffrey, K4DJ

Kentucky amateurs and amateurs everywhere
mourn the passing of our beloved SCM Jeff,
K4HY, in August. He was elected SCM in 1965
and was serving his second term. A most
popular leader, Jeff will be sorely missed by
all his friends and colleagues.

I have accepted the job of Acting SCM until an
election can be held. QST will announce the election
shortly. The following reports were received by me
or picked up from Jeff's XYL. If yours isn't here,
I'm sorry. It got lost:

	31 sess.	394 QNI	75 QTC
MKPN	23	448	38
KRN	23	842	416
KTN	02	384	538
KYN	14	95	41
PCAT			

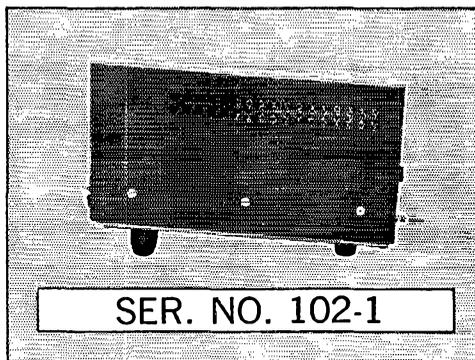
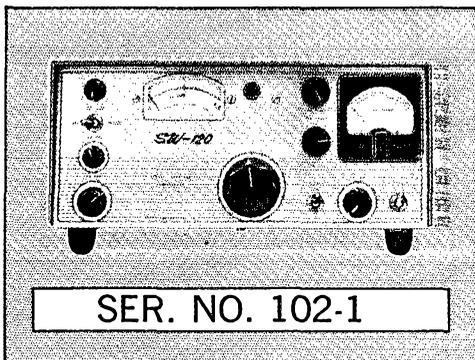
Traffic: W44DYL 434, W44UAZ 411, W4BAZ 399,
K4YZU 205, W44AGH 79, WB4AIN 48, K4TRT 41,
W44WSW 40, W4EON 38, W4OYI 32, W44VZZ 32,
WB4BKJ 30, WB4IOU 25, WB4EOR 23, W44ZB 22,
W4YOK 22, W4UK 19, W4KJP 17, W44GMA 15,
W44EQY 14, K4AVX 13, K4VDO 11, W4KKG 8,
W4CDA 7, K4HOE 7, K4MPT 4, W44ZXT 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—
SEC: W8MPD. RMs: W8FWQ, W8RTN, W8QGR,
K8KMQ. P.A.M.s: K8GOU, K8JED, V.H.F. P.A.M.s:
W8CVQ, W8YAN. Appointments: W8BEZ, W8JAC,
W8NOH as ECs; K8ETU as OBS; W8KRH as
OVS. K8HKM, as proxy, and K8ETU, as secy., are
sparkplugging the Mich. Council of Clubs and will
bring this organization bunch to life, provided Michi-
gan clubs will cooperate. Send K8ETU your list of
officers and suggestions.

Net	Freq.	Time	Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2200	Dy	452	408	31	W8FWQ
WSSB	3935	2300	Dy	397	244	31	K8WRJ
B/R-MEN	3930	2130	M-Fri.	950	105	27	W8QWG
PON-DAY	3935	1600	M-Sat.	381	90	27	W8QGR
MDMTN	50.7	2400	M-Sat.	235	34	27	W8LRG

New officers: Pictured Rocks RC—W8ZDF, pres.;
W8CQU, secy.-treas. Catalpa ARS—W8VHA, pres.;
W8CJT, vice-pres.; W8OXL, treas.; K8IIN, corr.
secy.; K8EHD, rec. secy. The U.P. gang had a fine
Hamfest at the Soo, Aug. 3 and 4; and the S.W.
Mich. V.H.F. group had a nice Picnic Swap & Shop
at Allegan West Side Park on Aug. 4. W8OXF is
up in Iceland and K8CBK is back from Europe.
K8MFO finished basic and will be in California. The
CMARC handled communications for the Spartan Wa-
ter Ski Tournament, Aug. 3 and 4. W8IWG bought
a new home in Roseville. W8NYK sold his tran-
sistorized dipper to LY, and both are satisfied!
W8RIIV, W8NYK, W8PPY, K8QDZ and W8VAV
all joined the "16" M Kite Flyers Club." W8BHW
and W8IWG both had their mobile rigs stolen. W8-
RXI came down along with his 35-ft. wooden tower,
but is able to walk again. Don't forget the N.E.
Mich. 4th Annual Hamfest, Oct. 4, 5 and 6, at
Tawas City, sponsored by the Oscoda Area A.M. Club.
Silent Keys: W8BSG, W8RSL. Traffic: (July) W8-
GAT 548, W8KJ 211, K8KMQ 206, W8MO 199,
W8MCO 136, K8ZJU 99, W8DET 79, K8MXC 79,

WANTED



Model SW120-Swan Single Bander manufactured in April, 1961 in a garage in Benson, Arizona. Grey, enameled cabinet, clear, anodized panel. Known to frequent the 20 meter band, probably working DX. Height: 5 1/2 inches. Weight: 14 lbs.

REWARD: One new Swan 500C Transceiver with 117-XC power supply.

Swan Electronics began some 7 years ago as a one-man operation with Herb Johnson, then W7GRA, building the first 10 single band Swans. At that time the only other SSB Transceiver on the market was the well known Collins KWM-2, selling, of course, for considerably more money. During the intervening years Swan has consistently offered top quality products at the lowest possible cost and backed them up with customer service that is unparalleled in the industry. As a result, Swan is now a team of 160 skilled craftsmen who are justly proud of their position of leadership in the sale of single sideband Transceivers to the Amateur Radio Service.

The first ten transceivers were serial numbered from 101-1 to 110-1, with the first nine being SW-120's operating on 20 meters, and the tenth, 110-1, being the first SW-140 operating on 40 meters. The company retrieved Serial No. 101-1 about 5 years ago from the original Ohio owner, and have it in our display case. Unfortunately,

we have lost the name and call of the original owner of this one. We're wondering now where the other 9 are, and will offer the following rewards for news of them:

(A) A new 500C Transceiver with 117-XC power supply in exchange for the lowest serial number identified by Nov. 1, 1968. This number must be one of the nine from 102-1 to 110-1. We reserve the right to make positive identification before making the exchange.

(B) A new 117-XC power supply will be shipped to each of the other eight early series owners who write in with positive identification by Nov. 1, 1968. If there is any question concerning serial number verification, Swan will pay shipping costs to the factory and return.

You may be interested to know that not only will the current 117-XC power supply run the early model Swan, but the cabinet on the current 500C Transceiver is interchangeable with the one on the earliest models. You might call this being consistent.



SWAN

ELECTRONICS

Oceanside, California

A Subsidiary of Cubic Corporation

HUDSON DIVISION

W8QQK 74, W8JTQ 73, W8IWF 72, K8JED 66, W8-
NOM 53, W8OGR 47, W8ALRC 45, W8RTN 39,
W8KAN 31, W8FX 25, W8LUC 19, K8LNE 19, W8UFS
19, W8CUP 18, W8WQ 16, W8YQO 14, W8KRII
12, W8VBL 12, W8ZBT 12, W8B5W 10, K8YDA 10,
W8MGM 9, W8BEZ 8, W8VGG 8, W8OWG 7,
W8PZT 5, W8TBP 5, W8HKT 4, W8SCW 4, W8-
SQC 1. (June) W8IUC 87, W8QQK 37, W8AKME 7,
W8PZT 7, W8AMCQ 5.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst.
SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM:
W8JMI. PAM: W8UBK. V.H.F. PAM: W8ADU.

Net	QNT	QTC	Seas.	Fr.g.	Time	Mgr.
BN	597	374	61	3580	230J & 200Z	W8IMI
055BN	1473	749	58	3925	224Z	K8UBK
05MtrN	177	55	30	50.5	2300Z	W8ADU
05N	157	75	30	3580	2225Z	W8VNU

Additional FD messages were received from WN8-
ACP, W8OZW, W8LT and K8AKF. The Joint Section
Nets Picnic on July 27 was a big success. It represented
were the buckeye, Ohio Single Sideband, Ohio Slow,
Ohio Six Meter and the Apricot Nets. W8RYP is
putting together a revised issue of a Traffic Delivery
Directory which lists locations to which traffic can be
delivered toll-free by regulars in the traffic nets. All
traffickers are urged to advise W8RYP of their area
of free telephone delivery. The Ohio Six-Meter Net
still needs check-ins. K8VWZ reports hearing KH6
and K17 signals on 6 June 22. W8LOW worked
KL7FAL on 50 Mc. for state No. 49. W8TYF's
activities on 2 included QSOs with W5MCC (740
miles), K1HLE/4 and W4CAB (both 790 miles)
on June 21. Congratulations to new Extras W8WCW,
W8DUL and W8MKE, and to Advanced W8IMU.
W8VCV has departed the section for a master's
degree at Indiana U. K8IOM is leaving to work in
West Va. ORS W8GYT goes to N.Y. for studies at
Cornell. July appointments: W8XCXV as OVS, W8-
BSA, W8GUD and W8CXV as OPS, W8BUX as
OVS. Net certificates (Buckeye Net) went to W8-
ULF, W8QAQ, K8LGA, K8DMZ, W8DH and K8DHJ.
The Piqua RC is starting a code and theory class.
Greater Cincinnati ARC reports graduating a whop-
ping 53 students from its code and theory class!
Massillon ARC's new officers are W8MND, pres.;
K8EKG, vice-pres.; W8YHU, secy.-treas. Copies of
a taped ham beginner course for blind aspirants are
available free of charge. Details from W8HBX.
K8ONA is the new awards chairman for the OCARC.
The next meeting of the Ohio Council of Amateur
Clubs takes place Sat., Oct. 5 at the YMCA, Front
and Long Sts., Columbus, at 10 A.M. All clubs and
nets in the section should belong to the OCARC.
It costs only five cents per member per year. Contact
W8OUU, secy. The Second Annual Amateur Radio
Public Service Corps Forum will convene Oct. 19 in
the Toledo area. This important meeting of AREC/
RACES/NTS groups in joint sessions is a must for
all ARPSC-minded amateurs. It will include traffic
and emergency personnel from Ohio, Mich. and W. Va.
and is hosted by the Lucas Co. AREC. Details from
K8LFI, W8CHT or W8RYP. The 1968 SET report
indicates that the section still maintains the lead.
It's not too early to have the 1969 SET planning
under way right now. I attended the July meeting
of the Lancaster and Fairfield Co. ARC as the guest
speaker. This active affiliated club conducts annual
code and theory classes for beginners, is active in
Field Day and other club operating activities, operate
its club station, K8QIK, and enjoys good attendance
at its meetings. I attended the Van Wert Hamfest
and enjoyed gabbing with a number of old and new
friends. Parma RC reports the start of another code
and theory class this fall. W8TNE got the Merit
Certificate for the Armed Forces Day message via
NSS. Traffic: (July) W8UPH 623, W8QZK 373, W8RYP
210, W8IMI 198, W8TYF 194, W8UPI 171, W8VNU
171, W8SUS 140, W8MITS 131, K8ONA 116, W8TWC
100, W8FSX 98, W8GVX 95, W8AOCG 90, W8QCU
90, W8ERD 87, K8UBK 80, W8XQJ 78, K8WUZ 78,
W8ADU 77, K8WKS 74, W8FGD 67, W8UDG 65,
W8BETV 57, K8DDG 54, W8PNJ 54, W8LAM 53,
W8HNP 49, W8OUTX 49, W8OE 47, W8APPK 42,
W8CHT 41, W8GOE 39, W8QFK 37, K8VMT 37,
W8LRE 35, W8WDU 33, W8AJZ 29, W8DAE 26,
W8MHO 25, W8ANTA 24, K8WZI 23, W8ELE 22,
W8CXV 21, W8WJR 20, K8BYR 18, W8SXI 18,
K8CKY 16, W8WEG 12, W8KPN 11, K8EKG 10,
W8LVT 10, W8SHP 10, W8ETU 7, W8LZE 7,
W8TV 7, W8CFJ 6, W8CXM 6, W8EQ 5, W8OUU
5, W8YDB 5, W8MGD 4, W8ZNC 3, K8DHJ 2,
W8IBX 1. (June) W8AOCG 76, W8SND 69, W8DAE
65, K8LXA 38, W8AJZ 23, W8ZGC 23, K8DHJ 9,
K8WKS 9, W8LT 5, K8PJH 2, W8LZE 1.

EASTERN NEW YORK—SCM, Graham G. Berry,
K2SJM—Asst. SCM and RM: Ruth Rice, WA2VYS.
SEC: W2KGC. PAM: WB2VJB. Section nets: NYS,
3675 kc. nightly at 2400Z; ESS, 3590 kc. nightly at
2300Z; NYSPT&EN, 3925 kc. nightly at 3925Z. Ap-
pointments and renewals: WA2FYE as OBS, K2RDS
as OBS, W2CRS as OVS, W2ANV as ORS, W2TPV
as ORS, WA2JWL as OPS, W2EAF as ORS/OPS,
WB2FOA as OVS, W2WFR as OBS, K2YJL as OVS,
WA2VQZ, editor of the Albany Co. *ARPSC Bulletin*,
reports WA2BAH is EC for the County, WB2PZL
is chairman of membership and NCS WB2IRBG hosted
a fine picnic at Thatcher State Park. Congrats to the
Albany group, and W2CRS in particular, for the
plans to introduce amateur radio to underprivileged
children in the Capitol City area. WB2AA, his
XYL, also plans to take an active part of this
FB activity. WA2CKW now is Acting N.Y. State
Radio Officer. The N.Y. State 600-yard and NRA-
sanctioned 1000-yard rifle matches used 2-meter com-
munications from pit to firing line supplied by
WA2KUL, WB2NSC, WA2UWM, W2CQD and K2YDP.
New tickets: WB2YEM as Extra Class, WA2NRJ as
Advanced Class, WB2UEQ as Extra Class. There
seems to be some confusion in the E.N.Y. section as
to which counties are included. See ARRL by-
laws or the latest *Operating an Amateur Radio Station*
manual for the list of eleven—from Schenectady down
to Westchester on the map. Asst. SCM WA2VYS
has a new tower and K2SJM a new low-band setup
complete. WB2AEK, secy. of NYSPT&EN reports
1319 check-ins, 203 traffic passed, average session
attendance 44.8 in June. The net can use more E.N.Y.
checker-inners. Late news: W2EAF received a 100%
copy (c.w.) certificate from Armed Forces Day DOD.
Hudson Division Director W2TUK attended a Tacoma
ARC meeting and will be at Harmonic Hills in
Sept. and the Communications Club of New Rochelle
in Oct. If your club plans classes, let Hq. and your
E.N.Y. staff know. There are lots of inquiries about
Novice and higher class license training. Don't forget
the Hudson Division Convention in Tarrytown Oct.
12-13. Traffic: (July) WA2BEN 363, WA2VYS 270,
W2EAF 152, WA2VYT 92, WA2UEZ 87, WB2VYS 69,
WB2FOA 51, K2SJM 50, WB2VJB 46, W2TPV 21,
W2ANV 19, WA2CRW 9. (May) W2EAF 190.

NEW YORK CITY AND LONG ISLAND—SCM,
Blaine S. Johnson, K2IDB—Asst. SCM: Fred J.
Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

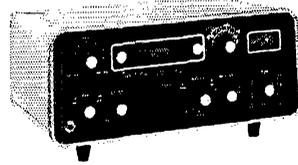
NLI*	3630 kc.	1915/2200 Nightly	WA2UWA	RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF	PAM
NLIPHONE*	3932 kc.	1600 Daily	WB2ZET	PAM
NLS (Slo)*	3715 kc.	1845 Nightly	WB2UQP	RM
Clear Hse	3925 kc.	1100 Daily	WA2GPT	Mgr
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG	Mgr
East U.S.	3683 kc.	0001 Nightly	K2UBG	Mgr
All Svc	3925 kc.	1300 Sun.	K2AAS	Mgr
NYSPTEN	3925 kc.	1800 Daily	K2AAS	Mgr

*Section nets. All times shown above are local. Listen,
you haven't forgotten the Hudson Division Convention
over there in Tarrytown, New York, on good old
Oct. 12 and 13 have you? Those HARC rascals who
have been breaking their whatchamacallits all year long
to make it a fun week end will sure be disap-
pointed if you don't come! W2BCB, revered NYCLI
Official Observer, is back home after a vacation of
fun and frolic way up there in the Adirondacks,
where he learned it requires a bodacious effort to
get a message off the ground in the height of a
hectic CD Party. K2UBG went the other way and
romped through the Blue Ridges of Virginia with
the NCX-3 type mobile and the XYL. On the other
hand, it was FB fishing down in Maine Country,
according to W2UAL. WA2PMW reports that the
Tu-Boro RC over in the Flushing area is looking
for new members so if you're interested, contact
WB2IPO. WB2DRW has now completed his good old
integrated circuit keyer and can't wait for the next
c.w.-type CD Party. WB2DXM, the one with that
distinctive mike switch sound, jumped back into the
traffic fray for one more fling before skipping off to
college up there in Albany. W2ZUQ, 5th PAM of
NYCLIPN, has followed WA2QJU, 1st PAM, to
Columbia University. WB2JJW won his Advanced
Class license and is now hot on the trail of the
Extra Class. WB2QL completed his summer courses
at C.W. Post and reports the club has received the
call WA2GRJ. W2GP allows that he enjoyed Field
Day with those Sperry guys up at the NYU Planting
Fields Campus in Upper Brookville. The new QCWA
Year Book lists more than 4400 active members with

HANDSOME IS... & HAMMARLUND DOES

Handsome habits by Hammarlund—outstanding performance, wide frequency coverage—built to last—SUPER-PRO quality!

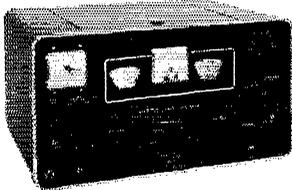
Pamper yourself. Develop the good habits of better hams for years! . . . go Hammarlund! At your dealers now!



HQ-215

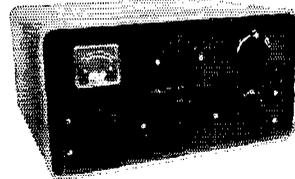
Newest member of the family, *solid state, solid copy*, in the best SUPER-PRO tradition.

Take 5 and prove it!



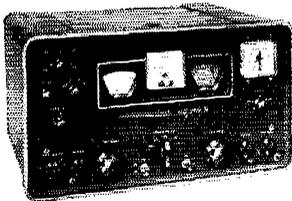
HQ-180-A

Versatile, general coverage receiver 0.5 — 30.0 MHZ full amateur bandspread has attained world recognition by creating new standards of performance.



HXL-1

The rugged one! 2KW PIP self-contained desk-top linear, 80 through 10 meters.



HQ-145A

This dual conversion general coverage receiver has *more* new features to provide even *better* operating efficiency.



HQ-110A-VHF

Improved mechanical and electrical stability plus expanded VHF dial in the *only* ham band receiver covering 160 through 2 meters.

THE **HAMMARLUND**
MANUFACTURING COMPANY INCORPORATED



A Subsidiary of Electronic Assistance Corporation.
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Send for full specifications now! We'll happily tell you how to ham with Hammarlund.

over 25 years as licensed amateurs, according to W2PF, and 275 of them have been licensed for 50 years or so. W2AXL boned up on things during his vacation and came out with an Extra Class ticket. WB2ZZE is using a new K4A nowadays. The Larkfield RC's winter class produced four new Novices. W2HAE finally got the junk box moved to the new QTH and scraped enough together to come up on 2 meters right away. Fourteen-year-old WB2TBP of Styvesant H.S. has passed the Extra Class exam and is working toward an active year for the school club. W2KTG/K4DJN has set up an HW-100 down at Cape Kennedy and plans to operate on 20 meters from there. Traffic: WA2UWA 728, WA2GPT 284, K2-UBG 220, WB2AEK 151, WB2DRW 93, W2EJW 45, WB2DXM 44, WB2UQP 42, WA2QJU 40, WB2JJV 26, WB2RQF 20, WB2QLL 15, W2GP 12, W2EC 9, WA2LJS 9, W2PF 8, W2DRQ 7, WB2YKL 7, W2TUK 6, WA2GRJ 5, WB2RWD 2.

NORTHERN NEW JERSEY—SCM, Louis J. Amoros, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: WA2ASM.
ARPC Section Net Schedules.

Net	Freq.	Time	Days	Sess.	QNI	Tjc.	Mgr.
NJN	3695 kc.	7:00 P.M.	Dy	31	427	354	WA2KIP
NJNS	3740 kc.	8:00 P.M.	Dy	31	165	80	WB2RKK
NJEPN	3728 kc.	6:00 P.M.	M-Sat.	31	148	137	W2ZI
NJPN	3728 kc.	6:00 P.M.	Sun.	—	—	—	WA2TEK
NJAN	50,300 kc.	8:00 P.M.	M-F	23	256	57	WA2K4F
PVETN	145,710 kc.	7:30 P.M.	Dy	31	256	111	K2KDU
BCTN	146,700 kc.	9:00 P.M.	Dy	31	265	131	WA2TBS

RM's: WB2VE and WB2RKK. PAM's: W2PEV, K2-KDQ, WA2KZF, WA2TBS and WA2TEK. New appointments. K2DQT as OVS; WA2TBS as PAM for the ECTN. WB2YO was forced to resign because of the work load at the salt mine. We all thank him for an FB job on 2 meters. Endorsements: WA2TBS as OPS. WB2UIR as ORS, WB2VFX and WB2VFW as OVS. K2KDU made the A-1 Operators Club. WB2CWP is chasing DX on 20. WA2EZG added a Communicator 3 to his shack. W2LWP is planning a four-element quad for 20. The Knight Raiders V.H.F. Club has a new QTH at the Salvation Army Office, 15 River Drive, Passaic, and will meet the 3rd Thurs. of each month. WN2GEM is a new ham in Bergenfield and WN2GKI is new in Passaic. WN2CTN and WN2DRJ passed the General Class exam. WB2UIR passed the Advanced Class exam and is now studying for the Extra. WA2ASM is now Advanced Class, traveling to Boston for the exam. K2SUX and K2AX passed the Extra Class exam. WN2DNB and WN2DNY passed both the General and the Advanced Class exams. WB2OZW reports enjoying his first trip to ARRL Hq. WA2CRF has a new QTH. K2KDU is looking for Hudson and Essex County stations for his PVETN. WB2ZCI is attending Monmouth College majoring in E.E. WB2VUJ is joining WB2JWB and WB2RIG at Stevens. We wish to thank everyone in the N.N.J. ARPC for the third place finish in the NET (results in Aug. QST). It was a real FB effort. Again congratulations to all the HCs and Net Mgrs. Traffic: (July) WB2RKK 628, WB2FUW 617, WA2IGQ 399, WA2TBS 123, WB2DDQ 116, WB2NSV 111, K2-AGZ 82, WA2ACJ 73, K2KDU 61, W2LQP 47, W2CVW 40, WB2CCI 40, K2DQT 35, WB2YO 34, WA2CCF 25, WA2NJB 24, WA2KZF 22, WB2N2U 21, WB2BKK 20, WA2GLI 17, WB2CGL 16, WN2DQE 16, WB2YQP 15, WA2CLO 14, K2DEL 14, WB2VFX 11, K2ZFI 10, W2EWZ 9, WB2WNZ 8, WN2DRJ 7, WB2ZWU 7, W2TFM 6, K2ITY 3, W2JDH 3, WB2UIR 3. (June) WA2ZDA 115, WB2ZCI 8.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, W0BDZ—Asst. SCM: Bertha V. Willits, W0LOG. SEC: K0BRE. RM: W0TIU. PAM: W0NGS. This will be the last report written by W0BDZ, as on Aug. 17 Wayne Johnson, K0MXX, became your new SCM. His address is RFD 1, Kellerton, Iowa. I have enjoyed being your SCM, but business and other commitments will not allow me to continue. The new SEC is Greg Miller, K0LVB, Marshalltown. K0GEY has a homebrew rig running 2 watts on 432 Mc., with an eleven-element beam, 90 feet in the air. He reports working WA9NKT, WA9HUV and W9WLD. He also has a new SB-301 receiver. WA0OTE has a new Extra Class ticket, and a 25-w.p.m. CP endorsement. Carl Madsen, a long-time Sioux City amateur, became a Silent Key Aug. 1. Many appointees have been lax in sending their certificates in for endorsement. This should be done now. Your appointment may be cancelled.

Iowa 75 Meter Net	QNI 1381	QTC 142	27 Sess
Iowa 160 Meter Net	QNI 515	QTC 6	31 Sess

Traffic: (July) W0LCX 851, W0CZ 89, WA0MLE 59, W0LGG 35, K0QKD 18, WA0BZF 16, WA0OTE 12, K0TDO 12, K0TFT 6. (June) WA0MLE 28.

KANSAS—SCM, Robert M. Summers, K0BXT—SEC: K0EMB. RMs: WA0MLE, WA0JFV. PAM: K0JMF. Our sincere sympathy to the family of K0EGZ, who became a Silent Key July 7. W0CGZ now is using SB-301, SB-401, Drake MN-4 and SB-610. WA0JYK is working on a "tone code" telemetry system for one of the v.h.f. F.M. repeaters. WA0AGI is running an NCX-3, both fixed and mobile. QKN, the Kansas Novice C.W. Net, has been meeting Sun. at 1600 local time on 3735 kc. Conditions have not been too good for full coverage of the state and changes are being considered. Hope more of you will entice a Novice to contact WA0JFV, Mullinvale, Kans. 67109, net mgr., so this net can again reach its peak of several years ago. QKS still could use your help also on 3610 kc. daily at 7 and 10 P.M. K0JDD, Dodge City, recently was awarded the R.E. Baker Memorial Trophy for being the Kansas Amateur of the Year. The award was made by K0LPE, Concordia, at the hamfest Aug. 4. Harold is on the air as EC for S.W. Kansas Zone 11. July reports: KSBN, QNI 824, QTC 212; KFN Sun., QNI 98, QTC 3, sessions 4, W0ORB NCS; weekdays, QNI 87, QTC 15, sessions 13; KWN, QNI 696, QTC 89, sessions 30; KPON, QNI 904, QTC 1254; Kans. EC Net, QNI 39, QTC 7; Kans. P1 (2-meter net), QNI 47, QTC 3; QKN, QNI 13, QTC 6; Zone 7 AREC, sessions 4, QNI 23; Zone 13 AREC, sessions 4, QNI 37; Zone 9 AREC 10 meter, sessions 4, QNI 23; Zone 15 AREC, sessions 4, QNI 40; Zone 11 2-meter AREC, QNI 36, QTC 10. Traffic: W0LXA 544, WA0NFP 147, K0EMB 132, K0JMF 100, K0BFX 98, K0HGI 91, WA0LLC 90, W0INH 79, W0PSN 58, WA0JOG 34, K0GZ 33, K0LPE 19, K0GII 17, WA0JQV 16, W0CGZ 15, WA0OZP 15, WA0CCV 13, W0LQK 13, W0FII 11, K0UVH 8, WA0JFV 6, W0HI 4, WA0RQG 3, WN0RTK 2, WA0KHN 1.

MISSOURI—SCM, Alfred E. Schwanke, W0GS—SEC: W0BUL. Appointments renewed: WA0KUH as PAM, K0DEQ as ORS and W0KY as OBS. WA0ERG received the St. Louis Amateur of the Year Award at the Zero-Benters Hamfest. The annual Mo. MARS meeting was also held at the hamfest with 23 members present. WA0ITU is pres. of the KC FM Club, which was formed to operate a 6-meter repeater under the call K0FRA. Input is 52.7 Mc. and output is 52.525, 20 hours daily at present. The club net meets every Sun. at 1900 CDST on both frequencies with WA0ITU as NCS. WA0QIA and WA0QLO were guests on the WHB (KC) Nightbeat talk show to present ham radio to the public. W0VFI and WA0PUL were among the hams who called in to the show. Officers of HARC (KC) are WA0APG, pres.; K0GTJ, vice-pres.; WA0ABO, secy.; K0SPE, treas.; W0UHU, sgt. at arms; WA0OPF, editor of HARK, the club newspaper. WA0DGG, after finishing boot camp at Ft. Wood, was assigned to operate K0WBD. K0WBD has received appointments as OBS, OVS, OPS and ORS. WA0QOI is a new Gen. Cl. license in Kirkwood. WA0TFB is a new Gen. Cl. license in Ferguson. WA0URI (ex-WN0NDQ) is a new Tech. Cl. in Aurora. K0ONK is a new CHC-FHC member. WA0HQR/O finished another successful summer at the H. Roe Bartle Scout Reservation. WA0EMX, WA0QIA, WA0QLO and W0SOZ receive special thanks from WA0HQR for help in the Scout Camp traffic. Net reports for July:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	14	122	33	W0BUL
MON	3585	2400Z	Daily	31	161	156	K0YBD
MNN	7063	1800Z	M-Sat.	27	84	29	W0UOD
MoSSB	3963	3300Z	M-Sat.	27	679	377	W0RTO
MoPON	3933	2100Z	M-F	22	212	203	W0HVJ
QMO	3580	2200Z	Sun.	7	4	—	WA0FKD
PHD	50.4	2430Z	Mon.	5	130	18	WA0KUH

Traffic: K0ONK 2266, K0WBD 373, K0YBD 192, WA0HTN 173, WA0HQR/O 163, W0HVJ 146, W0BV 118, W0UOD 68, WA0QXG 49, W0RTO 43, WA0FMD 20, W0GS 17, W0BUL 15, WA0KUH 11, K0DEQ 10, WA0RMW 2.

NEBRASKA—SCM, V. A. Cashon, K0OAL—SEC: K0ODF. Monthly net reports for July: Nebr. Emergency Phone Net, WA0GZP, QNI 1085, QTC 372. West Nebr. Phone Net, W0NKK, QNI 611, QTC 20. Nebr. Morning Phone Net, WA0JUF, QNI 963, QTC 77. Nebr. C.W. Net, WA0QMZ, 0000Z and 0300Z sessions, total QNI 31, QTC 18. AREC C.W. Net, WA0EEL, QNI 12. Nebr. Storm Net, WA0LOY, first session, QNI 767, QTC 19; second session, QNI 773, QTC 35. AREC Phone Net W0LRZ, QNI 169. Corn-

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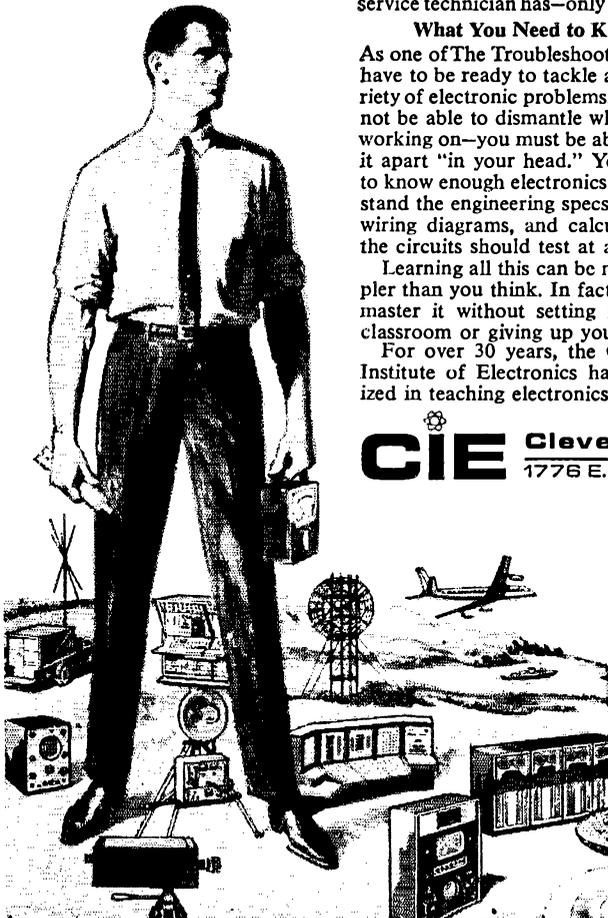
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husker Teenage Net, WAOCOW, QNI 221, QTC 33. The Central Nebr. ARC Steak-fry was successful with approximately 95 registered amateurs in attendance. OAL and ODF attended. Net comparisons: 1967 total QNI 4977, QTC 495; 1968 total QNI 4642, QTC 574. Many appointments are open as OO, ORS, OPS, OBS, OVS and EC. If interested, make your wishes known. Traffic: WA0IBB 220, WA0TID 194, WA0ORO 178, K0UWK 175, W0LOD 102, WA0GZH 96, K0-JTW 28, WA0GVJ 20, W0BVF 17, W0HTA 16, K0LXY 18, K0JFN 16, WA0RBR 16, WA0PIF 13, WA0SCS 12, WA0LXD 10, WA0PCP 10, K0DGW 9, WA0JUF 9, W0ATU 7, WA0BOK 6, WA0QQX 6, W0PQP 6, WA0EEI 5, K0FRU 5, WA0SRN 4, W0CNI 3, K0OAL 3, K0ODF 3, K0SFA 3, W0LSI 2, W0RJA 2, WA0RPB 2, W0SWG 2, K0UDW 2, W0WZR 2, WA0DGI 1, W0PHA 1, WA0PSN 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT
—SEC: W1PRT, RM: W1AHSN, PAM: W1YBH.
V.H.F. PAM: K1SXF. Net reports for July:

	Freq.	Days	Time	Sess.	QNI	QTC
CN	3640	Daily	1845	31	257	289
CPN	3880 M-S	1800 Sun.	1000	30	412	177
VHF 2	144.98	M-S	2200	23	143	60
VHF 6	50.6	M-S	2100	23	248	54

High QNI: CN—K1TKS, W1AHSN, K1EIR and W1AGGN. CPN—K1SXF 27, K1EC 26, W1YBH 25, K1CEC 23, W1AIX 23, W1GVT 23, W1IWN 23, W1AIEG 18, W1AHEK 18. SEC W1PRT is looking for stations with 2-meter f.m. gear willing to help develop a state-wide communications network that could also assist the Red Cross. If interested, contact W1PRT. W1ZFM has resigned as Route Manager. My sincere thanks for his outstanding work and the high standards he has maintained. Thank you, Tuck. W1AHSN will take over as RM. Bob, well known on CN and also CPN, is a very capable operator and well qualified to be our new Route Manager. Plan now to attend the Tri-City Hamfest in New London Oct. 19. Shoreline ARC's new officers are K1LLJ, pres.; W1F0K, vice-pres.; W1EYF, Jr., vice-pres.; W1AEDJ, secy. Picnic season: Murphy's Marauders had one; so did the Nutmeg V.H.F. 6 and 2 Nets. The Candlewood ARA provided communications for the Danbury Golf Tournament. K1YON and group originated G.I. traffic at the Hartland Fireman's Carnival. Clubs should provide some form of Public Service, not only because it's a requirement for the existence of amateur radio but also it's fun! Congratulations to: W1GVZ who has been presented the OOTC award, W1HLP on the Advanced Class ticket; W1AGGN on making the BPL in July, W1JGA on receiving a CP-10 sticker and W1ZZK/4 on the new YL! Traffic: (July) W1EWF 363, W1AGGN 230, W1AHSN 211, K1TKS 163, W1WCG 160, K1SXF 143, W1IWN 100, W1BDI 62, W1GVT 48, W1AIEG 40, W1AIX 36, K1YON 34, W1AW 32, W1AGLS 29, W1YBH 18, W1CUB 16, W1ARR 14, W1CTI 14, W1QV 14, W1BNN 8, W1AIGK 5, K1YGS 5, K1CEC 4, W1BGD/2 2. (June) W1OBR 9, W1H1QJ 2.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from these ECs: W1s RPF, ZMO, UJF, JSM, K1s DZG, PNB, W1DXL. The New England Emergency Phone Net meets Sun. at 1230 GMT on 3945 kc. W1AOG, the net mgr., would like check-ins from all of the New England states. The New England Chapter of the OOTC held a meeting at Valles Steak House in Portland, Me., with about 30 members and YLs attending. W1AOG visited the old Marconi station at Wellfleet. Many towns need ECs. Write to me or W1AOG. W1AANK/K1ZPC is a Silent Key. K1BJZ is a new OBS. W1JSM is moving to N.H. W1KSI is the new Waltham EC. W1AFCQ is on many bands. W1ALP attended the Whitman Club banquet, and presented the Charter of Affiliation. W1AJUY is the em of the Lowell Tech. ARC. Bedford RC held its Field Day at W1YYI's QTH. New YLs: W1s JVT, JWF, W1Ns JTP, JVI. These YLs are active in traffic-handling: W1AISI, W1AIED, W1AIAJN and K1BJZ, in Army MARS. W1AIFD has his Advanced Class ticket. W1AIFN has General. W1AICRA has Advanced Class. W1FJI got married. W1IRST has been on TV and radio. K1CLM is looking for a new QTH. W1AIDFL made the BPL. W1MIX will have new kws. on 2 and 20. W1AHHK has 75 watts and a 22-element beam on 2. W1AFHU is a member of FOC. K1UGG is on 2 from Biddeford Pool, Me. W1AIDFX is on 6/3 with a f.s.k./RTTY. W1MIX is providing contacts between fellows out in

the South Atlantic for summer research and local staff. The Massasoit ARA held its Annual Picnic in Carver. K1QDR and W1MX are new OVSS. Appointments endorsed: W1UE and K1CLM as ORSS, W1s DFS, THT and AYG as OOs. W1UE and W1YYI as ECs. The Capeway RC met at K1NFZ's QTH. K1KNM is over in Germany. The 6-Meter Crossband Net had 22 sessions, 75 QNIs, 1 traffic. W1LE is in Navy MARS. W1SMO visited W1AW. W1N1CH is studying for the General Class license. The Avon AREC Net meets Wed. nights on 147.6 Mc. The EMNN had 13 sessions, 49 QNIs, 25 traffic. The East Mass. Phone Net had 7 sessions, 30 QNIs, 7 traffic. W1VAH is moving to So. Acton. New stations in our FMNN: W1AIEG, W1AMTQ, W1AJCF, W1N1GJT, W1N1JCM, W1A1YG, W1N1FN, W1N1HH, W1N1HYI. W1FJJ operated 1/2 from Camp Drum when he was there with the National Guard. W1TZ and K1AXB are spending their time on a boat down in Hyannis. W1BSG is now the State Radio Officer, Eugene Gilbert is his alternate. W1TZ has been endorsed as OO/OBS. New Novices: W1s JWL, JYX, JYV, JVC, JVK, JVL, JVM, JVN, JVH, JVV, JUV, JUI, JUQ, JTV, JTO. Other new hams: W1s JWN, JWD, GMC, JVU, JUX, JUF, JUZ, JTZ, JUA, JUB, JTY, JTW. Traffic: (July) W1EYF 473, W1D0M 233, W1EAX 198, W1AIFD 176, W1EMG 145, K1CLM 132, W1AIDFL 115, K1KBO 91, W1MIX 76, W1AISI 64, W1DAL 53, W1AIDPX 41, W1AIED 34, W1AIDEC 32, W1AOG 26, W1CTR 26, W1AHHK 20, K1LCQ 19, W1N1RQ 18, W1DKD 14, W1AJN 11, W1AFHU 11, W1SMO 8, K1OKE 2, W1LE 1. (June) W1SMO 14, K1LCQ 12. W1N1RV 4. (May) K1LCQ 11.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. PAM: W1AFLG. Traffic nets: The Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1900. The Pine Tree Net meets daily on 3596 kc. c.w. at 1900. It is with deep regret that we report K1VET and W1ACBM as Silent Keys. Ted was very active on the nets and c.d. and Parker was active on the nets and in QSO, also on most of the bands. They will be sadly missed by all who knew them along the way. W1AFCM has a Valiant I for c.w. and the NCX-3 for s.s.b. and mobile. Traffic: W1AFCM 66.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1QES. RM: K1BCS. PAM: K1APQ. The GSPN reports 916 check-ins and 50 traffic, plus a late report for June of 1181/58. The NHAREC Net had 133 check-ins and 10 traffic. W1A1IH hopes to hear more check-ins on the VTNH Net. This would be a good idea for you folks needing c.w. practice for that new Extra Class ticket. W1HPM and crew of the Manchester Radio Club operated portable at the Canterbury Fair with lots of traffic and goodwill for amateur radio. W1AIEUJ is working in Franklin again this summer. Welcome to new hams: W1N1JTN, W1N1JUG, W1N1JUH, W1N1JUM, W1N1JUN, W1N1JJO, W1N1JUP, W1N1JVC and W1A1JWH. The W1HPM gang reports the 2-meter f.m. repeater completed and awaiting a license for the 432-Mc. control link. W1YWC has his new HW-100 and is busy assembling same. W1KOC was host to the Laconia gang on his boat. There were some pretty good fish stories resulting from George's mobile off the coast. Traffic: W1A1IH 156, K1PQV 39, W1A1EUI/10, K1QES 4.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. PAM: W1TXL. V.H.F. PAM: K1TPK. RM: W1BTV. RISPAN report: 31 sessions, 326 QNI, 58 traffic. Traffic during July was very slow and with so many away on vacations activity is down. W1BTV has completed over 45 consecutive sessions on the 1RN because of the lack of traffic men. The W1AQ Club held a successful picnic at Lincoln Woods and another picnic is planned before the fall season. The club's 6-meter antenna has been replaced with a 6- and 2-meter combination. A tri-band will be replaced by a new tri-band and the tower will be converted into a vertical for 30 meters. This will allow all members to operate on all bands. I would ask all club secretaries to send to SCM information so that it can be published in this column. K1HAMO caught the largest fish in a recent fishing party held by the W1AQ Club. It seems that the rest of the party caught nothing except mosquitoes. K1AGA watched his lighted flashlight fall into the deep water to become a beacon for all fish. Traffic: W1TXL 127, W1BTV 78, W1AEEJ 69, K1YVC 31, K1TPK 12.

VERMONT—SCM, E. Reginald Murray, K1MPN—Now that summer is nearly over we hope you will be getting those nets and traffic reports in by the 6th of each month. Welcome to new Novices W1N1JUL (Greensboro), W1N1JVP (Chester) and W1N1JYR (W1-

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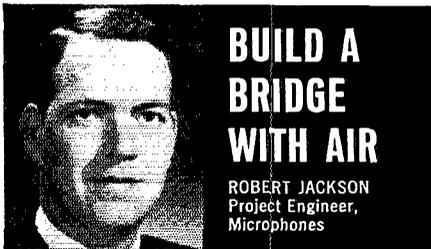
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BUILD A BRIDGE WITH AIR

ROBERT JACKSON
Project Engineer,
Microphones

If you closely examine a modern microphone, you'll often find some bits of cloth, fiberglass wool, felt, or sintered metal employed in the air stream. These porous materials are usually included to add an acoustic resistance to the design, either to control frequency response by damping the diaphragm, to control polar pattern by shifting phase, or both.

Despite the ubiquitous presence of these materials, they are difficult to control precisely. The relative porosity of cloth, felt, or other "loose" materials can vary widely, even in a single bolt of material. Unless the actual acoustic resistance of a given piece of material is known, it may be impossible to accurately predict the performance of a microphone.

Measurement of acoustic resistance is not normally an easy task. The conventional approach is to measure the air flow rate through a sample of the material under test, using a source of constant air pressure. But the flow rate is dependent on both resistance and air pressure (thus a measurement made at high pressure may bear no useful relationship to the behaviour of the same material at low pressure). In addition, absolutely constant air pressure is difficult to achieve and maintain.

Indeed, it is rare that an absolute measure of acoustic resistance is needed. More often it is desired to compare a new microphone assembly with a "standard" either for lab development or quality control. And so a technique has been developed to provide comparative measurements with ease and accuracy.

In essence, the new instrument developed is the pneumatic equivalent of a Wheatstone bridge. A source of air pressure is connected to two tubes with equal, fixed acoustic resistance. Joining these tubes is a differential pressure meter (designed to prohibit air flow through the meter). The "standard" microphone and the unit under test form the other two legs of the bridge. Air passing through these microphones is exhausted into the atmosphere to provide the return path. Accuracy is unaffected by variations in air pressure (although sensitivity increases with higher pressure).

This new measurement technique offers several significant advantages to E-V engineers. Materials can be tested as installed in their acoustic environment (including the case and internal structures). More accurate adjustment of resistance permits mass assembly of more sophisticated designs. Closer control of production quality can also be achieved for higher product uniformity. In addition, time spent in trial and error can be reduced when developing new designs.

For reprints of other discussions in this series,
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der). Congrats to new Conditional WA1JWI (Danville). All who hold EC, ORS, OPS, OVS, OBS and OO certificates, please check the dates. If appointments have expired please advise me if you wish reappointment. Anyone interested in these appointments, let me know because we will be more than glad to have you. This is time to review appointments, and if we don't hear from you we'll assume you're not interested. WA1RW was first in the R.L. QSO Party. W4SCY4, Bart #2, has been a welcome voice this summer but where is K1LJ, Bart #1? W1JLF had considerable electronic damage from lightning. Traffic: K1BQB 288, K1MPN 19, WA1GKS 13.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—W1DVV, new Route Manager for W1MN (c.w.) 3500 kc., has taken over from W1DWA, who has done a commendable job since 1966. Stations calling in order of activity were W1WZY, W1DVV, K1AEC, W1ZPB, W1BVR, W1STR, WA1ABW, K1JVV, W1MNG, W1AMI, WA1AMD, WA1HSJ, W1IIRC, W1EOB and K1SSH. We need more stations to obtain better coverage of the different sections. Total traffic for July was 126. The VARC announces a new SEC, WA1HY1. The new editor of *The Oscillator* is W1NPL. WA1BRU had to step aside for college plans after giving an excellent account of himself. The VARC also announces that Dr. Miennan, of NASA, will speak on "Communications in Space" at its Oct. 13 meeting. The ICRAI has a new editor, WA1UIU, taking over from K1FUA, who received an OTC award at Swampscott for outstanding work as editor of *Zero Beat*. The C1MAR1 has a new club call, W1-BIM. Its t.m. group is slowly progressing with plans for an t.m. repeater. Congratulations to K1ANF on his top score in WM during the Jan. V.H.F. Contest. Former W1HDM is now with FCC in the Washington office. WA1FKF is busy with the foreign mission amateur radio program. W1ZPB is now on RTTY and has been scheduling Germany in conjunction with the Mt. Hermon School's German program. Traffic: W1DVV 117, W1EOB 102, W1BVR 86, W1IC 56, WB2-PGH/1 53, W1ZPB 43, K1AEC 37, K1WZY 33, W1STR 14, WA1ABW 10.

NORTHWESTERN DIVISION

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7-THX. The FARM Net convenes on 3935 kc., week days at 0200 GMT. The Idaho C.D. Net convenes week days at 1415 GMT on 3991 kc. K7UAE will be W1MU pres. for 1969. W7A00 is sporting a new Swan 350. W7IUU has been appointed EC for Franklin County and received OO endorsement. W7EWW received endorsement as EC for Nez Perce County. W7GHT is now handling traffic for RN7 into Southern Idaho. W7ETO has been appointed state coordinator for Navy MARS. K7TGA is back on the air after a stint in the hospital. K7KRO and K7ZSW both lost beams in a wind storm. W7ZEK is recuperating from a heart attack. W7GPO is a new ham in Boise. K7BRO is providing communications for the Treasure Mountain Scout Camp using an HW-12 and a generator for power. K7NXX is a new ham in Kamiah. W7IWU reports good results on 160-meter mobile. FARM Net report for July: 19 sessions, 577 check-ins, 30 formal traffic handled. Traffic: WA7BDD 152, W7GHT 16, W7ZNN 10, K7CSL 6, K7OAB 5.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. RM: WA7DMA. PAM: W7ROE. Section nets:

Montana Traffic Net	3910 kc.	0000Z	M-F
Montana Section Net	3950 kc.	1700Z	Sun.
Montana PON	3950 kc.	1515Z	Sun.
Montana RACES	3906.5 kc.	1600Z	1-3 Sun.

W7TYN was elected to the SCM position for another two years. K7ABV sends along some information on his DX activity. He has worked 273 countries and has 264 confirmed. Eric is a teacher in Livingston. W7WYG, president of this year's W1MTU Hamfest, did a very excellent job. K7DCH and K7DCI are going to sponsor next year's Glacier Hamfest. W7ROE, our PAM, will be the new director of the Montana Traffic Net for the next year. The Montana Net will now be an NTS outlet. The Butte and Billings groups still are running tests to locate repeaters in their areas.

OREGON—SCM, Dale T. Justice, K7WWR—RM: W7ZFH. PAM: K7RQZ. Section nets:

Net	Freq.	Time	Days	Mgr.
AREC	145.35 Mc.	0100Z	Tue.-Sat.	WA7DLE
AREC	3875 kc.	0300Z	Daily	WA7AHW
BSN	3875 kc.	0130Z-2000Z	Daily	K7IFG
OSN	3585 kc.	0230Z	Tue.-Sat.	W7ZFH

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over standard telephone circuit.

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<input type="checkbox"/>	3-2N3565, 500HFE, NPN, 200MC\$1
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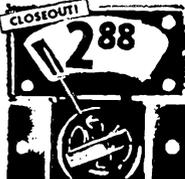
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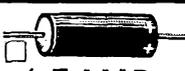
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W7ZFII reports for the ONS for July, sessions 22, check-ins 116, traffic 39. WA7AHW reports for the AREC Net, sessions 31, maximum number of counties 21, traffic 38, contacts 117. QSTs 6, check-ins 394. K7RQZ reports that 55 licensed hams with their families showed up for the Bend campout. The Central Oregon area is planning an i.m. relay on 2 meters to the Willamette Valley and Portland area. Recent Extra Class licensees include WA7ASP and WA7BYP. The 7-p.m. session of the Oregon Emergency Net now meets on 3980 kc. The Klamath Basin ARA provided communications for a fly-in July 20, during which an unexpected crash occurred. The club then provided the necessary communications for the police, fire and ambulance services. Those participating were WA7HKV, WA7AMZ and W7IEO. A new call in Glendale is WN7KOL. WA7FTN ran 62 telephone relays to S.E. Asia during July. K7RQZ made her third BPL and now gets the coveted medallion, 3875 kc. is the Oregon calling and QSO frequency. Traffic: (July) K7RQZ 500, WA7BYP 191, K7NTS 82, K7OUF 77, WA7DPK 74, WA7HKV 74, W7FFH 52, K7WWR 42, WA7AHW 25, W7BNS 16, K7ADR 14, WA7DOX 8, W7MLJ 8, W7DEM 7, WA7GFP 2. (June) WA7EJZ 13.

WASHINGTON—SCM, Willam R. Watson, W7BQ—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN 3590 kc. Daily 0145Z QNI 322 QTC 370 Sess. 31
 NTN 3970 kc. Daily 1830Z QNI 765 QTC 325 Sess. 29
 WARTS 3970 kc. Daily 0100Z QNI 730 QTC 176 Sess. 16
 NSN 3700 kc. Daily 0300Z QNI 252 QTC 114 Sess. 31

Congrats to our AREC teams on the leap from 57th to 5th place in the 1968 SET. Meetings were held of all LOs, net managers and ECs at the Washington State Hamfest at Yakima. WINJM joined with us in numerous discussions of League policy. The Radio Club of Tacoma got the vote for the 1969 sponsorship in a continuing program of rotation around the state. In the first meeting of the State Council of Clubs, now in the organizing stage, W7CJL, W7FNY and WA7FIC were elected to the constitution and by-laws committee. Awards were presented by SCM W7BQ to W7AMC, W7HDL, K7CTP and the Yakima Amateur Radio Club. W7AMC received an FB write-up in the Bremerton paper. New appointments: WA7DZL as OPS, K7MWC as OVS, K7UDG, W7OEB, K7UIC, W7GVC and K7NKZ as ECs. The new manager of NTN is WA7HRK, NSN is W7IEU and WARTS is W7JWJ. The Seattle and Spokane V.H.F. Nets will now be listed in the Net Directory with both tied into AREC operations. OVS W7PUL reports good success on 2 meters using FET loops. WA7AX carried off the c.w. prize at Yakima. The Skagit Club reports a continuing activity of outdoor activities. WA7HSJ hosted 11 teenagers at Yakima. W7OEB reports the new tri-cities directory, produced by WA7TTL, WA7IFF and WN7IXT, is available. OO W7EXM is active in the Intruder Watch. W7BUN now produces the WARTS Parasite from a new QTH. Our thanks to the State OCD for its display of the emergency mobile unit at Yakima. ARRL reports nominating petitions have been received for W7BQ as North-western Division Director and K7CTP as Vice-Director. We regret the passing of W7TH and W7ZBA to Silent Keys. The new pres. of the North Seattle Club is K7CFC with WA7GRN as secy. Traffic: (July) W7BA 2288, WA7DZL 506, WA7DXI 483, W7KZ 466, WA7EYN 395, W7ZIW 339, W7PI 322, WA7HSJ 300, W7JEY 190, W7IEU 182, W7AXT 136, W7BQ 129, WA7JBM 110, W7MCW 95, W7APS 93, W7AAO 88, K7CTP 82, WA7EDQ 81, WA7HPK 71, W7DZX 51, K7KPA 49, WA7HRK 46, WA7GVW 39, W7GVC 28, W7BTB 24, K7THG 24, WA7LIC 21, W7FHN 19, WA7BDB 16, WA7GHC 13, WA7ACQ 12, W7CJL 11, W7AIR 10, K7EFB 9, W7OEB 9, K7OXL 9, WA7HAM 7, W7UU 7, WA7FKM 6, W7UWT 6, W7ZHZ 6. (June) W7DZX 442.

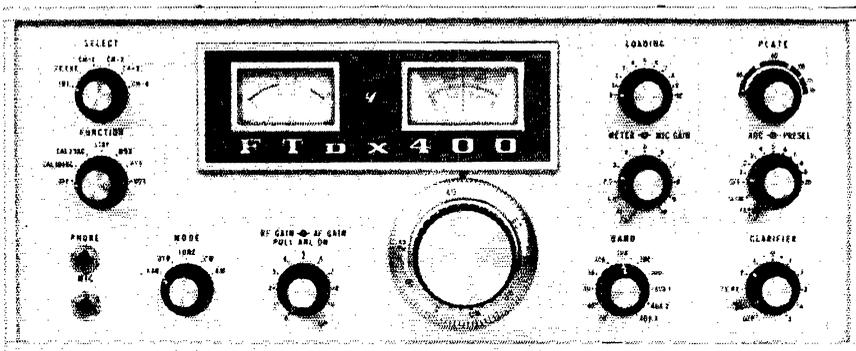
PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM. RACES NETS (40, 10, 8 and 2 meters). Coordinate with KH6AIN.

Net	Freq.	Time (GMT)	Days
League Appointees	7.290 Mc.	0700Z	Wed.
Friendly Net	7.290 Mc.	2030Z	M-F
Pacific Interisland Net	14.330 Mc.	0830Z	M-W-F

May I extend a warm welcome to RM KH6AD, of 808 Murray Drive, Honolulu, 96818. KH6GJC is Bill Cagney, the top Pacific Manager for Collins Radio here. WH6GPC is a U. of Hawaii student and is working 15 meters with his gamma-matched three-element yagi. KH6NS is a new OVS. KH6GHZ made QCWA and is No. 3875. KH6CBS is back on the air

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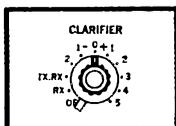
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Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in

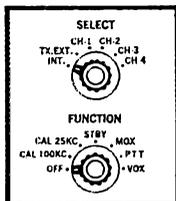
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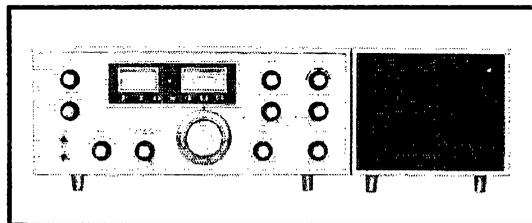


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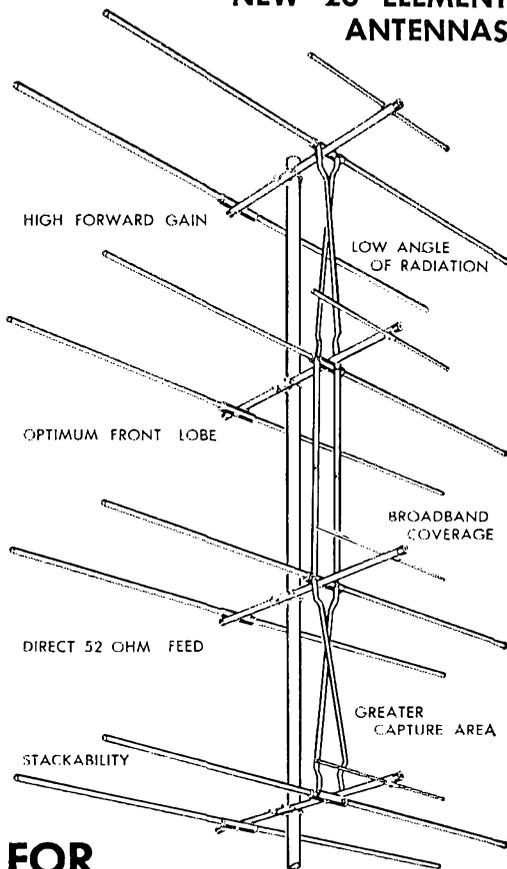


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after 5 years of silence. KH6GHC and KH6FNB keeps activity going at KH6EBQ for the Honolulu ARC. KG6AIG has rejoined us for an OBS appointment for Guam Island. W7QXA was in the islands recently. KH6GKI has taken over the Honolulu ARC's QSL situation. Seen at the HARC Field Day site looking on were HB9VP and G3RCM. In for some surf and sand recently was W8PCA, Dearborn, Mich. Heard on from Koror Island was KC6CK. K3OUL/KH6 and WB6FJY/KH6 recently joined the Defense Communications Agency-Pacific Area in Hawaii. W3-YVJ/KH6 will be setting up his rig from his new home in Foster Village. KH6EEM should be moving into his new DX/V.H.F.-DX home in Hualala. KC6APJ has moved from Apra Hts., Guam, to his new assignment in the Philippines. KH6IJ returned from Japan where he operated as KA2LJ. KH6BYS returned from military service. KH6CXP has departed for YB1-Land. Traffic: (July) KH6GHZ 320, h16BZF 19, W4UAF/KH6 8, WOPAN/KH6 3, W5QPO/KH6 1, KH6AD 1. (June) KH6GHZ 596.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU, W7DDB, the Southern Nevada FAL Association Repeater is on 146.34 in, 146.94 out. Trustee W7AKE received his Extra Class license. W7FJM is attending FAA Advance Radar School. W7JLV needs more in the state RACES program. WA7BGA, NCS of the Nevada Emergency Net, 3996.5 kc., Mon. and Thurs. 1900 local, is doing an FB job with all sections represented. W7EBP attended a medical convention in Denver. W7PRM is vacationing in VE7-Land. The Reno gang has been working hard for a successful Sierra Hamfest, W7CSB wants to form a Nevada chapter of the QCWA. If you belong to QCWA give Mac a call. K7RKH has some new 2-meter gear. W7TVF will schedule anyone needing a Nevada QSL, DX or stateside. WA7IRC and WA7JGV are now Extra Class. WA7JG General. W7DIM is doing an outstanding job of teaching amateur radio to some of the sightless. OM W7AKE, XYL W7CDH and Son WA7KQO comprise a new all-ham family. K7OEX is busy handling traffic. K7ZAU and family visited in Boulder City en route to NE-Land for a vacation. K7ICW, K0LES/7, K8YWT/7, K7ZOK, WAOCAG, WA7DSP, WA7ER and WA7JTI are all active on 6 meters. W7DGR and WA7IGN are new stations on 2-meter f.m. Traffic: K7OHZ 38, WA7BEU 4, W7PBV 2.

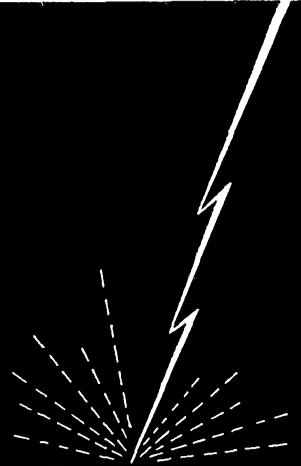
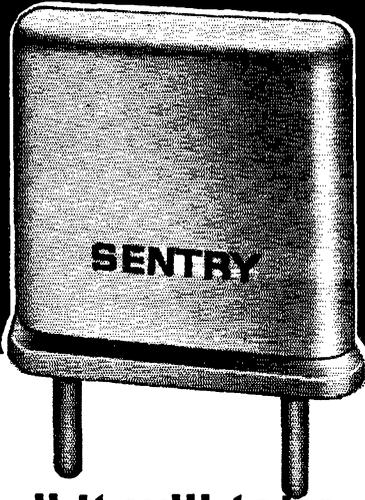
SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—ECs: WB6MXD, K6RHW, WB6RSY, W6SMU, WA6TQJ. RMs: W6LNZ, WB2YTX.

Net	Freq.	Time	Days	Mgr. or NCS
NCN	3630	0200Z	Daily	WB6HVA
NCN/2	3630	0330Z	Daily	WB6YTX
Nevada Co. Slow	3749	0300Z	Fri.	K6RHW
SCEN	146.25	0500Z	Wed.	K6IKV
Yolo Co. C.D.	146.94	0200Z	Tue.	WA6TQJ

WB6YTX has been appointed RM to supplement his asst. mgr. of NCN/2. WA6CXB reports that SCEN is in the usual summer slump, with K6IKV and K6GUC sharing NCS duties. WB6WJO has a second call of WA6HZS at Camp Harvey West, a B.S.A. camp up in the high country of El Dorado Co. W6DLB is giving up ham radio after being interested since 1915. Girls? Interested in radio clubs? Consider the RAMS which has room for all members of the family, radio amateur or not. The North Hills Radio Club, sponsor of the California QSO Party to be held Oct. 5 through 7, is looking for additional membership. W6HIL worked 5U7AN for DXCC No. 277 with 276 confirmed. W6DOR just got back from Anchorage where he operated as KL7GKW. Ev also holds the call W7BYF. WB6EAG finally got into a CD Party. The Nevada County ARC reports the Grand Pappy's Net is on 1990 at 5 A.M. local time. QNIs are from Trinity Co., Lake Tahoe, Santa Cruz, etc. There you are. 160 meter fans. Traffic: (July) WB6YTX 93, W6LNZ 86, WB6MAE/6 32, WB6QZZ 19, W6NKR 12, W6VUZ 3. (June) K6KRL 19.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6WLV. W6KVQ received the MORAN Awards for general excellence in net duties during the Annual Roundup of the Mission Trail Net. W6-FAX is a new check-in with the Northern California Net. WA6BYZ made the BPL again in July. W6ARQ has moved to Novato and is trying 2-meter s.s.b. WB2JQP is home from the Far East and up in the mountains trying the fishing. W6DTV spent the summer at Old Station on the slope of Mt. Lassen operating portable but is now home for the fall school session. The Marin Club participated in the Greater Bay Area Hamfest in July. W6WLV con-

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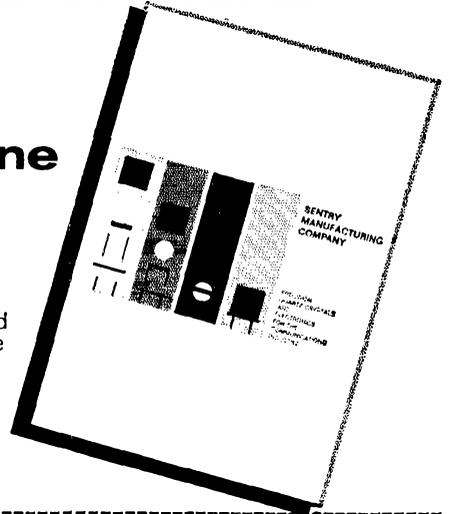
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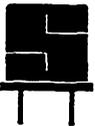
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tinues to shake the ECs up to get their organizations ready for the coming wet season. WB6UJO has put up a mono-bander for 20 meters for some DXing. WA6IVM has returned from a long trip to Japan and much visiting with the JA DXers. The San Francisco Radio Club held its July meeting at the Burgermeister Brewery. W6SR has been in the Kaiser Hospital in San Francisco with a heart condition. W6ZC has returned from a long trip in Europe. WB6CIE has swapped the vertical for a tri-bander beam. W6BIP is being sent by his firm on a trip which will take him through Europe and down into the Indian Ocean. WB6OGF has a new Swan 350. W6JSY is an Asst. EC in the Eureka area. W6CYO made it over to the FCC office for the first time in 39 years to get his Advanced Class license. K6KEV has returned to Marin County after an absence of several years and is planning a DX-pedition to Rat Island. W6FAX is a new ORS. Traffic: (July) WA6-BYZ 295, W6KVQ 214, WA6AUD 187, WB6LFT 81, WB6JQP 80, W6BWW 34, W6FAX 18, K6TZN 16, W6BIP 11, WB6OGF 9, W6PZE 2. (June) W6FAX 5.

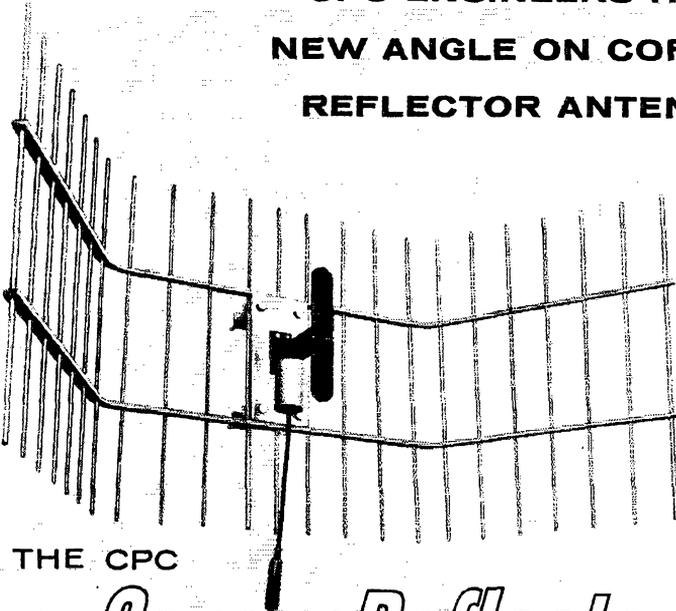
SAN JOAQUIN VALLEY—SCM, Ralph Sarovan, W6JPU—The new officers of the Tulare County Amateur Radio Club are K6RGZ, pres.; W6NKJ, vice-pres.; WA6CUZ, serv. The Boner Award was won by W6ARE. The TCARC held its Annual Breakfast in Tulare at the Pancake House with 36 in attendance. WB6SUP has a new Hi-Gain vertical antenna. W6COB is on 2 meters and seems to be working out. W6IPC is getting his RTTY equipment working for traffic. W6RRN is working 6-meter DX. WB6VVM worked a VE7 on 2 meters. WB6QDH is on 2 with a Sidwinder with 2 eight-element beams up 50 ft. W6YKS is building a 6- and 2-meter rig. W6NKJ has a 6-meter s.s.b. converter. K6RGZ has a Swan 250. W6ARE and WA6CUZ have worked up an identification system for the 2-meter f.m. repeater of the TCARC. W6BYY is moving down to L.A. from Visalia and, as time permits, he will be chasing DX from down there. W6TRP is operating portable from Camp Nelson. WB6OHB has a new Galaxy. WA6URV has a new Galaxy also. K6KOL is on 2-meter s.s.b. with 1/2 watts. W6JPS is operating fixed and portable with an NCX-3 s.s.b., no less. WB6UHB couldn't raise anything on 6 and found out, no modulator. WN6HIU is a new Novice in Modesto. W6DPD has 2 eleven-element 2-meter antennas. Traffic: (July) W6ADB 359, WB6HYA 247, WA6SCE 201, K6KOL 179. (June) W6IPC 326.

SANTA CLARA VALLEY—SCM, Edward T. Turner, W6NVO—SEC: W6VZE, RM: W6LFA. The Bay Area AREC Net meets on 3900 kc. at 1830G Sun. Nets: NCN, 3635 kc. 7 P.M.; RN6, 3655 kc., 7:45 P.M.; PAN, 7135 kc. (will return to 3675 kc. in the fall); RN6, 3655 kc. 9:30 P.M. Correction: The May report from W6YBV should have read that he is starting as liaison PAN-2 from RN-6 on Sun. Sorry about the misunderstanding. Lee, W6DEF activities would about fill up the report and he would like to see c.w. check-ins for traffic to the Salinas/Monterey Bay area. W6RFF is building a new final. W6AUC also is QRL with traffic, telephone relaying and skeds. K6DYX reports July was a slow traffic month on TCC. W6VK went to the CHC-FHC Convention in Boston. W6BVB had visitors from home, his dad, W6ADO. W6RSY is on vacation now and despite many heavy traffic skeds manages to hold a number of private skeds. WB6IZE mobile in a rented car, checks into the WCARS 7255, WX Net and WPSS Nets. WB6LYD, OBS is on 2 meter RTTY at 8 p.m. local time. W6MMG is building a 2-meter v.f.o. and checks into PCN while on vacation. WA6LPA is just back from a trip around the country. W6BPT has a 700 watt linear but not much traffic. W6ZRJ has a vacation and almost too late with his traffic report via radio. Visit the ARRL-SCM booth at the Greater Bay Area Hamfest Oct. 19-20, Thunderbolt Motel, Milbrae. Help keep the net channels clear. Listen first. Traffic: W6-RSY 745, W6YBV 364, W6DEF 121, K6DYX 89, WA6-LFA 56, W6AUC 40, W6VK 30, W6ZRJ 17, K6HGV 16, W6RFF 6, W6BVB 4, W6BPT 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE, RM: K4CWZ, PAM: W4AJT, V.H.F. PAM: W4ELJZ. K4EO reports that eleven members of THEN recently received their Advanced Class amateur licenses, and there are others who will be trying for them soon. WB4IJH now has an EICO-753. W4NAP has been keeping weekly schedules with OA4ACF, keeping parents in Reidsville in touch with their daughter. W4IXW has joined the Navy and is now in San Diego, Calif. The Annual NTS Picnic at Morrow Mountain was well attended with all N.C. nets represented. W4IRE is back in the saddle as NCN(E) manager after a six-months

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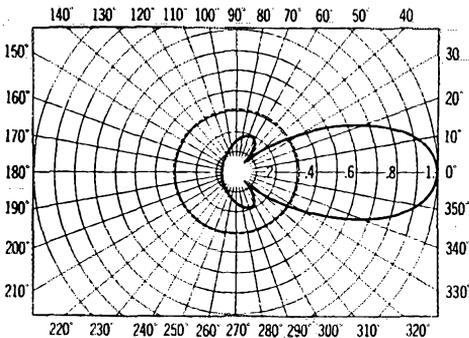
Frequency Range 406-470 Mc

Electrical Specifications

NOMINAL INPUT IMPEDANCE	50 ohms
FORWARD GAIN	10.0 db at 450 Mc
FRONT-TO-BACK RATIO	25.0 db
MAXIMUM POWER INPUT	250 watts
TERMINATION	Type N Female with metal weather shield and Type N Male with Neoprene housing
VSWR	1.5:1
BANDWIDTH	406-470 Mc
LIGHTNING PROTECTION	Direct Ground

Mechanical Specifications

REFLECTOR	55" wide by 29" high
REFLECTOR MATERIAL	6061-T6 aluminum
RADIATING ELEMENT MATERIAL	Brass
RADIATING ELEMENT SIZE	13-1/4" long by 2" wide
RATED WIND VELOCITY	in excess of 150 MPH with no ice 85 MPH with 1/2" radial ice
LATERAL THRUST AT RATED WIND	164 lbs. no ice 180 lbs. with rated ice load
WEIGHT	20 lbs.



Horizontal field strength pattern; a dipole pattern is shown for reference.

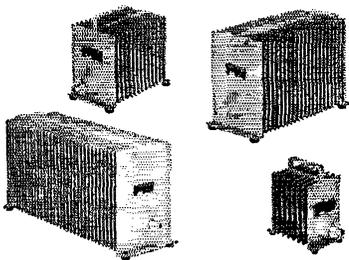
Note: dbd gain indicated as per EIA RS-329



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leave of absence for specialized training up "nawth" for Western Electric. WA4KVC says he is making better CD Party scores on c.w. than on phone now that he has a new "Match-Box."

Net	Freq.	Time	Days	QTC	Mgr.
NCN (E)	3573 kc.	2230Z	Daily	104	W4IRE
THEN	3923 kc.	0630Z	Daily	101	W4ZZC
NCN (L)	3573 kc.	0200Z	Daily	57	WA4CFN
Late (June)					
SSBN	3938 kc.	2330Z	Daily	36	WA4LWE

Traffic: (July) K4BUJ 418, W4EVN 205, W4IRE 104, W4FDV 58, W4ZZC 41, WB4JRG 36, K4EO 33, WA4VNV 33, WA4UQC 19, W4VTR 18, WA4GMC 17, WB4IJH 15, WA4AKX 13, K4ZKQ 12, WA4ZLK 11, WA4KWC 6, WA4RVI 5, K0JFJ/4 5, K4YCL 4, (June) WB4IJH 24. (May) WB4IJH 12.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. RM: K4LND. PAM: WB4BZA.

SCPN	3930 kc.	0830 and 1530 EST Sun.	1200 Noon Daily
SCN	3795 kc.	2300Z	0200Z
SCSSBN	3915 kc.	2300Z	Daily July Tfc. 50 Daily July Tfc. 89

K6QPH/4 reports his first harmonic, a boy, checked in July 28. In Anderson WB4DOT, with a new T4X, skeds his son in Denver. WB4FAN is exercising a new ground plane on 10 and WB4EOC sports a new 4-400 linear. Best wishes go to W4PST, recovering from an auto accident. The Spartanburg club-house wall is now graced by the plaque won in the transmitter building contest at the Columbia Hamfest. A crowd of 65 enjoyed the good food, eyeball QSOs and joint RACES/AREC meeting at the annual Camden Picnic. K4GL, in Pickens, reports the 6-meter band has been good to him to the tune of 35 states. He still keeps meteor scatter skeds on 144 Mc. but has heard nothing on 220. See you all at the Rock Hill 'fest! Traffic: WB4DXX 139, K6QPH/4 44, WA4EPP 22, K4GRG 21, K4OCU 20, W4NTO 19, W4FVV 15, W4PED 14, WB4BZA 11, WA4HFA 8.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4MLC, WA4EUL. PAM: W4OKN. WA4WJJ has been transferred to California after a tour as chief operator at K4CG. W4QDY received a letter of appreciation from the Coast Guard for supplying morale communications to remote station ships. WA4EUL has new Collins equipment which will allow him to operate s.s.b. W4THV is a new OPS appointee. WB4GTS is now mobile on 80 meters. W4GR, W4KFC and others plan a second trip to PJ country for the fall DX contests. Watch for them. W4JUJ has received the YLCC/500 award. Manager WB4CVY has issued dozens of certificates to worthy members of the Northern Va. AREC Net. W4DM/W4PTR is building a solid state receiver. WA4PBG has been named AREA 4 EC after the resignation of K4DC. Section net members are reminded of the forthcoming shift to standard time and the one hour adjustment in GMT net meeting times which normally occur simultaneously. Traffic: (July) WB4GTG 502, K4KNP 202, WB4FDT 160, W4NLC 149, K4CG 137, WA4HA 138, W4UQ 133, WB4DRB 121, WA4EUL 113, WB4CVY 93, K4FSS 88, WB4FLT 67, K4MLC 67, W4TE 67, WB4DOY 56, W4OKN 51, WA4JFF 49, K4LMB 44, K4NDH 40, K4TJS 39, W4YZC 37, WA4SJT 36, W4BZE 20, WB4FUJ 20, WB4EAE 18, WN4HRA 18, WB4GTS 14, W4HE 14, W4THV 14, W4IA 13, W4SHJ 9, WA4TJ 8, WA4PBG 8, K2USW/4 6, WB4JFX 5, W4LK 5, W4ZAU 5, K4GR 4, W4KFC 4, W4MK 4, W4KX 3, WB4GYP 1. (June) K4DC 45, WN4HRA 11.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8MYU, K8TF. PAMs: W81YD, K8CHW. WVN Phone Net Mgr.: WA8YOF. WN8BGG is interested in a Novice Traffic Net. WA8WCK and WA8NDY very active in Upshur County AREC work. W8SQO has received an Extra Class ticket. K8BIT has been transferred to Pittsburgh and along with his wife, K8MQB regrettably leaves. W. Va. The fall meeting of the W. Va. Chapter of the QCWA is set for Charleston Oct. 12. K8VNL has moved back to West Va. WVN (c.w.) Net reports 22 sessions, 46 messages and WVN (phone) Net 31 sessions, 119 messages. W8DUV and W8DUW now have linear for phone, c.w. and RTTY. All clubs should be represented on the State Council. If your club is not on the mailing list, contact Council Secretary W8DUV. W8MIS and W8DAR are recovering from recent illnesses. WA8PFB constructs neat TU for RTTY operation. K8BIT has 140 DXCC confirmed. K8TPF held open house at his new home and radio shack. W8ESQ and W8TGF operate v.h.f. openings from 4000-ft. Bickle's Knob. W8BT has 1DXCC from Belgium. K8MYU elected MARA's delegate to the State Council. Traffic: WA8POS 125, W8SQO 100, WA8NDY

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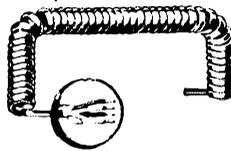
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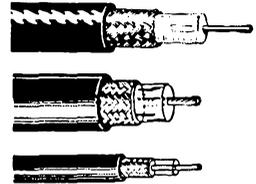
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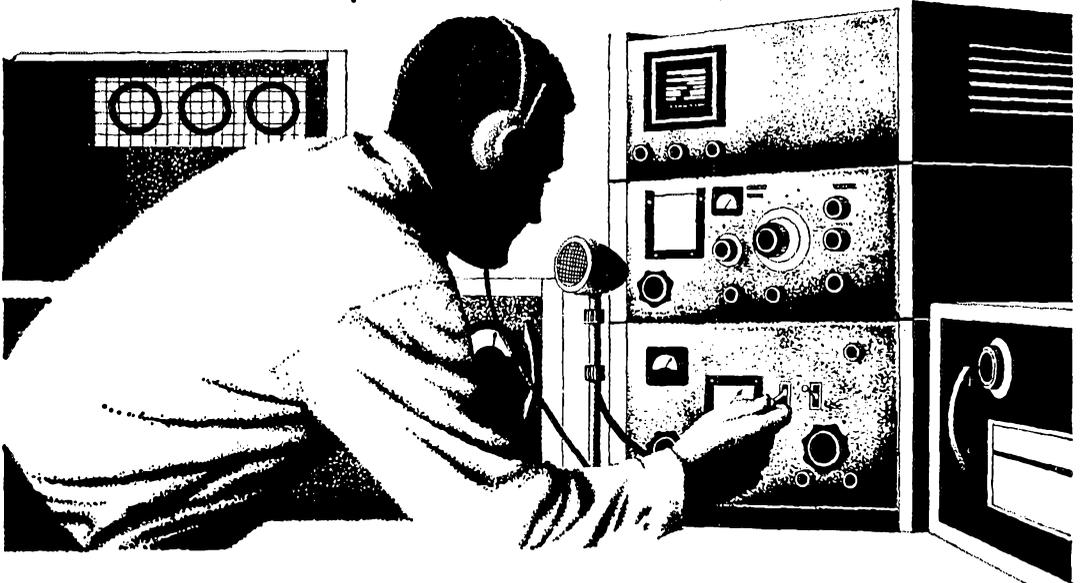
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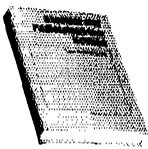
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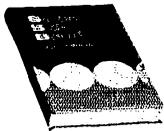
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ROCKY MOUNTAIN DIVISION

NEW MEXICO—SCM, Kenneth D. Mills, W5WZK—SEC: W5PNY, RM: WA5FJK, OO: K5EFW, PAMs: W5DMG, WA5FFL. Note the new net times and frequencies:

New Mexico Roadrunner Traffic, M-F 3.915 Mc. 1800 MST,
New Mexico Breakfast Club, 3.915 Mc. 0630 MST, M-F
New Mexico Emergency Phone Net, 3.915 Mc. 0700 MST, Sat.-Sun.

W5HJ has announced his candidacy as vice-director of the Rocky Mountain Division. The V.H.F.-F.M. Society of New Mexico has been formed. The club's primary interest is in 2 meters and repeater systems. WA5-JDZ was elected pres. and K5CQH secy.-treas. Membership will be open to all who have the same interest. WA5FPS reports K5GHS has moved to Iowa and W5-LFL has been transferred to California. Les was the secy.-treas. of the Albuquerque V.H.F. Club. Your SCM has a supply of CD Operating Aids 9A, ARL7 or 71. Traffic: W4DMG 24, WA5MIY 11, WA5JNC 7, W5-MYM 6, W5NON 5, W5PNY 4, WA5BLI 2.

UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7WKF. Thanks are extended to W7VSS for the fine job he did in handling the SCM job for the last two years. Early reports indicate that the Ogden ARC has scored a narrow victory in the Utah Section Annual Field Day competition over the Utah ARC. Congrats! W7SKB has been awarded a BUN certificate which represents a considerable effort in traffic-handling and net operation. BUN stations are up this month despite the usual poor summer conditions. All amateurs in the state are invited to submit monthly activity reports to the SCM for write-up in *QST*. *The Microvolt*, UARC's monthly publication, has won several awards given by the Amateur Radio News Service. The editor, K7HFV, has done a fine job. Traffic reports are down but totals are up. Traffic: K7HLR 178, W7OCX 143, K7SOT 57.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQG, RM: WA7CLF, PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQG. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 1930 on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, 0630 Mon. through Sat. on 3920. Note that the YO Net time is 0130 GMT, so don't forget the time change when we go off Daylight Saving Time. The hamfest went off very well and W7NKR went off to Washington to rest up. Also, K7AHO is out there doing some fishing. K7-TAQ lived up to his EC job in Aug. in being the communications link with the Highway Patrol after a serious accident near Buffalo. WA7GYP is now on s.s.b. from Sheridan. W7HEB and WA7WRS visited K7VVA in July and brought some of her pet trout home. K7-WUR is recuperating nicely from surgery. K7RFL and WA7HAB visited in Casper in Aug. Traffic: K7KSA 71, W7TZK 48, WA7EDC 19, K7VVA 17, W7HLA 15, WA7-GYQ 12, W7OBE 10, WA7EWC 9, WA7GOV 6, K7OVD 4, K7OAF 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4BHW—SEC: W4FPI, PAM: WA4EEC, RM: K4BSK, WA4AZC, WA4ROP, K4UEC, K4AOZ and WA4JSM have been doing excellent jobs as OBSs and have all been endorsed for another term. If you feel that you would like to help out with the section workload, the opportunity is ever present. Contact any one of the Alabama net managers, the PAM, RM or the SCM. We always need new control station trainees, Emergency Coordinators, liaison stations. The time is here again to elect an SCM for the section. Check with your friends and get the details for making a nomination. This is your chance to have a say in who will do the job. Details are printed in *QST*. WA4GNG is now putting fine signals out from his new QTH at Hartselle, 80 through 6. How about you traffic-handlers who did not report sending in your reports, either by mail or air? Traffic: (July) W4FYO 172, WA4AVM 148, W44ROP 90, K4BSK 71, WA4JSM 65, W4FVY 49, WB4EKJ 46, K4AOZ 44, WA4VEK 44, K4WHW 39, K4WOP 27, WB4EYZ 26, WB4KDN 17, WA4EEC 16, WA4AZC 15, K4OAH 11, WA4WTX 10, K4UMD 7, W4DGH 4, K4UCC 4, WB4-GZW 3, K4KJD 1. (June) K4OAH 2.

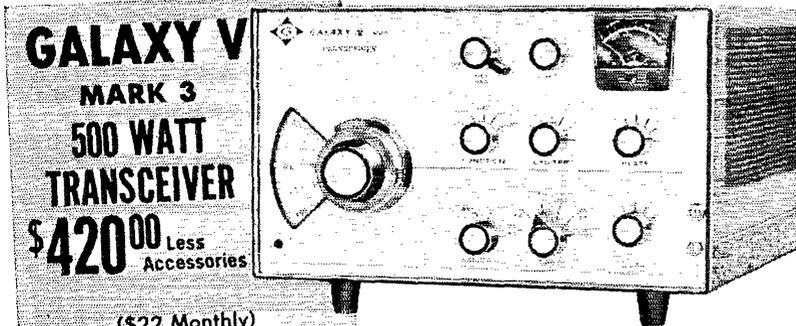
CANAL ZONE—SCM, Russell E. Oberholtzer, KZ5-OB—Asst. SCM: John S. Catanzaro, KZ5JC, Howard

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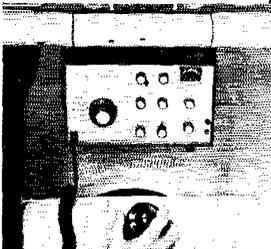
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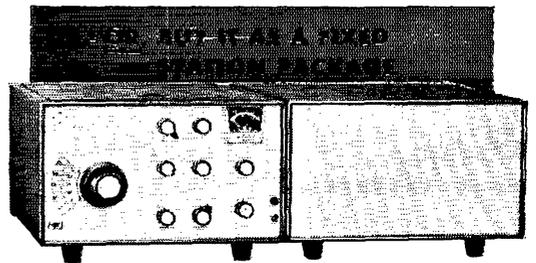


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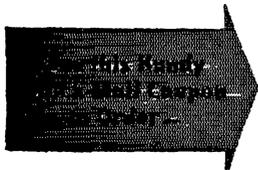
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Air Force MARS station is reactivating and looking for new members. Bob Hirsch, ex-KZ5UR, came up with the idea of forming an ex-KZ5 society. All displaced KZ5s interested may contact W5QEK, WA5NUR (ex-KZ5TT) or SCM KZ5OB. Further information will follow in this column as it develops. KZ5AJ and KZ5QA are rotating to Vietnam. A farewell party was held for them at the Elks Club. The C.Z. Emergency Net, on 7.000 kc. has been more active since the summer vacation period ended. Traffic: KZ5MV 126, KZ5AD 81, KZ5SA 66, KZ5JC 27, KZ5CT 18.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4MVB—Asst. SCM; William J. Blasing, Jr., W4NEY, SEC; W4YTT, Asst. SEC; W4FP, RM C.W.; W4LLE, RM RTTY; W4RWM, PAM 75M; W4OGX, PAM 40M; W4SDR, V.H.F. PAM; W44BMC. Well, here I am back in service again. At least I am nearly back in service. Bill still is doing most of the work until I get my feet back on the ground. My job has taken me away from home for the past five months and it is hard to get caught up after having been gone for that long. This was just about twice as long as I anticipated and things got a little behind schedule around the W4MVB QTH. I wish to thank Bill and all the other appointees in Eastern Florida for carrying on in my absence. As a matter of fact I note with some mixed feelings that things went about as well (or perhaps better) in my absence as when I was here. Bill has done an outstanding job and will continue to help me for the remainder of my term as my job again will take me away from home from time to time. Many, many reports were received about the fantastic 2-meter opening up the East Coast and into Canada during my absence. More news next month and by the time you read this I should have cleared away all the back correspondence. Thanks for your patience and efforts during the past five months. Traffic: (July) W4BKC 332, WB4AIW 319, WA4NEY 308, WA4SCK 279, K4EHY 258, W4FP 132, W4SDR 97, WB4EPD 85, WA4HED 81, K4LEC 80, WA4JH 80, W4UQZ 67, WB4HJW 59, WB4DSP 53, K4COC 45, WB4FGW 44, W4SMK 40, W4VDC 39, W4NGR 35, W4AKB 34, W44HDH 32, W4FHZ 28, W4OGX 28, K4LPS 26, W44UFO 25, W4DVO 23, W4ACIQ 19, W44EYU 18, K4BLM 17, W4GDK 16, K4SJH 16, WB4DDO 14, W4YXP 13, WB4FSF 8, K4EBE 7, W4ILE 7, W44BGW 6, W4TJM 5, W4VPQ 5. (June) W4ILE 34, K4EX 28, WN4JH 2.

FLORIDA AUTOMOBILE INSPECTION REGULATIONS INDICATE THAT FLORIDA HAMS WITH CALL LETTER PLATES MUST HAVE THEIR VEHICLES INSPECTED DURING (OR BEFORE) THE MONTH OF NOVEMBER.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC; W44WQU, RM; W4FDN, PAMS; K4HQI, W4YDN. W4YDN is ex-K7GOK with a new call and Advanced Class ticket. W44LU now has his Extra Class license. During the period July 6-10 W44WQU, WB4DMO, W44EHT and W44OQQ provided communications in Savannah for the 22nd Annual Powder Puff Derby. W4KXM returned to Macon after a three-month computer course. K4HA has a new NCL-2000, 50-Mc. activity remained good for the month of July. Numerous E openings and a few double hop signals were reported. There were band openings to California, Arizona, Nevada, Utah, Oregon, Washington and Montana with the following DX: C65CN, FG7XT, ZF1DT, W1HOY/KP4 and T12NA. Two-meter activity still is on the increase with two new stations in the Athens area. GSN reports 371 QNT, 243 messages handled. K4UXJ has a new tower, W44SKF has a tower, WN4GTB lost his tower and antenna during installation. W4OLC has a TR-108 on 2. W45NCL/4 is on 6 s.s.b. in Athens. W4ARR QRD Thailand in Sept. I appreciate my XYL filing my report while I was hospitalized last month. The following June traffic was not late—I just wasn't here to take it. Traffic: (July) W4FOE 244, W4CZN 106, W4FDN 71, K4JFY 68, W44WQU 48, W4RZL 39, W44UQQ 37, W4DDY 25, W44JES 12. (June) W4FOE 330, W4CZN 168, K4JFY 61, W4DDY 57, W4FDN 49, W44JES 16.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC; W44KB, PAMS; H.F.—W7BNR/4, V.H.F.—W4UCF, RM; K4UBR. Section nets:

Net	Freq.	Time	Days	Secs.	QNT	QTC
WFPN	3957 kc.	2200Z	Daily	31	428	28
QFPN	3651 kc.	2230/0200Z	Daily	62	...	..

Pensacola: W44WAR is the new EC for Escambia County. W4JV has completed his new antenna system and again is active on all h.f. Panama City: W44ZGI and his XYL, WB4E2S, have moved to Lakeland. He is now with the Florida Highway Patrol. W7BNR/4 reports that the West Florida Phone Net Annual picnic was held at St. Andrews State Park Aug. 25. Fort



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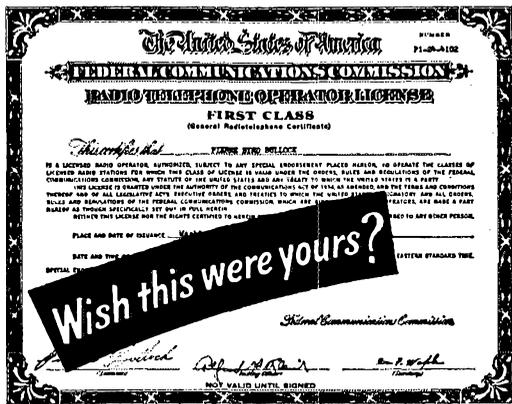
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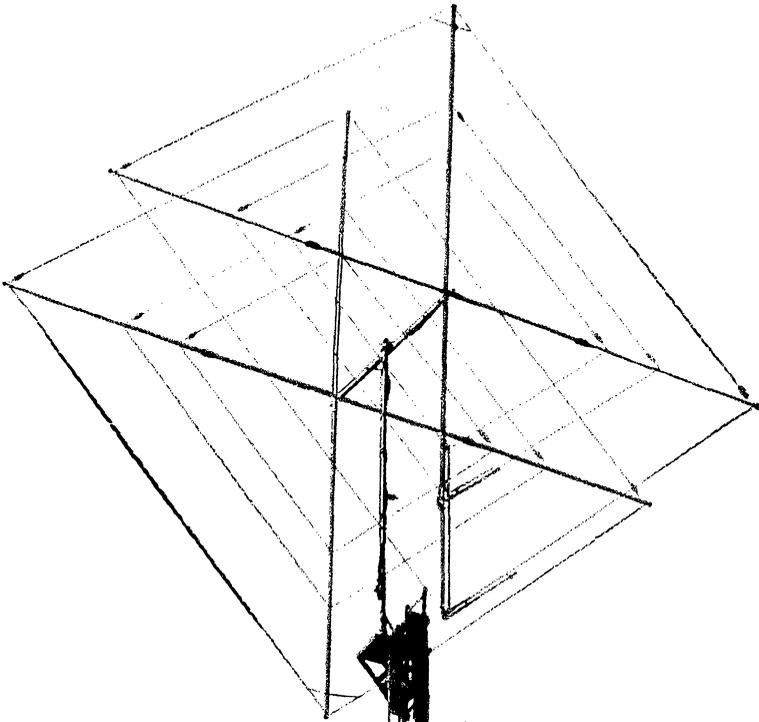
Walton Beach; W4RKH is T.D.Y. for approximately one month in Washington, D.C. EC WB4EER has revised the County Emergency Procedure Operating Manual for Okaloosa County. During the BEBA Net WB4EER came upon a highway accident and following a call on 146.94-Mc. f.m. within moments had an ambulance and county authorities on the spot. W4JNT and WA4DUF are now mobile on 146.94-Mc. f.m. Chipley; WA4ZFK is now mobile on 146.94-Mc. f.m. Madison; W4RCO is now active on 146.94-Mc. f.m., along with WA4GHE. W4WMA soon will have his 146.94-Mc. f.m. rig installed in his car.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—PAM: W7CAF, RM: K7NHL. The Fort Futhill Hamfest held in Flagstaff was a huge success and a fine time was had by all. K7GRH and W4TJRL passed the Advanced Class exams. W5EQ/70 has a new Galaxy and is active on 2, 6, 10, 15, 20, 40 and 80. Your new SCM will need your support to increase activity and improve the organization of the section. You will be asked to help. Let's all resolve to improve our operations and be aware of opportunities to perform public service through amateur radio. Some ideas for self-improvement would be to join a traffic net, improve our c.w. speed, build some piece of equipment or get a higher class license. This is my last report as SCM. I would like to express my appreciation for the wonderful support given me during my four years of office. It would be impossible to name all who contributed toward making my terms both memorable and enjoyable ones. Thanks to all. Traffic: K7NHL 124, W4TJRD 65, W7FKK 11.

LOS ANGELES—SCM, Donald R. Etheredge, K6UMV—Asst. SCM: Harvey D. D. Hetland, WA6KZL. Acting SEC: K6AVQ, BPL was earned in July by W6GYH, WB6BBO and W6MLF. Just a few of the participants in the Powder Puff Derby included W6DDB, W6MLZ, WA6VTM, W6BPNY, W6BYVN, WB6ZXB, W6MWO/6, WN6ZAL, WN6ZAQ and Vice Director W6PIF and his XYL, V.h.f.er WB6TSM has erected a new 60-ft. tower. A new club, the ITT (San Fernando) Radio Club, has elected its first officers in the form of W6IST, prexy; W6EWG, vice-pres.; W6YVR, secy.; W6MF, activities. A Silent Key in the San Gabriel Valley is W6MEG. While WB6WDS is working on a multiband dipole in his spare moments, WB6VZD is experimenting with 2 meters. W6CRQ has constructed a phase shifter for his OO work, and W6FTQ reports adding the final touches on a 40-meter c.w. rig that now works fine. WA6ODD, of the LERC RC group, was heard in the fourth district recently and W6RCV reports having a luncheon with ZL2AYI in July. The So. Cal. DX Club has a new slate of officers in W6FRZ, prexy; W6GEN, vice-pres.; W6DQX, secy.; W6EJJ, treas.; W6FW, W6NJU and WA6GLD, directors. OVS WB6GHB reports writing fiction and also notes for the ARRL *Hunts and Kinks* booklet. The Paramount group is gathering portable transceivers for the club n.f.m. on the 50-Mc. band. WB6GGL reports long working hours cutting the traffic total down, and K6EA is hunting in O-Land for a while. W6NSH is looking for hand keys (old explosion proof types that cannot "bite" the hand of blind operators if they touch the wrong spot) for his blind amateur radio class. WB6SXY, as well as many others, is active in the Intruder Watch program in the section. At the end of August the K6BPC crew handled communications for the Olympic Kayak Trials in Long Beach. K6LK is now involved in setting up a station with the aid of W6CAL for moonbounce with an 8-ft. polar mounted dish. A list of all clubs in the section is now compiled and is available for S.A.S.E. Club bulletins are solicited and welcomed via address on page 6. Traffic: (July) W6GYH 1227, WB6BBO 601, W6MLF 804, W6QAE 408, WA6KZI 207, K6CDW 154, WB6TQS 130, W6FD 102, W6MLZ 101, W6P633 40, WB6RKG 29, W6DQX 36, K6CL 33, WB6WDS 33, WB6TMC 28, WB6VZD 26, W6AIN 20, K6ASK 19, W6USY 19, W6BHG 12, W6DGH 8, W6BAEL 7, WB6SXY 7, K6UMV 7, WB6OLD 5, K6EA 4, W6HUJ 4, W6TN 4, W6EOE 1, W6SRE 1.

ORANGE—SCM, Roy R. Maxson, W6DEY—WB6UCK now is on s.s.b. with an HT-37. The Chino IIS ARC call is WA6DEH. OO W6VOZ has a 14-ft. runabout boat now for maritime mobile, WB6RJK, W6JF, WA6ROF, W6PQA, W6DNA, and many others are checking in the AREC C.V. Net, 3790 kc. at 9:30 a.m. Sun. W6RYM, Asst. SEC, has a Henry 2K, and recently was elected vice-pres. of the Golden Bear Net. The San Bernardino Microwave Society, Inc., now has a new meeting place, the second floor of the Security-Pacific National Bank, 204 E. Sixth St., Corona, entrance south side of the building. Meetings are held the first Thurs. of each month at 1930. W6PB's July visitor was WB6PGZ. ORS/OBS WB6UTC is leaving for W4-Land. Hurry back, Mike, ORS WB6AKR is back in Hemet, assisting WB6YXA in traffic. SEC WA6ROF rd-



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views that all is well on RN6. W6BNX has an antenna farm on the roof of his QTH. Welcome to WA6ORJ/W6HAW, who moved to Justin from Pomona. He is past-pres. of the Tri-County ARA. W6EIF is back from Florida. WA6MQL, WA6KRU, W6QAT, WB6IKV, WA6-UBP, W6DEY and others now are on the RACES 6-meter repeater, WA1JHZ/6 is leaving for Westover AFB. Traffic: (July) WB6UTC 311, K6MCA 289, WA6-ROF 259, WB6TYZ 249, W6BNX 126, WA1JHZ/6 108, WB6UCK 94, WB6RVM 69, K6IME 26, W6WRJ 26, WB6AKR 8. (June) WB6UCK 83.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: K6GV. WB6BWZ is the active OO and EC in Santa Marie who reports that the tentative 75-meter Santa Maria AREC frequency is 3960 or 3965. The tentative 2-meter frequency will be 146.35. Those who are interested in AREC activities in the Santa Maria area should check with WB6BWZ. W6UJ reports that the Lompoc e.d. stations checks in on SCM on 3600 c.w. Complete emergency power is available. WB6WZ has a new 3-band quad to assist with his MARS activities. Let's hear it for W6DPV, who has just received that Beautiful Extra Class license. To go with the new license Jim has a Heath HW-100 on order. W6ORW is the active OPS in Simi as well as quite active in the Mission Trail Net at 7 p.m. on 3854 kc. K6GV has a new job and has been unable to check in as usual on 3895. Sorry to report that the XYL of K6-AAK has been in the hospital but medical reports are favorable. The Channel Cities Net is an active traffic-handling net which meets weekdays at 1830 on 145.8 Mc. WA6WYD, in Port Hueneine, is Net Control. New appointment: W6ORW as EC for Simi Valley. Traffic: W6ORW 22, WB6DPV 15, W6UJ 5, WB6BWZ 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. I guess this is my swan song since this will be my last report as your SCM and I want to thank the many amateurs who helped to make my job easy by their support and cooperation. I do not intend to retire from amateur radio as it has been my love since 1919 and I will continue to serve to the best of my ability. I hope that you will give your new SCM the same support and cooperation that I have received in the past ten years. W5LR has been RM for most of my term in office and has executed the duties of that appointment very well. Please remember that the SCM must file his report by the 7th of the month and your report on time will ease his job no end. Many clubs are holding weekly classes for Novice, General and Advanced instruction. K5BNH seems to be trying to establish a record for making BPL each month. Congratulations, Bea, on your efforts. WA5TYH is coming close to the medallion. Your attention is called to the Election Notice, page 64 Aug. QST, for Director of the West Gulf Division. Much thought should be given as to who you want to represent you in the operation of your League. Remember your Director is your representative. Nominate your choice, then work for his election. The following was written by W5LR, your new SCM: I want to take this opportunity to thank those devoted ARRL members who wished the originator to be your SCM. It is with regret that I relieve such a fine ARRL man as W5BNG, who has been around here for many years and is highly respected. The Garland Amateur Radio Club is active in civil defense work, thanks to W5RHI. As I prepare this news item the Rebel Radio Club, Arlington State University, will hold its Annual "Pow-Wow" and gathering. The East Texas Section of Navy MARS also will hold its Annual Picnic in Tyler State Park. I am indebted to K5ENL for information on Northern Texas nets. They are: Sun, NoTexas Emcy Net, 3930 kc.; Sun., NoWest Texas Emcy Net, 3930 kc.; Sun., Central Texas Emcy Net, 3870 kc.; and Sun., East Texas Emcy Net, 3970 kc. at 8:00 a.m. The Tarrant County Emergency Net meets Sun. at 1:00 p.m. on 3970 kc. The DARC Net meets Mon. nights on 10 meters. If any have been omitted please correct me. Net report follows: 7290, check-ins 1897, traffic 1522. Band conditions: 30 sessions good, 9 fair and 5 bad. Traffic: K5RNH 805, WA5TYH 695, WA5QQR 50, K5-LZA 49, W5JSM 41, K7NCG/5 14, WA5NSJ 14, W5PBN 11, W5BNG 8, W5LR 6, WA5QQ 4, WA5CTD 2.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB. RM: W5QMJ. PAMs: W5MFX-75, K5TEY-40, WA5JGU-6, K5ZCJ-2. The Aeronautical Center Radio Club was blessed with a real fine program in July. W5GIQ, ex-7Q7EC, gave a talk and showed color slides of his work with the U.S. Department of Agriculture extension service in Africa. K5JZV, of Tulsa, is now operating KA2ZV. Thanks to WA5TSV, WA5TRN, WA5TRN and WA5VAQ for their fine work with the Boy Scouts. They took 37 boys of Troop 72, Oklahoma City, to summer camp at Grand Teton National For-

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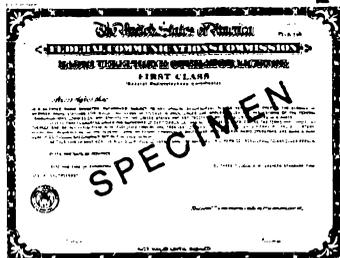
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est. Wyo., July 20 through 29. Operating a Swan 400 with inverted Vee strung up in the tall pines they were able to keep in communications with home during the week. Congratulations to the following up-graded or new licensees. Extra Class—W5WAX and W5VRV. Advanced Class—W5QGD, K5CAY, K5KOZ, WA5JGU, WA5KFT, WA5IDY, WA5OYY and W5I7X. General—WA5RQL, WA5UCK, WA5UUE, WA5VAO, WA5VAR, WA5VBA and WA5VAQ. Technician—WA5UJF. Novice—WN5UPE, WN5UUM, WN5UUT, WN5UTM, WN5UYU, WN5UYV, WN5UYF, WN5VDO, WN5VCQ, WN5VAA and WN5VEO. Following is the net schedule for this section:

Net	Freq.	Time	Secs.	QNTs	QTCs
OPEN	3850 kc.	1300Z	4	162	2
OPON	3920 kc.	2200Z	13	107	17
STN	3850 kc.	2230Z	25	572	174
OLZ	3682.5 kc.	0001Z	20	39	55
SZ	3682.5 kc.	0245Z	14	33	48

Traffic: K5TEY 3872, WA5AOB 89, W5PML 59, WA5KET 34, W5AFX 33, W5QBF 32, W5QMJ 26, WA5FSN 22, W5FKL 21, WA5IMO 21, WA5DZP 16, WA5KZA 16, K5CAY 14, WA5MDN 9, K5LUJ 5, K5OCX 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. *Off Resonance*, the bulletin from Southmost Texas, reports the new antenna is about ready to go. W5HBL and EC W5KR are working on the project and indicate the Terminal Building will have to go before the antenna for the ESSA Weather Bureau Airport station. WA5PUQ reports new Generals in Corpus Christi are WA5SQD and WA5SSL. EC K5HZR has been busy checking our emergency power plant, which reminds us that all stations equipped with emergency power should be sure everything is working in good shape. See "the US News and World Report" article in the Aug. 5 issue. EC W5TFW reports K5WYJ, K5YLU, W5UVB, WA5DUG, W5TFW and W5APX participated in the Powder Puff Derby Network and says the 2-meter link from W5TFW to Airport worked out very well. EC WA5RXO reports the new Asst. EC of Brazos County is WA5GZX. EC K5HMF put up a new antenna at the KUHT TV transmitter site at 60 feet. Seems the one at 150 feet skips completely over South Texas at night. PAM W5KLV says the secretary's job for the South Texas Emergency Nets is keeping him busy. Old Timer "Sarge" Horn, ex-D4ARJ, 5A4TQ, KA2SH, SV0WZ and W7FTU, now is settled in San Antonio with the call W5IB and will be on 2 through 160 meters. The Houston Amateur Radio Club's Annual Hamfest will be held Nov. 3 at Spring Creek Park. See you all there. *TEX Bulletin* reports the TEX C.W. Traffic Net is doing well considering many are on vacation. Editor W5QJA also included some observed improper net operations and pointed them out for newcomers. New EC WA5KHE now has the daily Twin Cities Public Service Net on 3955 kc. 6:30 to 7 A.M., Nacogdoches and Angelina Counties. K2EJU/5 now is enjoying mobile with a new SB-101 and Hustler antenna. Traffic: (July) K5GDH 267, WA5QKE 156, W5EZY 110, W5QJA 91, W5BGE 85, WA5PUQ 78, K2EJU/5 73, W5AC 67, K5HZR 54, W5TFW 34, W5KLV 18, WA5RXO 8, K5WYN 8, K5HMF 7, W5AIR 6. (June) WA5MXY 88, WA5RXO 19.

CANADIAN DIVISION

MARITIME—SCM, William J. Gillis, VE1NR—Asst. SCM: R. P. Thorne, VO1EL. SEC: VE1EJ. Well, here we are back again after difficulties with the mail. The column is a bit thin because of the postal strike. By now all will have received the newsletter issued as a supplement to the column. If not please advise. VE1MO advises that he is posted to Ottawa. Harry was the EC for Prince Cty., P.E.I. Our thanks to Harry for a job well done. APN, 3653 kc. daily at 8 p.m. ATL is looking for additional stations. VE1AAX is net mgr. See the newsletter for details of the new W.A.P. award. We wish VE1RO a speedy recovery. Congrats to VO1BH, who recently celebrated his 70th birthday. The Labrador Net meets daily at 2315Z on 3785 kc. There are several new calls on the air, many through the excellent training programs conducted by many of the clubs. APN: QNI 181, QTC 31, sessions 31. Traffic: VE1AMR 54, VE1AUD 23, VE1ALV 20.

ONTARIO—SCM, Roy A. White, VE3BUX—AREC

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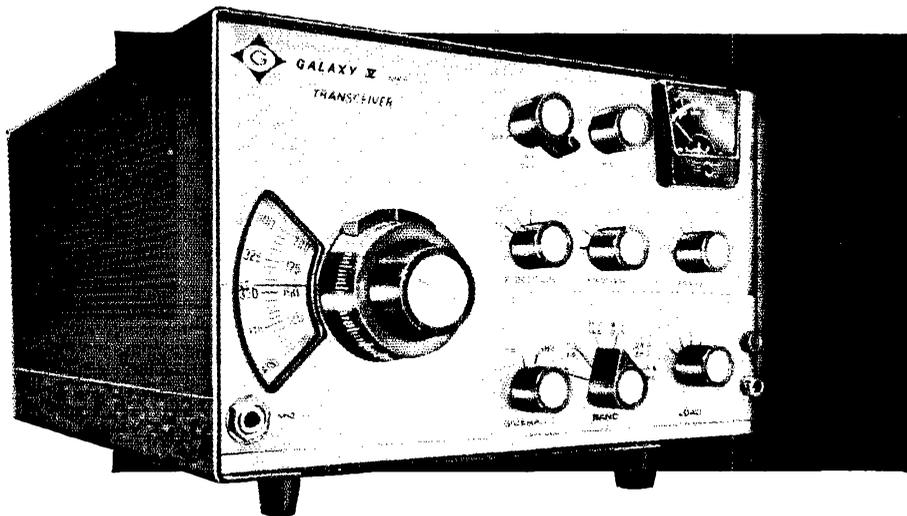
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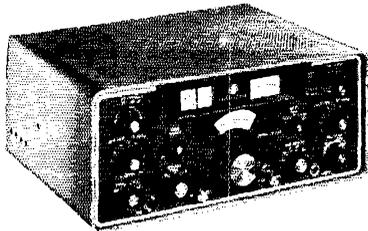
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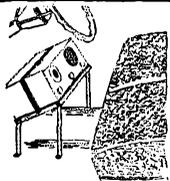
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Asst. National Coordinator: VE3YC. PAMs: VE3ETM and VE3BLZ. RMs: VE3BZB, VE3DPO and VE3GI. We expect to announce the appointment of a new SEC and also an assistant within the next couple of weeks; also a new PAM to replace VE3ETM, who wishes to relinquish the position because of the pressure of other interests. I'd like to see more phone activity by Canadians in the 7150 to 7200 segment. If we don't use it, then somebody else will! The postal strike in Canada raised hob with business and the public in general but it's surprising what the average individual can get used to. Amateur radio (particularly the phone nets) experienced a decided boost in traffic activity and we hope it continues. Amateur radio lost an active and enthusiastic member in July when VE3BQI died at the age of 21. Our very sincere sympathy goes to his family. VE3-EGO, of Ottawa, his XYL and little girl are in Belleville General Hospital following a head-on collision in July on the first day of their annual holiday. Glad to say all are progressing favorably. VE3OE sold his rig and reverted to c.w. until the new one arrived. Welcome to VE3GMQ, VE3WLT and VE3GKH, who have been appointed as ECs. Welcome, too, to VE3BZU, who has returned to the Ontario Phone Net as a controller. Don't miss out on the first Radio Society of Ontario Convention Nov. 1, 2 and 3 in Brantford at the Holiday Inn. ARRL will be holding a Forum. Quite a few Ontario hams attended the recent Soo (Michigan) Convention and I'm told "a good time was had by all." Traffic: (July) VE3GI 165, VE3GCE 66, VE3ATI 62, VE3-FGV 55, VE3AWE 44, VE3DV 34, VE3OE 34, VE3BUR 28, VE3EWD 24, VE3NO 24, VE3EHL 22, VE3DBG 19, VE3AUU 18, VE3EBC 10, VE3ETM 6, VE3DVE 3. (June) VE3BLZ 42, VE3BZB 42, VE3AUU 14, VE3GMQ 13.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2-ALE, RM: VE2DR, PAM (v.h.f.): VE2AGQ, PAM (h.f.): VE2BWL, VE2DFW and VE2AKC have graduated to limited phone status. VE2DR has by now settled down on the c.w. nets after a good fishing summer. VE2BRD was married in Aug. His brother, VE2BRT, is well on his way to becoming an MD. We understand the conventional CD or EMO is looking for reorganization in some areas. Let us not miss the opportunity to assist in all ways. VE2AJD and VE2EC still are steadies for traffic from Three Rivers. There is almost a complete blackout from Quebec City for reports although it keeps on the map via the Quebec Phone Net. VE2-APT calls his XYL faithfully each night on mobile—to suggest dinner time. She is VE2DGV, perhaps the wittiest ham you'll hear, and is the sister of VE2DGD, who likewise is called each day by VE2AVP. Then there is VE2BWW, heard announcing his position and time of arrival for food from mobile to VE2DCB. During the summer we heard VE2CK, VE2GK, VE2FK, VE2BK and VE2DK, each an old-timer with a good letter ending. VE2BGJ operates portable from VE2DFO's QTH. VE2DCW now handles all bands, especially c.w. net frequencies, wonderfully. VE2ALE got his SEC report via special courier to Headquarters. Traffic: (July) VE2-OJ 138, VE2RD 86, VE2BRD 60, VE2ALE 54, VE2BVY 48, VE2DCW 45, VE2ADE 42, VE2AJD 29, VE2EC 24, VE2PJ 3. (June) VE2ADE 12.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5-HP—Activity on the bands has been sporadic with conditions at times good. Since our Field Day and hamfest, activity locally has been quiet, with farmers filling their pockets with imaginary dollars expected from a good harvest, and others wandering far and near on holidays. Mobile activity has been good with many visiting hams passing through and working the locals on 2 and 75 meters. One of the most enjoyable picnics in recent years was sponsored by the Wood River Amateur Radio Club, and held on the farm of VE5GU and VE5-GV. The setting was superb and the attention given to the 22 hams and their families who attended was out of this world. The thanks of all were heartily extended to these fine friends. Why not let this picnic be but a sample of what we can expect in the future from other districts? Just to remind you once more, the Saskatoon Amateur Radio Club still has copies of the history of ham radio entitled "From Spark to Space." Get in touch with VE5YY for your copy. Traffic: VE5RJ 11, VE5LQ 7, VE5HV 6, VE5OF 6, VE5G 5, VE5CF 4, VE5YR 4, VE5BD 3.

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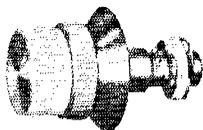
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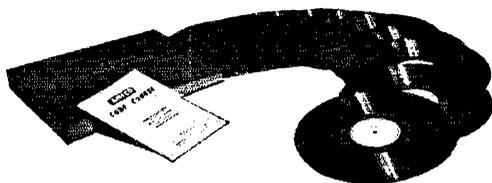
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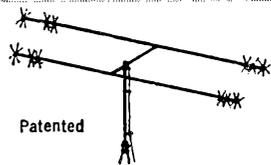
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K1ENS, Kenneth Du Beau, North Billerica, Massachusetts.

K1QVE, Andrew Peterson, Gloucester, Mass.
W1UOC, Mahlon Smith, Winthrop, Mass.
K1VHT, Ted Ames, Millinocket, Maine.
K1ZPC, Hector Babin, Waltham, Mass.
K2IZI, Doug Frothingham, Smithtown, N. Y.
W2QDO, Willard Jones, Remsen, N. Y.
W2RV, James Candido, Martinez, Argentina.
W3CEU, Fred Bearinger, Denver, Penna.
K3HOS, George Wallace, Waynesboro, Penna.
W3IFJ, George Griffith, Reading, Penna.
W3SNC, Willard Swearingen, Edgewood, Maryland.

K3WWR, John Baustert, Apollo, Penna.
K4AYI, Lee Roberts, Blacksburg, S. C.
W4GSQ, Joe Gresham, Memphis, Tenn.
W4JMI, Raymond Vermillion, Valparaiso, Fla.
W4KFO, Lawrence Jeffery, Owenboro, Kentucky.

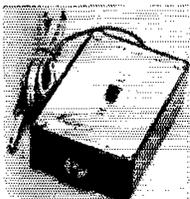
K4RRB, Bruce May, Miami Beach, Florida.
K4UEP, Amon Peters, Atlanta, Georgia.
W5JTK, Oran Roberts, Tyler, Texas.
W5MEI, James Rouse, Crescent, Okla.
W5NPN, Joe Rogers, Palacios, Texas.
W5UAR, Sam Greer, Amarillo, Texas.
K5YSW, Lynwood Butler, Dallas, Texas.
W5ZLR, Maurice Evans, Lafayette, La.
W5ZZP, Jay Thompson, Sayre, Oklahoma.
W6CQV, May Dobson, Bridgeport, Calif.
W6FWA, Howell Axtell, Fallbrook, Calif.
K6IOV, Lester Via, Bellflower, Calif.
W6LVS, R. J. Woolum, Castro Valley, Calif.
W6NRY, Ivory Crites, Mammoth Lakes, Calif.
W6WIX, Robert Moser, Las Vegas, Nevada.
W7TH, Arthur Emigh, Walla Walla, Wash.
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W9HUI, Carl L. Malson, Sioux City, Iowa.
W9IYM, Gordon Mendenhall, Garden City, Minn.
HC2HI, Harry Crawford, Guayaquil, Ecuador.
VE7PO, Ernest Hawksworth, Duncan, British Columbia.

ARPSO

(Continued from page 81)

W2FRN has issued 2RN certificates to WA2BNN and WB2s DRW YBX, making a total of 25 issued this year. K3MVO has sent 3RN certificates to W3s AIZ AXA EEB EML KUN LOS NEM NNL K3s JYZ KTH YVG ZSK W4As BLE HTQ. K5IBZ says vacations have hurt traffic

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No, we're not lazy! It's just that "Popular Electronics" (Dec. 1967) tells the DX-150 story so well.

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"What may be the first really noteworthy advancement in communications receivers is wrapped up in the new Radio Shack imported DX-150. Featuring continuous coverage from the top of the AM broadcast band (535 kHz) to the bottom of the 10-meter band (30 MHz), the DX-150 is a single-conversion superhet with a tuned r.f. stage, two i.f. stages, full-wave product detector for SSB/CW reception — and it's 100% solid state. Selling at \$119.95, the DX-150 has the flexibility of a communications receiver that a ham or SWL is used to buying for \$175-plus. To rattle off a few more "features": there is a front panel antenna trimmer, fast or slow a.v.c. attack, a cleverly concealed built-in monitor speaker, plenty of calibrated bandspread, and noise limiting in both the i.f. and audio stages. Because of the solid state circuitry, the usual warm-up drift expected with a tube-type receiver is virtually absent here. And, although the DX-150 is primarily a base station receiver with a 117-volt a.c. power connection, it can be operated from an onboard d.c. power supply consisting of only 8 D-cells. Radio Shack claims that the receiver will operate for 100 hours — continuously — using only the d.c. supply. Ideal for Field Day and emergency work! The proof of the pudding so far as any communications receiver is concerned is how well it works "on the air".

At POPULAR ELECTRONICS, the DX-150 was hooked up to a 125-foot long-wire antenna and tuned across the AM broadcast band. Needless to say, the S-meter was pinned on just about every single channel, and the audio quality with Radio Shack's voice-selective speaker (extra, \$7.95) was crystal-clear. Tuning the band between 1.55 and 4.5 MHz, your reviewer got a chance to appreciate the comfortable handling on SSB reception. Going a little higher (4.5-13.0 MHz), the 25- and 31-meter bands were "alive" and signals appeared to leap out of the air — possibly due to the very quiet background of the DX-150. While quietness is usually regarded as a lack of sensitivity, that wasn't the case with the DX-150. On the top band (13-30 MHz), the sensitivity still seemed high; and on the CB frequencies, the DX-150 could hold its own against a dual-conversion receiver built just for CB work. Summary: Radio Shack has the Model DX-150 in most of its 160 retail outlets. Take a look at it, and get the "feel" of this unusual receiver."

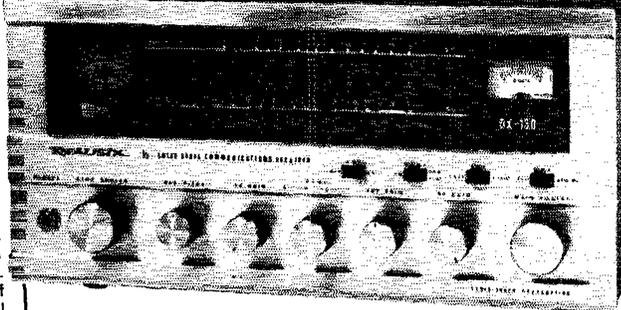
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totals and representation. An 8th Regional conference will be held in Toledo, Ohio, Oct. 19, according to W8CHT. *Transcontinental Corps.* W0LCX reports good nights are few and far between, with traffic on some functions up. A good month, says TCC-Pacific Director W7DZX.

July Summary:

Area	Func-tions	% Suc-cessful	Traffic	(Out-of-Net Traffic)
Eastern	124	89.5	2080	779
Central	93	90.3	1250	543
Pacific	124	93.5	1892	941
Summary	341	91.2	5222	2263

The TCC roster: Eastern Area (W3EML, dir.) — W1s BJJ EFW EMG EOB NJM, W2s FR GKZ PU QC, K2RYH, W4s BLV UWA, W5s FIT RKK UHZ, W3EML, K3MVO, WA3CTP, W4s NLC UQ ZM, K4KNP, W8s CHT UM, K8KMQ, W4s OCG POS ZGC, Central Area (W6LCX, dir.) — W4OGG, K4DYM, W44s AVM WWT, WB4AIN/4, W5KRX, W9s CXY DND DYG VAY, W4s OTD RAK VZM, W0s INH LCN, K0s AEM YBD, W4s DOU MLE, Pacific Area (W7DZX, dir.) — W6s BGF EMS EOT IPC IPW TYM VNQ VZT, K6DYX, WA6ROF, WB6LVA, W7s KZ ZIW, K7HLR, WA7CLF, VE7ZK.

Miscellaneous Net Reports.

Net	Sessions	Check-ins	Traffic
Eastern Area Slow	31	191	105
Coast Guard	22	474	10
QTC	22	324	206
North American SSB	27	553	275
Clearing House	29	506	385
Mike Farad E & T	27	378	403
7290	44	1897	1522
20 Meter ISSB	31	184	5815
Interstate 75M SSB	31	1002	568
Hit & Bounce	31	424	554
20 Meter SSB	27	478	6329

QST

Technical Correspondence

(Continued from page 48)

industrial complex, so I did nothing. As time went on, the noise got more severe; at times it wiped out all three bands completely, being 20 over 9 off the back of my beams.

After the DX contest in 1968, I decided to do what I could to locate it since my score in that contest was hurt considerably by the interference.

I attempted to borrow a battery-operated receiver to cover the h.f. spectrum, to no avail. Cruising the area in my auto and listening on the b.c.-band car radio at first produced no conclusive results, but after several nights spent driving around, listening between the b.c. stations, it was noticed that the noise was audible, but rather weak. At a point about four city blocks south of my QTH, there was a definite peak for a distance of about 50 feet, directly in front of the Reynolds Aluminum Company wire and cable plant. I then intensified my effort to locate a battery-operated portable receiver. Within a few weeks, the company I am employed by decided to purchase a battery-operated Ferris model 32-B noise and field-strength meter (ahem). A few evenings spent with this thing revealed the following:

1) There were two broad peaks of noise, one from about 4 to 8 Mc., another from 8 to 16 Mc. (The unit tunes 130 kc. to 20 Mc.).

2) Carrying the Ferris around in the car established the fact that the noise did peak in front of the Reynolds Aluminum Company.

The next step was a visit to the Reynolds Company where I requested, and got, an interview with the plant manager, Mr. Funary, and Mr. William R. Smith, Chief Electrical Engineer. They were most cooperative. I gave them full details of my observa-

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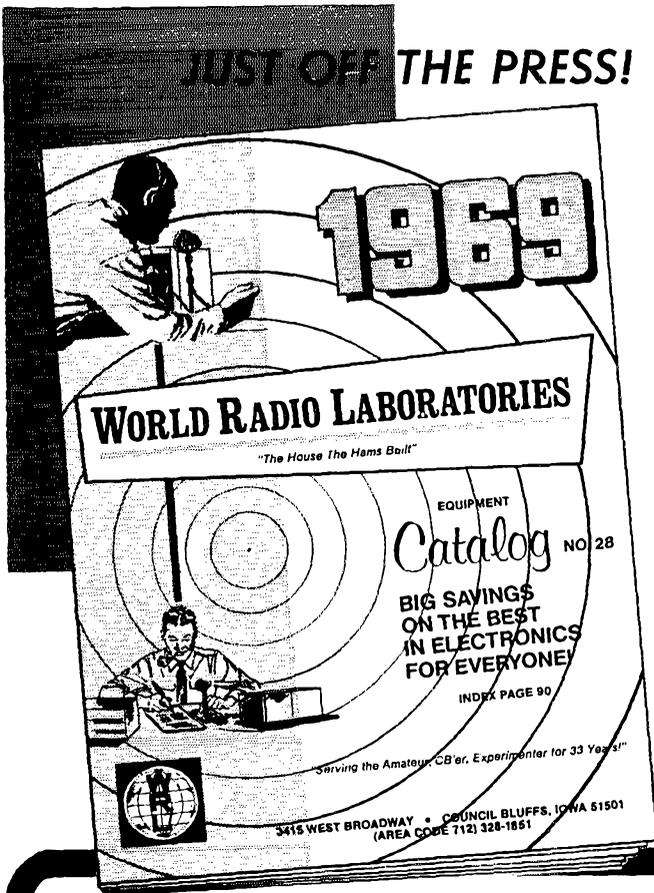
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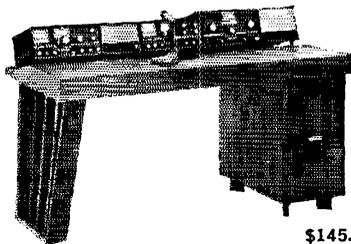
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tions and measurements. They told me that they would contact me in a few days after they had made some investigations of their own.

A week later, I was invited to the Reynolds facility and brought the Ferris 32-B with me. Mr. Smith escorted me through the plant and told me that his people had found one area which, as he put it, "was under suspicion." The area turned out to be an outdoor cable test facility. At this area, cables are strung outdoors (lengths of 50 feet or so) and various potentials are applied to them. Some of the cables had been under continuous test, with 5 to 15 kv. applied, for several years. As we approached the area, you could hear the hiss of corona. I set up the Ferris at 7 Mc. and got a reading of about 10,000 μ v./meter at a distance of about 100 feet from the test cage. Mr. Smith had an employee shut the line down and, as the man threw the switch off, the reading on the Ferris went from 10,000 μ v. to 1.5 μ v./meter! Mr. Smith told me that the test would be stopped immediately and steps would be taken to insure that they did not radiate noise in the future.

Needless to say, everyone was quite happy and the Reynolds people expressed some concern over the incident. Someone said, "This time, we interfered with a ham operator, but what could have happened if we had interfered with airport communications and the like?" (Philadelphia International Airport is about six miles northeast.)

And now, at my QTH, it is quiet as a graveyard. I can hear things over the long path again, and I will be breathing down the neck of W3WJD during the '69 ARRL DX smash. — Harold C. Ritchey, W3WPG, 208 W. Front St., Chester, Penna. 19013.

Recent Equipment

(Continued from page 61)

the same as from the a.c. supply, except that the heaters run off the 12-volt car battery.

The Model HA-20 Adapter

Available as an accessory is the HA-20, a separate v.f.o. Also included in this unit is an s.w.r. bridge which can be used either for monitoring the feed-line match or as an output indicator.

The HA-20 v.f.o. dial is exactly the same as the one in the SR-400. When the HA-20 is used it is possible to transmit and receive on frequencies as much as 500 kc. apart. Also—and this one is really weird—it is possible to receive on two different frequencies at the same time. In many instances a DX operator desires to monitor both his own transmitting frequency and that of the DX station he is trying to work. It takes a little getting used to, but the HA-20 does just that.

The s.w.r. bridge is of the Monimatch type, with the bridge itself a separate unit that can

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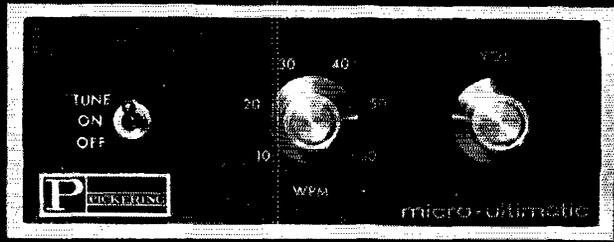
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be remotely mounted in the feed line. The HA-20 has its own built-in power supply. The unit also can be used with the SR-2000.

General

In testing the SR-400 in the ARRL lab, we found that the transceiver met, or bettered, all of the manufacturer's specifications for performance. Hallicrafters rates the transceiver at 200 watts output on s.s.b. and c.w. on 80, 40 and 20, and slightly lower than that figure for 15 and 10 meters. In the unit we tested, output was about 190 watts on the two higher bands and slightly over 200 watts on the other bands. The c.w. note was perfectly free from any trace of click or chirp.—*W1ICP*.

Strays

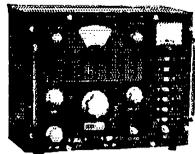
Danger, High Voltage!

Another tragic story involving the danger of electricity. Here it is, as related by Lewis Kline, WN3KKB:

"My brother was erecting a vertical antenna and needed three guy wires to secure it to the house. Two of the Nylon guy wires were connected when a gust of wind blew the third guy onto a power line close by. My brother and a friend tried to reach the guy with a hammer handle to pull it free, but they still couldn't reach it. The friend was sent for a wooden broom handle but, in the meantime, my brother reached into the attic window and pulled out a metal curtain rod and told the friend to wait, that he had found something just as good. Thinking the Nylon guy was a non-conductor, my brother reached out with the metal curtain rod to knock the guy wire free of the power line; 4000 volts jumped to the rod and electrocuted him. Please convey to all of your readers this message: Please take your time and think things out when working near power lines and save yourself a terrible tragedy."

The second annual Old Old Timers Club QSO Party will be held on January 24, 25 and 26, 1969, with the New Orleans, La. chapter as sponsor. This affair is for members only and all are urged to make their plans to participate. Log sheets, rules, suggested frequencies and other information will be published in the *Spark Gap Times* or contact the party chairman, J. L. "Bob" Robertson, W5BUK, 2609 Halsey Avenue, New Orleans, La. 70114. S.a.s.e., please.

EDITOR'S NOTE: Some Nylon line has a metal strand running down its center.

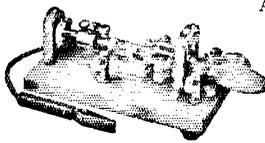


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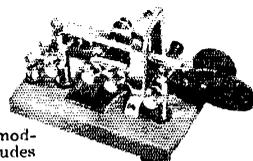
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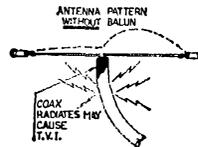
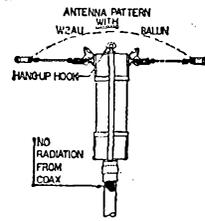
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(Continued from page 15)

tool is "out"; the whole apparatus is hand-capacitance conscious, though this could be avoided by enclosing it in a cabinet. The room should be maintained at a set temperature for at least twenty-four hours before the test. With these precautions and use of the b.f.o. to detect the 'wah-wah-wah' an exact beat can be obtained which should not vary through the duration of the test. Continue to make beat checks until 15 minutes before the test, then go for it.

When the beat between the 10-kc. signal and WWV on 10 Mc. is less than 1000 cycles you are within 0.01% of accuracy. It will be found that by the above procedure a 'wah-wah' (representing 2 cycles per second) can be sustained, which is 500 times more accurate, or within 0.00002%.

Miscellaneous

Other points to note are as follows: Some mush may be experienced in the receiver between the 10-kc. points. This comes from the harmonics of the 1-kc. divider tube. It is not normally annoying and does not affect operation, but some constructors may wonder from whence it comes.

Fig. 6, besides showing the Schmitt trigger, includes a negative-bias circuit which was added to the original gate circuit to make action more certain.

The original circuit of Skeen used eight counter flip-flops. It was found desirable to increase these to 13, the last one counting to 4096, since in the rush of an ARRL frequency-measuring test there is little time to spend checking the number of recycles taking place.

An annoying problem with home-built counters having no means of standardizing the amplitude of the incoming signal, as in this instance, is that if the circuit has lain idle for a minute or two, on the first attempt to make a count the first few pulses may not register, with the result that the count is low. This is because a capacitor in the input circuit is leaky, or its value is too high. Some of the first pulses fed to it are used up in recharging the capacitor. The answer is to use a good-quality smaller capacitor or take a second count immediately—which then comes out correctly.

On the first trial with this frequency standard, after some preliminaries to perfect operating techniques and debug the equipment, an accuracy of 0.8 parts per million was obtained in an ARRL FMT. All equipment used was home-brewed, or assembled from a kit, except the receiver. The author wishes to acknowledge the cooperation of the Hewlett-Packard company in supplying circuit information. **QST**

* Geiser, "A Zero-Beating Method", *QST*, February, 1968. An alternative method using the receiver b.f.o. is described in the chapter on measurements in *The Radio Amateur's Handbook*.

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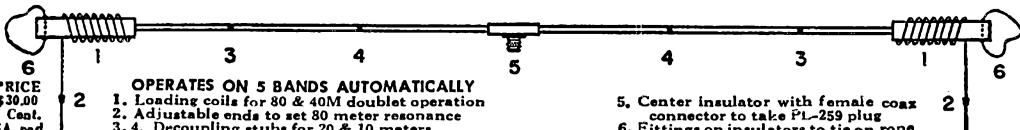
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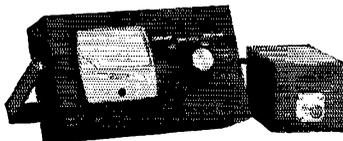
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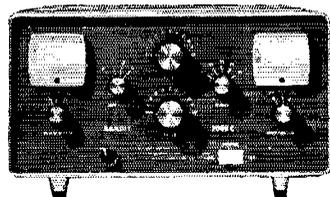
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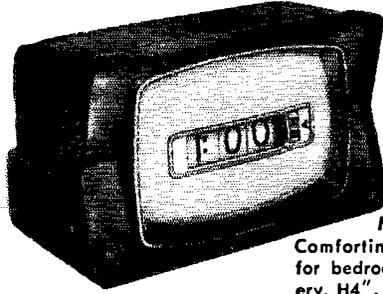
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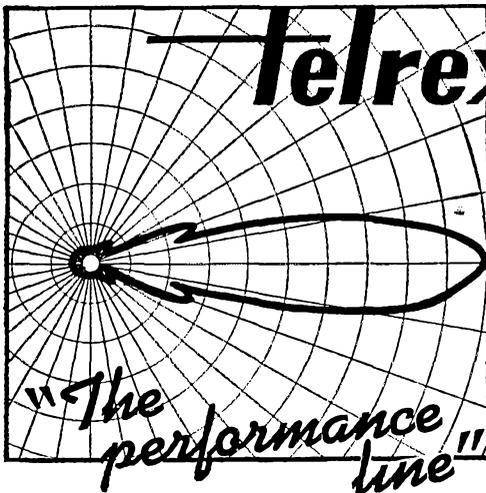
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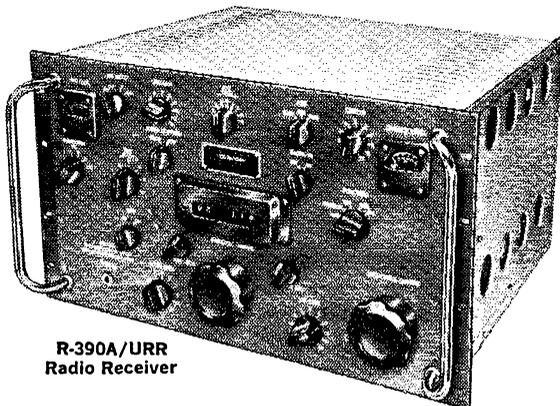
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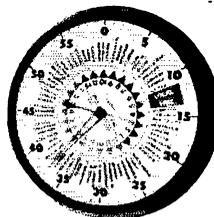
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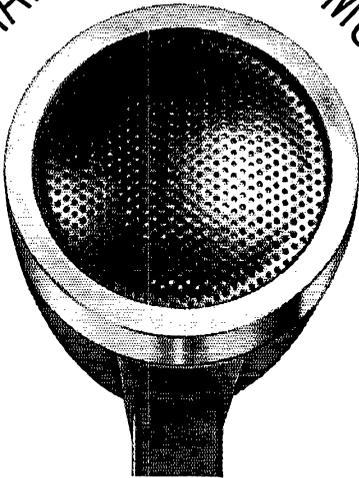


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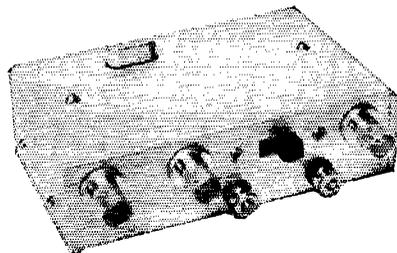
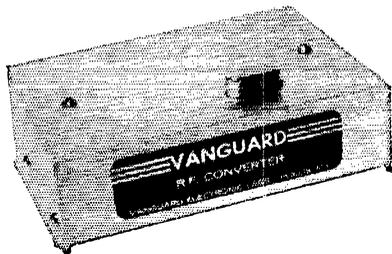


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RTTY Channel filters, octal mounted, 2125/2975, \$5.95 pair. Special filters for TTY-2 SASE for information, 88 4th. Inroads, uncase, for \$2.50. Herman Zachry, WA6GI, P.O. Box 845, Apple Valley, California 92307.

TR-4, \$480.00; **AC-4**, \$83.00; **DC-3**, \$123.00; **R4-B**, \$360.00; **T4XB**, \$360.00; **MS-4**, \$17.50; **RV-4**, \$83.00; **L-4B**, \$380.00; **W-4**, \$43.00. All factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919-299-8767.

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.

WELCOME to Maritime Mobile service net, 14317 Khz, daily 7:30Z. Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

SELL swap and buy ancient radio set and parts magazines. Lavery, 118 N. Wycomb, Landsdowne, Penna.

DUMMY Loads, 1 KW, all-band, \$7.95; wired, \$12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 625 West Jackson Blvd., Chicago, Ill. 60606.

QSL Cards??? America's finest!!! Personalized made-to-order. Samples 25¢. Deluxe 35¢. Religious, 25¢ (retunded). Sakkers, W8DED, Box 218, Holland, Michigan 49423.

C. FRITZ—QSLs that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85232.

QSLs "Brownie" W3CJL, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

QSLs stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs—SMS, Samples 25¢. Malgo Press, Box 375, M.O., Toledo, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

10¢ Brings free samples, Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo, 63118.

QSL, SWL, cards that are different. Quality Card stock, Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

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.

RUBBER Stamps \$1.15 includes tax and postage. Clints' Radio, W2UDD, 32 Cumberland Ave., Verona, N.J. 07044.

QSLs, finest YLRI's, OMs samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

3-D QSL cards, recognized leader among raised designs. Compliments aplenty! Prized collector's item. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

QSLs, Free samples, attractive designs, Fast return. W7IIZ Press, Box 2387, Eugene, Oregon 97402.

QSLs, SWLS, WPE, Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLs, samples, 10¢. Fred Leyden, WINZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

QSLs 300 for \$4.35, samples 10¢. W9SKR, George Vesely, Rte #1, 100 Wilson Road, Inglewood, Ill. 60041.

QSLs 3-color glossy 100, \$4.50. Ritters Vari-Typing Service, Free samples. Thomas SL, Riegel Ridge, Millford, N.J. 08848.

QSLs-100 3-color glossy \$3.50; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

SHARP QSLs, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

QUALITY QSLs: Samples 25¢ (Refundable) R. A. Larson Press, Box 45, Fairport, N.Y. 14450

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for \$1.00 or 10 for \$3.00 prepaid and guaranteed. Free sample to Dealers or Clubs. Tepabco, John, K4NMT, Box 1987, Gallatin, Tenn. 37066.

QSLs by KIFF, \$2.00 for 100. OSLs at reasonable prices. Samples 25¢ deductible. KIFF OSLs, Box 33, Melrose Highlands, Mass. 02177.

QSLs, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

QSLs Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-\$3.00 up. Samples 15¢. Agent for Cali-D-Cals, K2VOB Press, 240 West Kinney St., Newark, New Jersey 07103.

QSLs, WA6QAY Press, 15008 Orchid Ave., Poway, Calif. 92064.

RAISED Lettering QSLs. Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSL cards, Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

RUBBER Stamps Return mail delivery, postpaid. Basic price, \$1.00 first line, 50¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

QSLs, By Jansen, K2HVN. Samples, 25¢, 860 Atlantic St., Lindenhurst, N.Y. 11757.

BADGES, Engraved laminated plastic 1" x 3". Call and your first name, also for "KYL" and "Jr. Op" \$1.25 each, prepaid. Club badges designed, K6PBE, Box 1307, Alhambra, Calif. 91802.

NAMEPLATES, Call Letters, wall pressure-sensitive, \$2.00; desk type, \$2.50. Kronenberg, 1492 High Ridge Road, Stamford, Conn. 06903.

ENVELOPES! Amateurlized wid ur call, adrl! \$12.00 per 1000. K3ZWA Press, R. 1, Elizabethtown, Penna. 17022.

MANY Extras! Free samples!! K.L.L. Press, Box 258, Martinsville, New Jersey 08836.

RUBBER Stamps, 3-line address \$1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

100 QSLs, \$1.25 and up, postpaid. Samples, dime. Holland, R3, Box 649, Duluth, Minn. 558031

SUPERIOR QSLs, Glossy stock, best service, new owners. Samples 20¢. Ham Specialties Co., 402 E. Washington, Bloomington, Ill. 61701.

YOUR Call engraved White Plastic with Black letters or reverse. Choice lapel bar or tie-clasp, \$1.45. Also 1/2" x 6" wall signs, \$7.95. E. W. Gorb, W2DF, Box 213, Farmingdale, N.Y. 11735

MANUALS for surplus electronics, List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual \$3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

1916 QSTs needed for personal collection. Price secondary, Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred. 12% of cost, some in stock. Professionally wired, Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

JOYSTICK Variable frequency antenna systems, solve space problems. Available immediately. SWL Guide, 218-S Gifford, Syracuse, N.Y. 13202.

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) WAJker 5-7003

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.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual Editions 11, 12. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

RTTY gear for sale. List issued monthly, 88 or 44 Mhz toroids, five for \$1.50 postpaid, Elliott Buchanan & Assoc., Inc. Buck, W6PVC, 1057 Mandana Blvd., Oakland, Calif. 94610.

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone has extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

WANTED: Model #28 Teletype equipment, R-388, R-390A, Cash or trade for new amateur equipment. Alltrons-Howard Co., Box 19, Boston, Mass. 02101.

NOVICE Crystals; 40-15M, \$1.33, 80M, \$1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDs, 88 mh uncased, \$5/2.50. Postpaid, Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Military and commercial laboratory test equipment. Electrocrafter, Box 13, Binghamton, N.Y. 13902.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts. 617-958-2530 for the year u want at the prices u want to pay.

ESTATE Liquidation, SSAE brings list quality equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

3000 V @ 3 mif brand new GE Pyranol oil capacitors, \$3.00 each. Can mail, 3-lbs, each shipping weight. FOB P. Wandell, RD #1, Unadilla, New York 13489.

TELETYPE Gears, shifts, keytops, typebars, motors, forks, typeboxes, typewheels, punchlocks, nonoverliners, CR-LFS TRS, TDs, KSRs, ASRs, FSCs, toroids, fresh paper, testsets, SRT subchasses. Buy, too! Typetronics, Box 8873, Ft. Lauderdale, Fla. 33312.

TOOBES—Transceivers: New, unused, 6146B, \$4.00; 6CW4, \$1.60; 81T-A, \$4.25; 417-A, \$4.50; 6146-A, \$2.95. Free catalog. Vanbar Distributors, P.O. Box 91z, Paramus, N.J. 0765.

1000 PIV 1.5 amp, epoxy diodes, includes by-pass capacitors and resistor. 10 for \$3.75 pnd U.S.A. Fully warranted. East Coast Electronics, 123 St. Boniface Road, Cheektowago, N.Y. 14225

NATIONAL Incentive Licensing poll results: 639 against and 178 for incentive licensing. Thank you, WB2NOD, SCARC, Box 685, Moravia, N.Y. 13118.

MORE DX with a new QSO Phrase Book—Spanish, German, French, Russian, \$3.00. M. Holubov, VEZBAG, 22 Vaudreuil, Bale Comeau, P.O., Canada.

FREE Copy to hams (limited supply) National zipcode directory flyer. Send for your copy. E. McIvor, Box 8151, Rochester, N.Y. 14617.

A.W.A. Historical Radio Meet for old time amateur and commercial operators, hams and collectors. Smithsonian, Washington, D.C. Oct. 5th. See Hamfest Column for details.

OFFER \$10 for May 1913 Elec. Experimenter, \$3, Oct. 1914; \$2 May 1919; \$5 1919 issues Radio Amtr. News; \$10 any 1908 Modern Electrics; \$10 gov't. amtr. Callbooks 1922-26. Less for later dates, or poor condition. For historical library, none sold. Wayne Nelson, W4AA, Concord, North Carolina 28025.

YAESU FT-DX-400 transceiver for sale. W8AO, 2942 River-view Blvd., Silver Lakes Village, Ohio 44224.

SALE: Heathkit DX-60, \$50.00 Heathkit HG-10 VFO, \$25.00. Both in excellent condition. Hal Kusner, WB2PHW, 21 Charles Court, Fair Haven, New Jersey 07001.

HALLICRAFTERS HT-37, perfect electrical cond. All new tubes, \$200. No trades, please. L. E. Herring, Jr., WB4ARK, 2805 Glendale Rd., Charlotte, N.C. 28209.

WANTED Lampkin mod. 105B frequency meter and modulation meter model 205-A, XE2Q, J. R. Agraz, P.O. Box 554, Hermosillo, Sonora, Mexico. Tel: 3-54-46.

SELL Or trade: QST, CO, Electrical Experimenter, Radio, Modern Electronics Wireless Age and Callbooks, any quantity. Wanted: Old radio gear, books and magazines, Ery Rasmussen, 164 Lowell, Redwood City, Cal. 94062.

FOR Sale: Thunderbolt. Complete with spare tubes. Will ship, \$225.00. K6HLO, 511 Oak St., Roseville, Calif. 95678.

MUST sell: SX-115, \$350.00; HT-37, \$300 (or both \$610.00). Autronic Keyer with W8FYO paddle, \$75.00; RME DB-23 pre-selector, \$25.00; T-R switch, \$15.00. All in perfect condx. C. Lachterman, 3 Archer Lane, Scarsdale, N.Y. 10583.

WANTED: Tuncable capacitively loaded coaxial cavity for 6M, 1 kw, rating. WA8VQS, 1792 East 32nd St., Cleveland, Ohio 44114.

WANTED: Comanche tuning scale. WA6OAY.

FOR Sale: SB-301, c.w. crystal, \$265.00; HD-10 keyer \$25.00; 14 AVQ antenna, \$15.00; Kn.rht SWR meter, \$7.50; Grid di meter, \$10.00; Z scope, \$35.00, Elco VTVM, \$20.00. C. D. Maserang, 3408-29th, Lubbock, Texas 79410, Tel: a.c. (806)-795-6788.

1000 PIV @ 1.5 amp, epoxy diodes includes disc bypass, caps and bridging resistors. 10 for \$3.75. Postpaid USA. With diode purchase 125 Mf. at 350 volt electrolytic capacitors, 504 each. Postpaid USA, no limit. East Coast Electronics, 123 St. Boniface Rd., Cheektowago, N.Y. 14225.

SELL. Hallicrafters HT-32, \$220; SX-101A, 180; Hy-Gain 18AVO, \$35.00; Alliance rotor, \$20; Knight-Kit SWR meter, \$10. Must sell. Michael Prust, 514 North Washington, St. Peter, Minn. 56082.

WANTED: Microwave gear, waveguide, couplers, mounts, etc., for group starting experimental amateur work. Send list and prices to S. Daskam, K2OPL, RD #2, Box 360, Flemington, New Jersey 08822.

WANTED: Hallicrafters SX-28, SX-28A, SX-32 or SC-42 receivers. Howard Hoagland, Jr, 639 North Sierra Bonita Avenue, Los Angeles, Calif. 90036.

WRL's used gear has trial-terms-guarantee! G2-8, \$129.95; Comm II-V meter, \$89.95; SR-46, \$94.50; HW12, \$89.95; HW42, \$89.95; SB33, \$19.95; Galaxy III, \$189.95; Galaxy V, \$289.95; Galaxy V Mk II, \$329.95; Galaxy 300, \$159.95; AM68, \$69.95; HX50, \$199.95; RME6900, \$149.95. Hundreds more. Free "Blue Book" list. Write WRL, Box 919, Council Bluffs, Iowa 51501.

SALE: Sony Micro TV and rechargeable batteries, \$80.00; Zenith Royal 1000D Transoceanic, \$70; Emerson Wondergram phono \$15; Airline CB transceiver and case, \$15; Kidde ultrasonic intrusion alarm, best offer; Tuna-Sol proximity detector, \$15; Simpson 262 VOM, \$25.00; CIE course and Pickett circular rule and Geniac calculator, \$10.00; CRI Engineering course, #200, \$30; Sears citation 88 mil, best offer. B & K Dynaquick 500 tubester, best offer. Witmer, 3122 N. Harding, Chicago, Illinois 60618.

MECHANICAL Filters from R-390A receiver, center frequency 455 Kc., bandwidths: 8 kc, 6 kc, 2 kc. \$70 each. R. L. Cramer, 208 E. Lloyd St., Ebensburg, Penna. 15931.

FOR Sale: SR-150 AC supply, with mike, \$275.00. HO-170 clock-speaker, \$165.00; HT-37 spare finals, \$190.00. 6S101 linear, solid-state p.s., \$125.00. All units in mint condx. Jack Marino, 503 Farm Ranch Rd. E., Bethpage, L.I., N.Y. 11714.

PRE WORLD WAR I licensees who are entitled to an Amateur "Extra" license but unable to prove it, will be glad to know the Old Old Timers Club has all the early Callbooks plus lots of other information to help you prove your case. No cost to members. Write to W5VA Secretary, Old Old Timers Club, P.O. Box 840, Corpus Christi, Texas 78403.

CHANGING Transmitters. Sell Apache with SB-10. Extra-able VFO. FSK unit wired in. \$100 or your best offer. W4IRE, 2400 Hoyt St., Winston-Salem, N.C. 27103. Tel: (919)-725-3432 evenings.

SELL: Drake 2B, 2AQ, xtal cal an HT-37 for \$400 or best offer. Both excellent condx. Write S. W. Selfridge, Rte 2, Box 3435, Carmel, California 93921 or Tel: (408)-624-8813.

FOR Sale: SR-150 and p.s. \$380.00; also SB-200, in exlnt condx. \$190.00. Jim Wisneski, WA1DLM, 81 Hoover Avenue, Bristol, Conn. 06110.

DRAKE L-4, \$500.00; T4X \$300.00; R-4A, \$300.00, P/S \$500.00. Package deal: \$1000.00. HQ-170AC, \$150.00; Z-Match, \$50.00; Drake, in mint condx. Son's illness forces sale. Don Johnson, Wesson, Mass. 39191.

WANTED: TV Amateur transmitter, Lingmister V-2050. State condition and price in letter. Walt Stock, W4IIS, 117 N. W. 100 Street, Miami Shores, Fla. 33150.

CHRISTIAN Ham Fellowship being organized for Christian fellowship and gospel tract efforts among licensed amateurs. Christian Ham Callbooks, \$1 donation. For details write to Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan.

SELL Model 19 teletype, excellent condition, \$240.00. W2GJJ, C. Vinson, 2796 Larkspur St., Yorktown Heights, N.Y. 10598.

DRAKE 2NT, \$85.00; Knight T50, needs work. In orig'nal carton: \$15.00. Other Novice gear, Box 2134, Thibodaux, Louisiana, 70301.

HEATH HX20, HR20, ACPS, all band SSB c.w., \$190.00. Sixer, mobile supply and strip line filter warranted Maximum TV suppression \$50.00. WA3CDV, Tom Sullivan, 11 Monterey Dr., Newark, Delaware 19711.

FOR Sale: Heath HW-16 transceiver. In exlnt condx. Manual included. \$90.00. WA5TJG, Owen Thornton, 5136 Kaywood Drive, Jackson, Miss. 39211.

SELL: Galaxy 2000 and linear, 54 ft. crank-up tower, TR-44 rotor, RCA AR-88 receiver, Heathkit HM-11 SWR Bridge, DK60-G2C Dow Relay, IT-30 Mic. VOX, low pass, and more. Make offer. WA0FNS, Starbuck, Minn. 56381.

SELL HQ-180AC receiver, \$250.00 firm or trade for Heath SB-401. P. Herndon, 2212 NW 40th, Lawton, Okla. 73501.

WRITE, Phone or visit us for new or reconditioned Collins, Drake, Swan, National, Galaxy, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, Henry Linear, towers, rotators, other equipment. We try to give you the best service, best price, best terms, best trade-in. Write for price lists, Henry Radio, Butler, Missouri 64730.

SBE-33 Transceiver, like new, \$160.00; Johnson Matchbox, \$30.00, K2ZHH, Richard Gelman, 2196 Smith St., Merrick, N.Y. 11566. Tel: 516-378-0063.

HT-44, PS-150, \$275.00; SX-117, \$225.00. Buy both for \$475.00 and get microphone and tubes. WB2QLU, 253-42 87th Drive, Bellerose, L.I., N.Y. 1426.

SELL: Heath HX-10 Marauder, \$200. Hammarlund HO-170C, \$150.00. H. M. Sullivan, Box 312, Maple Shade, N.J. 08052.

HA-350 receiver and speaker. Like new condx. \$110.00 or your best offer. W2WHK, 210 Utica St., Tonawanda, N.Y. 14150.

SELL: DX-100 (modified), \$75.00, SX-100, \$125.00. In exlnt condx. W9FWR, 55 Almeida Terr., Apt. 21, Portsmouth, Rhode Island 02871.

AMECO TX-62 transmitter, VFO-621, Waters Nucvter 6 and 2 converter; Hy-Gan 6 and 2 beam, plus Navigator transmitter, complete Hustler 5-band mobile antenna set. Bill Miller, WA4JAY, 6251 S.W. 44th Street, Miami, Florida 33155.

MILLEN Monitor Scope, Model 90932, \$79.00; Heath Tunnel Dipper, \$19.00; Joystick DeLuxe antenna, \$16.00. All three: \$100. F.o.b. Melrose, Mass. All mint condx with manuals. Richard Hardwick, W1FRX/WA4ND1, 186 Lincoln St., Melrose, Mass. 02176.

HALLICRAFTERS HT-32B and SX-115 AM. CW, SSB, RTTY. Both are in A-1 mint condx electrically and physically. \$700. Will sell separately! Mike Match, WA9NNV, 11001 Ewing Ave., Chicago, Ill. 60617. Tel: (312)-768-3099.

FOR Sale: SX100, \$180; D06X0, \$50; T150A, \$80; RW381 electronic T-R switch, \$40; EV-729 mike with stand, \$10. All in mint condx, with manuals. Novice crystals and extra tubes. Complete package: \$320. Carl Porter, W1ZLX, 19 Penniman, Braintree, Mass. 02184. Tel: 843-9418.

GOING TO college! Must sell Thor VI, complete, in mint condx, \$145.00; Heath Sixer, \$55.00; Heath GR54 receiver, \$45.00; Viking Valiant I, \$120.00. Antique Kever, \$38.00. List of other John's Kaxstys, WA2VHW, 18 Hillcrest Terrace, Linden, N.J. 07036. Tel: (201)-486-6917.

MOVING TO mobilehome. Must sell treasured QSTs. Miscellaneous issues 1923 to 1935, and almost all 1935 to date. W6SL, 5430 Carlson Dr., Sacramento, Calif. 95819.

SELL: QSTs 1930-1960. Wireless Engineer July-Dec. 1930; Jan.-Dec. 1931 thru 1934. Any reasonable offer. John Glauber, 798 Appleby St., Boca Raton, Fla. 33432.

SELL: Heath TX-1 Apache and SB-10 Sideband Adaptor, manuals, both for \$150.00. Mint HQ-170-AC, matching speaker, manual, original carton, \$250.00. Will ship. Dave Chambers, K6DNY, 2941 Vassar Drive, Visalia, Calif. 93277. Tel: (209)-732-9239.

BRAND New factory-sealed cartons. Hallcrafters SR-160, \$250.00; P-150-AC, \$80.00. P-150-DC, \$90.00. CDR antenna rotors, TR-44, \$50.00. All above F.o.b., H D H Sales Co., 170 Lockwood Avenue, Stamford, Conn. 0902.

JOHNSON Invader for sale. Good SSB rig. Your best offer. No shipping. sry! W1FVU, 06074.

SELL: UTC CG 308 transformer, [10/220 prim, 3500-0-3500 at 500 Ma. Srv. can't ship. W2EZM, 431 Oakland, Maple Shade, N.J. 08052.

FOR Sale: Like new condx. SB-200, \$195.00. You pay shipping. Robert Dukes, 834 Butler, Bolivar, Tennessee 38008.

WANTED: RME84 receiver in good operating condition. Blake, K1CPW, Summer St., Andover, Mass. 01810.

ELECTRONIC Kever, Heath HD-10. Excellent condition. \$27.50. William Cunningham, 2231 Hilton Avenue, Columbus, Georgia 31906.

NCX-5, NCX-A power supply, factory converted to Mark II, remote VFO. Like new, \$575. You pay shipping. Ed Bude, 12830 Cold Springs Road, New Berlin, Wisconsin 53151 (Milwaukee area). Tel: 414-786-5461 after 6 PM my time.

COUNTY Hunters maps, 23" x 35", listing the 48 states and all counties, \$1.50. Postpaid. Cameradio Company, 2801 Liberty Ave., Pittsburgh, Penna. 15222.

SWAN 500 with 17XC A.C. p.s. In original cartons, used 5 hours. First \$475.00 takes both. Johnson 275 watt Matchbox, \$40.00. K0GXL/6, NS-36, Lincoln Ryan, Bellflower, Cal. 90706. A.C. 213-925-0736.

JOHNSON SW, \$190.00, 17C-30, \$120.00. W0EQU, 1822 S. 17th St., Grand Forks, N. Dak. 58201.

RTTY Typewriter, late used. In gud condx. Underwood. All caps. \$24.50. F.o.b. Hathorne, P. E. Boniface, 13 Hazen, Hathorne, Mass. 01937.

FOUR 4CX250R/7580 tubes. New unwrapped. Also Heathkit SB10 SSB adapter. Offers? Joe, WB6WLH/3, 12513 Summerwood Drive, Silver Spring, Maryland 20904.

COMPLETE Drake station, mint condx. R4, MS4, T4X, AC3 plus Shure 520SL mic, \$700. Joe Heffler, WB2QFR, 2200 Morris, Bronx, N.Y. 10453. Tel: (ac.) 212-295-1694.

FOR Sale: Drake 2B with 2B0 in like-new condx. \$700.00; DX-60, \$45.00, Heath HG-10 VFO, \$25.00, Robert Waugh, WA9IOM, 4660 Calumet Ave., Fort Wayne, Indiana 46806.

SELL: Collins 75S-3B with additional 500 Kc filter, \$550; 32S-1 and 51F-2, \$425.00; Henry 2K, \$475.00; SBE-33 with SB-2 DC supply and carrying case, \$245.00. All excellent with manuals and cartons. K6BYW, Dave Fulton, 4955 Palo Dr., Tarrana, Calif. 91356. Phone a.c. (213)343-7641 evenings.

GROUNDED Grid filament chokes, 30 amps, \$4.00; plate chokes 800 Ma, \$2.00 pp. William Deane, 8831 Sovereign Road, San Diego, Calif. 92123.

MISC gear of an ex-ham. Tubes, metal, glass, old, new, 1625, 803, 24G, 715A, 3AP1, 902, etc. Mostly 1930-1955 receiving types. Antique receiving gear. Variometer in carton, collapsible loop antenna, etc. Capacitors, transformers, dynamo 6/12 v.-500 v. 160 ma. R(8-8)/U 105 ft.; RG-11/U 4 pcs at 30 ft., 2 pcs at 31 ft., 28 ft 2 ft.; 1 pc at 5 1/2 ft., 12 ft., 17 ft., 24 ft., 25 ft. Offers accepted. J. Lee, Box 664, Plandome, L.I., N.Y. Tel: a.c. (516)-767-4422.

SALE: Polycromm 2 M xcvr 40 hours new (going transistor). Only \$175.00 or best offer. Dan Winkler, WB6HBL, 633 West 171 #56 NY, N.Y. 10032.

SELL: HT-32, \$220.00; SX-101A, \$160.00. Best offer. Knight SWR meter, \$10.00, 18 AV0, \$35.00, Alliance rotor, \$20.00, Michael Prust, 314 North Washington, St. Peter, Minnesota 56082.

HALLICRAFTERS SR-150—mobile rack—A-C and D.C. pwr. supplies, \$400.00 plus shipping in A-i condx. R. Drobbish, 1316 S. Fernandez, Arlington Hts., Ill. 60005.

WANTED: January 1961 issue of 73. Please state condition and price. W2DYY, Russ Schroeder, 469 Salt Road, Webster, N.Y. 14580.

HAMMARLUND 170 receiver, SSB, clock, lists \$380. Selling for \$140.00. Lafayette 90-watt transmitter, \$35.00. Lafayette VFO, \$20.00, WB2HXY, 684 Diellen Lane, Elmont, N.Y. Tel: 516-VAS-5342

QSTs, 1917 thru 1967. Complete, originals, mint condition. 1917-1950 run in binders. Price of QSTs includes all extra QSTs, CQs, Radio Magazines, Handbooks, Callbooks. Original copy 1908 Modern Electrics, like new, \$15.00. B. Kurtz, 515 E. Grand Avenue, Springfield, Ohio 45505. Tel: 322-7464 after 6 PM.

FAMOUS-For-Reliability 2-meter station. Built for longevity! Rack mounted RF and modulator subassembly. Sep. audio and RF pwr. supplies. Relay controlled PTT. VFO. Operated at 30W, minor change will put in 50W, Commercial converter. Tuneable IF strip. Spare tubes incl. 5894, diaphragms. Approx. \$150.00. SX101/3, 20A, VFOs, 200W linear, T/R switch, spare tubes, approx. \$275.00 plus spkr, mike and antenna and you're on the air! Budd Meyer, 5605 Yellowstone Blvd., Forest Hills, L.I., N.Y. 11375. Phone 726-2600/459-3491.

SELL Drake T-4X, R-4A, AC-4, MS-4, like-new, used only about ten hours, in original packing, with warranty cards: \$695.00 Marvin Fein, W2AH, 151 Rock Creek Lane, Scarsdale, N.Y. 10583.

SELLING: Shawnee 6 meters. Ameco preamp ahead of receiver, \$150.00. RCA 2-meter FM 146.94. Hybrid receiver and supply. Xmttr 50-60 watts, \$175.00. WA9KJX, Howard Salzman, 3846 Birchwood Ave., Skokie, Ill. 60076.

WANTED: Navy R/C bridge tester, ZM-11/U. Also 50-0-50 DC Ma. meter, George Leininger, WB0ZF, 16412 Marcus Ave., Cleveland, 11, Ohio.

OMS: Error in my August Ham-Ad. 75A3 item should have read 75A3 and vernier knob, \$250.00. James W. Craig, 29 Sherburne Ave., Portsmouth, N.H. 03801.

SELL: Davon DR-30 receiver. Perfect condition. Used two months, \$25.00. Will ship. Grant C. Schaefer, W0DBO, Box 95A, Star Route, Littleton, Colorado 80120.

COLLINS KWM-2 serial 11947. Waters rejection tuning; PM-2 AC portable supply and CC-1 suitcase, \$845.00. W2-DFS, Ralph Amursky, 45 Barry Road, Rochester, N.Y. 14617. Phone 716-266-3312.

PREPARE For new FCC exams! You need Posi-Check. Multiple choice questions, diagrams, explained answers, IBM sheets for self-testing. Same form as FCC exams. General Class, \$3.25; Advanced Class, \$3.50; Extra Class, \$3.75. 295 to 400 questions or diagrams in each. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 26¢ per copy for first class mail; 54¢ for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

FOR Sale: Complete 1-year old Drake station, low hours, no scratches, with cartons, T4-X, R-4A, MS4 speaker and AC4 supply EV-630 mike for only \$675.00. Phone after 6 PM. C.D.T. 812-4259857, Porter Barnes, 2922 Muensterman Ave., Evansville, Indiana 47712. W9CKF.

MOHAWK Receiver, \$115.00; Heath 2-1/2 watt hand 57 tube, \$45.00; Homocore sweet generator, \$23.00; Fosley TH-31, \$20; W2AZL 2M converter, \$195.00; QST, \$25.00; Sola 300VA constant volt xltmr, \$10.00. QSTs, 1940-1968. Write. WA2RKKW, 1320 Abington, N. Tonawanda, N.Y. 14120.

SELL: R-388 (Collins) receiver, \$200. B&W 5100B transmitter, \$120.00. Both units are in exlnt condx in every way! J.R. Bergeron, W2YLG, 3731 Sweet Road, Jamesville, N.Y. 13078.

SX-100, \$125.00. Good DX-100, \$80.00. Will sell or trade for TR3-TR4 or Swan 350 and pay difference. W9ZMK 4526-13th Ave., Rock Island, Ill. 61201.

NEED Funds Swan 250 and AC power supply with cabinet. \$100. Joe Carter, WA0FFK, Room 423, Morgan Hall, W.P.I., Worcester, Mass. 01609.

HALLICRAFTERS SR-150 and matching power supply, \$325.00. HA-6 transverter and power supply, \$125.00. Both nice units. You pay shipping. Want: 32S-1 or 32S-3 with power supply. Larry Payne, 121 Pepperidge Lane, Battle Creek, Michigan 49015

HRO-60 with xtal calibrator, standard coils and 15 meter coil, \$365.00. Central Electronics slicer with O-multiplier, \$65.00. Both for \$400.00. Will deliver within 250 miles radius. Vt. Casier, 34 Mountaintop Ave., Washington, N.J. 07882. Original owner.

SELL: HW-32 in exlnt condx, \$70.00; also Novice receiver, SX-110, like-new, with 2nd set of tubes, \$70.00. Paul Bowman, WA4OBM, 210 B Dchart Street, Blacksburg, Va. 24060.

CEGG Zeus, Interceptor B, all-band converter, in mint condx. used less than one year. Original factory cartons, all manuals. Will sell all or part first m.o., or certified check for \$650.00. Best offer. K4KTP, James Maxwell, 1233 Leeward Street, Memphis, Tenn. 38122.

ANTENNA Security? Over 1200 highly corrosion-resistant threaded and washer items. June ad, page 159. We match samples. Quote your needs! Ham Hardware Headquarters, Valt Strasser, W8BLR, 29716 Briarbank, Southfield, Michigan 48075.

QSTs for sale: 1924-1949. Run is complete, \$75.00 and shipping, W81NB, 9 Valley View, Vienna, W. Va. 26101.

BRAND New Ham-M, \$95.00; like-new TH-4, \$65.00. Brand new Hy-Gain 5BD0 80-10 M. KW trap doublet, \$25.00. WA2AS1/1, 48 Offutt Rd., Bedford, Mass. 01730.

To Settle estate of W2ARW: Sell Collins KWS-1 with new 4CX250Bs, \$550.00; Collins 310B-1, \$75.00; Gonson 2 and 6 meter VFO, \$30.00; Milken 2-6-10 meter transmitter and modulator, \$65.00; Hallcrafters SX-110-111A, \$150.00; SX-71, \$100.00; SP-44, \$50.00; Sonar SR-120, \$50.00; Heathkit HO-10 modulation monitor, new, \$50.00. Send for list of other goodies. Will pack and ship collect. W2FNF, Mike Rosenberg, 35 Strawberry Lane, Roslyn Heights, N.Y. 11787. Tel: 516-MA1-4798.

THORDARSON Flexible 1 K.W. wireless transformers made in 1913. Must be in gud condx. R. K. Golka, 38 Park St., Brockton, Mass. Tel: 617-387-5994.

COLLINS 75S-3B for sale, \$400.00. New condition. Sam Davis, WASDRS, 5766 St. Katherine Ave., Baton Rouge, La. 70805.

DOUBLE Birthday present: Sell brand new SWR bridge. Microwave devices Model 26 coupler, and 262 indicator, \$30.00. Will ship. WA1CRS, 35 Sunnybrook, Waterbury, Conn. 06708.

FOR Sale: Complete Heathkit DX-100B xmt and Heathkit SB-10 SSB adapter for c.w./a.m./s.s.b. operation. All conversions including grid block keying, solid state HV power supply, chrome knobs, complete conversion for s.s.b. using SB-10 with DX-100B. Runs 200 watts d.c. input. Manuals and connecting cables included. Will accept reasonable offer. WA3HJR, 1626 Moss St., Reading, Penna. 19604.

FOR Sale: HT-37, \$225.00; SX-101 Mark III, \$140.00, both are in exlnt condx. WRKYH, G. Reazer, 8354 Luster Dr., West Chester, Ohio 45669. Tel: 513-777-3756.

SELLING 2 meters: Ameco NuVistor converter 7-11 Mc. out, p.s., used only 10 hours, \$360. Handbook exciter, p.s., 8700 Class C amplifier, p.s., Eico 730 modulator, also TX-86, 80-W a.m. c.w., P.S. Dow-Koy. Make offers any piece or pieces. Howard Ball, WB2PUL, 2700 Grand Concourse, Bronx, N.Y. 10458. Tel: LU-4-0316.

SELL: 75A4 Ser. #2036, 2 filters, in mint condx, \$400. Seneca, VHF-1, trans, \$90; 12V G-E TPC, FE43JA6, 10w, w/a.c., \$175.00; Geiger counter, precision Model 1074, \$20.00; new 813 tubes, \$10.00; Hallcrafters SR-150 with a.c. and d.c. supplies, \$350.00; RA-42, adjustable power supply, 0-300 v.d.c. \$115.00. M. H. Klapp, W2EQV, 25 Gladwish Rd., Delmar, N.Y.

BIRD Wattmeter, \$75.00; pair of new meters for #43 or #43 line sections, \$150.00 ea.; 59 mcacycle meter, \$95.00; Eico transmitter, SB-100 Mil., \$150.00; Clegg Zeus, \$290.00; BC-221, \$45.00; T-323, \$85.00; T-3-186, \$125.00; Heath 10-12, \$50.00; 10-30, \$39.00; 432 Mc. rcvr., \$35.00; 6939, 7289, Communicator VFO, miscellaneous. List, stamp, WA4PI, Box 4095, Arlington, Va. 22204.

SB-34, HD-600 mike, mobile antennas, \$325.00. RCA Radiola. Atwater Kent 55C, old books, \$100. Gary Henman, Fairmount, Indiana 46928.

SELL: Receiver, Hallcrafters SX-111, good condition, \$115.00. Ed Steeve, W9ZWC, 7122 N. Odell, Chicago, Illinois 60631.

COLLINS 32S-1 and 75S-1 for sale, \$550.00. W. F. Hamilton, K5DFZ, 5505 Valerie Street, Houston, Texas 77036.

SALE: SX-146 receiver, Ameco TX-86 transmitter, M-1070 supply, V-10 VFO, converters, antennas, WA0NLR, 715 Tyler, Apt. # 36, Topeka, Kansas 66603.

SELL: 238 OSTs, from 1930; 132 COs from 1946; miscellaneous Callbooks and Handbooks. Make offer for the lot: BC221 with book and 110 VAC p.s. \$45.00. W2EXX, 58 Birch Place, Buffalo, N.Y. 14215.

SACRIFICE: NCX-5 transceiver with NCX-A a.c. power, and speaker; has solid state balanced modulator and crystal calibrator, manual and original cartons. Factory working condition and in mint in appearance! First \$460.00 sets it or will consider best offer. M. Eidson, W5AMK, Box 96, Temple, Texas 76701.

SALE: KWM-2 and 516F-2. P.s. Both two years old. Absolutely no scratches. Perfect mechanical and electrical condx. No modifications. Contact M. E. Williams, 1408 Quill Dr., Plano, Texas. 75074. Tel: 214-945-7309. KSUFL.

WANTED: Used radio correspondence course. For sale: Invader 200, exlnt condx, \$285.00. W4TZY, 6985 Malealeuca Rd., Cocoa, Fla. 32922.

WANTED: Johnson Navigator. State price and condx in your first letter. Will pay shipping. Pete Burbank, W4VCT, 409 Granite Circle, Lexington, Ky. 40503.

APACHE with manual, in exlnt condx, \$100.00. Will crate you pay freight. K3TDD, Dave Jones, Quevic Drive, RD #4, Ballston Spa, N.Y. 12020.

NOTICE To all amateurs! Notice to Extra Class! We will make you as good a deal, cash or trade, on your needs of new or reconditioned used gear. We also have demos at reduced prices. We have all leading lines of new amateur gear. Good reconditioned, used gear. Fully guaranteed. Factory reconditioned KWM2 with 516F-2 A.C.P.S., like new, \$800.00. 30L-1, \$350.00; Galaxy V Mk II, \$365.00; Johnson Invader 2000, \$350.00. Write or call for new listing of used gear at bargain prices. Bob's Amateur Electronics, 927 N.W. 1st, Oklahoma City, Oklahoma 73106. Tel: 405-CE5-6387.

SELL: Collins KWM-2 and matching a.c. power supply 516F-2. In perfect condx: \$700. Tel: 419-293-3500. WA8GGC, John Breecce, 295 S. Main, McComb, Ohio 44858.

B-24, all-band mini-beam, \$20.00. B&W 600 grid dip meter, \$18.00. Art Billington, W4UYH, 11421 SW 40 Ter., Miami, Florida 33165.

SB-100 Heathkit. Perfect shape, not a scratch, very little use. College expenses forces quick sale, \$225.00 with a.c. power supply. WA3AOF, James Lunt, 8434 Ardleigh St., Philadelphia, Penna. 19118.

HEATHKIT Apache TX-1, 150-watt AM, CW, 80-10 meters, in exlnt condx. With manual, \$50.00. Will demonstrate. Will not snip, sry. Acute Smith, W6JOM, 3649 Cedar Avenue, Long Beach, Calif. 90807. Tel: (213)-426-6098.

COLLINS 75S3B, \$425.00; 75A4 with 6 kc. 2.1 and 800 cycle crystal Ser. #4606, \$39.50. Money back guarantee. K1AGL, Stanley Parryka, 141 Waite Ave., Chicopee, Mass. 01020. Tel: 413-592-2952 person-to-person, please.

HEATHKIT SB Line: SB-100 transceiver, \$320.00; HP-23 AC supply, \$39.00; SB-600 speaker, \$14.00; SB-610 scope, \$59.00; SB-630 console, \$69; package deal: \$450.00. Poly Tri-quad, complete with coax, copper wire, fiberglass spreaders, heavy duty aluminum boom and "X" mounts and 3 band remote switching unit, \$79.00. All professionally wired, and in mint condition. W2BGND, 196 So. Hewlett Ave., Merrick, L.I., N.Y. 11566.

NATIONAL NC-300 receiver, in excellent condition, with crystal calibrator, speaker, headphones, manual, \$175.00. 1227 Bay Park Place, Far Rockaway, N.Y. 11691.

SOUTHERN California. Communications receivers, transmitters and SSB transceivers repaired and realigned. Guaranteed work. Special problems invited. Eighteen years communications experience. Gates Marine Electronics, 255-A Marina Dr., Long Beach, Calif. 90803, K6GOC, Roger.

THOUSANDS Sold worldwide! Genuine "3-D" raised relief map of the world, Giant 28" x 18" size, including wood-grain style molded frame! Free wall mounting kit! 8 rich colors on heavy vinyl. Mountains stand tall, actually feel height and depth! A priced addition to your shack, and fully guaranteed. Rush \$5.95 for postpaid shipment. 3-D MAP Co., Box 221, Lake Grove, N.Y. 11755.

WANTED: Electronic test equipment (military and commercial) made by companies such as Tektronix, Hewlett-Packard, General Radio, Measurements, Stoddard and others. Also technical manuals, airborne and ground communications equipment, tubes, accessories. Highest cash prices paid. Write for our offer, Tucker Electronics, P.O. Box 1050, Garland, Texas 75040.

CRYSTALS Airmailed: MARS, Nets, SSB, Marine, CD, etc. Nivac 05% crystal \$1.50. Custom finished etch stabilized FT-243 .01% any kilocycle or fraction, \$500 to 8600, \$2.75. (Five or more this range \$1.75 each), (nets ten or more same frequency \$1.45), 1700 to 3499 and 8601 to 20,000 \$2.75, with overtones supplied above 10,000, 10,001 to 13,500 fundamentals \$2.95, Add 50¢ each for .005%, Add 75¢ each for HC-6/u metal miniatures above 2000, OST, Handbook, SSB Manual and other ARRL built crystals, groups and singles. Be specific. Write for order-bulletin. Crystals, Inc. 1933, Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

"HOSS Trader" Ed says if you don't buy your ham gear from him you might pay too much. Write or telephone the "Hoss" for excellent cash quotes and trades anywhere in the U.S.A. New equipment with factory warranty: BTT LK-2000 linear, \$649.00; SB-34, \$349.00; Swan 500, \$359.00; New Framarund HQ-215 receiver, regular price \$529.50, cash price \$419.00; new L-4 linear, \$479.00; new VX-501, National VFO, regular price, \$249.95, cash price \$129.00; new SR-400, \$649.00; new Galaxy V, Mk II, \$329.00; Rohm 50 ft. foldover tower, prepaid, \$199.00; new Mosley Classic 33 and demo Ham-M rotor, \$195.00. Used equipment: Drake 2-B, \$79.00; Drake 44, SX-11 and surplus \$95.00; W-115, \$79.00; TR-4, \$419.00; TX-XB, \$329.00; R-4-B, \$319.00. Ed, Moory Wholesale Radio Co., Box 506, DeWitt, Arkansas 72042. Tel: 946-2820.

WANTED: ARRL Antenna Book, second edition; will pay any reasonable price or will swap edition 3, 5, 8, 9, or 10. Chappell, 22206 Del Valle St., Woodland Hills, California 91364.

HY-GAIN DB-10/15 in excellent condition, \$49.50. Will deliver to within 100 mile radius. K0CKX, Tel: 319-338-1814.

HEATHKIT HW-16 c.w. transceiver, like new, \$85.00. WB2BOY, 624 E. Pine St., Millville, N.J. 08332. Tel: 609-825-3612.

SELL: Heath DX-100 xmt, gud condx, \$65.00. HM-15 SWR meter, exlnt condx. \$10.00. Fred, WA1HKV, 92 Leonard Rd., Hamden, Conn. 06514.

SELL: Heath KW linear, Drake 2-A receiver, NCX-3 transceiver, 30L1 linear, TA-33 beam, Heath monitor scope, Leon Steinberger, W2EVV, Tel: (212)-672-2432.

SELL: HT44 and PS150, new finals, \$225.00; HQ-170AC, \$775.00. Cartons, manuals, both clean, no marks. Sry, no shipping; you pick up. W3CFX, St. Michaels, Md. 21663.

DRAKE 2B, 2AO, O multiplier, 2AC calibrator, extra 10-meter stals. All are in mint condx. \$195.00. Sry won't ship. WA1AZW, Framingham, Mass. Phone 1-617-879-0013 after 4 PM my time.

HT-32, \$199; HQ-170A, \$199, together for \$380, with manuals. Both look, work like brand new. Inspection invited. Mitch, WB2UPB, Tel: 516-RO6-7097, 3403 First St., Oceanside, N.Y. 11572.

NATIONAL NC-300, v/clean: \$145.00; DX-40, VFO, HR-10, all exlnt condx: \$110.00; HA-230 gen. coverage rx exlnt, \$65.00, Wollensak 1980 perfect, like new, \$210. Steve WA2BUF, 116 Hudson Ave., Haverstraw, N.Y. 10927.

FOR Sale: Drake R-4 in mint condx, used v. little, \$300. Mosley 20 mtr. 3-element beam, new, \$33.00, 6 mts, transceiver, Lafayette HE-45, \$50.00. Henry Niklas, 1138 Dorchester Avenue, Dorchester, Mass. 02137. Tel: 617-288-5846.

GOOD Condition: DX-60A, \$55.00; HG-10, \$25.00, "Twoer", \$30.00. WA4YNU, Box 2248, Poquoson, Virginia 23362.

FOR Sale: Johnson K.W. complete with desk, Ranger driver, and coax T/R switch, all in gud condx. \$300.00, 3-section crank-up tower, \$100.00. Hy-Gain Tri-Band beam, \$35.00. Model 26 printer, \$30.00. Small prop pitch motor, \$25.00. W6JLZ, 4624 W. 63 St., Los Angeles, Calif. 90043. Phone 2945760.

COMPLETE Amateur servicing. Kits wired, tested, J-J Electronics, Canterbury, Conn. 06331.

TOROIDS, 88 and 44 mhy. Center-tapped, unused 5/\$1.50 pcd. 11/16" perf. tape and 3/box; RTTY page printer paper, \$3.50/cass. Hallcrafters HT-37, electrically perfect, \$175.00. HQ100AC, \$95.00, 2 meter Tocratt Criterion conv. \$30. Johnson 10 pass filter, \$8.00. Saturn 6 halo, \$9.00. Wanted; PTO for Collins 51J3, 2 meter transverter, RTTY gear. Stamp for list. Van, W2DLT, 302Z Passaic, Stirling, N.J. 07980.

HEATH SB-101, \$370; HP-23, \$49.95. Works perfectly. Swan 2-0, w/ matching a.c. supply, speaker built-in, \$250.00. You pay shipping. WIERX, Rowayton, Conn. 06853.

SELL; SX-100 Hallcrafters, \$125.00; Knight T-60 transmitter, \$35.00. All with manuals and in A-1 condx. Marvin Luedtke, 6209 Nasco Dr., Austin, Texas 78757.

CONTROL Panel lettering (On aluminum foil), 5¢ a word. Stamp and call brings sample! Samco, Box 203, Wyanntskill, N.Y. 12198.

MUST sell new stereo equipment for school expenses. All equipment is new in factory-sealed cartons. Sony 250-A (cost \$135), \$100; dual 1015 Changer and base (cost \$97.45), \$70; Rogan AT-400 40-watt stereo amp (cost \$139.95), \$95.00. All is new equipment in factory sealed cartons. Full warranty. Used amateur equipment. Galaxy V, \$255; AC power supply, \$50.00; HQ-170C, \$129.00; Heath TX-1 Apache, \$50.00; new Hy-Gain 14AVO in factory-sealed box, \$30.00; new heavy-duty self-supporting 40-ft. tower, \$65.00. Martin Mitchell, WA5HTF, 2128 A 70th St., Lubbock, Texas 79412.

FROM W2LF's estate: QSTs run from January 1943 to June 1967. Some missing issues, about 23 to 44. George Batterson, 126 Westfall Road, Rochester, N.Y. 14620. Phone 716-476-3402.

SH101, 2nd rig, used less than 5 hours. Checked out OK on all bands. Sell to best offer. WIWJO, A. Misenti, 12 Lonview Dr., Simsbury, Conn., 06070. Tel: 203-658-9182.

FICO 753 w/751 a/c p.s. in FB condx. \$160.00. WA5RVD, 241 Stuart, Shreveport, La. 71105.

DRAKE station for sale. All units are in perfect operating condition. 2B, 2BO, 2AC, \$160, 24X, AC-4, \$330.00. Accessories: Heath SB-600 speaker, \$12.00. Johnson T-R switch, never used, \$20.00. WA9AUM, James Cain, Wilcy Hall, Hanover, Ind. 47243.

KWS-1, absolutely clean and unmodified and in exlnt working order; \$550.00. Will ship. 25-50 Mc 500 watt General Electric FM xmitr, complete in 6 ft. cabinet, w/meters. Uses two 4125As in the final, \$27.00. Will ship. Wanted: Several GE mobile sets, or PL or MASTRS, W9DSV, Box 87, Webster, Wisc. Tel: 715-866-2468.

SBE34. Clean, in gud condx. Mike, mount, hook, cables. \$225.00. Hustler M02 and RM20, \$100.00. P E-101C, new, \$3.50. Fomare FCB5 (CB) OK, \$20.00. F.o.b. C.o.d. all for \$240.00. Joseph Bodio, WA5ECL, 1920 Alta Woods Blvd., Jackson, Miss. 39204.

FOR Sale: Lafayette code oscillator and semi-automatic bug, both together for \$10.00; also 14AVO, vertical antenna and roof mount, together, not used for \$30.00. Need instruction book for MARS EK-20 keyer, will borrow or buy. R. Nicodemus, RD #8, Colonial Vill., Greensburg, Penna. 15601.

75A-4 Serial #5388 (latest model) in perfect condx with 800, 3-1 and 16 1/2" (for RTTY) filters, manual, original packing. \$460.00. CE-100V serial #918 (one of last made) in peak condition, manual, original crating, \$495.00. HI-41 linear, manual, \$175.00. Jim Dittrich, K2OIN, 249 Meadow Lane, Vestal, N.Y. 13850.

CW Station: Heath HW-16 with HG-10B, \$120.00; Hallcrafters HA-1 keyer with Vibroplex, \$45.00, like new, 3-400Z, new socket also new keyer power supply, 11 DUX coil, ear, HB choke, meters, etc. for linear, \$30.00. Will ship postpaid to first money-order or check. WA4KRU, 907 Pinecrest Drive, Vidalia, Georgia 30474.

SELL: Swan 500, seven months old, 117XC, AC supply, VX-1, best offer, and Heath SB-200, \$150.00. Nick, K9KLR, P.O. Box 1816, Gary, Indiana 46409.

HEATH Marauder, just factory aligned, in exlnt condx. \$170. Eugene Ornskin, WB2VIO, 313 Crown St., Brooklyn, N.Y. 11225.

NATIONAL HROSOT w/ crystal calibr. and Select-O-Ject. A,B,C,D coils, \$125.00. Johnson Ranger 1 w PTT, \$89.00. Both in A-1 condx. K9HQC, Laurence Van Someren, Baldwin, Wisconsin 54002.

LAST Chance. Factory overhauled Hallcrafters HT-32A; SX-101A, Heath Warrior HA-10, 1 KW P.E.F. linear. All for \$475.00 cash. No separation. You pick up. Abramson, K9-KVV, 2942 Jariath, Chicago, Ill. 60645.

SALE: Drake 2B with xtal cal. and spkr, \$175.00. \$40.00. All are in exlnt condx. WA9WOB, 1057 S. Dunton Ave., Arlington Heights, Ill. 60005. Tel: (312)-259-5818.

QUESTAR Wanted. Will swap Swan 500 with AC and DC supplies plus VOX unit and external Swan MARS oscillator and remotely-tuned mobile Swantenna. W1CNY, 228 Hickory Hill Lane, Newington, Conn. 06111.

BENDIX Inverter. 24v. DC input, 115v AC output @ .45a 400 Hz. Fred R. Profe, W1QXT, 487 Pinerock, Hamden, Conn. 06514.

QSTs: 1978 thru 1965. In QST binders. Few missing. \$25.00. W6KG, 5200 Panama Ave., Richmond, Calif. 94804.

SELL: Model 15 RTTY, model 14TD, Model 14 typing reperfator. Package for \$110. Pick up deal only, or Sell TD and reperfator separately and ship F.o.b. WA4RGL.

SWAN 2000 watt linear amplifier, never used, guarantee card not sent in, \$90.00. W9JCE, 370 Aspen Lane, Highland Park, Ill. 60035.

DRAKE IA, \$100.00; C-E 20A, VFO, \$90.00; 10A, VFO, \$50.00. Lou Hayes, W9BWW, 803 N. Harlem Oak Park, Ill. 60302.

HAMMARLUND HO-170AC, \$235.00. New cost \$430. Gud C.W. and S.S.B. receiver 160-6 meters. In vy gud condx. Will ship. David Soldar, Rte 3, Manhattan, Kansas 66502.

TRANSMITTER TX-1, Apache 5-bands, \$110.00. Jones, 1132 W. 124th St., Los Angeles, Calif. 90044, Phone 757-4438.

SALE: 75A4, 3 filters and matching speaker, mint condx. \$375; SX-122 and matching R-40A speaker, mint, \$165.00; M&M electronic keyer and Brown Bros CTL keyer, both brand new, \$48.00. Send for list of other items, meters, variable capacitors, etc. Earl Crews, W4DBH, 2522 Shafer St., Norfolk, Va. 23513. Tel: 703-853-4903.

"DON And Bob" authorized Collins warranty repair station in South Texas plus repair on other major lines. KWM-2 complete tube replacement kit—list \$63.70, your cost, \$29.95; 32S-3 tube kit, list price \$40.40, your cost \$19.95; 75S-3B tube kit, list \$38.25, your cost \$15.95. Used rear specials: K WM-2 \$700.00; 516F-2, \$95.00; 75S-3B, \$450.00; NCX-3, \$175.00; SB-300 All filters, \$225.00; HT-32B \$249.95; SC-122, \$350.00; HRG-60, Slice, coils, speaker, \$250.00; HI-170A, \$175.00; 85KC1F, \$1.50; 6V10A transformer, \$3.95; 12V10A, \$4.95; 1000KC xtal, \$3.95; Telex HMY-2000 headset, \$3.95. Write for list. Don, K5AAD, Bob, WA5UUK, Madison Electronics, 1508 McKinney, Houston, Texas 77002. Tel: 713-CA4-2668.

VIKING II, VFO Model 122, Matchbox and Gonset mod. indicator, \$75.00. All clean, no scratches, Manuals for all. Srv. can't ship. W2NZG, Tel. a.c. (201)-427-3893.

FOR Sale: Davco DR-30 communications receiver, 80-6 mtrs. in 10 positions, plus separate positions for WWV. Cost new \$389.50. Will sell for \$250 or your best offer. K1QOQ, 400 Willard Ave., Newington, Conn. 06111.

SELL: HT-37 and Drake 2B with 2BQ for only \$165.00 each. Both in excellent condition. Cannot ship, sry. K0CKX, Tel: 319-338-1815, 52240.

COLLINS 301-F for sale, serial 1397. Absolutely mint. Kept in plastic. \$350.00 F.o.b. Shipped in original carton, Roddick, K7BDG, 5105 East Sunbelt, Yakima, Washington 98901.

1930 ARRL Handbook in mint condition. Need SSB Kw amplifier or used Tri-Band beam. Will negotiate trade. WB4HIM, W. J. Crosby, 3529 Tula Dr., Jacksonville, Fla. 32211.

SBE-34 with mike, used only 3 hours. HW-80 mobile ant. and bumper mount, new. Heath P2 SWR and Twoer, like new. Must sell. Mario Lovator, 3725 West 82nd St., Chicago, Ill. 60652. Phone 585-5863.

ANTENNA Equipment: Vesto HPX-100, 100-ft. self-supporting tower, \$770; Telrex 20M546 5-element optimum spaced 20-meter beam, \$385. Telrex A2675RIS rotator (with Telrex mast and cable, less control box), \$330. F.o.b. St. Louis, Missouri. C. Grothen, 90 Florissant Park Dr., Florissant, Missouri 63031.

DX Awards Log. This 150-page book just published giving numbers and type of contacts needed for over 100 major awards for hams and SWLS by clubs worldwide 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. (W61ZE, R. McMahon) 1055 So. Oak Knoll, Pasadena, Calif. 91106.

DRAKE 4A4 and 24X, practically new. In mint condx with factory warranty cards, \$295.00 each. W4 Wattmeter, like new, \$35.00; VFO w/ Atlas, used but little, \$260. D-104 mike, \$72 in grounded grid, used but little, \$260. D-104 mike, G-stand, \$18.00; Mars SWR bridge, \$12.00. Drake TV 1000 low-pass filter, \$12.00. Vibroplex Bug, \$10.00. Write or phone L. Miller, 939 Rounfourt Rd., Philadelphia, Penna. 19150. Phone CH7-7943, WA3IKD.

COLLINS 75A-4, 0.5, 2.1 and 3.1 kHz filters, matching speaker; KWS-1 with spare 4X250Bs, antenna switch, vernier dials, both excellent condition. \$950.00 F.o.b. J. D. McWilliam, W6RTG, 1800 First St., San Pedro, Calif. 90732. Tel: 201-832-5277.

ROTORS: 2 AR22R automatic rotors for sale, or trade for 1 TR-44 rotor. Less than one year old and in great shape. \$20.00 each. Contact Marc Brown, 6545 Varna, Van Nuys, Calif. 91401. Tel: 213-782-5398.

TRADE Concord transistorized stereo-tape recorder Model 440 (in mint condition) for used name-brand communications receiver above \$200. Descriptive literature sent upon request. K3IGO, 1917 Haywood St., Farrell, Pennsylvania 16121.

WANTED: 23 Channel CB unit and pair 1 watt walkie-talkies. WB8NO, 424 Lewis Seifert Road, Hubbard, Ohio 44225.

HT-32, excellent condx, \$220.00. R. Dayton, WA8EGF, 401 Northwood, Rochester, Michigan 48063.

SELL: Apache SB-10, \$150.00; Lafayette HA-350 receiver, \$90.00; T-60, \$30.00; HG-10B VFO, \$20.00. All in gud condx. You pay shipping. Tom Mann, WA8TWR, Box 669, Lewisburg, W. Va. 24901.

VIKING 500 trans and SX-100 rec for sale. Both perfect, like-new condx. Eng. owner. Make best offer for together or separate. K1KON, 3 Beechwood Road, Norwalk, Conn. 06854.

SELL: DX-100B, excellent condition, \$100. Sorry, no shipments. K1GCS, 8 Norton Ave., Guilford, Conn. 06437.

HALLCRAFTERS HT-32B like new, \$310.00; Drake 2B \$160; BC221AK, \$50.00; SX-28, \$36, \$37 mounted in 36" cabinet with speakers, \$200. 60w mobile transmitter 10M, \$18.00. A. Zappia, 51 Willard Way, Huntington Sta., N.Y. 11746.

GONSET 6M 220 watt linear, \$70; H.B. 10 watt 6M exciter, \$20.00; Telrex 6M8R 11-element spiral ray, \$50; Topaz transistorized 300-watt power supply, C1OWDG, \$40.00; 300XL, \$50.00; Kupfrian p-12 vdc-300 vdc, 150 vdc, \$27.00; Clerg Thor VI w/a.c., p.s./modulator, \$149.00; Motorola GON3D on 6 AM w/transistorized modulator, \$25.00, Gonset #3012 (152-162 mc), #3011 (40-50 mc.) tuners @ \$25.00; FM-SCA background music adapter, \$35. Specially made Hy-Gain 6M center-mounted chrome plated 2-ring halo w/23 chrome metal contacts, \$30.00; 100-watt 6M 600 ohm, \$10.00; Matchbox, \$8. Shielded ignition coil, \$20.00; 2 Aya, \$15.00. All F.o.b. Richard M. Jacobs, WA0AIV, 4941 Tracy, Kansas City, Missouri 64110. Tel: (816)-HI-4-1968.

WILL Trade Heath DX-60 for \$60 Mosley CM-1; RME 4300; National NC-173 or any receiver of same value. John Erb, 218 Shaddle, Mundelein, Illinois 60060.

CAMERA Fans: Will trade Minolta SR-101, 200 MM, 58 MM, 35 MM Mc lenses, many accessories for SSB transceiver. Will consider cash either way for difference. W6ZAG, 1045 Ocean, Santa Monica, Calif. 90403.

FOR Sale: Globe Chief DeLuxe xmttr, Globe VFO V-10, Globe modulator SM-90, Astatic mic JT-30. All in fine condx. Best offer takes all. WA2JZU, 18 Elm Road, Pompton Plains, N.J. Tel: 835-3804

COLLINS 75A4 receiver, very good, serial 4441, with filters 3Kc, 2.1 Kc, and 500 cycles, \$345.00; Collins KWS-1 low serial No., gud condx, complete with co-ax relay and mike; \$465.00; Gonset 2-meter amplifier, Model #903A, exclnt condx, \$145.00; Polycorn 2-meter transceiver, very gud, \$95.00. All equipment with full manufacturers manuals. Milt Krauthoff, W9BTO, N89, W16800 Cleveland Ave., Menomee Falls, Wisconsin 53051.

WANT: Heath VC-2 voltage calibrator. Must be like new, and with construction manual. State price. F. W. Gensch, 396 Winnebago Ave., Menasha, Wis. 54952.

WANTED: AN SW-3 and 1930 issues of Short Wave Craft. W4COC, Tom Boone, 112 W. Sycamore St., Greensboro, N.C. 27401.

WANTED: Type 4D32 or 4D22 tubes, Ken Shaw, WB6VHE, 88 West 41st Ave., San Mateo, Calif. 94403.

SELL: Henry 2KS linear, on air now, \$650.00. In A-1 shape. WA1HNW, 66 Autumn St. Ext. Rochester, N.H. 03867.

KNIGHT R100A, exclnt condx. With skpr. S/meter, manual: \$60.00. WA2BLE, Barken, 274 E. Mt. Pleasant Ave., Livingston, N.J. 07039.

FOR Sale: NC-300, Viking Valiant, SB-10, National skpr. All in gud operg. condx. Any reasonable offer accepted. Don Backstrom, Rd 2, Russell, Penna. 16345.

QUICK Sale: Knight T-60 xmttr; HE-30 recvr, HA-90 80-10M VFO, plus bug, relay, padded headphones, First \$60 check to Tom Bellmore, WB2PAR, 1090 Arlington Road, New Milford, N.J. 07647.

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RARE QSTSI 50-year-run! All or none, 1916-1966, SASE for list. No offers under \$500. H. E. Sanders, Tel: 501-663-2297, 5110 N. Country Club Blvd., Little Rock, Arkansas 72207.

FOR Sale: Radiola III. A real antique, \$30.00. Mrs. Ruth S. Banks, 371 S. Park Place, East Aurora, N.Y. 14052.

ALL American OMs, XYLS, YLs visiting Spain are welcomed by Old Timer V. S. Alexandersen (T-2X E13CX, E83CX (1925-1926) at his home in Palma de Mallorca (Balears), Espana. Camino Son Tullier, 37, Casa 2es Eurs, St. Augustin.

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EICQ 720, \$50.00; Johnson 275 watt Matchbox, with SWR meter, \$65.00. B&W 426 TVI filter, \$10.00. Make offer. Paul Wilcox, 1340 Southlyn Dr., Kettering, Ohio 45409.

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SPEDY Sale: CE-20A with VFO, \$90.00; Gonset 500W linear, \$150.00; National NC-300 receiver, \$150.00. Wolf, K2DDC, 151 East Johnson, Bergenfield, N.J. 07621.

KWM2 and PM2 for sale. Late model with sealed relays: \$750.00 firm. Lafantasia, 613 S. Susana, Redondo Beach, Calif. 90277. Tel: 372-7543.

SELL Collins 30L-1, one KW amplifier, gud condx, \$350.00. K2POL, 559 Grant Blvd., Syracuse, N.Y. 13203.

FOR Sale: 1 Mosley TA-33 Jr, \$75.00; 1 Mosley A-92-S 2-meter beam, \$20.00; original cartons, W4RFP, P.O. Box 158, Snow Hill, N.C. 28580. Tel: 747-3476.

SELL: Microwave test-set "X" Band frequency meter; signal generator; power meter; FS-147-A, with manual, \$85.00. RTTY page printer, paper, 3-ply, \$7.50/case. WB2PLY, Box 207, Princeton Jct., N.J. 08550. Tel: (609)-452-9038.

FOR Sale: Ameco TX-62 transmitter, VFO-621, \$125.00. Also Hammarlund HQ-170A, VHF, \$250.00. In mint condx. J. Michael's, 80 Birch Lane, Woodmere, N.Y. 11598.

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ARRL DX Competition

(Continued from page 76)

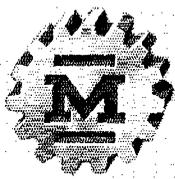
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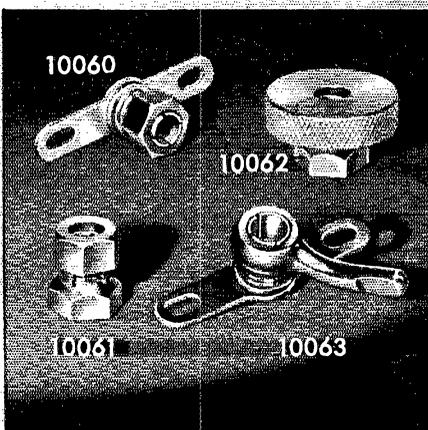
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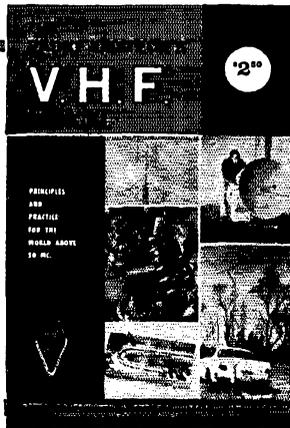
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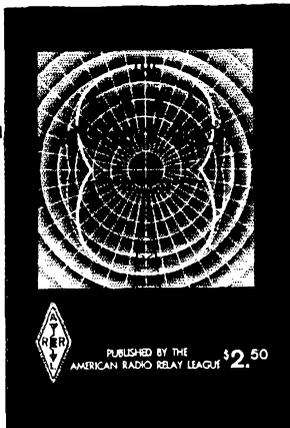
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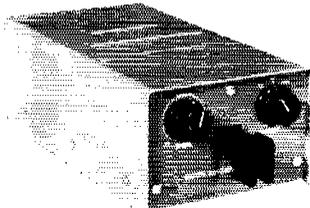
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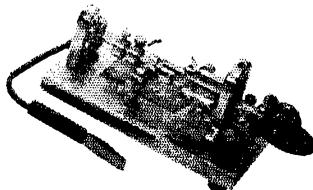
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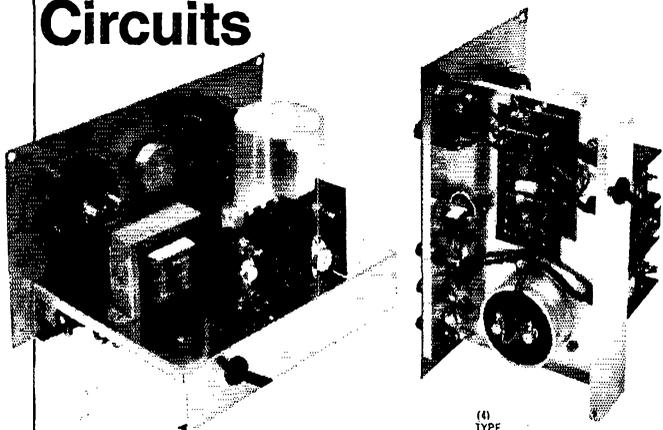
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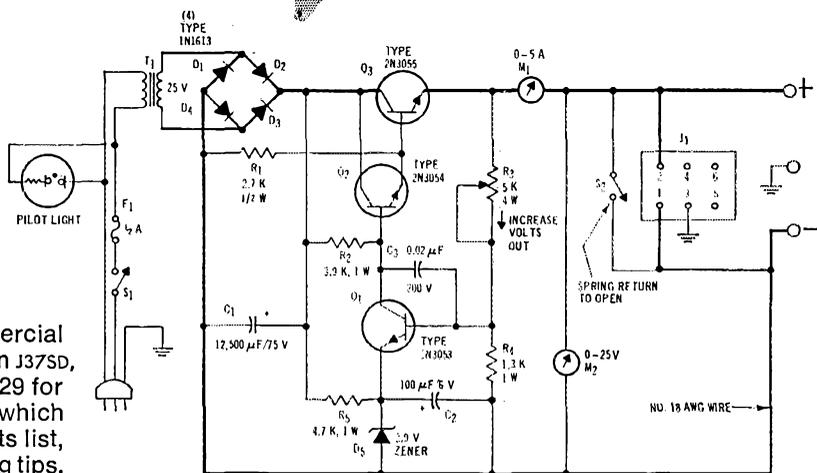
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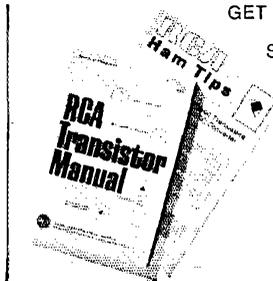
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