


# QST

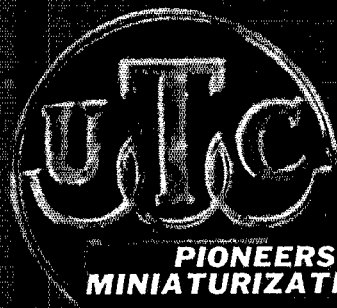


December 1965

60 Cents

50th  
Anniversary  
Issue





**PIONEERS IN  
MINIATURIZATION**

# REPLACEMENT TYPE TRANSFORMERS & REACTORS

## CHANNEL FRAME FILAMENT/TRANSISTOR TRANSFS.

Pri. 115 V 50/60 Cycles—Test Volts RMS: 1500

Type No.	Secondary	W	D	H	M	Lbs.
FT-1	2.5 VCT-3A	2 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
FT-2	6.3 VCT-1.2A	2 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
FT-3	2.5 VCT-6A	3 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{3}{4}$	1
FT-4	6.3 VCT-3A	3 $\frac{1}{4}$	1 $\frac{1}{4}$	2	2 $\frac{3}{4}$	1
FT-5	2.5 VCT-10A	3 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-6	5 VCT-3A	3 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-7	7.5 VCT-3A	3 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-8	6.3 VCT-8A	4	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
FT-10	24 VCT-2A or 12V-4A	4	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
FT-11	24 VCT-1A or 12V-2A	3 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-12	36 VCT-1.3A or 18V-2.6A	4	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$

Taps on pri. of FT-13 & FT-14 to modify sec. nominal V,  
-6% +6%, +12%

FT-13	26 VCT-.04A	2 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{1}{4}$
FT-14	26 VCT-.25A	2 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$

## DOUBLE SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-101	275-0-275	50	2A	2.7A	3	2 $\frac{1}{2}$	3	2 $\frac{1}{2}$	2	2 $\frac{1}{2}$
R-102	350-0-350	70	3A	3A	3	2 $\frac{1}{2}$	3 $\frac{3}{4}$	2 $\frac{1}{2}$	2	3 $\frac{1}{2}$
R-103	350-0-350	90	3A	3.5A	3 $\frac{3}{4}$	2 $\frac{1}{2}$	3 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	4 $\frac{1}{4}$
R-104	350-0-350	120	3A	5A	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	2 $\frac{1}{4}$	5 $\frac{1}{4}$
R-105	385-0-385	160	3A	5A	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{4}$	3 $\frac{3}{4}$	2 $\frac{1}{2}$	7

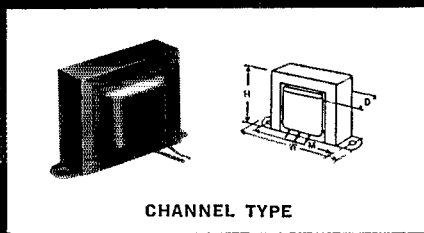
## VERTICAL SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-110	300-0-300	50	2A	2.7A	2 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{2}$	2	1 $\frac{1}{4}$	2 $\frac{1}{2}$
R-111	350-0-350	70	3A	3A	2 $\frac{1}{2}$	3 $\frac{1}{4}$	3 $\frac{1}{2}$	2	2 $\frac{1}{4}$	3 $\frac{1}{2}$
R-112	350-0-350	120	3A	5A	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4	2 $\frac{1}{2}$	2 $\frac{1}{4}$	5 $\frac{1}{4}$
R-113	400-0-400	200	3A	6A	3 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$	3	3 $\frac{1}{4}$	8

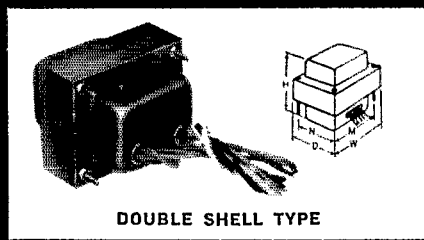
## CHANNEL FRAME FILTER REACTORS

Inductance Shown is at Rated DC ma—Test Volts RMS: 1500

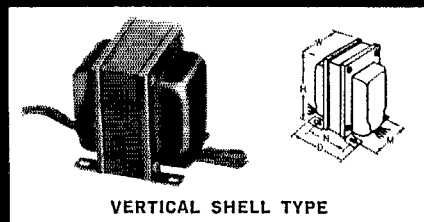
Type No.	Induct. Hys.	Current	Resistance Ohms	Dimensions, in.				Wt. Lbs.
			W	D	H	M		
R-55	5	40ma	300	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2	$\frac{1}{2}$
R-14	8	40ma	250	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$
R-15	12	30ma	450	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$
R-16	15	30ma	630	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$
R-17	20	40ma	850	3 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$	1
R-18	8	30ma	250	3 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$	1
R-19	14	100ma	450	3 $\frac{1}{4}$	1 $\frac{1}{2}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
R-20	5	200ma	90	4 $\frac{1}{2}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
R-21	15/3	200ma	90	4 $\frac{1}{2}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
R-220	100/8 Mhy 25/2 Mhy	2.5A 5A	.6 .16	3 $\frac{1}{4}$	2	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$



CHANNEL TYPE



DOUBLE SHELL TYPE

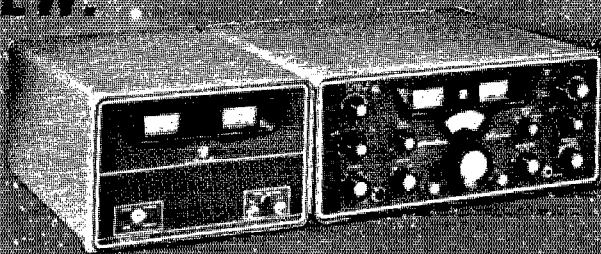


VERTICAL SHELL TYPE

# UNITED TRANSFORMER CORP.

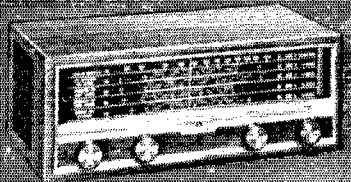


**NEW!**

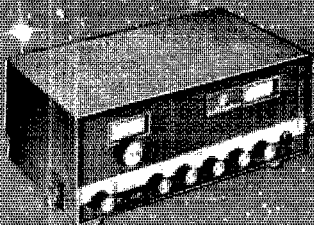


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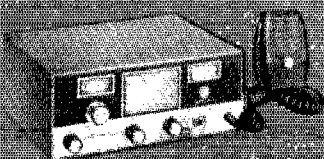


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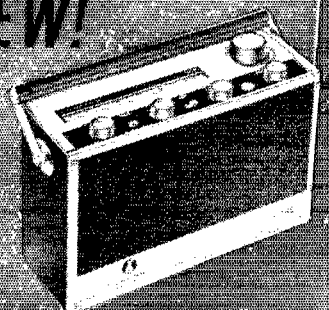
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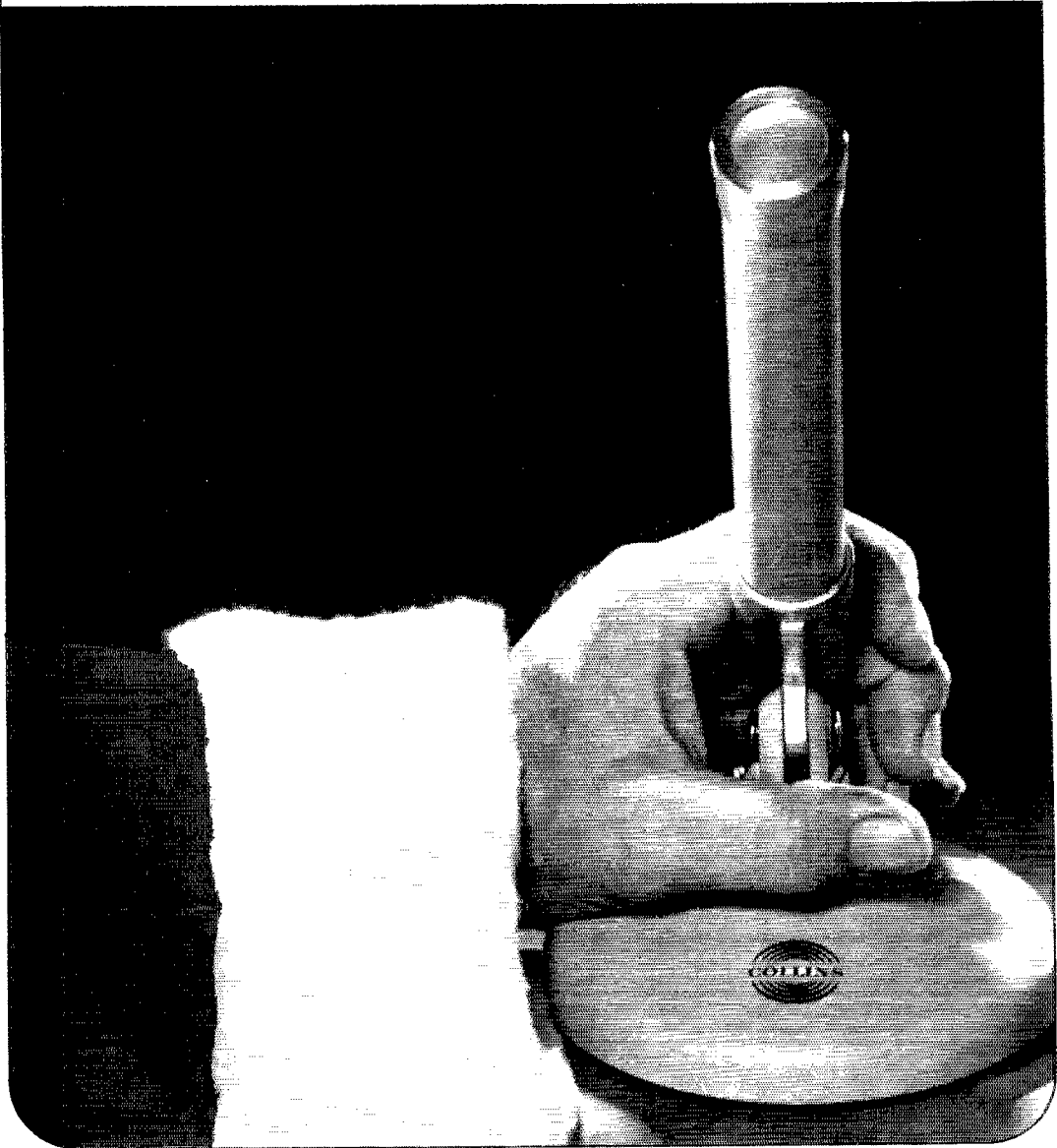
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# EIMAC

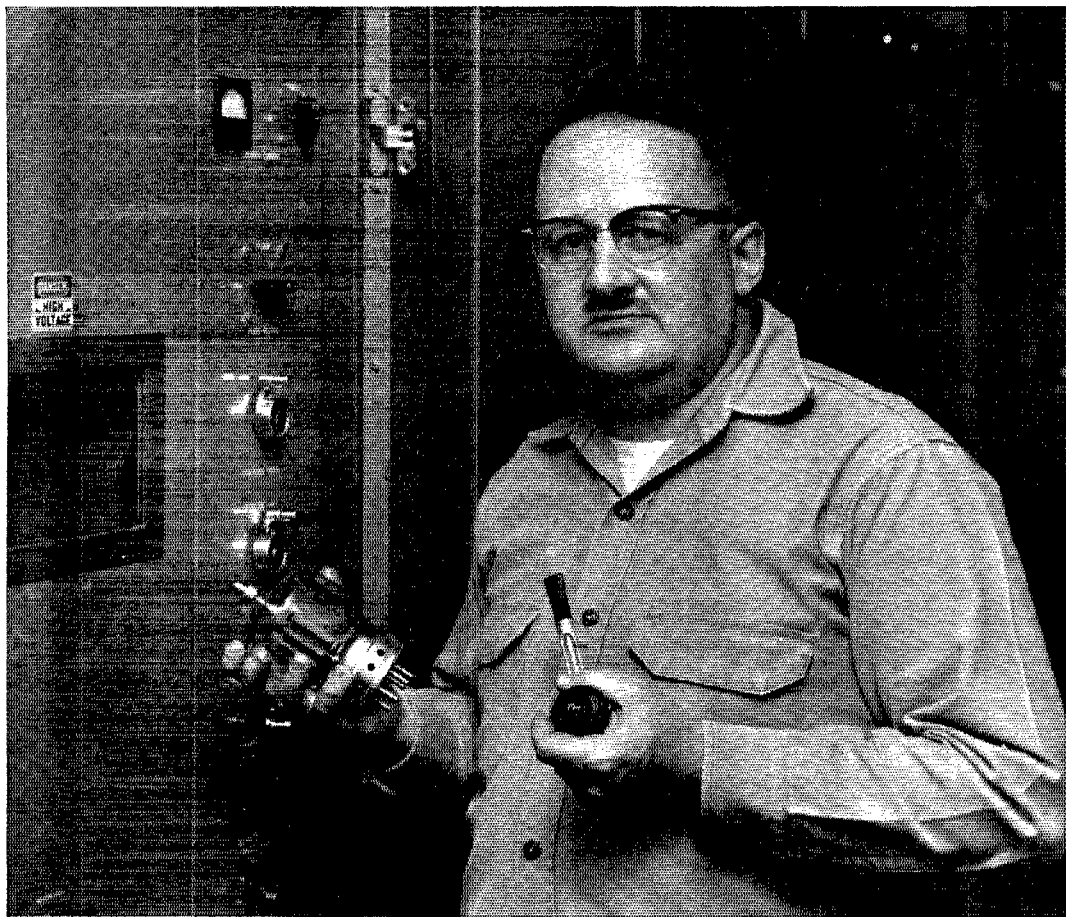
## 4-400A tubes pass 32,000 hour mark in FM service

This is Frederick C. Hervey, W9IIU, Supervisor of FM station WHKW in Chilton, Wisconsin. The tube is Eimac's 4-400A. It's one of a pair of 4-400A tubes that have achieved over 32,000 operating hours in an FM rig at WHKW. This non-commercial, education station is owned and operated by the taxpayers of Wisconsin. As Mr. Hervey points out, "These two tubes have saved the taxpayers money, have saved me trouble and have saved the station outage time. Never before have so many gotten so much for so little. Thank you Eimac!" And thank you

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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 licenses or higher may be appointed OES, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. P.A.M. Novices may be appointed OES. SCMs desire application leadership posts of SFC, EC, RM and PAM where vacancies exist.

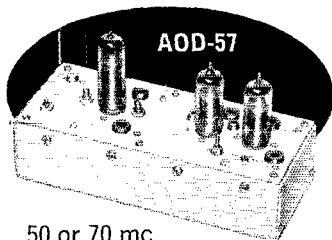
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\* Official appointed to act temporarily in the absence of a regular official

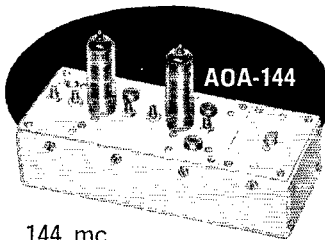
# NEW FROM INTERNATIONAL

## VHF/UHF UNITIZED TRANSMITTERS 50 mc—420 mc

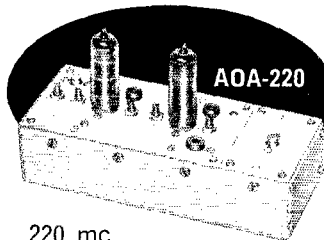
International's new unitized VHF/UHF transmitters make it extremely easy to get on the air in the 50-420 mc range with a solid signal. Start with the basic 50 or 70 mc driver. For higher frequencies add a multiplier-amplifier. All units are completely wired. Plug-in cables are used to interconnect the driver and amplifier.



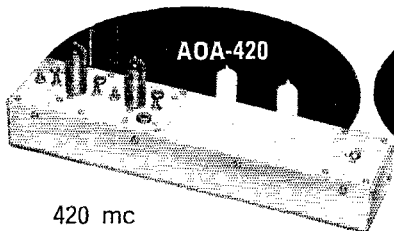
**AOD-57**  
50 or 70 mc  
**DRIVER/TRANSMITTER**  
The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma.  
AOD-57 complete.....\$69.50



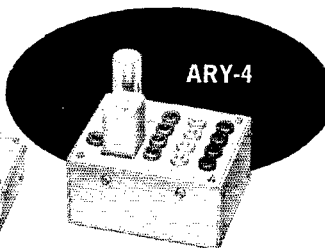
**AOA-144**  
144 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma.  
AOA-144 complete.....\$39.50



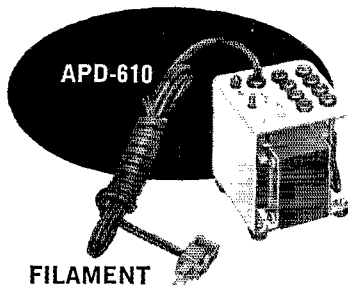
**AOA-220**  
220 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-220 uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma.  
AOA-220 complete.....\$39.50



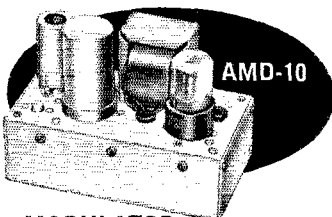
**AOA-420**  
420 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-420 uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma.  
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**ARY-4**  
**RELAY BOX**  
Four circuit double throw. Includes coil rectifier for 6.3 vac operation.  
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**APD-610**  
**FILAMENT SUPPLY**  
The APD-610 provides 6.3 vac @ 10 amperes.  
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The AMD-10 is designed as a companion unit to the AOA series of transmitters. Uses 6AN8 speech amplifier and driver, 1635 modulator. Output: 10 watts. Input: crystal mic. (High Imped.) Requires 300 vdc 20 ma, no signal, 70 ma peak; 6.3 vac @ 1.05 amps.  
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### COMPLETE TRANSMITTER

6 METERS	50 mc	AOD-57
2 METERS	144 mc	AOD-57 PLUS AOA-144
	220 mc	AOD-57 PLUS AOA-220
	420 mc	AOD-57 PLUS AOA-144 PLUS AOA-420

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# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



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**F**IFTY YEARS AGO this month there suddenly appeared on the amateur scene a "December Radio Relay Bulletin."

Privately published (price 10 cents, three-months trial subscription 25 cents), its stated purpose was "to help maintain the organization of the American Radio Relay League and to keep the Amateur Wireless Operators of the country in constant touch with each other." Twenty-four pages of operating and regulatory news, technical articles, features and advertising, its blue cover carried the title *QST*—general call to all stations.

Let us set the stage. It is 1915. There are perhaps 4,000 amateurs in the country, not all with official Department of Commerce licenses because the 1912 law is comparatively new, and rules enforcement and licensing are more by polite invitation than discipline. Several "national wireless" groups exist, most of no more substance than wall-paper certificates. But a year and a half earlier, through the vision and genius of Hiram Percy Maxim, 1ZM, and the enthusiasm and hard work of a young college student, Clarence D. Tuska, 1ZT, ARRL has been formed. The two named are its president and secretary. The League has acquired some 635 members, actively operating in relay routes, extending the short wireless ranges of 50 or 100 miles to longer distances through trunk line organization.

Yet something is still missing. Despite the intercommunication, word of such organized activity does not reach a sufficient number of stations, and the relay setup is less effective than hoped. A bulletin of some kind is needed.

Any such project will have to be wholly volunteer. There is no paid ARRL staff; the League's office is in the attic of Tuska's home. Dues are 50 cents, for which one receives a certificate, a pad of message blanks, and a callbook of member stations. So there is no money in the treasury.

The president and secretary talk it over, decide to take the big step on their own. Out of their pockets they dig up enough to risk three monthly issues of a bulletin to League members. At the end of three months the officers will know, from the response, whether they have lost their money and wasted a lot of

hard work, or whether they were right in sensing the need.

The question is quickly answered. Because it is really "of, by and for the amateur," *QST* is pure manna from heaven. The response gives the publishers sufficient confidence to announce a yearly subscription rate of \$1. The magazine grows rapidly, a huge 74 pages at its first anniversary, and requires a part-time stenographer and a part-time advertising manager. It reaches a peak in April 1917; but then comes World War I, and after a few issues devoted largely to recruiting, Editor Tuska gets out a final September issue and himself joins the Signal Corps, heavily in debt for those last few months of operation.

While the reopening battle with the Navy was on, the League held its first post-war Board meeting. ARRL was broke, but directors dug down in their pockets, financed a four-page issue devoted largely to selling ARRL bonds. With money thus borrowed from the members (and quickly repaid), ARRL bought the magazine. The price was little more than the total of unpaid salaries and printing bills! As our official organ, *QST* ever since has been the primary medium



of written communication among the membership.

To paraphrase a previous editor, amateur radio has come a long distance this past half century. You can see it all mirrored in *QST*, a complete file of which bulges the ends off a Ten Foot Shelf of Radio Knowledge. We look back with some measure of pride upon the job that the mag has done in chronicling these fifty years of progress, and we also like to think that *QST* has left its own impress upon the development of the art and helped to shape that course. Such has been possible only because of the unique position of *QST* as the technical and organizational forum for amateur cooperative efforts and investigation. That has resulted from the fact that ours is a mutually-owned magazine, with every member of the League feeling a personal interest in *QST* and wanting to do his bit to help. Whether or not the first fifty years are the hardest, we can say that we look forward with nothing but unalloyed eagerness to the next fifty. QST

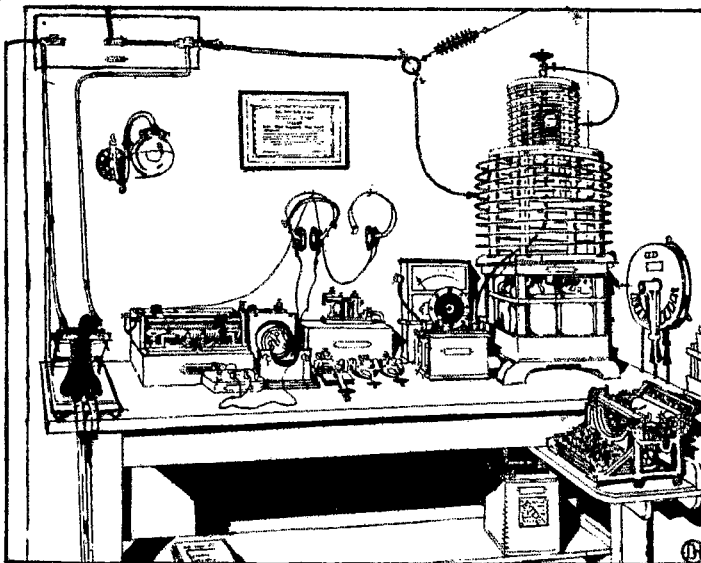
## An Anniversary Look at QST

The first issue of QST contained only 24 pages and amateur radio was in its infancy. Over the years, QST and amateur radio have grown and matured. It is only natural that on our 50th birthday we would want to stop and take a nostalgic look at those early years. It is impossible to cover all fifty years in one glance, but in this special 16-page section the editors have tried to review and recapture some of the excitement and lore of those first years of QST. The cartoons, the covers, the articles, the editorials, the letters—all are ingredients in the potion to bring back the flavor of early amateur wireless days. To begin, we have chosen portions of an editorial that appeared on our 25th birthday, written by K. B. Warner, W1EH, who himself contributed so much to QST's stature. We think these excerpts capture the atmosphere of amateur radio around the time of QST's beginning.

. . . And the advertisements in that first issue! You folks who know ham radio only in terms of tube transmitters and umpteen-tube receivers and are interested in no DX this side of the Philippines -- you really missed a lot. When our first issue appeared, the amount of money you have in your present rig would just about pay for a one inch spark-coil transmitter and a two-slide tuner, normal DX five city blocks if you were lucky. We find just one advertisement of vacuum tube equipment, an audion detector. Prominent is the rotary gap, "required in every transmitting station" because "this type of gap produces a pure wave of low damping decrement" and gives a note that "cannot be mistaken for static." There was a key with "straight-line" contacts that had the merit that "fading signals caused by varying resistance of contact points are entirely eliminated." There was a Universal Detector Stand "capable

of holding crystals up to and including  $\frac{3}{4}$  inch." No, not quartz plates but rectifying crystals. This one was a complicated gadget with a hollow standard, a ball, a spring, a thumb-screw, an arm, a set-screw and a few more jiggers. It was something really nifty. You have missed a precious part of amateur life who did not live through the days of hot arguments over whether it was better to use a silicon detector with a hard blunt point or a galena crystal with a cat-whisker made of a strand of iron "picture wire!"

The advanced amateur station of those days was something fearful and wonderful, a combination of witchcraft and execution chamber. The transmitter had to contain a condenser and inductance, and a spark gap to discharge it. Since the energy in the condenser depended upon the voltage to which it was charged, and since the size of the condenser was limited by the wave-



RADIO STATION J. DONALD HAIG MERCHANTVILLE, N.J.

— A typical early amateur station. From QST, May 1916.

length and was "too small" even when the inductance was reduced to a single turn, voltages were enormous — 20,000 to 40,000 volts at a kilowatt. Because the instantaneous currents were high, perhaps several hundred amperes; this primary circuit was connected up with copper strap at least an inch wide and the heavy plate-glass condensers were frequently immersed in oil for cooling and to stop brush discharge. This circuit was discharged by a motor-driven rotary spark gap that was pure hell-on-wheels. But ah, what a beautiful thing a well-made rotary was! Here was where dreams were made. Here, in its crashing blue-white spark, was tangible evidence of its might. No matter if it could be heard for blocks, — as indeed it could, unless it were put in a double box. No matter if it blinded the operator as well as made him deaf, and gave him red-rimmed eyes from its vaporized zinc electrodes. What if it did lose most of the energy in light, heat and sound; was it not the visible and mighty heart of radio? We hold it up to you to-day in sweet nostalgia as something whose marvelous symbolism we shall never know again.

The output of this remarkable device was coupled to a pancake inductance two feet or so in diameter which was in the aerial circuit. No linear antennas cut to 95.461% of a half-wave. Marconi antennas. That meant that one side was grounded. Grounded to driven pipes and wells and buried tanks and plates and to whole systems of plowed-in wires. Because the instantaneous currents to be handled were large and the voltages terrific, the antennas were of big wire and made into a "flat-top" having relatively high capacity to earth. Say four to twelve wires, spaced about four feet apart on spreaders. Large wire, too. Some of us used aluminum but No. 9 solid copper was a favorite. (No wonder the telegraph companies had deficits!) And this antenna had to be high; none of your 40-foot stuff. Amateur masts in those days were real structures, running 80 to 200 feet high and surrounded by forests of guy wires. Huge electrode insulators were the favorite insulation. Such an antenna system was an engineering job of no mean magnitude. We well remember that our antenna was so much heavier than we were that it would pull us right off the ground, three-quarter-inch half yard and all, and we had to get our dad to help us hoist it.

On the receiving side the modern 1915 station would have junked the slide tuner for the loose-coupler, which had separate primary and secondary and could vary the coupling by sliding the secondary in and out; Navy type, too — meaning switches to vary the number of turns — and a variable condenser across the secondary for fine tuning. Run from amateur wavelengths all the way up to 3500 meters, too, right on one instrument. The detector would be a genuine deForest round audion, hung from a gooseneck socket on a little cabinet that contained the B battery. You made your own battery by soldering up flashlight cells; none of these block jobs on the market until after the war. The audion was a "soft"

tube; it worked on a kink in its characteristic curve which you found by careful fiddling with A and B voltages, so you had a potentiometer across your B battery and some fool-proof system of disconnecting it when you closed down the station, else you'd need a new set of cells to-morrow. And because the tube was soft, it would do wonders in a magnetic field, so most stations possessed a strong bar magnet that could be adjusted to a critical position near the tube. Sometimes the tubes got too hard with the passage of time, got too good; a vacuum in them, lost their sensitivity — because the gas occluded to the walls of the glass bulb. So an important instrument in most shacks was an alcohol lamp over which the audion could be cooked to drive the gas of the walls and make it "ionic" again. (But, shucks! any of us oldtimers could do the job with a match and think nothing of it!) A very rare station sometimes possessed a stage of audio amplification but it was practically unheard of. Moreover, it wasn't needed. Don't feel too sorry for the sensitivity of these detectors. The tuning apparatus was crude and the spark method highly inefficient but actually the sensitivity of a good soft audion, operating at the right blue-glow point and under the stimulus of the left pole of magnet taken from a telephone ringer, was simply enormous. We've often thought that many multi-tube rigs of to-day don't touch it in sheer sensitivity to modulated signals. Trouble was you couldn't hold it in adjustment for long.

Well, there you were, except for the gadgets such as blocking condensers, phones, kickback preventor, change-over switch and a key with contacts as big as dimes to carry the heavy current. What could you do with it? You couldn't do much in the summer, particularly at night, because of the static. You couldn't hear anything when anybody else was sending in the same town, because a nearby signal occupied the whole tuner. But given a break, you could talk for miles, many miles. And given a really good break, a crisp clear winter night in the wee hours after the young squirts with spark-coils had gone to bed, you could have the time of your life and actually work for hundreds of miles . . . if the signals didn't fade out, if interference didn't start up, if you didn't blow a condenser, or if you didn't lose that critical adjustment. Or if the cops didn't run you in for maintaining a nuisance, or a wind blow down your mast. And you could investigate the phenomenon known as kickbacks-into-the-power-wiring, and, as we twice did, set the house on fire. Or the phenomenon known as corona losses, watching the great fuzzy caterpillars on the high-voltage points of your antenna system. Or involve yourself in endless arguments over high note versus low, what the power factor is in a freely oscillating circuit, or how loose the coupling ought to be to obtain a "pure" wave.

Those, our friends, were the days from which amateur radio has come — come a great long distance in this past quarter-century. You can see it all mirrored in *QST*. . . .

— K. B. Warner, *QST*, December 1940.

# QST's Diary, Volume I

*Our First Editor Describes Our Early Days*

BY CLARENCE D. TUSKA\*

## Fall, 1915

Will I ever see the light of day? Maxim and Tuska have been talking about a magazine for amateur wireless operators. Tuska says that the American Radio Relay League needs something more than the relaying of messages to hold its membership. He argues that a magazine would serve the members of the A.R.R.L. in many ways. Maxim agrees, but his mature vision foresees many difficulties. Once a magazine is started, it either succeeds or fails. If it fails, it is a reflection on the starters. And if it should succeed, the grind is as unending as the months. Tuska is a youth of just nineteen. Youth doesn't anticipate failures; it only envisions success. What most worries him is the possibility of running short of publishable material.

With some misgivings, they decide to launch me. My name will be *QST*, the general call to all stations, taken from the International Abbreviations. Little do they suspect that I shall become international. Somewhat skeptical that I may not survive, they decide to begin things on a trial basis. If only three months' subscriptions are taken, the worst will be three more monthly issues. Maxim will advance some money and assist as his time permits. Tuska will select and arrange the material, supervise the printing, solicit advertising and subscriptions, and become my first editor. No objection to his assuming a whole lot of titles because he will have all the responsibilities that go with them.

## December, 1915

At last my birthday arrives. I appear in a blue cover designed — gratis, of course — by George B. Ruddell, who is Tuska's uncle. Within the cover are twenty-four pages: eleven of magazine proper; three listing new A.R.R.L. stations; two pages forming an application blank; about six pages of advertising; and the balance announcements. I was printed by the Chapman Printing Company and mailed by the combined efforts of the Maxim and Tuska families, aided by Miss Cecil Powell, who was Maxim's secretary, Ethel Reardon, now Mrs. George Herriot, and others. This memorable issue is being sent to all the League members and to all the other amateurs listed in the government call book.

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\* 401 Mercer Rd., Princeton, New Jersey; ex-1WD and 1ZT, Hartford. First secretary of A.R.R.L., co-founder and first editor of *QST*.

## January, 1916

Before the returns of my first number were recorded, a second issue was in preparation. The Editor wrote an article on "The Oscillating Audion" and drew the diagram, but that is not all: he sketched the *QST* heading on page 5; the Amateur Radio Stations antenna device on page 7; and he made the diagram on page 14. Why in the name of art did he put a black border around it? It would have been better had he spent the time soliciting advertising, which fell short. Perhaps I should not criticize. Where would he, a freshman at Trinity College, have found the time? Now, I suspect, he should have studied harder on foreign languages. Anyway, they promised a February *QST*!

## February, 1916

This issue begins to look more like a magazine. Of only we could afford an art editor! Tuska's map-drawing for Maxim's article is passable, but the diagram borders make me shudder. Bob Miner's article recites receiving signals from transmitters located at distances of 60 to 600 miles. Looking back, I am not at all satisfied with the answer to Kathis Kathan's queries of December. That clever Jap (Maxim in his first disguise) wanted to know: If the charge resides in the dielectric of a condenser, what happens to the charge if all the air in a charged air-dielectric condenser is blown away? My sponsors are becoming confident; no timid three-months' subscriptions — for a dollar you can buy me for a whole year.

## March, 1916

Nothing shows better how subscriptions have been coming in than my application for entry as second-class mailing matter. Tuska had to buy an Addressograph to solve the mailing problem. Speaking of mailing, Mrs. Tuska, whose oak dining room table has become the mailing desk, objects to the paste on the table. Wrapping is a nasty mess; at first it was a kind of party; now it is work. Maxim is getting tired of turning his Franklin motor car into a truck to take the four or five mail bags to the Post Office. He thinks it is about time *QST* paid for a professional carting job. As for growth, notice the jump from 24 to 32 pages.

## April, 1916

I am worried. The entry as second-class mail matter helps on the postage bill, but I must have

advertising to survive. Mr. Chapman has been carrying most of my printing bill and does not seem to worry just as long as Tuska digs up enough money to meet the weekly pay-rolls. Somehow — I haven't yet discovered the secret — Tuska makes the grade. Miss Reardon gets paid occasionally for actual typing time, but no one else gets anything. Perhaps I should not complain — my rent is free in Tuska's attic, and the old furniture did not cost a cent.

#### May, 1916

A new cover, a new *QST* page, a new heading for Amateur Radio Stations — for these I am everlastingly grateful to Harry R. Hick, an artist and an amateur wireless operator. Within my proud covers are thirty-six pages. There's a picture of A. A. Hebert. How it hurt to tell Mrs. Hebert that the photoengraver had spoiled the only picture of Arthur she had! Would she mind if he turned half purple where they tried to fix him up? And there on page 97 is a picture of R. H. G. Mathews — Matty — still an enthusiast. And is that not the second article by The Old Man? How long and how well we kept his secret! How loved were the articles!

#### June, 1916

The seventh issue of *QST* comes off the press. I notice I am copyrighted, apparently for the first time. As I look back over the previous issues, the

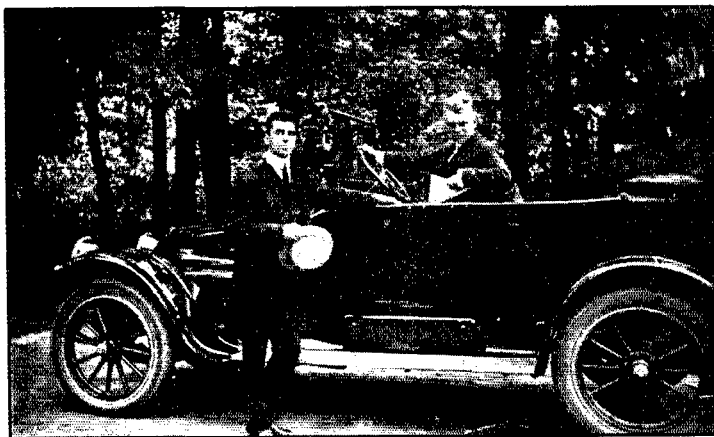
#### July, 1916

The middle of the summer, and advertising shows a small gain. That is encouraging. Moreover, I am proud to note an editorial improvement: An article by Ellery Stone entitled, "An Impulse Excitation Transmitter," reprinted from the *I.R.E.*, appears. There is a paper by Harry Sadenwater on "Distributive Capacity and Dead End Effect" — a truly important subject in those days — written by one who was to prove an amateur's worth on the transatlantic flight of the Navy's NC flying boats. Not only that, but an announcement that the A.R.R.L. and *QST* had made a deal with the Radio Club of America to publish papers presented before the club.

#### August, 1916

The cover design and the date recall Uncle Sam's expedition to the Border and into Mexico. Many of our amateurs served then, as they are ready to serve now. A. Hoyt Taylor was observing transmission variations, daylight effects, and skip distances. If you want a laugh, turn back and read "Rotten Luck" by The Old Man. Paul F. Godley writes a timely article, "Applications of the Audion." Why, that article alone was worth the price of a year's subscription! S. Kruse makes some pertinent remarks on "Summer Working." Harry Hick's heading for the editorials was just too brilliant. For the truth, see the editorial "Ourselves." What we lacked in office furniture,

◆  
The founders of *QST*, C. D. Tuska and Hiram Percy Maxim, and the old Franklin that used to carry *QST* to the post office, about 1916.  
◆



names of the contributors, correspondents, and those mentioned read like a "Who's Who" for the early-day amateurs. I only wish I could list all the names of all who helped make the hard going easier. It is becoming harder and harder to pay the bills, and I don't know where we'll wind up. If you think there is any doubt about this, just glance over the editorial on page 129. It is well that Tuska does not know he is licked. Isn't it strange how hard it is to defeat a man who does not know he is beaten? The subscription list grows; so do the accounts payable; and the advertising falls off. I can't prosper that way.

we made up in pages — 52 of them, if I counted correctly.

#### September, 1916

The shining light of 13 payable pages of advertising this month eclipses all else. Yes, even the conclusion of Paul Godley's "Applications of the Audion," where you can see outside and inside views of what a well-dressed amateur station of 1916 should include but couldn't afford. You see, they spend all the money I bring them to give me more pages. Prof. Hazeltine told us then, as now, some of the engineering reasons why our

devices were good or bad. I can't pass M. B. West's photograph on page 262 without recalling his unending enthusiasm. Last month I plumb forgot to record in my diary about *QST*'s subscription contest. First prize, a \$25 deForest audion; second prize, a \$14 Brandes headset (does anyone use them to-day?); third prize, a \$14 deForest audion, and among the seventeen other prizes a Crystaloi detector. (Remember?)

### October, 1916

Two things stand out this month. First, a H. R. Hick cover in *two colors*, either the bosses splurged or Mr. Chapman ran out of the blue cover stock. Second, the *QST* Publishing Company, Incorporated, takes over the burden. I do not recall all the reasons but perhaps a partnership *was* a dangerous liability. I think the editor himself undertook the excursion into the law and formed the corporation. Remember Mrs. Emma Candler? Her photograph appears in *Who's Who*. Notice the picture of deForest's air-cooled Oscillon on page 322. Rated at 250 watts, I now wonder what kind or where they were measured. Who does not remember Radio Inspector Harry Gawler? *QST* reports he was with the Massachusetts Militia at the Mexican Border.

### November, 1916

Volume I, Number XIII! Many a time I thought I should not live that long. There are 60 pages in this issue. Fifteen and a half paid pages of advertising — I mean payable; sometimes we can't collect. That makes it bad because every cent is poured back into me. Our old postman is beginning to growl about how much business mail he has to carry on a residential route. I suppose we should have an office, but besides not being able to afford one, the editor would not have time to go to one. He works at any and all hours when he isn't attending his college classes.

### December, 1916

December 1916 — Anniversary Number — 74 pages. A year ago it was 24 pages. I have arrived!

**Below and on the following 10 pages, we have collected some miscellaneous items from early *QST*'s that we think provide an additional historical touch for our fiftieth anniversary**

All amateurs are requested to send articles on radio matters. Contributions and pictures will help to make the bulletin a success. Send in yours today.  
— December, 1915

Joe Morgan, Jr., and Charlie Service tied for first place in the subscription contest. Morgan reminded your first editor about that memorable contest, when the contest leader, the other day, nicked the old editor for a new G. E. furnace.

### January, 1917

We hold all gains. C. S. Ballantine had started telling us how to make reliable measurements of high-frequency currents. Where did J. O. Smith get that good-looking Godley set?

### February, 1917

My diary would be incomplete if I failed to recommend that you get me out and read Irving Vermilya's account of "Amateur Number One." When I last saw him, he assured me the article represented the truth, the whole truth and nothing but the truth!

### March, 1917

Prof. Morecroft indulges in some fancy math. Vermilya concludes his article. We begin to wonder about war, but don't suspect how near it really is.

### April, 1917

The peak is reached under my first editor, 96 pages of interesting magazine. The cover by Clyde Darr shows the rising spirit of war and is a picture prophecy of the amateurs' part. Just as we reach our peak, war is about to be declared.

### May to September, 1917

War comes. *QST* shrinks in size, but does its job for Uncle Sam. A ham named K. B. Warner crashes the pages of *QST* for the first time — he got two letters published. The need for radio operators is great. The U. S. Army and Navy will welcome every able-bodied amateur. *QST* urges them to do their bit. The Navy requests us to keep up the good work; it is bringing results. The editor takes his own advice and goes into service in the Air Section, U. S. Signal Corps. *QST* is left alone, unpublished, but not unsung, waiting for the peace that will enable a new beginning to be made in June of 1919.  
— December, 1940

This is the first bulletin of the kind that League has published. Errors are sure to creep in, and the editor would consider it a favor to be informed of all errors.  
— December, 1915



## SEASON OPENING

The cool weather has arrived, "static" is getting better every night, and the owners of relay stations are returning to their instruments. It is time to send out another official QST from headquarters. There is much to tell not only our membership, but also every amateur in the country.

— December, 1915

The total eddy-current loss is proportional to the square of this current density multiplied by the volume of conductor; or

Eddy-current loss is proportional to

$$\left[ \frac{NI}{b+c} \frac{d_1}{\lambda} \right]^2 2\pi aN \frac{\pi}{4} d_1^2 \quad (14)$$

The resistance loss due to the work current I is proportional to

$$I^2 \frac{2\pi aN}{\frac{\pi}{4} d_1^2} \quad (15)$$

Hence the ratio of these losses, or the ratio of equivalent resistance, is

$$\frac{\left[ \frac{N}{b+c} \frac{d_1}{\lambda} \right]^2 aN d_1^2}{\frac{aN}{d_1^2}} =$$

$$\left[ \frac{Nd_1^3}{\lambda(b+c)} \right]^2 \quad (16)$$

In the discussion of Mr. Eastham's paper the writer gave the following approximate formula for the ratio of effective resistance to the direct-current resistance of a multi-layer coil

$$\frac{r}{r_{dc}} = 1 + \left[ \frac{0.007 Nd_1^3}{\lambda(b+c)} \right]^2 \quad (17)$$

— April, 1917

## RELAYING

THE idea of a citizen of Portland, Maine, being able to send a message to a citizen in Portland, Oregon, by wireless, and without cost, is of course very wonderful and extremely attractive. Nothing like it has ever been possible before in the history of the world. The co-operation of a few unknown but nevertheless kindred spirits between Portland, Maine and Portland, Oregon, by means of which the message is handed on, adds a touch to the whole scheme and makes it almost Utopian.

It is the history of human affairs however, that it is a far carry between a good idea and the practical working out of this idea. While it might be possible for the gentleman down in Maine to get a message through to his friend on the coast on some special occasion, yet it is quite a different matter for the former to communicate with the latter at any time that the spirit moves. It is just here where a Relay League either meets its Waterloo or grows into a great National institution.

— February, 1916

... The purpose of this test was to show the United States Government that the amateurs of the United States were in a position to co-operate in radio work. The United States authorities at the Rock Island Arsenal seemed rather skeptical about the results of such a relay, but promised to co-operate with 9XE. Never before had the amateurs been flattered by such co-operation. The Navy Department went so far as to have QRT and QRM signals sent out from Arlington on the night of the test. Many of the readers heard NAA give his warning.

— April, 1916

QST, QST, QST, de 9XE — . — . —  
QST relay MSG.

A Democracy requires that a people who govern and educate themselves should be so armed and disciplined that they can protect themselves.

(Signed) Colonel Nicholson, U. S. A.

The readers need no further description as to just how each station received and relayed the message. Needless to say, the test was a complete success. Certain parts of the message became balled up in the transmission, and before it had gone far it had been signed by Colonel Nicholson, Colonel Nicholson, Colonel Michalson, Colonel Micholson, Colonel Nichols, Colonel Nick, Colonel Richards, Colonel Richardson, and several other Colonels amplified to the nth power. It was a common cause, rich men, poor men, young men, old men, two ladies, a host of boys, and several ministers. All the talk about preparedness shows that young America is on the job when aroused.

— April, 1916

## H. C. GAWLER, RADIO INSPECTOR OF THE FIRST DISTRICT

To H. P. Maxim

I beg to inform you that the relay message sent out from Rock Island Arsenal was telephoned me at about 2:00 a.m. this morning by 1ZD. The text is as follows:

"A Democracy requires that a people who govern and educate themselves should be so armed and disciplined that they can protect themselves. Col. Nicholson."

This message was received by 1ZD at 1:45 A. M. and immediately telephoned to Governor McCall. He was unable to communicate with Mayor Curley of Boston, but delivered the message through other radio stations as outlined in the program.

Permit me to extend to you and the American Radio Relay League my heartiest congratulations for this notable achievement. You will recall when the formation of your league was under consideration, I emphasized the importance of having efficient and effective lanes of communications over extreme distances. It is indeed a most pleasant surprise that this ideal has been accomplished to such an extent in the short space of time the league has been in operation, and it seems to me the possibilities for even better results are most encouraging.

Respectfully,  
(Sgd.) H. C. GAWLER,  
Radio Inspector.

— April, 1916

## Sixty Cycle Wireless Telephone

By Seefred Brothers

The accompanying diagram will prove of interest to QST readers who have been experimenting with a wireless telephone. The novelty of the system lies in the fact that a sixty cycle current has been made use of. The diagram is self-explanatory with the exception of the gap which is made of two extremely hard carbons such as are found in dry cells. A close adjustment is necessary and it is left to the experimenter to develop this with the material on hand. The arc must be of a purple blue color to get the best results. If the arc turns to a white glare, it shows the carbons are burning.

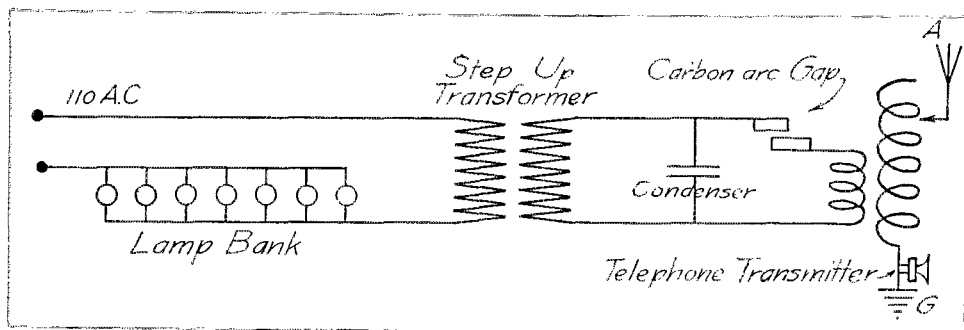
LOOK out for yourself if you are sending and are not the holder of a Government license for both yourself and your station. In last month's issue, we reported the bringing into Court of a lot of amateurs on the Pacific Coast for violation of the radio laws regarding sending without licenses. This month a case has been brought in the East. The First District is the battleground. The conditions surrounding the case are very instructive, and we have taken pains to get the details for the benefit of the readers of QST. The Government is evidently going to insist upon the observance of the radio laws, and any amateur lacking in respect for our Federal Laws should get out his chart right away and look up the meaning of QRT. . . The jury brought in a verdict in favor of the Government. The Judge made the fine only \$5.00, but saddled all the costs upon Mr. Scofield, and this must have amounted to enough money to buy the best kind of a transmitting and receiving set. Mr. Scofield made the mistake of his life in not applying for a license in the beginning. Every amateur ought to remember this case for the first time he sends out a message and signs calls letters which he has selected himself either from his initials or something else, he is guilty of not only operating an unlicensed station, but operating without an operator's license and also sending unauthorized call letters. Every letter in the alphabet has been assigned by the International Convention to some country or other, and no one can select his own call letters without committing what amounts to radio forgery.

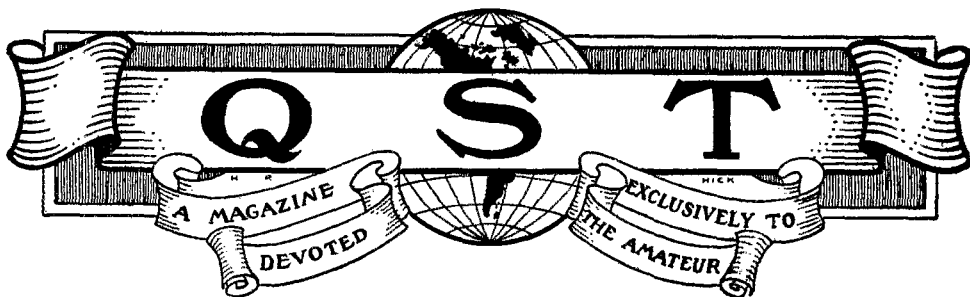
— April, 1919

Throughout the experiments, a high voltage transformer (Packard) was used and the arc gave less trouble than when a low voltage transformer was used. The power varied from two to three amperes which were adjusted by the lamp bank.

One plate of condenser gave the right capacity for a two hundred meter wave. The writers have experimented three years with this sixty cycle phone and have talked twenty-two miles from Los Angeles to an amateur in Long Beach. They were also heard by another in Pomona, Cal., thirty miles distant.

— September, 1916





## A Short Wave Regenerative Receiver

Complete Description with Instructions for Building

**F**OLLOWING the rapid growth of our relay work, there has come a continual and increasing demand for a receiver which would operate with efficiency and maximum sensitivity on waves of less than 600 meters. It was required that the instrument be very selective. With the advent of the regenerative systems, there was room to design just such a set. At the present time, a number have been placed on the market employing tuners of altogether better design than was dreamed of among amateurs two years ago. It has been found that much of the efficiency was due to the care with which dead-ends were eliminated.

During the recent period of improvement, more than one of us began to feel that two receiving sets were necessary for the up-to-date amateur. One for relay work on short waves, the other for long wave spark and arc signals. With much completeness and care, Mr. Godley described in our August and September numbers, the design and operation of the regenerative system. Following all the latest kinks, the following set has been designed for short wave work.

It was first decided to have the audion circuit separate and individual, but on second consideration the audion was built into the set for convenience and efficiency. Fig. 1 shows a view of the complete instrument. This general layout may be improved upon and changed to suit conditions. One of the

things worth noticing is that the complete set is mounted on a panel so that the panel may be drawn out of the case, bringing all the apparatus with it and opening it for inspection or repairs.

Fig 2 shows the back of the panel and the loose coupler, variables, etc., with the frame work on which the apparatus is supported. For the sake of clearness, the high voltage battery B, has not been shown, but it fits in the space outlined at B in Fig. 2.

The most important part of the set is the loose coupler. The primary consists of a cardboard tube  $4\frac{1}{2}$  inches in diameter and  $1\frac{1}{2}$  inches long. No size is given for the walls of the tube since this is a stock article. The secondary tube is 4 inches in diameter and  $1\frac{1}{4}$  inches long. The secondary loading coil is 4 inches in diameter and 6 inches long. These three tubes should be boiled in paraffin to exclude all moisture and the possibility of warping. The primary is wound with thirty turns of No. 22 double cotton covered copper wire. Taps are taken out every turn for six turns and then every six turns making six taps for single turns and four taps with six turns each. The taps should be soldered and made as short as possible. The primary coil is fastened to the end of the frame upright C, by means of a wooden disc  $\frac{1}{4}$  inches thick and of the right diameter. This completes the primary and it should be given a coat of thin shellac to hold the wires in place.

The secondary coil proper is built in a similar manner but wound with twenty-five turns of No. 26. No taps are taken off and the terminals are connected to two flexible

inches long, wound with 100 turns of No. 26 double cotton covered wire. Taps are taken out from every ten turns, giving a total of ten taps, the first turn being con-

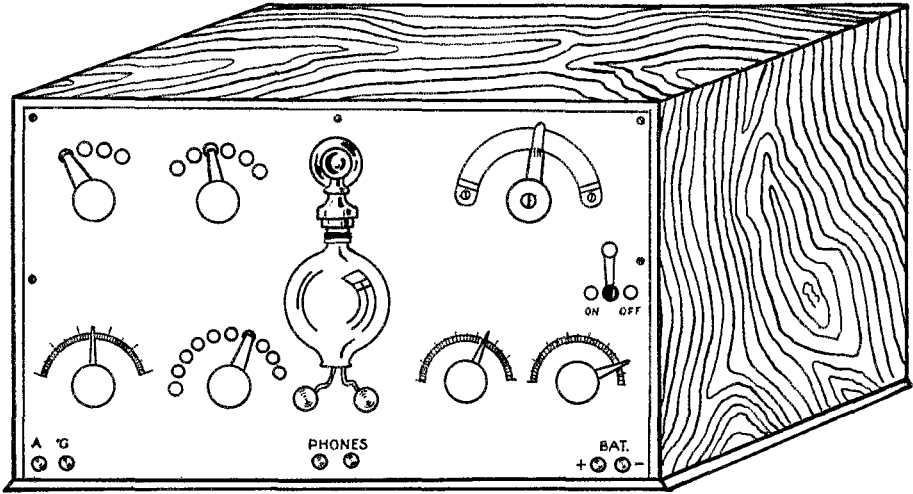


Figure 1

conductors to allow for the coupling which moves on arm E. A wooden disc is fitted into the end of the secondary on which arm E is fastened.

ned to the secondary proper as shown in the wiring diagram, Fig. 4. A connection is made between the last tap and the switch which acts as a reducer for the

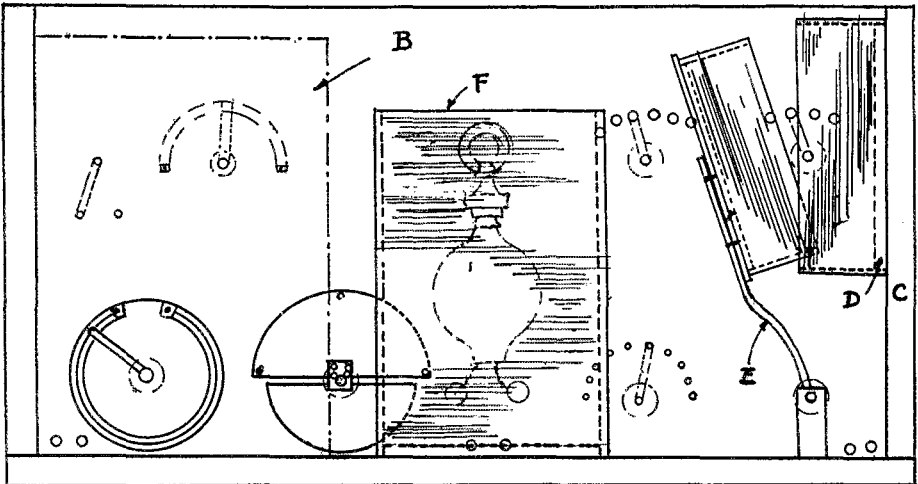


Figure 2

The secondary loading coil F, Fig 2, is placed at right angles to the secondary and primary to avoid undesirable inductive effects. Its size is 4 inches in diameter, 6

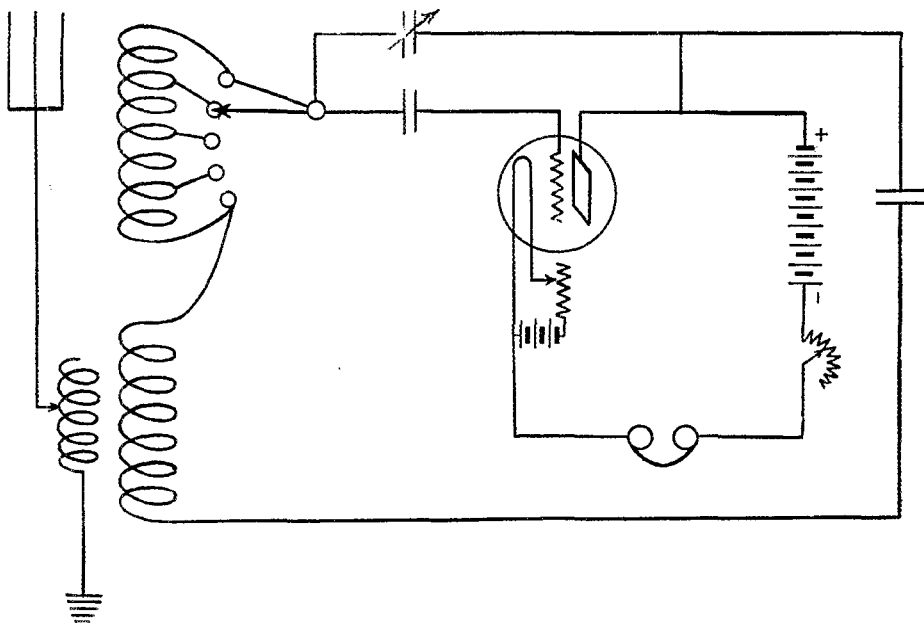
dead-end effect since it short-wave circuits the unused turns. One variable condenser is used to get the regenerative effect and this may be any of the small condensers

with about ten plates. The fixed condensers are about the size of a stopping condenser in the audion circuit. A piece of mica about 2 inches x 4 inches coated on each side with tinfoil gives the approximate capacity. A little experimenting will determine the exact size needed.

For adjusting the high voltage battery, a potentiometer has been shown. This is of the carbon resistance type such as is used on an RJ9 DeForest audion. With this circuit, either the tubular or round bulbs may be used with equal degree of success.

The apparatus may be mounted on a Bakelite or hard rubber panel. Figures may be stamped into the rubber and filled with a chalk and water mixture so that one will have no difficulty, with the proper tools, to label all the connections and switches. We have purposely withheld from giving in detail absolute and exact sizes and locations for switches, etc. This is to

give opportunity for original work, and a chance to make the apparatus fit special conditions. Detailed operating instructions are not given since no two operators agree as to the best way to tune, but it is well to bear in mind one or two points: For example when working the regenerative system, it is always well to use less capacity than inductance. One also finds that the capacity of one's hand is enough to throw the set out, but after working with the apparatus awhile, one gets accustomed to this and it causes no trouble. We can promise that if one follows with care the dimensions of the loose coupler and circuit given, remarkable results can be had. Amplifications of from 25 to 100 are often obtained with a circuit of this type. Sets similar to this but not as complete are in use at the present time in several of the best amateur stations. Relay work has been done which would not have been attempted a year ago.



*The atmosphere of the old days couldn't possibly be recaptured without reprinting one of the legendary "Rotten" stories by The Old Man. Here's the very first one — from May 1916.*

## Rotten Sending

By the Old Man.

I have been sitting by my instruments late into the night and saying nothing, but have done a pile of thinking. I hear pretty much all the boys have to say to each other, and hear these test messages and greetings and inquiries about the condition of somebody's health, and whether or not it will be convenient to come up next week, and a lot of different kinds of sending have passed through my phones. I want to break my periodical silence and bust forth once more in the columns of QST, which I am coming to enjoy more and more.

A while back I remember it was the fashion among some of the smart ones to spell out everything and never use figures. YOU was always spelled out, NIGHT was always spelled right, and never wrong, and the sign in was all blurred together so as to sound like some of the bum commercial operators.

This fashion had its day. Now, we have swung to the other phase of the cycle. Now, it is the fashion to abbreviate and mis-spell every word that can be abbreviated or mis-spelled. HAVE is now HV. NOW is now NW. NIGHT is now NITE. ABOUT is now ABT. HERE is now HR. I tried to get one the other night which had every single word butchered. I could not get the sense with certainty, but had to guess at a lot and I will make it a ten to one shot, that the fellow doing the receiving did a lot of guessing too. It is bad enough to guess any way, when you have to, but to do guessing just for the sake of guessing, always seems to me to be putting a premium on making mistakes. Radio communication requires enough guessing as it is. I am not in favor of taking these chances, but I suppose it is because of the

gray hairs on the top of my head, most of which have been brought about by mistakes made as a result of a wrong guess.

The fashion also at the present time runs to a kind of drawing out of dots and stringing on queer kinds of dashes. I know one of our best relay stations, one which is heard all over the eastern part of the country, who has formed the habit of dragging out his sign in so badly that it certainly must be copied wrong by a lot of people. I can take twenty-five a minute from any one of the Navy stations, or WHB, but I cannot take twelve a minute from this young man. And he is some punkins too.

Once in a while a station comes along who seems to think it good business to make a dot sound like a dot, and a dash sound like a dash. An attempt evidently is also made to give rhythm and cadence to the sending. It comes in strong and steady and clear and fast, and you know just what to expect in the way of steadiness and speed, and say, believe me friend, it is great stuff taking it down. I know one amateur whose spark I believe I could read at thirty if he would handle it the way he handles twenty. You can get it through QRM and QRN and the baby crying down stairs, and the 'phone ringing and the trolley passing, and it sounds like music. And it isn't it queer, this station never sends out a signal unnecessarily. You would think he was paying for his juice, the way he economizes with it.

Now, don't get the idea that a grouch is on the air tonight. I am just dashing this off along about time to go to bed, after listening to an especially choice selection of rotten sending. CUL OM GN SK.

### SPECIAL LICENSES

As is well known among most amateurs by this time, we have secured the co-operation of the Government to the extent that where it seems desirable for the purpose of relay work, a Special License will be granted by the Bureau of Navigation, provided the applicant holds a First-Grade Commercial License, and provided he is favorably recommended by the League.

This does not mean that everybody can secure a Special License. Distinctly the reverse is the case. No Special Licenses are issued except where it is very plain that the interests of the American Radio Relay League require it. Therefore, if you have a good station and hold a First Grade Commercial License and are located away from the sea coast, and absolutely require a

transmitting wave length of 425 meters in order to be able to handle relay messages, there is a chance that you may secure a Special License. But, unless you can make it very plain that you meet every one of these conditions, it is a waste of time for you to think about a Special License.

— December, 1915

**FOR SALE OR EXCHANGE:** Holtzer-Cabot type O2 Induction Motor, 1-6 H.P., 1350 R.P.M., 110 Volt 133 cycles, excellent condition. Need wavemeter, hot wire ammeter, Multi-Audi-Pone. K. B. Warner, 402 Washington, Cairo, Ill.

— June, 1916





## OURSELVES

The attention of the fraternity is respectfully directed to the ornamental heading at the top of this page. When this cut was prepared we were very busy. We confess we ordered the cut and we also confess we approved the drawing from which the cut was made. But, honest and true, fellows, we did not realize fully what we were doing. If the figure on the right is a picture of us, and the figure on the left is a picture of our helper, we are guilty of chucking the biggest bluff yet chucked on the North American continent.

First of all, we never had such a good looking coat as the chap in the cut. Next, we don't look so much like a distinguished statesman. Next, we have no phone on our desk. There is not room. But, if the filing pin and the papers impaled upon it are unpaid bills, it is us. When it comes to the other side of the cut, we have thought long and seriously. To the best of our knowledge we do not remember having met the lady. The table looks something like what we call "our desk." The filing case suggests one in the Presi-

dent's office, where he keeps some of his important American Radio Relay League papers. It suggests nothing we own. By no stretch of the editorial imagination can we see similarity between the pile of second hand transfer cases which we call "our filing case," and the natty looking outfit shown in the picture. And as for the vase with the two flowers, we know the whole business must be some pipe dream.

When the end of the month comes around, and we have a wagon load of magazines to wrap and address, we are favored by the presence of a certain radio lady. She is a good looker all right, but honest boys, she does not present the effect given above. Some day, when QST gets to be what we hope to make it, we may have an office that looks like the cut, and we may look like the handsome gent with the graceful attitude and the good looking coat, and we may have a peach like the one shown, and a bunch of roses in a vase and a waste paper basket which will stand up straight; but this day has not yet come.

— August, 1917

### AMATEUR LONG DISTANCE RECORD.

Just as this issue goes to press we learned that J. B. Ferrington of Los Angeles heard 2PM (Faraon and Grinan of New York.) Mr. Ferrington uses an RA-6 Transcontinental for receiving.

Full details of this 3,000 mile record and the apparatus used will be published in the next issue. Watch for it.



J. M. H., New York, writes us:

Question 1: What is the difference between two frequencies I hear spoken of in Radio work?

Answer 1: This question is one which troubles the average beginner. First, there is the frequency with which your condenser discharges. This discharge is of very high frequency and is not the audible note. The condenser discharge frequency is a function of the velocity and the wave length: that is, the frequency equals the velocity divided by the wave length. It is recommended that this be called "Radio Frequency."

The second frequency is the note frequency or audible note which one hears in the phones. Each impulse of the note frequency is made up with a number of high frequency or Radio Frequency oscillations. This frequency may be termed "The Audio Frequency."

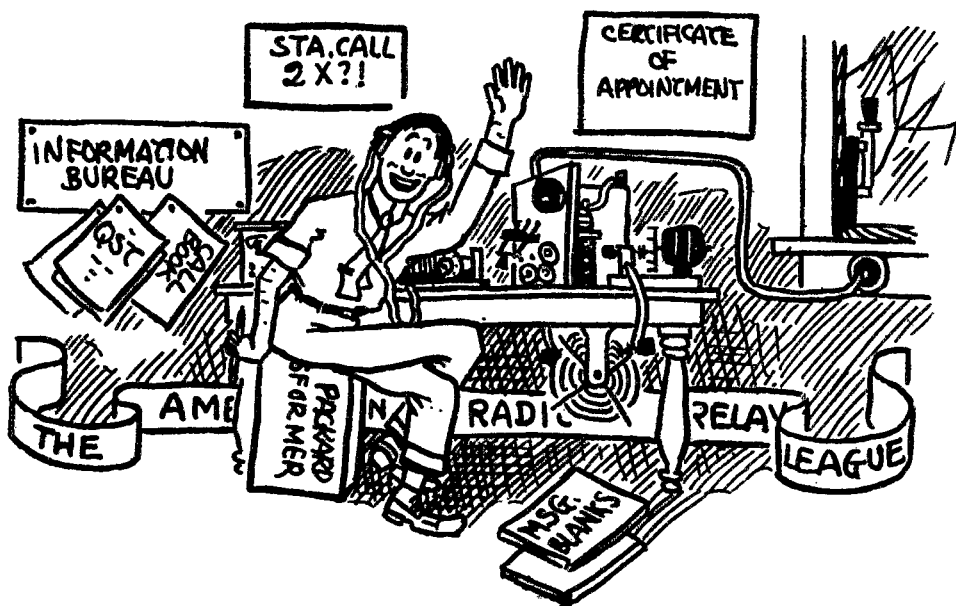
— May, 1916

H. E. G.

Question 1. I would like to hear your opinion as to which type of detector is the more sensitive, the round type of audion bulb, or the gas filled tubular bulbs operating on the "electron" principle?

Answer 1. Through advices from the various manufacturers, and technical papers, the Editor must confess that he is still doubtful as to whether there is or is not a distinct difference in the operating principle of these detectors. The question of sensitiveness seems to be this: The globular type appears to be much more sensitive for long distance work. The tubular bulb produces much louder signals from near-by stations, but is not quite as sensitive as the round type for long distance work. The tubular type operates much more efficiently over short distances. By long distances, the Editor means over 2,000 miles.

— August, 1916



— First cartoon in QST. April, 1916

## Aerials

*Mr. Wolfe has outdone his article on "Liars" in the October QST, by coming out with this one. "Aerials" is the leader for humor and is so true. A large number of us have antennas which might be taken for the hero of this article.*  
 EDITOR.

**T**HE aerial is a trap, a snare, cunningly suspended in space by the crafty experimenter for the purpose of way-laying migrating wave trains as said trains pass by. That it way-lays passing kites with great avidity is merely incidental. Were it not for the aerial, foolish wave trains would dissipate their substance in riotous and worthless waving.

We are indebted to Marconi, whose last name we can pronounce and whose first name we cannot, for this ingenious method of gathering unto ourselves those which the Government says possess a damping decrement not exceeding two tenths. There is much discussion in amateur circles as to whether Marconi should be thanked or shot.

Generally speaking, aerials are divided into two great classes; amateur and commercial. Commercial aerials are used to prevent ships from growing lonely. Amateur aerials are highly efficient at lofty tumbling. Some aerials get greater results than others out of a single collapse, depending largely on the location and lack of tensile strength of guy wires, but on the whole, every amateur aerial will do more actual damage per foot of falling matter than anything which uses the air as a medium of flight.

I remember gazing in admiration at the skilful fall of a certain amateur overhead. In one fell swoop it shoved twenty foot of spruce through a plate glass display window, pushed the other twenty feet through the brittle dome of a hot house nearby, dropped a strand of copper across a few street wires, thereby sending in four fire alarms and summoning three patrol

wagons; then wound the remaining strand gracefully around the neck of a passing policeman. The lead-ins, after a barely perceptible instant of hesitation, attached themselves lovingly to a friendly barrel wagon, which was, at the time, en route. All this, mind you, in one simple, easy movement. Darned fine falling, I call it.

No man knoweth what an aerial will next do. They are eccentric, and-er-capricious. I have a distinct recollection of an evening in February. Six or seven of us were assembled in my station, industriously using up the contents of a four volt forty and speeding a much abused filament towards a premature demise. On this placid gathering burst one of my usually peaceful neighbors. There was fire in his eye, and his nostrils belched forth smoke. He shook a brawny fist in our direction and announced in exceedingly harsh tones that he could lick anyone of the assembled multitude, regardless of height, weight, race, color, or previous condition of servitude. When no one took advantage of this very generous offer, in a burst of magnanimity he made it any two, three, or four, collectively, or individually, the choice resting entirely with us.

Some one politely remarked that ours was a radio station; that the gentleman had evidently become confused and lost his bearings, the prize-fighting factory being several blocks down, and to the left.

I calmed the irate one with some difficulty, and allowed him to tell the following tale: One of my aerial strands had elected to break, just as a gentle zephyr of north-east persuasion was passing. My wire joined forces with the depraved zephyr, and landed athwart my neighbor's tele-

phone line. It seems that as I transmitted, a few wave trains of high frequency, on adventure bent, had, out of curiosity no doubt, wandered along the telephone line and into my neighbor's instrument. The unfortunate part of the whole affair was the fact that the receiver happened to be in our visitor's hand at the time. Hence, the threatened breach of diplomatic relations.

The aerial is the first thing the prospective amateur considers. The aerial is also the last thing the disgusted veteran considers, when about to dismantle. Incidentally, one continues to consider it throughout his entire career. Consideration of the aerial enriches the vocabulary. Even as Minerva sprang full-grown from the forehead of Jove, so do many new, picturesque, and very expressive cuss-words spring spontaneously from the lips of the hapless bug as he considers the wreck of a fallen aerial. The last thing the enthusiast considers at night is his aerial, wondering if it will last the night and knowing blame well it won't. The first thing the same enthusiast considers in the morning is his aerial, wondering if it's still up, and knowing blame well it isn't.

He considers the aerial in the heat of

summer, when the joyous lightning is playing tag with his No. 12 B. & S. He considers the aerial in winter, when sleet and ice cluster on spreader and strand; in fact, he considers it at all times and on all occasions.

About the very first lesson that the novice learns in the wireless game is the sad fact that aerials do not grow on roofs, but are, alas, placed there by the sweat of one's brow and at the risk of one's neck. After about six months on the inside, the owner of an aerial finds a great feeling of comradeship growing within him for tinnerns, and those who pass the greater part of their lives on roofs. In fact, when passing a group of dusky hod carriers, he never fails to say, "How are you, fellows?"

Patiently, he stands on his scorching tin roof and mends lead-ins when a difference of one degree Fahrenheit is all that determines whether he is alive, human, or Experimenter a la Friccase. Patiently, he stands on that same roof in winter, en rapport with Cook, Peary, Shackleton, et al, and mends those self-same lead-ins. Won't some kind scientist please find a way to get Calcutta without an aerial? Think of it, friends! Aerial-less wireless!

### SUMMER WORKING HOURS

It is a pure waste of time to try to work in the evening or day time. The only possible opportunity is in the morning before 7 A.M. At that time, the ether is often as clear as in winter and bad static is hardly ever encountered unless a storm is approaching. — August, 1916

During the Junior encampment at Plattsburg, N. Y. in July, there were thirty-five hundred members from all over the United States. This included many radio amateurs, but Uncle Sam had sent all his wireless sets to the Mexican border, so we wireless "bugs" were unable to get together.

One morning on the march, the command was given to halt and we were allowed to rest by the roadside. Without thinking, I picked up a piece of grass, put it between my thumbs and began to blow CQ and sign off. I stopped and was very much surprised to hear five fellows of our Company (H, of the Fourteenth Regiment) come back at me with tones varying from a sick automobile coil to a five hundred cycle quenched. We soon got together and frequently spent our evenings discussing radio.

(Signed) L. S. SOMERS, JR., 3AFE.

— October, 1916

### IMPORTANT ANNOUNCEMENT

Every member of the American Radio Relay League will be interested to know that arrangements have been concluded whereby all papers presented before The Radio Club of America will be reprinted in *QST*. No other publication will have the right to publish these important articles and the discussion which accompanies them.

— July, 1916

### OUR COVER

We see here the 1915 Amateur, having surrounded himself with goodies, just opening the first issue of *QST* in search of words of cheer and wisdom. Depicted on the inside front cover is the very crystal detector he has before him!



# Weak-Signal

## V.h.f. Reception

BY HENRY D. OLSON,\* W6GXN

### *Some Basic Facts Regarding Phase-Locked-Loop Detection*

**S**YNCHRONOUS detection, phase-locked loops, tracking filters, radiometers, linear detectors, square-law detectors, and so on into the night in a great rattle of esoteria, beset the modern u.h.f. enthusiast who is reading prospective low-noise receiver material. "Copying signals 40 db. below the noise" is a term regularly tendered as a tout of how well one receiving technique or another works. But how in the world can one make any use of this material to put some hardware together if the literature sounds like the ads for TV antenna "measured-gain" did a few years ago?

First, let's examine the various ways that weak-signal detection technology has progressed. All weak-signal techniques attempt to increase the system output signal-to-noise ratio by narrowing the system bandwidth. First, probably the simplest approach is the use of a very narrow last i.f. passband in a multiple-conversion receiver, to achieve a small system bandwidth. Second, a phase-locked loop, as exemplified by the Vanguard program's "Microlock" system may be used. And third, there is the radiometer technique, wherein the narrow bandwidth is obtained by post-detection integration. These systems will be described one at a time in hope of pointing out the attributes and difficulties with each, but first let's take a quick romp through some of the basic information theory of our subject.

The basic rule of information theory, roughly stated, is that "information" ( $I$ ) is defined as

$$\log_2 \frac{P_2}{P_1}$$

where  $P_1$  and  $P_2$  are respectively the

probability of something before the message is sent, and its probability after the message has been sent.

To illustrate what is meant by the concept

$$\text{of } I = \log_2 \frac{P_2}{P_1}, \text{ let's say you are waiting for word}$$

from the obstetrician as to whether your wife had a boy or girl. He comes from the delivery room and tells you that it is a boy, and of course

statistics had previously told you that it was equally likely to be a boy or a girl. Since the probability of a boy was 50 per cent,  $P_1$  is 0.5. After the doctor tells you "It's a boy" you are 100 per cent sure it is a male heir, so  $P_2 = 1.0$ . Putting these probabilities into our definitive equation for information we get  $I = \log_2$

$$\left[ \frac{1}{0.5} \right] = \log_2 (2) = 1, \text{ and we say that the doc}$$

gave you "one bit" of information. This example may sound trivial, but consider the case that the obstetrician waits to tell you the news until you are both at a cocktail party, and then shouts at you across the crowded room, "What did he say? I thought he said, 'It's a boy'." If you felt 80 per cent sure he said "boy," then  $I = \log_2$

$$\left( \frac{0.8}{0.5} \right) = 0.68 \text{ bit. In short, because of presence}$$

of noise, the surety of the information was reduced and therefore we got a value of  $I$  which was smaller.

In an information transmitting and receiving system the received information rate is directly proportional to the system bandwidth. This can be supported by any experienced c.w. operator who has used a very selective receiver and found that only *slow* c.w. could be copied at such a narrow bandwidth.

Well then, if these points from information theory are correct, we first want to narrow the bandwidth of our receiving system to reduce noise-power output (whether it is from the receiver front-end or from the sky) to a level where the expected signal-power output is greater than this noise-power output. Then we must slow our information rate down to be compatible with this narrow bandwidth. And finally we must resort to whatever kind of trickery we can devise to increase  $P_1$  by finding out all we can about the signal we are to receive, and advantageously using this information. The last point also applies to eliminating noise as generated by auto ignition systems: since we know the nature of ignition noise we can use this information to cancel it, by a clipper or a noise

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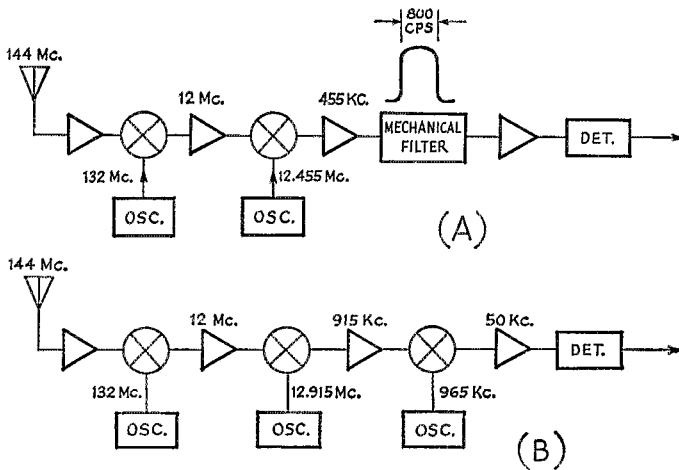


Fig. 1—Block diagrams of typical weak-signal receivers used by amateur radio operators. Multiple conversion and i.f. bandpass filtering methods are employed at A. Illustration B shows a typical multiple-conversion system providing a narrow i.f. passband without a filter network. Both systems suffer if oscillators in any of the conversion stages are subject to drift.

punch-out circuit. Only noise having a *predictable* nature can be operated on in this way; front-end noise and sky-noise (being "white-noise") are unpredictable and not susceptible to being operated on.

The whole subject of impulse-noise clipping and knowing what distinctive characteristics the signal is to have, can all be generally classified as cross-correlation techniques—methods by which we accept only the type of signals we expect, and reject those we don't expect.

A couple of simple ways of improving the ability to tell whether a signal is present or not are as follows: Dots and dashes could be agreed upon by transmitting and receiving stations to be  $\frac{1}{4}$  and  $\frac{3}{4}$  seconds long, respectively. Dots and dashes could always start on the tick signal from WWV. Then a look at a record would immediately reject anything that didn't satisfy the above two criteria.

One will notice that the above-mentioned technique has the effect of increasing  $P_1$ , the "before" probability, and therefore to *decrease* the information sent,  $I$ . But although this may sound as if we lost ground, we really gained some, since now we no longer have to process repetitious information, but only the language contained in the code symbols.

On the other hand, the elimination of impulse noise by a noise clipper increases  $P_2$  and therefore *increases*  $I$ , the information received.

Let us now return to the three types of weak-signal receivers in use by amateurs. The first is simply a multiple-conversion-receiver system wherein narrowing of the bandwidth is done by i.f. band-pass filtering. Two such systems are illustrated in Fig. 1. With either system, system bandwidths can be achieved of only several hundred cycles. The system suffers if any of the local oscillators used in the conversion have drift. Any oscillator drift may cause the signal to be

displaced outside of the system passband; therefore, all the oscillators must be stabilized so that their drifts do not add up to an amount approaching the system bandwidth.

Another system used occasionally by amateurs for weak-signal detection is the phase-locked-loop. The phase-locked-loop is one of a class of detectors in which the signal being detected is of the same frequency and *in a fixed phase-relation* to a locally-generated signal. These gadgets have been around in various forms since the earliest days of radio.<sup>1</sup>

To this author's knowledge, only two hardware-oriented articles have appeared in the amateur literature on phase-locked-loop detectors.<sup>2,3</sup> These are both fine articles and provide good explanations of the principles involved. Both describe loops designed for locking on the continuous signals from satellites.

Briefly, the phase-lock-loop detector is as shown in Fig. 2. The signal goes into a phase detector comprised of the limiter and multiplier 1, and then the phase-detector output voltage is returned to the voltage-controlled oscillator through a low-pass  $RC$  filter. This loop servos the oscillator into phase quadrature with the signal. The same oscillator voltage is then passed through a 90-degree phase-shift network to a second multiplier, without a signal limiter ahead of it, for in-phase (amplitude) detection.

The attractiveness of the phase-locked-loop is that one achieves the *equivalent* of bandpass filtering with a low-pass filter, and that this detection can be done at a relatively high receiver i.f. Several rather good phase-locked-loop systems are in use in space telemetry systems where detection is accomplished at 7-Mc.

The phase-locked-loop has been shown to work well for many signals, providing there is always a carrier present on which it can lock. However, for radiotelegraph signals, the loop may drop



out-of-lock between dots or dashes. Because of this inherent drop-out characteristic of phase-locked loops, it would seem that a discontinuous signal is not ideal for use with such detectors. But slowly-sent radiotelegraph is the way most marginal path records are accomplished, and it is unlikely that hams will find a simpler way of slowly feeding information into a communication link.

Perhaps the solution to this problem — use of phase-locked-loops with radiotelegraph — is to use phase-shift keying of a c.w. carrier. In this way, the loop can remain locked and information can be read from the phase-detector output in the locked loop. The second phase detector for amplitude output would be unnecessary.

The phase-shift keying (p.s.k.) must be done differently than some basic systems, however. An abrupt shift in phase must not be allowed to occur, or the loop will not track it. This means that a linear phase-shift network must be keyed, with appropriate time-constant keying, so that the phase modulation ramps up and down between the two selected phase positions, as shown in Fig. 3. Note that the slope of this ramp must be smaller than a factor we designate as  $\alpha$ , if the loop is to stay locked. In the case where there is Doppler shift on the signal the combined Doppler shift slope plus the ramp slope must be smaller than  $\alpha$ . The presence of the ramp, of course, automatically puts an upper limit on how fast we can send radio telegraphy, since it represents "the time to push the key down", in effect. The reason one may not exceed  $\alpha$  may be explained qualitatively as follows:

The inability of a phase-locked-loop to track signals which have a large rate of phase shift is a natural consequence of the RC low-pass filter delay. If the delayed correction voltage from the phase detector does not arrive back at the v.c.o. fairly rapidly, the v.c.o. tries to correct for a phase relation that no longer exists, and never catches up to the rapidly-changing input phase.

We must therefore design our loop bandwidth to be greater than  $\sqrt{N\alpha}$  where  $N$  is an empirically-derived number usually between 2 and 9. A more detailed description of loop bandwidth is given in the Appendix.

The last category of weak-signal receiver we

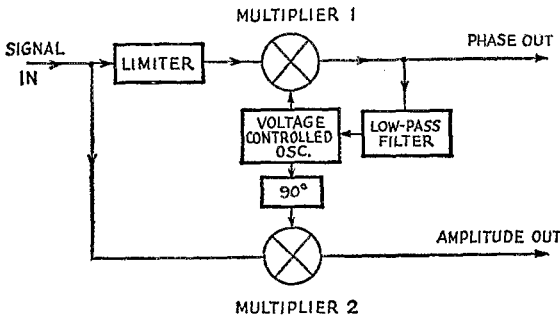


Fig. 2—Block diagram illustration of the phase-locked-loop system capable of achieving the equivalent of band-pass filtering, but usable at a relatively high receiver i.f.

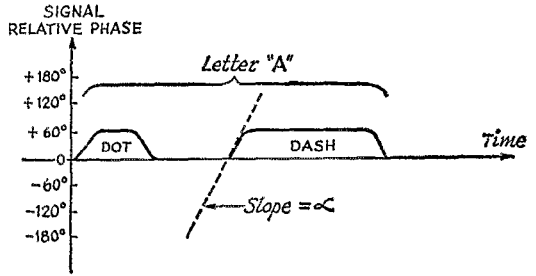


Fig. 3—Representation of the manner in which phase modulation ramps up and down between two selected phase positions.

will look at is the radiometer. In the switching radiometry receiver or Dicke Radiometer, the basic idea is to try to reduce the importance of receiver gain changes, since gain changes (if they occur at a rate similar to the modulation we are trying to receive) represent noise on the signal.<sup>4</sup> The Dicke system *does* stabilize receiver gain, but at the loss of at least 3 db of signal. Then, once gain is stabilized, post-detection low-pass filtering is used to narrow the system bandwidth.

The Dicke system and modifications of it, such as the Ryle-Vonberg radiometer, use a switch at the very input of the receiver.<sup>5</sup> This switch connects the receiver alternately to the antenna and to a noise source of some kind. A similar *synchronous* switch connects the detected output of the receiver to two identical RC circuits. The difference between the voltage across these two RC circuits is then the difference between the antenna and noise source, since the noise voltage from each is multiplied by the same (unstable) receiver gain constant. A schematic Dicke radio meter is shown in Fig. 4.

In this system the noise source is shown as a resistor at some known (stabilized) temperature. It could also be a stabilized temperature-limited diode noise source, or a stable c.w. signal from a generator.

At this point, it may be wise to note that astronomers often regard cosmic noise — which has a broad spectrum — as their *signal*, even though over a limited bandwidth it looks like white noise. Hence, their "signal" is equally noncoherent noise compared to their "noise" (that which the receiver contributes). So, unless we are very careful, we can easily become confused. A weak signal such as a 1296-Mc. moon-bounce signal is *not* a broad-spectrum white-noise-like signal; it is (or was) a single frequency in the r.f. spectrum, with spreading side frequencies out to plus or minus some  $\Delta f$  due to moon motion and roughness. Similar  $\Delta f$ 's can be caused by fluctuations in other propagation paths, by a number of effects.

One of the expressions given by Dicke for his receiver (as well as other stable receivers) is:

$$\frac{\Delta T_A}{T_A} = K \frac{N}{\tau \Delta f}$$

where  $\frac{\Delta T_A}{T_A}$  is the relative fluctuation in output

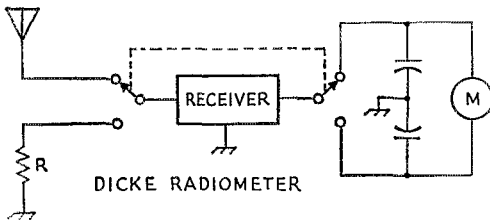


Fig. 4—Illustration of the Dicke radiometer system.

(in terms of temperature),  $K$  is a constant,  $N$  is the noise factor,  $\tau$  is the time constant of the  $RC$  circuit, and  $\Delta f$  is the pre-detection bandwidth. As can be seen, if we want to reduce  $\frac{\Delta T_A}{T_A}$

we can (1) reduce  $N$  (by use of a paramp in the receiver from end), (2) increase  $\tau$  (use a bigger capacitor), or (3) increase  $\Delta f$  (say broaden the i.f. amplifiers by stagger tuning).

The first two suggestions seem reasonable enough—getting the best front-end possible, and integrating the noise in the receiver output, but the third is obviously ridiculous. Increasing our system bandwidth beyond what will accept our plus-or-minus  $\Delta f$  information spectrum, will not increase our signal output in amplitude, but will increase noise output.

How then can this expression be true for astronomers and not for hams? Because

$$\frac{\Delta T_A}{T_A} = \frac{\text{Receiver Noise}}{\text{Cosmic Noise}} \quad \text{for astronomers and}$$

$$\frac{\Delta T_A}{T_A} = \frac{\text{Cosmic Noise} + \text{Receiver Noise}}{\text{Signal}} \quad \text{for hams}$$

That is, to us cosmic noise and receiver noise are both villains, whereas to an astronomer cosmic noise is that for which he is hunting.

The Dicke relation still holds for hams, but the third method of reducing  $\frac{\Delta T_A}{T_A}$  must not be used

beyond the bandwidth that encompasses the signal's inherent useful spectral width, as it appears at the receiving antenna.

Since the sky is a source of noise, it could be used as noise source in our Dicke system by simply using frequency-shift keying on the receiver local oscillator. The receiver then alternately looks at the same part of the sky, through the same antenna system, at the signal frequency and a frequency slightly removed from that where our signal is expected. This system has been utilized by WA6JZN and others with success, and has some advantage over a local-noise-source reference to the extent that cosmic noise is not constant, or not white.

The Ryle-Vonberg radiometer previously mentioned makes an important change in the Dicke system in using a servo-controlled noise generator. As before, the input of the receiver is switched between the antenna and a noise source. But this time the output (difference between the outputs of the two  $RC$  circuits) is

forced by a servo system to stay at zero. By noting any such difference, amplifying it, and applying it in such phase as to increase or decrease the noise source output (a noise diode), the difference is held at zero. The plate current of the noise diode is then recorded as a direct measure of antenna temperature. Such radiometers (riometers) are built by several firms commercially nowadays, and are one of the accepted means of monitoring apparent variations in cosmic noise due to changes in the attenuation of the earth's ionosphere, caused by solar flares and high-altitude nuclear bursts.<sup>6,7</sup> (Current models are completely transistorized (except for the noise diode) in a 7-inch panel, demonstrating that the system needn't fill the shack.

Although the Dicke (or Ryle-Vonberg) method does represent a practical method of stabilizing a receiver against its own drift, it does so at the expense of at least 3 db. of signal. This is because, even if it works perfectly, the receiver is only attached to the signal half of the time. In addition, more signal may be thrown away by our choice of the switching voltage.<sup>8</sup>

The author has tried to present a comparison between the several weak-signal detectors, to clarify the differences between them, and point out a few trouble areas in each. Certainly no one system is best, but knowing the attributes and disadvantages of each, we can make our choice and get on with building.

QST

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## Appendix

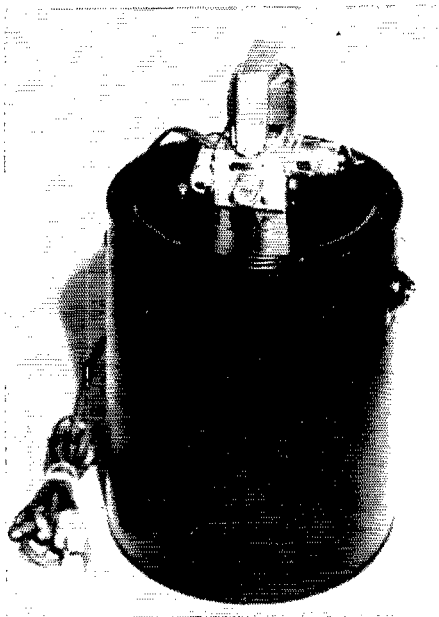
The loop bandwidth is defined as:

$$B = \sqrt{\omega_n \omega_s}$$

where  $\omega_n = G_1 G_2 S$  and  $\omega_s$  is the 3-db point of the low-pass filter.  $G_1$  is the phase-detector gain,  $G_2$  is the v.c.o. sensitivity, and  $S$  is the phase-detector input-signal voltage.<sup>9</sup>

The fact that the equation for loop bandwidth has  $S$ , the signal strength, in it shows that the effective bandwidth changes with signal.

## Measuring Power with a V.T.V.M.



# The "Cantenna" as an R.F. Wattmeter

BY HERMAN LUKOFF,\* W3HTF

The author describes some simple modifications to an already-useful piece of ham test equipment. The owners of Heath Cantenna dummy-load units can make a few simple circuit changes in the r.f. rectifier circuit and measure power output, in watts, by comparing v.t.v.m. readings against a chart, or by simple calculations.

LIKE many amateurs, I have never owned an r.f. wattmeter. Furthermore, I felt that only the boys in the laboratories could afford such a unit. Still, there were times when it would have been nice to have an r.f. wattmeter rather than the incandescent lamps I'd been using as dummy loads over the years.

Recently, I acquired a Heathkit "Cantenna" dummy load which performs nicely and contains a diode-rectifier monitoring circuit which Heath states is for relative power indication.

I decided that there was no reason why the Cantenna could not be modified for use as an r.f. wattmeter as well as for a dummy load. All of the basic ingredients were present and according to

the basic power law,  $P = \frac{E_{rms}^2}{R}$ . Since the Can-

tenna contains a reasonably accurate 50-ohm resistor, only  $E_{rms}$  has to be measured before the power can be calculated.  $E_{peak}$  at radio frequencies can usually be measured more conveniently than  $E_{rms}$ . For sine-wave input,

$$E_{rms} = \frac{E_{peak}}{\sqrt{2}} = 0.707 E_{peak}$$

Neither  $E_{peak}$  nor  $E_{rms}$  can be accurately read with the existing rectifier circuit. Referring to Fig. 1,  $R_2$  and  $R_3$  form a voltage divider (attenuator) network that prevents the peak inverse voltage rating of the diode from being exceeded with high power input.  $R_2$  also serves to isolate the rectifier and load from the r.f. circuit. Unfortunately, the attenuator is a rather inaccurate device over a wide range of frequencies, which is perhaps the reason why Heath states that power-input indication is relative. At low frequencies, the attenuation ratio is 1 to 101, as determined by  $R_2$  and  $R_3$ . At higher frequencies, the attenuation can be considerably different because of stray capacitance and rectifier loading effects.

The design of a 0-to-400-Mc. fixed-level attenuator is a difficult engineering job, so I took another approach — that of driving the rectifier directly. A peak-reading rectifier was designed whose d.c. output voltage closely approximates the peak r.f. input voltage. In order to have the rectifier's output voltage within a few per cent of the peak a.c. input voltage, several conditions must be met:

- 1) The rectified voltage must be high compared to the forward voltage drop of the diode.
- 2) The resistance of the load (meter) must be very high compared to the 360-ohm forward resistance of the 6AL5 diode rectifier. O. Schade<sup>1</sup> has shown that for  $E_{dc}$  (rectified voltage) to be 99 per cent or better of  $E_{peak}$

$$\frac{R_{diode}}{R_{load}} = 0.05 \text{ per cent}$$

$$R_{load} = \frac{R_{diode}}{0.0005} = \frac{360}{0.0005} = 720,000 \text{ ohms.}$$

\* 506 Dreshertown Road, Fort Washington, Pa. 19034.

<sup>1</sup> Schade, "Analysis of Rectifier Circuits," *Proc. IRE*, July, 1943.

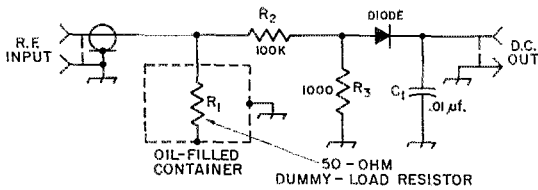


Fig. 1—Schematic diagram of the original r.f. rectifier network used with the Cantenna.

The voltmeter used to measure  $E_{dc}$  must have a high resistance, so a vacuum-tube voltmeter (v.t.v.m.) is ideal.

3) The capacitor at the output of the rectifier must provide a long time constant to permit a voltage drop of less than 1 per cent between peaks. A calibration check of the wattmeter at 60 cycles is desirable, and since 60 cycles is the lowest frequency to be measured, a 0.25- $\mu$ f. capacitor was chosen. This large value of capacitance is needed only for calibration checks, however. A 0.01- $\mu$ f. capacitor alone is sufficient at 3.5 Mc. and higher. The larger capacitor is left in the circuit at all times, however, to facilitate s.s.b. power measurement with normal speech input rather than with tone. More will be said on this subject later.

Now that one problem was solved, another was created. Assuming that 1500 watts is the maximum output power to be measured, the voltage across the 50-ohm dummy-load resistor is

$$E_{rms} = \sqrt{PR} = \sqrt{1500 \times 50} = \sqrt{75000} = 274 \text{ volts.}$$

$$E_{peak} = 274 \times 1.4 = 387 \text{ volts.}$$

Because of the charged capacitor, the diode would see twice this amount, or 774 peak inverse volts. High-frequency solid-state diodes normally have a p.i.v. rating in the 30- to 50-volt range. Therefore, it would take approximately 19 diodes (in series) to survive under this high power condition. To simplify matters, I decided to use a single 6AL5 vacuum-tube diode and a filament transformer. To minimize effect on the s.w.r., the detector is wired for positive voltage output. In this way only the plate capacitance of the tube (low) is added to the dummy load. The heater and transformer circuit capacitances present no problem because they are placed in parallel with the much larger capacitance of the

rectifier output circuit. The 6AL5 heater is connected to the cathode, reducing the possibility of voltage breakdown in the tube.

### Construction Details

To simplify matters, the existing aluminum box was used even though some components had to be mounted outboard. All work can be accomplished without removing the lid from the can, thus avoiding a messy situation. Remove the shield cover and unsolder  $R_2$ ,  $R_3$ ,  $C_1$ , and the diode (see Fig. 1). Save  $C_1$  for later use. Saw off the side of the U-shaped shield cover opposite the pressure relief valve. This side will be used for mounting the 6AL5 tube socket. Drill a  $\frac{5}{8}$ -inch hole for the 7-pin miniature tube socket, with its center  $\frac{1}{2}$  inch from the top and 1 inch from either edge. Mount the socket so that Pin 7 is as close as possible to the coax-connector center terminal.

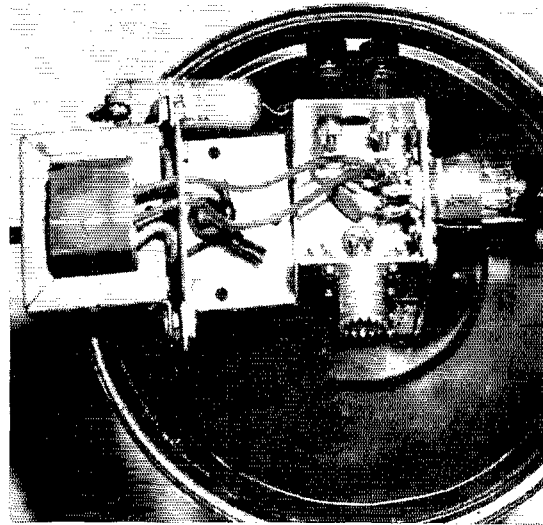


Fig. 3—A look at the modified Cantenna, showing the addition of a filament transformer, a 6AL5 tube, and a 0.25- $\mu$ f. capacitor.

Connect the two with a short length of bare wire. Resolder the 0.01- $\mu$ f. capacitor from Pin 1 to the ground terminal on the tie strip.

As a matter of convenience, the phono jack for the d.c. voltage was replaced with two binding posts because they are easier to connect a meter to than is a phono jack. One binding post must be insulated from ground and serves as a feed-through bushing for the d.c. output voltage. It is used, also, as a mounting terminal for the 0.25- $\mu$ f. capacitor.

The body of the 6.3-volt filament transformer may be longer than the shield. If so, a piece of aluminum, just long enough to receive the transformer mounting screws, can be mounted on the shield cover. This is shown in Fig. 3. The 6.3-volt leads are cut to a 3-inch length, inserted through holes in the shield, and soldered to Pins 3 and 4. A grommet is mounted on the

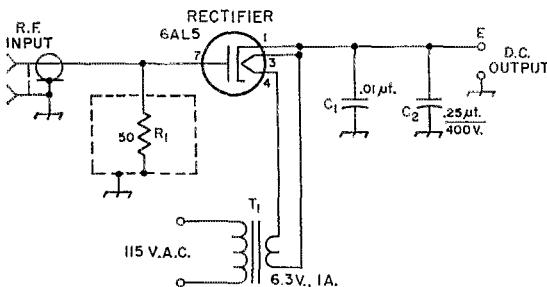


Fig. 2—A revised circuit for the Cantenna's rectifier assembly.  $C_1$  is a disk ceramic and  $C_2$  is a Mylar capacitor.

side of the shield approximately  $\frac{3}{8}$  inch from the top. A 115-volt lamp cord is inserted through the grommet and knotted, then spliced and taped to the 115-volt transformer leads. To conserve space, the a.c. on-off switch was omitted.

After connecting Pin 1 to Pin 3, and then Pin 1 to the output terminal, the unit is ready to enclose. The filament leads can be folded and dressed away from the coax connector. No space is available inside the box for the 0.25- $\mu$ f. capacitor, so it is mounted externally, alongside the safety valve, and connects between the d.c. output terminal and ground. The unit is now ready for use.

### Using the Power Meter

Using the wattmeter for power-output measurement is quite simple. Connect the wattmeter as a dummy load and adjust the loading control on the amplifier, if there is one, to the prescribed value of plate current at resonance. (This should be the same value of plate current that is used when feeding the antenna.) Read the d.c. output voltage of the wattmeter with a v.t.v.m., at  $E$ , remembering that

$$P \text{ (watts)} = \frac{E_{rms}^2}{50} = \frac{(0.707 E_{dc})^2}{50}$$

$$= \frac{0.5(E_{dc})^2}{50} = 0.01 E_{dc}^2.$$

The power can be computed simply by reading the meter, multiplying the reading by itself, and moving the decimal point two places to the left. Alternately, the chart shown in Fig. 4 can be used. Single-sideband power can be measured by whistling or talking continuously into the microphone. The 2.75-second time constant of the rectifier output circuit permits the voltmeter to "hang" (on peaks) long enough to be read on the meter. With carrier inserted and with tone modulation, or c.w. key-down condition, the meter reading is, of course, steady.

The honesty of the wattmeter's readings is determined by the accuracy of the 50-ohm dummy-load resistor, the v.t.v.m. accuracy and the rectifier efficiency. The value of my Cantenna resistor, when cold, is 49.25 ohms. After "cooking" it for a half an hour (r.f. power applied) to the point where the can became quite hot, the resistance decreased to 48.3 ohms. This is an error of 1.5 per cent when cold and 3.4 per cent when hot. The rectifier output circuit is designed for better than 98 per cent efficiency. The worst total error is:

Resistor	$\pm 3.4$ per cent	
Rectifier	$-2.0$ per cent	
V.t.v.m.	$\pm 3.0$ per cent	full scale
	<u>8.4</u> per cent	

Thus, power output can be measured with less than a 13-per cent error, using the  $P = 0.01 E_{dc}^2$  relationship. A measurement of this type should be adequate for all amateur needs. The error can be reduced to a few per cent by calibrating

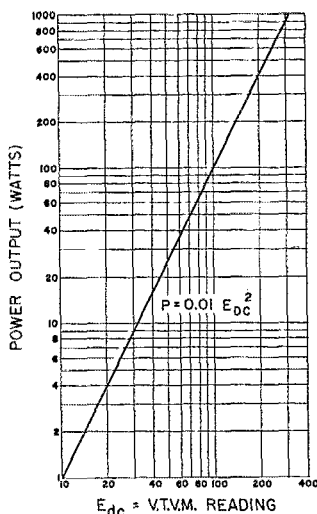


Fig. 4—A chart that permits direct comparison of v.t.v.m. readings, taken from the output of the Cantenna's rectifier circuit, and power-output (in watts).

the v.t.v.m. more accurately, measuring the resistor with a bridge and using the relationship

$$P = \frac{0.5 E_{dc}^2}{R}$$

### Some Final Comments

The wattmeter and v.t.v.m. can be calibrated at 60 cycles, if anyone cares to do so, by using a variac to control the input voltage. The a.c. voltage input should be measured with an accurate r.m.s.-reading voltmeter. The power input is equal to  $\frac{(E_{rms})^2}{50 \text{ ohms}}$ . Power input can be plotted against the v.t.v.m. reading. The calibration, although performed at 60 cycles, will be accurate at radio frequencies.

Measurements of this type, using 1-per-cent precision instruments, were made over a range extending from 0.3 watt to 1000 watts. The calibration points fell directly on the predicted curve as shown in Fig. 3.

The effect of the Cantenna modification on the s.w.r. is negligible. Removing the 6AL5 rectifier tube produced no noticeable change in the s.w.r.-meter reading at 14 Mc. and only a slight change at 144 Mc. Diode conduction occurs over such a small portion of the r.f. cycle that the loading effects are negligible.

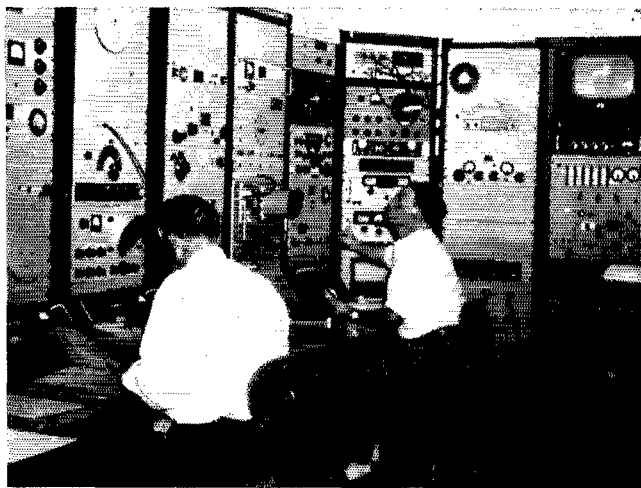
The modification described is an economical and accurate method of measuring r.f. output power. It is a useful addition to the shack and should pay for itself through better knowledge of the performance of your equipment. Efficiency measurements can become a reality rather than a textbook quote.

Appreciation is expressed to Ted Warzel for the photographs and to R. Frick, K3SXR, for the use of his laboratory instruments.

**QST**

**I**N a previous article<sup>1</sup> I indicated that after a series of inspections of amateur radio stations, the conclusion could readily be drawn that amateur stations, from an inspectional standpoint, have a good record of conforming with the rules and regulations.

The question has been asked, however: "How do amateurs actually *operate* their stations, from the standpoint of the FCC's policing efforts?" Opinion has not been unanimous that amateurs give a good account of themselves on the air in obeying the "rules of the road." The Monitoring Systems Division in our Bureau has tabulated 1297 violation notices issued to the amateur service during the fiscal year ending June 30, 1965. The previous year, 631 violation notices were issued through monitoring. This total ranks the amateur service only behind citizens and marine in the number of violations discovered through monitoring. Issuance of advisory notices was also high — 2708 compared



Laurel, Maryland—a typical FCC monitoring installation

with 2168 the previous year. These are notices of unsatisfactory conditions, such as spurious emissions within the amateur band (lacking a QRM complaint), and may lead to a violation notice.

tions for out of the band, or out of the sub-bands, namely, 781 against 516 for all other types of violations. Except for a special project detailed later in this article, we have no breakdown for the violations as against phone and c.w. amateurs. Statistics are not available as to whether there

## *Amateur Radio Station Operation*

# From a MONITORING ENFORCEMENT Viewpoint

BY FRANK M. KRATOKVIL,\* W3BA

As is the case with so many statistics, not only can different interpretations be placed upon them by different persons with different experiences or varying viewpoints, but the comparisons between the services are open to argument. For example, when an amateur station is observed outside of the band one violation notice is issued. On the other hand, if a commercial or public service installation is observed and it has twenty mobile units, all of them off frequency, only one violation notice is issued. Experience shows all services have a capability of maintaining frequency. It's just a matter of discipline and being careful.

### *Violations by Modes*

An appreciable number of amateur station violation notices are issued by monitoring sta-

\* Chief, Field Engineering Bureau, FCC

<sup>1</sup> "FCC Amateur Station Inspections," *QST*, June, 1965, p. 36.

were more phone stations operating than c.w. stations. Therefore, in the absence of a study, opinion has been substituted and it seems that more voice stations operate outside of their sub-bands than c.w. stations do. . . . But actual count shows that *during contests* more c.w. stations (70%) are caught operating outside of the band than phone stations (30%). This may well be because, at least judging by results of such contests as reported in the magazines, more c.w. stations take part in competitive activities.

Another interesting point directed toward opinions as to the conformance of amateurs to *their* rules and regulations is that there are relatively few repeat violations because amateurs generally have enough sense to get straightened out. The number of repeat violations for off-frequency are very few, compared to the large number of amateurs and notices issued.

In judging the amateur service in comparison with other services one must realize that the amateur rules give the amateur operator a very wide scope of operation. An amateur may choose an almost infinite number of frequencies within the amateur bands. Commercial stations are

generally held to one frequency and tight tolerances are in effect. Amateur operating procedure is also very democratic, giving the amateur a better break than a commercial service.

### Monitoring Survey

By means of a 48-hour survey, May 28-29, 1965, an attempt was made to approach the question of how good the amateur service really is in the matter of conforming to its operational rules. The statistics are listed later in the adjacent box. Instructions to monitoring stations asked them to tune in an amateur station, stay with it a short while, and if no violation was noted mark down "1" and go on to the next station. Thus thousands of stations were monitored by the system — with some unavoidable duplication resulting because a signal heard by one monitoring station very frequently is heard by five to ten others. Out of 6502 c.w. signals tuned in, 35 stations received violation notices and 35 more were heard violating but because of some technicalities could not receive a violation notice. (The monitoring station must be sure of the identity of the station being observed and sure of its facts before it can issue a violation notice.) Out of 5262 phone signals intercepted by monitoring stations, 17 violation notices were issued and 26 stations were heard in violation but could not receive notices because of "legal" technicalities. What these statistics seem to prove is that of the hundreds of thousands of amateur operations a very small percentage of violations are encountered. In actual operation at monitoring stations of course the observers stay with a signal much longer than they did in the 48-hour survey. With 18 monitoring stations in our system, of which only half operate full time, and with the entire spectrum and all services to be covered, you can see that there is much more to be done than there are people to do it.

During the course of any year our Bureau, either through its monitoring stations, its field offices, or through correspondence at headquarters, receives complaints from amateurs concerning violations being committed by other amateurs and sometimes by unlicensed operators. We cannot give complete satisfaction to complaining parties even though each complaint is processed. For example, complaints have been received from time to time of interference to net operations. No net has an exclusive franchise on any frequency. The legal proof for interference is frequently difficult to obtain. I know

### 48-HOUR MONITORING SURVEY

	C.w.	Phone	Total
Man days of monitoring	15	13	28
Violation notices issued	35	17	52
Violations for which notices were not issued*	35	26	61
Total observed violations	70	43	113
<i>Violations by type:</i>			
Spurious emissions	37%**	17%***	
Out of band	25%	39%	
Unstable emission	18%	11%	
Identification (predominately exceeding time limits of ten minutes before identifying)	12%	28%	
Hum modulation	8%	5%	

\* Due to interference preventing identification, violations occurring within waiting period on previous violation notice, etc.

\*\* Key clicks, harmonics, etc.

\*\*\* Includes overmodulation violations causing spurious emissions.

of one case, where at least five trips were made covering a distance of more than 300 miles, and each time the FCC observer found that the so-called interfering person was apparently obeying all the rules. Of course all cases are not as difficult as this one, and violators are caught. The system does "get its man," like the well-known police system.

### Apply the Golden Rule

I suspect most instances of avoidable interference are due to thoughtless operating practices rather than deliberate intent to interfere. A liberal application of the Golden Rule by each amateur would undoubtedly provide a considerable measure of relief from such interference.

In the two articles that have been written I have not yet touched on the subject of the ama-

(Continued on page 166)

*The Commission hopes that dedicated and experienced amateurs will continue to take part in the Official Observer program of ARRL, which is quite independent of FCC's own necessary monitoring and enforcement activities. Amateurs who are negligent in observing the rules or careless about their adjustments and signal conditions are forewarned in many cases by receiving friendly advisory notices from those amateurs holding OO appointments. I understand some 21,000 such notices were sent by ARRL Observers in 1964. This, I am sure, materially reduces the necessity for our FCC issuance of citations or official advisory notices.—W3BA.*

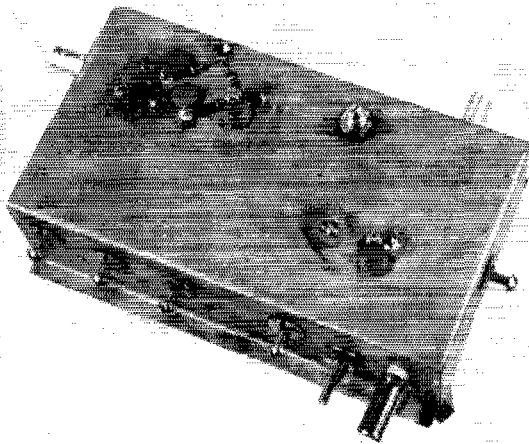


Fig. 1—The complete 432-Mc. semiconductor converter is hardly larger than a man's hand. In this model, ordinary insulating feedthrough bushings were used, and bypassing was done on the top side of the case, instead of doing the whole job with feedthrough capacitors, as indicated in Fig. 3. Tuning screws for the three r.f. circuits are at left-front portion of the chassis.

## A Semiconductor Converter for 432 Mc.

*Low-Noise U.H.F. Reception the Easy Way*

BY JOHN A. CLARK,\* K2AOP

**S**IMPLE inexpensive low-noise receiving equipment for 432 Mc. was the basic objective in the design of this converter. Though u.h.f. reception with transistors has been costly in the past, there are now many moderately-priced transistors that do just as well, if not better than, any tubes at 432 Mc. A converter with the best tubes is far more costly and more difficult to adjust, yet it will not perform as well as the all-semiconductor job to be described.

Circuit design and mechanical construction can be very simple with transistors. The methods employed in this converter for 432 Mc. evolved from the need to match the transistors effectively. The trough lines make adjustment of matching easy, and their high  $Q$  provides better selectivity than would be obtainable with coils. Selectivity is important with transistors, which are susceptible to mixing effects from strong signals outside the desired passband, and because image rejection in a receiver for the 420-Mc. band would normally be relatively poor with an intermediate frequency as low as 14 Mc. Image rejection with this converter is about 40 db., and gain ahead of the mixer is as much as 40 db., if need be.

Bias networks for the grounded-base r.f. stages are mounted externally, to permit easy variation of operating conditions. Either n.p.n. or p.n.p. transistors may be used in either r.f. stage, merely by reversing the battery polarity on the stage in question.

### *Circuit and Layout*

The converter uses four transistors and two diodes, with trough-line circuits in all u.h.f.

\* Nuclear Physics Laboratory, Rutgers, the State University, New Brunswick, New Jersey 08903.

stages. The best available u.h.f. transistor should be used in the first r.f. amplifier, but less expensive ones do very well in all other stages. A wide choice of transistors is available, and many different types can be used if the polarity of voltages applied is corrected for the transistors substituted for those shown. The Motorola 2N3280 used here for  $Q_1$ , and 3284 used for  $Q_2$  and  $Q_4$ , are p.n.p.; the 2N706 oscillator,  $Q_3$ , is n.p.n. Inexpensive substitutes are 2N3478s and Amperex 2N3399s for  $Q_1$  and  $Q_3$ , and a 40235 for the oscillator. A Motorola 2N3284 was found to be best for the multiplier. The silicon n.p.n. types require polarity reversal from that shown.

The mixer is a crystal diode. A transistor mixer was tried, but its noise output made front-end peaking difficult. Mixer noise tended to mask the peaking effect of the r.f. circuits, but with the diode mixer the noise increases gradually as the r.f. stages are brought into resonance. It will be seen from Fig. 3 that injection is applied to the "rear" of the mixer diode,  $CR_1$ . This method, common in TV tuners, provides some isolation between the last r.f. and multiplier tanks,  $L_2$  and  $L_3$ . The injection stages are not heavily loaded by  $L_4$ , the 14-Mc. output circuit, and the r.f. output circuit,  $L_3$ , is not loaded by the 418-Mc. circuit,  $L_3$ , directly.

The injection system shown achieves the greatest efficiency in terms of output and parts required. The diode doubler,  $CR_2$ , operates best between two grounded tanks, and a p.n.p. transistor works into a grounded tank efficiently. Germanium transistors were tried in the oscillator, but were discarded in favor of the silicon 2N706 to improve temperature stability.



As may be seen from the interior photograph, Fig. 2, the r.f. circuits are in three troughs, at the left. These are high- $Q$  lines, tuned at the top end and grounded at the lower. The transistors and input and output coupling leads are tapped at various points along these lines. Adjustment of loading is thus made continuously variable, an advantage over coils, wherein taps must be changed a turn at a time, or the builder runs into inconvenient arrangements.

The mixer diode may be seen projecting into the output compartment, lower right. The larger compartment above this houses the oscillator-multiplier chain, with the diode multiplier circuit, a line similar to those used in the r.f. stages.

### Construction

Copper flashing or brass of similar thickness, or heavier, can be used to make the chassis and partitions. Dimensions of the box and hole locations are given in Fig. 4. No attempt is made to give hole sizes, as parts used by builders are likely to vary somewhat from those used by the writer. Hole centers should work out the same, but mounting hole sizes required may be different, so check your parts before drilling the metalwork. Holes are identified in Fig. 4 as follows: tuning capacitors — A, crystal socket — B, feedthrough capacitors — C, coaxial connectors — D.

Next, bend the chassis beginning with the long sides, then the bottom tabs, and last the short sides. All joints should preferably be silver-soldered together. If ordinary solder is used, the bond between overlapping surfaces can be strengthened with small screws or rivets. Mount  $L_1$ ,  $L_2$ ,  $L_3$ , and  $L_8$  by inserting the end of the wire through the hole provided, and then solder from the outside of the chassis. The chassis and lines can be silver plated at this point, if you have facilities for doing the job. This should not be considered a necessity, as converters have been built without plating and they work very well.

The button-type feedthrough capacitors specified may be hard to find, and rather expensive, but are preferred. Other types will work, and

ordinary feed through bushings can be used if bypassed effectively.

Before any connections are made, tin all transistor and diode leads to aid in soldering. Do this, and all other soldering to semiconductors, with no more heat than necessary. Hold the lead in long-nose pliers, close to the device, making the pliers serve as a heat sink to prevent overheating.

The only areas that may present problems are the r.f. amplifier emitter leads and the connections to  $L_7$ . Mount the 1000-ohm resistor to  $C_7$  first, then  $C_4$  between it and  $L_1$  close to the hole in the partition. The transistor emitter lead, with insulated sleeving over it, will then connect to  $C_4$  through the hole. Assembly of the second stage follows the same procedure as the first.

Connections to  $L_7$  must be done carefully to prevent shorting out turns. The diode is mounted first, one turn up from ground, then the transistor connects to the second turn. A thin-tipped iron must be used to be successful. The rest of the wiring is point-to-point with the shortest possible leads on all components.

The mixer output coil,  $L_4$ , may be wound as follows: Set the collars on the form so that Terminal 1 is at 12 o'clock, as you look down on the form, Terminals 2 and 3 at 3 o'clock, and Terminal 4 at 6 o'clock. Starting at Terminal 2, the grounded end, wind No. 26 enameled wire counterclockwise  $5\frac{1}{4}$  turns, and solder to Terminal 1. Continue  $5\frac{1}{2}$  turns in the same direction, solder to Terminal 4, and then  $11\frac{1}{4}$  turns to Terminal 3. When  $C_6$  is connected across the coil, leave a half-inch lead at the top for grounding.

The oscillator coil form is prepared for winding by putting Terminal 1 at 12 o'clock, 2 at 3 o'clock, 3 at 6 o'clock and the tap at 9 o'clock. Start  $L_5$  at the top, Terminal 1, winding clockwise  $7\frac{1}{2}$  turns, tapped at  $\frac{3}{4}$  turn, ending at Terminal 3.  $L_6$  is  $1\frac{3}{4}$  turns between Terminals 1 and 2, also clockwise. In making the tap on  $L_5$ , clean the enamel off about 3 inches of the wire, double this back on itself, and twist the loop tightly. Tin it throughout its length, to make the lead to the crystal socket.

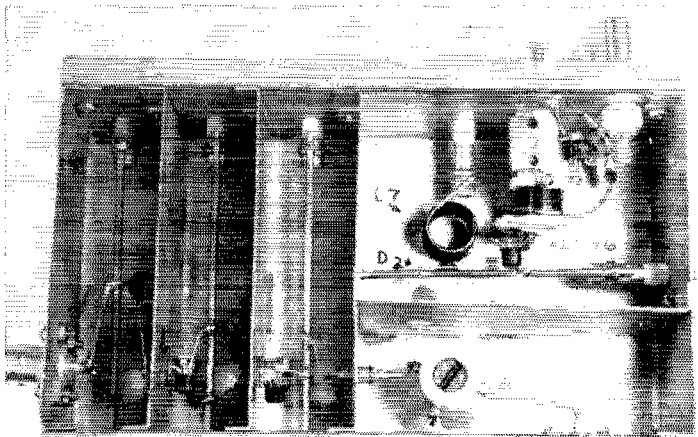


Fig. 2—Interior of the 432-Mc. converter. R.f. circuits are at the left, in separate troughs. Large compartment at the upper right contains the crystal oscillator and multiplier circuits. Section at the lower right has the mixer diode projecting into its left end, and the injection coupled through the top. The mixer output circuit,  $L_4C_6$ , is the principal occupant of this compartment.

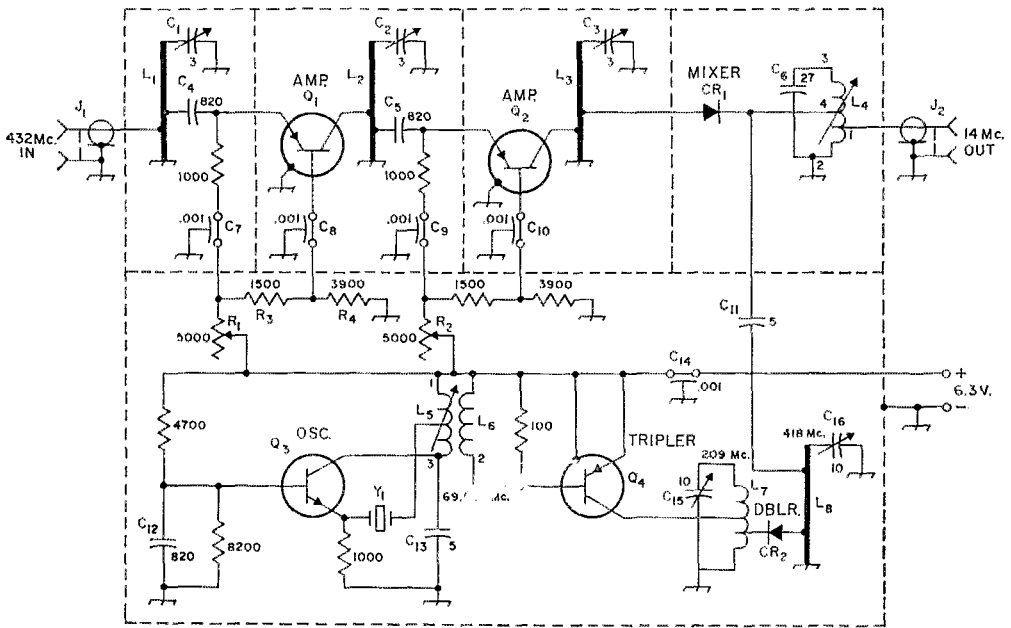


Fig. 3—Schematic diagram and parts information for the 432-Mc. solid-state converter.

$C_1, C_2, C_3$ —0.5- to 3-pf. ceramic or glass trimmer (Centralab 829-3).  
 $C_4, C_5, C_{12}$ —820-pf. disk ceramic (0.001- $\mu$ f. also usable).  
 $C_7, C_8, C_9, C_{10}, C_{14}$ —0.001- $\mu$ f. feedthrough capacitor (Erie 654-017102K, Centralab FT-1000 also suitable).  
 $C_6$ —27-pf. dipped mica.  
 $C_{11}, C_{13}$ —5-pf. dipped mica.  
 $C_{15}, C_{16}$ —1- to 10-pf. ceramic or glass trimmer (Centralab 829-10).  
 $CR_1$ —U.h.f. mixer diode (Sylvania 1N82A).  
 $CR_2$ —Silicon signal diode (GE 1N4009).  
 $J_1, J_2$ —Coaxial fitting.

$L_1, L_2, L_3, L_8$ —No. 12 wire, 2½ inches long. Tap  $L_1$  at 1 and 1½ inches,  $L_2$  at ½ and 1 inch,  $L_3$  at ¾ and 1¼ inches,  $L_8$  at ½ and 1¼ inches.  
 $L_4$ —No. 26 enamel wound as per text on ¾-inch iron-slug form (CTC 1534-2-2, slug coded red).  
 $L_5, L_6$ —No. 26 enamel wound as per text on ¾-inch iron-slug form (CTC 1534-4-2, slug coded white).  
 $L_7$ —4½ turns No. 16 enamel, ⅜-inch diam., ⅝ inch long. Tap at 1 and 2 turns.  
 $Q_1, Q_2, Q_3, Q_4$ —See text.  
 $R_1, R_2$ —5000-ohm miniature control. All other resistors ½ watt or less, values as marked.  
 $R_3, R_4$ —for text reference.  
 $Y_1$ —5th-overtone crystal, 69.666 Mc.

### Adjustment

With an absorption wavemeter (or grid-dip meter not oscillating) adjusted to 70 Mc. and coupled into  $L_5$ , screw the slug in slowly from full out. The oscillator should start abruptly at about half in, and decrease gradually as the slug continues into the coil. The proper setting for the slug is ¼ turn further in than the point where oscillations start. Improper operation is indicated if the oscillator does not follow this pattern or if birdies are heard near 14 Mc. when the receiver is connected to the converter. These indicate oscillation in  $Q_4$ , in which case the value of the 1000-ohm resistor must be decreased. No oscillation means it must be increased in value, or removed.

Assemble an r.f. probe by attaching a wire to the cathode of a 1N82 diode, and taping the diode onto a pencil. A high-impedance meter is then used to measure rectified current between the probe and circuit ground. Touching the probe to the  $L_7$  side of  $CR_2$  should produce some meter movement which then can be peaked with  $C_{15}$ . Determine the frequency by sweeping 140 to 209

Mc. with the absorption wavemeter, while watching the meter on the probe. You will find that there will be a very noticeable dip on the probe meter. An r.f. indication on the grid-dip meter is unlikely, because of its lack of sensitivity. Move the probe to the  $L_8$  side of  $CR_2$ . The 418-Mc. tank circuit ( $L_8C_{16}$ ) should tune from about 250 to 550 Mc. Starting with the screw full in, the second peak should fall at 418 Mc. It can be checked with Lecher wires, but the converter will work as long as the tank is tuned to one of the peaks.

The alignment of the r.f. stages will be very simple if a 432-Mc. signal is available. The third harmonic of a strong two-meter signal below 144.1 Mc. will also serve. Without a signal, one may have a great deal of difficulty peaking the three high- $Q$  r.f. tanks.

Using a strong signal, with  $R_1$  and  $R_2$  at maximum resistance, adjust  $C_1, C_2, C_3$  and  $L_4$  for maximum signal at 14 Mc. in a receiver connected to the converter. When the signal has been peaked up, recheck  $C_{16}$ . The various peaks noted previously will produce differing conver-

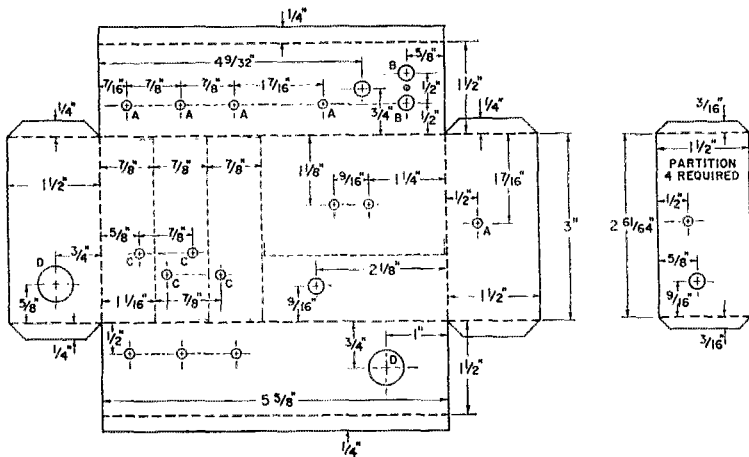


Fig. 4—Principle dimensions of the chassis and partitions. Hole dimensions are not given, as they will vary with components used. Locations should be similar to those shown, if parts generally similar to the original are employed. Lettered holes are as follows: A—ceramic trimmers, B—crystal socket, C—feedthroughs, D—coaxial fittings.

sion gains. The peak that produces the greatest output will be the one at 418 Mc. Now set  $R_1$  to just below the point where oscillation develops in the first r.f. stage, then decrease  $R_2$ . The first stage should be run at near maximum gain or the signal-to-noise ratio may suffer. The second stage is relatively unimportant when the first stage is working properly. There will be no measurable drop in performance with any transistor having a noise figure of 6 db. or so.

The positions of the taps on the lines will provide adequate performance for most builders. If you want to optimize the noise figure, use a signal generator through a cable properly terminated or very long, to reduce s.w.r. A high s.w.r. into the converter, indicated by a high degree of instability, will make improvements in noise performance impossible. With a proper load, the first stage should begin to oscillate with about 5 volts at the junction of  $R_3$  and  $R_1$ . If the stage will not oscillate, either move  $C_4$  further from the ground end of the line, or move the input tap closer to the ground.

If the stage oscillates with less than 4.5 volts at the  $R_1$ - $R_3$  junction, either couple the antenna tighter by moving the input tap higher on the line,  $L_1$ , or move  $C_4$  lower. Keep in mind the procedure outlined above for achieving maximum gain while the signal-to-noise ratio is optimized. Careful adjustment of the first stage will provide a very good noise figure and a first-stage gain of at least 20 db. When the first stage is near optimum gain the front end bandwidth between the 3-db. points will be less than 300 kc.

#### Some Thoughts on Noise Generators

The author does not recommend the use of a noise generator for optimizing the r.f. stages at 432 Mc., or for comparisons with other front ends. A signal generator or weak-signal source will be far more likely to produce a correct alignment than a noise generator for the following reasons:

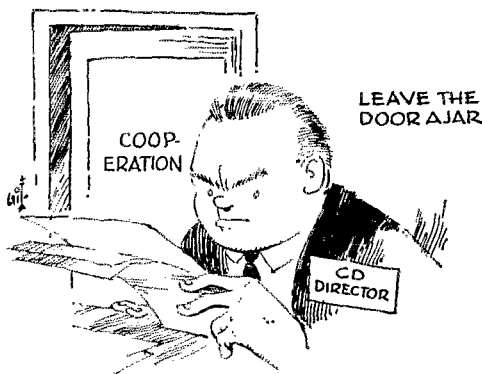
1) The home-built noise generator's impedance change, with varying current, alters the loading at the input to the amplifier under test. Since this amplifier and almost all others are regenerative to some extent, the gain will change with input load and produce an erroneous conclusion as to whether an improvement has actually been made by an adjustment.

2) The front end could be aligned at 404 Mc., and with the high  $Q$  of the tanks you may never hear anything from 432. This can also happen when peaking by noise alone, but not when a test signal is used.

A noise generator should not be used indiscriminately in comparing different types of front ends or converters, since the image responses usually are not known. When noise is introduced from image responses, along with a wanted signal, the true signal-to-noise ratio will suffer by as much as 3 db. The same poor image rejection condition present when a noise generator test is made will falsely indicate a noise figure 3 db. better than the true one! Parametric amplifiers also usually look good on noise generator tests but many fall down on actual signal-to-noise comparisons, indicating that parametrics can have problems with image rejection. This converter has no such problem. Image rejection is in excess of 40 db. at 404 Mc., and receiver image rejection at 14 Mc. is improved by the converter output circuit,  $L_4C_6$ .

It is hoped that the simple methods used in the construction and adjustment of this converter will increase interest in the u.h.f. range, and be used as guides by those who have been avoiding the higher frequencies. The design is the least complicated, best working, and most easily duplicated of any tried to date. Ideas may be drawn from it for construction of a preamplifier or a test-signal source, if one is not interested in a complete converter. In any such application, low cost u.h.f. transistors now available have many and marked advantages over vacuum tubes. QST

# SOME RANDOM THOUGHTS ON PUBLIC SERVICE



## *A Discussion of Some of the Principle Problems*

BY GEORGE HART,\* WINJM

MANY of our letters to traffic and emergency organizers conclude with the sentence: "If there is any way in which we can be of assistance, please don't hesitate to call on us." Needless to say, hundreds of SECs, ECs, RMs and PAMs, not to mention net managers and net controls, have taken us up on this. Requests for assistance have ranged all the way from "any suggestions will be appreciated" to "please send me a detailed program for organizing an active RACES group in a city of ten thousand people with no active hams." In between these two extremes are

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*Organizing amateurs for public service is not an easy task. Down through the years during which public service organization has been coordinated at ARRL headquarters, a pattern of difficulties has been noted. Many of them have no "pat" solution. But on the basis of the old saw that knowing your troubles is half the battle, this article attempts to examine the principle ones.*

the majority of requests with which we can, and do, to the best of our ability, comply.

How to organize? We have information available, both for the just-getting-started amateur and the experienced EC. Hand-outs? We have lots of them, both for licensed amateurs and the general public. Material and supplies? We have membership and identification cards, decals, certificates, placards, operating aids, reporting forms — all the things that you might call "staples" of public service organization. Often we have that feeling of inadequacy when we cannot fulfill some specialized request, but we are always considering additions to the list of available material to assist in organizing. One thing we cannot do is organize for you. This has to be done at the local level, by volunteer amateurs taking the leadership among amateurs who are also volunteers.

### **Apathy**

This is a pretty general term and covers a lot of ground, but it is our biggest and worst problem. Of course it is not restricted to amateur ranks alone, but this makes it worse, not better. It exists in all corners of our national life today, that attitude that: "someone owes us something, someone has an obligation to take care of us, we have a right to be looked after, what are we paying taxes (or dues) for, let someone else do it, that's what we're paying (or appointing) them for, I'm too busy enjoying myself, besides, I don't go in for that sort of thing, it's only a hobby, or I just want to chew the rag once in a while, or I like to work DX only, or I'm just keeping my license up because I might want to get on the air some day, or this public service stuff is a lot of hokum anyway, or if the League is doing it I don't want anything to do with it because the League keeps harping on responsibility" — or any number of other excuses for not participating, *every one* of them invalid in light of the paramount importance of public service organizing.

There are two things needed, basically, before organization can proceed apace. The first is a willing and capable person for the big job of leadership — someone who has the experience, the know-how, the intelligence, the personality and who inspires the respect of both the local amateurs and those they seek to serve. The second is a group of amateurs genuinely interested in performing a public service through amateur radio, so that the leader has someone to lead.

Without someone to lead, the best leader in the world is helpless — and we have quite a few cases of this. Without a suitable leader, the most enthusiastic and energetic group of amateurs gets nowhere: we have some cases like this, too. *Both* are required. Sometimes one inspires the other. Sometimes more than one leader arises and a personality or ideological conflict ensues.

### Qualities of Leadership

This takes us right into our next topic of discussion — the selection of an adequate leader. How do you know whether a particular prospect is the best available for leadership? Too often, the wrong type is chosen, while the desirable type is bypassed. This is another failing in our organizational efforts — failure to recognize leadership qualities when we see them, and the selection of “best-liked” types for jobs requiring ideas and ability. Sometimes they have them, often they do not. Since the popular ones are also the “vote-getters,” it turns out that the appointive function as often brings forth the desired man as does the elective. The quiet, retiring type of person who would not think of considering himself a candidate for the job as often as not makes a better leader than the loud, pushy type who attracts a lot of attention with his “aggressiveness” and “drive.” The former will feel flattered, protest his unworthiness, but gladly accept if called upon to do so; the latter will want to be coaxed, and will give the impression that he is doing you a favor by accepting. Unfortunately, it is almost always the latter type who gets the nod.

While personality, location, financial and social status may all be things to consider, they should be minor considerations, not major ones. A business executive who drives a Cadillac, smokes expensive cigars, has a roomful of modern commercial equipment and exhibits other symptoms of affluence should not, for those reasons alone, impress to the extent of being automatically considered qualified. Conversely, neither should consideration of another amateur be neglected because he works behind the counter at a local radio store, drives a rickety car, can't afford cigars and operates medium-powered equipment he built himself.

You will say these things are fairly obvious and nobody needs to be told this. Yet, too many groups select leaders *strictly* on the basis of popularity, influence, affluence and volubility, because it's easier to be impressed by the fast talker than to *seek out* the needed qualities of enthusiasm and ability for the job to be done.

### Group Qualities

Once you have such a leader, it is not good to expect him to do, or let him do, all the work himself, even if he is willing. Such a man could perhaps obtain immediate, perhaps even spectacular, results, but they would at best be temporary — until he burned himself out. Meanwhile, the membership would become lazy, lethargic, and adopt a “let George do it” attitude. He who is willing to do everything will find himself with



everything to do. Public service organization is a teamwork proposition. The leader doesn't *do* it, he just *leads* it. The doing of it is a joint proposition among the leader, the sub-leaders to whom he delegates certain functions, and the many members of the group who follow the leadership.

The group itself, unlike the leader, can seldom be “chosen.” You have to use what you have. While the leadership element can and often does inspire (or fail to inspire, as the case may be) the group membership, the response to their efforts can also go a long way toward determining how successfully the leader does *his* job. The members of the group cannot accomplish their objective without someone properly to lead them; but neither can the leader attain the group objective without an effective group to lead. In short, there must be *rapport* between the leader and the group he leads if there is to be an effective public service organization, whether it be AREC or NTS.

### Personality Conflicts

Sometimes two or more leaders come to the fore at the same time, and then we often have personality conflicts. For example, two rival clubs may have their own public service groups, both trying to serve the Red Cross, civil defense, the sheriff's department and others, in competition with each other. In its worst phases, such a situation can get greatly out of hand and do a lot of damage to our reputation, not even to mention the more important loss of public service efficiency. Community officials will quickly throw up their hands in *disgust* and look elsewhere for their back-up communications facilities.

We know that such internal conflicts are inevitable at times, but the pity of it is they are not always kept internal. Sometimes served agencies are even dragged into them, asked to favor one side or the other; we have even heard of agencies being threatened by amateur groups if the agency failed to support them. The spectacle of amateurs running down other amateurs before disinterested parties is one which cannot be countenanced if we are to hold our heads up in the public esteem.

### RACES Versus AREC

Make no mistake about it, whether you are operating in RACES or the AREC you are in an



amateur radio program. Where a sharp distinction is made between the two, no good can come of it. RACES is a means by which amateurs may offer their skills to civil defense communications. As far as we are concerned, it is one of the jobs of the AREC. As far as c.d. officials are concerned, RACES is one of the several means of emergency communications among many they have available in the event of national disaster invoking c.d. laws.

Where differences occur between AREC and RACES devotees among the amateurs and c.d. officials of a community, it is usually a matter of attitudes. The AREC group has the attitude that if civil defense wants its help, they had danged well better supply full equipment and facilities — and not wish to say anything about how it is to be used. The RACES group will feel that it is *they* who are serving the government in an official capacity and that if amateurs want to continue operating at all in the event of an emergency they had better “join up.” Civil defense officials will look upon RACES as a means for using the amateur bands and often will take a cavalier attitude toward non-RACES amateurs and their rights on the amateur bands.

The tendency toward short-sightedness is a characteristic of most human beings (including *thou*), so there is nothing surprising about these attitudes; but this observation makes them no less damaging. A little general education all around seems to be in order, plus an understanding of the other person's (or group's) situation. But we suppose all this reflects back on the qualities of leadership we were talking about a few paragraphs ago. A properly-selected leader would neither have nor countenance such attitudes, and would be willing to seek a compromise solution at the halfway point or further if necessary. We amateurs cannot have everything our own way. There are bound to develop areas of disagreement among us, and between us and officials of agencies we should be serving. Only where someone is unreasonably adamant is a solution difficult. Even in such cases, it is up to us to keep the door open so that any prejudicial attitudes against us will not be carried along through changes of tenure. We never know when an unreasonable official will suddenly be replaced by

one (perhaps of a different political party) who has an entirely different attitude. Let's not prejudge him by the person he is replacing.

The FCC's Office of Emergency Communications is at present conducting studies of all radio facilities with the aim of preparing them for emergencies, and of course the amateur service is among those under study — and of course the League is deeply involved in this. RACES and ARPSC are both being considered in the potential of the amateur in an emergency condition.

### Politics

The cry of “politics” is a familiar one in the history of RACES, and also, to a lesser degree, in AREC. When used in a negative sense, it refers to that operation of governing machinery which knowingly ignores or bypasses merit in favor of prejudicial considerations. Civil defense at all levels has long been subject to political influence and pressures, and many appointments have been made on the basis of “pull” rather than on innate ability. Even in our own AREC circles, the EC appointed has sometimes been a crony of the SCM and not at all the generally-recognized best man suited for the job.

There is no really effective way to control this, and about the only thing that can be done is to go along with the appointee, whoever or whatever he is, as much as possible so that any shortcoming in the organization cannot be laid at your doorstep. Most inept officials at one time or another try to lay the blame for their own mistakes on somebody else. If your own activities and your cooperation are beyond reproach, at least *you* (you amateurs) will not be blamed.

### Public Relations

A very important phase of public service, public relations is often emphasized far beyond its real value. A recent “brag” sheet from one of our SECs illustrates this very well: out of fifteen “brags,” ten mentioned only the publicity achieved, not the actual service rendered. It seems to us it's about time we made up our minds which is the more important — how a thing is, or how it *looks*. If the former, which seems logical, then we had better concentrate more on preparing to do the job and a little less on talking about it.

Getting publicity for our efforts is an achievement in itself. It puts us in the public eye and makes us known, and often in that way permits us to perform a greater public service. We certainly do not wish to play down publicity and public relations. We do sometimes get concerned that we are devoting too much of our effort to publicizing our work and too little to *doing* it. The standard recommendation has been that one man (an assistant EC, perhaps) be given the job of public relations and that the rest of the group devote themselves exclusively to *doing* things in the public interest. Let the PR man take care of telling the general public about what we are doing, and let's not spend too much of our time in activities which have only a publicity value.

\* \* \*

These are a few random thoughts on the problems of organization, presented without any particular attempt at solutions. It is an unfortunate fact of life that only local leadership can be fully detailed, and the more specific a problem is, the closer to home you must look for the solution. Each level of leadership has its function, but that at the higher, broader levels is no more important than that at the community level where the ac-

tual work gets done. Most people these days want to have their hands held, to be led down the path to the ultimate destination and have the door unlocked for them. But it doesn't work out this way. As the level of leadership broadens, detailed solutions to specific problems disappear in generalities which become the basic guidelines in organization, which are the same throughout. The details at your own level are up to you. **QST**

#### COMING A.R.R.L. CONVENTIONS

January 22-23 — Southeastern Division, Miami, Florida  
 March 19-20 — Michigan State, Saginaw  
 April 22-24 — ARRL National, Boston, Massachusetts  
 May 28-29 — Roanoke Division, Natural Bridge, Virginia  
 May 27-29 — Southwestern Division, Anaheim, California  
 June 3-5 — West Gulf Division, Arlington, Texas  
 June 18-19 — Rocky Mountain Division, Colorado Springs, Colorado  
 October 15-16 — Hudson Division, Tarrytown, New York  
 October 21-22 — Great Lakes Division, Muskegon, Michigan

#### OSCAR IV News

Project Oscar has received an invitation to contribute a radio amateur satellite for orbit on a Titan IIIc research and development vehicle. The launch will be from Cape Kennedy, Florida. Six and one half hours after blast off, the vehicle will reach a semisynchronous, 18,200-nautical mile orbit having a 30 degree eastward drift per day, with a 0 degree inclination angle. If all goes well, the satellite should be within radio range of the U.S.A. upon activation over Ecuador. Radio coverage will extend 81 degrees, north and south latitude. It is planned that the OSCAR IV package will be spin-stabilized, with satellite axis and transmitting antenna parallel to the axis of the earth. OSCAR IV will be completely solar-powered, with about a year's life span.

OSCAR IV will probably contain a linear translator with an input center frequency of 144.1 Mc., an output center frequency of 431.935 Mc., and a passband of 10 kc. Power output is approximately 3-watts p.e.p. A beacon transmitter will be on 431.925 Mc. The translator is gated by the beacon signal about once every 10 minutes for a period of about 32 seconds, for 12 seconds of c.w. carrier followed by "HI" repeated twice. No telemetry is contemplated.

Listen to W1AW or W6EE for up-to-date information on the OSCAR IV project and late news on the launch date when scheduled. **QST**

## Strays

Word has been received here at Headquarters that Santa Claus once again plans to appear on 50.50 Mc. at approximately 0230 GMT on December 25 during the evening session of the Eight Ball Net (Los Angeles area). Santa will talk with amateurs and their children.

Don't be too sure your equipment is safe from theft just because it is anchored to the ground. W3LRS had a fully-assembled 3-element beam stolen out of his yard in full view of the State Police Barracks, two drive-in theaters and a busy highway. All of this happened in less than two hours while W3LRS was out to lunch!

W9NIX would like to hear from amateurs who now work, or who have worked for the "Bell System," or any affiliated telephone company.

WB6MCK sent in a clipping from the *Los Angeles Times* reporting a Communist Chinese claim on the world record for sending five-letter code by hand key. Hasia Shan-hsiu, 19, knocked out 150.8 characters per minute, breaking the Russian record of 149.6 characters set earlier this year at an international contest in Czechoslovakia. The record was set by Miss Shan-hsiu at the Peking Radio Club without spectators, because "even a cough" might have disturbed the competitors.



The June QST Cover Plaque Award went to Ivan H. Loucks, W3GD, former chief of FCC's Amateur and Citizens Radio Division whose article, "Amateur Radio and the Public Interest," was picked as best of the issue by the ARRL directors. Central Division Director W9HPG (left center) made the presentation to W3GD/9 (right center) on August 31 at Chicago, monitored by W9SRJ (left) president of Society Radio Operators and W9FVU (right), chairman of the Chicago Area Radio Club Council.

# A General-Purpose Voltage-Regulated Power Supply

*Low-Cost Unit for Surplus Receivers and Other Low-Power Applications*

BY DON ROBERTS,\* W7PXE

**D**ID you ever acquire a "bargain" surplus receiver during one of your weaker moments, and then later realize you had no suitable power source for it? Or, perhaps you did have a power supply—one of those cumbersome 30- to 60-pound unregulated jobs found on the surplus market, that takes up more space than the receiver!

The power supply shown in the photograph was originally built to fill the need for a small, light-weight, regulated supply for the RBM-3 receiver, whose requirements are 205 volts d.c. at 70 ma. It will work equally well with almost any other surplus or homemade receiver. The appropriate filament voltage is provided. No doubt some of you will want to use the unit for other applications, such as low-power 6- and 2-meter transmitters, v.f.o.s., or other frequency-sensitive devices. Almost any gear will benefit from the excellent regulation and low-ripple output of this supply.

### Circuit Operation

The circuit, shown in Fig. 1, is quite conventional. The unregulated, but filtered, output of the silicon-diode full-wave bridge circuit is applied to the 6L6GC, which acts as a cathode-

follower series-regulator output stage. The 6AU6 is a d.c. amplifier which controls the 6L6. Inspection will show that the 0A2 works as a voltage reference for the 6AU6, holding the cathode of the latter at a fixed potential above ground. Should the output voltage of the supply tend to vary from the desired value, a portion of this change will appear on the control grid of the 6AU6 since this grid is tapped on a voltage divider across the output of the supply. This change of voltage (known as error voltage) is amplified by the 6AU6 and applied to the control grid of the 6L6. This causes the internal resistance of the 6L6 to change (increase or decrease) in a direction such as to return the output voltage at the cathode of the 6L6 to its original value.

The 18K resistor is the principal path for maintaining the VR tube in a conducting condition.  $C_2$  provides additional filtering and may not be required in some applications. Its use is recommended in receiver supplies.  $C_2$  helps to further reduce ripple in the following manner: Since the grid of the 6AU6 is connected at the approximate center of the divider, about half of any change in the output actually is applied to the grid of the 6AU6.  $C_3$  effectively connects the grid of the 6AU6 directly to the B plus as far as ripple volt-

\* 3731 West Glenn Drive, Phoenix, Arizona 85021.

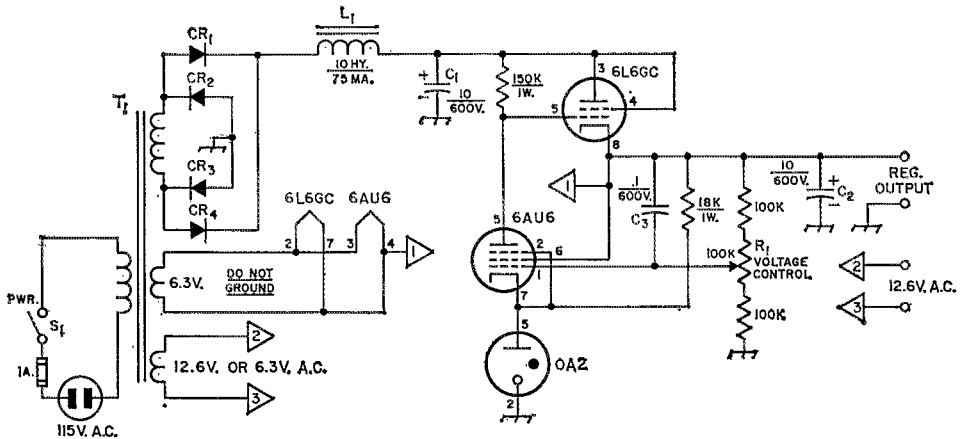


Fig. 1—Circuit of the general-purpose regulated power supply. Capacitances are in  $\mu$ f., and resistances are in ohms ( $K = 1000$ ). Fixed resistors are  $\frac{1}{2}$ -watt unless indicated otherwise.<sup>1</sup>

- $C_1, C_2$ —Oiled-paper, or electrolytic.
- $C_3$ —Paper.
- $CR_1$ — $CR_4$ , incl.—Silicon diode: 800 p.i.v., 200 ma. at 50 degrees C., minimum ratings.
- $L_1$ —Filter choke.
- $R_1$ —Linear control.

- $S_1$ —S.p.s.t. toggle switch.
- $T_1$ —Power transformer: 400 volts, r.m.s., 150 ma.; 6.3 volts, 1.2 amperes; 12.6 volts, 3 amperes (or to suit equipment). Homemade, as mentioned in the text, or Barry Electronics (512 Broadway, New York City) No. 12-31, or similar, used as described in the text.



age is concerned. This, then, doubles the gain of the regulator for the ripple component.

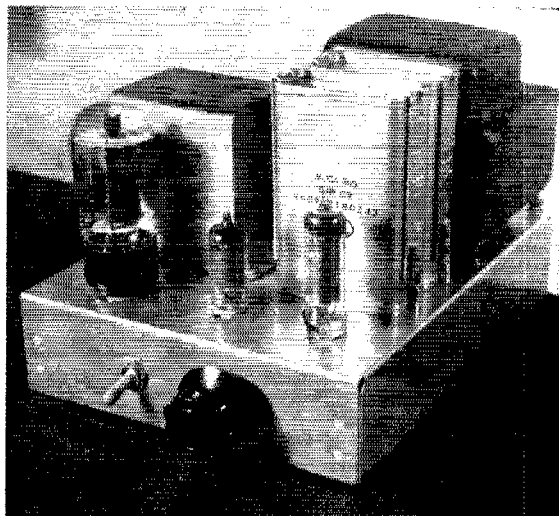
The maximum cathode-to-heater voltage rating of the 6L6GC is 200 volts (180 volts for the 6L6). Since this voltage will be exceeded when the output voltage is adjusted above this value if the heater is grounded, the cathode should be connected to one side of the heater, as shown, and neither side of the heater circuit should be grounded. A separate heater supply of appropriate voltage must be provided for equipment to be operated from the regulated supply. In this particular case, the separate source is a 12-volt winding on the power transformer.

### Construction

The unit was constructed on a  $7 \times 10 \times 2$ -inch aluminum chassis. A steel chassis might be preferred because of its greater rigidity, but aluminum is easier to work with and has proven to be of sufficient strength for the size and weight of the components used by the author.

Savings in cost, weight, and space were gained by rewinding an old TV transformer to obtain proper plate and filament voltages. Don't let this scare you off! Rewinding a TV transformer is very rewarding as to both cost and self-satisfaction. In addition, it is relatively easy to do. Complete instructions for rewinding are found in *QST* for February, 1964,<sup>1</sup> and therefore will not be repeated here. However, for those of you who do not wish to rewind, suitable "store-bought" substitutes are listed under Fig. 1. The transformer suggested as a substitute for  $T_1$  was selected because it is a low-cost item. However, if it is adapted to the bridge circuit shown in Fig. 1, only half of the secondary should be used. The 6.3-volt heater winding on this transformer has a rating of 6 amperes. If the equipment with which the supply is to be used requires a 6.3-volt heater supply, it might be desirable to use this winding for the equipment, and use a small separate transformer for the 6L6GC and 6AU6, since the requirement of the latter is only 1.2 amperes. If the equipment needs a 12.6-volt heater supply, a separate 12.6 volt transformer will be required,

<sup>1</sup> McCoy, "Tailor-Made Volts," February 1964 *QST*.



The author's regulated supply. Tubes, from left to right, are the 6L6GC, the 6AU6 and the 6A2. The knob to the right of the power switch is for the voltage control. Filter capacitors and choke are surplus items.

of course. In this case, the 6.3-volt winding on the power transformer can be used for the 6L6GC and 6AU6.

Wiring and parts layout is not critical. However, a power supply is a good piece of gear on which to practice neat layout and wiring. It will help the appearance if you position all components and wiring either perpendicular or parallel to the edges of the chassis. Right-angle bends in wiring will give a "factory-made" look to the finished product.

This supply will regulate properly at up to 105 ma. at 210 volts, or up to 70 ma. at 270 volts. Further excursions than this will result in loss of regulation.

This power supply has been in operation for a period of six months at my QTH, and has done wonders to the stability of v.f.o.s and receivers in the shack. So get out your hand tools and soldering iron, and whip up a batch of well-regulated, low-ripple d.c.!

**QST**

## **Strays**

The U.S. Coast Guard Auxiliary is a voluntary national organization dedicated to the promotion of safety in maintenance, operation and navigation of small craft. In their endeavor to provide supplementary disaster communications to the 5th Coast Guard District, the Auxiliary needs some additional amateur-radio land stations to work in conjunction with their radio-equipped vessels. Volunteers must be licensed, and have equipment capable of operating a.m. and c.w. on the 2- to 3-Mc. band. Coast Guard procedures and discipline will prevail during operation on these frequencies. The Auxiliary is willing to train personnel through indoctrination and scheduled drill periods. It is not essential that the

volunteer stations be adjacent to water bodies, as the Auxiliary operates on many dams, lakes and reservoirs. Any amateurs in the North Carolina, Virginia, D.C. and Maryland areas interested in this program should write A. F. Yurek, District Communications Officer, 5th District, Coast Guard Auxiliary, 6808 Bessemer Ave., Baltimore, Md. 21222.

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Classes in learning the code and in beginning theory are being offered, free of charge, at North Torrance High School in Torrance, California. Classes start at 7:30 P.M., Monday through Thursday.

## Stunts you can do with Tape

BY IRVIN M. HOFF,\* K8DKC

MANY RTTYers enjoy exchanging special features that are peculiar to tape-sent transmissions. One of the most compelling reasons for owning a reperforator is the possibility of copying these tapes, and for owning a tape reader, of playing them.

For example, by proper manipulation, Ralph Larsson, Chief of the Equipment Exhibits Department of the Teletype Corporation, has made numerous portraits of various important executives, including Presidents Eisenhower, Kennedy and Johnson. As tapes of this type become available to various amateurs, a popular activity is demonstrating this enjoyable aspect of RTTY is demonstrating this enjoyable aspect of RTTY to send any pictures he may have on tape.

At Christmas time various interesting pictures are exchanged by the more ambitious individuals.<sup>1</sup> Nearly as interesting and just as enjoyable

is playing "Jingle Bells" by tapes. Here the timing between the bell characters is all-important. Clever individuals have been able not only to get a tape that taps out "Jingle Bells" in authentic rhythm, but at the same time writes the words "MERRY CHRISTMAS AND A HAPPY NEW YEAR TO ALL."

Others enjoy typing special QSL cards on tape for later transmission. Some of these represent hours of hard work and are most enjoyable to receive.

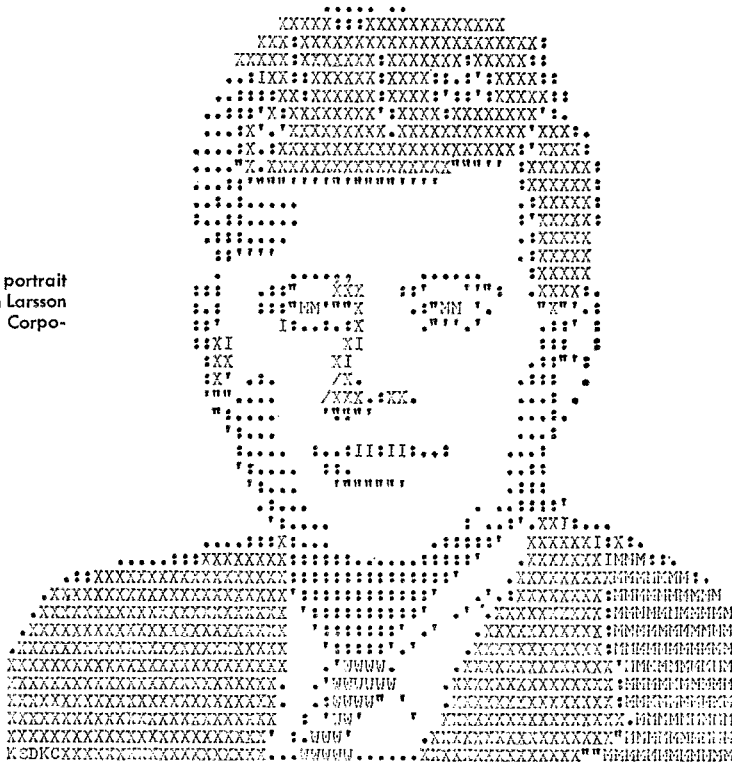
### "Brag Tapes"

Most stations owning tape equipment like to type up pre-cut tapes telling of the station's equipment. These are very interesting, and some of the fellows exhibit a real sense of humor. A lot can be discovered about the person's preferences

<sup>1</sup> For an example, see the cover picture on January 1965 QST.

\* 1733 West Huron River Drive, Ann Arbor, Michigan 48103.

Fig. 1—A TTY portrait made by Ralph Larsson of the Teletype Corporation.



CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY  
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 RY KKK KKK 888888 DDDDDD KKK KKK CCC RY  
 RY KKK KKK 888 888 DDDDDDD KKK KKK CCCCCC RY  
 RY KKK KKK 888 888 DDD DDD KKK KKK CCC CCC RY  
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 CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY  
 RY RY RY RY RY RY RY RY RY RY  
 RY THIS CONFIRMS 2-WAY RTTY CONTACT WITH RADIO STATION: W8HXL RY  
 RY ON: 15 SEPTEMBER 1962 AT: 2100 EST ON: 3.623 MEGACYCLES RY  
 RY EQUIPMENT IN USE: HT-32A KALLICRAFTERS WITH VFO-FSK· RY  
 RY COLLINS 75S-1 WITH STANDARD FILTER, RY  
 RY ELENCO COMMANDER (4-1000A) RY  
 RY ELECTROCOM FSC-250-C CONVERTER RY  
 RY MODEL 15, MODEL 26 AND MODEL 14 REPERF RY  
 RY TWO TAPE-READERS RY  
 RY ANTENNAS: 3-ELEMENT TWENTY METER BEAM AT 110 FEET RY  
 RY TRI-BANDER FOR 10, 15 AND 20 AT 68' RY  
 RY 6-ELEMENT AND 2-ELEMENT BEAMS FOR 40M RY  
 RY 2-ELEMENT BEAM (FIXED DIRECTION) ON 75M RY  
 RY DOUBLE-EXTENDED ZEPP ON 80M AT 95' RY  
 RY IRVIN M. HOFF K8DKC AND W9PNL RY  
 RY 1733 WEST HURON RIVER DRIVE RY  
 RY ANN ARBOR, MICHIGAN RY  
 RY RY RY RY RY RY RY RY RY RY  
 CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY CQ-RTTY

Fig. 2—Although most of the equipment described has long since been superseded by newer gear—the Mainline TT/L demodulator described in August QST among it—the author's 1962 RTTY QSL is an example of what can be done by pre-cutting a tape for automatic transmission.

in equipment in this manner, and quite often some of the tapes include information on the operator's occupation, family and other interests.

One of the funniest such tapes that I ever saw was sent by K9BRL of South Bend. Burt, who is president of the Electrocom Corporation that makes RTTY equipment for the amateur, has quite a collection of older TTY machinery such as the Model 12 printer and the "iron-horse" tape punch. He also has some older transmitting equipment that sounds as though it is a relic of the spark days. So even though he also has some of the nicest Model 28 and 32 printers, his tape mentions only the ancient and outdated items, with the statement that the demodulator is "home-made" — which is stretching things a bit as the manufacturers them. Unfortunately, this wry bit of humor has been lost upon most of the recipients who do not know of his connection with Electrocom.

### Fun with Tape Lettering


Table I is a chart for typing various letters of the alphabet onto perforated tape. This makes the tape print garble if run through a tape reader, but if held up to the light it looks quite readable. You could cut such a tape and send it, assuring the other operator that although it will garble badly on the printer, it will be quite unique when scanned visually after being copied on a reperforator or retyped on his perforator. 



Fig. 3—Punching the actual characters of the alphabet can be done by using a code such as the one given in Table I.

### Table I

A	VSSV
B	LTRS YZR
C	CZZR
D	LTRS ZYC
E	LTRS YYZ
F	LTRS SSE
G	CZBR CARRIAGE-RETURN
H	LTRS SPACE SPACE LTRS
I	ZZ LTRS ZZ
J	CARRIAGE-RETURN TTK
K	LTRS SPACE RZ
L	LTRS TTT
M	LTRS LINE-FEED SPACE LINE FEED LTRS
N	LTRS LINE-FEED SPACE CARRIAGE-RETURN LTRS
O	CZZC
P	VSSI
Q	CZBCT
R	LTRS SFP (OR VSFP)
S	IYYD
T	EE LTRS EE
U	KTKK
V	ANTNA
W	LTRS CARRIAGE-RETURN SPACE CARRIAGE-RETURN LTRS
X	ZR SPACE RZ
Y	E LINE-FEED M LINE-FEED E
Z	ZBYWZ
1	L LTRS T 6 OYYN
2	BYYL 7 ZDSA
3	ZYYC 8 FIGS YY FIGS
4	U SPACE SPACE LTRS 9 LINE-FEED YYC
5	JWWF 0 ECZYBCT



# Hints and Kinks

## For the Experimenters



### CUTTING ALUMINUM

**A**n easy cut can be made in aluminum tubing or sheet by using a fine-toothed hobby saw sold under the trade names of X-Acto Razor Saw or Zona Saw. — *Stan Hornbaker, WA4TJJ*

### KEY SPRING

**L**ose the spring from your J-38 key? The springs in most FT-243 or CR-1 surplus crystal holders will make a good replacement. — *Everett G. Taylor, K7YSE*

### PANADAPTOR ADAPTOR

**M**ost commercial and surplus Panadaptors have 455-kc. input frequencies, but each amateur receiver seems to have a different intermediate frequency, anything from 50 kc. to 8 Mc. A 455-kc. Panadaptor may be "mated" with any receiver by using the frequency converter shown in Fig. 1. This converter may use either a crystal oscillator or signal generator to provide the local oscillator signal. The advantage of using a signal generator is that it extends the usefulness of the Panadaptor converter combination — it becomes a hamshack spectrum analyzer. Oscillator injection is applied to  $J_2$ .  $R_2$  is a load for the signal generator; if a crystal oscillator is used,  $R_2$  may be omitted. The local oscillator frequency should be 455 kc. above the i.f. frequency of the receiver. It may be necessary to broaden the response of the 455-kc. tuned circuit by loading it with resistor  $R_3$ . Depending on the compensation available in the Panadaptor,  $R_3$  may be between 500 and 10,000 ohms.

A pick-up loop around the mixer tube is the most convenient method of obtaining i.f. signal for the converter as re-alignment of the receiver i.f. is not required.  $R_1$  is placed across the converter input circuit when a step-type attenuator is used between the receiver and the converter for level measurements; otherwise it may be omitted. — *Ture Heline, K1MPQ*

### CLEANING ALUMINUM

**A** corroded aluminum panel, chassis, or antenna part may be restored to "like new" appearance with Met-All Aluminum Polish, Formula No. 1187, made by Anton Products Corp., 55 Front St., New York 4. — *Stan Hornbaker, WA4TJJ*

### "STARTER," RTTY CONVERTER

**T**HE "Starter" RTTY demodulator described by W1KLK in *QST* for March 1965 is a simple unit for beginners. The performance of this converter is improved by using a selective audio filter immediately preceding the input transformer,  $T_1$ . The FL-8 range filter is ideal for this application and is quite inexpensive when purchased on the surplus market. Also, the sensitivity of the demodulator can be improved by using a different transformer for  $T_1$ , one with a higher turns ratio. I suggest a transformer with a 3-ohm primary and 30,000-ohm secondary will allow the operation of the unit without turning the audio gain on the receiver "way up." — *Don Outright, W5FLY*

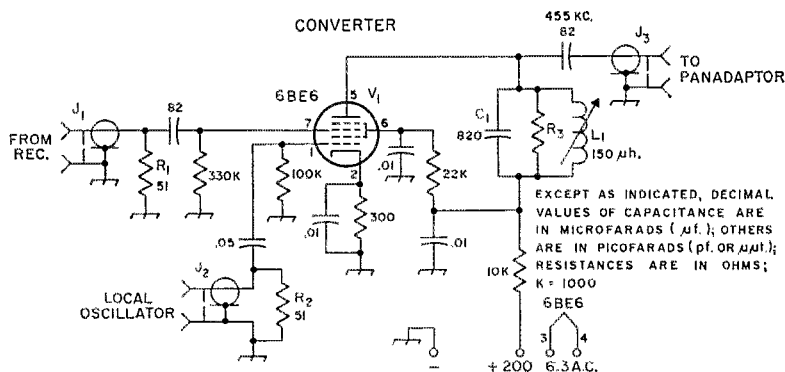


Fig. 1—The mixer for converting any receiver's i.f. to 455 kc. Resistors are 1/2-watt composition, and capacitors are ceramic.

$C_1$ —820-pf. ceramic.

$L_1$ —Slug-tuned inductor, 110-200  $\mu$ h. (Miller 4512).

$J_1, J_2, J_3$ —Phono-type connector, chassis mount.

$R_1, R_2$ —5-percent composition.

$R_3$ —See text.

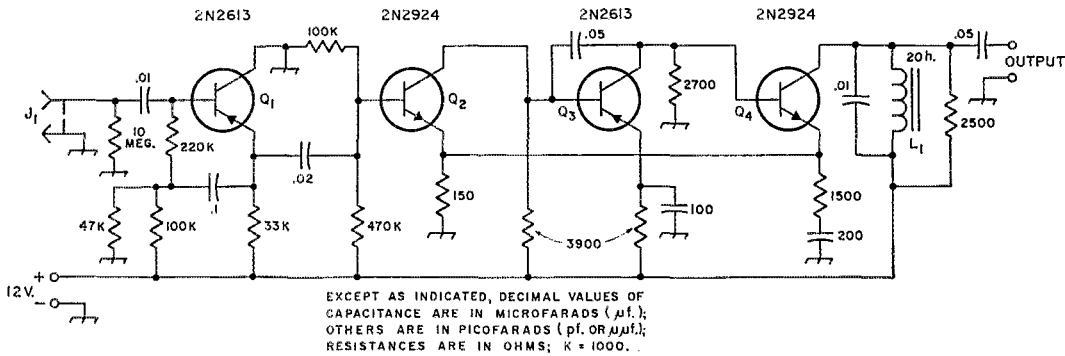


Fig. 2—Diagram of W10OP's speech amplifier. Resistors are 1/2-watt composition. Fixed capacitors of decimal values are paper or Mylar, others are ceramic.

J<sub>1</sub>—Microphone connector.

L<sub>1</sub>—20-hy. audio choke, or primary of a driver transformer.

Q<sub>1</sub>, Q<sub>3</sub>—2N2613 or 2N508.

Q<sub>2</sub>, Q<sub>4</sub>—2N2924 or 2N2712.

### TRANSISTOR SPEECH AMPLIFIER

THE speech amplifier shown in Fig. 2 is intended for use with crystal microphones. The input impedance is about 1 megohm, and the maximum output is 6.3 volts r.m.s. For 0.002 volts in — an average value for crystal microphones — the output is 2 volts. The frequency response is 150 to 5000 c.p.s. — *Hank Cross, W10OP*

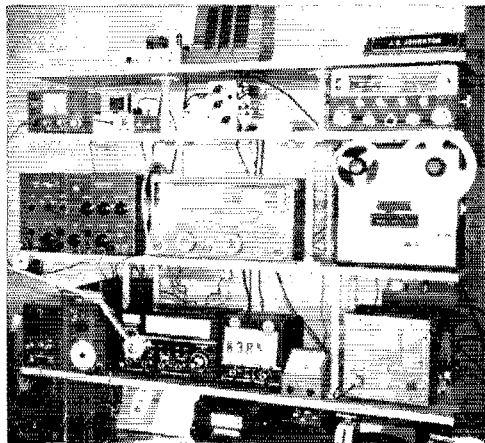


Fig. 3—The equipment shelf at K3BNS.

### EQUIPMENT SHELF FROM PIPE FITTINGS

MY operating desk became so crowded with receivers, exciters, converters, and station accessories that I had to construct a shelf-type rack to keep everything within reach. Pipe nipples 1/2-inch in diameter were used as upright supports and attached to the 3/4-inch plywood shelves with floor flanges. The resulting shelves are shown in Fig. 3. They provide a convenient way to hold a lot of odd-sized components.

— *John B. Johnston, K3BNS*

### PILL-BOTTLE PLUG-INS

PLUG-IN coil forms are harder to find every day. During my search for a suitable substitute, I found that plastic pill bottles combined with octal tube bases make practical plug-in coils. The pill bottles come in 1/4-inch intervals from 3/4 to 2 inches in diameter and can be obtained from most any drugstore. You may even find some in your medicine cabinet.

Select a suitable octal tube which you are willing to part with and break out the glass. Wrap the tube in a cloth before striking it to prevent flying glass particles. Octal tube bases come in two sizes, one a little larger than the other. With the smaller one, the 1-inch bottle fits inside the base and the 1 1/4-inch size butts to the base. The 1 1/2-inch bottle fits over the outside of the larger tube bases usually found on power tubes. The bottle and tube base are glued together with polystyrene plastic cement. A heated ice pick can be used to make holes in the plastic bottles for the coil leads. — *Forrest R. Schussler, K3OHI*

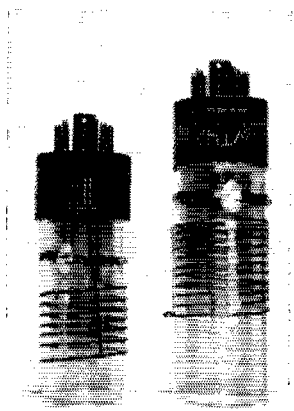


Fig. 4—1- and 1 1/4-inch coil forms made from pill bottles and the bases from glass octal tubes.

THE unit described in this article is not intended to portray advances in design and engineering, since the basic circuitry used is well established in v.h.f. applications. The primary purpose in presenting the circuitry for the 2 + 6 Converter-Preamplifier is to illustrate a simple and effective way of combining a 6-meter preamplifier with a 2-meter low-noise converter, for use ahead of any communications receiver that is capable of tuning the 50- to 54-Mc. range. In my case, the unit is used ahead of a Hammarlund HQ-170-A, which exhibited considerable need for preamplification when used for weak-signal reception on 6 meters. This v.h.f. accessory could be gainfully employed in connection with other communications receivers such as the older types—NC-57, NC-183-D, SX-71—to provide 2-meter reception and offer significant improvement on 6 meters.

#### Circuit Description

The converter-preamplifier employs a switching arrangement which enables the 2-meter converter section to be placed in "standby" while the 6J4 r.f.-i.f. stage serves as a 6-meter preamplifier. When receiving 2 meters, the 6J4 stage func-

tions as a broad-band i.f. amplifier between the converter and the communications receiver. The function switch not only selects 6- or 2-meter output, but transfers the input and output circuitry so that it is unnecessary to juggle coax fittings and cables outside the unit when changing bands. A power supply is included on the chassis, further reducing the need for external assemblies and cabling.

A Western Electric 416-B planar triode is used in the first r.f. amplifier stage of the converter. Since these tubes are somewhat rare (and expensive) an alternate circuit, using a 6CW4 Nuvistor, is shown in Fig. 4 at A. Similarly, a 6CW4 may be substituted for the somewhat antiquated 6J4 r.f.-i.f. stage (Fig. 4B).

Both converter r.f. stages are used in grounded-grid configuration—assisting in making the bandpass of the converter fairly broad, and permitting a noise figure of approximately 3 db. during 2-meter reception. A 6CY5 is used in the mixer circuit, with 94-Mc. injection being provided by the second half of the 12AT7 oscillator-doubler. A 47-Mc. 3rd-overtone crystal is used in the oscillator stage. The second half of the 12AT7 serves as a doubler, providing a 94-Mc.

\* Assistant Technical Editor, QST.

## The 2 + 6 Converter-Preamplifier

BY DOUG DeMAW,\* WICER

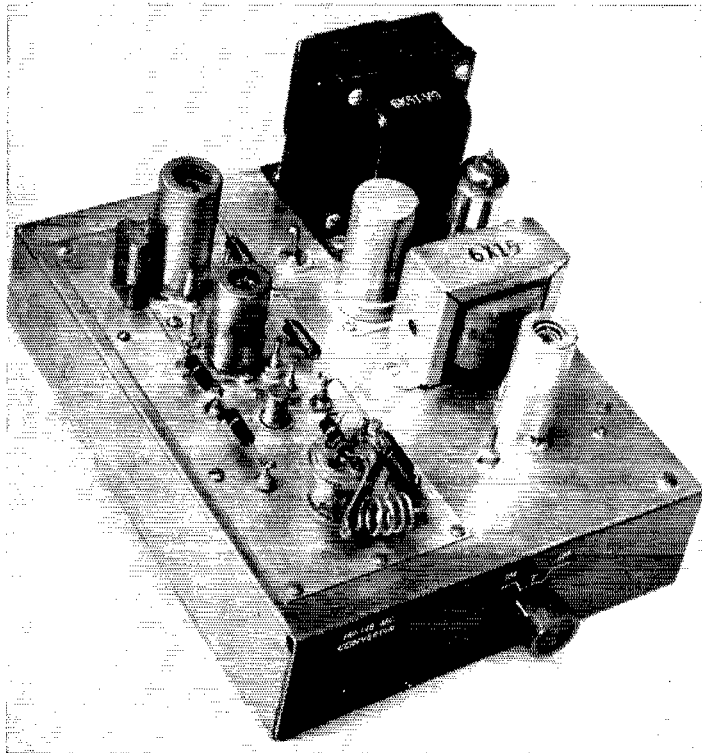
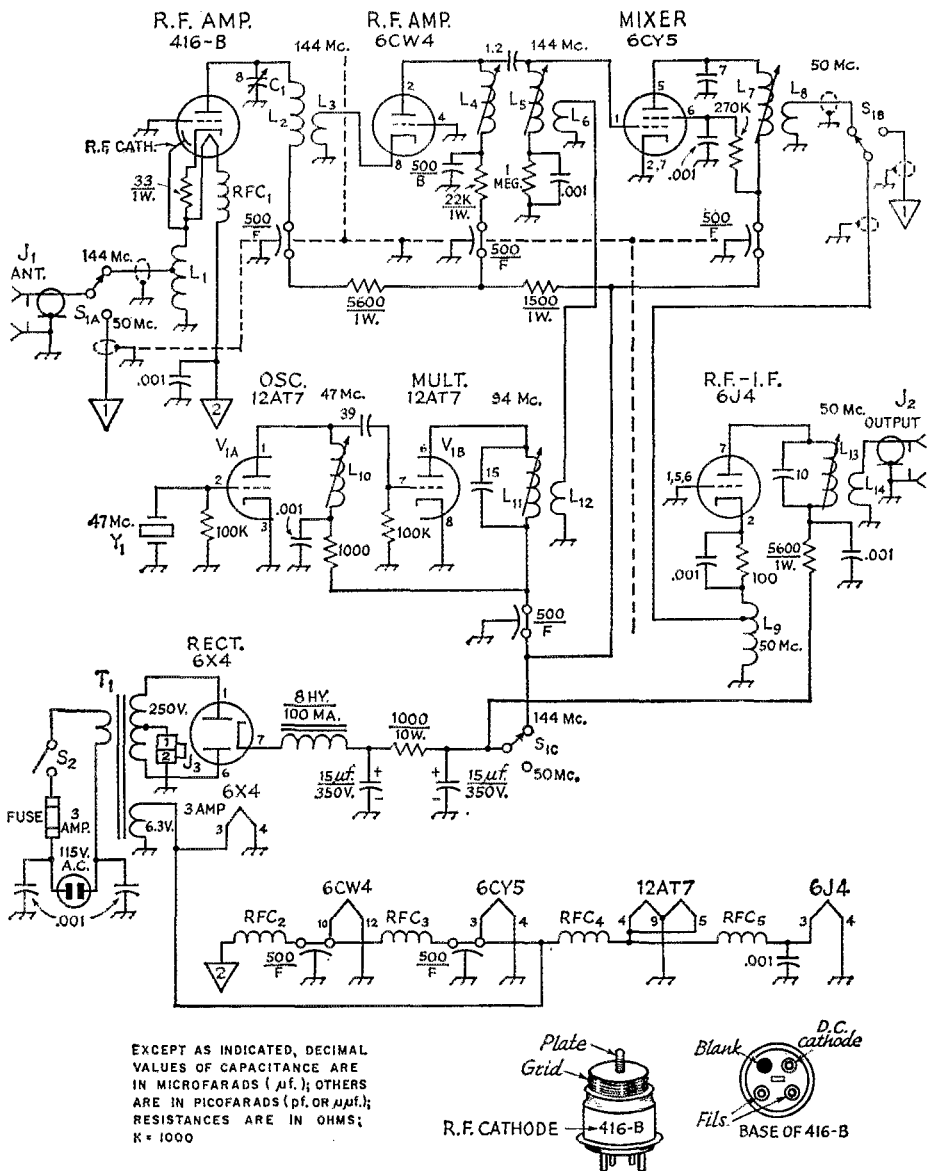


Fig. 1—A top-chassis view of the 2-meter converter. The r.f. section is shown at the left with the B-plus and filament decoupling networks above the chassis. To prevent accidental contact with the B-plus voltages, a ventilating cover, made from perforated aluminum sheeting, should be placed over the r.f. subassembly.



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

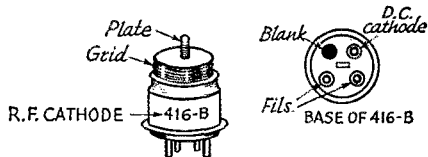


Fig. 2—Schematic diagram of the converter-preamplifier unit. All decimal value capacitors are disk ceramic; other fixed capacitors are tubular ceramic unless otherwise noted. B indicates button-mica capacitors; F indicates feedthrough capacitor. Polarized capacitor symbols indicate electrolytic type. Resistors are  $\frac{1}{2}$ -watt unless otherwise stated.

- $C_1$ —0-8-pf. piston trimmer.
- $J_1, J_2$ —Coaxial receptacles (Amphenol SO-239).
- $J_3$ —2-terminal chassis connector.
- $L_1$ —4 turns No. 16 wire,  $\frac{3}{8}$ -inch diam.,  $\frac{1}{2}$  inch long. Tap  $1\frac{1}{2}$  turns from cathode end.
- $L_2$ — $5\frac{1}{2}$  turns No. 16 wire,  $\frac{3}{8}$ -inch diam.,  $\frac{1}{2}$  inch long.
- $L_3$ —2 turns No. 22 insulated wire,  $\frac{5}{16}$ -inch diam., inserted in cold end of  $L_2$ .
- $L_4, L_5$ —4 turns No. 22 enam., space-wound on  $\frac{1}{4}$ -inch diam. iron-slug form.
- $L_6$ —One turn insulated wire over cold end of  $L_5$ .
- $L_7$ —9 turns No. 20 enam., close-wound on  $\frac{3}{8}$ -inch diam. iron-slug form.
- $L_8$ —2 turns insulated wire over cold end of  $L_7$ .
- $L_9$ —10 turns No. 20 wire,  $\frac{7}{16}$ -inch diam.,  $1\frac{1}{4}$ -inch long. Tap at  $8\frac{1}{2}$  turns from ground end.

- $L_{10}$ —8 turns No. 20 enam., close-wound on  $\frac{3}{8}$ -inch diam. iron-slug form.
- $L_{11}$ —8 turns No. 22 enam., on  $\frac{1}{4}$ -inch diam. iron-slug form.
- $L_{12}$ —One turn insulated wire over cold end of  $L_{11}$ .
- $L_{13}$ —9 turns No. 22 enam., close-wound on  $\frac{5}{16}$ -inch diam. iron-slug form.
- $L_{14}$ —3 turns insulated wire over cold end of  $L_{13}$ .
- $RFC_1$ — $RFC_4$ —20 inches No. 24 enam., wound over 10,000-ohm 1-watt resistor.
- $RFC_5$ —15 turns hookup wire, close-wound,  $\frac{1}{4}$ -inch diam. single section.
- $S_1$ —3-pole, 2-position wafer switch.
- $S_2$ —S.p.s.t. toggle switch.
- $T_1$ —Power transformer: 250 volts, 50 ma.; 6.3 volts, 3 amp. (Stancor PC-8419 usable).
- $Y_2$ —47-Mc. overtone crystal.

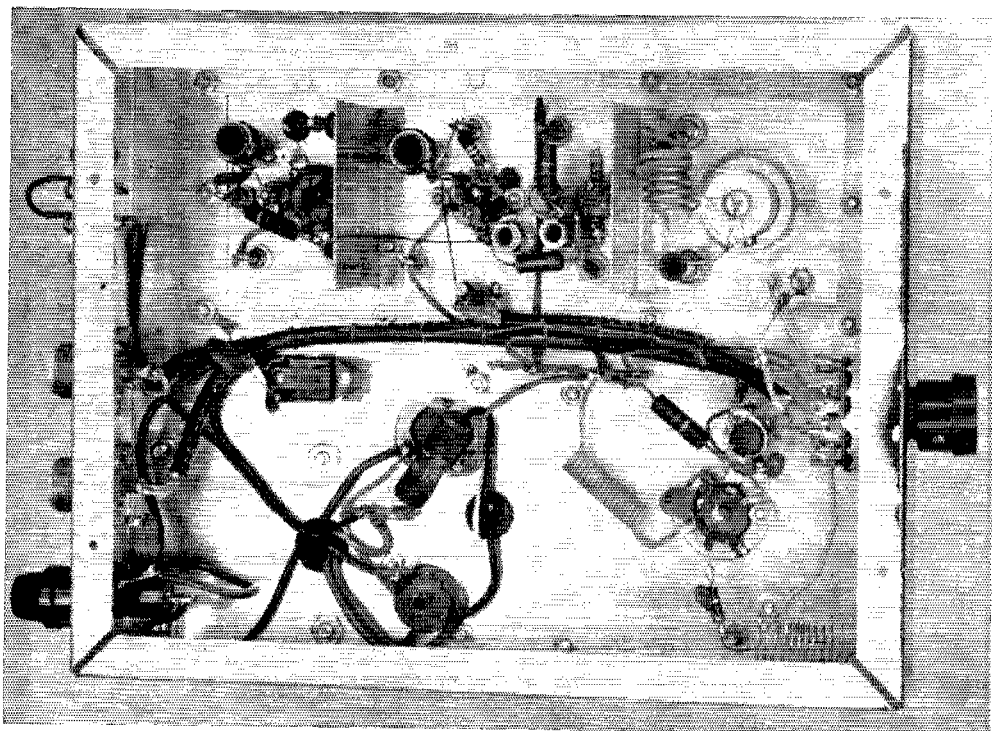


Fig. 3—Bottom view of the converter-preamplifier. The shield partitions, that aid in stage isolation, are visible near the top of the photo. The 416B (upper right) is screwed into a grid collet which is fashioned from a  $\frac{1}{8}$ -inch slice of  $\frac{1}{4}$ -inch diameter brass rod. The slice of brass is drilled and tapped to provide a  $\frac{3}{4}$ -inch X 40 thread. The collet can then be soldered to the brass subassembly of the converter. I had these mounting rings made by a local machine shop at 50 cents each.

injection signal for the 6CY5 mixer. This results in an i.f. output of 50 Mc., which is next amplified by the 6J4 stage. Two-meter reception is accomplished by tuning the station receiver from 50 to 54 Mc. Since the 6J4 stage is also used as a grounded-grid amplifier, it is sufficiently broad to be used as a 6-meter preamplifier without the need for repeaking it during tuning excursions from 50 to 51.5 Mc.

The power supply is conventional in all respects and uses a 6X4 tube as the rectifier<sup>1</sup>. Silicon-diode rectifiers could be substituted, making this section of the converter-preamplifier more compact.

### Construction

The complete unit is built on a  $7 \times 9 \times 2$ -inch aluminum chassis. Examining the photograph in Fig. 1, the power supply can be seen at the rear and in one corner of the chassis. The 2-meter converter assembly is built on a silver-plated brass strip and mounted over a cutout area on the main chassis. This was done to provide short ground return paths, by soldering directly to the chassis. It also provided a convenient arrangement for trying other converter circuits without completely rebuilding the entire unit each time.

<sup>1</sup> A 6BW4 was used in the author's model, but a 6X4 would be a better choice.

The silver plating is not necessary, but adds to the appearance of the assembly while offering improved surface conductivity. Plain brass or copper stock,  $\frac{1}{16}$ -inch thick, will serve just as well.

The 6J4 r.f.-i.f. stage can be seen in the right-front corner of the chassis. The power-supply switch is located near  $T_1$ , on the top of the chassis, and could be placed on the front panel of the unit if desired. The input and output coax fittings are mounted on the rear apron of the chassis, adjacent to the fuse holder, a.c. line cord entrance, and standby terminals.

The filament and B-plus decoupling networks have been brought out through the converter chassis via feedthrough capacitors, and are routed above the chassis. This method simplified the shielding and baffle requirements while providing ample isolation between circuits. Fig. 3 shows the underside of the chassis, where the heat-dissipation plate cap can be seen on the 416-B tube. This, plus the low plate voltage used, eliminates the need for a cooling fan—required at higher voltage levels. A baffle plate can be seen between the two r.f. stages. A second shield is located between the oscillator-multiplier section and the 6CY5 mixer.

The 6J4 stage is assembled on the main chassis and has a  $\frac{1}{4}$ -inch brass ring bolted to the chassis,



with the tube socket mounted through it, to permit direct ground-return paths. This aids in the stabilization of the amplifier. The 6J4 filament r.f. choke (RFC<sub>5</sub>) consists of 15 turns of hookup wire, close-wound on a 1/4-inch diameter mandrel.

Following completion and check out of the unit, a bottom plate should be bolted to the chassis. Rubber feet can be added, to prevent damage to the operating desk. The front panel of the converter-preamplifier is coated with gray enamel paint and labeled with decals.

### Wiring

The circuit is wired while observing the usual precautions common to v.h.f. assembly. Keep all leads as short and direct as possible, dressing the filament and B-plus wiring close to the chassis. All r.f. wiring associated with S<sub>1</sub>, is small diameter RG-58/U or Sub-Minax coaxial cable. Be sure to ground the shield braid to the chassis at each end of the cable. Feedthrough and button-mica capacitors are used throughout the decoupling networks to assure maximum isolation and circuit stability. Though they are rather expensive, their cost is justified by the improvement in performance. Capacitors of this type can often be "burgled" from war-surplus v.h.f. equipment at reasonable cost.

No attempt has been made to specify dimensions for the layout of the circuit, since most v.h.f. equipment builders have their own stock of components which require specific hole sizes for mounting. Furthermore, other layout ideas may occur to the builder following examination of the photographs in Figs. 1 and 3.

### Tune-Up and Operation

Following completion of wiring and assembly, the unit should be thoroughly checked for possible errors in wiring. Make certain that no short circuits exist in the B-plus and filament wiring. Next, adjust the tuned circuits to resonance with the aid of a grid-dip meter. Connect a suitable length of RG-58/U cable between J<sub>2</sub> and the antenna-input terminal on the station receiver. Connect a 6-meter antenna to J<sub>1</sub> on the converter-preamplifier. Place the front-panel function switch in the 6-meter position. With the receiver and the converter-preamplifier turned on, tune in a weak signal near 50.7 Mc. Peak L<sub>13</sub> for maximum receiver sensitivity. By experimentally moving the tap on L<sub>9</sub>, and retuning L<sub>13</sub>, a point can be found where optimum signal-to-noise ratio (s.n.r.) will occur. Next, place the function switch in the 2-meter position. Using a signal generator, insert a signal at approximately 144.2 Mc. and peak L<sub>2</sub> for best sensitivity. Next, apply a signal at 144.7 Mc. and peak L<sub>4</sub> and L<sub>5</sub>. Coil L<sub>7</sub> can be tuned for maximum response at 145.5 Mc. This procedure will result in a reasonably flat bandpass curve, from 144 to 146 Mc. L<sub>10</sub> and L<sub>11</sub> can now be adjusted for maximum output while observing the S meter on the station receiver. Do not readjust L<sub>13</sub>. The unit is now ready for use. Further improvement in s.n.r. can be accomplished by adjusting the tap on L<sub>1</sub> and changing the setting of C<sub>1</sub> in the 416-B stage. A calibrated noise generator will be useful during this process. A noise figure of 3 db., or less, should be possible on 2 meters. The substitution of a 6CW4 for the 416-B tube should provide comparable results.

This converter has been in constant use during the past 18 months, being operated for 2 or 3 hours nightly. It has served well in 2-meter DX work and has given a needed boost to 6-meter reception when switched to the preamplifier position. To date, the 416-B tube has not required replacement. Proper isolation in the antenna switching circuit (change-over relay) is required, to prevent damage to the 416-B during transmit periods. It is recommended that a coaxial relay with a shorting contact be used, where transmitter power levels in excess of 100 watts are employed.

The circuits used are not new, but the unit offers single-package construction for improved 6- and 2-meter reception with receivers capable of tuning the 50- to 54-Mc. range. QST

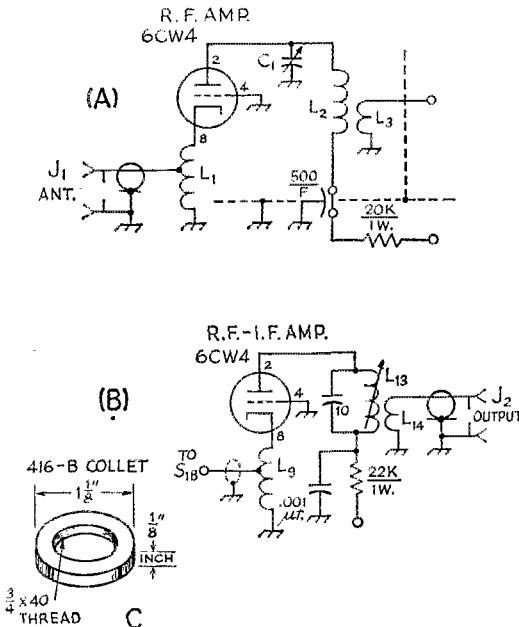


Fig. 4—An alternate first r.f. stage for the converter, using a 6CW4, is shown at A. A 6CW4 Nuvistor may be used in place of the 6J4 stage, and is shown at B.

*This converter-preamplifier combination, when used ahead of a communications receiver capable of tuning the 50-54-Mc. range, offers low-noise reception on 2 meters while providing a stage of grounded-grid preamplification on 6 meters.*

# Building Fund Progress



**Northwestern  
Over the Top!**

**H**ALF of the League's sixteen divisions have now reached their Building Fund quotas — the Northwestern Division being the eighth to achieve 100% of the assigned goal. Congratulations and thanks to those members of the

Northwestern Division who have made this accomplishment possible.

Now the race is between the Delta and the Midwest Divisions, and with the help of matching funds either division could soon go over the top.

Here's our Honor Roll of divisions which have already met their quota.

Canada	Northwestern
Dakota	Pacific
Hudson	Roanoke
New England	Rocky Mountain

The percentage standings of the other eight divisions look like this:

Delta	92.0	West Gulf	79.4
Midwest	89.4	Atlantic	69.9
Southwestern	87.8	Great Lakes	60.1
Central	87.6	Southeastern	59.7

Many hundreds of ARRL members have visited their new headquarters in Newington — we hope that *you* can, too. And if you haven't already contributed to the Building Fund, why not send along a dollar or two. It'll help *your* League, and you'll also get a handsome piece of wallpaper, if you're one of those certificate hunters.

## Members Are Saying

I am enclosing a contribution to your Building Fund. I also wish to express my sincere thanks to an organization that has done so much in guiding and working for amateur radio. I am solidly behind your proposals for elevating the standards of the amateur radio service. I wish you continued success in all your endeavors. — *W8ILP*

Check enclosed for renewal of membership and for the Building Fund. *QST* has been a 25-year "habit" with me, and I am glad to renew membership. May the League keep up its good work. — *W5JET*

Being a 16-year-old in urgent need of money, a dollar around here is as rare as a QSL from Upper Volta. However, I had put off the Building Fund contribution too long, so my conscience compromised with my wallet. As a result, even though poverty is rearing its ugly self in front of me, at least I have done one small thing for the ARRL. — *WB2JQC*

I should have sent this sooner. I think we should all support the League whether we agree with all their policies or not. I would have contributed even if I didn't agree with incentive licensing. — *K9JEL*

Enclosed is a check . . . for membership [and] for your building fund. I have been a ham for 33 years, lots of enjoyment that you have contributed to (*MM*). Small pay for that! — *K2OLS*

Keep up the good work. You have my 100% support in all policy decisions. — *W8CAO*

As for incentive licensing, I'm already hitting the books, and it's lots of fun. — *W7PF*

Enclosed are my checks to renew my membership in the ARRL for another year and a contribution towards the building fund. I fully support the League and feel that more editorials like the one in August *QST* are needed to open a few minds. As far as I'm concerned, the operation of the ARRL is not substantially different in form than that of the U.S. Government, and while we may not always agree with the policies of the Government there are orderly ways in which change can be accomplished if the majority chooses to do so. Of course, ham radio has its rabble groups just like the U.S. does. — *W8FAX/K8JIC*

I wish to make a contribution . . . for our new building. I have appreciated all the help, advice, and news *QST* has provided for me since I started. — *K9UBH*

Celebrating arrival of "General" ticket today by enclosing modest donation to our Building Fund, in appreciation for services rendered and best hopes for our bigger-and-better fraternal headquarters plant. — *WB2QKQ*

I hope your Building Fund goes over the top this year. I could not have gotten my General without League publications and W1AW code practice. Also I think the FCC proposals are the best thing that's happened to amateur radio in years. — *K8OZK*

By the way, while visiting the FCC Houston office recently for an exam, I spotted a number of recent issues of *QST* lying around, but not one copy of the other so-called "ham" magazines could I find. This was the final proof that money invested in ARRL speaks for the ham. — *W14BRS*

While I have been a ham for a little over a year now, I have always been proud of what the League has done for ham radio. I'm only 17 and my bank roll is small but I'm hoping this small contribution will help. Keep up the great work! — *W2SIC*

I have been reading *QST* since 1925 and have been a ham since 1937 (Class A) hi hi, I am getting too old to pass an exam as you are contemplating. Sorry you can't help us old Class A boys. I am enclosing two checks . . . one for *QST* and one for Building Fund. — *W9ZWQ*

Enclosed is a contribution . . . to the Building Fund. You are doing a great job for amateur radio and even though I am not a ham yet I am in support of the constructive work you are doing. — *Nickolaus Leggett*

Enclosed is . . . a contribution from Intercity Radio Club, in support of the splendid building program going on. Wish this could be more, but we are not often so very loaded with cash. — *Intercity Radio Club*

Enclosed please find another Building Fund contribution; may it, in some small way, enable the League to brighten the future as it has the past. — *K8NXZ*

Enclosed my check . . . for Building Fund. In general feel that ARRL does a pretty good job. If I make any criticisms will try to make them constructive, hi! — *W42DIJ*

Enclosed please find cheque . . . to be applied towards the Building Fund. We meant to have done this long ago but have just slipped our minds, not until our hard working, loyal and good standing member Noel Eaton gave us a short talk about the new ARRL and all you're doing "for us!" Thank you very much and continue your good work. — *Hamilton Amateur Radio Club*

In appreciation of all that our League has done for amateur radio. — *W3BJI*

. . . a small and belated contribution to the Building Fund, which is my way of saying that I am with you 100%. Even though your incentive licensing efforts may mean that after all these years (24) I will have to get back to studying, I feel that it is definitely in the best interests of amateur radio. — *W4HKS*

This completes my [pledge] to your new Building Fund.

In part only, this will at least partly compensate the League for the help it has been to me in a great many ways — *W1QJCR*

At our last general meeting, the members of our club voted to contribute to your Building Fund. A check is enclosed. It is not as much as we would like to give, but we hope that it will in some way help the Great Lakes Division meet its quota. Thanking you for all the past services and help to our fellow amateurs — *Catalpa Amateur Radio Society*

I am enclosing my check as a contribution to the Building Fund. As I just recently received my license, I want to say "thank you" for the ARRL assistance I received in the license study, both "on the air" and from your publications — *W18VWR*

Enclosed is my small contribution for ARRL Building Fund. I am grateful to be a part of this project. — *W12JTT*

**QST**



December 1940

. . . A goodly portion of this issue is devoted to reviewing and reminiscing about the days when *QST* first saw the light of day in December 1915. A splendid editorial by K. B. Warner is in itself a condensed history of the League and *QST*. Clarence D. Tuska, first Editor of *QST* and co-founder of the League recalls the very beginnings from a first hand point of view. Excerpts appear elsewhere in this issue.

. . . J. S. V. Allen, WSUNS, describes the experiments of Prof. A. E. Dolbear who, in 1882, using kite-born antennas and spark coils, succeeded in receiving signals over a distance of a few miles. The detecting device was supposedly a tiny spark gap. He was unaware that he was using Hertzian waves, thinking only in terms of induction.

. . . The National Park Service gives constructional data and performance of short vertical mobile antennas in the 2-to-4 Megacycle range. For a top loaded antenna, 12 db. gain is claimed over the then conventional base-loaded whip.

. . . One of "The Old Man's" classic articles on

"Rotten QRM" is reprinted. The Wouff Hong and Rettysnitch are born.

. . . Byron Goodman, W1JPE (now W1DX), has an article on the double beam-power 815 tetrode and points out that it is readily necessary to neutralize this tube if good low-loss components are used. His rig operated in the 28-, 56-, and 112-Mc. bands. On 112 Mc., the final tank takes the form of parallel copper tubes bent in the form of a hairpin.

. . . The 8th ARRL Field Day competition was won by the Frankford Radio Club, W3KKX/3, which provided 22 operators using 6 bands to amass a total of 8406 points with 610 contacts.

. . . Ed Tilton, W1HDQ, tells about the formation and functioning of 5-meter nets as one means of encouraging more amateurs to become more active on this band.

. . . Don Mix, W1TS, gives the low-down on the use of the popular 6L6 as a crystal oscillator working at the fundamental and at the second harmonic.

. . . It is noted that the FCC is way behind in the issuing of licenses, principally because of the requirement regarding proof of citizenship. It seems that many applicants for licenses have been enclosing applications in the same envelope with the proof of citizenship documents whereupon the applications become lost in a different department!

. . . In an article on micro-wave receivers, Frank D. Lewis, W1LKV, describes a 700-Mc. superhet developed at M.I.T.

**QST**

# A Simple Electronic Key

## Self-Completing Circuit Using Only 3 Transistors

BY WES HAYWARD,\* W6GUVR

THE 1965 Field Day happened to coincide with a previously-planned mountain-climbing trip in the Sierra Nevada. Not wanting to miss the fun, some of the author's transistorized gear<sup>1</sup> was taken along, and the expedition took on a dual role. While few contacts were made, the trip was very successful in that many of the deficiencies of the author's equipment were clearly recognized. Probably the most profound observation was the difficulty involved in operating a hand key while curled up in a sleeping bag in a small mountain tent at 12,000 feet elevation! Hence, it was decided that a small portable electronic keyer would be built.

Upon returning from the mountains, a search through the literature revealed a profusion of keyer circuits. While there is little doubt of the superiority of the all-digital type of keyer,<sup>2</sup> this circuit was more complex than desired for portable operation. After some consideration, the circuit shown in Fig. 1 was devised and built. Although the circuit is quite simple, it performs well, features variable speed, and is self-completing.

### Circuit

The operation of the circuit is easily understood with reference to the circuit diagram, Fig. 1.

\* 2367 Wyandotte, Apt. 4, Mountain View, Calif. 94041  
<sup>1</sup> Hayward, "A Transistor C.W. Station for 7 Mc.," *QST* August, 1964.

<sup>2</sup> e.g., Boelke, "The Bugless Bug," *QST*, September, 1963.

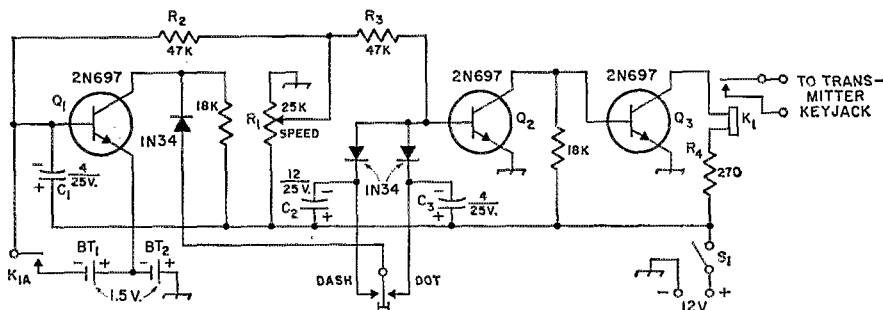


Fig. 1—Circuit of the simple electronic key. Resistances are in ohms; capacitances are in  $\mu$ f. Resistors are  $\frac{1}{2}$ -watt; capacitors are electrolytic. (See text.) Component designations not found below are for text-reference purposes.

BT<sub>1</sub>, BT<sub>2</sub>—1.5-volt penlight battery.

K<sub>1</sub>—Sensitive d.p.d.t. relay (Potter & Brumfield ML-11D, 2500 ohms, with no R<sub>4</sub> resistance; Sigma 42RO-500-G/SIL, or similar).

and to the waveforms shown in Fig. 2. Transistor Q<sub>3</sub> functions as a switch to control the relay. This stage is normally cut off by Q<sub>2</sub>, which is saturated through the 47K base-bias resistor R<sub>3</sub>. Transistor Q<sub>1</sub> similarly is saturated (through R<sub>2</sub>) during the key-up period. Because the emitter of Q<sub>1</sub> is returned to -1.5 volts, the collector is also approximately at this potential.

Imagine, now, that the paddle is actuated in the

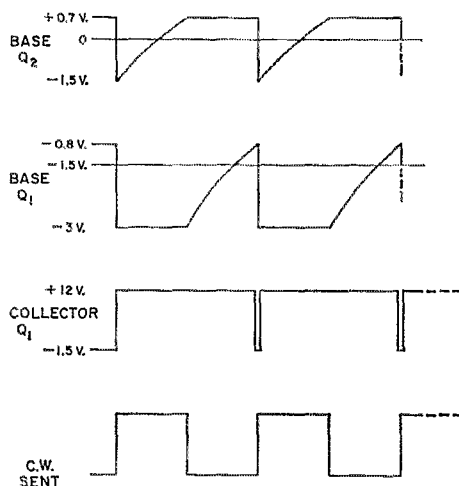


Fig. 2—Waveforms at various points in the circuit of Fig. 1 in forming a string of dots.

R<sub>1</sub>—Linear control.

R<sub>4</sub>—See text.

S<sub>1</sub>—S.p.s.t. switch, any type.

dot direction. This pulls the base of  $Q_2$  down to nearly  $-1.5$  volts and charges  $C_3$  to this voltage. In this condition,  $Q_2$  is cut off which, in turn, allows  $Q_3$  to saturate, causing the relay to close.

Besides keying the transmitter, the relay also provides control to start the timing function. When the relay contacts  $K_{1A}$  close, the base of  $Q_1$  is pulled to  $-3$  volts. This cuts  $Q_1$  off, allowing the collector of  $Q_1$  to rise to  $+12$  volts. The diode in the keying-lever circuit provides isolation between  $Q_1$  and  $C_3$ . Capacitor  $C_3$  now charges through the  $47K$  resistor  $R_3$  toward the voltage determined by  $R_1$ .

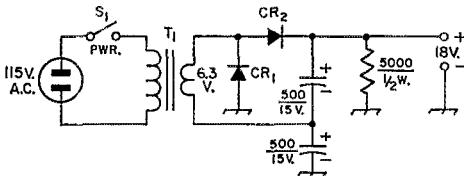


Fig. 3—Circuit of the 18-volt supply. Capacitances are in microfarads, and resistances are in ohms. Capacitors are electrolytic.

CR<sub>1</sub>, CR<sub>2</sub>—Silicon diode, 50 p.i.v., 500 ma.  
S<sub>1</sub>—S.p.s.f. switch, any type.  
T<sub>1</sub>—6.3-volt 0.6-amp. filament transformer.

When the  $Q_2$  base voltage reaches  $+0.7$  volt,  $Q_2$  again saturates, which cuts  $Q_3$  off and allows the relay to open. This, in turn, allows  $Q_1$  to go through a similar timing cycle. When transistor  $Q_1$  goes back into saturation, the collector of  $Q_1$  again returns to  $-1.5$  volts. If the paddle is still closed, the entire cycle is repeated. Notice that as soon as the relay is closed, and  $Q_1$  is biased into cutoff, the paddle may be opened without affecting any of the subsequent timing. This constitutes the self-completing action of the keyer.

A dash cycle is produced in exactly the same way as the dot cycle, except that  $C_2$  determines the dash length. Diodes  $CR_2$  and  $CR_3$  serve to isolate the dot and dash functions.

A more careful analysis of the circuit reveals that there are circuit asymmetries which will lead to slight variations in the dot-space ratio which ideally should be unity. However, in practice, this error is not detectable at speeds between 15 and 40 words per minute. The author used ordinary electrolytics from the junk in the timing circuits. If minimum cost is not an objective, 10-per cent tantalum would be ideal.

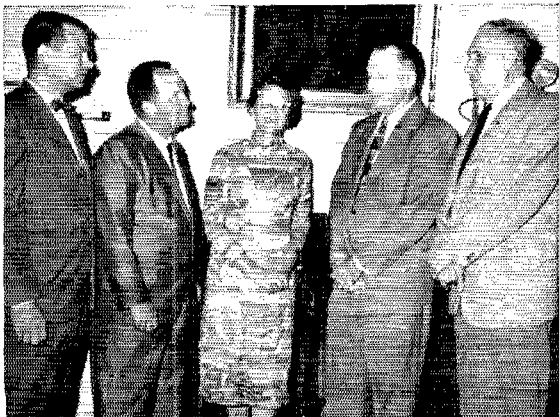
### Power Supply

The construction of this keyer is about as non-critical as any ham project could possibly be. Thus, details will be left to the individual. Likewise, the construction of a paddle is largely a matter of personal taste and ingenuity. The author's keyer is built in a  $3 \times 4 \times 5$ -inch box, and includes the paddle and batteries  $BT_1$  and  $BT_2$ . In portable operation, the 12-volt supply is obtained from penlight cells, or is "stolen" from the battery pack for the author's portable transmitter. If resistor  $R_4$  is changed to 560 ohms, the keyer operates quite satisfactorily from an 18-volt source. A suggested circuit for the 18-volt supply is shown in Fig. 3.

The relay used in the author's keyer is a small crystal-can unit obtained at a local surplus outlet. This relay has a coil resistance of 400 ohms, and a 6-volt pull-in. Suitable, more-readily-available substitutes are suggested under Fig. 1. An appropriate value of  $R_4$  should be chosen.

There is little doubt in the author's mind that the electronic keyer is a major aid to quality c.w. operation. It is hoped that the simplicity of this circuit may help others to get on the band-  
QST

## Strays



The Stray on page 10 of October 1965 *QST* mentioned that the "key twisters" were to be tried on a bug or hand key and implied that Continental (International Morse) code was to be used. Actually, W9LQE (whom we incorrectly listed as K9LQE) intended that the copy be sent in American Morse on a sounder. When the key twisters are sent in American Morse, there is not a single dash in the sentences!

Shown at the Berkshire County Radio Club Hamfest in September is (l to r) K1TRZ, president of the club, Captain Kurt Carlsen, W2ZXM/MM, Mrs. Carlsen, K1JGW, and W1AOF. Kurt attended the hamfest at the Dalton Community Club House to speak to a gathering of some 60 hams, telling of his epic stay on the sinking freighter *Flying Enterprise*, in December 1951.

CONDUCTED BY GEORGE HART,\* WINJM

## Place of the Independent Organizer

A few years ago when we had the honor and privilege to be the ARRL headquarters representative at a convention far from West Hartford, we casually asked one of the officials if there was much antagonism toward the League in that part of the country.

"Oh," he said, "No one around here is against the League. They're just indifferent to it."

At the same convention we subsequently had further evidence of this official's statement. Prominent among the convention attendance were amateurs wearing large badges signifying membership in a group which, as far as we knew, had absolutely no ARRL affiliation. Yet, it was known to be a group actively engaged in activities beneficial to amateur radio's public service image.

At the time, we remember pondering whether it was better to be ignored than disliked. Somehow, we doubted it. Indifference implies either lack of awareness of or lack of concern with what the League is doing, and this in turn implies a basic failing on the part of the program. At least one could not say that animosity implied either of these.

But there exists, even today, a considerable segment of our public service effort consisting principally of amateurs indifferent to the League's program. They are not *anti*-ARRL, they are just *non*-ARRL, and the nets and groups in which they participate seem to prefer to stay that way.

Well, this is all right. We would dearly love to have their participants join us in a single united effort to put ARPSC across, but it is much better to have them participating in a non-ARRL program than not to be taking part in this type of activity at all. So we have honored them and respected them, included them in the net directory where appropriate, written up emergency activities in which they have been involved, if reported, and by every possible action tried to indicate that the League approves of them even if it does not actively sponsor them. And this has seemed to be a satisfactory arrangement with all concerned.

There is also quite a large contingent of pro-ARRL organizers who have nevertheless proceeded to organize on an independent basis but now wish to be recognized as part of the ARRL program. Most of these are ARRL members, so their organization is not just *pro*-ARRL, in a manner of speaking it *is* ARRL. Yet, it does not follow the lines of organization sponsored by the League through its policy-making Board of Directors.

\* National Emergency Coordinator.

So what to do? A dilemma indeed!

Well, obviously, we cannot do everything that every group of members wants us to do; we have to act in accordance with the wishes of the majority. At the same time, neither can minority wishes be ignored. At its 1963 meeting, the Board put its stamp of approval on the combination of AREC and NTS to form the Amateur Radio Public Service Corps. But in the long range plans for ARPSC there was a third division contemplated — the "independent" division, consisting of nets and organizations not a part either of AREC or NTS. This was hinted at in the diagram appearing with the first article on ARPSC which showed the two divisions (AREC and NTS) and another arrow pointing to "Other Amateur Facilities."<sup>1</sup>

This arrow was not inserted frivolously. At the time of writing, we had every intention of developing this theme to make "Other Amateur Facilities" a third division of ARPSC. These ideas develop slowly. Often they start out as something we *ought* to do without any idea *how* to do it. Then as the desirability becomes stronger we start to doodle on it — that is, start trying to figure out ways and means of accomplishing the objective. After that, one of two things happens. Either the doodling becomes energetic, we sit up straight and start getting enthusiastic and things began to take crystalline (instead of embryo) shape, and first thing you know we have a plan. Or, the difficulties inherent in the problem seem so insurmountable that we set the whole thing aside for further consideration at a later time.

We don't give up. If a thing is desirable enough and beneficial enough, there has to be a way

<sup>1</sup> Apr., 1964, *QST*, page 49.



At a recent ARPSC meeting in R.I., the fellows posed for this shot before getting down to business. Front (l to r) K1HZN (EC), W1BTV (RM/EC); Center (l to r) W1VWR (EC), K1AAV (SCM), W1YKQ (Asst. EC); Rear (l to r) K1TPK (VHF PAM/ Asst. SEC), W1QLT (EC), and K1NJT (Mgr. RISPNI).

## BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Sept. Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
K6BPT	70	1951	1868	83	3972
W3CUL	233	1896	1623	202	3954
W7BA	14	924	860	60	1858
K9ONK	137	787	679	42	1645
W0LGG	16	699	617	5	1337
K6EPT	126	531	332	199	1188
W4TUB	16	571	562	5	1154
W4BMC	312	160	122	27	1121
K2KQC	19	529	513	18	1069
W1PEX	79	481	483	44	1037
W49CCP	17	518	469	7	1011
W3EML	28	460	355	8	851
K7TCY	23	396	328	49	796
K8QKY	43	372	351	21	737
K91VG	42	405	352	5	734
W0OHJ	27	377	376	1	781
W5GHP	156	318	36	267	777
W7DZX	11	385	302	34	732
K6YVN	14	345	332	7	698
W6BBSO	36	334	291	2	663
W7HMA	0	310	287	2	599
W5NAR	23	291	273	5	592
W4DJT	66	258	153	100	577
W6ZJB	11	281	268	13	573
W3VR	46	261	241	15	543
K4FLR	34	334	230	4	562
W4CFY	37	300	192	30	559
W42RUE	49	267	198	37	551
W4FX	1	250	269	6	526
W50BD	19	250	248	0	517

### Late Reports:

W42RUE (Aug.)	104	991	879	72	2046
W4TUB (Aug.)	7	563	547	11	1128

### More-Than-One-Operator Stations

W6YDK	1206	955	472	428	6061
W6IAB	681	937	604	333	2555
K6MCA	143	821	746	13	2023
W4LBY	42	647	606	41	1356
KR6GF	168	38	14	22	542

### Late Report:

W6YDK (Aug.)*	6473	926	601	292	8292
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BPL for 100 or more originations-plus-deliveries

W7APS 202	W4RZL 129	W4IAPY 115
W44AGH 166	W1CRX 128	K1CLM 114
W6GYH 165	K7BEM 7 128	W4GGJU 114
W4CFY 164	K3ZYP 127	W4ANEV 110
W40GG 161	W8DAE 126	W4SAJD 100
W41CFT 149	W2OE 120	Late Report:
W44QGM 139	W47CFY 116	VE7BH (Aug.) 106

### More-Than-One-Operator Stations

K4CSH 195	W4RCC 195	W5YM 142
	W46VFM 180	

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: K3DCB, W3FTL, W44GQM, K4JTG, W44LHK, W3GHP, W4SHNN, W6BPHL, W4STMY, W4BET, W49GJL, W4LZL.

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

\* Correction.

to do it. We keep worrying the problem until we come up with something.

There are several imponderables connected with including the so-called independent organizations in ARPSC. First of all is the inescapable thought that the very designation "independent" is ill-fitting because it indicates separation from an established organization. Probably it would be more accurate to call them non-AREC or non-NTS, as the case may be. Secondly, what sort of changes would be required in their present organization to make them eligible as a part of ARPSC — if any? Thirdly, do enough of them want to be included in ARPSC to make it worth while? And fourthly (probably most important and certainly most complex), how to fit them into a comparatively tight organization such as ARPSC?

Anybody got any bright ideas? We're listening. — WINJM.



During the search for a mentally retarded boy in Mass., (standing l to r) K1s OWJ NUR CGM and LNC (EC) and an unidentified operator in the back, took a break for some chow and this photo. (See Diary of the AREC for details).

## National Traffic System

Another SET has come and gone and at this writing reports are still coming in. We look forward with very little pleasure to sorting them and analyzing them for the wrap-up article in February or March QST.

We think NTS did a fine job, however — better than in any previous SET. Not good enough yet, but we're getting there, and as of the present time we dare say that NTS could do a very creditable job in a real emergency.

One thing we continue to notice in NTS nets is that precedences are sometimes ignored. On several occasions we were on the receiving end of long strings of messages in which TEST P and P2 traffic came after the routine stuff. Either the sending operator considered regular routine traffic more important than "test" priority traffic, or he felt that as long as it was all to be sent the order didn't matter, or (more likely) he didn't think at all, just sent the stuff as he received it, or as it came to light in the stack.

There was very little TEST EMERGENCY traffic floating around this year. The boys and gals were looking for it and ready to pounce on it if it showed up, but this year we originated only one.

But getting back to precedences, we know it is a nuisance to sort the traffic before you send it, but in an emergency situation it is absolutely essential that we do so, even when a big stack is to be sent to the same station. PRIORITY first, then P2, then R! You won't find any EMERGENCY traffic showing up as part of a stack (or you shouldn't, because this should receive separate handling). Priority and P2 traffic labeled "test" should receive the same handling as the real McCoy — otherwise, what's the use of having a test?

You might ask why the order matters if a stack of mixed-precedence traffic is all to be sent to one station in a single sitting. The answer is obvious, if you think about it. How many times have you had a string of traffic interrupted by QRM, by fading, by equipment failure or other unforeseen contingencies? Never? You've been very lucky. When such an interruption occurs, you are left holding some traffic. We want to get the high-precedence traffic cleared first because it's the most important. If we are to be left holding some, let it be routine, not priority.

The QST writeup on the SET is primarily for the casual reader. For you ARPSC readers, we are going to try to



For the last seven years, Jan, WB2JCE and Fred, K2RYH have played host to the NYS crew at their annual picnic. We caught 'em overseeing the roasting of some of the traffic hounds. K2RYH is one of the EAN NCSs, holds an ORS and is quite active on most of the NTS levels. WB2JCE is also quite active on NYS, and may soon graduate to the higher echelons of NTS. (Photo by W1BGD).

get out an ARPSC Field Bulletin critique of the whole operation. If you have some comment that you have not already made, then spill it so it can be included in any general survey of the operation. — W1NJM.

September reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	30	1452	1,029	48.4	98.3
CAN	30	1078	.818	35.9	100
PAN	30	1173	.898	39.1	100
1RN	58	515	.334	8.9	93.7
2RN	62	508	.690	8.2	99.3
3RN	60	562	.442	9.4	98.9
4RN	54	568	.397	10.5	98.6
RN6	60	1202	.442	20.3	94.3
RN6	60	711	.625	11.9	98.4
RN7	30	534	.511	17.8	79.0 <sup>1</sup>
SRN	59	306	.273	5.2	74.6
9RN	30	354	.456	11.8	97.5 <sup>1</sup>
TEN	60	748	.592	12.5	83.1
EON	29	161	.272	5.5	78.2 <sup>1</sup>
TWN	28	300	.406	10.7	62.8 <sup>1</sup>
Sections <sup>2</sup>	1561	8159		5.2	
TCC Eastern <sup>3</sup>	120	541			
TCC Pacific <sup>3</sup>	120	762			
Totals	2241	19634	EAN	8.2	CAN/PAN
Records	2078	22413	1.183	15.4	100

<sup>1</sup> Representation based on one or less sessions per day.

<sup>2</sup> Section nets reporting (52): QIN (Ind.); VTNH (Vt.-N.H.); MTN (Man.); NJ 6&2, NJN (N.J.); VSBND, VSBND (e), VN, VSN (Va.); AENR, AENP, AENAI, AENH, AENB, AENT (Ala.); GBN (Ont.); NCN, THEN, SSBN, NCNL (N.C.); BEN WBSN (Wis.); SCN, NCN (Calif.); CN, CPN (Conn.); MWSSBN, QMN (Mich.) SCN, SCEN (S.C.); PTNN (Pa.); WFPN, QFN, FMTN, GN (Fla.); TN, TPN, TSSBN, ETPN, TSN (Tenn.) MDSS (Md.-D.C.-Del.); BUN (Utah); MSPN (e), MSN, MJN (Minn.); RISP (R.I.); OQN (Ont.-Que.); NYCLIVHF, NYCLIPN, NLS (N.Y.C.-L.I.); KTN (Ky.); GFN (Ga.).

<sup>3</sup> TCC functions not counted as net sessions.

The old sessions record bit the dust by a far margin this month. This is probably a result of receiving 52 section net reports. We have mailed reporting cards to each Section and Local net manager who registered for the new net directory, and it is our hope that the number of reports will increase markedly.

One of the most important statistics we keep is the representation figure. This month, 10 out of 14 higher level

nets reported over 90% representation. This is excellent, and yet we would like very much to see every Region and Area net near the 100% mark. CAN has been doing it for over a year now. How about the rest of the crew?

W1NJM and W1BGD would like to wish each and every one of you the best during this holiday season. Buckle your seat belts, folks, here comes the Christmas traffic rush!

W9DYG sez all is well on CAN. WB6JUH reports the first case of long skip messing up the net sessions. K3MVO also noticed a few nights when long skip started its dirty work on the late 3RN session. Here we go again, fellows. K5IBZ kudos W. Fla. for hitting the 100% representation mark for the first time in many months. Starting October 1, RN5 will QND the early session at 0130 GMT. K7JIA reports that KL7CGE was able to QNI RN7 a few times. Maybe he will keep it up. W9QLW has issued 9RN certificates to W9IRB and WA9NFB. W0LGG reports that everything went up this month except the total time in session, making for a good report and a good month. K7NHL has taken TWN into hand, and things should be shaping up shortly. They still need a regular Wyoming representative. Anyone interested?

Transcontinental Corps: W3EML reports that even though traffic is down a little, most of the functions are standing up well. WA4PDS will be moving to the west coast soon, and as Bill says, "my loss, W7DZX's gain." Speaking of W7DZX, Jack has finally filled all the open schedules in Pacific Area.

Sept. report:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	120	90.0	1524	762
Pacific	120	90.0	1753	541
Summary	240	90.0	3277	1303

TCC Roster: Eastern Area (W3EML, Dir.) — W1s BGD CRX EFW EMG NJM, K1YKT, W4As BLY RUE, W7Bs AEJ HWB, W7s EML NEM, K5s PHR MVO, W4DVT, K4s EHY/1 VDL, WA4PDS, W8CHT, K8s KMQ NJW QKY, W48GYT, Pacific Area (W7DZX, Dir.) — W6s AGR EOT HC IDY TYM VNO, K6s DYX LRN, W4As ROF WNG, WB6JUH, W7s AAF DZX GMC.

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Net reports:

Net	Sessions	Traffic	Check-ins
7290	42	545	1065
ISSBN	30	698	1089
HBN	30	753	455

Diary of the AREC

A few relays by amateur radio, a quick call to the police department and a five mile ride on horseback were required to deliver a message to a man on a ranch in a remote part of Nevada. On June 6, WB6QKD originated an emergency message to a man on a ranch in Nevada. There was no telephone service to the ranch and the nearest highway was miles away. The message was sent to W6DRV who relayed it to WA6MCU, NCS of the WCARS net on 7225 kc. He telephoned it to the California Highway Patrol. The message was then relayed to the Nevada Forest Service at Gold Creek, Nev., and from there, two girls traveled by horseback to the ranch where they delivered the message. — K6III.

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K1ZVN from Auburn, Maine, was the main communications link between a search party in Baxter State Park and the outside world for over a week. Two boys who had gone hiking in the park were lost, and a desperate search had been organized to try to find them. Traffic was handled between the searchers and the boy's parents, and supporting agencies. On the advice of medical authorities, the search was abandoned after over a week of unsuccessful hunting. Authorities said no one could survive in the Maine wilderness for over a week without food or shelter. — W1LDC.

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When an 8 year old boy from South Boston, Mass., rolled down a hill in Thomas Park, his head struck a rock. K1ZMH, operating mobile at the time, spotted the boy and told K1ZGH, with whom he was in contact, to notify the local police. A phone call from K1ZGH brought the police in jig time, and the boy was rushed to the hospital.

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When a mentally retarded 7 year old boy from Templeton, Mass., wandered away from home on Sept. 14, a search party of boy scouts, police, firemen and army helicopters began combing the Thousand Island Swamp area, where it was believed the boy had gone. Communication was provided by the Gardner c.d., with K1LBC in command. In the early afternoon of Sept. 19, K1s LNC and CGM spotted the boy, but were unable to reach him. As a result, helicopters combed the 600 acre swamp. A few hours after the reported sighting, an explorer scout found the boy. Other amateurs providing communication links to the local radio station, Red Cross, c.d. headquarters and police station were K1s NUR PLW NPA AND NUU. — *K1LNC, EC Templeton, Mass.*

On Sept. 4, the Milwaukee Weather Bureau forecast a severe series of storm cells with possible tornado activity developng. AREC members manned their cars and were deployed according to plan, to various places around the city. Two hours after the alert, operations were secured. The storm had passed the area without causing any damage. Twelve amateurs participated. — *K9ZPP, SEC Wisconsin.*

Fourteen AREC members participated in the Passaic, Clifton, West Patterson, N.J., part of the NNJ pre-SET held on May 22. They simulated damage from hurricane Nasimova, provided communications to Red Cross and c.d. officials and ran several tests of their own. Everything went off smoothly and the results of the exercise was the realization that they needed better mobile planning and beforehand preparedness. — *K2KDQ, EC Passaic Area, N. J.*

As a return favor to the Boy Scouts for letting them use their camp site for Field Day, AREC members from the Northwest Amateur Radio Club provided communications for the scout camporee on June 4 through 6. The operation involved providing a link between the scout's office in Evanston, Ill., and the camporee site at Illinois Beach State Park. Operation in the field at the campsite involved the use of handi-talkies for 2 meters. Several dozen messages were handled over the weekend. — *W9CWH, Asst. EC, Northwest Amateur Radio Club.*

When the North Florida Amateur Radio Society was asked to provide communications for the annual St. Johns Sailing Regatta on June 12 and 13, the Duval Co., AREC ably handled the request. Two meter equipment was used to its fullest extent, with five portable rigs on various yachts, and the NCS on shore. Simple gutter clip antennas were used, and proved to be excellent for the line-of-sight communications. Approximately 100 sailboats from all over the Southeast participated in this annual event, and communication between the race officials and the boats in the field were carried out. During one of the races, a severe rain squel upset several contesting sailboats and thanks to quick relaying, the NCS was able to send help almost immediately. — *W4GJ, EC Duval Co., Fla.*

The Radio Amateurs for Greater Syracuse, N. Y., used 2-meter f.m. to provide highly successful communications support for the 1000-Islands International Outboard Motorboat Marathon on June 13. This was the fourth consecutive year that the club participated in this event. Twelve mobile and portable units, each with two operators, were located on islands, aboard boats and on shore, reporting boat positions to the judges as well as summoning aid for contestants in trouble. The coverage was excellent, especially when the portable repeater station was put into service. The repeater was put on the narrow sidewalk in the center of the U.S.-Canada bridge, and the antenna was suspended, by its own coax, some fifty feet below the bridge. This unusual antenna gave rise to a Coast Guard investigation of a reported hazard to shipping seen dangling from the high bridge. — *W2SEI.*

Well, we finally did it! Forty-nine SEC reports were received for August, representing 20,311 AREC members. This is the largest number of reports so far this year. Last year at this time, 37 SECs reported, representing 3,000 less AREC members. Those sections reporting are: Ill., N.N.J., Tenn., N.C., Ind., Iowa, Nebr., N.Y.C.-L.I., Los A., Miss., R.I., Alta., Sask., S.C., E. Pa., Man., La., W.N.Y., Del., N. Dak., S.F., E. Bay., S.V., Orange, Ky., Hawaii, E. Mass.,

## NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

### FULL TIME

3550	7100	50,550
3875	29,640	145,350

### PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Full time frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for any purpose (except calling for emergency help) the first five minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in an FCC-requested or FCC-declared emergency, at which times they become full time frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require us all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

W. Pa., Ariz., W. Fla., Kans., Wyo., Maine, Mich., Ala., E. Fla., Wash., Nev., Ohio, Utah, Mo., Ont., N. Mex., Ark., S. Tex., Va., Colo., S. Dak., Okla. In the October issue, Nebraska should have been shown as being 100% for the first six months of the year.

## RACES News

According to the Houston, Texas, c.d. communications officer, the Houston RACES has changed from a paper plan to a real and working system in just five months. The system

included sixty fixed stations and twenty-five mobiles, all assigned to a 2-meter frequency. Some of the advantages of their system are: (1) Crystal controlled channel operation. (2) Continuous monitoring of the net frequency, enhanced by the use of a squelch. (3) Simplicity of antennas (in this case, ground planes). (4) Excellent local coverage. (5) Freedom from QRM from other areas. (6) Freedom from electrical interference and static. (7) Equipment operation simple, and can be used by inexperienced operators. (8) Adequate mobile coverage for local work. (9) Conforming to the National Plan for amateur emergency communications. How does your RACES operation stack up against these standards?



We have received a rather impressive annual report for West Virginia RACES from W8IHA. Two new county RACES plans were approved, bringing the total to 10 counties. Over 400 hours of amateur participation were logged in RACES work, and 175 hours of amateur participation in RACES nets. Various antenna improvements are contemplated and scheduled for completion, and an expansion to the communications facilities by additional s.s.b. gear. In general, the plan for the new year calls for increased recruiting of counties and new personnel, to set up regular weekly drills and training nets, and to prepare a program for presentation at the W. Va. State Amateur convention next year. — *W8IHA.*

## OOPS . . .

We goofed. In the November QST article on the mid-western floods (p. 52), we inadvertently attributed all that FB Wisconsin activity to Indiana. There is a La Crosse in Indiana, but the one we were talking about is in Wisconsin.

Also, in the tornado article in October QST, it seems that the printer decided to chop off a couple of lines at the bottom of page 172, and this included the Wisconsin subheading.

We have nothing against Wisconsin, honest!

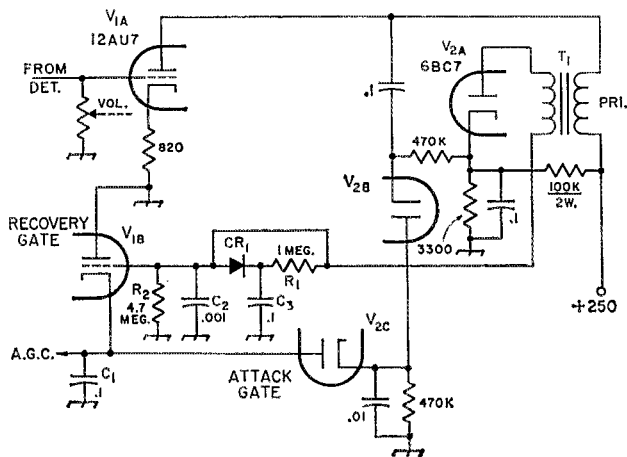


Fig. 1—Audio "hang" a.g.c. modified for immunity to noise "pops." The circuit is the same as the original except for  $C_2$ ,  $CR_1$ , and  $R_1$ . All capacitances are in  $\mu\text{f}$ .  $CR_1$ —200-p.i.v. silicon diode.  $T_1$ —1:3 audio transformer.

## Some Thoughts on Hang A.G.C. Systems

BY CHET OPAL,\* K3CUW

THE many variations of Goodman's hang a.g.c. circuit<sup>1</sup> which have appeared in *QST* over the last eight years attest to the popularity of this type of automatic gain control for s.s.b. and c.w. reception. Unfortunately, the circuits used tend to be somewhat complicated

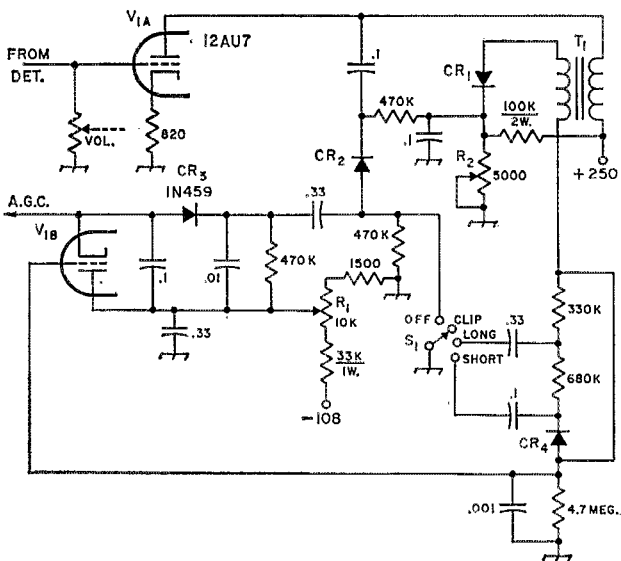
and many hams may be reluctant to use them, particularly since no suggestions are given as to how to adapt the systems to one's particular needs. My purpose here is to present a set of modifications applicable to any of the "hang" systems and, for the most part, to the simpler fast-attack slow-decay circuits now popular in commercial gear. The modifications include a circuit to prevent the a.g.c. from hanging up on

\* 42 West Biddle St., Baltimore 1, Maryland 21201.

<sup>1</sup> Goodman, "Better A.G.C. for S.S.B. and Code Reception," *QST*, January, 1957.

Fig. 2—Further evolution of the a.g.c. circuit with "Sensitivity" ( $R_1$ ) and "Threshold" ( $R_2$ ) controls added. The function switch,  $S_1$ , select 10-ms., 3-second and 1-second "hang" times.

$CR_1$ ,  $CR_2$ ,  $CR_4$ —Bargain silicon diodes.  $CR_3$ —High back resistance silicon diode. (1N459 or equiv.)



isolated noise pops, and the addition of a cathode follower so that the a.g.c. line may be used for other purposes such as receiver muting or manual gain control. Methods of adapting gain-controlled amplifiers for good performance under fast-attack a.g.c. conditions are also discussed.

A slightly modified version of the hang a.g.c. system described by Luick<sup>2</sup> is shown in Fig. 1 and is typical of all circuits used. This particular version is audio driven, but circuits which obtain driving voltage from the i.f. amplifiers are quite similar. The important thing is that all selectivity precede the point at which the a.g.c. driving voltage is taken off. The systems work best when used with a receiver with good skirt selectivity and which recovers quickly when overloaded (that is, with a good receiver).

The circuit shown here works basically as follows: Audio is picked off the receiver volume control<sup>3</sup> and amplified in  $V_{1A}$ . Part of the result is rectified in  $V_{2B}$ , filtered, and dumped onto  $C_1$  through  $V_{2C}$ .  $C_1$  will thus charge up immediately to the peak of the audio voltage appearing on the plate of  $V_{1A}$  and will stay at that voltage until discharged through  $V_{1B}$ . The resulting negative voltage is applied to the grids of the i.f. tubes to reduce the gain of the receiver. There should be no d.c. return to ground on the a.g.c. line itself or the a.g.c. voltage will not "hang" properly. The audio is also stepped up in  $T_1$ , rectified in  $V_{2A}$ , and the resultant negative voltage is applied to  $C_2$  (ignoring  $CR_1$  for the moment) to cut off  $V_{1B}$ . Because of the voltage gain in  $T_1$ , the voltage across  $C_2$  is considerably more negative than that across  $C_1$ , and  $V_{1B}$  will not conduct again until  $C_2$  discharges through  $R_2$ . As a result, the a.g.c. voltage will hang at a voltage proportional to the peak amplitude of the signal being received for a length of time determined by the step up in  $T_1$  and the time constant  $R_2C_2$  (usually chosen to be about a second). The voltage divider in the cathodes of  $V_{2A}$  and  $V_{2B}$  puts a back bias on these diodes and sets a threshold below which the a.g.c. will not operate. The actual values in this divider will depend on the particular receiver and the noise conditions on the band in use. It would be advisable to make the threshold adjustable temporarily, as shown in Fig. 2. After the a.g.c. has been in use for a while, a good compromise value could be determined and a fixed resistor substituted if desired.

#### Immunity to Noise Pops

From the above description it is evident that a sudden noise peak will cause the a.g.c. to hang. Since man-made noise caused by electrical appliances or a v.f.o. swishing across the band can have a much higher peak amplitude than the signal being received, this will cause a one-second hole in the message before the a.g.c. returns to

its normal operating point. The addition of a diode, resistor, and capacitor in the grid of  $V_{1B}$  to correct this condition is shown in Fig. 1. The signal peak is fed directly through to  $C_2$ , but as this capacitor is smaller by a factor of a hundred than the one normally used, the a.g.c. will only hang for about 10 milliseconds. The audio is also fed to  $C_3$ , but this capacitor must charge through a 1-megohm resistor and hence will not reach full voltage until several s.s.b. peaks, or at least 100 milliseconds on c.w., have gone by. When  $C_3$  is finally charged,  $CR_1$  conducts, placing  $C_3$  in parallel with  $C_2$ , and the a.g.c. switches over to the full 1-second hang mode. Occasional pops will be filtered out; but a static burst, which would have blotted out a large part of the message anyway, will still cause the a.g.c. to hang for the full second. The values shown worked equally well with a 200-c.p.s. c.w. bandwidth or a 3-ke. s.s.b. bandwidth, although if sideband-only operation is contemplated, a resistance smaller than 1 megohm could be used. If the short time-constant mode is used alone, the circuit will behave like a clipper to keep ear-splitting signals in line while returning the receiver to full gain, when possible, to make sure that no weak signals are missed. The clipping introduces no harmonics on c.w. and very little distortion on sideband, consequently it is more comfortable to listen to than conventional audio clipping.

#### I.F. Amplifier Considerations

The a.g.c. voltage comes on in a millisecond or less and will cause an irritating "thunk" when it comes into play unless the gain of the i.f. amplifiers can be changed at least as quickly. Unfortunately, the usual i.f. wiring is inadequate in this respect. The grids are decoupled from the a.g.c. line with large resistors and bypass capacitors; the result is a delay of as much as 1 millisecond between the time the a.g.c. is applied and the time it reaches the grids of the amplifiers. The response may be speeded up by replacing the grid resistors with small r.f. chokes and by removing any other resistors in the line. If instability results, shielded wire, bypassed at strategic points, can be used for the a.g.c. bus. The cathodes and screens of the gain-controlled tubes are not normally bypassed for audio, causing poor performance while the gain is being changed. If popping persists on attack even after grid resistors are removed, the grids and screens should be bypassed with 0.1-pf. or larger capacitors, or better still, the cathodes may be grounded and the screens run off a stiff d.c. supply. Operating bias may then be obtained through the a.g.c. line (see below). This modification should also improve the cross-modulation performance of the amplifiers, although in present-day receivers most of the damage has been done long before the first i.f. tube.

#### Additional Modifications

I am presently using the circuit shown in Fig. 2 to generate the a.g.c. voltage. A switch

<sup>2</sup> Luick, "Improved A.G.C. for Sideband and C.W.," *QST*, October, 1957.

<sup>3</sup> If the audio becomes distorted when this connection is made, there is clipping taking place in  $V_{1A}$  and the audio takeoff point should be moved closer to the detector. Two or three volts audio on a strong signal is more than adequate at the grid of this tube.

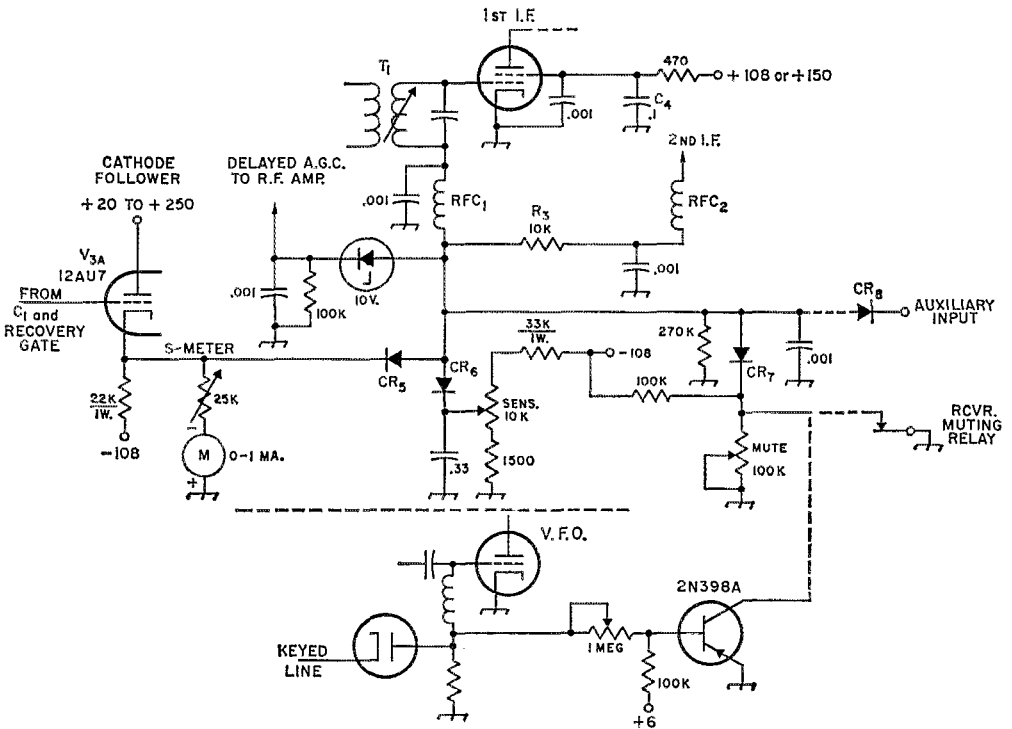


Fig. 3—A cathode follower may be used to drive the a.g.c. line. This permits the use of additional circuitry for muting or break-in silencing. For example, the receiver can be muted by a negative voltage applied at "auxiliary input," by a "receiver muting relay," or by a negative voltage from the transmitter keying circuit applied via the 2N398A transistor. Delayed a.g.c. to the receiver r.f. amplifier is obtained by using a Zener diode. The time constants in the a.g.c. circuits have been reduced by substituting r.f. chokes for resistors (RFC<sub>1</sub>, RFC<sub>2</sub>).

C<sub>4</sub>—Audio bypass. May be omitted if screen voltage is stabilized.

CR<sub>5</sub>—CR<sub>8</sub>—Bargain silicon diodes.  
R<sub>3</sub>—Grid filter resistor; omit if possible.

to turn the a.g.c. off and to select various time constants has been incorporated, along with "sensitivity" and "threshold" controls. The negative 108-volt supply<sup>4</sup> is an inconvenience, but if the cathodes are to be grounded some source of negative voltage will be required. As will be seen later, the supply is used elsewhere. The sensitivity control adds a fixed bias to the a.g.c. voltage and is best used if the threshold control is incorporated permanently into the receiver. Otherwise, the a.g.c. line may be clamped at some minimum negative value as shown in Fig. 2.

#### Lowering the Impedance of the A.G.C. Bus

A simple cathode follower will isolate the hang capacitor (C<sub>1</sub>) from the a.g.c. bus as shown in Fig. 3. The old S-meter amplifier tube may be used for V<sub>3A</sub> since the meter can now go directly to the a.g.c. line. The plate of this tube must go to a stiff 20- to 250-volt supply. Now that the line can have some resistance to ground, the a.g.c. bus may be used for all sorts of auxiliary

gain controls. Diodes CR<sub>5</sub>-8 select the most negative voltage appearing at their cathodes and apply it to the a.g.c. line. Good muting for e.w. break-in with grid-block or differential keying is obtained by keying a 2N398A in step with the v.f.o. The base current divider on this transistor should be adjusted so that the transistor conducts when the v.f.o. is cut off and opens just as the v.f.o. comes on (this does not necessarily occur when the v.f.o. grid voltage goes to zero). If the station receiver has an output stage with the cathode resistor bypassed by an electrolytic capacitor, its cathode is a good source for the 6 volts or so required to cut off the transistor.

It is often desirable to operate the r.f. amplifier at full gain for all but the strongest signals. The circuit shown in Fig. 3 to apply delayed a.g.c. to the r.f. amplifier is nothing new, but it cannot be used without the cathode follower isolation stage. The 10-volt Zener diode worked with my receiver; if more than two i.f. amplifiers are controlled, the value should be reduced to about 6.8 volts.

The S meter in the circuit as shown will indicate full scale with -24 volts on the a.g.c.

(Continued on page 164)

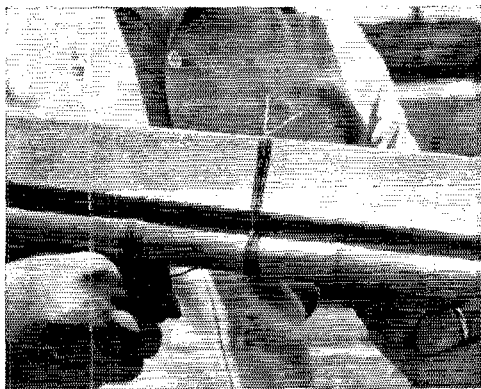
# The Penny-Pincher's Dream

*Phased Elements*

*Plus Director on 20*



BY CONRAD E. BLUHM,\* K3SWW/KG6



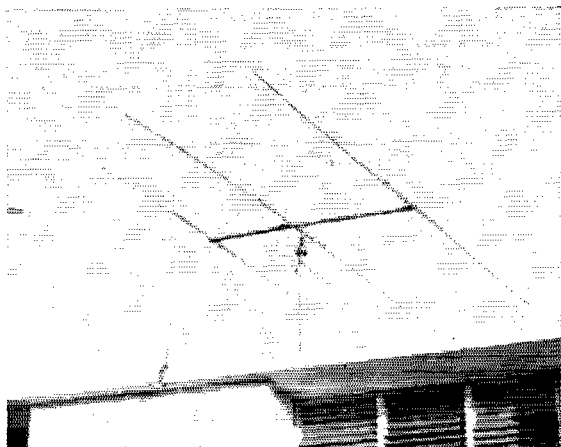
The bamboo element supports are lashed to the 2×2 crossarms with heavy waxed cord. The lashings are then cinched by loops of similar material running between the bamboo and cross-arm, pulled tight.

THE article, "The Scotsman's Delight," by WHICP<sup>1</sup> started me thinking. This antenna consists of a pair of folded dipoles spaced approximately 0.1 wavelength and fed 135 degrees out of phase. I decided to try one of these antennas for 20 meters, juggling the figures a bit to suit my own requirements. I used RG-58/U instead of RG-59/U and found the s.w.r. surprisingly low and flat across the entire band, varying from 1.4 to 1.6, slightly favoring the c.w. portion of the band. Using a maximum of 150 watts, I worked over 120 countries with this antenna. I then decided to try to improve this antenna by adding a third element.

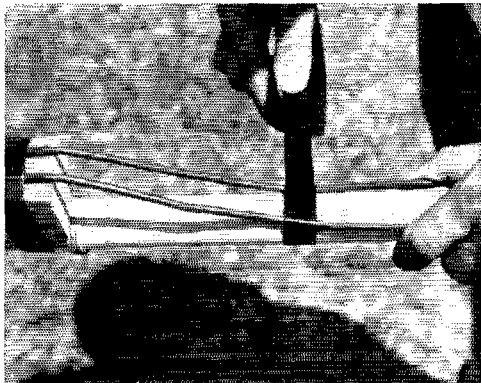
Since I could find no record of anyone having used such an arrangement, I asked questions on the air, wrote letters, studied *The A.R.R.L. Antenna Book* and also *The Radio Amateur's Handbook*. Although they did not give me the exact answers I was looking for, they did give me some very good clues. As a result, I finally decided

\* 126 L. E. Sunset Blvd., NAS, P.O., San Francisco, Calif. 96637.

<sup>1</sup> McCoy, "The Scotsman's Delight," *QST*, June, 1963.



The author's antenna is mounted about 13 feet above the roof, or about 35 feet above ground level. The boom is attached to the rotator by means of an inverted floor flange and a 1-foot length of pipe.



Weatherproof plastic tape is used to fasten the element conductors to the bamboo supports.

to use a parasitic director, rather than a third phased element.

Once again I juggled figures, drew up a plan, and started the project of the antenna to end all antennas. The XYL (K3TAH) acted as third hand and photographer. The sketch of Fig. 1, and the photographs show the general construction. The lumber consists of one 12-foot 2 × 4 and three 7-foot 2 × 2s. The hardware consists of a 1-inch floor flange, 1 foot of 1-inch pipe and some nails. Six pieces of bamboo, each about 16 feet long, were used for the element supports.

Instead of 300-ohm ribbon (which can be used), I used No. 12 neoprene-coated house wire, spaced about an inch, for the driven elements. The director is a single piece of similar wire. The driven elements are fed with RG-8/U, and the No. 12 wire is used for the phasing section. Electrical dimensions are shown in Fig. 1. I built the antenna on the ground, then hauled the antenna to the roof (two stories) by myself, fastened it to the mast, and then raised it to its

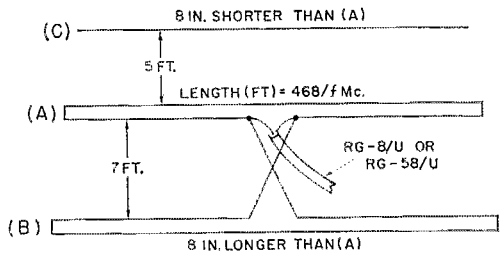


Fig. 1—Sketch showing the essential dimensions of the Penny Pincher beam antenna. Elements are made of No. 12 neoprene-insulated wire. The conductors of the folded elements are spaced approximately one inch.

present height. Two or three people would make this part of the operation much easier.

As soon as the construction was completed, I connected the feed line to my transmitter to see if the antenna would work. A check on the s.w.r. showed a variation between 1.7 and 1.4 across the band, favoring the phone portion. My first contact was with W7JHA in Oregon who gave me a 599 plus. I then tried working with a couple of local stations about two miles away. They each gave me a 59 plus 30 off the front of the beam, and said it was difficult to copy off the back. I tried another station about 15 miles away on c.w. and got 599 off the front and 339 off the back. This was all far better than I had hoped for. For DX work, the front-to-back ratio may not be as high, depending on the propagation angle. The directivity of the antenna on receiving is excellent. It is very hard to copy a signal station off either side unless it is a very strong one.

If you use 300-ohm ribbon for the driven elements, use good-quality line. I used a cheap brand when I built the original two-element job, and it cracked and split within six months. My TV antenna is fed with a good grade of line, and it is still in fine shape after two years of use. If you try this antenna, I think you'll be glad you did.

**QET**



The author lashes a bamboo support in place. The 2 × 2 crossarms have already been nailed to the 2 × 4 boom.

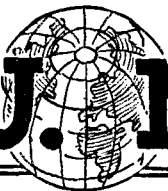
## Strays HP/W

How's this for devotion to schedules? For 38 years, with the exception of the war years, W2EC and W1HUM have been keeping regular schedules several days each week, starting in 1927. During 17 of these years, schedules were maintained daily handling traffic in net and trunk-line operation before and after World War II.

This float is one of 50 which rolled in parade at Bristol, Tennessee, this year. The theme of the parade was Salute to Safety. Automobiles identifying the Bristol ARC as the sponsor of this entry were in front and behind the trailer. A complete amateur station was set up on the trailer and mobile rigs were in both automobiles and in the cab of the tractor pulling the display. Shown on the float is WA4RUT (right), president of the club, and WA4NEC, secretary.



# I.A.R.U. News



## KOREAN AMATEUR LICENSING

In Korea, the licensing authority for amateur radio is the Bureau of Radio Regulations, Ministry of Communication; amateur licenses are issued in cooperation with the Korean Amateur Radio League, the national society. Three classes of operator licenses are available to Korean citizens, or radio clubs composed of Korean citizens, who meet the requirements.

All applicants for any HM amateur license must pass code tests and written examinations of varying difficulty. The First and Second Class written examinations test the applicant's knowledge of radio technique, regulations — and the *English language!* The First Class code test is at 10 w.p.m.; Second Class, 7 w.p.m. The Third Class examination tests the applicant on his knowledge of radio technique and regulations, but not on English language. There is no age limit for any amateur license.

First Class licensees may use all modes, on all allocated bands, with a maximum of 160 watts input and 100 watts output. Second Class licensees may use all modes, on all allocated bands *except 1 1/2 Mc.*, with a maximum of 50 watts output. Third Class licensees are allowed to use c.w. only, crystal-controlled, on the 3.5 and 7 Mc. bands, and all modes above 50 Mc.; maximum power is 10 watts output. Portable stations must not use more than 50 watts output.

The fee for an operator's license is approximately 70 cents; the license is renewable without re-examination every five years, provided the holder can prove operation during at least 2 1/2 years. Fees for station licenses, renewable every



Perhaps the most popular section of the IARC reception area: HB9ZO, a Swiss PTT official from Berne, issues on-the-spot temporary mobile licenses with HB9X-prefixes.

three years, also approximate 70 cents, but vary slightly according to output power authorized.

Korean amateur allocations, based on frequency assignments from the International Telecommunications Union, Region III, are as follows: 3.500-3.550, 7.000-7.100, 14.000-14.350, 21.000-21.450, 28.000-29.000, 50.0-54.0 and 144.0-146.0 Mc. There are no subdivisions for particular modes.

Call signs are issued systematically in the following areas: HM1 to Seoul City; HM2 to Kyonggido, Kangwondo and Hwanghaedo; HM3 to Choongchongnamdo and Choongchongpookdo; HM4 to Chonlanamdo, Chonlapookdo and Chejudo; HM5 to Kyongsangnamdo and Kyongsangpookdo; HM6 to Hamgyongnamdo and Hamyongpookdo; and HM7 to Pyongannamdo and Pyonganpookdo. HM8-HM0 call signs are issued regardless of call area, with HM8 calls assigned to Third Class operators, HM9 to portable or mobile stations and HM0 to club stations. Every amateur retains his suffix, even if he changes call areas or license class. For example, if one is licensed as a Third Class operator with the call sign HM5SK, when he acquires Second or First Class he would be assigned HM1SK, HM2SK, HM3SK et cetera, depending on his location. Should HM1SK subsequently move to another call area, such as HM5, for example, his call would become HM5SK.

There are presently 75 licensed radio amateurs among the 400 members of the Korean Amateur Radio League. Inquiries for information may be sent to Mr. Cho Dong-In, HM1AJ, General Secretary, Korean Amateur Radio League, Central Box 162, Seoul, Korea.



K2HLB, as host, welcomes ITU plenipotentiary delegates to a reception given in their honor during the International Amateur Radio Club's convention.

## HELSINKI AMATEUR LUNCHEONS

Every weekday for nearly fifteen years, radio amateurs have met for lunch at the Cafe de Colombia in Helsinki, Finland, between 1200 and 1300 hours local time. Amateur visitors from other countries are especially welcome; full information from the *Suomen Radio-amateurilitto r.y.*, P.O. Box 306, Helsinki, Finland. (From *Region 1 Bulletin*)



ARRL General Manager John Huntoon, spoke at a September meeting of the German-American Amateur Radio Club in Frankfurt. Here l. to r., W1LVQ; DL5AY, program chairman; DL4HU, club president; and DJ0BS, executive chairman, have pre-meeting coffee.

## QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country; e.g., cards for VPs go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most QST's, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

**Aden:** Amateur Radio Club, RAF Khormaksar, B.F.P.O. 69, London, England  
**Algeria:** G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger  
**Angola:** L. A. R. A., P.O. Box 484, Luanda  
**Antarctica:** KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.  
**Argentina:** R.C.A., Carlos Calvo 1424, Buenos Aires, BA  
**Australia:** WIA, 23 Laudale St., Box Hill, E. 11, Victoria  
**Austria:** Oe. V.S.V., Box 999, Vienna 1/9  
**Azores:** via Portugal  
**Bahama Islands:** D. R. Thompson, VP7NS, Box 48, Nassau  
**Bahrain:** (All MIP) Ian Cable, MIPBBW, P.O. Box 425, Awali  
**Barbados:** Highgate Signal Station, Highgate, St. Michael  
**Belgium:** U.B.A., Postbox 634, Brussels 1  
**Bermuda:** R.S.B., P.O. Box 275, Hamilton  
**Bolivia:** R.C.B., Casilla 2111, La Paz  
**Brazil:** L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro  
**British Guiana:** D. E. Yong, VP3YG, Box 325, Georgetown  
**British Honduras:** VP1RL, P.O. Box 463, Belize  
**Bulgaria:** Box 830, Sofia  
**Burma:** B.A.R.T.S., P.O. Box 800, Rangoon  
**Burundi:** via Congo (9Q5) QSL Bureau  
**Cape Verde Island:** Radio Club de Cabo Verde, CR4AA, Praia, Sao Tiago  
**Caroline Islands:** Father Jack Walsh, Xavier High School, Truk

**Cayman Island:** via Jamaica  
**Ceylon:** 487WP, P.O. Box 907, Colombo  
**Chagos:** via Mauritius  
**Chile:** Radio Club de Chile, P.O. Box 13630, Santiago  
**Colombia:** L.C.R.A., P.O. Box 584, Bogota  
**Congo:** (TN8) QSL Bureau, P.O. Box 2239, Brazzaville  
**Congo:** (9Q5) U.C.A.R. QSL Bureau, B.P. 1459, Leopoldville 1  
**Cook Island:** ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga  
**Costa Rica:** Radio Club of Costa Rica, Box 2412, San Jose  
**Cuba:** ANRAC QSL Bureau, P.O. Box 6996, Havana  
**Cyprus:** C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta  
**Czechoslovakia:** C.A.V., Box 69, Prague 1  
**Denmark:** E.D.R. QSL Bureau, OZ6HS, Ingstrup  
**Dominican Republic:** R.C.D., P.O. Box 1157, Santo Domingo  
**Ecuador:** Guayaquil Radio Club, P.O. Box 5757, Guayaquil  
**El Salvador:** Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador  
**Ethiopia:** Kagnew Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09083  
**Faeroes Islands:** via Denmark  
**Fiji Islands:** P.O. Box 184, Suva  
**Finland:** S.R.A.L., Box 10306, Helsinki 10  
**Formosa:** (BV1US calls only) Taiwan American Radio Club, USARSCAT, Box 8, APO, San Francisco, Calif. 96263  
 All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China  
**France:** R.E.F., Boite Postale 26, Versailles (S & O)  
**France:** (F7 only) F7 QSL Bureau, % Base MARS station, APO, New York, N. Y. 09083  
**Germany:** (DL2 only): C. J. Thomas, DL2CT, Box 125-A, RAF Butzellerhof, B.F.P.O. 19, via London, England  
**Germany:** (DL4 & DL5 only) MARS Radio Station, Hqtrs. 12th Signal Group, APO, New York, N. Y. 09046  
**Germany:** (Other than above) D.A.R.C., Box 89, 8 Munich 27  
**Ghana:** 9G1CW, Ians Suss, P.O. Box 3773, Accra  
**Gibraltar:** RAF Amateur Radio Club, New Camp, RAF Gilbert and Ellice I.; Charles W. Adams, VRIA % P. and T. Dept., Betio, Tarawa  
**Great Britain (and British Empire):** R.S.G.B. QSL Bureau, G2ML, Bromley, Kent  
**Greece:** George Zarafis, P.O. Box 564, Athens  
**Greece (SV6s only):** Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223  
**Greenland:** via Denmark  
**Greenland (KG1, OXA and OX5 calls only):** KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023. KG1F-KG1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121  
**Guam:** M.A.R.C., Box 145, Agaña, USPO 96910  
**Guantanamo Bay:** Guantanamo Amateur Radio Club, Box 74, FPO, New York, N. Y. 19593  
**Guatemala:** C.R.A.G., P.O. Box 115, Guatemala City  
**Haiti:** Radio Club d'Haiti, Box 943, Port-au-Prince  
**Honduras:** Jacobo Zelava Jr., IFR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.  
**Hong Kong:** Hong Kong Amateur Radio Transmitting Society, P.O. Box 541  
**Hungary:** ILS.R.L., P.O. Box 214, Budapest 5  
**Ireland:** Islenzkir Radio Amatorar, Box 1058, Reykjavik  
**India:** A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1  
**Iran:** Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205  
**Ireland:** I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2  
**Israel:** I.A.R.C., P.O. Box 4099, Tel-Aviv  
**Italy:** A.R.L., Viale Vittorio Veneto 12, Milano 101  
**Jamaica:** Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5  
**Japan:** (JA only): J.A.R.L., Box 377, Tokyo  
**Japan:** (KA only): F.E.A.R.L. -Al-, APO, San Francisco, Calif. 96525  
**Johnston Island:** KJ6BZ, % MARS Str., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305  
**Kenya:** RSEA QSL Bureau, Box 30077, Nairobi  
**Korea:** Korea Amateur Radio League, Central Box 162, Seoul  
**Korea:** (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301  
**Kuwait:** Alhaf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf



*Laos:* Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane

*Lebanon:* R.A.L. QSL Bureau, P.O. Box 1217, Beirut

*Liberia:* EL1 and EL2 to G. Marcus Kelley, c/o Liberian Government Radio Station, Monrovia. Others to Robert Flemister, P.O. Box 485, Monrovia

*Libya:* 5A QSL Service, Box 372, Tripoli

*Liechtenstein:* via Switzerland

*Luxembourg:* R. Schott, 35 rue Batty Weher, Esch sur, Alzette

*Macao:* via Hong Kong

*Madeira Island:* via Portugal

*Malagasy Republic (Madagascar):* P.O. Box 587, Tananarive

*Malawi:* 7Q7RM, P.O. Box 472, Blantyre

*Malaya:* QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur

*Malta:* R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara

*Mariana Islands:* see Guam

*Marshall Islands:* KX6 QSL Bureau, via KX6BU, Box 444, FPO, San Francisco, Calif. 96555

*Mauritius:* Paul Caboche, VQ8AD, Box 467, Port Louis

*Mexico:* L.M.R.E., P.O. Box 907, Mexico, D.F.

*Midway Island:* KM6BI, Box 14, FPO, San Francisco, Calif. 96643

*Monaco:* Pierre Anderhalt, 3A2CN, 49 rue Grimaldi

*Monrovia:* JT1KAA, Box 639, Ulan Bator

*Morocco:* A.A.E.M., P.O. Box 2060, Casablanca

*Mozambique:* CR7LU, P.O. Box 161, Beira

*Netherlands:* V.E.R.O.N., Postbox 400, Rotterdam

*Netherlands Antilles:* VERONA, P.O. Box 583, Willemstad, Curacao

*New Zealand:* N.Z.A.R.T., P.O. Box 489, Wellington

*Nicaragua:* C.R.E.N. QSL Bureau, Box 925, Managua

*Nigeria:* QSL Bureau, P.O. Box 1044, Samaru, Zaria, Federation of Nigeria

*Northern Ireland:* via Great Britain

*Northern Rhodesia:* See Zambia

*Norway:* N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1

*Nyasaland:* See Malawi

*Okinaua:* O.A.R.C., APO, San Francisco, Calif. 96331

*East Pakistan:* Mohd, AP5CP, Tiger Amateur Radio Club, Dacca Signals, Dacca 6

*West Pakistan:* Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore

*Panama, Republic of:* L.P.R.A., P.O. Box 1622, Panama City

*Papua:* VK9 QSL Officer, P.O. Box 201, Port Moresby (or via Australia)

*Paraguay:* R.C.P., Casilla de Correo 512, Asuncion

*Peru:* R.C.P., Box 538, Lima

*Philippine Islands:* P.A.R.A. QSL Bureau, P.O. Box 4083, Manila

*Poland:* PZK QSL Bureau, P.O. Box 320, Warsaw 1

*Portugal:* R.E.P., Rua de D. Pedro V., 7-4º, Lisbon

*Roumania:* Central Radio Club, P.O. Box 95, Bucharest

*Rwanda:* via Congo (9Q5) QSL Bureau

*Samoa (American):* Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago

*Saudi Arabia:* HZIAB 724th ABRON-COMM., APO, New York, N. Y. 09616

*Scotland:* via Great Britain

*Senegal:* Ch. Tenot, 6W8BF, P.O. Box 971, Dakar, or via REF (France)

*Sierra Leone:* Radio Society of Sierra Leone, P.O. Box 907, Freetown

*Singapore:* QSL Manager, P.O. Box 777

*Somali Republic:* Box 397, Mogadiscio

*South Africa:* S.A.R.L., P.O. Box 3037, Cape Town

*Southern Rhodesia:* R.S.S.R., Box 2377, Salisbury

*Spain:* U.R.E., P.O. Box 220, Madrid

*St. Vincent:* QSL Bureau, P.O. Box 142, St. Vincent, West Indies

*Surinam:* QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo

*Sweden:* Sveriges Sandare Amatörer, FACK, Enskede 7

*Switzerland:* U.S.K.A., 6233 Buron/LU

*Syria:* P.O. Box 35, Damascus

*Tanganyika:* RSEA, P.O. Box 2387, Dar es Salaam

*Trinidad and Tobago:* P.O. Box 756, Port of Spain, Trinidad

*Turks and Caicos Islands:* via Jamaica

*Uganda:* R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala

*Uruguay:* R.C.U., P.O. Box 37, Montevideo

*U.S.S.R.:* Central Radio Club, Box 88, Moscow

*Vatican:* HVICN, Domenico Petiti, Radio Station, Vatican City

*Venezuela:* R.C.V., P.O. Box 2285, Caracas

*Virgin Islands:* Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V. I. 00820

*Wake Island:* KW6DS, U.S. Army Radio Station, P.O. Box 217, APO, San Francisco, Cal. 96501

*Wales:* via Great Britain

*Yugoslavia:* S.R.J., P.O. Box 48, Belgrade

*Zambia:* Radio Society of Zambia, P.O. Box 332, Kitwe

*Zanzibar:* via Tanganyika

### A.R.R.L. QSL BUREAU

The function of the A.R.R.L. QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4½ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. Changes are shown in heavy type.

- W1, KI, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
- W2, K2, WA2, WB2 — North Jersey DX Ass'n., P.O. Box 303, Bradley Beach, N. J. 07720.
- W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
- W4, K4, WA4 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.
- W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
- W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.
- W7, K7, WA7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.
- W8, K8, WA8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.
- W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
- W0, K0, WA0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn. 55921.
- VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
- VE2 — John Ravenscroft, VE2NV, 135 Thorcrest Ave., Dorval, Quebec.
- VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
- VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5 — Fred Ward, VE5OP, 899 Counaught Ave., Moose Jaw, Sask.



DL9GU, a member of the German moonbounce crew, demonstrates equipment used in successful transatlantic tests to IARC convention guests.

(Continued on page 164)



# Correspondence From Members-

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

## MODERN MEDICINE VS. FATAL CURRENT

❏ I enjoyed "The Fatal Current" in September *QST* by WA0JBU. The information contained is always timely. However, there is one statement in the article that is false and should be corrected. In the third paragraph he states that currents between 100 and 200 ma. are fatal and that there is no known medical procedure that will revive the victim.

Before making my comments on these statements, I would like to state my qualifications to do so. I am a physician certified by the American Board of Anesthesiology and as such am considered to be an expert on resuscitation. We have had instruments for the defibrillation of the heart for some years now. The most recent ones utilize the discharge of a large capacitor through an inductance, applying this shaped DC pulse to the heart across the intact chest. As much as 7000 volts may be applied in this manner, the total power being about 400 watt seconds. The effect of this jolt is to cause the heart muscle fibers to all contract at the same time and then relax at the same time. When this happens, the heart can resume regular synchronous beats.

Much of the research that has gone into the development of these techniques has come from the need to defibrillate the heart during cardiac surgery. Another interesting fact is that the most frequent direct cause of death in a heart attack is an electrical derangement of impulse formation that leads to ventricular fibrillation and death.

The hooker in this whole discussion which lends some support to Mr. Brainard's statement is that the brain can only survive for about four minutes without damage if the circulation is lost due to ventricular fibrillation or any other cause. In past years it was necessary to open the chest cavity and massage the heart in order to maintain circulation until the heart could be defibrillated. In the past four or five years, a method of massaging the heart through the intact chest has been developed. This, together with mouth to mouth artificial respiration, may enable the circulation to the brain to be maintained until the victim can be brought to a hospital where defibrillation can be carried out.

While the outlook for victims of electric shock is still very grim, due to the time factor and the lack of training of the general public, I don't believe that it is fair to say that there is no medical procedure that can revive them. — *Noul V. Ice, M.D., K5GNE, Fort Worth, Texas.*

❏ Regarding the hopeless prognosis for ventricular fibrillation, for almost a quarter of a century a means has been available for treating this killer. That the means is effective in some cases is attested to by the ever growing list of successful outcomes reported.

Interestingly enough the means consists of applying a "countercurrent" (A.C. or D.C.) sufficient to bring the heart to standstill. Often a normal rhythm will ensue restoring the heart as an effective pump which it is not while ventricular fibrillation is in progress (this is how it kills).

Such a "defibrillator" of mine (home brew) was used to defibrillate a human heart in 1938. Commercial units are now available.

Life may be sustained for long periods of time even though the heart is fibrillating by proper rhythmic compression of the chest (external cardiac massage) and ventilation of the lungs while transporting the victim to a facility having a defibrillating unit (almost all hospitals). "What To Do For Victims" might profitably have included instructions along these lines. — *John J. Thornton, M.D., K8CQJ, Cleveland, Ohio.*

## MIND YOUR MANNERS . . .

❏ Why, oh why, can't some phone amateurs learn some courtesy? Whenever the c.w. men in the State of Slobovia want to have a c.w. traffic net on 3650 kc. and the net members find two rag chewers from East Spasmania on that particular frequency, all they have to do is politely request the rag chewers to QSY up or down a few kilocycles, and they will either do that or, as I have seen a couple of times, they will join into the net, many times providing valuable relays.

This evening I tried to check into a bona fide ARRL (Virginia) phone net. I tuned my receiver to the frequency and found a complete state of chaos and deliberate QRMing on the part of a W2 and a W3 who should know better. These two gentlemen (which they are not) were exactly on the net frequency *making fun* of the net control station, who had such a rough time holding the net together because of these two jokers that he finally had to close the net down. If there ever was a time for the terrible Wouff Hong to strike, it was then.

After the net was given up, I listened to our two "friends" for a while. They were talking of their high-powered rigs and saying how silly they thought nets were. I just hope for their sake that they never have any emergency traffic . . . — *Bob May, WA4DBG/4, Blacksburg, Virginia*

## . . . AND FCC REGULATIONS

❏ I recently received a notification from an official observer reminding me of an FCC regulation which I was violating. It is one constantly broken by myself and all hams working DX stations. This reminder led me to reread FCC regulations. I suggest you remind all DX hounds that Section 97.87, FCC Regulations, (old Section 12.82) calls for all stations to give both calls *initially until contact has been established*. Knowing your exactness for FCC regulation interpretation, I am sure you will do this — besides I'll be able to find out who the DX station is when there is a pile-up! — *Dr. Joseph Taddonio, K1OZR, East Boston, Massachusetts.*

❏ . . . Since my return from a three-year tour of duty in Germany about a year ago, I have heard what appears to be a staggering number of violations of the regulations. Or else, since I am operating both portable and mobile all the time, I am going to a lot of unnecessary trouble in trying to properly

comply with the rules.

Section 97.87 of the rules plainly states that an amateur, in using radiotelegraphy, may suffix his call sign with a slant bar and a figure representing the area in which he is operating portable or mobile. On the other hand, when using radiotelephony, after "This is" or "From," he must use a geographical location to properly identify, and illustrations are given within the regulation. — *Thomas J. "Tom" Hall, Jr., W4TAU/5, El Paso, Texas*

### SELF IMPROVEMENT

☐ . . . Rather than fight the problem of self-improvement, why not work with it? Enough correspondence courses are now being offered by many institutes that we can get what will be required of us in time to keep the privileges we now enjoy and perhaps gain some others.

I've operated from DX calls ET3USA and KA9MF and have met foreign hams that would put many of us to shame, both theory and code wise.

I don't want to be second rate and I'm glad the League and the FCC agree. — *Bruce W. Haupt, K3MYI/KA9MF*

☐ I would also like to support the ARRL's view on the incentive licensing proposal. Before I heard

about incentive licensing I was content in staying a Technician until doomsday. However, when I realized that because of my laziness I could lose my favorite part of 6 and 2 meters, I decided that I would get at least a General Class license, if the proposal is passed or not — and I did a few months later. For me, even the proposal was an incentive, not a curse. I believe that every sensible amateur, after his madness has boiled off, can't help but see some good in it. (Let's face it, if one is seriously trying, the next higher ticket isn't that hard to obtain.) — *Paul Tazner, WA1DP, Lexington, Massachusetts*

### HOW'S DX?

☐ All you DXers, would-be DXers, SWLs and just plain *QST* readers, up on your feet and face toward Chicago! Three big hoo-rays and a low bow to "Jeeves" and his constant helper Rod Newkirk who wade through piles of figures, GMTs, scribbled notes and neatly typed reports, just to bring you and I the monthly feature called "How's DX?" Those of us who work DX, or attempt to, would like to express our thanks to W9BRD & Co. for many years of interesting reading. — *Bob Baird, W9NN-W9JJ, Des Plaines, Illinois.*

## Lest We Forget

BY DWIGHT CROSS,\* KØCZU



Cover, *QST*, Dec. 1916

ONCE, long ago on a winter evening, a boy gulped his supper and hurried up the stairs of an old frame house. A single yellow bulb illuminated the attic, which was chilled by the cold air seeping through the cracks.

The boy had saved for weeks to buy the rotary spark gap which had arrived with the morning mail. During the afternoon, the wild assortment of wire and components, together with the new rotary spark gap, had been assembled into a transmitter. Then he increased the length of the

antenna which had served the crystal receiver for months.

Now was the moment. The boy connected the power and the rotary spark gap sputtered and cracked like miniature flashes of lightning in the icy gloom of the attic. Slowly, he keyed the signal, trembling not with cold, but with an intense excitement. The boy's hand was still shaking as he adjusted the catwhisker. Had he been heard?

Except for the scratch of the catwhisker, audible in the headphones as he searched for a sensitive spot on the crystal, there was nothing. Again, the small monster broke the chilled silence as it spit out tiny tongues of lightning. The boy keyed the signal several times, pausing at intervals to adjust the taps of the crystal receiver.

And there it was. An answer. His signal had flown into the wintry night and miles away, another pair of human ears had heard him. Now the boy listened to the flute-like notes which were pouring into the headphones. Already, his hands were numb with cold. Yet, the joy of creation was a wonderful warmth flowing through his body. Here, was *his* rig. Built with his own hands, its magic power had penetrated the unknown. The boy's curiosity and eager mind had led him to the miracle of wireless communication.

And that boy was the early radio amateur. Today, he is the old-timer. It's a long way from his primitive equipment to the commercial transmitter. And some might say that his achievement in the days of long ago was only a hobby — therefore, we owe him nothing. Others may forget that he pioneered the short waves. Within the comfort of an elaborate shack, surrounded with shining factory equipment, some may scoff at his love for tinkering and loyalty to c.w.

To the Amateur of yesterday — and the old-timer of today I say: "Tnx OM." ☐

\* 1212 Lynch St., St. Louis, Mo. 63118.

# SEPTEMBER V.H.F. PARTY RESULTS



Though not a study in modern art, this array of the K7AUC/7 antennas is enough to delight the eyes. Included are drooping dipoles for 75 and 40; 144 Mc. f.m.; 50 Mc. 6-L; 220 Mc. 4 10-L yagis; 432 Mc. 16-L with screen reflector, etc.

COMPILED BY ELLEN WHITE,\* W1YYM

**T**HE lead paragraph to this report of the September 11-12, 1965 ARRL VHF QSO Party, is, in a sense, the final part of the story written. After compiling the scores and highlights, we were surprised to total 350 logs received, down over the same period in 1964. Despite the figures, countless logs recorded phenomenal 144-Mc. conditions in the east, as recounted in the division highlights to follow. The major single-operator home efforts and impressive group mountaintopping led to massive scores, invariably resulting from multi-band operation. All awards are scheduled for December 15th mailing.

## DIVISION HIGHLIGHTS

**Atlantic Division:** Delaware section leader W3CGV worked five bands for 87 contacts, including 9 in four sections on 420 Mc. Eastern Pennsylvania high K31PM recorded the only four-band effort in the section. Stan's antennas include 5 over 5 (6 meters) 11 over 11 (for 2 meters), 8 over 8 on 220 Mc. and 32 elements for 432 Mc. The 220 and 420 Mc. effort paid off with 6 additional multipliers. WA3AAN thinks that the Miss America contest drew more entries than the VHF test! (His single-band six-meter effort netted 141 QSO's in 12 sections.) W3PMG reports a big thrill from an Iowa QSO on 144 Mc. Saturday night. Division high (and runner up) multioperator scores were posted by the Germantown Radio Club groups. Both K3YFD and K3MTK/3 operated two bands with YFD taking the lead with 461 exchanges and a multiplier of 35 for over 16-K. K3VAX/3, operated by K3s HQC VAX and WA3AQF reported a big thrill in the 2-meter band opening to VE3 Saturday afternoon. WA3CBC's two-band effort earned the Maryland-D. C. award. The Aero Amateur Radio Club W3PGA/3 operated portable with generator

power from the field day site at Jacksonville, Maryland. Top single-operator total for the division was posted by Southern New Jersey's W2EIF. Joe ran 200 watts on 6 and 2, 120 watts on 220 and 100 watts on 432 Mc., all homebrew 4X150 finals. W.N.Y.'s WA2THS/2 found conditions fine this September, leading the section with 5319 points. K2ACQ concentrated on 420 Mc. and reported working over 450 miles, making state number 7 (N. J.) with 10 watts input. Dave heard, but couldn't work VE2LI W1QWJ WA9ITUV W3RUE W2MDE and W1OOP. WA2CJK/2 manned by five operators on Mt. Pleasant in W. N. Y. worked three bands for 295 exchanges. K2ZWT, the University of Rochester club, reports their first contest effort with the usual last-minute technical difficulties. Club president WA2WXZ reports fun for all and . . . learning quite a bit. The club plans activity in the January VHF SS and u.h.f. gear on by next summer. K2DUR who edged out WA2SOO last January, joined up with her this year (after gear troubles of his own) with a joint 6 and 2 effort. Shirley reports wild conditions on 2. On the other hand K3ZGI in W. Pa. found 2-meter activity poor (until he discovered that there wasn't any antenna on the rig!). The fellows at K31WK/3 found good ground-wave conditions.

**Central Division:** WA9KYE, Illinois leader, reports the bands good, the operators courteous and the entire contest simply great. KL7EBB/9 must have created a stir on 6 and 2 with *that* call. WA9JKT reports good six meter conditions along with a lack of activity. Joe reports two meter conditions good with an opening to New England. The Near North Radio Club, K9JAM, Illinois multi-operator high found 2 most profitable in contacts and sections. They still await 144 Mc. signals from South Dakota or Nebraska and have yet to work a station from the Virginias; all in all a fine contest teaching the value of working as many bands as possible. K9NIMH led Indiana with a six-meter only effort resulting in 163 exchanges in 8 sections. The antenna was an 8-element beam up 75 feet. The excellent three band effort by the Michigan City Amateur Radio Club, W9TWU/9 resulted in the division multioperator high, 9144 points.

\* Assistant Communications Mgr., ARRL.

**Dakota Division:** Although reported activity was sparse, a good turnout was reported by the Minneapolis VIII'ers, led by WA0DWM's two-band effort. WA0CQG reports that ten minutes after the end of the contest Murphy took care of the transmitter! K8OST explains that sidebar doesn't pay off with the prevalence of b.f.o.-less transceivers in the area.

**Delta Division:** Tennessee and division leader high K4FKO worked two bands for 100 exchanges. Ken says that after operating from mountain tops for the last five years he decided to try this one from home. No openings says he, but groundwave contacts far exceeded his expectations. A dull time (almost) without snakes, chiggers and candle flies. Ken says that without openings on six it sure pays to operate as many bands as possible to get additional section multipliers. The Kingsport Amateur Radio Club W4TRC/4 literally had a fine location, 4800 feet high at the "Beauty Spot" in the Vanuka Mountains of Tennessee. They conquered bad roads (roads?), near cloudbursts, gale force winds, fog, equipment troubles and although operating from one of the best locations in the East they heard fewer states than usually heard at the home locations at less than half that elevation.



**Great Lakes Division:** Atop the highest point in Kentucky was K4QPJ/4 (four operators), on Black Mountain at a 4150 foot elevation. The weather was ridiculous (storm Betsy with 50-60 m.p.h. winds, wet, soggy) and all contacts were via groundwave, little tropo, no scatter or skip. Single-operator Ohio (and Great Lakes) leader W8WEN reports that the rig broke down three times on 2 meters. K8BHH's 144 Mc. effort netted 110 exchanges in 13 sections. Dan reports that from what the old timers in Ohio were saying that it was the best two-meter band opening in over ten years. WA2USG operating W8EDU (The Case Amateur Radio Club) says he experienced his best two meter tropo. opening in his experience with this band. He reports that the opening appeared to extend from New England clear into Iowa and Minnesota. His best contact was with K0MIQS in Cedar Rapids and later he heard him call K2YRZ/2 in E. N. Y., nearly 900 miles distant. Additionally, Steve reports copying a Chicago station, YRZ on the back of the beam, working Iowa with a 549 (550 miles), Indiana with a 5-6, Wisconsin and Illinois. The biggest six-meter total was reported by division high multiplier W8BCA/8 with 476-21 on six and 172-22 on two! Two hundred watts were used on two and a kilowatt on six, final score topped 27-K! Respectable single-band totals were posted in Ohio by K8BHH on 2 and WA8OXC on 6.

**Hudson Division:** WA2ZPD led Eastern New York on a two-meter only effort. He plans a better setup next year and says this contest favors multi-band operation which helps activity. W2YPM ran 100 watts on 432 Mc. and came up with 9 exchanges in 5 sections. The fellows atop Slide Mountain in E. N. Y., K2YRZ/2 worked three bands for 716 contacts and a multiplier of 52! The WB2DST description of the effort is shown elsewhere in this report. N. Y. C.-L. I.

leader with a 6-meter only 4000-point plus showing is WA2LRO commenting on an excellent turnout and good ground-wave conditions. Second in line WB2GQZ agrees with Dick on conditions and adds two new states to his total, Vermont and Maine. WB2MEO reports great DX both mornings and unbelievable 144 Mc. QSO's heard. W2KXC agrees it was great with 8 sections on two with 15 watts in less than two hours! W2MDE's 432-Mc.-only operation featured an exchange with Ann Arbor, Michigan, about 550 miles away! WA4AIG/2's interesting portable operation on three bands took place aboard a yacht anchored in the Hudson River off New York City. WA2FAM with 2500 points in N. N. J. comments: no reports on a.m. less than 5-8, lots of c.w. activity, little or no sidebar activity and what a pile-up to work W8YIO W8AEC W8WEN W8BCA/8 and K8WXB when the band opened! WB2JVE worked two new states on six (Delaware and Vermont) that were never even heard before. The 6220 Club operating W2PEZ/2 from Bearfort Mt., West Milford, New Jersey made a fine 4-band showing as the chart indicates. The fellows found a wonderful opening on two working Ohio, Michigan, Ontario, Indiana, Illinois and Wisconsin on a.m. between 4 and 6:30 p.m. Saturday afternoon. The final score lettered 50-K. The Thunderbolt V.H.P. Society manned K2VAC/2 for a 50-144-220-1296 Mc. showing arriving at an impressive 34-K score. Perhaps the neatest entry received was the WA2FSQ multiplier tally of 29,302 points.

Slide Mountain, at 4204 ft. the highest peak in the Catskill Mts. in eastern New York was the scene this year of the first major v.h.f. contest effort in at least three years from this location. K2YRZ/2 worked three bands for a terrific 37,544 total. You'll agree that these extracts of a recent letter to W1HDQ by WB2DST make a good story about what's involved in mountain-topping.

"I must admit you were sure right to recognize that getting the stuff up (logistics as you call it) was the main problem. The five of us labored for two days and a night to get everything up. Just walking up takes about two hours. Going up with a heavy load (60-80 lbs.) takes from 3½ to 4½ hours. Real heavy loads (like the generator) take five to six hours! Everything had to be carried as the road is badly washed out. I think we all found some hidden physical reserves. Our main a.c. source was a 1500-watt generator. We also had a small 300-watt generator that proved invaluable for temporary repairs, lights etc. The list of "extras" like gas (20 gallons), water (10 gallons), coax, relays, mikes, bead-phones, connecting cables, extension cord, tools, logs sheets, pens, lights, food, extra clothes, sleeping bags, rope, spares of everything that might fail, etc. eventually added up to a great deal of things to remember and carry up the hill. We made mistakes of course but somehow remembered everything on our checklists!

"It would have been worthwhile to carry up a better tent, also more stereo next time, hi! We were really smug though about remembering a spare spark plug and plug wrench (just in case). We needed that new plug Sunday afternoon and only lost about three minutes replacing the old one.

"Our score was o.k. considering the equipment and operators. None of us have had much v.h.f. experience except Dick, K2YRZ. I don't think, however, that it will take too many more contests for us to improve a great deal. If we do it again 220 and 432 Mc. equipment is a must.

"The opening Saturday afternoon on 144 Mc. to the west was the best I've ever heard."

— WB2DST, ex-K3PGJ

**Midwest Division:** The fine conditions on the eastern seaboard could have been used in the Midwest Division where reported activity was slight. The Jaylawk Amateur Radio Society, always a contest-interested group, manned two bands at W0BFE/0 for 145 exchanges and a multiplier of 8. Dozens of stations were reported worked within the division, in Kansas, Missouri, Iowa and Nebraska, but without submitted reports it appears to have been a quiet weekend in the division.

**New England Division:** Connecticut and division high single operator K1WHT of Connecticut doesn't fool around with antennas. His Monroe location sports 9 elements on a 31-foot boom at 72 feet for 50 Mc. and 8 over 8 at 90 feet for two meters. The fine two-band total was 13,716-381-36, K1PKQ/1 specialized on two meters in Connecticut coming up with 174 exchanges in 21 sections. WA1ANB reports wild conditions on 2 hearing W8's and VE3's coming in during the afternoon. W1LUA/1 led multiplieroperator stations in Connecticut with a three-band effort to the tune of 476-45 for 21,870. The West Hartford Radio Club manned WA1BXA/1 in Farmington, Connecticut, coming up with 161 QSO's apiece on six and two, a total multiplier of 29. W1OOP's three band effort to top E. Mass. did not include six meters. The 144-220-432 Mc. total of 2236 includes 63 exchanges with a multiplier of 26 (more sections on 432 than on 220 Mc.). High multiplieroperator score for the section was posted by the 1200 Radio Club operating W1LPJ/1 at Hoopkinton, Mass., working four bands for close to 10-K. Three of the crew at W9DHK/1 must have created a stir on four bands signing that call! K1TOL in Maine reports hearing scatter from Illinois, Missouri, Ohio, Wisconsin and Michigan on Sunday morning also some aurora Sunday night (working Ontario and Quebec). Good conditions, says Paul, but the only skip was to N. C. for about 20 seconds. Maine multiplieroperator K1UGQ/1 manned by a crew of five (including Hq. Staffer WA2BAH) put the state on in a big way on four bands for almost 500 QSO's; 257 in 14 on 50 Mc., 205 in 17 on 144 Mc., 30 in 11 on 220 Mc. and 5 in 1 on 432 Mc. Versatile W1ALE of N. H. operated four bands picking up multipliers galore that meant the section award, final total over 4400 points. W1HDQ/1 made the journey to Pack Monadnock and Monadnock summit for the particular kind of fun dear to a VHF'er's heart. Ed did the Monadnock Summit portion with a 50-milliwatt output transistor portable, easier going with a three-mile hike each way! VE3FCH operated portable W-1 on two meters in N. H. and heard (and worked) for the first time, Vermont, W. Mass., R. I. and Connecticut. The Manchester Radio Club manned W1HPM on three bands for 6750 points. K1TPK topped Rhode Island with an excellent two-band showing tallying 8060 points, gear included 150 watts on 6 meters and 100 watts on 2. W1AIM led Vermont with a two-band effort and found this one the best ever. "Chip" reports a new location on the south side of a small hill with a 1800 ft. elevation, nearest neighbors a half mile away and little traffic. High division multiplieroperator K1RYT/1 reports absolutely the best conditions experienced in many years of contest operating. Dave says they were deluged with QSL requests and many, many stations waited up to three or four hours to get Vermont on 6 or 2. A fine job for 25,069 points and reflects the efforts of the following crew at Mt. Equinox, Vermont; W1ADZ, K1s PXX RYT UVP, WNIEQP. The Merrimack Valley Amateur Radio Club operated W1UW/1 for 363 happy recipients of a Vermont

exchange. W2BVU operated K1JXN on 144-220-432 Mc. for the W. Mass. certificate award, 100 watts on each band, all home-brew. WA1COR worked his longest DX, to N. N. J. and E. Pa.

**Northwestern Division:** Activity in Montana featured a general turnout of state hams although just two reported results. W7TYN journeyed to an 8200 ft. mountain in the southwestern part of the state. W7TYR led Oregon with an excellent four-band effort. Deane reports that although the contacts made on 432 and 220 were not "distance" efforts they represent a considerable effort. On both frequencies Deane worked Oregon and Washington with distances of 140 miles maximum. He reports that it is approximately 113 miles to the portable location in Wash. used by K7CCW/7 and approximately 110 miles to the portable location in Oregon used by K7AUO/7. Both of these portable sites are on the eastern slopes of the Cascades and Deane's location is in the Tualatin Valley west of Portland and west of the Cascades. W7LNG/7 journeyed to Mt. Ashland, 7500 ft. high and only about five miles north of California. No sixes were heard on 144 Mc. even with friends and NC-303 and converter. Bob says that a passing airplane must have heard his CQ as he dipped his wings! The K7AUO/7 group of the Tektronix Employees' Radio Amateur Club (top division multi-op.) made the first two-way 432 Mc. contact with W6GDO near Sacramento. No record breaker at 350 miles but the path is rather mountainous. K7BBO led Washington with 102 QSO's and 10 multipliers on 6 and 2. The other section of the Tektronix Effort, K7CCW/7, journeyed to a 5000 ft. mountain north of Goldendale, Washington. Not much activity reported, perhaps due to cold weather locally, limiting mountain-topping.

**Pacific Division:** K4CHE/6 with a fine East Bay showing reports one slight problem concerning his log. At one time during the contest a missing sheet of 6 meter contacts took to the air and was last seen heading northeast at approximately 10 to 15 knots. Luckily he was using Operating Aid #6! K7ICW of Nevada felt it was a major operating feat to just work 11 sections. Al feels that if other states in the West had had serious operators on the ball many more stations could have been worked via scatter of the ionospheric variety. In other words says Al, we could have made our own band openings. W6GDO feels that the highlight of his four-band division leading effort was a QSO with K7AUO/7 on Paulina Butte near Bend, Oregon. Jay feels that 75-meter coordination really pays off. He worked W0EVE/0 on 75 during the regular v.h.f. net Sunday night and decided to try 50 Mc., it worked like a charm. Jay concludes that 144 and 432 Mc. QRM would make 20-meter DX'ers give up! WA6JDT, Sacramento Valley SCM, found conditions better than in June. John says he's going to look into getting on 220 or 432 to better his score. One of the highlights of activity in the Pacific Division to your reporter is the effective use of bands other than 6 and 2. The Litton Industries Amateur Radio Society, K6SLQ/6, operated five bands for tops in their class division-wise; particularly effective was 420 with 14 exchanges in 5 sections.

**Roanoke Division:** N. C. leader WA4BVV/4 worked two bands for section high. The High Point North Carolina UHF Society WA4SHA/4 operated at a 3800-ft. elevation near Boone in Western North Carolina, 128 exchanges and 12 multipliers. W4VHI, S. C., operated 144 and 432 and reports that 2 meter conditions seemed very good to Florida. 432 Mc. conditions were excellent on both nights into central and southern Florida. Tom's projects for the winter include higher power on 432 and a new final on 2. The Opequon Radio Society manned WA8FSE/8 for division multiplieroperator high; two bands for almost 3000 points.

**Rocky Mountain Division:** The one log received from K5PGI of New Mexico indicates at least 12 hams were active there on 6 and 2.

Southwestern division multiplieroperator high K6OKC/6 operated in Santa Barbara atop 8831 foot Mt. Pinos. That's the 432 Mc. setup in the foreground with 2 meters behind.



**QST for**

**MANCHESTER BENNINGTON COUNTY VERMONT**

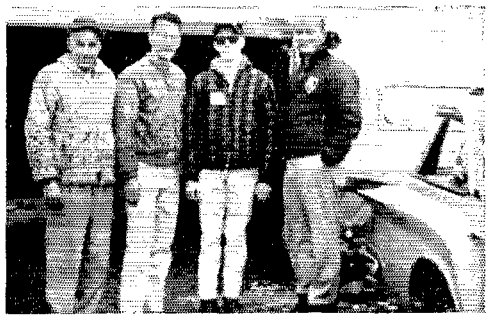
# K1RYT-1

**MT. EQUINOX Elevation 3848 feet.**

THIS CARD CONFIRMS CONTACT WITH RADIO

CIN	MCS	AT	SWT	Sept	1965
<b>SIX</b>		<b>RIGS</b>		<b>TWO</b>	
RANGER II		<b>SIX 588</b>		AMPS 1A-6Z	
CALLERS 25.50				AWGCD NOVISTOR	
TABLETS 20.00				28-100	
TELEX & REF. MTD.				MAR. FT. GRAND COLLEARS	

OPERATORS: W1ADZ, WN1EQP, K1PYX, K1RVT, K1UVP  
 QRL VIA K1RYE WILLIAMSTOWN, MASS.



New England multioperator high K1RYT/1 operating from Vermont with (left to right) K1PYX K1UVP K1RVT W1ADZ, photo by the 5th operator WN1EQP. Dave says they were deluged with requests for this handsome QSL. The six and two meter operator netted 583 exchanges and a multiplier of 43.

**Southeastern Division:** Although Roanoke Division reports indicate activity was reasonable further south, this division's reports show moderate 6 and 2 meter activity at best. K4WHW topped solo performances with two bands of effort in Decatur, Alabama. The CLERC Amateur Radio Club put WA1QPL/4 through the paces on two bands for division high at 1460-146-10-AB.

**Southwestern Division:** Contest perennial W7AYY (W9KLD/KL7) took part in two bands from Arizona finding 50 to exchange sections with. K7YSE reports he'll be ready in January with a transistorized rig on six, 5 watts output. K7AAB was surprised at the local activity, attributing it to a contest or band opening turning out the fellows. The Southern California V.H.F. Radio Club, K6BPC, was operated by K6QPH for section high in a two-band "go." WB6GFD reports that he spent this test at the home QTH instead of up on the hill. WB6CGM says that Orange section activity has increased since the last contest but actual contest activity was almost nil. WB6PHO found poor conditions and low activity on 6. WA6WTD found good conditions on 6 and two and plans on hilltopping in 1966. K6OKC/3, top multiop, in the Southwestern Division, sums up his happy news in red in, "How about that, 8 sections on 432 yet in California, 150 watts output all on A-3. All California sections worked on 2 meters with 10 watts p.e.p., sideband did it."

**West Gulf Division:** WA5EOI found 106 to exchange information with on 6 meters in 4 sections, earning the section award. K8CQA/5 comments that this was his first V.H.F. QSO Party and more than half of his two-meter contacts were on c.w., with K5SDM his best DX (250 miles). Division high W5WAX operated two bands from

Oklahoma for certificate honors. W5UGO says he sure would have liked to work K2YRZ/2, the first "2" heard via any form of 144-Mc. propagation. Multiple-operator high K1IGY/5 feels that with the same equipment and conditions from one of the northern states, their score would have been considerably higher. The only bonus was a new state on six. Dick plans to stir up a little more South Texas activity in January.

**Canadian Division:** Perhaps the best section competition was found in Ontario, where VE3BPR turned to on four bands to take section and Canadian high with over 3100 points. VE3ASO was second with 2899 based on a two-meter only effort (that antenna was ten over ten over ten over ten up 90 feet fed with RG-17U, an approximate ERP of 800 watts. VE3EZC reports that this one was the best ever on 2 meters, lots of skip and good to see the c.w. turnout. VE3DSE says he never has worked so many sections with just 25 watts. With his 12 states in seven call areas he still has had no luck with W1's. He asks some of the New England boys to keep an ear open. VE3CRA/3 put together a lash-up antenna and borrowed a linear for his first two-meter work since moving to Ontario from Nova Scotia where he was VE1QZ. He reports hearing W6's near the end of the contest but couldn't attract their attention. Ron, VE3GAG, claims that the fun started an hour and a half before the contest ended when Toronto had a 13-minute power failure knocking everyone off the air! The Eastern Ontario Club manned VE3SAU for top Canadian multiple-operator score, a fine two-band effort. VE3VM/3 reports that DX was really rolling in both days. They claim to be the best educated station on the air operating from E. L. Crosley High School grounds! Quebec leader VE2ZX comments on the band openings occurring throughout the contest period, with at least a third of all made on c.w.

## SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 432 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Novice Award Winner.

### ATLANTIC DIV.

<i>Delaware</i>		K3YFD (multiopr.)	16-135-461-35-AB
W3CGV		K3MTK (K3S DV8 LW8)	14-586-429-34-AB
W3ABO	2346-87-23-ABCDE	K3YGH (5 oprs.)	7004-204-34-ABC
W3ABU	1482-78-19-AB	K3VAX/3 (WA3AQF, K3S HQC YAX)	4654-179-26-AB
K3UHU	1188-99-12-A	K3ZYT (WA2KZV, K3ZYT)	1547-91-17-AB
K3OBU	528-44-12-AB	<i>Maryland-D. C.</i>	
W3IGM	462-42-11-A	WA3CBT	2624-151-24-AB
<i>Eastern Pennsylvania</i>		K3LYW	2385-159-15-A
K3IFM	3375-116-27-ABGD	W3VRD	1680-105-16-AB
W3ARW	2409-26-35-BCD	K3MWQ	1547-91-17-AB
K3ZPN	2087-97-21-AB	K3WIK	1296-108-12-AB
WA3AAN		W3LQU/3	
WA3BJR	1692-141-12-A	K3ZRX	1232-77-16-A
W3ETB	1850-110-15-AB	W3LCC	700-46-14-ABCD
K3HNP	1521-117-13-A	W3HB	282-47-6-B
W3ACMP	1320-110-12-A	WA3AJC	250-50-5-B
W3PMG	909-101-9-A	W3PGA/3 (5 oprs.)	4677-199-23-AB
W3PZL	450-30-15-AB		
K3ZLL	225-25-9-AB		
WA3EFE/3			
W5NFJ/3	140-35-4-A		
	22-11-2-A		

K3VRS (K3s VAE VRS)	152-38-4-AB
	976-61-16-AB
<i>Southern New Jersey</i>	
W2E1F	6720-197-32-ABCD
W2PGE	1938-102-19-AB
WN2OE*	152-38-4-B
WN2RVX	81-27-3-B
WN2TD	234-12-2-B
<i>Western New York</i>	
WA2THS/2	5319-197-27-AB
W2FDI	4176-144-29-AB
K2YCO	3172-115-26-ABCD
K2ERQ	2394-133-18-AB
WA2TEY	2096-131-16-AB
WA2KND	1111-101-11-AB
WB2CMR	560-70-8-AB
WA2EJS	536-67-8-AB
K2TTI	240-30-8-B
W2WGL	171-19-9-B
K2ACQ	168-12-7-D
K2BBJ	152-38-4-AB
WB2VYQ	582-16-5-B
W2HYK	80-12-5-B
W2ZHW	34-17-2-AB
W2AGG/2	18-6-3-B
WA2ISE	15-15-1-A
W2ZJK/2 (5 oprs.)	11-083-295-37-ABC
W2OW (12 oprs.)	11-083-295-37-ABC
WA2SHE (WB2s BBA NJD)	2295-135-17-AB
K2ZWI (4 oprs.)	2128-133-16-AB
WA2SOO (K2DUR, WA2SOO)	1802-106-17-AB
W2AGJA/2 (WA2GJA, K2LFB)	1276-53-22-AB
WB2SEJ/2 (WA2KEK, WB2HQJ, SEJ)	814-74-11-AB
<i>Western Pennsylvania</i>	
W3BWU	2448-136-18-AB



K3QIO/3 275-55-5-AB  
 W3PUH 210-30-7-B  
 W3DJM 120-30-4-A  
 K3NXO 96-16-8-A  
 K3ZGI 21-7-3-AB  
 W3NKI2 15-15-1-A  
 K3IWK/3 (5 oprs.)  
 6183-229-27-AB  
 K3HKK/3 (5 oprs.)  
 5148-198-26-AB  
 K3ZVB (W3ZGI, K3ZVB)  
 988-76-13-AB

WA0CQG 396-66-6-AB  
 K9OST 17-17-1-A  
 WA0HRA 9-9-1-A  
 WA0MWH3 5-5-1-A

**DELTA DIVISION**

*Tennessee*  
 K4FKO 1526-109-14-AB  
 K4EJW/4 120-21-5-A  
 W4TRC/4 (8 oprs.)  
 949-73-13-AB  
 WA4VNP/4 (5 oprs.)  
 910-130-7-A

*Onto*  
 W8WEN 2530-110-23-AB  
 K8RHH 1430-110-13-B  
 WA8OX 1161-129-9-A  
 W8NOKS\* 468-52-9-B  
 W8JRN 432-108-4-AB  
 W8ED14 430-43-10-AB  
 W8AMU 186-62-3-A  
 W8NOKL 124-31-4-B  
 W8JMQ 14-14-1-A  
 W8RCA 8 (9 oprs.)  
 27.864-048-43-AB

W2YPM 90-9-5-D  
 WB2HZY 84-21-4-B  
 K2YRZ/2 (4 oprs.)  
 37.544-715-52-ABC  
 WA2HRE (4 oprs.)  
 2060-97-20-ABCD  
 WB2OIM (WB28 OIM OWZ)  
 180-30-8-A  
 N. Y. C.-L. I.  
 WA2LRO 4131-243-17-A  
 WB2GQZ 3654-174-21-AB  
 WA2QCF 2552-116-22-AB  
 WA2QNA 1644-137-12-A  
 WN2TEO\*

**CENTRAL DIVISION**

*Illinois*

WA9KYE 2002-143-14-AB  
 KL7EBB/9 1176-98-12-AB  
 WA9KAY 1000-100-10-AB  
 W9EET 660-60-11-AB  
 WA9FTH 640-80-8-AB  
 WA9OUU 450-50-9-AB  
 W9YVF 432-48-9-B  
 WA9NTC 305-61-5-A  
 WA9QCO 285-57-5-A  
 WA9FX 265-53-5-A  
 WA9JKT 85-17-5-A  
 WN9OPT 81-27-3-B  
 WA9KQD 60-12-5-B  
 WN9NGB 38-19-2-B  
 K9YZG 28-14-2-A  
 K9JAM (7 oprs.)  
 6573-313-21-AB

*Indiana*

K9MIMH, 1304-163-8-A  
 W9TWU/9 (multioopr.)  
 9144-379-24-ABE  
 K9DZK (K9DZK, WA9PAF)  
 2100-150-14-A

*Wisconsin*

WA9JFM 2760-184-15-AB  
 WA9FWD 910-91-10-B  
 W9PZD 766-48-10-B  
 W9WAG 154-22-7-B  
 WN9OFF 150-25-6-B  
 K9GID\* 2-2-1-B  
 WA9JCX/9 (K98 OXY YGR,  
 WA9JCX)  
 5280-264-20-AB

**DAKOTA DIVISION**

*Minnesota*

WA0DWM 553-79-7-AB



**GREAT LAKES DIVISION**

*Kentucky*

K4QPJ/4 (4 oprs.)  
 2261-133-17-AB

*Michigan*

W8LJR 1040-80-13-AB  
 W8WOG/8 (11 oprs.)  
 7620-381-20-AB  
 W8NSH (6 oprs.)  
 3458-182-19-AB

**K8KTX (W5NCE, K8KTX)**

2109-111-19-AB  
 WARLOW (WA88 LOW  
 PAM) 1062-118-9-AB  
 WANAMZE (WA88 GMS  
 MZE PAV.)  
 300-75-4-AB

**HUDSON DIVISION**

*Eastern New York*

WA2ZPD 630-90-7-B  
 W2CTH 176-22-8-AB  
 W2IP 90-15-6-B

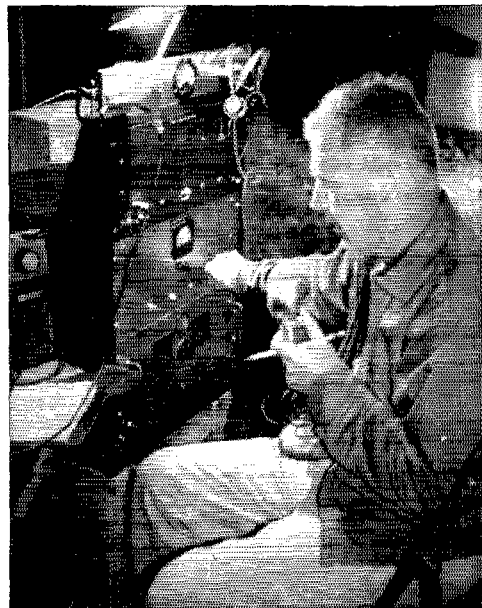
1365-114-12-B  
 WB2MEO 924-77-12-B  
 W2KXG 272-31-8-B  
 WB2QKO 800-80-10-AB  
 WB2MZE 696-87-8-AB  
 WA2EKF 598-46-13-B  
 WA2ZCK 678-64-9-B  
 W2MDE 528-24-11-D  
 WA2BUS 352-30-11-BD  
 WN2TC8 318-53-6-B  
 WA4AIG/2

242-15-11-ABC\*  
 WB2RBA 116-23-4-A  
 W2NNB 60-12-5-B  
 WA2IPC 40-20-2-B  
 W2NJS 21-7-3-B  
 W2ZSD 16-4-4-B  
 WB2BON (WB2BON,  
 WA2VXY

6580-235-28-AB  
 WB2GGX (WB28 GGX ROZ  
 RQN) 1417-109-13-AB  
 WN2QWZ (WN28 PUI QWZ)  
 420-60-7-B  
 WB2QLP (WN2PML,  
 WB2QLP, WB2SRB)  
 300-60-5-B

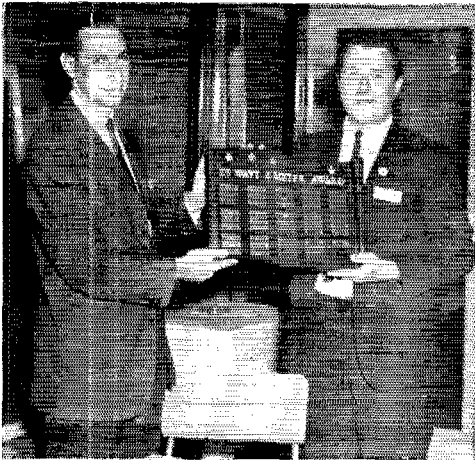
*Northern New Jersey*

WB2QEA/2 6463-281-23-AB  
 WA2JAM2 500-125-20-B  
 WB2GYS 948-79-12-B  
 WB2UCS 948-86-11-AB  
 WB2JVE 848-105-8-A  
 WA2IDH 768-64-12-AB  
 WA2TTP 605-55-11-B  
 WA2CMG 315-35-9-B  
 WB2MITG 258-43-6-B  
 WB2OYK 190-38-5-B  
 WA2VTE 190-19-10-AB  
 W2QJY 150-30-5-B  
 W2CVW 90-18-5-B  
 WN2RSS 68-34-2-B  
 W2PEZ/2 (multioopr.)  
 50.518-832-58-ABCD



Typical multioperator positions, though widely separated were (left); VE3CBC, president of the Niagara Peninsula Amateur Radio Club, at the controls of VE3VM/3 operated by four of the club for 105 exchanges in 8 sections on two meters. The operation was completely portable, and included a trailer and C.D. generator at Fonthill, Ontario. On the right, Pacific Division multioperator high K6SLQ/6 was manned by W6GWQ on 220 and 432 while five others of the crew helped to operate 50, 144, 220, 420 Mc. and 10 HMc. The Litton Industries Amateur Radio Society operated from the top of King Mountain on the San Francisco Peninsula in S.C.V.





On the left VE3ASO is shown receiving the 25-watt two-meter award presented by VE3MR to the station scoring highest on this band. The recipient must live within a 75-mile radius of Toronto and run less than 25 watts. The VE3ASO effort netted close to 3000 points, 2nd high in Ontario.

K2VAC/2 (multiopt.)  
34,200-736-45-ABC  
WA2FSQ (4 oprs.)  
29,302-566-49-ABCDE  
K2BJP/2 (14 oprs.)  
17,235-857-45-ABCDE  
WB2RIP/2 (K20JP,  
WB2RIP, WA2TVL)  
4798-218-22-B  
WB2QZZ (4 oprs.)  
2432-128-19-AB

### MIDWEST DIVISION

*Kansas*  
WA0DZI 39-13-3-AB  
W0BFE/0 (7 oprs.)  
1160-145-8-AB

*Missouri*  
K0TLM 837-93-9-AB  
WA0HKP (WA0s HKP LSF)  
405-81-5-AB

### NEW ENGLAND DIVISION

*Connecticut*  
K1WHT 13,716-381-36-AB  
W1WHL 5249-179-29-ABC  
K4WQZ/1  
3925-157-25-AB  
K1ZDY 3900-156-25-AB  
K1PKQ/1  
3654-174-21-B  
WA1ANB  
1974-141-14-B  
K1HTV 1246-89-14-B  
K1KIK 689-82-11-AB  
W1PHE 740-34-15-AB  
W1WHR 387-43-9-B  
WN1DWJ\*301-43-7-B  
WA1AV\* 78-13-6-A  
W1QJL 15-15-1-B  
W1LUA/1 (7 oprs.)  
21,870-474-45-ABC  
WA1BXA/1 (7 oprs.)  
9338-322-29-AB  
K1SDF (K1s SDF UUP ZXJ)  
2178-99-22-AB  
K1VQW (K1VQW, WA1BAZ)  
259-37-7-A

### Eastern Massachusetts

W1OOP 2236-63-26-BCD  
W1JSM 2222-101-22-AB  
WA1DPX 1782-162-11-A  
WN1DRO/1  
1584-132-12-B  
K1ZCU 855-95-9-A  
WA1DDN 696-58-12-AB  
W1HLL 600-50-12-A  
K1FJM 470-47-10-B  
WA1IDB 284-44-6-B  
K1ZGH 253-23-11-AB  
W1CTR/1 145-29-5-B  
W1CTR 80-16-5-A

WA1AEZ 52-13-4-A  
W1IPJ/1 (12 oprs.)  
9699-250-35-ABCD  
W9DHK/1 (K1QCP,  
W9DHK, K9YCK)  
5797-172-31-ABCD  
WA1CBH (4 oprs.)  
2903-137-19-AB  
WA1FCD (WA1s FCD DWL)  
115-23-5-B

### Maine

K1TOL 2220-148-15-A  
K1OYB 28-6-4-ABC  
W1EXZ/1 3-3-1-A  
K1UGQ/1 (5 oprs.)  
24,472-497-46-ABCD

### New Hampshire

W1ALE 4422-124-33-ABCD  
W1HDQ/1 833-49-17-AB  
K1PHQ/1 240-24-10-AB  
V63FCH/W1  
105-15-7-B  
W1HPM (15 oprs.)  
675-261-25-ABC

### Rhode Island

K1TPK 8060-310-26-AB  
K1ABR 4536-168-27-AB

### Vermont

W1ATM 1764-84-21-AB  
W1EXZ 35-6-5-BC  
K1RYT/1 (5 oprs.)  
25,069-882-43-AB  
W1UW/1 (5 oprs.)  
10,527-363-29-AB  
K1UZK/1 (5 oprs.)  
5890-190-31-AB  
K1DJH/1 (5 oprs.)  
1584-72-22-AB

### Western Massachusetts

K1JHX 1600-40-25-BCD  
WA1BEM 451-41-11-B  
K1ULZ 276-46-6-B  
WA1BWF 209-19-11-AB  
W1UCB 160-16-10-AB  
WA1COR 98-14-7-AB  
K1YLU/1 (7 oprs.)  
15,022-399-37-ABC

### NORTHWESTERN DIVISION

### Montana

W7CJN 14-7-2-AB  
W7TYN 6-6-1-B

### Oregon

W7TYR 480-50-8-ABCD  
K7QXF/7 354-53-6-ABCD  
W7LNG/7 9-9-1-B  
K7AUO/7 (4 oprs.)  
624-42-12-ABCD  
W7IC8/7 (K7s BLM UWW,  
W7LCS) 245-49-5-ABC

### Washington

K7BBO 1020-102-10-AB  
K7COW/7 (6 oprs.)  
234-34-6-ABCD

### PACIFIC DIVISION

### East Bay

K4CHE/6  
1692-141-12-AB

### Nevada

K7ICW 220-19-11-ABC

### Sacramento Valley

W6GDO 4256-125-28-ABCD  
WA6JDT 140-28-5-B  
WN6NNR/6 (4 oprs.)  
509-118-5-B  
W6HBU/6 (5 oprs.)  
531-59-9-AB

### San Francisco

WB6PWW/6 (9 oprs.)  
1200-93-12-ABCD

### San Joaquin Valley

K6UJG 234-26-9-AB  
WB6NFT 156-26-6-AB

### Santa Clara Valley

WB6KAP 2432-99-22-ABCD  
K6JC 880-43-16-ABD  
WB6HFR 728-53-13-ABC  
WA6LYF 365-73-5-A  
K6SLQ/6 (6 oprs.)  
6072-254-22-ABCDE

### ROANOKE DIVISION

### North Carolina

WA4RVW/4  
1470-98-15-AB  
W4HJZ 368-46-8-ABD  
WA4UJ 156-52-3-AB  
WA4SHA/4 (5 oprs.)  
1536-128-12-AB

### South Carolina

WA4LTS 1332-109-12-AD  
W4VHH 119-14-7-AD  
W4NYK/4 (4 oprs.)  
1512-126-12-AB  
K4UFT (WA4s KLLT LVU,  
K4UFT) 10-5-2-A

Division Highs		Shown are number of contacts and sections per band			
		50 Mc.	144 Mc.	220 Mc.	432 Mc.
ATLANTIC	W2EIF	99-12	85-14	10-4	3-2
	K3YFD*	295-21	166-14		
CENTRAL	WA9JFM	65-6	119-9		
	W9TWU/9*	119-7	259-16		
DAKOTA	WA0DWM	62-3	17-4		
DELTA	K4FKO	95-9	13-5		
	W4TRC/4*	55-8	18-5		
GR. LAKES	W8WEN	1-1	109-22		
	WA8BCA/8*	476-21	172-22		
HUDSON	WB2QEA/2	147-13	134-10		
	W2PEZ/2	433-19	360-25	27-9	12-5
MIDWEST	K0TLM	84-6	9-3		
	W0BFE/0*	99-5	46-3		
NEW ENG.	K1WHT	183-16	198-20		
	K1RYT/1*	400-21	183-22		
N.W.	K7BBO	88-7	14-3		
	K7AUO/7*	5-2	28-4	4-2	4-3
PACIFIC	W6GDO	33-9	65-9	9-3	18-7
	K6SLQ/6*	100-6	133-6	6-4	14-5
ROANOKE	WA4RVW/4	75-10	23-5		
ROCKY MT.	WA8FSE/8*	62-11	61-11		
	K5PGI	5-1	7-1		
S.E.	K4VHW	41-5	13-2		
	WA4QPL/4*	122-6	24-4		
S.W.	K6BPC	176-4	36-3		
	K6OKC/6*		127-9		28-8
WEST GULF	W5WAX	41-5	28-6		
CANADIAN	K1IGY/5*	55-3	7-2		
	VE3BPR	27-7	63-18	1-1	6-4
	VE3SAU*	65-12	95-12		

\*Multioperator Station.

**Virginia**  
 W4UBY 756-44-14-BCD  
 W4LTU 875-45-15-B  
 W4UDC 369-41-9-A  
 W4BHD 75-25-3-A  
 W4RL 44-11-4-AB  
 W4KFK/4 (4 oprs.)  
 480-60-8-AB

**West Virginia**  
 K8WVP 564-47-12-AB  
 W8ACTS 55-11-5-B  
 W8FSE/3 (9 oprs.)  
 277-136-22-AB  
 W8DAU/8 (W8DAU,  
 K8s WMQ WVV)  
 270-30-9-A

**ROCKY MOUNTAIN  
 DIVISION**  
*New Mexico*  
 K5PGI 24-12-2-AB

**SOUTHEASTERN  
 DIVISION**  
*Alabama*  
 K4WHW 378-54-7-AB  
 W4AKM A150-30-5-AB  
 W44YWX 57-19-3-A  
 W44PH 54-18-3-AB

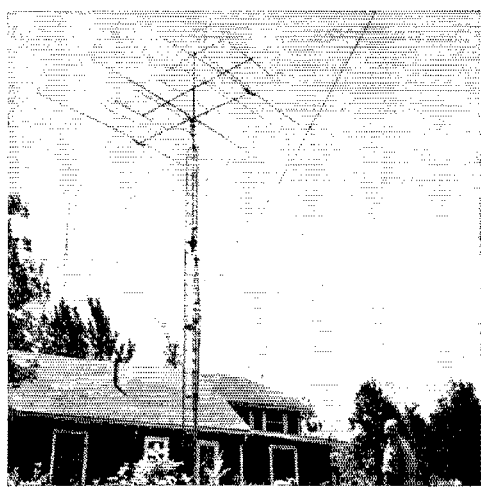
*Georgia*  
 K4YZE 11-11-1-A  
 W4A4U 6-6-1-B  
 W4AR4 6-6-1-B  
 W44QL/4 (6 oprs.)  
 1460-146-10-AB

**SOUTHWESTERN  
 DIVISION**  
*Arizona*  
 W7AYY<sup>3</sup> 100-50-2-AB  
 K7YSE<sup>8</sup> 100-50-2-AB  
 K7AAB 26-26-1-A  
 K7EBW/7 (K7s EBW MDH,  
 W47BMD)  
 198-66-3-AB  
 K7DAW (7 oprs.)  
 126-63-2-AB

*Los Angeles*  
 K6BPC<sup>9</sup> 1484-212-7-AB  
 W6GGF 714-83-7-ABC  
 W6TXJ 428-107-4-A  
 W6FPT 124-31-4-B  
 W6KGGK 104-28-4-B  
 K6UMV 28-7-4-AB  
 W6AYM 20-10-2-A  
 W6SD/6<sup>10</sup> 4-4-1-A

*Orange*  
 W6CGM 756-108-7-AB  
 W6PH 136-15-4-1DE  
 W6PHO 36-18-2-A  
 W6WTD (W6AWTD,  
 W6BERG)  
 2392-299-8-AB

<sup>1</sup> WB2LEI, opr. <sup>2</sup> K3IRS, opr. <sup>3</sup> KOOST, opr. <sup>4</sup> WA2USG,  
 opr. <sup>5</sup> W1WPR, opr. <sup>6</sup> Headquarters staff, not eligible for award,  
<sup>7</sup> W2BYU, opr. <sup>8</sup> Tied for section award, <sup>9</sup> K6JPH, opr.  
<sup>10</sup> WA6TGH, opr. Check logs: W8TGO VE3TO WPE2JEW.



W1H1L's handsome 6-meter array.

**Santa Barbara**  
 WA8CPK 17-17-1-B  
 K6OKQ/6 (K6s JYO GKQ)  
 8111-155-17-BD  
 WA6RTM (W6MSG,  
 WA6RTM)  
 225-25-9-B

**WEST GULF  
 DIVISION**  
*Northern Texas*  
 WA5EOI 424-106-4-A  
 K5CMC 208-104-2-A  
 K5YB 162-81-2-A  
 K9CQA/5 33-11-3-B

*Oklahoma*  
 W5WAX 759-69-11-AB  
 W5UGO 280-40-7-B  
 W5HUJ 50-25-2-AB  
 K5E2G (K58 CFM FZG)  
 69-82-4-A  
 WA5CXB (WA58 CXB INB,  
 WN5KZJ)  
 64-32-2-AB

*Southern Texas*  
 K5HUT/5 22-11-2-A  
 K5HUT 21-21-1-A  
 WA5KXG 5-1-A  
 K1IGY/5 (K1IGY, K5VWV)  
 310-62-5-AB

**CANADIAN  
 DIVISION**  
*Ontario*  
 VE3BPR 3120-97-30-ABCD  
 VE3ASO 2899-223-13-B  
 VE3ESE 1872-152-11-B  
 VE3E2C 1518-138-11-B  
 VE3AGQ 880-88-10-B  
 VE3AIB 528-44-1-ABD  
 VE3DSE 504-56-9-B  
 VE3PUL 488-61-8-AB  
 VE3CJA 450-50-9-AB  
 VE3CRA/3 234-39-6-B  
 VE3XCN 155-31-5-A  
 VE3EYV 84-14-6-B  
 VE3CIT 66-22-3-AB  
 VE3GAF 51-17-3-AB  
 VE3DNR 36-9-4-B  
 VE3GAG 6-6-1-B  
 VE3SAU (9 oprs.)  
 3840-160-24-AB  
 VE3VM/3 (4 oprs.)  
 840-105-8-B  
 VE3FNV/3 (VE3s DFB  
 PNV) 742-106-7-B

*Quebec*  
 VE2ZX 1190-85-14-B  
 VE2BMQ 630-41-15-ABD  
 VE2ALE 240-48-5-B  
 VE2BMH 10-10-1-A

# ARRL DX COMPETITION Rules for DX

PHONE: February 12-13 and March 12-13  
 C.W.: February 26-27 and March 26-27

The starting time in each instance is 2400 GMT Friday, ending at 2400 GMT Sunday. Phone and c.w. are separate contests. Multipliers are the following call areas: W1-W6, KH6, KL7, VO and VE1-VE8 (a maximum of 21 per band). Each completed QSO counts three points. Logs must contain calls, dates, times, bands, exchanges (report and power) and points. The W/VE station will send report and state/province. You may use your own forms or obtain logs from ARRL, 225 Main St., Newington, Conn. 06111, U.S.A.

Your entry must be postmarked by April 23, 1966 to be eligible. Please enclose photos and soapbox comments with your report.

SUMMARY, ARRL INTERNATIONAL DX COMPETITION

C.W. Call: \_\_\_\_\_ Area/Section: \_\_\_\_\_ of Country: \_\_\_\_\_  
 PHONE

Name: \_\_\_\_\_ Address: \_\_\_\_\_  
 Transmitter(s): \_\_\_\_\_  
 Receiver(s): \_\_\_\_\_ (lower inputs) \_\_\_\_\_  
 Antennae(s): \_\_\_\_\_  
 (Non-W/VE/V6 entrants show number of U.S.A. and Canadian call areas worked, instead of number of countries (dots).)

Date	1-8		9	10	11	12	Totals
	M	M					
Number of Multipliers (dots)							*
Number of Countries							
Number of QSOs							

Number of Different Countries Worked: \_\_\_\_\_ Number of Hours of Station Operation: \_\_\_\_\_  
 Show calls of all operators if multiplexer: \_\_\_\_\_  
 (Points) (Multiplier) (Multiplied Score)  
 Participating for club award in the \_\_\_\_\_ (name of club)  
 I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Awards Committee.  
 \_\_\_\_\_  
 (operator's signature and call)  
 (Signature in this box is the multiplier.  
 \*out of 3 points per completed QSO; see contest rule 8a in January Off.)

Sample summary sheet that must accompany all reports.

## Hamfest Calendar

JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

New York — The Communications Club of New Rochelle will hold its Fifth Annual Dinner and Ham Get Together on Saturday evening, December 18, at the Davenport Club in New Rochelle. For more information write WB2GMN, 100 Joyce Rd., Hartsdale, New York.

Nevada — A Sahara Amateur Radio Operators Convention (SAROC) and funfest, co-sponsored by the Southern Nevada Amateur Radio Club of Boulder City, will be held January 7-9, 1966, at the Sahara Hotel, Las Vegas. Activities include technical talks, manufacturers displays, behind-the-scenes tour of a casino, hotel extravaganza, tour of Hoover Dam, etc. Expected also are FCC exams and an ARRL open forum meeting, Saturday MARS and ladies' luncheons. Preregistration (to Dec. 31), \$8.50. Special hotel rates (\$10 for two). A fun-type ham affair. Contact Leonard Norman, W7PBV, 652 Utah St., Boulder City 89005.

# • *Beginner and Novice*

## 15- and 10-Meter Operation and

# TVI

or

## *How To Keep Out of Trouble*

BY LEWIS G. McCOY,\* W1ICP

**A**MATEURS who got their tickets in the last few years came into amateur radio at a time when radio propagation conditions were very poor on the 15- and 10-meter bands. As we come out of the low in the sunspot cycle — and that is what is happening now — conditions on these bands will improve. Amateurs who haven't spent time on them are in for a pleasant surprise, because they'll find it very easy to work out on 15 and 10.

However, working on these bands can cause problems if your equipment isn't protected against harmonic or spurious radiations. Yep, we're talking about TVI. When working on the lower bands such as 80 and 40 meters, one isn't likely to have a TVI problem, even with equipment that does radiate some harmonics. The reason is that those harmonics which fall in the television channels frequently are too weak to cause interference. However, this is not usually the case with harmonics from 15- and 10-meter operation.

Before going farther it might be appropriate to explain exactly what harmonics or spurious radiations are and how they can give you trouble.

### *Spurious Emissions*

Whenever you generate a radio signal you also generate signals at multiples of the desired frequency. For example, let's assume you have a transmitter tuned up on 7150 kc. In addition to the fundamental 7150-kc. signal your rig will also generate signals at 14,300, 21,450, 28,600, 35,750 kilocycles, and so on. Fig. 1 is an example of harmonic generation. As the harmonics increase in frequency, they get weaker and weaker. However, if one happens to fall in a TV channel, and the TV signal being received is weak, the harmonic can cause interference to the picture. Depending on where the harmonic falls in the TV channel, the interference can appear either as a "herringbone" pattern in the picture or as interference with the TV audio.

\* Beginner and Novice Editor.

In addition to harmonics, many transmitters will generate what are known as very-high-frequency parasitics. You may be transmitting on 7150 kc. and at the same time be putting out a v.h.f. signal caused by a parasitic oscillation anywhere in the 60-Mc.-and-up region — and this is TV channel country! Parasitic radiations, along with harmonics, are classed as spurious emissions. In other words, anything coming out of your rig that is *not* the fundamental is a spurious emission. Also — and this is most important — any spurious emission that causes interference is the responsibility of the amateur, and it is his obligation to clean up the interference.

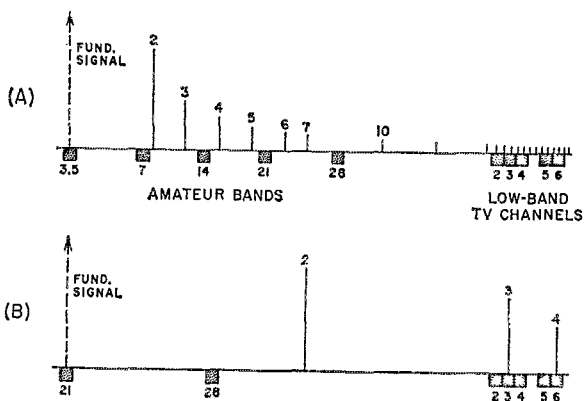
When operating on 15 and 10 meters, special precautions must be observed if TV Channels 2 to 6 are in use locally. The second harmonic of 10-meter operation falls right in Channel 2, and the third harmonic falls in Channel 6. Fig. 2 shows the low-band TV allocation and which amateur bands can be a problem.

### *TVI-Proofing — What's Involved*

Let's get one point cleared up right away: Simply because you may own a commercially-built transmitter is no guarantee that it will be clean as far as TVI is concerned. Many commercially-built rigs do have excellent shielding to prevent harmonic radiation, but some don't. If you live in an area where TVI is likely to be a problem, and you plan on buying a transmitter, be sure you get one that does have good shielding.

During the decline in sunspots, activity dropped on 15 and 10 meters. However, with maximum usable frequencies on the upswing, these bands will be opening up and more and more hams will be getting on them. This in turn means increased chances for TVI. This article passes along some information about the problem and how to stay out of trouble with your neighbors and the FCC.

Fig. 1—At A, the dotted line indicates a fundamental signal, the vertical height indicating signal strength. To the right are the harmonics from the 3.5-Mc. signal. Note that they decrease in amplitude as they go higher in frequency. However, when the fundamental signal is on 21 Mc., as in B, the harmonic that falls in Channel 3 would be much stronger than one from the lower bands. For this reason, the harmonics from the higher bands, 14, 21, and 28 Mc., must be attenuated.



In home-built gear you can, of course, do your shielding when you build the rig.

Exactly what do we mean by "shielding?" A metal cabinet doesn't in itself mean that the rig is shielded. True, a metal cabinet might help, but spurious radiations can still escape from the rig, reach the antenna and be radiated to be received by nearby TV sets. Shielding means making the enclosure around the transmitter, particularly the area around the r.f.-generating circuits, completely tight, with clean metal-to-metal surfaces so that any r.f. leaving the transmitter can only go out via the coax antenna connector.

In order to obtain good shielding, painted surfaces, such as a panel or cabinet lid might have, cannot be depended on for good electrical contact. By clean metal-to-metal, we mean just that. Also, the screws clamping surfaces together should be no more than three inches apart. It is much easier for r.f. to escape through a slit than through a hole. As to holes, anything larger than 1/2-inch diameter should be shielded, otherwise the r.f. may escape through the hole. This, of course, means that meters should be shielded unless you have the newer-type metal-backed panel meters, which don't require shielding.

Keep in mind that in addition to the coax output lead, there are other wires that enter and leave a transmitter cabinet. These include the a.c. line, microphone or key lines, and possibly other lines for various measuring purposes. These leads must be prevented from carrying harmonics through the cabinet walls. The customary method is to bypass the leads right where they leave the cabinet. Using shielded wire as described in the chapter on TVI in the *Handbook* aids immensely in such filtering. The shielded wire must terminate as close to the exit connector as possible and be bypassed right at the terminal. Shielding and bypassing the leads accomplishes two things for you. Harmonics cannot be coupled from one lead to another within the cabinet when the leads are shielded, nor can harmonic energy be radiated from shielded leads. So, in order to TVI-proof a transmitter, the enclosure must be a complete shield, and any leads leaving it must be filtered.

Every transmitter has its own particular shielding and lead filtering problems, so we won't go

into additional details. However, more complete information can be found in *The Radio Amateur's Handbook*, along with dope on tracking down and eliminating v.h.f. parasitics.

### Once the Rig Is Shielded

When a rig is completely shielded, the r.f. can only leave via the antenna connector. Up to this point we have made sure that this is the only route. However, no precautions have been taken to eliminate spurious emissions. If you have the rig all shielded, you can now employ a "shotgun" technique and get rid of the spurious emissions by installing a low-pass filter on the output of the transmitter.

A low-pass filter is simply a circuit designed to pass a given band of frequencies while attenuating or reducing the strength of others. For the amateur bands from 80 through 10 meters, a single low-pass filter will suffice—one that will pass any signals from those bands but will stop any signals higher in frequency than 10 meters. For example, suppose you are operating on 10 meters and have a strong second harmonic. When the low-pass filter is installed in the coax line to the antenna your 10-meter signal can pass through the filter without being attenuated, but the harmonic cannot. But if your rig isn't shielded, the harmonic can go around the filter and reach the antenna to be radiated.

A low-pass filter is a simple device to make, and details are given in the *Handbook*. You can also buy commercial units.

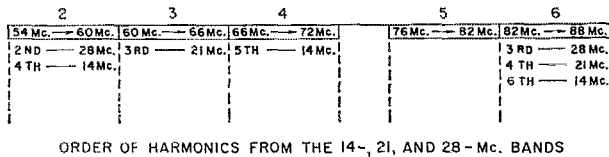
To repeat an earlier statement, TVI caused by spurious emissions is your responsibility, and you must attenuate such signals to a point where they don't cause interference. The answer is shielding plus a low-pass filter.

### Fundamental Overloading

There is one other common type of amateur TVI, called "fundamental overloading." This is not your responsibility, but that of the TV set owner.

When your ham station is close to a TV set, the set is likely to be affected by your fundamental signal. By "close" we mean something less than a few hundred feet. TV sets farther than

LOW-BAND TV CHANNELS



ORDER OF HARMONICS FROM THE 14-, 21, AND 28-Mc. BANDS

Fig. 2—This chart shows the relationship of 14-, 21-, and 28-Mc. harmonics and the low-band TV channels. It is apparent from the chart that the only channel that can be hit by harmonics from all three of the higher bands is Channel 6. Also, it should be obvious that you could avoid harmonic TVI by staying off certain bands, such as 21-Mc. operation and Channel 3. However, our recommendation is to clean up your rig so that you can operate on any amateur band without fear of having spurious emissions.

a few hundred feet away are not likely to be bothered by fundamental overloading. When the nearby TV set picks up your fundamental signal, and the set doesn't have adequate selectivity, TVI can result.

Unlike your communications receiver, the TV set is designed to receive a wide band of frequencies at one time. For example, a single TV channel is 6000 kc. wide, and for a TV set to operate properly it must receive all 6000 kilocycles. Compared with a communications receiver which receives only a few kilocycles, a TV set is a rather unselective device.

When the TV antenna is close to your antenna, your fundamental signal can get into the r.f. stage in the TV set and overload it. If the TV set doesn't have good protection, your relatively strong fundamental signal, even though it is widely removed in frequency from the TV channel in use, can cause havoc in the picture. What actually happens is that the first stage in the set is not equipped to handle such a strong signal and the stage actually acts as a harmonic or spurious-signal generator. These spurious signals are then fed through the set, resulting in TVI. Keep in mind, though, that you are *transmitting* only a fundamental signal, the one you are entitled to radiate. It is the TV set itself that is at fault, simply because it cannot cope with such a strong signal. While we said it isn't your obligation to cure this type of interference, you do have a responsibility which we will discuss in a moment.

**High-Pass Filters**

You already know what a low-pass filter is. A high-pass filter is just the opposite as far as the frequencies it will pass and stop are concerned. A high-pass filter is designed to pass all frequencies above its designed "cutoff" frequency and attenuate all those frequencies lower than the cutoff frequency.

When a TV set doesn't have adequate selectivity in its front end, a high-pass filter will usually add enough to prevent fundamental overloading. Your fundamental signal will be below the designed cutoff frequency of the high-pass filter so the signal is prevented from reaching the first stage of the TV set and causing TVI. It should be added that a good many of the present-day TV sets do have built-in circuits or filters to prevent his type of interference. However, a

good many don't have the protection, so you have to be on guard for fundamental overloading.

**Your Responsibilities**

The FCC regulations are quite clear about TVI. According to the regulations, spurious radiations from an amateur station must be reduced or eliminated in accordance with good engineering practice. "Good engineering practice" means a completely shielded transmitter with a low-pass filter, when necessary to prevent interference.

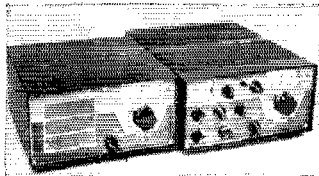
A question frequently asked by hams is how to determine when they are "clean" for TVI. While not positive proof, absence of TVI on your own set is reasonably good evidence that your transmitter is clean as far as spurious emissions are concerned.

This doesn't mean you can tell your neighbors to go jump in the lake if they experience TVI from your station. Bear in mind that a TV set owner having interference only knows one thing — when you are on the air he has interference, and when you are off, his set is clean. You may know he needs a high-pass filter, and this is where you must use diplomacy and tact in pointing out that his set is at fault, not your station.

In many areas in the country, radio clubs have formed TVI committees that will voluntarily step in and handle TVI complaints. Your best bet, if you live in an area where there is a radio club or clubs, is to contact the club members and find out if they have such a program. It is always best to have a third party handle the TVI complaint because emotions are likely to get the upper hand with the parties most intimately concerned. If you don't have a TVI committee in the area and you have a fundamental overloading problem, explain the problem to the set owner. From past experience we have found that it is not a good idea for you to install a high-pass filter on the neighbor's TV set. Get the owner to have a TV serviceman do the job. If you do the job and something goes wrong, you'll be blamed.

We don't want to leave the impression that you are bound to have a TVI problem if you go on 15 or 10 meters. In recent years there have been many improvements in TV sets, plus the fact that TV stations send out more powerful signals. However, if you are thinking of going on these bands, it is a good idea to check out your equipment and avoid trouble beforehand. **QST**

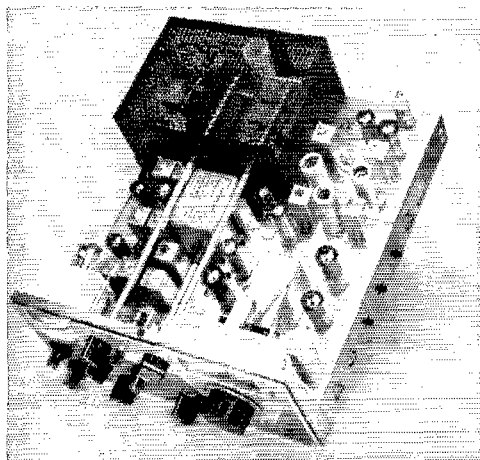
## Drake TR-4 Transceiver



THE popularity of transceivers continues to increase, and with the growth of this packaged-equipment market come advancements in circuitry, packaging, and over-all performance. Notable among the list of new transceiver units is the Drake TR-4, superseding the popular Drake TR-3 transceiver. Offering a healthy 300 watts p.e.p. input on s.s.b., the newest member of the Drake family operates on the 80-, 40-, 20-, 15-, and 10-meter bands. In addition to the s.s.b. mode, a.m. and c.w. operation are available at the flip of a switch at a power input level of 260 watts. A solid-state v.f.o. is included in the package, contributing to the general compactness of the TR-4.

### Transmitter Section

A block diagram of the TR-4 is shown in Fig. 1. Because of the transceiver configuration, some of the tubes serve for both receiving and transmitting. The change over from transmit to receive is accomplished with a relay activated by the VOX or push-to-talk circuits.



A top-chassis view of the Drake TR-4 transceiver. The p.a. tubes and tank circuit are contained in the metal cage at the left rear of the chassis. The permeability-tuned v.f.o. is housed in the metal can in the right foreground. The microphone, key, and headphone jacks are located along the right side of the chassis and are adjacent to the VOX control shafts.

When in the transmit mode, audio from the microphone is supplied to  $V_{18A}$  where it is amplified and passed on to  $V_{18B}$  and amplified further. The a.f. energy is then fed to the balanced modulator (Fig. 2) where it is mixed with a 9-Mc. signal from the carrier generator,  $V_{16}$ . The resulting suppressed-carrier d.s.b. energy (when operating on s.s.b.) is taken from the balanced modulator and amplified by  $V_{15}$  prior to being passed along to the 9-Mc. crystal-filter circuit.

Upper or lower sideband is selected by switching the appropriate 9-Mc. filter into the circuit, as shown in Fig. 1. The bandpass characteristics of the filters permit a single 9-Mc. carrier oscillator to furnish a b.f.o. signal which is placed at the proper point on the filter's selectivity curve when receiving. The carrier is positioned in the same place when transmitting s.s.b., making it possible to select either upper or lower sideband without changing the carrier frequency. During c.w. operation the carrier is shifted to a point that is higher on the selectivity curve.

Output from the 9-Mc. filter is supplied to the transmitting mixer,  $V_4$ , the latter receiving the appropriate mixing signal from the cathode follower,  $V_{3A}$ .  $V_{3A}$  is supplied with energy either from converter  $V_1$ , which is crystal controlled, or directly from the transistor v.f.o.-buffer section, depending upon the frequency of operation. The v.f.o.'s 4.9-5.5-Mc. energy is fed directly into  $V_{3A}$  during operation on 80 and 20 meters. On the remaining bands the v.f.o. signal is beat against crystal-controlled frequencies generated in the converter stage,  $V_1$ , in each case producing an output which, when mixed with 9 Mc. in  $V_4$ , will result in the desired final output frequency. Following the mixing process, the output of  $V_4$  is applied to the 12BY7A driver stage,  $V_6$ , where it is amplified and passed on to the grids of three parallel-connected 6JB6 tubes in the p.a. stage. The p.a. output tank employs a pi network designed to match a nominal 50-ohm load.

The TR-4 has an effective a.l.c. circuit (Fig. 3) which serves to maintain a high average talk-power level while preventing "flat topping" of the transmitted signal. The p.a. stage is operated Class AB1 and under normal conditions there is no grid-current flow. When too much drive reaches the p.a. grid circuit, grid current flows, reducing the negative bias between grid and

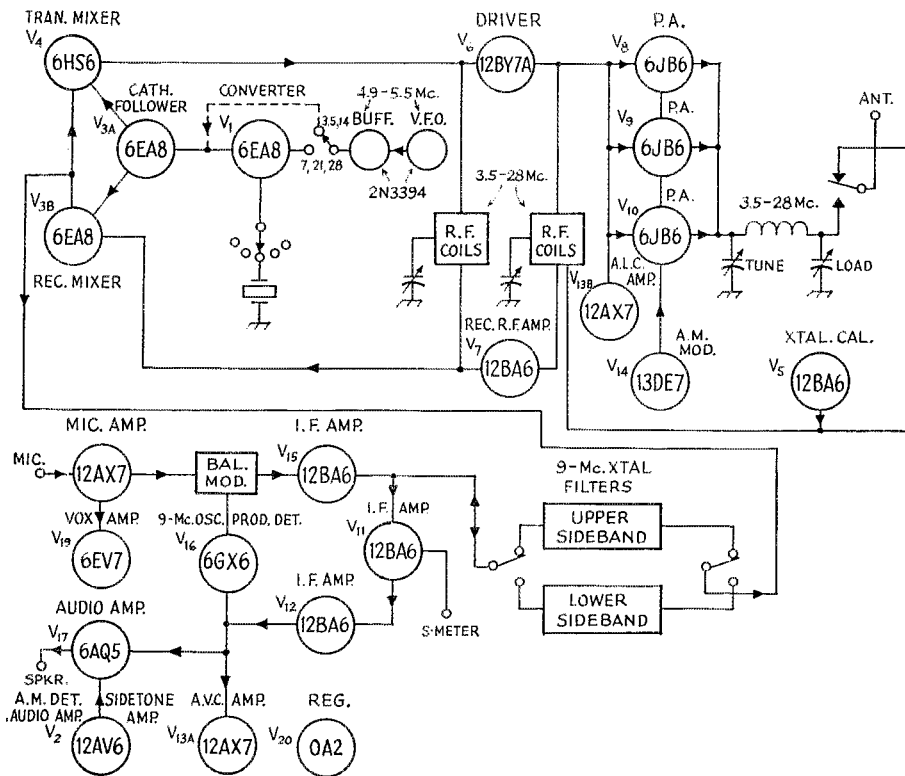


Fig. 1—Block diagram of the Drake transceiver. The arrows indicate the signal's path as it travels through the circuit. The means by which upper and lower sideband selection is accomplished is shown in the diagram.

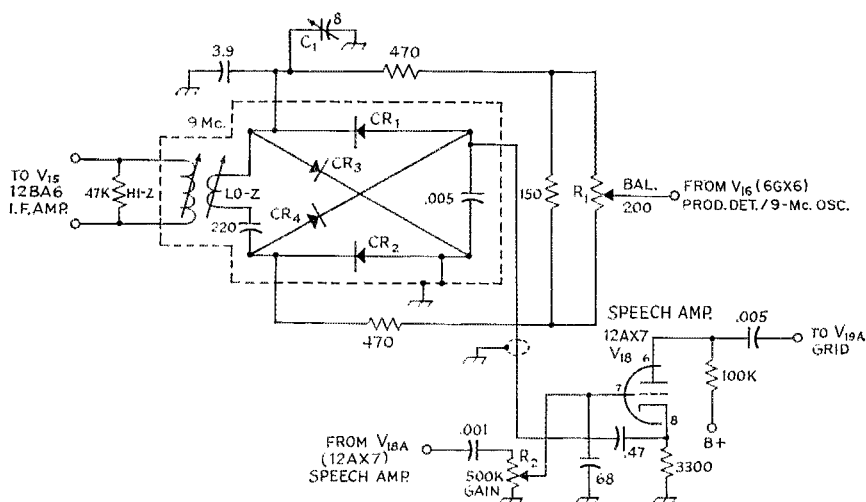


Fig. 2—Details of the balanced modulator used in the TR-4. CR<sub>1</sub> through CR<sub>4</sub> are matched pairs of 1N270 diodes. CR<sub>1</sub> and CR<sub>2</sub> are matched as are CR<sub>3</sub> and CR<sub>4</sub>. Low-impedance audio input is supplied by the cathode-follower arrangement at V<sub>18</sub>. R.f. balance is accomplished by C<sub>1</sub> while d.c. balance is effected by R<sub>1</sub>.

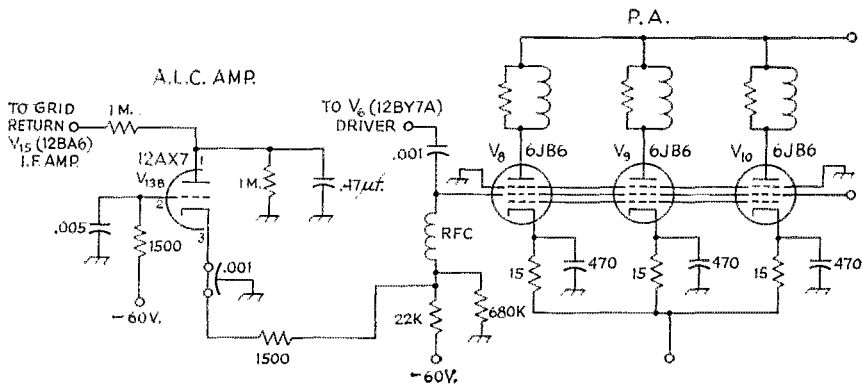


Fig. 3—A somewhat novel approach to a.l.c. is illustrated in this diagram. One half of a 12AX7 tube is used to amplify changes in p.a. grid current, in turn permitting varying amounts of negative voltage to be applied to the control grid of i.f. amplifier tube  $V_{15}$ . The higher the p.a. grid current, the greater the negative voltage that reaches  $V_{15}$ , thus reducing  $V_{15}$ 's output and in turn lowering the excitation to the p.a. grids.

cathode of the a.l.c. control tube,  $V_{13B}$ . This in turn increases the voltage across the 1-megohm resistor in  $V_{13B}$ 's plate circuit (negative to ground), which is also the grid-return circuit of i.f. amplifier tube,  $V_{15}$ . The increased negative bias voltage on the grid of  $V_{15}$  reduces the output of that stage, in turn reducing the drive to the p.a. grid circuit.

During c.w. operation  $V_2$  becomes an audio phase-shift oscillator which is grid-block keyed along with the transmitting mixer,  $V_4$ , and the driver stage,  $V_6$ . Audio output from  $V_2$  is applied to the grid of the product detector tube,

$V_{16}$ , through the sidetone control to provide audio output from the speaker for c.w. monitoring, and to the grid of the VOX amplifier tube,  $V_{19A}$ , operating the control relays in the TR-4. The relays turn on the transmitter, cause the 9-Mc. oscillator to be shifted to 9.001 Mc., and apply a variable d.c. voltage source (through one section of the transmitter gain control) to the balanced modulator, unbalancing it so that carrier injection will occur.

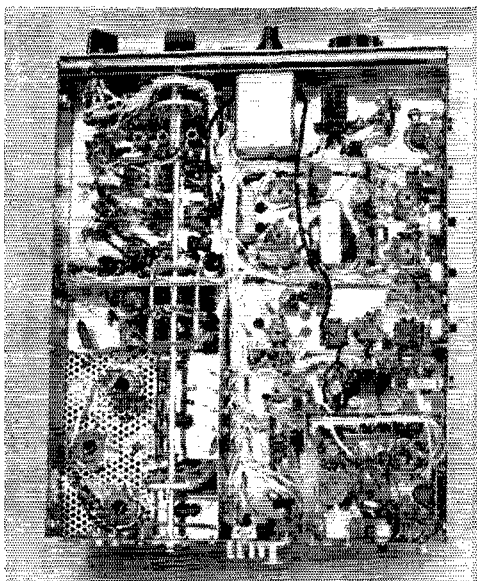
During a.m. operation, the screen modulator tube,  $V_{14}$ , is connected to the p.a. screen-grid circuit and a fixed-value voltage is applied to the balanced modulator, unbalancing it. As is the case with c.w. operation, the 9-Mc. oscillator is shifted to 9.001 Mc. The operator may select VOX or push-to-talk operation while using the a.m. mode.

### The Receiver Section

The incoming signal from the antenna is routed to the r.f. amplifier tube,  $V_7$ , through the change-over relay in the TR-4. The amplified signal is passed on to the receiving mixer,  $V_{8B}$ , where it is combined with the appropriate injection signal from  $V_{8A}$  to produce the required 9-Mc. i.f. The 9-Mc. i.f. energy is fed into either of the two crystal filters, depending upon whether upper or lower sideband is to be received (Fig. 1). After leaving the filter, the 9-Mc. signal is amplified by tubes  $V_{11}$  and  $V_{12}$  and then fed into the a.g.c. amplifier,  $V_{13A}$ , while at the same time being applied either to the input circuit of the product detector,  $V_{15}$ , for s.s.b. reception or to the diode detector in  $V_2$  for a.m. reception. A 9-Mc. b.f.o. signal is generated by  $V_{16}$ . The audio output level from  $V_{16}$  is sufficient to be fed directly to the audio output tube,  $V_{17}$ , without additional amplification.

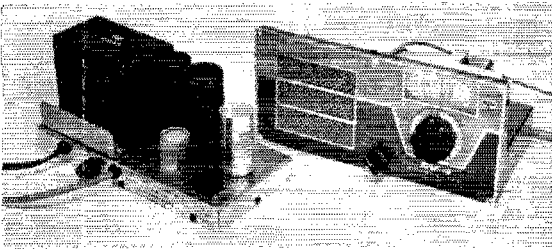
### Additional Remarks

The TR-4 is designed to operate from an a.c. power supply (AC-3) or from a 12-volt d.c. power supply (DC-3), making it convenient to operate from either a fixed station or from a mobile setup.



Under-chassis view of the TR-4 transceiver. The accessory plug for the RV-4 is visible adjacent to the front panel and near the side of the chassis containing the VOX controls. Circuit isolation between the p.a. stage and the balance of the circuit is effected by means of power-lead filtering made possible by bringing the wiring into the p.a. compartment via feedthrough capacitors.





The RV-4 remote v.f.o. and AC-3 power-supply unit are shown removed from their cabinet. The RV-4 is discussed in the text.

An accessory item, the RV-4, is an external v.f.o. which can be plugged into the TR-4 and used to control either the transmitting or receiving frequency, or both, within the same band independently of the v.f.o. setting in the TR-4. The desired combinations of the two v.f.o.s can be selected at will by means of a switch. The separate frequency control is especially convenient for tuning the band without disturbing the TR-4's v.f.o., which may be left on a selected transmitting and receiving frequency for schedules, net operation, and so on. Similarly, the RV-4 offers flexibility in receiver tuning when operating c.w., permitting stations on slightly different frequencies to communicate without "walking" across the band—a common occurrence when both stations are using transceivers. The separate v.f.o. is equally useful on s.s.b. for working foreign stations on frequencies outside the U.S. phone assignments. The RV-4 cabinet contains the speaker and power supply for the TR-4, contributing to a neat, compact installation.

#### Other Features

Equipment servicing and circuit adjustment are simplified by rapid removal of either the top or bottom halves of the TR-4 cabinet. By removing 6 screws, the top section of the cabinet can be lifted off, exposing the top of the chassis. Similarly, the bottom portion of the enclosure can be removed, making the under chassis of the TR-4 available. The panel-chassis assembly remains intact at all times.

One blessing that is included with the TR-4 package is that all interconnecting cables, plus the key and microphone plugs, are shipped with the unit. This is a special convenience if one has a key or microphone that is equipped with fittings of a different style.

The illuminated dial plate is calibrated in 10-ke. increments and is supplemented by 1-ke. calibration marks on the skirt of the tuning knob. The built-in crystal calibrator aids in rapid mechanical calibration of the two dial mechanisms when moving from one band to another. A feature that some manufacturers overlook can be noted in the photographs—the main tuning dial is well removed from the other controls on the panel, making tuning of the v.f.o. possible without becoming entangled in the other panel controls. The remainder of the controls are easily accessible but are a bit difficult to identify by their panel markings under ordinary lighting conditions. This

results from a rather low contrast between the color of the panel and that of the lettering. After a few hours of use the panel layout becomes memorized, making the readability of the labels less significant.

The instruction book is very complete and is worded in terms that are easily understood. A step-by-step explanation of how the circuit works is included in the manual, plus tuneup and troubleshooting information. The schematic diagram, although somewhat complex, is easy to follow because of its 2-page size. It would be somewhat easier to identify the various stages of the transceiver, however, if the function of each tube had been printed on the diagram along with the V numbers.

A 2-scale meter is located on the front panel, enabling the operator to read p.a. plate current, transmitter a.g.c. voltage, relative r.f. output when transmitting, and S units while receiving. Each S unit equals approximately 5 decibels and S9 equals about 30 microvolts.

The a.l.c. circuit shown in Fig. 3 performs effectively. During on-the-air use of the equipment, an attempt was made to overdrive the p.a. stage by turning the transmitter gain control fully clockwise. The signal quality remained good despite the fact that household sounds became almost as audible as the operator's voice.

The TR-4 was used to excite a 1-kw. linear amplifier and performed as well as it did in the "barefoot" mode. A spare set of relay contacts is connected to the power plug in the TR-4, making it possible to control an external relay such as might be contained in an outboard linear amplifier.

An MMK-3 bracket assembly is available to TR-4 users, permitting them to mount the transceiver under the dashboard when the TR-4 is used in a mobile installation. — *WICER*

#### Drake TR-4 Transceiver

Height: 5 $\frac{1}{4}$  inches.

Width: 10 $\frac{3}{4}$  inches.

Depth: 11 $\frac{3}{8}$  inches.

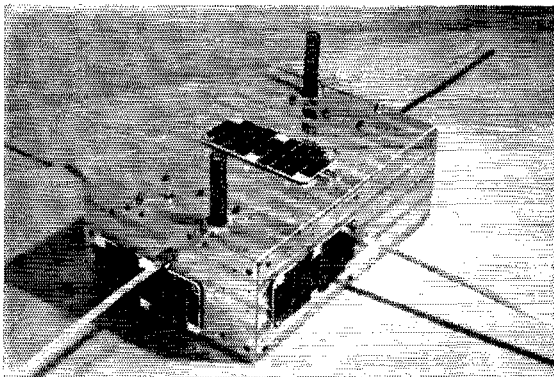
Power requirements: 650 volts d.c., 500 ma.; 250 volts d.c., 175 ma.; —45 to —65 volts d.c., 35 ma.; 12.6 volts a.c./d.c. at 5.5 amp.

Price class: \$550—600.

Manufacturer: R. L. Drake Co., Miamisburg, Ohio.

# OSCAR 3 Report

## Communications Results



BY H. C. GABRIELSON,\* W6HEK

At about 1933 GMT on the ninth of March 1965, the OSCAR III satellite crossed the Equator in the vicinity of 297 degrees west longitude to begin orbit number one. The nominal orbit parameters were: altitude — 570 statute miles; period — 103.5 minutes; and inclina-

tion — 70 degrees. The orbit was very nearly circular. The Oscar-satellite package contained a communications repeater (termed a translator), a c.w. beacon transmitter and a telemetry transmitter, all operating in the international portion of the 2-meter amateur band. The c.w. beacon failed to operate normally, while the telemetry

\* 1150 Polk Ave., Sunnyvale, Cal.

Table I  
Contacts Through Oscar III

Europe		North America		
DJ3EN.....1	HB9AR.....1	KL7CUH.....2	K4QIF.....9	W6MSG.....11
DJ3ENA.....1	HB9RG.....10	VE3BQN.....1	WA4TWW.....1	W6PJA.....1
DJ4AU.....2			W4WNH.....10	WA6QQI.....1
DJ4EZ.....1	OH2BAA.....2	W1BU.....2	K4YYJ.....1	WA6RSG.....1
DJ4ZC.....5	OH2DV.....1	W1HDQ.....4	W5AJG.....1	W6TYM.....1
DJ6DT.....3		W1JSM.....4	W5JWL.....1	W6YK.....2
DJ9DT.....2	OK2TU.....1	W1QXX.....3	W5KXD.....2	W7JRG.....7
DL1EI.....1	OK2WCG.....1	W2AMJ.....5	W5NIUK.....1	W7UAB.....5
DL3BJ.....1		W2AZL.....1	K5TQP.....3	W7ZC.....1
DL3YBA.....21	ON4FG.....2	K2GUG.....7	K5WXZ.....10	W8FEH.....1
DL6EH.....2	ON4TQ.....1	K2IEJ.....3	W5XXD.....1	W8KAY.....3
DL6WG.....1		K2MWA.....21	W6AB.....1	W8NSH.....2
DL9AR.....1	SM5BSZ.....3	WA2WEB.....18	W6AJF.....2	W8YIO.....1
DL9GU.....3	SM6CSO.....4	W3BYF.....2	W6DQJ.....1	K9AAJ.....13
	SM7OSC.....10	W3SDZ.....3	K6GCD.....1	W9TGB.....5
E44AO.....7		W4AWS.....6	W6GDO.....7	K9CER.....1
	UP2ON.....1	W4HHK.....5	K6HAA.....1	W0EOZ.....1
F9MX.....1		K4XC.....4	K6HNS.....1	W0EYE.....5
		K4MHS.....2	WB6JZY.....13	W0IC.....1
G3BAR.....1		K4MNH.....1	WB6KAP.....2	W0IDY.....1
G3LTF.....2		W4MNT.....14	W6KEV.....1	W0LER.....2
G6AG.....1		W4PFQ.....1	WA6KLL.....3	W0NWX.....1
			WA6MGZ.....9	W0PHD.....1

Table II

## Stations That Reported Hearing Calls Through Oscar III

WA2WEB.....	401	WA6TGY.....	35	G3NLR.....	13	DM2BML.....	6	K6GCD.....	2
W4WNH.....	311	W6MOX.....	34	OHISM.....	13	PA9KT.....	6	WA6MIA.....	2
W1JSAI.....	260	G3LTF.....	33	UA6AJ.....	13	W6ASH.....	5	W7QLC.....	2
DL6EZA.....	213	V6BNT.....	33	PA9IF.....	12	W6BJT.....	5	K9THZ.....	2
W4MNT.....	184	W1AIP.....	30	DJ8UC.....	11	W6DMN.....	5	W0BZY.....	2
K6WXZ.....	160	W6PFB.....	30	OH7NF.....	11	W6EDU.....	5	W0H8K.....	2
K1HTV.....	156	WB6JZY.....	29	OH9NV.....	11	W6OUE.....	5	DJ2ND.....	2
W8SMC.....	134	K6TSK.....	29	OZ3GW.....	11	W8SKPJ.....	5	DL9GU.....	2
W9TKX.....	129	K7BBO.....	29	UR2CQ.....	11	W0PFP.....	5	H1ITFU.....	2
W7ZC.....	125	DL3BJ.....	29	DJ1HH.....	10	DK7AA.....	5	11KG.....	2
W1FCJ.....	124	WB3HS.....	28	DL0UL.....	10	HB9**.....	5	OH2BA.....	2
WA6QQI.....	124	G6TS.....	27	LX1CW.....	10	PA0L.....	5	OZ4EM.....	2
K7ICW.....	121	11ER.....	27	VE4UM.....	10	Z62APC.....	5	VE2ET.....	2
WA2YLL.....	119	WA6HTJ.....	26	W6AJF.....	9	W4LSQ.....	5	VK2ZRG.....	2
K6HMS.....	118	W0WAP.....	26	W6QWN.....	9	K6HVV.....	5	Z12CD.....	2
W8KAY.....	113	W6GKP.....	25	WA6RLW.....	9	SM7ANL.....	5	VL2DT.....	2
XW2ABP.....	112	W5TTB.....	25	W6ZRR.....	9	K1EPM.....	4	W1DF.....	1
W6GDO.....	111	OH2GY.....	25	DJ3EN.....	9	W6TFB.....	4	K2DZV.....	1
W6MSC.....	107	W2ABP.....	24	DJ4BG.....	9	KL7DFE.....	4	W2GAX.....	1
W9TGB.....	107	W9VPU.....	24	F9MX.....	9	DH8UC.....	4	WB2IQG.....	1
WB6KAP.....	106	W6JQV.....	24	GM3GU.....	9	DJ3FC.....	4	W21YR.....	1
W2UTH.....	85	W0PHD.....	24	W2DID.....	8	E16D.....	4	WA4TWV.....	1
K1VDZ.....	84	DJ4AU.....	24	W2UK.....	8	G3AYC.....	4	W6IFE.....	1
W1HDQ.....	82	GW3MFP.....	24	W4APL.....	8	HB9RG.....	4	W6KAY.....	1
K6CER.....	81	OE6AP.....	24	K5TQP.....	8	SM6PU.....	4	W6OYJ.....	1
W4HJZ.....	76	W9FBC.....	21	W6ITF.....	8	SM6CSO.....	4	K7DVK.....	1
W0EOZ.....	75	F8TD.....	21	W0UBD.....	8	VE6IP.....	4	W7FEN.....	1
W6PJA.....	73	OZ9OR.....	21	DM2ACM.....	8	UA1DZ.....	4	W8YCP.....	1
W7OUE.....	73	F8NB.....	21	HB9WB.....	8	UR2AA.....	4	W0IDY.....	1
W0EYE.....	71	W2FAN.....	20	VE4GI.....	8	UR2BU.....	4	K0IJN.....	1
W07BNO.....	71	K2MWA.....	20	F8DO.....	8	WB2COZ.....	3	W0PAM.....	1
W2AMJ.....	67	DJ0013.....	20	W2MZE.....	7	WA2UCP.....	3	W0RTI.....	1
WA6KLL.....	66	G3IUD.....	20	WA4FJM.....	7	K1RMIH.....	3	W0TGB.....	1
DL3YBA.....	66	W1AW.....	19	W4ZRH.....	7	WB6CKT.....	3	W0THX.....	1
DL6EH.....	64	K9GSC.....	19	K6DEB.....	7	W6GDP.....	3	K0VTV.....	1
DJ7AA.....	63	DM2BEL.....	19	K6KV.....	7	WA6QIC.....	3	W0WVM.....	1
K2GJJ.....	62	W3FB.....	18	WA6TKC.....	7	WA6ROJ.....	3	DJ2LF.....	1
SM7ZN.....	61	DJ4ZC.....	18	W7GVX.....	7	W8EHW.....	3	DJ5DI.....	1
K6HCP.....	60	DL3LR.....	17	W8VVD.....	7	W8JAY.....	3	DJ910.....	1
SM7OSC.....	59	W2WGL.....	16	DJ6PP.....	7	W9NTP.....	3	DL9NP.....	1
W6ELT.....	56	K6JC.....	15	DL1LS.....	7	K17CLH.....	3	DM2CGN.....	1
K3CFA.....	55	DL3EV.....	15	OH2HK.....	7	DL1CK.....	3	E12A.....	1
K4YYJ.....	55	DL9AR.....	15	PA9FB.....	7	DL8AR.....	3	OH1WY.....	1
W4AWS.....	54	E16D.....	15	VE3ETO.....	7	DM3YJL.....	3	OZ0OR.....	1
W7JRG.....	53	WB2FXB.....	14	K3EHS.....	6	F8NB.....	3	PAOCRA.....	1
E4A4A.....	51	W2UZR.....	14	K4RCX.....	6	G3GRA.....	3	PA0WX.....	1
W6WOO.....	46	K3AKR.....	14	W5MJD.....	6	11BMV.....	3	VK1VP.....	1
ON4FG.....	44	K6GYX.....	14	W6GHV.....	6	PA9PMQ.....	3	VK2ZBJ.....	1
K17CUI.....	43	WA6TXH.....	14	K6QUH.....	6	W7AYH.....	3	VK2ZMR.....	1
DJ9DT.....	43	W8END.....	14	W8ENM.....	6	W1AIM.....	2	DJ8ABP.....	1
DL9AR.....	43	K9AAJ.....	14	W8ZJM.....	6	W2EDC.....	2	VK5ZDX.....	1
WA6MGZ.....	42	DL9GU.....	14	K9CHU.....	6	W3SDZ.....	2	VK5ZAI.....	1
W2BLV.....	39	W6PYM.....	13	DJ1SL.....	6	W4ALK.....	2	ZL1DE.....	1
W4HMK.....	38	W0LER.....	13	DL1EI.....	6	WA6BAH.....	2		
WB6HOT.....	37	DJ1EH.....	13	DL1LB.....	6	WA6DBL.....	2		

transmitter sent temperature and voltage data for several months. The translator functioned for about 250 orbits (18 days) at which time the primary battery ran down.

This is a summary report of the communications performance of the translator portion of the Oscar III satellite. Other phases of the operation will be covered later in separate reports. It is the intent of this report to present a listing of stations that made contacts through the satellite, a listing of stations that reported hearing relayed signals, and lists of station calls that were reported as being heard through the satellite. The information contained herein is based on information reports submitted by nearly 300 observing stations.

## Contacts

A total of 176 two-way contacts was claimed through Oscar during 247 orbits of active translator operation. Table 1 shows call letters of stations successfully communicating through the satellite, along with the number of contacts made by each. Contacts were made by 98 participating stations, 67 from North America and the remaining 31 from Europe. All continental U. S. call areas plus Canada and Alaska are represented in the North American list. In Europe, contacts were reported by stations in Germany, Finland, Sweden, France, Spain, Switzerland, Belgium, England, Czechoslovakia and Lithuania. Transatlantic contacts were reported be-

tween Germany (DL3YBA) and Massachusetts (W1BU) during orbit 61, and between Spain (EA4AO) and New Jersey (W2AZL) during orbit 157. While several transcontinental contacts were reported, the longest distance was the one between Alaska (KL7CUH) and New York (K2IEJ). The great majority of all contacts were made using c.w., but 5 stations made voice contacts using sideband. DJ4ZC reported s.s.b. contacts with DL3YBA, HB9RG, and DJ4AU. DL3YBA also reported a sideband contact with DJ4EZ.

### Heard Reports

Heard reports were submitted for the following stations on sideband: DJ4EO, DJ4JC, DJ4YP, OZ4RO, W1BU, W4HUQ, W5QDL,

K5RHL, W6DEE, W6GDO, W7JCU, K7DZG, KSBPA, W9WDB, W9WDD and ??DQI. A few weak but unidentifiable a.m. carriers were reported and several observers reported hearing teletype signals. None of the teletype signals was identified. Transmitting stations from Europe, North America and Australia — New Zealand, were logged. Table II is a tabulation of the 273 observing stations who submitted reception reports of signals heard through the satellite. The listing also shows the number of reports by each reporting station and is arranged in descending order of the number of reports submitted.

Table III is given in three sections (A, B, and C) showing all of the station calls which were reported as being heard through Oscar. This

Table III-A

*Calls That Were Reported 2 or More Times Through Oscar III*

K2GGC.....397	W5KXD.....22	W4MHS.....6	W7WDP.....3	K6IB.....2
DL3YBA.....276	K7DZG.....22	K6GCD.....6	W8YIQ.....3	W6JRG.....2
K9AAJ.....216	K7NII.....22	W6MGZ.....6	W9AAJ.....3	W6ZY.....2
K4QIF.....228	DJ3ENA.....22	W6RLW.....6	W9IFA.....3	W6KAP.....2
K5WXZ.....211	K4YYJ.....21	W6TYM.....6	W9NTP.....3	W6MIGZ.....2
HB9RG.....155	W1QXX.....20	W0PHD.....6	K9QIF.....3	W6AIMU.....2
K2IEJ.....146	W4HHK.....20	DL6EZA.....6	W9WDD.....3	W60ZY.....2
K2MWA.....140	W8PEH.....20	G3TRH.....6	W0EOZ.....3	W6PDO.....2
W4WNH.....132	W6DEE.....19	SM7ZN.....6	W0TCB.....3	K6YQH.....2
W4MNT.....127	W0IC.....19	K2GUN.....5	DL3BJ.....3	W7PUA.....2
W66JZY.....127	DL9GU.....19	K2RCH.....5	DL9GU.....3	W7JCG.....2
SM7OSC.....119	W2LVQ.....18	W3TDF.....5	G3BAR.....3	K7UAB.....2
WA2WEB.....115	K9CHU.....18	W4FJ.....5	I1HC.....3	W8AJF.....2
HB9RG.....114	W1JSM.....17	W4YYJ.....5	SM7BCX.....3	W8CKY.....2
W2AALF.....111	W6KEV.....17	W6DNJ.....5	V6GNT.....3	W8JRN.....2
W6MIGZ.....107	W0NWX.....17	W6KLL.....5	W1BUJ.....3	W8LIO.....2
W8YIO.....107	SM6CSO.....17	W6PJA.....5	K2AALJ.....2	W8NSJ.....2
K9UIF.....89	W6DNG.....16	W0LFE.....5	W2AWJ.....2	W9EGB.....2
W9PGB.....86	K6HMS.....16	DJ4AU.....5	W2AXU.....2	W9AIAL.....2
W3SDZ.....85	VJ3BQN.....16	DJ9DT.....5	W2DNE.....2	W9NTW.....2
W6GDO.....83	W6AJF.....15	UP2ON.....5	W2EMB.....2	W9NWX.....2
G6AG.....74	W4WNS.....13	VJ3BPR.....5	W2FDI.....2	W9UIF.....2
W1BU.....71	K6LCP.....13	W2LWL.....4	W2FSQ.....2	W0FNN.....2
W6KAP.....69	W6YK.....12	K4MHS.....4	K2IBJ.....2	W0ICR.....2
G3LTF.....64	W1YQI.....11	W4VHI.....4	W2LWE.....2	W0ICW.....2
K4IXC.....62	K2RTH.....11	W4WNT.....4	K2MGE.....2	W0JDY.....2
K3KEO.....60	W4QIF.....11	W5NUK.....4	K2MILJ.....2	K9JN.....2
W4AWS.....58	W6NLZ.....10	K6JYO.....4	K2MIW.....2	W0LSL.....2
W7JRG.....58	G3BA.....10	W6KAP.....4	W2QEU.....2	W0ITD.....2
DJ4ZC.....58	G3EDD.....10	W6RSG.....4	W2WEB.....2	W0SJA.....2
K4MHS.....55	OZ9AC.....10	K6SDZ.....4	WA2WEK.....2	W0ZIB.....2
W5AJG.....55	VJ3DIR.....10	W88DJ.....4	WA2YXS.....2	KI6DEM.....2
W7UAB.....55	W5UKQ.....9	K8YIO.....4	W3HLS.....2	K17CAZ.....2
W9ZIH.....55	DJ2RLA.....9	W9PBP.....4	W3QIR.....2	DJ4EN.....2
W7LHL.....52	OH2RK.....9	SM5OSC.....4	W4BUM.....2	DJ4EZ.....2
EA4AO.....51	W4IXC.....8	W1BUD.....3	W4HUG.....2	DJ4JC.....2
W2AZL.....50	W6UXN.....8	W1JDF.....3	K4IXZ.....2	DJ6QK.....2
W3BYF.....46	K7ICW.....8	W1LMZ.....3	W4LSQ.....2	DJ8QL.....2
W8KAY.....44	W7PUA.....8	K1LSY.....3	K4MNH.....2	DJ9DN.....2
DJ3EN.....40	K8AJF.....8	W2GUG.....3	K4MSI.....2	DL9CUE.....2
K5TQP.....39	DL6TK.....8	W2MWX.....3	K4QSF.....2	G2HCG.....2
W6MSG.....39	W1TJW.....7	K2OJI.....3	W4TGB.....2	G6GA.....2
W8NSH.....36	K2LMG.....7	K8CFA.....3	K4UGF.....2	G6GN.....2
SM5BSZ.....34	W6QJW.....7	W3GLC.....3	W4ZIH.....2	G6NB.....2
W0EYB.....33	W6TXY.....7	W3KEO.....3	K5JAZ.....2	HB9RF.....2
ON4FG.....31	W8PT.....7	K4BUZ.....3	W5KXL.....2	I1HK.....2
W1HDQ.....29	K0CER.....7	W5AJF.....3	K5MBV.....2	OH2BAA.....2
W4BUZ.....29	DL1EL.....7	W5NU.....3	W5MXZ.....2	OH2RH.....2
W6DQJ.....29	DL9SHA.....7	K5WOZ.....3	W5UJF.....2	OK1AHO.....2
K6TSK.....28	OH1NL.....7	W6GHV.....3	W5VK.....2	OZ9OR.....2
W0LER.....28	OK2WCG.....7	WA6JZY.....3	K6WTF.....2	SM4CDO.....2
W0MOX.....26	ON4TK.....7	WA6QQL.....3	W5VXN.....2	SM6OSC.....2
KL7CUH.....26	K2EJI.....6	W6TSK.....3	W6AB.....2	SM6PU.....2
W5JWL.....23	K2MWA.....6	K7JRG.....3	K6DQJ.....2	VK2ZRG.....2
WBWXZ.....23	W4HJQ.....6	W7NII.....3	W6ELT.....2	VK3ATN.....2

Table III-B

## Partial Calls Reported Through Oscar III

DL6**	W2***	DJ3**	K2N**	DJ***	WA2**B	K3**	KL7C**
K1***	W4MS*	G3**	G3**F	OK2W**	K3**	K3***	W7WR*
WB6***	WOEX*	K2MJ*	W9***	DL3*Y	VE3***	K7***	WA2W*B
K8***	*5WXY	WA2WO*	***ZY	K5***	K6*SE	W6***	W9*PV
K9J**	WA2YX*	WA2***	W7U**	K3***	W6***	W7***	W9***
KL7C**	WB6J**	K2***	W7H**	W1FK*	*2YXS	W8*RG	*9FHU
W6M*E	W1Y*L	W4**H	WB6***	K3KE*	K*SDK	K9MA*	SM7B*
W4*SB	WA2***	W9***	W7***	W0LE*	OZ9*R	W3U?*	DJ1**
WB6***	VE3***	W3***	W9OX*	W9GI*	K6***	W2A**	C3LQ*
K7***	W1*JK	W8***	DL1**	W3K**	**YCG	W5K**	W9NL*
K8***	K4***	*5JS*	ON4***	W5***	W4A**	W0*UE	W9T**
ON4**	*8G*Y	*J9DI	K4CX*	W8***	W8***	K6***	W6TK*
DL1L*	*1YXP	DL9DT*	W3E*Z	*5WXM	WA2***	*2AMJ	W6ZK*
G3**	*OPSA	*WBE*	W5WK*	W8P?*	W1***	W**AP	VE3SQ*
K9TD*	**NUG	K5WX*	K9OC*	K7C**	W4***	VE***	W5K**
KL7AU*	**QLX	W6B*K	W5VY*	W7U**	W7JR*	W2***	DJ3**
K9***	**IIZ	W4***	VE3E*	W*AGB	C3GL*	WB6***	W9***
SM7OS*	W5***	WB6***	K8R**	W7Q*W	DL9*U*	K4M?*	W7***
DL1L*	W1***	W*RLU	K6H**	W6G1*Y	SM3**	W9***	DJ4*U
HB9R*	OK1**	K*RTH	**8YIC	VE3**	G2*DT	W6***	EA1**
G8**	WB6*ZY	W7E*	W8Y**	VE3**	G3**	DJ3ON*	W9***
***CB	K5***	K7NI*	DJ9**	W5***	OZ9*C	DJ3**	UB1**
W4MS*	K6DZ*	W7U**	WA2***	K2***	VE3D**	UB***	*2ARK
K5IS*	SM5**	WB6***	G3**	W7*PK	W8Y**	DJ4TY*	DL7**
W9Z*	*0CIU	**2DG	W9***	W4***	W2**	DJTY*	G3***
W9*RB	K2G**	**3NXT	*8DNO	**MWA	W3***	OK1**	F3*N
*BQH	W9***	VE***	**8YIC	W7U**	W9***	VE***	OK3**
W7TA*	**WXXZ	W9PB*	K6TK*	SM7**	K6KS*	K2Y*	DJ4**
W4FJ*	W5WX*	K5TT*	W0EN*	G3*DD	W3CO*	W9SF*	K9A**
W4HU*	WB6J**	VE3***	WA2WE*	W2***	W1A**	W4WR*	W8K**
W6DE*	VE3**	K5***	K2NW*	DJ9**	W4E**	W48**	K8***
W9T**	WB6***	VE3SQ*	WA0IC*	W7*IL	K3***	K2***	W8K**
W0M**	W0TT*	K5S*A	VE3BQ*	DJ3EN*	K1*LF	W0***	W4M**
K6D**	K6***	WA6***	W0Y*F	DJ2A*	VE3***	W9***	VE3**
W6D**	K4***	W2*ZL	K2***	DL3**	W6***	W8***	VE7**
W4***	**PW	*9NTP	VE3**	ON4**	W8***	W4***	W6***
*9SUJ	**2GUG	W9G**	*8SDJ	DL3**	*5VY	**KEO	*1WN
*8EJH	G*GU	W6G**	**JHG	DL9**	*0GFP	*0GFP	**DZG
*4MDO	W0YS*	W7***	W9CH*	G1**	K2SA*	W75*B	K6TS*
*4DQI	W0TT*	W5***	K9C*U	DJ9**	W46**	W4M**	DJ4E*
W6AS*	**AZL	W**QP	K9U**	W2RT*	G3*S	DJ9**	DJ4**
W3CU*	W6***	OK*TU	DJ2**	W1LM*	***BSZ	W5**	DJ9**
W6*DO	**HDQ	SM7OS*	K0**V	W8KP*	W5A**	W3*MJ	*9VV
W6***	K2***	YU1EX*	K4***	W3DZ*	W2***	W3***	G6*G
W*YWD	W0*IC	G3**	*9UIF	W5VY*	OK2W*	W2***	UB2**
DL*OJ	W5***	G3O**	SM***	W1C**	I1H*	W9***	OH2*V
W*DWI	W6***	SM5**	DJ3EN*	K3*BY	DJ2*E	W8***	K2***
UAO**	W*6MGZ	K9A*J	SM7O*	W7**	G6**	W4***	K2H**
LU3**	OK1**	W1***	UA0**	W4*VG	OZ***	K6TY*	W7***
**BP	G5A*	K5***	DJ4*U	**2EW	SM7C*	W46**	W8***
ON4**	DL4***	K4*YJ	DK4*U	W*FNR	W2AO*	F3**	G3***
G3**	UD3***	*8SSE	**JZY	W5WE*	K5WX*	W4***	*4TX*
OK***	OZ9**	VE3BQ*	G3N*	W6GR*	W2AJ*	DL6*Z	*3T*F
SM6**	ON4**	K5***	*3NC	W2AQ*	W0DG*	ZL1**	
SM6C*	HB9**	W5***	SM5B*	VE3B*	W7JR*	SM7*C	
SM6***	OK1**	W3*YF	DJ9**	K7E**	K9A*F	I1**	
SM7**	OZ***	K4MH*	E4A*	W7R**	K3K**	W1**	
F8***	VE2E**	W5K**	SM7***	W7I**	W2E**	*2WTB	

list, too, is arranged in descending order of the number of times each station call was reported. Table III-A shows the 275 station calls which were reported two or more times. The number following each call is the number of times that call was reported. Table III-B is the list of 459 partial calls which were reported. Table III-C shows the 822 calls that were reported once.

The total number of different complete calls (1097) reported may be somewhat misleading. It will be noted in scanning the lists of calls reported once or twice that some of them are probable misinterpretations of the call of one of the more actively-reported stations. For example,

WA2WEB was the subject of 115 reception reports. Also in the list you will find W2WEB (twice), WA2WEH, WA2WEK (twice), WA2WEP, WA2WEX, WA3WEB, WA4WEB, and WA6WET. All of the reported calls have been reproduced in these lists just as they appear in the incoming reports. Similarly, some of the partial calls in Table III-B are apparently incomplete versions of the more active calls (for example, WA2WE?). Again, all such calls have been presented in these lists just as they appear in the incoming reports. I have taken the liberty of omitting, as being of no real value, those reports which simply stated the fact that several W1s, 2s

Table III-C

## Calls That Were Reported Once Through Oscar III

W1ABZ	F2GWW	W3IGZ	W4MNF	K5KAP	W6GDD	WB6WBY	K8RIO
K1AFR	W2HJ	W3LXK	W4MOC	W5KAP	K6GDO	W46WET	W8TAC
K1ALE	W2IEJ	W3KE	W4MS	K5KIE	W6GEV	WB6WJZ	W8TAM
W1AMJ	K2IGJ	K3KTF	W4MSII	K5KJT	W6GFG	W6WNH	W8TIW
W1AWJ	W2LID	W3LHC	K4MSS	K5KXD	WB6GGO	K6WXX	K8TXU
W1AZK	K2IV	K3LVA	W4MST	W5KXN	W6GHJ	WB6WZO	W8WNS
W1BB	W2AJAM	W3LWJ	W4MVB	W5KXT	W6GOC	W6YHM	W8YEO
W1BDQ	W2JTO	W3LWQ	W4N6E	K5KXZ	K6GYK	K6YTM	W8YOK
W1BGU	W2JUG	W3MJA	K4NMF	W5KXZ	K6HAA	K6YVO	W8YOK
W1B8G	K2KEO	K3QER	W4NMT	K5LKZ	K6HCW	W7AQQ	W8YOW
W1BUC	W2KET	K3QOK	K4ORZ	W5LX	K6HMH	W7AQJ	W8YVO
W1BUZ	K2KH	K3RTH	W4PFQ	W5MGZ	W6HPJ	W7AYB	W8ZIS
K1CRO	W2KJI	W3SDR	K4PXZ	K5MHH	WB6HUT	W7BKA	W8ZVI
W1DBT	W2KOM	W3SET	K4QFF	K5MOO	K6IBY	K7CVH	W9AAG
W1DQI	K2KWI	W3SEZ	K4QIC	W5MWJ	W6IID	W7DM	K9AAR
W1DUB	W2LJ	W3SK	K4QIS	K5MNQ	K6ISK	W7DSL	K9AAW
W1GLL	W2LJI	W3SXZ	K4QJF	W5NCE	W6JMY	W7DZM	W9ADD
W1GXG	W2LVE	W3UCA	K4QTF	W5NEC	WB6JZA	W7DZW	K9AIO
W1GXX	W2LVF	K3UJG	K4QXF	W5NJZ	W6KAW	W7EGN	W9AIR
W1HGZ	K2MAJ	W3VWI	K4QYJ	W5OZI	W6KDO	K7GCD	W9AIS
W1LFQ	W2AMB	W3WAB	K4UIF	W5PJA	W6KEP	W7HIL	K9ASD
W1HSL	K2MCO	K3WB	K4UKG	W5QDL	K6KEV	W7HPO	K9ASF
W1J8K	K2MFA	W3WID	W4VCJ	K5QLF	W6KGC	K7HRD	K9AWJ
W1JZD	W2MIE	W3WIL	K4VHS	K5QXZ	W6KPN	K7HZB	W9AWN
W1KGM	K2MJR	W3YKO	W4VHV	K5RLL	K6KV	W7IFA	K9BUD
W1KJ	K2MRP	W43YLL	W4VNH	K5SDM	W6KYP	W7JCU	W9BWG
W1KUR	W2MWD	K3YVJ	W4WEB	K5STA	W6MDY	W7JPG	W9CAU
W1LEW	K2MWF	K3ZC	W4WEN	K5SXI	K6MGA	W7JRI	W9CUI
K1HK	K2MVG	W4ADS	W4WMA	W5TQP	W6MGC	W7JRM	W9CID
W1LAL	K2MWJ	W4ALS	W4WMI	K5TR	W6MGI	W7LHI	W9CVS
K1LSC	K2MWO	W4ARK	W4WNE	K5TDX	W6MGP	W7LRL	W9ELI
K1LSK	K2MWX	K4ASY	K4WNI	K5TXP	W6MGS	W7LWI	W9ELX
W1AMK	K2MXE	W4AUG	K4WNS	W5UWA	K6MHS	W7MGZ	W9ETG
W1NH	K2NBP	W4AW	W4WNU	W5YYQ	W6MIW	W7MSG	W9FIA
W1NSH	W2NCE	W4AWI	W4WNX	K5WVZ	W6MKZ	W7MSL	W9FUR
W1NWX	W2NCF	W4AWL	K4WOZ	K5WHZ	W6MLL	W7NCW	W9GBP
W1OQI	W2NEB	K4AWN	W4WT	K5WKE	W6MME	W7PRQ	W9HRV
W1OXX	K2NWA	W4AWR	W4WTC	W5WKY	K6AMI	W7PRS	W9HTH
W1PBT	W2PJJ	K4AWS	W4WXZ	W5WS	W6MMV	W7PUB	K9JFP
W1PDT	W2QYX	K4AXT	W4YFH	K5WX	W6MNA	K7RUA	W9JPB
W1PHE	K2REB	W4BOF	K4YF	K5WXX	K6MS	K7SDK	K9KIF
W1PRJ	W2REJ	W4BRZ	K4YIM	K5WXX	K6MSG	W7TAX	W9KXZ
W1QKX	K2RUG	W4BU	W4YQI	K5WXX	W6MSM	W7TUA	W9LOX
W1QXI	K2RVA	W4BUG	K4YQJ	K5WZX	W6MSN	W7UAG	W9MSH
W1QYX	W2TLV	W4BWZ	W4YWK	W5XXD	W6MSZ	W7UAK	W9OSH
K1RTH	W2TQI	W4DUD	K4YZ	K5XZ	W6MVP	W7UAN	W9XII
W1SDZ	W2UG	W4EGT	W4ZCM	W5YK	W6NAG	W7UBK	K9PBP
W1TAW	W2UK	W4FIW	K4ZIV	W5YX	W6NGR	W7UTB	W9PGW
W1TWU	K2UP	K4GUD	W4ZKH	W5ZIH	W6NHG	W7UZY	W9PTP
W1YDS	W2UTS	K4GUZ	W4ZN	K5ZXD	W6NNH	W7VAB	K9QYD
W1YQA	K2VWA	W4GUZ	W4ZNC	W6AJA	W6NQJ	W7WCG	W9SU
W2AALB	K2WAF	W4IAG	W4ZNH	W6AMJ	W6OQJ	W7WRC	W9TG
W2AMG	W2WEH	W4HJK	W4ZXI	W6ANJ	W6OSO	K7YIH	K9TGB
W2AMH	W2WEP	W4IJZ	W5AAV	W6AQ	K6OWA	W7ZC	W9TGD
W2AMU	W2WEX	K4HMS	W5ABW	K6AZL	W6OWJ	K8AFJ	K9TGD
W2AQV	K2WMI	W4IQJ	W5AGJ	W6BAA	W6PWA	W8AMJ	W9TGM
W2AZAL	W2WUU	W4HSI	W5AJM	WB6BAP	W6PWT	K8AXU	K9TGM
W2AZO	K2YCO	K4HBC	W5ANH	K6BCM	K6QU	W8CEO	W9TGP
W2AZY	K2YCR	K4HCV	K5APK	W6BJZ	W6QS	W8CO	K9TGN
W2BCC	K2YF	K4HCX	K5ARX	K6BJZ	K6RJB	W8DEI	W9TGT
K2BQR	K2YXF	W4HHK	W5AVG	W6BKA	K6SDG	W8EAY	W9TMB
K2BUG	W2ZR	K4HOC	W5AWP	W6BYW	WB6SDZ	W8EJ	W9TMB
K2CJI	W3AIR	W4HXK	K5BMV	WB6CGP	K6THK	W8FEE	W9TOS
W2DKY	W3ANJ	W4XET	W5CAY	W6DEA	K6THK	W8FEI	W9TQI
K2EIJ	W3AUJ	W4KZF	W5CPK	W6DRG	W6TKJ	W8FER	W9TQS
W2EJX	W3BKP	W4LTO	W5FS	W6DOR	K6TKK	W8KCY	K9UID
W2EUK	W3BKU	K4MAL	W5HKQ	W6DQI	K6TNK	K8KPE	K9UIP
W2FZT	K3BPA	K4MDS	K5HMY	W6DWJ	K6TSC	W8KPE	K9USE
K2GMI	W3BPR	W4MET	W5FM	W6DX	K6TSM	W8KW	W9WDB
K2GMM	W3BY	W4MGT	K5IXC	W6DYE	W6PTB	W8KWW	W9WDH
K2GMY	K4DEO	K4MHG	W5JRM	W6DYT	W6PWK	W8LPO	W9WLZ
K2GNE	W3DSZ	W4MFE	W5JUZ	W6EGH	W6GUK	W8LVE	W9WLD
K2GGG	W3FBZ	K4MIF	W5JW	W6EIV	W6IOW	W8NAH	W9WLD
K2G8F	K3FGV	W4MIZ	K5JWC	W6ESM	W6UQH	W8NHH	W9WOK
K2GTG	K3GA	W4MKJ	K5JWL	K6FCH	W6UXN	W8NSD	W9XBB
K2GUM	K3HHS	W4MKT	W5JWR	W6FZA	K6UZ	W8PBY	W9YB
W2GUS	W3IDZ	W4MMT	W5JWS	W6GCD	W6WBT	W8PTY	W9ZCR

Table III-C — Continued  
 Calls That Were Reported Once Thru Oscar III

W9ZIS	W0JRE	W0WPH	DL2EI	G3BO	HB9RGD	OZ90	VE3BPA
W0AIK	W0LAR	K0YYJ	DL3BJR	G3ED	HB9WB	PA0COB	VE3BQ
W0AMC	W0LFW	KH6IZY	DL3BYA	G3EDP	HB9WG	SM1ZZN	VE3BW
K0AMJ	W0LIR	KH6QPE	DL3EN	G3HBW	HB9ZN	SM4COK	VE3BYN
W0AZL	W0MGE	KL7CLH	DL3ENA	G3HRO	LA3YS	SM5BI	VE3BZN
W0BJJ	W0MOK	DJ1EQ	DL3SP	G3JNC	OE3TQ	SM6GU	VE3DNM
W0DDJ	W0MUX	DJ2BE	DL3VOA	G3KAD	OE4TQL	SM7BA	VE3DP
K0DOM	W0MWX	DJ3DN	DL3OFA	G3LBA	OH2DV	SM7BAE	VE3EQ
W0ENC	W0NSH	DJ3ET	DL3OPA	G3LCC	OH3VHF	SM7BS	VE3ES
W0EYS	W0NWC	DJ3NC	DL3XW	G3LX	OK1AH	SM7BSX	VE3GQT
W0FDZ	W0NWD	DJ3SML	DL3YAB	G3NN	OK1CG	SM7BSZ	VE3KEO
W0FNV	W0NWL	DJ3YBA	DL3YD	G3SON	OK1WA	SM7CDO	VE3KYF
K0GJJ	W0NWO	DJ4DZ	DL3YDS	G3SRA	OK1ZG	SM7CH	VE3MA
W0GMQ	K0QOI	DJ4EC	DL4Z	G3VR	OK2RC	SM7CS	VE3MIR
W0HCV	W0PAD	DJ4EO	DL6BJ	G4LR	OK2TU	SM7GSC	VE3MSM
W0HJZ	W0PSF	DJ4GZ	DL6DT	G4LU	OK2WCR	SM7OCS	VE3OAN
W0HWX	W0QXX	DJ4IE	DL6EMI	G5AG	OK7AHO	SM7OS	VE3SQN
W0IB	W0RED	DJ4JZ	DL6GU	G6ALV	ON4AO	SM7OSA	VE3QIF
W0IBD	W0RFR	DJ4LT	DL6WG	G6AP	ON4FD	SM7OX	VE6BPG
K0IDY	K0RKT	DJ4LZ	DL9GV	G6HG	ON4FM	SM7SK	VE6VF
W0LJA	W0SWX	DJ4YP	DL9GW	G6JP	ON4TX	SM7ZYM	VK2AFW
W0IKP	W0TDE	DJ9DM	E44AN	HB9AP	ON4UG	UR2DT	VK7PF
W0ISR	W0TKX	DL1CK	F2TU	HB9AR	OZ4RO	VE1EK	ZL1DE
W0IU	K0UWV	DL1DA	G2BA	HB9BP	OZ5EDR	VE2DIL	ZL1PE
W0LXC	W0WEB	DL1GA	G2DT	HB9LB	OZ9AK	VE2IR	
W0JAS	W0WER	DL1LS	G3AG	HB9RA	OZ9AV	VE3BEK	

etc. were heard in the translator passband.

In addition to the information incorporated as part of this report, there are several comprehensive source lists available. The basic list (about 2750 lines) shows the specific heard calls which were reported during each orbit by each reporting station. This information is arranged either in alphabetic sequence by the call letters of the reporting station or in orbit sequence. This same basic information has also been rearranged (3550 lines) in the form showing the heard stations which each listening station reported hearing during each orbit. This version of the comprehensive list is also available in either call letter or orbit sequence. In addition there is a complete listing of all reported contacts. Any of

these lists can and will be made available in several different forms: as printed lists, as decks of punched cards, as punched paper tapes (either 5 or 8 level), or as magnetic data tapes. Write to Project Oscar, Inc., Foothill College, Los Altos, Calif., for details about obtaining any such data.

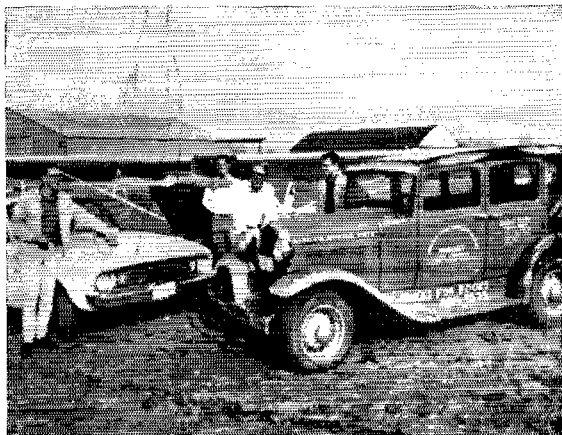
Thanks are due to M. C. Towns, K6LFH, for his help in punching data tapes; to Bill Eitel, W6UF, for contributing card stock for the punched cards; and to Larry Harvey of the Foothill College staff for allowing use of the 1620 computer to process the mass of data. Above all, the reporting stations (list 2) deserve a great deal of credit for helping advance the Oscar program — without their participation, this report would not have been possible.

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## Strays HOV

VE6WN would like to exchange call-letter license plates with anyone interested.

The Colorado State University ARC station, W0QEY in Fort Collins, obtained special permission for its members to use their 2-meter mobile gear as live remote-mobile news units for the college f.m. station during the annual College Days festivities. Shown in the photograph (l to r) is WA0BND, WA1AUU/0 who operated aeronautical mobile during the parade, WA0ALW who drove the 1931 Model A Ford in the parade and WA0DFX president of the club who acted as mobile coordinator and relayed transmissions via land lines to K0FQM who was announcing at the college-f.m. station, KCSU-FM. By the way, the boys scooped both the commercial stations in the area with a story about a fire that broke out in the parade.



# A 500-Watt D.C.-to-D.C. Converter

## *A Power Supply for Mobile Transceivers*

BY GLAYDE STEELE,\* WA6BKG

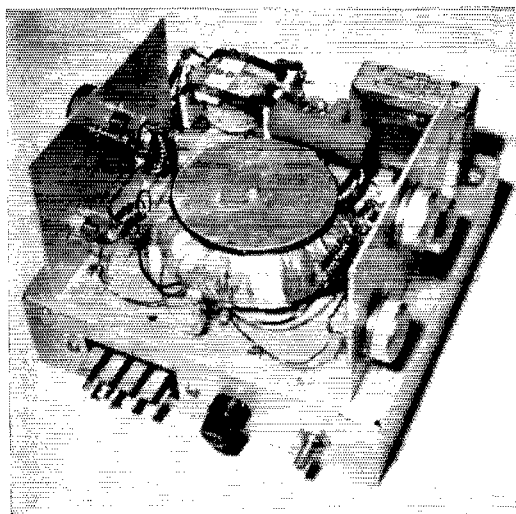


Fig. 1—Top view of the solid-state power supply showing placement of components. Transistor heat sinks are at the left- and right-hand sides of the chassis with the toroidal transformer centered between them.

THE expression, "Nothing ventured — Nothing gained," is as applicable to amateur radio as any cliché can be. This seems to be particularly true of the home-construction facet of our pursuit. The transistorized power supply described in this article, built by the author and dubbed "The BKG Special," offers economy in operation to the users of many commercially-built mobile transceivers. The reduced outlay of cash results from a careful search for inexpensive components to be used in the circuit, plus the fact that home-construction techniques are used throughout the project.

As a rule, the major expense involved in the fabrication of any similar solid-state power supply results from the need to purchase a toroidal transformer. The author instituted a careful search for suitable core material upon which to wind the transformer and chose a reasonably-priced product, produced by G. S. Toroids Co. of Lomita, California. Two core types are available and both were tried — providing excellent results. Part number T-5920-S sells for \$4.90 and is a tape-wound core of 3-inch outer diameter, with a 2-inch inner diameter. It is  $\frac{1}{2}$  inch high and uses 0.002-mil stock. The larger unit is designated T-3920-D, sells for \$9.70 and has the same characteristics as the smaller model with the exception that its stack is 1 inch high. Both cores are made from material which is 50 per cent nickel and 50 per cent iron alloy, offering excellent efficiency. The transistor heat sinks are also homemade and will be described later in the text. The transistors used in the power supply are Motorola 2N1100 units and sell for \$5.00 each. Lower-priced semiconductors, of equal power rating, can be found at bargain prices and could be substituted in the interest of economy.

### *Construction*

The general layout of the power supply can be seen in Fig. 1. The unit is built on a  $7 \times 7 \times 2$ -inch chassis and parts placement is not critical, provided that related components are grouped together in the usual manner.

A common-collector configuration is used, permitting ease of mounting in the transistor portion of the circuit. The heat sinks are fashioned from pieces of  $\frac{1}{8}$ - to  $\frac{1}{4}$ -inch thick aluminum plate and are bolted to the chassis in a secure manner. Commercially-manufactured heat sinks can be used, if desired, at a slight increase in cost. A cover for the completed unit can be fashioned from perforated aluminum stock, held in place with homemade mounting brackets. Sufficient circulation of air must be provided for when convection cooling is used, making the use of perforated stock mandatory.

### *Transformer Assembly*

Since few of us have access to toroidal transformer winding equipment, I shall describe a

\* 21236 Walnut St., Torrance, California.



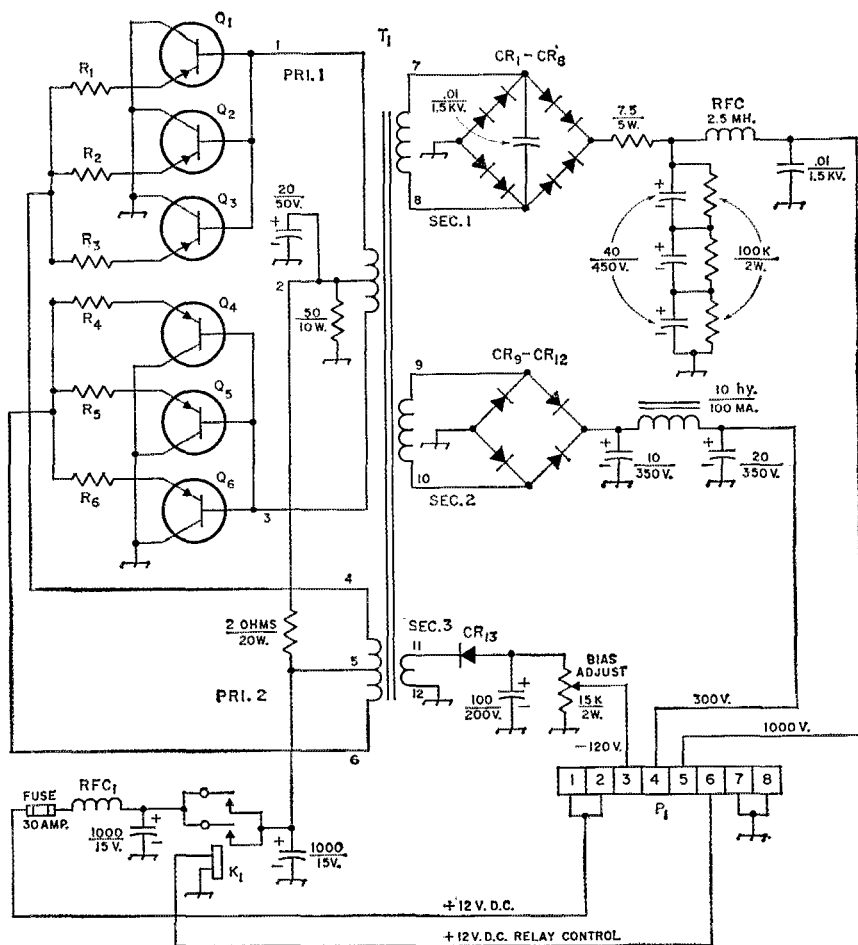


Fig. 2—Schematic diagram of the power supply. Decimal-value capacitors are in  $\mu\text{f}$ . and are disk ceramic. Capacitors bearing polarity marking are electrolytic type and are in  $\mu\text{f}$ . Resistances are in ohms;  $K = 1000$ .

CR<sub>1</sub>–CR<sub>12</sub>, inc.—Silicon diodes, 600 p.i.v. at 750 ma.

CR<sub>13</sub>—Silicon diode, 400 p.i.v. at 200 ma.

K<sub>1</sub>—D.p.s.t. relay, 12 volts d.c. with 15-amp. contacts (Advance PC/2C/12VD usable).

P<sub>1</sub>—8-contact male plug (chassis mount) (Cinch-Jones P-408-AB).

Q<sub>1</sub>–Q<sub>6</sub>, inc.—2N1109 (or equiv.) power transistors.

R<sub>1</sub>–R<sub>6</sub>, inc.—Resistors formed by winding 12 inches of No. 20 enam. wire into  $\frac{1}{4}$ -inch diam. coils.

RFC<sub>1</sub>—14 turns No. 12 enam., close-wound,  $\frac{3}{4}$ -inch diam.

T<sub>1</sub>—See text.

simple technique for hand-winding  $T_1$ . A bobbin (Fig. 4) can be fashioned from a piece of  $\frac{3}{4}$ -inch diameter dowel rod, cut to a 6-inch length. A notch,  $\frac{1}{2}$  inch wide by  $\frac{3}{4}$  inch deep, can be cut in each end of the rod. The wire can be placed on the bobbin and passed back and forth through the center of the core material as the winding progression takes place. It may be necessary to splice the wire, but if good solder connections are made, this procedure is acceptable. The individual windings are first placed on the hand-bobbin, then transferred to the toroidal core in the above manner.

The core should first be wrapped with a layer of insulating tape,<sup>1</sup> prior to starting the winding

<sup>1</sup> Scotch Brand glass tape No. 27.

process. Start with the high-voltage winding (Sec. 1) by filling the bobbin with as much No. 26 Formvar-insulated wire as it will hold. Secondary 1 will require 1075 turns of wire. Try to get all turns applied in a single winding operation. If this cannot be done, place a layer of insulating tape between the first and second layers of the winding. Caution: Apply all windings in the same counter-clockwise direction. Next, wind Secondary No. 2 (300-volt winding), in the same manner. This will require 325 turns of the same type wire with a layer of insulating tape between this winding and the previous one. The bias winding, consisting of 125 turns of No. 26 Formvar wire, is wound over Secondary 2, after a layer of insulating tape is used to cover the previous winding.

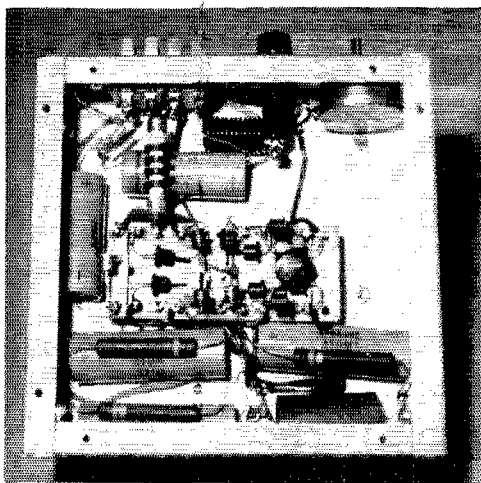


Fig. 3—Under-chassis view of the power supply, showing placement of the silicon diodes on the terminal board. RFC1 is located near the fuse holder.

After the three secondary windings are completed, place a double layer of insulating tape over the work.

Primary winding No. 2, consisting of two pieces of No. 11 Formvar wire, each 64 inches long, is next added to the core. The winding will result in a 12-turn layer. Each 64-inch piece of wire is wound individually and the two windings are placed side by side. Correct polarity must be observed when joining the two wires at terminal 5. Next, the feedback winding (Pri. 1) is added. After placing a layer of insulating tape over Pri. No. 2. This consists of 36 turns of No. 20 Formvar wire, center-tapped, and added as closely as possible over primary No. 2. A double layer of glass insulating tape is now added, completing the winding job. The balance of circuit wiring is conventional and needs no detailed explanation. Relay  $K_1$  serves to activate the power supply from a remote point. Make certain that the relay contacts, and all primary wiring, are capable of handling the current in that portion of the circuit. If different voltages are desired at the secondary of the transformer, the windings can be altered on a one-turn-per-volt basis.

Upon completion of the unit, a load was attached to the supply and the output-voltage waveform was examined with an oscilloscope. The scope presentation showed the output voltages to be free of spikes, with well-filtered d.c. being delivered to the load. The system indicates an efficiency of approximately 82 per cent in the receive position of the transceiver. Under full-load conditions, the efficiency approaches 92 per cent. I attribute this desirable feature to the excellent properties of the core material contained in the toroid. After two or three hours of operation, the core material of the transformer showed no sign of excessive heating. Actually, the 2-ohm feedback resistor exhibits more heating than the transformer.

In the receive position, the power supply consumes about 5 amperes of current. The amount of current drawn in the transmit position depends, of course, upon the input power of your particular transceiver. Several of the amateur operators in this area have built this power supply and found the circuit to be quite satisfactory. How is the efficiency of *your* mobile system? Perhaps this solid-state power supply can lower your battery drain.

QST

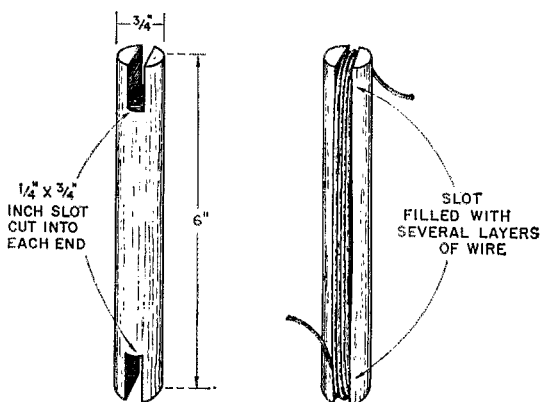


Fig. 4—Details for construction of a bobbin to be used for hand winding transformer,  $T_1$ . (See text.)

## Strays

Another example of ham ingenuity pays off. Stephen Slenker, W1YKH, was determined to design and build a truly miniature inductor, something that hadn't been done and something there was a real need for in the area of integrated circuits. After trying many methods, W1YKH tried a tiny threaded mandril. Around the tip, which was not threaded, he wound several layers of No. 47 enameled copper wire. After temporarily holding it with Duco cement,

he applied some Epoxy and cured the assembly in his wife's electric frying pan!

Stephen then drilled a small hole in a brass screw and filled it with powdered iron rod. Insertion of the brass screw into the threaded part of the epoxy form gave a miniature variable inductance. The inductors are so small that 22 of them will fit in a space  $\frac{1}{4}$ -inch in diameter! Improvements were made and today he has a successful business making miniature inductors.

# 19th V.H.F. Sweepstakes — January 8-9

**A**TENTION v.h.f. operators! The 1966 V.H.F. Sweepstakes will start at 1400 your local standard time on Saturday, January 8, 1966, and end at midnight local time on Sunday, January 9. Remember, contacts count only when the contest is in progress at both ends of a QSO. So join in the fun this year. Just call CQ Sweepstakes or answer such a call.

Remember that, unlike the v.h.f. QSO parties, in the SS sections count only once no matter what band they are worked on, although you may work the same station on a different band again for additional contact points. Example: W1HDQ works W1FZJ on 50 and 144 Mc. for complete exchanges of 2 points on each band;  $2 + 2$  gives 4 points but only *one* section multiplier. So bandhopping will increase your score.

In scoring, the multiplier is the number of sections worked *plus ten*. Each complete exchange counts two points. Here is a scoring sample. Suppose W3HYJ made 100 contacts in 17 different sections:

100 QSOs  
 $\times 2$  (if all SS data exchanged in both directions)  
 200 (QSO points)  
 $\times 27$  (17 sections plus 10)  
 5400 (claimed score)

You can get log forms by writing to ARRL, 225 Main St., Newington, Conn. 06111. Let us know how many you need. Logs must be postmarked by February 5 to be eligible for score listing and awards.

## Rules

- Eligibility:** Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable under one call on or above 50 Mc. are invited to take part. Yukon-N.W.T. (VES) counts as a separate multiplier.
- Object:** Participants will attempt to contact as many other stations in as many ARRL sections as possible.
- Contest Periods:** The contest starts at 2:00 P.M. your local time, Saturday, Jan. 8, 1966, and ends at midnight, Sunday, Jan. 9, 1966. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.
- Exchanges:** Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.
- Scoring:** (a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions.

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

(c) Final score is obtained by multiplying total contact points by the sum of different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.

(d) **Conditions for Valid Contact Credit:** (a) Repeat contacts on other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (Example: W1HDQ works W1FZJ on 50 and 144 Mc. for complete exchanges of 2 points on each band;  $2 \times 2$  gives 4 points but only *one* section multiplier.)

(b) Cross-band work shall not count.

(c) Portable or mobile station operation under one call, from one location only, is permitted.

(d) A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest (with the exception of family stations, where more than 1 call is assigned to one location by FCC/DOT).

(e) Contacts with aircraft mobiles cannot be counted for section multipliers.

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

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

(g) **Awards:** Entries will be classified as single- or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where at least three such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in QST.

When three or more individual club members compete and submit logs naming the club with which they are identified, an ARRL certificate will be issued to the leading club member. When less than three individual logs are received there will be no club award or club mention.

A gavel with an engraved sterling-silver band will be offered the club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL of the *individual contest logs* from such members. Only the score of a bona fide club member, operating a station in local club territory, may be included in club entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

(h) **Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Award Committee.

(i) **Reporting:** Reports must be postmarked no later than Feb. 5, 1966, to be considered for awards. QST

## EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the . . . . NR		Call	CK	Place	Time	Date
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of station worked)	Your ARRL section	Send GMT time of transmitting this NR	Send date of QSO
Sample	NR 1	W1AW	59	CONN	1905	JAN 8

# The World Above 50 Mc.

1215-1300    2300-2450    3500-3700    5650-5925    10,000-10,500    21,000-22,000    30,000-?

CONDUCTED BY SAM HARRIS,\* W1FZJ

## A Big Day for the Bay Area

SEPTEMBER 25, 1965 was indeed a big v.h.f. day for a number of San Francisco Bay Area hams. Not only was the 432-Mc. moon-bounce of WA6LET successful, but the 5900 Mc. two-way record was also broken by WB6JZY and WA6KKK.

At about 1435 GMT the moon peaked over the horizon for Menlo Park, California (or so the almanac says; it was overcast all morning), and WA6LET heard its first echoes. The first station heard was K2MWA/2 at 1439 GMT, but a successful two-way was not established until WA6LET worked W3SDZ at 1501 GMT. In all, a total of eleven calls were worked two-way: W3SDZ, W9HGE, W2CCY, G3LTF, K2MWA/2, K2CBA, K2YCG/2, W2FZY/2, W1ZIG and W1HIV (in that order). Partial contacts with W1BU, W9GAB and HB9RG were also made but not complete enough to count as two-way. WA6LET left the air at 1945 GMT (earlier than they had hoped to quit, to make the 150-foot dish available for a radio astronomy project). All contacts were AI.

The moonbounce experiment was the combined effort of the Stanford Research Institute Amateur Radio Society, WA6LET, and the U.I.F. Radio Society, W6GD. Those participating from S.R.I. were Ron Panton, W6CBE, Ralph Evans, W6ENE, Hank Olson, W6GXN, Don Powers, WA6NJD, and Doug Lee, K6TDR. The U.I.F. Radio Society operating group was composed of Chuck Davis, WB6FSC, Jay O'Brian, W6GDO, Ken Holladay, K6HCP, Paul Rumford, K6IMZ, and Chuck Smallhouse, WA6MGZ.

The electronics equipment consisted of a c.w.-s.s.b. exciter system consisting of an HX-30, with 50-Mc. output, into a 5894 mixer with 432-Mc. output, driving a 4X150A linear amplifier (K6HCP). The final was borrowed from Willie Sayer, WA6BAN and consisted of a pair of Eimac 4CPX250K tetrodes in a linear that measured 600- to 700-watts output. The receiving system started with a 1.2-db. noise figure paramp (WB6FSC and K6IMZ). The converter was a Parks Electronics 432-Mc. transistor job with 4-db. noise figure which was loaned by W7UHF/6. (This same converter was used alone in the July 24, 1965 tests.) Three h.f. receivers were used as i.f.s from the same 432-Mc. converter: a Collins 75A3 (K6HCP), a Drake R4 (WB6FSC) and a Collins 51J4 (WA6LET). Two tape recorders were used for making records of contacts (WB6FSC and WA6MGZ). W6GDO

and WA6QQI did the largest part of the actual operating, because of their known skill in weak signal listening and c.w. ability. However, W6CBE and WB6FSC each made one QSO and WA6MGZ made the partial with HB9RG.

The use of three h.f. receivers for i.f. tuning turned out to be a great asset, for then three operators could be searching for signals simultaneously. Also, each receiver had a different bandwidth for different modes and search rates. The antenna at WA6LET was the 150-foot dish located at Stanford University. We acknowledge the U. S. Government for making the 150-foot dish available.

## New 5 KMC Record

On the same day, two other members of the U.H.F. Society positioned themselves on Copernicus Peak, Mt. Hamilton, and Sentinel Dome in Yosemite, California to easily break the 5900-Mc. record. Jack Trollman, WB6JZY and Glen Tomlin, WA6KKK made the 120-mile two-way contact about 15 minutes after setup of the 5900-Mc. gear, first using f.m. tone and then changing to voice. Will Jensby, WA6BQO assisted at the Copernicus Peak end.

All in all, a successful day was had by the u.h.f. gang.

## 144 Mc. and Up

220-Mc. activity cannot be said to be booming but there are a few of the boys around the country who are trying to promote more activity. K1YON in Connecticut writes us that through the courtesy of K1PAN, who loaned Ted his converter, there is a little more work being done on 220 Mc. in New England. Ted sez he has been working W1ALE in New Hampshire, K1JIX in Massachusetts, K1GQO



WA6LET, et al. From left to right: WA6MGZ, W6CBE, K6HCP.

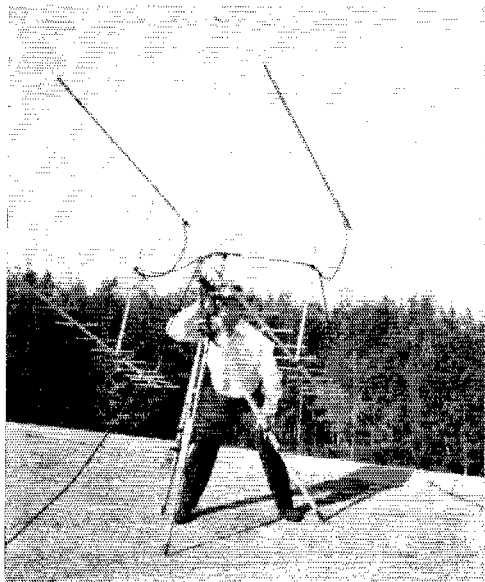
\* P.O. Box 1738, Arecibo, Puerto Rico 09613.

and K1UGQ/1 in Connecticut on that band and all of the boys are looking for more activity and contacts.

Better equipment and bigger antennas seem to be sprouting throughout the country on 432 Mc. WLOOP is now using 96 elements on 432 Mc., courtesy of K2CBA who made the beam and WHIV who erected it. Hank sez that so far the 96 elements are 4 db. better than the old 24 elements and he would like skeds.

New Hampshire will probably contribute more to the v.h.f. bands this winter with the return of W1CTW/W1IQD. Cal has been inactive for the past year due to long working hours at his job and on his house. He hopes to complete work on the house by the end of October and then have more time to relax and do some hamming. If we know Cal there won't be much relaxing done.

In New Jersey WA2JAM and WB2UCS are both building for 432 Mc. Ron, WA2JAM expects to have a signal on the band by the time you read this. His transmitter is a completely transistorized unit running about 12-watts input to a pair of push-pull RCA 2N3375s. Receiver is working and is a con-



VE6NT lining up his quad Yagi for KP4BPZ tests. Bob copied entire test on 432-Mc. July-24 moonbounce test from KP4BPZ. A 20-foot polar-mounted dish is in the works at VE6NT.

## 2-METER STANDINGS

W1REZ	33	8	1300	W5UKQ	24	8	1150	
W1AZK	28	8	1205	K5TQP	24	7	1250	
W1JSM	27	8	1330	K5WVZ	24	7	1225	
W1AJR	25	7	1130	W58WV	20	5	960	
W1KCS	24	7	1150	W51GO	17	4	1050	
W1MFI	24	6	1000	W5KIP	15	5	1360	
W1MIN	22	8	1200	W5WAX	11	5	735	
W1HDQ	22	6	1020	W5BEP	9	3	1000	
W1AFO	19	6	920	W5IDZ	8	5	1375	
K1CRQ	19	6	800	W5YYO	7	4	1330	
K1AFR	17	6	675					
				W6WSQ	15	5	1300	
W2CKY	37	8	1360	W6NLZ	12	5	2510	
W20RI	37	8	1320	W6NDG	9	5	5250	
W2BLV	36	8	1020	K6HMS	8	4	1010	
K2GOL	35	8	1365	W6AJF	6	3	800	
K2LMG	32	9	1710	W6KAP	5	3	1300	
W2AZL	29	8	1050	W6AMU	3	2	950	
K2CEH	25	8	1200					
W2ANJ	25	5	960	K7NLI	11	5	1220	
W7PTA/2	24	8	1150	W7LHL	10	4	1170	
W2ALR	24	8	1100	K7ICW	7	4	1246	
W2APZ	23	7	1200					
W2HVL	23	7	1050	W8PT	41	9	1260	
W2ESX	23	6	730	W8KAY	39	9	1210	
W21TH	20	7	880	W8LFX	39	8	1225	
W2AFMA	19	6	1010	W88DJ	37	8	1220	
W2APZ	18	6	750	K8AXU	34	9	1275	
W2YXS	17	6	720	W8LDF	34	8	1060	
K2GDF	16	6	1010	W8YIO	34	7	1250	
W2BGO	16	6	780	W8MYE	33	9	1155	
K2JVT	16	6	550	W8NOH	3	3	1090	
WA2JAM	16	5	670	W8ELW	31	8	860	
				K1CRQ	8	30	9	850
				W8WNL	25	8	900	
W3RUE	33	8	1100					
W3GKP	31	8	1180	W9VOK	42	9	1170	
W3TDP	30	8	1125	K9UIE	41	9	1150	
W3BYF	30	8	1125	K9AAJ	36	9	1200	
W3LST	22	6	800	W9AAG	35	9	1050	
K30BU	20	7	930	W9GAB	34	9	1075	
W3MLT	19	6	600	K9SGD	33	9	1100	
K3CFA	17	6	600	W9OH	32	8	1090	
W3HLC	16	6	550	W9PBP	28	8	820	
				W9OJT	27	9	910	
W4HJQ	39	9	1150	W9WDD	27	7	1000	
W4HHK	38	9	1280	W91FA	26	6	1000	
W4WNL	35	9	1350	W9CUX	24	7	1000	
W4ZXL	34	8	954					
W4HJK	34	8	1149	W0BPE	43	9	1350	
W4NNT	30	8	1225	W0LFE	33	9	1040	
K4QUR	30	8	1000	W0BNC	28	7	1250	
K4LXC	29	8	1255	W0DLY	27	8	1100	
W4HJ	27	8	1050	W0MOX	23	6	1150	
W4RFR	24	9	820	W0LIC	22	7	1360	
W4FLV	23	7	1000	K0TFE	21	6	940	
W4HMT	21	7	1080	W0JAS	19	7	1130	
W4OLK	20	6	720	K0CER	17	6	1225	
K4YYL	20	6	720					
K4MHS	20	5	800	VE1CL	8	5	800	
W4LNG	190	7	1080	VE3DIR	37	9	1300	
K4VWH	18	6	590	VE3AB	29	8	1340	
				VE3BP	24	7	950	
W5RCL	39	9	1280	VE3BQ	23	7	1180	
W5AJJ	38	9	1360	VE3AG	18	8	1300	
W5EYZ	33	9	1275	VE3HW	17	7	1350	
W5JWL	33	7	1150	VE6HO	1	1	915	
W5DFU	29	9	1300	KH6UK	2	2	2540	
W5PZ	28	8	1300	OH1NL	1	1	5250	

The figures after each call refer to states, call area and mileage of best DX.

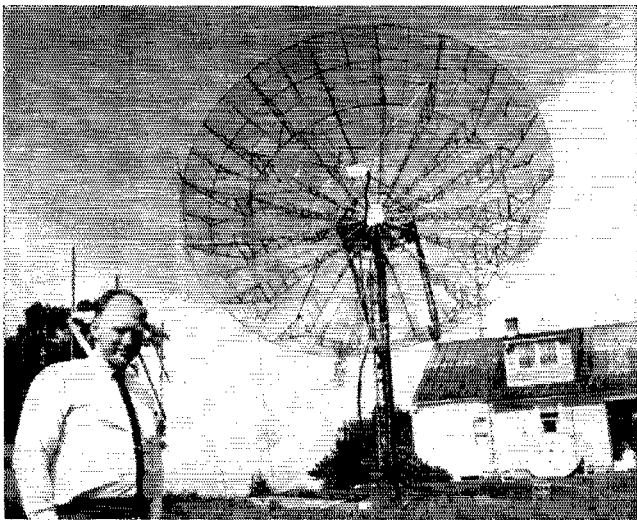
verted Telco WTC-800 and the antenna is a 32-element extended-expanded collinear at 55 feet. Ron is looking for an inexpensive source of 8122s so he can run a little more power on 432.

When Doug, K2ACQ, is enthusiastic about something he really pushes it. Since the first of August, Doug has raised his total states worked on 432 Mc. to 8, running 10 watts input (6939s) and a 12s-element beam. It does our hearts good, Doug. Stay with it! During the September V.H.F. Contest, K2CBA raised his total states on 432 Mc. to 9 when he worked W8YIO and W8PT in Michigan. In New York City WA2WGM has completed a linear using a pair of 8122s which he hopes will run a kw. a.m. and c.w., and two thousand watts s.s.b. on 432 Mc. The s.s.b. exciter is taken from QST for November 1964. Maury sez that cost of all parts was under thirty dollars and so he can afford to spend a little extra on the converter. Does not know just what he will use as yet. Antenna will be atop a two-hundred foot apartment building in the middle of New York City. So there! You must either have pull or very good neighbors, Maury.

W2YPM sez he finally made it with VE2LI on September 21 on 432 Mc. when he received a report of 550 from George and gave one of 539. This does not up the states worked for Ed but surely makes another country and call area for him.

The night of September 7 was a good one on 432 for W3MMV. Fred worked W1QWJ in Massachusetts, W8YIO in Michigan and W8JLQ in Ohio, his first contacts in each of those states bringing his total to 10 states on 432.

The night of September 10 was the good one in Florida for W4UWH, K4NTD, WA4BYR and W4GJO when they worked W4VIII in South Carolina. The Florida boys had been running skeds with Tom for over a week with no results but on the 10th, K4NTD and W4UWH hooked up immediately at sked time. That was at 9:35 p.m. but it wasn't until 12:45 a.m. that Lou, WA4BYR, heard and worked



W3SDZ with 28-foot polar-mounted dish, à la W8LIO.

him followed immediately by a contact between Grid, W4GJO and W4VHH. At the time of this last contact Tom was solid S4 at Sarasota and way over S9 at Auburndale. This brings Lou and Grid's states total to 6 on 432 Mc. and from Florida that ain't hay. On this same night Lou and Grid were the first Florida stations worked by W5AJG in Dallas, Texas. This was the first time that tropo on 432 Mc. reached as far as north Texas. Stations in San Antonio and Houston have worked into Florida previously but never any Dallas stations. Leroy sez that no other stations farther inland were heard, although there were reports that he was heard in Palm Beach.

Out in California W6GDO and K7AUO/7 worked on 432-Mc. for the first California/Oregon contact on that band. Jay, W6GDO, tells us that his 220-Mc. s.s.b. mixer and 2-kw. p.e.p. linear are now on the air, and that to date tests into the San Jose area seem better on 220 than on 144 Mc. However, he sez that tests will have to be maintained over a longer period of time to be sure. K6OKC reports a contact with Jay (W6GDO) on the night of October 8 on 432 Mc. and sez that considering the path (over two mountain ranges), the frequency and his 160 watts out, he was quite surprised to be heard. Congratulations, Rich and Jay!

K7ICW is building the 432-Mc. final as outlined in QST by W6FZA. Al sez it is in the early stages of construction and that attempts to use a single 5894 tripler from 144 to 432 Mc. have been fruitless (at power levels above 7 watts.) His best guess is that it will take at least two tubes to get to the 15/20-watt level. Out in Washington K7MGB/WA7AKJ is building the final stages of his transmitter for 432 Mc. using a 2C39A for doubler from 216 to 432. A new antenna for the same band is also under construction.

A note from W8YIO reveals that after raising his power to 200 watts out he worked into Illinois, Pennsylvania, New York on 432 Mc. Lew would like to know how come when he worked K2CBA and W2MDE on phone on that band for over two hours, he heard no trace of any W1s. Well! How come? The new station in Freeport, Illinois, WA9NKT, reports several openings on 432 during September. He sez that on September 6 the band looked good with radar signals to the east and north. He found a signal to the northwest that

turned out to be W6CTM in Minneapolis. Later W8RQI in Ohio was heard and worked, and W9OKB and WA9HUV were also heard. On the 20th, K9UIF was worked with signals below normal. So now, the new station in Freeport has a total of seven states worked on 432 Mc.

W9JCS writes from Chicago that he's still very much interested in the 220-Mc. band but it is kind of difficult to work new states when the activity is so low. John sez he does operate and listen three times a week, on Monday, Friday and Saturday at 8:00 p.m. on 220.500 with an input of 90 watts to 15 elements 60 feet up. From Indianapolis W9ZRX tells us that due to the meetings of the Indiana Amateur T.V. and U.H.F. Club last year with its interesting and informative technical talks and demonstrations, activity on 432 Mc. in that area increased 100 per cent. The first meeting of the new season was held on October 2 with fifty-six hams attending from Indiana, Kentucky and Ohio.

Bob Broughton, VE6NT, sez that his receiving setup on 432 Mc. consists of a 416B with coaxial tank, crystal converter to 145-Mc. 3 nuvistor converter to 10 meters and a Drake 2A. Antenna is 4 11-element yagis in lieu of the 20-foot dish which is in the works. The transmitter, not quite finished, will be a 4CX250 driving a pair of 4CX250s with 2,000 volts on c.w. Very glad to get the information, Bob. Keep us informed.

Hope we continue to receive these two-meter reports from New England. We know there's a fair amount of activity in that area with a number of v.h.f. oldtimers keeping their keys and mikes hot, but it isn't too often that we hear from them. K1MTJ writes from Maine that there have been auroral openings into New York on 144 Mc. and that in general the band has been good into VE2 and VE3 lands with VE2ZX being very active in the evenings. On September 19 Joel worked VE1EE and VE2BTR/1 for the first VE1s of the season. From Massachusetts W1JSM gets number 27 for his contact with WØIDY in Iowa. Don sez that although he kept skeds with five stations during the Perseids he had no contacts. Burst-ping rates seemed to be lower than previous Perseids according to Don. New Hampshire is also represented again by that well-known v.h.f.er, W1AZK. Don writes that he has been keeping skeds with W4AWS at 144.105 to see what can be done on scatter, tropo, or whatever. They have heard each other every morning for at least a few pings or bursts and on September 29 had about two minutes of solid signals for a complete QSO. The sked runs daily (except Sunday) at 0745 to 0800 EST and the boys use 15-second sequence with W4AWS transmitting the first and third 15-

## 220- and 420 Mc. STANDINGS

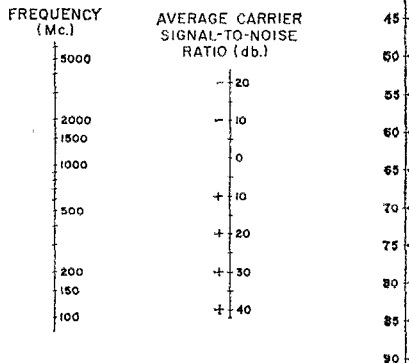
220 Mc.		420 Mc.	
W1BU	14	5	600
W1HDQ	12	5	450
W1AJR	12	4	480
K1JIX	11	4	615
K2CBA	16	7	660
W2AOC	15	5	530
K2AXQ	9	3	240
W2BAH	4	2	167
K2ZM	12	5	400
K2ISA	11	4	300
K2ITP	10	5	285
K2ITQ	11	5	265
K2JWV	6	3	244
K2KIB	12	4	300
W2LWI	12	4	400
W2EUT	5	2	450
K2UUR	6	3	210
W3FEY	11	5	350
W3RUE	10	5	480
W3LCC	10	5	300
K3IUV	9	3	310
W3BJY	8	4	295
W3JZL	4	3	250
W4TLC	5	1	315
W5AJG	3	2	1050
K7ICW	4	2	250
W7AGO	2	1	160
K8AXU	11	5	1050
W8PT	11	5	660
W9JCS	6	2	340
VE3BPR	3	3	300
W1AJR	12	4	410
W1BU	11	3	390
W1UHL	10	4	430
W1HDQ	10	3	250
W1OOP	11	3	390
W1QWJ	10	3	230
K1JIX	9	3	230
WA2DTZ	6	3	200
K2DZM	10	4	390
K2CBA	9	7	220
W2EUT	9	4	260
W2EUS	7	3	130
K2GGA	4	4	383
W2ZHQE	8	4	280
K2HQL	8	4	250
W2DTX	10	4	300
K2UUR	9	3	280
W2VCG	9	4	280
K2ACQ	8	5	525
W2YPM	6	3	300
WA2TOV	5	3	140
W3MMV	10	5	410
W3RUE	9	5	470
K3CLK	9	4	350
W3FEY	8	4	296
K3IUV	8	3	310
W3SZD	5	4	300
W3UJG	4	2	350
W4HEK	9	4	550
W4TLV	6	2	500
WA4BYR	6	2	420
W4GOO	6	2	415
W4RFR	5	2	665
W4TLV	4	2	500
K4QIF	4	1	280
W5RCL	16	5	725
W5SWV	7	3	525
W5AJG	7	3	1010
W5HTZ	5	3	440
W5OKJ	5	2	500
W6GDO	2	2	385
W6IZA	1	1	280
K6GTG	1	1	180
W8PT	11	5	400
W8YIO	10	6	560
W8TYQ	9	5	580
W8ITX	8	5	470
W8JLQ	8	3	275
W8RQL	6	3	270
K8AXU	5	3	660
W8JST	3	3	25
W9OJL	6	3	330
K9AAJ	9	5	425
W9ITX	9	5	390
W9GAG	9	4	608
W9AAG	8	4	525
W9AHUV	7	4	450
W9NKT	7	3	310
W9OJL	6	3	330
W1DY	9	5	560
K0ITP	3	2	158
VE3AIR	5	4	450
VE3BQN	5	4	447

The figures after each call refer to states, call area and mileage of best DX.

7th and during the contest he worked stations in Ohio, western Pennsylvania, eastern Pennsylvania, Virginia, northern New Jersey, western New York and Ontario in a two-hour period. After three weeks of skeds, K4QIF in North Carolina and W5UGO in Oklahoma made contact on September 16 to make state number 30 for Rusty, K4QIF. He sez that activity has reached an all time low in North Carolina and he feels like a lone outpost since W4VIII took off for a new QTH in South Carolina. Guess you are, Rusty. Few reports received other than your own from that area. Of course, this month we received a letter from K4AGV concerning activities of the VHF Club in High Point, North Carolina. Bob sez that as of August the club has been on 144-Mc. e.w. every Thursday night and the members hope that everyone will keep an eye out for them on that particular night. They are also on other nights but it is a for sure proposition on Thursdays. The station consists of 50-watts output into a 68-element antenna with nu vistor converter into an SP-600 receiver. A kw. amplifier for the club is under construction by W4ZG. Club call is WA4SIIA and frequency is 144.096 Mc. Bob also caught the tropo opening of September 5 and 6 when he worked stations in New York, New Jersey and Maryland. W5UGO writes that his contact with K4QIF also made a new state for him with his total on 144 Mc. now standing at 17. Not bad at all from Oklahoma! Larry is holding skeds with K4IXC on 14.05 Mc. and they would welcome any other two-meter and up boys who'd like to call in. Sez the phone bills are getting big pretty fast and this sked helps keep them under control. WB6CKT notes that the path between Santa Rosa and San Jose has deteriorated on 144 Mc. during the past few weeks. Noland sez that WB6OQS was averaging about an S6½ to 7 but now

SUM OF RECEIVING  
AND TRANSMITTING  
ANTENNA GAINS (db.)

second periods. Frequency at W1AZK is 144.029. From New Jersey WA2JAM writes that main emphasis at the home station (W2UM/WA2JAM) is on two-meter s.s.b. techniques and on receiving apparatus. Transmitter is conservative with a pair of 4CX300As loafing at 720-watts input in linear mode. Ron sez that the duct opening along the east coast on September 5 gave him the states of North and South Carolina on 144 Mc. and makes him eligible for the two-meter states-worked box with 16 states now worked on that band. The opening was good with strong signals being heard from New Hampshire to Augusta, Georgia and extending inland as far as central Pennsylvania and western Virginia. However, Ohio seemed to be out of the picture with W8KAY being much weaker than normal. Ron brings up once again that old time gentlemen's agreement that used to be adhered to strictly on two meters, that the phone enthusiasts would stay out of the first 100 kc. of the two-meter band to give the c.w. boys who are looking for DX a chance. WB2MXZ agrees almost word for word with what Ron heard on September 5 and says he is looking forward to the day before Labor Day next year on 144 Mc. Seems the same type of opening occurred last year on Sunday before Labor Day. September 3, 7 and the weekend of the contest were mentioned by K3CFA as being good conditions on 144 Mc. Joel worked K2IEJ for 20 minutes on the 3rd (through the mountains), W8YIO in Michigan and WA8ILXS in Ohio on the



Moonbounce Nomograph. A method of determining equipment parameters for successful moonbouncing. Prepared by Peter Laakmann, WB6IOM. Parameters: Transmitter radiated power, 500 watts; receiver noise figure, 0 db. (300 degree K. net); receiver bandwidth, 100 cycles. Antenna gain against isotropic radiator, s/n averaged over 1 minute. The Nomograph is based on a frequency normalized space loss of 247 db. (Nomograph was calculated from data given by J. V. Evans, "Bandwidth of a Moon Communication Circuit." Brit. J. Appl. Physics, Vol. 12, No. 8, August 1961; G. H. Pettengill, J. C. Henry, "Radar Measurements of the Lunar Surface." Adv. Astr. Sci., Vol. 8, Plenum Press, Inc., New York, 1963)

reads between 2½ to 3. From Arizona W7AYY tells us that the antenna experiments with K7VAB have been temporarily interrupted due to illness on Sully's part. He's reported improving and the tests will continue upon his recovery. Out in Las Vegas, Nevada, K7ICW was once again involved in a first. On August 12, Al and K5TQP in New Mexico made contact on 144 Mc. via the Perseids for the first Nevada-New Mexico contact on 144 Mc. On the 13th, Al worked W0EYE in Colorado and these two contacts brought him up to 7 states on two meters. K7DVK and K7VYU are building two-meter linear amplifiers as described in February 1964 QST, and Dick (K7DVK) sez he is modifying his much-modified twoer to incorporate some of the ideas suggested in W1CER's article in September 1965 QST.

W8YIO has his all important question of where are all the boys in 1 land when 144 Mc. opens to New Jersey and Long Island. Lew sez there have been several of these openings this year with just one W1 heard. Activity on two is about normal in the Manchester, Michigan area sez Lew, except for September 2 when he worked K5WXZ in Dallas, Texas (980 miles), K2LEJ and W2AZL are heard almost nightly during their skeds with W8KAY. At Saginaw K8AQA caught two-meter band openings on the 5th, 6th and 27th of September to Indiana, Ohio, New York, Illinois, Pennsylvania, Kentucky and Ontario. During the first two weekends of September conditions were excellent on two at the QTH of W5CVQ in Kalamazoo. Walt sez that stations were worked at 300 to 500 miles and many others heard at 500 to 800 miles. September 6, 7, 10 and 11 were exceptionally good at Galton, Ohio. K8ZES sez that on Labor Day, 16 stations in Illinois were heard plus others in Wisconsin, Indiana and Iowa. New Jersey, Delaware and Pennsylvania were heard on the 7th; Missouri and Kansas on the 10th; Vermont, Massachusetts, Connecticut plus 12 or more Wisconsin stations on the 11th. Number 26 and number 27 for W9WDD were K5WXZ in Texas on September 3 and K4SGF in Georgia on October 3. Chuck sez that these two were a long time coming but he finally made it. He's hoping to bring his total up to 30 by the end of the year. Think you can do it too, via meteors. WA9BYF tells us that his RTTY on two-meter f.m. is working out very well and tests are being made with W9RSV. Up in Appleton, Wisconsin, W9FBC has been experiencing the same good conditions on 144 Mc. as other operators around the country. September 6 and 7, 12 and 13 were good for Maury with stations being heard in Ohio, New York, Pennsylvania, Minnesota and Ontario. After hearing Illinois stations with better than normal signals on 50 Mc. W0PPF decided to listen on two meters on September 11. Results? He worked W0DQY plus W8NUB and K8RZB in Ohio.

### 50 Mc.

From Portland, Maine K1MTJ reports several auroral openings into New York and Pennsylvania on 50 Mc. during September. However, Joel neglected to tell us the dates of these sessions and who was heard or worked. Six meters was in good condition into Highland Park, New York for the first week of September. WB2UCS heard stations in all call areas except six land with terrific signals. Wayne sez that ground wave to 1 land was also exceptional with best hours for that mode being between 4:00 and 10:00 A.M. At Sunbury, Pennsylvania K3MPN reports very little activity on 50 Mc. He operates morning and evening and has been working New Jersey, New York, Philadelphia and Pittsburg sta-

tions. K3SBT is now running 200 watts on six-meter s.s.b. Auburn, Alabama has an increase of local activity on 53.4-Mc. f.m. K4FJZ reports that mobile rigs belonging to W4MPQ and K4FJZ are now in operation on that frequency and that these two boys are now working on the base station at W4MPQs QTH. The boys in Florida observed openings a number of times during September. WA4STJ reports openings on the 3rd, 15th, 16th and 26th with stations worked in North Carolina, Virginia, Louisiana, Texas, Iowa, Illinois and Michigan. Jim tells us that there is very little s.s.b. activity in that area at this time of year, but that the s.s.b.ers in south Florida work Scotty, VP7DD on Tuesdays and Thursdays on 50.110 Mc. at 10:00 p.m. local time. However, Scotty's beam was taken down by Betsy while he was vacationing in Texas. (Wouldn't ya know it!) During seven days of openings into Sarasota WA4FJO heard stations in all call areas except 6 and 7 lands. W6GDO notes that early morning ionospheric scatter seemed slightly better during September to Washington and southern California. Jay worked K7ICW on the 18th of September via s.s.b. scatter for the first time on 50 Mc. At Fortuna, California W6YKS sez that forward scatter signals have not been too good recently. Although a number of stations have been heard and identified, signals are too weak for a QSO. Bursts on s.s.b. signals at 50.107 are sometimes heard as late as 11:00 p.m. in Fortuna. John recently built a double-sideband rig for 50 Mc. using a pair of 6AQ5s in the final-balanced modulator, driven by a 6CL6. It runs about 20 watts and also works on a.m.-carrier controlled modulation. He sez it was quite simple, especially the balanced modulator portion, but the r.f. section needed neutralization. Al, K7ICW, reports that ionospheric scatter with sizeable meteoric bursts increased in activity on the east-west paths while decreasing in the north-south directions in intensity. Tropospheric scatter dropped considerably about the middle of the month of September as compared with the summer months. No aurora, F2, Es or other media noted, sez Al. Al was also the only one (apparently) to note the error in QST that stated that W7ORG worked KP4BPZ via the moon. The list should have read W7JRG. From Detroit W8MBH reports what must have been a most interesting QSO on September 2 when W8TFI, W8EMG and K8KYS held a four-hour QSO on 50.4 RTTY. K8KYS is the only ham known in that area to have an RTTY rig set up in a trailer. A 50-Mc. opening on September 14 into Alabama, Texas, Mississippi, Pennsylvania, Louisiana and New York was noted by K8TUT. K0OST notes that he has been operating on 50-Mc. s.s.b. for the past month and getting good reports. The rig is undergoing final adjustments but needs more power, sez Jim. He also reports openings on September 12 and 15 into Wisconsin, Indiana, Illinois, Wisconsin, Indiana, North and South Carolina, Georgia and Alabama; and auroral sessions were observed on September 16 into Iowa and Wisconsin, and on the 28th into Wisconsin and Illinois. Not many auroral sessions this year and when they do appear there does not seem to be many of the boys that catch them. Seems we made another error and this one was caught by WA0LDB. We noted that there was much activity on 50.525 in that area and it should have read 52.525 Mc. f.m. Jim, W0PEP, back from vacation (?) reports skip worked on September 3, 4, 12 and 15 when a number of 4s and 8s were worked. Jim has added a Lamb noise limiter to his 75A3 and is experimenting with s.s.b.-a.v.c. systems for it.

QST



# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## How:

This job is great for the heraldic complex, a compulsion to bring portentous facts to the attention of one's peers. Hermes, Iris, Mercury and that crowd were consistently BPL on relays in the old days. We can't hope to approach their traffic totals with mere mortal facilities, but K3CUI, excerpting from a recent Washington Post, gives us a chance to score a few delivery points this month.

On the subject of the rewards of industrial air conditioning and cooling, the article declares:

... The human body is sensitive to excessive heat and humidity. In hot, muggy weather, most people have a tendency to become mistake-prone, and to slow down.

A number of studies show how air conditioning benefits employers and employees alike.

The Industrial Electrification Council cites tests of a radio operator's ability to receive code at different temperatures. At 79 degrees, the operator made about 12 mistakes an hour. But at 97 degrees, his mistakes increased to 90 per hour. . . .

Now this, in itself, is really not surprising. We could have told them so. But the clinical flavor and authoritative presentation of the lab report is inspiring. We could use a few more plots on that curve, yet there already are important conclusions to jump at.

Firstly, ARRL may have to endorse Code Proficiency Certificates by temperature. If you manage to capture a 30-w.p.m. sheepskin at room temperature you should be a 35-w.p.m. cinch out in the back yard this winter. Secondly, since cool, collected Ws obviously can operate rings around hot, perspiring W4s, how about an equalizing contest multiplier (air conditioned shacks ineligible) for our southern call areas?

We must particularly stress the competitive menace of our Canadian gang. If those VEs8s wise up and turn off their footwarmers during next year's ARRL DX Contest we W/Ks are in for an ignominious skunking.

Warmuffs, mittens, Sterno, anyone?

## What:

Tearing, that's a word for it. These autumn conditions can be summed up in the epic verse of Max R. F. Gaines:

*Now you hear 'em,  
Now you don't,  
Will you work 'em?  
Bet you won't!*

Max loses a wager quite often, though, and the "How's" grapevine holds other points of view: "Fifteen's better all the time!" — WB6NXX. . . . "The lot-up in 75-meter static lets good DX through." — W. P. Kilroy. . . . "Kilroy was here." — 75 phone. . . . "Never knew such DX could exist on 10!" — WB6NBU. . . . "Rapid improvement here, especially on 21 Mc." — WA7s BOA and BOB. . . . "A kw. on a 2000-ft. Vt. mountain does wonders on 20." — WIAYK (K2UPD). . . . "Forty continues good to all points." — K9UIY. . . . "Looks like another FB 7-Mc. season." — WA4OYX. . . . "After seven years at

the books I'm finally back to DX." — K2JWM. . . . "I don't dare mention the good 20-meter conditions for fear they'll go away." — K3CUI. . . . "U. of Nev. EE pursuits leave little time for the DX chase." — K7ADD. . . . "Great to hear 15 back in form!" — W4GMWG-KH6FLC. . . . "Conditions not too bad on 40 here but summer QRN was rough." — W8NHF. . . . "Even 40 phone is good here lately." — W82MJD. . . . "Things are shaping up on the west coast, too." — W4BTZN. . . . "My old RAIF-69 and 60 watts are still good for plenty of 7-Mc. countries." — W4AUMX. . . . "Rapidly running out of IRCs and I love it." — W4GTS. . . . "Africans are 'in' on 40 these days." — W2APD. . . . "My ground-planned 90 watts do the job on 20 c.w." — W4GQA. . . . "Yep, 20's still DX king." — K5DZE. . . . "Moving from 60 to 200 watts sure makes a difference on 14 Mc." — W4AQE. . . . "Finding more consistent 20-meter openings for my 50-watter." — W82NLI. . . . "School and YEs keep cutting down my new ones." — W86MEO. . . . "Autumn's back again and so's DX!" — W46VAT. . . . "Improvement now after a poor summer." — W8YGR. . . . "Asian DX Contest activity surprised me." — W86ITM. . . . "Enjoyed this year's WAE Test immensely." — W4GZM. . . . "Nice DX chorus yodeling on 15 c.w." — K3FOP. . . . "Forty picks up the DX slack when 20 goes flat." — K4TWJ. . . . Now let's keep our 20-meter sked with the printer as promised.

**20 phone** offers greetings of the season to Ws 3HINK IGTS 6PQT 8YGR 8ZCO, Ks 1BPJ 2JWV 3P0P 4TWJ, WAs 3BTA 4PSA 4QBX 51LS 6TZN, WBs 20CN 2NBU 6FRP 6NHF 6NXX and Mr. Kilroy by way of BV1USA (14,280 kc.) 1000 GMT, GM11D, GN8s AR 20, BM 19, FS 20, M11\* 2, CQs 2BY (180) 6, 8CP\* (200) 3, CP6GA 2, CRs 3GP (120) 17-23, 4AJ (105) 18, 6BX 20, 6FE (250) 22, 6GQ 0, 7CK (180) 16, 8AE (250) 9-15, 8AW 9AE 16, 9AH (185) 13, 9AK (110) 12, CTs 1CF\* 23, 1PK 19, 2GF (120) 18, shipboard D12DR (130) 19, DUs 16H (280) 12, 1HR (115) 17, 1JC 7SW (238) 12, EAs 6AR 19, 8AX 14, 8CR (160), E9V, E8s 1P 2AF 20 28 23, 6A, EPs AX BU, ETs DR (260) 18, USA 19, 6RY FC (108) 22-0, EG7s XL (132, 331) 21-23, XT, FK8AC (125) 11, FM7WQ 20, FO8-AQ 4, BL, FR7J (105) 12-17, FY7s YL 21, YS 3, GC8HT (242) 13, GD3ENK (128) 21, HA5AM 23, HC8JG, H8XFS, HK6AI 23, HL9s KF (260) 11, KH (260) 12, KN KW (150) 11, LH 13, TP 13, US (110) 11-12, HMIAB (290) 12, HSI 5 F (125) 16, HF 19, HVICN (120) 21, HZ1AB 13, HP1s AI, MB, HRs 1AD IRP 180 1WV 2ABC 2AFK 2GK (295) 6, 2SY 6C6A, IS1s GF (110) 14, SAT VAZ (110) 14, ZDT, IT1TAI, JAs 1CRR 14, 1ICU 13, 1KG 5, 2AEV 14, 101 6AD (220)



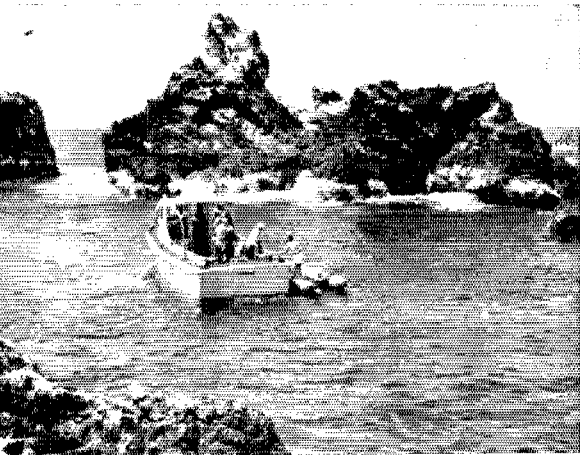
\* 7862-B West Lawrence Ave., Chicago, Ill. 60656

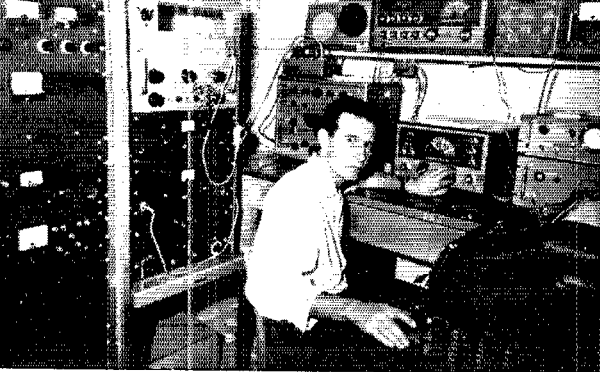
12, Ks 38WW/KG6 (278) 11, 5ETK/KG6 (240) 14, 5EWW/KG6 (260) 10, 7TJC/KJ6 0BYC/KS6 (226) 4, KAs 2NA 4, 2RG 5DG (253) 11, 7AB 14, KCs 4USV (265) 2, 6BO 14, 6BY (290) 9, 6PMI (222) 12-13, KGs 4AA 4AL 4AM 4AN (340) 4, 6AJQ (270) 10, 6AON (290) 14, 6APJ (260) 11, 6IF (300) 4, KJ6s DA 5, BZ (240) 12-13, KL7s EBK EWG FBI FIJ WAH, KM6DK 3, KR6s AP AL 14, EO IL GF (290) 14, JW 14, MB 15, UL, KS6s AW 2, BH (260) 7, BO BV (238) 6, KV4s AA CR 23, CX, KW6EJ 14, KX6s BW (270) 10-11, DP (285) 11, DQ (280) 10, DR (258) 10, DZ (260) 9, FC RB, KZ5s AA CU DR HH (320) 11, LC MM OA VE, LAs 3P/p (120) 10-11, 5AJ/p (230) 19-20, 5CI/p (245) 20, 7RF/mm 8K/p (110) 17, MIB, MP4s BBA (118) 18, BBC 18, BBL 5-19, DAN (280) 17, MBT (110) 20, TAV (290) 16, TBO (105) 15, OAs 4AY\* 4BY\* 6AM, OEs 12L (240) 18, 5BJ\*, OD5s AR BZ (250) 20, EG LX, OHs PZ NF (230) 16, NI 17, OX3JV (100) 13, PJs AA (248) 11, CR MI (100) 19, PZIs BI 12, BW CN 0, SL6AL, SM2s AY BHX (228) 15, BJ (268) 12, SVs 1AI 0WBB (250) 21, 0WGC 21, 0WJI (248) 17, 0WR, TP 2WHI 0, 3EA (155) 12, 3KG (252) 13, TGSs MO RJ (110) 12-13, TJAC (290) 15-12, TL88W, TU2AA (110) 18, UAs 2AO 22, 2KAK\*, 9HA 17, 9HB, UB5WL, UC2s BF (103) 21-23, OK WX 21, UJ8KAA (230) 11, UL7NF, UM8F, UP20K 16, UO2KFQ (236) 13-14, UR2AR (255) 17, UT5RP 23, UWs 3BF 19, 4HZ 0EH (115) 16, VEs 3CVL/SU 8BB 8MA 8MB 8MD 8ML, VKs 6AF 9JO (267) 12-13, 9DR (105) 14, 9GP (270) 13, 9NT 12, 9VG 15, 9XI (110) 16, 9CW (115) 18, 9TO\* (170) 5, VPs IIB (331) 22, 1LB 1LP 2AT 2KD (135) 18, 2EJ (109) 12, 2MIN 15-21, 2SJ (120) 21, 2SY\* (165) 23, 4VP 22, 5AR 22, 5GC 20, 5LV 5NF 6KL (110) 20, 7DL 8AB 1, 8IJ 8HO 9AK 9BY 9FR 19, 9FT 0, VOs 8AR (120) 16, 9HB (125) 18, 9J, VR2s DZ 4, EL, VSs 6AJ (255) 12, 9AWR 17, 9MB (110) 16, 9PCZ (110) 16-17, VU2CK, Ws 9MCI/KS6 (265) 16, 5HWR/VP9 (265) 16, 6PHM/DUI (115) 17, 6IBU/KG6 (285) 12, STNC/KW6, WAs 5GTI/KG6 (245) 14-15, 9HDM/KG6 (255) 12, WB6PZK/KJ6 3, XEs 3JG 3L 5EYs, XW8s AX (140) 16, AZ (125) 15, YAs 1AW (100) 16, STNC (230) 16, 4A (102) 2, YK1AA (115) 16, YNs IIT ILL (120) 12, 3FP 3KM (331) 18, 9JUL, YU3s BC LB (245) 20, LMI (105) 21, ZBs AL (232) 21, AO, ZG4MO, ZD8s BC HL (110) 18, TG WZ (150) 0, ZD5D (115) 17, ZPs 3RA\* 5KT 7BM (106) 0, ZS3s E HT 20, 4S7s BR (240) 18, IW (190) 16, 4U1s ITU 1, SU (233) 17, 4W2AA (250) 17-18, 4X4s AK\* 0, AN 4, FQ 19-21, HW 23, JU 18, QC, 5A4TK, 5H4JR (140) 16, 5N2JAB (330) 22-0, 5R8CN (252) 22-23, 5U7AU (110) 32, 5VZ8CM (251) 21, 5X5TU (320) 21, 5Z4s ERR 21, EB 16, GT 23, IR (180) 16, JD (250) 21, JW 21, 6Y5s AR (205) 22, GG 0, RA XX, 7O7s GS (130) 17, PBD, 7X2s MD 23, VX 18, 7Z3AB (115) 18, 9G1s BY DY (255) 0, 9J2s AM FF (241) 20, FK, 9K2AM (243) 21, 9L1s JR 22, MJ, 9Ms 2AE 2OV (132) 16, 2SS (108) 15, 4FF 16, 4LP 14, 4MIY (115) 17, 6AP (211) 13, 6BM (120) 17, 8KS (135) 16, 9Q5s AA (130) 22, CM HR HW, 9U5s BR ID (236) 21-22 and 9X5CE (115) 17, the asterisks for rare non-s.b.ers.

20c.w.treats Ws 1BDI 3UNK 3ZNB 4GTS 7DJU 7VRO, 8CAG 8TRN 8YGR 8ZCQ 9LCC, Ks 1BPF 2JWM 2UPD 3CUI 3ZOL 4TWJ 5DZE 6AJ 7QXG 8HLR

8YSO 9UIY, WAs 2WLI 3BTA 4CZM 4PSA 4QBx 4YDR 5EQ4 5IIS 6TZN 6VAT 7BOA 7BOB 8MAT 8OPH 9AQE 9GQA 9IBT, WAs 2CUN 2NLIH 6FRP 6ITM 6ATEQ 6NBU 6NHF and 6NXX to locals of AP2AR (24) 1, BVs IUSP (44) 13, IUSR (38) 12, 3NO, CMs IAR (70) 23, 2BL, CN8s F8 (92), ETC (60) 2, COs 2BO (25) 23-0, 2FA 2JB (7) 22, 6AH (4) 21, 8LB, CPs 1EA (30) 21, 6AI (40) 12, 5EZ 15, CRs 3CF (80) 20, 4AE (80) 19-0, 6BX (10), 6EI 6GV 7IZ 9AH (80) 23, CTs IHT 22, 3AG, CXs 2CO (30) 1, 3AN (88) 4, D12DR (68) 21 of the *Mefear*, DMs 2AUO 2BDD 2CBM 3JD 3SBM 3XVO (20) 21, 4SFA, DUOs 1OP 1UP (50) 12, 7SV (94) 6, 9DLM, EAs 6BD (10) 23, 8BQ (17) 18, EIs 5F 7AV 9J, ELs 1F 3AD 19, 2AE 17, SAR, EP2s AS (15) 19, EZ (70) 17, FT3USA (8), F9UC/FG (88) 10, 6B8s XX (50) 11, YY, FG7s XC (10) 20, XD (63) 0, XF (13) 12, XJ (50) 21, XK, FK8BG (30) 11, FL8s MIC (59) 20, RA, FO8s AA BE (28) 4, BI (31) 6, FR7s ZD (50) 20, ZG (56) 13, ZI (80) 17-18, PU8s AG AN (84) 10, GCs 2FMV (16) 15, 3FKW (20) 15-16, 5RV (30) 22, GD3s FXN (45) 19-20, HQR (66) 18, RWF (44) 12, TNS (61) 0, HAs 1KSA 1SD (20) 20, 3KGC 3AMT (10) 21, 3CQ 5KFR (65) 22, 7PR 7PZ 8WH (61), 8KVO 9HR, HILARMI (45) 16, HLRs KB 13, KZ TD (32) 12, US, HMs IAB (64) 6, 1BB 3CG 5BF (15) 12-13, HZG, HPs IAC IIE 12-13, 1MIN 5PSL, HR3JP (60) 11, 0HJAB, IS1ZE (7) 23, ITIs SEU TAI, JAs IAKH IAYJ (61) 16, 1AZR (29) 6, 1BRK 1 CFD 1CG 1CTB 1CIB 1EDU 1EDU 1FV 1FGV (32) 6, 1GUC IHBX IOIO (64) 0, 1D2W 2HG 2JV 2PY 3CWV 3EAMU 3EOP 4BS 4CNS 4DI 14, 5ACF 5FQ 5TP (30) 6, 6AD 6HOS 7ABQ (30) 6, 7AGO 7AIN 8ADQ (10) 11, 8BAM 8HQ 0AJN (31) 6, 0BBS (73) 12, 0BJI (30) 6, 0PX, JTIs AG (41) 11, KAA (44) 14, JY2WF (72) 22, Ks 1CZM/KM6, 4DRD/KJ6 (25) 2, KAs 2NA (74) 6, 2JH (30) 1, 7AB (30) 6, KB6C (62) 5, KGs 4AA (15) 15, 6AAY 6APJ (40) 12, 6APR (75) 10, 6IG (88) 18, KIL6FF/KS6, KLTs CGE FAR, KM6CE, KR6s 6WV (80) 12, 6JZ (62) 5, 8CA (30) 6, KV4s AA (80) 22-23, CI 11, KX6s DB (20) 19, EA (20) 11, KZ5s AY FN, LA5CI/p (90) 20-23, LUs 1ZC (45) 20, 4ZC (50) 19, LX1BZ (31) 0, LZIs KAA KKZ (65) 23, KPZ, MIB (47) 0, MP4s B8K BEL (80) 17-18, BEU BFI (35) 18, OAs AO (60) 5, FMI (80) 21, U (85) 16, OD5LX (14) 21, OH0s AA (34) 15, FZ (80) 14, VF (40) 14-15, OR5R (85) 17, OX3s AB ET (GR 23) UD 13, OYs IR (5) 15, 2H (8) 12, 2J (35) 16-17, PE2EVO (10) 15, PHs KM (11) 22, RRS, PJ2s CZ (60) 12, BLE (37) 0, PXIs AA EG, PZIs BB BH CL, SLS 7BZ 9TD (30) 6, SM2s BII CNU, SV0WAA, TADBE (40) 21, TFS 2WJ (8) 15, 2WJI 3AB 23-0, TCG7SS, TEs PZ (40) 4-14, WR, TN8AF (46), TU2AN, UAs 1KBD (75) 13, 2AR 32 23, 2BY 2BZ 2CA 2KAK 2KAW (26) 14, 9DN (20) 14, 9KCF 9KPV 9PI 9PP (33) 2, 9VB 9VI 9AG (50) 1, 9EN 9DJ (74) 6, 9DV (20) 13, 9EH (88) 6, 9EV (74) 4, 9KZ 2, 9IE (74) 7, 9KAD (30) 6, 9KAE 9KAN (5) 2, 9KFG 9KIA 9KIN (30) 6, 9KKC 9KSB 9KZV 2, 9MD (64) 2, 9ML 9SO 0, UB5s AQ KHQ KJE WJ, UG2AR, UD6s BA BZ 19, UR6s AG 2, AW FE (65) 21, UG6s AD (1), UG7s 1-2, AI (18) 1-2, AU 2, CX 1, IO MI (76) 12-13, UJ8s AR KAW (19) 12, UL7s HB (25) 2, JJ 2, KDT (14) 1-2, RP, UM8s AP (24) 2-13, FI (75) 18, FM IE 1, KAA 16, KAT UNIBK (10) 15, UO0s AA BAI DN (15) 20, KBR

DJ2KS/PY0 made a difficult and brief appearance from remote St. Peter and Paul Rocks in late August. Forty lucky DX hounds were worked before the station and personnel had to reboard South Atlantic research vessel *Mefear*. DJ2KS and fellow radioman DL6XP, who man shipboard gear as DI2DR, are licensed for Fernando de Noronha hamming as well. (Photos via W1s WPO and YYM)





I1AHN (left), W2RUI (upper right) and G3MWI were among high scorers in the 1st Alexander Volta Radio-teletype DX Contest, an activity sponsored by the Como, Italy, SSB & RTTY Club in May. Among 52 formal entrants, I1AHN, SM6CSC, G2HIO, 11ORS, G3MWI, W2RUI, K8MYF, ON4HW, 11RIF and DJ6ZBA turned in the top ten performances in that order. More than 200 stations in five continents, 24 countries and 29 United States participated. I1AHN's winning total weighed in at 129 QSOs with 18 countries and 23 states on 3.5 through 28 Mc. W2RUI led the field with 19 different countries worked, and K8MYF's 26 states was a topper.

(25) 18-19, TI, UP2s CT (30) 15, NK OM FT 22, UO2s GA HT KBH 22-23, KCT (13) 20, UR2s FR FU (18) 20, IP 6, UT5IZ, UV9VF, UWs 1AR 9CS 9B1) 20, 9XAL 17, 0AP 0FK, VE8AP, Vks 1VK (30) 13, 6RS (88) 9, 7GV (82) 7, 7SM (30) 6, 9DR (17) 15, 9GC (48) 10, 9WE (38) 5-8, 0KH (9) 5, VO1s CH (35) 12, HB, VPs 2AR 19, 2AX 2GL (37) 22-0, 2GLE (45) 0, 2KJ 2MN (35) 22, 4VT (25), 5AR (45) 22-23, 5BH (10) 13, 5GC (7) 13-22, 6AP 6AY (15) 12-13, 6BW (35) 21, 7NQ (15) 21, 7NV 8HD 8HJ (40) 20, 9BO 9EU (47) 21, VO9s 11B (16) 19, J (3) 16, VRs 2BZ 2CC (13) 17-18, 2DK (12) 12, 2ER (96) 6, 4CR (60) 8, 6TC (65) 22, VSs 6BJ (65) 13, 6FE (50) 12, 6FK (73) 12, 9AAK 9ASP 30, 9AWR 9MP (70) 16-17, 9OC (90) 16, 9OSC, VU2s AJ (35) 16, DIA (40) 14, GW (22) 1, JA RA TZ, Ws 3J8X/HIS 16, 4BIC/DUI (15) 13, 7NUD/9K2 (40) 16, 7SZM/KL7, XEs 11JD (50) 17, ILLN 1VI (84) 15, 1XQ (62) 0, 2AAG, XW8BD 15-16, YO's 2BB 2BI 3KAA 4AAC 5CU 7DL 8CF 21, 8DD 9HC, YS1RF, ZB2s A AJ (40) 21, AM (55) 21, ZC4s GB (35) 19, LK, ZDs 5M (60) 16, 7IP (25) 17, 8BC (19) 22, 8DX (35) 22-23, 8VZ (40) 13, ZE3KL (6), ZPs 5AY 5CF (78) 23, 5KT 9AY, ZS8E, 457s EC (20) 15, NE (28) 3, 4U1TU (40) 12, 4W2AA (75) 19, 4X4s JN (10) 21, MZ (2), QA (28), 8K (31), XL 21, 5A3TX 21-22, 5R8BC, 5W1AZ, 5Z4s BM (25) 19-20, IR (55) 21, 6O6BW (32) 22, 6W8CQ (12-54) 17-20, 7G1s A (70) 18, Q, 7Q7RM (90) 19, 7X2s AH (15) 19, SX (40) 19, 7Z3AB (75) 19, 9F3USA (81) 13, 9G1s VY (65) 21-22, FK 0, FQ (25) 20, 9H1s AA AD (83) 22, AG (23) 21, 9J2IE, 9Ms 2BAI (35) 14, 2DW 2LN 2LO (50) 14, 2OV 16, 4LP 4MJ (23) 16, 4MT (17) 17, 4MX 4MY (65) 15, 4NA 16, 4NB 16-17, 6BAI 6DS (19) 13-14, 8FS 8KS (60) 15, 8RS (44) 12-13, 9Q5s HD TJ (45) 21 and 9X5MH.



lopes for prompt reply. Larry promises that all other HV1-CN contacts during this period will be confirmed via the bureau route . . . . . I sent 1600 cards via bureau for my operation as 4U1-2-3-4-5-6ITU in May and September. . . . . notices 11RB. . . . . After March 1, 1965, all 11RB QSLing will be handled by Hammarlund DXpedition, Box 7388, QPO, New York, N.Y., 10001, and the same for my 11RB/ISI activity. . . . . Cards for Pier's HB9CXU/m operation go direct to 11RB's Torino address . . . . . "Too many EA3OT QSL seekers are trying to use my former address. . . . . protests WB6BSJ. QSL managers move around just like the rest of us, fellows — consult only the latest *Callbook* . . . . . W2-GHK informs, "All OY7ML QSLs will be handled through the 'DXpedition of the Month' address effective October 1, 1965." . . . . . ON4NM took up K2MYR's QSL managerial offer through "How's". George generously waives the usual s.a.s.e. requirement for W/K applicants.

We'll start the new year tidying up the old, next "How's", covering the multiband DX scene with the assistance of (15 c.w.) Ws 3HNK 4GTS, K8s HLR YSO, WAs 5HS 6TZN 7BOA 7BOB 9IBT, WBs 2CON 6NBU 6NXX; (15 phone) Ws 3HNK 8YGR, K8YSO, WA9IBT, WBs 2CON 2MJD 6NBU 6NXX; (40 c.w.) Ws 1AYK 1BVP 2APH 3HNK 3ZNB 4GTS 8ZCQ, Ks 1BPJ 2UPD 7QXG 8HLR 8YSO 9U1Y, WAs 3AZI 4OYX 4UMX 5HS 6EGL 6TZN, WBs 2CON 2MJD 6NBU 6NXX; (40 phone) WAs 5HS 6TZN, WB2MJD; (80 c.w.) W7DJU, WA6TZN; (10 phone) K8YSO, WAs 5HS 6TZN, WB6s NBU NXX; and (10 c.w.) WA5IIS — plus listener W. P. Kilroy, and other Bandwagon jumpers-on . . . . . W1BB reminds us to remind you that December 5th and 19th are 160-Meter Transatlantic DX Test dates, details published in this corner last month. That 1.8-Mc. DX door may be closing, OMs, so you'd better make your move!

**Where:**

**EUROPE** — QSLs for QSOs with HV1CN between November 22 and 30, 1965, should be sent to W9IOP, preferably accompanied by self-addressed stamped envelope

**OCEANIA** — Operator Chuck of KG6IF informs W6-PQT that W6ANB handles his QSLs. Apparently operator Harry's QSOs can be confirmed through K7CAD . . . . . VP7DO/mm (VE7IR-VK2IQ) will QSL via bureau unless International Reply Coupons accompany incoming cards . . . . . W6RCG of Yasmie Foundation requests that QSLs for KC6SZ, KG6SZ, KG6SZ/KC6 and KX6SZ be directed only to the organization's address, not to his home QTH, S.a.s.e., or s.a.e. plus IRCs, are expected . . . . . Leaving Fiji, VR2CC will advise proper QSL routing later, says W8ZCQ . . . . . That WS6 prefix is shaking some of the chaps on 40 and 15 meters. It's for K86 Novices . . . . . "Regarding KH6FJL's complaint about lack of nomination for your 'QSLers of the Month,' I wish to correct that oversight based on my own experience. Not only did he help me make contact with a KJ6, he also sent his QSL by air." This tribute from W3LNE.

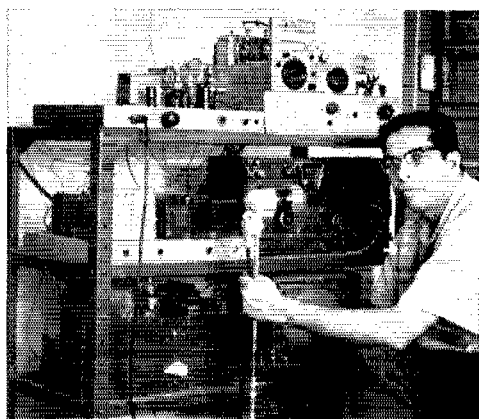
**ASIA** — "I QSL 100 per cent and am always up to date because I do them as I go along," remarks 9M4MT to WB6KVA. "In seven months I've sent out 2208 cards." . . . . . SP4s AWE and BGR claim no knowledge of TA3-AS QSL matters . . . . . W4BPD's Afghanistan confirmations were in the mail by early October, according to W2-GHK . . . . . "HM1AB is back on and his logs are rolling

through," cheers W7VRO. Dick ran out of JTICA QSLs but he's trying to stir up more for the gang still yearning . . . . . K9BPO requests the customary self-addressed stamped envelopes and QMT-only QSLs from those seeking cards from 4WIs G and T. Harry may be able to help with future new 4WIs as well . . . . . W6RKP tells LIDXC's *Bulletin* that AP2MT's QSO records for the period August 20 to September 26, 1965, are very sketchy, indeed.

**AFRICA** — "Anyone worried about QSLs from TN8AF can rest assured they will be forthcoming," soothes W1ZLX. "Stan is having some printed but there's a delay at the printers." . . . . . WA4RAK reports receipt of a VE3CVL/SU card via W3CXX. Woody was a three-time loser in attempts to dislodge an IZLAB QSL until he tried the address in the catalog to follow . . . . . W2CTN's QSL efforts in behalf of ZD8BC were temporarily hung up for lack of logs . . . . . FL8MC cards should not go direct or via REF, only to W7WLL, according to the latter.

**SOUTH AMERICA** — QSLs for the Falkland Islands work of VP8HO may be obtained through VP8HJ, Box 59, Port Stanley, Falklands, according to LIDXC . . . . . Mailing of those 4M-preixed Venezuela QSLs occurred in October, says W2GHK, and Hammarlund will also handle confirmation of Venezuela Radio Club's fall contest work as YVs 8AJ and 9AA.

**HEREABOUTS** — "QSLers of the Month" this month: H CLE3OX, CP5AQ, CRs 3AD 4AJ, CT1OF, Djs 20EC 0KQ, DLs 3GH 5FL, DM0HAM, DU1OR, EAs 6BD 9AY, EL2s AD AE, F9RY/FC, Gs 3ESE 6KQ, GD3RWF, GI3OQR, HI8XAL, HI9US, HP1AIN, IS1TAI, KG6SZ, KH6s BIH FJL, KL7s AIZ AKD FBI, KM6CE, KV4AA, KX6s BQ RB, LA8FI/P, ALP4BCC, OH4PC, OX3UD, SV0WAA, TF2WHI, TG9EP, UA2s AC BZ, UG6CW, UT5FI, UW0FK, VKs 4CK 4SD 4TE 4TY 6WT 9JO, YPs 2GL 2KJ 2SK 3YG 5GC 6BW 8HJ, VRs 2WR 4JD, YS9AW, ZE1KIV, YS1s LIHM RFE, YU3AAN, YV5-BIG, ZLs IAGO 1DI 2VS 3VB, 4X4PW, 5R8CB, 7X2AH and 9G1FQ, plus QSL agents Ws 2CTN 4SSU 5QMJ 7TDD 8ZCQ, Ks 3EDX 4RCS 7UCH 9WIE, WA4STL, VK6RU and the gang at Hammarlund. Their dependable and rapid QSL response is cheered by Ws 1BGD 1ZLX 3UNK 3LNE 3URE 3ZNB 8YGR, Ks 1DW 1LMS 3ZOL 7QXG 8HLL SYSO, WAs 4UMX 6MVG 6VAT 7BOA 7BOB 8AJZ 9AQE 9LBT, Wbs 2CON 2NLH 6MEQ 6NBU 6NXX and J. Aleirose. Anyone high on *your* list? . . . . . 'Alp! The following italicized brethren can't seem to coax confirmations from holdouts listed: *W1BVP*, CR5AR 1961, HI2RS '62, VQ2GD '61; *W1ZLX*, OD5AX, VP2LI; *W3HNK*, KG1FI; *W3ZNB*, AP5B; *W4GTS*, VP2VL, 9ALFZ; *K2-J/W*, EA9AR, KW6BS, ST2DB, UN1KAA, VP4TM all '56, VP2MB, VR3L both '60; *K5DZE*, VR4EE '62; *K7-ADD*, ZD8BC; *K7QXG*, FP8CC, KH6CMM/KB6, ZK1-BW, 7Q7RM; *K8YSO*, VK9BH '63; and *W4AZA*, OK2-KOJ. You slip 'em tip? . . . . . Overseas DX ops in need of Stateside QSL aides are invited to contact volunteers K2MYR, WAs 2AZI 8GUA, J. Gordon of 1823 Twentieth St., Monroe, Wis., or W. P. Kilroy, Box 6779, Washington, D.C., 20020 . . . . . KP4YT, in the P.R., *D.Xer*, points out that the P.O. down there frowns on too-frequent overweight postage-due shipments, so KPIs are urged to file extra loose stamps with their ARRL Bureau s.a.s.e. . . . . "Despite my 100-percent QSL policy with s.a.s.e., IRCs, etc., I have only 45 of my 88 countries confirmed," sighs W7SZM/KL7. "At that rate I'll have to work almost 200 countries to make DXCC." Courage, Charlie . . . . . "Those mint DX stamps from W2SAW really work!" — enthusiasts WB6MEQ. "Of the first dozen used I've gotten full airmail response within two weeks." . . . . . If K6QDI, WAGs SBS SLU and VAT make it to Socorro island this month, W2GHK's Hammarlund office will handle their XF4 QSLs. By the way, Stu writes, "In order to facilitate QSL chores, a separate s.a.s.e. or s.a.e. per requested QSL will be appreciated. "The Hammarlund staff also will take care of QSLs for the current Caribbean caper of ZD8HL-VP7CX . . . . . "I'm now QSL manager for VP2SJ," reports VE4OX. "Cards have been printed. Only QSLs accompanied by s.a.s.e. will be answered." Remember, U.S. postage sent to Canadian QSL agents should be unaffixed . . . . . K2JWM observes, "About the best thing a DX hound can hear from a DX station is 'QSL via W2CTN'. Jack's the greatest." . . . . . #57RT tells K2JWM that FS7RF seems strictly figmentary . . . . . WB2NLH figures fellows miss VP2GLE's last dot now and then, causing receipt of unanswerable QSLs by VP2GL's WA5KQF . . . . . Mayhaps one or more of the following individual shipment specs will push you toward a pasteboard or two. Naturally each datum is necessarily neither complete, accurate nor "official":  
**GM8RD**, J. Rodriguez, Box 90, Mayamo, Cuba  
**CO2BO**, c/o OK3AIM, Box C22, Priestany, Czechoslovakia  
**CP1EA** (via W2CTN)  
**CR9AH** (via W7ZAS)  
**DJ3GN/LX** (via DARC)  
**DJ0OR**, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001  
**F7BL**, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001



VU2AJ has worked over five thousand W/Ks in the past ten years. Duff runs 75 homespun watts in Calcutta and, aided by fresh s.s.b. gear and improving conditions, he confidently expects to reach the 10,000-Yank mark in due course. (Photo via W5AI-W5VA)

**F7DO** (to K5CVD)  
 ex-F7BS (to WA4RAK)  
 F9UC/FC (via I4L9PP)  
 FL8MC (via W7WLL)  
 FO8BE (via FO8AA)  
 GC5RY (a to G5BY)  
 HB0UZ (to HB0U7)  
 HB0XCU (to I4RB)  
 ex-I4HEM-CX6GM-C63ME (to I4P1MN)  
 HTSRLH, Casilla 1157, Santo Domingo, D.R.  
 H8RY, P.O. Box 145, San Cristobal, D.R.  
 HK3AVK, L. Perez, Aptdo. Aeres 7818, Hogota, Colombia  
 HK4PP, P. Ossa, Box 2163, Medellin, Colombia  
 HR2JQC, Box 219, San Pedro Sula, Honduras  
 HV1CN (see preceding text)  
 HZ1AB, USATSMA-MD, APO, New York, N.Y., 09616  
 H1B-IRB/ISI (see preceding text)  
 JY2WF, Box 43, Amman, Jordan  
 K7LMU/HIS (via W4ECD)  
 K7TJC/KJ6, Box 814, Bozeman, Mont.  
 KC6SZ-KG6SZ/KC6-KX6SZ, *Fasme* Foundation, P.O. Box 3025, Castrol Valley, Calif.  
 K6GIF (see preceding text)  
 KL7FO, #19 Fourth Av., Fairbanks, Alaska  
 OD5EG, P.O. Box 2309, Beirut, Lebanon  
 O8SJK (to I39KH)  
 ON4NM (W/Ks via K2MYR)  
 OR5RK (via UBA of Belgium)  
 OX3JV (via SM7ACB)  
 OY2GHK, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001  
 OY7ML (see preceding text)  
 PE2EVO, J. van Oort (PA0VO), EVOLUON, Philips, Eindhoven, The Netherlands  
 PY7ACQ/PY0, c/o CBI DX, P.O. Box 842, Recife, Brazil  
 PZ1BK, P.O. Box 140, Paramaribo, Surinam  
 PZ1CH, R. Zaudergron, P.O. Box 848, Paramaribo, Surinam  
 SV0WDD (via W6QVW)  
 VK9JO (via VK6RU)  
 VK0KE (via VK2AGU)  
 VP2SJ (via VE1OX)  
 VP2VD (via K4IFE)  
 VP5AR (via W8GUA)  
 VP7CX, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001  
 VP7DO/mr (via VK2SG)  
 VP8s HJ HO (see preceding text)  
 W4BIG/DUI, c/o U.S. Embassy, APO, San Francisco, Calif. 96258  
 Y08DD, Box 60, Suceava, Roumania  
 YVs 3AJ 9AA (see preceding text)  
 YV4NB, Box 18, Maracaay, Venezuela  
 ZD8AR, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001  
 ZS5UT/mn (to ZS5UT)  
 ZS8E (via ZS7OS)  
 ZS9WNV (via W4ECL)  
 4W1s G, I (via K9BPO)  
 4X4s SO UL (via W2IWP)  
 ex-8N2CKH (to OD5EG)  
 5V2CM (via W1Y1D)  
 7G1U, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001

7XZJP (via ARA)  
9HIAG (via RSGB)  
9L1JW, c/o Sherbro Minerals, Freetown, Sierra Leone

The gift committee for preceding donations: Ws 1AYK 1BGD 1BVP 1VG 1WPO 1YYM 2APL 3ZNB 4GTS 4PK 8YGR 8ZCQ, Ks 1HDW 2JWM 2UPD 3CUI 3ZOL 5DZE 7LDU 7QXG 8HLR 9UIY, WAs 4RAK 4UMX 4WIP 4VAT 7BOA 7BOB 8JXM 9AQF, WBs 2CON 2NLH 6KVA 6MEQ, VE3CJ, DJ0NE, KH6FGA, PY7AKW, DARC's DX-MB (DLs 3RK 9PF), DX Club of Puerto Rico DX'er (KP4RK), Far East Auxiliary Radio League News (KA2LL), Florida DX Club DX Report (W4JVV), International Short Wave League Monitor (12 Gladwell Rd., London, N.S. England), Japan DX Radio Club Bulletin (JA1DM), Kansawa Radio Club Splatler (K8BIT), Long Island DX Association DX Bulletin (WB2HXD), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association DX Bulletin (K1AMP), Northern California DX Club DX'er (Box 608, Menlo Park, Calif.), Ontario DX Association (VE3FXR), Puerto Rico Amateur Radio Club *Groova Wave* (KP4DV), VERON's *D Xpress* (PAFs FX LOU TO VDV WWP) and West Gulf DX Club Bulletin (W5IGJ).

### Whence:

**AFRICA** — "FL8MC is anxious to work W/Ks on 14 Mc. at 2000-2300 GMT," says W7WLL. The anxiety is mutual, of course. Claude, with ex-FL8AK's Globe Chief, a dipole and BC-1004D receiver, expects to remain active in French Somaliland until 1967. . . . 9C1s FK and FQ make Ghana grabbable around 14,020 kc. almost daily, 2200 GMT, observes WB2CON. K9TUY finds 9G11G craving Nev. and Mont. to wrap up WAS. . . . WA6TZN notes former 5A2TJ signing WA5GHT/6 and looking forward to early retirement on his Mississippi rhombic plantation. . . . Quantity isn't back up there yet, but the quality of 21-Mc. DX keeps that band well watched. WA8JXM lists ZD8WZ regularly workable between 1500 and 2100 GMT near 21,065 kc. Near-by ZD8s AR and HL are enjoying those ten-meter revival openings to the States. . . . Marion Island's ZS2MI puts a rhombic on 7005-ke. c.w. now and then. . . . 5VZ8CM (5R8CDM) expects to keep Togo a-go-go for a year or more. Francois likes sidebanding on 20, 1900-2100 GMT.

**ASIA** — 9M4MT (G3ATH) pours potent r.f. out of Singapore with his 75-watt er and dipole. WB6KVA reminds us that Harry formerly signed DL2NS, GA3ATH, VS7PII, XZ2HP and ZB2A. . . . UA9PP hunts N.H. and Nev. for WAS purposes on 20 c.w., says K9UIY. . . . VS6s BJ DS FF FJ FO and other Hong Kong OMs recently got a kick out of tracking down VS6EL's hidden transistorized half-watt er on 160. VS6BJ believes this to be the first VS6 rig hunt ever held. . . . Judging from the *Callbook* and on the air, there's an amateur radio boom in Israel. Representative of this trend are 21-year-olds 4X4s HW and SK. K4WMB finds the former active on 20 sideband most weekends with a quad and 154/137-country DX score. W2IWP observes 4X4SK's 75-watt 6146 sender on 7- through 21-Mc. c.w. at 2000-2300 on weekends. Dan, a signals staff sergeant studying for his extra-class ticket, plans early s.s.b. activity. . . . VU2LWZ's first 103 contacts featured thirty countries, an auspicious DX beginning for a newcomer. VU2GW tells W3ZNB that India's amateurs generally QRTD voluntarily in September due to developments on the northern frontier. . . . W7VRO's friend HM1AB renews the hunt with an HW-32, 2B and two-element quad

on sideband, a 3ZV-2, SP-000 and TA-33 for c.w. work. "John, a lieutenant at a Korean military academy, seems to find plenty of time for DX."

**OCEANIA** — VE7IR has an interesting DX assignment aboard the *Sea Search*, a scientific ship probing geophysics off the western Australia coast. John signs VP7DO/mm on 14-Mc. s.s.b. and, so far as some W/K/Vs are concerned, this is just about as far away as you can get. John also holds the call VK2IQ and formerly signed VE7IR/3VS near Tunis. . . . W5KJK finds rarer stuff more catchable while signing KH6FRE these days. . . . K7QXG and others regrettably passed up KG6SZ, Saipan, as just another Guam guy in September. Lloyd and Iris continue their Pacific DXcursion under Yasmee Foundation colors after stops at KC6SZ and FX6S2. . . . DX men talked up the Spratly Islands for years and years but nobody did anything about 'em till W0WNV and K7LAIU came along. Don and Chuck put these China Sea reefs on DX hands as 189WNV in October to generate new peaks of pile-up hysteria.

**EUROPE** — "I am planning DXpeditions around Europe to activate the rarest countries," warns 11RB, claim-authorization to operate in unworkable Albania. Pier also intends to activate various Italian islands in the I0 IE1 IG1 IM1 IP1 and IU1 prefix series. . . . PA0VO frequently signs PE2EVO from the Philips base, Eindhoven. "PE2EVO is QRV for all amateurs needing critical reports on their signals." WB2NLH was among the first to catch this one on 20 c.w. . . . G3HS (ex-SU1HS, VR1H-VU2HS) couldn't jell plans for stops at rarer points so he'll just be surfing at Sydney for the next few months on a down-under vacation. . . . Listener P. Kilroy finds 80-year-young G5TH, an RAF vet, successfully battling SWBC monsters on 40 phone with a 100-watt d.s.b. outfit. . . . W1PC comes back home from the Continent after great DX sport as DJ0NE. . . . OK3MM should be back from his CO2BO DXcursions by now. . . . W2GHK drew the call HB9NBB at the well attended Geneva IARC convention in September. Shortly thereafter roving W4BPD used Stu's OY2GHK tag in a Faeroes frolic before mounting Monaco maneuvers. . . . W8DUS, W9s AC and IOP joined forces for HV1CN DXcitement over Thanksgiving.

**HEREABOUTS** — K1BPJ specializes in shore-to-ship DXing. Dave has consumed 38 of 56 "mm" stations worked. K1BPJ reminds us of the maritime-mobile certificates offered by W3OB, contacts with thirty vessels required. . . . "One of the best ways for the modestly-equipped operator to collect DX is to plug away in every DX test that comes along," opines WA3AZL. Mike's results back him up. . . . K8YSO encountered a rickety Cuban on 15 phone, CO2DL/CO4. No Fours left in the *Callbook*, as a matter of fact. . . . WAs 4UMX and 80UA comment on VP5AR-inspired fireworks on the low edges of 20 and 40. Tony will be on Grand Turk for another year or more. . . . "I've been fairly active on DX bands for about a year," remarks W7SM/KL7. "After a few more months in Alaska I'll be moving on to a new assignment." . . . W1s WPO and YYM of ARRL's Communications Department clocked WA2EFN, W1s JYH and EC1I one-two-three in the DX quiz at the New England DXCC meet in October. 'Twasn't easy, unless you're up on things like the 4J1 prefix and the spelling of — er — Revilla Gigedo. . . . LU7A of So. Orkneys skeds LU2BG regularly at 1530 GMT on 14.20 kc., and VP8HO shifted diggins from the Falklands to So. Georgia. . . . The Caracas gang is cooking up an international DX meeting for February, the eyeball species. QST

## Strays

The Stanley S. Holmes Telephone Pioneer Ham Radio Club invites all telephone pioneer hams throughout the U.S.A. and Canada to participate in contacting as many individual members and to reach as many different chapters as possible in the Telephone Pioneer Ham QSO Party, December 4 and 5. The Party will start at 1900 GMT on the 4th and will end at 0500 GMT on the 6th. The same station may be worked on other bands for points. Suggested calling frequencies plus or minus 20 kc.: (phone) 3.850, 3.950, 7.250, 14.250 and 144-146 Mc. (c.w.) 3.575, 7.040 and 14.100 Mc. Exchange consists of date, time, signal report, chapter name and number. Send extract of log showing date, time, contact number, station worked, chapter name and number not later than January 8, 1966

to Joe Dugan, W2CML, 100 Central Avenue, Kearny, New Jersey.

— . . . —

With the closing of the NY World's Fair, K2US at the Coca-Cola Pavilion has discontinued operation and is being dismantled. The job of QSLing is still in process. Ernie Bressette, WA2TEK, 33 Roosevelt St., Pequannock, N. J., is handling the task; a self-addressed stamped envelope enclosed with your own card (or dope on date and time of contact) will be appreciated and facilitate the response.

The Hudson Amateur Radio Council is preparing an extensive "scrapbook" record of the K2US activity. Many visiting amateurs took pictures, and HARC would appreciate receiving extra prints for their book; send them to David T. Ferrier, W2GKZ, 43 Cameron Drive, Huntington, L. I., N. Y.

# YL news and views

CONDUCTED BY JEAN PEACOR,\* K1IJV

## DX—W, X, Y, Z

The normally lively 2250 kcs. allotted to Novices is nothing compared to the superabundance of activity produced on these same frequencies once each year during the Novice Round-up. This once-in-a-Novice-time experience takes place in February each year and provides some fine operating experience for all radio amateurs. Newcomers have the chance to gain valuable experience and the old timers thoroughly enjoy assisting in the process.

The increase in number of YLs holding Novice licenses is astounding. If names were part of the Round-up exchange, or were you to be endowed with e.s.p. for the occasion, you'd find quite a number of the distaff side behind the keys. A close look at the latest call book points this out.

As a YL operator, if yours is a not uncommon share-the-rig station, you know the fun that this can be. We all learn to be fast runners! True, operating procedures change slightly when one YL in a family gets her ticket. Can you picture then, what it must be like having three licensed YLs under one roof? Lively!

It almost appears to be a mistake in the call book when you see WN1DXW, Patricia T. Benoit; WN1DXX, Patricia T. Benoit; WN1DXY, Marcel (Tiny) Benoit; WN1DXZ, Catherine Benoit; all at the same address. To distinguish between the two Patricias, the FCC found it necessary to add birthdates to their licenses. On the air, you can tell them apart by the spelling of their names as Pat, WN1DXW, mother of the family, uses one T and her daughter, WN1DXX, uses Patt.

Their interest in amateur radio stems from the encouragement of a ham. Bob Bilodeau, K1OIO, first merely agreed to assist them in raising a new antenna for their Citizen Band radio. With all the marks of the true amateur spirit, Bob pointed out the added privileges that could be theirs were they to become radio amateurs and the next thing he knew, he had a class. Once each week he conducts a class in theory, during which the Benoit family and other interested hams are literally learning the ins and outs of amateur radio. Questions and answers begin after the actual dismantling or building of different pieces of equipment.

Since being on the air, the family has shared a DX-60, an SX-100 and a great deal of pleasure operating on 80, 40 and 15 meters. Cathy is a 15-year-old high school freshman and her sister Patt is a junior at South Hadley High School where she is the only YL member of the electronics club.

Between Tiny's code practice sessions, actual on-the-air experience, and Bob's theory classes, all have their General Class goal planned for next February. Their timing is excellent since all will get a chance to operate during the Novice Round-up. With four operators to choose from, you're almost certain to QSO either DXW, X, Y, Z, or maybe all four — all at the same address.

### Ligo-Internacia-Frata-Esperanto

Regular schedules on the air in Esperanto are being planned by the newly formed radio Esperanto Club of which Phyllis Shanks, K7KSF, is President and Eva Green, VE7BBB, Secretary. A Northwest Esperanto convention is also being planned in Vancouver in July, 1966.

Esperanto is a constructed language approved for radio transmission since 1931 and endorsed as a second language for all nations by UNESCO in 1954.

This group plans to supplement the activities of W2CIL, who has spearheaded an international Esperanto Radio group for several years among amateurs all over the world.

To converse with people of all nationalities in a common language is a thrilling experience and any



Recess at the Benoit's! Seated (l. to r.) are Cathy, WN1DXZ; Pat, WN1DXW; Patt, WN1DXX. Standing (l. to r.) are Bob, K1OIO, and Tiny, WN1DXY.

The Benoit family of South Hadley, Mass. has three YLs, plus an OM. All have thoroughly been enjoying all the aspects of amateur radio since receiving their four consecutive calls in March.

\* YL Editor, QST. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.



Frankye Prigg, WA9ENB, and XYL of Johnny, WA9ENF, of Rockford, Ill. was first licensed in 1962. In addition to being one of last year's YL/OM high contest scorers and an active DXer, she, too, has encouraged other YLs in amateur radio interests and assisted new licensees through code classes conducted in her home.

YL or OM interested is invited to contact either Phyllis or Eve for further information.

### G2 YL Honored

Baylare made history on September 25 by being the first YL club to entertain its YLRL DX adoptee in person. Nell Corry, G2YL, was guest of honor at a luncheon where she was presented with the membership pin of their club by President, Vera Wall, WA6PKP. She was also presented with a charm bracelet bearing the YLRL girl on the world, a mermaid (club emblem), several San Francisco points of interest and identification discs. In addition, a Baylare Mermaid certificate for eyelash QSO was presented by custodian K6SZT. The certificate bore the signatures of the twenty-one YLs assembled in her honor.

Nell brought greetings from G-Iand YLs, including G8LY, Constance, another Baylare adoptee and gave a brief resume of her trip across Canada and down the U. S. west coast. She noted, that prior to this trip she had never seen more than five licensed YLs together at one time and compared the Baylare attendance to the total licensed YLs in the British Isles.

Upon her return home in late November, Nell is very much looking forward to working many of the new friends recently met.

YLRL's DX adoptee plan, whereby a U. S. A. YL sponsors a DX YL for club membership, has brought YLs all over the world closer together through correspondence, radio contacts and, now, meeting in person. If you'd like further information about DX adoptees, it may be obtained by writing Ginny Powell, K1LCI, YLRL's International Membership Chairman.

### DXCC YLS

Please add the following calls to the DXCC YLS listed in the October, 1965 column:

Cert. No.	Issued	Call	Total
1339	Oct., 1958	W3ICQ	210
6690	July, 1963	K6POC	231
2948		WA6OET	136 (fone)
6789		WA6OET	204

Excerpts from letters received:

"Ellen did a wonderful job. It would be most in-

teresting to present a list quarterly, or periodically, of the YLs' DX progress." — WA6OET

(Editor's Note: Further corrections would still be welcome and would greatly help to make a periodic list that much more accurate.)

"Really enjoyed your column on DX. My hat is off to Ellen, W1YYM, for trying to sort out the YLs from the thousands of DXCC holders. I tried to do something similar using the call book once and it was impossible." — K6POC

### YL Club News

The Ontario Trilliums announce an award to be given by their club effective May 19, 1965. Requirements: work club members, any place. W/VE: accumulate 6 points, 1 each per member, 2 for club station, VE3TOT, any band or mode. Fee \$1.00. Band endorsements. Seal endorsements for each 6 points. S.a.s.e. only. DX: same as W/VE, except 3 points required. SWL: eligible under same requirements. Club members: accumulate 12 points, endorsements for each additional 12 points. Application: send list of calls in alphabetical order, with TOT number and full log details, signed by two amateurs that QSLs are in your possession. Send to: VE3CLP, Marion, 2727 Russell St., Niagara Falls, Ontario, Canada, enclosing fee or s.a.s.e. as required.

The Buckeye Belles announce the following supplemental information in regard to their Memorial Station, W8MBI, (see August, 1965 column). Effective July 18, 1965 a contact with W8MBI will count as 2 contacts toward the Buckeye Belle certificate. Certificate Custodian is Lillian Richardson, W8HWX, 3709 Starr Road, Oregon, Ohio 43616. No qsls necessary, but a list with call, Buckeye Belle number, first name, date, frequency, and mode are requested together with 25¢ in coin or stamps to return the certificate in a mailing tube.

### Congratulations

Congratulations to Helen Maillet, W7GGV, who has been named Idaho's Ham of the Year for her outstanding activities as a radio amateur.

Seasons Greetings to all.

QST



The Oberdoesters are all top notch DXers. In addition to having 210 countries confirmed on fone, Elsie was the 4th YL to earn DXCC-SSB. All received their DXCC awards at the same time. Seated (l. to r.) are Ron, Jr., W3HCO; Elsie, W3ICQ; Lou, W3FWD.





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.

LILLIAN M. SALTER, WIZJE, Administrative Aide GEORGE HART, WINJM, National Emergency Coordinator  
 ROBERT L. WHITE, WIWPO, DXCC Awards ELLEN WHITE, WIYYM, Ass't. Communications Mgr.  
 GERALD PINARD, Club Training Aids PETER CHAMALIAN, WIBGD, Communications Asst.

**160-meter Tests.** An Annual Top Band DX Test Transatlantic and Worldwide for 160-works takes place Sunday mornings, Dec. 5 and 19, Jan. 2 and 16, Feb. 6 and 20. W/VE's will call CQ DX Test the first 5 mins. each hour, and in the alternate five minute periods between 0500 and 0730 GMT those Sundays. They will listen for other nations' amateurs who will call CQ similarly in the 2nd, 4th, 6th etc. 5-min periods. The purpose is to establish some new records. Reports go to W1BB.

**First-Timer Tests** are also scheduled to help those who have never before worked transocean on 160. During these times the "160 meter regulars" are asked to stay off or stand by to permit newcomers to have the best chance. W/VE and N. A. stations are requested to stay below 1820 to avoid QRM to the 1820-25 spot where many EU stations must operate. North American stations will make their try from 0500-0730 GMT January 9 and March 7 using the time plan above for all calls. Everybody will please use the WWV time tick to keep the periods right on the nose. Good luck to all in the tests.

**Use Amateur Radio for Your Holiday Greetings.** Amateurs everywhere show both themselves and their techniques off most favorably in the Christmas season, and at Thanksgiving and other holidays, when greeting and other meaningful messages can be sent. This can be for yourself or for others. You demonstrate the true ability of our Amateur Service to do something for others in handling traffic. There's personal pleasure and often the thanks of family and friends in meeting this challenge of radio origination of a message. Not every amateur has the know-how to assure accuracy and correct routing-handling so there may be a small element of challenge to some. But as with birthdays and anniversaries, a formal recognition of all the occasions is much appreciated. Receiving a radiogram also can be a very pleasant surprise.

The handling of amateur radiograms is without restriction in this country. This requires only adherence to FCC's section 97.111 and (internationally) restrictions to the provisions detailed in Chap. 8 of the *License Manual*. Messages should be concise. Addresses must be complete

## Christmas QNI

by Hugh S. Pettis, W3QCW; RM-MDD

"Dedicated to those unseen, unsung, very over-worked traffic men caught up in the piles of Yuletide messages."

— \* \* \* —

T'was the night before Christmas, and at last off the net,

My traffic was cleared and all schedules met;  
 The rig was shut down and all logging through,  
 But the receiver (still on) whispered a signal or two.

I had just lit my pipe and stretched out my legs,  
 When I heard a strange call on 3.6 Megs.  
 Conditions were poor, as usual and rough,  
 With most signals fading, lost in the LUF.

But the op was persistent as he called MDD,  
 Repeatedly, patiently, with a terse "QTC."  
 So I turned on the rig and sent on my key,  
 His call and mine and a quick "QRV."

With a crisp "QSK" and "HR NR 1"  
 Preamble, Address and Text were begun.  
 My copy was clean, and I gave not a thought  
 To the message itself, or the SIG as I ought.

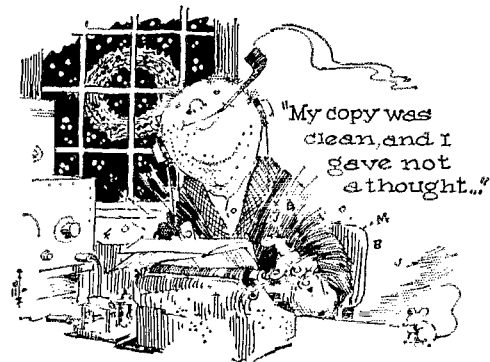
So I sent "QSL," and then heard him say,  
 "TU OM CU SK."  
 Then I turned off my gear on a now quiet band,  
 And started to read the message at hand.

The Address was us, with a Text rather trite,  
 MERRY CHRISTMAS TO ALL AND TO ALL A  
 GOOD NIGHT.

But the SIG at the bottom which I read with a start,  
 Filled my mind with delight, gave a lift to my heart.

For those signals so faint, were DX so rare  
 I'd not heard the call before on the air.  
 It was bootleg I know, but nonetheless right  
 For an Air Mobile station aloft that one night.

So I turned off the lights and tiptoed to bed,  
 Cheered with the knowledge 'bout the op in the sled;  
 For the SIG was a call, though not FCC,  
 Self-assigned, true, as "P I S C"





and correct, too, to assure deliveries. We suggest if possible, getting your messages off fairly early into the appropriate nets, to allow time for routing and relaying ahead of the peak traffic. There's more such popular traffic exchanges on amateur circuits at Christmas than for other holidays.

**Setting Up the Message.** The new Operating Aid 9A was made a *QST* insert with the August issue just so amateurs could detach this and have a message *example* to follow right on the operating table. If you are lacking this a postcard or radiogram will bring you another. You can, of course, pen your message right on one of the new ARRL message blanks or follow the example or consult the booklet *Operating an Amateur Radio Station* for data on message counting and message form. You can review "Aids for Traffic Men" (Nov. '65 *QST*) or "Fine Points in Message Handling" (Oct. '64 and Feb. '65, *QST*) for procedural hints if you wish. As to texts (1) each ARRL log book has (bound in) the list of fixed-text messages — to be utilized in emergencies or for special holiday situations as well. These ARL-check numbered radiograms are very useful in the holidays to permit sending a warm greeting, and to reduce circuit handling time.

**Precautions on ARL-Texts.** Use of these messages helps amateur radio do a bigger public service job. For accuracy the listed number representing a meaning is *spelled out* in the text you send. Send the identifying ARL in the preamble just before the message check or group count and also ahead of the spelled out number in the text. When an amateur gets an ARL-text message for his city, as a destination, the receiving operator must consult his list of texts and expand the message so it carries the full exact intended meaning in delivering the message. Any amateur who needs same may ask ARRL to send this ARL-text list (CD Form 3). A postcard or radiogram will get you one, if you need.

**On Starting and Routing Your Message.** You do not have to be a regular member of the net to use your state or section net for starting a message. Most nets will be happy to have you report in as often as you can to send or receive traffic, of course. The *ARRL Net Directory* (CD-50) is a source for information, giving net frequencies and times for c.w. and voice and RTTY net operations. Also you can consult the SCM's *Station Activities* reports right in this *QST* for a possible lead to this netting information or to identify the calls of the consistent traffic handling-and-reporting stations. One of these stations, especially if ORS, OPS or OES, will gladly assist in starting the holiday message. If you are away from home or not on the air for any reason, start your message on your own Section Net if you can.

If you enjoy casual work you might do a lot of monitoring of the different bands to find a station to schedule or work, so as to try to handle your message direct. Better yet will be systematically to use the full time National Calling and Emergency Frequencies (NCEF's) especially 3550 and 3875 kc. with directional calls and a

move off the frequency to pass traffic. But the operator that can be counted on to do the best job for you will be one with traffic know-how and reliability, as demonstrated in net operation or regular experience with some traffic handling. So the highly recommended organization way to insure preferred treatment of your message is to place it on the local ARRL Section Net. Most such nets interconnect to all states and Canadian provinces through ARRL's National Traffic System. The "organized" way utilizes the largest interconnected group of traffic-dedicated stations and outlets through liaison stations, so automatically gives the best assurance of good handling.

Having ascertained the frequency and time of operation of your net, you get on when the net controller ends his roll call or sends the net's collective call. When your call to him is acknowledged, you state that you have traffic, and where for. Then stand-by until the net control station (NCS) tells you what station to give your message to. When this station receipts to you for the message, you can record the time of handling (and his call on the message) and take satisfaction that your message has been placed in reliable

## A.R.R.L. ACTIVITIES CALENDAR

*Dates shown are in GMT*

- Dec. 2: CP Qualifying Run — W6OWP
- Dec. 15: CP Qualifying Run — W1AW
- Jan. 6: CP Qualifying Run — W6OWP
- Jan. 8-9: V.H.F. Sweepstakes
- Jan. 15-16: CD Party (c.w.)
- Jan. 18: CP Qualifying Run — W1AW
- Jan. 22-23: CD Party (phone)
- Feb. 4: CP Qualifying Run — W6OWP
- Feb. 5-20: Novice Roundup
- Feb. 11: Frequency Measuring Test
- Feb. 12-13: DX Competition (phone)
- Feb. 16: CP Qualifying Run — W1AW
- Feb. 26-27: DX Competition (c.w.)
- Mar. 12-13: DX Competition (phone)
- Mar. 26-27: DX Competition (c.w.)
- June 11-12: V.H.F. QSO Party
- June 25-26: Field Day

## OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Dec. 4-5: New England QSO Party, Connecticut Wireless Assn. (p. 132, last month).

Dec. 5, 19: 160 Meter Tests (p. 105, last month, and p. 101, this month).

Dec. 18-19: Maine QSO Party (p. 30, this issue).

Dec. 18-20: Ohio QSO Party, Upper Arlington Radio Club (p. 118, this issue).

Jan. 8-10: Arkansas QSO Party, North Arkansas Radio Society (p. 116, this issue).

Jan. 29-30: Louisiana QSO Party, Lafayette Amateur Radio Club (next month).

Feb. 18-20: QCWA QSO Party (next month).

hands. This is better than to attempt to go into the net of the section to which a message may be addressed. Propagation conditions are not always favorable at the distant point nor can nets accommodate dozens of distant reporters-in besides their regular coverage; also we must add that several messages to several nets cannot be sent into each, where they meet at approximately the same time.

— F. F. H.

### CLUB COUNCILS AND FEDERATIONS

Chicago Area RC Council, A. G. Robert, W9-YMF, Secy., 15200 So. 108th Ave., Orland Park, Ill.

Federation of E. Mass. AR Assns., E. H. Hastings, W1VRK, 23 Forest Ave., Swampscott, Mass.

Hudson Council, A. R. Rauch, W2DID, Secy., 451 Smith St., Central Islip, N. Y. 11722.

Michigan Council of Clubs, H. W. Rieman, Secy., K8IIN, 16121 Locherbie, Birmingham, Mich. 48009.

Ohio Council of ARCs, J. W. Benson, Secy., W8OUU, 2463 Kingspath Drive, Cincinnati, Ohio 45231.

Orange County Council of Amateur Radio Organizations, Ted Glick, K6LUA, Secy., 1009 River Lane, Santa Ana, Calif. 92706.

Radio Society of Ontario, Inc., A. K. Meen, Secy., VE3RX, Suite 2212, 44 King Street, W., Toronto, Ontario, Canada.

San Diego Council of AR Organizations, Inc., Douglas E. Decker, WA6TAD, Secy., 5901 Streamview Drive, Apt. 3, San Diego, Calif. 92105.

### A.R.R.L. AFFILIATED CLUB HONOR ROLL

We're proud now to present a list of the Honor Roll clubs that will shortly receive our "100% ARRL club" certificates. June '65 QST, page 112, had the first section of this Honor Roll. We included all affiliates showing 100 per cent ARRL membership according to their Club Report sent in early '65. Each year our listings have to be established from data given us in the current Club Annual Report (CD-18) forms. Next February we plan again to forward to every active ARRL-affiliated radio club the form for new annual filings. This is then examined in connection with the Board's 51 per cent requirements for continuing affiliation and also for further QST 100%-listings.

The Honor Roll clubs are those whose *entire* membership consists of members of the League.

Bandhoppers Radio Club, Inc., Chesterfield, Mo.

Elmira Amateur Radio Association, Elmira, N.Y.

The Fifty Club of California, Monterey Park, Calif.

Fort Dodge Amateur Radio Club, Fort Dodge, Iowa

Haddonfield Teen Hams Assn., Haddonfield, N.J.

Helix Amateur Radio Club, San Diego, Calif.

Long Island DX Association, Ozone Park, N.Y.

Louisville Gas & Electric Co. ARC, Louisville, Ky.

Lower Columbia AR Assn., Longview, Wash.

Maui Amateur Radio Club, Kahului, Maui, Hawaii

Northeast Nebraska Radio Club, Fremont, Nebr.

O.B.P. #1 Radio Club, St. Louis, Mo.

Ohio State University ARC, Inc., Columbus, Ohio

Order of Boiled Owls, Columbus Ohio Chapter, Columbus, Ohio

Orlando Amateur Radio Club, Orlando, Fla.

RA Transmitting Society, Nashville, Tenn.

The R Operators Assn. of New Bedford, Fairhaven, Mass.

Rochester AR Association, Rochester, N.Y.

Shelby Radio Club, Shelby, N.C.

Skagit ARC, Inc., Mount Vernon, Wash.

South Bay Wireless Society, Torrance, Calif.

State Line RC of N.Y. & N.J., Old Tappan, N.J.

Washington Radio Club, Washington, D.C.

Windblowers VHF Society, Inc., Ramsey, N.J.

### ELECTION NOTICE

To all ARRL members residing 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 have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL 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, and station call of the candidate 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.

The following nominating form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

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.

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 the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Idaho	Dec. 10, 1965	Raymond V. Evans	Apr. 10, 1965
Saskatchewan	Dec. 10, 1965	Mel Mills	Dec. 17, 1965
Eastern	Dec. 10, 1965	George W. Tracy	Feb. 10, 1966
New York			
Southern	Dec. 10, 1965	Albert E. Hankinson	Resigned
New Jersey			
Georgia	Jan. 10, 1966	Howard L. Schonher	Mar. 26, 1966
Ohio	Jan. 10, 1966	Wilson E. Weckel	Mar. 28, 1966
West Indies	Jan. 10, 1966	Jose E. Saldafia	Resigned
Arizona	Feb. 10, 1966	Floyd C. Colyar	Apr. 15, 1966
Tennessee	Feb. 10, 1966	William A. Scott	Apr. 15, 1966

### 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.

Virginia	H. J. Hopkins, W4SHJ	Oct. 11, 1965
Arkansas	Don W. Whitney, W5GKN	Oct. 13, 1965
Vermont	E. Reginald Murray, K1MPN	Oct. 17, 1965
Hawaii	Lee R. Wical, KH6BZF	Nov. 11, 1965
Wisconsin	Kenneth A. Ebner, K9GSC	Dec. 10, 1965
Western Florida	Frank M. Butler, Jr., W4RKH	Dec. 15, 1965
N.Y.C.—L. I.	Blaine S. Johnson, K2IDB	Jan. 2, 1966

In the San Diego Section of the Southwestern Division, Mr. Don Stansifer, W6LRU, and Mr. Leonard E. Babin W6CQF, were nominated. Mr. Stansifer received 377 votes and Mr. Babin received 163 votes. Mr. Stansifer's term of office began Oct. 21, 1965.

## 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 WIAW will be made Dec. 15 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Dec. 2 at 0500 Greenwich Mean Time on 3590 and 7129 kc. **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, 0230 GMT Dec. 15 becomes 2130 EST Dec. 14.

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 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0230 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sunday, 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 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230-0320 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 0230-0320 GMT practice on those dates:

Date Subject of Practice Text from Oct. *QST*  
 Dec. 1: *It Seems to Us*, p. 9  
 Dec. 7: *Amateur Reception of Weather Satellite . . .*, p. 11  
 Dec. 13: *The Monifiller*, p. 18  
 Dec. 17: *The Basic Helical Beam*, p. 20  
 Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition  
 Dec. 20: *Cathode Bias*, p. 37  
 Dec. 29: *Grid Return Circuit*, p. 37

## OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department.

During October the following additional amateurs were nominated in recognition of their extra skills and courtesies:

WA1APY	WA5DES
WN1DGK	W5EBM
K1LMS	K6LKD
W1RLS	W6GTZN
WB2QHD	W6YZV
WN2RMM	KH6FF
K3IPX/3	W8PNW
F3JH	KSUFJ
WA4EEC	V9PBA
WA4EXA	VE3EWY
W4GHS	VE3FWA
WA4HRG	DJ9SB
WA4IBZ	G3JFY



## Briefs

Corrections to the October DX Competition report should be made as follows: the Awards Committee is pleased to reinstate the W6L CX 128,754 point c.w. score making Frank the San Diego c.w. award winner and raising the Orange County DX Century Club aggregate to 364,540 points with 5 entries; the San Joaquin Valley c.w. section leader should be shown as W6UJ; W8M QE's c.w. score erroneously appeared in Michigan and should be listed in the Ohio tabulation; WA2KSD of N.Y.C.-L.I. received no operating aid; that f.b. 224,466 point c.w. Michigan total should be credited to WA8CZH and phone winner for England is G6RJ with 671 contacts, a multiplier of 28 and final score of over 56-K. The W8FGX mentioned on p. 84 should have been in bold face, clarifying Jake's 2nd-high single-op, c. w. spot.

## WIAW SCHEDULE, DECEMBER 1965

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 p.m.-3 a.m. EST, Saturday 7 p.m.-2:30 a.m. EST and Sunday 3 p.m.-10:30 p.m. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed December 24 and 25 in observance of Christmas.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0030			<b>Code Practice Daily<sup>1</sup> 10-13 and 15 w.p.m.</b>				
0100		C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0120-0200 <sup>4</sup>			7.080	3.555	7.080 <sup>6</sup>	3.555 <sup>6</sup>	7.080
0200		Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0205-0230 <sup>4</sup>			3.945	5.7	145.6	1.82	3.945
0230			<b>Code Practice Daily<sup>1</sup> 15-35 w.p.m. TThSat, 5-25 w.p.m. MWFSun.</b>				
0330-0400 <sup>4</sup>			3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS <sup>3</sup>		RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>
0410-0430 <sup>4</sup>			3.625	14.095	3.625	14.095	3.625
0430	Phone OBS <sup>2</sup>		Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0435-0500 <sup>4</sup>			7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS <sup>1</sup>		C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0530-0600 <sup>4</sup>			3.555 <sup>6</sup>	7.080 <sup>6</sup>	3.555	7.255	3.555
0600-0700			7.080	3.945	3.555	7.255	7.080
0700-0800			3.945	7.255	3.945	3.555	3.945
2000-2100		14.280	21.28 <sup>5</sup>	14.100	21.28 <sup>5</sup>	14.280	
2100-2200		14.100	14.280	14.100	14.280	14.100	
2300-2345		7.255	21.28 <sup>5</sup>	21.1 <sup>6</sup>	21.28 <sup>5</sup>	7.255	

<sup>1</sup> C.W. OBS (bulletins) and code practice on 1.805 3.555 7.08 14.1 50.17 and 145.6 Mc.

<sup>2</sup> Phone OBS (bulletins) on 1.82 3.945 7.255 14.280 50.17 and 145.6 Mc.

<sup>3</sup> RTTY OBS (bulletins) on 3.625 and 14.095 Mc.

<sup>4</sup> Starting time approximate. Operating period follows conclusion of bulletin or code practice.

<sup>5</sup> Operation will be on one of the following frequencies: 21.075 21.1 21.11 28.08 or 28.7.

<sup>6</sup> WIAW will listen for Novices on band indicated before looking for other contacts.

Station Staff: W1QIS W1WPR.

\* All times/days in GMT, general operating frequencies are approximate.

# DX Century Club

The following list contains the call letters and country totals of holders of the DX Century Club Award who have submitted confirmations to ARRL for the period from October 1, 1963 through September 30, 1965. New Members in DXCC for the period from September 1, through September 30, 1964 also appear in this list. DXCC members qualifying for the Honor Roll appear in the Honor Roll list below. Since the necessary space to run the complete DXCC Roster is not available (the total number of DXCC certificates issued as of September 30, 1965 was 10,990), this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 24-month period.

## Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through September 30, 1965.

W8JIN . . . 315/339	W8KIA . . . 314/337	W5ABY . . . 312/328	W4P4L . . . 310/324	DL1IN . . . 308/323
W1JYH . . . 315/337	W9OVZ . . . 314/334	W9BBF . . . 312/329	W6UX . . . 310/324	W6WWO . . . 308/324
W8POO . . . 315/337	W8BE . . . 314/334	W2ZGB . . . 312/327	HAAMU . . . 310/328	W7ACC . . . 308/331
W3GHD . . . 314/337	W5KCK . . . 313/329	K2EHT . . . 311/328	W3NQ . . . 308/327	W6B/E . . . 308/332
W9RBI . . . 315/339	W8MPW . . . 314/331	OF1ER . . . 312/333	D1ZBW . . . 310/326	W2YTH . . . 308/325
CX2CO . . . 315/335	W3GAU . . . 314/336	W4TM . . . 312/333	K2OEA . . . 310/325	W3NKM . . . 308/324
W1FH . . . 315/340	W2LPE . . . 314/334	W4OPM . . . 312/326	K2LVR . . . 310/322	DL3RK . . . 308/324
W7GUW . . . 315/337	W4OCW . . . 314/330	KV4AA . . . 311/324	W4OM . . . 310/331	W8NGO . . . 308/324
W8TAS . . . 315/335	W2DDU . . . 314/335	W2DEG . . . 311/326	W1HX . . . 310/329	W3CGS . . . 308/329
HB9J . . . 315/338	W2BKA . . . 314/337	W1ME . . . 311/333	W1ZW . . . 310/326	W6EPZ . . . 307/327
W2AGW . . . 315/338	W9LNM . . . 314/336	K2DCA . . . 311/327	W2TVR . . . 309/326	K5BCB . . . 307/319
W8EWS . . . 315/338	W8JBI . . . 314/332	5Z4AO . . . 311/328	W2SSC . . . 309/324	W6TZD . . . 307/327
W4DOH . . . 315/338	CE3AG . . . 314/337	VE7ZM . . . 311/334	PA8FX . . . 309/328	K2UVU . . . 307/319
W8HGW . . . 315/339	W1CLX . . . 314/336	W4LY . . . 311/330	HB9MQ . . . 309/325	W2DOD . . . 307/324
W2TQC . . . 315/337	W5AFX . . . 313/337	G8KS . . . 311/328	W4MR . . . 309/328	W5KBU . . . 307/324
W8IRA . . . 315/337	W2SUC . . . 313/329	W2AYI . . . 311/329	W4GXB . . . 309/329	W4ZLR . . . 307/312
W6QUO . . . 315/339	W6EBG . . . 313/327	W2LAX . . . 311/327	W0QGI . . . 309/324	W4BJ . . . 307/318
4X4DK . . . 315/332	W7GBW . . . 313/336	W4VPD . . . 311/327	W81RN . . . 309/326	HB9TL . . . 307/322
G2PL . . . 315/337	W3LMA . . . 313/334	W6CYP . . . 311/328	W3VGH . . . 309/323	G3AAE . . . 306/325
W3CT . . . 315/338	W8KHC . . . 313/332	W2OKM . . . 311/328	W2FXN . . . 309/322	W6KEV . . . 306/327
W1BHI . . . 315/338	W5KC . . . 313/335	W9NTA . . . 311/329	DL6EN . . . 309/327	W1CG . . . 306/324
W4GD . . . 315/335	DL3LL . . . 313/328	W2TF . . . 311/319	W2SAW . . . 309/325	K4TJL . . . 306/314
G4CP . . . 315/338	W2BOK . . . 313/329	K4LNM . . . 311/324	W2NUT . . . 309/324	W4LRN . . . 306/317
PY2CK . . . 315/337	W4ML . . . 313/332	K6ENX . . . 311/327	W2HTT . . . 309/323	W5OK . . . 306/316
W7PHO . . . 314/331	L1UGDJX . . . 313/336	VE3CFG . . . 311/324	ON4DM . . . 309/327	W9VHM . . . 306/321
K3UPG . . . 314/337	W5KCC . . . 313/335	W1HZ . . . 311/328	W3JTC . . . 308/330	K4RPF . . . 306/314
W9WV . . . 314/337	W9AIW . . . 313/335	W9AMU . . . 311/327	G3EAB . . . 308/325	W2PCJ . . . 306/323
W2ZX . . . 314/332	W3JNN . . . 313/336	K6EVR . . . 311/327	W5OLG . . . 308/328	W6OSU . . . 306/317
W4AIT . . . 314/336	W2WZ . . . 313/335	W3EGR . . . 311/327	DL7BA . . . 308/324	W9AJU . . . 306/319
W6AM . . . 314/338	W5CKY . . . 313/331	W2UVE . . . 311/328	VK3KB . . . 308/330	W8KPL . . . 306/323
G3FKM . . . 314/336	G3AAM . . . 312/335	W1MV . . . 311/327	K4AIM . . . 308/321	W6PUY . . . 306/326
W2LV . . . 314/332	W8DMD . . . 312/333	W9ODF . . . 310/326	W8PUD . . . 308/322	W2RBD . . . 306/319
W9NDA . . . 314/337	D1JHZ . . . 312/329	W2EY . . . 310/322	W0PCJ . . . 308/322	W2GL . . . 306/319
W6YY . . . 314/333	W8KML . . . 312/332	W8DAW . . . 310/333	W4LZS . . . 308/324	W9YSX . . . 306/322
W2JT . . . 314/332	W6GPB . . . 312/332	W7ENW . . . 310/333	W9GIL . . . 308/324	K6EC . . . 306/319
W9HUZ . . . 314/333	W9ELA . . . 312/334	W9SYK . . . 310/327	W2GUM . . . 308/329	W4LVV . . . 306/325

## Radiotelephone

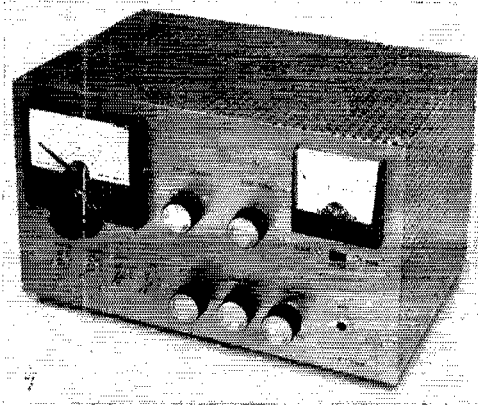
CX2CO . . . 315/335	W8BF . . . 314/334	W9JJF . . . 313/329	W2BNA . . . 311/332	W4OCW . . . 308/320
W8HGW . . . 315/336	W8CZ . . . 314/336	5Z4EKK . . . 312/335	W6AIV . . . 310/335	W9GJA . . . 307/326
W3RIS . . . 315/339	4X4DK . . . 315/332	W1EY . . . 312/332	HAAMU . . . 310/328	TL1PH . . . 306/327
PY2CK . . . 315/337	W9RBI . . . 313/335	W0AIW . . . 312/332	G2PL . . . 309/328	W3KT . . . 306/324
W7PHO . . . 314/331	W6YY . . . 313/332	W2JT . . . 312/325	DL3LL . . . 309/324	W3GHD . . . 306/323
W2ZX . . . 314/332	PY4TK . . . 313/329	W8KML . . . 311/331	ON4DM . . . 309/327	G8KS . . . 306/319
W4DOH . . . 314/335	W3JNN . . . 313/333	W8POO . . . 311/327	G3FKM . . . 308/321	

<b>328</b>	<b>320</b>	<b>317</b>	<b>314</b>	W9GFF	<b>308</b>	D1I8O	DJ3KR	CR6BX	W7AQB	W6TXL	W4HUE	W5OGS	W9GDI
W9KOK	W2JVU	W1BAN	W1RB	W3KDP	D1H8O	G3HCT	LA5HE	OK1FC	W8ZCQ	W7DLR	K5ADQ	DL3ZL	HB9EO
<b>326</b>	W5LGG	W2CR	W2RGV	W4SSU	<b>305</b>	<b>302</b>	<b>302</b>	SM5CO	W9EYX	VE9ES	W5ARJ	DL7EN	<b>288</b>
G3YF	W5PQA	W2GT	W7KTN	W1FZ	W2BQM	W2WMG	W2WVG	Y5AAB	W9GRF	ON4NC	SM6CCE	SM7MS	W1UOP
W2HH	W9FKC	W3LMO	<b>313</b>	W1AS	W6HX	W4HZK	W4DZH	W9BIB	W9MJK	<b>297</b>	<b>293</b>	<b>290</b>	W2DXX
ZL1HY	W0NLY	W5HDS	W1AZY	W2ESO	W7CMO	K4JVE	W4DHH	W1BGW	W9RCJ	W4EEE	W2BRV	W1JNV	W4FVR
<b>324</b>	W0PNQ	W6HD	K0RAL	W3OP	W0BTD	W7CNM	W4NNH	W1T5	W9RKP	W5BUK	W2MJ	W1RAN	DJ3JZ
W3HM	D1ZAA	W6KXL	W0TJ	W5P8B	YV5BX	W8KBT	W6ULS	W2EQS	W9WYB	W5PWW	W4NJF	K1SHN	HB9KU
W2HHH	G2BYN	W9UXO	VE2FW	W6HOC	<b>307</b>	K8LSG	W6W X	W2TQR	VE2BV	PY1HX	W8WZ	W1TYQ	KP4CK
W3EHW	W6TS	SM5LZ	<b>312</b>	W6BHD	W4CFD	VE3HWY	W8GLK	W2ZVS	F3YR	YS1O	W6NSL	W2CWK	PY4OD
W6LDD	W1BLI	W2GNQ	WA6EYP	K6LGF	W4EPA	<b>304</b>	W8JSU	W3MFW	G3ATZ	<b>296</b>	JA1KB	W2FBP	ZS1RM
W9VBQ	W23NS	W2HO	W7ADS	W6UOV	W4MS	W10OS	V63RE	W3MWC	JA1DM	K2SHZ	K1PW4	W2UMU	<b>287</b>
W3EYV	W6C8A	W6UAE	IT1TAI	W7HKT	W9DWQ	W1WDD	DL1KB	K4ASU	ZP1AX	W9YNB	<b>292</b>	W3AFM	W4HA
W6LDD	W9FDD	W6NJK	<b>311</b>	W9HCR	W9JUV	W2IRV	DL3BK	W4AYY	P5CFC	VE2YU	W1ELR	W3NHN	W5QVZ
W6VBD	G3DO	W0BMJ	W2SHC	W6ATH	W9QYV	W4BQY	G3HDA	W4BBR	W4CKB	SM7QY	W4ZELS	K4HYL	W467GY
W9VBD	HB9EU	W0MLY	W3ZAO	G2BOZ	W9GKL	W6KRM	<b>301</b>	W4MCM	W1MQV	<b>299</b>	K4HNA	W4JDR	W8CUT
<b>322</b>	<b>318</b>	<b>315</b>	W4DQS	OH2NO	DL9OH	K6RWO	W2BBS	K4PVD	W6LN	<b>295</b>	W1OJR	W8KUT	W8CUT
W4AAU	K4R1D	W3KQV/2	<b>309</b>	PA0LB	<b>306</b>	W6UHA	W2MES	K4R3N	W7EJD	W1VCG	W9WFS	W7UMJ	W7HIA
W5EGK	W6CYI	W6B5Y	W1AEB	W2CKA	W1GYE	<b>303</b>	W4KFC	W6DQH	LU5AQ	W2CTN	HB9IK	W9MCK	W4UKA
LA7Y	W8WZ	W8ONA	W2FKA	W1AEB	W6ANN	W1HA	W4PAA	W6K6K	W1M6V	W5FFW	<b>291</b>	W2QX	W7QIA
<b>321</b>	W9SFR	VE2NV	W8PHZ	W6WVM	W8SCL	W4DKP	W6OME	K6KTI	W3GJY	<b>294</b>	W20JD	W2VUF	W89JH
W4BYU	G5VT	G13JV	W6RKP	G6XL	W9FVU	E8ONV	K7CGM	W6SQP	W51YU	W1BGA	K8OHG	<b>289</b>	W9TKD

F8BS	DL1DC O77ML ZL1PV	264 W1FQA W3YZI W4THZ W3E3K D32KS H89UL W4NT W8S1A W8LY	253 W3DJZ W3HJQ W39JW W6ATO W6ADUG K6E1V W7ABO W9RH W6BPA DL6MK H89BK OH2YV K01ZL W8CPM D4JDN DL7BK Z81CR Z8J8J	233 W201B W3KDF W3ZQ W7NRB W9LJW W9QFC W42FZ K4TWK DL9RK	225 W1EVT K5DGI K6RTK W7UVV K8JWC W8QVY W9NGB PY1ADA	214 W1BYP K21NP W1ATM K4TFW W6DX W8YPT W8ZEC DL3TW W8PAW G3ABG G3OZU YK2NS Z82U	205 W1GJK LA4ZC	204 K4CLT OK1MP W4S1B W6CBE SP9ADU UA2AO Z55KU Q95AB	K3DNU W5DVV W6LV PA0VDV	188 W1NI SM5AM UA4PA	179 W1OPB W9WV DL7DE W3JURU DL7EG P23BL VK5KO	187 W1NJL W6PET TN8AF	186 W4TFL/1 W7BCYI W8DGH CR6DB	198 H89US H1ZPB	185 W3GOQ EA2CR I1RC ZL2PM	196 W6ZOMR F8CW	195 W2ACH W2AXR W2HVD K4GRD K9V6E W9GXH	184 W2ASF W2AXR W2HVD K4GRD K9V6E W9GXH	175 W1GDY W1YNF W21P WA48UR W5CME W6NQU W90QQ VQ8AD	169 W2HUG W3HNI W5LZG W8DDK VE7BW DL7EM K06BK SM6VR SM7BHT	160 W1VJZ W1PNR WA2BRI W2CUE WA2DIJ W2KOY DL2LAW K20XN WA2RUB G8ON HB9QA OK2NN SM6CAS	173 W1MD W4LSG W6DER W8NAN DL1AM DL1JD DL1WT K01ZT SM3BN SM7CAB ZL1QW	167 W2AAV W8NPF DJ2CM W8LZV K8YCM W91WC K90YD K90YE K06HM K0EUV G3LP OK1A VD SV0WAA	172 K1PNL W2RWQ W4OEL WA4XP W8RME/5 G8ZY EA9AP G8KU I1SF OH2XF SM5RK ZL5M ZD5R	165 W5FJ K9TGH H1P1E VE3ACD W8RME/5 W6VX EA9AP G8KU I1SF OH2XF SM5RK ZL5M ZD5R	164 W1WLZ K2L2B WA2ZEZ K4OYR K4PVZ W6YC W9MCJ VE3EUV DL1ES DL1JF OH5VF K8BCK K8WQV W6RRG K8DZT W80KB W9GYZA W6GND VE6ABP DJ1UE DL3ZA F2PO LA7XE SP3LP V5PAO	159 W1GOG W1YQF K2KNV W2MZY WA2PWI W9OD G7CR I1PF K4PAZ	158 K1AWP K18EO C86U DJ3CT DJ4X G8KAA H2YAK V83BG ZL1NG	157 W4GJY W4ZEA W70AG W8NGM VE4MP DL3CM OK3EE SM7VX	170 K1LW1 W2ANX W82APG WA2FQG W8JSN W2OCL W2RSJ K3MNJ W3UHV W3JURE W40MV WA5CBE W5CPW K5OGP W6GSV K86ACU W7MH K8GJD W9GDM W9KXZ K90JZ W9SCZ W9WQQ W0HNA W1CJZ W2LJX W4PZD WA6OZL OZ5DX	171 W1GDK DL1KS SP2HL SP5GX UC2AV VPTNQ	161 W1HEM W1M0Z W2JSX WA2MNQ W4KN K4YYL K5GOT WA6AY W6WLY W7QY VE5DGX CE5EF DJ2ZJ DJ2ZJ FRSC HB91M H1PZ K1PBJU KR6JZ L1E1 OES8H VQ8AI YU1KC	176 W1CJZ W2LJX W4PZD WA6OZL OZ5DX	177 K8GJD VE2BK EA7CP W3GOQ EA2CR I1RC ZL2PM	186 W4TFL/1 W7BCYI W8DGH CR6DB	198 H89US H1ZPB	185 W3GOQ EA2CR I1RC ZL2PM	196 W6ZOMR F8CW	195 W2ACH W2AXR W2HVD K4GRD K9V6E W9GXH	184 W2ASF W2AXR W2HVD K4GRD K9V6E W9GXH	175 W1GDY W1YNF W21P WA48UR W5CME W6NQU W90QQ VQ8AD	169 W2HUG W3HNI W5LZG W8DDK VE7BW DL7EM K06BK SM6VR SM7BHT	160 W1VJZ W1PNR WA2BRI W2CUE WA2DIJ W2KOY DL2LAW K20XN WA2RUB G8ON HB9QA OK2NN SM6CAS	173 W1MD W4LSG W6DER W8NAN DL1AM DL1JD DL1WT K01ZT SM3BN SM7CAB ZL1QW	167 W2AAV W8NPF DJ2CM W8LZV K8YCM W91WC K90YD K90YE K06HM K0EUV G3LP OK1A VD SV0WAA	172 K1PNL W2RWQ W4OEL WA4XP W8RME/5 G8ZY EA9AP G8KU I1SF OH2XF SM5RK ZL5M ZD5R	165 W5FJ K9TGH H1P1E VE3ACD W8RME/5 W6VX EA9AP G8KU I1SF OH2XF SM5RK ZL5M ZD5R	164 W1WLZ K2L2B WA2ZEZ K4OYR K4PVZ W6YC W9MCJ VE3EUV DL1ES DL1JF OH5VF K8BCK K8WQV W6RRG K8DZT W80KB W9GYZA W6GND VE6ABP DJ1UE DL3ZA F2PO LA7XE SP3LP V5PAO	159 W1GOG W1YQF K2KNV W2MZY WA2PWI W9OD G7CR I1PF K4PAZ	158 K1AWP K18EO C86U DJ3CT DJ4X G8KAA H2YAK V83BG ZL1NG	157 W4GJY W4ZEA W70AG W8NGM VE4MP DL3CM OK3EE SM7VX
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This handsome transmitter/v.f.o. was built by Dave Karpiej, K1THP, from the original article by McCoy in April 1965, QST. Dave, along with his friend, K1THQ, who also built one, used some of their own ideas on their models which have a slightly different panel layout and finish, plus some minor circuit changes. The pair built the rigs in about one week and Dave mentioned that the most difficult part of the job was applying the decals to the front panel! K1THP has worked 35 countries and 34 states with his rig, mostly on 40 meters.



This is WA9DCK's unicycle mobile in motion! The hand-held transceiver operates on 29.1 Mc. and Dan seems to be able to operate both devices simultaneously.

## Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

### ATLANTIC DIVISION

**DELAWARE**—SCM, Roy A. Belair, W3IYE—SEC: K3NYG, RM: W3EEB, V.H.F. PAM: K3OBU.

Net	Freq.	Local Time	Days
DEPN	3905 kc.	1800	Sat.
18AIN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2000	Wed.
KCEN	3905 kc.	1300	Sun.

I regret to announce the resignation of W3CFA as PAM. WA3DYG, ex-WA9HZI, is a new station in Delaware. K3YZF is doing more school work and less traffic-handling and W3EEB is QRL work. Kent County ARC is conducting a class for prospective Novices. K3NYG and K3UHU handled traffic to Delaware. Governor Terry. W3PM was a guest on the USS *Hope* from Marcus Hook to Philadelphia. K3LGC will spend the next two years in VP9-Land. K3UXQ is the new EC for New Castle County. Traffic: W3EEB 123, K3YZF 18, K3NVV 8, K3YHR 6, W3HKS 5, WA3DYG 4, K3NYG 4, W3IYE 1.

**EASTERN PENNSYLVANIA**—SCM, Allen Breiner, W3RQ—SEC: W3ELI RMs: W3EML, K3YVG, K3-NVO. PAMs: W3SAO, K3LSV. The EPA C.W. Net showed QNI of 334 and QTC of 280. The PTTN had a

QNI of 356 and QTC of 244. The EPA Emergency Phone and Traffic Net had a QNI of 310 and QTC of 85. All nets kept above average during the summer slump. K3FCB is one of the Lehigh Valley's sick transmitter repairmen and is building an HW-32 for the Coplay ARC. W3EU is experiencing another run of receiver troubles. The engineers at radio station WHHS include K3FCM, K3FYE, K3MTE, K3OMP, K3PGX, K3PWM, K3WIB and K3WJZ. Our apologies if we missed any. The Penn. Wireless Assn. communications trailer made its debut during the Sept. V.H.F. Test. W3BUR, again active in the EPA C.W. Net, has been spending some time with a local zoning problem. K3-KTH acquired a new secretary after his recent W1 vacation and is holding down his usual EPA and 3RN posts. The wrist surgery of W3JKX has forced him to acquire an electronic kever. K3ADS is back in the Philadelphia area for the winter and installed a new TV transmitter on 440 Mc. using 5894s. K3HNI/6, stationed in Calif., recently returned from South Vietnam. K3-MSG has his new 6-meter v.f.o. in working order; it's transistorized. K3VAX has entered Drexel Institute of Technology in Philly. During a recent storm lightning struck and burned the coax connector from the 6-meter rig at K3NZD, whose station is only about 4 feet from that of your editor. K3MPH is QRT 6 meters because of a final meter burn-out. He also reports that activity on 2 meters is increasing in the Sunbury area. New officers of the big "K" ARA are K3JST, pres.; WA3-CCG, vice-pres.; K3PID, secy.; W3ONJ, treas. W3-RKP spent 4 days in the hills of Maryland. The 1965 SET is now history. There are many Pennsylvania counties who will not be part of that history because of complete lack of any week-end communication test program. Traffic: W3CUL 3954, W3EML 851, W3VR 563, W3AIZ 274, WA3CBL 256, K3PIE 182, K3MYS 158, K3-NVO 154, W3JKX 135, K3YVG 133, K3KNJ 92, K3RZE 75, W3ZRQ 66, WA3BYH 65, K3YQL 59, W3RV 48, K3-KTH 42, K3HFV 39, W3CBB 37, W3AXA 35, W3VAP 35, K3ZUN 35, K3PWM 34, K3ZSK 33, W3MPX 23, K3-



MNT 22, W3OY 20, K3LPT 19, K3MLD 19, K3KKO 14, W3FLI 12, W3BCUR 9, W3PVY 8, K3HNP 7, W3KJJ 7, K3YQJ 7, W3ABJI 6, K3OMP 4, W3BKF 2, W3ID 2, W3CKA 1.

**MARYLAND-DISTRICT OF COLUMBIA—SCM.** Bruce Boyd, W3QA—SEC; W3CVE, RMs: K3JYZ, W3QCW, W3CE, W3ZNV, PAMs: W3JZY, K3LFD.

Net	Freq.	Time	Days	Sess.	QTC	Are.
MDU	3643	0000Z	Daily	30	300	10
MD108	28200	0130Z	Daily	27	4	0.1
MEPN	3820	2200Z	M-W-F	22	10	0.5
MEPN	3820	1700Z	S-S			
MSTN	50150	0030Z	Daily		14	

*Operating:* K3UXY handled GI traffic for his neighbors, W3DVO has started a Novice net in Baltimore and W3QCW is helping to train 5 new hams, K7IPZ/3, in Annapolis, is entering traffic work again after a 4-year eclipse because of school, K3TJE, K3VHS, K3ZIX and W3AZI are experiencing school QRm to varying degrees, K3NCM finds DX good on 75 meters, K3ZUL, in addition to his OO work, has made WAC and worked 70 countries, W3RKK is restricted to 6 meters temporarily because of antenna space, W3ACE was very successful with 2-meter portable work in South Carolina, W3EOV keeps his traffic rolling in spite of being QRL with boats and boating, W3QA spent one of his 15 days in California operating at K6CCP, K3JYZ is president of the PVRC and chairman of the Maryland QSO Party Committee, K3IPX/3 is organizing a mountain-top v.h.f. safari for next January, *Sky Hooks:* W3PZW is getting his 40-meter beam ready for the DX season, K3LFD has a new 40-ft. tower up with a dropping dipole for 80 meters, W3GRF, W3PZW and W3VBE helped W3MCG by cutting trees near his antenna while he was grounded by a lame back, *New Gear:* K3IPX/3 has a new Thior 6, K3QDD won an SR-500 transceiver at the Foundation Hamfest, *General:* K3ZYP plays an electric guitar in a rock and roll band, W3CQS says that W3VJ is in V.A. Hospital in Wilmington, Del., following a stroke, QSLs would be appreciated, W3JZY has been busy securing his mountain top for the winter, W3ECP reports that K3SVA is a student at Capitol Inst. of Tech., K3WKV is at Stevens Tech. in New Jersey, W3AVQ was hospitalized for surgery on his foot and K3PHV has moved from an apartment to a house where he can put up an antenna, *Traffic:* W3PZW 241, K3ZYP 193, K3JYZ 192, W3LBC 110, W3TN 74, K3PKY 58, K3GZK 58, W3QCW 55, K3UNY 46, K3LFD 43, K3IPX 37, K3TJE 37, K3QDD 34, K3CUR 34, K3LIR 30, W3EOV 25, K3UPV 21, W3MCG 15, W3ECP 13, W3PRC 12, W3RKK 11, K3ZSX 9, K3VHS 8, W3CQS 7, K3ZIX 6, W3ZNV 4, W3AJR 2, K3NCM 2.

**SOUTHERN NEW JERSEY—Acting SCM,** Edward G. Raser, W2ZL—SEC; K2ARY, PAM: W2ZL, RM: WA2BLV. Your former SCM, W2BPHV, is leaving this area. His FAA work takes him to Colorado and I have been appointed as the Acting SCM. See the call for SCM nominations elsewhere in this QST, N.J. Phone & Traffic Net totals for Sept.: 30 sessions, QNI 679, traffic 221. May we have more reports from ECs? We rank 32nd now... so please get in your reports so we can "move up!" K4RAD (Princeton) seeks appointment as OO. Old reliable W2KG sticks to skeels with CDNJ and USR-1 in the civil defense nets, W2BZJ, chief at State Control Center, is having equipment problems, W2KAP sends his traffic report via the NJPN Net this month. Try this channel, it's fast service! W2YPZ has joined MARS, K2SHE, our VL member of the Jersey Phone & Tfc. Net, is doing a swell job traffic-wise. Sounds like a real veteran, W2MZR and WA2QOL paid the Acting SCM a visit. New NJPN members: W2EJR, WA2KYU and WA2DVT. K2SOL now lives in Mantua, W2EWR has a strong signal on check-in. We feel the loss of top traffic man W2MMD, who became a Silent Key. W2QWC has a new-high power final, WA2ARJ was at the Southern Counties Amateur Radio Club Picnic, Mays Landing, in August. The Jersey Phone & Tfc. Net Annual Picnic was held at Washington's Crossing State Park, Sun., Aug. 29. Thirty-five members and their families attended. W2TLO enlisted in the Air Force, WA2EYK is doing a swell job as NCS Wed, K2CDH, K2AAR, K2BPI, W2ZI and K2SNK man DVRA club station W2ZQ on the Sun. morning net, 3900 kc, 0900. We'll hope for more reports next month. *Traffic:* W2RG 94, W2ZI 49, WA2KAP 6, W2BZJ 3.

**WESTERN NEW YORK—SCM,** Charles T. Hansen, K2HUK—SEC; W2ZRC, PAM: W2PVL, RM: W2RUF, W2EZB and W2FEB, NYS CW, meets on 3670 kc, at 1900, ESS on 3590 kc, at 1800, NYSPTEN on 3925 kc, at 2200 GMT, NYS C.D. on 3510.5 kc, and 3993 kc,

(s.s.h.) at 0900 Sun, and 3510.5 kc, at 1930 Wed., TCPN 2nd Call Area on 3970 kc, at 0445 and 2345 GMT, NYS County Net on 3510 Sun, at 1600 and 3670 Sat. Appointments: K2DNN and K2YMU/2 as ORSS, Congratulations to BFLERS K2KQC and W2OE. The Syracuse V.H.F. Club held its 11th annual roundup and as usual it was top-rate with well over 400 in attendance. Talks were given by W1OUP, W6OLO and W1RR. Your SCM was impressed by the Onondaga County Civil Defense Mobile Emergency Operating Center (Com Trailer). This is a large trailer with two missions in mind. First of all, it is a mobile EOC, second it is designed to bring the local RACES organization and its function to the attention of the local citizenry by displaying it at local events, shopping centers, etc. It has emergency power, local government public safety transceivers as well as full ham facilities and it includes heat and air conditioning, W2ABV, plus many helpers, designed the unit and it was in operation for the V.H.F. Roundup. I would be remiss if I didn't mention the Rochester and Utica busses, which are also mobile EOCs, as well as the Niagara County trailer and mobile tower. Your SCM would appreciate photos of the above mentioned units and information on others I may have missed. Many clubs are sponsoring code and theory classes for Generals who want to upgrade to Extra. Now that Christmas is near many thoughts turn to winter sports. How about snow reports on phone and c.w. nets on Fri. nights? Erie County RACES is going to supply emergency communications to local units of the National Ski Patrol system, WA2PTK/2 (West Seneca School ARC) originated 136 messages at its station at the Erie County fair. Participants were W2B-HCH, W2JPF, W2BHFU, W2BHRF, W2NRGU and W2QWR. NFDXA has obtained W2CQ for a new club call. Please see that reports and items for this column reach the SCM by the 3rd of each month. *Traffic:* (Sept.) K2KQC 1069, W2OE 371, W2ZGAL 149, W2RUF 145, WA2UFI 141, K2JXB 55, W2BERK 52, K2OFV 46, WA2LHP 36, W2PCG 33, K2IMI 32, W2SEI 29, W2RQF 26, W2BRHJ 19, K2MGN 17, W2PVI 17, WA2TUI 16, K2VMT/2 14, W2BNZA 12, WA2ANE 10, K2BWK 10, K2DNN 10, K2HOG 10, WA2FOJ 9, W2MTA 9, WA2GLA 8, W2PNW 4, K2RYH 4, W2EMW 1, (Aug.) K2RTQ 48, K2EQB 29, W2MTA 22, K2BWK 11.

**WESTERN PENNSYLVANIA—SCM,** John F. Wolkiewicz, W3GJY—Asst. SCM; Robert E. Gawryla, W3NEM, SEC; K3ZAIH, PAMs: W3TOC, K3VPI (v.h.f.), RMs: W3KUN, W3MFB, K3OOU, W3UHN, *Traffic* Nets: WPA, 3585 kc, 0000 GMT Mon, through Sun, KSSN, 3585 kc, 2230 GMT Mon, through Fri, Welcome to new ECs K3PNG, Fayette County, and K3SID, Potter County. Get behind these ECs and "Be prepared." K3AKR has construction projects planned for 220- and 420 Mc. gear, K3SIQ was elected secy. of the Horseshoe Radio Club, W3KQD received his 1st-class radio ticket, K3HTR has a new 758-3B; ditto W3TTY, W3OCR does a fine job as EC in McKean County. With regret this column records the passing of K3MTW, WA3CBD is back on the air with a new 88B-400, K3FTI works lots of DX with QRP rig, W3BEA is a new member of the Allegheny ARC, W3QCP is back on the air after a layoff, W3AUD enjoys putting out Officials League Bulletins on RTTY, K3EDH is the proud owner of a new Swan transceiver, K3FTJ worked 135 stations in 43 sections during the Pennsylvania QSO Party, K3CFA took time out to remodel his shack. After 25 years off the air W3CES, formerly W8CAN/W3AQO, is back on near Freeport, WA3AW teaches code, W3KNQ theory at the YMCA in Erie each Mon. evening, W3SDV took upon himself a bride, W3ZGI has a new Squires-Saunders receiver and Central 100V transmitter, W3NKMI is wiring a new SB-300 receiver, W3PPZ a transmitter for the Steel City ARC. The Horseshoe ARC now meets at the Webster Bldg. in Altoona. Thanks to all club secretaries who sent in club bulletins. Keep them coming, K3ZAIH finished first for Western Penna. during the WVA QSO Party. New appointments: WA3DGI as ORS, WA3DHT as ORS, K3PNG as EC/OES, ORS: K3SID, EC, Endorsements: K3OOU as RM, W3MFB and W3UFL as ORSS, K3RNF as EC, K3AKR and K3CFA as OESS, K3SOH as ORS/ORSS. My best wishes to you and your families for a Happy Holiday Season. Thanks for your support throughout 1965. *Traffic:* (Sept.) W3KUN 149, K3PYS 110, W3LOS 84, W3GJY 46, K3ZAIH 43, W3UHN 29, K3KMO 15, WA3AKH 14, W3AUD 11, W3OEO 10, W3YA 8, K3SOH 5, W3SMV 2, W3IDO 1, W3KQD 1, (Aug.) K3OOU 31.

**CENTRAL DIVISION**

**ILLINOIS—SCM,** Edmond A. Metzger, W9PRN—Asst. SCM; George J. Nesbed, W9LQF, SEC; W9RYU, RM: W9EVI, PAMs: W9VWJ, WA9CCP and W9KLB (v.h.f.). Net reports:



Net	Freq.	Time	Days	Traffic
ILN	3760	1900 CST	M-Sat.	124
III PON	3925	1700 CST	Al-F	
III PON	3925	0830 CST	Sun.	
III PON	3945	0930 CST	Sun.	133
No. Cont Phone Net	3915	0800 CST	M-Sat.	281
No. Cont Phone Net	3915	1300 CST	M-Sat.	256
IBN	3940	0900 CST	Sun.	no report

This SCM is finishing his eight years with this report. Many thanks to all the appointees and clubs who have sent in reports, too numerous to mention, and have helped make this column a success. My thanks also to the traffic-handlers who have helped in many ways to make amateur radio what it is today. K9RAZ has a new all-band trap dipole to help him bring in the hard ones on his HI-37. K9BQQ is the new net manager of the Interstate Single Side Band Net. The net's traffic for Sept. was 698, according to W9NWK, retiring net manager. W9IDY is recovering from a minor operation. K9UOV has a new Galaxy V transmitter. K4CQC is operating from Champaign as W9IWS. W9LXQ received his YL-WAS after taking ten years to get it. WA9-EXP is attending Marquette University in Milwaukee, Wis. New calls in the Chicago area are WN9PQY, WN9NRAI and WN9PVS. WA9EQN lost his TA-33 in the high winds. The 9RN traffic count was 354. WA9-AIH and WA9AII have built a portable c.w. rig for vacation use. W9JMG has received his membership in the Old Timers Club. K9QKI has finished building a Heath SB-300. The Egyptian Radio Club and the Peoria Area Radio Club Hamfests were very well attended and the weather helped attendance. W9ERU gave a pictorial description of his DN Antenna farm at the DXCC annual gathering in Chicago. New appointments include W9WGG as EC of Marion County. K9AVQ as OIS. W9WCG as OO. W9IPO as OPS. Members of club station K9YHB held a Ham Swap in the club yard to help get funds for club projects. W9RCJ has a new Galaxy V transmitter. This column's sympathy goes to the family and friends of WA9AQO, who recently passed away. WA9BGT, W9SGH, WA9TDC and W9-BYN were elected as officers of the Sangamon Valley Radio Club, Inc. (Springfield) at the annual picnic. WA9CCP is the only BPL recipient this month. Traffic: (Sept.) WA9CCP 1011, K9KZB 365, W9NFS 234, W9-EVJ 137, K9AVQ 169, K9WAP 105, K9BQQ 68, W9-DOU 59, W9GUM 58, W9NXG 56, K9ISTE 46, W9IWS/ K4CQC 32, W9HOT 28, K9CYZ 26, W9IYV 26, K9HKS 25, W9QET 19, WA9KLB 14, W9SKR 14, WA9JF 13, W9PBN 12, W9LNQ 6, W9MSD 6, K9UOV 6, W9IDY 5, W9HJM 3, WA9FHT 2, K9RAS 2, W9QQV 1. (Aug.) K9KZB 605, K9BQQ 35, W9SMD 14, K9RAS 2, W9IDY 1.

**INDIANA**—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET.

Net	Freq.	Time	Sept. Tfr.	Mar.
IFN	3910	1330Z daily	2300	K9IVG
ISN	3910	0000Z daily	2130	K9CRS
QIN	3656	0000Z daily	136	WA9BWY
RPN	3656	1300Z Sun.	71	WA9IZR

K9GLL, PAM of the Hoosier V.H.F. Nets, reports Sept. traffic of 60. W9QLW, RM of 9RN, reports that Ind. was represented 100% in Sept. K9IVG made the BPL QIN Honor Roll: K9VHY, W9QLW, WA9QCS, K9IYV, K9HWJ, WA9BWW, W9HRB, K9DHC, K9-KTL and W9HRY. W9HRB got a 9RN certificate. K9-GEL made DXCC. WA9AOT made General Class. The Fishers High School ARC opened the fall semester with 12 new members. W9QLW has a new mill and a HAM-AL rotor for his 10-15-20 beam. WA9JYM is principal cellist in the Indianapolis Symphony Orchestra. New officers of the IRCC: W9FZW, chairman; W9SNJ, vice-chairman; W9UDJ, sec'y.; W9LUM, treas.; W9TQC and W9CMT, directors. Phil Haller, W9HPG, spoke at the IRCC fall meeting. The Central Ind. V.H.F. - U.H.F. Club is sponsoring a Worked All Counties in Indiana certificate with K9VIE as custodian. Many thanks to Indiana amateurs for the support given me as SCM. I am sure you will give the new SCM, K9-IVG, the cooperation you have given me. Amateur radio exists because of the service it renders. Traffic: (Sept.) K9IVG 784, W9QLW 244, WA9BWY 191, WA9-IZR 109, W9ZYK 108, W9HRB 82, K9HYV 76, K9CRS 63, K9VHY 37, K9GLL 56, W9YYX 53, K9RWQ 50, W9BTQ 34, K9EYF 32, K9ZLB 28, W9FWH 27, WA9-LUG 21, W9RTH 20, K9WVJ 20, W9CCJ 19, W9FJW 16, WA9BG 15, K9LKL 15, K9HSL 13, WA9CHY 12, WA9-BRD 11, W9PZW 10, K9YFT 10, W9BZJ, W9DCK 8, WA9GJ 8, WA9JWL 7, W9ZZR 7, W9FJF 6, K9KTL 6, W9RDP 5, K9TV 5, K9THQ 5, WA9CFW 4, K9IHJ 4, K9RFW 4, K9PPA 3, W9HRW 3, K9SUI 3, W9TKK

3, W9URQ 3, WA9CYG 2, K9QVT 2. (Aug.) W9ZYK 110, K9UHQ 6, W9ZZR 5, W9FJI 4, WA9DBK 3, W9-HWR 3, K9IIV 3, K9PNP 3, W9URQ 3, K9RFW 2, K9DHJ 1.

**WISCONSIN**—SCM, Kenneth A. Ebnetter, K9GSC—SEC: K9ZPP, PAAs: W9NRP, K9IMR, K9HJS and WA9EZR. RM: Still looking. Net reports:

Net	Freq.	Time	Sexs.	QNI	QTC	Manager
BEN AM	3985 kc.	1300Z Mon.-Sat.	25	143	25	W9NRP
BEN N	3985 kc.	1800Z Daily	30	511	169	K9HJS
WSBN	3985 kc.	2315Z Daily	30	1133	398	K9IMR
WIN	3535 kc.	0045Z Daily	30	252	87	W9KQB
SWRN	504 Mc.	0300Z Mon.-Sat.				WA9EZR

Renewed appointments: WA9AVZ and W9HWQ as OESs and W9HWQ as OPS. Net certificates went to W9BLQ, W9NYS, W9UDX, K9IMR, WA9MIO, WA9-HRS, W9KAM and K9FHI for WIN. WIN is looking better with some new stations, but still is need of more outlets and an RM. K9GDF led the OOs with 50 notices sent. BPL for Sept. traffic was made by WA9GJU. K9PKQ is on 75-meter mobile with an HW-12 and K9DTK is mobile with a Drake TR-4. WA9MIO got a certificate for scientific achievement from Wis. Jr. Academy of Science for work on moonbounce. W9KQB has his DX up to 117. WA9AVZ has a new NCX-3. WA9KGG is working on 432 Mc. Traffic: WA9GJU 321, K9IMR 205, W9IDY 153, WA9LWJ 112, K9HJS 97, W9CXV 93, W9NRP 81, W9YT 59, W9GOC 57, WA9-MIO 57, W9KQB 47, K9GDF 45, W9RLQ 38, K9RCX 30, W9HWQ 29, W9CBE 27, WA9YK 17, W9WJH 17, K9GSC 15, K9UTQ 15, W9RTP 12, W9APB 11, K9FHI 2, W9HRZ 2.

**DAKOTA DIVISION**

**MINNESOTA**—SCM, Herman K. Kopischke Jr., W9TCK—SEC: WA9BZG, RMs: W9ISJ, WA9IIZ, PAAs: K9FLT, K9QBI, W9HEN, WA9DWM, M5PN meets M-8 on 3820 kc. at 1805 and 2300Z., Sun. and holidays at 1500Z. M5SS Net meets M-F on 3805 kc. at 1730Z and on 3812 kc. at 0045Z. M5N meets daily on 3595 kc. at 0030Z. M5N (slow-speed c.w.) meets on 3595 kc. at 0100Z. M5N times for Novice check-ins on 3725 kc. M5TN meets 8-P at 0430Z and Sat. at 0200Z on 50.4 Mc. The evening M5PN meets at 2300Z instead of the usual 2400Z during the winter. W9KJZ sends code practice on 3652 kc. at 1300Z and 0400Z. Congrats to WA9IHJ and WA9JKT, new OPSs. Renewals: WA9-ACL, WA9FUR and W9FIT as ECs.; W9RA, WA9-FEJ and WA9LAW as ORSs.; W9BUO as OPS and WA9CAG as OES. The Minn. AREC membership is now 255 with 22 ECs. We need ECs in some areas. If you would like to head an AREC group why not ask WA9BZG if there is an opening in your locality? Minnesota amateurs are playing a large role in building the Oscar IV satellite. W9LER and W9ZBM, of Minneapolis, have built the 2-meter transmitter; W9-UBD, K9HAM and W9ZUN, of Rochester, head the Oscar Telemetry Group which has devised a seven-channel data encoder and keyer for Oscar IV telemetry. W9MNX, the Olmstead County e.d. station, has been reactivated with some new gear. Included is a Drake R-4 and T-4 and a National NCL-2000. A Clegg "Zeus" transmitter and a Clegg "Interceptor" receiver will be used for 6- and 2-meter work. W9KNCJ is a new operator at the Lake Harriet ARC station, WA9MWH. Equipment there is a DX-35 and a Drake R-4 on 80 and a Clegg 90er with a Squalo antenna on 8. A new General on M5N is WA9LOB, St. Cloud. K9OST has a new home-brew s.s.b. rig on 6 meters. WA9JKT made the BPL Traffic: (Sept.) WA9JKT 577, WA9IHJ 247, K9ZZR 182, K9ORL 98, WA9HAW 96, K9UXC 88, WA9EDN 51, WA9EPX 45, W9HEN 45, W9MKF 41, WA9BQ 35, WA9IEF 31, K9QBI 29, K9ICG 28, K9PZ 26, WA9IDZ 25, W9ISJ 25, K9-FLT 24, W9TCK 24, W9UML 24, K9KXZ 19, W9-MXC 18, WA9BZG 15, WA9DWM 14, WA9KRU 14, W9ENY 13, W9KJZ 12, K9ZRC 12, K9ZRD 11, WA9IJJ 9, W9ATO 6, K9IGZ 6, WA9JPR 6, WA9-KFJ 6, K9SRK 6, W9SZJ 5, K9IKU 4, K9LWK 3, WA9DFT 2, W9FKC 1. (Aug.) W9ISJ 38, K9PIZ 17, WA9CAG 8, W9KJZ 5.

**NORTH DAKOTA**—SCM, Harold L. Sheets, W9DM —K9AHN is back on 80 meters after a long bout on 20 meters. WA9YA got a TR-4 and put a 600 L after it. W9QAG got his linear on after a long struggle. The N.D. Weather Net meets from 7:15 to 7:45 CST. WA9AYL is NC. K9PH garnered two awards, a first and a third from N. Dak., in the YL W/K-DX Contest. W9VRN has been using a ground plane on 20 meters from some DX contacts. WA9HYI, WA9GQJ, WA9IBE, WA9DGG and WA9GGI are trying to get the Fargo Central High School station W9JME back on the air. W9ESC, at Fargo State, has moved to a

new QTH on campus. The Goose River 160-Meter Net meets every Sun. at 1500 GMT on 1900 kc. and had 100 check-ins, 2 formals and 2 informals. WODM, with the help of WAQAYL and WAOBIT and the weather, got the 44-ft vertical up for some 40-meter activity and some 20-meter c.w. KOHXL wandered in around dinner time and helped with that. WAOBIT got a Hi-Gain Hi Tower vertical. WOIQ's XYL has been hospitalized in Bismarck. WOPHC is recovering from surgery. KOQYD has been busy with a home-brew crystal calibrator with markers of 100, 10 and 1 kc. The BARK, Bismarck club, has sold its equipment and is looking for a good s.s.b. transceiver. WOPQW is way up in the north country operating a YE5 mobile on his annual goose hunting expedition. When in the same area WO-WWL went maritime mobile on 40 meters with the Swan 350 in a row boat. The RACES Net is in full swing again with WQCAQ, KOSPH, WOCGM, WOVWL and WOPQW calling the net and reports 456 check-ins with 37 formals and 53 informals. Traffic: KOITP 127, KOSPH 23, WODM 10, WAOBIT 8, WAQAYL 7, WQCAQ 5, KOCND 2.

**SOUTH DAKOTA**—SCM, Seward P. Holt, KOTXW—SEC: WOSCT, RM: WAQAOY. The South Dakota Morning Phone Net has been suspended and the Weather Net, conducted by WQZWL was activated on Oct. 4. KOVYV acts as net control in the absence of Martha. Martha has done a fine job for a number of years and we are fortunate that she continues this worthwhile service. KOHHD is back in Brookings after spending the summer in Denver. New calls heard in Redfield are WNOCJ and WNONAC. South Dakota nets in operation are the Weather Net, 0800 CST; NJQ Net, 1315 CST; South Dakota Phone Net, 1830 CST, all on 3870 kc.; South Dakota S.S.B. Net, 1900 CST 3987.5 kc., all daily; the South Dakota C.W. Net Mon., Wed. and Fri. at 1900 CST on 3645 kc. We hope to see more participation since there is such a choice of time, mode and frequency. We are sorry to report the death of KOARE. Traffic: KOGSY 304, WAQAOY 121, WOSCT 56, KOVYV 40, KOBWSW 12, WOFJZ 4, KOTNMI 3, WAOBWJ 2, WODJO 2, KOKOY 2, WQZAL 2, WAOFJG 1, WOHJO 1, WOIGG 1.

### DELTA DIVISION

**ARKANSAS**—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM, PAM: WA5GPO, RM: K5TYW, NMs: WA5IIS, K5IPS. Special compliments go to WA5IIS on an excellent job as Acting SEC of Arkansas during the SET. The Amateur Radio Club of the University of Arkansas has elected WA5AVR, pres.; K5SGH, vice-pres.; WA5CAA, secy.; WA5FHR, treas.; K5TCK, chief engineer; WA5EKA, chief operator. W5YM/5 operated at the Washington County Fair and originated lots of traffic. Congratulations to W5YM and W5OBD on making the BPL Net reports:

Net Freq.	Time	Days	Secs.	Traffic	Check-ins	
OZK	3790	0100Z	Daily	30	170	214
RN	3815	0001Z	Daily	30	100	434
APN	3885	1200Z	Mon.-Sat.	(no report)		

Top operators in the Razorback Net were WA5GPO 27, K5ZFL 27, W5IIE 27, WA5IIS 23, WA5NBO 22, K5YBB 18, W5HNB 17, WA5JZV 14. Top stations on OZK: WA5HNN 25, WA5IIS 23, W5DTR 16, W5NPM 14, K5EDH 13, K5TYW 13, W5YM 12, WA5AVO 12, WA5AVR 11. Please note that all traffic reports should go to the new SCM (see page 6). Welcome to new Novices: WN5NBB, Fayetteville, and WN5NXG, Kingsland. Traffic: (Sept.) W5OBD 517, WA5HNN 210, WA5IIS 175, W5YM 156, W5DTR 142, W5NND 56, W5MJO 48, K5TYW 18, WOKON/5 6, WA5AVR 2. (Aug.) K5TYW 19.

**LOUISIANA**—SCM, J. Allen Swanson, Jr. W5PM—SEC: K5KQG, RM: W5CEZ, PAM: W5TAV, V.H.F., PAMs: W5UOR, WA5KHE, W5BUK has resigned as SEC and K5KQG has accepted the appointment. Dan has had lots of experience in Florida emergency communications. His address is 217 Bellaire St., Houma, La. The Central Louisiana Radio Club, under the leadership of K7YUC/5, has launched a very fine monthly newsletter, W5JHF is vice-pres., and Jane O'Neal is secy.-treas. of this fine club. W5MXQ reports his power was off 9 days after "Betsy." W5CEV has transmitter trouble. WA5HGX reports WA5MJM has a new Galaxy, W5BV and WA5JWE put in many hours during "Betsy" as c.d. operators. W5ZJO reports long hours at the old grind have slowed his ham activities to a crawl. WA5JVL reports a large number of the local v.h.f. boys were put off the air through damage and flooding from "Betsy." He and WA5DXA were on almost continuously transmitting WX and bulletins. K5AAM, in his report on the storm, says he was the only "thing" on in St. John's Parish for two days. The Lafayette Radio Club's Annual Banquet will be held Sat., Dec. 4. A hospitality room will be open at the Town House Motel at 1:00 p.m. WA5BIM is handling reservations.

## FIRST ARKANSAS QSO PARTY

January 8-10, 1966

The North Arkansas Amateur Radio Society of Harrison announces its first Arkansas QSO Party and invites all amateurs to participate.

Rules: 1) The time will be the 30-hour period from 2200 GMT January 8 to 0400 GMT January 10, 1966. 2) No time limit or power restrictions. 3) Arkansas stations score 1 point per contact and multiply by the number of states, Canadian provinces and foreign countries worked during the contest period. Outside stations score 5 points for each Arkansas station worked and multiply the total by the number of counties in Arkansas worked during the period. 4) Stations may be worked once on each band and each mode. 5) A certificate will be awarded to the highest-scoring station in each state, Canadian Province and foreign country (with 100 or more points). 6) General call: "CQ ARK". Arkansas c.w. stations should identify themselves by signing de (call) ARK K. Phone say "Arkansas calling." 7) Suggested frequencies are a.m. 3825 7225 14,225 21,225 28,560; c.w. 3525 7025 14,025 21,025 28,025; s.s.b. 3975 7275 14,325 21,425 28,650; Novice 3735 7175 21,110. 8) Arkansas stations send QSO number, RS(1) and county, all others send QSO number, RS(T) and state, province or country. 9) Logs and scores must be postmarked no later than January 30 and sent to the North Arkansas Amateur Radio Society, c/o Don Anderson WA5GVG, 508 North Robinson, Harrison, Arkansas.

WA5DES is pushing Official Bulletins on 40 meters Mon., Wed. and Fri. at 5 p.m. on 7095 kc. K5HFI has been on vacation. WA5EID handles lots of traffic from LAN and RN5. K5OKR comes through again with a nice traffic total. W5CEZ reports having power supply problems with his linear. WA5DRP is now active on 3905 kc. as well as the v.h.f. frequencies. WA5KHE has joined Army MARS. WA5KIV has submitted several hints and kinks for possible future publication. WA5ITW reports too much school! W5GHP, one of the heroes of "Betsy," is rebuilding antennas. W5JFB, in his reports about "Betsy," claims c.w. was more effective than phone on outside "hook-ups." W5UQR operated with emergency power on 50.4 Mc. during the nightmare but was unable to establish contact with New Orleans and Slidell c.d. headquarters. K5YHI is operating from Atlanta, Ga. W5WZR spent an expensive week end not long ago burning up transistors in a power supply and linear. W5HKJ is now a regular on 3900 kc. every morning, along with WA5JWE, W5BAM and W5SWS. W5PAI now has a complete emergency power supply and operated seven hours during the SET without the help of commercial power. Traffic: W5GHP 77, W5CEZ 559, WA5EID 110, WA5HGX 84, WA5FNB 79, K5OKR 77, WA5DRP 68, WA5DES 40, W5PM 31, WA5ITW 25, WA5KIV 24, K5AAM 19, WA5JVL 18, W5EA 12, W5MXQ 11.

**MISSISSIPPI**—SCM, S. H. Hairston, W5EAM—SEC: W5JDF, Mississippi RACES, Magnolia Net, "Miss" C.W. and the Gulf Coast Sideband Net were very active during Hurricane Betsy. Individual stations participating included WA5CAC, W5WB, WA5LXC, WA5FH, K5VBA, W5ODV, K5WUX, W5JHS, K5GEL, K5PPI, W5WZ and WA5IMU. Keesler ARC, K5TYP, operated RTTY, s.s.b. with NB300, SB-400 and 4-1000 A linear on 75, 40, 20 and 6 meters during "Betsy." The club's new secy. is WN5EELK, Magnolia Net traffic, under K5PPI, is greatly on the increase. W5HTV has a Swan 350 in his new car. W5BAP is now at Chanute AFB, Ill. K5VBA/5 has a new matchbox. W5YD is back in operation with a kw. on a.m., s.s.b. and c.w. WA5IMU has a pair of 818s running about 800 watts. Glad to have W5SJP/5 back in Meridian. Hope K5TJG enjoys being in Tupelo with W5BX, K5HYD and others. New appointments: K5TJG/5 as OO, WA5CKL as OPS, WA5IMU as OBS, K5WUX as EC and OPS. Check into our nets: Gulf Coast Sideband Net 3925 kc. daily 1370 CST; Magnolia Net Mon. through Fri. 3870 at 1900 CST; "Miss" C.W. Net daily 3047 kc. 1845 CST. Traffic: W5JDF 253, WA5IMU 134, K5TYP 100, K5VBA 89, W5WZ 36, K5WUX 12.

**TENNESSEE**—SCM, William A. Scott, W4UVP—PAMs: WA4GQM, W4PFP, WA4EWM, RM: W4MXF

Net	Freq.	Days	Time	Secs.	QNI	Q'Q
TSSB	3980 kc.	M-Sat.	1830C	26	1154	95
TPN	3980	M-Sat.	0645C	30	1042	226

ETPN	3980	Sun.	0800C			
TSN	3635	MWF	0640E	22	376	26
TN	3635	Daily	1900E	13	35	27
			1900C			
			2030C			

Sorry to report W5BCO as a Silent Key. Casey was well known among the MARS gang, active on 75 and 6 meters. K4EWH also is a Silent Key. Jim was active on all of the phone nets and as an OBS. net control and rarchewer. K4UWH and W4YAU are competing for QRP title in the under-two-watt class. K4SXD is circulating activity because of school. Preliminary SET reports are excellent. K4JXG, K4JIG and WA4GQM handled 356 originations to 32 states and 6 countries from the Memphis Mid-South Fair. The ETSU Club and WA4UCI are going strong again. Congrats to W4FX, WA4GQM and W4OGG on making the BPL Traffic: W4FX 526, W4OGG 403, WA4GQM 289, K4SXD 161, W4PQ 140, WA4MXF 122, W4IWBK 73, W4KAT 67, W44YU 59, WA4MCC 47, K4JIG 45, W4IUP 45, W44PCW 36, K4RCT 32, K4JXG 30, W4YAU 30, WA4OSD/4 27, W4PFP 27, K4UWH 27, W4TZE 17, W4VTS 15, WA4AIS 13, WA4EWW 11, K4HRY 11, WA41ZB 10, W44YNF 7, WA4PTD 6, W4TYN 6, W4SGT 5, K4UWH 5, K4CPM 2, WA4REJ 2, WA4PSH 1, W4VJ 1.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: K4URX. PAMs: W4BEJ, WA4RDE, K4YZU. V.H.F. PAMs: K4KZH, WA4IUW. RM. W4RHZ. Appointments: W4MWX as OHS. Endorsements: K4HOE as EC, W4ZRB as EC and OPS, K4ZCB as EC.

Net	Freq.	Days	EST	Sess.	QNI	QTC
EMKPN	3960	M-Sat.	0630	24	348	74
MKPN	3960	Daily	0630	30	538	143
KTN	3960	Daily	1900	26	1292	350
KYN	3600	Daily	1800/2000	37	425	320

WA4GHQ is NCS for the 6-Meter Emerg. Net at Lexington. K4KZH reports for the Louisville 6-Meter Area Net with QNI 242, sessions 28. QTC 26. W4JUI visited National Radio Co. during his vacation. W4CDA won the code contest at the Cincinnati Hamfest conducted by W4RHZ, W4BAZ and W4CDA are working on a new net operating manual. W4ZXY is the V.A. Hospital station and reports 11 new operators. WA4VCN is building a tri-band quad. Our ex-SCM, K4QIO, and OAI K4GWA plan a trip to Mexico. K4YDK had back surgery. K4CGW was injured in a motor boat accident. The ARTS picked a rainy day for its picnic. Our RM is publishing a monthly KYN Bulletin. MKPN members miss K4EWH, who joined the Silent Keys Sept. 22. WA4AGEH is to be commended for personally publishing a telephone directory listing the towns in Kentucky. K4URX worked portable from VEI-Land during his vacation. The OARC has applied for a club license. WA4ST now is in Viet Nam. Traffic: WA4AGH 394, K4YZU 360, K4CSH 250, W4RCC 245, W4RHZ 238, WA4HJM 121, WA4KFO 105, WA4RDE 105, WA4TPB 86, K4DZM 80, W44DY 73, W44UAZ 68, W44GMA 48, W44VCN 42, W4KJP 38, W4ZXY 32, W4OYI 32, K4QCQ 32, W4BAZ 24, W44ST 22, WA4SOM 20, W44QLK 18, W4CDA 16, W4BTA 15, WA4ZIF 14, K4HOE 13, W44DXA 11, W4QCD 11, K4TQZ 9, W4ADH 8, WA4GHQ 7, W4HOJ 3.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8ELW, K8OKY, W8EU, K8KMJ. PAMs: W8CQU, K8LQA, K8FED, V.H.F. PAM: W8YAN. W8CVQ. Appointments: W8CUL, W8DOP, W8F8M, W8AGBN, K8GKX as ECs; W8EU, W8LWQ, W8KXO, K8MPO, W8RTN as ORSs; W8AAM, W8LRC as OPSs; W8DSW, W8MTI, W8TMO as OBSs; W8CQU, W8ANTO as OESs; W8MTI as OO. Michigan needs several 6-meter OOs with frequency measuring equipment in 6-meter "hot spots" like Battle Creek, Kalamazoo and Marshall. Detroit presently is dead on 6 meters. The Saginaw Valley ARA announces that its ARRL-sanctioned convention will be held at the Bancroft Hotel in Saginaw Mar. 18, 19 and 20. Silent Keys: W8AGG and W8AJM. K8GKX now has an HT-32B and a BC-22 and operates c.w. and s.s.b. K8ZJU and W8VWY operated portable VEB from Lake Superior Provincial Park, using an HW-12 and d.c. power with great success. The U.P. Emerg. Net and U.P. S.S.B. Net has been combined into one net and meets Sun. A.M. at 9 on 3920 kc. The Michigan 6-Meter PON and Michigan C.W. PON now are well organized and Michigan FONE PON also had 25 sessions for Aug. W8HKT sold the home he has lived in for 25 years and is off the air. He will retire to Arizona next spring. We'll miss him. W8SWF has returned from Denver. W8MEE is back in Detroit and the station is all set. FO8HI was heard at W8SS on 9/28/65 on 28.563-ke. c.w. W8AAM matches his 2S-3 with a 7S-3C. W8DQL erected a 48-ft. tower and quad. W8DVB still works the Eye Bank Net.

WA8GRI, on RTTY, says 6 is active in Saginaw. One OO reports Thailand, HS1, is working U.S. stations. Thailand is on the banned list! K8NBF finished his SB-200 and K8MHS has a new Swan 350. WA8AMA has new Collins station. W8NRX, WA8QHI, WA8QHH and W8JUU have self-supporting towers. WA8QHH is building an SB-300 receiver. K8KLV has a new Galaxy 5. K8QKY made the BPL Traffic: (Sept.) K8QKY 787, K8HLR 498, K8KAIQ 200, K8NJW 128, K2SIL/8 99, W8YAN 87, W8ABQK 77, W8KXO 65, K8BYX 57, W8APIM 56, K8TIG 55, W8ELW 51, K9RHU/8 47, K8GOU 40, W8LBR 33, W8EU 32, K8JED 32, W8FX 31, W8RTN 30, W8LRC 29, W8BEZ 24, W8EJR 21, W8HKT 20, W8PBO 20, W8HGE 18, W8SWF 17, K8LQA 16, W8CZJ 15, W8AUD 10, W8ARCE 10, W8TBP 10, K8VDA 8, W8AIEB 7, W8FWP 6, W8FUS 4, W8ZLIB 4, W8DSB 3, W8AGBN 3, K8QLL 2, W8SS 2. (Aug.) K8NJW 164, W8NQLY 105, K8ZJU 98, K8LQA 27, W8APIM 14, K8SLG 13, W8AXF 9, W8PLQ 8, W8TBP 8.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8NRP. RMs: W8BZX, W8DAE, K8LGB, PAMs: W8VZ, K8BAP, K8UBK. Attention all Ohio amateurs: The new W8-K8 QSL Manager is Paul Hubbard W8RCXY, 921 Market St., Zanesville, Ohio 43701. It would be wise if everyone sent him an addressed stamped envelope, whether you work DX or not. W8EEQ put up a 60-ft. tower and is active on 2 meters. Six Meter Nomads' *The Amateur Extra* says the club held a weiner roast and furnished communications during the Broadview Heights Home Days Parade with W8JBS, K8AJB, K8AIBW, W8GEO, W8ARNL and W8PIW participating. K8HDO reports K8JZW was awarded a Worked All Ohio Counties certificate on 6 meters and advises winners in the 1965 Ohio QSO Party were 1st W8NBK, 2nd W8CWU, 3rd W8HLX, 4th W8RSW and 5th W8KMF. Northern Ohio AR Society held its second annual picnic. I have started receiving Inter-City RC's IRC News Bulletin again (wish I could say same about Dayton ARA's *R-F Carrier* and Greater Cincinnati ARA's *Mike and Key*) which tells us W8JEY has a new Drake 5 receiver; W8NQNF is a new Novice in Mansfield; K5WXX, ex-W8WXY, visited in Mansfield and the club's new officers are W8EHA, pres.; W8VLB, vice-pres.; W8PO, treas.; W8FCU, secy.; W8WOU editor, Toledo's *Ham Shack Gossip* states that K8ZCU joined the Silent Keys. W8BRQM and W8ARRV are new Technicians. W8RKB vacated in N.C., W8PXS has started on his retirement and W4JG visited W8HWX. Appointments made in September are W8UUL, K8DHJ and K8BWT as ECs, K8BPN as OO and W8NQE as OES. Miami County ARC elected W8FRL, pres.; and W8GRM, secy.-treas. Springfield ARC's *The Qser* says 1966 officers are W8FZS, pres.; W8OG, vice-pres.; W8AEY, secy.; W8IGD, treas. The clubs' hamfest had 438 amateurs register with Harold Stevenson winning the Finney 662 meter beam and W8TKN the Drake R-4 receiver. W8LY passed the Amateur Extra examinations. K8SSY, K8WIW, W8AGE and W8NXY worked this summer to get Orange High School station W8MSW on the air with an Eico 720 and a Heath HT-10. For the second year the Six-Meter Lunch Bunch gang in Cleveland has met on 51 Mc. every Wed. noon. The new VA hospital in Cleveland has a club station, W8MBV, with K8ZBL as its trustee and W8BPR, K8JDO, K8ZFR, W8CAH and W8LWR as its operators. The Apricot Net joins with the Pennsylvania Apricoters Mon. at 2200. Canton ARC's *Feedline* informs us 1966 officers are K8AGB, pres.; K8DHJ, vice-pres.; K8RMY, secy.-treas.; W8OYV and W8ANCK, directors. W8KYY was in the hospital. The Warren hamfest had a total attendance estimated at 2000 and W8JFN won an SBE transceiver. K8ZIP an SR-42 transceiver, W8FIP an HA5-V.F.O., K8SXC a CDR T44 rotator; W8FZU is attending Le Tourneau College in Texas; W8VYT was a Pacemaker. K8MKR moved to Maine. W8GGB moved to Cleveland, W8HP has a Heavy 2K amplifier. Mt. Vernon ARC's *K8FEN Newsletter* states W8TNP is in Fla., W8KNR is going to Carnegie Tech, and W8ONN to Dayton U. Columbus ARA's *Carscane* tells us W8ETU spoke on Home Construction of Amateur Gear. Southeast ARC is starting code and theory classes. Parma RC's *P.R.C. Bulletin* informs us the club held a picnic. Stark County C.D.-RC officers are K8NJA, pres.; K8DNZ, vice-pres.; W8FAA, secy.-treas.; K8DQV and W8BTE trustees. W8CQU was on active duty for training. Babcock & Wilcox ARC held a weiner and corn roast. W8UUI has a new TR4. W8RQ has been ill. K8ORG is mobile with a new Swan 350. Miamisburg Wireless Association's *The Spectrum* reports the club started code and theory classes and K8MSN is building a new kw. linear. Your Great Lakes Director, SEC and SCM attended the Findlay Hamfest. Traffic: (Sept) W8DAE 398, W8FSM 322, W8ALBR 201, W8F8X 189, W8BZY 181, K8UBK 171, WA8AUZ 150, K8DHJ 140, W8RYP 128, WA8QES 107,

W18AJD 101, W18CCD 79, W8ENM 70, W8QCU 55, W18CXY 48, W8OUU 45, K8BYR 37, K8DHF 37, W8LAG 32, W8CXM 31, K8MOK 24, W8TV 24, W8FGD 18, W8FKD 18, W8LZE 18, K8LFI 15, K8DDG 13, W8HFI 13, W8ILC 12, W8NAL 11, K8JSQ 10, W8KPN 10, K8LGB 10, K8SONQ 8, W8ERD 4, W8JXM 4, W8EEQ 3, W8IBX 3, (Aug.) W8RYP 273, W8LAG 38, W8OUU 27, K8HLKB 20, (July) W8OUU 4.

County	EC	Net	Mc.	Day	Time	NCS
Bronx	WA2QAO	Command	146.178 M	1900	WA2QAO	
Bronx	WA2QAO	Hudson #1	146.178 M	2000	WA2ZPQ	
Bronx	WA2QAO	Hudson #2	50.35 Sn	1000	WA2PFL	
Bronx	WA2QAO	Hudson #3	28.71 M	2000	W2QFN	
Kings	WA2UCP	Kings #1	145.25 M	2000	WA2GAB	
Kings	WA2UCP	Kings #2	146.88 M	2000	WA2HTA	
Kings	WA2UCP	Kings #3	50.4 M	2030	W2BDUD	
Kings	WA2UCP	Kings #4	28.62 M	2100	W2ISF	
Nassau						
Nassau	W2FI	Command	146.1 M	2100	K2DHC	
Nassau	W2FI	Hempstead 2	147.0 M	2110	K2UIB	
Nassau	W2FI	Wantagh Area	147.0 M	2115	K2UIB	
Nassau	W2FI	FtPk Area	145.56 M	2115	K2UIB	
Nassau	W2FI	VlyStrm Area	146.91 M	2115	K2UIB	
Nassau	W2FI	RkVChfr Area	145.23 M	2115	K2UIB	
Nassau	W2FI	Hempstead 5	50.25 M	2110	K2UIB	
North						
Nassau	W2FI	Hempstead 2	146.82 M	2110	W2UAL	
Nassau	W2FI	Oyster Bay 2	145.32 M	2110	WA2LXT	
Nassau	W2FI	Nassau 10	28.72 M	2000	WA2ZAI	
New York						
New York	WA2VKK	Manhattan 2	147.18 M	2000	W2NEM	
New York	WA2VKK	Manhattan 6	50.48 M	2000	W2NEM	
New York	WA2VKK	Manhattan 10	28.58 M	2000	W2HMS	
Queens	WA2TAQ	Queens 2	145.62 M	1945	WA2OGA	
Queens	WA2TAQ	Queens 5	50.52 M	2000	WA2WAO	
Queens	WA2TAQ	Queens 10	29.50 M	2000	W2IAG	
Richmond						
Suffolk	W2VKF	Richmond 2	147.12 M	1930	W2VKF	
Suffolk	W2KNA	Suffolk 2	145.47 M	2100	K2BGP	
Suffolk	W2KNA	Suffolk 10	29.56 M	2000	K2BGP	
Suffolk	W2KNA	Huntington 2	145.6 M	2100	K2HTX	
Suffolk	W2KNA	Huntington 6	50.46 M	2030	K2HTX	
Suffolk	W2KNA	Huntington 10	28.73 M	2000	K2HTX	
Suffolk	W2KNA	Brookhaven FM	146.34 M	2100	W2OQI	

W2NXZ, charter member of Suffolk CRC, has a new 50-ft. E-Z Way with Ham-M and Tri-band beam atop it. New officers of the Chamade HSRC are WB2DXM, pres.; WB2SLI, vice-pres.; WB2OYC, secy.; WN2-QLX, treas. Correction: WA2SUY has installed a nuvistorized i.f. strip in the listen-box, not WA2SOY as mentioned in Oct. QST. K2UMM's YL sprung the trap and is now the XYL! K2PFH, now in Vietnam, will be operating from Hong Kong and Singapore come next June. WA2RUE is working on secret formula to successfully mix YLs, school and traffic nets. K2AAS is a new A-1 operator. WB2EMJ's chemistry teacher is K2VGS. WA2LJS has an LR2 frequency meter. It'll take a 3000-lb. wind to blow W2DBQ's antenna down, now! WA2UCP has a new SB-200 with Tiger tri-band antenna. WA2GAB is sporting a new Swan 350 and W2-MAM is on s.s.b., too! WB2AOU put up a new 14AVQ. Did you know that WA2HRZ is in the Armed Forces? It is with regret that we note the passing of W2TO, Asst. EC for Queens 10-Meter AREC. K2DGI is now a WAC. WB2NSQ has gone mobile with the Cheyenne and the Comanche. A BPL certificate was awarded to WA2RUE. Merry Christmas! Traffic: (Sept.) WA2RUE 551, WB2DXM 461, WB2HWB 342, WB2PLI 146, K2AAS 136, WB2EALJ 118, W3EW 78, WA2LJS 55, WB2DZZ 53, WA2QJU 51, W2GKZ 46, WA2KZ 42, WB2LUK 39, WN2TCS 38, WB2RQF 34, WB2DBW 29, WB2BQ 21, WN2NGZ 20, WB2AKF 18, W2TJZ 18, WA2UCP 17, WB2MLN 15, K2IDB 14, W2EC 11, W2IAG 9, W2BCB 8, W2PUH 8, W2PF 5, WB2QPT 4, W2BAWX 1, K2-DGI 1, WB2NSQ 1. (Aug.) WA2RUE 2046.

**NORTHERN NEW JERSEY**—SCM, Edward F. Erickson, W2CIV—SEC: K2ZFI, ANJ ARPSC-NTS net works:

NJN	3695 kc.	7:00 P.M. Daily	WA2BLV-RM
NJ Phone	3900 kc.	6:00 P.M. Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M. Sun.	W2ZI-PAM
NJ 6 & 2	51,150 kc.	11:00 P.M. M/W Sat.	K2VNL-PAM
NJ 6&2	146,700 kc.	10:00 P.M. Tu Sat.	K2VNL-PAM

All times local. AREC skeds are available from K2ZFI. New appointments: WB2LUS as ORS and OPS, WB2-UCS as OBS-Tue., Thurs. and Sun. on 145,700 kc. at 7:30 p.m. local time A3. Congratulations to WB2QMA and WB2UIR on the receipt of General Class license. W2CFB is the new EC for Toms River, and WB2NSV for Belleville. WB2EFV has 15 states confirmed on 2 meters. K2VVI has joined MARS. WA2MXT is chasing DX on 20 with a new TA-33 jr. WB2HLI has 25 toward DXCC. The TCNR operates nightly on 3520 kc. at 0100Z. WB2ICH reports that the Labor Day demonstration of ham radio was a complete success, with 120 messages originated at the site in Highland Park. WA2DEW has gone to the Virgin Islands (KV4CQ).

## OHIO QSO PARTY

December 18-20, 1965

The Ohio QSO Party, sponsored by the Upper Arlington Radio Club, will take place as follows.

**Rules:** 1) The contest begins 2300 GMT Saturday December 18 and ends 0400 GMT Monday December 20. 2) Suggested frequencies are 3560 3940 7060 7240 14060 14190 21060 and 21290. 3) Each station may be worked once per band, c.w. and phone bands count as separate bands. 4) Call CQ Ohio and Ohio stations send de Ohio. 5) Ohio stations send QSO number, RS(T) and county. Out-of-state stations send QSO number, RS(T) and ARRL section. 6) Awards go to first, second and third in Ohio and in the Country and to first place in each ARRL section. 7) Ohio stations score 2 points for each out-of-state contact, 1 point for each Ohio contact. Out-of-state stations get one point for each contact and may only work Ohio stations. Total score for Ohio stations is the product of QSO points and ARRL sections (Ohio included). For others it is the product of QSO points and Ohio counties worked (88 total). 8) Log copies which include QSO number, station worked, date, time, band, mode and your call. Mail entries to Craig Nohl, WA8GYT, 2614 Brandon Road, Columbus, Ohio 43221. Entries must be postmarked by January 20, 1966. (Please include s.a.s.e. so results and awards can be mailed.) Activity is highly encouraged in both modes. Both phone and c.w. contacts count together.

## HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: WA2VYS, PAM: W2LJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointments: K2HNV and WB2HZY as OPS; W2QFR as OBS; WA2LJM as OO, K2AJA as ORS. Endorsements: K2SJM and WA2-MID as OPS; WB2HYA as ORS; K2SJM as EC. It's nice to have K2HNV back after a year's absence in England performing research. Ted is Professor of Physics at Union College. Eico demonstrated its new transceiver to the Westchester Club. In New Rochelle plans were made to handle Columbus Day and Thanksgiving Day Parades as well as SET participation. FCC Engineer WA2CCF was speaker at the Schenectady Club. The Albany Club discussed plans for the year and reviewed Field Day activities. Approximately 35 are attending an Extra Class symposium in Schenectady. WB2DXL and WB2ERK are new members of the ESS Net. W2ODC, W2MEK and WA2VYS are new Extra Class holders. Congrats. ESS reports 160 messages handled in Sept. WB2HZY reports a new quad on his 30 ft. tower. Among those participating in the Sept. FMT were WA2OJD and K2LSX. A new beam also rotates over the shack of WB2DXL. W2EFU was elected a life member of the Schenectady Club for his many years of faithful support. Wide-band f.m. on 2 meters is sweeping the capital district with dozens of mobiles and two repeater stations in operation. One-watt walkie-talkies can communicate easily to Utica, 90 miles away. Traffic: WA2VYS 172, WB2HZY 104, WA2JWL 88, K2SJM 67, WB2DXL 47, WA2LJM 34, W2ANV 29, W2BXP 22, W2PKY 21, WB2HYA 17, WA2WGS 10, WA2DXB 5, WB2-OTR 4.

## NEW YORK CITY AND LONG ISLAND

—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP	—RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW	—PAM
VHF Net	146.25 Mc.	1900 FSSM	W2EW	—PAM
NYCLIP	3932 kc.	1600 Daily	WB2HWB	—PAM
NLS (Sip)	3630 kc.	1845 Nightly	WA2RUF	—RM

NYC-LI AREC nets: Pick one near you and join up!

**T**HE VX-501 external VFO console for the NCX-5 transceiver provides unusually versatile frequency control for both the advanced and the novice amateur.

**U**NLIKE other external VFO's, the VX-501 incorporates a separate oscillator (in addition to the VFO) which may be crystal-controlled on any one of five channels. A front-panel four-position switch on the VFO console permits choice of transceive operation controlled by either the NCX-5 or VX-501, transmit frequency controlled by the NCX-5 and receive frequency by the VX-501, or vice versa. A separate six-position switch allows choice of either VFO or crystal control of the VX-501 itself.

**T**HE most obvious application of the crystal control feature of the VX-501 is, perhaps, net operation. Yet the superb stability and 100 cycle digital readout of the solid-state VX-501 VFO make us suspect that not many advanced amateurs will find crystal control enough of an improvement to warrant its frequent use for such purposes. Rather, it is the novice amateur who will really enjoy the available crystal channels — since by using the VX-501 to crystal-control transmit frequency while the NCX-5 VFO controls receive frequency he may legally operate the novice bands by reducing the CW input of the NCX-5 from its normal 200 watts to 75 watts (accomplished with a twist of the carrier insertion or carrier balance knob).

**T**HE advanced amateur with a potential or active novice in the family may well find the VX-501 the least expensive and most practical solution to the problem of a duplicate rig — and meanwhile enjoy the advantages of the VX-501/NCX-5 combination himself (when he gets a chance to use it).

MIKE FERBER, W1GKX



National Radio Company, Inc.

W2TFM has returned from Europe. W2ABL is working on an indoor antenna. W2KOG has converted a CB ground plane to 10 meters. W2CZM has a new YL harmonic. K2UKQ has 85 DX YL QSLs. WB2UCS has joined Army MARS and is a busy OES. WB2MXZ took advantage of Sept. v.h.f. conditions and worked all stations of the "Big Blow" contest. WB2LDE is attending college in Virginia. W2CFB reports a long emergency traffic session during the hurricanes. There still are some possibilities for potential leadership appointments. Those of you who have special ideas for nets and/or AREC are urged to get in touch with me. Now that I am back in the section to stay for awhile (I hope) let's get things moving again, as the politicians would say. Too many are dropping out of ARRL-sponsored public service activities because of the pending FCC Docket 15928. This is not a good situation, let's stick with it for awhile and see what happens. On the plus side, we can all be proud of our SEC, KZZFI, and all our ECs, since NNJ placed 7th out of 73 sections in fullness of ECs in reporting for 1964. KZZFI and myself are grateful to the ECs, RMs, PAMs, NCSs, and liaison stations for their hard work during the Simulated Emergency Test. As of this writing the following officials participated: WB2AEJ, W2PEV, K2VNL, W2ZAL, W2ASEJ, KZZFI, K2KDG, WA2NJB, WB2BCS, W2COT, W2CFB, WA2NSV, WA2CCF, W2DMJ, W2TNS, W2IIN, and yours truly. W2CVW, WB2JGD has received his WAS certificate. Please pass the word along to your friends and fellow club members about our public service oriented activities. Also please send news for this column such as receipt of General Class license, new equipment, etc. Merry Christmas and Happy New Year! Traffic: (Sept.) K2VNL 239, WB2JWB 210, WB2AEJ 155, WB2KSG 146, WA2TEK 117, WB2ICH 87, K2KDG 55, WB2BCS 35, WB2FIT 31, W2CVW 29, K2UCY 27, KZZFI 26, WB2HCS 25, WB2IYO 24, W2SRQ 23, WA2CCF 20, W2PEV 19, K2MFX 7, WB2QLF 7, WB2MAT 6, WA2DEW 5, W2TFM 4, WB2QGB 2, W2APWI 1. (Aug.) WB2QLF 29, KZZFI 18, W2CVW 4. (July) W2CVW 48, WB2KXG 15.

### MIDWEST DIVISION

**IOWA**—SCM, Dennis Burke. W0NTB—SEC; K0BRE, PAM; W0NGS, RM; W0TUI. Send all your AREC reports to K0BRE, 1008 So. Third St., Fairfield, on or before the first day of the month. Send all other reports to your SCM on the first, likewise. If you have not made a report in the last twelve months your appointment is no longer in effect. Our section needs more members who are willing to dedicate their equipment to Public Service when there is need. To be of help in an emergency you should know how to originate a radiogram in proper form. There is little excuse for the term "Double X-ray", in lieu of a proper check. This section is 27th of 73 sections; not so bad but not nearly as good as it might be. We have thirty-nine counties without Emergency Coordinators which means, to a great extent, without participation in the AREC program. Net reports for Sept.: 160 Meter, QNI 622, QTC 15, sessions 30, 75 Meter, QNI 1446, QTC 246, sessions 26, Hamilton County, QNI 204, QTC 4, sessions 30. (This second oldest net in the section meets every night on 1815 at 1900). Do not hesitate to report your traffic to the SCM regardless of how small it is. Traffic: W0LGG 1337, W0NTB 147, K0ASR 59, K0OKD 30, W0GDYV 27, W0ADAG 19, K0KZB/O 15, W0BKR 13, W0PTL 12, K0EVC 11, K0ZCQ 11, W0NGS 6, K0TFT 6, K0OTV 1.

**KANSAS**—SCM, Robert M. Summers, K0BNF—SEC; K0EMB, V.H.F. PAMs; W0HAJ, K0VHP, RM; W0OJIL.  
 Net Freq. Time Days Sess. QTC QNI Ave.  
 KPN 3920 kc. 0645 CST M-W-F  
 0800 CST Sun.

Kansas  
 S.S.B. 3920 kc. 1830 CST T-Th-Sat. 193 212  
 NCSs: K0LHF, K0SKK, K0EMB, K0LPE, W0CCW, QKS 3610 kc. 1830 CST Daily  
 NCSs: K0BNF, W0OJIL, W5NAR/O, W0VBBQ.  
 Kans.  
 WX 3920 kc. 1800 CST  
 NCSs: K0EMB, W0CCW, W0LLC

Ham Butchers  
 Net 3880 kc. 1205 CST M-Fri. 22 125 770  
 NCSs: K0HGI, W0OHVI, W0GQR, W0BHG, W0GFKO, W0HJP  
 Kans 6-Meter Tfc. Net 50.85 Mc. 1900 CST Sat.  
 W0ADZI Net Mgr.

The Tec Ni Chat Amateur Radio Club, Inc., Wichita, junk sale netted a nice profit. W0HJP now is net mgr. of HBN, W0EMIQ is asst. net mgr. W0FRK. Zone 2 EC. reports his AREC racks have been reduced greatly because of the Viet-Nam situation. The Newton Amateur Radio Club's October meeting was devoted to

power supply and transformers. The Hoot Owl Net at Wichita early Sun. morning at 1230 a.m. on 145.85 Mc. is doing real fine. More participation is welcome. Let us hear from you if you are interested in OO, ORS, OPS, OES or OBS appointments. My new address is 2930 North 13th, Kansas City, Kans. 66104, Tel. Mafair 1-6276. Anyone missed on this report, please report again as I could very easily have lost a paper or two in moving. Traffic: W0OHJ 781, W5NAR/O 592, K0LHF 287, K0HGI 224, K0GII 197, K0JMF 86, K0RFX 78, W0CET 75, W0CCW 65, W0OJIL 48, K0GZP 41, K0PSD 41, K0EMB 30, W0EMIQ 37, K0LPE 10, K0VQC 8, W0BMW 4, W0HAS 4, W0DZI 3.

**MISSOURI**—SCM, Alfred E. Schwaneke. W0TPK—SEC; W0BUL, RM; K0AEM, W0AFKD, K0ONK, W0OOD, W0WYJ, PAMs; W0BUL, W0BVL, W0AFL (v.h.f.), W0HVI, K0ONK, K0TCB. Congratulations to SEC W0RUL and the ECs for bringing Mo. up to ranking No. 11 in the nation for reporting in 1964. New appointments: W0BVGU as OBS, W0A0JZK as OPS, Appointments renewed: K0JJP as EC and OO; W0GQR as EC; W0EEMS, OPS; K0LGZ as ORS, W0HGG is attending Carleton Coll. in Minn., and W0JLL is at Mo. U. K0HA has moved to K.C. and has a new TR-4. W0EEMS placed 1st in Mo. in the C.W. DX Contest and received district certificate in the Scandinavian Art. Contest. K0JPL worked VQ9 for country No. 208 on 20-meter cw. K0JPS keeps regular skeds with brother W7QBK in Wash. W0AIM reports an average of 21 check-ins on the 5-County AREC Net. K0ONK reports 2 new Novices, W0N0BD and W0N0BO in Marshall. K0ONK is back on s.s.b. after one year. W0TPK spoke before the K.C. V.H.F. Soc. and visited with K0ONK, K0TCB and K0TGU. W0OOD has a new linear and was visited by W0ITX, K0AEM, W0AFKD, K0JPF, K0LGZ, K0VMZ, K0VNB and K0YGR are NCSs on SMN and received net certificates. W0BWW, W0BHG and W0IYL are alternate NCSs for MEN. K0DEQ received MON certificate. If your code is slow and you want traffic training try MSN nightly, 9 P.M., 3715 kc. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mar.
MEN	3885	2345Z	M-W-F	13	205	16	W0BUL
MON	3580	0100Z	Daily	30	218	183	W0WYJ
MNN	3580	1900Z	M-Sat.	26	52	20	W0OOD
SMN	3580	400Z	Daily	26	192	65	K0AEM
MSN	3715	0300Z	Daily	30	41	12	K0ONK
MoSSB	3963	2400Z	M-Sat.	26	624	173	K0TCB
MoPON	3810	2100Z	M-F	21	200	88	W0HVI
QMO	3580	2200Z	Sun.	4	16	3	W0AFKD
MTTN	3940	2330Z	M-F	23	180	34	W0EMIX

Traffic: (Sept.) K0ONK 1645, W0WYJ 324, W0AFKD 302, W0HVI 106, K0AEM 90, W0OOD 90, K0JPL 86, K0LGZ 70, K0TCB 68, W0YO 51, K0TGU 44, K0JPS 33, W0EEMS 29, W0LYE 25, W0TPK 22, K0WOP 22, W0ACHH 13, W0EELM 13, W0RTO 13, K0OYV 11, W0ADKT 9, W0GQR 9, K0YIP 8, W0BUL 6, W0JLL 6, W0ZLN 6, W0KIK 3, W0AJDR/O 2, K0DEQ 2, W0AFL 2, W0BGU 1. (Aug.) K0YGR 28, W0AJRJ 22.

**NEBRASKA**—SCM, Frank Allen, W0GGP—SEC; K0JXN. Appointments: W0BAM as OBS, W0AGIV as ORS, W0NIK as OBS, Net reports for Sept., 1965: Nebraska Storm Net, K0JXN, 1st session, QNI 803, QTC 37; 2nd session, QNI 545, QTC 21, Nebr. AREC Net, W0IRZ, QNI 140, QTC 1, Nebr. C.W. Net, W0AGHZ, 1st session, QNI 208, QTC 49; second session, QNI 197, QTC 57, West Nebr. Phone Net, W0NIK, QNI 493, QTC 73, Nebr. AREC C.W. Net, NACN, W0EEL, QNI 13, QTC 3, Nebr. Emergency Phone Net, W0ABID, QNI 1318, QTC 115, Nebr. Morning Phone Net, K0UWK, QNI 681, QTC 29. The 160-Meter Phone Net has started operations for the winter season on 1995 kc. at 0130Z daily. W0GVJ has claimed 26,400 points in the recent VE/W Contest. Full participation in the October SET in Nebraska was obtained. Traffic: W0AGHZ 235, W0LOD 121, W0ABID 103, W0AGBJ 65, W0AODU 64, W0ABIE 51, K0JFN 45, K0JXN 38, W0GVJ 34, W0AIND 30, W0AHW 28, W0MTI 27, W0FQB 25, W0AEEI 22, W0ABOK 20, W0AKGN 16, W0AIXF 14, W0VEA 13, W0GGP 13, K0HNT 12, W0CFE 11, K0FRU 11, W0BVF 7, K0DGV 7, K0FJT 7, W0RJA 7, W0VRE 7, W0EGQ 6, K0HJY 6, W0AHSX 6, K0RRL 6, W0NIK 5, K0UWK 5, W0HOP 4, W0PQP 4, W0AES 3, W0WKP 3, W0AFJN 2, K0VTD 2.

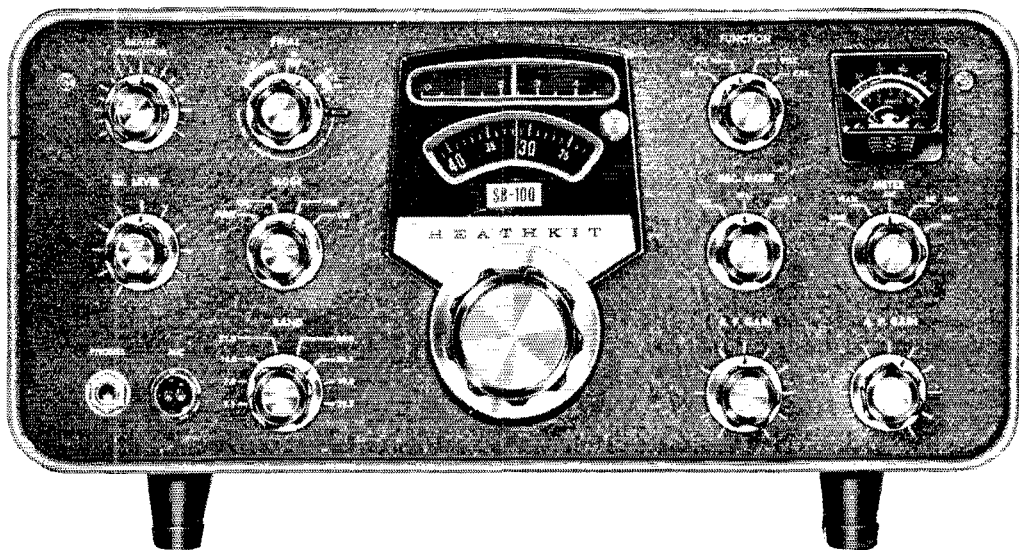
### NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Fred Tamm, K1GGG—SEC; W1EKL, RM; W1ZFM, PAM; W1YBIL, V.H.F. PAM; K1RTS. Sept. net reports:

Net	Freq.	Days	Time	Sess.	QNI	QTC
CN	3640	Daily	1845	30	339	260
CPN	3830	M-S	1800	30	473	156
		Sun.	1000			

# Introducing...

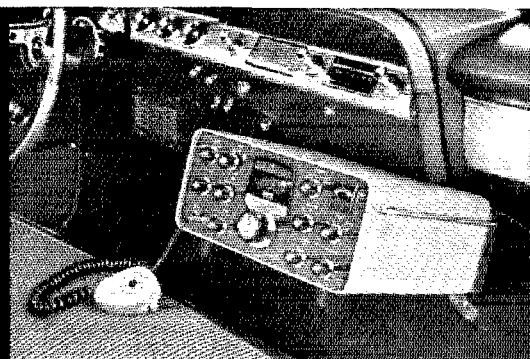
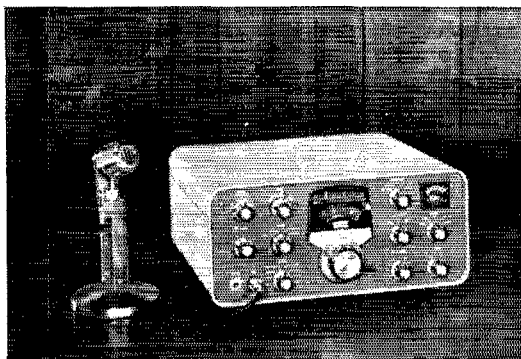
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**180-Watt, 80-10 Meter SSB Transceiver . . . . . \$360.00**

- Full five band transceive SSB & CW operation, 80-10 meters
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- VOX-operated CW with built-in sidetone • Can operate crystal control in the transmit mode with variable tuning of receiver or can operate crystal-controlled transceive mode—excellent for net control • Separate offset CW carrier crystal for clear, pure CW note • Triple Action Level Control™ • Built-in 100 kc crystal caibrator • Enclosed relays for quiet, trouble free operation • Heath SB-Series LMO (Linear Master Oscillator) provides truly linear tuning with 1 kc dial calibration—less than 100 cps per hour drift after warm-up—400 cps accuracy • Perfect companion for HA-14 KW Kompact or SB-200 final amplifiers • Fixed station operation with HP-23 power supply—mobile with HP-13 & SBA-100-1 mobile mount for quick plug-in/quick disconnect mobile installation • Fast circuit board assembly • Simple alignment—requires only a VTVM with RF probe, a dummy load and a broadcast receiver

If you are considering the purchase of an SSB transceiver, we urge you to read every word on the next two pages before deciding. ▶



## Heathkit SB-100—The SSB Rig You've Been Waiting For

The Newest And The Hottest Of The SB-Series! Here's a complete 80 through 10 meter 180-watt SSB transceiver. It includes all of the high-performance features you've read, heard talked about, or experienced on the already famous Heathkit SB-Series Amateur Radio Equipment . . . plus 5-band coverage with fast, simple band-switching and tune-up . . . alternate "remote" power supplies for fixed or mobile operation . . . new Heathkit Switch-Board™ coil and band-switch assembly . . . and a new ALC control circuit (TALC™) that allows even greater variation in speech level. All this and more in the new SB-100!

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Power Consistent With Maximum Versatility. 180 watts P.E.P. is the best transmitter power level for most hams. This power level permits using the right tubes for the job and does not require eliminating useful features to pay for increased power. The SB-100 produces a "bare-

foot" signal comparable to the higher power transceivers and is ideally suited for driving a grounded grid linear for a really big signal without the problems of excessive drive.

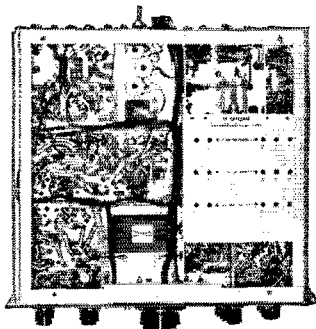
TALC™ (Triple Action Level Control) Sets New Standards For Automatic Level Control. Control from three separate circuits is combined in TALC™ to provide greater speech compression . . . allow for even more variation in speech level . . . and boost the performance of the SB-100 still higher.

Operating The SB-100 Is A Pleasure . . . Like Driving A Fine Automobile! Select the band, dial the frequency, peak-up the preselector, and tune. Receiver and transmitter bandswitching is simultaneous. The preselector control peaks up the driver. Final tuning is quick, sure, and positive. And for CW op's who prefer headphone listening, there is a separate headphone level control to adjust the headphone audio level independently of speaker volume. In addition, the transmitter and receiver are always on the same frequency . . . no "leap-frogging" around the frequency when you're working round tables.

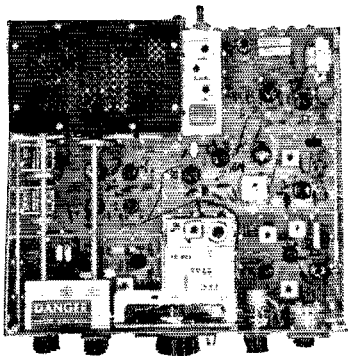
Order The SB-100 For The Best Value In SSB Transceivers . . . Regardless! We invite comparison of the *complete* SB-100 specs on the next page with those of any other make SSB transceiver. Also consider circuit design as related to inherent stability, use of quality components and fine mechanical construction, cost of companion power supplies and linear amplifiers, band coverage in view of increasing 10 and 15 meter activity, ease of circuit familiarization with regard to possible maintenance, and resale value. You will agree that the SB-100 is the best investment you can make in amateur radio equipment. (Recommended for hams with previous electronic or kit construction experience.)

Kit SB-100, 23 lbs., \$36 dn., \$31 mo. . . . .	\$360.00
SBA-100-1, Mobile Mounting Kit, 6 lbs. . . . .	\$ 14.95
GH-12, Mobile PTT Mike, 2 lbs. . . . .	\$ 6.95
HDP-21, Communications Microphone, 4 lbs. . . . .	no money dn., \$5 mo. . . . .
	\$ 29.40
Kit HP-13, DC Power Supply, 7 lbs. . . . .	no money dn., \$6 mo. . . . .
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Better than factory assembled!—section-alized circuit board construction, a minimum of point-to-point wiring, the use of pre-assembled wiring harnesses, plus the personal care given to kit assembly assure the quality you demand.



Just how hot can a SSB transceiver be?—Heath SB-Series leads in amateur radio electronics. Modern circuitry, select components, ample shielding, and the rock-stable Heath LMO give the SB-100 pace-setting high performance.

**SB-100 SPECIFICATIONS—Receiver section: Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **SSB selectivity:** 2.1 kc minimum at 6 db down, 5 kc maximum at 60 db down—2:1 nominal shape factor—6.60 db. **Input impedance:** Low impedance for unbalanced coaxial input. **Output impedance:** Unbalanced 8 and 600 ohm speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Supurious response:** Image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Transmitter section: DC power input: SSB:** 180 watts P.E.P. continuous voice. **CW:** 170 watts—50% duty-cycle. **RF power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm nonreactive load). **Output impedance:** 50 ohms to 75 ohms with less than 2:1 SWR. **Oscillator feedthrough or mixer products:** 55 db below rated output. **Harmonic radiation:** 35 db below rated output. **Transmit-receive operation: SSB:** Push-to-talk or VOX. **CW:** Provided by operating VOX from a keyed tone, using grid-block keying. **CW side-tone:** Internally switched to speaker in CW mode. Approx. 1000 cps tone. **Microphone input impedance:** High impedance. **Carrier suppression:** 30 db down from single-tone output. **Unwanted sideband suppression:** 55 db down from single-tone output at 1000 cps reference. **Third order distortion:** 30 db down from two-tone output. **Noise level:** At least 40 db below single-tone carrier. **RF compression (TALCTM):** 10 db or greater at .1 ma final grid current. **General: Frequency coverage:** 3.5 to 4.0; 7.0 to 7.5; 14.0 to 14.5; 21.1 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.0 to 29.5; 29.5 to 30.0 (megacycles). **Frequency stability:** Less than 100 cps per hour after 20 minutes warmup from normal ambient conditions. Less than 100 cps for  $\pm 10\%$  line voltage variations. **Modes of operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Dial accuracy—“resetability”:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps after calibration at nearest 100 kc point. **Dial mechanism backlash:** Less than 50 cps. **Calibration:** 100 kc crystal. **Audio frequency response:** 350 to 2450 cps  $\pm 3$  db.

**Front panel**

**controls:** Main (LMO) tuning dial; Driver tuning and Preselector; Final tuning; Final loading; Mic and CW Level Control; Mode switch; Band switch; Function switch; OSC Mode switch; Meter switch; RF Gain control; Audio Gain control. **Internal controls:** VOX Sensitivity; VOX Delay; Anti-VOX; Carrier Null (control and capacitor); Meter Zero control; CW Side-Tone Gain control; Relative Power Meter Adjust control; P.A.—Bias; Phone Vol (headphone volume); Neutralizing. **Rear Apron connections:** CW Key jack; 8 ohm output; 600 ohm output; ALC input; Power and accessory plug; RF output; Antenna switch; Receiver Antenna. **Power requirements:** 700 to 800 volts at 250 ma; 300 volts at 150 ma;—110 volts at 10 ma; 12 volts at 4.76 amps. **Cabinet dimensions:** 14 1/4" W x 6 3/4" H x 13 3/4" D.

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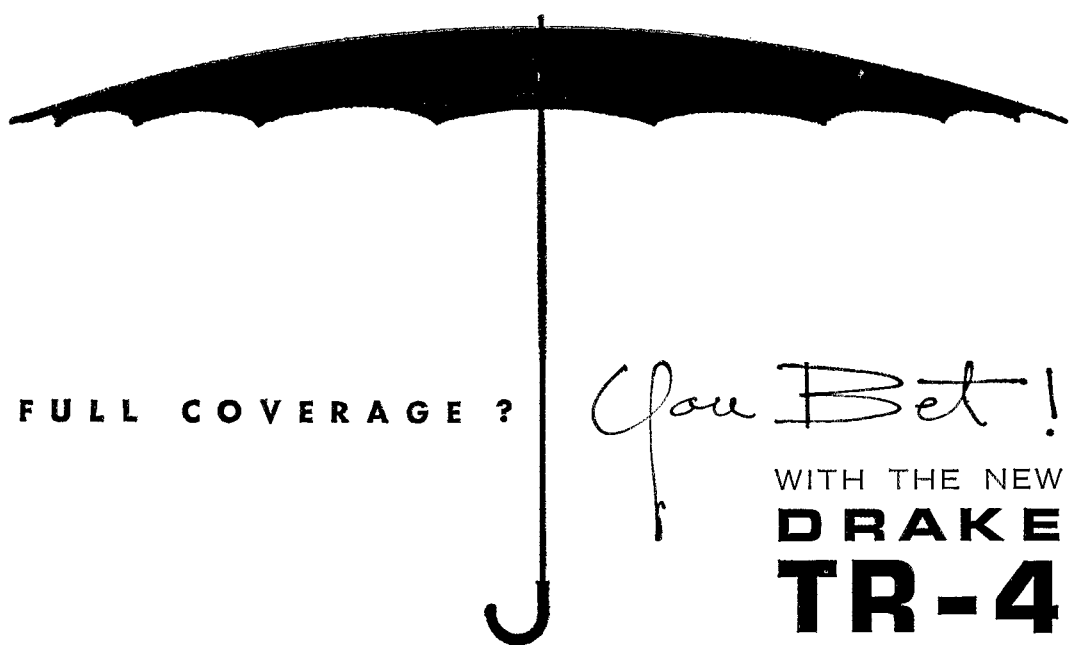
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AM-160



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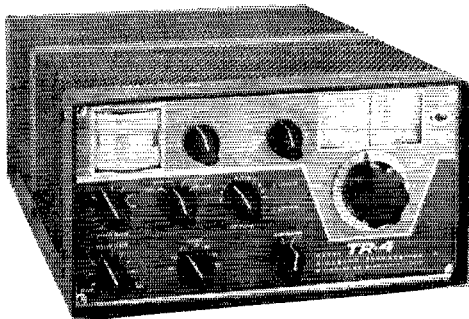
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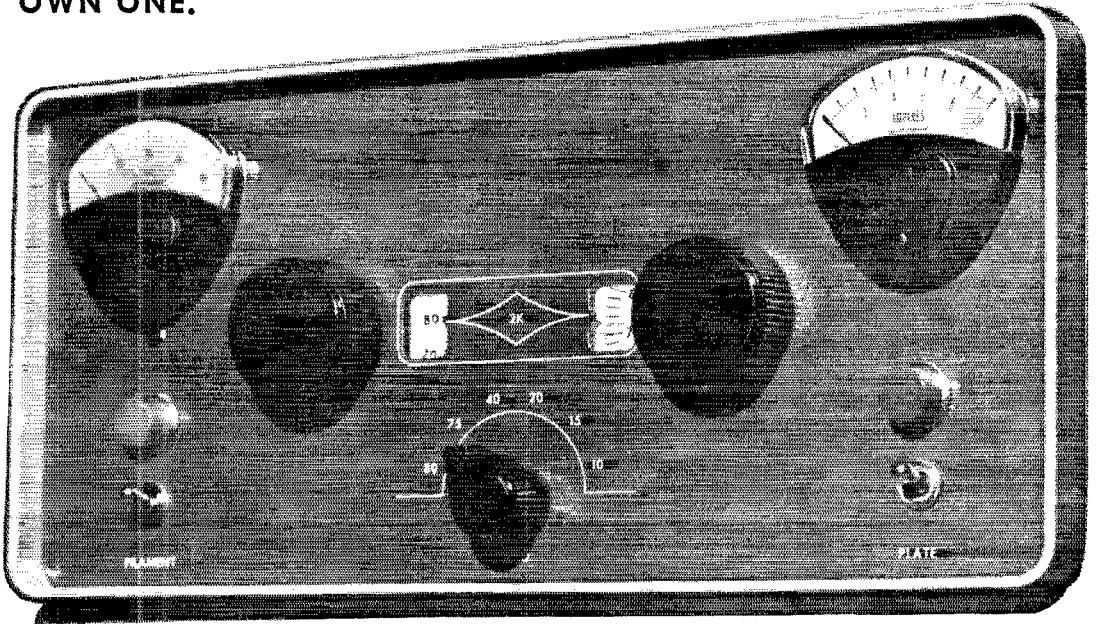
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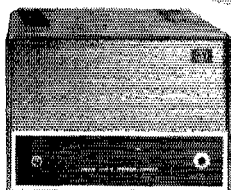
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Five Band, 2000 watts PEP input. Uses two Eimac 3-400z or two Amperex 8163 triodes.

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TUBES \$ 68



## MATCHING AC SUPPLY

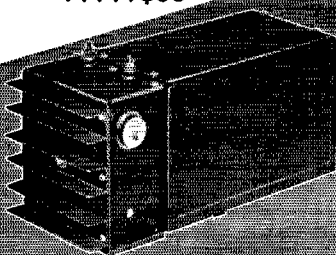
with speaker, phone jack.

MODEL 117-XC ..... \$85

MODEL 230-XC  
for 230 volts. .... \$95

**DC MODULE** Converts AC supply to 12 volts DC for portable or emergency operation.

MODEL 14X ..... \$55



## 12 VOLT DC SUPPLY

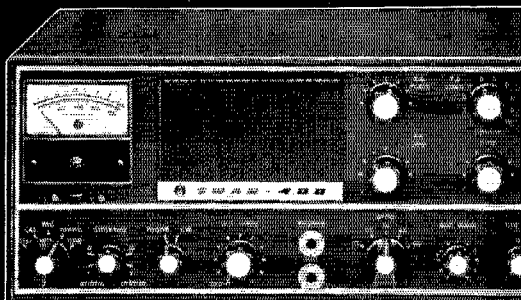
For mobile or portable operation. Negative ground standard. Positive ground available on special order.

MODEL 14-117 ..... \$120

## SWANTENNA 5 BAND MOBILE ANTENNA

Remote switching from inside car. 500 watt rating.

MODEL 55 - \$95



## MODEL 400 SSB TRANSCEIVER 5 BANDS 400 WATTS

Includes many deluxe features. Designed to use the highly stable, full coverage Model 420 VFO in fixed station, the miniature Model 406 VFO for mobile, or the Model 405 for MARS operation.

\$395

## PLUG-IN VOX UNIT

for either transceiver

MODEL VX-1 \$35

CRYSTAL  
CALIBRATOR  
KIT ..... \$19.

## SIDEBAND SELECTOR

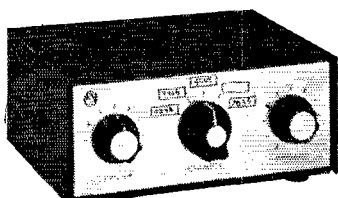
KIT ..... \$1

Kits for Model 3 only. Model 400 includes these features.

# SWAN SPEAKS YOUR LANGUAGE

ASK THE MAN WHO OWNS ONE

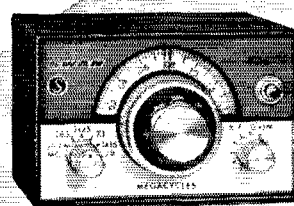
# SWAN LINE



## MARS OSCILLATOR

5 fixed channels, pre-set and locked to any frequency. May be used directly with Model 400 Transceiver or with Model 350 and Model 22 adaptor.

**MODEL 405 . . . . . \$45**



## MOBILE VFO

Miniature size. Covers phone bands. Makes it possible to trunk mount the transceiver.

**MODEL 406 . . . . . \$75**

## REMOTE CONTROL KIT

For trunk mounting of transceiver.

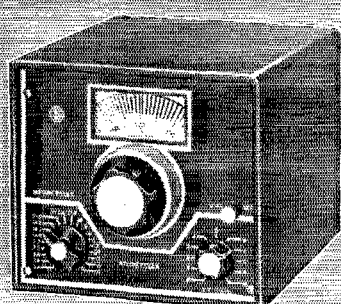
**MODEL RC2 . . . . . \$25**



## MODEL 350 SSB TRANSCEIVER 5 BANDS 400 WATTS

Built in full coverage VFO with 5 kc calibration. The greatest transceiver value ever offered the radio amateur.

**\$395**



## FULL COVERAGE VFO

20 ranges, 200 kc each, 2 kc calibration. Matches 350 and 400 transceivers in size & styling.

**MODEL 420 . . . . . \$120**



## DUAL VFO ADAPTOR

Provides for the addition of second VFO for separate control of transmit and receive frequencies. May plug into either 350 or 400 transceiver.

**MODEL 22 . . . . \$25**

*Merry  
Christmas  
from all the gang  
at SWAN*

FOR COMPLETE  
INFORMATION  
SEE YOUR DEALER



# SWAN

ELECTRONICS CORP.  
Oceanside, California

# W910P PUTS THE WORLD AT YOUR FINGER TIPS!



\$1.00

## FAMOUS "SECOND OP"

Essential DX operating aid, provides vital data like: beam headings; list of world QSL bureaus; includes logging space. See needed prefixes at a glance, increase your odds of a QSO because you have full information instantly.



\$1.00

## NEW "Q" DIAL

A must for every active operator, ham or C.B. Over a dozen vital information tables including: Q-signals, 10-signals, abbreviations, all U.S. radio districts and prefixes, time conversion, logging space for CW-SSB-CB. Saves time for efficient operation.

At your E-V microphone headquarters, or send \$1.00 each to:

**ELECTRO-VOICE, INC.**

631 Cecil Street

Dept. 1253Q, Buchanan, Michigan 49107

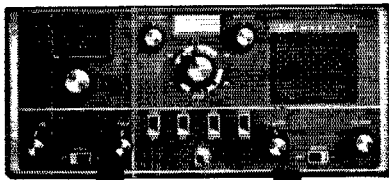
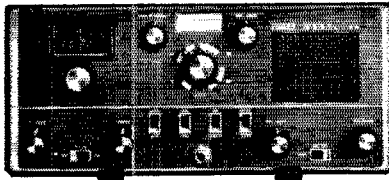
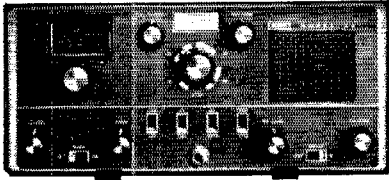
**Electro-Voice**®

SETTING NEW STANDARDS IN SOUND

High attendance: CN—WAIAPY, KIZND, WIZFM, KILMS, CPN—KIYGS, KIEYY, KILMS, KISRf, W1YBH, W1FVU, K1DQK, K1EIC, K1LFW, K1OJZ, CPN—KIYGS 26, K1EYY 25, K1LMS 25, K1SRF 22, W1YBH 22, W1FVU 20, K1DQK 19, K1EIC 19, K1LFW 18, K1OJZ 18. New station on CPN: WAICBW, North Haven, KIZND passed the Extra Class exam, and made his QSO Nr. 10,000 in Sept. CN held its annual business meeting Sept. 18 in Stratford. Congratulations to W1EFW on the fine work of publishing the new CN bulletin. W1QV is back on the air after a brief stay in the hospital. K1QGC is getting ready to start building his new QTH in Granby. K1AFC reports all-hand operation on the green keys but also gets in on 75-meter s.s.b. activity. W1FAJ and W1NDUV1 started a new club in the Westport area. W1APY reports that TCRN is now on 3520 kc. at 0100Z. W1BGD's latest DXCC score: 144/104. New AREC members: W1IPK, W1RFJ, W1ZFM, K1TKS, K1WKK, K1ZZB and W1APY. 220-Mc. activity was reported by K1YON, K1PAN, K1GQO and K1UGQ/1. K1WKK will be away at college for the winter but hopes to contact the gang via 80-meter c.w. K1ZAT is entering the USAF. W1AFGN, ex-WA0HYG, is new in Westport. New appointments: K1LMS as OPS, Endorsements: W1YBH as OPS and OBS. Your SCM is getting back on the bands after a hectic period of setting up his station at the new QTH. K1GGG again is fully operational on all bands, c.w., RTTY and s.s.b. Reports were received from OOs W1BGD and K1QGC. BPL for Sept.: W1APY, Traffic: W1EFW 280, W1APY 256, W1ZFM 248, K1LMS 185, W1BGD 180, K1ZND 123, K1EIC 96, K1EIR 82, K1EYY 53, K1RQO 38, K1GGG 37, W1ADIU 28, W1YBH 23, W1CTI 22, W1QV 21, W1RFJ 20, W1ZL 20, W1VCG 17, K1NTR 12, W1YGS 10, W1BNB 9, W1CHR 7, W1NDUV 5, W1FVU 5, W1CUH 4, W1BDI 2.

**EASTERN MASSACHUSETTS—SCM.** Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from K1s PNB, DZG, W1s STX, LVK. We need more annual reports from our ECs. Last year we ranked 27th nationally, so come on, fellows, do your part. New ORSs: W1ADT and W1AKNO/1, who is going to MIT. W1AEDV has a new TR-4 from his XYL. Silent Keys: W1OJ and W1WEJ. The T-9 Radio Club met at W1IB's and W1WNK's QTHs. W1BVP bought a house in Brockton and has one antenna up. K1ZBZ is on 2 and 6. W1AAU says that the Dedham c.d. group had a successful alert; a hurricane, and it really rained hard that night. W1AIBJ is secy. of the Townsend Club. W1DXO has a low-band receiver rig for 6, a quad for 2. W1AR/W1AWF is up in N.H. The W1AEC club has a paper now, *Zero Beat*. W1AICCM is editor. K1IBR, tech. ed., and W1EJL, roving reporter. K1IBR has a new receiver. K1NWS is fixing up his shack. K1EEQ made walkie-talkie contacts on 10 while in the hospital. W1LAZ has a new tri-band beam. W1ABZJ has a new beam and tower. W1EJJ has a ground plane for 40. W1VAH is building an s.s.b. exciter for 75. W1KZD has an NCL-2000. W1RFB has a new Drake R4 receiver. W1VOK has a beam for 10. W1AICFT has a vertical antenna for 15. W1PEX, K1CLM, W1CRX and W1AICFT made the BPL. K1VFS is on 6. The Six-Meter Cross-band Net had 22 sessions, 385 QNIs, 17 traffic. W1AUQ is busy in OO work. W1SIV is on a cruise to the Caribbean. W1GE/W1GDY, and IKWV in 1915, is getting his "50 Years in Amateur Radio" certificate from the QCWA. New officers of the Danvers Amateur Radio Assn. are W1MNNK, pres.; W1JOS, vice-pres.; W1ZMO, secy.-treas. W1ZMO has a new Drake R4 receiver. W1A4WBG has returned to Florida. W1DFS is the chief communications advisor for the Selective Service Plan and W1AOG has been asked to try to get a station in each city. Contact Don. Medford C.D. has moved to the Public Safety Bldg. and antennas are up for 2 and 6. W1AOG is busy on this, too. K1YPB, on many bands, is now in Navy MARS. W1NJL and K1REX are attending Colby College in Maine. A nice note was received from W1MPP, who says she is busy with OOTC work. Wellesley ARS had a talk by WINZX on "Linear Amplifiers," also an ARRL movie. K1KZZ is on 6. W1AICJW is on several bands. His son, W1AICJV, is a Tech. W1A1BLG and W1OJF took part in the SET on 2 and 6. W1NE is busy at OO work. The Quannapowitt RA had a demonstration and talk by K1SWU-TV on ham-TV. The Capeway RC met at K1DYU's. The net is on 28.8 Mc. Mon. at 8 P.M. K1ROA is in the "air." he has his pilot's license. W1CRX has a new antenna for 40/20. W1NEAT is active in our 2-meter net. W1DEC-DED is mobile on 2. W1JDP is painting his house. W1AFDC has a DX-60 on 40-20-meter c.w. W1AIDJC is putting up an antenna for 15. W1NDBD is trying for General. W1ALT is helping out. W1ADLT is now in Chelmsford. The Middlesex ARC held a meeting. W1AICFP put a PTT in his DX-60 and is going to Wentworth Inst. Appointments endorsed: W1YAC/1 and K1VOK as ORSs. K1VOK as OPS. K1PNB as RM for the 80-meter Novice band. EM2MN had 22 sessions,





# SB-34 ... your biggest dollar value!

The price of 395.00 includes built-in, solid-state, transformer type power supply that lets you operate on 12V DC for mobile...on 117V AC for fixed station service. The power change is simple too—just use AC or DC cable. (Both furnished). SB-34, the complete SSB station, is so small, lightweight and easily carried (has a handle for this purpose) that you can readily enjoy double use of this fine SSB four-band transceiver.

**More power?** Just add the big-value SB2-LA KW Linear Amplifier.

**Mobile KW?** Add the compact SB2-LA Linear and SB3-DCP Inverter,

**CW?** Merely plug in the new CODAPTER and key away.

### HIGHLIGHTS:

- Expanded frequency coverage • Delta receiver tuning •
- Solid-state dial corrector • Panel switch selects USB or LSB •
- Solid-state switching---no relays • Collins mechanical filter •

**Power input:** 135 watts P.E.P. input (slightly lower on 15). **Freq. range:** 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc  
23 transistors, 18 diodes, 1-zener, 1-varactor, 2-6GB5's PA, 1-12DQ7 driver. **Speaker built in.** Pre-wired receptacles on rear accept VOX and Calibrator—both units optionally available. **Size:** 5"H, 11¼"W, 10"D. 20 lbs. (approx.)

- SB-34 Transceiver 395.00
- SB2-LA Linear ... 249.50
- SB3-DCP Inverter 249.50
- Codapter ..... 39.95



**SIDEBAND ENGINEERS**  
213 East Grand Ave.  
So. San Francisco, Calif. 94080

Export sales: Raytheon International Sales & Services, Lexington 73, Mass. U.S.A.



The  
**Christmas Gift**  
 that  
**Lasts All Year**  
**QST**

He won't turn up his coat collar  
 to hide it.

He won't have to exchange it  
 for one with longer sleeves.

He won't read it once and  
 shove it out of sight.

It won't shrink.

And he'll like it whether he  
 smokes or not.

**QST is the one present that's always  
 suitable, always welcome—a  
 monthly reminder that you think  
 enough of him to give him something  
 he really wants.**



QST and ARRL Membership \$5  
 \$5.25 in Canada, \$6 elsewhere

**THE AMERICAN RADIO  
 RELAY LEAGUE, INC.**

Newington, Connecticut 06111

197 QNTs, 136 traffic, Traffic: (Sept.) W1PEX 1037, W1-  
 CRX 372, W1EMIG 254, K1CLAI 229, WA1CFZ 192, K1-  
 PNB 170, W1DOM 124, WA1CFP 102, K1GKA 56, W1-  
 OFK 37, K1VPJ 35, W1AOG 34, W1LES 23, W1CTR  
 22, W1SIV 21, W1LEAT 19, K1VOK 17, WA1DEC 11,  
 K1LCO 11, WA1DED 10, W1JDP 8, W4YAC/1 8, K1-  
 BGK 7, W1NF 4, WA1FDC 3, W1NDBD 2, WA1DJC 2,  
 WA1DLT 1, (Aug.) WA1CRR 46, W1LES 23.

**MAINE—SCM, Herbert A. Davis, K1DYG—SEC:**  
 K1QIG, PAMs: K1WQI, K1ZVN, RAI, K1TMK,  
 V.H.F. PAM: K1OYB, Traffic nets: Sen. Gull Net 1700  
 to 1800 on 3940 kc. and 2000 to 2100 Mon. through  
 Sat.; the Pine Tree Net c.w. daily at 1900 on 3596 kc.  
 Tribute to a Silent Key: W1KLEH, Roy Nason of Han-  
 cock, passed away recently. He worked 75, 15 and 2  
 meters mostly. He will be sadly missed by all who knew  
 him. W1AIML had a bad fall from a tree but is doing  
 OK. WA1BEB is one of our new OBSS. Jim will be  
 helping a lot by doing this service. It seems very nice  
 to receive the many certificates for endorsement and  
 glad to have all these stations holding on and doing a  
 nice job. K1UGQ/1 operated in the V.H.F. Contest and  
 did very well with 497 QSOs on the high bands. K1-  
 MTJ is having a nice time on the v.h.f. frequencies and  
 doing real well. Keep sending in all the news. Traffic:  
 K1TMK 116, K1ZVN 110, WA1BEB 66, K1WQI 31,  
 K1TMJ 38, W1LDC 2.

**MAINE QSO PARTY**

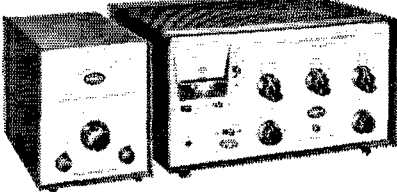
*December 18-19, 1965*

**Rules:** 1) Contest time is from 1600 GMT  
 Saturday December 18 to 2400 GMT Sunday De-  
 cember 19. Phone and c.w. are considered the  
 same contest. 2) General call is CQ Maine. Maine  
 stations identify by signing "Maine calling." 3)  
 Suggested frequencies are: 3596 3940 7125 7200  
 14,050 14,200 21,050 21,200 28,050 29,520 144.08  
 and 145.08. 4) The exchange consists of QSO  
 number, RS(T) and QTH. 5) Scoring: Out of  
 state stations multiply by the number of Maine  
 Counties worked. Maine stations multiply by  
 states, countries and provinces 6) Certificates will  
 be awarded to first, second and third place  
 scorers. 7) Logs must show time in GMT, date,  
 band and emission and be postmarked no later  
 than January 25, 1966. Logs go to the Maine  
 SCM, Mr. Herbert A. Davis, K1DYG, RFD #1,  
 Franklin, Maine 04634.

**NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-  
 SWX/K1DSA—SEC:** W1ALE/WITNO, PAM: K1APQ,  
 RM: W1DYE. The GSPN meets on 3842 kc. Mon.  
 through Fri. at 2300Z and Sun. at 1330Z. The VTNH  
 Net meets on 3685 kc. Mon. through Fri. at 2230Z. The  
 GSPN went all out and had 1054 check-ins and 97  
 traffic. This exceeds last month's record of 731/80. Con-  
 grats again to all. The VTNH Net is on the fall up-  
 swing with 109/52, and RM W1DYE would like more  
 check-ins. Dig out those dusty keys and let's hear some  
 c.w. GSPN certificates were issued to W1AQS, K1-  
 QES, K1SHC and K1RLI. K1APQ has a new car in  
 which to go mobile. W1RCC won the Phone CD Party  
 in July. W1DYE and W1SWX attended the Route 128  
 DXCC meeting. W1YMJ is building a big rig. W1KQZ  
 is now on RTTY and looking for other N.H. stations.  
 K1OLV is home after his annual fishing trip to Vel-  
 land. Happy to report that W1YHF is up and about  
 and on the air. W1JMC is active on the 6-meter nets.  
 K1LNU is heard mobile often on the GSPN. Best  
 wishes for a Merry Christmas to all. Traffic: W1DYE  
 103, W1ALE 46, K1BGI 43, WA1BEB/1 42, W1MHX 10,  
 W1SWX 4.

**RHODE ISLAND—SCM, John E. Johnson, K1AAV—  
 SEC:** W1YNE, PAM: W1TXL, RM: W1BTY, V.H.F.  
 PAM: K1TPK. New appointments: WA1PAV, K1QZW  
 and K1YVN as ORSs; WA1URR/1 as OPS. Endorse-  
 ments: W1YNE as SEC, OPS, ORS, OBS and OO.  
 The W1AQ Club of Rumford reports that K1s CZD,  
 CZB, CBO and AMG recently visited the World's Fair  
 and CZB, with CBO, operated the rigs at K2US. The  
 Club Bowling Team has started its season with K1s  
 AMG, PEL, AGA, LIL, W1s YUT and WAC. K1HMO  
 and K1QLM have renewed their membership after com-  
 pletion of a tour of duty with the Air Force. K1AIG  
 was appointed acting pres. for the remainder of the  
 year as the pres., K1AGA, will be working nights. The  
 club has a new NCX-5 and is now s.s.b., a.m. and c.w.  
 on 80 through 10 meters. W1YKQ has a new 20-, 15-  
 and 10-meter beam. W1YNE has worked four new  
 countries on c.w. and has a new electronic keyer. Dur-  
 ing the recent SET the following sent messages to the  
 SCM: W1s BTY, AFO, YKQ, J.F.F., K1V, W8BZX, K1s  
 TPK, ABR and NJT. At a RIN meeting it was  
 decided that the net would meet seven nights per week.



**AMECO***Leader in Compact, Quality Ham Gear***NEW VFO FOR TX-62 or any other VHF TRANSMITTER****NEW AMECO VFO FOR 6, 2 & 1 1/4 METERS**

The new Ameco VFO-621 is a companion unit designed to operate with the Ameco TX-62. It can also be used with any other commercial 6, 2, or 1 1/4 meter transmitter.

Because it uses the heterodyne principle and transistorized oscillator circuits, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

This new VFO is truly an exceptional performer at a very low price  
**Model VFO-621 \$59.95 net.**

**The NEW AMECO TX-62**

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

**SPECIFICATIONS AND FEATURES**

Power input to final: 75W. CW, 75W. peak on phone.

Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.

Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.

Meter reads final cathode current, final grid current and RF output.

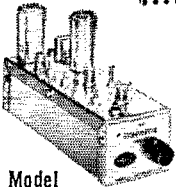
Solid state power supply.

Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.

Potentiometer type drive control. Audio gain control.

Additional connections in rear for key and relay.

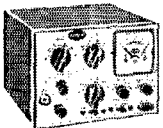
**Model TX-62 Wired and Tested only \$149.95**

**AMECO EQUIPMENT CORP. 178 HERRICKS RD., MINEOLA, L. I., N. Y.****NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE****Model CN**

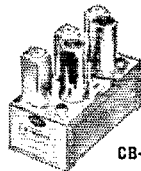
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95

**ALL BAND NUVISTOR. PREAMP 6 THRU 160 METERS****MODEL PCL. Wired, \$24.95  
MODEL PCLP, with built-in power-supply, wired, \$32.95**

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

**COMPACT 6 THRU 80 METER TRANSMITTER****Model TX-86**

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" x 7" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 Kit \$89.95 — Wired Model TX-86W. \$119.95. Model PS-3 Wired \$44.95. Model W612A Mobile Supply wired \$54.95.

**CB-6**

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. .... \$19.95  
 CB 6W — wired & tested ... \$27.50  
 CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix, 6J6 osc. .... \$23.95  
 CB-2W — wired and tested, ... \$33.95  
 Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. PS-1K — Kit ... \$10.50  
 PS-1W — Wired ..... \$11.50

**EASY TO UNDERSTAND AMECO BOOKS**

Amateur Radio Theory Course \$3.95  
 Amateur License Guide ..... .50  
 Radio Operators' Lic. Guide, EL 1-2 ..... .75  
 EL 3 ..... 1.75 EL 4 ..... 1.25  
 Amateur Log Book ..... .50  
 Radio Electronics Made Simple 1.95

**CODE PRACTICE MATERIAL**

Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear.

Dept. QST-12 Ameco equipment at all leading ham distributors.

**AMECO EQUIPMENT CORP.**

178 HERRICKS RD., MINEOLA, L. I., N. Y.

Affiliated with American Electronics Co. and Ameco Publishing Corp.

**Webster Band-  
Spanner**

# top sider

## STREAMLINED MOBILE ANTENNA

Better . . . more versatile Communications on 160-75-40-20-15-11-10 meters . . . merely by changing inductors. Top-sider inductors are high "Q" . . . have excellent form-factor . . . ample geometry. Top-sider with standard coils just loafs at 300 watts p.e.p. and the new "Gallon" coils easily handle a full p.e.p. kilowatt!

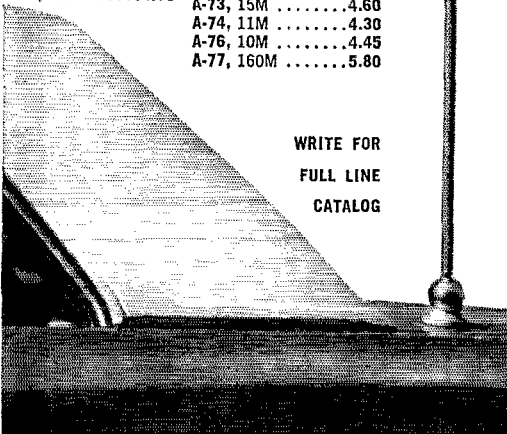
For quick coil change or coil/whip tie down, the polished aluminum column (9/16" O.D.) hinges below coil, features fast release and positive lock-up action. Column butt is threaded standard 3/8-24. Stainless steel top whip is adjustable over 10".

2-models: H-218R, 93" max and H-218S, 77" max. (Overall, less inductors).

Price: Either model (less coil) . . . . . 13.50

KILOWATT (1KW p.e.p.)	STANDARD (300W p.e.p.)
A-81, 3.8-4 mc. 19.90	A-70, 3.8-4 mc. . . . . 5.10
A-82, 40M . . . . . 14.70	A-75CW, 3.6-3.8 mc 5.75
A-83, 20M . . . . . 14.30	A-71, 40M . . . . . 5.10
A-84, 15M . . . . . 14.30	A-72, 20M . . . . . 4.70
	A-73, 15M . . . . . 4.60
	A-74, 11M . . . . . 4.30
	A-76, 10M . . . . . 4.45
	A-77, 160M . . . . . 5.80

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Please send information on Top-sider and other Band-spanner antennas and mounts.

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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

All interested in joining the net should contact the RM, W1BTV, or the SCM, Traffic: W1BTV 195, W1YKQ 112, WA1FV 103, K1BRJ 72, K1YVN 50, W1YNE 39, K1TPK 30, K1QZV 28, K1USD 26, K1VYC 25.

**VERMONT**—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: W1W1Z. Sept. net reports:

Net	Freq.	Time	Days	QNT	QTC	VCS
Gr. Mt.	3855	2230Z	Sun.	111	4	W1VMC
Vt. Fone	3855	1400Z	Dy & S	464	33	W1UCL
VTNH	3685	2330Z	M-F	109	32	K1UZG
VTCD	3990.5	1500Z	Sun.	159	14	W1AD
VT8B	3909	2330Z	Dy & S	541	64	W1CBW
		1330Z	Sun.			

We welcome W1YFL back to Vt. and we will miss W1I2S while he winters in Florida as W4SCY. W1AIM is in Loudonderry until November, from where he worked 63 stations on 6 and W3AD/3 on 2 during the V.H.F. Contest. W1AYK has a new 20 meter beam ready for the Vt. QSO Party next Feb., as has W1FRT. Congrats to the Granite State Fone Net on its anniversary in Oct. Traffic: K1BQB 176, W1CBW 27, K1MPN 22, K1EQI 8, W1I2S 7, W1IDM 6.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—C.W. RM: K1HJV. Club bulletins are being mailed here regularly, but reports from individual holders of League appointments are few and far between (with the exception of traffic reports only). Let's hear what you are doing! The Hampden County Radio Association plans to hold classes leading toward the Amateur Extra Class license. FB. Check with K1RPB, 36 Maple Street, North Wilbraham. There seems to be a bit of misunderstanding among some hams about the scope of the West. Mass. Section, Worcester County and west is our section. Panelists on the "Symposium on C.W." held at the Valley Radio Club on Sept. 17 were W1JLL, W1NY, K1PKZ and W1BVR. K1NJC recently passed the Extra Class exam. Congrats. Self-addressed, stamped postcards were mailed to our 10 ECs recently with a definite date for return, inquiring about activity of the AREC. Four answers were received. W1ABW has DXCC confirmed, W1ABDE and K1FNA are operating from K5TYP while at Air Force electronics school in Texas. W1UUC, W1GTO, K1ZJH and K1WZY are battling out the DX. Ex-W1PFD is now W3COD. K1ZJH is now Extra Class. FB. The West Mass. C.W. Traffic Net (WMN 3560 kc. nightly at 7 p.m.) still is very active handling 111 messages during the month. Stations in order of activity were W1ZPB, K1WZY, K1LJV, W1BVR, W1DWW, W1DWA, K1LBB, K1SSH, W1MNG, W1ZEL, K1VFN, K1FJS, W1UYU, K1YMS, K1ZZI and W1AIM. We wish more of you would give it a try. Call in at 5 w.p.m. and we'll work you at 5 w.p.m. (or any other speed you want up to say 35 w.p.m.). Those who are in like it. You might, too! Traffic: W1BVR 114, K1HJV 96, W1ZPB 69, K1LBB 45, K1WZY 29, W1DWA 14, W1MNG 13, W1DWW 3.

### NORTHWESTERN DIVISION

**IDAHO**—Acting SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. Those previously not mentioned assisting W7GGV at the Civil Scout Roundup (K7GS) are W7GUQ, W7GQA, W7BFI, K7ISV, W7OBH, W7HCJ, K7MFS, W7BDD, K7RAM, K7PVE, K7PVG, K7VSG and W7TWQ. Sorry to hear that K7MRX was in the hospital and unable to assist as planned. New officers of the FARM Net include K7NEY, W7DWE, K7YPR, K7ZSW and W7JHM. RACES exercise Charlie got underway Oct. 7 at 1515Z, making a heavy week end for some working in that and the SET exercise on the same week end. FARM Net: 22 sessions, 333 QNT, 50 traffic. Traffic: K7HLR 56, W7GMC 55, W7GGV 17, K7OAB 14, K7NEY 10.

**MONTANA**—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. V.H.F. PAM: K7IOA.

Montana SSB. Net 3910 kc. M-F 1800 MST  
Missoula Area Emergency

Net 3890 kc. Sun. 0900 GMT  
Montana PON 3895 kc. Sun. 0815 GMT  
Montana RACES 3995.6 kc. Sun. 0900 GMT

Endorsements: W7COH as EC. W7TECP is a new call in Bozeman. W7NUS is now in California. W7BRY has a new baby daughter. K7SSQ has moved to Salt Lake City. The new directors of the Montana S.S.B. Net are K7DCH mgr., K7SVR and K7QLP. K7ZIX is now a student at M.S.U. W7PX was lucky enough to make it to the ARRL National Convention at San Jose. Both W7KUH and W7RZY are now on teletype. K7SYQ has a new beam and tower up, thanks to the help of K7s VCA, VSS, UPH and QLP. W7RZY attended the Northwest Division meeting of the ARRL at Walla Walla, Wash. The Butte Amateur Radio Club has a fine turnout at its code and theory classes in Butte. The Butte Club has just received a new HT-44, SX117 combo as a club station. The Sept. V.H.F. QSO Party in Montana had a real fine turnout. Some of the stations on were W7s. CJB, EGN, RZY, CJN, BKB, TYN, JZW, JRG, FL, COH, K7s PFG, IOA, OEK, SRA and BYB. Many of the stations were located on

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1. Broadband exciter stages to simplify rapid QSY
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5. TRANSMITTER frequency SPOTTING SWITCH
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7. Tube line-up


6CW4	RF Amplifier	12AX7	AF Amplifier
6KE8	Tripler/1st Mixer	6AQ5	Rec. Audio/Modulator
6EJ7	2nd Mixer	6AQ5	Modulator
6BA6	10.7 MC IF Amplifier	6KE8	VLD/Buffer
6BE6	3rd Mixer	6KE8	OSC/Tripler
6BA6	456 KC Amplifier	12BY7	72 MC Amplifier
6AL5	Diode Detector/Noise Limiter	12BY7	doubler
		2E26	Power Amplifier

Other S-S Products: SS-1R HF receiver, SS-1S Noise Silencer, SS-1V Bandscanner; Venus, Thor VI, and 99'er Transceivers; Interceptor B VHF Receiver; Allbander HF Converter; Apollo Linear Amplifier

## Squires - Sanders, Inc.

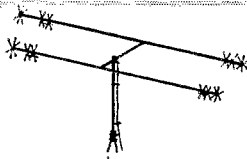
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Impedance	52 ohms
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• LEADERS IN COMPACT ANTENNAS •

mountain-top locations and DX QSOs were frequent during the contest. Please send news of your station to your SCM and have your club's activities director send information concerning coming club activities. Traffic: K7PWY 25, W7TYN 19, W7NVP 18, K7UHF 5, K7DCH 2.

**OREGON**—SCM, Everett H. France, W7AJN—Acting SEC: W7AJN. RM: W7ZFH. New appointments: W7DLE as EC for Clatsop County. OSN (NTS) 3585 kc. 0230 GMT Mon. through Fri. AREC 3875 kc. 0300 GMT Daily. OEN 3840 kc. 0200-0300 GMT Daily. W7AZD, net manager for AREC, reports sessions 30, total attendance 371, 13 counties maximum per session. 4 ARRL Bulletins by OHSs, 2 traffic, contacts 38. K7-IFG OSN manager, reports sessions 20, attendance 91, traffic 27. BRAT award to W7ZFH. OEN, AREC and OSN invite your participation. OES K7DVK made a four-element 2-meter Yagi from scrap TV antenna and claims it out-performed a well-known ten-element beam during the recent V.H.F. Contest. W7KTG worked W7SO and station at Mary's Peak and two stations in Bend during the test on 114 Mc. from Mt. Ashland; also W7LNG, using a Gonset III 144 Mc., worked K7AUO/7 on Paulins Peak and W7ICS/7 near Corvallis. W7AEDK and W7NEEJ are new hams in Southern Oregon. K7YEV and W7CGW are studying electronics at OYI, Klamath Falls. How about your activity reports? Traffic: (Sept.) K7TWD 348, K7IWD 263, K7IFG 180, W7JHA 70, W7ZFH 24, W7LTL 12, W7-DEM 11, W7AJN 10, W7KTG 4. (Aug.) K7ZMR 43.

**WASHINGTON**—SCM, Everett E. Yong, W7HMQ—SEC: W7HMQ. RM: W7OEB. V.H.F. PAM: W7PGY. Washington's traffic people join hands in high salute to the Noontime Net on its NTS Affiliation. NTS nets: QNI QTC Sess.

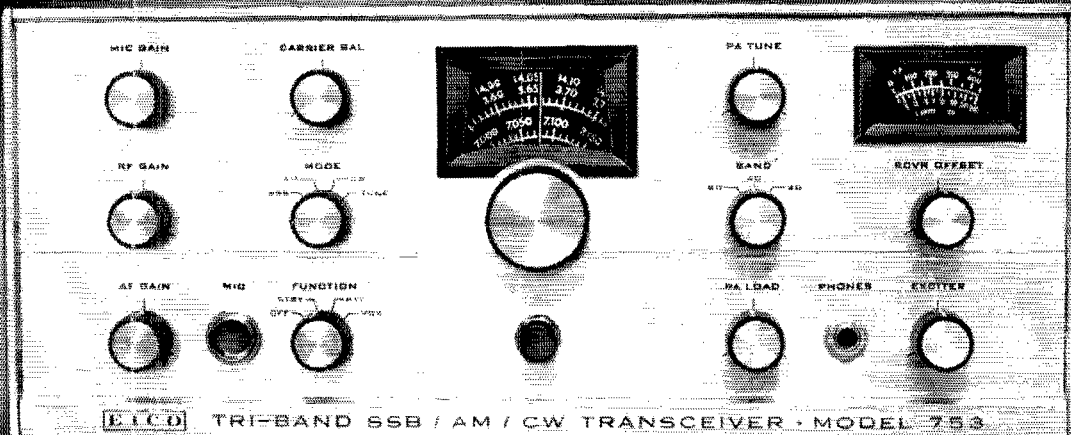
WSN	3535	Daily	0200Z	435	331	30
WARTS	3970	M-S	0230Z	1066	127	26
NTN	3970	Daily	1830Z	880	58	30

Northwestern Division Director W7PGY held a division meeting for SCMs and SECs in Walla Walla Sept. 18 with four sections represented. Hearty congrats to W7GVC, Hamfest Chairman for the Walla Walla Valley Club, on a most successful gathering with 267 hampresent. ORS W7EUV reports improved health and more activity. ORS K7SRI adds a differential kever to the home-brew rig. K7ZPM, now in Idaho, handles Spokane traffic through a 2-meter repeater. ORS W7-AIB wants PST will be welcome. The North and West Eye-Bank Net meets nightly at 9 P.M. local time with K7AII and W6BSE as NCSs. K7ZQX is a new Bremerton ham; W7NEEK and W7NEE are new Novices. EC K7NZO has a new KWM-2. K7VVB is awaiting transport to Antarctica. K7GQH is a new Extra. OBS/ORS W7AMC is building a new VT kever for Viking. W7HMA is a new ORS. ORS W7GYF hooks FOR-BI-VP2VL DX-wise and is working on an AREC group for Grant County. W7BTB says K7CAH will NCS the Sourdough Net and the Inland Empire Net meets on 1995 kc. Wed. and Sun. ORS W7JZC worked KC4USN. W7LBR is erecting a four-over-four fixed beam on Peru and expects 13 d.b. gain. W7AXT is a new Extra Class licensee. OBS W7GVC reports his 1010th RACES check-in. W7PI is a new WSN recorder and a new ORS. ORS K7JRE moved to Wa-Wa-Land. EC W7AJV is moving to a 3-acre shack with a house attached and now is active net wise. RAI/OO/ORS W7OEB sends in an FR OO report. EC K7WTG has the Puget Sound Emergency Net moving up. PSEN meets on 50.85 Mc. K7PTW was caught casing the Richland Amateur Radio Club meeting in September. W7JII is looking at ham gear. K7PYO now squirts r.f. from Elgin AFB and should be a 2/c by now. W7LEC, of Tacoma, took home a monitor scope from Wa-Wa. The Puget Sound Council of Amateur Radio Clubs held its Fourth Annual Banquet with W7IOK of KTNT-TV fame as M.C. W7JEM, Boeing Research specialist, showed his brother hams how to put a big antenna in a 2-ft. space on jet aircraft. W7DWG is heard again after a long absence. W7ICW, WARTS Net Mgr., is working hard for more check-ins, more traffic listed and more traffic handled. K7LVV has taken up residence with the U.S. Navy. W7ZEV takes a Ferrite Core-Balun for the beam, now 1:1 to 1; K7NZO purchased her 2nd KWM-2; she now has a standby rig. NV Slow Speed Net: 3700 kc., 0400Z. QNI 256, QTC 56, sessions 26. Traffic: (Sept.) W7BA 1858, K7CTY 796, W7DZX 732, W7HMA 599, W7APS 277, K7CTP 221, W7CFY 176, W7N7CFY 120, W7OEB 110, W7PI 60, W7AMC 53, K7ZPM 52, W7HMQ 46, W7BTB 43, K7MGA 41, W7GYF 38, W7N7CFN 17, W7AIB 12, W7EUV 5, W7IEY 4, K7SRI 4. (Aug.) K7ZPM 32, W7GVC 10, K7NZO 3, W7AXT2.

## PACIFIC DIVISION

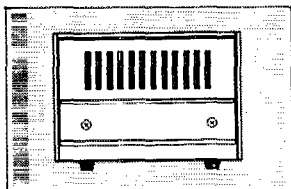
**EAST BAY**—SCM, Richard Wilson, K6LRN—It looks like more people have taken an interest in traffic. Our traffic total for the first eight months of 1965,

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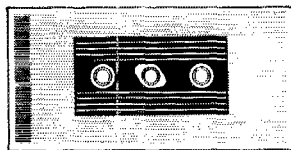


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**FREQUENCY COVERAGE:** 3490-4010kc, 6990-7310kc, 13890-14410kc. **SSB EMIS- SIONS:** LSB 80 and 40 meters, USB 20 meters. **RF POWER INPUT:** 200 watts SSB PEP and CW, 100 watts AM. **RF POWER OUTPUT:** 120 watts SSB PEP and CW, 30 watts AM. **OUTPUT PI NETWORK MATCHING RANGE:** 40-80 ohms. **SSB GENER- ERATION:** 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. **STABILITY:** 400 cps after warm-up. **SUPPRESSION:** Carrier-50db; unwanted sideband-40db. **RECEIVER:** Sensitivity 1uv for 10db S/N ratio; selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). **PANEL CONTROLS & CONNECTORS:** Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hair- line Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, Receiver Offset Tune, MIC input, phone jack. **REAR CONTROLS & CONNECTORS:** VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. **METERING:** PA cathode on transmit, S-Meter on receive. **SIZE (HWD):** 5 $\frac{1}{4}$ " x 14 $\frac{1}{4}$ " x 11 $\frac{1}{4}$ ". **POWER REQUIREMENTS:** 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

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through Aug. 30 is higher than all of 1964. There are more stations handling more traffic. Thank you, guys and gals, keep up the good work. We have one or two problems, though there are higher level nets like RN6 and PAN where casual QNLs are not appreciated. If you have traffic that must be cleared, QN1 after QNA, clear your traffic and then QNO. If QRU, please don't QNL. It only slows down the net. Now that traffic interest is on the increase we must turn our attention to another equally important phase of ARPNC—the AREC. According to figures just received from Hq, the East Bay section is 67th in AREC participation for 1964. This is because our ECs are not sending reports, only one report from SET 1964 and in general poor participation in the AREC programs. If I am reelected as SCM Jack and I will, with your cooperation, try to put together a comprehensive AREC program. WA6WNG/WB6CRC, K6LRN, W6LDY and W6TYM have TCC skeds. WB6FHH is new to the East Bay. He is ORS and chases DX with 108 worked/79 confirmed. WA6WNG is QRO with a 4-250A and WB6LLH hopes to be QRO soon. WB6GID, K6VXM, WA6NOV, K6UJS, WA6SDS, WA6PYP, W6KGX, W6BJCN, WA6MXI and NBARA station WB6OTH handled 50 emergency messages when a disastrous grass fire disrupted communications between Vallejo and Napa. EC K6TFT was on the fire lines as a volunteer fireman. WA6PTU and WA6QZA have added a Swan 400 to the fixed station with WA6PTU giving it a workout on NCTN. WA6YXP is out of the hospital after having his car hit by two dump-trucks in Japan. WA6UF/6 is now /KH6 at Uncle Sam's request. K6GK has moved to Santa Clara. K6LRN and his XYL attended the LARK picnic at Pleasanton. WA6RRH will be moving to the East Bay and will become V.H.F. Pam. Chuck was responsible for the success of the Santa Clara Valley Section Net on 2 meters and we hope he will have the cooperation necessary to expand it to cover the East Bay as well. It meets on 146.7 Mc. Mon. through Fri. at 1900 local. 0200Z at present. Traffic: (Sept.) K6TFT 203, K6LRN 202, WA6WNG/WB6CRC 184, W6LDY 91, W6TYM 68, K6GK 55, WB6FHH/6 53, WB6LLH 48, WB6GID 39, WB6ETY 36, WA6PTU 32, W6CBF 10, WA6QZA 5. (Aug.) W6ZF 7.

**HAWAII**—SCM, Lee R. Wicat, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL, PAM: KH6ATS, RM: KH6EWD, V.H.F. PAM: Vacant. I've just completed a swing through the Far East. On Wake Is. I spent a few minutes with KW6DS, At Tachikawa AB, Japan. I call on W6LSF/K6A2. Lon and his XYL have fixed up their "shack" located in one end of station KA2LL. At Ie Shima Island, R.I., I had the pleasure of working the rig of KR6CS. He was using a Heathkit transceiver to a three-curtain rhombic antenna. I passed KR6UL's QTH in Oyama, Okinawa. I dropped in on KR6MEH, who runs two 8/Lines, Henry 11 K afterburner and a Telrex 20-meter beam at a QTH located on the east side of the island. Contacts were made with KR6AF and KR6USA also. KH6BJ is back home after an extended tour throughout the Mainland where he spent time with the ARRL Hq. gang and overnights with Director Dennison. KH6EPW/W6-HJT is very much interested in ARRL's "Intruder Watch" program. KH6CRY is now working at a new job with the Navy, joining KH6EWD and W8JWU/KH6 at Haiku. Mike is sporting a new pair of Sony DR-3's. KH6FGA worked XW8AX at the Vientiane Embassy. KH6DEM is sparking v.h.f. activity with KH6CMI, KH6EMM and KH6EFL following in close order. KH6-BJ will head the electronic technicians at Plateau Station located in Queen Maud Land on the other side of the South Pole from McMurdo Sound, for Operation Deep Freeze 66. Traffic: (Sept.) K6AIG 90, KH6ATS 21, KH6BZF 1, KH6DO 1, KH6EXI 1, (July) W4EXM/KH6 1, KH6DEM 1.

**NEVADA**—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU. There are ARRL appointment positions vacant. Contact the SEC or SCM for details. W7-FBI is doing FB in Fallon. W8HER/7 is on 8 meters. K7RKH/7 is doing FB on 6.2 & 1 1/4 meters. K7USU is communications officer for CAP, with K7DRV as his assistant. W7RY is back on 2 meters with several different types of antennas. The Nevada C.W. Net, on 3660 kc., is going good but needs more Nevada check-ins. W7BIF is on the sick list and may be off the air for awhile. W7BJY and his XYL were honored by a dinner for his long and outstanding service as SNARC secy. WA7BEU has a new v.f.o. for the TR-3. K7ADD is attending school in Reno. W7YDX is active in Wells. K7RBM has lost his 5 o'clock shadow! W7CXQ was in Boulder City for a visit. WA7BEU is looking for tallow hydro or steam plant power generating employees for a net. Traffic: K7RBM/7 293, W7AAF 75, W7BKK 20, W7PBV 2.

**SACRAMENTO VALLEY**—SCM, John F. Minke, III, WA6JDT—EC's: W6SMU, WA6TQJ, RM: W6CMA, PAM: K6RHV.

# YOU COULD SPEND LOTS OF \$\$\$;

Cajole a dozen hams to put up a giant tower; guy it with a forest of wires; install a powerful rotator (and wire that!); top off the whole works with a monster antenna (your neighbors will love it); tune up with a dozen electronic instruments; and spend half your life dangling in space;

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# GET A GOTHAM V80 VERTICAL ANTENNA FOR \$1695

"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, T1ZFGS, W2STK, W5KYJ, W1WOZ, W3ODH, WA3DJT, WB2FCB, W2YHH, VE3-FOB, W4SCZE, K1SYB, K2RDJ, K1MIV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2OGS, W2QJP, W4IWI, K2PSK, WA8CGA, WB2KWY, W2IWI, VE3KT. Moral: It's the antenna that counts!

## GOTHAM VERTICALS DELIVER THE CONTACTS

### PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

#### CASE HISTORY #271

"I am very delighted with the first V80 and want another for a different location." A. C., California.

#### CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more?" W. A., Alaska.

#### CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

#### CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

#### CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success—i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

#### CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XLV and I are getting great kicks out of some of the lower bands!" J. A., New Mexico.

#### CASE HISTORY #144

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. L., Nebraska.

#### CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

#### CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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- Every vertical is complete, ready for use.
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- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
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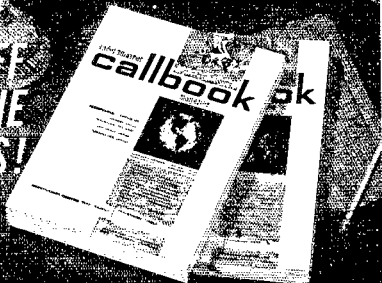
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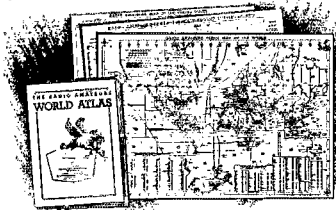
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During the Sept. V.H.F. QSO Party, W6GDO in Rio Linda worked K7AUO/7 near Bend, Ore., on 432 Mc., the first Cal.-Ore. QSO on record for this band! Are any of you fellows interested in ARKQ or Public Service? Are we capable of helping our communities in case of an emergency? Of course, if we don't care the CBers will gladly do our job for us. Please think about it. How about some EC offers from the northern part of the section? New appointees are WB6MMC as OBS and WB6EAG as OPS. WA6HYU received a Public Service Award for her efforts in the West Coast Emergency Net. The Nevada Co. ARC Net meets M.-W-F at 2000 on 53.44-Mc. n.f.m. The North Hills RC of Fair Oaks has been devoting part of its meetings to Extra Class exam preparation. WA6YQS is planning for a Teen Traffic and Emergency Net. The Sacramento Valley Net (SVN) had over 100 QNI and 90 QIC its first month of operation. Traffic: (Sept.) WA6HYU 218, WB6LLAW 86, W6CMA 48, K6BYV 35, WB6LAE 54, W6LZN 32, WA6JDT 10, K6REHW 7, W6GONT 6, W6ECE 2, W6OFK 2. (Aug.) WA6HYU 214, W6OFK 12.

**SAN FRANCISCO**—SCM, Hugh Cassidy, WA6AUD—SEC; W6KZF. New officers of the Marin Radio Club are W6OPL, pres.; W6FO, vice-pres.; WA6JY, treas.; WB6LMO, secv. W6CXO was operated mobile from Union Square in San Francisco for the kick-off of the United Crusade this year. W6WVF, W6GCG and W6GHI put on a demonstration of W6CXO, the Red Cross station and ended up on TV without any possibility of an FCC complaint. Humboldt Radio Club has an incentive plan of its own—build something or pay into the club's treasury. WA6NDZ is modifying a rig for 432-Mc. operation. WA6STS, WA6LWQ, WB6KDF, WB6KXL, WA6ARE and W6BCC were active in the September V.H.F. Contest from Sonoma County. WA6STS reports hearing the Moonbounce signal from WA6LET on 432 Mc. WA6JUV is taking a transistor course at City College in San Francisco. W6HSA is assembling a Heath SB-400. WA6QXV shifted to the Golden Bear Net to save his eardrums when someone would cough on an s.s.b. net with the VOX on. W6UDL and W6JWF handled traffic from Regional Red Cross Headquarters for the Oct. SMT. WA6IVM has an HX-50 for s.s.b. operation. K6LEN acquired a Swan rig. W6ARQ has been down in 5-Land but reports little success on v.h.f. on the trip. K6ANP and his XYL spent their vacation on the Salmon River in Siskiyou. Traffic reports were up for Sept. with some 22 stations sending in Form Is. W6ZZK is building stacked 6- and 2-meter beams for study of forward scatter signals and has just finished a new 6-meter converter. WB6CKT is looking for a chart recorder for some path tests in the Sonoma County area. W6BCC has a new Heath SB-300 with the v.h.f. converters. WB6WV, in the Eureka area, operates with a dipole inside the house and gets fine signal reports. WA6EXM and WA6GHL are mobile on 6 in Humboldt County, while K6SBI and WA6OJI are trying out on 6 meters to see how things go. 47.31 is the 2-meter frequency in the Eureka area. The Marin Red Cross Station was activated for fire emergencies in Sept. with K6OVV, WA6AUD, W6CYO, WB6AIS, WB6PVV and K6RAO handling communications for the Chapter headquarters. New OO WA6IVM is spending a lot of time at his new duty. W6YKS was high traffic man again for Sept. W6OPL and WB6AVS are checking into the NCN from Marin but the net still needs Sonoma and Mendocino Counties check-ins. Traffic: W6YKS 248, W6KVQ 91, WB6GLD 78, W6UDL 44, WB6GVI 39, WA6IVM 13, WA6AUD 7, WB6NKS 7, W6CYO 3, WA6QXV 2, WA6STS 2.

**SAN JOAQUIN VALLEY**—SCM Ralph Saroyan, W6JPU—Would anyone like to volunteer as SEC for San Joaquin Valley? W6BQG is now located in Fresno. WB6MIG, K6SNA, WB6JSL, WN6PSD, W6PZC, WN6NXW and WB6PME are all on 2-meter f.m. and would like to stir up some activity. WB6FRM is on 2-meter mobile. K6AJU is recovering from a heart attack. WA6LKW is attending FSC. K6RAU is teaching in jr. high school. WA6GTN wants to stir up some traffic interest. For any of you who are interested in handling traffic, here is a list of the nets: NCN, 0300, 3635; SVN, 1200-3690; SJN, 0130-3915; NCTN, 0100-3905. The Turlock Radio Club put on a display and operated an amateur radio station at the hobby show which turned out to be very successful. Of the EC in our section, only one (1) reported on his annual report, and since the national percentage is 39.3, this makes us 41st nationally. Maybe we could do better next time? W6HKV got a complete mobile station using Galaxy equipment. W6HYZ has a Galaxy 5. W6URK is moving to Sanger, Calif. W6NKZ got his mobile working again and is on 40- and 80-meter s.s.b. using an SB-33. WB6ETQ is

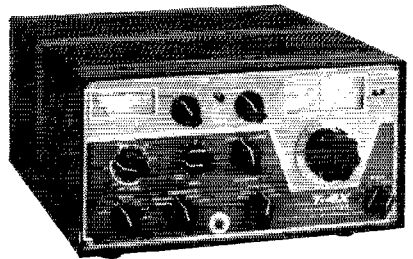


# Season's Greetings

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Receiver



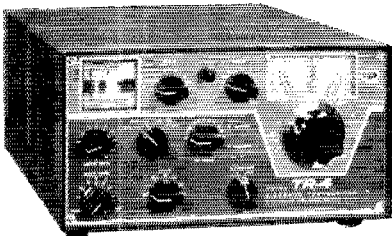
T-4X  
Transmitter



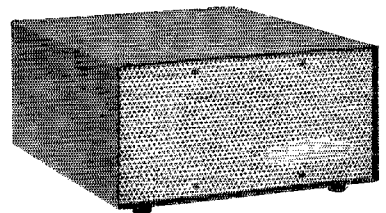
*May  
the joys of  
this season  
be yours*

along with all the  
Drake Ham Gear  
that will fit  
under your  
Christmas Tree!

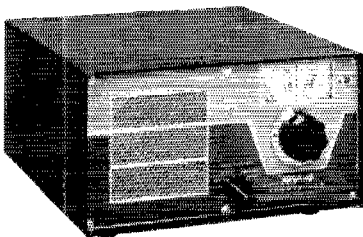
TR-4  
SSB Transceiver



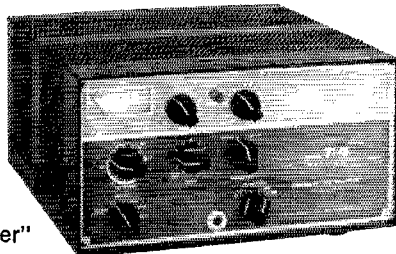
MS-4  
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RV-4  
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For further information see "Recent Equipment" on page 54 of October QST, or write:

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mobile with a KVAL-2. W6TJZ is thinking about moon-bouncing. W6FXX has a Drake H4 and TX4. The San Joaquin Valley Net reports 801 check-ins, 96 contacts, 44 traffic, 3 QST. WB6MIWY has a Swan 175. Traffic: W6ADB 87, W6GTZN 73, WB6HVA 65, WB6MIWY 18.

**SANTA CLARA VALLEY**—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: W6-HVN, RM: W6QMO. V.H.F. PAM: W6ARRH. All amateurs in the section are invited to check into the Northern California Net, section net for the SCV. The net meets on 3635 kc. at 0300Z daily. For information on the net, contact W6QMO, net manager. W7YBV leads the section traffic list this month. Lee is very active on NCN and helps keep the net working at high efficiency. W6-QMO was very busy with plans for the October NCN luncheon and other net activities. W6HVN was busy planning for the SET. K6DYX reports that the Navy Postgraduate School in Monterey now has the club call K6LY. The club had a two-letter call when the school was in Annapolis and so traded in the call W6YGV. W6AIT works NCN. W6AGR has been spending time flying as well as working traffic nets. W6YHM is busy with RTTY and also has been putting in flying time. W6PLS made plans for the SET including newspaper publicity. W6VZE, EC for Burlingame, sends in a line report on a Simulated Test Drill held in Sept. Chuck works on the AREC Net Sun, and is NCS at times. W6DEF was QRL with house painting but kept regular NCN skeds. W6AUC was busy with net skeds and attended the QCWA Annual Picnic at Sonoma. K6YKG is NCS on NCN. W6JSA is busy building RTTY gear and is active on the RAATS Net. W6SAW took part in the FMT but had active duty with the Navy for part of September so was not as active as normally. W6JXK is back working NCN and fills a badly-needed spot handling traffic for SFO. WB6IZF is the new EC for King City, and works the C.D. and Weather Nets. K6PJW is active on the San Mateo AREC Net. W6-MMG is active on Army MARS and reports that the North Peninsula Electronics Club held Old Timers Night. The speaker at the SCARS Sept. meeting was W6VSV, who spoke on v.h.f. and u.h.f. W6YSY and his editorial group at SCARS publish a fine club paper, *Panagraphs*, the club paper of the Palo Alto Amateur Radio Society, reports that the Sept. meeting featured c.d. and traffic as the main topic of discussion. Several members of the PAARA have gained national recognition for work in traffic operations. SCCARA, in addition to the regular monthly meeting, held an Old Timers night in San Jose, with a number of former club members present. *Short Skip*, club paper of the Santa Cruz Amateur Radio Club is edited by W6PZE. The Santa Cruz club planned a visit to the planetarium show at Cabrillo College. Traffic: W6YBV 134, W6QMO 120, K6DYX 100, W6AIT 99, W6AGR 72, W6HC 58, W6PLS 36, W6VZE 32, W6DEF 28, W6ZRJ 25, W6AUC 18, K6-YKG 17, W6JSA 10, W6JXK 4, W6SAW 4, WB6IZF 1.

### ROANOKE DIVISION

**NORTH CAROLINA**—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: W4ANH, K4CWZ. PAMs: W4AJT, W4LWE. V.H.F. PAM: W4HJZ. The Carolina V.H.F. Society elected W4HJZ, pres.; K4AGV, vice-pres.; W4-NUB, secy.-treas. W4BSJ has been taking flying lessons and flew herself to Atlanta where she boarded a commercial plane to school. The North Carolina Section c.w. nets mourn the passing of Martin L. Hancock, W4BDU, who died suddenly Oct. 3. Licensed in 1930 and an ARRL member for most of the ensuing years he was active as ORS and EC at the time of his death.

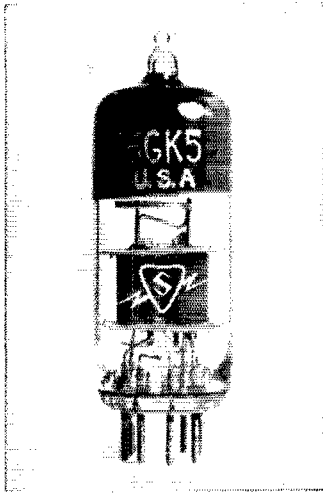
Net	Freq.	Time	Days	QTC	Mgr.
NCN(E)	3573 kc.	2330Z	Daily	103	K4CWZ
NCN(L)	3573 kc.	0500Z	Daily	127	W4ANH
THEN	3865 kc.	0000Z	Daily	109	K4WLY
SSBN	3938 kc.	2330Z	Daily	40	W4LWE

Traffic: W4LEV 1356, W4EVN 289, W4PDS 148, W4-LWZ 140, W4BDU 86, K4HEX 75, K4CWZ 69, W4ICU 63, W4UFQ 55, K4EO 47, W4ANH 44, W4UWS 42, W4BVF 32, W4BNU 31, K4OXM 31, K4HZP 24, W4-OTF 23, W4FJA 20, W4BAW 16, K4GNX 15, W4CFN 14, K4TTN 14, W4GAIB 2.

**SOUTH CAROLINA**—SCM, Charles N. Wright, W4-PED—SEC: W4ECJ. Asst. SEC: W4WQM. RM: K4-LND. PAMs: K4WQA (s.s.b.), K4OCU (a.m.).

SCN	3795 kc.	0000Z, 0300Z	Daily	QTC	136
SCEN	3820 kc.	0030Z	Daily	QTC	28
SCEN	3930 kc.	1330Z, 2030Z	Sun.	—	—
SCSSB	3915 kc.	0000Z	Daily	QTC	126

New appointment: W4SOL as ORS; he also was issued an SCN certificate. The Anderson Club now has a local net meeting Thurs. on 2 and 10 meters. The Palmetto Radio Club of Columbia joined the State Radio Council at the Oct. meeting in Rock Hill. South Carolina was



## Hot front-end triode for six and two

If you're interested in the frequencies from 50 to 220 mc, you'll take a shine to Sylvania's new 6GK5 frame grid gain controlled rf triode. There are few tubes that can match it in gain, noise figure, or price. And it has some features not to be found in equivalent types designed for VHF receiving applications.

For instance, there is a partial shield between the grid and plate which lowers the grid-plate capacitance to 0.52 pf and makes neutralization a simple matter. The 6GK5 also has an input capacitance of only 5.0 pf, and a higher input impedance by virtue of dual cathode leads.

The tube has a gm of 15,000 at 135 plate volts and a grid bias of -1.0 volt. Gains of 30 db for a 2-mc bandwidth and a noise figure below 2 db were obtained at 50 mc with a pi network input circuit. This type of circuit was chosen as a convenience in tuning for power-matched or noise-matched conditions.

Under noise-matched conditions, the noise figure at 50 mc measured 1.5 db. And it worked out to 3.5 db at 144 mc, and 5.0 db at 220 mc.

The Sylvania 6GK5 is currently being used in the front ends of many new TV receivers where it has proved its worth in fringe area reception and long life reliability. Since the tube is in mass production, its price is definitely low in relation to its capabilities as a VHF amplifier. That makes it pretty attractive for use in grounded cathode, or cascode circuits designed for the amateur bands.

If you're toying with the idea of upgrading your present VHF receiver or building a new one, why not design around the Sylvania 6GK5? If you're in need of a data sheet on this tube, we'll be happy to send you one. Just write to the Sylvania Electronic Components Group, Sylvania Electric Products Inc., 1100 Main Street, Buffalo, New York 14209.

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*Bob Lynch*

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represented on all sessions of 4RN for July, Aug. and Sept. Retiring RM W44PFQ and the hard-working net members who accomplished this deserve our thanks. Traffic: (Sept.) K4LND 113, WA4SOL 81, K4OCU 67, W4AKC 63, W4NTO 41, W4PED 37, W4WQM 37, K4WOL 26, WA4QKQ 22, W44HFA 5, WA4LPV 5, W4JA 4, WA4IKU 2. (Aug.) W4AKC 21.

**VIRGINIA**—SCM, H. J. Hopkins, W4SHJ—SEC: W5VZO/4. PAM: K4SCL. Early V5BN Mgr.: WA4EDG. Note the above changes in section leadership appointments; additionally K4LMB has been appointed EC Area 4 to replace W4RHC, who has resigned. The RMs remain as previously listed. New PVRC officers include K3JYZ, pres.; W4BVV, vice-pres.; W6HOH/3, secy.; W3MVB, treas. The PVRC is the group that always takes first or second place in the SS and DX Contests. WA4EUL, deferred from military service, again is planning to reactivate the *Virginia Hom*. W4SHJ was visited by N.N.J. SCM W2CVW and by DX man DL7GQ. W4TE and wife, K4LMB, each are sporting new station equipment. A man of honor and integrity is WA4FCS, who omits hundreds of messages per month from his activity report when such messages are handled out of ARRL form. WA4YSE is working on WAS and WA4URN on a tower and beam; both are very active in section nets. Amateurs in the Arlington-Fairfax area interested in public service work are urged to contact SEC W5VZO, telephone 385-7709. Start planning now to originate lots of Christmas traffic. The following nets meet daily:

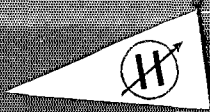
C.W.	3680 kc.	2330-0030	GMT
S.S.B.	3035 kc.	2300 & 0300	GMT
A.M.	3835 kc.	2330-0100	GMT
ODSB	30.125 Mc.	0230	GMT

Traffic: W4DVT 222, WA4EDG 201, W4RHA 140, W4ZAI 140, WA4EUL 101, K4FSS 92, K4SCL 91, K4WCO 88, W5VZO 86, K4LJK 79, K4LMB 78, WA4URN 68, W4OKN 58, K4VCH 53, WA4FCS 52, WA4DAI 44, WA4YSE 36, W4SHJ 22, W4TE 29, WA4KVR 25, W4BZE 21, W4ZAU 19, K4SDS 16, W4QDY 12, K4MXF 11, WA4IK 9, K4VCY 7, W4LK 6, WA4UJ 4, W4KX 4, W4PTR 4, WA4UMX 2, W4WBC 2, K4YEE 2. (Aug.) W5VZO 133.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8SSA, RM: W8LMF, PAM: K8CHW, S.S.B. Net Mgr: K8SHP. Operating the amateur exhibit at Wetzel County Town and County Days were W8AKU, WA8ART, K8IUD, WA8FB, K8MHR, WN8OJF, WA8PXF, WN8RPZ, K8VQG and K8YXL. Another "ole timer," ex-W8CSR, has passed away. Congratulations to WA8OVT and W8LSC for a 2-mile QSO on 1230 Mc. Wood County Emergency Net, K8UEH NCS meets Sun. at 11 a.m. on 50.250 Mc. WA8ANS is the new EC for Calhoun County and W8BKE is a new OQ in Huntington. K8EEJ has been transferred to Baltimore and is W3ECX now. Congratulations to K8BIT and the Kanawha Radio Club for their fine summary of the W. Va. QSO Party. K8MQB keeps Tue. seds with K3AIS and K8LHH. Armed Forces Day c.w. winners were W8HZA, W8IRN, W8JUE, W8NEAI and W8VMP. K8SCHV reports for WVX Phone Net: 21 sessions, 398 stations, 82 messages. The YLRL was started by K4LMB when asked "How many YLs are there?" I would like to ask "How many YL ops are there in West Va.?" May I hear from you. Remember the Roanoke Division Convention, Natural Bridge, Va., May 28-29, 1966. Traffic: K8TPF 151, K3WVW 56, W8CKX 55, W8JM 9, WA8MRK 7, WA8OVT 7, K8BIT 6, WA8GCI 5, WA8ALI 4, WA8MIY 4, K8VMQ 4, WA8KGU 3, K8CHF 2, K8CFT 1, W8CZT 1, WA8DAU 1, WA8KNZ 1, K8LGF 1, K8NNT 1, K8SDH 1, W8UMR 1.

### ROCKY MOUNTAIN DIVISION

**NEW MEXICO**—SCM, Bill Farley, WA5FLG—SEC: K5HTT, PAM: W5WZK, K5ONE is now a big signal with his new Galaxy five. Congratulations to WA5FFL on receiving his certificate of appreciation from the Cerebral Palsy Telethon. The Mesilla Valley Radio Club is now operating from its new space provided at the Las Cruces Boy's Club and really is creating excitement over its 2-meter transmitter hunts. The first South American DXVI, to receive the Amigos De Albuquerque certificate is PY2SO. Congratulations. New operating hours for all New Mexico nets are in effect now. The Roadrunner Net meets at 1830 MST each week-day evening. The Breakfast Club meets at 0630 MST each week-day morning. The New Mexico Emergency Phone Net meets each Sat. and Sun. at 0700 MST. All nets are on 3.838 kc. Changing of the net operating times has brought about changing of the net operating times has brought about many many more check-ins than in recent years. Our new SEC, K5HTT, has made the following EC appointments: WA5AMG, K5VXJ and WA5JAM. Our New Mexico Section mourns the passing of Carl Franz, W5-ZHN, who died Oct. 12 of a heart attack. He served as SCM, Asst. Director, ORS, RM and EC, and was



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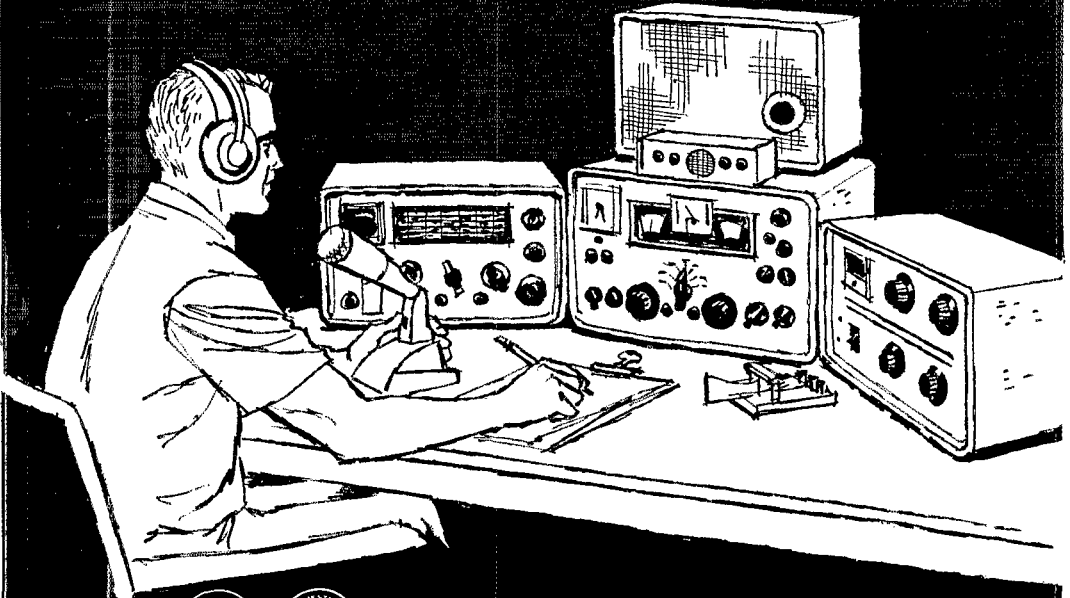
*Feliz Ano Nuevo*

*Zaalig Kerstfeest*

*Buon Natale*

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known personally throughout the state. He held the calls W3IHD and W2JWT and was a member of the Amateur Radio Caravan Club of Albuquerque. Traffic: W5UBW 28, WA5DUIH 24, K5ONE 22, WA5FLG 20, K5HPI 5, K5VXJ 5.

**UTAH**—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7-WKF. Section nets: BUN meets daily on 7272 kc. at 1930Z, UARN meets each Sat. and Sun. on 3325.5 kc. at 1400Z and on 3987.5 kc. at 1500Z. The Utah Hamfest was held with fun for all who attended. The UARC (Salt Lake Club) was the winner of the Utah Inter-Club Council Field Day competition for the most points scored but the Bountiful Club took first place honors in the largest-percentage-of-club-members-participating category. The Ogden ARC was a close second in both categories. W7SBG has been doing a nice job on Utah County C.D. Communications Center. Ham time for K7SAI has been reduced because of school work. K7JVF is really going after the DX with a new four-element beam up 60 feet. K7CLS and K7JVF are enjoying new electronic keyers they built from the *Handbook*. W7LQE/W7VTF have installed a 2-band inverted "V" for 40 and 30. K7RAJ is installing a monitor scope. W7-BAJ had five equipment failures in September, which is probably much better than average! Traffic: W7OCCX 135, W7LQE 86, W7CLS 35, W7VTF 5, K7SAI 1.

**WYOMING**—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: K7LAY. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830 on 3920; VO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. K7KMT is back in Casper. W7COK is on duty in Guam. W7MZW has moved to California. The Cheyenne and Casper Clubs are instructing code and theory classes. K7AHO has been awarded the 1984 PICON Award. K7VWA has moved into Ten Sleep for the winter. W47BFV has been passing out cigars as a result of their new boy. W7AEC is a grandpa again, but says grandpas aren't obligated to pass out cigars. By now, all of the tall hunting stories have subsided and the ham bands are more active so I hope to have more news of activities for next month. Traffic: K7SLM 20, K7VTA 14, K7ITH 7, K7OVD 6, K7LOH 4, W7TZK 4, W7AEC 2, K7HAW 2, K7MGM 2, W7CLF 1.

## SOUTHEASTERN DIVISION

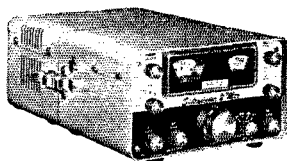
**ALABAMA**—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML. RM: WA4EXA. PAMs: K4NSU and K4WEW. The ACK DX Trophies were won this year by W4RLS, phone, and K4NWM, c.w. Merry Christmas. Sept. section net reports (times GMT):

Net	Freq.	Time	Days	Sess.	Ar.	Ar.	QNI
AENB	3575	0100	Daily	31	4.7	7.4	
AENM	3965	0030	Daily	30	3.3	50.7	
AENP	3955	1230	Mon.-Sat.	27	2.2	14.2	
AENR	50.55	0115	Wed./Fri.	7	.28	18.7	
AENT	3970	2230	Daily	33	1.09	7.21	

The AENM set a new AVE QNI record this month. WA4UXC won the AENT Contest. New equipment: WA4RES, 50-ft. tower; K4AJF, Model 19; WA4GCS and WA4HOM, 70-ft. tower and quad; K4RSB, HT-41; K4GUQ, TA-32 and tower; W4WGI, TH6 DX beam, WA4BTA, BV5100/51SB. Remember the Southeastern Division Convention in Miami Jan. 22-23. Hope to see U there. We welcome W4ZJY, Director TCC Central, to Alabama. Dave and Pete, WO4XB/4, make the two top traffic men to move to Alabama recently. Traffic: (Sept.) W4ZJY 133, WA4TID 101, WO4XB/4 92, K5-RSI/4 77, WA4EXA 67, WA4EXB 63, WA4UXC 50, W4YNG 50, K4NUW 49, W4NML 39, W4USM 39, K4KJD 37, K4TNS 29, K4GXS 23, K4WEW 24, WA4RES 19, W4HON 17, K4WOP 14, K4ANB 13, K4FZM 12, K4GHX 10, K4FZQ 9, WA4OCL 8, WA4RMY 8, K4NSU 6, K4AJF 5, W4ATK 5, W4ZVI 5, W4TSY 2, W4WGI 2, W4CIU 1. (Aug.) WO4XB/4 28, WA4QNI 2.

**CANAL ZONE**—SCM, Thomas B. DeMais, KZ5TD—The September CZARA meeting approved a letter to the licensing authority requesting no special privileges for Advanced or Extra Class licensees. New stations are KZ5s GE, TW and MY. KZ5MV, formerly K4YWC, is operating an SR-150 to a tri-band beam. KZ5GE is using a DX-100 and Super Pro to separate three-element beams 10, 15 and 20. KZ5LT is out of the hospital. KZ5MM was active for 2 days on the "Betsy" net. KZ5HR, at Purdue U., has kept schedules through the school stationing with this area. KZ5CU and KZ5WN now are in Huntsville, Ala.; KZ5CQ is in Memphis, Tenn. Ex-HP1SB now is operating as W9EPX/7 from Phoenix, Ariz. KZ5MQ is reported to be stationed in Japan with the U.S. Navy. KZ5LC is operating with a TH-6 tri-band antenna. KZ5s WV, AW, KV and LR are operating on 6 meters. KZ5AY is chasing DX with a 7-foot loaded indoor antenna on all bands. KZ5BT will be operating as KIUFX from the U.S. KZ5CT operated

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Modes of Operation	AM, SSB, CW
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Selectivity	3.1 KC crystal bandpass filter
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Audio Output	2.5 watts into 3.2 ohms
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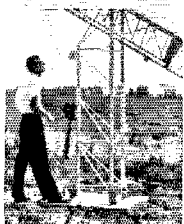
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from various stations while on vacation in the U.S. KZ5LB left for a new assignment in Hickory, N.C. KZ5RD is back in New Orleans after completing a hitch in the U.S. Army. KZ5MY reports good results on 80 meters with an inverted "V." KZ5VR is doing a terrific job as southern anchor on the Intercontinental Net. 15 meters has been good for U.S. contacts and also long-haul DX; 10 has been interesting also.

**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4-SJH—SEC; W4YTT, RM C.W.; W4LUV, RM RTTY; W4RWL, PAM S.S.B.; W4OGX, PAMs; W4SDR, W4-TUB, PAM V.H.F.; W4ABMC. A few personal observations on "Betsy" reveals that (1) communications difficulties of the past have mostly disappeared from view. (2) traffic as a whole was extremely light considering the fury and length of "Betsy." Normal communications by landline seemed much less affected this year. (3) A change in the nature of griping was noticed. In the past it was "too much traffic" while now it is "not enough traffic" A 20 meter "hurricane net" seems to have handled the majority of welfare traffic by, I presume, non-AREC amateurs. Have we been neglecting haul capabilities and the avoidance of heavy loading of NTS? Is your county taking advantage of the services that CB can provide through C.D. authorized connections or do you have enough amateur mobiles to provide this service? Isn't the end result desired "service to the public" however it is accomplished? New officers of the Orlando ARC are K4SSS, pres.; K4UGW, 1st vice-pres.; W4YZH, 2nd vice-pres.; W4SIL, treas.; W4AJV, secy. PAM and RM activity have reached a new high. Our new RATT Net has our best wishes for success. Let's feed them both traffic and RTTY operators, gang, Traffic: (Sept.) W4TUB 154, W4ABMC 121, W44JH 360, W4ASCK 298, W44HTK/4 274, W44NEV/4 201, K4COO 130, K4SJH 112, K4MNB 111, W4OGX 110, W4LUV 84, W4ANBT 84, W4SDR 84, K4KDN 80, W4-PDM 77, W4YTT 65, W44CIQ 60, W44HDH 53, W4EHW 52, W44DEL 49, K4DAX 46, W4FP 44, W4KRC 44, W4AYD 42, K4LLB 38, W4LEI 34, K4QAY 34, W44WEV 23, W4MVB 22, W44OHO 32, W44FGH 29, W44RIH 28, W44YGP 38, K4OSQ 20, K4EBE 16, W44LRW 15, W4TJM 15, W4BKC 14, K4MTP 12, W4SMK 11, W44-ARB 7, W4SVB 6, K4TQL/4 6, K4YOO 5, W4LMT 4, W44PWF 4, W4DFZ 2, W44QLZ 2, W44WAJ 2. (Aug.) W4TUB 1128, W44BAW 205, W44NBT 201, W44FPC 138, W44LUV 119, W44OGX 99, W44FEI 93, W44JYB 30, K4OSQ 30, W44AD 22, W44MKE 10, W44WAJ 4, W44LV 3, W44LMT 1.

**GEORGIA**—SCM, Howard L. Schonher, W4RZL—Asst. SCM; James W. Parker, Sr., W4KGP, SEC; W4-SAZ, RM; W4DDY, PAMs; K4PKK, K4YZE, W44-HSN, W44JSU, K4FH pounds brass from Savannah. K4TXK now is at the University of the South, Sewanee, Tenn. He reports good 2-meter activity. K4JBJ is stationed at Camp Ritchie. He maintains regular schedules with the Griffin gang. W44HWY operates mobile from college. W44IU submits line reports for Cobb County. K4NFP is spending most of his operating time with GTN. W44LLI has been plagued with equipment failure but is back in service again. W44ARB took the Tech. Class exam and is heading for General. W44GAY is tanning a new electronic keyer. W44BOG (ex-W44-RRN) is active once more. W44SAZ is sporting a new emergency generator and trying to work the bugs out of it. W44LRR is rushing antenna projects before the cold weather. W44HYW was active in the Penna. QSO Party and W/VE Contest. W44UPE is active on several nets and has a new keyer. K4SES is back in circulation. Let's check into the nets: GSN, 3595 kc. Dy. at 0000 and 0300 GMT; GTN, 3718 kc. Dy. at 2200 GMT; Ga. S.S.B. Net, 3975 Dy. at 0100 GMT; Georgia Cracker Net 3995 Tue. and Sun.; Teenage Net 3855 kc. at 1600 GMT Sat. Traffic: K4FLR 562, W4RZL 189, W4FOE 106, W4SAZ 77, K4TKM 77, K4NFP 71, W44GAY 68, W44PM 55, W44UYT 52, W44BYD 41, W44ARB 33, K4YZE 23, W44UPE 25, W44LLI 22, W44AIU 16, W44JSU 16, W44FUN 13, K4BAI 4, W44HYW 2.

**WESTERN FLORIDA**—SCM, Frank M. Butler, Jr. W4RKH—SEC; W4MLE, PAM; K4NMZ, RM; W4BYE. Section net report:

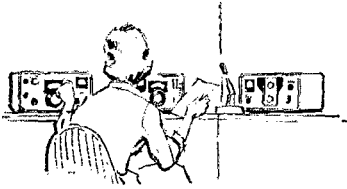
Net	Freq.	Time	Days	Sess.	QNI	QTC
WFPN	3836 kc.	2300Z	Daily	30	659	171

Pensacola: W44CLH is back on the air with an AF67 and a PM1R7. K4SOI, K4BZJ, K4YND, W4OOV and W4UCY keep 23,560 active. W4UUF is a regular on 145.2 Mc at 0400Z daily. W7BNR/4 is working with NAS Roy Scouts. W44IZM has married and moved to E. Pensacola Heights, Fort Walton; Thanks to hard work by W6RTD/4, a 2-meter repeater is in operation at Eglin. It receives on 145.2 and retransmits on 147.6 with 100 watts power, using vertical polarization. W44QN won the Oct. 2-meter transmitter hunt; W4RKH was the hidden bunny. W43APO handled emergency traffic to Ecuador. K7PYO is a new c.w. traffic man in the area. Panama City: Bay County c.d. W44VXL, bought a



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75A2..... 229	CENTRAL 100V... 429	GONSET GR211... 69	HR20..... 129	SX111..... 169
75S1..... 299	CLEGG 99ER... 89	GONSET G50..... 239	RX1..... 159	SX115..... 389
75S3..... 469	INTERCEPTOR... 299	111 6METER... 149	TX1..... 159	SX117..... 259
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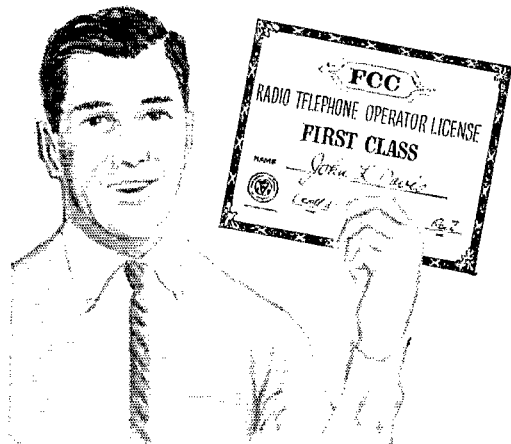
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Clegg 22er. Quincy: Gadsden County c.d. soon will have a complete ham station for h.f. and v.h.f. Tallahassee: K4YPI is on 145.2 Mc. with 100 watts to stacked vertical beams. Traffic: (Sept.) K4YFY 476, W4NLE 208, WA4ECY 122, W4BYE 120, K4NMZ 105, K4BDF 82, K4VWE 62, WA4E0Q 59, WA4JMI 29, WA4NRP 20, K4SOI 7. (Aug.) K4BDF 46. (July) K4BDF 72.

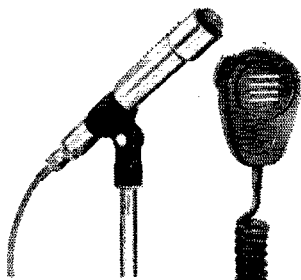
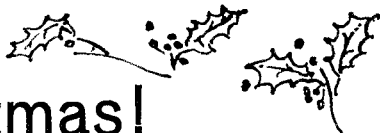
## SOUTHWESTERN DIVISION

**ARIZONA**—SCM, Floyd C. Colvar, W7FKK—SEC: K7NII, PAM: W7CAF, RM: K7NHL, K7TNV. The following stations in the valley participated in the V.H.F. Contest: W7AYY, K7YSE, K7DAW/7, K7AAB, W7AABH, K7LDT, K7VOR has a new six-element Cush Craft beam, WA7AQT, K7VOR, K7YFR, WA7CYB and W7LIP are active on 6 meters, K7YDY has a new Pontiac CTO complete with a Polycomm and four-ring hulo antenna, W7ANY has a new 46-ft. tower, W7FKK received his DXCC certificate, K7NII rebuilt his 32-element antenna; he also is busy building some test equipment. Traffic: WA7EBR 300, K7NHL 201, W7PKK 36, K7RUR 8.

**LOS ANGELES**—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: John A. Vaidean, W6BNX, RAIs: W6BHG, W6BBO, W6QAE, PAMS: K6MDD, W6AILZ, W6ORS, K6EPT, K6YVN, W6BBO, W6GYH and W6VFM/6 made the BPL, W6MLZ has a 1/2-hour show on KPFK-FM which started Oct. 31, WA6WPN finally has his 40-ft. tower up, W6WTX and W6BKVA report off-and-on operations because of school activities, W6USY reports that work is keeping him busy, WA6NCA has his projects stopped for a while because of work, W6PCP now has Amateur Extra Class license, K6HY and K6EX had an interesting trip to New Orleans in a private plane and hammed it up both ways, K6UMV really has a "ham's dream" of a job, working on antennas and research, WA6ZJJ, W6GFD and K6UAV visited the Oscar group in Los Altos, WA6USU now is on RTTY, W6SRE reports that he will be settling down soon and will become active again, W6BOW is having good luck with a vertical "J" and plans to raise the antenna up to 75 feet, K6EA now has a TR-4, WA6OKZ is thinking of new ways to stimulate interest in the AREC net at Inglewood, W6NKR says he had a relaxing vacation, with thunder-thorns daily, had on three occasions; no complaint because it made for good sleeping and poor fishing, K6LDM is trying to get 6-meter RTTY going, and is hoping to start on his 4X150 for 6 meters soon, K6UMV turned in a nice OES report, W6IOM is continuing work on a 7650 amplifier for 1296 Moonbounce, also has skeds with W6HPH on 1296 with signals 20 to 40 db., over noise across an 80-mile path, WA6WKF is working on TVI filters, The Palisades Amateur Radio Club elected W6LDA, pres.; W6OON, vice-pres.; W6PCP, secy.; W6BFD, trans.; K6HY, editor. Another fine report and net bulletin was received from W6QAE, K6MDD reports that 16 operators at the L.A. County Fair gives the following information: 16 operators, 180 messages and 200 guest hams signing the guest book. Thanks for the nice club bulletins from San Gabriel Valley Radio Club and SoCal Six. Liaison stations are needed between the c.w. nets and s.s.b., a.m. and RTTY nets. Southern California Net meets daily at 0800 on 3600 kc. (SCN) and will be glad to have you QNT, Eightball Net (EBN) meets Mon. through Fri. at 1515Z and Tue. through Sat. at 0130Z on 50.5 Mc. Any Pacific Coast teenage hams interested in a 40-meter phone net may contact W6NLM, 123 Ravenna Ave., Long Beach, Calif. 90803, or W6MYJ, 28 Park Ave., Long Beach, Calif. 90803. Traffic: (Sept.) K6EPT 1188, K6YVN 698, W6BBO 663, W6GYH 481, W6QAE 299, W6WPF 242, K6MDD 200, WA6VFM 180, W6FD 97, W6BNX 96, W6MLZ 72, W6BKVK 52, K6LDM 51, WA6WKF 31, W6GGL 29, WA6WPN 28, W6BBIH 26, WA6WTX 26, W6BKVA 20, W6USY 20, W6BHG 19, W6BAEL 7, W6NIA 12, W6KAI 10, W6PCP 9, K2PHF/6 8, W6BAEL 7, K6HY 7, W6NKR 7, K6UMY 7, WA6USU 6, W6GXI 4, W6HUJ 4, W6AM 2, W6PSJ 2, W6SRE 2, W6VUZ 1. (Aug.) W6AILZ 45, W6BAEL 25, W6NKR 4, K2PHF/6, 3, W6SRE 2.

**ORANGE**—SCM, Roy R. Maxson, W6DEY—Our new SEC is Ralph E. Alexander, W6WRJ, W6BRLA has a new tower and beam with the aid of W6JHD, W6JE's new QTH is Capistrano Beach, W6TMY rates a gold star for check-in to the AREC Sun. 9 A.M. Net on 3965 kc over 100 consecutive times, K8TSK is doing good work with the moonbounce program, W6HEM and K8TXS are back from vacations, W6DNA and W6WSW made Extra Class, W6FB advises his MIT class secy., W1ANM, of 35 years ago, recently visited him in Palm Springs, WA6NMC is returning from a 4-month Pacific cruise with a Swan 350, New AREC members are WA6YWS, W6BNC, W6BNYQ, W6BJHL and W6LAIN, WA6JZZ got 17,120 points on 40 meters with a Swan 350 in the W/VF Contest, W6CJS recently finished a 2-transistor autokeyer and Q8Ced PYBLT on the first CQ, WA6CXB and 5 other local hams operated

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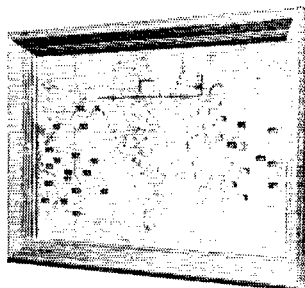


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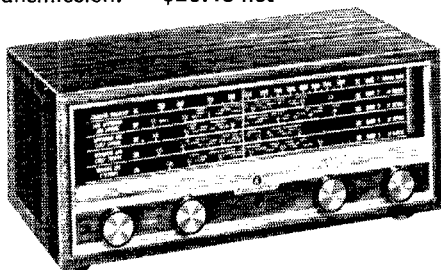
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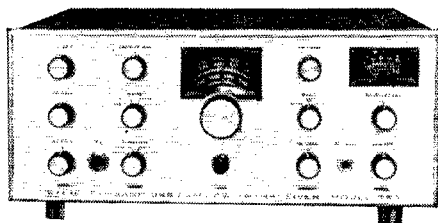
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2-meter mobile at Riverside Intl. Raceway Sept. 26 assisting the Jr. Chamber of Commerce. The 246 Net, 145.08 Mc, 0145Z daily, had 687 check-ins and 71 pieces of traffic. SoCalSix had 1190 check-ins and 300 messages on 50.4 Mc. at 0200Z and 1900Z. Traffic: K6MCA 2023, W6ZJB 573, WA6ROF 81, WB6JFO 75, K6IME 47, W6-DNA 42, W6WRJ 14, W6CK 12, WA6TAG 4, WA6YWS 4, WA6CXB 2, W6DGM 2.

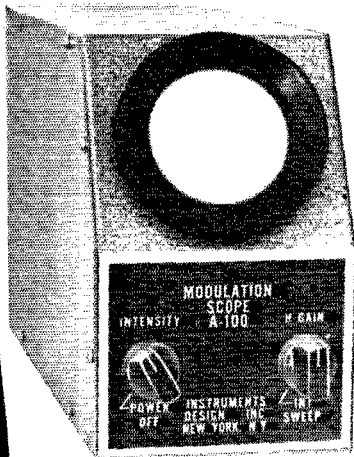
**SAN DIEGO**—SCM, Don Stansifer, W6LRU—K6-COP, of San Diego, recently received the Navy Commendation Ribbon. WN6PJ1, of Vista, has an NC-300, 6- and 2-Converter and a Globe HiBander. The October meeting of the San Diego V.H.F. Club featured a talk on Transistor Theory by ex-K6RKB from the Naval Air Station, W6ZOM, San Diego, was active during the recent hurricane in Mazatlan, Mexico, handling weather reports and traffic to that area. The V.H.F. Club furnished excellent communications during the boat races in Mission Bay. W6ECP vacationed in Europe. The October meeting of the San Diego DX Club was held at the home of W6LRU with WB6GMM as host. The SET in October was well organized by SEC W6SK and EC W6MHY with the cooperation of AREC and ARPSC members. RA1 WB6JUH activated the PAN for extra hours during the week end of the SET. WB6NMT checks into the SoCal Six Net when not at sea. Well-known DXer W6EPZ vacationed in Mexico in October. The most active San Diego station on SCN during September was W6BGF, who also is net manager of the San Diego Section Net which meets Sun. at 1530 GMT on 3795 kc. on c.w. Newcomers are welcome. Season's Greetings to all. Traffic: (Sept.) W6-YDK 6061, K6BPI 3972, W6LAB 2555, W6EOT 382, WB6-JUH 327, W6VNQ 156, WB6GMM 88, W6BGF 84, W6ECP 19, WB6KNN 14, W6LRU 1. Correction: (Aug.) W6-YDK 8292.

**SANTA BARBARA**—SCM, Cecil D. Hinson, WA6-OKN/WOCUG—SEC, WB6NDP, RM, W5WT/8, Sept. 25 and 26 saw the gathering of the 3895 clan in Santa Barbara. Some 85 hams and family were present for Sun. breakfast with numerous prizes being awarded. Of particular note was the fact that WA6LAL was celebrating his 18th anniversary in the same honeymoon city. K6LDW has completed the move from Camarillo to Lompoc and will be on the air soon. WN6QHM reports on the Pismo Beach ARC activities, including a picnic and a gas generator construction project. W6DYQ is the bulletin station in Santa Maria and averages 4 nights a week transmitting. Anyone interested in code practice in that area should contact W6DYQ. WB6BI is tower stopping. Traffic: WA6OKN 4.

#### WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG—The Lubbock ARC held its annual Swapfest Oct. 3 with 216 registering and many more attending. I failed to receive a notice or invitation to this haunfest and did not know the date it was to be held until too late for me to attend. It pays to advertise. The Abilene ARC was disbanded some time last year and a new club known as The Key City ARC has been organized with 18 active members. Officers are WA5JQE, pres.; K5BMZ, vice-pres.; W5SLVH, secy.; WA5BXC and WA5MNP are working to organize an ARC station at the Grand Prairie High School. Any help or advice on getting ham gear for the station would be appreciated. This would be a good place for the extra receiver or transmitter for which you have no further use. New officers of the Permian Basin ARC are W5NTX, pres.; WA5MOO, vice-pres.; WA5DAB, secy.-treas. W5NTX says he was elected one night when he failed to show up, so you had better attend all club meetings or you might get elected to some office. WA5HZS reports the Amateur Communications Club of North Texas, Denton, Tex., is growing but still has room for more members so if you are in that area why not join. Contact Richard P. Escue, phone 382-4037, 1904 Scripture St., Denton, Tex. 76201. Traffic: K5DDBJ 191, W5VFM 93, W5LGY 5, K2ETU/5 4.

**OKLAHOMA**—SCM, Bill F. Lund, K5KTW—Asst. SCM, Cecil Andrews, W5MFX, SEC, K5DLP. I will try to fill in as SCM until an election has been completed so that we can keep Oklahoma in the 100% roll. The new officers for the Electron Benders Amateur Radio Club in Tulsa are WA5LOB, pres.; WA5BPS, vice-pres.; K5RGI, secy.; W5FWW, treas.; K5OOV, trustee; K5-ZCJ, corr. secy.; K5LDR, publicity; K5VYV, master-at-arms. The Electron Benders plans to have a code and theory school starting in January 1966. W5WL has a new Drake receiver and transmitter. K5ZCJ has a new Drake R-4 and TX-4. K5GNP reports he is going to retire in November and plans to ham 24 hours a day. Hi, K5LDR and WA5BPS are working on a telephone dialing system for mobiles and are about ready to install it on some of the local mobiles. Well, I hope that I am back in the air for awhile. The plaster on my den fell in and damaged most of the furniture and my gear. Traffic: (Sept.) K5TEY 254, W5QMJ 98, K5MBK/5 85,

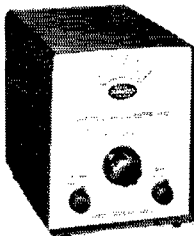


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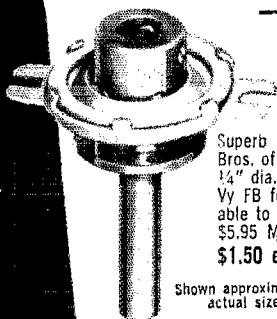
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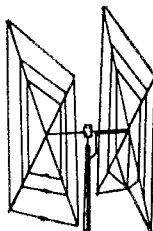
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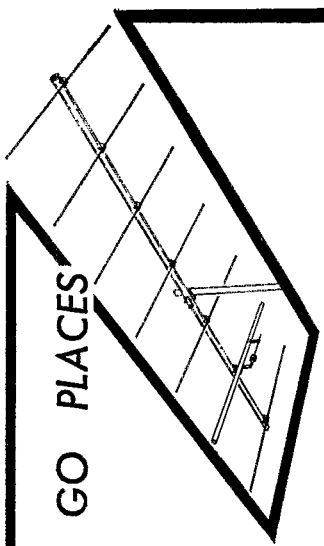
A144-11Q	2 meter	44 element	\$84.50
A144-7Q	2 meter	28 element	72.50
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W5NBI 79, W5MFX 33, K5DLP 29, K5KTW 29, K5AMTC 15, W5WDD 14, W5PML 8, K5OCX 6. (Aug.) K5MBK 128, W5BTDQ 38.

**SOUTHERN TEXAS**—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5RDP, PAM: W5ZPD, RM: K5ANS. New officers of the Houston Amateur Radio Club are K5HXR, pres.; WA5CYI, vice-pres.; K5IHK, program; WA5HNP, membership; K5BXM, secy.; W5-EYN, treas. All who made contact with W5DPA/5 at the International Trade and Travel Fair Sept. 17 through 26 will receive a special QSL. W5EYN, with many helpers, did a good job promoting amateur radio at the Fair. WN5LXW has moved to Austin to attend the U. of Texas. Hurricane Betsy was a threat to Southern Texas when she went in at New Orleans. Houston mobiles W5HNI, W5DNE, K5FOG and K5EXR went to Louisiana and assisted in communications. W5FJU helped survey damage with Red Cross officials in New Orleans. W5YCE has about 60 2-meter f.m. stations in operation in the Harris County area. Leon is Radio Officer for Houston Civil Defense. K5KZQ will be missed in Houston. Dui is now working in Dallas. W5-URW now is back in Southern Texas and is the new EC for Gonzales County. WA5AUZ and the gang on the TEX C.W. Traffic Net need more participation. Come on, you guys, let's check in on 3770 kc. at 1900 and 2200 CST. K5ZSC now is running a new 3-1000Z linear. K5LQJ is back at A. & M. and is regular operator for club station W5AC. K5HZR continues to run up an excellent traffic score. WA5CZR is the proud OM of twin girls. W5ABQ is making plans to rebuild the station and move into the house. W5DAA and K5CGO are working on 6-meter rigs. WA5CQD has a new 6-meter mobile rig. WN5MOE is back from an enjoyable trip to Europe. K5ANS now is teaching full time at Texas A. & M. and reports W5AC has over 50 members this year. Good luck, K5ANS, on the Ph.D. degree. Reports were received from the following: K5ANS, W5DAA, K5GDH, W5ABQ, WA5CZR, K5ZSC, K5HZR, K5-LQJ, WA5AUZ, W5NGW, WN5LXW and W5ZPD. Come on Southern Texas gang, let's hear about your activity. Traffic: K5HZR 298, K5GDH 121, K5ANS 56, W5ZPD 46, WA5CZR 36, W5AIR 19, WA5AUZ 18, W5ABQ 9.

**CANADIAN DIVISION**

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM: VE6PV, ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE6ALL, VE6XO, ORS: VE6BR, OPSS: VE6-CA, VE6PV, VE6HM, VE6SS, VE6BR, VE6ADS, OO: VE6HM, VE6NX, VE6TY, OBSS: VE6HM, VE6-AKV, OESS: VE6DB, VE6AKV. APN is having trouble with blackouts and may have to go on winter sked to try and beat the blackout conditions. It is rumored that VE6CA and VE6RC are moving to the big city this winter. Hope to hear you on more often at your new QTH. George and Flo, VE6FK just cannot find any time to put up another antenna. What are you doing, Don? VE6ADS is back home after mobiling all over the country. Yours truly had visitors from Grayslake, Ill.; Queen Charlet Islands, Watson Lake, Yukon; Norman Wells, Inuvik, and Eureka, N.W.T. Thanks to the fellows who are getting their reports in on time. Would like to say thanks to VE6SS for the PR job that he did on APN while VE6PV was off the air. The winter sked for APN is 1900 MST on 3770 kc. starting Oct. 15. Traffic: VE6HM 114, VE6XC 33, VE6FK 11, VE6TG 10, VE6AHT 7, VE6ALQ 7, VE6SS 7, VE6ADS 7, VE6SA 1.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7-FB—Orr SEC, VE7OM, has appointed the following ECs: For North and West Vancouver, VE7RR; mobiles for North and West Vancouver including Vancouver, VE7BQU; Kamloops District, VE7BNM; Powell River, VE7BOQ, New ORSs are VE7BQB and VE7BNM, VE7-QQ, our RM, has moved the Slow Speed Net from 3700 to 3650 kc. The Slow Net will operate before BCEN opens, VE7BFN, also VE7AA, lost all in a fire when his shack went up in flames, VE7MC, VE7ML and VE7-MA were operated by VE7AGF, VE7NG and VE7BGE during the summer. VE7BBB had some good DX visitors at her home during the summer; she also found time to teach Allan and come up with the call VE7BU, Parksville ARC is a new one. Powell River ARC meets in the high school with code and theory classes. The Vancouver ARC code and theory classes this winter totals thirty-five members. This will keep VE7XW, VE7AQW and their helpers very busy. East Kootenay ARC is planning to have a number of rigs on 147.33 Mc. VE7BY is working on a trip to HC8, Galapagos Island, in a three-master bark. He would like to hear from anyone interested. VE7AC worked four new countries between orchard duties. I would like to hear from Prince Rupert ARC, also the Parksville ARC. Traffic: (Sept.) VE7BHH 146, VE7BLO 23, VE7BQB 18, VE7BHW 10, VE7AC 4. (Aug.) VE7BQB 359, VE7BHH 168, VE7-BNM 149, VE7BLO 23, VE7BOQ 12, VE7AKY 10, VE7-BHW 10, VE7BDW 7, VE7AC 5, VE7AMW 5.

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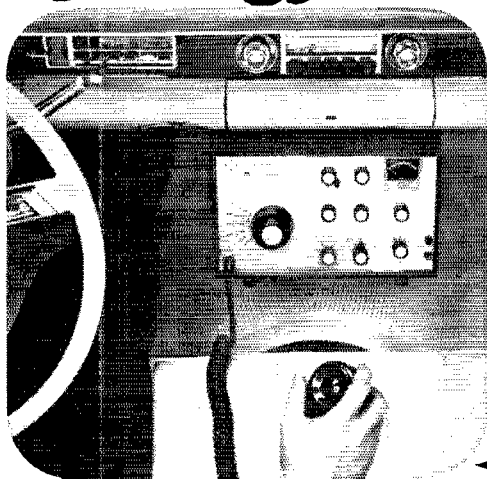
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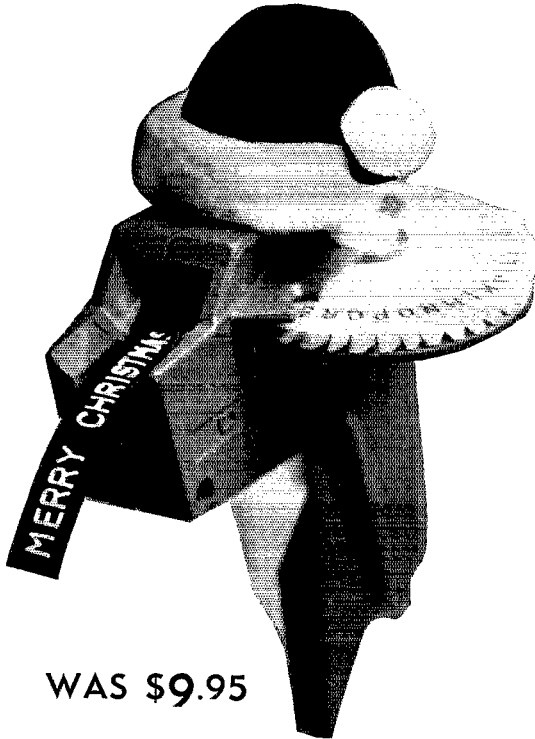
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**MANITOBA**—SCM, John Thomas Stacey, VE4JT—The Brandon ARC is reorganizing and also supplying instructors to a local high school to teach code and theory under the Adult Education Plan. VE4DR is now living in Peniticon. VE4UM, the university station again is busy with the university net running coast to coast on 14.140. VE4RE and VE4HI are running daily skeeds on 50.110 and are looking for some Winnipeg activity. sked time 0400Z. VE4HD has been bitten by the v.h.f. bug and is experimenting with receiver circuitry. VE4EJ is back in Brandon after an Army course in the East. VE4DL did some mobiling on his trip to B.C. and even managed to handle traffic. Our RMI, VE4QX, has the MTN operating in fine shape with six stations now checking into the Tenth Region. VE4RD has been checking into the slow-speed net. VE4KN has dropped the editing of *Sparks* and turned the reins over to VE4QZ. Fellows, a hamgram or postcard will bring a supply of Form 1s for station activity reports. Let's hear from you. Traffic: VE4JT 164, VE4QX 102, VE4EI 73, VE4LG 55, VE4NE 28, VE4QD 20, VE4SC 11, VE4HI 4, VE4RE 4, VE4DL/7 2, VE4EP 2, VE4GB 2, VE4XN 2, VE4RD 1.

**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and R. P. Thorne, VO1EL. SEC: VE1HJ. Amateurs attending the recent AAB Convention (Atlantic Assn. of Broadcasters) at Fredericton included VE3RE, VE2PR, VE1GJ, VE1OM, VE1VO, VO1DI and VO1DS. Officers of the newly-formed Amateur Radio Club of Newfoundland include VO1DZ, pres.; VO1DF, vice-pres.; VO1DO, secy-treas. Newly-elected officers of the Argentina ARC include WA4TUH/VO1, pres.; WA6LZN/VO1, vice-pres.; WA1EVL/VO1, secy-treas. New calls include VO1HD, VO1IH, VO1II and VE1ARR. Amateurs in Newfoundland have been invited to participate in the Provincial Come Home Year, 1966, VO1BT and his ham family (VO1AM and VO1DR) have been transferred to Ontario. Other departures include VO1CK, VO1FC, VO1DJ and VO1GZ. VO1FQ recently operated as FP8CJ from St. Pierre. The TransCanada Net meets on 14.140 kc. Sun. at 1800 GMT. VE1 and VO representation would be very welcome. The ARPSC Net continues to meet Sun. 3750 kc. 1830 AST. Your assistance is very much appreciated. Traffic: (Sept.) VE1OM 37, VE1ABS 5, VE1DB 3, VE1ES 1. (Aug.) VE1OM 40, VE1ABS 14.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—The Ontario Division ARRL Convention held in Sudbury was the highlight of September. ARRL officials in attendance were VE2BE, ARRL Vice-Pres.; WI1KE; VE3CJ, ARRL Canadian Director; VE2BK, ARRL Canadian Vice-Director; VE3RX, ARRL Associate Counsel; VE3EUM, Ontario SEC; and VE3NG, Ontario SCM. Visitors were from New Zealand, Nova Scotia, the United States and Bermuda. My congratulations to the Sudbury & District Amateur Radio Club on its first effort in holding a divisional convention. The Windsor ARC won the 1965 Field Day Canadian award. VE3ETM, delegate to the Convention for Windsor, was presented with the Keith Russel Memorial Trophy, for the highest score in Canada. The Skywide ARC of Toronto will man the AREC booth at the Sportsman show in Toronto next spring. VE3HW, of Don Mills, is in the body shop and is recovering rapidly; VE3AJA likewise. VE3AGS, VE3SD and VE3PK are Silent Keys. VE3RU, of King, is on a tour of Japan, Thailand, Bangkok, Egypt and England. VE3FQH is now in Waterloo. VE3CSN, of Toronto, also is in Waterloo. VE3FHZ, formerly of VE3-Land, is now in Kitchener. The Nortown ARC, Box 356, Toronto, has a club paper, *Nortowns*, and will swap. Officers are VE3AAW, pres.; VE3AEJ, vice-pres.; VE3EAK, secy.; VE3FTS, treas. Rverson Institute in Toronto elected VE3DSQ, pres.; VE3DBU, vice-pres.; VE3ESN, secy.; VE3CSO, station engineer. The Scarborough ARC manned the ham radio station at the Canadian National Exhibition. VE3-IPA announces that the inter-police network operates on 3875 kc. Sat. at 11:30 a.m. VE3LI has resigned as Toronto EC and VE3DRF has been appointed in his stead. Tom was 2-meter EC and this post is now in the hands of VE3HW. The XYL and YL operators in Ontario have gotten together and have formed a group known as the "Trilliums" under the call VE3TOT. Traffic: VE3OYR 178, VE3NG 117, VE3BII 92, VE3DRF 92, VE3EBH 83, VE3DPO 75, VE3BZB 71, VE3TT 68, VE3DU 47, VE3GI 45, VE3EAM 39, VE3AWE 37, VE3-

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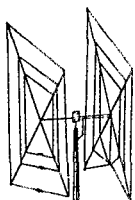
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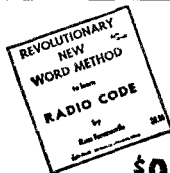
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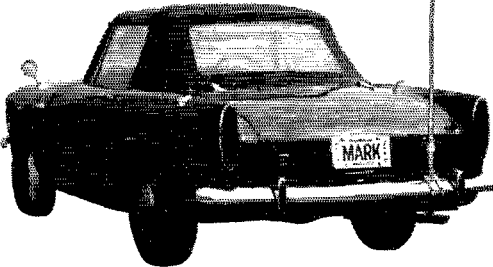
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**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—Asst. SCM; *Claude Duberger*, VE2ALH. *The VE/W Contest* was very popular this year with good VE participation. The issuing of special QSL cards, depicting the 1967 World's Fair and the ARRL convention for that year, has met with some snags but VE2TA reports that he has not given up hope. The first fall meeting of the MARC at the new Capri Hotel location saw a large turnout. Principles and operation of the surplus 2-meter transceivers were discussed. Communications during the large annual Inter-Line Car Rally again was handled by AREC members and this service was carried out in conjunction with the SET program. Our roving Asst. SCM was contacted on 20 meters from 72 N., 80 W. He regretted that several reports sent via amateur radio never arrived here. It is hoped that approval for and the installation of the 2-meter repeater station will be an accomplished fact in the near future. Committees are now being formed in connection with the ARRL 1967 convention. This is a very big job and a successful conclusion can only be reached by your cooperation and a dynamic effort by the various committee chairmen. It is with the deepest regret we record the passing of VE2-QQ's *XYL*. From the St. Maurice Valley: VE2BSC is in charge of VE2CRT, VE2AIF is returning to the air, and VE2AUS is the "Club-pylone." VE2AGD keeps La Tuque on the map. VE3CJ and VE2BK have been re-elected as Director and Vice-Director by acclamation. Congratulations, Traffic: VE2ANK 188, VE2OJ 94, VE2-DR 84, VE2TA 44, VE2BVY 41, VE2AJD 33, VE2BRT 31, VE2EC 31, VE2ACU 28, VE2HRD 26, VE2CP 26, VE2AAH 12, VE2ANY 12, VE2PG 12.

**SASKATCHEWAN**—SCM, Mel W. Mills, VE5QC—Congratulations to all the AREC members who participated in the October SET exercises. The exercise was a definite success. Looking back on the year I personally feel that the AREC is a most capable organization and SEC VE5CU and his ECs are to be congratulated, along with all AREC members. While the AREC of Saskatchewan is up to strength and in a position to

(Continued on page 162)

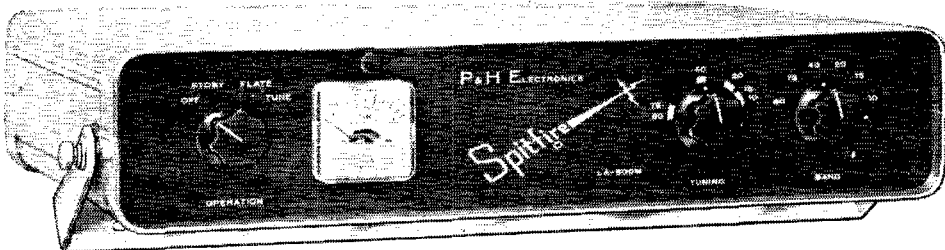
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(Continued from page 112)

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VE77M	SM3BLZ	PA0HBO	288	G3AIZ	W8JBI	YS10
320	310	300	288	YV5AJK	W9SFR	261
W0WHM	W1JFG	W2BQM	W1UOP		HUA	W2FVR
W0JYW	W2TP	W6RKP	287			D13RK
319	W4ANE	W8EAP	WA2ZS	W2PTM	270	ZS6FN
W2HTI	W4PDL	G1B1J	WA6EYP		W1BH	
W20KM	W8AFX	G27PG	PA0FX	278	W1PZ	260
W6GVM	W8UAS	MF4BW		W1PST	W3CGS	W2FGD
W0QVZ	309	P7IAX	K6LGF	W8ZET	G4CP	K2JGJ
HB9TL	W2VCZ	YV5AB	LA5HE	277	TG9AD	W4ZRZ
	K8RTW		SM5LL	W48SU	ZP5ET	K6VYA
318	W10NK	308	W1CLX	285		W8WT
	W2WZ	W6BAF	W5LZW	276	W5KC	W9UZO
317	K4AIM	W9JW	W8QJR	K80NV	W6YMY	K9RAL
W9YSX	W2LV	K9LUI	W8YK	KP4CK	G6TA	DL1KB
DL1N	K4TWF	VE3QA	ZS6UR	275		F8PI
	ZP5CF	298		K2BZT	W8RGI	G3HDA
316	G5VT	K1TXG	284	W5MMK	G8NUG	259
HB9J	W2RGV	W100S	W1HX	W7DLR	H1CTE	VE2WJ
L04DMG	W5PQA	W6JYU	W1JYH	YV5AIP		EA7ID
		W6MBD	W9NZM		267	CT1PK
		PY4CB		274	W0MLY	11R1F
315	W9RNX	DL7BA	W9LNM	K4AJ	ZS1DO	258
	DL7BA	ZS5JM	W9LNM	W4RLS		ZS6WJ
314	W1LLF	5Z4AQ	296	KP4CL	266	
W8NKM	304	W4EEE	282	W6HYG	WA2ELS	257
DL3IR	W4SKO		W7HIA	W9EXY	W4HA	W4FFS
ZL1HY	303	W4TDW	281	W7HIA	K8LSG	256
	W8PUD	W8BMQ	W1YDO		265	W6NJU
K4TJL	W9BVX	W0GKL	W4AZD	W2BOK	I1SM	SM5WJ
G3DO	302	DJ2BW	KH6OR		YV5BBU	255
	W3WG	294	CR6BX	272	264	W48HP
W1BAN	W3QJH	W1PAA	280	W1ICV	W6QUG	T21A
W2FXN	W4JIN	K6EVR	W1WDD	W9JYJ	LA7Y	YV5AQ
W3MAC	DL9OH		W2CKY	ON4DH		
K6LAS	ZS6Q	293	W2GNQ	YV5AXQ	263	254
W8DMD	301	W1ZW	W4MS		WA2RAU	W3FW D
OE1ME	K3MGE	290	W4NJS	271	W4CWV	W8CLR
	W2PIE	K4HEF	W7ADS	W1AOL	W9HB	F8DJ
	W3ECR	K9ECE	W8NGO	W10RV		253
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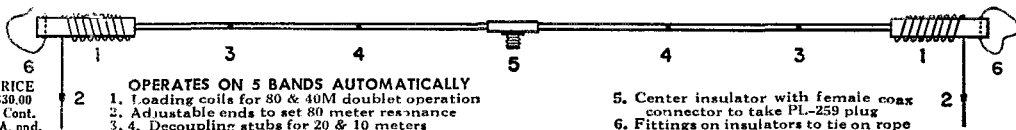
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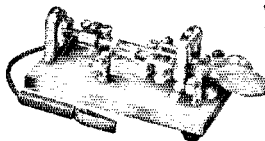
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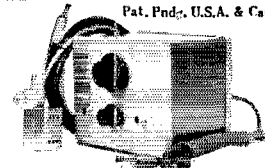
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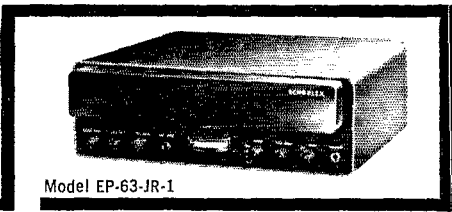


<p>252 K2CNX W6CHV</p> <p>251 K1JMV W4R3B W5TIZ K6YRA W7CMO W8BGU W8BRA W8BND W8BPI K9PPX W0NFA G6LX PA8NSG</p> <p>250 W2ODD W3DJZ W4BJJ W6BEH W81EJ K8NZD LA8LF OA4CV</p> <p>247 K6FXX W9LTR DL3DW HCQD</p> <p>246 W2WMG W4CFD K7SHN YV5AKP</p> <p>245 W2TQR VE2YU DL7AU</p> <p>244 W3WFL K6CYG K7ZAS EA1GH YV5BFT</p> <p>243 W5KFT W7GUV K0TFN G3AAE</p> <p>242 W2ZTV K6ERV W6CVU F2MO OB1FF</p> <p>241 K2JLV W3VSU W9GMY HK3LX LA5YE</p> <p>240 W2QKJ W5NMA PY7YS Z86BBP</p>	<p>238 WB2FSW W2GBC W5ABY 11BAF M66FB</p> <p>237 DL1FK</p> <p>236 K4ASU K6MNO HB9KU TI2PI</p> <p>235 W2GKZ W8SZS</p> <p>234 W3AYD W4HKJ W0QGI VE2WY VE3ES OZ3Y</p> <p>233 W4DCR W4HUE W4YZU W0GAA PA0ZD</p> <p>232 W2SUC W8EYZ K0TJW CX3AA</p> <p>231 W2CFZ W42BQ W0ZSZ W0BFB DL7AA</p> <p>230 W4BYU W8CDO K8OHG IT1TAI OY7ML VK2JZ</p> <p>229 W5JJA DL3EA</p> <p>228 W4DLG W4EJU HB9NU</p> <p>227 W2CPI W2JLH F2MO OB1FF</p> <p>226 G2BOZ</p> <p>223 W1DGI W5ERY W6MNV W8QNW XE2FL</p> <p>221 WA2HOK W3QMG W4ESP K4WHD</p>	<p>K4BVQ W5GXP VE1WL EA4GZ VK2DI</p> <p>220 W1BHP W5PWV W8ALJ W8NVP W9PQA W9HP W04KY YV5ANQ ZL1P9</p> <p>219 W9CPM</p> <p>218 WA6SBO W0HX</p> <p>217 W2EXH W2YTH W8CUT W0NCG DL1JW</p> <p>216 K8SOK W9JLH VE4XO SP9FR</p> <p>215 W1HIB W2FXE W8NFX</p> <p>214 W9EGQ W9TKD DL3BK</p> <p>213 W1FAB W1GQX W7QPK DJ4IK YV5BQF</p> <p>212 K1UDP W4EEO K8YUR W8WC W0MCC W6FTP F8SK JA1DM</p> <p>211 K1UDP W4EEO K8YUR W8WC W0MCC W6FTP F8SK JA1DM</p> <p>210 W1WQC K2OEA W28NI W31QC K6ENX W6FPB K9COS W0MAF K0MAS W0QUU GM3CLX SM5RY YV5AQS Z85PG</p> <p>209 W9DIZ W9JAV</p>	<p>208 WB2CNA W6DLA W6TXL W7BTH DL8OV 11A1M SM5BPJ</p> <p>207 W2GHK W1HR G4JZ</p> <p>206 K1IDW WA6EFL F0RM HK4EB</p> <p>205 W2CYX K2JLM DL2JT HCWN</p> <p>204 W2JIL WA4CA VE2TV DJ7AA GM3BCL</p> <p>203 K1DPI W6USG</p> <p>202 WB2HXD W2LEC W5CYC VE8BTI</p> <p>201 W2EOH W3BSC W4RBL W5IPH CR6CA XE1CE XE1HHT</p> <p>200 W1EFT W2DBC W21OT W30BD W5QVE W6KTE W6WX W8ACT W8AJI VE3CIO DL2UZ DJ7JZ HTDJ HZCT XE1SN ZL4BO</p> <p>199 W4AVY WA6FPB SM3AZI</p> <p>198 W9LJG W9JAV</p> <p>197 W4PRP W0NVZ 11ZFT SPIHX</p>	<p>196 W3LPT G4JW ZK1BS</p> <p>195 W9JUV SM7ACB</p> <p>194 W1HR G4JZ</p> <p>193 W7AUS F8CW</p> <p>192 W1AUR W1DBM W4ASV WA6TGY</p> <p>191 K4CAC W4VMS W6LUT W0LBB VE3MR WA4CA SM6CZY YV2CJ</p> <p>190 W2AEB D12WC W5RDA K6HZP VE3AE DL5AQ DL5VQ DL6PC F8XP 11ZPB SM5ATN UA2AO</p> <p>189 DJ5LA CR6CA XE1CE XE1HHT</p> <p>188 W8WZ</p> <p>186 OH6NC PY3AH SM16HK</p> <p>185 W3HCO W9RKL ZL3NS</p> <p>184 W3VKD W4JDR W6DAX W7DQM W9GAI F87HJ FG7XL</p> <p>183 K3DNU K6OHJ</p> <p>182 W2HQL W8JXY VE5BKL 11RC OQ6PD</p> <p>181 W3EUV WA4JOS VE6SF CE3WN OX3JV VQ4KRL</p>	<p>180 W1BPM W1VAN W1WKO W2FXA K8TOQ W4BXG K8YTI W8TGB W8GUZ W8MXS W9JTF W0SFU 11B1W SM5MC</p> <p>179 WA4LYQ W8CLL W8CUV HB9BU OA4PH</p> <p>178 WA2VDH W5DVV CR6DB HK3AFB 1ZBRN</p> <p>177 W4LVV W9HPS DJ9GD F3KE 11SCA</p> <p>176 WIRO W4UO K8YDV G3WW OZ3SK</p> <p>174 W5EJT W8JFD W9QQN W0MRJ W0YYS SP8CK</p> <p>173 K1IMP G2MI OE1PC</p> <p>172 K4HRG W5NTL CX2CN ZL3NS</p> <p>171 W6DAX W7WDM W9GAI F87HJ FG7XL</p> <p>170 K1JNE W1KID K2POA W2MM W2MOP K2UTC K4FTZ K9JJR W9WLO WA4JOS KG4AO PY2QT PY7EC VK5QR</p>	<p>169 W7MKI W9WKU DL1PM SP9EJ</p> <p>168 K1AMO W18GA</p> <p>167 W1CJF VE6ABP</p> <p>166 W1FQA W4BFR YV5BIG Z86VX</p> <p>165 W2NQR W2OWL VE2ANK</p> <p>164 WA6DET VE3RPU EP3RO 11AHW SM5VS SP9RF</p> <p>163 K3IVI W6CME W5WLD W8SIA VE2AFC 11PRC JA2JW SM5RK</p> <p>162 VE3RO EP2AU</p> <p>161 W2J8X W3JNM K4BMS W5DNL K8GOT WA6LDY K8AKJ K9KKN DL3AA DL7DE PA8LOU</p> <p>160 W1PNR WB2EPG W3QIR W4LLY WA6KNE W8WUO OK1MP T12RFT YV5AMW</p> <p>159 W2BRY K4DSV JA1ADN YV3DV</p> <p>158 DJ8CB OE3CL</p> <p>156 W1CUX K8DYX DJ2KS</p>
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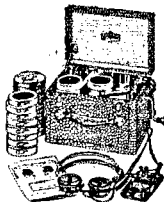
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| 154<br>W8HDB<br>VE1OC<br>9G1DY   | 143<br>K4CLT<br>W6ABA<br>CR7CR<br>F8WE<br>1T1GAI<br>11TMG  | 131<br>W2WDV<br>K4KIF<br>W6NAT<br>W7PRY<br>K9ZEQ<br>W9YTQ                            | 121<br>VE2BCK<br>P2YT<br>11ZQ<br>KP4AWH  | 113<br>W02UJ<br>TU2AE<br>ZS5TC  | 112<br>W3NML<br>K4DI<br>W4UF<br>W6OHU<br>W6WVWG<br>K8RDE<br>K6EC<br>K9WTS<br>K8BUR<br>HK4DP<br>11AHN<br>11GAS<br>11NE   | 105<br>K6AHV<br>K6BJG<br>K6EC<br>G3SDN<br>K8BUR<br>HK4DP<br>11AHN<br>11GAS<br>11NE   |
| 153<br>W1MQV<br>K1SEO<br>W3PN<br>W3SW<br>K6K11<br>K8WOT<br>K9RNQ<br>DL1BS  | 142<br>W1BPY<br>K1HVV<br>W5LGG<br>W8BDD<br>W9LAA<br>G8DJ<br>11SF   | 130<br>W2PDB<br>K3BNS<br>W4ELB<br>K4ZJF<br>W8KDJ<br>W5LDH<br>K8QOP<br>W9CPD<br>W9KXK | 120<br>W1PDL<br>K1R2B<br>W2HC<br>K2TJK<br>W3KJ<br>K3MNV<br>K3PDC<br>K4FTY<br>K9VRV/4<br>W9OMH/6<br>K5SJV<br>VE2AV<br>COBRA<br>G3KLL<br>HB9BR | 111<br>K4RHL<br>K3PDC<br>K4FTY<br>K9VRV/4<br>W9OMH/6<br>K5SJV<br>VE2AV<br>COBRA<br>G3KLL<br>HB9BR                     | 104<br>K3CRV<br>W4HVV<br>K4HKR<br>W4YHW<br>W5ATM<br>W6LV<br>W8FWK<br>W9PUY<br>DJ3YC<br>OH2XA<br>SM5CAK<br>XP2WH<br>ZS6ALW<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG | 100<br>W1A0E<br>W1S1K<br>W2BGSK<br>W2MXW<br>W2QNW<br>W3LNE<br>W3JFW<br>K4RNS<br>W5BCU<br>K5HWO<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG |
| 152<br>K2YTY<br>W4YQB<br>VE3TR<br>CX2AY<br>DL3NE   | 141<br>W1JSK<br>W2CES<br>W2JAE<br>W2ZVS<br>W6DFR<br>K9JJS<br>VE3DGX  | 130<br>W2PDB<br>K3BNS<br>W4ELB<br>K4ZJF<br>W8KDJ<br>W5LDH<br>K8QOP<br>W9CPD<br>W9KXK | 121<br>K1DMG<br>W1LTY<br>K1DMG<br>W1LTY<br>W1MGP<br>W2PDB<br>K5KMK<br>W6GLD<br>W6WVWG<br>W8KDJ<br>VE3AGC<br>F2LZ<br>F8YO                     | 112<br>W3NML<br>K4DI<br>W4UF<br>W6OHU<br>W6WVWG<br>K8RDE<br>K6EC<br>K9WTS<br>K8BUR<br>HK4DP<br>11AHN<br>11GAS<br>11NE | 105<br>K6AHV<br>K6BJG<br>K6EC<br>G3SDN<br>K8BUR<br>HK4DP<br>11AHN<br>11GAS<br>11NE  | 100<br>W1A0E<br>W1S1K<br>W2BGSK<br>W2MXW<br>W2QNW<br>W3LNE<br>W3JFW<br>K4RNS<br>W5BCU<br>K5HWO<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG |
| 151<br>K3HHY<br>W4PLL<br>K8AXG<br>W8PNS<br>K9LKA<br>DL2OX<br>F88C  | 140<br>W1AJV<br>W1HNI<br>W1YFK<br>W3EPV<br>W5EGS<br>W5KXK<br>W5NCF<br>W9DNE<br>K8TRP<br>K9OYQ<br>G6W3N<br>UD6KAR | 139<br>W1BAB<br>W2PEV<br>K8TKB<br>W9GXH  | 128<br>K2IQP<br>W3GRS<br>W7UMJ<br>4X4HW  | 111<br>K4RHL<br>K3PDC<br>K4FTY<br>K9VRV/4<br>W9OMH/6<br>K5SJV<br>VE2AV<br>COBRA<br>G3KLL<br>HB9BR                     | 104<br>K3CRV<br>W4HVV<br>K4HKR<br>W4YHW<br>W5ATM<br>W6LV<br>W8FWK<br>W9PUY<br>DJ3YC<br>OH2XA<br>SM5CAK<br>XP2WH<br>ZS6ALW<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG | 100<br>W1A0E<br>W1S1K<br>W2BGSK<br>W2MXW<br>W2QNW<br>W3LNE<br>W3JFW<br>K4RNS<br>W5BCU<br>K5HWO<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG |
| 150<br>W1MZE<br>W2GRY<br>K3IDF<br>K2KGS<br>K2RAP<br>K4SBH<br>W5AJY<br>K8TRG<br>DJ2MM<br>DL3VZ<br>F8JWE<br>F8HA<br>G3TN<br>11BXX<br>LUI1DJ<br>OE2EGL<br>OZ8EA | 140<br>W1AJV<br>W1HNI<br>W1YFK<br>W3EPV<br>W5EGS<br>W5KXK<br>W5NCF<br>W9DNE<br>K8TRP<br>K9OYQ<br>G6W3N<br>UD6KAR | 139<br>W1BAB<br>W2PEV<br>K8TKB<br>W9GXH  | 128<br>K2IQP<br>W3GRS<br>W7UMJ<br>4X4HW  | 111<br>K4RHL<br>K3PDC<br>K4FTY<br>K9VRV/4<br>W9OMH/6<br>K5SJV<br>VE2AV<br>COBRA<br>G3KLL<br>HB9BR                     | 104<br>K3CRV<br>W4HVV<br>K4HKR<br>W4YHW<br>W5ATM<br>W6LV<br>W8FWK<br>W9PUY<br>DJ3YC<br>OH2XA<br>SM5CAK<br>XP2WH<br>ZS6ALW<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG | 100<br>W1A0E<br>W1S1K<br>W2BGSK<br>W2MXW<br>W2QNW<br>W3LNE<br>W3JFW<br>K4RNS<br>W5BCU<br>K5HWO<br>W5LZZ<br>W61SO<br>W6TZN<br>W7JWE<br>K8BIT<br>K8KOM<br>W8NNR<br>W8YCP<br>W9WCM<br>W8GVM<br>VE2AMP<br>VE3NN<br>VE40X<br>VE7BEA<br>CR6DU<br>DL4BT<br>DJ81<br>EA3KT<br>F9DX<br>11ANY<br>YV8BPG |
| 149<br>W6MVG<br>W6WNN  | 148<br>W2EVV<br>W8KPT<br>K0LFF<br>VE3UR<br>ZL2UW   | 136<br>W1YQF<br>W2XTB<br>K6AYO<br>W7AQB<br>VE3CTX                                    | 125<br>W3MYE<br>K4QPV<br>W4ASUR<br>W5EDX<br>W6PNQ<br>DL5QB<br>DL7PT<br>11ANE   | 118<br>W1OJR<br>W2BJV<br>W2WPP<br>DLIAR<br>ON4UN  | 109<br>W2GSO<br>DJ3BB<br>DL8DX<br>F2JT<br>11CJV<br>DL1EG<br>HR3HH<br>JA1BK<br>JA2ADH<br>TL8AC<br>VU2PP<br>ZL1ARY  | 103<br>W1EJE<br>W1JSQ<br>W1RFE<br>K2ISF<br>DL6S1<br>HA9OZ<br>K9BPO<br>W0IQW<br>DJ2VZ<br>DJ3BB<br>DL8DX<br>F2JT<br>11CJV<br>DL1EG<br>HR3HH<br>JA1BK<br>JA2ADH<br>TL8AC<br>VU2PP<br>ZL1ARY   |
| 147<br>W8TTN<br>DJ2ZJ<br>F2FO  | 146<br>W6U1M<br>11LX<br>11FP<br>KC6BK  | 135<br>K1INO<br>W6PHN<br>W6VNJ<br>W8FAW  | 124<br>W9PFL<br>K6BPR<br>W6OET<br>K4FA<br>W6MVB<br>VE8AH<br>O44OS<br>ZS401<br>PAUC   | 116<br>W1NTH<br>K4UAS<br>W86GVV<br>VE3BSJ<br>OE1KW  | 108<br>W4RZN<br>W86AJH<br>F7DB<br>TG9GZ   | 102<br>K1MCL<br>W2BHZ<br>W2ZGO<br>W6IEG<br>W8ZKM<br>KL7BCS<br>VE2JD<br>VE6CJ<br>DL9BS  |



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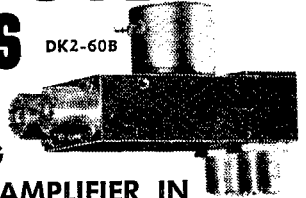
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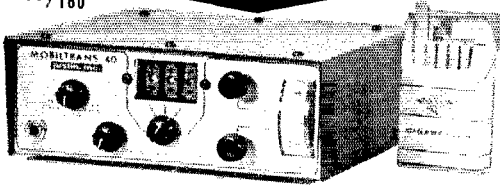
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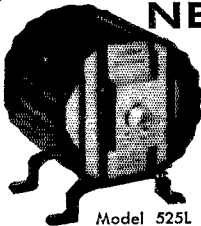
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It is with deep regret that we record the passing of these amateurs:

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 W1OJ, John F. Lamont, Seekonk, Mass.  
 W1VOT, Bruce Anderson, Manchester, Conn.  
 W1WEJ, William L. Peters, Hull, Mass.  
 W2DRH, W. Fredrick Hendrickson, Mamaroneck, N. Y.  
 W2GG/W4GG, E. W. Dannals, Bradenton, Fla.  
 W2PHO, Alfred P. Lane, Larchmont, N. Y.  
 W2RIP, Richard G. Hunt, Ludlowville, N. Y.  
 W2VDF, Kenneth L. DuPrey, Fayetteville, N. Y.  
 WA3BMH, Robert C. Stone, Coraopolis, Pa.  
 W3TOD, Fred M. Cowan, Monroeton, Pa.  
 W4BDU, Martin L. Hancock, Charlotte, N. C.  
 W4BXL, Richard G. Canfield, Miami, Fla.  
 WA4CFA, William D. Bowen, Louisville, Ky.  
 W4FAM, John O'Connor, Merritt Island, Fla.  
 K4OHL, Thomas H. Ballew, Raleigh, N. C.  
 W4SOZ, Daisy T. Dean, Lexington, Ky.  
 K4UHT, Thurmond D. Jessup, Madisonville, Ky.  
 W4YRQ, Glenn Davis Kelley, Pompano Beach, Fla.  
 W5KOC, Roger A. Barnett, Grand Prairie, Texas  
 W6SLN, James E. Robinson, Santa Ana, Calif.  
 W6THZ, George Meulendyk, San Francisco, Calif.  
 K6VVM, William B. Richardson, San Gabriel, Calif.  
 K7LYD, Edward J. Keaveney, Phoenix, Ariz.  
 W7SEW, Walter G. Johnson, Malta, Montana ex-SAAAN, Elmer Brownell, Utica, N. Y.  
 ex-W8CSR, William F. Kisser, Fairmont, W. Va.  
 W8QCZ, Harry W. Frysock, Toronto, Ohio ex-W9DIR, Frank Van Epps, Portage, Wisc.  
 K9JLB, Harold F. Cannady, Clarendon Hills, Ill.  
 W9KPN, William D. Manning, Indianapolis, Ind.  
 WA9ONG, Robert J. Sharples, Elmhurst, Ill.  
 K9ONP, Rufus Whipple, Omaha, Ill.  
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 W0BUM, Galen W. Nolder, Ida Grove, Iowa  
 W0DSV, John R. Brill, St. Louis, Mo.  
 W0ENK, Martin L. Redman, Moorhead, Minn.  
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 VE1VD, Ewart R. Penney, Halifax, N. S.  
 VE2IC, Julien J. D. Mathon, Pont Viau, Que.  
 VE3ACS, A. O. Adams, Ashton, Ont.  
 VE7AOW, William T. White, Vancouver, B. C.  
 VE7JF, R. M. Balfé, Cloverdale, B. C.  
 ZL4CK, William F. Self, Dunedin, New Zealand

## Station Activities

(Continued from page 156)

function most efficiently when called upon, such is not the case with other League activities in our section. The most glaring is communications! That is, communications among ourselves! The ECs are not getting their reports in to the SEC and I cannot but surmise, because of the fine job the ECs are doing in their districts, that the fault must be with the membership at large not sending in reports. Just a note every 2 weeks or at least once a month will suffice. Reports in 1964



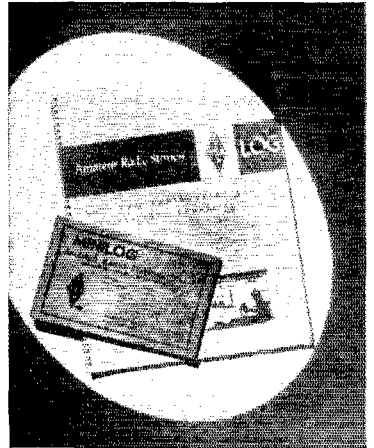
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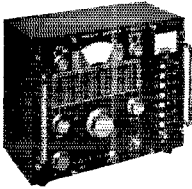


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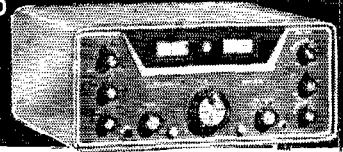
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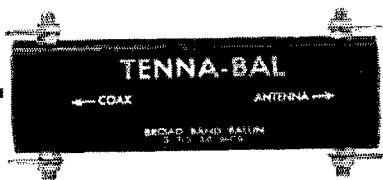
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## Hang A.G.C. Systems

(Continued from page 68)

line. It is possible to limit the maximum current by increasing the  $V_{3A}$  cathode resistance, and to adjust the meter sensitivity by varying the resistor in series with the meter. If this is too much of a chore, the original "calibrated" S-meter circuit may be left intact and a new tube installed for  $V_3$ .

### Final Considerations

I would recommend that the a.g.c. circuit be built on a small chassis mounted inside the receiver cabinet. Shielded wire should be used from the receiver volume control to the grid of  $V_{1A}$ ; aside from that nothing is critical.

I have used one variant or another of this circuit with break-in c.w. over the last four years and am quite satisfied with the results, although the endless series of modifications has left the audio portion of my receiver a shambles! I hope that enough information has been presented above so that with a little experimentation one can come up with a hang a.g.c. system to suit his specific needs.

**QST**

## ARRL QSL Bureau (IARU News)

(Continued from page 67)

- VE6—Karel Tettelear, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
- VE7—H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
- VE8—George T. Kondo, VE8RX, c/o Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
- VO1—Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
- VO2—Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
- KG6—Guam QSL Bureau, P.O. Box 445, Agaña, Guam
- KH6—John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
- KL7—Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska 99502.
- KP4—Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902
- KV4—Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820
- KZ5—Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
- SWL—Leroy Waite, 39 Hanum St., Ballston Spa, N. Y. 12020

## Station Activities

(Continued from page 168)

put us 54th among the sections! This is not good and makes it most difficult for me to accomplish the top item on my list of needs when I took this honored job as your SCM, which is not to miss a single report for QST in this section! Now I must apologize for not getting around this summer as much as I should or would have liked to. My only excuse is that business here in Saskatoon gave me little time to leave the city. To one and all a very Merry Christmas and a Most Prosperous 1966. Remember "Saskatchewan really clicks in '66." Traffic: VE5HP 84, VE5LM 71, VE5BO 9, VE5-YR 7, VE5PZ 6, VE5CB 4.

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1. Date of Filing: September 22, 1965.
2. Title of Publication: *QST*.
3. Frequency of Issue: Monthly.
4. Location of known Office of publication: 225 Main St., Newington (Hartford County), Connecticut 06111.
5. Location of the headquarters or general business offices of the Publishers: 225 Main St., Newington (Hartford County) Connecticut 06111.
6. Names and addresses of Publisher, Editor and Managing Editor: Publisher, The American Radio Relay League, 225 Main St., Newington, Conn., Editor, John Huntoon, 574 Hills Street, East Hartford, Conn. Managing Editor: Laird Campbell, 18 Mohawk Drive, Unionville, Conn.
7. Owner: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If now owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given.) The American Radio Relay League, Inc., 225 Main St., Newington, Conn. (an association without capital stock).
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9. Not Applicable.
10. Not Applicable.

I certify that the statements made by me above are correct and complete: **JOHN HUNTOON, Editor**

## Monitoring Enforcement

(Continued from page 53)

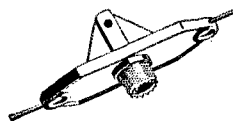
teur and the TVI situation. Some interesting statistics and observations can be made in this field of amateur operation and I hope to present you with this in the near future.

The astonishing thing to me, when viewing amateur radio operations from the standpoint of 37 years of radio law enforcement and 42 years of personal amateur radio operation (minus the war years), is that the whole system works as well as it does. With over 266,000 amateurs, of which a large percentage operate at some time during the year, there appears to be very good order in the amateur system. I can recall the days when the "want list" at monitoring stations was over a yard long with call letters of bootleggers or amateur stations to watch. The Novice license and the amount of self-discipline exerted seems to be enough to keep good order in the amateur spectrum. Your cooperation in self-discipline and group adherence to the "rules of the road" will help our Bureau to keep this opinion. **QST**

## Strays

Because of a clerical error, we failed to list KH6AX in the RTTY Certificate Winners in the article "Armed Forces Day — 1965" that appeared in *QST* for October 1965. Also, WSIV was missing from the C.W. Certificate Winners list.

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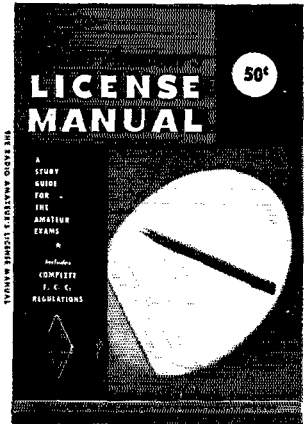
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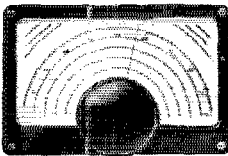
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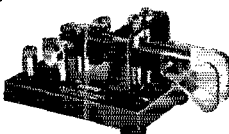


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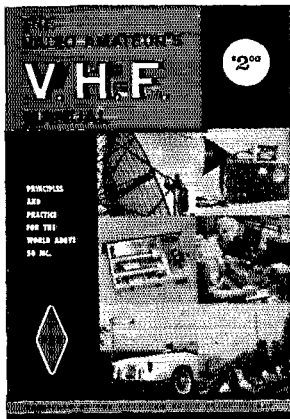
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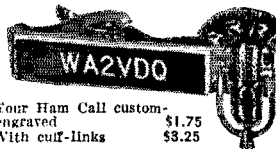
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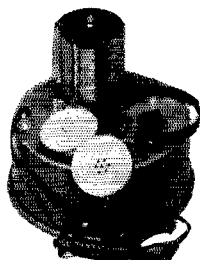
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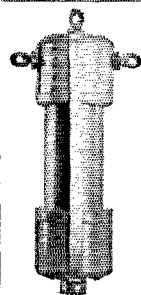


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See page 101 "New Apparatus" Oct. QST

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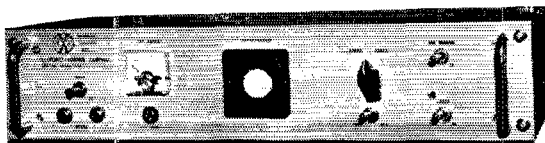
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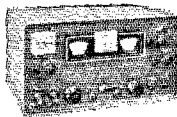
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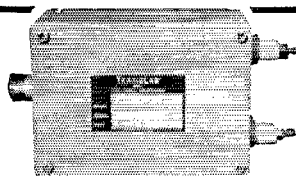
Finished in reddish-brown fabrioid with stiff covers, each Binder holds twelve issues of QST, opens to any page and lies flat. Your copies are protected and always available for easy reference.

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• 2-30 MC • 2 KW P.E.P. • COMPLETELY WEATHERPROOF  
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Nearly perfect characteristics are obtained by the use of low loss ferrite materials and special winding techniques. The transformer is completely encapsulated in plastic to assure freedom from moisture or shock damage. Model 601 is designed for a 1:1 ratio (50 ohms unbalanced to 50 ohms balanced) and the Model 601A is available for applications requiring a 4:1 ratio (50-200 ohms or 75-300 ohms). Each unit is supplied with a UG58A/U (type N) fitting to provide superior weather resistance.

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**TRANSLAB INC.**  
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Powerful crystal controlled MINIVERTER units convert any home or auto radio for shortwave reception between 2 and 60 MC. All units transistorized with tuned RF stage and tuned mixer, and are available with either a high impedance input (BC whip) or low impedance input (tuned whip).

The following models are shipped from stock:

- CVA2(160M); CVA4(80M); CVA7(40M-CHU);  
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CV30(10M); CV50(6M) each..... **Special Now \$10.56**  
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- FIRE, POLICE 33 to 47 MC each..... **\$27.95**
- MARINE 2-3 MC (Auto or Home Radio) each..... **\$18.95**

When ordering, specify desired frequency and input.

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Enclose this ad with order.

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**BOX 276, S. GLASTONBURY, CONNECTICUT**  
**Telephone 203-633-1971**

Hand-crafted desk pen; name and/or call letters permanently embedded in deep plastic. Colorful sea scene or abalone pearl background. Base: 2 1/4" x 3 3/4" x 5/8". Felt back.

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Jewelry: Letters embedded in suitable shapes. Plain, abalone, or glitter on white background. Other colors on request. Post-paid.

Tie clips	\$1.50	Label pins	\$1.50
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Model 8902 pre-tuned 455 KC IF strip provides excellent gain (55 db) and selectivity (6 db bandwidth: 8 KC). No alignment is required. Included among the 21 components on the PC board are a mechanical filter, 2 transistor amplifiers and a diode detector capable of driving earphones. Overall dimensions: 1/2" x 1/2" x 1 1/2".

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# HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

*Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

**WANTED:** Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

**MOTOROLA** used FM communication equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

**WANT** Calbooks, catalogs, magazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C.

**MICHIGAN** Hamst. Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy's Purchase, W9RF. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. Normandy 8-2622.

**WANTED:** All types of aircraft on ground radios. 17L 618F or S388, 390, GRC, PRC, 51 JRVX. Collins linear amplifier, Type 2044. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.J.

**SELL** swap or buy ancient radio set and parts magazines. Laverty, 118 N. Wycombie, Landsdowne, Penna.

**WANTED:** Military and commercial laboratory test equipment. Electrocrafter, Box 13, Binghamton, N.Y. 13902.

**SAVE** On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Ascon Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

**WANTED:** 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Cointon, Chicago 6, Ill.

**304TL** tubes wanted. Also other xmtg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

**WANTED:** Collins Parts. BC-610, GRC-27, Antodyne, Bethpage, L.I., N.Y.

**INTERESTING** Offers alone in the new combined "Equipment Exchange-Ham Trader". Next 12 issues \$1.00. Sample free. Brand, Sycamore, Ill.

**WE** Buy all types of tubes for cash, especially Elmec, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

**ACT** Now! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-Walker-5-7000.

**TUBES** Wanted. All types, highest prices paid. Write or phone Low-Tronics, Inc., 74 Willoughby St., Brooklyn 1, N.Y. 11021. Tel. UL5-2615.

**WANTED:** For personal collection: QST, May 1916, WICUT, 18 Mohawk Dr., Unionville, Conn.

**TELETYPE** Machines, converters, R-388, 51J3 and 51J4, R-390; HQ-180, spkr, \$269.00. R-390A receivers, mechanical filters for R-390A (455 IF). Want: TS-382 audio sig. CV89/URA8A converter. Alltronic-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

**NOVICE** Xtals, 30-40M, \$1.05 each, others 75¢. Free list. Nat Stinnette, W4AYV, Umattila, Fla. 32784.

**FOR** Sale Cheap QSTs or COs, any quantity. Send your list for quotation. Cash for Calbooks before 1942. Want early radio gear and publications. Erv Rasmussen, Box 612, Redwood City, Calif.

**QSLs? SWLs?** Personalized made-to-order! One-day service! Largest variety samples 25¢. Delux 35¢. Religious, 25¢ (re-funded), Sakers, W8DED, Box 218, Holland, Michigan 49424. QSLs, samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60433.

**QSLs "Brownie" W3CJL, 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.**

**C. FRITZ** back on the job! Bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible, Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

**QSLs:** Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

**QSLs-SMS, Samples 10¢, Maigo Press, Box 375 M.O., Toledo 1, Ohio 43601.**

**DELUXE QSLs** Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

**QSLs.** See our new "Eye-Binder" cards. Extra high visibility, Samples, 2¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

**QSLs.** Twenty exclusive designs in 3 colors. Rush \$3.00 for 100 or \$5.00 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

**DON'T** Buy QSL cards until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

**QSLs, SWLs, XYL-QMs** (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypical, snazy, unparagoned cards (Wow!). Rogers KOAAB, 961 Arcade St., St. Paul 6, Minn.

**QSL Specialists, Distinctive Samples, 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago, Illinois. 60639.**

**PICTURE QSL** Cards of your shack, etc. Made from your photograph. 1000, \$14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

**QSL, SWL** cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

**QSL, SWLs, WPE, Samples 10¢ in adv.** Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

**QSLs, Samples 25¢.** Rubber stamps; name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

**QSLs \$2.00 per 100 postpaid.** Free Sample. Hobby Print Shop, Umattila, Fla. 32784.

**QSLs 300 for \$4.35, Samples 10¢, W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.**

**QSLs 3-color glossy, 100, \$4.50.** Rutgers Vari-Typing Service. Free samples. Thomas St., Kiegel Ridge, Milford, N.J.

**QSLs Kromekote 2 & 3 colors, attractive, distinctive, different.** Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

**NEW** Plastic holder, frames and displays 5 certificates, 3 for \$1.00, or 10 for \$3.00 ppd. Regular 20-card holders, same price. Assorted if you wish. Tepabco, Box 198, Gallatin, Tenn.

**QSLs, Free samples, fast service, customized cards, W7JZ Press, Box 183, Springfield, Ore.**

**QSLs \$2.50 per 100.** Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

**3-D QSL** Cards have that prestige look, with glittering colors and metallic in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

**QSLs-100 3-color glossy \$3.00; silver globe on front, report form on back.** Free samples. Rusprint, Box 7375, Kansas City, Mo. 64116.

**Send Last! Something new in Qsl cards!** All original designs. Try 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

**QSLs** New cartoons. Top quality, fast service. Samples 20¢. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651.

**QSLs** Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

**QSL, 3-color glossy, Samples, 10¢.** Gates Print Shop, 317-11th Ave., Juniata, Altoona, Penna. 16601.

**1966 QSL** Designs. Samples 10¢. Brigham, Colson St., No. Biltmore, Mass.

**DX-QSL.** The original plastic display for ur cards. Holds 20 cards, 3 for \$1; ten for \$3. Satisfaction guaranteed. Dealers' inquiries invited. DX-QSL, Box 19033, Houston, Texas 77024.

**FINE** Embossed QSL cards, Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

**QSLs, Free samples, WA6OAY Press, Box 17112, San Diego, Calif. 92117.**

**QSLs-SWLs, 2&3 colors, 100 \$2.00, Samples dime.** Bob Garra, Lehighton, Penna.

**QSLs, 18 samples, 10¢.** Filmcrafters, Box 304, Martins Ferry, Ohio.

**HUNDRED QSLs:** \$1.00. Samples, dime, Holland, R3, Box 649, Duluth, Minn. 55803 (formerly Meininger, Jesup, Iowa).

**QSLs, Free offer with samples, 10¢.** "Jack", W3PRU, Rice's Lane, Baltimore, Maryland 21207.

**LOW** Cost QSLs: 100 4-color glossy, \$3.99. Free samples. Ed's Press, 3232 LeMoyne, Chicago, Ill. 60651.

**QSLs, Free samples, WA6OAY Press, Box 17112, San Diego, Calif.**

**QSLs, 18 samples 10¢.** Filmcrafters, Box 304, Martins Ferry, Ohio.

**QUALITY QSLs.** New designs monthly. Samples 10¢, 25¢, 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

**QSLs:** Large selection, including photos, rainbows, glossy stock types, cuts, etc. Fast service. Samples dime. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

"GOLDEN CALL" OSLS, samples 10¢, 2 x 3 in. Stamp-ett cards, \$1.00 hundred. Samco, P.O. Box 203, Wyzantskill, N.Y. 12198.

OSLS: Movers Printing, 846 Rising Sun, Telford, Penna.

3-LINE Rubber stamp or 1000 address labels, only \$1.00. Include call. Betty Harms, W1JWW, 1513 Ivywood, Pikesville, Md. 21208.

CANADIANS: Opportunity knocks but once. Brand new Elmac A-68 in original box, instructions, \$200.00; famous Elmac M-1070 power supply, 115 VAC, 12V, 6V, new, in original box, instructions, \$50.00; new Shure 104B 10-4 Mike carbon \$15.00; the complete rig for \$250. Will add 12V D.C. relay. "First come first served". Andre Robillard, 209-12th Ave., Itherville, Quebec P., Canada.

SELLING T-60 trans., \$29.95, not used. A.R.C. 6917 Chester Ave., Philly, Penna.

FOR Sale: Knight R-100A receiver, in exclnt condx, with Ameco AC-IT transmitter: \$75. Leon Golub, 3064 Brighton 4th St., Brooklyn, N.Y. 11235.

DESPERATE: Need 800 cycle filter for 75A-3, K6CNV, 6617 Rockelen Avenue, San Diego, Calif. 92111.

COLLINS 75A owners tuning knob 6 to 1 reduction, \$7.00 postpaid, J. W. Wenzlars, W4VOF, 1517 Rose St., Key West, Fla. 33040.

TELETYPE Model 15 in mint condx with table, power supply, manual, auto-unshift-on-space, copy light, worked 20 countries, \$129.00, with converter built into table, ready to go on air, plus in phone jack, and mic jack of sss xmtr: \$395; usable with any rig, K2DCY, Tom Perera, 410 Riverside Drive, New York City, N.Y. 10025.

TOOFILES: 6CW4-\$1.40; 6146B-\$2.55; 6146B-\$4.75; 6360-\$3.45; 5894-\$15.00, 417A-\$3.95. New, boxed, guaranteed. No pulls, seconds or JAN. Free catalog and hundreds more. Vanbar Distr., Box 4442, Stirling, N.J. 07980.

HAM Discount House. Latest amateur equipment. Factory-sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANTED: Tubes, all types, write or phone W2ONV, Hill Salerno, 243 Livingston Avenue, Garfield, N.J., Tel. GARfield Area code 201-471-2020.

CASH For Your Gear We buy sell and trade. Send for free bargain list. H & H Electric Supply, 506 Kishwaukee St., Rockford, Ill.

WANTED: FR-2409 bandpass filter. State price. Pete Chalmers, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

DXer Beware: A real bomb. York 5000 transmitter, 1 kw, using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep, 6 ft high. Further details, Bill Brown, W6SYK, 28 Marine Lane, Hazelwood, Mo. Tel: Hempstead 4-5440.

COLLINS Owners: AM Kit, \$5.00! State model KWM-2 independent receive control, \$15.00. Kit Kraft, B-763, Harlan, Ky.

RTTY Gear for sale. List issued monthly. 88 or 44 mhz toroids, five for \$1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

4000 Radlows for hams, German-English. Send one dollar bill to Christian Zangerl, OF9SZ1, Dornbirn, Austria.

HIGHLY Effective home-study review for FCC commercial phone exam preparation. Free literature. Cook's School of Electronics, Box 747, Riverdale, N.Y. 11902.

HOUSE, Custom-built estate home, ideal ham location, 400 ft. high point in Stamford ridges 35 miles from NYC, 3 bedrooms, den, 2 full baths, solarium, terrace, 2-car garage, sundeck, large kitchen, privacy. On landscaped acre: \$46,000. Two adjoining acres available. Financing arranged. WITZX, Erich Quast, Skymeadow Drive, Stamford, Conn. 06903.

RTTY Extra clean Telco Reconditioned Model 19, \$175.00; Model 14 typing perforator with keyboard and 14-TD, \$125.00. Sry, no shipping. New tested ML-6C21 tubes, \$15.00 each. W8CEG, Tel: 513-542-3643.

KWM-2 and AC supply with single band KW finals, all bands HV supply sale or swap for travel trailer or aluminum boat with outboard motor K3VIL. Telephone 33441, 583 Arch St., Meadville, Pa.

HALLICRAFTERS SX-101A, HT-32, HT-33, in exclnt condx: \$600. Will separate. Tom Leach, K9ROR, 4616 Wilson Ave., Downers Grove, Ill. (Chicago suburb). Tel: WO-9-1185.

KWM-2 and 516F-2 AC supply, \$650.00, certified check. H. L. Parrish, W5PSB, P.O. Box 3915, El Paso, Texas 79909.

VIKING II and VFO, \$85; HQ-150 and spkr, \$90; 3-cl. Tri-bander, \$30.00. Stiffler, K6CZK, 1501 Spencer, Santa Rosa, Calif.

PRINTED Circuit materials. Three sample pieces and details, one dollar. Betty Nofin, 35 Arbor Drive, New Hartford, N.Y.

TELEPRINTER Parts. Fast service. W4NYF, Schmidt.

KWS-1, exclnt condx, clean, \$750; KWM-2, 351D-2, 516F-2 with speaker, and Adcom mobile supply for KWM-2, never mobilized, \$895. Motorola 45 ampere alternator, transistorized regulator, universal mounting brackets, new, \$40.00. Inquiries answered. Orders considered. C. Jacobsen, 2001 W. Cone, Greensboro, N.C.

DRAKE 2-B, used less than 2 hours, like new condx, \$199.00; crystal calibrator \$13.00. Elvin Miller, 3845 Kipling Ave. So., Minneapolis, Minn.

BOOST Reception—3-4—30 megacycle SK-20 Preselctor kit, \$18.98. Boost modulation, AA-1 clipper-filter kit, \$10.99. Postpaid. Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

BARGAIN: Spotless SX-101 Mk III, including manual and original cartons, for Heathkit Ham Shack Only \$135.00 cash. W6FRB, 1011 Oak Grove Ave., San Marino, Calif. 91108.

MOBILE Rig complete: Johnson Viking mobile transmitter and VFO, 5 bands 60 watts, Elmac PMR-8 receiver. Transistor power supply powers receiver and the transmitter. Mike, antenna, relay, cables, filters, antenna, manuals. In exclnt condx. All for \$190.00. Marv Polan, W2MVS, Tel: 1N-1-4919, 140-39 34th Ave., Flushing, L.I., N.Y.

FOR Sale: to raise money college tuition: National NCX-3, \$225; NCX4 ac power/spkr, \$75; Heath Sixer HW-29 A transceiver, \$40; Matching 6/12 vdc supply, \$40. All in exclnt condx. Curtis, K3RXX, P.O. Box 102, Centre Hall, Pennsylvania 16828.

WANTED: QST's 1916 to 1920 inclusive. Government Call-books, Fleming de Forest, Moorehead, Audiotron tubes, Marconi and Wireless Specialty receivers. Private collection. Top prices. John Cain, 1101 Belle-Meade Blvd., Nashville, Tenn. 37205.

WANTED: Hy-Gain 18 Ht. Hy-Tower or Johnson "Matchstick." Will dismantle and pick-up within 100 mile radius. Call or write A. J. Bertolisi, W2ALT, 382 Fulton St., Farmingdale, L.I., N.Y., Tel: 516-CH-9-0923 anytime.

75S-1 Rejection-tuning, \$300. F.o.b. WAIDBJ

RUBBER STAMPS \$1.00. Call and address. Clint's Radio W2UDDO, 32 Cumberland Ave., Verona, N.J.

MANUALS For surplus electronics. List 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

MINT 75A-4, No. 5349, 3.1 kc, and 800 cycle filters, vernier, \$440. David Allen, W1WAL, 9 Upland Rd., Burlington, Mass.

NCX-5 Transceiver, xtal calibrator, NCX-AC power supply. Checked and tested by factory representative. No carrier. New in March 1965, only about 15 hours operating time. No time to operate. \$550.00. Will ship collect, or will meet buyer at a reasonable distance by car. R. J. Doherty, Box 247, 11 Huntervale Ave., Rye, New Hampshire. Tel: 603-964-8912.

WANTED: 3-phase Delta plate transformer, primary 220V; secondary, 3-phase wye, 1 A, approx. 1300 V each leg of wye; or three 1-phase transformers. Same specifications. Also need smaller 220 V transformers. E. E. Hanson, K7PDI, 3127 So. 2800 E., Salt Lake City, Utah 84101.

WANTED: 75A4 serial 5000 or higher. Also KWS-1. Must be in mint condx. Advise complete information, best price. All inquiries will be answered. W9YFV, 400 Bloomingdale Rd., Itasca, Illinois. Tel: 312-773-1123.

SPECIAL Filament xfmr 120V, 60 cy, pri. 2 sec. 7.6V, @ 21 amp., and 5.1V @ 13 amp. Unused. Sealed, \$4.50 plus postage. Wt. 14 lbs. A.R.C. Sales, P.O. Box 12, Worthington, Ohio.

SEASON'S Greetings And Best Wishes to all my ham friends. Frank Blaustein, W2JICS.

SALE: HW-12, SB-200, SB-300, SB-400, DX-60, HR-10, SX-101, GR-64. Name the kit you want. Wired or repaired. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

FOR Sale: Johnson Viking II with 122 VFO, \$100.00; HP-13 mobile power supply, \$49.00. WAZGCL, Sanders, 168 East Fulton Ave., Roosevelt, N.Y. 11575.

SELL: Xclnt condx: R-390A receiver with manual: \$600.00, J. C. Larson, W6IMQ, 330 No. Saltair Ave., Los Angeles 49, Calif.

FOR Sale: One NCX-5, AC/PS, used 20 hours; \$530.00, or will trade for NCX-3 or PW-12. Solomon Hofer, Spencer, South Dakota.

NCX-3 and NCX-4, used only 20 hours, in original cartons: \$300.00. Will toss in mike, headphones, 2000 Coy. Cole Hendry, W0FTZ, 4401 E. 48th Terr., North, Kansas City, Mo. 64119.

SELL All or part of complete rig, excellent condition: Johnson Viking II transmitter with Heath VF-1, Gonset GR-63 receiver with preamp, Extras. All for \$250.00. WBFJAJ, Andy Germain, 544 Larch Lane, East Meadow, N.Y.

COLLINS S/Line 32S-3, 75S3B, 516F-2 AC power supply, all less than one year old. Like new condx. Lot price, 1,000. WA4-LUN, Box 238, Troutman, N.C. Tel: 528-5246.

CHRISTIAN Ham Fellowship now being organized among Christian hams for fellowship, tract ministry, missionary efforts among hams. Christian Ham Calbook, \$1.00 donation. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49424.

FOR Sale: Cash & Carry, Valiant, \$150.00. NC-303, \$250.00. Gary Schmidt, WAZAY, 238 East 58th St., New York, N.Y. 10022. Tel: Plaza 9-3591.

HT-32 in exclnt condx! No flaws, no scratches! \$249.00. Also trade for ham equipment: 2 CB Realtone walkie-talkies, worth \$90. Both in gud condx. Each has 11 transistor radio, WA0-KRN/5, Dick Lauderdale, 6601 Nasco Dr., Austin, Texas.

FOR Sale: NC-155 receiver, in gud condx. Will consider swap or trade for RTTY gear, \$100 or your best offer. K1TWK, K. W. Nokes, Island Park, Ipswich, Mass. Tel: 617-356-4771.

SALE: QST magazines July 1919 to December 1940; antique tubes and gear. Send for list. John Kanode, W4WSF, 244 Parkway, Winchester, Va.

SELL: Apache, \$100; SX-101, \$125.00. WA6CCC, 1220 S. Church St., Lodi, California 95242

MERRY Xmas and a Happy New Year from W0CVU, On the air since 1913. Still a wonderful hobby through these fifty years. 75A-4, #2670, 3.1-2.1 filter, station control in Collins spkr. All factory mod., clean. Will ship C.o.d. \$400.00. F. Bates, 900 Mayfield, Winterpark, Fla.

SWAP Mosley CM-1 receiver for T-150. W0BHA, Bird Island, Minn.

SELLING Out! SASE for bargains: HQ-170-A; GSB-100, linears, etc. K9RGH, 9600 S.W. Highway, Oaklawn, Ill.

WANTED: Heathkit VHF-1 Seneca, any condition but with no parts missing. Must be located in New York City area. Contact George Hawrysko, W2CVU, 115 South Second St., Brooklyn, N.Y. 11211, Tel: EV-8-1893 between 5-7 PM.

SELL: TR-3, AC, DC supplies, speaker. All new condx. factory warranty, \$560.00. Collins 75A-4, like new, over 5000 serial number, \$525.00; New-Tronics 10M mobile, Kreco 10M coaxial antennas, American I-501K mike, B&W KW balun, all bands. Make offer. Bell & Howell 8mm movie camera (trade?), extra lenses, 6 volt mobile power supply, R. Lamb, 1219 Yardley Road, Morrisville, Va. 22067.

HEATH 10-80M, SSB for collegue money. HX-20, HR-20, HP-25, all mounts, \$300 plus shipping. WASEGZ, Box 4166, Lubbock, Texas 79409.

WANTED: Many types Military or Commercial Surplus. Airborne, Ground, test sets. Try the Big Boys and then write or call collect Area code 703: 560-5480 and give us your price. We pay cash and freight. Dun & Bradstreet rated. Ritco, P.O.B. 156, Annandale, Va.

TUNAVERTERS! Half mobile station AM-SSB-CW, \$19.95-\$24.95! Transistor, 6-1 tuning, calibrated converters for Marine. Amateur, SW bands! Satisfaction Guaranteed! Saich & Co., Woodboro, Texas 78393.

HALLICRAFTERS HT-37, SX-101 Mark IIIA, SR-160 with AC/DC power supply, vud condx. Make an offer. Howard Lane, 120-2 Chevy Chase, Minot AFB, North Dakota.

WRL Blue Book prices save money on quality used gear. Take 10% without trades. G76, \$179.00; "Sideshow" 7A, \$299.00; 626-1, \$650.00; 32V-1, \$149.00; Ameco, \$149.00; Yallant, \$199.00; HT-37, \$269.00; SB-400, \$299.00; Invader 200, \$289.00; 200V \$499.00; HT-41, \$299.00; Loudenboomer, \$299.50; PRO 6001X, \$199.00; SX-101A, \$219.00; SSI-R, \$545.00; HO-10, \$55.00 and hundreds more. Free list. Leo, W0GFO, Box 919, Council Bluffs, Iowa.

GONSET Model 900A 2-meter Sidewinder with model 901A: AC supply, \$325.00; Gonset 2-meter Communicator III with Ameco Nuvistor preamplifier, \$150.00; Viking Ranger I, P11, factory-wired, \$100.00; new stock Craft 2-meter Bigwheel, \$8.00; Collins 8R-1 xtal calibrator, \$10.00. W2CYX, R. L. Kanorski, R.D. #1, Lebanon, New Jersey.

FOR Sale: HQ-110-AC with S-200 speaker and Ameco PV-50 preamp, \$170.00; Clegg 99'er and Comaire CF-6 bandpass filter, \$90.00; Globe V-10 VFO 6-160 meters, \$25.00. Multi-Elimac AF-68A and M-1070 power supply 12 VDC and 120 VAC, \$170.00; ATR 12U-RSP inverter, \$25.00; Ameco PCL preamp and power supply, \$18.00. Donald Radman, K1VMX, 21 Baxter Drive, South Norwalk, Conn.

FOR Sale: Heath DX-60, \$50.00; Eico 720 xmt, \$50.00; Parks 30-1 6 mtr. converter, 14-18 Mc. IF, \$25.00; Heath G-W-30 walkie-talkies, \$25.00 pair; Heath O-multiplier, HD-11 \$10; Heath HD-20 xtal calibrator, \$12.00; Two Eimac 7034 tubes, new, \$25.00. Eimac SK-610 sockets, \$10 each. All equipment with manuals and shipped postpaid. Philip Heck, W6CVD, 297 Lynnbrook Ave., Ventura, Calif.

SELL: In xclnt condx: 50 ft. Rohm Model 25 tower. Hornet TB-600 Triband Kilowatt beam. Both for \$100. K1SRZ, 545 Potter Road, Saxtonville, Mass.

COMPLETE 10 meter phone station including: Lettine transmitter (40 watt input); Heathkit receiver, microphone, antenna tuner and three element beam with rotor. Robert G. McCarthy, 186 Marlyn Ave., Lansdowne, Penna.

APACHE, Johnson low-pass filter, Dow-Key relay, \$160.00; xclnt condx. Lyn Nall, K4TFP, 1025 21st Court, Vero Beach, Florida.

RCVR, new, HQ-170AC, \$260.00; Gonset Com. III 6M, perf., \$160.00, both; \$400. N.Y.C. WA2OVG, Tel: 212-WO-2-2369.

WANTED: Early studio microphone circa 1930, Carbon element suspended from large outer ring by four springs. Original manufacturer believed to be RCA. Please state condition, price and associate information. K2LRE/KL7, J. M. Shaw, CTSN, U.S. Naval Communication Station, Box 10, Dorm G, FPO Seattle, 98791.

GONSET Twins, in xclnt condx, 6V, 12V and 110V power supply and all cables, \$135.00. Heath D-2, HF sig., \$22.00; Knight VFO, \$25.00. Johnson, modulator, \$7.00. 51J-3 recvr, \$35.00. Will ship. Ted, K6LJA, 1009 Riverlane, Santa Ana, Calif. 92606.

SELL: SX-101 Mk III; SX-111, Eico 723, Matchbox, SWR, Atomic inst, 15000V DC reg supply; plate trans 7KV, 5KV at 1 A., 110/220V AC input; broadcast quality speech compressor, U.S. govt. AM 864/U; McLean dual blower. Make an offer. K2LAI, 427 E. 69th NYC, Tel: TR-8087.

KWM-2, \$695; SW-240, \$240.00 and 12V DC supply, \$70.00. Both for \$300. KWM-1, DX adapter, AC supply, \$375.00, or your best offer. No trades. Louis Kocurek, Jr., 108 Thelma Dr., San Antonio, Texas, 78212.

10 volt, 20 amp. fil. xfmrs. size: 5/2 i. sq., \$7.50 plus shipping. K3MNI.

HAMMARLUND HQ-180C, xclnt condx. Best offer over \$225. Tom Benewick, WA2OBT, 11 Montrose, Allendale, New Jersey.

BARGAIN: Commercial SSB units like new, R-F Model SB-6F, \$400; Westex 9182, \$500. Neither unit ever used "on the air." Contact W. W. Scott, P.O. Box 6527, Raleigh, N.C.

SELL: HW12, \$115.00; Topaz C10WDG, \$45.00; Hustler MO-1, RM-75, mount, \$15.00; Dow-Key TR, \$5.00; Heath OL-1, \$25.00; Heath balun B1, \$4.00, Astatic JT-30, \$7.00; TS-413 microvolt signal generator, \$75.00; 5842/417, \$3.00; 6844, \$5.00 7077, \$15.00. Tubes, new. H. L. Snivey, Morningside Drive, Madison, Alabama.

I Need QSTs from June 1919 to July 21 to round out my file. Copies must have both covers. What do you have? How much do you want? Elmore Fitz, Lanesboro, Mass.

SELL: Johnson Viking Valiant, exceptionally clean condx. No homebrew modifications. \$150.00. K4G3J, 907 Magnolia St. S.E., Aiken, S.C. 29801.

DRAKE 2B with speaker and crystal calibrator, Viking Valiant, Ameco 2400 converter, make offer. W3NRG, 48 St. Andrews, Severna Park, Md.

COLLINS KWM-2, PM-2, CC-2, 312-B4, \$900, New 75S-1, used 3 months; \$325.00. Lt. R. P. Huffman, 205 Johnson Ave., Mather AFB, Sacramento, Calif. 95655.

HALLICRAFTERS HA-6, HA-220, Panadaptor, \$45.00; vacuum variable, \$25; Bird 611, \$65.00. Ampidyn 621, list VHF-UHF-HF gear excess to needs for stamp. Wanted; P & H VFOmatic 8010. WA4PL, Box 4095, Arlington, Va. 22204.

COLLINS 30L1, with four UEW572B and four 811A spares. Harvey-Wellis Z-Match with built-in dummy load. Art, WA9-IQP, 811 Franklin, River Forest, Ill.

FOR Sale: Heath HA-10 Warrior Kilowatt linear, \$150.00; Heath DX-100, \$80.00. Equipment in vny nice condx. K9LWA, Robert White, 2540 Birch Drive, Richmond, Ind.

HEATH: 600V, 300V, \$135.00; AT-1, \$15.00; VF-1, \$15.00; homebrew; Apvch, Apvch, pwr/supps, pr. 807's, final, BC-348, \$15.00 each. Pick-up deal only. B. Sievers, 115 Hillside, Menlo Park, Calif.

HALLICRAFTERS SR-160 transceivers, AC and DC supplies, VOX control, xtal calibrator. All in guarantee. W2WEE, Tel: 201-388-0851, E. Muska, 77 Union Ave., Colonia, N.J.

COLLINS 75A-4 2 filters and manual, serial #5799, \$500, in perf. condx. Local deal preferred. New, never used, Johnson 6 and 2 converter, manufactured, not a kit; 28 to 30 mc., \$40.00, National NC-300 220 Mc. converter, \$25.00. Master Mobile antenna mount 446XSS, \$9.00; Cush Craft AM 22 2-meter stacked halo, \$8.00; Kreco DG P-6A stacked 6 meter ground plane antenna, \$20.00; Dow-Key DK-6-CZC 12-volt relay \$9.00. Used Heathkit 2'er, \$40.00 and Vibroplex chrome Original deluxe, \$15.00. You pay the shipping charges. WB2-ASR, P. Zarch, 2728 Kines Highway, Brooklyn, N.Y. 11229.

SELL: Eimac 4X250B tubes, Guaranteed gud condx. \$6.50 each, \$10.00 pair prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr., W5JLO, 722 So. 30th, Muskogee, Okla.

NATIONAL NCX-3, NCX-A, almost new, never mobile, \$325.00. Mint HRO-60T with 4 coils, \$275.00. K9ZNX, Jones, 1135 Bohland, Bellwood, Ill. 60104.

SB-10 wanted, with book. State price and condx. W4TJU, Wells, 3107 Trentwood Blvd., Florida 32809.

MATCHBOXES: KW with built-in SWR, \$120.00; 275 watt, \$40. Original cartons, perfect. G. Baxter, Indian Lake Shores, Wakefield, R.I.

MINT Condx: Drake 2B, 2BQ calibrator, original cartons; \$220.00; Hallicrafters SX-100, \$120.00 Bargain parts list, SASE. WA2YZN, 636 Chilton Ave., Niagara Falls, N.Y.

DX-40 for sale, \$50. Includes extra 6146; Moheican GC-1A also for sale, \$75.00, including AC power supply, K4VDE, Richard Bergen, 1000 Lincoln Ave., Bedford, Ind. 47421.

KENNEDY Universal receiver type 110 with 2-stage amp, 175-26000 meters (long wave) offer, gud condx, sry, no shipping. W2STF, Brown, 00 Palisade Ave., Bogota, N.J.

DRAKE 2B, \$175.00. Clegg Zeus, \$375.00 and a Globe Side-bander, \$60.00. All are in gud condx. John Colicci, K1AJC, 45 Grant, Providence, R.I.

1-Heath AC VTVM as is, \$5.00; 1-Eico 944 Flyback and yoke tester, \$18.00; 1-BK 230 substitution master, \$30.00; 1-Knight KG670 R/C tester, \$19.00; 1-Eico 250 RMS voltmeter, \$20.00. Bob Penko, WA8MCS, R.D.#2, Kirtland, Ohio 44094.

COLLINS KW-1 Deluxe transmitter, 1,000 watts AM or CW. Wd make a fine SSB linear, \$1400 or make offer. George F. Norton, W4EEE, Georgia Univ. Sta., Athens, Ga.

SELL: HQ-170, \$195.00; HT-37, \$269.00 plus handling. Will consider trade for transceiver. Bruce P. Tis, K1WVY, 113 Love's Lane, Southport, Conn.

WANTED: Junk or near-junk: NC-100XA recvr with gud coils. Clark W. Baker, 976 Eaton Ave., Columbus, Ohio 43223.

RTTY Channel Filters, octal mounted, specify frequency, \$3.00 each. Zack, WA6JGI, 3232 Selby Avenue, Los Angeles, California 90014.

FOR Sale: Ham radio station of K2JZD, the late Bill Boehle: HQ-170, recv \$200; HT-32-A, SSB transmitter \$300; 40 ft. crank-up tower, with rotator, \$175.00; TA-33 Tri-band antenna, \$60.00, or will take \$700.00 for the entire station. QSTs from July 1954 thru 1964. Mrs. Mary Boehle, 231 Roosevelt Ave., East Paterson, N.J. Tel: 201-797-6046.

COLLINS KWS-1, No. 1087, all new tubes, IREC tube shields, two new spare Eimac 4X250Bs, book, cables, antenna relay. Condx xclnt; \$695. KWM-1, No. 1050, xclnt condx \$250.00, \$16E-1, xclnt, \$65.00. Roland B. Webster, K4VCT, 4401 Sunset Road, Knoxville 14, Tenn.

FREQUENCY Meters, LM-18, original AC power supply and calibration charts; \$75.00; BC-221, \$60.00, W7CBE, E. A. Eastman, 3360 E. Laurelhurst Drive, Seattle, Washington 98105.

SELL: NC-270, \$135.00; Globe Chief 90 w. transmitter, \$35.00. McGee, 58 Campus Dr., No. Buffalo 26, N.Y.

SELL: HQ-110, xclnt. Make offer! Deutsch, 545 Neptune, Brooklyn, N.Y. 11224.

MANUALS for surplus electronics. List. 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

FOR Sale: Plate transformers, 3600-0-3600 VAC @ 1000 ma, CCS, with 120/240 VAC primary. Commercial-quality units carry one year unconditional guarantee. Price \$35.00, Peter W. Dahl Co., 401 4th St., S.E. Minn., Minn. 55414. Tel: 338-9077.

POST-CHECK Extra Class—Amateur Extra and General Class FCC type exams, complete in detail and style even to the IBM type answer sheets! A must for checking before taking an exam. General Post-Check consists of 297 questions and explained answers for only \$2.98—Extra Class, 115 questions and diagrams with explained answers, \$2.00. A very good aid to learning and a must in preparation for FCC exams. 138 questions of the 297 in the General Post-Check apply directly to Extra Class also. Get both for only \$4.50 postpaid. Post-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa, 50222.

WANTED: Dumont 304A oscilloscopes. Will pay high prices or will swap 1966 color TV (Zenith) for test equipment, special deals for late type Hewlett-Packard, General Radio, Tektronix, Boonton equipment. Government test sets needed. ARC, GRC, ARN, URM, UPM, Greenwich Sales, 84 Cortland St., New York 7, N.Y. Tel: 267-1616.

HRO-60T1 with accessories, \$300; DX-100 with PTT, \$115. Both are in xint condx. Frank Klink, W7SUJ, 3027 E. Flower, Phoenix, Ariz. Tel: 274-8015.

CIRCUITS From ARRL Handbook, OST, etc. constructed. All work is guaranteed. Free information, WA6IKV/9, Whitmore, 520 So. 16th St., Springfield, Ill. 62703. Tel: 827-7209.

SB-200, factory carton. Your best offer, K9T2T, 4617 Maryland, Gary, Indiana.

KWM-2, PM-2, MM-2, new condx, in original factory cartons: \$965.00. Write or phone: Ovis T. Asleson, P.O. Box 84, Hazelwood, Mo. Tel: 314-849-0510.

TR-4, \$480.00; AC-3, \$66.00; DC-3, \$108.00. All factory sealed, in warranty, naturally. Sell separately. K4LGR, P.O. Box 10021, Greensboro, N.C.

K.W. Phone, CW Rig VFO. Less hi-voltage supplies, \$125.00, W8FBC, Rte. #1, Lafayette, Ohio.

KWM-1 516F1 ACPS spkr, \$295.00; KWM-1 spkr console, watt-meter, etc. \$99.00; 75S-1 receiver SN 11557 watt OM, \$315.00; 32S-1 transmitter SN 2586 516F2 ACPS, \$465.00; S-Line in original cartons, all in perf. condx; Hickok tube-ster 533AS. Just calibrated, \$85.00, Edward D. Flynn, W9IHD, 3118 N. Francisco Ave., Chicago, Ill. 60618.

SELL: Globe Linear LA-1, less power transformer, \$30.00 shipped, W2IHP.

COLLINS 301-1, \$350.00; Collins 75A-4, \$400.00; Johnson KW, \$400.00; Falmouth Amateur Radio Assn., Box K, Falmouth, Mass. Tel: 617-548-3146 days, and 617-548-1891 nights.

NEW Custom wired Fico 753 Triband transmitter and Heath HW12-22-32s. W8FAX, Box 182, Allen Park, Michigan.

CALL Letter plates wanted. Sell perfect HO-10 scope, \$45.00, WASERC, 154 Ronald Blvd., Lafayette, La.

SH-300 Receiver with SSB, CW, and AM filters, in xint condx: \$285.00, Steve Sussman, WA2UOQ, 1201 Shakespear Avenue, Bronx, N.Y. 10452. Tel: 992-1298.

SEASONS Greetings to all from "D.B." and Paul, WA4UQ, and W4HHK-A4HHK, P.O. Box 417, Collierville, Tenn. 38017.

FOR Sale: in mint condx: Lafayette Star-Lite, A-120 general coverage receiver, 4 months old: \$30.00; Also Heath QT-1 Q1 multiplier, in perf. condx, with manual: \$7.00. WN1ELX, 65 Blake, Worcester, Mass. 01605.

HQ-110-C, \$130.00; HT-40, used two weeks, \$80.00; ART-13, \$45.00; BC-454 or BC-455, \$10.00. Postpaid, William Blaine, 4132, Haverhill, Atlanta, Ga. 30305.

MARAUDER, HX-10, brand new, needs testing and vly little work: \$220.00, Allen Margolis, W2UJN, 196-43 69th Ave., Flushing 65, L.I., N.Y. Tel: GL-4-0354.

CE-20A with QT-1, 458 VFO, LA-1 linear, \$175.00. Package deal only. M.O. or certified check. Thad Boroughs, Rte. 4, Box 886A, Taylors, S.C.

P.H. 50 D.B. audio compression amplifier, Mod. AFC-2, with power supply. Like new condx, with manual: \$30.00, WA9JDT, Tel: 442-3767-5711, W. Brooklyn Pl., Milwaukee, Wis. 53216.

OSCILLOSCOPE, Heathkit, Model OM-2 general purpose oscilloscope, expertly assembled by W2AB, \$25.00. You pay shipping. WA4HUT, 1928 Virginia Road, Winston-Salem, North Carolina 27104.

VESTO 61-ft. tower; original installation instructions; less four 4x2-ft. ground posts, \$150.00 cash. You carry away. W1OHJ, Fred Benkey, 35 Whipple Road, Lexington, Mass. Phone: 617-862-0825.

CLEGG 500 6 & 2 meters, 185-watts returned from factory for complete check-up and still in warranty: \$395.00, Roy E. Pedersen, K9CNR, 21 W. 215 North Ave., Lombard, Ill. 60148.

GLOBE Scout AM/CW xmt, \$40.00; Heathkit SWR/power meter, \$15.00; Eico 722 VFO, \$30.00. WA1DDJ, 63 Freeman St., Hartford, Conn. Tel: 249-0313.

SELL: Heath Apache and Hallcrafters SX-101A. In perf. condx, \$335.00, K9SOF.

ENGRAVED Badges, 1" x 3", with call and first name, \$1.00 prepaid, QSLs, YLRL Specials, OM's, samples 10¢, W2DJH Press, Warrensburg, N.Y. 12885.

SELLING: Heath HW-32, 20M transistor, in excint condx. 6 months old, with good hb p.s. Cash: \$125.00, WB2OQK, Schwartz, 1129 Astor Ave., Bronx, N.Y. 10469.

SELLING OUT: Drake TR-3, \$420.00; AC-3 and speaker, \$75.00; DC-3, \$110.00. All for \$590.00, GSB-201 linear, \$250.00. All in A-1 condx. F.o.b. Paul B. Heitman, W0VRE, RFD #1, Benedict, Neb.

GONSET G-76 transceiver A.C. P.S. with speaker. Both in mint condx: \$225. Will ship. WIAMK, 371 Village St., Medway, Mass. 02053.

SELL: Pair of BC-611F handie-talkies complete for 3885 Kc operation: \$30.00, D. Robinson, 325 Wedgewood Dr., Lower Burrell, Penna.

CLEGG 99'er, \$79.00; Eico Mono 50-watt amp., \$35.00. Keltzman, Stony Brook Road, Darton, Conn.

ACCUMULATED Apparatus: F/W Central Electronics 20A, 488VFO (160-10) Deluxe case, QT-1, \$135.00; Heath DX-40, \$35.00; VF-1, \$15.00. No scratches or modifications, all manuals. Surplus 1D-6B/APN-4, 5" scope W/T \$15.00. Ship at your cost. W7GXC, 414 Fountains Circle, Murray, Utah.

COLLINS KWS-1, buy of a lifetime! Factory-sealed carton, completely modernized and fully guaranteed by the factory. Exceptionally fine condx: \$650.00, Ray Clurman, W2LNP, 134 Wheatley, Glenhead, N.Y. 11545.

JOHNSON Ranger II, \$175.00; Johnson Viking I and 122VFO, \$75.00; Ameco X86, \$45.00; Hammarlund HQ-129X, \$75.00; Hammarlund HC-10, \$60.00; Hallcrafters SX-71, \$70; Lyco Transmitter, \$25.00. All in gud condx. Philip Schwabler, Jr., 4536 N. 50th St., Milwaukee, Wisconsin 53218.

SELL Beautiful SX-111 receiver in mint condx. Cost \$279, With 100 kc xtal, \$150.00 firm. R. B. Enemark, WINLL, 2 Lyme St., Weymouth, Mass.

CRYSTALS Airmailed: MARS, SSB, Nets, Novice, etc. Custom finished etch stabilized FT-243, .01% any kilocycle 3500 to 8600 (100 kHz or more \$1.70) (Ten or more same frequency only \$1.35) (700 to 3499 and 8601 to 20,000 \$2.50) Overtones above 10,000 Kilocycles. Add 50¢ each, ARRL crystal kits: "DGIS-500", "IMP", \$9.95. Many other filter and oscillator crystals and kits. Write stating exact needs. Add 10¢/crystal airmail, 5¢ surface. Crystals since 1933. C-W Crystals, Route 2, Box 22-B, Marshall, Missouri 65706.

HEATH HX-10 Marauder transmitter, in A-1 condx: \$250.00. Will deliver up to 150 miles radius or pack for shipment. Johnson 250-23-3 Matchbox, with coupler, \$45.00, W9USO, 904 Miss. Blvd., Bettendorf, Iowa.

NCX-3, NCX-D, Homebrew AC power supply, mobile bracket, 40-meter Hustler whip, \$360.00; Gonset G-76 with AC power supply, \$210.00, K8IRQ, 29141 Shirley Ave., Madison Heights, Mich.

FOR Sale: Collins 75A-4, matching 10" speaker, manual, \$400. Johnson Ranger, \$120.00. All in xint operation condx, and appearance. K4YVL.

SELLING: NC-183D, \$130.00; Heath Twoer, \$40.00; Dumont 294A 12 Mc. lab scope, \$100; Millen VHF amp, with 829B coils, \$25.00; B&W 880B TR switch, \$10; new BC-7740 emergency transmitter, \$20.00; Heath 5B-300, State serial number, condition, price W2EWS, 14 Oak Ave., So., Huntington Station, N.Y. Tel: 516-HA-1-3824.

SX-100 with speaker, \$145.00; Vibrog 99'er with halo, \$110.00; DX-40 with VFI VFO, \$45.00; Cleopex Bug, \$15.00; HE-45B, \$25.00; Simpson 270, \$50.00; Monitor scope HO-10, \$55.00, W8ZSQS, 234 Cedarhurst Ave., Cedarhurst, L.I., N.Y. Tel: CE 9-7481.

HALLCRAFTERS HA-5 VFO. Extremely stable, Perfect. Looks like new inside and outside. In factory shipping carton with manual. \$55.00, C. Brooner, W9FSW, P.O. Box 261, Morton, Illinois.

SELL: Johnson 500, in xint condx, 4-400 in final; factory wired. Make offer, W8DSV, 6635 Crane Ave., Detroit, Michigan 48213. Tel: 313-925-4990.

VIKING "88" tape deck, new, \$175.00; National NC-303, with speaker, \$235.00; SSB-400, new, \$260.00; Viking Ranger, \$110.00; Elmac A54H, xmt, \$15.00; S22, \$10.00; Johnson SWR, \$18.00; Matchbox, \$38.00; D-104 mic, \$11.00; JI-30, \$5.00; Bud LPE, \$6.00 W2FNT.

Heath 6 mtr. Shawnee, complete \$150; Matchbox \$38.00, John Kakstys, 18 Hillcrest Terrace, Linden, N.J. Tel: 201-486-6917.

10R, QT-1, all coils, manual, in xint condx. First reasonable offer gets it, subject to prior sale. K8HJJ.

LEAVING Country. Must sell equipment including meters, dynamos, transformers, low-pass filters, chokes, tubes, BC-348, etc. Donald Slattery, Loveland, Colorado.

COLLINS 75S-2 revr, \$275.00, J. F. Young, W5HXW, 1214 Northlake, Richardson, Tex. Tel: 214-235-6927.

SELL: Eico 720, \$70; Eico 730 730 modulator, \$45.00. Both \$100. Write Bill W2JDE, 46 Bradish Lane, Bay Shore, N.Y. 11706.

SELL: HO-100 w/matching speaker, coil, manual FB condx: \$125.00. Will deliver NYC area. WAZTBT, Reid Edies, 31-32 54 St., Woodside, L.I., N.Y. Tel: AS8-1837.

COLLINS KWM-2, never mobile, with PM-2 AC supply. Waters notch, like new, price: \$775.00, Collins 75S-3 with 200 cycle for use as a filter, for AM, only 1 yr. old. Price: \$425.00, W9CRJ, 812-425-9857 after 6 PM, Barnes, 765 Lincoln Ave., Evansville, Ind.

FOR Sale: Hallcrafters HT-37, perfect condx, \$240.00, Albert Brehm, W8MFW, 5081 Sumter, Cincinnati, Ohio 45238. Phone: 921-1037.

75A-4, Ser. No. 3165, with 2.1 Kc filter: \$400. Prop pitch motor, \$25.00, Jack Short, WAUHA, Route 2, Box 20, Oxford, Ala. 36203.

SELL: Galaxy V, VOX, calibrator, speaker, console with AC supply, A-1 mint condx! Used less than 4 hours! Yours for only \$450.00 cash. 3-element full size Telrex 10-meter beam, only \$20. Mor-Gain 40-80 meter dipole, only \$10.00. All perf. condx! Contact K3MVP, Cooper, 8258 Brittany Place, Pittsburgh, Penna. 15237.

CLOSEOUT! Discontinued full-size beams, new 7/8" and 1" aluminum; 3-element 20-meter, \$22.00; 2-element, \$16.00; 3-element 15-meter, \$16.00; 2-element, \$12.00. Shipped express collect. Gotham, 1805 Purdy Ave., Miami Beach 39, Fla.

KEYER-Monitor-Compact; Model KM-1A keys your transmitter with hi-speed, sealed relay. Internal speaker monitors keying with loud, crisp tone. Attractive cabinet has front Key-Jack, Tone/Off Control, Hi/Lo Volume, and rear keying terminals. Requires 2 flashlight cells, \$19.95 PP U.S.A. Electro-Signal Lab, 782 Broad Street, Weymouth, Mass. 02189.

WINTER Specials: HO-180C, \$249.00; HO-170C, \$189.00; HO-110C, \$139.00; HC-100C, \$109.00; A667s, \$39.00; DX-100s, \$79.00; DX-60s, \$49.00; AF68s, \$89.00; HC-129Xs, \$89.00; NC-300s, \$169.00; Viking Valiant, \$139.00; GR-64, \$49.00; 500 watt Courier, 149.00. New, boxed HT-37s, \$349.00; 200 watt Invader, \$269.00. Free List. Howard Radio, Box 1269, Abilene, Texas 79604.

CHRISTMAS For the technically-inclined ham should include a copy of "Radio-Electronic Transmission Fundamentals" by Griffith (W5CSU). McGraw-Hill, \$10.75, Griffith, Box 798, Garland, Texas.

SELL: HT-37, \$250.00; Heath 5 in. oscilloscope, \$50; R.F. signal generator, \$12.00; V.T.V.M. with A.C. and R.F. probes, \$75.00; Motorola Receiver, \$65.00; 2 enclosed 19-in. relay racks, 42H, \$17.00; 200 tubes-2 new 100THs, \$7.00; 2 new T240s, \$5.00; 2 new 807s, \$2.00; 2 used 1W75s, \$2.00; solid state power supply, 2,000V, 350 MA, \$25.00. Cash & carry deal only. W2AEA, 33 Sterling Drive, Livingston, N.J. Tel: 201-992-1421.

RANGER I, \$150.00; RME 6900, \$290.00, Mike Bellinger, 2110 Lincoln Way, Ames, Iowa.

MARAUDER HX-10, professionally wired, barely used, and absolutely like new, \$265.00; NC-300 with matching speaker, calibrator, and 6 meter converter, \$175.00. Both for \$410.00. DX-100, professionally wired, \$120.00. All scratchless, Charles E. Minter, W4MNS, 2711 Nottingham Rd., S.E., Roanoke, Virginia 24014.

SX-96, speaker, manual, exclnt, \$110.00; S-404, exceptional, \$50.00; Tel-tex 2-el. 40-mtr. beam, \$50.00; Bargain list of parts. Clare Mercury relays, \$1.50. W0LWZ, Rickard, 1030 So. Dudley, Denver, Colorado 80226.

TR-3, \$375.00; the smart man's KWM-2. Same stability, greater brandspread, same calibration accuracy. Also have Galaxy V w/a.c. demonstrator, save \$50. Galaxy 200WV bomber, fantastic. Will take Warrior in trade. W0BNNF, Box 105, Kearney, Nebraska.

GOING TO College. Selling entire station: HT-37, SX-101A and speaker. All in exclnt cond. Make reasonable offer. F.o.b. Topeka, Ralph Haller, K0YMA, 3530 Adams, Topeka, Kansas 66605.

COLLEGE Expenses! Must sacrifice RME 4350-A receiver, \$149.00; Lafayette SWR/Field Strength meter, \$19.00. Both with Thomas Mercury, K1EOP, Box 638, Lowell Technological Inst., Lowell, Mass.

FOR Sale: DX-100B. Needs transformers and chokes. Your best offer. W1ADJO.

WANT: HRO-50, HQ-120 receivers. Steve Sullivan, W2DYU, 360 Marlboro Road, Englewood, N.J.

WANT Globe King 500 or Johnson 500. Bob Sturdevant, Callicoon, N.Y.

WANTED: Regency ATC-1 converter. Stan Putra, 1429 Lawdale, Racine, Wis.

SELL: RME-4350 rcvr, Knight T-60 xmt, both in v. gd condx. No reasonable offer will be refused, priority receipt. WA8RPC. Terry Minsel, 916 Wilhelm St., Defiance, Ohio, 43512.

COLLINS S/Line for sale: 75S-1, 32S-1, 516F-2 and 30L-1 linear bought in February 1965; \$1300. Or, sell separate. Lafayette sweep and marker generator, never used, your best offer. Steve Koczko, WB2FFK, 288 Fourth Ave., East Orange, N.J. 07017.

"HOSS-1rader Ed Moory Plays Santa Claus": Demonstrator Equipment SR-500, \$309.00; SB-2 Linear, \$189.00; SWAN-350, \$320.00; KWM-2, \$795.00; TR-4, \$439.00; New TR-3, \$419.00; SBE-34, \$319.00; 30L-1, \$389.00; New TA-33 Beam & Ham M Rotor, \$179.00; Drake R-4, \$309.00; T4-X, \$339.00; New NCX-5 Marker, \$489.00; New PM-2 Collins Supplies, \$109.00; Reconditioned Gear at Unheard of Prices: SB-33, \$179.00; SR-160, \$189.00; Swan-240, \$195.00; TR-3, \$369.00; HT-37, \$229.00; 2-B, \$179.00; Johnson Ranger 2, \$139.00; HQ-140-X, \$79.00; 200-V, \$389.00; GSB-100, \$149.00; HAM-M Rotor, \$79.00; HF-40 Transmitter, \$35.00; SX-111, \$139.00; AF-67, \$34.50; Swan Mark-1 Linear, \$389.00; New TR-44 Rotor, \$49.95; Will accept reasonable cash offers on new equipment. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone Whitney 6-2820.

NOVICE Setup: Sell T-150A transmitter, \$75.00; R-100 receiver, 100 kc. calibrator, S-meter, \$60.00; both for \$130.00. In exclnt condx, with all manuals. F.o.b. WA6NAT, 9802 Forni Road, Placerville, Calif., 95667.

SPECIAL Gear made up or order from magazine or Handbook articles. Kits wired. Your own ideas worked out. W5KRU, Morgan, Box 88, Keithville, Louisiana 71047.

COLLINS 32V-3, in exclnt condx, almost "mint", used v. little, not marred, nor modified, \$225. NC-125, v. sud. National spkr, no modifications, \$60.00. Both in original cartons. R. J. Earl, 1346 Miller Court, Saratoga, Calif.

SALE: Apache transmitter, exclnt condx, Bob Aberle, W2OPP, 15 Falcon, Haysville, L.I., N.Y. 11788.

FW Valiant for sale: \$200. WA0FVI, John Hastings, 1122 West Campus, Kansas University, Lawrence, Kans.

GSB-100 (manual needed) \$5.00 paid for same, plus postage expense. Write Perry Howell, 603 Cox St., Nacogdoches, Texas.

SELL: Morrow MB-560 5-band 65-watt mobile transmitter (See Nov. 1965 QST, p. 40). W/12 to 625 volt dynamotor, \$90.00; matching Morrow SBR-FTR 12-tube mobile receiver, 12-volt p/s, \$45.00; NC-300 with xtal calibrator and spkr, 2nd conv. osc. xtal controlled with USB/LSB xtals, \$170.00; Ranger 1, factory-wired, \$105.00. All instruction manuals. R. Markel, W2IVS, 1435 Lexington Ave., New York 10028.

COMPLETE Station: Viking II, 122 VFO, 250-20 LP Filter, 22X Turner Xtal Mike, \$150.00; HRO-50T, AA, B, C, D Coils, GC and BS Scales, NBFM Adapter, Xtal Calibrator, Matching Speaker, Selectoject, \$250.00. No modifications, all excellent condition, with manuals. W4OKO, 752 Bon Air Circle, Lynchburg, Va. Phone 703-846-6832 after 6:00 P.M.

Viking Ranger transmitter with microphone, \$110.00; BC-453 (Q-7), receiver, \$120.00; 300 watt modulation multimatch transformer, \$15.00. W9TVV, 2038 Oriole Trail, Michigan City, Ind.

HOME BREWERS Wanted to meet other builders, display gear, and exchange ideas at the Roanoke Division Convention next May. Interested? For details write to Joe, W4IMP, 4318 Hanover Ave., Richmond, Va. 23221.

TWO Element Telrex 20M beam with 52 ohm matching balun for sale, v. reasonable. Herb Zambakian, W2PUK, 79 Sunset, Glenridge, N.J. 744-5704.

HALLICRAFTERS SX-101A (Has been used about 24 hours), \$200; Johnson Hvy-duty transmitter key (new), \$2.00; Bud Codemaster oscillator, as new, \$6.00; Telexco code instructor, Riders Sound N Sight code course, Riders basic electricity and Electronics, Tapecode Novice and Advanced course on tape and other books. Prices on request. H. Sieger, 2451 So. Park Rd., Bethel Park, Penna. 15102.

MARAUDER Heath HX-10 Tx, in exclnt condx, with accessories, \$220.00. WA5GFE, Tel: MO 4-4639, Houston, Tex. 5254 Indigo, Houston 77035.

HT-32B for sale, in gud condx, on the air now, priced right: \$350.00. F.o.b. Melbourne Beach, Fla. 32951. W4YGX, Box 740.

COLLINS 75S-3, in xclnt condx. Will pay shipping charges anywhere in states. First \$450 takes it. E. M. Cholerton, Sea Isle City, N.J. Day phone: 609-263-8836.

DX-60 for sale. Has worked 43 states, Europe, Africa and South America in three months. Use with phone or c.w. \$60.00. Drake 2A, in exclnt condx, \$155.00. Spkr and Q-multipl, 2 BQ, \$25.00. Heath xtal calibrator, \$8.00. Have bought TR-4, WN2TSX, J. E. Kitts, 112 E. Genesee St., Skaneateles, N.Y. 13152.

SELL: Brand new Eico Triband SSB transceiver, \$200; AC power supply, \$90.00; Both wired and tested. New Heathkit SB-200 linear amplifier, \$230.00. Gerald Williamson, Box 203, Williamstown, N.C. Tel: 792-2446.

WANTED: Globe Champ xmttr, also RME converter for 10 meters. G. C. Campbell, WAIDVE, Pittsfield, Mass. Area code: 413-443-3528.

SELL Surplus test oscilloscope TS-100AP, \$25.00; Scott LK-48 stereo amplifier kit, never opened, \$50; Astatic AB-8-S pick-up arm, \$5. F.o.b. Hartford, Conn. R. L. Baldwin, WIIRE, 26 Ridge Road, Simsbury, Conn.

QST RARE Collection from issue No. 1, December 1915. Seven issues in 1916; eight 1917; six 1919, twelve 1920, ten in 1921, twelve 1922, eleven 1923, seven 1924, twelve issues each 1925, 1926, 1927, eleven 1928. Preter sell total 121 issues complete. Offers? W. T. Feecey, P.O. Box 337, Dana Point, Calif.

FOR Sale: Hy-Gain DB-24, 20-40 meter beam. Superb on 40 mtr. \$95.00; prepaid or will trade for 1H14. Pat Kendall, K8ZZX, 4207 Maple St., Cass City, Mich.

SELL: HT-37 bought new, in exclnt condx, low operating time. Will ship freight collect, \$275.00. Also: Bandmaster Z-Match. Needs a little work on it. Price: \$40.00. Albert C. Rotor, K3GLL, R.D. 1, Jim Thorpe, Penna.

SO. CALIFORNIA Area, want 40 meter beam, rotor and small roof tower for cash. Also have Heath T-twoer with mobile gear, \$50.00 and Browning Medalist, unused, \$90.00. Ralph Thomas WN6PCZ, 4717 Oakwood, Los Angeles, Tel: HO-74412.

SELL: HT-32, Drake 2A, Bandmaster Antenna Coupler, B&W low-pass filter, First \$310.00 takes it. Will not ship, sry. Ed Hemlow, W2DKO, 51 Roundhill Road, Poughkeepsie, N.Y.

RANGER II, like new condx, \$225.00; NC-155, \$120.00. Dragone, 38 Porrea Dr., Millville, N.J.

COLLINS 75A-4 receiver, mint condx: \$395. KITUQ, 582-8849, Bristol, Conn., after 6 P.M.

SELL: HQ-160 General Coverage receiver, \$130; Globe Scout xmt, \$50; VF-1, \$15; two 900VCT xmttrs, \$5 ea. You pay shipping, WA4VPB, Apt. 1, 4215 58th Ave., Bladenburg, Md. Call: 277-5145.

SELL: Phasemaster and Handhopper VFO, physically OK but needs some work. Eico 720 and Hallicrafter HA-5 VFO, now on air. W3CD, 211 Sumner, New Castle, Penna.

## XMAS GIFT SUGGESTIONS

For that budding new amateur:  
See page 177.

For the newcomer or oldtimer:  
See page 167

For the VHF/UHF amateur:  
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For every amateur: See page 130

Don't delay. Place your order now to allow plenty of time for arrival before Christmas

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**TRANSMATCH or  
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Allows a transmitter to work into the 50 ohm unbalanced load for which it was designed. Converts a multi-band antenna to 50 ohms at all amateur frequencies between 3.5 and 29.7 MC. Match 10 to 300 ohm unbalanced loads.

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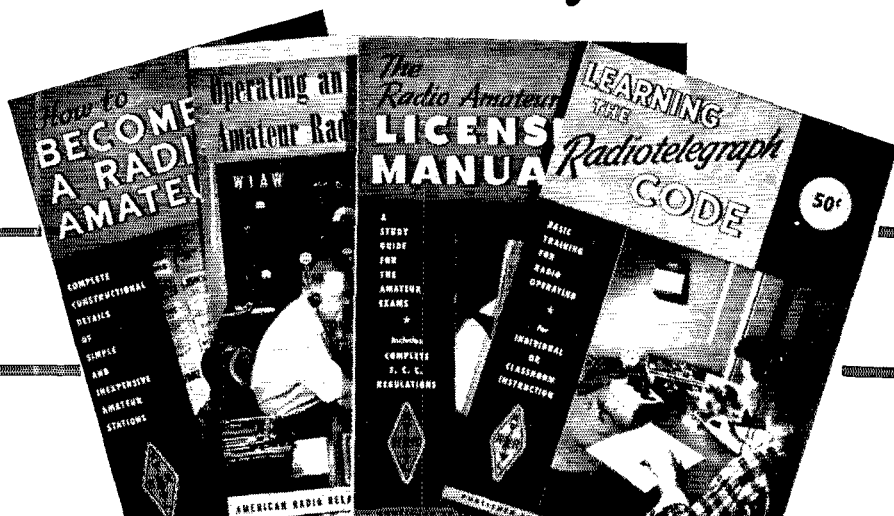
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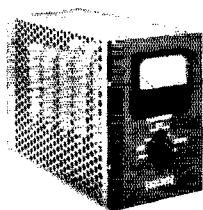
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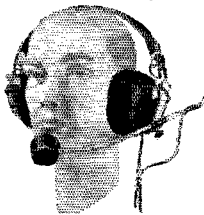
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Some Thoughts on Hang A.G.C. Systems (Opal).....	60, Dec.
Some Thoughts on Home Receiver Design ("The Miser's Dream") (Goodman).....	11, May
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Weak Signal V.H.F. Reception (Olson).....	25, Dec.
2 + 6 Converter-Preamplifier, The (DeMaw).....	48, Dec.
3.5-Mc. Auto-Radio Conversion (H&K).....	80, July
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Hallcrafters SR-42 and SR-46 V.H.F. Transceivers.....	85, July
Heathkit HW-14 Sideband Linear Amplifier Kit, The.....	89, Nov.
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Operating The Teletypewriter (Hoff).....	29, Feb.
Over-All Design Considerations for RTTY Demodulators (Hoff).....	44, Apr.
Receiving Radioteletype (Hoff).....	24, Mar.
RTTY Reception for Beginners (Blakeslee).....	28, Mar.
RTTY Indicator Systems (Hoff).....	21, Oct.
RTTY Station, Operating The (Hoff).....	44, Nov.
Some Fine Points in Traffic Handling (Hart)	
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Filterfier, The (MacCluer and Thompson, Jr.).....	32, Nov.
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Pulsed Signals Through S.S.B. Transmitters.....	18, Sept.
Pulsed Two-Tone Test Oscillator, A (Lange).....	11, Sept.
Testing a Sideband Transmitter (Blakeslee).....	14, Sept.
VXO With The 20A (H&K).....	65, Nov.
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Semiconductor Converter for 432 Mc., A (Clark).....	34, Dec.
Simple Electronic Key, A (Hayward).....	54, Dec.
Transistor Audio Oscillator, A (Baxter, Jr.).....	51, Feb.
Transistor Preamplifier for 432 Mc., A (Brannin).....	62, Oct.
Transistor Secondary Frequency Standard, A (Grigg).....	11, July
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Oscar III Compatibility with Transmit-Receive Converters (McKay).....	17, Feb.	Oscar Practice.....	162, July
Parasitic Suppressors for Final Amplifiers (H&K).....	51, June	Power Mounts for Moon Tracking (Michael).....	84, Sept.
Relayless Screen-Grid Keying Circuit (H&K).....	50, June	Semiconductor Converter for 432 Mc., A (Clark).....	34, Dec.
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W6IEL Chassis Design, The (Alexander).....	79, June	Tracking the Moon — In Simple English (Michael).....	37, Jan.
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		V.H.F. Scope Connections (H&K).....	70, Aug.
		Weak Signal V.H.F. Reception (Olson).....	25, Dec.
		2 + 6 Converter-Preamplifier, The (DeMaw).....	48, Dec.
		2N2 Receiver, The (Blakeslee).....	11, Jan.
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		6-Meter S.S.B. Mixer-Converter, A (Deane).....	51, Aug.
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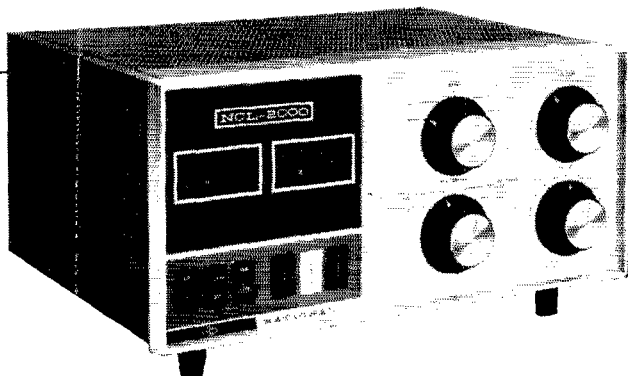
## V.H.F. AND MICROWAVES

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A.M./C.W. Exciter for 144 Mc., An (DeMaw).....	39, Sept.
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# got a match?

Definitely not. It's a cold fact that no competitive linear amplifier compares with National's NCL-2000—regardless of price. Take the time to look at the chart below and plug

in the specs of *any* amplifier next to those of the '2000 — not a single competitive unit in the maximum power classification offers even half the features of the NCL-2000:



FEATURE	NCL-2000	COMPETITION
POWER	Entire equipment I.C.A.S. rated for full 1000 watt average, 2000 watt peak input; output tubes and all RF components rated for C.C.S. operation. Power input and efficiency identical on all bands—80 through 10 meters.	
SIZE	Completely self-contained, including power supply, in desk-top cabinet (dimensions only 7 $\frac{5}{8}$ " H, 16 $\frac{1}{4}$ " W, 12 $\frac{3}{4}$ " D).	
DRIVE REQUIREMENTS	Adjustable passive grid input and use of high power ceramic tetrodes in final permits drive to full output with exciters delivering as little as 20 watts or as much as 200 watts.	
METERING	Separate rear-illuminated precision D'Arsonval plate and multi-meters for simultaneous measurements.	
ALC	ALC output to exciter for maximum talk-power with greatest linearity.	
SAFETY AND PROTECTIVE DEVICES	Fuses, time delay and plate current overload relays, plate power lid interlock and automatic HV mechanical shorting bar.	
CLASS OF OPERATION	Grid-regulated AB <sub>2</sub> permits easiest tune-up, low drive power for maximum exciter linearity, and protection from destructive peak currents.	
EASE OF TUNE-UP	Internal dummy load in grid circuit makes adjustment of exciter into amplifier possible without turning on NCL-2000 and without radiating a signal.	
STYLING	Award-winning design matches NCX-5 transceiver and complements <i>any</i> equipment.	
GUARANTEE	National's exclusive One-Year Warranty.	
PRICE	Only \$685.00.	

The NCL-2000 is a rock-crusher of a rig built to *commercial* standards. That's why you get I.C.A.S.-rated maximum legal power in a one-piece desk-top package, and why you get ALC and drive power compatibility with high quality exciters. It's why you get two

precision meters, and sensible protection afforded by proper safety devices. Match the NCL-2000 with all the others before you buy — then see your National dealer for easy terms and trade-in deals.



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66\* in '66

*\*Most sincere wishes for  
health, happiness + good cheer  
on this Christmas Day.*

**RCA** RCA Electronic Components and Devices, Harrison, N. J.

\*Message Sixty-Six (66) listed in ARRL Log Book.