

December 1963

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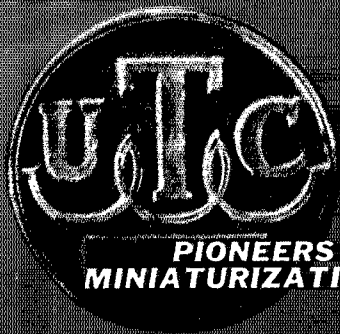
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REPLACEMENT TYPE TRANSFORMERS & REACTORS

Many years of pioneering by UTC in design, design and engineering, plus its wide product line and reliability, has established it as the industry leader in size and space. Custom built, low cost, quality units transformer and are available for both military and commercial use.

UTC makes most types transformers, like described. Pri. 115 V 50/60 cycles. Output in. Output voltage is 115 V. All units are low temperature, low humidity, and resistant to vibration. All units are designed to provide long life. All units are designed to provide long life.

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

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 $\frac{1}{4}$	3	2 $\frac{1}{2}$	2	2 $\frac{1}{2}$
R-102	350-0-350	70	3A	3A	3	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$	2	3 $\frac{1}{4}$
R-103	350-0-350	90	3A	3.5A	3 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	4 $\frac{1}{4}$
R-104	350-0-350	120	3A	5A	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$
R-105	385-0-385	160	3A	5A	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$	7

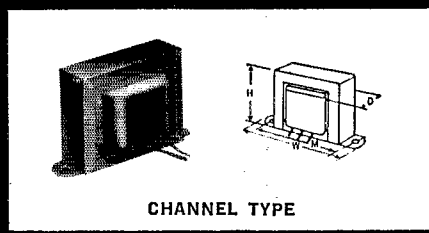
VERTICAL SHELL POWER TRANSFORMERS

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 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2	1 $\frac{1}{4}$	2 $\frac{1}{4}$
R-111	350-0-350	70	3A	3A	2 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{4}$	2	2 $\frac{1}{4}$	3 $\frac{1}{4}$
R-112	350-0-350	120	3A	5A	3 $\frac{1}{4}$	3 $\frac{1}{4}$	4	2 $\frac{1}{4}$	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

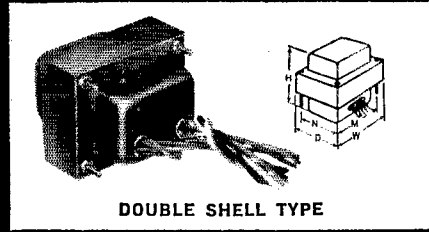
CHANNEL FRAME FILTER REACTORS

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

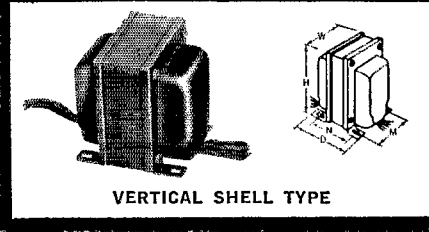
Type No.	Induct. Hys.	Current	Resistance Ohms	W	D	H	M	Wt. Lbs.
R-55	6	40ma	300	2 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	2	$\frac{1}{4}$
R-14	8	40ma	250	2 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
R-15	12	30ma	450	2 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$
R-16	15	30ma	630	2 $\frac{3}{4}$	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 $\frac{1}{4}$	2	2 $\frac{1}{4}$	1
R-18	8	80ma	250	3 $\frac{1}{4}$	1 $\frac{1}{4}$	2	2 $\frac{1}{4}$	1
R-19	14	100ma	450	3 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
R-20	5	200ma	90	4 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
R-21	15/3	200ma	90	4 $\frac{1}{4}$	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 $\frac{1}{4}$



CHANNEL TYPE



DOUBLE SHELL TYPE



VERTICAL SHELL TYPE

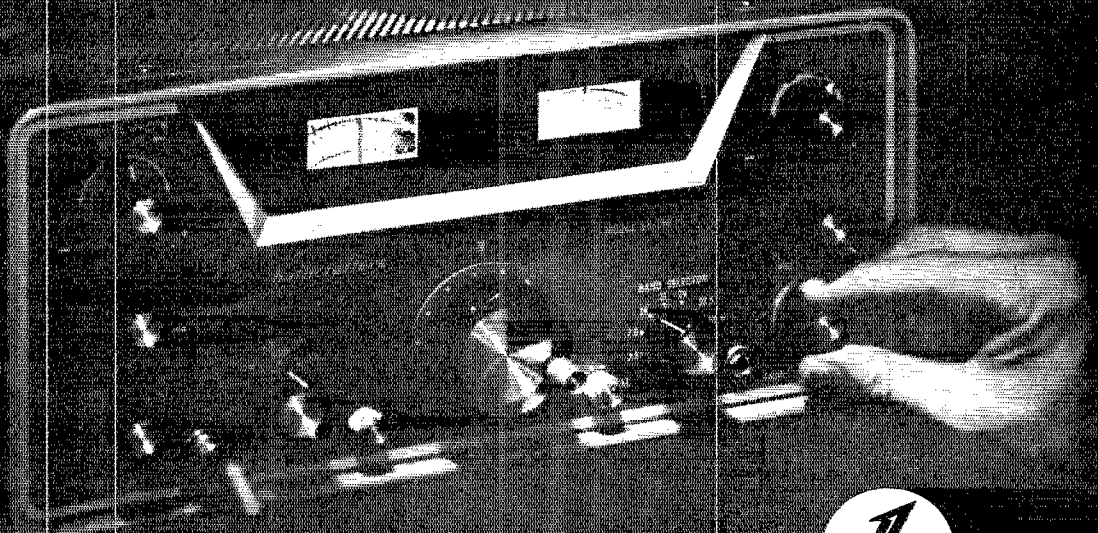
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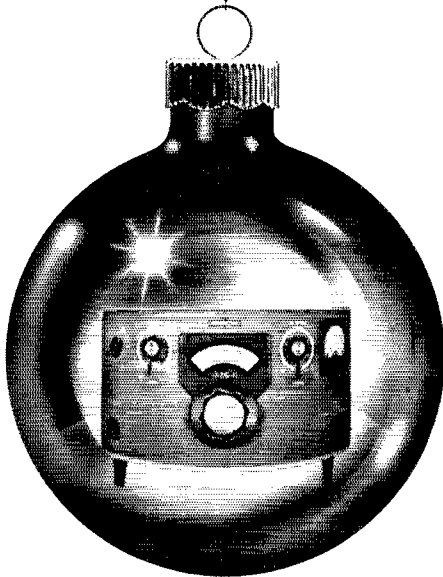
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of Christmas



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Second-class postage paid at Hartford, Conn. and at additional mailing offices.

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INDEXED BY

Applied Science and Technology Index
Library of Congress Catalog Card No.: 21-9421

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3-400Z	B SSB	3000	$\frac{.100}{.333^{(3)}}$	—	0	32	—	.12	655	$\frac{5.0}{14.5}$
3-1000Z	B SSB	3000	$\frac{.240}{.670^{(3)}}$	—	0	65	—	.30	1360	$\frac{7.5}{21.3}$
4CX250B ⁽¹⁾	AB1/SSB	2000	.1/.25 ⁽³⁾	350	-55 ⁽⁵⁾	0	0/.005 ⁽³⁾	0	300	$\frac{6.0}{2.5}$
	C/CW	2000	.25	250	-90	2.9	.019	.026	390	
	C/AM	1500	.20	250	-100	1.7	.02	.014	235	
4CX300A	AB1/SSB	2500 ⁽⁶⁾	.1/.25 ⁽³⁾	350	-55 ⁽⁵⁾	0	0/.004	0	400	$\frac{6.0}{2.5}$
	C/CW	2500 ⁽⁶⁾	.25	250	-90	2.8	.016	.025	500	
	C/AM	1500	.20	250	-100	1.7	.02	.014	235	
4CX1000A	AB1/SSB	3000	.25/.90 ⁽³⁾	325	-60 ⁽⁵⁾	0	-.002/.035	0	1680	$\frac{6.0}{10.5}$
4-65A	AB1/SSB	3000	.015/.065 ⁽³⁾	360	-85 ⁽⁵⁾	0	0/.006	0	130	$\frac{6.0}{3.5}$
	C/CW	3000	.112	250	-105	1.6	.022	.009	270	
	C/AM	2500	.102	250	-150	3.1	.026	.013	210	
4-125A	AB1/SSB	3000	.03/.105 ⁽³⁾	510	-95 ⁽⁵⁾	0	0/.006	0	200	$\frac{5.0}{6.5}$
	B/SSB ⁽⁴⁾	3000	.02/.115 ⁽³⁾	0	0	16	0/.03	0/.055	240	
	C/CW	3000	.167	350	-150	2.5	.03	.009	375	
	C/AM	2500	.152	350	-210	3.3	.03	.009	300	
4-250A	AB1/SSB	3000	.055/.21	600	-110 ⁽⁵⁾	0	0/.012	0	400	$\frac{5.0}{14.5}$
	C/CW	3000	.345	500	-180	2.6	.06	.01	800	
	C/AM	3000	.225	400	-310	3.2	.03	.009	510	
4-400A	AB1/SSB	3000	.09/.30 ⁽³⁾	810	-140 ⁽⁵⁾	0	0/.018	0	500	$\frac{5.0}{14.5}$
	B/SSB ^{(2) (4)}	3000	.07/.30 ⁽³⁾	0	0	40	0/.055	0/.10	520	
	C/CW	3000	.35	500	-220	6.1	.046	.019	800	
	C/AM	3000	.275	500	-220	3.5	.026	.012	630	
4-1000A	AB1/SSB	4000	.17/.48 ⁽³⁾	1000	-130 ⁽⁵⁾	0	0/.04	0	1130	$\frac{7.5}{21.0}$
	B/SSB ⁽⁴⁾	4000	.12/.67 ⁽³⁾	0	0	105	0/.08	0/.15	1870	
	C/CW	4000	.70	500	-150	12	.137	.039	2100	
	C/AM	4000	.60	500	-200	11	.132	.033	1910	
3CX100A5	C/CW ⁽⁷⁾	800	.08	—	-20	6	—	.03	27	6.3
2C39A	C/AM ⁽⁷⁾	600	.065	—	-16	5	—	.035	16	1.0

(1) Ratings also apply to 4X250B.

(2) Ratings apply to 4-250A within plate dissipation limitation.

(3) Zero signal and maximum signal dc current.

(4) Grid and screen grounded, cathode driven.

(5) Adjust to give stated zero-signal plate current.

(6) For operation below 250 Mc only.

(7) At 500 Mc.

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A DX-pedition QSL

*A personal greeting to each of you
in the brotherhood of Amateur Radio.*

Season's Greetings

Joyeux Noel

Frohe Weihnachten

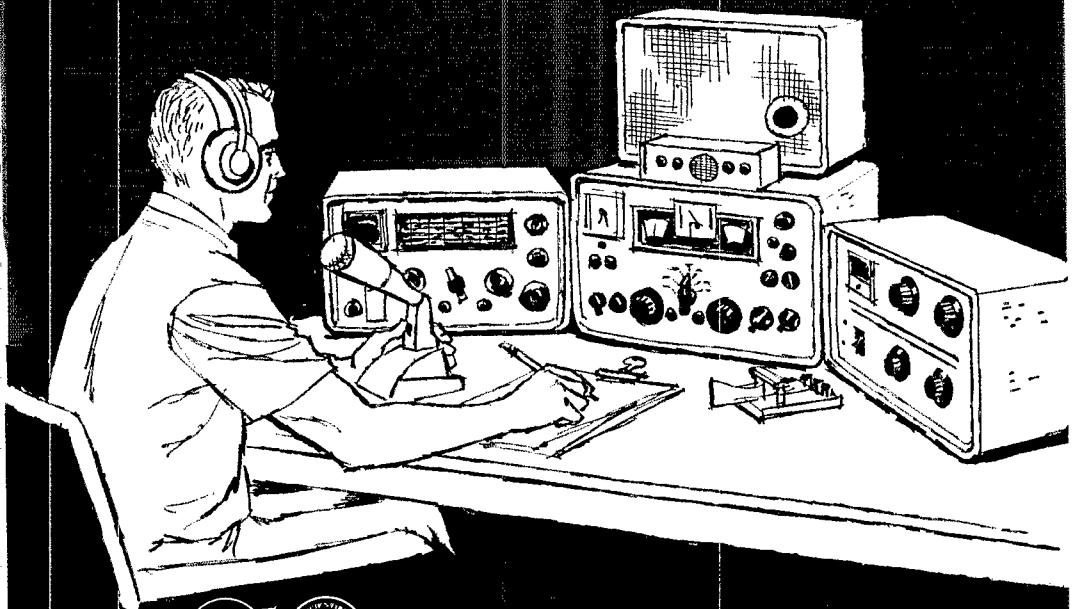
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Buon Natale

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. ARRL Field Organization station appointments are available in areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs desire applications for SEC, EC, RLM and PAM where vacancies exist. OES, v.h.f. bands appointment, is available to Technicians and Novice, as well as to full-privilege amateur licensees.

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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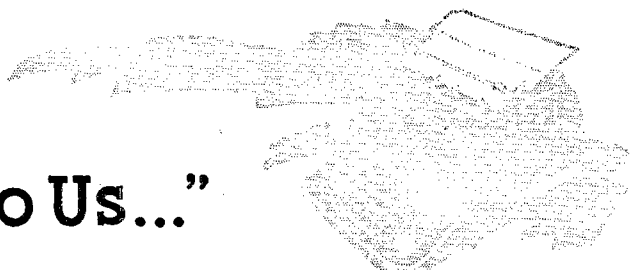
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"It Seems to Us..."



Field Day and Amateur Radio

In this issue we report the results of the 1963 Annual Field Day, one of the most popular amateur activities each year. Its popularity is well deserved, for it combines all of the best features of amateur radio.

It is a testing ground for emergency-powered equipment. Low-wattage gear is taken into the field and powered by gasoline-driven generators or batteries. Receivers and transmitters are operated in their most economical fashion so that power supplies will not be overloaded, and so that these power supplies will last for the entire 24-hour test.

Field Day is a testing ground for operators. The skill of phone and c.w. operators plays off in points for each team, and each group is competing against other groups in the same transmitter category. New operators have a chance to observe skilled operators at work, and they get unequalled practice in copying through interference, static, and the distractions of kibitzers, mosquitos, and Jupiter Pluvius or "liquid sunshine."

Field Day is a testing ground for the technical experts of each club or group. Antennas have to be devised and erected, complete stations arranged for each contemplated operating position, mutual interference problems solved, safeguards provided against off-frequency operation.

And Field Day is a testing ground for the handling of traffic under emergency conditions, which is, after all, what the whole thing is all about.

Field Day fits right in with the ARRL Program which we have been talking about these past few months. Much of our mail in recent months has been because of misunderstandings of one sort or another. Some amateurs have overlooked the fact that incentive licensing is not an end unto itself, that it is but one portion of an eight-point program which was outlined on page 10 of the June issue.

Amateur radio is only one of many radio services, and like each other occupant of portions of the radio-frequency spectrum, it must justify this use. It is not enough that amateur radio is a fascinating hobby — it must also serve in the public interest, convenience, or necessity. (See page 82 of this issue.)

To improve the stature of amateur radio, to lift it to heights of achievement which will insure our government's enthusiastic support for our use of very choice frequency bands, the League has embarked on its campaign for the revitalization or reawakening of amateur radio, known simply as "The ARRL Program."

What is this program? It is a program of technical and operating advancement. We advocate the upgrading of license examinations to bring them into line with modern amateur techniques. This upgrading would help insure that the applicant for an amateur license would be more familiar with equipments and techniques which were not in common use when the present examinations were developed.

The ARRL Program advocates the reinstatement of upper-level incentive licensing, and the League has already started toward this goal by filing its petition with FCC, as reported last month. It's not a revolutionary new idea — we have incentive licensing from the s.w.l. level up to the General level at present. We had incentive licensing beyond that point at least 25 years before it was abolished by the Commission in 1953, over the protests of the League. Quoting from the editorial in the February, 1953, issue of *QST*:

"... (The) decision completely removes the practical incentive for self-improvement. It seems to us that the effect will be to stagnate the great body of amateur radio at the General Class level. Don't misunderstand — that's quite a respectable level. But the FCC decision is a step backward from the theory of progressively higher levels which held attraction for most all of us, which gave us the incentive for moderate technical improvement (or at least a refresher) and which is now withdrawn."

Since 1953, no new Advanced Class licenses have been issued. Extra Class licenses have been available, of course, but only 3164 of them have been issued — for lack of incentive.

The ARRL Program seeks an expanded Official Observer system. The 500-plus active OOs do a good job of advising the 250,000 U.S. amateurs on infractions which could get us in trouble with FCC, but, obviously, they

are spread pretty thin. Can additional highly-qualified amateurs be persuaded to voluntarily give up a part of their operating time to help the rest of us? An article in the November issue seeks additional support for this important part of the League Program.

It also plans for more effective public service through a combining of the Amateur Radio Emergency Corps and the National Traffic System into the new Amateur Radio Public Service Corps (ARPSC). The ARPSC had its first work-out in October, and preliminary reports are most encouraging.

The ARRL Program looks to tightening up of licensing procedures for the Conditional Class, to correct abuses that have existed there. As "Happenings of the Month" reports, this subject has caused the concern of FCC as well.

Amateurs need to be better acquainted with their own achievements of the past, as well, to bring into focus their goals for the future. The story of cooperative efforts by amateurs in the U.S. and Canada is the story of ARRL, for there has been no other continent-wide, permanent framework for such efforts. In 1964, as the amateur radio fraternity observes the fiftieth year of its organization as a League, there will be much more in *QST* about the past problems and solutions developed by organized effort, not only to inform and entertain, but also to increase our collective perspective for the future.

Finally, the ARRL Program advocates the strict adherence to the following operating principles:

- a) To make proper choice of bands below 30 Mc. appropriate to the distance to be covered.
- b) To achieve equipment flexibility so that an adequate choice of frequency bands and powers may be available.

c) To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.

d) To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.

e) To use the minimum power necessary for each communication.

Field Day epitomizes these last five operating principles, for Field Day is a test of the operating efficiency of each participating station. In order to provide a friendly spirit of competition, scoring has developed through the years to reward the station using minimum power and to encourage the use of multi-band transmitters with clean signals.

Fellows who never used break-in or push-talk or VOX at their home stations have been educated by Field Day operations in the advantages of using these operating techniques. Confirmed c.w. men found that low-power phone, either a.m. or sideband, was a whale of a lot of fun and a great way to handle traffic under some conditions. And confirmed phone men learned that c.w. men could show them a trick or two when the going got tough.

Club groups going all-out for points discovered that the v.h.f. were a gold mine of contacts. Portable 2-meter beams, for example, got bigger and bigger, receivers got better and better, and scores went up and up.

Club groups going for scores in Field Day have acquired emergency generators and other equipment to secure favorable contest multipliers; without the immediacy of an impending Field Day these purchases would undoubtedly have been postponed by many clubs.

Yes, Field Day is an exhilarating activity which brings out the best in amateur radio. And so will the ARRL Program. QST

The Season's Greetings to all, from the Headquarters staff. May both you and your amateur radio prosper and advance in 1964.

OUR COVER

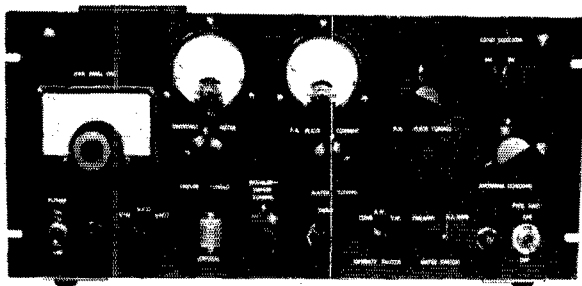
We are once again indebted to the Aerojet Radio Club for an excellent cover photograph, (probably again taken by Aerojet's Bill Miller) this one at their 1963 FD operation. Left to right, working on an antenna or kibitzing, are: Roland Maurer, ex-W7???; Bud Gatlin, WA6LXX; Gene Harrison, K6SFP; Ernie Banks, WA6JSC; Bruce Kelly, W6DEL; Bud Boulton, WA6AAD; and Gus DeGrazia, W6CAG.

The report on this year's Field Day begins on page 36 of this issue.

Strays

To the ARRL's Newington, Connecticut address has been added the "Zip" number 06111. Use it when you write League Headquarters. The Zip code number should be placed two spaces to the right of the state.

Panel view of the 2- and 6-meter transmitter. The v.f.o. dial is a National type MCN.



A Medium-Power Band-Switching V.H.F. Transmitter

240 Watts Input on 2 or 6

BY ERNEST H. ADOLPH,* K8WYU

This rig covers the two v.h.f. "DX" bands with optional v.f.o. or crystal control. A pi-network output circuit is used on both bands.

THE popularity of the concept of a band-switching transmitter covering the 2- and 6-meter bands is evident by the number of v.h.f. operators who have been attracted to manufactured units designed for this combination of bands. The idea appealed to me as soon as I saw the first ads, and I immediately started laying plans to build such a unit. The development was not without its headaches, but the finished product shown in the photographs was well worth the effort.

Exciter Circuit

The circuit of the v.f.o. and frequency-multiplying stages is shown in Fig. 1. The v.f.o. circuit is essentially a copy of one described earlier by W3LCK,¹ except that the tuning range has been altered to cover 8 to 9 Mc., and frequency is tripled, rather than doubled, in the output circuit.

The second stage, using a 6BC5, may be switched to operate either as a buffer amplifier for the v.f.o., or as a 24-Mc. crystal oscillator. The output of this stage is tunable from 24 to 27 Mc. so that multiples will fall in both of the desired output bands. The 4700-ohm loading resistor across L_2 assures stability when the 6BC5 is working straight through.

In the first position of S_1 (XTAL), the v.f.o. is off and the crystal is connected into the 6BC5 grid circuit. In the second position (v.f.o.), the grid of the 6BC5 is connected to the output of the

v.f.o., and the cathode circuits of the two stages are connected in parallel. In the third position (SPOT), the v.f.o. cathode alone is grounded, turning on the v.f.o. to provide a spotting signal.

The output tank circuit of the 5763 in the third stage may be tuned so as to double to 50 Mc. or triple to 72 Mc., the tank capacitor having sufficient range to cover both segments. The output of this stage may be switched either to drive the driver stage (Fig. 2) directly on 50 Mc., or to furnish 72-Mc. drive to the following 7558 doubler stage whose output is tuned to 144 Mc. The 7558 is a v.h.f. version of the 5763.

To achieve a reasonably low- C output circuit at 144 Mc., tuning capacitor C_7 is in series with the tube capacitance across the coil. Since the low-potential point of the circuit varies with the setting of C_7 , the plate voltage is fed to the tank through an r.f. choke. Series tuning is used also in the inductively-coupled input of the driver stage when the latter is operating at 144 Mc. The Q of these circuits is low enough so that retuning is not required if the circuits are initially set near the center of the band.

Driver and Final Amplifier

Another 7558 is used in the driver stage (Fig. 2). On 144 Mc., the output tank and coupling arrangement to the grid of the final amplifier is the same as in the 144-Mc. doubler, with L_8 as the driver plate coil and L_9 as the final-amplifier grid coil. On 50 Mc., however, the switch returns the circuit to a conventional parallel-

* 377 Franklin Court, Worthington, Ohio.

¹ Beckage, "A V.F.O. for 6 Meters," *QST*, June, 1959.

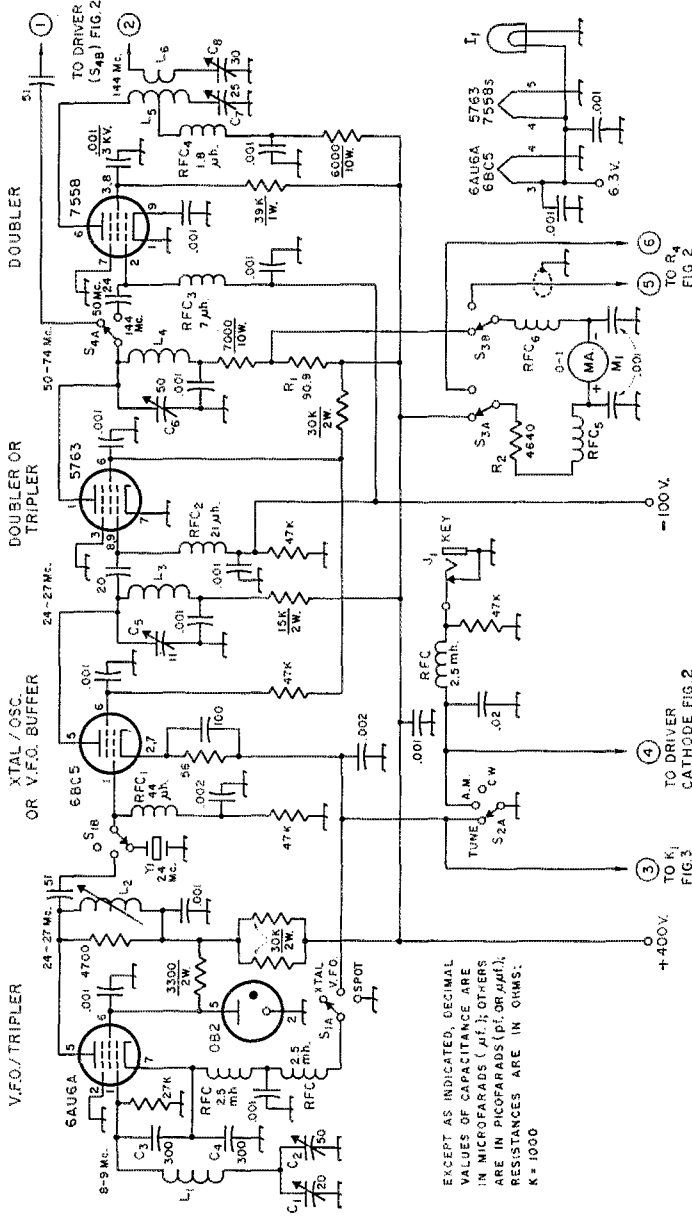


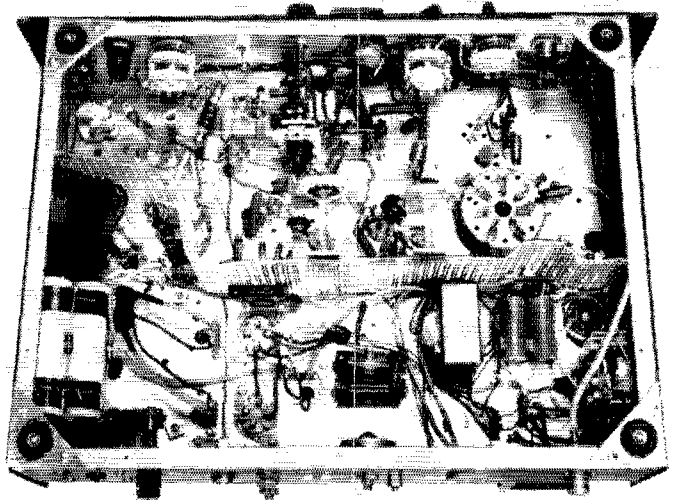
Fig. 1—Oscillator and frequency-multiplying circuits. Fixed capacitors of decimal value are disk ceramic; others are silver mica if not listed below. Resistors are 1/2 watt unless indicated otherwise.

- C₁—Double-bearing 20-pf. midjet variable (Hammarlund MC-20-S).
- C₂—Air trimmer (Hammarlund APC-50).
- C₃, C₄—NPO ceramic (Centralab TCZ-300).
- C₅—Air variable (Johnson 167-1).
- C₆—Midjet variable (Hammarlund HF-50).
- C₇—Ceramic trimmer (Centralab 825-AZ).
- C₈—Ceramic trimmer (Centralab 822-EN).
- I₁—6.3-volt panel lamp (green).
- J₁—Closed-circuit key jack.
- L₁—32 turns (see text) No. 20, 3/8-inch diam., 2 inches long (B & W 3007 Miniductor).

- L₂—18 turns No. 22 enam. close-wound on 3/8-inch iron slug form (CTC PLS-8 form).
- L₃—21 1/2 turns No. 28 enam. close-wound on 1/4-inch phenolic form.
- L₄—5 1/2 turns No. 16 tinned, 1/4-inch i.d., 3/4 inch long.
- L₅—5 turns No. 16 tinned, 3/8-inch i.d., 3/4 inch long, tapped at center.
- L₆—1 turn No. 16, covered with cambric tubing and wound around center of L₁.
- M₁—0-1 d.c. milliammeter, resistance approx. 50 ohms.
- R₁, R₂—1 per cent tolerance (IRC type DCC).
- RFC₁—R.f. choke (Ohmite Z-14).
- RFC₂—R.f. choke (Ohmite Z-28).

- RFC₃—R.f. choke (Ohmite Z-50).
- RFC₄—R.f. choke (Ohmite Z-144).
- RFC₅, RFC₆—18 turns No. 18 enam., 3/8-inch i.d., close-wound.
- S₁—Ceramic rotary switch, 2 sections, 2 poles, 2 positions (Centralab PA-2045).
- S₂—Phenolic rotary switch, 1 section, 2 poles, 3 positions; see Fig. 3 for other pole (Centralab PA-1003).
- S₃—Phenolic rotary switch, 1 section, 2 poles, 2 positions (Centralab PA-1003).
- S₄—Ceramic rotary switch, 3 sections, 2 poles per section, 2 positions; see Fig. 2 for other poles (Centralab P-272 index, 3 type VD sections; see text for assembly).
- Y₁—24-27-Mc. third-overtone crystal.

Bottom view showing arrangement of components on the underside of the chassis. The perforated-aluminum bottom cover has been removed.



tuned tank with capacitive output coupling to the final. In this case, the tank circuit is comprised essentially of L_7 shunted by C_9 , the inductance contributed by L_8 being relatively small at this frequency. Drive to the final may be adjusted as required by means of R_3 which alters the driver screen voltage.

A Penta Labs type PL-177A tetrode is used in the final amplifier. This tube is compact and carries full ratings to 175 Mc. A pi network, toward which the author is partial, operates with reasonable efficiency and is more convenient to adjust than a link-coupled tank or linear circuit. The final is "neutralized" by series-resonating the screen. This is the function of RFCs.

Meter M_1 in Fig. 1 may be switched to read either 5763 plate current (50 ma. full-scale) or final-amplifier grid current (20 ma. full-scale). Monitoring of the 5763 plate current is helpful in selecting (by the plate-current dip points) the desired output harmonic (50 or 72 Mc.). Otherwise, all circuits preceding the final amplifier are

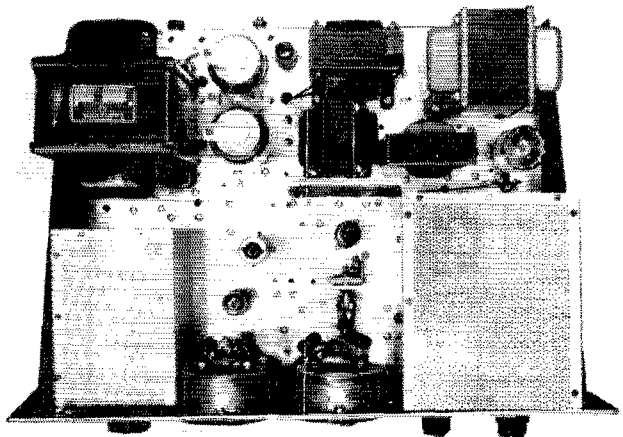
simply tuned for maximum amplifier grid current, after which the grid current is adjusted to proper level by the screen control in the driver stage. A separate meter is used to check final-amplifier plate current. The transmitter is keyed in the cathode circuit of the driver stage. Unkeyed stages are provided with fixed protective bias.

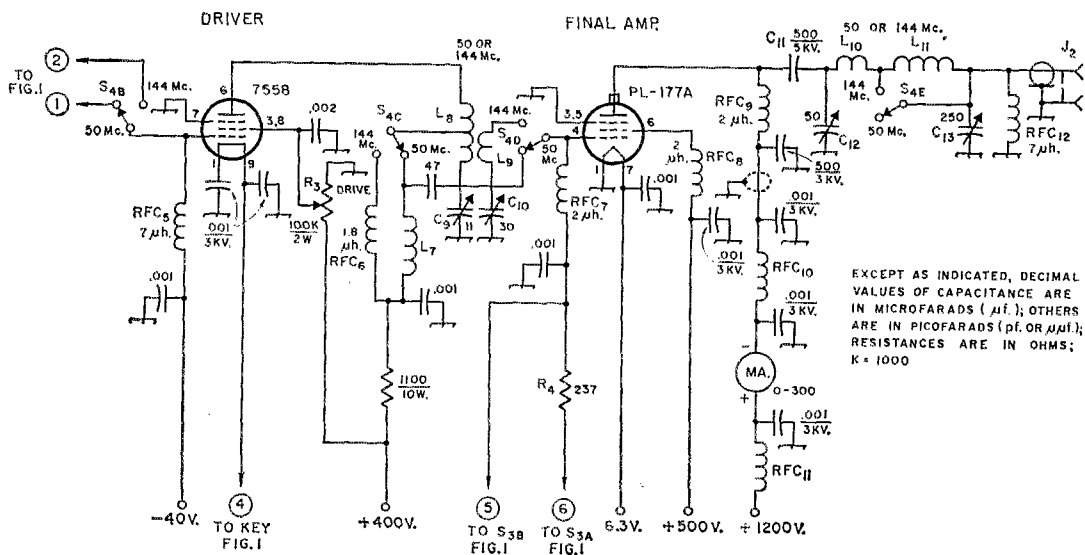
Power Supply

Fig. 3 shows the power-supply circuits. The high-voltage supply, using type 3B28 rectifiers (low-noise versions of the 866A), delivers about 1200 volts at a final-amplifier load of 200 ma. On a.m., screen voltage (approximately 500 volts) is obtained through a dropping resistor (40K, plus R_8 , plus R_{10}) from the plate supply in the conventional manner. On c.w., a 6AQ5A in a limiter circuit prevents soaring of the screen voltage under open-key conditions. R_9 provides adjustment of final-amplifier screen voltage over a range of about 100 volts.

The low-voltage supply, from which all other

Chassis-plan view of the 2- and 6-meter transmitter showing the v.f.o. box to the left, the final-amplifier box to the right and power-supply equipment at the rear. The unit is normally fitted with a perforated-aluminum enclosure.





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

Fig. 2—Driver and final-amplifier circuit. Capacitors of decimal value are disk ceramic; others are silver mica except as listed below.

- C₉—Same as C₅.
- C₁₀—Same as C₈.
- C₁₁—Ceramic capacitor (Centralab 858S-500).
- C₁₂—Air variable (Johnson 167-3).
- C₁₃—Air variable (Johnson 154-1).
- J₂—Chassis-mounting coaxial receptacle.
- L₇—7 turns No. 16, 3/8-inch i.d., 3/8-inch long.
- L₈—5 turns No. 16, 3/8-inch i.d., 3/8-inch long, tapped at center.
- L₉—1 3/4 turns No. 16 covered with cambric tubing and wound around center of L₈.

- L₁₀—1 turn No. 12, 1/2-inch i.d.
- L₁₁—7 turns No. 14, 5/8-inch i.d., 7/8-inch long.
- R₃—2-watt control (Ohmite CU1041).
- R₄—1 per cent tolerance (IRC type DCC).
- RFC₅, RFC₁₂—R.f. choke (Ohmite Z-50).
- RFC₆—R.f. choke (Ohmite Z-144).
- RFC₇, RFC₈, RFC₉—R.f. choke (National R-60).
- RFC₁₀, RFC₁₁—18 turns No. 18 enam., 3/8-inch i.d. close-wound.
- S₄—See Fig. 1.

stages are operated, delivers 400 volts. A 5-volt filament transformer, T_2 , connected in reverse to the 6.3-volt winding of the low-voltage transformer furnishes, after rectification and filtering, about 150 volts of fixed bias. Potentiometer R_5 is provided for adjusting bias to the two multiplier stages. Bias for the driver is regulated at -40 volts by a series pair of inexpensive zener diodes. Bias for the final amplifier is regulated at -90 volts by the 0B3.

Modulator

The modulator used with this transmitter was patterned after the 6146 modulator described in the last few editions of the ARRL *Handbook*, to which reference should be made.

Control Circuit

In Fig. 3, S_5 turns on the low-voltage, bias and filament supplies. S_5 is in series with the high-voltage switch S_6 , so high voltage cannot be turned on until after S_5 has been closed. With S_5 closed, S_6 will then actuate K_1 . One pole of K_1 closes the primary circuit of the high-voltage transformer T_5 , a second pole switches on the red warning light I_2 , and the third pole closes the cathode circuit of the v.f.o. and/or the cathode circuit of the 6BC5 to activate the transmitter. For tune-up purposes, these cathode circuits may be closed without applying high voltage to the

final by placing S_2 (Figs. 1 and 3) in the TUNE position.

When S_2 is turned to the A.M. position, S_{2A} shorts the key jack J_1 (in case a key is plugged into the jack), turning on the driver stage. In this position, S_{2B} (Fig. 3) sets up a 115-volt a.c. circuit (through J_3) to a relay located on the modulator chassis, which applies plate voltage to the modulator. This relay is then actuated simultaneously with K_1 when S_6 is closed, thereby putting the complete transmitter on the air.

Operation with S_2 in the c.w. POSITION is the same, except that the key is no longer shorted by S_{2A} and S_{2B} actuates K_2 (Fig. 3), which introduces the screen-voltage limiter and shorts the modulation-transformer secondary (through J_3). The modulator cannot be operated in this condition because its switching-relay circuit is open with S_2 in the c.w. POSITION.

Construction

The unit is built on a 17 x 13 x 3-inch chassis with an 8 x 19-inch panel. Most of the v.f.o. components, including the 0B2 screen regulator, are enclosed in an aluminum box at the left end of the chassis. C_2 and L_2 , however, are actually mounted on the under side of the chassis with the capacitor shaft and the coil-slug screw protruding into the bottom of the v.f.o. box. L_1 is mounted on small standoff insulators.

Tuning capacitor C_1 is elevated above the bottom of the box to line its shaft up with the dial. If the capacitor is mounted in conventional manner, capacitance increases with clockwise rotation, which means that frequency decreases with clockwise rotation of the tuning knob. If this is objectionable (I didn't find it so), the capacitor may be turned end-for-end and the dial coupled to the tail shaft. An alternative is to remove the stop pin from the shaft of the capacitor, which will allow the rotor plates to be offset 180 degrees in respect to the dial pointer.

The final-amplifier components are housed in a larger box at the opposite end of the chassis. The PL-177A is mounted in a septar socket (Johnson 122-101) set in a clearance hole cut through both the chassis and the bottom of the box. Pins 1, 3 and 5 are grounded to the chassis with heavy copper strap.

Tank capacitor C_{12} is mounted on a heavy grounding bracket attached to the left-hand wall of the final-amplifier compartment in such a position that the blocking capacitor, C_{11} , will just fit between one of the stator rods and the radiating plate cap of the tube. The output capacitor, C_{13} , is mounted on the floor of the box. The switch sections used for S_4 have four poles per section, although four poles are not needed. This type was selected because the capacitance per pole is lower than in switches having fewer poles. The unneeded contacts were removed by drilling them out. S_{4E} is mounted from the rear stator bar of this capacitor, with the switch arm connected directly to one of the stator terminals. L_{10} is then soldered between one switch terminal and the stator of C_{12} . The plate choke, RFC_9 , is mounted between the plate cap of the tube and a stand-off insulator fastened to the left-hand wall

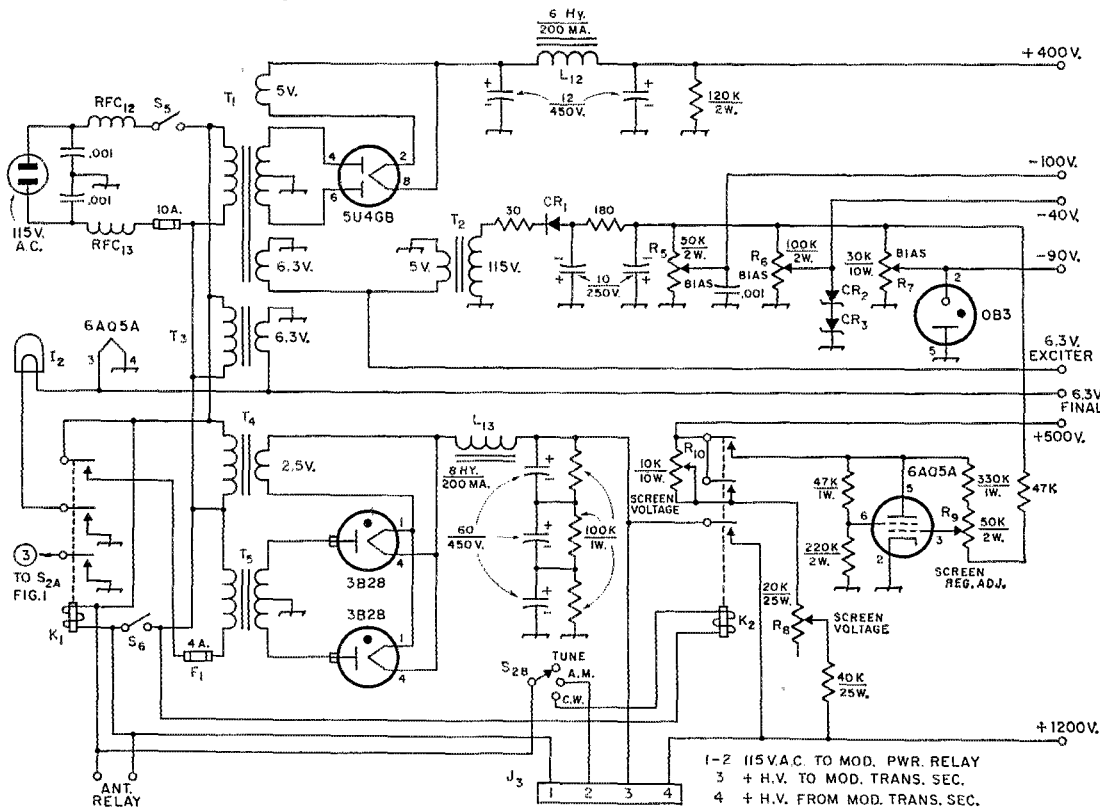
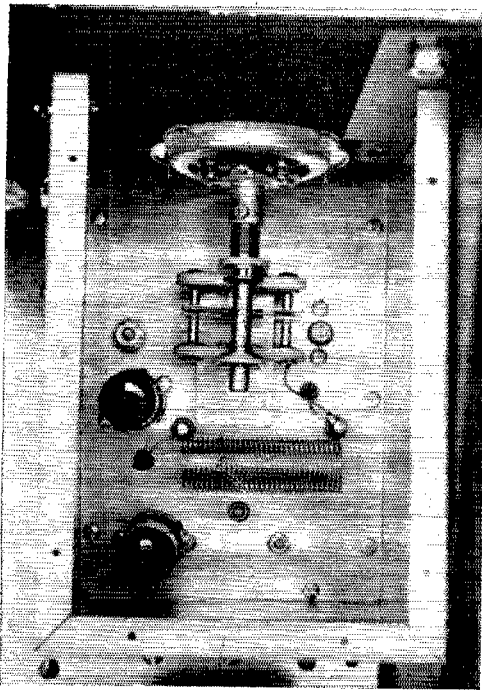


Fig. 3—Power-supply circuit for r.f. section. Capacitances are in μf . Capacitors of decimal value are disk ceramic; others are electrolytic. Resistances are in ohms and resistors are $\frac{1}{2}$ watt unless indicated otherwise.

- CR_1 —Selenium rectifier, 130 volts, 65–75 ma. (I.T.T. 1234A-H).
- CR_2, CR_3 —20-volt (V_Z), 150-mw. zener diode (Hoffman type HB).
- F_1 —Fuse, slow-blow type.
- L_2 —6.3-volt panel lamp (red).
- J_3 —4-prong tube socket.
- K_1, K_2 —3-pole 115-volt a.c. relay (Potter & Erumfield KA14AG).
- L_{12} —Filter choke (Triad C-14X).
- L_{13} —Filter choke (Stancor C-1721).
- R_5, R_6, R_9 —Linear control (Ohmite "AB" type).

- R_7, R_8, R_{10} —Slider adjustable.
- RFC_{12}, RFC_{13} —Same as RFC_{10} .
- S_2 —See Fig. 1.
- S_3, S_6 —6-amp. d.p.s.t. toggle switch, poles in parallel.
- T_1 —Power transformer: 700 volts r.m.s., c.t., 160 ma.; 5 volts, 3 amp; 6.3 volts, 5 amp. (Triad R-16A).
- T_2 —Filament transformer: 5 volts, 3 amp. (Triad F-7X).
- T_3 —Filament transformer: 6.3 volts, 3 amp. (Triad F-16X).
- T_4 —Filament transformer: 2.5 volts, 10 amp. (Merit P-3042).
- T_5 —Plate transformer: 2400/1800 volts r.m.s., c.t., 200 ma. (Thoradson 21P91).



Detail view of the v.f.o. assembly. The 6AU6 is above and the OB2 below. Adjusting controls of C_2 and L_2 may be seen on either side of the tuning capacitor.

of the box at the same level as the plate cap, where the choke is bypassed. A shielded high-voltage lead runs from the standoff insulator to the meter, and thence to the power input connector. A length of RG-141/U connects the stator of C_{13} to the UHF output coax connector, J_2 , at the rear of the chassis. RFC_{12} is connected directly across J_2 .

The switch index head which controls S_4 is fitted with a shaft made of insulating rod. The shaft extends from the index, through the switch wafer S_{4E} , and through a bearing set in the rear wall of the box. The end of the shaft is fitted with an arm which is linked mechanically to other sections of S_4 below deck through a hole in the chassis at the rear of the box.

Components of the remaining r.f. stages are assembled in the area between the two boxes, most of them being mounted under the chassis. The tubes and the driver tuning capacitor C_9 are, however, on the top side.

The space on the underside of the chassis is divided into two sections by a lateral baffle shield of perforated aluminum. R.f.-circuit components are mounted forward of this shield and power-supply components to the rear.

The two double-pole switch wafers comprising S_{4A-B} and S_{4C-D} are epoxied into the edges of pieces of Lucite sheet which have been cut out to follow the contour of the wafers. The Lucite pieces are, in turn, epoxied to the chassis. The switch shafts, made from Lucite rod, extend in each case from the switch wafer through a

bushing set in an aluminum bracket fastened to the chassis. The bearings are made of larger-size Lucite rod drilled out to fit the shaft. The bearing-hole brackets are so placed that the ends of the shafts line up with each other and also with the linkage hole for S_{4E} previously mentioned. The linkage arms were made by pulling apart a Millen "universal-joint" type of shaft coupler, and bending one side of the metal "U" out straight to form an arm. One of these shaft couplers will make two arms. Alternatively, a conventional coupler of the bakelite-washer type could be used by removing the hub and supporting strip from one side of a flexible shaft coupler, and riveting on a flat metal arm in its place. The arms are linked together with stiff steel wire. This may sound like a rather crude arrangement, but it works well.

Most of the remaining constructional details may be determined with sufficient accuracy by referring to the photographs. The two meters are shielded with metal cups. The power-supply equipment occupies the rear portion of the chassis, both above and below deck. Be sure that the shaft of screen-voltage limiter control R_9 (Fig. 3) is grounded to the chassis. Shielded wire is used for all power wiring.

Solid r.f. connections are of more than ordinary importance at the high frequencies involved. Unavoidable high- Q circuits result in comparatively large tank currents. The use of lockwashers on screws which serve to secure an r.f. contact to chassis or elsewhere is strongly urged. The exciter coils should be well spaced from other metal.

Exciter Adjustment

The v.f.o. is first adjusted to cover the correct frequency range of 8 to 9 Mc. It is a good idea to have a couple of extra turns on L_1 , since it is easier to remove turns than to add them. A calibrated general-coverage receiver is the most convenient means of checking frequency. If one is not available, you will have to check with an indicating wavemeter or grid-dip oscillator until you have the approximate range, and then listen for the harmonics on 2 and 6 meters while making final adjustment.

With C_1 set at minimum, adjust C_2 to give a signal at 9 Mc. Then set C_1 at maximum and check the frequency. If the frequency is much below 8 Mc., the coil must be trimmed, the circuit retuned to 9 Mc. with a larger capacitance at C_2 , and the process repeated. If the frequency is higher than 8 Mc. with C_1 set at maximum, L_1 must be increased, the circuit retuned to 9 Mc. with less capacitance at C_2 , and the process repeated. In this manner, the range can be adjusted so that it is spread out over most of the dial scale. The portion of the dial from 8 to 8.22 Mc. is calibrated in terms of the two-meter frequencies of 144 to 148 Mc., while the portion from 8.33 to 9 Mc. is calibrated in terms of the six-meter frequencies of 50 to 54 Mc.

The remaining tuned circuits should be checked with a grid-dip oscillator to make sure that they

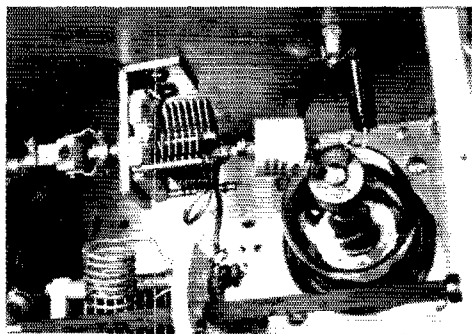
are tuning to the approximate correct frequencies. The slug of J_2 should be set at about the center of the 24-27-Mc. range. The higher-frequency circuits can be adjusted by squeezing or stretching the coils as necessary.

The biasing voltages should be adjusted to the values shown in the diagram. Remove the 5U4GB rectifier from the low-voltage supply, allowing the bias supply to operate alone. Adjust R_5 to give -100 volts. Starting with the arm of R_6 at ground, adjust R_6 carefully to the point where the output voltage (approximately -40 volts) does not increase. Set R_6 just slightly above the point where the voltage starts to drop off when the arm of R_6 is moved back toward ground. Zener current should not be more than 2 or 3 ma. The slider on R_7 should be adjusted by starting near the ground end and gradually moving the slider up until the 0B3 ignites. Be sure to turn off the supply while adjusting the slider! Replace the 5U4GB in its socket.

Now turn S_2 to the TUNE position, and S_1 to XTAL or V.F.O.; turn on the low-voltage supply and close the key while the various exciter circuits are adjusted for maximum final-amplifier grid current, first on 50 Mc. and then on 144 Mc. Readjust R_5 , if necessary, to maintain a bias of -100 volts with excitation. With the drive control set at maximum (arm away from ground), maximum grid current should run to 15 ma. or more.

Final-Amplifier Adjustment

Although a lamp-bulb r.f. load will not give a very reliable indication of power output at these frequencies, such a load connected across J_2 will serve for preliminary testing. With S_2 in the c.w. position, and the key open, turn on the high-voltage supply and adjust R_8 until a screen voltage of about 540 volts is obtained with R_9 set at about its mid position. Again, be sure to turn off all power while the slider on R_8 is being adjusted!



This view shows details of the interior of the amplifier box. C_{12} is mounted against the right-hand (upper) wall. C_{13} , partially visible at lower left, is mounted on the floor of the box.

The excitation control, R_3 , should be backed off before closing the key, and then gradually increased as the tuning progresses. With S_2 still in the c.w. position, close the key no longer than is necessary until tuning and loading adjustments are completed. The pi network is adjusted in the customary manner, adjusting C_{13} for loading while maintaining resonance with C_{12} . The amplifier may be loaded to a plate current of 200 ma., at which time the grid current should be adjusted to 5 ma.

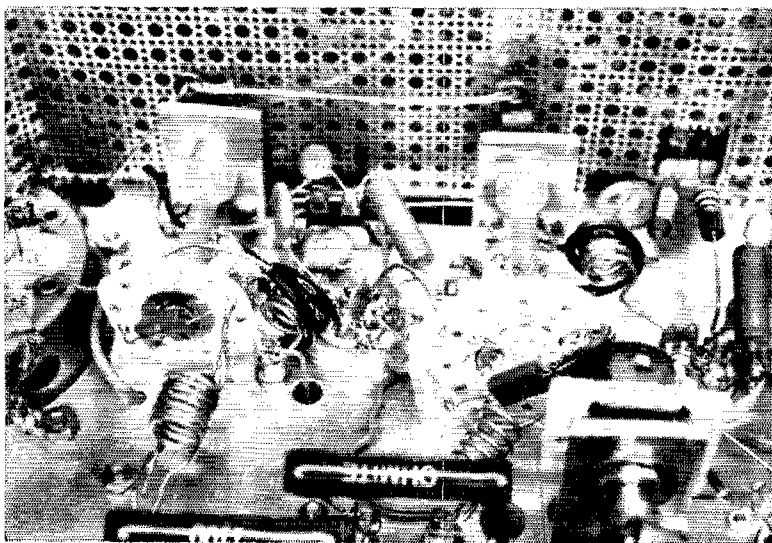
A final check on screen voltage should be made, and R_9 readjusted, if necessary, to set the screen voltage at 500 under loaded conditions.

Before applying modulation, S_2 should be turned to the A.M. position and R_{10} adjusted to give a screen voltage of 500 under the fully-loaded condition. Once more, be sure that all voltages are off while adjusting the slider on R_{10} .

Appreciation goes to W8UHZ and W8RRJ for providing critical hearing aids during the on-the-air tests.

QST

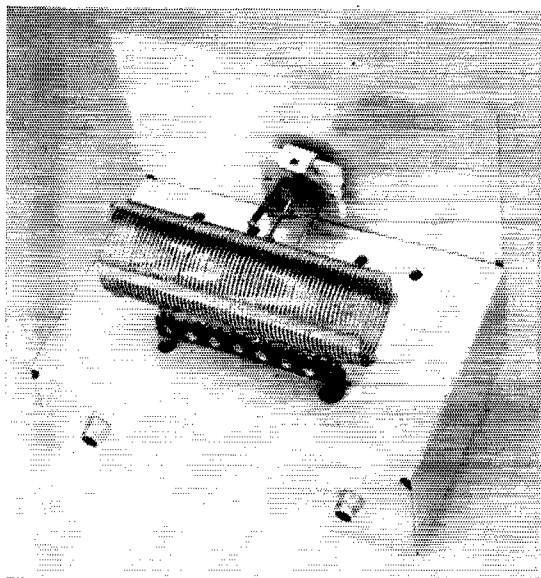
Close-up view showing the mounting of switch sections S_{4A-B} , right and S_{4C-D} , left.



How To Fight Your Image Battle

A Simple Trap To Attenuate Images

BY LEWIS G. McCOY,* WIICF



This photo shows the completed image trap. The coil is mounted on an 8-terminal tie-point strip.

As a general rule the newcomer to ham radio will usually start off with a simple receiver, either a commercial low-cost unit or a home-built job. Low-cost commercial receivers are usually manufactured with a bare minimum of circuits simply because it is a highly competitive market. Such receivers are all right for the short-wave listener who doesn't have a serious interest in communication, but they are usually inadequate for the ham who wants to make contacts. Whenever a receiver doesn't have a sufficient number of tuned circuits in its "front end," there is a lack of "image" rejection. To the newcomer, the word "image" doesn't mean much, so let's show what it is and you'll quickly see why a receiver should have good image rejection.

What's An Image?

Fig. 1 is a block drawing of the front end of a simple superhet receiver. Such a receiver would probably have a mixer, an oscillator, and then the intermediate frequency stage or stages. A

* Technical Assistant, *QST*.

signal coming in on the antenna feeds into the mixer. Also being fed into the mixer stage is a signal from the oscillator. The two signals "beat" against each other in the mixer and produce a third signal which is the difference between the two. (Actually, there are both the sum and difference frequencies produced, but for the moment we'll ignore the sum frequency.) When the signal is properly tuned in, this third signal coming out of the mixer is the same frequency as the intermediate frequency, and it is fed through the i.f. amplifier.

Now comes the clinker! Let's assume there is insufficient selectivity in the antenna circuit into the mixer and also let's put some actual frequencies into the picture to see what happens. Suppose we want to listen to a signal at 7100 kc. and we tune in a signal on this frequency. It comes down the antenna and is fed into the mixer along with a signal from the oscillator. The two signals are mixed, one at 7100 kc. and the oscillator signal at 7555 kc., resulting in a beat at 455 kc., the intermediate frequency. Fine and dandy up to this point. But also, let's assume that there is a strong commercial teletype station on 8010 kc. This signal is also fed down the antenna into the mixer, along with our same oscillator signal at 7555 kc. The difference in frequency between 8010 kc. and 7555 kc. is also 455 kc. So what happens? The intermediate-frequency amplifiers have no way of telling the teletype from the ham station, so even though your receiver dial is set at 7100 kc., what you hear in your headphones are two signals on the same frequency. One answer to the problem is to have

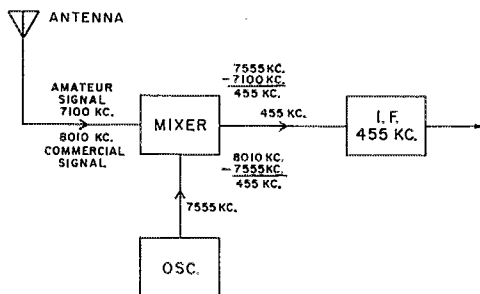


Fig. 1—This drawing shows the relationship of signals coming down the antenna and into the mixer stage. See text for a detailed explanation.

adequate selectivity before the mixer to discriminate against or attenuate the unwanted image signal.

It is not at all uncommon for ARRL Headquarters to receive complaints about "commercials" in the ham bands. Many of these complaints obviously come from amateurs who actually are receiving images and don't know any better. It is true that an occasional commercial station will get into a ham band where he doesn't belong. Also, many hams believe that the amateur bands are exclusively for amateurs. This is not so. For example, the only *exclusive* amateur bands on a world-wide basis are the 20-, 15-, and 10-meter bands.¹ On 40, the portion from 7000 to 7100 kc. is exclusively amateur, but all the other frequencies between 7100 and 7300 kc. are shared with other services.

The inexpensive receivers we have been discussing here are useful for making contacts on the 80- and 40-meter Novice bands, but below 40 meters they leave much to be desired. In this article we are going on the assumption that the beginner eventually plans a better receiving setup, but for the time being is interested in getting rid of interfering images on 80 and 40. For the higher-frequency bands, both sensitivity and selectivity must be improved to make the receiver useful. This requires more complicated devices, such as a crystal-controlled converter. If you are interested in building a crystal-controlled converter, you'll find complete details in the *ARRL Handbook*. However, only a very simple circuit is required to give excellent image rejection on the lower bands and will considerably improve the low-cost commercial receiver.

Fig. 2 shows the circuit of an adjustable trap that is connected across the feed line of the receiver's antenna terminals. The operation of the unit is quite simple. Whenever you have an amateur signal being interfered with by an image, you merely "null" out the image by tuning C_1 . We set up a "clunker" receiver in our lab and then fed in a strong image signal—strong enough to completely mask out a weak amateur signal. By adjusting C_1 we were able to reduce the image signal to a point where the weak amateur station became good copy.

Almost all of the low-cost receivers use a 455-ke. i.f. and the image will appear at twice the i.f., or about 900 kc. away from the desired signal. We found that the trap, when tuned to the image frequency, only slightly reduced the gain of the receiver at the desired frequency. Normally, this point wouldn't be worth mentioning except for one interesting thing. We decided to try the trap on a strong local amateur signal at one end of the 40-meter band (7280 kc.) while listening for amateur signals at the low end of the band. In our case the strong local signal was WIAW whose antenna terminates at the same mast ours starts from, so the signal was plenty strong. So strong, in fact, that it was impossible to tell at first when the trap was

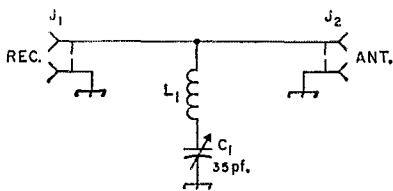


Fig. 2—Circuit diagram of the image trap.

C_1 —35-pf. variable (Hammarlund HF-35).

J_1, J_2 —Phono jacks.

L_1 —47 turns No. 18, 1¼-inch diam., 16 turns per inch (B & W type 3019 Miniductor).

actually tuned to 7280 kc. We adjusted the trap by removing the antenna from the antenna side of the trap and substituting a few inches of wire. This reduced the pickup enough so that it was possible to adjust for a null. There was a decided improvement and the receiver didn't overload or block nearly as much as without the trap. We don't claim it as a world-beater for getting rid of local QRM but, as they say, every little bit helps. The unit is easy to build, so for those hams who have a strong local who usually operates on one frequency (and there seem to be plenty who do), we would suggest they try the trap.

Making the Trap

The components were mounted on a 2 × 4 × 6-inch aluminum chassis. Phono jacks are used for the input and output terminals, J_1 and J_2 . If desired, the more expensive coax chassis connectors can be used. The jacks are mounted on the rear of the chassis and a single lead is brought up to one end of L_1 . At first we tried the variable capacitor mounted on the chassis top without a metal front panel. There was enough hand capacitance when tuning C_1 so that it proved difficult to get the null in the right place. Putting on a small metal panel (5 by 6 inches) gave enough shielding to eliminate this problem.

The coil is mounted on a standard terminal strip and supported by its own leads. Unwind one half turn from the coil support bars at each end of the coil to provide enough lead length to connect to the terminal strip. With the coil specified in Fig. 1, the tuning range of C_1 will cover the 80- and 40-meter bands. The HF-35 capacitor specified has a maximum capacitance of 36 pf. and a minimum of 3.2 pf. If another type is substituted, it should have a similar range.

To find out whether an interfering signal is truly an image and not a commercial station actually in a ham band is quite simple. Tune C_1 to null out the interfering signal. If both the interference and the desired amateur signals null out, then the commercial is actually in the band. If the interfering signal nulls out, but not the desired signal, then it is an image.

As we pointed out earlier, not all ham bands are exclusively amateur. Novices who operate on 40 meters will soon find that under certain conditions their portion of the band may be loaded with foreign broadcast stations.

¹ Exception: 14,250 kc. to 14,350 kc. is reserved by U. S. S. R. for fixed and mobile services.

Summary of Rules — 1964 ARRL DX Contest

AMATEURS throughout the world are invited to participate in the 30th ARRL International DX Competition. A certificate will be issued to the top phone and c.w. scorer in each country. For those DX stations that do not receive complete DX Contest rules (next month in *QST*) in time for the contest, here is a summary of the rules for the 1964 ARRL DX Contest — they are unchanged from 1963.

1. DATES:

This 1964 DX Contest will be held two week ends each for c.w. and phone:

PHONE: February 8-9 and March 14-15

C.W.: February 22-23 and March 28-29

S.s.b. as well as a.m. stations are invited to participate in the phone contest.

Phone and c.w. are separate contests.

2. TIMES:

The starting time in each instance is 0001 GMT Saturday and ends 2400 GMT Sunday.

3. OBJECT:

DX stations try to QSO as many W-K-VE-VO-KH6-KL7 stations as possible during the contest in as many different call areas possible *per band*.

4. EXCHANGES:

DX stations send RS or RST report followed by a three-digit number representing power input. For example, on c.w. you might send 579050, which means RST 579 and power input 50 watts. U.S.A.-Canada stations will send a number consisting of RS or RST report followed by the name of their state or province, whose abbreviations follow:

W1, K1, W41 — CONN MAINE MASS NH RI VT	W9, K9, W49 — ILL IND WIS
W2, K2, W42, WB2 — NJ NY	W0, K0, W40 — COLO IOWA KANS MINN MO
W3, K3 — DEL MD PA DC	NEBR NDAK SDAK
W4, K4, W44 — ALA FLA GA KY NC SC TENN VA	VE1 — NB NS PEI
W5, K5, W45 — ARK LA MISS NMEX OKLA	VE2 — QUE
TEXAS	VE3 — ONT
W6, K6, W46 — CAL	VE4 — MAN
KH6 — HAWAII	VE5 — SASK
W7, K7 — ARIZ IDAHO MONT NEV ORE UTAH	VE6 — ALTA
WASH WYO	VE7 — BC
KL7 — ALASKA	VE8 — NWT YUKON
W8, K8, W48 — MICH OHIO WVA	VO — NFLD LAB

5. SCORING:

Repeat QSOs on additional bands are permitted. Your multiplier is the total call areas (not states) QSOed on each band (maximum of 21 *per band*). The 21 call areas are listed above. Each completed QSO counts three (3) points. For DX stations incomplete contacts count two (2) points. FINAL SCORE is the number of QSO-points times the multiplier.

6. ENTRY:

Free log forms are available on request from ARRL. You don't have to use these forms. Logs should contain calls, dates, times, bands, exchanges, and points. Sign your name to the statement: "I have observed all competition rules and regulations for my country." Send your log with summary data to:

AMERICAN RADIO RELAY LEAGUE
225 MAIN STREET
NEWINGTON, CONN. 06111, U.S.A.

Your entry must be postmarked by May 1, 1964, to be eligible.



Col. Robert D. Curtis, W4JWV, whose article, "The W4JWV S.S.B. Exciter," appeared in the January 1963 issue of *QST*, has notified us that his new address is Box 1525, Craig Air Force Base, Alabama.

Visitors to the 1963 Oklahoma State Fair got a good look at ham radio, courtesy of the crew from K5FHP/AG4BX. A sideband kilowatt and teletype equipment were part of the gear displayed in the

35 x 8-foot trailer. Military and civilian MARS men, AFA5DMT, AF5MJY, AFA5SUD, AFA5EJU, and WA5DXE, helped set up and operate the station.

Here's real cooperation. When WA9BPG ran out of gas on a busy Milwaukee expressway, K9PGE called police (who delivered two gallons of gasoline) and K9ZEZ called BPG's wife to say he'd be late for dinner.

Adapting the 20A Exciter to RTTY

Simple Plug-In Unit for Frequency-Shift Keying

BY ROBERT L. ANDERSON,* W8KZM, ex-WA2JDF

WITH the increasing popularity of RTTY, many hams will have the problem of modifying their existing exciters for frequency-shift keying (f.s.k.). Although many of the newer exciters are provided with f.s.k. circuits as standard equipment, the earlier transmitters are not so equipped. This article describes an f.s.k. circuit that was designed and built for a 20-A, but it could be used with a 10B or any heterodyning exciter provided the exciter has a crystal-controlled oscillator or mixer. The circuit requires only four connections to the 20-A — one to the 9-Mc. crystal-oscillator grid, one to ground, and two to the 6.3-volt filament circuit (which is not grounded) — all of which are available at the 6U8 crystal-oscillator tube socket in the 20-A.

The portion of the circuit that is interconnected to the 20-A is built on a CBS test-adaptor (type SH29) which plugs into the socket normally intended for the 6U8 9-Mc. oscillator tube. This adaptor provides exposed contacts corresponding to the tube pin connections, to which external wiring may be connected.

The power supply and keying circuit are built on a separate chassis external to the 20-A. The three interconnecting leads can be brought out of the 20-A through ventilation holes in the rear of the cabinet. Thus, the modification of the exciter to include the frequency-shift keying can be made without changing a single connection, or drilling a single hole in the 20-A itself.

Circuit Operation

The circuit of the adapter is shown in Fig. 1. Frequency-shift keying is accomplished by electronically switching in and out a small capacitance between the grid of the 6AL5 crystal-oscillator tube and ground, and thereby changing the 9-Mc. oscillator output frequency. Electronic switching is accomplished by means of a 6AL5

This plug-in f.s.k. adapter for the 20-A s.s.b. exciter requires no modification or drilling of holes. All new connections are made through an adapter plug fitting one of the 20-A tube sockets.

dual-diode which is either forward-biased well into the saturated region, or reverse-biased so that the diode is nonconducting. When the diode is reverse-biased, the tube presents an almost infinite impedance across RFC_3 , and C_1 is disconnected from r.f. ground. When the polarity of the biasing voltage is reversed, the 6AL5 conducts and becomes a low impedance in parallel with RFC_3 , so that C_1 is connected to signal ground through C_3 . The addition of C_1 from the 6U8 to ground lowers the oscillator frequency. The amount of frequency shift is dependent mainly on the value of C_1 , and is insensitive to variations in the keying voltage.

The r.f. chokes RFC_1 and RFC_2 were found necessary to suppress unwanted oscillations which resulted from the transmitter final output being picked up and fed back into the keying circuit.

Power Supply

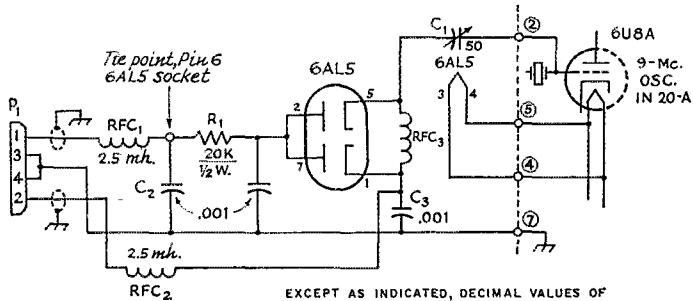
The power supply for the f.s.k. circuit is of conventional design, as shown in Fig. 2. The transformer, T_1 , diodes, CR_1 and CR_2 , and filter, consisting of L_1 and C_4 , supply +100 volts of filtered d.c. across the voltage divider, R_3R_4 . This voltage is also supplied to the RTTY selector magnets through the machine keyboard contacts and current-limiting resistor, R_2 .

When the keyboard contacts are open, point A is 50 volts positive with respect to the junction of the voltage divider, point B. With S_2 in the position shown in Fig. 2, the 6AL5 will normally be reverse-biased. When the keyboard contacts

* 790 Lamhkins Road, Saline, Michigan.

Fig. 1—Circuit of the 20-A f.s.k. adapter. Fixed capacitors are disk ceramic. Circled numbers indicate pin numbers on CBS test adaptor (see text) to which connections are made. Components not listed below are labeled for text-reference purposes.

- C_1 —Ceramic trimmer.
- P1—4-contact male plug (Cinch-Jones P-304-CCT).
- RFC_1 , RFC_2 —2.5-mh. r.f. choke (National R50-2.5).
- RFC_3 —1-mh. r.f. choke (National R50).



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

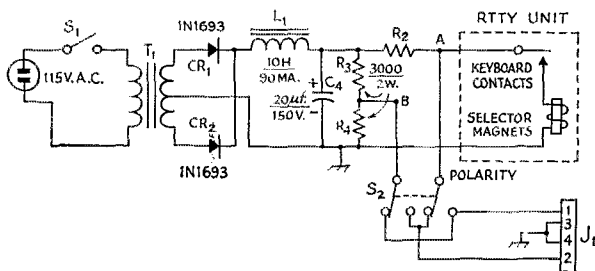


Fig. 2—This power-supply circuit supplies voltages for both the f.s.k. adapter and the RTTY selector magnets. Resistances are in ohms.

C_1 —Electrolytic capacitor.

J_1 —4-contact chassis-mounting female connector (Cinch-Jones S-304-AB).

L_1 —Filter choke (Triad C7-X).

R_2 —See text.

S_1 —S.p.s.t. toggle switch.

S_2 —D.p.d.t. toggle switch.

T_1 —Power transformer: 230 volts, c.t., 50 ma. (Triad R-29A, filament winding not used).

close, point A becomes 50 volts negative with respect to point B, and the 6AL5 conducts, connecting C_1 to signal ground and lowering the 9-Mc. crystal-oscillator frequency. The value of resistor R_2 depends on whether the RTTY selector magnets are connected in series or parallel. If the magnets are in series, requiring 30 ma., then R_2 should be 3200 ohms, 5 watts. If the magnets are in parallel, requiring 60 ma., R_2 should be 1600 ohms, 10 watts.

Construction

Because the four connections required to the 20-A circuit are all available at the 6U8 socket, it was possible to build the entire f.s.k. circuit on a CBS 9-pin test-adaptor socket. The 6AL5 socket is mounted directly on the adapter as shown in Fig. 3. The 6AL5 socket is a standard 7-pin bakelite socket with the metal mounting ring clipped off. The socket is mounted to the CBS socket by soldering Pins 3 and 4 of the 6AL5 socket directly to Pins 5 and 4 on the adapter socket. Choke RFC_3 is mounted underneath the 6AL5 socket, as shown in Fig. 3. The 20K resistor R_1 is to the right and slightly above RFC_3 . The 0.001- μ f. capacitor shown wrapped around the front of the adapter socket is bypass capacitor C_2 .

The trimmer capacitor, C_1 , is soldered directly between Pin 5 of the 6AL5 socket and Pin 2 of the adapter. All other components are mounted directly below the 6AL5 socket. Pin 6 of the 6AL5 socket is used as a tie point for R_1 , C_2 , and RFC_3 . Care must be taken to arrange the parts as shown in Fig. 3, particularly C_1 , so that the circuit can be plugged into the exciter without interfering with the indicator-eye-tube selector switch.

Installation

Adjust C_1 for minimum capacitance before installing the circuit. Remove the 6U8 tube from the 20-A, and insert it in the CBS test adapter socket. Now plug the entire assembly into the 6U8 socket. Slip the three leads, two from the r.f. chokes and one from ground, through the ventilation holes in the back of the 20-A and then attach the male Jones plug, P_1 . The power supply can now be connected to the f.s.k. circuit. It is recommended that shielded cable be used to connect the remote power supply to the circuit in the 20-A.

Adjustment

With the power supply connected to the 20-A and the RTTY machine as shown, turn on both units and adjust the 20-A for c.w. operation on the desired frequency, as usual. With the keyboard contacts open, adjust the receiver for zero beat with the transmitter frequency. Now close the keyboard contacts, and note the frequency

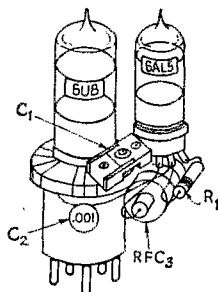
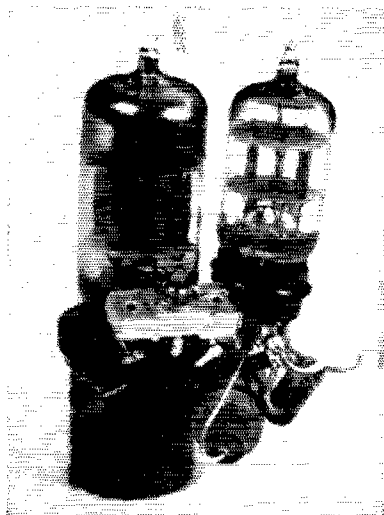


Fig. 3—Photo (left) and sketch showing how the f.s.k. components are supported by their leads from the test adapter.

shift. With C_1 at minimum, the shift should be 300 to 500 cycles. Now increase C_1 , turning the adjustment screw $\frac{1}{4}$ turn at a time, and recheck the total amount of frequency shift. If a scope and an 850-cycle audio generator are available, the output of the receiver can be connected to one set of inputs on the scope, and the 850-cycle oscillator attached to the other. The precise amount of frequency shift can be obtained by adjusting C_1 so that the Lissajous pattern indicating a 1:1 frequency ratio (a circle) is obtained.

Lacking the test equipment to make the frequency-shift adjustment as just described, an alternate method would be to simply compare the shift with other teletype signals received. The correct amount of frequency shift can also be obtained with the help of the receiver terminal unit if it is equipped with some form of tuning indicator, such as a scope or magic-eye tube.

The author has found that by increasing C_1 to large values, another point will be found

where 850-cycle shift is obtained, but the operation of the keyer will be erratic. The 9-Mc. oscillator has a tendency to "stall out" rather than shift at high keying rates. The minimum value of C_1 necessary to produce the desired 850-cycle shift should always be used. This is why the shift adjustment is made starting with a minimum value for C_1 .

If the output of the 20-A drops noticeably when the oscillator is shifted, check to be sure that C_1 is set at the minimum value necessary to produce an 850-cycle shift. A weak 6U8 or low-line voltage will also produce the same effect.

The direction of frequency shift will not be the same on all bands because of the heterodyning of the 9-Mc. crystal oscillator with the v.f.o. to produce r.f. output in the ham bands. Switch S_2 is provided so that the polarity of the keying voltage can be reversed to obtain the proper direction of shift on all bands

QST

COMING ARRL CONVENTIONS

November 29-30 and December 1 — Delta Division, Lafayette, Louisiana

January 18-19, 1964 — Florida State, Miami

April 3-5, 1964 — Great Lakes Division, Detroit, Michigan

May 9-10, 1964 — New England Division, Swampscott, Massachusetts

June 12-14, 1964 — West Gulf Division, Brownwood, Texas

August 21-23, 1964 — ARRL National, New York City

1964 A.R.R.L. NATIONAL CONVENTION

New York City — August 21-23

Next summer it will be "QRD New York" for hams and their families. The dual attractions will be the 1964 ARRL National Convention, celebrating 50 years of progress in amateur radio, and the New York World's Fair. The convention will run August 21, 22, and 23 at the spectacular New York Hilton Hotel: the Fair will be open from April through October.

A busy program of exhibits, meetings, demonstrations, technical talks and special events is now being worked up by the convention committee of the Hudson Amateur Radio Council, headed by co-chairmen Harry Dannals, W2TUK, vice-director of the Hudson Division of the ARRL; Stanley Zak, K2SJO; Henry Levow, WA2NLL; Frank Frimerman, W2FZ; and Russ Gerstein, K2RLY.

At the grand banquet on Saturday evening, August 22, the guest of honor and featured speaker will be Senator Barry Goldwater, K7UGA/K3UIG. ARRL President Herbert Hoover, Jr., W6ZH, will also be among the speakers at the convention.

Tickets for the convention will be available

after January 1, 1964 from HARC Convention, P.O. Box 58, Central Islip, Long Island, N.Y.

Facilities for visitors to New York in 1964 will be the most extensive in the city's history. New hotels and motels by the dozen are springing up, not only in Manhattan proper, but also in the adjoining suburbs to handle the huge crowds anticipated. Arrange your summer vacation now to include a trip to New York City in August of '64. The convention committee is planning, for your enjoyment, the most complete ARRL National Convention ever. Enjoy as a bonus the opportunity to see the New York World's Fair and visit the "Voice of the Fair" amateur radio station, operated by the member clubs of the Hudson Amateur Radio Council. More information will appear in future issues of QST.

Strays

The first Panamerican Congress of Radio Amateurs is being planned by the Liga Mexicana de Radio Experimentadores for April 15-18, 1964 in Mexico City. As more details are available, QST will bring you the news, but in the meantime keep those dates in mind.

We said in August QST that K7VMB was the only ham we knew who made his own call-letter license plates. Our apologies to W1MXP, who directs activities at the New Hampshire State Prison license shop.

While some of us spend hour after weary hour cutting wire lengths, measuring booms, and trimming our s.w.r.s., W5CYO operates with such radiators as an umbrella (open) on the floor; a coil of wire 5 x 3 inches; a burned-out electric laundry iron, ten inches long; and a four foot high mike-stand vertical. Feed lines are anything from coax to zip cord, and all antennas load up on all bands. Thanks to W7KRW for this info.

Tuned-Circuit

Temperature

Compensation

Reducing Frequency Drift

with T. C. Capacitors

BY R. H. DECKER,* K8QYV

S.s.b. operation, in both reception and transmission, requires a considerably higher order of frequency stability than that usually found acceptable for a.m. or even c.w. operation. This article discusses commonly-used methods of reducing frequency drift caused by changes in temperature.

TEMPERATURE compensation as related to transmitter v.f.o.s and receiver local oscillators is familiar to most amateurs. The methods employed in effecting temperature compensation, however, are not so well known. With the ever-increasing popularity of s.s.b. and its attendant long-period frequency-stability requirements, temperature compensation becomes more and more important. For most good-quality purchased equipment, whether factory assembled or in kit form, temperature compensation will have been carried out by the design engineer. If high-quality components are used, no further compensation should be required.

Ground communication equipment for military and commercial use is generally designed to operate satisfactorily over a temperature range of -55 to $+85^{\circ}\text{C}$. This requires excellent tuned-circuit temperature compensation. Amateur equipment is usually not required to operate over such wide temperature extremes, since it is operated in the relatively constant temperature of the shack. Even so, some compensation may be required.

In the case of a fixed-tuned resonant circuit (see Fig. 1), frequency stability depends on, among other things, the temperature of the frequency-determining components. When the resonant circuit is used to control the frequency of a vacuum-tube oscillator, there will be a frequency drift, caused mainly by interelectrode capacitance change of the tube, during the first few minutes after turning the oscillator on. Oscillator circuits, such as the Clapp circuit, whose characteristics tend to reduce this initial drift are well known, and have been adequately described in previous issues of *QST*, the ARRL *Handbook* and other technical journals. After a sufficient lapse of tube warm-up time at a constant ambient temperature, the frequency

becomes stable, provided other components produce no drift. However, subsequent changes in ambient temperature will usually cause changes in the capacitance and/or inductance of other components in the frequency-determining circuit, producing further frequency drift. To reduce this drift, the circuit may be temperature-compensated.

T. C. Capacitors

Basically, temperature compensation, sometimes called thermal frequency-drift compensation, consists of selecting temperature compensating (t.c.) capacitors having suitable characteristics to counterbalance drifts in frequency-determining circuit elements caused by ambient temperature variations. Temperature-compensating capacitors are those in which the capacitance value changes with ambient temperature variations in a known and reproducible manner. They are usually ceramic-dielectric types, because of the availability of ceramic materials having dielectric constants which vary with temperature in a predictable and traceable way. A wide range of t.c. characteristics are obtainable by varying the composition of the raw ceramic material before firing. Their manufacturing process, however, must be very carefully controlled to insure uniformity of coefficients.

Tubular ceramic t.c. capacitors are relatively simple in design and construction (see Fig. 2A).

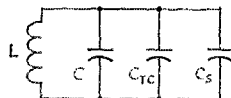


Fig. 1—Typical temperature-compensated tuned circuit, where L is the inductance, C the tuning capacitance, C_s the stray capacitance, and C_{Tc} the compensating capacitance.

* 3441 Millrich Ave., Cincinnati 11, Ohio.

The capacitor plates are formed by depositing and firing silver directly to the inner and outer surface of a ceramic tube. Flexible (tinned-copper) wire leads are soldered to the plates and brought out radially at each end (see Fig. 2B). Usually the capacitor is coated with clear enamel or lacquer for protection against humidity. Because of the coaxial type of construction, the residual inductance of the tubular t.c. capacitor is relatively low. In some cases, the unit is sealed in a second ceramic cover tube forming an insulated capacitor. The entire assembly is sometimes vacuum impregnated with wax for moisture proofing. Disk ceramic t.c. capacitors are also popular, and their application is essentially the same as the tubular units. In some instances they might be preferable because of physical characteristics.

Compensation

In general, commonly-used r.f. coils have a positive coefficient of inductance; that is, the inductance increases with increasing temperature. For high- Q resonant circuits, whether series or parallel, the resonant frequency is inversely proportional to the square root of the LC product:

$$f = \frac{1}{2\pi f \sqrt{LC}}$$

and the frequency of an uncompensated resonant circuit will decrease with a temperature increase. Temperature compensation may be affected by selecting a t.c. capacitor having a negative coefficient; that is, the capacitance decreases with increasing temperature. If the two opposite coefficients can be matched in value, the LC circuit will be stable with temperature changes.

Capacitor Temperature Coefficients

The temperature coefficient of capacitance is expressed in *parts per million per degree centigrade*, and may be computed as follows:

$$K_{tc} = \frac{\Delta C \times 10^6}{C \times \Delta t}, \text{ (p.p.m./}^\circ\text{C.)}$$

Where ΔC = change in capacitance (C_2 at $t_2 - C_1$ at t_1), pf.

C = capacitance at t_1 , pf.

Δt = change in temperature ($t_2 - t_1$), $^\circ\text{C}$.

Ceramic t.c. capacitors are manufactured with a wide range of temperature coefficients of capacitance, ranging from positive, through zero, to high negative values. A capacitor having a negative coefficient of 330 parts per million per degree C is usually designated by the symbol N330, one having a positive coefficient of 100 parts per million by P100, while a zero-coefficient unit is identified by NP0 (negative-positive-zero). Fig. 3 shows the percentage capacitance change versus temperature referred to $+25^\circ\text{C}$. for a group of standard temperature coefficients.

Tolerances

As with all electronic components, there are tolerances on the characteristics of the t.c. capacitor. The tolerances on the temperature

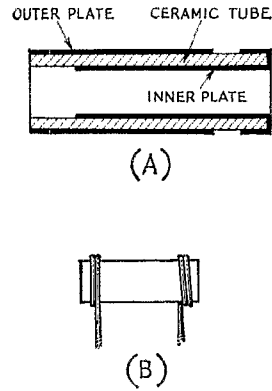


Fig. 2—Sketches showing the construction of a typical tubular compensating capacitor.

coefficients for normal t.c. capacitances are indicated in Table 1. For those applications requiring closer tolerances, there are available from some manufacturers units with tolerances ranging from NP0 ± 15 p.p.m. to N750 ± 75 p.p.m. For applications requiring a larger gradient of capacitance versus temperature than the normal t.c. capacitor affords, some manufacturers produce a group of extended t.c. units. Typical temperature coefficients and tolerances are as follows: N3300 ± 650 , N4700 ± 900 , N5600 ± 1000 . Capacitance values range from 0.3 pf. up to 1800 pf. Standard capacitance tolerances are as follows:

10 pf. or less, $\pm 0.25, 0.5$ and 1.0 pf.

Above 10 pf., $\pm 1, 2, 5$ and 10 per cent.

Depending on the electrical characteristics, the physical size of a tubular t.c. capacitor varies from 0.2 inch in diameter and 0.4 inch long to 0.275 inch in diameter and 2.0 inches long. The d.c. working voltage is usually 500 volts, although units having higher or lower voltage ratings are available for special applications. Capacitor characteristics are identified by color-coding or stamping the tubular body. For detailed technical data on any particular t.c. capacitor, check the manufacturer's catalogue.

Practical Application

By making a number of drift tests and trying various t.c. capacitors until the frequency drift is reduced to a tolerable degree, the approximate

Temperature Coefficient (p.p.m./ $^\circ\text{C}$.)	Tolerance (p.p.m.)
P100	± 30
P030	± 30
NP0	± 30
N030	± 30
N050	± 30
N220	± 30
N330	± 60
N470	± 60
N750	± 120
N1500	± 120

coefficient and capacitance required may be determined. With all tuned-circuit elements subjected to the same temperature change, the frequency drift caused by uncontrollable elements may be determined. A t.e. capacitor is then installed in the circuit; a capacitance equal to the amount added by the t.e. unit must be removed so that the circuit will still resonate to the desired frequencies, of course.

In the well-equipped laboratory, a more sophisticated procedure may be employed, rather than this trial-and-error method. The entire assembly to be temperature-compensated is placed in a temperature test chamber and subjected to the desired temperature range while the resonant frequency is accurately monitored.

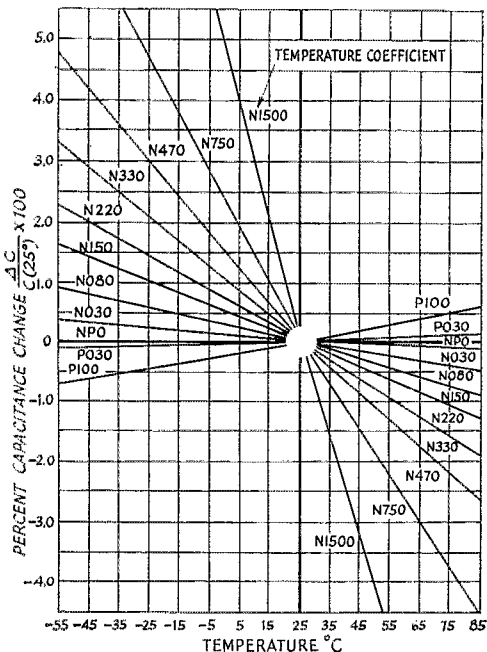


Fig. 3—Graph showing percentage change with temperature in the capacitance of temperature-compensating capacitors with various temperature coefficients.

There are many types of temperature test chambers, from small portable units to large permanently-mounted models. They are thermally-insulated compartments with provisions for automatically controlling and maintaining the internal temperature over a range of -55 to $+85^{\circ}\text{C}$. or greater. The larger models may have self-contained refrigeration units, while the smaller portable units usually employ dry ice (solid CO_2) for the low-temperature range.

The following expression may be used to determine the value of capacitance and temperature coefficient:

$$K_{tc} \times C_{tc} = \frac{2 \times \Delta f \times C}{f \times \Delta t} \times 10^8,$$

where K_{tc} = temperature coefficient of capacitance, p.p.m./ $^{\circ}\text{C}$.

- C_{tc} = capacitance of t.e. capacitor, pf.
- C = total capacitance, including strays, pf.
- f = frequency at 25°C ., Mc.
- Δf = change in frequency (f_2 at $t_2 - f_1$ at t_1)
- Δt = change in temperature ($t_2 - t_1$)

By choosing appropriate values of temperature coefficient and capacitance, the product $K_{tc} \times C_{tc}$ may be adjusted to the value indicated by the above expression. Thus, a fixed-tuned circuit, such as an oscillator or r.f. amplifier, may be temperature-compensated by adjusting the temperature coefficient of all or a portion of the capacitance.

It should be pointed out that exact compensation by simple capacitance adjustment is feasible only at one point in a given tuning range. For small tuning ranges, such as in amateur-band v.f.o.s, a very appreciable improvement, compared to an uncompensated circuit, is obtainable without exact compensation. For larger tuning ranges, such as in receiver local oscillators, methods exist for obtaining exact compensation at two points, using the principles of superheterodyne tracking.

It may be shown for a variable-inductance-tuned circuit, if the temperature coefficient of the inductance is assumed to be constant with frequency, that essentially exact compensation is possible over a band of frequencies. To construct such an inductance is not always practicable, although a compromise adjustment may be obtainable.

Although t.e. capacitors are manufactured with standard coefficients and tolerance, they may not be readily available. Usually, only the NPO and N750 units are stocked by electronic parts distributors. It may be shown that by placing t.e. capacitors in parallel, intermediate temperature coefficients of capacitance are obtainable:

$$K_t = \frac{(C_1 K_1 + C_2 K_2)}{(C_1 + C_2)}, \text{ and } C_t = \frac{C_1 \times C_2}{(C_1 + C_2)}$$

- where C = capacitance of combination, pf.
- K_t = temperature coefficient of combination, p.p.m./ $^{\circ}\text{C}$.
- C_1 = capacitance, pf.
- K_1 = temperature coefficient of C_1 , p.p.m./ $^{\circ}\text{C}$.
- C_2 = capacitance, pf.
- K_2 = temperature coefficient of C_1 , p.p.m./ $^{\circ}\text{C}$.

In recent years, several manufacturers have made available t.e. capacitors with essentially fixed capacitance values, but adjustable temperature coefficients. The coefficient is usually adjusted by a screw-driver slot. One such unit may be varied from -50 to $+500$ p.p.m./ $^{\circ}\text{C}$.

A technique that sometimes may be employed to locate a suspected defective frequency-determining component is to use a small hand-held hair dryer as a source of localized heat. Care must be taken not to overheat, but usually a defective component may be readily located by

an abrupt change in frequency or output, depending on the type of circuit being investigated. Of course, if the assembly utilizes semiconductors this technique would not be wise. If a t.c. capacitor is replaced, make certain to install it with the "hi" terminal connected to the high r.f. point. The "hi" terminal of a t.c. capacitor is the end bearing the coefficient color code.

When temperature-cycling an oscillator, the frequency of oscillation must be accurately monitored over the temperature range. One method of doing this is to use a heterodyne frequency meter and the radiated oscillator signal. In cases where the assembly is well shielded, it may be necessary to sample the frequency from the oscillator circuit directly. If this is done, extreme care must be used in selecting the sampling point to prevent loading or "pulling" of the oscillator and thus introducing instability. In lieu of a frequency meter, a receiver in conjunction with a crystal oscillator is a convenient and satisfactory method for monitoring the oscillator frequency.

When temperature-cycling an amplifier stage, the resonant frequency must be measured over the temperature range. The tuned circuit must be excited from an external variable-frequency source or signal generator. The condition of tuning may be determined by swinging the generator frequency through resonance and observing a v.t.v.m. (with r.f. probe) connected across the tuned circuit. Here again, care must be taken so that the monitoring method does not affect the resonant frequency.

When temperature-compensating either an amplifier or oscillator, well-regulated power supplies should be used to eliminate frequency

changes not caused by temperature changes but by voltage variations.

In the case of a crystal-controlled oscillator with a tuned circuit where precise frequency stability with temperature is needed, it may be necessary to resort to temperature compensation. Inherently, crystal oscillators have very good stability, but if the tuned-circuit resonant frequency varies with temperature, objectionable frequency "pulling" could result. This is especially true of v.h.f. overtone crystal oscillator circuits. In this case it is desirable to temperature-compensate the tuned circuit.

Conclusion

There are many aspects of tuned-circuit temperature compensation. Only basic examples have been cited here to illustrate the principles and techniques involved. To deal in detail with many of the possible problems is beyond the intent of this article.

The usual application of t.c. capacitors is to compensate receiver and low-level transmitter r.f. tuned circuits. In general, the bandwidth of high-level transmitter r.f. power amplifiers is such that by using transmitting capacitors (vacuum, air, or mica) and physically-large air-wound inductors, no temperature compensation in the usual sense is needed.

It must be remembered that good circuit layout and quality components are essential requirements for stability. All sources of heat should be kept away from tuning capacitors and coils. Only after all requirements for stability have been met should final temperature compensation with t.c. capacitors be considered.

QST

Strays

The "Morale Man of McMurdo Sound" Petty Officer Walter R. Jones of New Preston, Conn., needs some cheering up himself right now. While on leave from Antarctica (where he handled volumes of traffic daily from KC4USV), he and his wife were seriously injured in an automobile accident. Let's all send him some get-well cards at Hartford Hospital, Hartford, Conn.

Who sez U.S. hams have a corner on TVI and BCI? W6OJW points to a Russian news (*Trud*) release, complaining about hams in the Donets Basin of the Ukraine who break into official government radio and TV broadcasts with "wild, indecent" jazz and twist records, making it hard for honest Soviet citizens to catch the government show.

The Intercollegiate Net meets Thursdays at 1200Z on 7270 kc. (a.m.), according to K8RHZ. All college clubs are invited to check in.

K7YAE, K7YFE, K7YSE and K7YWE all operate on six meters in the Phoenix, Arizona, area. Thank goodness for those standard ARRL phonetics!



E. Finley Carter, K6GT, was recently presented a top Department of the Army award at a dinner in his honor in New York. Carter received the award for "outstanding service to the . . . Army from 1954 to 1963" as president of the Stanford Research Institute. He's now SRI's senior management counselor, a vice president of the World Affairs Council of Northern California, a fellow of the IEEE, and a director of Project Oscar.

17th V.H.F. Sweepstakes, January 4-5

ATENTION v.h.f. operators! Here is the dope on the 1964 VHF Sweepstakes, sure to be bigger and better than ever. It will start at 1400 your local standard time on Saturday, January 4, 1964, and end at midnight local time on Sunday, January 5. 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: WHDQ 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 as shown in December, 1961, *QST*, by writing to ARRL, 225 Main St., Newington, Conn. 06111. Let us know how many you need. Logs must be postmarked by February 1 to be eligible for score listing and awards.

Rules

1) *Eligibility:* Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable *under one call* or above 50 Mc. are invited to take part. Yukon-N.W.T. (VE8) counts as a separate multiplier.

2) *Object:* Participants will attempt to contact as many other stations in as many ARRL sections as possible.

3) *Contest Periods:* The contest starts at 2:00 P.M. your local time, Saturday, Jan. 4, 1964, and ends at midnight, Sunday, Jan. 5, 1964. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.

4) *Exchanges:* Contest exchanges, including all data shown in the sample, must be transmitted and received for as a basis for each scored point.

5) *Scoring:* (a) Contacts count *one point* when the re-

quired 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.

6) *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: WHDQ 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.)

(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-type 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.

7) *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.

8) *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.

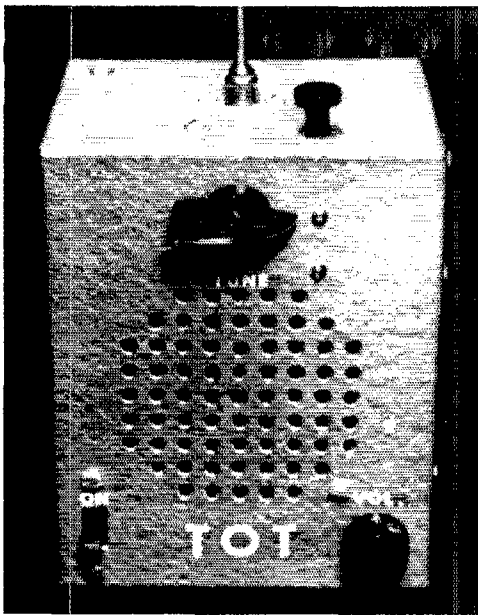
9) *Reporting:* Reports must be postmarked no later than Feb. 1, 1964, to be considered for awards. QST

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the NR		Call	OK	Place	Time	Date
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	OK (Readability and strength or RST of nation worked)	Your ARRL section	Send time of transmitting this NR	Send date of QSO
Sample	NR 1	W1AW	59	CONN	1402	JAN 4

The TOT

BY ROBERT GLORIOSO,* W1EBW



The complete two-meter transmitter-receiver is assembled in a 3 X 4 X 5-inch box. The knob at the top actuates the p.t.t. change-over switch. The pointer controls the receiver tuning. Power and audio-gain controls are at the bottom of the panel.

V.h.f. transistors now available at reasonable prices make it economically feasible for the amateur to build this 144-Mc. handie-talkie. The 60-mw. output is sufficient for a range of 1 to 5 miles between units.

SOME of the more recent transistor types have opened the door to reasonably-priced rigs in the v.h.f. regions. The rig described here uses the two types 2N1742 and 2N2048.¹ The latest prices are about \$2.85 and \$1.80, respectively.

The block diagram of Fig. 1 shows the layout of the TOT transmitter-receiver. The receiver, a superregenerative detector, tunes approximately 135 to 150 Mc., and has a sensitivity of around 3 μ v. for 6 db. s/n. The transmitter is a 3-stage affair and runs about 200 mw. d.e. input. The audio amplifier/modulator is a modified readily-available commercial subassembly.

Circuit Description

The receiver uses a single transistor. A superregenerative detector, although relatively simple circuitwise, must perform several functions simultaneously. These functions are: high-frequency oscillation, amplification, low-frequency oscillation (superregeneration), and detection. As a basic circuit (see Fig. 2), the TOT detector is an oscillator which consists of C_1 , L_1 , C_2 , R_1 , R_2 , and RFC_1 . The addition of C_3 provides the low-frequency oscillation (about 500 kc.). At this point the circuit is just an oscillator which is being modulated. If L_2 and R_3 are added, and an amplitude-modulated signal introduced, the rate

* 63 North St., Danbury, Conn.

¹ Since the article was written, the author has informed us that Philco will stop production of these types in the near future. He also states that respective satisfactory substitutes are the Amperex 2N2495 and the T.L. 2N2635. No changes in circuit or values are required. — Editor.

of low-frequency oscillations will change with the amplitude of the incoming signal, and an audio voltage will appear across R_3 .

The oscillator in the transmitter (see Fig. 3) is a grounded-base stage which uses a 5th-mode overtone crystal operating at 72.4 Mc. The buffer/doubler and the final amplifier are conventional grounded-base r.f. amplifiers. The final stage is collector-modulated at 60 per cent, and the buffer is collector-modulated at 40 per cent.²

Modulator

The audio section is a completely-assembled subminiature 100-mw. unit obtained from Lafayette (PK-543). It measures 3 by $1\frac{1}{16}$ by $1\frac{1}{16}$ inches. The output transformer in this unit was replaced by one having a 3000-ohm secondary for modulation as well as an 8-ohm secondary to drive a speaker. This transformer is also obtainable from Lafayette (TR-119) and fits directly into the amplifier board without modification. The board already has additional holes for the extra transformer leads.

There is a feedback connection to the secondary of the original output transformer. When the new transformer is substituted, a check must be made to determine to which of the two 8-ohm terminals this feedback connection must be made. With a speaker connected to the transformer, apply power. If the amplifier oscillates, the feed-

² Rheinfelder, "Modulation of Driver Stage to Increase Power Output of A. M. Transmitter," *Motorola Application Note*.

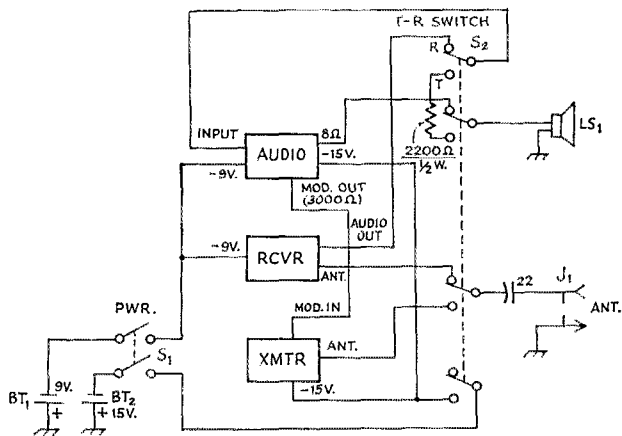


Fig. 1—Block diagram of the TOT transmitter-receiver, including the switching system. Capacitance is in pf.
 BT₁—Miniature 9-volt battery (Burgess 2U6 or equivalent).
 BT₂—15-volt battery (see Table I).
 J₁—Phono jack.
 LS₁—3-inch dynamic speaker (Lafayette SK-193).
 S₁—D.p.s.t. slide switch.
 S₂—Four pole double-throw spring-return push-to-talk switch (Lafayette SW-102).

back connection must be shifted to the other terminal.

The 3-inch dynamic speaker serves as the microphone on transmit, and the change-over switch, S₂ in Fig. 1, transfers the speaker from the output to the input of the audio amplifier. Diode (R₁ in Fig. 3 prevents loading of the audio output by the 1000- and 300-ohm resistors while receiving.

Construction

The receiver is made using the etched-circuit layout of Fig. 4B. The antenna coil, L₂, is wound adjacent to the collector side of L₁. The coupling between these coils must be adjusted rather critically. To facilitate this adjustment, the collector end of L₁ should be away from the board and L₂ wound at this end.

The transmitter is built by the etched circuit-board diagram of Fig. 4A. L₀ is required to provide a negative capacitance, i.e., inductance, to counteract the inherent capacitance of the crystal holder. This coil consists of a full single-layer solenoid of No. 32 enameled wire wound on a ½-watt 1-megohm resistor. It is then put across the crystal in its socket and tuned, by removing and/or spreading turns, to resonate slightly higher than the resonant frequency of the crystal (higher by not more than 5 per cent) as indicated by a dip on a grid-dip meter. The resonant frequency of the crystal can be seen as a sharp rise in the g.d.o. indication. L₃L₄ and L₅L₆ should be wound in the same manner as L₁L₂. L₇ should be wound with the power-supply end away from the board and L₈ coupled to this end. RFC₁ and RFC₂ are made by close-winding No. 32 wire on a ½-watt, 1-megohm resistor. These coils are checked with a g.d.o., and adjusted to self resonance just above the 2-meter band (not greater by more than 10 per cent) by adjustment of turns.

The TOT is housed in a 3 × 4 × 5-inch Minibox (Bud CU-2105A). The parts layout can be seen in the photographs. The antenna is made from a 20-inch piece of No. 14 or 16 bus bar. The free end should be bent over for safety. The bottom end is fitted with a phono plug to fit the jack, J₁, mounted in the top of the Minibox.

Size	Burgess type (or equiv.)	Expected Life	Location
AAA	No. 7	6 hours	Internal
AA	Z	7	Internal
AA	930	20	Internal
C	1	35	External
C	130	50	External
D	2	120	External
D	230	150	External

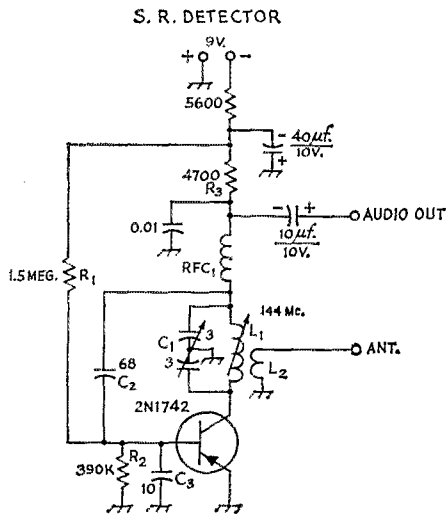


Fig. 2—Circuit of the superregenerative receiver. Except as indicated, decimal values of capacitance are in μf.; others are in pf. Resistances are in ohms. Fixed capacitors of decimal value are disk ceramic; others are mica except where polarity indicates electrolytic. Resistors are ½ watt. Components not listed below are labeled for text-reference purposes.

- C₁—Butterfly air variable (Johnson 160-203).
- L₁—4¾ turns No. 22 enam. space-wound on CTC SPC-11-1-4L slug-tuned form.
- L₂—1¾ turns No. 22 enam. wound on same form as L₁ at collector end (see text).
- RFC₁— See text.

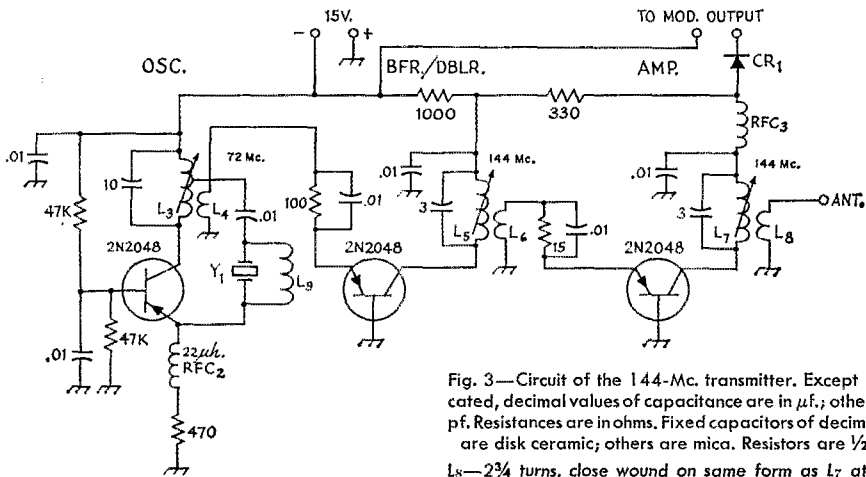


Fig. 3—Circuit of the 144-Mc. transmitter. Except as indicated, decimal values of capacitance are in $\mu\text{f.}$; others are in pf. Resistances are in ohms. Fixed capacitors of decimal value are disk ceramic; others are mica. Resistors are $\frac{1}{2}$ watt.

L_3 — $6\frac{1}{4}$ turns, space-wound, tapped at $3\frac{1}{2}$ turns from collector end.

L_4 — $2\frac{3}{4}$ turns, close-wound on same form as L_3 at collector end (see text).

L_5 — $4\frac{1}{4}$ turns, space-wound.

L_6 — $3\frac{1}{4}$ turns, close-wound on same form as L_5 at collector end (see text).

L_7 — $3\frac{3}{4}$ turns, space-wound.

L_8 — $2\frac{3}{4}$ turns, close wound on same form as L_7 at supply end (see text).

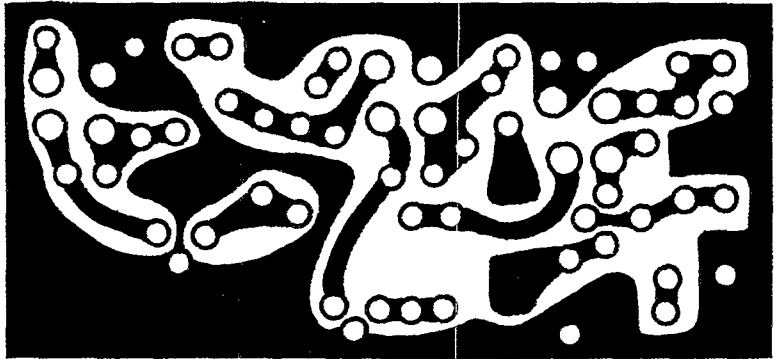
The above coils are wound with No. 22 enameled wire on CTC SPC-11-I-4L slug-tuned forms.

L_9 —50 turns No. 32 enameled on $\frac{1}{8}$ -inch diam. $\frac{1}{2}$ -watt 1-megohm resistor (see text).

RFC₂—Ohmite Z-28 or equivalent.

RFC₃—See text.

Y₁—Fifth overtone 72-74-Mc. crystal.



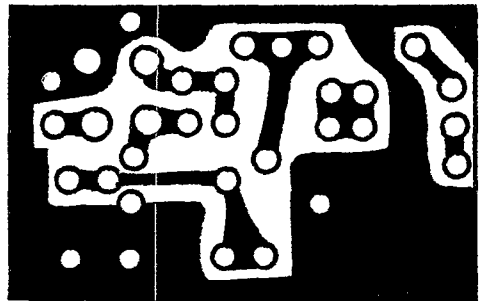
(A)

Power Supply

The power required by the TOT may be supplied from several sources depending upon the objectives of the builder. However, the author has found that the two-supply arrangement shown in Fig. 1 is best. The receiver-amplifier combination draws an idling current of approximately 5 ma. and the 2U6 battery will provide up to 50 hours of service, while the transmitter battery may require replacement more frequently. Also, the two supplies eliminate decoupling problems which may occur as the batteries are drained. There is ample space available in the TOT cabinet for a self-contained supply; however, the life of such a supply is necessarily limited. The chart of Table I provides a comparison of expected battery life as an aid in making a choice of batteries in the transmitter power pack.

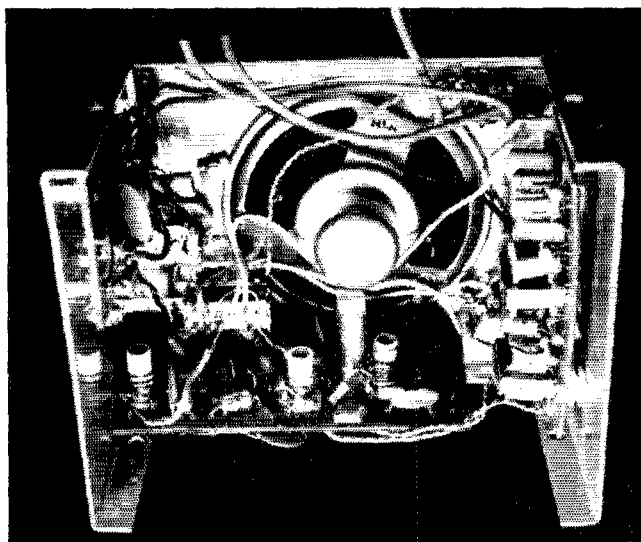
Tuning and Operation

Mount the audio unit, receiver and associated components such as switches and speaker, leaving



(B)

Fig. 4—Actual-size etched-board patterns for transmitter (A) and receiver (B). Views show copper sides of boards.



Interior view of the TOT. The receiver board is against the left-hand wall (top of the finished unit), the audio board is to the right, and the transmitter board at the bottom.

Specifications

Voltage requirement:	9 v. d.c. and 15 v. d.c.
Current drain:	10 ma. at 9 v. (average) 30 ma. at 15 v.
Final d.c. input power:	200 mw.
Final r.f. output power:	60 mw.
Receiver sensitivity:	3 μ v. for 6-db. signal-to-noise ratio.

the transmitter unit out. Adjust the coupling between L_1 and L_2 to minimum (L_2 at outer end of coil form), connect the antenna and apply power. A superregenerative hiss should be heard. Adjust L_1 by movement of the slug so that the receiver tunes to about 135 Mc. with C_1 fully meshed. Adjust the coupling for maximum sensitivity.

Disconnect the ungrounded side of L_6 on the transmitter board and connect a 50- to 100-ohm resistor across the coil. Apply power and monitor the collector current of the buffer/doubler stage. Adjust the oscillator-coil (L_3) slug and the coupling of L_4 for maximum current in the buffer stage, approximately 10 ma. If the buffer draws no current, the oscillator is not working.

Place a grid-dip oscillator in the wavemeter position near L_5 ; output at 2 meters should be indicated. Adjust L_5 for maximum indication. Remove the resistor, and place it across the out-

put coil, L_8 . Apply power, and monitor the collector current of the final. Adjust L_3 and L_5 and the coupling of L_4 and L_6 for maximum current, between 10 and 14 ma. Check for output by placing a g.d.o. near L_7 . Install the transmitter unit, connect the antenna and apply power. With a g.d.o. near the base of the antenna, adjust all coils and couplings for maximum indication. The collector current of the final amplifier should be between 12 and 14 ma. A check of the modulation should be made by listening to the TOT on another receiver. Adjust the buffer and final-amplifier tuning for minimum audio distortion. The transmitter and receiver coil slugs should now be glued to prevent tuning changes while the unit is in operation. The TOT is now on the air.

The TOT has been used in local net operation covering a radius of about 3 miles. The maximum distance worked so far with the whip is about 12 miles. Maximum distance between two TOTs appears to be between 1 and 5 miles, depending on the antenna and terrain. The TOT has also been used as a mobile rig with equally good results, using either a halo or a broadcast-band whip adjusted to 19 inches.

Acknowledgment

I wish to thank Ron (W1FQB), Robert Giordano, Wayne Dasher, and my wife Dee (W1MGA), for their help. QST

Strays PROW

W6MLZ sends some information for the benefit of sightless hams: Sideband Engineers now offers an audio tuning unit *free of charge* to the sightless purchaser of one of their transceivers. W6LWE, the firm's chief engineer, developed the unit. Its notched dials allow the operator to find a particular spot in the band; and an audio signal indicates power output, making tuning up easier, too.

WB6ALE, WA6RYW and WA6REC, all members of the ACTORS Club of Santa Ana, California, have received trophies for their help in coordinating a recent motorcycle rally, reports W4BLGF. Hams and cyclists seem to get together quite often in the Los Angeles area; the Salvation Army Disaster Network recently rode herd on 700 riders in the "City of Hope" benefit rally at 29 Palms, Calif.

• Technical Correspondence

NEW VERSION OF 6DQ5 TUBE

Technical Editor, *QST*:

The popular 6DQ5^{1,2} has now appeared in two new versions. The RCA 6JE6 is identical electrically but has a novar base and a separate base pin connection to grid No. 3. Lower-loss high-frequency circuits and high- μ , zero-bias, grounded-grid operation should be possible.

The Tung-Sol 8236 is a direct plug-in replacement for the 6DQ5, but uses a carbon anode and hard glass envelope and has an ICAS plate dissipation rating of 60 watts. — *Jay D. Gooch, W9YRV, Control Systems Lab, University of Illinois, Urbana, Ill.*

TWO-TONE GENERATOR

Technical Editor, *QST*:

In experimenting with the two-transistor two-tone generator in July *QST*, I came across several items that might be of interest to those attempting to use other transistor types (probably 95 per cent of those who will construct this device).

In experimenting with four different p-n-p germanium and three n-p-n silicon transistor types, I found that a minimum *beta* of 50 to 60 was necessary for oscillation at 12 volts. The individual oscillators worked well alone at their respective frequencies, but in my particular circuit interaction between the two of them produced a single output frequency around 1500 cycles when both operated into the common 100K load. Isolation was achieved by reducing the pot from 100K to 50K and using coupling capacitors of 0.0033 μ f. (C_1) and 0.0047 μ f. (C_2) for the 2000-cycle and 1000-cycle oscillators, respectively. The reactance of these capacitors is near 50K ohms for the frequencies involved.

Using n-p-n silicon transistors, the 82K base bias resistors were reduced to around 51K to center the operating point. With n-p-n or p-n-p types of adequate *beta*, the circuit oscillated with as little as 9 volts, although 12 volts would provide a greater margin.

In the unit shown in the photograph below, the 50K pot was replaced by a 47K fixed resistor in series with a 10K pot to further reduce the output voltage to suit my application. A pair of 2N234 transistors were used. The $2\frac{3}{16}$ X $1\frac{3}{4}$ -inch circuit board was selected to fit an available plastic

¹ Gardner, Gooch, "The 6DQ5 as a Linear Amplifier," *QST*, October, 1959.

² "High-Frequency S.S.B. Exciter," and "75-Watt 6DQ5 Transmitter," *The Radio Amateur's Handbook*, 40th ed., 1963.

Two-tone generator, based on the K2ENN circuit (July *QST*), built by W4PVT. The familiar G. Washington medallion gives an idea of the size of the "chassis."

box. Greater miniaturization is possible with attendant risk of eyestrain.

Many thanks to K2ENN for the article.

— *M. W. Wood, Jr., W4PVT, 2606 Alderney Lane, Winston-Salem, N. C.*

HOW TO TUNE A DIPOLE

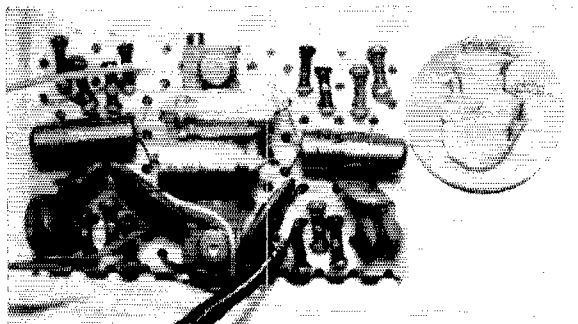
Technical Editor, *QST*:

Late in the summer of 1962, a dipole was strung from the roof of the house to a telephone pole and fed with 100 feet of RG-8/U. Each end of this dipole was bent down a few feet. Using the transmitter or grid-dip meter on 3975 kc., no null was apparent. The antenna simply refused to load on 3975, either from the pi network in the transmitter or from a link on the grid-dip meter. Values were juggled in the pi net to no avail. Although the antenna did radiate enough for c.d. drill and a rare QSO, it was far from satisfactory. This ridiculous situation persisted for the whole winter of 1962-1963.

During the winter months a Monimatch was constructed (from February 1957 *QST*). I didn't like or trust this coax feed, but since it has been so popular for so many years, it only seemed reasonable that I was missing the boat somewhere. Thus the Monimatch for a double check.

Sure enough, the Monimatch showed high reflected power. Now, what to do? On the first warm and available day in the spring of 1963, I set out to see once and for all what was wrong with this antenna. The first step was to cut the 100 feet of cable down to about 80 feet, an electrical half wave on 3975. This was to give a duplicate of the center impedance in the shop where it could be measured. While the feed line was down for measuring and trimming, the center of the dipole was lowered to a point where I could stand on a box and couple the grid-dip meter to the center of the antenna. A one-turn link was fastened across the center insulator and coupled to the dipper. In the shop I had fed the line with 3975 kc., and been unable to interpret the reading. Out in the yard, without conscious thought, I swung the dipper across the band, and there was the dip — at 3750!

This, then, is the trick. Cutting the feed line to a half wave had been unnecessary. To find the resonant frequency of the antenna, you have only to feed the line through the bridge, and change the frequency of the exciting source across the band. At resonance, the standing-wave ratio will be minimum. The resonant frequency of the antenna can be changed simply by adding to or cutting from the wire of the flat top, or bent ends, as the case may be.



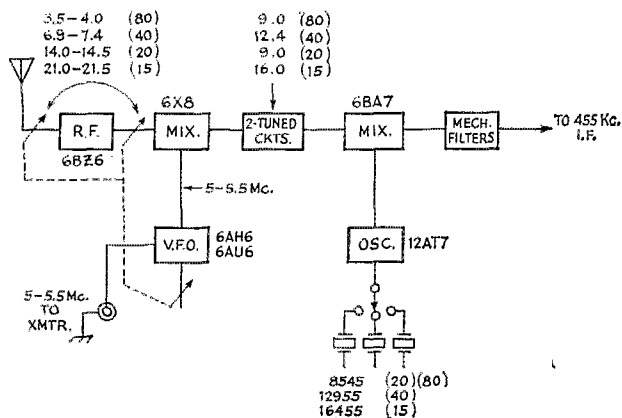


Fig. 1—Block diagram of frequency-converting arrangement used by K8JIX. V.f.o. range is the same as that used in a popular s.s.b. setup, thus making transceiver operation possible with separate transmitter and receiver.

My dipole seems only about 50 kc. wide. One tuned for phone is useless on c.w. Recently, I had occasion to move this dipole to 3520 kc. Setting up the gear and lengthening the antenna took only 30 minutes. Incidentally, height variations from 15 to 30 feet did not have a pronounced effect on the resonant frequency. — James M. Fisher, W3KNG, 2084 Blair St., Williamsport, Pa.

A DIFFERENT CONVERSION IDEA

Technical Editor, *QST*:

The imminent loss of a borrowed receiver, plus a 2.1-ke. mechanical filter on the shelf, prompted the construction of a new receiver for my station. The receiver was designed to complement a home-brew s.s.b. exciter that uses a heterodyning scheme similar to that used in the HT-37. Looking at Fig. 1, it may seem strange to see first-i.f. frequencies of 9, 12, and 16 Mc., but such a scheme does have advantages. The v.f.o. tunes from 5 to 5.5 Mc. on all bands and runs into the first mixer; the first i.f. remains fixed for any band and does not need to be tracked with the v.f.o. The first i.f. is different on different bands, though.

Some eyebrows may be raised at converting from the high first-i.f. frequencies down to 455 kc. in one step. The situation is different from most of this type in that the first i.f. is fixed, and sharply-tuned loosely-coupled resonant circuits will reject the 910-ke. image satisfactorily. In my receiver I use a single large coil tuned to 16 Mc., with additional padding capacitance switched in to cover 12.4 and 9 Mc. I had thought of adding a simple crystal filter at this point for overload protection, but so far it has not been necessary.

The biggest advantage of this receiver plan is that the v.f.o. range of the receiver and that of the transmitter will be the same for any operating frequency. So one v.f.o. may operate both the transmitter and receiver for transceiver operation.

Operation on 10 meters has not been attempted yet, so I can't say how well the system works there. I plan to use the second harmonic of the v.f.o. to obtain the 18-Mc. i.f. from 28 to 29 Mc. in both the transmitter and receiver.

The only objectionable birdie occurs at 21.333 Mc., where the fourth harmonic of the v.f.o. comes in S9.

If anyone should try this idea and try to gauge the r.f. and mixer tuning to the v.f.o. tuning as I did, let me point out that the 80- and 40-meter bands tune backward, so you need a gang on the main tuning capacitor that is fully meshed when the oscillator section is wide open. Tracking is very difficult without it, since the plates are wide open at 3.5 Mc. and

meshed at 4.0! — William L. Hale, K8JIX, 4459 Reed Road, Columbus 21, Ohio.

SATELLITE SCATTER FOR 50-MC. DX

Technical Editor, *QST*:

During the past five years, there have appeared in *QST* three articles,^{1,2,3} several columns and varied letters dealing primarily with the subject of communication by means of sporadic patches of anomalous plasma associated with artificial satellites. These ion clouds, to use their historical but not-so-accurate name, do not accompany the satellite in flight as was once thought, but form only when the moving satellite encounters certain unique conditions in its environment. Once formed, these reflecting regions can change their shape, grow, shrink, move in most any direction at most any speed, even stand still.^{4,5} Two characteristics seem to be all that observable interaction effects have in common: they reflect signals, and they don't last very long.

With the present growth of interest in 50-Mc. scatter experiments and in meteor-trail reflection, these phenomena possess a moderate amount of potential for practical use.

Three basic facts have been learned about satellite scatter frequency distributions:

- 1) Signals may come in at frequencies quite far from the transmitted frequency, much farther than would result from normal passive reflection.
- 2) Because the relative velocities involved are fast-changing, we can look for considerable frequency drift and instability in the returning echoes.
- 3) Because of the irregular nature of the reflection, signals will rarely be coherent, but will more frequently return in the form of "smears," as in aurora. The "smears," however, will themselves be subject to facts 1 and 2, which auroral smears are not.

Fast-changing, Doppler-shifted aurora? Sounds difficult to copy. It is, but that isn't the half of it, because we have no idea when and where these reflected signals will pop up. When they do occur, it may be only for a second or so, 30 kc. from where

(Continued on page 178)

¹ Roberts, Kirchner, and Gray, "Radio Detection of Silent Satellites," *QST*, August, 1959.

² Soifer, "High Frequency Satellite Scatter," *QST*, July, 1960.

³ Soifer, "Project Echo A-12 Research, Tracking, and Reporting," *QST*, June, 1962.

⁴ Kraus and Tiuri, "Observations of Satellite-Related Ionization Effects Between 1958 and 1960," *Proc. IRE*, October, 1962.

⁵ Kraus, "Evidence of Satellite-Induced Ionization Effects Between Hemispheres," *Proc. IRE*, November, 1960.

Harris's Theorem

BY JOHN HARRIS,* VE3ON

PROBABLY every ham who has had anything to do with military services has heard of Murphy's Law, and certainly every ham who has drawn more than two consecutive breaths has, at one time or another, experienced the workings of this law in the building and operation of his equipment. For those who are not acquainted with this natural law, and wonder why that new rig or receiver doesn't work after they were so careful in constructing it, Murphy's Law explains it thusly:

"If it is possible for something to be put together backwards or the wrong way, sooner or later some knucklehead is going to put it together that way."

There is also a corollary to this law — Henderson's Corollary — which states that:

"The probability of Murphy's Law operating increases directly with the amount of destruction, noise, and expense that could result from its operation in a particular situation."

After having had personal and painful experience with the functioning of these natural phenomena, there seem to be many circumstances which cannot be covered adequately and neatly with a sigh and the observation, "Oh, Murphy's Law is rearing its ugly head again." Detailed investigation of many of these instances indicates very definitely the existence of a further and hitherto unsuspected natural law which will be found to cover junkyards full of shorted and scorched equipment for which up till now poor old Murphy has had to shoulder the blame.

It is for this reason and for the vindication of Murphy that I wish to propound this discovery as Harris's Theorem — a natural law which covers these situations. The functioning of Harris's Theorem appears to transform ordinarily docile and well-behaved equipment into a snarling mass of components bent on self-destruction. Further, the functioning of this law apparently exerts a powerful influence on the timing of unrelated events in order to produce the greatest amount of frustration possible, especially just before an event such as the Sweepstakes or the DX Contest. Although all the mathematical calculations are not yet complete, one might state Harris's Theorem as follows:

"The probability of ham radio equipment breaking down, burning out, or absolutely refusing to work increases as the square of the requirement or desire of the operator to use it."

There may be some who are inclined to doubt the existence of this law. I ask them, then, to consider why that filament transformer opened up just on the eve of the Sweepstakes, to be followed the next day by a surprise visit from Aunt

Harriet and her seven children, and then by an ice storm on the second weekend which brought all the antennas down! And I hereby offer as irrefutable proof my own log of the 1961 DX Contest:

First Weekend-VE2BX/W4

GMT

Feb. 17

2400 Fired up rig — entered contest — 20 c.w.

Feb. 18

0002 Beam won't load.

0005 Can't find one overshoe.

0007 Pulling coax up out of snow. In bedroom slippers — both feet wet.

0008 Slipped and fell in snow. Kicked tower — dislocated toe.

0033 Vertical won't load either.

0130 Changed pickup loop. Vertical loads — a little. No answers.

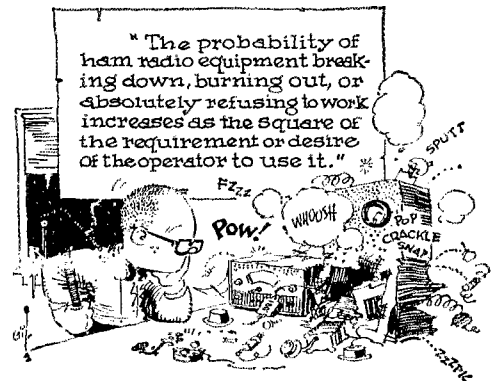
0315 Moved to 10 phone for antenna check. Only one station on — he can't wait for check — busy taking medicine for his ulcer.

0320 Back on 20 c.w. Connected up 80-meter doublet — no loading.

0322 Out in snow again. Feet wet — doublet down and under snow since last storm.

0330 Got 807 out of refrigerator — will try to load operator.

0740 Back on 10 — worked local. He reported vertical louder than beam — vertical almost S3.



0800 Operator loaded — went to bed.

1500 Pulled doublet up out of snow. Can't find stepladder — put doublet up around tree as high as I could reach.

1530 Doublet loads P'B on 10.

1545 No answers. Doublet only five feet high in center.

1600 One 866 dead in final power supply — no spares.

1605 Took 866 out of modulator power supply — put in final supply.

1700 No answers — went to 15.

1730 No answers — went to 20.

1745 No answers — tried with antenna direct to final — no relay or filter.

(Continued on page 180)

* 166 Meadowlands Drive, Ottawa 5, Ontario.



'63 Field Day Results — *the biggest!*

15,654 Participants and 3815 Transmitters Demonstrate Readiness

COMPILED BY ELLEN WHITE,* WIYYM

THE annual ARRL Field Day exercise is many things to many people. Some find it an event to officially start the summer, others look to it for the competition aspects within each class. This yearly test of the emergency capabilities of amateur radio is all that and more. It is a wonderful opportunity for a club to participate in a project appealing to all — the operator, the experimenter, the newly-licensed amateur, the DXer, the old-timer, the v.h.f. man, the traffic man, the public-relations man, the families too! Again this year the gang took to the hills to show what they could do under field operating conditions. In '63 a higher-than-ever number did operate away from their home stations under a variety of weather, terrain and propagation conditions. A total of 1555 entries were received from all Classes, up about 4½% over '62. Un-

*Asst. Communications Mgr., ARRL

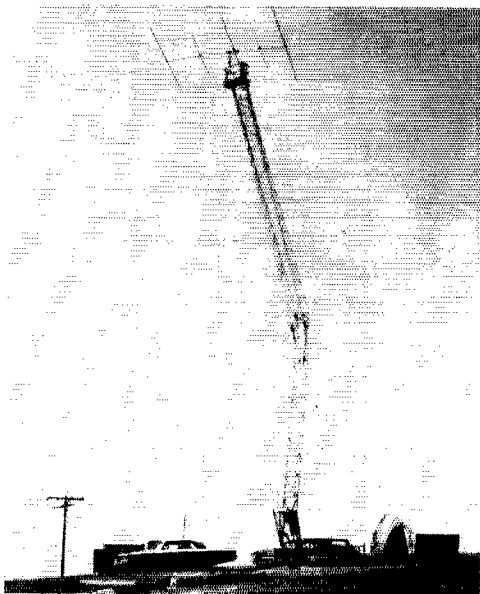
sual QSO totals were recorded, indicative of this increased activity and of the increasing skill of the FD operators.

Everyone is a winner in the Field Day exercise. The experience gained in operating away from the home location points up equipment weaknesses leading to better preparation for potential emergencies. As was said in 1933, "The Field Day activities were a real trial for portables. (And some portables are a trial for those who operate them . . . hi.)"

How ready are *you* for emergency-type operation independent of commercial mains? Is your group ready for Field Day '64?

SOAPBOX

"Thanks to the County Commissioner for bulldozing out the wooded area to give more room for our antennae, to a local electrical company who did all the wiring from the generator, to members of a line crew who, in their free time,



(left) The Tamalpais ARC, W6JTP/6, topped 750 two-ways in 3A, operating from this spectacular campsite overlooking Novato from 1500' Mt. Burdell. (right) The Southern Wisconsin DX Club, W9CCN/9, operated 1A and put out one whale of a signal, responsible for 1074 QSOs! The gang rented a cherry picker to raise a W3DZZ beam to the 105' level at the site of a former radar base. In spite of a massive onslaught by Murphy the boys plan a '64 return with QRP to make a stab at a new scoring record.



Phases of FD '63 at the Prairie ARC, W9GFD/9, operating 2A with 15 participants.

set the poles and did the tower work, to the City of Smithville for poles and cross arms, to K5HRR for 500' of RG17, to the local mortuary for the use of a tent and boy did we ever need it—we had a downpour." — *Lost Pines RC, W5KPI/5* . . . "In the cool of the morning, one of our participants built a fire in a nearby stove. The power cord passed over the stove pipe, need I say more?" — *Richmond ARC, W4ZA/4* . . . "A challenge by the Baltimore chapter of the QCWA, made up by many members of our club, involved a softball game in addition to the operating chores in the contest." — *Friendly ARC, W3GR/3* . . . "The 'Tri-Bander' which arrived the day after last year's FD worked perfectly." — *Society of Radio Operators, W9NGI/9* . . . "Civilization is taking over all the best FD spots on mountain tops." — *Crescent Bay Emergency Net, K6LDA/6* . . . "This year we decided to run a full 150 watts d.c. on s.s.b. and built a high-efficiency 811A linear. Two 811A's drive nicely to 150 watts and since they were capable of more output, there was no danger of overdriving them and flat-topping. The additional 3 db. over a pair of 6146s is helpful." — *ARC of the Ohio State University, W5LTI/8* . . . "Five minutes before the start, in typical fashion, we had to tear apart our HT-32 and replace 6-year old 6146s. First distributor closed, second open, time lost just an hour." — *Providence R Assn., W1OP/1* . . . "We report with vigah that a convertible, top down, is the best beam carrier yet." — *W4ACDL/4* . . . "Normal year, no thunderstorms but the usual number of cows." — *Walton Radio Assn., W2LZ/2* . . . "Ugh, the mosquito repellent was as bad as the mosquitos!" — *Ville Platte R.A., W5AQR/5* . . . "Enlured high winds, rain, hail storm and 32 deg. weather, but a real good show." — *K6BDE/6* . . . "Next year try and pick a weekend with better weather, the rain and winds up to 60 mph almost blew us away." — *Central Alberta R. League, VE6QE/6* . . . "Our best score ever, attributed to more elaborate antennas, good conditions, fine participation by the home s.s.b. stations." — *Miami Valley AR Contest Soc., W8CEA/8* . . . "This year was better than last when we got into the p. a. system of a dog show." — *St. Joseph Senior High ARC, W8SIO/8* . . . "It didn't rain!" — *South Community Y.M.C.A. RC, K5HUO/3* . . . "We worked until 0130 in the dark to put up two beams on one rotator and then the rotator wouldn't turn." — *Chicago R. Traffic Assn., W9QV/9* . . . "After it rained all day Friday and Saturday, a car, tractor and a truck got stuck in the mud trying to pull our radio van out." — *Atlanta Soc. of Teenage R. Oprs., K4ZLI/4* . . . "After the rains came we were forced to shut down and move out of the flooded area 1½ hours ahead of schedule." — *Santo RC, K5IIS/5* . . . "We roughed it in comfort at a Girl Scout Camp, without the scouts of course!" — *Midland ARC, W8KBA/8* . . . "Our first try in 1A with competition between club members, W4PRO taking honors. Transceiver worked fine on

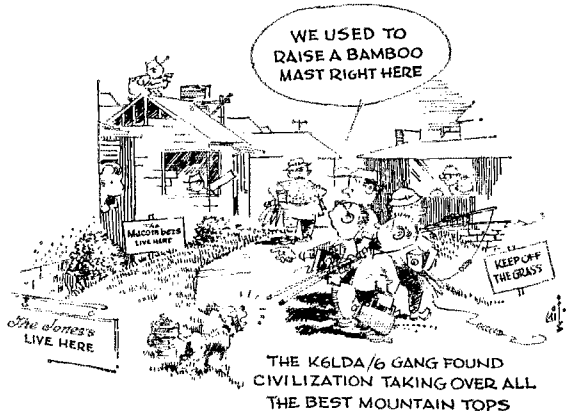
s.s.b. but almost unusable on c.w. In all, a good time." — *Hampton Roads RC, K4UYT/4* . . . "Found a den of black bears 100 yards from camp. Elevation was 3500', see you next year 800' higher!" — *Rip Van Winkle AR Soc., W12IRK/2* . . . "We had antennas this year, a 40-meter ZL-special up 60 in the pines along with a 20-meter cubical quad at the same height." — *W46SLU/6* . . . "While stringing antennas we noticed tracks of a large animal, possibly a mountain lion or cougar but no further thought given at the time. About 0100 while shining a light into the woods a pair of eyes were spotted which promptly disappeared. Next morning some more fresh tracks. 'It' had been very curious during the night." — *K7WRV/7* . . . "We set up a battery of lights to fire automatically if power failed." — *6 Up ARC of Burlington, WA2TV/2* . . . "Damn near froze at night and then broiled during the day with 40- and 90-degree extremes." — *Summit Teenage*



K6IH/6 operated 2B with W6ZCL using a completely transistorized outfit. Two prototypes of a new military transceiver were borrowed for the occasion and given the benefit of a 7500' elevation. The HC-162s use digital tuning by means of a 4-knob frequency synthesizer. The c.w. rig, being operated by W6ZCL, took some getting used to, switching instead of tuning!

RC, K801M/8. . . . "At Guantanamo Bay we took to the hills with great vigah and learned several lessons. When our 35-emp coffee pot finished perking the resulting voltage surge from our portable power unit turned the transmitters into smoke puts. No sooner had repairs been effected than a thunderstorm plus rain finished us off." — *Guantanamo Bay ARC, KGLAN/KG4*. . . . "Upon arriving home from FD, WA5CLS went to sleep in the bathtub!" — *Pecos ARC, WA5CLS/5*. . . . "Winds were gusting up to 70 mph while putting up our full size 3-L tribander." — *Moosejaw ARC, VE5MA/5*. . . . "The park board gave us permission to set up behind the rifle range and we were finished setting up by 1530. Suddenly we were under a barrage of .22 caliber pistol fire. THEN we knew we had picked the wrong location. We tore down, moved and set up again in an hour and a half." — *Eisenhower H. S. R. Assn., K9ODL/9*. . . . "Our east-west rhombic did fabulously well after repairs to a shorted feeder caused by a horse being where he shouldn't." — *Boulder & NBS ARCs, W0DK/0*. . . . "We did better this year with one less xmtrr, less operators, simpler antennas and lower power." — *Foothills AR Soc., K6GJ/6*. . . . "An unwelcome visitor was a copperhead, annihilated same and allowed a large black snake to go its way in peace. Our visiting mosquitos used 1/2" drills!" — *Greene County AR Soc., W0FHM/0*. . . . "We laughed when one of the fellows inadvertently filled the gas tank with oil; we cried when we saw our final score." — *DBSC MARS, W8TE/8*. . . . "We made about 90 miles on 432 Mc. with 2 watts input." — *Mid-Island AR Soc., K2SW1/2*. . . . "A poor start due to being snowed out at 7000', time lost due to locating at a lower altitude." — *East Kootenay ARC, VE7IP/7*. . . . "Three of our members were nearly asphyxiated from a charcoal grill used in a small trailer to keep the shack warm." — *Metropolitan Erie VHF Soc., W3KP1/3*. . . . "The food committee got a good buy on canned pork and beans and went ahead and bought a whole case! 48 cans for about 20 guys, hi!" — *Zero Butlers ARC, W40FYA/0*. . . . "Notice that supper-time gap on the logs? We have a traditional steak fry Sat. evening

and everyone stops at their gone." — *Starved Rock RC, W9MKS/9*. . . . "The combined effects of culprits who stole 2 antennas, poor band conditions, failure of two generators, the annual Sunday morning flood, and the aromatic old city zoo next to the FD site made this an FD not soon forgotten." — *Baumont ARC, W5RIN/5*. . . . "Thanks to the Essex County Park Commission. Without their garbage can for a base, our v.h.f. antennas never would have made it." — *Ston Hall Prep RC, W2AHP/2*. . . . "Everything was fine except for the fact that one of our new members, not knowing the location of our site, asked directions from a policeman, was sent to the wrong club and ended up by operating for 2 hours for our rival club before he realized his mistake!" — *Union County AR Assn., W2HFP/2*. . . . "A total of 649 two-way contacts were established and a good time was had by all (including the mosquitos)." — *Brookley Air Force Base ARC, K4FEC/4*. . . . "All had a chance to operate the rigs and we gave special attention to the kids who don't yet own equipment." — *New York RC, W2-ATT/2*. . . . "It was a pleasure to have a sunny dry weekend after the downpours of '61 and '62." — *Englewood AR Assn., W2AST/2*. . . . "Score or no score, the best FD in years. On six, a stacked array up



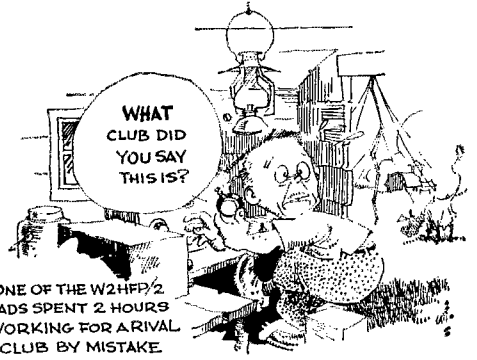
60-plus feet made a QRP rig do yeoman service. Hint for '64: Put an XYL YL on the phone hands the second day, the feminine voice does wonders." — *Communications Club of New Rochelle, K2YCI/2*. . . . "If we could only learn the trick that the women have with the food. They have a multitude to feed and they don't let Murphy's Law interfere with their part of the FD fiasco. Whatever it is, if we knew it maybe we would not have so many FD frustrations." — *North Hills RC, K6QWL/6*. . . . "At 2100 a Pacific weather system moved into the Calgary area, bringing rain, sleet and winds of 45 mph, gusting to 60 mph. At the lake near the site retaining walls were torn loose, piers washed out, boats sunk, etc. The experience gained from this order was really beneficial." — *Calgary AR Assn., VE6NQ/6*. . . . "Our results were summarized and checked out on a Univac 1." — *Delmont RC, K3SSC/3*.



(left) K6JNV, F. D. Chairman for the Radio Amateur Mobile Society, checks RAMS mobile aggregate entries for accuracy and compliance with FD rules. The club credits George for the smooth teamwork exhibited during the past 3 FD exercises. (right) In spite of almost nothing on 75 and 40 the Aeroject RAC, K6CLZ/6, rang up 647 QSOs in 3A. Their usual excellent photography came through again with this shot of the crew setting surplus verticals in place for antenna masts.

SCORES

Class A stations are clubs and groups in the field. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of valid contacts, the power inputs used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letters A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 3); B indicates power over 30, up to and including 150 watts (multiplier of 2); C indicates over 150 watts (multiplier of 1).



ONE OF THE W2HPF/2 LADS SPENT 2 HOURS WORKING FOR ARRIVAL CLUB BY MISTAKE

One Transmitter				
W5KPI/5	Last Pines ARC.....	1004-	A-10-	9261
W5DDI/5	Lafayette ARC.....	864-	A- 6-	8001
W2MNNQ/2	Brookside Offbeat Oscillators.....	764-	A-10-	7101
W3WJD/2	Frankford RC.....	1027-	B- 5-	6182
W7OTV/7	Trialatin Valley ARC.....	687-	AB-24-	6078
W42A/4	Richmond ARC.....	617-	A-20-	5778
K8GLM/8	JFK Fan Club.....	632-	A- 6-	5638
W0ERH/0	Johnson County RAC.....	602-	AB-30-	5409
W4KFC/0	Hudson Wireless Assn.....	601-	A- 5-	5409
W8NCF/8	Tusco RC.....	568-	AB- 7-	4970
W3GR/3	Friendship ARC.....	527-	A-45-	4998
W2EU/P/2	RA of Erie County.....	548-	AB- 5-	4917
W5CK/5	Order of Bolled Owls of New Mexico.....	520-	A- 6-	4905
K5JCV/5	(nonclub group).....	502-	A- 3-	4518
K1HTV/1	West Haven Beer, Chowder and Propagation Soc.....	560-	AB- 3-	4440
K3MJW/3	Skyview R Soc. and Allegheny- Kiski ARC.....	677-	AB-25-	4104
K8HVT/4	Cincinnati Buckeye Netters.....	420-	A- 4-	4005
W8AL/8	Canton ARC, Station "A".....	422-	A-16-	4023
K6BGM/6	Santa Clara County RACES Group.....	412-	A- 4-	3708
W0TIU/0	(nonclub group).....	409-	A- 4-	3681
K5YMI/5	Jefferson ARC.....	613-	B- 7-	3678
W8RXL/8	Miami Valley AREC.....	568-	AB- 9-	3678
W9NGL/9	Soc. B. Operators.....	571-	AB-35-	3618
W1OS/1	Easton ARC.....	365-	A- 6-	3510
VE2AQV/2	(nonclub group).....	362-	A- 5-	3510
K6LDA/6	Crescent Bay Emergency Net.....	422-	AB-12-	3471
W7LRA/7	Utah ARC.....	540-	AB-27-	3468
K0CVA/0	(nonclub group).....	536-	AB- 3-	3456
W6BLY/6	Whittier H 50 C.....	356-	A-11-	3429
K0ZXE/0	Aurhead RA.....	351-	A- 5-	3384
W8LTL/8	ARC of Ohio State U.....	531-	B-14-	3336
K8IPV/8	Brass Pounders ARC.....	344-	A- 8-	3321
W9CCN/9	Southern Wisconsin DX Club.....	1074-	C- 8-	3297
W8RYL/8	Kalamazoo ARC.....	341-	A-14-	3294
W2WS/2	RA of Greater Syracuse Group 1.....	341-	A- 3-	3294
W6QNM/6	(nonclub group).....	340-	A- 5-	3285
W8VPC/8	Central Michigan ARC.....	335-	A- 5-	3222
W4AGJ/4	Hillsboro AR Soc.....	495-	B-24-	3129
W2PT/2	Plainville ARC.....	361-	AB-11-	3066
W4KFPX/8	County Wide RC.....	495-	B-14-	2970
W1OP/1	Providence R Assn.....	300-	A- 5-	2925
K5SVE/5	The Group.....	475-	B- 4-	2850
W0WWL/0	(nonclub group).....	470-	B- 7-	2820
W5WG/5	Baton Rouge ARC.....	441-	B-10-	2796
W9OKN/9	Joliet AR Soc.....	284-	A- 6-	2781
K8JSR/8	Greater Cleveland VHF RC.....	284-	A-16-	2781
K5CEB/5	(nonclub group).....	302-	A- 3-	2718
W9ZB/9	GEARCS.....	276-	A-11-	2709
W9Y7/9	Badger AR Soc.....	426-	B- 6-	2706
W5HT/5	Etad ARC.....	272-	A-14-	2673
W3GQF/3	Hopkins ARC.....	291-	A- 6-	2610
W6OM/6	(nonclub group).....	394-	B- 8-	2514
K6HV/6	Palisades ARC.....	419-	B-14-	2514
W0IUL/0	(nonclub group).....	388-	B- 4-	2478
W4ACDL/4	(nonclub group).....	344-	AB- 4-	2454
K8HLR/8	Cooler His Electronics Club.....	384-	B-11-	2454
W3CDI/3	Baltimore Polytechnic Institute RC.....	382-	B-10-	2442
W0NWK/0	Newton AR Assn.....	245-	A- 7-	2430
W0DFP/0	(nonclub group).....	270-	A- 4-	2430
K8KCN/8	Hillside ARC.....	399-	AB-15-	2415
K3RPN/3	Greater Pittsburgh Teenage RC.....	613-	BC-16-	2403
W1CB/1	Burlington AR Assn.....	240-	A-14-	2385

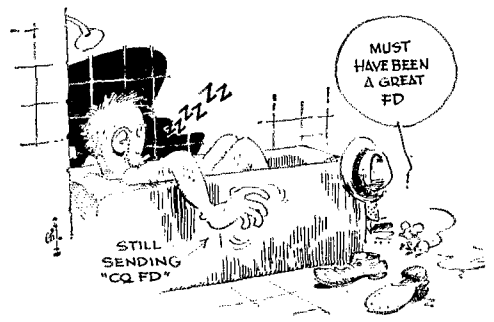
K9IMM/9	WANI RC (Young Squirts).....	239-	A- 3-	2376
W2ORA/2	Chippewa Forestown ARC.....	309-	AB- 4-	2367
W8OZR/8	Crabbrook ARC.....	384-	R- 4-	2304
W9HRM/9	Allwaukee RAC.....	357-	B-26-	2292
K4NCL/4	Sowega ARC.....	375-	B- 7-	2250
K0KAQ/0	Mae West Ham Club.....	348-	B- 6-	2238
WA2YL/2	Long Island Duck ARC.....	328-	AB- 3-	2235
W4EM/4	Mid-South AR Assn.....	372-	AB- 6-	2235
K8ZM/3	Dover Intl. 6 & 2 ARC.....	249-	A-18-	2214
VE1JV/1	Pieton County ARC.....	290-	A-11-	2205
W1VB/1	Candlewood AR Assn.....	218-	A-15-	2187
K8VAK/8	(nonclub group).....	362-	B- 6-	2172
W7JHR/7	Rodeo City RC.....	357-	B-10-	2172
K4UTV/4	Hampton Roads RC.....	693-	C-15-	2087
K3CRU/3	(nonclub group).....	342-	AB- 5-	2070
K6DYX/6	Monterey Bay Band Jamers.....	202-	A- 8-	2061
K9KGA/9	Wauwatosa RC.....	315-	B- 7-	2040
K8GOS/K8H	Honolulu Mobile ARC.....	315-	B-14-	2040
W4BQM/6	(nonclub group).....	353-	B-14-	2039
W8MAA/8	Central Michigan ARC Phone Group.....	332-	B-10-	1992
K0OYM/0	Mid-Missouri ARC.....	301-	AB-14-	1989
K0BHM/0	(nonclub group).....	329-	B- 3-	1974
W8OHP/8	Timken Co. Employees Electronics Club.....	192-	A-25-	1971
W5HZZ/5	Key County ARC.....	327-	AB- 9-	1965
W4TW/4	(nonclub group).....	301-	B- 3-	1956
W9BKC/9	ARROW.....	325-	B-10-	1950
W8YPT/8	Chippewa ARC, Group B.....	296-	B- 7-	1926
K0AZV/0	Kirkwood Hs ARC.....	316-	B- 6-	1895
W2MSO/2	Hamburg ARC.....	313-	B-10-	1878
K0TKC/0	(nonclub group).....	312-	B- 6-	1872
W7JES/7	Prosser ARC.....	298-	B- 6-	1872
K9ZBI/9	(nonclub group).....	306-	B- 4-	1836
W5ETG/5	San Antonio 6 Meter Club.....	203-	A-15-	1827
W0DFA/0	Slideholders of Storm Lake.....	300-	B- 7-	1800
W7TCQ/7	(nonclub group).....	295-	B- 7-	1770
WA2LKW/2	Western New York Off- beat Zero Beaters League.....	288-	B- 3-	1764
K2ISP/4	Public Beaches.....	267-	B- 4-	1752
W2TIO/2	Royal Order of Feedline Warmers.....	291-	B- 8-	1746
W5CVU/5	(nonclub group).....	166-	A- 3-	1728
K8MIT/8	Niles ARC.....	286-	B- 5-	1716
K0SOQ/0	Hastings ARC.....	156-	AB-31-	1710
W9QJ/9	Lawrence ARC.....	281-	C- 9-	1686
K9WAW/0	Minneapolis CW Club.....	162-	A- 4-	1683
K1SHY/1	(nonclub group).....	280-	B- 3-	1680
W4UC/4	Pensacola ARC.....	280-	B-10-	1680
VE1RR/1	Albert County ARC.....	160-	A-12-	1665
W0FEM/0	(nonclub group).....	252-	B- 6-	1662
VE2CO/2	Lakeshore RD Group.....	249-	B- 4-	1656
W4UB/4	Reaches AR Soc.....	245-	B-12-	1620
K8SQJ/8	(nonclub group).....	267-	B- 3-	1602
K9FTN/9	Explorer Post 700.....	176-	A- 4-	1584
W8RB/8	Beckeye Rag Chewers Net.....	257-	B-40-	1542
K6JKS/6	Palisades AR Soc.....	252-	B-12-	1542
K9CAL/9	(nonclub group).....	257-	B- 6-	1542
W5VFM/5	Sabine Valley ARC.....	253-	B- 9-	1518
K3MBQ/2	(nonclub group).....	200-	AB- 4-	1512
W7FO/7	Butte ARC.....	227-	B-11-	1512
W2LZ/2	Walton R Assn.....	230-	AB- 8-	1509

Class-A Call-Area Leaders

1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A
K1HTV/1	W1TX/1	W1AQ/1	W1U8S/1	K1OGR/1	W1UX/1	W1MV/1	W1GLA/1	---	K1OXT/1	---
WA2MNO/2	K2YAZ/2	K2GQ/2	W20YH/2	W2YKQ/2	K2AA/2	W2WW/2	W2AST/2	---	K2YCI/2	W2LJ/2
W3GR/3	W3MFPV/3	K3NB/3	K3SSC/3	W3BTN/3	W3CTC/3	---	W3TYI/3	---	W3RCN/3	W3WFO/3
W4ZL/4	W4JRA/4	W4AM/4	W4SKH/4	W4CA/4	W4AMB/4	W4DOC/4	W4BRF/4	W4PLB/4	---	VE3VE/3
W4KPL/4	W4SAUP/5	W5KHB/5	K5TMS/5	W5DPA/5	W5PFC/5	W5KA/5	W5AGRO/5	W5SC/5	---	12A
K6BGM/6	W6KA/6	W6MSO/6	K6FDU/6	K6BAG/6	W6PMK/6	W6ZE/6	W6ULI/6	W6FA/6	W6PMO/6	W1NY/1
W70TV/7	K7WAT/7	W7CO/7	K7OUS/7	W7AW/7	---	W7VE/7	K7UGE/7	---	W7HZ/7	---
K8GLM/8	W8CPA/8	W8IV/8	W8WC/8	K8EMY/8	W8ACW/8	K8TH/8	---	W8HLD/8	W8HTX/8	13A
W9NGL/9	W9AA/9	W9AB/9	W9OFR/9	K9GXU/9	K9AVT/9	W9SW/9	W9LM/9	W9FQ/9	---	W6ODP/6
W0ERH/0	W0VQ/0	W0DK/0	W0ERG/0	K0QMH/0	W0VTV/0	W0OU/0	---	---	W0WSV/0	15A
VE2AQV/2	VE2ARC/2	VE2AUU/2	VE3ODX/3	VE3JJ/3	VE3VM/3	VE3CKD/3	---	VE3MRC/3	VE30V/3	W8RF/8

K21YO/2	Salem County RC (NJ)	251-	B-10-	1508
VE2BHE/2	(nonclub group)	226-	B- 6-	1506
W5AQL/5	Ville Platte RA	247-	B- 7-	1482
W4ARAZA/3	(nonclub group)	221-	B- 4-	1476
K4HPP/4	(Delta RC)	221-	B-12-	1476
W8WQS/8	(nonclub group)	161-	A- 3-	1449
W3FT/3	Baltimore ARC	241-	B- 8-	1446
W4HTT/V01	Ernest Harmon APB			
W42PXR/2	ARC Michael RC	446-	AC-15-	1434
K7NEC/7	(nonclub group)	159-	A- 7-	1431
K3GUU/3	Soc. for the Destruction of Mosquitoes, Poison Ivy and Other P.D. Pests	134-	A- 3-	1431
K5JUU/5	Mesilla Valley RC	157-	A- 4-	1418
K6EBE/6	(nonclub group)	208-	B- 7-	1398
K8OBW/8	Canton ARC	232-	B- 6-	1392
K9SLP/9	(nonclub group)	203-	B-24-	1368
K7UTP/1	Nutmeggers	222-	AB- 7-	1362
K6QTK/6	Lake Region ARC	146-	A- 6-	1314
W8ODJ/8	Buckeye Short Wave R Assn.	202-	B-12-	1302
W46JDL/6	Kilocycles RC of Helix US	216-	B- 8-	1296
W45EXX/5	Tarrant County Six Meter Emergency Net	191-	B- 9-	1296
W9AIQ/9	Door County ARC	93-	A- 8-	1287
W48IAQ/9	Wabash County ARC	214-	B- 7-	1284
W46PZX/5	Stephen F. Austin ARC	153-	A- 7-	1275
W4UHC/4	Ancient City ARC	161-	AB- 8-	1275
W5ABF/5	Mineral Wells ARC	211-	B- 5-	1266
W9ENJ/9	Stamton HS RC	184-	B- 8-	1254
W4VTD/4	Low Country RAG of North Charles SC	139-	A-10-	1251
W46ORL/6	East Bay A. Bandits	207-	B- 6-	1242
W7YB/7	Montana State College ARC	112-	A- 4-	1233
W45CSA/5	6 Meter Club of Dallas	175-	B- 8-	1200
W6YR/6	Pacific States U. Student Engineers ARC	132-	A-12-	1188
K9PMU/9	Waukegan VHF Soc.	171-	B- 6-	1176
K0ITZ/0	Notdaway Valley R Assn. (nonclub group)	161-	AB- 8-	1161
K4EQR/4	Old Faithful RC	191-	B- 8-	1146
W7ZOD/7	Old Faithful RC	164-	B-10-	1146
W3FPT/2	Oswego County AE Assn.	190-	B-15-	1149
K2DNN/2	Chemung County AREC (nonclub group)	101-	A-23-	1134
K8WPN/8	(nonclub group)	354-	AC- 4-	1128
K2SKO/2	Peanut Whistle Net Radiators (nonclub group)	141-	AB- 3-	1116
W78RN/7	(nonclub group)	185-	B- 4-	1110
W5JXN/5	(nonclub group)	160-	B- 3-	1110
W1DHT/1	Bristol RA	150-	AB- 4-	1101
W8RCC/8	Babcock & Wilcox ARC	330-	BC- -	1101
W7IDA/7	Bonner County ARC	183-	B- 8-	1098
K1UPL/1	Norwalk H. S. ARC	157-	AB- 7-	1062
K9RGY/9	Unorthodox ARC	93-	A-12-	1062
W5FO/5	Meridian ARC	329-	C-15-	1062
W6QPAL/6	Igarote RC	177-	B- -	1062
K8EYS/8	(nonclub group)	175-	B- 5-	1050
K9URN/9	Navy MARS-Illinois	161-	AB- 9-	1044
K2QHK/2	Greene ARC	115-	A- 6-	1035
VE3AVS/3	(nonclub group)	172-	B- 4-	1032

W9IRO/0	(nonclub group)	172-	B- 7-	1032
K7EPF/7	(nonclub group)	171-	B- 5-	1026
W49HW/9	Platte ARC	171-	B-10-	1026
W9JGL/9	Nearsh Menasha ARC	167-	B-10-	1002
KH6HS/KH6	Mauli ARC	138-	B-22-	978
W4VX/4	(nonclub group)	159-	B- 3-	954
VE6QE/6	Central Alberta Radio League	128-	B- 9-	948
K3PZL/3	Demarva Traffic and Emergency ARC	152-	B- 3-	912
K4DAO/4	AREC/RACES Group	127-	B-10-	912
W2BSL/2	Colonials	149-ABC-	7-	909
VE7OJ/7	(nonclub group)	151-	B- 4-	906
K7IFR/7	ARC of Olympia	147-	B- 7-	882
W8IRL/8	(nonclub group)	140-	B- 3-	846
W4AGN/9	(nonclub group)	139-	B- 3-	834
VOICU/V01	Soc. of Newfoundland RA	114-	B- 9-	834
W9DLQ/9	Glendon East HS ARC	135-	B- 4-	810
W2IDM/2	Massena ARC	89-	A-12-	801
K7IRA/KP4	Warze County ARC	123-	AB- 7-	768
W1TOE/4	Greater Atlanta VHF Soc.	101-	B- 6-	756
W4UYQ/4	Lake Wales ARC (nonclub group)	112-	AB-10-	732
K9CTH/9	(nonclub group)	83-	AB- 3-	669
W9ZCM/9	(nonclub group)	107-	B- 8-	642
K7LW/7	LEWIS RC	167-	B- 8-	636
W6NNT/6	Stromsburg ARC	318-	B- 1-	636
W8JGB/8	Hickory Corners Engineering Soc.	105-	B- 2-	630

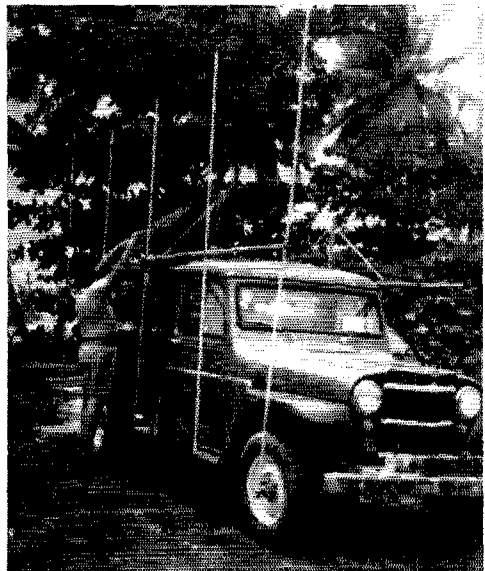


WA5CLS FELL ASLEEP IN THE TUB UPON ARRIVING HOME

K7NWS/7	Boeing Employees AR Soc.	68-	AB-15-	624
K3RNP/3	(nonclub group)	42-	A- 4-	612
K1BAK/1	Foster Ham RC	101-	B- 5-	606
K9GJ/9	(nonclub group)	393-	B- 4-	606
W8NGYV/8	(nonclub group)	41-	A- 4-	594
K8PXI/VE3	(nonclub group)	99-	B- 4-	594
K3YSV/3	East Hills Oscillators Net	72-	B- 5-	582
W9KYC/9	The Hamsters	94-	B- 4-	564
W9BSO/9	MGC Scout Units 61 ARC	90-	B-12-	540
W1KVA/1	(nonclub group)	63-	B- 4-	528
K9TLF/9	Albert Lea Spiderweb AR Assn.	86-	B- -	516
W4NTA/4	Aldemarle ARC	83-	B- 9-	498
W4VW/4	WVHF League	28-	B- 3-	477
K0DKM/0	Storm Lake ARC	130-	C- 6-	465
VE7AJY/7	Terrace AR Assn.	77-	B- 4-	462
K7VWF/7	(nonclub group)	50-	B- 4-	450
W8NFG/8	(nonclub group)	68-	B- 5-	408
W9VYV/9	R. of Leavenworth Sr. HS	64-	B- 4-	384
W5AGB/6	(nonclub group)	270-ABC-	6-	343
W49CJP/9	Q-Mults ARC	16-	AB- 7-	327
K0MHB/0	(nonclub group)	51-	B- 3-	306
W45CUT/5	Watonga ARC	29-	A- 4-	261
W9UYX/9	(nonclub group)	23-	A- 3-	207
W2GOE/2	North Folk R.C.	18-	A- 4-	162
W4PYN/4	William and Mary ARC	58-	B- 6-	116
K9VUA/9	Explorer Post 27	33-	AB- 5-	95

Two Transmitters Operated Simultaneously

W1TX/1	Connecticut Wireless Assn.	1084-	A-14-	9980
W3MFW/3	Elizabethtown AR Soc.	1055-	A-11-	9495
W8CEA/8	Miami Valley AR Contest Soc.	1284-	AB-13-	9399
W3ATR/3	Beacon RA	917-	A-10-	8478
W9AA/9	Hamfesters RC	864-	A- 8-	7776
K8LNM/8	Hammberg & Conitts Soc.	939-	AB-23-	7665
W9OIG/9	River Park ARC	1045-	AB-15-	6846
W9NUW/9	Wisconsin Valley R Assn.	863-	AB-20-	6666
W6VQ/6	Whose Electric ARC	1028-	AB- 8-	6144
W6AJN/6	South St. Louis ARC	932-	AB- 8-	5829
K9LAL/9	Love 'em & Leave 'em AR Soc.	564-	AB-10-	5250
W4JRA/4	Louisville Gas & Electric Co. A	841-	B-18-	5196
W4KVK/4	Ashland AE Soc.	864-	B- -	5184
W4YQ/4	Owensboro ARC	806-	B-20-	4986
W3PSH/3	Keystone ARC	21-	A- 8-	4914
K8HYD/8	(nonclub group)	616-	AB- 6-	4827
K9RAS/9	(nonclub group)	520-	A-15-	4680
K2YAZ/2	(nonclub group)	431-	B- 3-	4644
W8COE/8	Kanawha RC	1032-ABC-	15-	4605
W8MO/8	Michigan Six Meter C.	479-	A-10-	4536



KP4RA/KP4 says turn your beams towards West Indies too! The fellows operated 1A and after a long night with few contacts managed to work KH6EXX/KH6 on 40-meter sideband, a big thrill. Then, naturally, two hours later worked 'em again on 20. That's KP4AET unloading the tribander and 6-meter beams.

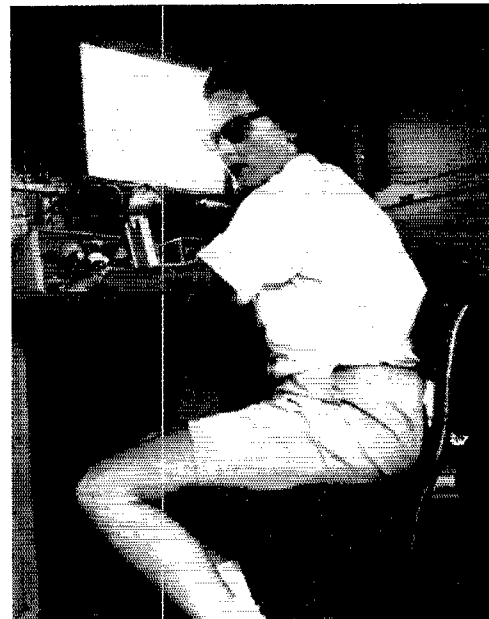
WA9DYJ/9	Hoffman RC.....	500-	A- 7-	4500
W3MIVQ/3	Friendly AR Transmitters Soc.....	705-	AB- 9-	4461
K7WAT/7	Fort Lewis ARC.....	491-	A-15-	4461
W3EAN/3	Main Line Dandies.....	619-	AB- 5-	4410
W42MPK/2	Lackawanna AR Assn.....	689-	B- 6-	4284
W8SIO/8	St. Joseph Sr. High ARC.....	669-	B- 6-	4164
W9MOW/9	(nonclub group).....	658-	AB- 6-	4161
W6KA/6	Pasadena RC.....	433-	A- 9-	4222
W0ZIVY/0	Stoux Falls RC.....	941-	BC-23-	4110
W9TCH/9	Rock River RC.....	685-	B-12-	4110
W9UDL/9	Racine Megacycle C.....	673-	B-10-	4038
K2BIV/2	South Amboy AR Assn.....	446-	A-13-	4014
W8FT/8	Findlay RC.....	514-ABC-12-	3981	
W3CJU/3	(nonclub group).....	619-	AB- 6-	3948
W35AUP/5	(nonclub group).....	613-	B-12-	3828
W5LNI/5	Richardson ARC.....	517-	AB-25-	3789
K4FT/4	Roane County ARC.....	578-	AB-16-	3784
K6FDG/6	Travis AFB RC.....	583-	AB- 6-	3726
W2CTA/2	(nonclub group).....	451-	AB- 8-	3996
K5VY/5	(nonclub group).....	451-	AB-30-	3684
W5NS/5	Bartlesville ARC.....	506-	AB-12-	3678
W8NFW/8	Edison RA Assn.....	381-	A-25-	3654
K2BFB/2	Altura AR Assn.....	607-	B- 8-	3642
W8T8/8	Catmet ARC.....			
W6PB/6	Wheel'n Whips Mobile Club.....	404-	A-13-	3436
W2EEQ/2	Tioga AR Assn.....	553-	AB-20-	3621
W7BB/7	Lake Washington ARC.....	398-	AB-14-	3534
K9ZBV/9	Highland County RC.....	497-	AB- 9-	3531
W42EWN/2	Ramapo Regional HS RC.....	358-	A-15-	3447

K5HS/5	Santo RC.....	400-	B- 7-	2400
K8AMX/8	(nonclub group).....	322-	AB- 9-	2382
W6MWO/6	Los Angeles YL RC.....	372-	AB-11-	2387
K6JCC/6	Gillespie ARC.....	397-	B- 5-	2387
W9FAR/9	Southeast AR Assn. of Chicago.....	264-	A-15-	2376
K4GLL/4	Accomack-Norhampton ARC.....	332-	AB- 6-	2373
WA21JW/2	(nonclub group).....	341-	AB- 3-	2373
W8KEA/8	Midland ARC.....	401-	B-19-	2366
K3QLA/3	Berwick AR Klub.....	274-	AB- 8-	2331
W0CKF/0	Minneapolis RC.....	368-	B-24-	2322
W81P/2	Richmond ARC.....	352-	AB- 8-	2316
K7NLY/7	San City AC of Arizona.....	369-	AB- 6-	2310
K8JWC/8	(nonclub group).....	321-	AB- 6-	2292
W46MIA/6	Bay Area YL ARC.....	325-	AB-11-	2289
W8TKP/8	Hilltop ARC.....	352-	AB-17-	2256
W9GFD/9	Prairie ARC.....	308-	AB-15-	2239
VE2UN/2	ARC of McMill U.....	279-	AB- 8-	2196
K8JW/8	Six Meter Nomads.....	335-	AB-21-	2175
K3LJU/2	Windsor ARC.....	287-	AB-12-	2172
W0ZLS/0	(nonclub group).....	478-	BC- 5-	2151
KH6EXX/KCII	American Legion ARC.....	690-	C-16-	2145
W5NWX/5	Permain Basin ARC.....	357-	B- 8-	2142
W9ZSK/9	Martinsville ARC.....	331-	B-15-	2136
W3CWL/3	St. Louis Nomads.....	235-	A-10-	2115
W3A/2	RA of Greater Syracuse.....	284-	AB-15-	2097
W8HOE/8	AVC RC.....	232-	A-22-	2088
W5ZDN/5	Central Texas ARC.....	347-	B-19-	2082
W9CPO/9	(nonclub group).....	346-	B- 7-	2076
K0EJS/0	Galva ARC.....	320-	B-12-	2070
W4LLO/4	Key West ARC.....	313-	B- 8-	2028
K9KX/9	Radops ARC.....	334-	B- 8-	2004
W2TBZ/2	North Country RC.....	298-	AB-10-	1965
K9MIV/9	Duneland AR Assn.....	187-	A-15-	1908
VE4DP/4	Cranberry Portage ARC.....	292-	B- 5-	1902
W1AEW/1	Pioneer Valley ARC.....	315-	B- 5-	1890
K8GTF/8	(nonclub group).....	255-	AB- 4-	1890
W42BRK/2	Edgemoor AR Soc.....	208-	A-10-	1872
K9VHF/9	Fishers HS ARC.....	243-	AB- 5-	1872
K4BUJ/4	Cherry Point ARC.....	305-	B- 4-	1830
K4IVI/4	North Augusta-Belvedere RC.....	215-	AB-14-	1824
W5YM/5	ARC of the U. of Arkansas.....	274-	B- 7-	1794
WA9GWM/9	Hig Thunder ARC.....	272-	B- 9-	1782
W46SLU/6	(nonclub group).....	246-	AB- 6-	1779
W3VSD/3	(nonclub group).....	295-	B- 6-	1770
K9CGG/9	Crawford County ARC.....	294-	B-18-	1764
W2JUF/2	Western Westchester RC.....	293-	B-10-	1758
K0SWS/0	Chattanooga ARC.....	265-	B- 7-	1740
K7WRV/7	(nonclub group).....	290-	B- 3-	1740
W1CWA/1	Bloomfield ARC.....	194-	AB- 8-	1725
K9TRX/9	(nonclub group).....	191-	A- 8-	1719
W2JUG/2	Burlington AR Soc.....	285-	B- 4-	1710
K9HEL/9	Key & Mike ARC.....	262-	AB- 7-	1695
W9CYX/9	6 & 2 AR Soc.....	281-	B- 7-	1686
W8VPV/8	Chynoweth Falls RC.....	254-	BC-12-	1674
W5AVZ/5	Watahga RC.....	250-	B-17-	1662
W1QEE/4	Mobile ARC.....	302-	AC-10-	1635
K7WPD/7	Sammamish Potoms AR Soc.....	243-	B- 8-	1608
W7YN/7	Nevada AR Assn.....	268-	B- 8-	1608
W8RE/8	(nonclub group).....	267-	B- 4-	1602
VE1PF/1	St. Croix Valley ARC.....	148-	A- 6-	1557
VE3GBN/3	Grey Bruce AR Assn.....	233-	B- 8-	1548
W46YVX/6	Explorer Post 872.....	172-	A- 9-	1548

CLUB AGGREGATE MOBILE SCORES

Phil-Mont Mobile Radio (Club (Pa.).....	114,072
Radio Amateur Mobile Society (Calif.).....	85,887
Parma Radio Club (Ohio).....	14,785
South East Amateur Radio Club (Ohio).....	11,331
Hayward Radio Club (Calif.).....	5212
Argonne Radio Club (Ill.).....	2832
Mobile Amateur Radio Club of South Bend.....	2581
Chibouran Mobileers (Ill.).....	1094
Rodeo City Radio Club (Wash.).....	756
Red River Amateur Radio Club (Texas).....	701

K6SYD/5	Bayshore ARC.....	987-	BC-14-	3444
K4GWO/4	(nonclub group).....	372-	B- 7-	3432
W1HGW/1	Nashua Mike & Key C.....	411-	AB- 4-	3420
K9MME/9	(nonclub group).....	402-	AB- 7-	3324
K2TCB/2	South Irvington ARC.....	524-	AB-10-	3309
W9KXK/9	Waupaca ARC.....	452-	AB-10-	3309
K9RHH/9	Menomonee Falls RAC.....	526-	B-21-	3306
K4JH/4	Aiken ARC.....	457-	AB- 5-	3294
W1SEA/1	Open Air Operators C.....	548-	B-12-	3288
W5ABD/5	Westside ARC.....			
K3HUO/3	South Community YMCA RC.....	522-	B- 5-	3282
VE2ARC/2	Montreal ARC.....	521-	B-18-	3276
K9YFG/9	South Bend ARC.....	338-	A-28-	3267
VE3RAM/3	Ottawa Valley Mobile RC.....	515-	B-10-	3240
K7CBP/7	Klamath Basin AR Assn.....	514-	B-14-	3234
W0RFU/0	Bandhoppers RC.....	440-	AB- 9-	3189
WA2KAE/2	(nonclub group).....	327-	A- 9-	3168
K2IZZ/2	Tower ARC.....	334-	AB-12-	3135
W4MVL/4	Tidewater ARC.....	485-	B-26-	3006
K9QCU/9	(nonclub group).....	487-	B- 8-	3072
W0BKW/0	Central Nebraska ARC.....	197-	B-15-	2982
W2EAE/2	Larkfield ARC.....	304-	A-12-	2961
K9AEB/9	Valley VHF C.....	302-	A-16-	2961
W0CET/0	Kaw Valley RC.....	656-	BC-25-	2958
W0CVJ/0	Tube And Shutter C.....	463-	B-10-	2928
W46NNJ/6	South Bay Propagation Soc.....	187-	B- 7-	2922
W9VAR/9	(nonclub group).....	460-	B- 4-	2910
K8NYM/8	Tire Town RC.....	458-	B-12-	2886
W7ZA/7	Grays Harbor ARC.....	453-	B-13-	2808
W9QV/9	Chicago R Traffic Assn.....	381-	AB-11-	2807
K8STR/8	44th Fighter Interceptor Sqdn MARS Station.....	317-	A- 3-	2853
K4FER/4	Spartanburg ARC.....	447-	B-16-	2832
K4JLA/4	Halifax ARC.....	446-	B-15-	2826
VE1FO/1	Caribide ARC.....	445-	B-12-	2820
K5BHF/5	Pentagon Civil Defense ARC.....	313-	A-13-	2817
VE7AAM/7	(nonclub group).....	417-	AB-19-	2817
W8EQ/8	Lima Area ARC.....	434-	B-12-	2754
W4NJT/4	Big Orange ARC.....			
W2DAY/2	Northern New Jersey R Assn.....	280-	A- 3-	2745
W5BQN/5	Point Comfort ARC.....	126-	B- 5-	2706
K3MNT/3	Pocono Maverick ARC.....	350-	AB- 3-	2682
K9AWZ/9	Point RA.....	370-	AB-11-	2658
W4YKY/4	Lake AR Assn.....	414-	B-15-	2634
W0CXK/0	OMARC.....	429-	B-14-	2574
K4KAB/4	(nonclub group).....	400-	B- 5-	2550
K8DDC/8	Lakeshore & R Assn.....	124-	B- 8-	2544
W2CZZ/2	Mid County Net.....	282-	A-15-	2538
K5LRU/5	Muskogee ARC.....	398-	B-32-	2538
W4JNB/4	Muskie Shoals ARC.....	413-	B- 8-	2478
K8IEK/8	Port Huron AR Organization.....	384-	B-15-	2454
K4ZIM/4	Atlanta Soc. of Teenage R Ops.....	310-	AB-13-	2451
K5HHU/5	Southern Louisiana VLF Club.....	378-	B- 8-	2418



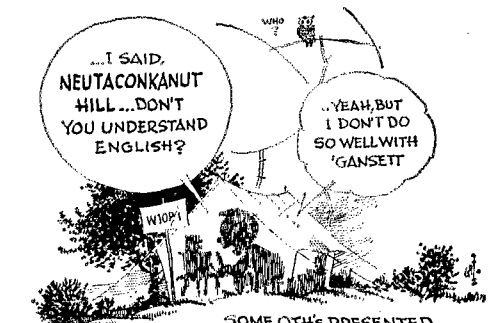
The Panama City ARC (W4MMA/4) operated 6A and utilized WA4FJF to add up those sideband QSOs.

WRBAE/8	Crawford AR	255-	B-8-	1530
W40IX/4	Kinston AR Soc.	254-	B-18-	1524
W5EGW/5	Harrison County ARC	165-	AB-6-	1488
W3RDM/3	York Rd. RC	165-	A-6-	1485
VE3CSB/3	(nonclub group)	244-	B-3-	1464
W4MID/8	KYAMA ARC	187-	AB-15-	1461
K9GSC/9	(nonclub group)	225-	AB-12-	1443
WA2TPV/2	6th ARC of Burlington	179-	AB-6-	1437
K2HJY/2	Madford Wireless Assn.	158-	AB-7-	1431
W2FEJ/2	Orange And Blue ARC	181-	A-10-	1422
K9YCO/0	Coon Valley ARC	235-	B-	1410
K9HGH/0	Spencer A.R. Club	227-	BC-10-	1389
K1PLR/2	The ALA VHF Soc. & Network of Stamford	202-	B-7-	1362
VF5NN/5	Regina AR Assn.	194-	B-14-	1350
W9DDM/0	(nonclub group)	222-	B-6-	1352
W9GHZ/0	Des Moines Technical Soc. RC	196-	B-6-	1326
K8QBC/8	Astoria ARC	220-	B-10-	1320
W0RRI/0	(nonclub group)	658-	H-7-	1316
W6KI/6	Dunsmuir ARC	218-	B-4-	1308
VE6RP/6	(nonclub group)	309-	BC-4-	1302
W2ASL/2	(nonclub group)	192-	B-6-	1302
W4HIB/4	ARC of Savannah	430-	C-	1297
W2BHG/2	(nonclub group)	118-	A-5-	1287
W4HTW/4	(nonclub group)	126-	AB-3-	1281
K8TWS/0	New ULM RC	213-	B-10-	1278
WRAX/8	Thumb ARC	258-	BC-	1277
W8GQN/8	Straits Area RC	212-	H-8-	1272
K6WAR/8	Lamar AR ARC	141-	A-	1269
W9A/9	North Shore RC	177-	AB-4-	1244
W4HOU/6	National City ARC	181-	AB-13-	1248
K4HOE/4	Capital AR Soc.	414-	C-	1242
K8OPAL/8	Summit Teenage ARC	182-	AB-10-	1197
K3KLG/3	Clearfield County AR Assn.	199-	B-6-	1194
W4DSH/4	Tainiar ARC	171-	AB-	1182
K9KTR/9	Soc. of the Phoenix	197-	B-5-	1182
W47UM/4	U. of Manitoba AR Soc.	150-	AB-5-	1178
W8TKZ/8	St. Joseph HS RC	190-	B-7-	1140
K5EKJ/5	(nonclub group)	185-	B-3-	1110
WA2FDJ/2	Ogdenburg ARC	140-	AB-8-	1104
K3JNB/3	Druid Hill Avenue YAFCA RC	182-	R-10-	1092
WA2YSQ/2	Huntington ARC	134-	AB-4-	1092
W4MN/4	Palmetto ARC	1088-	C-10-	1088
WBAA/8	Chippewa ARC (group A)	154-	B-24-	1074
K7GVM/VOI	Aronia ARC	174-	B-8-	1044
W4ORR/5	(nonclub group)	187-	B-3-	1002
W3WVO/4	Suncoast VHF Club	923-	AB-12-	972
W0LCN/9	(nonclub group)	140-	AB-5-	945
W3BR/3	Port Venango Mike & Key Club	167-ABC-25-		945
W0JY/6	Public Dog ARC	225-	BC-	936
K9QKG/9	Flambeau AR Technical Soc.	152-	B-5-	912
KG4AN/KG4	Guantanamo Bay ARC	162-	B-8-	912
W45CL5/5	Pecos ARC	151-	B-8-	906
K9JZV/9	Nicolet HS ARC	123-	B-4-	888
W0TIA/0	Westchester A RC	130-	BC-4-	879
W1SWX/1	Nashua Mike & Key C.	825-	C-4-	850
W1UDT/1	(nonclub group)	91-	A-4-	819
W7SWS/7	Magic Valley ARC	132-	B-8-	792
B9CGG/0	(nonclub group)	167-	BC-4-	789
V65MA/5	Moose Jaw ARC	130-	B-16-	780
K2BC/2	Eastern Suffolk RC	126-	AB-20-	765
K5RSH/5	Covington ARC	103-	AB-5-	729
K4BV/4	Daytona Beach AR Assn.	116-	B-22-	696
WA6EWP/6	Delta ARC	96-	AB-6-	669
K3ODE/3	North Allegheny HS	109-	B-	654
VE2BAW/2	St. George Williams U.	120-	AB-11-	645
K0FLY/0	(nonclub group)	106-	B-5-	636
W9ETQ/9	St. Mary of the Lake Seminary ARC	57-	AB-5-	594
WA4AJK/4	(nonclub group)	73-	B-3-	588
W8PFP/8	Marquette-Memnonie RC	94-	BC-12-	561
W4PTP/4	Hampton Road 6 Meter Club	84-	AB-15-	558
K9YYB/9	(nonclub group)	90-	B-6-	540
K5RLM/5	Wheat Straw ARC	61-	AB-4-	534
W4AWD/6	(nonclub group)	39-	A-8-	531
K6JQJ/9	(Crete ARC)	59-	AR-3-	525
K1JMR/1	Northward ARC	86-	B-10-	516
K1OXW/1	Central Connecticut ARC	75-	AB-4-	513
W2N2FGA/2	(nonclub group)	58-	A-6-	504
VF8NC/6	Northier Alberta RC	82-	B-7-	499
W2EAS/2	(nonclub group)	72-	AB-4-	482
K90DL/9	Eisenhower HS R Assn.	76-	AB-3-	459
W4SELQ/8	(nonclub group)	74-	AB-3-	453
W46KDX/6	Bellaraine Prep. ARC	71-	B-3-	426
W1TRM/1	Shore Line ARC	54-	AB-6-	426
K9ENM/9	Communicators	67-	B-20-	402
W2IAO/1	Tring ARC	66-	B-8-	396
W9BAI/9	(nonclub group)	66-	B-3-	396
K7JUC/7	(nonclub group)	64-	B-3-	384

W0ADY/0	Blue Valley ARC	48-	AB-12-	294
WA4BBO/4	(nonclub group)	43-	B-3-	258
WA2YHS/2	(nonclub group)	128-	AB-4-	257
K0CBP/0	Hector ARC	110-	AB-11-	223
W2QZR/2	Bishop Timon HS ARC	87-	B-7-	174

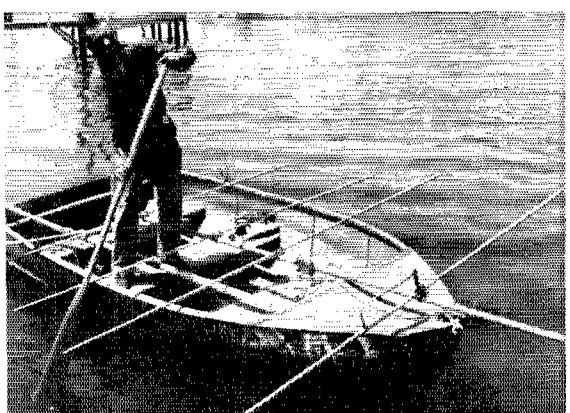
Three Transmitters Operated Simultaneously

W5KIB/5	Old Natchez ARC	1306-	A-15-11-979
W0DK/0	Baldwin ARC and National Bureau of Standards ARC	1212-	A-20-11,112
W7CD/7	Western Washington D.N. Assn.	1618-ABC-	18-10-581
K2GQ/2	Irvinton RAC	985-	A-29-9090
VE2ARU/2	(nonclub group)	1431-	AB-6-8748
VE7AVU/7	Vancouver ARC	922-	A-25-8423
K3NBU/3	West Oak Lane RC	958-	AB-10-8055
W8IV/8	Kent RC	1216-	AB-26-7935
W6MSO/6	Inglewood ARC	872-	A-25-7848
W9AB/9	Michiana ARC	965-	AB-58-7776
W2HS/6	Crescenta Valley RC	959-	AB-27-7550
K5TYP/5	Kessler ARC	1236-	AB-20-7644
W0FTB/0	Emporia ARC	883-	BC-8-7569
K2BR/2	Southern Counties AR Assn.	818-	A-25-7588
W4AM/4	Pyre ARC	1254-	B-20-7554
W4LY/4	Kentuckiana RC	1189-	AB-20-7195
W5FC/5	Dallas ARC	1159-	B-30-7104
WA2IRN/2	(nonclub group)	775-	A-10-6975
K6EMB/6	South Bay Wireless Soc.	945-	AB-12-6765
W5PAA/5	Aeronautical Center ARC	841-	AB-30-6645
W4ABK/4	Kentuckiana RC	1067-	B-30-6552
W2MO/2	Livingston ARC	796-	AB-25-6513
W3OK/3	Delaware-Lehigh ARC	891-	AB-18-6444
K3MTK/3	Germanatown RC	869-	AB-18-6234
W9REK/9	Tippecanoe AR Assn.	1005-	B-20-6182
W8MRM/8	Motor City RC	1090-	B-28-6156
W4CV/4	Am Transmitter Soc.	1020-	B-8-6129
K4FBA/4	Turner AFB ARC	1010-	B-25-6060
K6CLZ/6	Aerolet ARC	647-	A-13-6018
W3ISE/3	Soc. for the Preservation of Key-Links, Splatter & TVI	753-	AB-8-6018
W8NP/8	Massillon ARC	791-	AB-10-5919
W2UW/2	Mohawk ARC	636-	A-30-5919



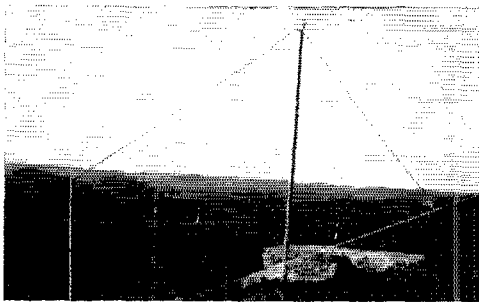
SOME QTH'S PRESENTED A PROBLEM ON PHONE

W2HO/2	Order of Hotted Owls of New York	861-	AB-15-5778
W8VM/8	West Park Radiops	937-	B-15-5772
W5PDO/5	Los Alamos ARC	669-	AB-12-5736
W8ZHO/8	Muskegon Area ARC	815-	AB-25-5703
W9BZN/9	INDO VHF ARC	707-	AB-25-5673
W2UBW/2	Michiana RC	619-	A-10-5571
W4WC/4	Lynchburg ARC	790-	AB-32-5550
K6GJ/6	Foothills AR Soc	671-	AB-12-5448
K3QBD/3	First State ARC	894-	AR-21-5445
W7NTO/7	Lewis County ARC	577-	A-21-5418
W9MJL/9	Vernillon County AR Soc	865-	B-35-5340
W9EOC/9	Old Post AR Soc.	851-	AB-16-5283
VE7BAR/7	Burnaby ARC	548-	A-43-5157
W1AQ/1	Associated RA of So. N.E.	772-	AB-25-5103
W46YNN/6	American Radio Club of IA Club	805-	AB-12-5091
W0MG/0	Northeast Iowa RA Assn.	732-	AB-17-5070
K9YMO/9	(nonclub group)	706-	AB-6-5025
W6TJ/6	Riverside ARC	579-	AB-15-5019
W4TRC/4	Kingsport ARC	796-	AB-38-5001
W6TJ/6	Texasians ARC	751-	AB-34-4836
W7IO/7	Arizona ARC	778-	H-20-4818
W9RYA/9	Ozaukee County RC	776-	B-24-4818
K8UTT/8	Ford AR League	657-	AB-15-4698
W9VT/9	Tri Town RAC	698-	AR-25-4680
K2ERN/2	Leopold AR Assn.	556-	AB-30-4605
W2AMK/1	Westchester Alt Assn.	684-	AB-20-4557



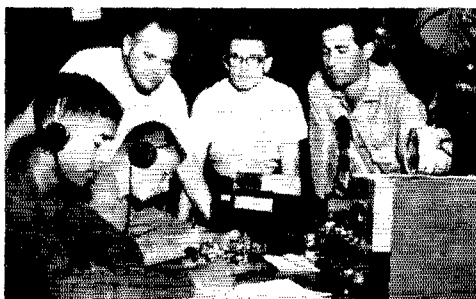
W2EW, FD Chairman for the Amateur VHF Institute of N. Y., W2WCR/2, reports interesting things on v.h.f. during the period, including a 32-L colinear for 2 up 90°. A highpoint of the shoreside operation was the "special delivery" of a 6-meter beam via rowboat, with tricky footing maintained by WA2JYJ.

QST for



(left) K2IZZ/2, the Tower ARC (2A) of the Metropolitan Life Insurance Co., "towered" over the surrounding terrain from this beautiful spot on top of a stone tower on a 900' peak in the Ramapo Mts. of NNJ. Shown is an inverted-Vee for 80 meters. (right) Old Man Murphy made it to Missouri and the 3A site of the Greene County AR Society, W0FHM/0, (left K0JJP, right WA0BGR), i.e., the c.w. boys operating sideband and the phone boys on c.w., a large blacksnake almost making it into the c.w. tent before it was caught and a copperhead just about biting one of the s.s.b. operators. A roaring success!

W8VVL/8	Queen City Emergency Net.	734-	B-27-	4554	W9DUP/9	DuPage RC	465-	B-14-	2790
K2RFT/2	Aerospace ARC	481-	A-16-	4554	KWAGE/0	Two-County AR Assn.	465-	B-14-	2790
K2LROK/3	Chautauqua Lake Amateur Assn.	593-	AB-12-	4545	W3NNL/3	(nonclub group)	332-	AB-5-	2772
W2CWB/2	Orleans County ARC	602-	AB-12-	4527	W0EBK/0	Minot AR Assn.	459-	R-8-	2754
K5WPH/5	Oklahoma Central VHF Club	719-	AB-12-	4509	VE3NBO/3	Gateway ARC	457-	R-10-	2742
W8MFP/8	Sun City ARC	748-	H-17-	4488	WA0BSM/0	Colorado YL ARC	426-	AB-11-	2736
W4SEPP/5	Calhoun ARC	709-	AB-15-	4422	W9DUF/9	Clark County ARC	442-	AB-9-	2694
K5YJG/5	Springhill RC	711-	H-7-	4416	K8VXH/9	Genoa RC	425-	ABC-11-	2685
W2GLO/2	Suburban West ARC	736-	B-32-	4416	VE2ADX/2	South Shore ARC	408-	AB-10-	2682
W9UJI/9	Levittown ARC	657-	AB-18-	4395	K9CQA/9	Hoosier Hills Ham C	406-	AB-7-	2675
W4KDK/4	Wish VHF Club	638-	AB-20-	4371	WA5CKF/5	Irving ARC	386-	AB-11-	2646
W0ENX/0	Peninsula ARC	567-	AB-31-	4371	W5ND/5	Orange ARC	412-	AB-11-	2631
WA21B/2	Tee-ni-Chat Club	485-	A-25-	4365	K2GHB/2	Brighton HS ARC	386-	AB-12-	2583
WA2LXB/2	Wanaque AR Soc.	485-	A-8-	4365	W4PL/4	Central Florida Ground-wave Club	429-	B-20-	2574
W4KAT/4	North Shore At Assn.	488-	A-10-	4292	W7SAA/7	Salem ARC	428-	H-8-	2568
W6LS/6	Nashville ARC	616-	AB-20-	4254	W6LUC/6	Santa Barbara ARC	359-	AB-13-	2565
W2CQW/2	Lockheed ARC	698-	AB-18-	4236	K2Y01/2	Ulster County Mike Key Club	388-	AB-7-	2550
W4BBD/2	Staten Island AR Assn.	581-	AB-33-	4137	KH6WO/KH6	Woodbridge RC	399-	AB-14-	2547
W9AXD/4	RAC of Knoxville	768-	RC-	4050	K3PGB/3	Pop-Bottle Net	311-	AB-7-	2514
W9AAR/9	Rockford AR Assn.	639-	AB-13-	4020	W3LWV/3	Wichita RC	405-	H-25-	2520
W2LL/2	Bloomington ARC	520-	AB-11-	4014	W0S0E/0	Poehita ARC	390-	H-20-	2502
W7E2/7	Explorer Post 304	597-	AB-12-	4014	W4MLK/4	Ole Virginia Hams ARC	402-	AB-12-	2489
K1BC/1	Victoria R.W.C.	614-	B-20-	3834	W3SJ/3	Hazleton ARC	359-	AB-	2424
K8UZW/8	El Paso ARC	616-	B-18-	3834	W4BHM/8	Thunder Bay ARC	447-	BC-	2346
K11EM/1	CQ Radio Club	536-	AB-14-	3826	K9EHC/9	Plint Hills ARC	361-	AB-11-	2340
K9LDN/9	Parma RC	601-	AB-40-	3798	W3EQ/3	Haverford Township Emergency R Net	310-	AB-6-	2296
W670/6	(nonclub group)	590-	AB-5-	3786	K9EER/9	(nonclub group)	479-	BC-11-	2253
K5OJ/5	Iowa-Illinois ARC	620-	B-22-	3720	W3CSL/3	Mosses ARC	370-	H-10-	2220
VE8AR/3	Fresno ARC	591-	AB-30-	3711	W2HTD/2	Thunder Bay ARC	264-	AB-3-	2217
K6CEK/6	Texas Instruments ARC	616-	B-13-	3708	W1VPU/1	Shelton Emergency Radio Assn.	314-	AB-15-	2187
W7DP/7	ARC of Sarula	592-	B-12-	3702	W3BMD/3	Indiana County ARC	361-	AB-5-	2187
K2DGI/2	El Segundo Civil Defense Group	385-	A-10-	3690	W9BXR/9	Montgomery County ARC	296-	AB-72-	2178
K7SNT/7	Wallia Wallia Valley ARC (nonclub group)	548-	AB-26-	3666	K20DP/2	Woodbridge RC	425-	ABC-11-	2172
WA9GWL/9	Mount Baker ARC	592-	AB-6-	3660	K6QHQ/6	South Bay AR Soc.	340-	AB-10-	2160
W6JBT/6	Metuchen YMCA & Edison HS RC	608-	B-16-	3648	K1JMQ/1	Lexington HS ARC	315-	AB-11-	2157
W4GOW/4	Iball Creek ARC	428-	AB-12-	3603	W1WHE/1	Hamden AR Assn.	347-	AB-7-	2157
W0FHM/0	Citrus Belt ARC	537-	AB-16-	3570	W4MOR/4	Buncombe County ARC	334-	H-10-	2154
VE7BD/7	Royal City AR Assn.	395-	A-20-	3555	W3ZWJ/3	Bedford County AR Soc.	318-	AB-12-	2085
W1KCV/1	Greene County AR Soc.	666-	B-25-	3546	W61B/6	Humboldt ARC	322-	H-6-	2082
K9DEC/9	Martins ARC	265-	B-20-	3540	W3ZRQ/3	Eastern Pennsylvania S.C.M. Stump Jumpers	280-	AB-10-	2079
K8NCT/8	(nonclub group)	364-	A-3-	3501	K7LYY/7	Leather Valley ARC	235-	AB-	2073
W8AM/8	Southington At Assn.	624-	AB-18-	3432	K3LIS/3	Pottstown YMCA ARC	273-	AB-9-	2058
W4GG/4	(nonclub group)	473-	AB-9-	3399	K4WUG/4	(nonclub group)	407-	ABC-	2058
WA9CP/8	Charlie Brown ARC	566-	R-7-	3396	W9DUF/9	Ninth Area RC	341-	H-12-	2046
W30L/3	Confederate Junkers of Detroit	475-	AB-10-	3375	K9CJD/9	RA Motorcycle Soc.	340-	H-	2040
W9AGC/9	Greensboro RC	560-	B-25-	3360	W8ZZ/8	Detroit AR Assn.	201-	A-15-	2034
K5AKS/5	Millford ARC	423-	AB-14-	3357	K2IPN/2	Carteret NJ CD Organization	225-	A-4-	2025
K3LDD/3	Lehigh Valley ARC	558-	BC-15-	3318	K1JF/1	Roger William VHF Soc.	287-	AB-6-	2022
K9VHB/9	(nonclub group)	456-	AB-4-	3312	K5SAM/5	Edmond AR Soc.	333-	AB-11-	2001
K7RJY/7	Philadelphia Electric ARC	551-	B-9-	3306	W7BCA/7	Electric City RC	267-	AB-3-	1985
W1HBB/1	Ottawa ARC	514-	AB-10-	3270	K9EMV/9	Greenwood ARC	297-	AB-16-	1980
W9CRM/9	Hill AFB Communicators Club	539-	B-10-	3234	W1MBE/1	Catamount RC	325-	R-12-	1950
W2CJ/2	Middesex ARC	515-	AB-18-	3207	K1NQG/1	Fidelity ARC	262-	AB-15-	1929
W1LH/4	Dixatar Co. AR Soc.	399-	R-12-	3171	W3XNW/3	Elna RC	214-	A-18-	1926
W3FF/3	Ridgewood ARC	526-	B-7-	3156	W9COP/9	(nonclub group)	314-	B-5-	1884
K9GPF/9	Alexandria RC	449-	AB-11-	3093	K4YTB/4	North Florida AR Soc.	285-	H-10-	1872
W81ZD/8	Chesapeake ARC	457-	AB-13-	3090	K3DNA/3	Juniata Valley ARC	369-	BC-12-	1860
K4ORS/4	Southwest Iowa ARC	506-	B-16-	3036	K9DIP/9	Clinton County VHF ARC	279-	B-14-	1836
WA4IXA/4	Assn.	801-	BC-22-	3033	W3MPX/8	(nonclub group)	293-	AB-5-	1824
WA2LHM/2	Pickens County ARC	501-	H-8-	3006	K2BWK/2	Squaw Island ARC	229-	AB-12-	1824
W61WH/6	Knox Presbyterian Radio Club	497-	R-8-	2982	W81B/8	DeSoto NARS	336-	ABC-23-	1821
VE1TQ/1	Band-Dix-Dahs	469-	B-7-	2964	W7HHE/7	Tuldo Mobile R Assn.	397-	ABC-8-	1818
VE3RS/3	Santa Clara County AR Assn.	461-	B-20-	2916	K8BSX/8	Woodward HS RC	276-	AB-10-	1788
W2SXR/2	Liverpool Civil Defense RC	294-	H-11-	2914	K3BKQ/3	Southern Chester County ARC	236-	A-25-	1755
W7RGL/7	Sudbury & District ARC	437-	AB-6-	2901	VE4ZZ/4	Winthrop AR Assn.	428-	ABC-10-	1752
W3VY/3	Cumberland RC	481-	B-13-	2886	K9EAM/9	Green Bay Mike & Key Club	271-	AB-10-	1749
W6MLX/6	AR Communication	334-	AB-3-	2877	W0BFE/0	Jayhawk AR Soc.	162-	BC-40-	1749
W5U5/5	McKean County RC	471-	H-21-	2826	W8DSO/8	(nonclub group)	289-	H-	1734
	El Dorado County ARC	312-	A-10-	2808	W5PGL/5	Armstrong ARC	315-	BC-12-	1731
	Red River ARC	465-	B-12-	2802	W1LUA/1	Canada AR Soc.	285-	ABC-8-	1725
					W5BJZ/5	General Dynamics & Fort Worth Rec. Assn. RC	259-	R-20-	1716
					W7TD/7	Goderich-Stratford Group	423-	BC-12-	1701
						Apple City RC	278-	B-15-	1668



(left) W2WW checked the log while W2DED pulled 'em through for the Watchung Valley RC, W2WW/2. They had a go at 7A and came up with a keynote for '64, "Plan ahead meticulously, but simplify whenever possible." While totalling over 1500 QSOs the crew enjoyed a visit by Matty of old 92N fame. (right) The Southern Counties AR Assn., K2BR/2, operated 3A and came up with 818 exchanges. This photo by W2PJD shows WB2GUK and WA2WLN operating and logging, while WA2OZQ WA2SNN and W2TUR observe.

K2SWL/2	Mid-Island AR Soc.	185-	A-12-	1665
W4ARCY/4	Tube Busters ARC	469-ABC-10-		1593
W5OQIG/5	Midland ARC	264-	B-11-	1584
V2ETCD/3	St. Thomas ARC	235-	AB-9-	1581
K2SES/2	Highland AR Soc.	349-	AB-5-	1542
W8ONB/9	Seymour ARC	231-	B-9-	1536
W8DUH/8	Branch County ARC	252-	B-15-	1512
W0BRN/0	Three Rivers Ham C.	226-	B-12-	1506
K2REY/2	Jersey City RC	184-	AB-6-	1491
W1WQML/1	Port City ARC	186-	AB-6-	1491
W4WVJ/4	Loudon County ARC	236-	AB-9-	1491
K8IUZ/8	Jackson County VHF C.	199-	AB-18-	1485
W3PZC/3	MICARC	203-	AB-7-	1476
V2EMX/2	Bale Comeau RC	218-	B-4-	1458
W4MRC/4	Hialeah ARC	216-	AB-10-	1440
K8MDC/6	(nonclub group)	236-	B-6-	1416
W4OEMB/8	(nonclub group)	235-	B-8-	1410
W8RTB/8	Canton ARC	197-	AB-28-	1401
V34KV/4	Winnipeg Ham Club	303-	BC-10-	1398
K01ZT/9	Sheboygan County ARC	305-	AB-10-	1386
V37ID/7	East Kootenay ARC	201-	B-10-	1356
K3CPC/3	Laurie ARC	240-	AB-12-	1344
W6YDQ/6	Antelope Valley ARC	180-	AB-5-	1341
W2REM/2	Black River Valley ARC	216-ABC-18-		1335

K9UAO/9	AR Disaster Corps	124-	AB-5-	960
K1ECU/1	Bishop Bradley HS RC	112-	AB-4-	891
W4AB/4	Broward ARC	131-	B-10-	861
W1EPM/1	Manchester RC	355-	AB-7-	848
K3BYE/3	Episcopal Academy ARC	115-	AB-1-	822
W0BLK/0	Black Hills ARC	109-	B-12-	804
K9HDL/9	Elkhart ARC	129-	AB-10-	795
W40DJG/0	(nonclub group)	114-	AB-5-	795
W43HSK/4	Tuscaloosa ARC	121-	AB-7-	777
W42RJJ/2	Central Nassau ARC	100-	AB-9-	762
W6EQZ/6	Ontario Civil Defense	126-ABC-15-		750
W0TWU/0	Merherson ARC	125-	B-9-	750
W35YP/3	(nonclub group)	115-	AB-4-	720
W1TRZ/1	Tri-County ARC	79-	A-3-	711
W5WE1/5	T-Pappa-Key	106-	AB-10-	708
W5WCR/2	Johns Hopkins Inst. of NY	209-	B-9-	700
V17QR/7	Point Grey AFB	104-	B-4-	624
W5ACI/5	Slaton ARC	100-	B-7-	600
K3NLI/3	(nonclub group)	191-	AB-5-	593
W2RBM/3	Tu-Boro RC	88-	AB-11-	588
K0RNR/0	Wheatbelt RC	93-	B-11-	558
V2TNA/7	Nashamo RC	85-	AB-8-	551
K7UER/7	Portland Roses	70-	AB-5-	516
W8JXU/8	A VHF Assn.	162-	AB-3-	480
W2GFEZ/2	Pascack Valley RC	50-	A-3-	450
K9TBN/9	Emergency Service Radio Assn.	66-	AB-3-	462
W6RNA/6	Trinity RC	48-	A-6-	432
W3KPI/3	Metropolitan Erie VHF Soc.	154-	AB-9-	392
K0FCR/0	Hillsworth AFB RC	55-	AB-9-	354
W5CPT/5	(nonclub group)	32-	B-8-	192
W4AAO/4	New River ARC	68-	AB-5-	138
KN1FP/1	(nonclub group)	34-	AB-4-	92

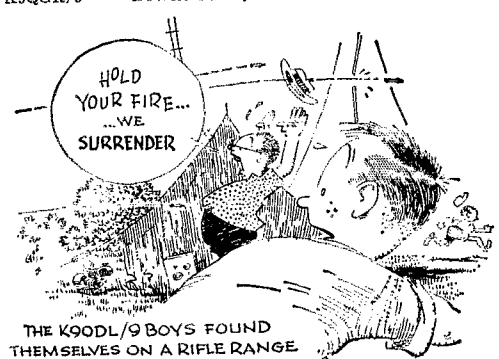
K1BHK/1	(nonclub group)	192-	AB-5-	1330
W40BWH/0	Notre Dame HS RC	128-	A-11-	1323
W5PIL/5	Beeville AR Klub	218-	B-8-	1308
W9CWT/0	Fullerton RC	216-	B-7-	1296
W40BM/4	(nonclub group)	285-	BC-10-	1263
K3RZX/3	Bureau of Mines ARC	206-	B-9-	1256
K5ARL/3	(nonclub group)	200-	AB-12-	1250
W0DRC/0	Tri-State AR Soc	200-	B-6-	1200
W6BML/6	MT. Shasta ARC	147-	AB-1-	1194
V15AA/5	Saskatoon ARC	169-	B-25-	1188
K9TQJ/9	Fulton County ARC	161-	AB-11-	1182
V1RND/1	Central New Brunswick ARC	171-	B-13-	1176
W46DZL/6	(nonclub group)	142-	AB-4-	1167
W9C7H/9	Eau Claire ARC	388-	C-10-	1164
V12MO/2	St. Maurice Valley ARC	168-	B-25-	1158
V12ASC/7	Chilliwack ARC	178-	AB-14-	1119
W9C7O/0	Grand Island AR Soc.	179-	AB-15-	1110
W1XOJ/1	Ponchartraine RC	152-	AB-5-	1104
K4VUT/4	Pioneer ARC	184-	B-6-	1104
W4ATG/4	Hancock ARC	208-	BC-1-	1095
W4ZICV/2	Port Washington Brotherhood of RA	95-	A-10-	1080
K9WBD/0	St. Cloud RC	151-	AB-6-	1071
W8WZ8/8	Ketterling ARC	490-	AB-5-	1068
K6HIX/6	(nonclub group)	149-	AB-3-	1005
W5PNL/3	Explorer Post 401	115-	AB-7-	996
K6GFM/0	(nonclub group)	162-	B-5-	972
W9G9Y/9	Forest City ARC	103-	AB-12-	972
W3COT/2	Levittown NJ ARC	350-	AB-7-	966
W8VMV/8	Kenton RC & Marion VHF III-Banders	153-	AB-7-	960

W6RNA/6	W3KPI/3	K0FCR/0	W5CPT/5	W4AAO/4	KN1FP/1
AR Disaster Corps	Bishop Bradley HS RC	Broward ARC	Manchester RC	Episcopal Academy ARC	Black Hills ARC
Elkhart ARC	(nonclub group)	Tuscaloosa ARC	Central Nassau ARC	Ontario Civil Defense	Merherson ARC
(nonclub group)	Tri-County ARC	T-Pappa-Key	Johns Hopkins Inst. of NY	Point Grey AFB	Slaton ARC
(nonclub group)	Tu-Boro RC	Wheatbelt RC	Nashamo RC	Portland Roses	A VHF Assn.
Pascack Valley RC	Emergency Service Radio Assn.	Trinity RC	Metropolitan Erie VHF Soc.	Hillsworth AFB RC	(nonclub group)
New River ARC	(nonclub group)				

Four Transmitters Operated Simultaneously

W2OYH/2	Morris RC	2027-	A-30-18-	468
W0OFR/0	Joliet AR Soc.	1155-	A-20-10-	638
K8PDI/6	Mather AFB MARS	1045-	A-16-	9630
W4SKH/4	Oak Ridge R Operators	1414-	AB-27-	9015
W8WC/8	Ohio Valley AR Assn.	1432-	AB-9-	8766
K6HM/6	Douglas Santa Monica ARC	1044-	AB-22-	8616
W8ICN/8	Indian Hills RC	993-	AB-25-	8553
K6CXI/6	Alexander Hamilton Sr. HS ARC	878-	A-12-	8127
W8FY/8	Van Wert ARC	871-	AB-35-	7962
K6FAY/6	McClellan AR Soc.	1101-	AB-56-	7650
W0ERG/0	20/9 Club	1193-	B-38-	7308
K5TMS/5	Soc. of AR Operators of A Texas	1214-	B-10-	7284
W5GZG/5	Dallas Ten Meter Net.	1213-	B-	7273
K7OUS/7	Clackamas AR Soc.	1070-	AB-30-	6591
V30DX/3	Ontario DX Assn.	888-	AB-14-	6774
W4THM/4	Bristol ARC	1078-	AB-10-	6642
K9T8M/9	Goshen ARC	1055-	AB-	6621
W7YPA/7	Richard ARC	1101-	B-	6606
W2LEG/2	(nonclub group)	1003-	B-	6168
K5KXN/5	KlCycycle Club	968-	B-15-	5982
W42NGI/2	Glaucoster County ARC	888-	AB-28-	5952
K2GE/2	Haritan Bay RA	900-	AB-20-	5880
W9BRE/9	Argonne ARC	780-	AB-25-	5792
K5TK/5	20/9 Club	902-	AB-15-	5886
K3SSC/3	Delmont RC	847-	AB-21-	5781
W5USS/5	Pittsfield RC	857-	AB-12-	5733
W5OK/5	Electron Benders ARC & Oil Capitol Mobile Club	886-	B-25-	5601
W3PPT/3	Reading RC	899-	B-35-	5566
W9CSE/9	Michigan City ARC	700-	AB-12-	5487
V6ILC/1	Loyalist City ARC	842-	B-15-	5202
K9AYO/9	Western Electric ARC	943-	AB-	5099
K2QNR/2	Long Island Tri-Banders ARC	566-	A-35-	5094
W4TOI/6	Reading ARC	585-	AB-16-	4992
K3JZU/3	Bucks County ARC	709-	AB-19-	4959
W3VPR/3	Howard Co. & Anne Arundel Co. RC	767-	B-25-	4764
W4NYK/4	Blue Ridge R Soc.	742-	AB-15-	4749
W9WK/9	Martin ARC	701-	B-20-	4746
K2YCB/2	Hair Lawn ARC	601-	AB-22-	4734
K8TAO/8	Metropolitan Rag-Chewers Club	657-	AB-23-	4629

KATPY/4 W3AD/3	Hill-Billy ARC.....	770-	B-25-	4620	WB2AHP/2 W3WIDZ/3	Seton Hall Prep RC....	208-	AB-8-	1692			
VE3YI/3 W9IP/9 W2LY/2	Lancaster R. Transm- iting Soc.....	900-	AB-13-	4506	WB2BCY/2 W9CTV/0 K8ROM/3 W9URC/9	Somerset County ARC... Washington AR Soc.... Raytown HS ARC..... Milton ARC..... Central Indiana Mobile RC.....	276- 248- 265- 220-	B-7- AB-14- AB-10- AB-15-	1656 1823 1604 1666			
K6IZI/6 K5AYH/5 W7AQ/7 W3KOL/3 W4ZOF/4 VE3BSQ/3	Indianapolis RC..... Camden County Civil Defense.....	735-	B-20-	4410	WA0DHJ/0 W4FTD/4	O'Brien Co. AR Assn... Suffolk Emergency Com- munications Unit.....	302- 239-	BC-6- B-13-	1554 1434			
W4LEN/4 W4EXU/4 W4JW/4 W3BSG/3 W8NDR/8 W49IAK/9 K5VOZ/5 W6PW/6 W1BRA/1 W8SQ/8 VE6NQ/6 W2JNZ/2	North Bay AR Assn... Curry County ARC..... Loudon ARC..... Delaware 6 Meter Net... Forsyth RC..... Belleville and District ARC.....	590- 707- 643- 676-	AB-11- B- B-14- B-23-	4377 4350 4242 4008 4206	WA6SHH/6 WB2AWN/2 K3HFD/5 VE7BQ/7 W1LN/1 K9QGR/9	Limpoec ARC..... High Point ARC..... District Heights RC..... Totem ARC..... Danvers Emergency Net DeWitt County ARC....	205- 145- 232- 167- 200- 158-	BC-6- AB-8- AB-8- AB-12- ABC-6- B-12-	1380 1368 1305 1298 1248 1098			
W3GV/3 W4VYA/0 W2RCX/2 W8CWO/8 K4RDR/4 W8FO/8 W9DUZ/9 K4BWZ/4 W3RC/3 W9MKS/9 W3ABT/3 K2LZW/2 K1MLU/1 W4SDYD/8 VE2APX/2 VE3HB/3 K3CSG/3 W3CAB/3 W1OR8/1 W6MIM/6 W2QV/2 W0BXO/0	Triangle ARC..... Piedmont ARC..... Wake County AR Assn... Valley Forge ARC..... Graftot County AR Assn. NaBaGe RC..... Lawton Fort Hill ARC Suu Francisco ARC..... Quinebaug Valley RC... Springfield ARC..... Calgary AR Assn... Harmonie Hill Radio League.....	632- 613- 595- 632- 625- 619- 590- 614- 588- 513- 579- 546-	AB-25- AB-16- AB-12- AB-16- AB-8- B-22- AB-8- B-18- B-8- AB-15- B-100- B-19-	3984 3842 3852 3834 3827 3714 3660 3624 3528 3498 3474 3426	541- 548- 555- 516- 518- 544- 412- 493- 514- 480- 477- 456- 355- 587- 439- 380- 311- 404- 395- 347- 408- 417- 400- 398- 350- 398- 396- 308- 308- 387- 354- 700- 303-	AB-18- AB-10- AB-17- AB-18- AB-30- B-13- AB-29- AB-20- B-4- B-10- AB-15- B-5- AB-9- ABC-15- AB-14- AB-10- A-21- AB-20- AB-9- BC-16- AB-17- AB-1- AB-9- B-2- AB-20- AB-16- AB-18- B-20- AB-36- AB-8- B-7- AC-14- AB-9-	3426 3488 3515 3303 3285 3264 3291 3099 3084 3030 3024 3000 2991 2973 2868 2814 2799 2730 2727 2706 2676 2583 2544 2502 2481 2478 2376 2358 2343 2220 2217 2172 2166	W3JRJ/3 W4DNR/2 K1RKF/1 K3WRS/3 W9REA/0 K8PBN/8 W4GAC/4 K7UFT/7 W3VPJ/3 VE3BNK/3 W2HCS/2 W8HEM/8	Canonsburg AR Soc.... Colonie Central HS RC. Nipmuc Emergency Radio Corps..... General ARC..... St. Paul Mobile RC..... St. Hamilton AR Assn... St. Petersburg ARC..... Valley Council of HS Radio Clubs..... Susquehanna Valley ARC..... Robbin RC..... Albany AR Assn... U. of Toledo AR Assn...	183- 174- 267- 137- 125- 454- 120- 130- 325- 118- 59- 383-	B-6- AB-9- AB-18- AB-10- AB-8- B-8- BC-8- AB-15- AB-20- B-9- AB-1- AB-10-	1098 1062 1026 969 948 908 870 846 792 696 525 383
K8TIW/8 W9YMG/0 W46UW/6 W1SVE/6 W8MOP/8 W6AK/6 K1KBO/1 K9KED/0 K4DXO/4 K5UFR/5 W6RIN/5 W8CDZ/8	Oshtemo ARC..... Air Capitol AR Assn... Laketown RC..... Newport County RC... East River RC..... Sacramento ARC..... Fort Devens ARC..... Central Kansas RC..... Vienna Wireless Soc... Pasadena ARC..... Beaumont ARC..... Copper Country RA Assn.....	361- 297- 330- 333- 300- 298- 313- 209- 273- 352- 291- 270- 248- 258-	B- AB-12- AB-12- AB-19- B-18- B-18- B-18- B-18- AC-12- PC-32- B-7- B-6- AB-11- B-7-	2166 2079 2070 2055 1974 1938 1902 1881 1803 1773 1746 1727 1713 1698	W2YKQ/2 K6BAG/6 K9QMH/0 W3BTN/3 W7AW/7 K8EMV/8 W2OR/2 W4GOSM/6 K8HKK/3 W8RRZ/0 V8EJJ/3 W8MJJ/6 W2HFP/2 K8GXSU/9 K6LGR/6	Lake Success RC..... Pacific RC..... Montrose County ARC. North Penn ARC..... West Seattle ARC..... Southeast ARC..... Pompton Valley RC... Newport AR Soc..... Nittany ARC..... Western Slope RC..... West Side RC..... Hells ARC..... Union County AR Assn... St. Clair ARC..... Edgewood AR Soc.....	1491- 1538- 1475- 1358- 1359- 1217- 1152- 1017- 1013- 824- 861- 946- 1008- 929- 715-	A-23- A-10- A-21- A-35- A-19- AB-50- AB-25- AB-50- AB-31- A-26- AB-18- AB-18- AB-33- AB-35- A-27-	13.860 13.842 13.518 12.447 12.438 9693 9522 8571 8169 7659 7080 6861 6786 6660			
K3IGP/3 K9XKS/9 W6LIE/6 K7CCH/7 W45FMC/5 K8RPO/8 W4ZATM/2 K1YML/1 W9NMF/9 W7BK/7 W1VSR/1 W2BPA/2 W7DMF/7	Penn Central RC..... Elkhart HS ARC..... Kern County RC..... Coos County RC..... North Little Rock ARC. Holmes County ARC... (nonclub group)... Central Vermont ARC... Y-Rad Club..... Cascade RC of Everett... (nonclub group)... Telco ARC of Manhattan Bagle Rock RC.....	297- 330- 333- 300- 298- 313- 209- 273- 352- 291- 270- 248- 258-	B- AB-12- AB-12- AB-19- B-18- B-18- B-18- AC-12- PC-32- B-7- B-6- AB-11- B-7-	2166 2079 2070 2055 1974 1938 1902 1881 1803 1773 1746 1727 1713 1698	Fire Transmitters Operated Simultaneously							



THE K9ODL/9 BOYS FOUND THEMSELVES ON A RIFLE RANGE



(left) W5KPI/5, the Lost Pines ARC, topped 1A for a new scoring record attributed to months of hard work, planning, excellent conditions, sideband and fine operators. This unusual view shows K5HRR observing (left to right) K5BSZ, K5ABV and W5TFB. (right) The Valley ARC of Puyallup, Wash., W7HZ/7, does things in a big way. Operating 10A with over 27-K points, the fellas gave forty phone the big treatment with a full-size 7-Mc. beam, way up in the clouds topped by FD Chairman, K7DQV.

1964 FIELD DAY

JUNE 27-28

W8ID/8	Seneca RC	945-	AB-30-	6327
W2CQW/2	Pine Towns RC	881-	AB-25-	6156
K6QYB/6	Litton Communications Club	684-	A-13-	6156
VE3NSR/3	North Shore RC	996-	B-26-	6126
W4CA/4	Roanoke Valley ARC	1199-	ARC-57-	6117
W42SCZ/2	West Jersey RC	704-	AB-23-	5799
VE3DC/3	Hamilton ARC	841-	AB-20-	5412
W4KH/4	RA Transmitting Soc.	841-	AB-25-	5379
W3PIQ/3	South Hills Brass Pounders & Modulators	825-	AB-30-	5289
W8PGL/8	Blennerhasset ARC	850-	B-14-	5250
W2CLO/2	Nutley AR Soc.	710-	AB-25-	5139
W8DFU/9	Delaware AR Assn.	799-	AB-25-	5130
VE3DRT/3	Skywide ARC	799-	ARC-96-	4938
W2WUX/2	Utica ARC	780-	AB-20-	4779
W5DPA/5	Houston ARC	705-	AB-15-	4725
W8AEX/6	Soc. of AR Operators (nonclub group)	713-	AB-20-	4698
K9ACZ/6	Harford County AR Assn.	731-	AB-9-	4521
K3CJT/3	BlackJack AR Klub	692-	AB-25-	4485
K4IRE/4	Kansas City ARC	683-	AB-19-	4425
K9OKI/0	Jeff County ARC	692-	B-18-	4302
K9DID/9	Confederate Signal Club	476-	AB-12-	4254
W4VT4/4	Santa Cruz County ARC	684-	B-9-	4104
K61GS/6	Dade RC	536-	AB-10-	3836
W4NVU/4	Detroit Metropolitan RC	581-	AB-20-	3810
W8OHR/8	North Shores ARC	596-ABC-	B-11-	3762
W6SK/6	MARS Station	595-	AB-	3827
K5PGL/5	Frederick ARC	603-	B-13-	3618
K3ERM/3	Lee's Summit RC	578-	AB-20-	3513
W0GWX/0	La Porte ARC	559-	B-22-	3504
W91VZ/9	Brookley A P H ARC	499-	AB-	3486
K4FBC/4	Shore River ARC	649-	BC-20-	3237
FTFBL/7	Hellertown ARC	496-	AB-12-	3165
K3HFV/3	Bainbridge Brass Pounders	497-	AB-16-	3102
K3ORS/3	New York RC	508-	B-14-	3048
W2ATT/2	Barrington AR Soc.	437-	AB-20-	2901
W49BLW/9	Tulare County ARC	429-	AB-16-	2739
W4NBR/4	Northeast NC ARC	400-	AB-15-	2709
W6UJ/6	Taft RAC	403-	AB-30-	2418
W0EQI/0	Ak-Sar-Hen RC	366-	AB-7-	2329
K9UXZ/9	National Trall ARC	622-	BC-16-	2308
K1OGR/1	Farmington ARC	337-	AB-30-	2121
W1NRG/1	Meriden ARC	491-	BC-6-	1857
W3CWC/3	Antietam RC	296-	AB-17-	1824
W9PJ/9	La Crosse RAC	348-	AB-	1548
W9AML/9	Central Illinois RC	244-ABC-	B-18-	1485
K2BYS/2	Seneca Drums ARC	280-ABC-	-	1464
K9ILG/9	Fulton County ARC	219-	AB-20-	1434
W42LJC/2	Trion-Endicott H H ARC	229-	B-19-	1374
W2BXX/2	Brooklyn Polytechnic Institute RC	538-	B-12-	1336
W9CZH/9	Winslow AR Soc.	324-	BC-20-	1296
W9BMC/9	Oak Park and River Forest HS RC	208-	B-20-	1248
W1UXS/1	Souhegan AR Assn.	161-	AB-8-	990
		125-	AB-5-	900

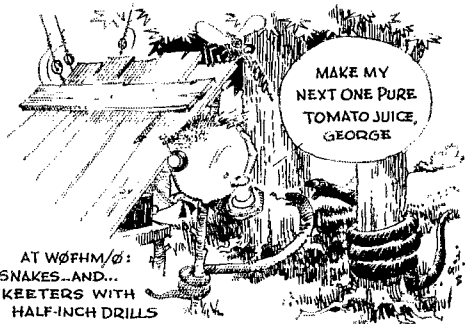
Six Transmitters Operated Simultaneously

K2AA/2	South Jersey R Assn.	1712-	A-75-	15,651
W4AMB/4	Blue Grass ARC	1687-	AB-25-	11,142
K2AE/2	Schenectady AR Assn.	1588-	B-38-	9528

(left) OT W5GH/5 operated 1B "the hard way" near Ben Franklin, Texas, with the following gear: Receiver IUT4 r.f. amp., 1U4 regen. detect., 3V4 audio amp., plus dry cells, transmitter one-tube 6146 crystal osc., 28 watts input from storage batteries and dynamotor. The antenna was a 40-meter dipole, 20' high. FB comments on fine weather, many visitors, a fine time and no visits by Murphy! (right) "Decor" was important to the artistically-minded crew of VE3DRT/3, the Skywide ARC, a 5A entry. This view of the 20-meter sideband tent was taken 5 minutes before the start of the contest and two minutes before the final went.



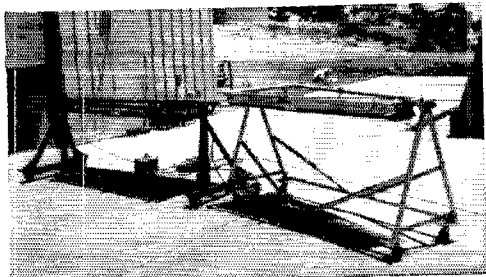
K9AVE/9	Illinois Valley Radio Assn.	1558-	B-20-	9510
W9PCB/9	York RC	1242-	AB-21-	8387
W42LQO/2	Grumman ARC	1109-	AB-40-	8007
W8ACW/8	Genesee County RC	1243-	AB-60-	7701
W8WYV/0	Bellevue ARC	1169-	B-50-	7164
K4HAL/4	Birmingham ARC	1121-	AB-30-	7131
W6PMK/6	North Peninsula Electronics Club	752-	AB-12-	6447
W4MMA/4	Panama City ARC	1038-	AB-32-	6432
W3CFC/3	Delaware Valley ARC	944-	AB-55-	6126
W5PFC/5	Jackson ARC	919-	AB-18-	5916
W1UX/1	Chelmsford ARC	852-	AB-12-	5907
VE3VM/3	Niagara Peninsula ARC	729-	AB-25-	4856
W0EAO/0	Kansas City VHF Club	959-	AB-22-	5814
W4BFM/4	Deatur ARC	901-	B-24-	5656
K6QEZ/6	Ampex ARC	720-	AB-18-	5415
K4CYP/4	Wayne County AR Assn.	773-	AB-16-	5214
K4DIZ/4	Gainesville A Soc.	778-	AB-12-	5112
K6QWL/6	North Hills RC	642-	AB-15-	4221
W6LJ/6	Sonoma County RA	541-	AB-15-	4575
K1WEV/1	Sub-Sig ARC	491-	AB-18-	4080
K6EAG/6	Hayward RC	665-ABC-	30-	3792
W46UUN/6	San Fernando Valley State College RC	520-	AB-15-	3723
W18CZ/1	AARC of Norwalk (nonclub group)	483-	AB-24-	3387
K6JKC/6	Kansas City ARC	540-	B-7-	3240
VE3ZM/3	Guelph ARC	417-	AB-19-	3210
W9ADZ/9	Chain of Lakes ARC	467-	AB-	2961
K1RSX/1	National Employees AR Soc. & Malden AR Assn.	436-	AB-15-	2950



AT W0FHM/0:
 SNAKES...AND...
 SKEETERS WITH
 HALF-INCH DRILLS

K9OVN/8	South Eastern Michigan AR Assn.	265-	AB-20-	1893
WB6DFV/6	Poly H.S. ARC	134-	A-6-	1206
K3IZI/3	Wireless Wizards of K3IZI	106-	AB-6-	801
<i>Seven Transmitters Operated Simultaneously</i>				
W2WW/2	Watching Valley RC	1528-	AB-35-	12,300
W6ZE/6	Orange Co. ARC	1129-	AB-24-	9930
K2DC/2	Garden State AR Assn.	1275-	AB-35-	8871
W9SW/9	Chicago Suburban Radio Assn.	1167-	AB-20-	8247
W5KA/5	Austin ARC	1125-	AB-32-	8136
W6WWJ/6	South County AR Soc.	1162-	AB-26-	7983
W1MIV/1	Massasoit AR Assn.	1021-	AB-20-	7389
W7VE/7	AR Assn. of Bremerton	920-	AB-19-	6279
W2SEX/2	AR Assn. of the Panwandas	805-	AB-40-	4986
W6SD/6	San Fernando Valley RC	745-ABC-	17-	4833





(left) Something new "under the sun" this field day was the power source used by the 2-man portable K6ASK/6, atop Table Mountain. Six- and two-meter operation by communicators was powered by a 12v/200 A.H. battery and two large arrays of silicon solar batteries. (right) The Honolulu Mobile ARC, KH6OS/KH6, operated 1A at Ewa Beach, managing 315 QSOs from a delightful site.

W6BXN/6	Turlock ARC.....	868-ABC-33-	4641
W6UCS/8	Monterey Bay RC.....	655- AB-12-	4566
VE3CKD/3	Kitchener Waterloo ARC.....	662-ABC-25-	4446
W6CX/6	Mount Diablo.....	693- AB-22	4441
W00U1/0	Denver RC.....	593- AB-50-	3804
W2A01L/2	Apple Pie Hill RC.....	523- AB-23-	3249
K5THH/3	Wood County ARC.....	618- AB-	3768
W4DOC/4	Atlanta RC.....	429- AB-10-	2989
W4UBG/4	Haleyville ARC.....	396- AB- 5-	400
W4SRX/4	Eglin ARC.....	310- AB-23-	2208
W8DXW/8	Maple Leaf Amateurs.....	363- B- 8-	2178
W9D9YH/9	Bureau County ARC.....	278-ABC-18-	1605
W4ZYBL/2	Ionosphere Busters ARC.....	265- AB-15-	1665

W6FA/6	Corona Gang.....	861- A-13-	7992
W8HLD/8	Catalpa AR Soc.....	1113- AB-24-	6696
W9IKN/9	Elgin AR Soc.....	713- AB-18-	4815
W6MLK/6	H-Frequency A Mobile Soc.....	636- AB-19-	4446

Ten Transmitters Operated Simultaneously

W7HZ/7	Valley ARC.....	2993-	A-44-27 180
W7DK/7	RC of Tacoma.....	2292-	AB-47-17 617
W3RCN/3	Rock Creek AR Assn.....	1831-	AB-14-13 482
VE3CW/3	Windsor ARC.....	1612-	AB-30-13,095
K2YQJ/2	Communications Club of New Rochelle.....	1608-	AB-40-12,111
W6PMO/6	Associated RA of Long Beach.....	1378-	AB-35- 8955
W8HTX/8	Health-Blossomland ARC.....	1246-	B-29- 7626
W2US/2	Stark Valley RC.....	1170-ABC-54-	6444
W9WSV/9	Cedar Valley ARC.....	911-	B-30- 5466

Eight Transmitters Operated Simultaneously

W2AST/2	Englewood AR Assn.....	1280-	AB-28-11 436
W6ULI/6	Fullerton RC.....	1405-	AB-19-11 358
W9LMI/9	Northwest ARC.....	1299-	AB-28-11,166
W6WX/6	San Francisco Peninsula Mars Group.....	1328-	AB-25-11 013
W3TYU/3	William Penn RC.....	1802-	B-25-10,812
W4BRE/4	Huntsville ARC.....	1198-	B-20- 7338
W9YH/9	Twin City ARC.....	1353-ABC-30-	6999
W9CEJ/9	Fox River & League.....	974- AB-	6144
W1CLA/1	Framingham RC.....	774- AB-23-	4959
K7GJE/7	Las Vegas ARC.....	693-	B-50- 4308
K6LSX/6	Sidewinders RC & San Jose AF MARS Group.....	626- AB-20-	4071
W4SGRO/5	Fort Smith Area ARC.....	329-	B-19- 3324
W4PAR/4	Davidson ARC.....	485-	AB-20- 3246

Eleven Transmitters Operated Simultaneously

W2LI/2	Tri County R Assn.....	2866-	A-40-26 019
VE3VE/3	Scarborough ARC.....	1536-	AB-45-13 569
VE3NAR/3	Nortown ARC.....	1613-	AB-63-11 415
W8ZEW/2	Nassau R Assn.....	1029-	AB-26- 7668
K10XT/1	Northampton VA Hospital ARC.....	620-	AB-22- 3801
W8TNO/8	Oakland County AR Soc.....	540-	AB-44- 3666

Twelve Transmitters Operated Simultaneously

W1NY/1	Hampden County R Assn.....	567-	B-30- 3552
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Thirteen Transmitters Operated Simultaneously

W4GODP/6	Livermore AR Klub.....	1431-	AB-28-12 657
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Fifteen Transmitters Operated Simultaneously

W8RP/8	Huron Valley AR Assn.....	1083-	AB-34- 6822
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CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is given below that of the amateur whose call was used. Figures following the calls indicate number of contacts, power and final score.

One Transmitter		Two Transmitters		Three Transmitters	
W2PVX/2	781- A-10-274	W8EKC/6	129- A- 2079	W4GAPC/0	91- B- 546
W2CZG/3	374- A- 5387	W8DZP/8	232-AB- 2040	W4P8ASQ	
W2IJB		W4GUCM/6	333- B- 1998	K9UQM/9	269-AB- 538
W00GM/0	460- A- 4140	W6B8JJ		W4GAKM	
W40IDQ		W9NUC/9	325- B- 1950	VE3CGP	38- B- 528
K8YZO/8	449- A- 4041	W9LJJ		W1ALL/1	57- A- 513
W8CQJ		W6TLC/6		W8RQH/1	36- A- 486
W7BQ/7	391- A- 3519	W7B8G	303- B- 1818	W8Q5J	
W7WQ		K7NNA/7	172- A- 1773	W49VT/9	149-AC- 453
K0QWM/0	213- A- 3240	K4NAA/42	289- B- 1761	K9VBL/3	50- A- 450
W0ZBL		K6ASK/6	100- A- 1715	K9VBJ	
K5CDC/5	503- B- 3168	K8DEK/8	234- B- 1704	W49LH/0	7- A- 432
W5HWB		K8GVQ		K3NXX/3	182-AB- 431
K4WHK	376-AB- 3057	K8W9N/9	276- B- 1656	K3TEZ	
W3WGO/31	201- A- 3051	K9TIG		K9LQJ/9	70- B- 420
K0BEL/0	313- A- 3042	W49VJP/6	151- A- 1584	W4NTE/4	46- B- 414
W4ZDPT/2	308-AB- 2757	W7ZY		W7PBV/7	42-AB- 405
K2BML		K8HTP/7	232-AB- 1500	K9DOL/9	66-AB- 402
W4ZAPT/2	287- A- 2583	K3ETU		K9DIM	
W4ZJHE		K8YWR/8	249- B- 1494	K8RDM/3	200- B- 400
K5VHX/5	281- A- 2529	K8SHQ		K3KJ/1	64- B- 384
W5AJJ	159- A- 2484	W8DZA/5	165- A- 1485	W1HDQ/1	68-AB- 378
W8VWY/8		W88Y/8	156- A- 1404	K1WU/1	55- B- 330
W4NHH/4	387- B- 2417	K7JHF/7	223- B- 1338	K9EBK/91	10- A- 315
W4ADCPC		K9YVY/9	202-AB- 1299	K9NYB/1	50- B- 300
K5WUE/5	153- A- 2403	W9HED/9	189- B- 1284	W3RTU/VE3	29-AB- 288
W6OLD		K6MPX/6	208-AB- 1254	W61AA/6	21- A- 284
W48PMK	246- A- 2304	W6MUG		W82HLH/2	46- B- 276
K9NPD	373- B- 2238	VE3AO/3	124- B- 1251	W6CIS/6	18- A- 243
K8UHM		K1RYT/1	138- A- 1242	W7ADY/7	26-AB- 224
K5LJF/5	219- A- 2196	W42IMH/2	162-AB- 1203	K7GTY	
W1BPE/1	361- B- 2166	W8ZAO/3		W7HOS/7	13-AB- 216
W48AHC/9	328- B- 2118	W9DQX/1		K8UO/3	77- B- 208
W48AYR		W9NCS	199- B- 1194	K3UWH	
W2VYP/2	130- A- 2093	K2AXA/1	174- B- 1194	K10OV/1	33- B- 198
W2ZTJQ		K8DBY/8	153-AB- 1167	W48AW/8	98- B- 196
		W8NWW		K4XND/4	70- B- 190
				K9TFP/5	21- A- 189
				K9WRL/2	
				K9UO/9	31- B- 186
				W9UXT	



(left) This interesting transceiver, built by VE3CGP, was put through the paces in Class B by VE3AK/3. (right) Tops in their call area in Class 4A was the Oak Ridge Radio Operators—W4SKH/4, who reports their new club generator, under the direction of W4CHB, really acted like the TVA.

WN9GOP/9	1-4	B-	174	WA2OOD/2	167-176	B-	1002
WA2WHY/2	185-186	B-	176	W7VPT/7	90-99	AB-	996
K5IQJ/5	153-154	B-	156	K7HRW			
VE3BFC/2	25-26	B-	150	W7ZTW/7	127-128	B-	912
VE3BEM				K7SNG			
KN7TYE/7	1-6	A-	144	VE5BO/5	72-73	A-	873
K3VTD/3	22-23	B-	132	VE5DN			
K3TAZ				K7BJE/7	133-134	B-	798
WA6VWJ/6	63-64	B-	126	W7OWS			
WB3BPH				K7POZ/7	103-104	AB-	732
W5BNS/5	20-21	B-	120	E7SAD			
K9ILB/9	15-16	B-	90	W7OHR/7	97-98	AB-	606
K9ARK				WA9FBC/9	95-96	B-	570
K3VZD/3	13-14	B-	62	WA9CTR			
K5IMF				WA6COE/6	61-62	AB-	393
W1BBI/1	10-11	B-	38	WA6JJC			
WN8KCP/8	18-19	B-	36	K4BEL/4	60-61	AB-	372
WN8HK				WA4AFF			
WN4LBO/4	15-16	B-	30	K1DRB/1	104-105	AB-	336
W3YC/3	4-5	B-	24	K1QQT			
WN2EDU/2	2-3	A-	6	K1VQW/1	127-128	AB-	315
				K1VEX			
Two Transmitters				K9BBN/9	129-130	AC-	197
W6KEV/6	345-346	A-	4658	K9BBP			
W6MSM				W8HBF/8	73-74	B-	146
W6BAM/6	353-354	A-	4302	W8HRQ			
W6BPNX				WB2HTN/2	118-119	B-	108
WA2BSW/2	135-136	A-	4068	WB2HLJ			
WA2SAB							
K6IHY/6	225-226	A-	3375				
W6ZCL							
K3BFT/3	617-618	B-	3702				
K3RFP							
W7UWV/7	315-316	AB-	2490				
WB2COW/2	269-270	A-	2421				
K9JLJ/9	260-261	A-	2340				
K9OV1							
K6JBN/6	316-317	B-	2046				
W4BFA							
K9UWL/9	176-177	A-	1809				
K9BJL							
K7QMP/7	180-181	A-	1755				
K7MIXE							
WA6CRQ/6	179-180	AB-	1548				
WA6PBY							
W5DBN/5	211-212	B-	1266				
W5CTL							
K1WSX/1	130-131	A-	1170				
K1RIF							
K1URK/1	179-180	B-	1074				
K1YTM							

K3GJN/3	75-76	A-	2967	WA6VZA/6	38-39	A-	1850
W3MHR/3	77-78	A-	2943	K6ZPQ/6	34-35	A-	1796
W3YHV/3	75-76	A-	2943	K2GKK/5	107-108	A-	1782
K3CBE/3	74-75	A-	2930	W6LTC/6	22-23	A-	1634
K8UYE/8	109-110	A-	2835	W8BRL/8	62-63	AB-	1611
W3WPD/3	69-70	A-	2808	WA6YZO/6	78-79	B-	1593
W3GIE/3	66-67	A-	2795	W8BRM/8	62-63	A-	1580
K6RIF/6	285-286	B-	2790	K6VYV/6	17-18	A-	1566
W3VPG/3	85-86	A-	2768	W3ZEH/3	33-34	A-	1539
W3LNQ/3	60-61	A-	2673	W8ZEL/3	33-34	A-	1539
K8UUE/8	99-100	A-	2673	WB6OC/6	66-67	B-	1485
WA6DGH/6	97-98	A-	2646	W0UMG/0	64-65	AB-	1472
W3NIP/3	51-52	A-	2646	K8YYK/8	54-55	A-	1458
K3DJE/3	54-55	A-	2633	WN6DF/6	9-10	A-	1458
W3AJQ/3	56-57	A-	2606	WA6JTO/6	62-63	B-	1449
W3FQV/3	46-47	A-	2565	WN6DFN/6	5-6	A-	1404
W3VCE/3	53-54	A-	2566	WN6DFM/6	4-5	A-	1391
K6UML/6	87-88	A-	2511	K3TNE/3	74-75	A-	1337
K3HLJ/3	43-44	A-	2511	W5TJT/5	71-72	A-	1296
W3GOW/3	49-50	AB-	2493	W8BRL/8	11-12	A-	1296
W3HOJ/3	47-48	A-	2484	K8MVA/8	39-40	A-	1283
W3DJW/3	38-39	A-	2471	W6LIP/6	135-136	B-	1215
K3EHD/3	39-40	A-	2457	WA6NFC/6	128-129	ARC-	1143
W6OOR/6	82-83	A-	2444	W6AHE/6	122-123	B-	1098
W3CDY/3	37-38	A-	2403	WA6WHZ/6	22-23	B-	1098
W3PWI/3	34-35	A-	2309	W3GACD/3	33-34	B-	1089
W3VVS/3	28-29	A-	2255	W6OZO/3	54-55	A-	1087
K6YJL/6	18-19	A-	2255	K9YRN/9	118-119	B-	1062
W3LEM/3	17-18	A-	2241	W9KLD/9	117-118	B-	1053
W3QQH/3	26-27	A-	2228	K6AUU/6	14-15	B-	1017
W3VSD/3	25-26	A-	2224	W9QY/9	73-74	A-	986
W3TKQ/3	50-51	A-	2214	K8BQY/8	16-17	A-	969
W3AWH/3	21-22	A-	2214	K3WQT/3	43-44	A-	918
W6OPY/6	64-65	A-	2201	K8VPI/8	17-18	A-	918
K6ZFL/6	64-65	A-	2201	WA8FTU/8	27-28	A-	905
K3HLE/3	20-21	A-	2187	K8UQA/8	7-8	A-	837
WA6IVL/6	113-114	B-	2178	WA8GCR/8	7-8	A-	837
W8YJM/3	21-22	A-	2160	W3ADY/3	38-39	A-	851
WB6AOK/6	61-62	A-	2160	W3UMK/3	32-33	A-	770
K6JNY/6	68-69	A-	2133	W8PTZ/8	4-5	A-	770
WA6NDL/6	55-56	A-	2079	K8PAZ/8	10-11	A-	716
K6RLJ/6	54-55	A-	2066	K8DJC/8	9-10	A-	702
W3ZPP/3	14-15	A-	2039	W8SUS/8	9-10	A-	702
WN6AGM/6	49-50	A-	2025	K8JFM/8	9-10	A-	702
W3PST/3	15-16	A-	2025	K8BFT/8	9-10	A-	702
W2OKR/2	124-125	A-	2012	K8NXV/8	9-10	A-	702
W6LTN/6	49-50	A-	1998	WA8HZR/8	9-10	A-	702
W3ZLI/3	3-4	A-	1971	W8AIR/8	9-10	A-	702
W3OEC/3	5-6	A-	1890	W3WAU/4	50-51	A-	675
WA6ONX/6	10-11	A-	1877	W8AYU/9	24-25	A-	675
K8CAN/8	207-208	B-	1863	K3UWO/3	24-25	A-	675

CLASS C

W5IOU/5	526-527	B-	4968
W3HFY/3	313-314	A-	4563
W3DSG/3	167-168	A-	4158
K3HWX/3	143-144	A-	3888
WA6THL/6	224-225	AB-	3861
WA6HJH/6	224-225	AB-	3852
K9VPL/9	121-122	B-	3789
W3RQZ/3	118-119	A-	3578
W6QHP/6	164-165	A-	3551
W3IWO/3	107-108	A-	3492
W6PFP/6	222-223	A-	3362
W6GTG/6	144-145	A-	3281
WA6ORZ/6	142-143	A-	3254
K3GNM/3	99-100	A-	3240
WA6JJD/6	132-133	A-	3119
K8SEA/8	130-131	A-	3119
K6SBL/6	122-123	A-	3011



A classic FD shot shows K9DCJ/9—1B (B for bovine that is) who claims his operations received wide attention. That is, he ran up moo and moo contacts!



(left) It was cold on Bald Mountain, Oregon, but W7LJK kept warm for the Walla Walla Valley RAC, 3A—W7DP/7 (right) During the recent Ontario Division Convention held at Hamilton, Associate Council VE3RX (on the right) presented the Keith Russell Memorial Trophy to VE3BXN, president of the Scarborough ARC, top Canadian club scorers in the 1963 FD. (Photo courtesy VE3CSX)

W3BBB/3.....23-	A-	648	W3RVM/3.....1-	A-	351
K8CGW/8.....19-	A-	504	W3CYH/8.....1-	A-	351
K1NL1/1.....66-	B-	504	KNZC1/8.....1-	A-	351
K3EJZ/3.....39-AB-	B-	585	KNNCW/8.....1-	A-	351
W3CW/3.....18-	A-	581	K8HKJ/8.....1-	A-	351
K9SFO/9.....17-	A-	581	K8OLB/8.....1-	A-	351
W9CKZ/9.....16-	A-	581	W8GTO/8.....1-	A-	351
W3ZN/3.....17-	A-	567	K8JPC/8.....1-	A-	351
K3NVN/3.....17-	A-	554	K8SVN/8.....1-	A-	351
W8AHN/8.....14-	A-	527	K8SYX/8.....1-	A-	351
K8MHC/3.....13-	A-	513	K8LMP/8.....1-	A-	351
K9PBA/9.....38-	A-	513	K8RPS/8.....1-	A-	351
W8DOK/8.....38-	A-	513	K8TPO/8.....1-	A-	351
W8NCM/8.....37-	A-	509	K8TOL/8.....1-	A-	351
W8GMC/5.....41-	B-	504	W8TQR/8.....10-	A-	351
K8ZFD/8.....5-	A-	500	W8VSD/3.....25-	A-	338
K8TSL/8.....12-	A-	500	K8TWB/6.....36-	B-	321
W3KV/3.....11-	A-	486	K3NNE/3.....24-	A-	321
K2ISR/1.....14-AB-	B-	477	W8BKM/6.....28-	B-	252
K61QA/5.....24-	B-	474	W8ZHU/2.....28-	B-	207
W9NIO/9.....10-	A-	473	K8IGS/8.....25-	B-	207
W38AA/3.....7-	A-	432	K8OUC/5.....23-	B-	207
K8BPN/8.....5-	A-	432	W8TIL/9.....15-	A-	203
K8OJD/6.....31-	A-	419	W8EFT/9.....22-AB-	B-	203
W3PNW/3.....9-	A-	419	W8GDO/6.....20-AB-	B-	198
W8UDC/8.....5-	A-	405	W8GJS/6.....18-	B-	162
K7TPN/7.....19-	B-	396	K8SPJ/3.....11-	A-	149
W3UZE/3.....1-	A-	392	W8IRS/3.....11-	A-	149
W9OHD/9.....29-	A-	392	W8JFN/9.....7-	A-	95
K9TBF/9.....29-	A-	392	K8HHD/6.....8-AB-	B-	81
W8AVE/9.....29-	A-	392	W8MRQ/1.....8-	B-	72
W9QXO/9.....28-	A-	378	K9LIC/9.....1-	A-	68
K8VYV/8.....3-	A-	378	K8JCG/8.....3-	A-	68
K8CKR/6.....11-	B-	369	K8AYT/8.....3-	A-	41
K8AXC/8.....2-	A-	365	K9PPG/0.....3-	A-	41
K8ONA/8.....2-	A-	364	W8AWH/8.....2-	A-	27
K6PKO/6.....27-	A-	365	K8GRN/6.....2-	A-	27
W7VAB/7.....15-	B-	360	K8TRM/8.....1-	A-	14

CLASS D

W8AMR * 802, K5ILN 703, KZ5PA * 566, W2NSD/1 527, W8BR1 * 492, W6JUR * 421, K58NH * 120, K1RIP * 358, W9PR1 * 156, W6KG 268, W8FDD 244, W4ZRUD * 239, W5KWE 218, W86APY 136, K1PCF 132, W42DSR/2 31, W42VFD 28, W1MRQ 17.

CLASS E

K9RAL 1 889, W6UTS * 809, K9VRU * 702, K9ZGT 1 401, K9OJQ 1 395, K9WCE * 387, K5SDX * 368, W5AGCA 357, W4JTA 271, W48SZY 1 * 269, W82BDC 1 295, K8ZQS 1 213, W9JDJ 1 209, K4RDU 187, W3RNV 182, W8EFL 177, W42DHF 175, K3UM1 164, K2PTT 20 163, W8BNH 162, W8BHC 158, W4KSM 158, K5PTT 153, W2DRV 152, W8ANX 144, K1THQ 1 144, W41PMM 140, K8TYP 133, W4HRG 132, W1AW 1 129, K1QAL 127, W8QLY 126, W4ZICQ 120, W86PKL 1 119, W46SNA 112, W4HDS 111, W4KEY 109, W8EYV 108, W44CJP 104, VE3CBG 104, W8YKQ 100, K1EWL 91, W44BPE 91, K6VMD 90, W86SVY 88, W6GYM 87, W44JAQ 84, W4OABN 1 82, W9OCVY 1 81, W4LLX 2 79, W86KCM 77, W42PDU 76, W42PXT 1 74, W8PAWK/5 74, W8MSR 74, W45CBQ 73, W48CFJ 1 72, W8OJW 72, W4ZURD 50, K7CPG/7 48, W4ZZNR 47, W42WXL 2 65, W82BRO 65, W3CNS 62, K1VPN 64, K8RFY 60, K6IGW 60, W2TSF 57, K3J11 56, W8FWQ 56, WB2CGY 55, K3TEJ 51, K9GZZ 50, K8OQE 50, W5MCC 49, K9IYV 49, K9GDP 49, W85EMD 21 48, K7SGE 47, VE3BHF 42, K3MAH 40, W4HIC 37, W82GTY 1 36, W6YRN 36, W82EUL 36, W8EEN 1 36, K8CZH 6 35, K9ORC 35, W4OSG/3 35, W6D11 33, K9UCG 32, W8QLJ 32, VE3PHQ 31, W5ILT 28, K5MFA 28, W2HF 27, W82FV 1 26, W45CFJ 25, W1PL 23, W2EYV 23, K5EDH 21, W86DBB 20, K6KDE 20, K1TFU 17, W8LOK 17, W88NW 16, W9PAL 16, K3CIV 16, K6MHW 16, K2AZJ 16, VE3DZB 15, K2DBV 14, VE4ED 12, W4OCG 11, W82HBI 1 10, K1BDA 1 10, W8TKW 10, W45BVC 1 10, K87URU 8, W9GGA 8, W8WEG 7, W4EHL 7, K4BSK 6, K2NEXW 6, W3U1U 5, K8IESV 3, W85FRQ 1.

1 2 oprs. 2 K3NWX, W44DGH, oprs. 3 W6JVA opr. 4 K6s BFF KVD RUP, oprs. 5 7 oprs. 6 10 oprs. 7 W1NJL, W2NSD oprs. 8 5 oprs. 9 15 oprs. 10 K58 SNE SNI YDS, oprs. 11 6 oprs. 12 16 oprs. 13 4 oprs. 14 K9s YWS ZGT, oprs. 15 K6s WGF, W9VWZ, oprs. 16 K1s SDX YWL, oprs. 17 K2PVD, K3KRX, W8GCA, oprs. 18 W46s PFY SZY, W86KJ, oprs. 19 3 oprs. 20 K2PTT, W42DHC, oprs. 21 W3JZJ, opr. 22 8 oprs. 23 W44s ELL LAX, oprs. 24 W8CFJ, K8KMT oprs. 25 W46s WOA WXL, oprs. 26 ARRL thanks the following amateurs for submitting their logs for checking purposes: W1BNB/1, K1PQV, W42DAH, W2NHL, W8BS, W5PGG, W6UVP, W7CWN, W8CHX, W9YAC, K9VEJ.

Strays

Here are some of the hams who attended this year's international rally of the Wally Byam Caravan Club at Bemidji, Minnesota, where 2006 Airstream trailers congregated. Seated, left to right, are W8RK, W8AW (president), W8ATB (secretary), K7BKI, W8QBO, W8EFR, Standing (l-r.), W9BIM, W4ZIR, W2BZB, K3QFU, W1PCZ, W7IWC, W0WKS, W0IXB, and K0DYS. A Caravaneers' net is held the first Sunday of every month on 14,260 kc. at 1600 GMT.



Instantaneous Break-In With the Collins S-Line

BY H. ROMMEL HILDRETH, M.D.,* KØHZF

THERE is a natural reluctance to modify any of the fine commercial equipment available these days, so let me hurry to say that the modification I describe is merely to clip one end of one resistor underneath the bias-control potentiometer in the exciter power supply.

C.w. operation is enjoyed by a great many operators. Anything to improve our operating conditions adds to our pleasure in the crowded bands. A break-in system gives a real bonus, for it not only improves our operating efficiency but increases the fun as well.

Over the air, I find many operators who do not understand what the term break-in really

to terminate your calling instantly, and avoid "clobbering" the signal for others. Anyone who has ever used a break-in system will be most unhappy sending "blindly" as one must do without such a system.

Receiving Antenna

Before getting to the modification, let me mention first that a good t.r. switch is needed if one wishes to use the same antenna for sending and receiving. If one wishes to avoid the expense of a t.r. switch, he can use a separate receiving antenna. Even a few feet of wire under the rug works quite well, except for very weak signals. I use a Johnson t.r. switch.

Noise Interference

However, if one of the Collins S-line transmitters is used in its original state with either receiving-antenna system, there is considerable "hash" interference from the transmitter in the key-open condition which makes it difficult to copy weak signals. This noise occurs because the tubes in the final amplifier are not completely cut off, but draw an idling current of approximately 50 ma. The bias control in the Collins 516F-2 may be adjusted to reduce this idling current to 10 ma., or even less, but the hash seems to remain essentially the same unless the plate current is completely cut off. To accomplish this, more bias is needed than can be obtained by adjustment of the bias potentiometer.

If the owner will look at his schematic of the 516F-2 he will see that the bias-control potentiometer (R_9) has a fixed resistor on either side. One of these (R_8) has a value of 4700 ohms and connects to a diode rectifier. In the modification this resistor is replaced by a 5000-ohm potentiometer, R_1 in Fig. 1. An s.p.d.t. switch, S_1 , transfers the bias output lead to the arm of R_1 for c.w. operation. This permits increasing the bias to a value that will cut off final-amplifier plate current completely in the key-open condition. This change also increases the bias on the output tubes under key-down conditions. Therefore, to avoid a loss of power output, the bias should not be increased beyond the point where interference ceases. With proper adjustment, the noise can be eliminated with no reduction in output. Open-key bias is also increased on the keyed stage, V_5 , by about 10

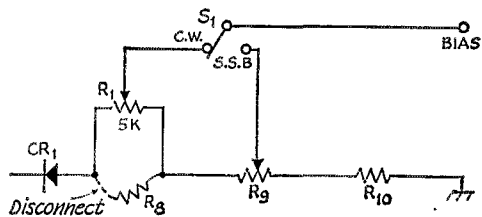


Fig. 1—Circuit revision in Collins S-Line units to suppress noise generation in the final amplifier. A 5000-ohm potentiometer replaces R_8 when S_1 is in the C.W. position. Circuit reverts to original with S_1 in the S.S.B. position. R_1 is a 2- or 3-watt linear control; S_1 is an s.p.d.t. slide switch. Other components are the original.

means. There is no such thing as "full" or "partial" break-in, and the word "instantaneous" was used in the title merely to bring attention to the subject matter. By definition I think we can agree that the most desirable break-in system is one in which the receiver is in instantaneous normal operation between each dot and dash, and completely silent during key-down conditions (except for any monitor note we may introduce). The operator not only knows what is going on over the air while he is sending, but he can be stopped instantly when the other operator presses his key for a moment. This type of operation is extremely useful in handling traffic, but is equally desirable in any type of QSO. In calling DX or another station on his frequency, you can usually hear him if he starts coming back to someone else before you have finished calling. This permits you

*711 Middle Polo Drive, St. Louis 5, Missouri.

volts, but the key-down bias on this stage remains unchanged because the key removes the fixed bias in the key-down condition. Switch S_1 returns the biasing system to its original state for s.s.b. operation.

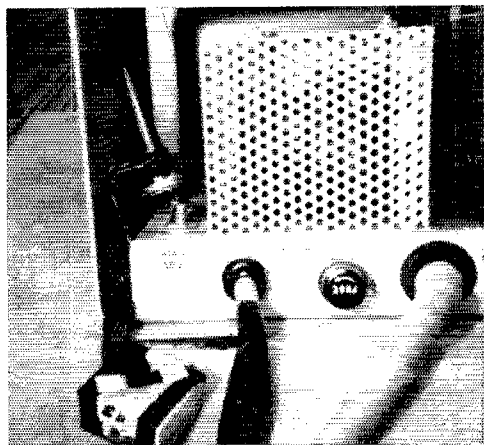
Physical Changes

If one removes the power supply from its cabinet and turns it over, he will see a carbon resistor that runs from one end of the potentiometer to the diode; this is R_8 . Clip it free at the diode end, and push the resistor aside a little. This can be resoldered if one ever wishes to revert to the original connections. Solder a piece of hook-up wire to the diode and another to the other end of R_8 . These two wires are led out through a nearby hole in the side of the chassis. I enlarged this hole to $\frac{1}{4}$ inch and put in a rubber grommet. If smaller wires are used, this enlargement would not be necessary. The wires should extend out of the hole about 4 or 5 inches, and are soldered across the ends of the 5000-ohm, 2- or 3-watt potentiometer, R_1 .

A small sliding s.p.d.t. switch (S_1) is mounted in a plastic box, such as those holding the small parts we buy for use around the shack. The leads from the switch enter the chassis through the same hole and are connected as shown in Fig. 1. The box should hang out of the cabinet about 2 inches so that it can be easily reached when switching from s.s.b. to c.w. The new potentiometer is laid alongside the chassis inside the cabinet after the adjustment is made. Insulating tape is wound around the solder points. The potentiometer adjustment will be described later.

Muting

I have often had other operators ask me how I can stand the noise of my own transmitter signal in the receiver when using break-in. Receiver muting during the key-down period is vital in



The auxiliary biasing potentiometer is tucked in alongside the chassis. The C.W./S.S.B. switch is in the plastic box in the foreground. The leads to the box are long enough to permit placing the switch in a spot convenient to the operator.

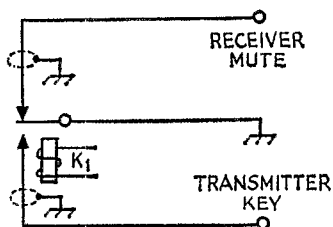


Fig. 2—Circuit used to mute the receiver.

a break-in system. I have known of some operators who turn down the receiver gain while transmitting. Of course, they miss the point completely. My keyer happens to be transistorized, so a keying relay was introduced. As one can see from Fig. 2, as the armature starts down, the muting contact is opened before keying takes place. I happened to have had an old EBY 10,000-ohm relay around the place, and it is excellent for this purpose. The spring is kept fairly tight, and the contacts quite close together so that the movement of the armature is small. With a 22-volt battery, the armature will follow very fast keying. (The battery life is nearly shelf life.) When making the connections be sure that the lead from the armature runs to both transmitter and receiver chassis as indicated.

A.G.C. Regulation

If the receiver a.g.c. is not turned off, the delayed release is long enough during fast keying to hold out the incoming signal. If your receiver is the 75S-1, it is necessary to short out R_{24} and its companion capacitor, C_{50} . A small sliding on-off switch is mounted in a piece of aluminum bent to a right angle about $\frac{3}{4}$ by $\frac{3}{4}$ by 2 inches long. This aluminum piece is mounted on the back of the housing of the v.f.o. light by the two long screws that are already there. The switch is reached by just lifting the top of the receiver. R_{24} is in the open and easily found, and is in the lead from the r.f. gain control. The wires are run through the opening alongside the dial, and no holes need be made in the chassis. Closing this switch turns the a.g.c. to "off" as in the 75S-3.

Tune-Up and Adjustment

Set the s.p.d.t. switch, S_1 , to s.s.b. and follow the usual procedure in tuning to some c.w. band. Check the idling current to see if it agrees with the manual recommendations. Some slight re-adjustment of the original biasing potentiometer may be necessary after replacing the 4700-ohm R_8 with the 5000-ohm potentiometer.

To switch to c.w., perform the following steps:

- 1) Set S_1 to c.w.
- 2) Replace the mute cable in the receiver with the leads from the relay.
- 3) Disconnect the high-frequency oscillator cable and use the high-frequency oscillator of the transmitter. This is necessary, otherwise a very strong c.w. calibration signal comes through. (This is not true with the 32S-1.) The transmitter

v.f.o. is used, but this is done merely by the frequency-control switch, and the cable does not have to be removed.

4) Turn the microphone gain to the far left. Close the VOX relay by tuning the VOX gain control to the left until the switch clicks, and also turn the anti-trip control to the left, otherwise the relay may open at times.

5) Adjust R_1 by watching the plate current and listening to the hash. Raising the bias potential too much will cut down the drive and output. Therefore, stop the potentiometer just at the point where the hash disappears. At this point

the drive should be normal and the output not reduced in the slightest. Lay the potentiometer inside the cabinet, for it needs no further adjustment.

6) Run up the microphone gain to where the grid meter needle moves on key-down, and you are on the air with full power.

There is an extra bonus for those who have the 30L-1 linear. Even though it has an idling current of 130 ma., there is absolutely no hash whatever when it is turned on. I have used this set-up for several months and hope others will enjoy the added pleasure I have gained. **QST**



California—The McClellan Amateur Radio Society will hold its annual Christmas party at the Sierra Oaks Country Club in Sacramento on December 19. A "happy hour" at 6:30 precedes dinner, prime ribs of beef, at 7:30 p.m. Total cost, including tax and tips, \$3.50. OMs and XYLs will exchange gifts under the Christmas tree. For more info and reservations, contact WA6TZZ, 4334 Kilcher Court, Carmichael, Calif.

Missouri—The MOARKY Hamfest, sponsored by the TRICO RC of Sikeston, Missouri, will be held on Dec. 1, at Rustic Rock Inn, Sikeston. Contact Earl Underhill, WA8DUQ, for more info.

New York—The annual dinner meeting of the Communications Club of New Rochelle will be held at Cesario's Restaurant, December 28. Contact WA2TEQ, dinner chairman, 245 Bronx River Road, Yonkers, for details.

Pennsylvania—The Delaware Valley ARC's annual dinner-dance will be held November 30. Reservations and information from K3SZK, 807 West Penn Pines Blvd., Aldan, Clifton Heights, Pa.

Pennsylvania—The South Philadelphia Amateur Radio Klub will hold a swap and shop plus auction, Jan. 5, 1964, at Childs School from 1 to 6 p.m. For more info, contact Ray Gianchetti, South Phila Amateur Radio Klub, Childs School, 17th and Tasker St., Philadelphia.



December 1938

... The new FCC regulations went into effect on Dec. 1, and QST carried the complete text of the changes in apparatus requirements, operating practices, and licensing procedure.

... The FCC began assigning special identifying prefixes to be used in amateur calls in regions outside of the U.S. and the new prefixes of the Pacific Island possessions were listed in "How's DX?"

... The Egyptian Radio Club (W9AIU) led the FD scores for the second consecutive year with a score of 3708—an all-time high in Field Day scores at that time.

... Under the heading of IARU News, ZL2JQ, a visitor from New Zealand, gave his impressions of the differences between amateurs in his country and ours.

... Technical articles included a simple transmitter for portable or emergency work, a practical television receiver for the amateur, and 455-kc. quartz crystal filters with full-range selectivity.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1AXP, Vincent H. Chandler, Gorham, Me.
ex-K1PWW, Albert L. Capstaff, St. Thomas, Virgin Islands

W1RJL, George W. Swain, Portland, Me.
W1RYM, Lawrence M. Hagerthy, Scarborough, Me.
W2FCL, Albert Tatka, Clifton, N.J.
W2LI, Burt J. Toegel, Plainfield, N.J.
W2LMK, Joseph J. Roche, Wayne, N.J.
K2UHD, John F. Grover, Rockaway Beach, N.Y.
K3KLN, Joseph G. Fowler, Philadelphia, Pa.
W3LAH/W3OFM, Andrew Salitros, McKeesport, Pa.

W3LAJ, Chauncey A. Brown, New Castle, Pa.
W3NEA, Thomas H. Thomas, Dravosburg, Pa.
W4CCS, Clifford J. Moore, Sr., Bradenton, Fla.
W4VM, Roy L. Wells, Rocky Mount, N.C.
W5TFK, Ray F. Lucas, Thibodaux, La.
K5VDF, John E. Phillips, Jr., Lafayette, La.
W6ASY, Roe H. Plimpton, Arcadia, Calif.
W6DWC, Frank H. Wallace, Vallecito, Calif.
K6EI, George A. Davidson, San Francisco, Calif.
K6GTG, William J. Loey, Arlington, Calif.
WA6HLA, Robert B. Sladek, Escondido, Calif.
W6OWN, Louis A. Watt, Ventura, Calif.
W8ZB, Clifford J. Dow, Pleasanton, Calif.
W8ZSE, Herbert R. Scott, Eureka, Calif.

W7CNG, Jay W. Peters, Carlin, Nev.
K7UR, Robert J. Schroeder, Scottsdale, Ariz.
W8RAM, Kenneth L. Marshall, Wickliffe, Ohio
W8UWF, August A. Gable, Wadsworth, Ohio
K9ASK, Philip J. Boening, Chicago, Ill.
K9BFT, Thomas J. Elder, Chicago, Ill.
W9LIM, Merrill P. Stevens, Pennville, Ind.
W9VDL, Roger B. Russell, Madison, Wis.
W0FLO, Leo J. Hemen, Whitney, Nebr.
W0TTO, Clarence W. Anderson, Laurens, Iowa
KH6EC, Percy S. Gray, Honolulu, Oahu, Hawaii
VE3DLR, Ian Carr, Toronto, Ont., Canada
ex-VE3DR, Craig Hutchison, Toronto, Ont., Canada
VE3JN, George Richardson, London, Ont., Canada
VE4QI, John S. Gray, Winnipeg, Manit., Canada
VS8AE, Patrick J. O'Brien, Hong Kong
ZS0CJ, A. M. Holtzhausen, Brits, Transvaal, Republic of South Africa

Changes of Address

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

Basics for Beginners

Antennas and Feeders

Part III—Beam Antennas; Power Gain

BY GEORGE GRAMMER,* W1DF

THE directive effects described in Part II¹ arise because the amplitude of the current changes throughout the length of the antenna, and because the timing or phase varies along the wire. As explained there, the energy radiated from all parts of the antenna combines in various ways in different directions. In some directions the combination produces a strong signal; in others the combination is weak. This raises a question: In those directions where the signal is strongest, is it stronger than it would have been if the antenna had simply radiated equally well in all directions?

The answer is yes. Suppose an antenna did radiate the same power in all directions.² (It would have to be so far from earth that reflections from the ground would be unimportant.) Imagine the antenna to be at the center of a spherical space some miles in diameter. If we could go all over the surface of this imaginary sphere measuring the signal strength from the antenna we

should find that at all spots it is the same. A sphere is hard to represent on a sheet of paper, so in Fig. 1 we've taken a slice through the center to show a plane cross-section. The radiating antenna is simply a point at the center of the circle, and the spacing of the radial lines (there are 36 of them here, drawn at intervals of 10 degrees) is a measure of the power distribution. It is important to appreciate that these lines do *not* represent rays from the antenna; the radiation is measured by the number of lines per unit angle. The more lines per degree of angle, the higher the intensity.

Now look at Fig. 2. The same 36 lines have been rearranged so that in some directions from the center the density is high (more lines per degree) and in others is quite low (fewer lines per degree). The *total* number is the same — an indication that the total power radiated by the antenna has not changed. But in some directions — up and down in the figure — the density per unit angle is greater than in Fig. 1. It is as though a more powerful transmitter, generating more lines per degree, had been put to work driving the antenna. In other directions the density is less — less power is radiated in those directions.

This, in broad terms, is the principle that

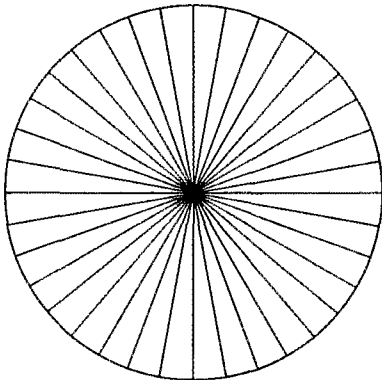


Fig. 1—In this drawing, the uniform spacing between the radial lines indicates that the radiation from an antenna at the center of the circle has the same intensity in all directions. If the figure is assumed to be a cross section of sphere, the antenna radiates equally well in any direction in the space surrounding it.

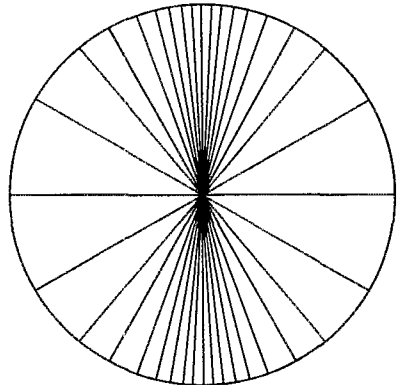


Fig. 2—The close spacing between the radial lines running more or less up and down represents increased intensity of radiation, while the wide spacing between those running in the general left-right direction represents low radiation intensity. This is one way of showing directivity, as contrasted with the pattern drawings given in Part II.

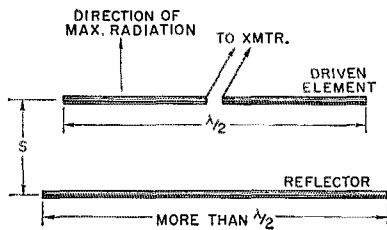


Fig. 3—A two-element parasitic beam. The lengths in wavelengths shown are to be understood to be electrical rather than physical lengths.

makes "beam" antennas possible. By one means or another, power is prevented from being radiated in one direction so it can be added to power radiated in a more favored direction. No new power is created; the antenna has no magic wand to wave. If a large concentration of power in a favored direction is wanted, that power has to come from a large area which will *not* be favored. The greater the power "gain" the more "sharp" the beam has to become.

There is a direct analogy to this in the focusing of light rays. A flashlight bulb out in the open doesn't seem to shed much light. But put it into a properly-shaped reflector, as in the ordinary pocket flashlight, and it throws a bright beam. The bulb isn't giving any more light. The reflector is simply taking what light there is and intensifying it. It does this by focusing the rays into a narrow pencil. The price paid for the "gain" in this beam is *less* light in all other directions.

The type of reflector used in a flashlight has to be very much larger than the wavelength, in order to do any good. It is practical at radio wavelengths of the order of a few inches, but becomes too large for amateur use in bands below about 1000 Mc. On the lower bands the focusing is usually done by combining the individual radiations from a number of dipoles. The waves from the dipoles are timed so that they add together when going in the desired direction, and tend to subtract (interfere with each other) in other directions.

Types of Beams

A dipole in such a system is called an **antenna element**. It may or may not be exactly resonant, depending on the kind of system. A combination of antenna elements is called an **array**. There are two general types of multi-element arrays. In one, all the elements are connected to the transmitter through a system of transmission lines. This is called a **driven array**. However, it isn't *necessary* that all elements be driven directly. If an element is close to and more-or-less parallel with a second element that does have r.f. power in it, some of the power in this second element will be coupled into the first through the electromagnetic field. There is a resemblance here to inductive or capacitive coupling between ordinary circuits. Elements that get their power by this means are called **parasitic elements**, and arrays in which they

are used are called **parasitic arrays**. One or more of the elements in a parasitic array has to be driven, of course; power has to be introduced into the system before any electromagnetic-field coupling can take place.

Besides multi-element antenna arrays there are several other types of beam antennas in use. Principal among them are various forms of **long-wire antennas**. These work on much the same idea as the multi-element types, but the "elements" are the half-wave sections of continuous wires operated on multiples of a fundamental wavelength.

The study of directive antennas is a whole field in itself.³ It will suffice for our present purposes to become a little acquainted with a type of beam that is widely used on the amateur bands from 14 Mc. up — the Yagi antenna.⁴

Yagi-type Beams

In its usual form, the Yagi antenna has a driven dipole, usually resonant, and one or more parasitic elements. The simplest arrangement is the **two-element beam** shown in Fig. 3. There is only one parasitic element. Usually it is a **reflector**, so-called because the energy it receives from the driven element bounces back to concentrate the radiation in the same direction that a reflector behind a flashlight lamp would concentrate it. This direction is shown in Fig. 3.

The power that a parasitic element picks up from the field of a driven element is practically all **reradiated**. Only a small fraction is lost in heating the resistance of the element itself — no more than in any dipole having the same ohmic resistance and carrying the same current. Thus, from a practical standpoint, all the power a parasitic element gets is used in enhancing the radiation of the system in one direction and tending to suppress it in others. What it does, and how well it does it, depends on how the parasitic element is tuned and on the spacing (in terms of wavelength) between elements.

A parasitic element acts as a reflector, at the spacings normally used, when it is tuned somewhat *lower* than the operating frequency. That is, it is made somewhat *longer* than an electrical half wavelength — about 5 per cent longer, ordinarily. The spacing *S* is usually about 0.15 wavelength. There are no magic figures here. Many values of *S* and reflector length will give good results. The two quantities are not independent; changing one will require changing the other for optimum results.

More than two elements can be used. When a third one is added it is usually a **director**, as shown in Fig. 4. This element helps the radiation along when it is placed in *front* of the driven element. To do this it has to be tuned *higher* than the operating frequency, at ordinary spac-

³ There are many books on the subject, among them *The A.R.R.L. Antenna Book*.

⁴ The antenna is more properly designated the "Yagi-Uda" antenna, after the Japanese co-inventors of the system. The original papers describing it in English were written by Yagi, which accounts for the fact that the antenna is nearly always referred to, at least in English-speaking countries, as the "Yagi."

ings. That is, it is made about 5 per cent *shorter* than an electrical half wavelength. The spacing, S_2 , between the driven element and the director is from 0.1 to 0.2 wavelength in most antennas. S_1 is about the same as in the two-element beam.

We don't need to stop with three elements. A sharper beam and greater gain can be obtained by adding more. The fourth and subsequently-added elements are practically always additional directors. Additional directors are usually a little shorter than the first one, and when a large number is used the spacing, for optimum results, tends to level off at about 0.2 wavelength. Antennas with many elements are practical only at very short wavelengths, because of the size of the structure required for a large number of elements. Three elements are commonly used at 14 Mc., three or four at 21 and 28 Mc., and four or more at 50 Mc., and above.

Beam Antenna Gain

The **gain** of a beam antenna is the ratio of the power radiated in the desired direction to the power radiated by some **reference antenna**, assuming the same power input to both. In amateur work it is understood that the reference antenna is a half-wave dipole. Such a dipole doesn't radiate equally well in all directions; its maximum radiation is along a line at right-angles to the direction of the antenna itself, as shown earlier in Part II. So the reference dipole must aim its radiation in the same direction as the beam, in figuring the gain of the beam. Also, it must be at the same height above ground, and otherwise be installed under the same operating conditions as those for the beam.

Since gain is a power ratio, it is usually measured in decibels. (Fig. 5 is a chart showing the relationship between power ratios and decibels.) Gains of up to 4 or 5 db. can be achieved in the two-element antenna, and up to 7 db. or so in the three-element. As a fraction of a decibel represents a power change that is not observable audibly (remember that one decibel is about the *least* detectable change) it doesn't pay to take too seriously attempts to squeeze out the last one-tenth of a decibel. Also, bear in mind that the same lengths and spacings will lead to the same results whether you make the antenna yourself or buy one ready-made. Once you've decided how many elements you'll use, it's sensible to forget about minor gain differences and concentrate on constructional features that will keep the antenna up in the air and operating throughout all kinds of weather.

Front-to-Back Ratio

Bearing in mind that power gain in one direction is obtained by taking a power *loss* in some other direction or directions, a little consideration will show that this power loss can be useful, too. In transmitting, it means that your signal is weakened in directions where you aren't trying to be heard; this reduces unnecessary interference to others. In receiving, it means that incoming signals from those unfavored directions will be

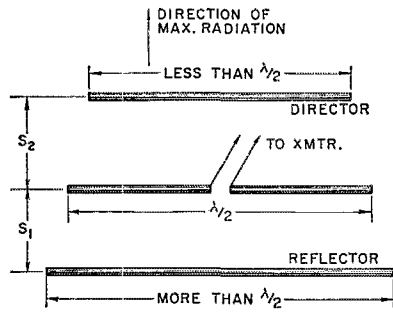


Fig. 4—The three-element parasitic beam. More parasitic elements—nearly always directors—can be added. The power gain in the favored direction is approximately proportional to the length of the antenna measured in the direction of the arrow, provided the elements are properly spaced and tuned.

reduced in strength, lessening interference with the signal you want.

It is customary to express the over-all improvement in this respect in terms of the ratio of the power transmitted (or received) in the desired direction to the power transmitted (or received) in the directly-opposite direction. This "front-to-back" ratio is also measured in decibels. In many ways this particular number is practically meaningless. For one thing, it will vary widely with a small change in direction, as well as with the upward angle at which energy leaves the antenna or is intercepted by it. But even more important, it is rarely the case that the worst interference comes from *exactly* the opposite direction to that you want. There are too many other points to the compass, most of them filled with stations which can give you interference, and with whom your transmissions can interfere.

With Yagi antennas the best ratio of this kind is usually the "front-to-side" ratio. The half-wave (or approximately half-wave) elements have relatively little radiation off their ends, so the front-to-side ratio can be quite high, and often very useful.

QST

Part IV of this series will appear in an early issue.

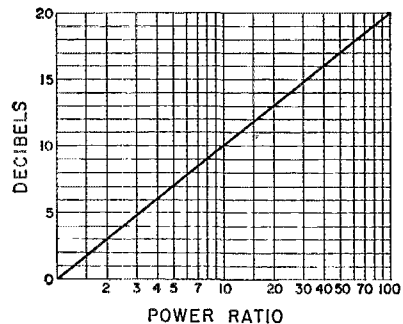


Fig. 5—Decibels and power ratio, for the range useful in antenna work.

"Maybe Next Year, Charlie"

BY JOHN G. TROSTER,* W6ISQ

REAL good, Charlie. You must be real excited about that Christmas tie. Green's a swell color, too."

"Naw, usual thing. Handkerchief, picture of Sandy Claws from kindergarten. Kinda disappointed, though — no tie. Not like Christmas.

"Oh, I nearly forgot. Junior got me a little radio gear. Nice, thoughtful boy. Kinda choked me up, him thinkin' about his old man like that.

"Really don't know exactly how he got the idea, Charlie. We were just out for a leisurely stroll, us two . . . you know, man-to-man talk-and-walk and things. And we just happened to saunter by GOFARS . . . you know, the Goode Olde Friendly Amateur Radio Shoppe.

"Well, we're just standing there admiring the Christmas decorations in the windows and minding our own business, when all of a sudden I remembered I'd burned out a resistor the day before.

"Where? Where do you think, where? In my set, naturally, Charlie. Where else do resistors burn out? And what makes you ask where a resistor would burn out? — WHO, ME?

"So, in we go. But they didn't have my 7138-ohm resistor in stock. What? Yeah, 7138. Why? No! I calculate it out long hand. Quite particular about the things that go into my set and . . .

"Well, naturally, I was still under the influence of great disappointment when I wandered into the other room where GOFARS keep all the rigs and things.

"I was just absently tweeking knobs and snapping switches when I notice both Junior and me are lookin' at the same box. Turned out it was that tremendous new final we were talkin' about — yeah, the Scandahoovian Obliterator.

"Well, maybe Junior had noted my apparent and keen unhappiness about the resistor. Can't really say how it happened, just one of them things, Charlie. The lad didn't say a word, just pointed and nodded, and kinda smiled . . . 'knowingly,' I guess you'd say.

"Sure I knew what he meant, but I didn't let on.

"Naw,' I said, 'Junior, I already got a big Paralyser, just two years ago — remember? So, I couldn't very well use this Obliterator here . . . ahhh . . . this one here with the built-in supplies, easy terms, only 23 pounds, easy terms,

easily driven by my moderately-powered KW Paralyser with the matched chartreuse panels, easy terms . . . naw, son, save your money.'

"Kinda got me, Charlie. Him wanting to get me that thing.

"But ya know, he wouldn't give up. Just kept pointing. I'd shake my head 'no,' and he'd nod 'yes,' and gimme that old megawatt smile.

"How ya gonna pay for it, son?' I say. And ya know what, Charlie? He wants me to take it outa his allowance and deduct it therefrom! Plus a paper route he'd get, and do odd jobs after . . . ahhhh . . . no kidding, Charlie, ya ever heard anything to equal it? Makes me feel a little, well, choked up about the boy.

"Well, of course, this was too much for a young fella to take on for just a plain old Christmas present for the old man. But how could I say no, under the circumstances, that is? So, I insisted on helping out . . . like putting up the old Paralyser on trade.

"Hey, Charlie. Gotta QRT. Here comes Marge. — Sooooooo, Charlie, old boy . . . my friend, Charlie . . . ah . . . we've had a nice family Christmas here. Yeah. Always real nice to have the kids

home at Christmas time. You know, when a fella gets on a bit in years . . . well, now . . . what do ya know, Charlie, here comes my charming XYL, Marge. Maybe Marge would like to say Merry Christmas to ya before we sign off, Charlie."

"Yes, Jack, I think I will. Pass the mike . . ."

"Ok — don't drop it. Stay about 8 inches . . ."

"Charlie, I've been monitoring some of this interesting conversation about how this purple Obliterator just *happened* to materialize on the table here."

"It's chartreuse, Marge, and Junior's a fine boy."

"And I must say, Charlie, I agree absolutely about how nice it is to have the kids home from school . . ."

"Well, Marge, for once . . ."

"But just to keep the log book straight, Charlie, Junior's oldest sister made it home for Christmas — all the way from kindergarten!"

"Purely academic, Marge. A figure of spee . . ."

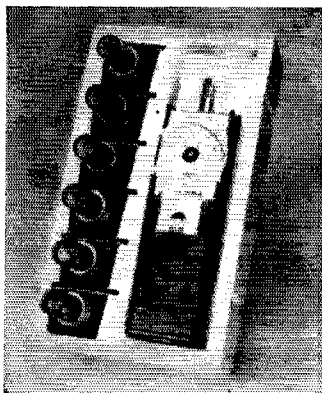
"But this year Charlie, the OM really fractured his crystal. Imagine trying to parlay a baked condenser into a Staggering Obliterator —



* 45 Laurel St., Atherton, Calif.

(Continued on page 170)

• Recent Equipment—



Waters

"Little Dipper"

SEVERAL transistorized dip-meters have been described for do-it-yourselfers in past issues of *QST*,¹ but there are some things that give the commercial models extra attractiveness — features that just can't be duplicated by the home constructor with simple hand tools. The Water's Little Dipper is an example.

The first thing one notices is the rugged stainless-steel, wrap-around case. It makes the instrument look and feel like the proverbial battleship, yet it is light in weight and easy enough to handle with one hand, and that includes the ability to tune the frequency dial and the SENSITIVITY control. Another feature that catches the eye is the linear calibration — there's no crowding near one end or the other of the scale. This is accomplished in the oscillator circuit by using a tuning capacitor with specially shaped plates.

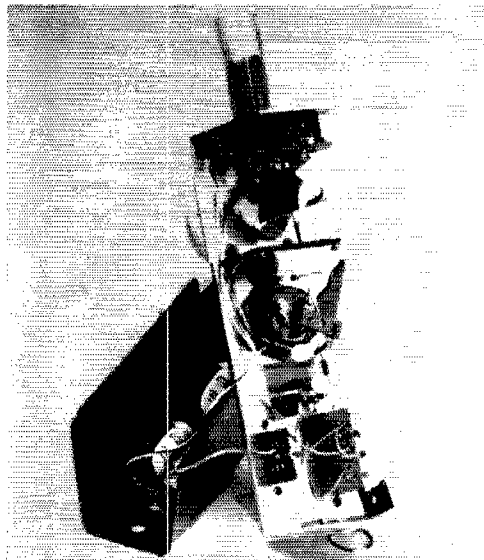
It's quite a surprise when one of the coils is removed from its socket in the Little Dipper: out comes the coil, and out comes the frequency-range scale, too! Each coil carries its own calibrated scale. When the coil is plugged into the unit, the scale slides beneath the clear plastic tuning dial.

Electrically, the Little Dipper has some interesting features, too. For optimum feedback and operating voltages in the r.f. oscillator circuit, resistors and capacitors are included in the plug-in coil assembly for each frequency range. Good electrical contact is insured between the coil and the oscillator circuit, even after repeated coil changing, by the use of gold-plated fork-like hermaphrodite connectors. The unit also has a built-in, 1000-cycle tone generator that can be switched to modulate the r.f. oscillator.

A diagram of the Little Dipper circuit is shown in Fig. 1. Inductance L_X , capacitance C_X and resistance R_X are the constants that are part of the plug-in coil assemblies. Q_1 is a selected r.f. transistor, used in a modified Colpitts oscillator circuit. The emitter bypass capacitor, C_X , and resistor, R_X , are for oscillator feedback and bias,

and have been chosen for best oscillator operation for each tuning range. Seven frequency ranges cover 2 to 230 Mc. The ranges are 2 to 4 Mc., 4 to 8 Mc., 8 to 16 Mc., 16 to 32 Mc., 32 to 64 Mc., 50 to 110 Mc., and 100 to 230 Mc. The frequency accuracy of the instrument is rated at plus or minus three per cent. The indicating meter is calibrated with a 0 to 10 scale.

Output from the r.f. oscillator, Q_1 , is rectified by the diode CR_1 . The d.c. output is used to bias the base of the d.c. amplifier, Q_2 . A 100-microampere meter in the collector circuit of Q_2 measures the collector current. The d.c. amplifier gain is controlled by the SENSITIVITY control, R_1 .



This view of the Little Dipper shows the penlight-cell power supply mounted on the stainless-steel case cover. Also visible is the dip oscillator's r.f. section (top) with the shaped-plate capacitor that gives straight-line tuning over the various ranges of the oscillator. The center section of the chassis has the indicating meter and the transistor d.c. amplifier. Sensitivity control, on-off switch, and function switch are at the bottom of the chassis in this photograph. The printed-circuit audio oscillator is on the phenolic board just above the meter.

¹ Campbell, "Modernizing a Transistor Dip Meter," *QST*, May, 1963; Gunderson, "Transistorized Auditory Grid-Dip Meter," *QST*, August 1961; Neben, "A Transistorized Grid-Dip Meter," *QST*, June 1958.

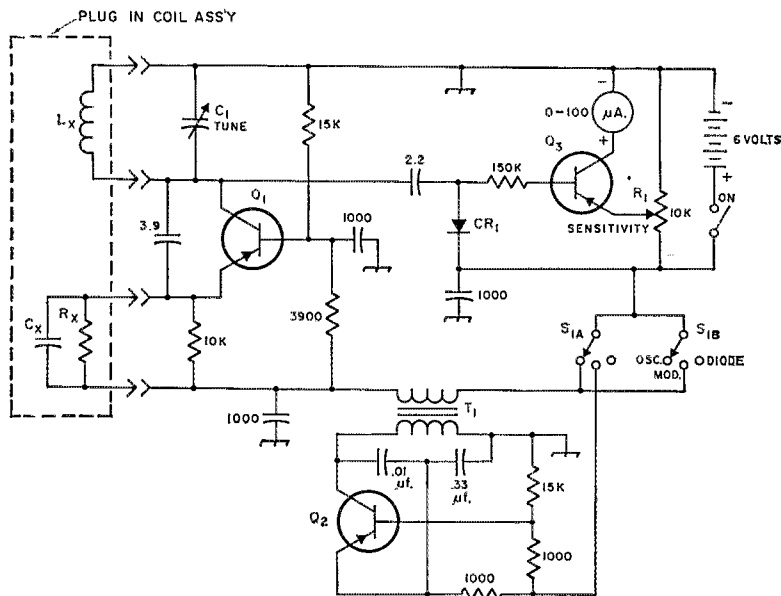


Fig. 1—Circuit diagram of the Waters Little Dipper. Except as indicated, capacitance is in picofarads. Resistances are in ohms.

When the switch, S_1 , is positioned to **MODE**, power is disconnected from Q_1 but remains on Q_2 . The instrument may then be used as an absorption wavemeter. Energy picked up by the plug-in coil is rectified in CR_1 and applied to the base of the d.c. amplifier, Q_3 .

The 1000-cycle tone oscillator uses transistor Q_2 in a Colpitts-type circuit. Transformer T_1 acts as the inductance in the tone-oscillator tuned circuit and also couples the audio output to the r.f. oscillator circuit. Modulation percentage is rated at 25 to 40 per cent.

Power for the Little Dipper is obtained from four penlight cells. Battery life is in the neighborhood of 300 hours.

The instrument is especially convenient for field use where there is no mains power. A 3 $\frac{1}{4}$ -inch diameter ring riveted to the case makes it easy to haul the meter atop a tower for beam measurements and the like. Alternatively, it can

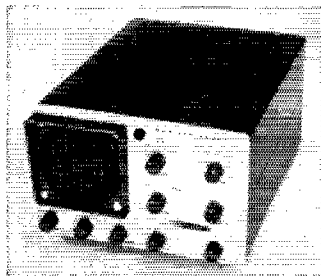
<p>Waters Little Dipper</p> <p>Height: 2$\frac{1}{2}$ inches. Width: 2$\frac{1}{4}$ inches. Depth: 7 inches. Weight: 1 pound, 6 ounces. Power Requirements: 6 volts (supplied by four penlight cells). Price Class: \$130. Manufacturer: Waters Manufacturing, Inc., Wayland, Mass.</p>
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be clipped to the user's belt for easy transport to some difficult measuring spot.

The Little Dipper, with its seven coils, comes packed in a featherweight expanded polystyrene case, which is handy for storing the instrument. However, exercise caution when removing the Dipper from the case in a high wind; the case weighs only 3 $\frac{1}{2}$ ounces! — E. L. C.

Heathkit HO-10

Monitor Scope



THE unique advantages of the oscilloscope for many kinds of tests and measurements are so well established they need no discussion. *But*, for routine testing and monitoring of transmitters and receivers an assortment of auxiliary gadgets,

ranging from r.f. pickups to tone generators, has to be supplied before the scope can be used. A natural result is that too many scopes sit on the ham-station shelf most of the time, getting dragged out and put to use only on rare occasions.

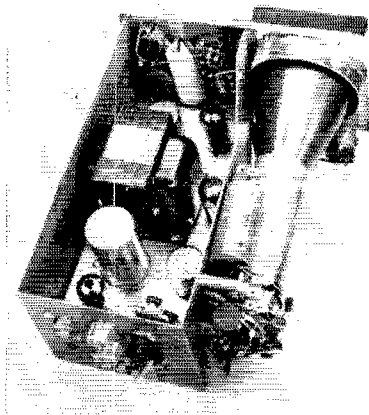
The Heath HO-10 Monitor Scope has all the needed accessories in one package. The r.f. output of your transmitter runs in one coax receptacle and out another, and with that simple connection a good deal of routine monitoring can be done. More thorough testing may take a little more effort: minor additions may have to be made to the transmitter or receiver, but these offer no technical problems, and the mechanics should be simple in practically all cases.

The HO-10 is set up for the following: (1) wave-envelope pattern display of either voice or c.w. signals, (2) trapezoidal-pattern display of linear-amplifier operation, (3) trapezoidal display of a.m. signals, (4) wave-envelope display of received signals, and (5) RTTY cross patterns. For (1) and (4) there is a built-in sawtooth sweep generator and horizontal deflection amplifier. For (2) there is a detector which rectifies r.f. from the transmitter's driver stage to provide an audio signal used as a horizontal sweep. For (3) a small amount of audio voltage must be taken from the output of the transmitter's modulator and applied to the horizontal amplifier in the Monitor Scope. A tone generator supplies the microphone-level audio signals needed for making either one- or two-tone tests.

Circuit Lineup

The various sections of the HO-10 are shown in Fig. 1. There are six tubes, including the cathode-ray tube, but this doesn't mean much in relation to circuit complexity because most of them are multiple-unit types; there are actually 12 tube functions, plus some semiconductor rectifiers in the power supply.

The tone oscillator, V_4 , uses a 6J11 Compactron containing two pentodes, each of which is a phase-shift oscillator. One has a nominal frequency of 1000 c.p.s.; the other is on approximately 1700 c.p.s. The former can be used alone, for tests requiring a single tone. The outputs of the two are combined when a two-tone signal is needed. There is no internal connection between these oscillators and the rest of the scope; they



The cathode-ray tube socket in the Heathkit HO-10 is mounted on the side of a shield which surrounds the chassis. R.f. and a.f. connections, together with the r.f. attenuator switch, are mounted on the rear wall of the shield. A cutout in the back of the cabinet gives access to this chassis wall.

are there for the sole purpose of providing a microphone-level signal for the audio system in the transmitter. The nominal output voltage is specified as 15 millivolts; whether this is r.m.s. or peak is not specified. In the kit we assembled, the voltage turned out to be just 15 millivolts, peak. Most phone transmitters probably have enough audio gain to work from this level, although we did run across one that needed about twice as much to give full modulation.

The sweep generator uses two triodes of a 6C10 Compactron as a free-running multivibrator sawtooth oscillator. The third triode in the same bulb is the horizontal amplifier, which furnishes the deflection voltage for the c.r. tube. The sweep frequency is rated as adjustable between 15 and 200 cycles, but this is probably subject to some variation since in our kit the range turned out to be 9 to 150 cycles. There is no provision for synchronizing the sweep rate with the signal being observed. Except in the one case of ob-

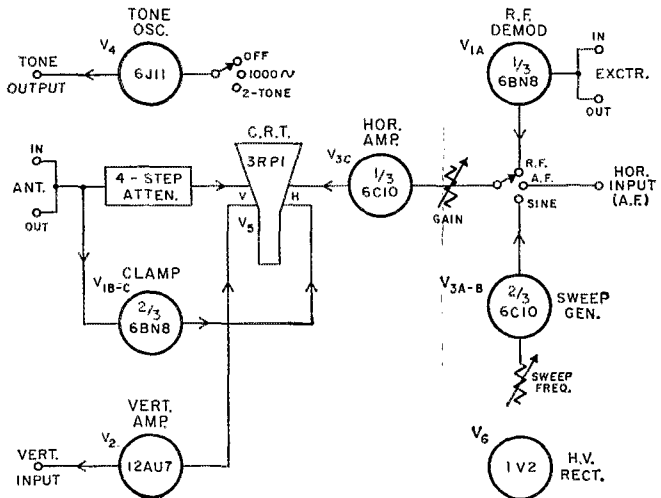


Fig. 1—Block diagram of the Heathkit HO-10 Monitor Scope.

servicing amplitude-modulation patterns, synchronization would not be particularly useful. However, a.m. patterns can be "held" for long-enough periods to judge signal quality, if the sweep-frequency control is adjusted carefully enough.

The r.f. demodulator used in linearity checks is one diode of a 6B8S. The circuit is that of the conventional diode detector. In the r.f. position of the function switch the rectified output is applied to the grid of the horizontal amplifier.

There are a couple of interesting features in the r.f. feed to the vertical plates. One is the four-step attenuator between the deflection plate and the connector into which the coax from the transmitter is plugged. The voltage in matched 50-ohm line from a high-power transmitter is too high for direct use, so the attenuator cuts it down in a 2-to-1 (6 db.) ratio in each step — ample range to handle a kilowatt transmitter. The minimum transmitter-power operating level, with the attenuation cut out, is rated at 5 watts. We were unable to go below 10 with any transmitting equipment immediately available, but at that level a quite usable pattern was obtained. The capacitance shunted across the line is quite small and does not represent an appreciable capacitive load on the 50-ohm line at frequencies up to 100 Mc. or so. Thus the response is substantially flat below that frequency and a tuned input circuit is not needed.

Spot Clamp Circuit

Another item of considerable interest is the "clammer" circuit used to throw the cathode-ray spot off the screen when there is no signal input to the plates. Such no-signal periods occur during receiving, when the transmitter is off, and in the momentary silences between words in s.s.b. transmission. If the trapezoidal pattern is used for monitoring the transmitter about the only way to eliminate the spot, and thus avoid burning the phosphor, is to cut back on the intensity control, in most scope setups. This is a nuisance since it has to be done manually each time the transmitter goes off the air.

The details of the HO-10 circuit are given in Fig. 2. The plate-cathode circuit of V_2 is connected between one horizontal plate and ground, but when the clamp switch is off the cathode is open and the tube has no effect on the centering voltage at the c.r. tube plate. On closing the

switch, the tube takes plate current, upsetting the centering and throwing the spot off the screen. However, when the transmitter comes on some of its r.f. output voltage is rectified by V_1 , making the plate end of the 3.3-megohm resistor negative to ground. This biases V_2 beyond cutoff and the spot returns to its normal position on the tube face. The time constant of the clamping operation is determined by the 100K resistor and 0.22- μ f. capacitor. It seems likely that this or a similar arrangement could be adapted to conventional oscilloscopes.

Other Details

The vertical amplifier, V_2 in Fig. 1, is used in conjunction with the receiver for displaying incoming signals. It has substantially flat response up to 500 kc. and is thus suitable for working out of 455-ke. and lower-frequency i.f. amplifiers. Coupling to the last i.f. plate or grid through a small capacitor will give enough voltage for full-screen deflection from the average receiver.

The power supply uses a transformer having two heater windings — one for the 3RP1, the other for the rest of the tubes — along with 220-volt and 1200-volt secondaries. The former has silicon diode rectifiers for full-wave voltage doubling, giving two d.c. output voltages, 180 and 580. The high voltage is rectified by a 1V2; after filtering, the d.c. voltage for the c.r. tube is 1550, negative with respect to chassis.

We did not find this one of the easier Heathkits to assemble, as there are quite a few parts and a good deal of wiring to fit into a small space. Also, there are several hard-to-get-at spots where soldering has to be done, if the sequence given in the assembly manual is followed. At times, a miniature soldering tip is almost a necessity, although by using care we managed to get through it without burning any insulation off already-installed wires, using a regular 50-watt iron. Assembly and wiring took a shade under 13 hours, but running through the post-assembly test procedure took only 30 minutes. After that the scope was ready for use.

As we said at the outset, the HO-10 has everything needed for ordinary transmitter testing and monitoring. We found it just about the most convenient instrument imaginable. The designer of the kit deserves a lot of credit for having a real "feel" for ham needs in this field. Let it be understood, though, that the kit was designed for this

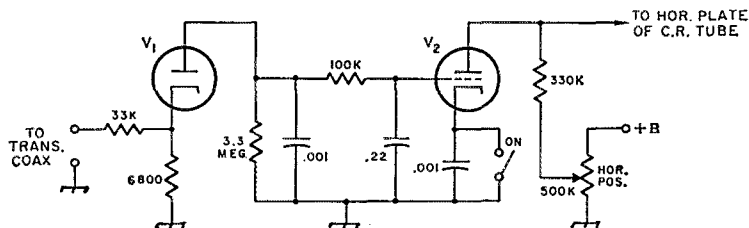


Fig. 2—Clamp circuit for moving the cathode-ray spot off the screen when there is no vertical-deflection voltage. Resistances are in ohms; capacitances are in μ f. R.f. voltage from the transmitter is rectified to develop cutoff voltage for V_2 , removing the clamp on the horizontal centering voltage. Any tube diode may be used at V_1 , and any high- μ triode at V_2 .

Heathkit HO-10 Monitor Scope

Height: 5¼ inches.

Width: 7¾ inches.

Depth: 11 inches including knobs.

Weight: 8¼ pounds.

Power Requirements: 105/125 volts a.c.,
50-60 c.p.s., 35 watts.

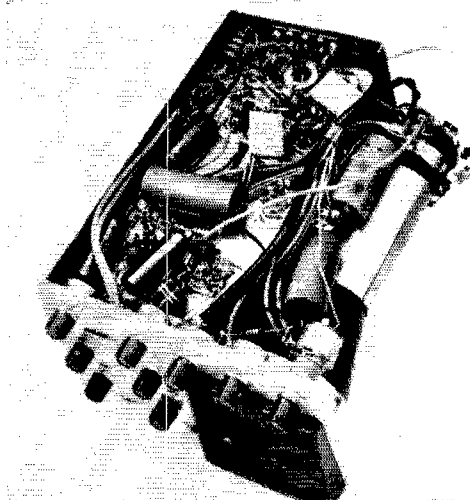
Price Class: \$60.

Manufacturer: Heath Company, Benton
Harbor, Mich.

specific job, and it is not the equivalent of a conventional scope for general measurements. It also has a few characteristics that would not be desirable in a general-purpose scope, among them a certain amount of hum that shows up under some conditions, and some trapezium distortion or "keystoning" that accompanies the essentially single-ended deflection-plate connections. Neither of these seriously affects the information to be obtained from the displays.

The manual accompanying the kit has complete instructions for its use, including a great many sample patterns for various types of signals and receiver bandwidths. The treatment here, in our opinion, is excellent.

Anyone who assembles this kit and doesn't use it for receiving as well as transmitting will be missing a free education in the way to use a



Bottom of the Monitor Scope. Each of the tube sockets has a rather extensive collection of parts mounted on and around it. Wiring to the c.r. tube mostly goes through a cable clamp on the shield wall near the rear in this view.

receiver. The amount of flat-topping on phone signals that can be eliminated just by using the receiver gain controls properly will be amazing to the operator who is ambitious enough to turn a few knobs.

— G. G.

• Technical Topic

The New Breed

HERE at Headquarters we would be derelict if we failed to report repeated evidences of a mutation within the amateur ranks. We have seen traces of it occasionally through the years, but in the past few months the frequency of confirmed observations has increased several thousand per cent.

The mutants have been classified as *orthograph-erimaniack*¹ and the syndrome is consistent. A letter is received, saying, "I enjoyed the description of the beam-deflection mixer circuit, but when do we get the details? I want to use it in my Goosey II receiver." Or, "If you're going to use up four pages letting some guy blow his horn about how good a noise-silencing system is, without giving any dope on it (so I can put it in my Martini F-line rig), make the guy buy a couple of pages of advertising!"

Examine the evidence and observe the pattern. *QST* was accused of merely reporting the existence of something new and desirable, of giving no details. Nothing could be further from the truth. In the articles in question (by W2PUL, in September and October, 1963), enough information was given to enable anyone with a reasonable technical background to start building similar devices. Signal levels were given, block diagrams of systems were provided, and schematic diagrams of pertinent details were shown — right down to operating voltages, tube and transistor types, and bandwidths.

For those mutants in our midst who have not yet penned their "you-done-us-wrong" letters, let us point out a few facts of life about "technical" arti-

¹ From "orthograph-erimania," literally, "exaggerated love for spelling it out."

cles. They take two forms. One so-called technical article gives the number of turns, a careful description of the parts locations, a blow-by-blow description of the cooling of the soldered joints, and a tabulation of the desirable voltages and currents. It is about as technical as a good kit instruction book; a reader can build the unit, get it working, and know no more than when he started. These articles are very popular, and quite obviously have their place in amateur radio or any other hobby.

The truly technical article, at *QST* level, is one that reports and explains a new technique or approach, gives enough details to allow a competent radio amateur (not necessarily an engineer) to start off on his own. These are "idea" articles, not nut-and-bolt how-many-turns accounts of something that may have been done many times before in almost the same way. Ask one of your old-timer friends (who built his own s.s.b. gear before any was commercially available) to tell you whether or not everything was spelled out for him! Or go way back, before the big influx of commercial gear, when a ham's rig was a composite of the published ideas that attracted him most, and no two rigs were exactly alike.

QST will continue to print a wide variety of "technical" articles, from nut-and-bolt to idea and back again. But, please, don't insist that, to qualify for publication, an idea article must be a nut-and-bolt description universally applicable to all existing equipment. That's a little like criticizing *Road & Track* for describing a new Mercedes-Benz fuel-injection system without telling you how to bolt it on your Edsel! — B.G.

Signal Checking with Phone-Bandwidth Receivers

Some Pitfalls

and How To Avoid Them

BY GEORGE GRAMMER,* W1DF

It's easy to put the wrong interpretation on what you hear on a phone-bandwidth receiver. Satisfactory checking of signal bandwidth is possible, but only if you know exactly what's going on.

An earlier article on using the station receiver for checking the bandwidth of transmitted signals¹ advocated the use of a high degree of selectivity of the "peaky" type, such as can be obtained from an old-style sharp crystal filter or a Q multiplier. Many current receivers don't have this kind of selectivity, but instead offer a 2- or 3-ke. flat-topped bandwidth intended for s.s.b. reception. This makes it harder to determine the actual band occupied by the signal.

Not every owner of such a receiver is aware of what is going on. Figs. 1 and 2 are attempts to show arrested-motion pictures of receiver tuning with two different bandwidths. The same signal — one having all of its emission confined within a 3-ke. band — and the same total tuning excursion are used in both figures. In Fig. 1 the receiver bandwidth is assumed to be extremely small (perhaps 50 cycles), while in Fig. 2 the bandwidth is 3 ke. In both figures the skirt selectivity is shown to be ideal, in that the sides are infinitely steep. No practical receiver filter is that good, of course, but we can imagine one for the purposes of this discussion.

First, bear in mind that although the incoming signal occupies a fixed-frequency band, the superhet receiving process changes it to one that can be varied in frequency (in the i.f. region) by the h.f. oscillator tuning. Taking some actual numbers, suppose that the signal shown in Figs. 1 and 2 occupies the band between 3914 and 3917 ke. In these drawings the tuning dial is presumed to be calibrated in one-kilocycle steps. The intermediate-frequency region, also marked off in 1-ke. steps, is represented by the horizontal line on which the receiver bandwidth and signal bandwidth are indicated by rectangular blocks. Zero on this i.f. scale is the center frequency of the receiver's passband.

This passband is very narrow in Fig. 1, as represented by the two lines close together. In Fig. 2 it is 3 ke., and so extends 1.5 ke. either side of the center frequency — that is, the band to which the receiver will respond lies between -1.5 ke. (1.5 ke. below the i.f. center frequency) and $+1.5$ ke. (1.5 ke. above center). Although signals on intermediate frequencies outside these limits

won't be heard, because they are outside the receiver passband, the i.f. scale is extended beyond them to show where the signal lies in relation to the tuning-dial setting and the receiver passband.

Razor-Sharp Selectivity

In Fig. 1A, the dial is shown initially set at 10 on the scale, meaning that the receiver is tuned to 3910 ke. in this example. The signal, being between 14 and 17 (dropping the 39 prefix for convenience), is well outside the receiver's passband and is not heard. Its nearest "edge" or frequency component is 4 ke. away, if we neglect the small width — 25 cycles either side of the center frequency — contributed by the assumed 50-cycle bandwidth. Turning the receiver dial clockwise makes the signal move in the direction of the arrow.

As the dial is turned, the edge of the signal band will approach the receiver's passband, and will reach it when the dial setting is 14. Fig. 1B shows the dial at 15, where the leading edge of the signal band has already moved one ke. beyond 0 on the i.f. scale. The signal continues to move past the receiver's passband as the dial is turned; Fig. 1C shows its trailing edge almost there, the dial being set at 16.5. There is only a 500-cycle segment to go before the signal passes out at 17 on the tuning dial. Eventually, as at D, the signal will be well beyond the passband and nothing further will be heard from it. Here the dial is set at 19 and the trailing edge of the signal is 2 ke. away from the receiver's passband.

Note that the signal first came in at 14 on the dial and went out at 17. The receiver showed the signal bandwidth to be 3 ke., which it actually is. A "sharp" receiver like this makes a good spectrum analyzer; it can examine the signal in fine detail and spot the frequency components that actually exist.

Phone-Width Passband

Now consider Fig. 2. Here again the tuning starts with the dial at 10 and the signal outside the receiver's passband. But not as far out as in Fig. 1; in that figure the leading edge of the signal was 4 ke. away. In Fig. 2A it is only 2.5 ke. away. In this case, turning the dial only 2.5 ke. will bring the edge of the signal just to the edge of the receiver's passband; that is, the signal will

* Technical Director, ARRL.

¹ Grammer, "Looking at Phone Signals," *QST*, December 1962.

just start to get into the passband when the dial setting reaches 12.5. In Fig. 2B the dial has gone a little farther, so the signal has penetrated 500 cycles into the passband. At this point the dial setting is 13, a setting at which the signal was still inaudible in Fig. 1.

In Fig. 2C, the trailing edge of the signal is still in the passband by 500 cycles, the dial setting being 18. In Fig. 1 a dial setting of 18 already would have moved the same signal a kilocycle *outside* the receiver's passband. But in Fig. 2 the signal will just leave at a setting of 18.5, and at a setting of 19 it will be only 500 cycles out, as shown by Fig. 2D. Since the signal first became detectable at a setting of 12.5, and did not disappear until the dial reached 18.5, the total bandwidth as indicated by the receiver is 6 kc.

In other words, in tuning through a signal what is actually observed is the *bandwidth of the signal plus the bandwidth of the receiver*. To get the signal bandwidth alone, the receiver passband has to be subtracted from the observed bandwidth.

If the signal bandwidth is extremely narrow — an unmodulated carrier — it would correspond to only one edge of the signal shown in Figs. 1 and 2. The leading edge at A in the figure, for instance, would be a line without width at -4 on the i.f. scale, equivalent to 14 on the tuning dial. Tuning such a signal through the receiver's

passband would show response beginning at 12.5 and ending at 15.5 on the dial — just the bandwidth of the receiver. In other words, *the minimum signal bandwidth that a receiver can show is equal to its own passband*.

Practical Selectivity

The ideal straight-sided receiver passband is not realized in practice. The sides taper off — quickly if the receiving filter has a low “shape factor”; more slowly with a larger one. Fig. 3 shows a receiver selectivity curve that might be typical of a rather good intermediate-frequency filter, one having a shape factor of 2.5. That is, the bandwidth at 60 db. down is 2.5 times the bandwidth at 6 db. down. The latter is the “nominal” or rated bandwidth of the filter, and in the illustration is 3 kc.

In being moved through the passband by the tuning dial, a given signal is going to appear sooner and disappear later than it would with the ideal passband. Fig. 3 shows the same signal as used in Figs. 1 and 2, with the tuning dial set at 19. This corresponds to Fig. 2D except that the receiver passband is not the ideal one of Fig. 2 but is a practical one having sloping sides, although the *nominal* bandwidth is the same.

Any signal components that fall inside the receiver's passband will be heard, attenuated by the slope of the passband. In Fig. 3, components

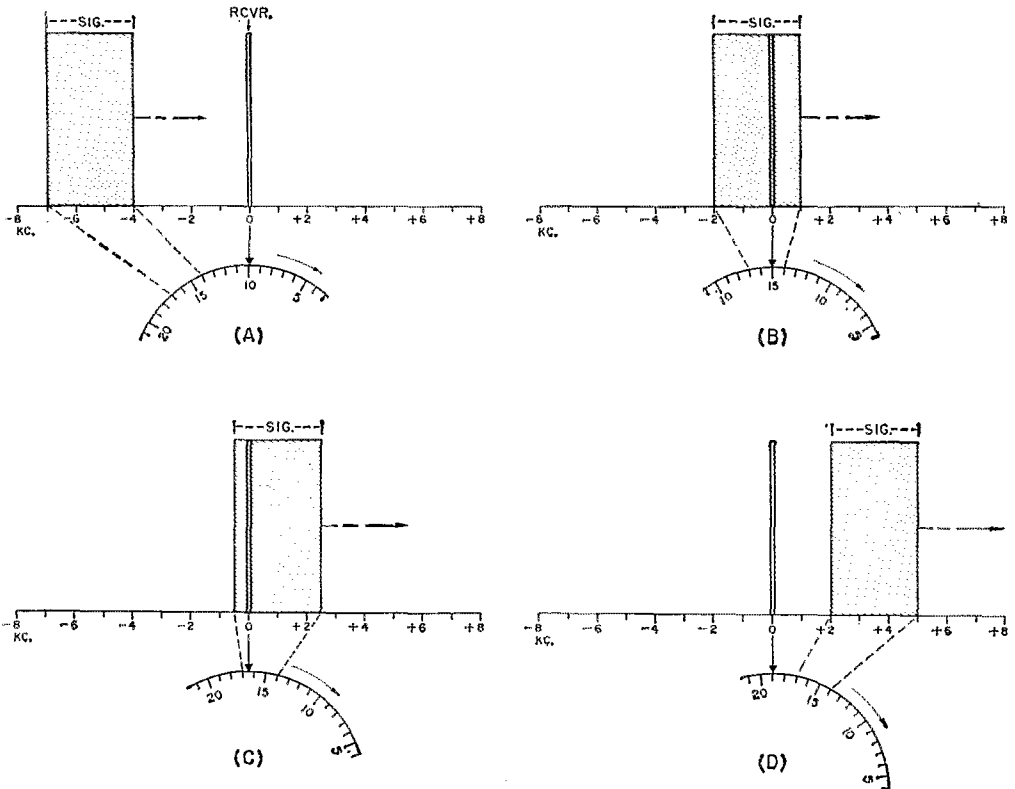


Fig. 1—Tuning a superhet receiver moves the incoming signal, converted in frequency, across the i.f. passband of the receiver. Four successive steps in the tuning process are shown here for a receiver having an extremely narrow passband.

at the low-frequency edge of the signal (the trailing edge in the previous examples) fall at about the -20 -db. point on the passband curve. The attenuation of higher-frequency components follows the curve, reaching -80 db. 2.5 kc. from the low edge of the signal. All but 500 cycles of the signal is encompassed by the receiver's passband in this example.

Since there is no sharp cutoff, the problem of checking the signal bandwidth has no definite solution. If we can hear a change in signal strength amounting to 80 db., the apparent bandwidth of the signal is its actual width, 3 kc., plus the receiver bandwidth at -80 db. This latter amounts to something over 9 kc. in Fig. 3, so the signal can be heard over a tuning range slightly greater than 12 kc.

If the signal when centered in the receiver's passband is strong, but not excessively so, an observer tuning through it might decide that components more than 40 db. down were negligibly weak. The apparent passband on such a signal would be somewhat under 6 kc., so the observer would hear the signal over a tuning range slightly under 9 kc. However, if the signal is very strong it is readily possible that any part of it falling between the -80 -db. points of the receiver passband will be heard — probably with rather high intensity if the transmitter is nearby.

Obviously, none of these responses outside the

nominal receiver passband is the fault of the signal. Its actual bandwidth has stayed at 3 kc. throughout these examples. The *apparent* bandwidth depends on the receiver's selectivity curve and how strong the signal is.

A. G. C. Action

The receiver's automatic gain control is very likely to confuse the issue. Although in a properly-designed receiver the a.g.c. does not affect the actual selectivity, it may give the appearance of doing so. It is not hard to appreciate why.

Using Fig. 3, suppose that 0 db. represents the level just under the receiver's overload point. There is no signal in the nominal receiver passband, so there is no a.g.c. voltage and the r.f./i.f. gain is at maximum. Now if the signal shown in the figure comes on at the zero level, a large part of it will get through the receiver's passband to give output that may be as little as 20 db. below the maximum receiver response. (Some signal components may be sufficiently strong to operate the a.g.c. intermittently. This complicates the picture still more, but will be ignored here.)

Now suppose that a weak signal is in the passband and we try to copy it. It is not strong enough to cause appreciable a.g.c. action, so the receiver's gain remains practically at maximum. The first signal will still put through just as much "hash" as before, and the interference may be

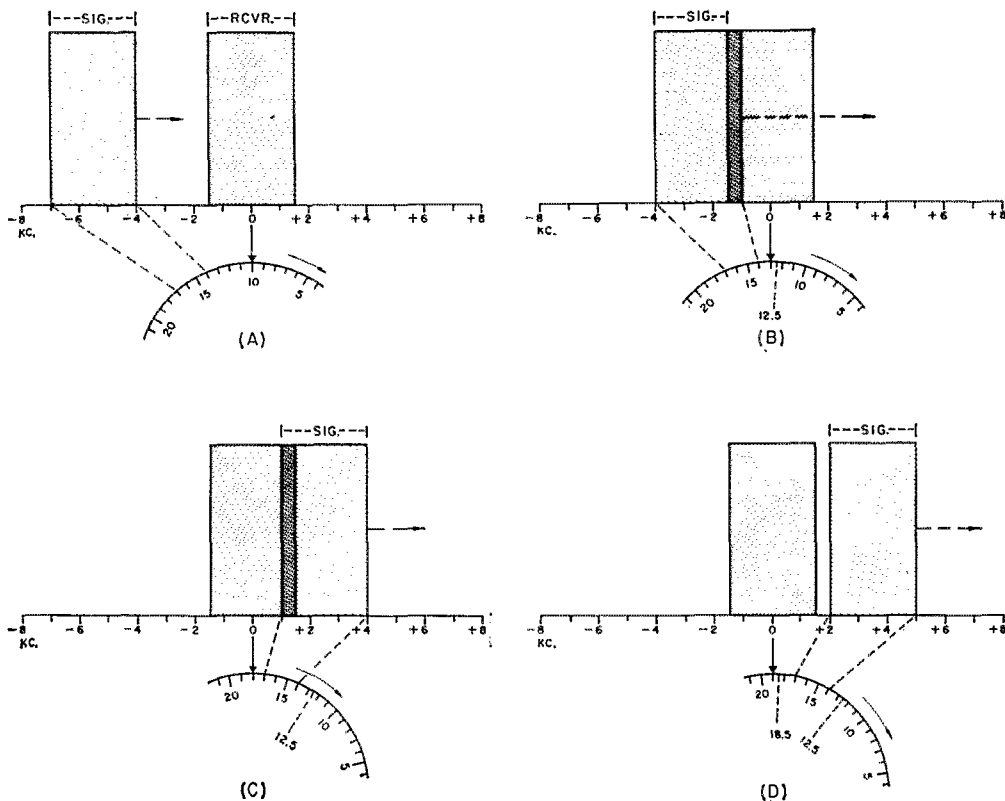


Fig. 2.—Same signal as in Fig. 1, tuned through the passband of a receiver having a 3-kc. width with ideally steep skirts.

more than enough to drown out the weak one.

Or take the other extreme — a desired signal centered in the receiver's passband but strong enough to generate a rather hefty a.g.c. voltage; enough, say, to reduce the receiver's gain by 40 db. The interfering signal between +2 and +5 on the i.f. scale is also depressed 40 db., and so are all the components that previously were slipping through. For all practical purposes, these components have now disappeared, and there is no interference.

It should also be plain that automatic gain control, by raising the gain when the signal is on the high-attenuation part of the passband curve, tends to exaggerate the bandwidth of a signal that is being tuned through the receiver's passband.

These are not "faults" peculiar to the a.g.c. system. The same things would have happened if the gain had been changed similarly by manual control. But when the gain is varying more or less continually through a.g.c. action, the important effect of signal level frequently gets overlooked. When the gain is high, the receiver is far more susceptible to interference from a signal just outside the nominal passband.

Checking Signal Bandwidth

If there is a moral to be drawn from all this, it is that a great deal of care, based on knowledge of the receiver's limitations, should be used in coming to any conclusion as to the bandwidth of an incoming signal. Accusing a station on an adjoining channel of splattering because his transmissions interfere with a weak desired signal *may* just be displaying ignorance of receiver operation.

To make a reasonably good qualitative check requires, first, that the signal being checked be sufficiently in the clear so that the transmissions of other stations will not be confused with the one under observation. Second, the a.g.c. should be disabled. Third, the signal being examined should be tuned in for maximum response and the r.f./i.f. gain adjusted manually so the receiver is operated well below its overload point. Fourth, the receiver should be tuned through the

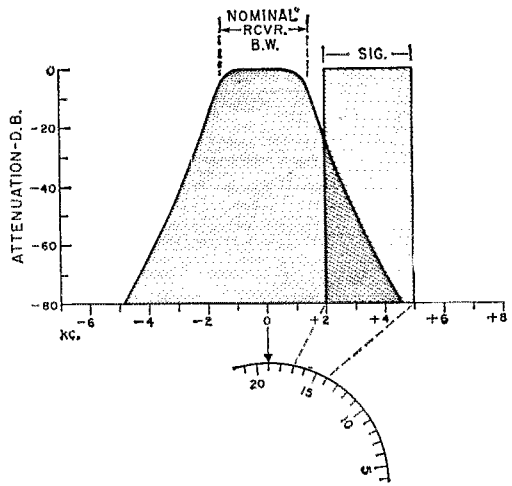


Fig. 3—The signal superimposed on the passband skirt of a practical selectivity curve having a nominal bandwidth of 3 kc. The signal position corresponds to Fig. 2D.

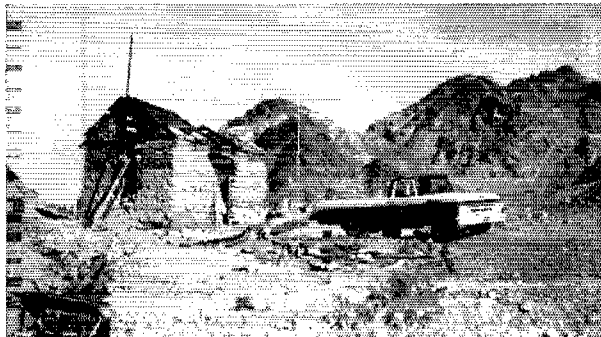
signal to determine the dial settings at which the outermost components first become detectable and at which they are last heard. With a strong signal and interference-free conditions, these components will be 40 db. or more below the tuned-in signal strength. Finally, the receiver bandwidth at that amount of attenuation should be subtracted from the frequency range over which the signal could be heard.

Just tuning through the signal with the receiver controls set for normal reception, or jumping to the conclusion that a signal is broad because it happens to interfere with one you're listening to, is simply inaccurate observation and leads to false reporting.

Cleaning up poor signals is an objective that deserves every amateur's best efforts. Checking signal bandwidth is an important part of the clean-up activity. It may do more harm than good, though, unless the checking is based on intelligent use of the receiver, especially when it's a phone-bandwidth receiver. Q57

Stays

Thinking of doing some portable hamming on your next vacation? Here's K6YKH's suggestion. He loaded some equipment into his pickup truck and spent a recent weekend at a California desert ghost town. The photo shows the abandoned church which served as headquarters. Equipment used included BC-342 and 348 receivers and two BC-459 transmitters on 40 meters. Power was supplied by a 1.5-kw. gas generator. Bob got in a little sight-seeing while he was there, too. He counted about 30 old buildings, several unmarked graves in the local cemetery, and the mineshafts which had made Tumco a boomtown during the 1890s.





Hints and Kinks

For the Experimenters



SEMICONDUCTOR I.F. NOISE SILENCER

TODAY the problem of noise in amplitude-sensitive receivers is obvious, and most of this noise has been effectively eliminated in the receivers at the expense of the quality of the detected audio signals. But amateur radio is not high fidelity. Therefore, a combination of filters and limiters in the r.f., i.f., or a.f. stages of an amplitude-sensitive radio receiver will do the job of reducing noise strikingly well.

The Bishop circuit described by Stiles¹ is an excellent guide along these lines, and the one suggested in the ARRL *Handbook*² will prove useful. But with the unlimited numbers of receiver-accessory gadgets — *Q* multipliers, beat-frequency oscillators, *S*-meter amplifiers, crystal calibrators, product detectors, and squeleh circuits — there is hardly any room left on the receiver chassis for other gadgets. This is primarily why the author chose semiconductors for this particular device, an i.f. noise silencer.

The schematic diagram of the silencer is shown in Fig. 1. A 100-pf. capacitor couples some of the i.f. energy from the grid of the second i.f. amplifier into the network L_1 and C_1 , which should have values corresponding to the i.f. frequency in use in the radio receiver. A 1N34 diode, CR_1 , rectifies all the i.f. noise pulses and injects these rectified pulses into the screen circuit of the 6BE6. Components L_2 and C_2 are tuned to the i.f. frequency of the receiver. A second 1N34 diode, CR_2 , acts as a clamp. A 470,000-ohm potentiometer, the THRESHOLD control, is used to adjust the operating point of the silencer. The second i.f. amplifier in the radio receiver should be changed to a type 6BE6.³ With this done, the net output from the

¹ Stiles, "I.F. Noise Limiter," *QST*, June 1960.

² *The Radio Amateur's Handbook*, 37th ed., p. 105.

³ Some loss of gain can be expected when using the 6BE6; a 6DT6, with the signal fed back to No. 3 grid, would still have full gain when substituted in this circuit. — Editor

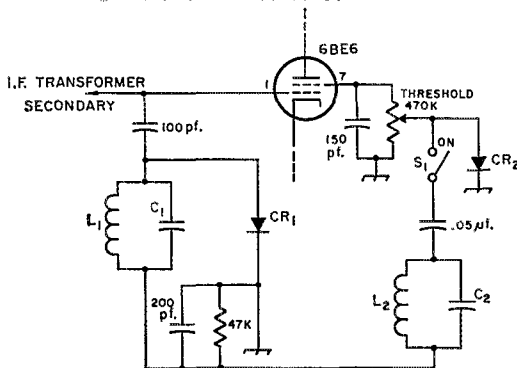


Fig. 1—WA2MTB's i.f. noise silencer. L_1 , C_1 and L_2 , C_2 should resonate at the receiver's i.f. CR_1 and CR_2 are 1N34 semiconductor diodes.

threshold control is applied to Pin 7 of the 6BE6 i.f. amplifier.

The author has found this circuit to be most useful in that it will work when amplitude modulation and sideband transmissions are used. But for those who, at times, desire to switch back to hi-fi "unmuffled" reception, switch S_1 can be turned to the OFF position. However, with the silencer operating, the author has been able to decipher many messages which could not have been received without this limiter. — Alex S. Labounsky, W12MTB

CHANGING CONTROL TAPER

IF it is desired to make a log taper control out of a linear taper control, place a resistor, R_2 , between the wiper terminal and one end of the

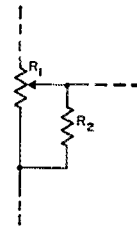


Fig. 2—A linear taper control, R_1 , becomes logarithmic when resistor R_2 is added as shown.

control, R_1 , as shown in Fig. 2. The value for R_2 can be calculated using the following relationship: $R_2 = \frac{1}{2} R_1$. — Dennis Reed, K7VGZ

BREADBOARDING TRANSISTORIZED CIRCUITS

AFTER trying many different ways of breadboarding transistor experimental circuits, I discovered a practical and economical method of doing it. I use an old-fashioned wooden breadboard, or any suitable piece of wood. However, instead of conventional terminal strips or tie points, I simply hammer in ordinary copper tacks wherever a terminal is needed. — John Oriol, W12LED

CUTTING METAL TUBING

SHORT lengths of small, hard metal tubing are sometimes difficult to cut with a tube cutter. An easy way to cut tubing is to insert the tube stock in an electric drill, turn on the drill and hold a hacksaw against the tube at the spot to be cut. After a notch has been cut in the rotating tube, turn off the drill, strike the tube a swift blow, and it will break off at the desired spot. Lengths as short as $\frac{1}{4}$ inch can be cut with this method. — James Garrett, K5BTY

MULTIPLE-CRYSTAL PACKAGE

CRYSTAL switching is nice, but it takes up room and requires several parts. Those who, for one reason or another, still plug their crystals into a single socket may find a simple crystal package used by VE3DMK interesting. To facilitate changing crystals in a neat 144-Mc. trans-

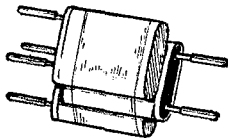


Fig. 3. This crystal bundle makes crystal changing easy even when there's only one socket.

mitter he had on display at the recent Ontario ARRL Convention, VE3DMK tapes several crystals together, as shown in Fig. 3. The crystal socket should be mounted so that its entire body is outside the mounting surface. Any number of crystals may be taped together, the number being limited only by the space available around the crystal socket. — *E.P.T.*

ICE-CUBE BURN CURE

ONE of the weekly news magazines recently reported on a new method of treating burns—apply ice. We had occasion a few days ago to test the treatment when we grabbed a soldering iron by the wrong end along toward the end of a long session at the workbench. Long “sear” marks were left on the thumb and index finger, while the middle finger had a red welt raised instantly along the inside edge. We applied ice cubes to the burns for the next hour, and then bandaged them lightly with a medicated salve overnight. Result—the “sear” marks disappeared, while the red welt changed first to a blister and then to a streak of hard skin. Eighteen hours after the burn, there was no tenderness. In this one case, at least, the ice treatment really worked. — *R. L. B.*

QST REFERENCES

SMALL, self-adhesive labels, the kind stocked by most stationery stores, have the obvious amateur-radio applications of wire markers, control labels, etc. One more use for the labels that I have found is for noting especially interesting articles that appear in *QST*. I merely apply the label to the *QST* cover containing the article with reference on the label to the title, or subject, and the page. — *F. H. Western, VE2QQ*

PILOT LAMP INSTALLER

TO INSTALL pilot lamps in hard-to-get-at places in equipment, use an eye-dropper bulb. Cut off the rubber suction part of the dropper so that it will fit snugly over the pilot lamp. Insert the lamp into the rubber holder and then position the lamp base into the socket. The rubber will provide enough grip on the glass lamp so that it may be twisted into place. — *Bill F. Agee, WA4AVX*

INSULATING COMPOUND

I HAVE found that the red liquid-plastic substance, which is sold for insulating tool handles, makes an excellent all-around insulator for coating connectors, antenna hardware, etc. Called INSL-X Tool Dip, it is available from most electronic-parts distributors or mail-order houses. — *Roger W. Krass, K1ZSF*

LIQUID TAPE

SEVERAL years ago mention was made in this column about Liquid Tape. However, the substance was difficult to find since it was not a common stock item. A Liquid Tape is now made by GC Electronics (General Cement) and is distributed nationally by most radio parts dealers. The compound hardens to a strong pliable finish that will not crack, peel or chip. The Liquid Tape can be used as an insulating and waterproof coating for fittings and connectors on antenna systems. It is available in 2 oz. (176-2), 16 oz. (176-16), or 1 gallon (176-G) quantities. — *E. J. C.*

EXTENDING THE JOHNSON “MATCHBOX” RANGE

A COMMON complaint from amateurs is that their Matchbox won't handle the mismatch for some types of antenna systems on certain bands. This is not the fault of the Matchbox but rather the antenna system. One simple method of putting the system within the range of the unit is as follows: use a length of B & W coil stock type 3907-1. This is two inches in diameter, 10 turns per inch. Cut the coil into two equal lengths. Connect each coil in series with each of the feeders at the Matchbox. Connect a shorting clip lead on each coil. By shorting out a turn at a time on each coil, a point will be reached where the Matchbox will be able to “match.” — *L. G. M.*

POWER SUPPLY TURN-ON CIRCUIT

POWER supplies using very large values of filter capacitance must be turned on at a reduced power level so as to limit the capacitor-charging current to a value that is safe to the rectifiers. This can be done by inserting some resistance in series with the primary of the plate transformer; the resistance is shorted out after the capacitors have become charged. The diagram in Fig. 4 shows a fool-proof method for doing this, and it does not matter which switch is closed first. The resistor, R_1 , is always in the circuit when one

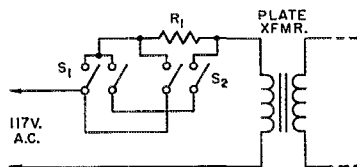


Fig. 4—W3KET's switching circuit. S_1 , S_2 , D.p.s.t. switch.

switch is closed. Closing the second switch shorts out the resistor. The supply is off when both switches are open. A household lamp makes an inexpensive resistor for R_1 . — *Melvin Leibowitz, W3KET*

I.A.R.U. News

GENEVA INTERNATIONAL HAMFEST

Telecommunications dignitaries from various parts of the world briefly addressed amateurs in Geneva, Switzerland, at opening ceremonies for the October 19-20 hamfest sponsored by the International Amateur Radio Club.

The meeting was welcomed by Gerald Gross, HB9IA/W3GG, honorary club president — and professionally the Secretary-General of the International Telecommunications Union. The Soviet Minister of Communications, The Chairman of the Geneva Conference, and the heads of the U.S., U.K., and U.S.S.R. delegations were among those presented honorary IARC membership certificates by John Gayer, HB9AEQ, club president and — professionally — chairman of the International Frequency Registration Board. Each recipient had words of praise for the activities of the amateur radio service.

Nearly 200 amateurs, wives and friends, including a substantial number from the ham travel group sponsored by 73 magazine, gathered to hear technical and administrative discussions of amateur affairs; W6SAI on Oscar; Dr. R. L. Smith-Rose, a former G, on amateur space research possibilities; W1LVQ on the future of amateur radio; W3PS on reciprocal operating privileges internationally; SM5ZD on Region 1 IARU activities; F3NB on Oscar activity in France; and many others. The group heard a report indicating that amateurs in Europe may soon be in process of constructing an amateur satellite, under the aegis of IARU and coordinated by IARC.

Operating of 4U1ITU was at an especially high level throughout the weekend, and many visitors

were able to communicate with their home countries. The first annual edition of the club's publication, "4U1ITU Calling," an excellent production edited and managed almost single-handedly by DL1YJ, added much to the enjoyment of participating amateurs both as a useful document and a souvenir of their visit. A Saturday evening banquet was chaired by M. Joachim, OK1W1, assisted by Willi Menzel, HB9AAB, both vice presidents of the club. As they departed from Geneva, participating amateurs most certainly felt they had learned a great deal about amateur radio in other countries, and come to a better understanding of amateur problems — and thus strengthened the bonds of international amateur organization.

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 VP8s 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 QSTs, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

Aden: J. M. Hern, VS9AAA, 114 M. U., B. F. P.O. 69, London, England

Algeria: G. Deville, FA9RW, 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,



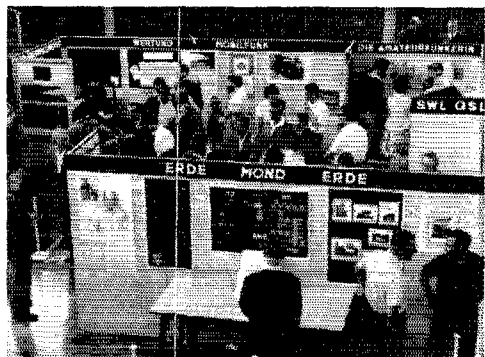
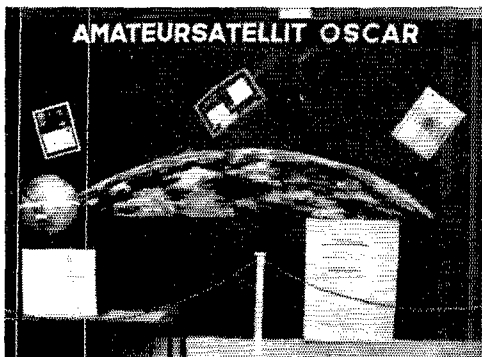
Administrative telecommunications officials present at the space conference attend the opening of the Geneva hamfest. Shown in the photo are (l. to r.) E. Moine, USSR; Capt. Charles F. Booth, head of the U.K. delegation; Gerald Gross, ITU Secretary-General; Joseph H. McConnell, head of the U. S. delegation; Gunnar Pedersen, head of Denmark's delegation and chairman of the space conference; John Gayer, Chairman of IFRB; N. D. Psurtsev, Soviet Minister of Communications; A. Badalov, head of the USSR delegation; and T. A. M. Craven, vice chairman of the U. S. delegation.

ARRL General Counsel Robert M. Booth, Jr. reports to the Geneva amateur gathering on the progress of reciprocal operating privileges in the U. S. (l. to r.) M. Joachim, OK1W1; W3PS; W. Menzel, HB9AAB; and Per Anders Kinnmann, SM5ZD.



D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBC, Davisville, R. I.
Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires
Australia: P.O. Box 41, 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 MP4) Ian Cable, MP1BBW, P.O. Box 425
 Awali
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: P.O. Box 487, Belize
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: Boite Postale 14, Usumbura or via Belgium
Canton Island: Phil Preece, KB6CB, Postmaster, Canton Island, USPO 06-5000, Phoenix Group, via Honolulu, Hawaii
Cape Verde Island: Radio Club de Cabo Verde, CR4AA, Praia
Caroline Islands: Father Jack Walsh, Xavier High School, Truk
Cayman Island: via Jamaica
Ceylon: W. P. Somaratne Perera, 4S7WP, Shanti, Wijaya Road, Kolonnawa, Wellampitiya
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
China: M. T. Young, P.O. Box 16, Taichung, Formosa
Columbia: 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: Bill Scarborough, ZK1BS, % Radio Station, Rarotonga
Costa Rica: Radio Club de Costa Rica, Box 2412, San Jose
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
Dominica: VP2DA, Box 64, Roseau, Dominica, W.I.

Dominican Republic: R.C.D., P.O. Box 157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guayaquil
El Salvador: Y810, Apartado 329, San Salvador
Ethiopia: Telecommunications Amateur Radio Club, P.O. Box 1047, Addis Ababa or via APO 843, New York, N. Y.
Faeroes Islands: via Denmark
Fiji Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 306, Helsinki
Formosa: (BV1 only) Taiwan American Radio Club, USARSCAT, Box 8, APO 63, San Francisco, Calif.
France: R.E.F., Boite Postale 26, Versailles (S & O)
France: (F7 only) F7 QSL Bureau, MARS, Headquarters U.S. European Command, APO 128, New York, N. Y.
Germany: (DL2 only): G. D. Griffiths, DL2OX, 212 (Hohenzollern) Str., Moench-Gladbach
Germany: (DL4 & DL5 only) QSL Bureau, Support Company, Signal, APO 403, New York, N. Y.
Germany: (Other than above): D.A.R.C., Box 99, Munich 27
Ghana: 9G1CW, Hans Sues, P.O. No. 3773, Kumasi
Gibraltar: E. D. Wills, ZB2I, 9 Naval Hospital Road
Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent
Greece: George Zaratias, P.O. Box 564, Athens
Greece (SV0s only): Signal Officer, Hqtrs. JUSMAGG, APO 223, New York, N. Y.
Greenland (OX calls only): via Denmark
Greenland (KG1 calls only): All KG1F's to MARS Director, 2004 Comm. Sqdn., APO 121, N. Y., N. Y. All other KG1's to MARS Director, 1983 Comm. Sqdn., APO 23, N. Y., N. Y.
Guam: M.A.R.C., Box 445, Agana, Guam, Marianas Island
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, Navy 115, FPO, New York, N. Y.
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haïti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenzkir Radio Amatorar, Box 1058, Reykjavik



These two photos were taken at the DARC national convention in Wolfsburg this past June. Oscar and moonbounce (Erde Mond Erde) were the subjects of these two exhibits, complete with a sketch of Sam Harris, W1FZJ, and pictures of the gang at Eimac. (Photos courtesy VW Works)

India: P.O. Box 531, Delhi 1
Iran: Joseph L. Mattiandy, EP2BN, American Embassy, APO 305, New York, N. Y.
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.I., Viale Vittorio Veneto 12, Milano 401
Jamaica: Alec A. Hugh, 6YAAH, 38 Brentford Road, Kingston 5
Japan (JA only): J.A.R.L., Box 377, Tokyo
Japan (KA only): F.E.A.R.L. -M-, APO 925, San Francisco, Calif.
Kenya: Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Kuwait: William N. Burgess, 9K2AZ, % Kuwait Oil Co., 14 5th St. North, Ahmadi 1, Kuwait, Persian Gulf
Lebanon: R.A.L., Ahmadi, B.P. 3245, Beirut
Libya: 5A QSL Service, Box 372, Tripoli, or via Box 1281, APO 231, New York, N. Y.
Liechtenstein: via Switzerland
Lucembourg: R. Schott, 35 rue Batty Weber, Esch/Alz.
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive
Malaya: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur
Malta: R. F. Galea, ZBLE, "Casa Gulea," Railway Road, Birkirkara
Marianus Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, Navy 821, FPO, San Francisco, Calif.
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico 1, D.F.
Midway Island: Midway Navy 3080, Box 23, KM6CE, Naval Security Group Activity, FPO, San Francisco, Calif.
Monaco: Pierre Anderhalt, 3A2CN, 49 rue Grimaldi
Morocco: A.A.E.M., P.O. Box 2080, Casablanca
Morocco: (CNSFA-JZ only): American QSL Service of Morocco, Box 2104, APO 30, New York, N. Y.
Mozambique: Liga dos Radio-Emissores de Mocambique, P.O. Box 812, Lourenco Marques
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles (Aruba): VERONA. P.O. Box 392, San Nicolas, Aruba, Netherlands Antilles
Netherlands Antilles (Curacao): P.O. Box 383, Willemstad, Curacao, Netherlands Antilles
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington
Nicaragua: Club de Radio Experimentadores de Nicaragua, Apartado Postal 925, Managua
Nigeria: Dr. M. Dransfield, 5N2JKO, Agricultural Research Station, Samaru, Zaria, Federation of Nigeria
Northern Ireland: via Great Britain
Northern Rhodesia: N.R.A.R.S., P.O. Box 332, Kitwe
Norway: N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
Nyasaland: ZD6RM, P.O. Box 472, Blantyre
Okinawa: O.A.R.C., APO 331, % Postmaster, San Francisco, Calif.
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
Paraguay: R.C.P., Casilla de Correo 512, Asuncion
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Peru: R.C.P., Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, 1546 Requesens, Santa Cruz, Manila
Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 10
Portugal: Rua de D. Pedro V., 7-4°, Lisbon
Rodrigues Island: via Mauritius
Roumania: Central Radio Club, P.O. Box 95, Bucharest
Rwanda: via Burundi
Samoa (American): Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago
Saudi Arabia: HZ1AB, Det. #5, Hq. USMTM, APO 616, New York, N. Y.
Scotland: via Great Britain
Senegal: Ch. France, 6W8BF, P.O. Box 971, Dakar, or via REF (France)
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 (PZIAR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
Sweden: Sveriges Sandare Amatörer, Enskede 7
Switzerland: U.S.K.A., Buron/1U
Syria: P.O. Box 35, Damascus
Tanganyika: P.O. Box 2387, Dar es Salaam
Trinidad and Tobago: P.O. Box 756, Port of Spain, Trinidad
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
Venezuela: R.C.V., P.O. Box 2285, Caracas
Virgin Islands: Richard C. Speuceley, KV4AA, 16 Commandant Gade, Charlotte Amalie, St. Thomas
Wake Island: T. D. Musson, KW6CJ, P.O. Box 445
Wales: via Great Britain
Yugoslavia: S.R.J., P.O. Box 48, Belgrade
Zanzibar: via Tanganyika

A unique memorial to the late WA6ISR, Theodore Kaye, has been established by the West Covina AREC and the Edgewood Amateur Radio Society, both of suburban Los Angeles: The "ARRL Memorial Blood Bank." Other amateurs residing within the area served by the Los Angeles-Orange Counties Regional Blood Program of the American National Red Cross may designate donations of blood to be added to this fund. Similarly, ARRL members within the area in need of blood for an operation may call upon this fund, as long as it has a balance.

This seems to be a very worthwhile public relations project, supporting the Red Cross's blood donor project, and at the same time possibly assisting a fellow ham in a future medical problem. Amateurs in the Greater Los Angeles area wishing further information on the project may contact Larry Hayman, WB6BND, Corresponding Secretary of the Edgewood Amateur Radio Society, 2525 Larkwood Street, West Covina, California. Amateurs in other areas wishing to establish a blood

fund should contact the headquarters of the regional blood center having jurisdiction over their town or city, or their local Red Cross Chapters.

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One of the hams on the staff of the Los Angeles *Herald-Examiner* not included in the Stray on page 19 of October *QST*, is WA6NNN. Although he sets type for W6MLZ's ham column, he saw our Stray, but not the similar item in his own paper. Could it be *QST* gets better coverage in Los Angeles than the *H-E*?

— —

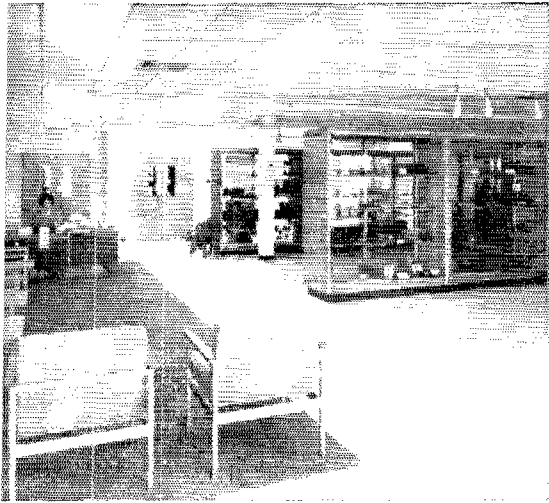
W3CAH sends a recent spec sheet of a well-known tube manufacturer, which claims 11,500% efficiency for a new tube type. Aw, c'mon!

— —

Naval One-up-man-ship: Replying to the Stray about K3UIG's unusual QSO in October *QST*, page 91, W4NMK sez he worked KZ5BU fixed, several California mobiles, and K1MIN/a.m. above the North Pole—all from W4NMK/*submerged*-MM, 58 feet below the Atlantic on the *USS Cutlass*.

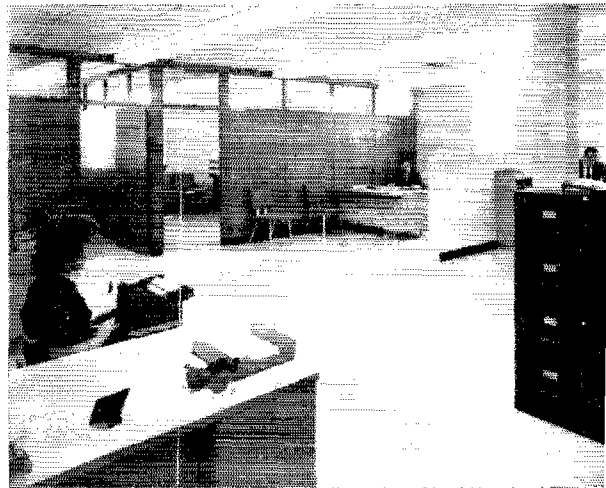
Your New League Headquarters

THE new ARRL administration building is a service headquarters, where some sixty-five people are employed full-time to provide numerous and varied services rendered by the League to its membership, and to coordinate the efforts and activities of several thousand administrative and field organization officials and appointees. The new building — largely financed by membership contributions and therefore *your* new building — provides long-needed additional working space and much more efficient quarters than ever before. You have seen pictures of the exterior. Let's take a brief trip now around the inside of 225 Main Street, Newington, Conn. (A descriptive caption is alongside each photo.)

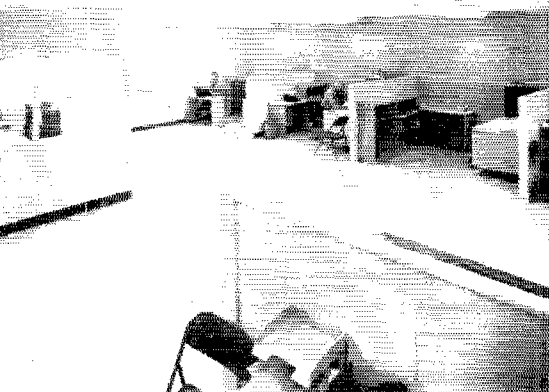


Entering the front door, you see a large, spacious room which serves as a reception area and also houses the *Museum of Amateur Radio*. Several cabinets at the right display collections of old-time ham gear which always attract the rapt attention of visitors. You introduce yourself to the receptionist at the left, and while she is calling one of the staff to escort you through the building, you sign our guest book.

The first room at the left of the lobby is the Secretarial Department. The offices at the far end of this photo are for the General Manager and his assistant. In the main room are three Assistant Secretaries and two typists. This department handles general ARRL administration, membership correspondence, requests for licensing information, IARU administration including issuance of WAC certificates, the operation of the QSL bureau, and public relations.



Next down the hall (through the left-hand pair of swinging doors in the top photo) is the Technical Department. Here the staff answers letters requesting technical information, creates or edits all technical material for *QST*, the *Handbook*, and other League publications, and designs gear to be constructed in the lab across the hall.



The last office on the left is the Production/Editorial department, where all the League publications (including this issue of *QST*, of course) are "put together." Here manuscripts are checked for correctness, type faces assigned, layouts prepared, schematics drawn, and liaison established with the printer, photo-engraver, commercial artist, and photographer.

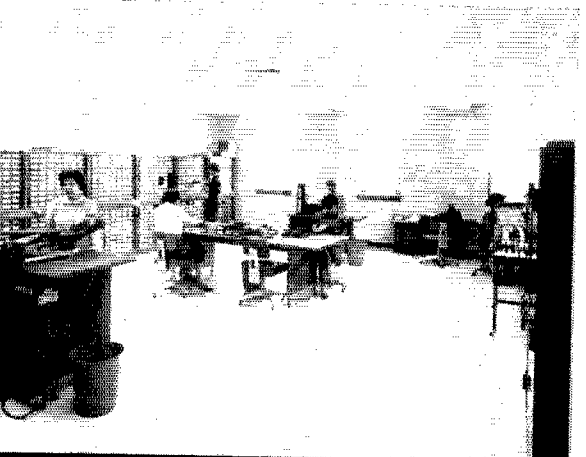




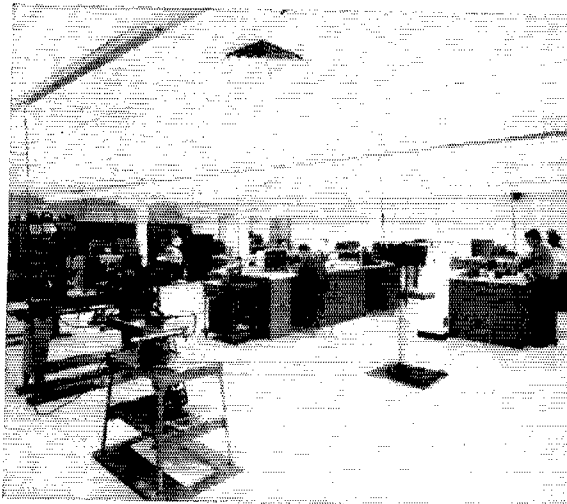
The lab, across the hall from the technical offices, is well-equipped to handle the construction of ham gear which will be described in ARRL publications, and to test commercially-built gear which will be reviewed in QST. Each member of the technical staff has his own work bench, and in addition there are plenty of power tools and test equipment. A safety feature is the spotting throughout the lab of switches connected to a special circuit breaker—any one of these switches will kill all power on the work benches. >>



On the second floor, in the front of the building, we find the largest department of all—the Circulation Department. The girls take care of all membership records, issuance of membership certificates, changes of address, and orders for individual publications. The Circulation Manager and his assistant have offices at the far end in this photo. >>



Across the hall from Production/Editorial is the Advertising Department, which handles ads for League publications. << The chart at the left is to keep track of the progress of each ad in each publication throughout the month.



To the right of the lobby is the Communications Department, where are administered the many operating aids and services, coordination of the huge volunteer field organization, public service, emergency and traffic networks, DXCC, WAS, RCC, contests, code practice, and training aids. The camera lens wasn't wide enough to catch half of the department, out of the picture at the left. In the right foreground is the telephone switchboard, with six trunk lines and 23 local stations. <<



The adjoining room is the "machine" room. Here are prepared, used and stored more than 100,000 mailing plates used to address QST wrappers each month. The plates are also used for mailings to League officials, appointees, and for ballot mailings in the annual elections. Electronic controls on addressing machinery provide flexibility for various operations. <<

In the mail room, all outgoing mail is weighed and metered. A lithograph machine, on which various special bulletins are prepared, is in operation many hours each day. Photocopy, collating and folding machines speed up office operations. In the left rear is the sorting rack for the ARRL QSL bureau. Thousands of QSL cards come in here each month from overseas stations, and are sorted and forwarded on to the district QSL Bureau managers. »



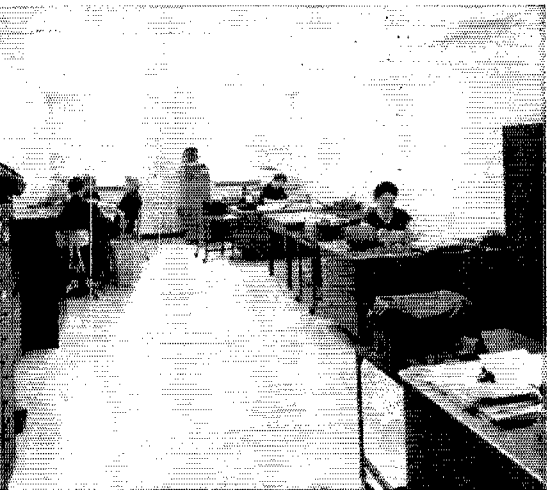
« The shipping room and its associated storage area occupy a large part of the second floor. The land on which the building is located slopes upward so that trucks for incoming and outgoing shipments can back up and unload at the proper height for convenient operation. This photo was taken standing in the doorway to the loading dock. Thousands of League publications go out from this room each year.



This photo shows part of the storage space now available (in the old building there was nothing like this)—in the background are copies of *Understanding Amateur Radio* stacked awaiting shipment. The door to the right leads to the garage where our pick-up truck, snowblower, and lawnmowers are stored. »

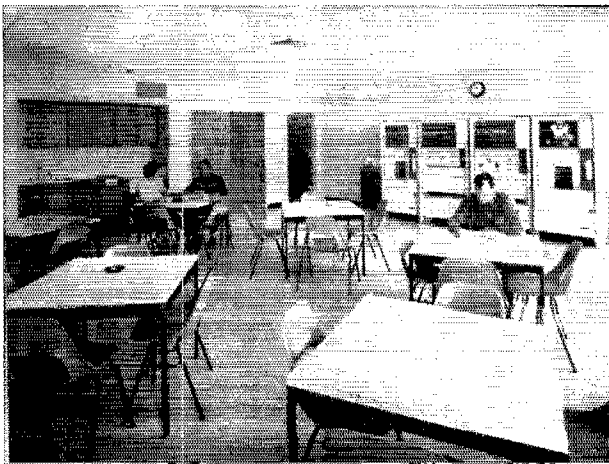


« This is the Accounting Department, where the daily heavy loads of incoming mail are sorted, opened, and each piece time-stamped. Letters with remittances are separated from general correspondence before being handled further. And of course the books and records of all League finances are kept in this office.

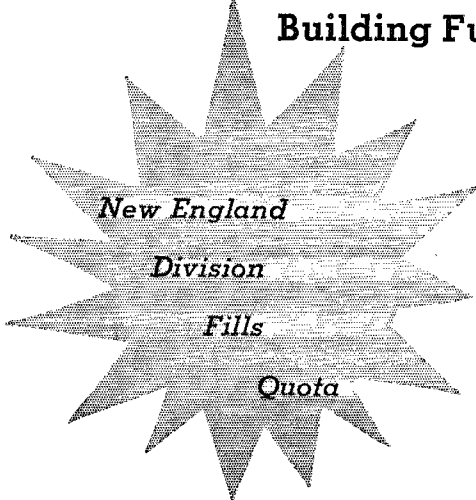


Finally, we come to the staff lounge and lunch room just before the noon rush. In the left background is a kitchenette containing a two-plate electric range, a small refrigerator, and sink. At the right are vending machines for soft drinks, coffee, soup, and hot chocolate, pastry, candy, and cigarettes. »

Why not drop by and pay us a visit? You're always welcome during regular office hours, Monday through Friday 8:15 to 4:30. Groups wishing to visit evenings or on weekends may make special arrangements in advance. **QST**



Building Fund Progress



The New England Division went over the top with a bang this month, and so now we have two divisions which have met or exceeded the quotas originally set for them. The goal was reached in the New England Division through the generous gifts of both individuals and clubs. At the annual New London hamfest of the Tri-City Radio Club, for example, a donation was made on behalf of the club from money received at the hamfest. This generosity was doubled, of course, through the matching funds.

New England..	105	Canadian.....	57.1
Dakota.....	102	Central.....	55.2
Hudson.....	82.7	Atlantic.....	54.2
Northwestern..	78.8	Delta.....	54.0
Southwestern..	72.9	Rocky Mountain	51.5
Midwest.....	67.3	West Gulf.....	44.7
Roanoke.....	62.5	Great Lakes....	44.0
Pacific.....	62.1	Southeastern...	39.7

Many contributions to the building fund this month were accompanied, as usual, by membership renewals. Certificates of appreciation are being sent out to all contributors, and we'd like to send one to you. May we?

QST

Members Are Saying . . .

Being sixteen isn't one of the most financially stable ages, but here is my five dollars anyway for the building fund. — *K1RCZ*.

Enclosed is a small donation for your building fund. I wish it could be a larger amount, but I am medically retired from the Army, and am living on my retirement check. — *W9GCZ*.

Although my contribution is small and quite late, I feel that it will be used to its full extent. I am only twelve years old and have had my Novice ticket for less than a year. — *KN8VXO*.

Enclosed is a small contribution to the building fund. The ARRL has done excellent work in looking after the interests of hams — may it long continue to do so. — *K4DNW*.

Just a note of thanks for the fine job you've been doing with *QST*. I would say there has been an upswing in the quality of the articles that can't be matched by any other journal. I would like to take this opportunity to give something to the building fund. — *W3JEE*.

Please find the enclosed cheque as our contribution for your new administration building.

We wish you continued success for the future, and we know that you will undoubtedly succeed. — *Winnipeg Amateur Radio Association*.

Here finally is my contribution — a dollar for each year that I have been a ham.

As long as you continue to do what is best for "ham radio" as a whole, you have my firm support. Here's to ARRL's continued success, and I am glad to be a member. — *K8CSM*.

We are not sufficiently articulate to voice our support of the League's position on licensing. How-

ever, perhaps the enclosed meager contribution towards the building fund, which should have been made long ago anyway, will indicate in a small way our enthusiastic support of the tremendous job the League is doing for amateur radio. — *WV2IPF, WA2VYT*.

Although this is late I certainly can not see how anyone can pass up this opportunity to further the advancement of our society. In my few years as an amateur and over twenty-five years of reading *QST*, I have never known a society to equal ARRL in this or other fields. — *K9BPT*.

Enclosed you will find my donation toward the building fund.

I appreciate the work the League has done in the past, and understand the importance of the job at hand. — *W8NOT*.

Enclosed is my contribution to the building fund in appreciation of the fact that without ARRL there would be no amateur radio. — *W6LBC*.

As a member of the League for many years, I would like to add my contribution to the building fund for the new headquarters.

The current controversy regarding license restrictions is, I think, a very healthy one, and I fully support the League's official position that we must put our own house in order if we are to retain the extraordinary privileges we currently enjoy. — *W6VM*.

Here is the contribution of the Indianapolis Radio Club to your building fund.

Part of this money was raised at a special club auction to which members donated equipment and components for sale, with all the proceeds going to you. We even sold a 1942 ARRL *Handbook* for 25¢ more than the original price! — *K9KTL*.

September V.H.F. Party Summary

USERS of 144-Mc. and higher bands had their innings in the V.H.F. Party, September 14-15. There was little sign of sporadic-E skip, which often gives the 50-Mc. operators a big advantage in June parties. Instead, tropospheric propagation was excellent over most of the country, fattening section multipliers for the 2-meter men. Several section awards were won by stations that worked on 144 Mc. only, and effective use of the band was almost a must for anyone aspiring to upper-bracket scoring. Increased activity on 220 and 420 Mc. also paid off handsomely, with at least one station accumulating a respectable score employing only those two bands.

Concentration on the higher bands enabled K2CBA, Rensselaer, N. Y. (operated by K2BVC), to post the country's top single-operator score, 345-63-24,255, and win the Eastern New York Section award. K31PM/3, Eastern Pennsylvania winner, used 50 through 420 for a 456-10-19,000 effort. W1RJA, Connecticut winner, made the highest contact total with his 481-34-16,354 entry, using only 50 and 144 Mc.

Group effort was outstanding, with K10OR/1, the King Philip Amateur Radio Society, leading the pack. As for several years past, this aggregation used Mt. Greylock, highest point in Massachusetts, to over-power all competition. The setup at K10OR/1 included high power on 50 and 144 Mc., a stacked beam on 50, two 64-element collinear arrays on 144, and effective setups on 220 and 420 Mc. Their 1328 contacts probably set an all-time record in this department. Included were 707 in 23 sections on 50 Mc., 560 in 22 on 144, 54 in 14 on 220, and 7 in 5 on 420, for 88,896 points. The latter figure has been topped at least twice in v.h.f.-party records, once by the same aggregation in their June work-out.

Second ranking multioperator entry was WIBU, the Rhododendron Swamp V.h.f. Society, who used all bands from 50 to 10,000 Mc. to run up a 972-73-77,672 total. Snagging rare sections (15 on 220, 13 on 420) was a major factor in their record.

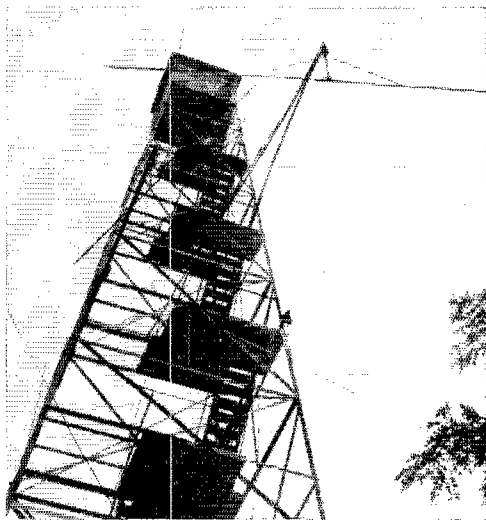
W2PEZ/2, the 6220 Club, 868-62-57,908; W3JZY/3, Copperhead V.h.f. Associates, 718-60-43,080; W3WJC/3 671-56-39,872, and scores of other mountain-top portables helped to provide fun and section multipliers for the stay-at-homes. West Virginia, often a difficult section even for contestants in adjoining sections, was available to many through the work of WA8PSE/8, as may be seen from their 220-29-6554 figure.

Lack of sporadic-E skip openings, the principal opportunity many stations have for large multipliers, kept scores down over much of the country, but activity and contact totals ran high

almost everywhere. Note the photo-finish of K6KCB/6 and W6SAW/6 in the Santa Clara Valley Section, the 377-9-3438 work of W6NLO/6 in the San Diego Section, 227-15-3585 by W6JOX/6 atop Mt. St. Helena in Northern California, 307-21-6468 by K9PAF/9 in Illinois, and many others.

DX was not entirely lacking on 50 Mc., but the openings were scattered and brief and the race was to the alert operators of well-equipped stations. WB2CZI won the NYC-LI Section Award with the country's top 50-Mc. effort. His high power on s.s.b. and c.w. helped amass a 410-18-7380 total on 6. K3LOM placed second in the highly competitive E. Pa. Section, using 50 Mc. to run up a 405-17-6885 score. K1VWH took the wallpaper in Virginia with 294-21-6174. W8NYM won in Ohio with 301-10-3010 on 6. K2MUB showed what can be done if one really bears down on weak-signal modes. Mario worked only 100 stations, but his skill with the code paid off with the leading section total on 50 Mc.: 23. VP7CX, on remote San Salvador Island in the Bahamas, proved that there is life in the 6-meter band, with 68-15-1020 — entirely DX work.

Several section awards were won by 144-Mc. operators, and second or third place in many hot spots went to users of this band only. K8VOZ/8 gave many W. Va. multipliers in amassing their



If you've ever pondered the problem of suspending and rotating v.h.f. beams from the side of a fire tower, perhaps this solution by W3JZY/3, consistent high v.h.f. party scorer, will be of interest. Horizontal supports extend out from the tower, and the beams and rotators are suspended below these. Location is the Foxville Fire Tower, Smithsburg, Md. Beams for 144, 220 and 420 Mc. are visible in this picture. Dish for 1215 is just below the tower cabin.



Top Canadian 2-meter operator in the September V.h.f. Party was VE3ESE, Toronto, with 190 contacts in 12 sections, for 2280 points.

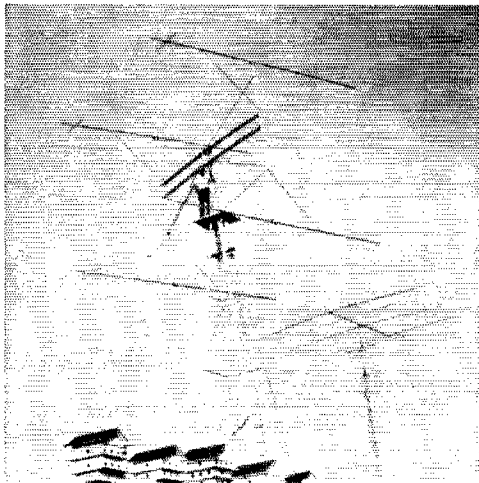
168-18-3024 pile on 144. W2ROA worked 18 sections from west N.Y., K1PKQ/1 17 from Conn., and VE2NI 16 from Quebec. K8PLD placed second in Ohio, and high-ranking spots were achieved by K2RTH in NYC-LI, VE3ESE, Ont., W1ECM/1, Me., and Novice WN2GSK, E.N.Y. K9WZB, 107-10-1070, won in Indiana. All these were 2-only efforts. In busy NYC-LI, only two of the top ten were multiband scores.

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, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk designates a Novice Award Winner.

ATLANTIC DIVISION

Eastern Pennsylvania	
K3IPM/3	19,000-456-40-ABCD
K3LOM	6885-405-17-A
W3FTB	6168-231-28-AB
K3HIV	5508-121-36-ABCD
W3CLQ	4623-201-23-AB
K3ISH/3	3423-163-21-AB
W3ARW	1738-60-22-BCD
W3CCN	1703-108-15-AC
K3HNP	1430-100-11-A
W3MMV	1020-61-15-BDE
K3MRV	402-67-6-A
K3OUN	198-33-6-AB
K3NVTY	160-32-5-B
K3RO	156-26-6-AB



This giant 4-Yagi 144-Mc. array at W9DHC was erected just in time for the September Party. The OM hangs on at the center of the 16 by 16 by 24-foot structure.

W3UMK	80-16-5-A
K3DLS	66-22-3-B
K3UGH	54-18-3-B
K3OAT	48-16-3-A
K3LWY	30-15-2-A
K3TUV	10-10-1-A
W3WJC/3	29 oprs.
39,872-671-56-ABCD	
K3JFL/3	(4 oprs.)
21,828-400-51-ABC	
W301/3	(5 oprs.)
21,217-408-49-ABCD	
K3IZU/3	(17 oprs.)
16,169-423-37-ABC	
K3UNZ/3	(7 oprs.)
13,377-343-39-AB	
K3YFD	(11 oprs.)
10,686-411-26-AB	
W3AD/3	(8 oprs.)
5874-154-33-ABCD	
K3YGH	(W38 CFN, JUZ)
5152-147-32-ABC	
K3OKW	(5 oprs.)
1221-201-21-AB	
K3PFU/3	(25 oprs.)
2560-160-16-A	
K3UGI	(K38 UGL, UUY)
105-45-9-A	
K3NYHE	(K3USZ,
K3NYEE)
280-40-7-B	
<i>Maryland — 1, C.</i>	
W3NG	3038-217-14-AB
W3HB	448-56-8-B
K308Z	440-44-10-AB
W3GCO	357-51-7-AB
W3GOC	326-4-4-C
K3VEH	50-25-2-A
W3JZY/3	(11 oprs.)
43,080-682-60-ABCD	
<i>Delaware</i>	
W3CGV	7140-138-42-ABCD
K3AZH	4530-158-30-ABD
K308Z	3058-136-22-ABD
K3TNG	18-9-2-B
<i>Southern New Jersey</i>	
W2EIF	10,914-197-48-ABC
W2REB	5180-185-28-AB
K2ZJX	3042-111-26-AC
W2GSO	3066-16-18-A
W2ESN	1656-92-18-B
W2UBN	
1456-112-13-A	
W2ZUL	1008-63-16-AB
W2LBL	450-50-9-B
<i>Western New York</i>	
K2YCO	3667-193-19-AB
K2GUG	3612-168-21-ABC
K2ERO	2983-157-19-AB
W2VA1	2882-131-22-AB
W2ROA	2268-126-18-B
K2IWS	800-89-10-AB
W2JTA	762-9-9-A
W2AKND	700-100-7-AB
W2ZKF	686-47-14-BD
W2MLV	375-75-5-AB
W2YRH	360-72-5-AB
K2HUS	318-53-6-AB
W2EHS	240-60-4-B
W2OPK/2	
204-51-4-AB	
W2CJA/2	195-65-3-A
W2HKE	132-33-4-B
K2YMI	61-32-2-B
W2ERL/2	60-30-2-A
W2UKA	23-23-1-A
W2GHN/2	
(4 oprs.)	
18,156-534-34-AB	
W2TGC/2	(6 oprs.)
12,642-245-49-ABC	
K2DNN/2	(19 oprs.)
1224-136-9-A	
K2LQR/2	(8 oprs.)
1210-121-10-AB	
WB2CCA/2	(13 oprs.)
750-72-10-ABCD	
W2RBF	(W28 DVI GHX
RBF)	712-89-8-A
K8AOE/2	(K88 AOE RVM,
W8ASA)	618-72-9-A
K2HOW	(K2HOW,
W2QLE)	110-22-5-B
W2CQH/2	(2 oprs.)
16-16-1-A	
<i>Western Pennsylvania</i>	
W3BWU	3456-142-24-ABCD
K3FCO	1569-129-13-A
K3UQD	1120-140-8-A
K3VIC	808-101-8-A
W3CRA	756-63-12-AB
W3UMY	330-33-10-AB
W3JFS	222-37-6-A
W3DMI	160-32-5-A
W3ZJR/3	(K38 DJC NZZ,
W3ZRL))
4440-138-30-ABCD	
K31WK/3	(5 oprs.)
2540-162-30-AB	
K3CPC/3	(K38 JDU QKR)
3088-193-16-A	
W3QZF/3	(W38 RTX ISZ)
2160-144-15-AB	
K3MJW	(4 oprs.)
608-76-8-AB	
CENTRAL DIVISION	
<i>Illinois</i>	
K9GBR	1656-207-8-AB
K9VLD	1134-189-6-A
W9BQJ	1070-107-10-AB
K9LCR	777-111-7-AB
W9BFLH	100-100-4-A
W9BYR	368-46-8-AB
W9EOD	322-46-7-AB
W9HSZ	300-75-4-A
W9CJVJ	200-40-5-AB
W9JCS	116-22-5-B
W9CRN	88-22-4-B
W9CWZ	57-19-3-A
K9FBL	42-13-3-AB
K9PAF/9	(K98 PAF PID,
W9A1U))
6168-307-21-ABC	
W9FA/9	(multiope.)
2380-238-10-AB	
W9DOA	(W8BNV,
W9GTTJ, W9HSTU)	
1250-125-10-AB	
W9OKM/9	(4 oprs.)
488-81-6-AB	
W9BHF	(K9YG, W9RYT,
W9EWW))
470-91-5-AB	
<i>Indiana</i>	
K9WZB	1070-107-10-B
K9VFP	630-70-9-AB
K9JTZ	141-47-3-A
K9BBV	90-18-5-A
K9SUT	(K98 QOB RUT)
2886-222-13-AB	
K9LXS	(6 oprs.)
34-43-8-AB	
W9HNJ	(K9RJO, W9HJN)
234-39-6-A	
W9CYG/9	(W98 CYG
DHO)	177-59-3-A
<i>Wisconsin</i>	
K9VNM	3216-201-16-AB
W9DHC	1924-148-13-AB
W9NYA	88-22-1-B
W9TC	72-18-4-B
W9NPN8	48-16-3-B
W9JYP	(W9JYP, W9GAX)
3667-193-19-AB	
K9GSC/9	(13 oprs.)
1184-148-8-AB	
DAKOTA DIVISION	
<i>Minnesota</i>	
W8CCQ	384-64-6-AB
W8IRO	156-30-4-A
W8CAE	14-7-2-B
DELTA DIVISION	
<i>Louisiana</i>	
W5UQR	27-9-3-A
<i>Tennessee</i>	
W4PHW/4	342-57-6-A
W4BJS/4	(K4PKO, W448
BJS PUJ))
2955-197-15-AB	
W4TRC/4	(6 oprs.)
1776-111-16-AB	
W44GJU/4	(18 oprs.)
1877-153-9-A	
GREAT LAKES DIVISION	
<i>Kentucky</i>	
K4RZK	1727-157-11-AB
W4AAJ	1035-115-9-A
W4ERT	456-57-8-A
<i>Michigan</i>	
W8ZCJ	1937-149-13-AB
K8HND	1458-162-9-A
W8CQJ	1044-87-12-AB
W8AEF	756-108-7-A
W8NDZP*	726-66-11-B
K8ZQE	658-91-7-B
W8VRE	560-80-7-B
W8SGCN/4	
140-35-4-B	
W8N8LV/	68-17-4-B
W8GCR	12-4-3-B
K8DUU	(K88 DUU HVO
W8NSB)	2295-135-17-AB
K8WUZ	(4 oprs.)
1432-179-8-AB	
W8BHF	(4 oprs.)
1368-152-9-AB	
W8ACZJ	(W8YAN,
W8ACZJ))
1116-124-9-AB	
K8TIW	(8 oprs.)
610-61-10-B	
<i>Ohio</i>	
K8NYM	3010-301-10-A

KRPLD 1617-147-11-B
 WASEWT
 WBJRN 1096-137-8-A-B
 WADSN 910-10-10-ABD
 WADSN 816-102-8-AB
 K8YWF 783-87-9-B
 K1CRQ/8 714-51-14-B
 W8LQJ 558-55-9-AC
 W8BCXV 408-68-6-A
 W8NGCV 160-32-5-B
 W8N8LS 145-29-6-B
 K8WVZ 108-27-4-A
 W8ASHQ 27-27-1-B
 K8RND 16-8-2-B
 W8HBI/8 (12 ops.)
 22,534-683-33-AB
 W8ADH (5 ops.)
 1188-132-9-A
 W8ACNV (W8AS BOR CNV)
 968-121-8-A
 W8LUZ (W88 LUZ OKT)
 392-56-7-AB

HUDSON DIVISION

Eastern New York

K2CBA*24,255-345-63-
 ACBDE
 WA2PYE 10,800-291-36-ABC
 WN2GSK*
 K2GXJ 2310-154-15-B
 1888-77-23-ABC
 WN2FXB
 1220-122-10-B
 W2HL 468-29-14-BC
 W2CTH 168-28-6-AB
 W2YPM 154-11-7-D
 W2PFSQ 40-15-4-B
 W2WGE 45-9-5-B
 WN2BFB 36-4-4-B
 W2AQD 48-6-3-B
 W2BPKJ/2 (13 ops.)
 15,720-391-10-ABE
 WA2FQA/2 (4 ops.)
 4725-175-27-AB
 WA28VY/2 (5 ops.)
 4602-155-26-ABC
 WA2YHS/2 (WA28 R.XH
 YHS YOB)
 1824-96-19-AB
 WIUDT/2 (WIUDT, WB28
 FRL FRM)
 1278-71-18-AB
 WN2HDS (WN28 HDS IBQ)
 360-40-9-B
 WB2AIV (WA28 PZX ULM
 WQD)
 273-39-7-A

N. J. C.-L. I.

WB2CZI 7380-410-18-A
 K2MUB 2300-100-23-A
 K2RTH 1890-126-15-B
 WH2AXN 1872-117-16-AB
 WA2WVV 1400-140-10-A
 W2KNG 1320-120-11-B
 WB2DUL 1290-129-10-A
 WA2RJJ 1082-84-13-AB
 WA2OOL 1068-89-12-B
 WA2UNC 1008-84-12-A
 WA2YXK 702-78-9-AB
 WA2IKL 688-86-8-A
 WN2GYD*
 576-64-9-B
 W2AGT 516-43-12-B
 WN2FCB 480-60-8-A
 K2ZPU 441-49-9-B
 WA2VNK 432-46-9-AE
 399-57-7-AB
 WA2GFP 370-35-16-AE
 W2RPZ 352-32-11-B
 W2HVL 266-19-7-C
 WA2ZCK 266-38-7-B
 WA2DRK 230-23-10-B
 K2DDK 216-18-6-C
 WA2ZUM 140-35-4-B
 WN2HFE 104-28-4-B
 WA2TTP 75-15-5-A
 WB2FBN 8-8-1-A
 WA2UBH 5-5-1-A
 W2UW/2 (multipl.)
 7440-310-24-AB
 WA2PDI (6 ops.)
 4224-264-16-A
 WB2CNT (WA2ZHL,
 WB2CNT)
 1425-95-15-AB
 WB2GND (WB2ART
 GND), 1332-111-12-A
 WB2BQJ (WA2YSQ,
 WB2BQJ)
 1053-81-13-AB
 WA2YDN (WA2YDN,
 WB2AYT)
 504-63-8-A
 WN2GZH (WN28 GZH KOE)
 413-59-7-B
 WN2KJQ (4 ops.)
 378-54-7-B

Northern New Jersey

WA2HFI 7080-22-130-ABC
 W2AOC 3689-88-31-BC
 WA2PBN 1876-134-14-A

WA2AXY 1860-124-15-B
 WA2VEB 1784-98-18-AB
 WA2BDP 1755-117-15-AB
 WA2UXB 1581-84-17-ABC
 W2IDZA 1400-48-20-ABCDE
 W22VJ 852-71-12-A
 WA2BEM 664-50-11-B
 WB2DEA 450-50-9-B
 WA2FVL 364-52-7-B
 WB2ALP 158-26-6-B
 WB2GYS 140-28-5-B
 WA2OOI 125-25-6-B
 W2CTW 23-16-5-B
 WA2VTE 27-9-8-B
 W2PZZ/2 (9 ops.)
 57,908-868-62-ABCDE
 K2BJP/2 (16 ops.)
 22,145-493-43-ABCDE
 WA2VLR (10 ops.)
 14,222-543-26-ABE
 W2AZL/2 (5 ops.)
 10,024-358-28-AB
 K2ZSQ (K2ZSQ, WB2AOG)
 5994-333-18-A
 WB2DAP/2 (38 ops.)
 1210-121-10-AB
 WA2TGW (4 ops.)
 1177-107-11-AB

MIDWEST DIVISION

Iowa

W0PFL 148-56-8-A
 W0ZBL (4 ops.)
 378-54-7-A
Kansas
 K0GIC 136-34-4-AB
Missouri
 K0LJJ 744-124-6-A
 W0WEQ 700-70-10-AB
 K0ABK 54-14-3-AC
 WA0FLL 131-11-4-A
 W0W 30-7-3-AC
 W0BZV/05 6-3-1-C
 K0HZW 6-3-1-C
 K0CWP (K08 HYR CWP)
 180-45-4-A
Nebraska
 K9KHW/0 204-51-4-A
 WA0DJK 26-18-2-AB

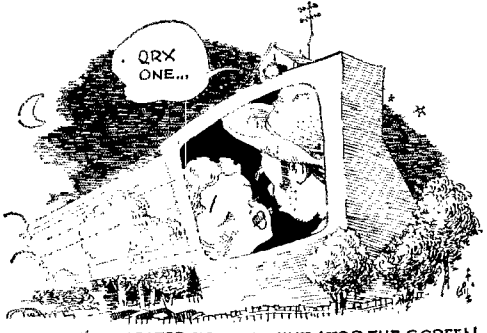
NEW ENGLAND DIVISION

Connecticut

W1RJL 16,354-481-34-AB
 W1WHL 5561-214-26-AB
 K1UOL 3510-195-18-AB
 K1PUG/1 3345-223-15-A
 K1P 2285-155-17-B
 W1ULZ 2080-104-20-AB
 K1TJD 2079-99-21-AB
 K1TOS 1540-140-11-B
 W1DZA 1508-118-13-B
 K1RIS 1065-73-15-B
 K1UUC 1024-84-13-AB
 W1HDQ* 688-29-16-BD
 K1YON 540-45-12-A
 K1OAV 396-44-9-B
 K1RXP 110-35-6-B
 K1QPN 71-29-6-B
 W1AW* 119-17-7-AB
 K1TAX 108-18-6-A
 W1RFJ 84-28-3-AB
 W1NIANB 28-28-1-B
 K1FFP (16 ops.)
 12,655-371-35-AB
 WA1AKP (5 ops.)
 11,024-406-26-ABC
 K1RCK (15 ops.)
 10,052-359-28-AB
 W1LUA (16 ops.)
 8829-245-39-AB
 K1CJY/1 (4 ops.)
 8256-258-32-AB
 W1ORS (4 ops.)
 3933-207-19-AB
 K1SBAL (K1SBAL,
 W1HCU)
 2232-124-18-AB

Maine

K1UGQ/1 5549-170-31-ABC
 W1DDN/1 1272-108-12-A
 K1MTJ 528-66-8-AB
 W1PLN/1 450-45-10-AB
 K1OYB 78-13-6-AB
 W1BCM/1 (W18 ECM,
 MBH) 1140-35-12-B
 K1VTE/1 (K15 OGH, SEV,
 VRO) 108-27-4-B
Eastern Massachusetts
 K1JCC 4375-175-25-AB
 W1JSM 2645-109-23-BC
 W1COP 1054-31-17-CD
 K1KKS 988-76-13-A
 K1QOT 828-59-14-AB
 W1BDF 1476-31-14-B
 W1BKI 440-40-11-AB
 K1ZGH 160-20-8-A
 K1MNO 144-24-6-B



VE3FNV/3 OPERATED FROM A TENT AT THE SCREEN OF A COUNTRY DRIVE-IN

K1ZJW 105-15-7-A
 KN1EJM 19-19-1-B
 K1ABU 2-2-1-A
 W1BU (4 ops.)
 77,672-972-73-ABCDE
 K1KUZ (4 ops.)
 6237-297-21-AB
Western Massachusetts
 W1STR 989-51-19-AB
 K1VFD 376-47-8-B
 W1HDQ/15
 297-33-9-A
 KN1UTL 115-23-5-B
 W1UCB 56-8-7-AB
 K1OOR/1 (19 ops.)
 88,806-128-64-ABCD
 W1BRF/1 (Multi-ops)
 5568-192-29-AB
New Hampshire
 W1FZ/1 5810-150-35-ABCD
 W1UON/1
 5350-214-25-AB
 W1AER 2768-173-16-A
 K1JDY/1 2603-137-19-AB
 W1AZK 2322-79-27-BC
 W1QD 192-24-8-A
 W1ALE (W18 ALE, YOH)
 6690-214-30-ABC
 W1HMP (5 ops.)
 4740-158-30-ABC
 W1BXM (W18 BXM, SWX)
 2124-118-18-B

Washington
 K7IQI 1074-178-6-ABD
 K7TRM 110-35-4-AB
 K9DWR/7 41-41-1-A

PACIFIC DIVISION

Nevada

WA6GER/7 150-25-3-A
Santa Clara Valley
 W6YYS 1620-135-12-AB
 WA6GYD 149-90-14-ABCD
 WA6BYA 333-37-9-AB
 WA6NOV/6 170-34-5-AB
 WA6RNB 88-22-4-AB
 WA6VPL 60-20-3-AB
 WA6CPG 21-7-3-B
 K6KCB/6 (5 ops.)
 4433-341-13-AB
 W6SAW/6 (6 ops.)
 4235-385-11-AB
 WB6ADM (5 ops.)
 3772-252-11-AB

East Bay

K6ZXS/6 581-83-7-AB
 W6BBBC 33-11-3-A
 W6JOX/6 (5 ops.)
 3585-227-15-ABCD

Sacramento Valley

W6NFGM 72-18-4-B
 W6HNB/6 (6 ops.)
 840-84-10-AB
 W6YTO/6 (W68 EUN, YIO)
 800-160-5-B

San Joaquin Valley

W6FZA 420-26-15-ABD

ROANOKE DIVISION

North Carolina

WA4BVW/4 1442-102-14-ABC
 K4QIP 1091-77-13-AB
 K4YJY 858-65-13-ABD
 WA4BY 454-62-7-AB
 K4KHS 384-47-8-ABD
 W4RRK 108-54-2-B
 W4OAB 90-18-5-AB
 WA4MFG 62-62-1-B
 WA4FM 51-17-3-A
 K4BE 34-34-1-B
 K4QJV 21-21-1-B
 W4PAR/4 (K48 HGK, SWN,
 WA4JVD) 1890-134-14-ABD

NORTHWESTERN DIVISION

Oregon

K7SJK 558-91-6-ABCD

(Continued on page 170)



Solid cloud layer moves in below the Tecate Mountain position of WA6TBY/6, near the Mexican Border some 50 miles southeast of San Diego.

Space Conference

Filing Fee Rules

Mail Exams

QSL Bureau Operation

Reciprocal Operating Bill

SPACE CONFERENCE

The Extraordinary Administrative Radio Conference on Space Communication opened on schedule in Geneva, Switzerland, October 7, 1963. Of the 122 administrations/members of the International Telecommunications Union, only about 67 are represented, probably because of the specialized nature of the conference.

The International Amateur Radio Union has been admitted as a participating organization with observer status, and has been represented for all or portions of the conference by SM5ZD, G6CL, G2MI, W3PS, W6SAI, and W1LVQ. The principal item of concern to the amateur service is, of course, satellite communications experimental activities as exemplified by the Oscar program.

At copy time the conference had not yet finished its work. The amateur matter has been discussed first at working-group and then at full committee level, with approval for space satellite activity in the 144-146-Mc. band. Considerable opposition at first came from USSR, largely on concern that amateur satellites might interfere with normal amateur operation; agreement was reached in a small study group with the USSR proviso that the allocation require coordination of satellite activity among national amateur organizations, and that CCIR be asked to recommend technical principles and limitations. In full committee, however, the CCIR study was deleted, over considerable objection by USSR, most countries feeling that amateurs could take care of this aspect themselves. The matter will undoubtedly come up again in the plenary sessions, too late for a final report in this issue. It is almost certain that we shall retain a satellite allocation in 144-146 Mc., but there is an open question on precisely what the conditions will be. However, such conditions as have been proposed will not be a particular handicap to the amateur service, and, therefore, from the practical standpoint the result should not materially affect the Oscar or other satellite programs.

It is worthy of note that the makeup of this conference, even though a specialized one, con-

firms the concern expressed in earlier *QST* editorials and in WØDCA's October article as to a shift in the balance of power at ITU conferences. At Geneva there are 28 administrations from Europe, 11 from Africa, 15 from Asia, 2 from Oceania, and only 8 from the entire Western Hemisphere (including Cuba). Were the high-frequency amateur bands a subject for the agenda, it would most certainly be a critical problem.

FILING FEE RULES

Last month we reported that the Commission had denied our petition (and sixteen others) for rehearing in Docket 14507, and thereby reaffirmed, in spite of almost unanimous opposition of the radio industry, its decision to require the payment of filing fees beginning on January 1, 1964.

Accordingly, Part 12 of the FCC Regulations has been amended by the addition of two new sections, setting forth rates and procedures for the application fees. It is to be noted that the fees are tied to applications, not to the issuance of licenses *per se*; thus, there is no refund of the fee if an applicant fails an examination or the FCC denies the application for any reason. Note, too, that there has been no change in eligibility for special call signs; specific call signs will still only be issued to previous holders of the calls; to clubs wishing to honor a deceased former member by adopting his call for the club station; to former holders of a "two-letter" call wishing to regain such a call; and to special-events stations at activities of interest to the general public. The only change is to require a \$20 filing fee for such applications.

Here is the text of the new rules:

§ 12.85 Payment of fees.

(a) Each formal application for which a fee is prescribed in § 12.86 must be accompanied by a remittance in the full amount of the fee. In no case will an application for which a fee is prescribed be accepted for filing or processed prior to payment of the full amount specified. Applications for which no remittance is received, or for which an insufficient amount is received, may be returned to the applicant.

(b) Fee payments accompanying applications submitted to the Commission should be in the form of a check or money order payable to the Federal Communications Com-

mission. The Commission will not be responsible for cash sent through the mails. All fees collected will be paid into the United States Treasury as miscellaneous receipts in accordance with the provisions of Title V of the Independent Offices Appropriation Act of 1952 (5 U.S.C. 140).

(c) Receipts will be furnished upon request in the case of payments made in person, but no receipts will be issued for payments sent through the mails.

(d) All fees will be charged irrespective of the Commission's disposition of the application. Applications returned to applicants for additional information or corrections will not require an additional fee when resubmitted. Refunds will be made only in the case of payments in excess of the fee prescribed in this subpart.

§ 12.86 Schedule of fees.

(a) Except as provided in paragraph (b) of this section, applications filed on or after January 1, 1964, under this part must be accompanied by the fees prescribed below:

Applications for initial license, including new class of operator license, and applications for renewal of license.....	\$ 4
Applications for modification of license without renewal.....	2
Applications for a combination of modification and renewal of license.....	4
Applications for a specific call sign pursuant to § 12.81(a).....	20

(NOTE: Reassignment of a specific call sign held under an expired license is not subject to this fee if an application for renewal is filed within 1 year after the expiration date of the license.)

(b) Fees are not required for the following types of amateur applications:

- Applications for Novice license.
- Applications for a license for a station for recreation under military auspices.
- Applications filed in the Radio Amateur Civil Emergency Service.

MAIL EXAMS TIGHTENED AGAIN

In November *QST* we reported some changes in the FCC procedures for handling examinations administered by volunteers. The effective date of the order has now been postponed until December 1, and further changes have been made in the routine. Under the newest rules, candidates will obtain a Form 610 from an FCC office, and locate an examiner who is at least 21 years of age and holds a General or higher amateur license, or holds a commercial radiotelegraph license or operates a government radiotelegraph station manually. The examiner first administers the sending and receiving code tests. Within ten days after the applicant passes the code tests, the examiner forwards the application, the applicant's check or money order payable to FCC when required, and his certification of the code test together with the examiner's and applicant's complete name and permanent address, and the examiner's qualifications to supervise the test. The papers will then be forwarded only to the examiner, who must return them within the time specified.

OTHER FCC RULES CHANGES

In the same order, the Commission specified that candidates for examination before an FCC engineer must file their applications and fees when required in advance. The engineer will then schedule the applicant for testing at the district office or a field point.

The FCC further changed its rules, making it possible to request a duplicate license by letter

instead of by formal application, thus saving the fee in such cases.

The FCC Order adopting all these changes appears below:

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

In the Matter of
Amendment of Sections 12.22 and
12.44(c) of the Rules governing
applications and examinations for
Amateur Radio operator licenses

ORDER

At a session of the Federal Communications Commission held at its offices in Washington, D. C. on the 16th day of October, 1963;

The Commission having under consideration Section 12.44(c) of its rules as amended by its Order (FCC 63-813, 28 FR 10206) adopted September 11, 1963 and effective November 1, 1963 and Section 12.22 of its rules, both of which govern, in part, applications and examinations for amateur radio operator licenses; and

IT APPEARING, That, Part 12 of the Commission's Rules should be amended to specify that the filing of a formal application (FCC Form 610) at the District Field Office involved is a prerequisite for applicants desiring examinations conducted by such office, and that when the examination will be supervised by a volunteer examiner the request for the written portion of the examination must be made in writing by the examiner after the applicant has passed the required code test and submitted a formal application (FCC Form 610) to the Commission's Office at Gettysburg, Pennsylvania; and

IT FURTHER APPEARING, That, the requirement that a formal application be filed for obtaining a duplicate license is no longer necessary; and

IT FURTHER APPEARING, That, subparagraph (1) of Section 12.44(c), as adopted by the Commission's Order, FCC 63-813, effective November 1, 1963, should be superseded by the amendment of Section 12.44(c) in this Order so as to reflect the rule change adopted herein; and

IT FURTHER APPEARING, That, the effective date, November 1, 1963, of the Commission's Order, FCC 63-813, should be stayed until the effective date of this Order; and

IT FURTHER APPEARING, That, the amendments adopted herein and set forth in the attached Appendix are procedural in nature and hence are not subject to the prior notice provisions of Section 4(a) of the Administrative Procedure Act; and

IT FURTHER APPEARING, That, authority for the issuance of these rules is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended;

IT IS ORDERED, That the effective date of the Commission's Order, FCC 63-813, adopted September 11, 1963, is stayed until the effective date of this Order; and

IT IS FURTHER ORDERED, That, subparagraph (1) of Section 12.44(c), as previously adopted by the Commission's Order, FCC 63-813, is superseded; and

IT IS FURTHER ORDERED, That effective December 1, 1963, Sections 12.22 and 12.44(c) of Part 12 of the Commission's rules are amended as set forth in the attached Appendix.

FEDERAL COMMUNICATIONS COMMISSION
HEN F. WAPLE
Secretary

Released: October 17, 1963

Appendix

1. Section 12.22 is amended to read as follows:
§ 12.22 Application for Operator License.

(a) An application (FCC Form 610) for a new operator license, including an application for change in operating privileges, which will require an examination supervised by Commission personnel, shall be submitted to the district field office of the Commission which exercises jurisdiction over the area in which the applicant resides. Upon receipt of the application, and any necessary filing fee (See § 12.86), the district field office will make arrangements for conducting the required examination either at its location or at an examination point within its area.

(b) An application (FCC Form 610) for a new operator

license, including an application for change in operating privileges, which requests an examination supervised by a volunteer examiner under the provisions of § 12.14(c), shall be submitted to the Commission's office at Gettysburg, Pennsylvania 17325. The application shall be accompanied by any necessary filing fee (See § 12.86) and by a request for the written examination material (See § 12.14(c).)

(c) An application (FCC Form 610) for renewal and/or modification of license when no change in operating privileges is involved shall be submitted, together with any necessary filing fee (See § 12.86), to the Commission's office at Gettysburg, Pennsylvania 17325.

2. Section 12.44(c)(1) is amended to read as follows:

* * * * *

(c) * * *

(1) Within ten days after passing the required code test, an applicant shall submit an application (FCC Form 610), together with any filing fee prescribed by § 12.86 to the Commission's office at Gettysburg, Pennsylvania 17325. The application shall include a written request from the volunteer examiner for the appropriate examination papers. The examiner's written request shall include (i) the names and permanent addresses of the examiner and the applicant, (ii) a description of the examiner's qualifications to administer the examination, (iii) the examiner's statement that the applicant has passed the code test for the class of license involved under his supervision within the ten days prior to submission of the request, and (iv) the examiner's written signature. Examination papers will be forwarded only to the volunteer examiner.

NOTE: When the applicant is entitled to examination credit for the code test pursuant to § 12.46(b), an application may be submitted without regard to the ten day limitation. The examiner's request should then state that a code test was not administered for that reason. The applicant should furnish details as to the class, number, and expiration date of the Commercial radiotelegraph operator license involved.

QSL BUREAUS

Last spring the operation of QSL Bureaus was questioned by a postal inspector on the grounds that the shipping of mail from or to various people in one package violated Section 25 of the Private Express Statutes, intended to prevent private competition with the Post Office.

After consultation between ARRL and Post Office Department officials, a ruling in favor of our QSL bureaus has been made. As long as QSL cards merely confirm in writing information already known to the addressee, they are not letters, and therefore are not affected by Section 25. Pertinent paragraphs of the ruling by the POD General Counsel's office are reprinted below:

"A question arises whether a violation of the Private Express Statute results from the [normal QSL Bureau procedures]. If the cards contain live, current information upon which the addressee is expected to act, rely or refrain from acting, then the cards would be considered letters. If, however, the cards contained old information, previously communicated to and known by the addressee, then normally the cards would not be considered letters.

"After examining the exhibits you furnished, and considering the purpose which the exchange of QSL cards serves, we have concluded that the cards contain old information, already communicated to and known by the addressee at the time of the air contact. We do not believe the QSL cards are sent for the purposes of verification

within the meaning of Section 9 of the pamphlet, 'Restrictions on Transportation of Letters,' . . . As used in Section 9, verification is for the purpose of assuring the accuracy of the information. Here, the basic purpose of the QSL card appears to serve as written proof an air contact was in fact made. Accordingly, the cards are not considered letters within the meaning of the Private Express Statutes, provided they contain no matter extraneous to the information exchanged in the air contact. We do not believe the grouping of the QSL cards in one envelope violates Section 25 of the pamphlet because the cards are not letters . . .

HARVEY H. HANNAH
Acting General Counsel"

SENATE APPROVES GOLDWATER BILL

On October 16 a calendar session of the Senate approved and sent to the House of Representatives the bill for reciprocal operating privileges, S. 920, with minor amendments. Most of the amendments were purely technical; one, however, is of interest. Designed to meet reservations on security held by government agencies, the amendment added the following:

"*Provided*, that when an application for an authorization is received by the Commission, it shall notify the appropriate agencies of the Government of such fact, and such agencies shall forthwith furnish to the Commission such information in their possession as bears upon the compatibility of the request with the national security; *And provided further*, that the requested authorization may then be granted unless the Commission shall determine that information received from such agencies necessitates denial of the request."

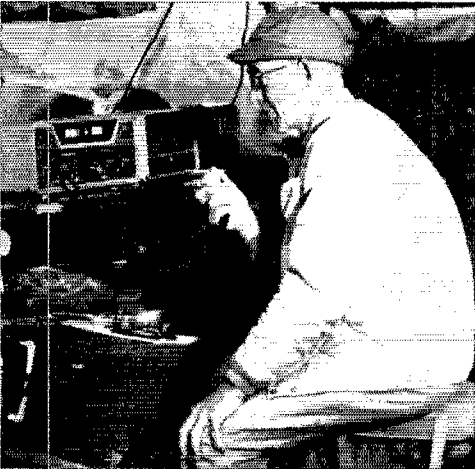
Let the procedures above be interpreted so closely that the effect of the bill is lost, the Senate Commerce Committee added to its report the following:

"It is the hope of the committee that the Federal Communications Commission in working out the procedures implementing this legislation, will not establish cumbersome procedures that may defeat the objectives that underlie the purpose of the bill. It should be noted here that time will frequently be of the essence when authorizations are requested, where perhaps vacation and travel plans are made on rather short notice. Delays necessitated by coordinating with so many agencies must not be permitted to derogate from the very type of good will which the bill intends to promote. The Committee expects, therefore, that all agencies involved will treat such matters expeditiously."

The bill now goes to the House Committee on Commerce, of which Representative Oren Harris of Arkansas is chairman. Amateurs are urged to write Chairman Harris and their own representatives asking for their early action on and support of the bill.



(left) Tommy Doucet, VE1ALV, has been crippled with multiple sclerosis since age 8. He recently earned his DOT license after teaching himself the code and theory. Tommy, now 20 years old, earns some money by repairing radios for his neighbors in Belleview Cove, Nova Scotia. (right) Here's P. J. Faulkner, K6CRA, possibly the world's oldest living ham. Jack grew up with the telegraph in Louisville and New York, and worked as a telegrapher until his retirement in 1944. He was there in the early days of amateur radio, being a former holder of 2BFH and W2IKZ. Jack, now 90, says "I tell my friends I have nothing to do but eat, sleep, and work ham radio. It's a dog's life . . . but I love it!" An eight-foot shelf has been filled with file cards, one for each QSO since 1920. The fellow who got Jack started in ham radio was W2MB, and they QSOed more than 1100 times before W2MB's death in 1958. Those who have worked K6CRA tell us that he is a real sharp operator, both phone and c.w.



(left) W9APN, (shown operating a Hallicrafters SR-150 with a.c. power supply), and W9DOO went on a fishing trip in early September to Old Woman's Lake, in the wilds of northern Ontario, where the only means of access is by air. The rig was powered by a Zeuss 1250-watt generator, and the antenna was a trap dipole 110 feet long. Using the call W9DOO/VE3, they made many contacts with stations all over the Western Hemisphere. (right) Here's Jim Rees, K9YKH, holding a handsome plaque awarded him by the Indiana Radio Club Council when they named him Indiana's Outstanding Radio Amateur of 1963. Jim earned the award by teaching radio code and theory at the Indiana School for the Blind. Several students have been licensed through Jim's efforts.

These two suave pipe-smoking individuals are WA4FJM (background) and W4MFK, RM and SEC respectively of North Carolina. The picture was taken in passing by the ARRL official photographer inside W4MFK's personal communication van, which attracted a lot of attention in the ARRL parking lot last August.



The following speech was made by Ivan H. Loucks, W3GD, Chief of the Amateur and Citizens Radio Division, FCC, before a meeting of the Quarter Century Wireless Association in New York on October 25, 1963. Its message is so important that it deserves careful consideration by every amateur.

Amateur Radio and Public Service

I AM sure that it is no news to a group of old-timers like yourselves that Amateur Radio is often classed as a hobby, and as a very interesting one at that. It is probably also not news that Amateur Radio is said to be the only hobby that is basically governed by International Regulations. The very fact that it is governed by International Regulations, however, makes it a radio service, defined as "A service of self-training, intercommunication and technical investigations carried on by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

In the United States, this Amateur Radio Service is administered, along with all of the other radio services, by the Federal Communications Commission, under the authority and *mandate* of the Communications Act of 1934, as amended. It is this mandate to the Commission which should be of particular interest to us as amateurs -- our licenses, our frequencies, and the rules under which you and I are permitted to operate our amateur radio stations are all subject to a determination by the Commission that public interest, convenience or necessity will be served thereby. In passing, it might be well to mention that many persons seem to confuse their own personal interests or convenience with that of the public at large. The high incidence of "problem children" among the Class D station licensees in the Citizens Radio Service is a very glaring example of this, but I am afraid that the attitude is also seeping over into the Amateur ranks. Nothing could prove more fatal to amateur radio, as such, than to have that attitude become dominant. You have heard before, and you will undoubtedly hear again, that amateur radio must justify itself as a "Service" -- if it becomes merely a "hobby" there will be no defense against the other communication services which are continually looking for more frequencies on which to transmit their necessary traffic. Ships, aircraft, international telephone and telegraph circuits, private and governmental users of all kinds and, yes, international broadcasting are all cramped for spectrum space and are very possibly eyeing our amateur bands as a means of relief. It is up to all of us, as dedicated amateurs, to justify our frequency bands and our Amateur Radio Service,

on the scales of *public* interest, convenience and necessity.

In the FCC rules, you will find that the fundamental purpose of the amateur radio service is expressed as five basic principles, all designed to meet the criteria which I have just mentioned. These are, and I quote:

- (a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.
- (b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- (c) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.
- (d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.
- (e) Continuation and extension of the amateur's unique ability to enhance international good will.

That, gentlemen, is the Charter of amateur radio in the United States. If you haven't read it lately, I would seriously urge that you do so. It is contained in the "Basis and Purpose" of the Amateur Radio Service rules and deserves your careful consideration. Ask yourselves, if you please, which way is amateur radio going in the United States, where will it possibly end, and what you are doing or can do to preserve this wonderful avocation of ours for ourselves and those who become amateurs in the future. None of us can have much effect, individually, but if we work together we can certainly steer the future of amateur radio in the way that it should go.

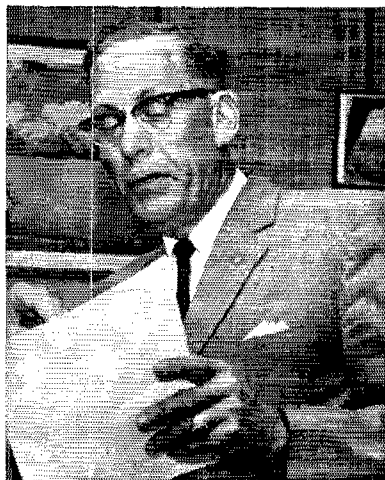
It would take hours to adequately discuss all of the five basic principles involved in our "Charter" for amateur radio, particularly if I were to cover the "pros" and "cons" of those principles involved in the League's recent petition on incentive licensing. Since that petition has been filed with the Commission, has been the subject of numerous articles and editorials in many of the amateur magazines, and has already generated a flood of correspondence with the Commission, it would not be appropriate for me to seem to pre-judge it by discussing its merits or its relation to the basic principles of amateur radio. However, there is one of them which seems

only remotely involved, so with your permission I would like to expose my personal thinking on it. *This relates to the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.*

From the beginning of amateur radio, the amateurs have freely and willingly provided *emergency communication facilities and circuits*, when normal means of communication were disrupted or inadequate as a result of natural disasters such as flood, fires, earthquakes, hurricanes, et cetera. As a corollary, amateurs have in the past provided communication facilities in connection with marshalling parades, conducting boat races, and many other types of public functions where such communications were needed. They still do, but the percentage of amateurs who are ready, willing and able to do so seems, in my perhaps jaundiced eye, to be gradually decreasing. True, we still have our RACES, ARLEC and other emergency amateur organizations, but they all seem to be suffering from a bad case of apathy on the part of the licensed amateurs themselves.

Do you know what appears to be happening in these cases nowadays? Numerous cases have been reported to me where the amateurs have passed up the opportunity to be of public service and a new and enthusiastic group of radio licensees has taken over. Yes, I refer to the Class D station licensees in the Citizens Radio Service. These licensees, operating low-power units in the eleven-meter ISM band, have organized themselves into local groups which are currently performing many of the functions for which amateur radio has been noted in the past. They have conducted search and rescue operations, they have provided communications in fighting forest fires, and they have affiliated themselves with Civil Defense organizations for all types of local civil defense communications. In addition, they have organized, almost on a national scale, in a program designed to help any part of the traveling public in need of assistance or information in the towns or on the highways of the nation. In short, if the amateurs do not look to their laurels, the so-called Citizens Banders will shortly replace the amateurs in the public esteem for the public service activities in which they engage.

I cannot suggest any type of "instant cure" for this situation. In fact, I doubt that there is one. Certainly, incentive licensing as such cannot improve it — each amateur must have a personal incentive, a dedication if you please, to volunteer his time and the use of his equipment, not only for the performance of such public service activities when needed but to train and drill in advance so that when needed he will be able to do the job with efficiency and with credit to himself and the amateur fraternity as a whole. He must be able to meet on a common frequency which is suitable for the purpose, with other amateurs of like dedication. In other words, he must have equipment which will do the job and must use the same mode of operation as the



Ivan H. Loucks, W3GD.

other stations with which he is communicating to provide that service. When we consider that amateurs operate in eight h.f. and v.h.f. bands, using everything from c.w. and RTTY to f.m., a.m., and s.s.b., we will concede that there certainly is a problem of compatibility if they are to work together. Admittedly, the CB'ers are possibly in a better position to carry on *local netted operation* — their equipment is all a.m. phone and it all operates on spot frequencies in the eleven-meter band. There are also more of them than there are of amateurs and many of them have several transmitters so that the total potential in any given area is higher. This, however, should be considered as a challenge by the amateurs rather than a deterrent. After all, with the number of frequency bands available to the amateurs, our circuits can be tailored to specific needs. In any full-scale disaster, natural or man-made, long-haul and medium-haul circuits will be needed as well as local ones. What could be more logical than a complete integration of all of the emergency radio capabilities in any given area when they are needed, regardless of whether they are amateur or CB? Advance planning for such integration could also serve to acquaint the licensees in each of these groups with the capabilities and problems of the licensees in the other.

Yes, gentlemen, we as amateurs are bound by our "Charter" to provide a non-commercial communication service, particularly in the emergency situation. Unless we are willing to abrogate our responsibilities for public service as licensed amateurs, we must do our share toward keeping amateur radio active on that public service front. We can share the job with others who are able and willing, but we cannot afford to sit back "fat, dumb, and happy" to rest on our past accomplishments and "let George do it." We must continue to provide that non-commercial communication service, particularly with respect to providing emergency communications, which is first and foremost among the reasons for our existence.

□□□

Amateur License Figures

The following figures are supplied through the courtesy of the *Radio Amateur Callbook Magazine*, and are based on an analysis of the Winter edition of the *Callbook*.

Call Area	State	Novice	Tech-nician	Con-ditional	General	Advanced	Extra	Club	Military	Second station	State totals
#1	Conn.	292	740	915	1,618	685	53	85	14	57	4,459
	Maine	72	101	769	329	262	34	19	24	33	1,643
	Mass.	595	3,298	632	4,060	1,685	169	128	52	141	10,760
	N.H.	77	370	173	473	186	25	18	12	52	1,386
	R.I.	76	580	114	598	198	22	28	8	21	1,645
	Vt.	48	57	259	120	80	9	8	9	24	614
		<u>1,160</u>	<u>5,146</u>	<u>2,862</u>	<u>7,198</u>	<u>3,096</u>	<u>312</u>	<u>286</u>	<u>119</u>	<u>328</u>	<u>20,507</u>
#2	N.J.	807	3,685	334	5,049	2,106	210	133	35	123	12,482
	N.Y.	1,685	6,871	954	9,824	3,353	312	288	85	195	23,567
		<u>2,492</u>	<u>10,556</u>	<u>1,288</u>	<u>14,873</u>	<u>5,459</u>	<u>522</u>	<u>421</u>	<u>120</u>	<u>318</u>	<u>36,049</u>
#3	Del.	34	129	41	264	76	7	9	8	11	579
	Md.	241	886	233	2,020	849	74	47	31	56	4,437
	Pa.	908	3,654	840	5,811	1,948	167	172	64	164	13,728
	D.C.	27	146	27	307	171	24	17	16	24	759
		<u>1,210</u>	<u>4,815</u>	<u>1,141</u>	<u>8,402</u>	<u>3,044</u>	<u>272</u>	<u>245</u>	<u>119</u>	<u>255</u>	<u>19,503</u>
#4	Ala.	246	648	975	1,139	368	35	20	21	21	3,473
	Fla.	444	1,385	1,889	2,871	1,537	124	74	46	185	8,555
	Ga.	244	582	1,007	1,288	521	44	42	42	34	3,804
	Ky.	146	407	570	699	316	22	16	24	22	2,222
	N.C.	243	511	1,148	1,319	562	33	40	39	53	3,948
	S.C.	120	70	1,198	323	151	7	19	31	19	1,938
	Tenn.	214	1,144	722	1,347	453	39	26	15	39	3,999
	Va.	318	717	860	2,005	908	82	47	60	56	5,053
		<u>1,975</u>	<u>5,464</u>	<u>8,369</u>	<u>10,991</u>	<u>4,816</u>	<u>386</u>	<u>284</u>	<u>278</u>	<u>429</u>	<u>32,992</u>
	#5	Ark.	99	214	498	433	196	17	15	17	31	1,520
La.		191	354	900	941	397	35	36	28	38	2,920
Miss.		84	121	629	434	203	13	15	16	34	1,549
N.Mex.		67	75	717	336	283	25	13	17	19	1,552
Okla.		148	659	594	1,089	523	38	29	27	37	3,144
Texas		780	2,351	3,596	4,563	2,087	165	129	124	120	13,915
		<u>1,369</u>	<u>3,774</u>	<u>6,934</u>	<u>7,796</u>	<u>3,689</u>	<u>293</u>	<u>237</u>	<u>229</u>	<u>279</u>	<u>24,600</u>
#6	Calif.	<u>2,124</u>	<u>8,592</u>	<u>3,582</u>	<u>13,534</u>	<u>7,034</u>	<u>475</u>	<u>415</u>	<u>253</u>	<u>355</u>	<u>36,364</u>
#7	Ariz.	127	517	621	898	442	37	22	42	54	2,760
	Idaho	62	39	678	118	146	10	9	24	14	1,100
	Mont.	59	36	714	128	144	16	13	13	10	1,133
	Nev.	23	32	291	101	87	3	5	16	26	584
	Oreg.	277	580	911	1,427	641	37	60	45	40	4,018
	Utah	82	241	185	465	172	16	9	19	14	1,203
	Wash.	406	1,119	1,358	2,321	1,087	85	58	49	44	6,527
	Wyo.	18	16	252	87	63	7	9	4	7	463
		<u>1,054</u>	<u>2,580</u>	<u>5,010</u>	<u>5,545</u>	<u>2,782</u>	<u>211</u>	<u>185</u>	<u>212</u>	<u>209</u>	<u>17,788</u>
	#8	Mich.	786	2,720	1,064	3,785	1,187	77	95	42	105	9,861
Ohio		1,104	5,151	580	5,474	1,965	122	184	59	104	14,743
W.Va.		135	448	228	655	182	8	21	13	21	1,711
	<u>2,025</u>	<u>8,319</u>	<u>1,872</u>	<u>9,914</u>	<u>3,334</u>	<u>207</u>	<u>300</u>	<u>114</u>	<u>230</u>	<u>26,315</u>	
#9	Ill.	1,115	3,381	1,828	5,334	1,965	146	187	53	150	14,159
	Ind.	401	2,017	509	2,222	793	46	97	25	68	6,178
	Wisc.	342	740	1,041	1,460	718	49	66	35	39	4,490
		<u>1,858</u>	<u>6,138</u>	<u>3,378</u>	<u>9,016</u>	<u>3,476</u>	<u>241</u>	<u>350</u>	<u>113</u>	<u>257</u>	<u>24,827</u>
#10	Colo.	178	398	677	1,027	509	38	26	36	39	2,928
	Iowa	275	612	724	1,519	638	39	38	22	45	3,912
	Kans.	236	310	1,187	1,043	498	35	39	57	30	3,435
	Minn.	261	547	969	1,531	652	47	46	25	25	4,103
	Mo.	340	1,041	928	1,891	778	55	59	28	45	5,165
	Nebr.	151	291	553	689	292	20	27	18	6	2,047
	N.D.	37	16	501	68	83	7	8	11	10	741
	S.D.	50	57	284	213	116	4	10	12	13	759
		<u>1,528</u>	<u>3,272</u>	<u>5,823</u>	<u>7,981</u>	<u>3,566</u>	<u>245</u>	<u>253</u>	<u>209</u>	<u>213</u>	<u>23,090</u>
	KH6	Hawaii									
KL7	Alaska										1,117
Misc.	K's										1,592
											<u>4,167</u>
Grand totals		<u>16,795</u>	<u>58,656</u>	<u>40,259</u>	<u>95,250</u>	<u>40,296</u>	<u>3,164</u>	<u>2,976</u>	<u>1,766</u>	<u>2,873</u>	<u>266,202</u>



How's DX?

CONDUCTED BY ROD NEWKIRK, * W9BRD

How:

A DXpedition, stripped of rampant rumors, perplexing geography and other incidental complications, boils down to basic status as a one-station or one-callsign DX contest. This transitory species of operating competition, now so popular with DXers world wide, is usually plagued by distressing motivational uncertainties. The mortality rate and aborted outputs of even the most carefully planned DXpeditions remain unsatisfactory enough to generate possibly more disappointment than delight among the brethren; this even granting that all pleasure be ninety per cent in the anticipation. Ergo, there are not enough high-output DXpeditions to go around, and there's a crying need for something to be done.

DXdom licked the DX station QSL-overload bugaboo a few years ago by instituting specialized volunteer stateside QSL agents. Works quite smoothly, even though lack of operator signatures, exotic postmarks and rare overseas postage may subtract all glamor from QSL exchange. "Awards" hunters recently have simplified their field, too, dispensing in many instances with the nuisance of QSL inspection. Works quite smoothly, even though lack of proper confirmation audit by sponsors may subtract all authenticity from the wallpaper. Why, then, should DXers have to suffer the inconvenience of having their beloved one-station DX contests run in the old-fashioned hit-or-miss DXpeditionary manner?

Instead of waiting breathlessly for somebody to hack through the red tape of authorization difficulties, transportation obstacles, equipment shortcomings, operator incompetencies, financing inadequacies, publicity insufficiencies, time deficiencies and other vitiating DXpeditionary confusion, let's do it a sure and simple way. Let's periodically select a topnotch operator with a topnotch station, preferably off the mainland — KH6LJ or KV4AA, for example — and label his location, say, Adamland — '63. Then, with plenty of surefire advance notice, at the appointed time on the appointed frequency we all start piling up. Next week end it might be KP4CC's turn as Bakerland — '63, and so on right through the ARRL Phonetic Alphabet. Even qualified W/K/VEs eventually could rate a shot at being target for tonight!

Sooner or later, under the present archaic system, some heroic but unfortunate DXpeditioner is going to fall off a mountain or feed the fishes while groping for some inaccessible principality or impossible island. You want blood on your hands? Better to end this dangerous procedure

in a hurry. Think of the wealth of time, trouble and "contributions" to be saved. No new DXCC countries, you complain? Well, most of the big noise in today's DXpeditionary pile-ups seems to be produced by guys who already have QSLs from the targets concerned. Their kick is the chaotic excitement of the hunt, *any* hunt, plus the opportunity to check their beams against local competition. We can easily leave rare countries to hams who just happen to be there.

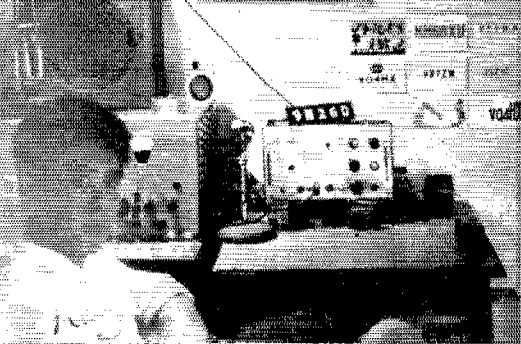
What:

Appreciable easing of atmospheric QRN up our way normally brings us to that time of year when the lower-frequency portion of the DX spectrum moves into higher gear. But this has been an unusual year. We don't recall a summer and autumn that produced less static (and less rain!) than 1963. Night after night one could push ones r.f. gain up to midwinter monitoring levels. The customary limiting factor, QRN, just wasn't there most of the time, and the DX threshold became winterlike, ionospheric instead of atmospheric. So what comes next? What kind of a DX winter is in store?

15 phone is a real bomb to Africa lately, especially for 21-Mc. men in southerly latitudes. Ks 1VWL, 2VFE, 6SXX, 47QXG, 9GVB, WAs 2ZVJ, 4AYX, 4DZU and 5AER write Jeeves about CEs 2AW, 3AGI*, CRs 4AG (21,300 kc.), 3000 (GMT, 4AY, 5SP (240) 18, 6AN (21), 6AT (230) 20, 6CD (220) 20, 6CY (230) 17, 6DU (280) 20, 6EZ (19), 6GC (265) 20, 6GO (280) 18, 7IZ (180) 18, CT1s GJ 18, JH 19, QF 19, EA8s CK (240) 18, DAL (210) 21, ELs 2S (300) 16, SS, FG7XL (255) 23, FM7WE (230) 12-21, HIZH1*, JA1MTH, KB6CP* (438) 23, KV4CM*, TL8AC (290) 19, TN8AA (240) 18, TU2AU* (430) 18, VP3, 2AE (210) 23, 2AQ, 2AR (240) 16, 2S1Y (270) 0, 4PS (230) 21, 4TR (280) 20, 6ZK (230) 21, 9F1Y 22, VO1MH (260) 18, YS1MPB, Ys 1NT (300) 17, 4EF, ZB2A (236) 21, ZK1AR (210) 23,



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



9M2GD of Ipoh hunts his DX with a Phillips 266 receiver, homebuilt 5763-6146 transmitter, 40/20-meter inverted V and 15-meter rotary dipole. At right 9M2JJ (seated) visits Penang's 9M2FK where a DX-100, AR-88, 7-Mc. dipole, 14-Mc. phased array and 21-Mc. yagi spinner catch plenty of rare ones. 9M2JJ is with the Peace Corps and signs W8SWN when home in Michigan. (Photos by 9M2s GD and JJ).

ZS9G (210) 18-20, 5A1TK (217) 18, 5B4RA (300) 13, 5H3JL (270) 20, 5N2CKA 17, 5X5JK 18, 6W8AE (252) 16, 9G1s DN 18, EC 19, EZ 18, GF 19, 9Q5s CP 21, HF (220) 20, OB (273) 19, PB (255) 14, TR (300) 18, TU (230) 19, 9U5ID (255) 18 and assorted other Caribbean and South American items, the rare asterisks indicating s.s.b. users.

15 c.w. supplies Ks 1VWL 2YFE 4IGD 6SXX/4 7KTE 0JPL, WAs 2ZVJ 4AYX 6VAT 6WTD 8EWT and 0BMW with such items as CR6s CY 1A DX FW, G2FMI, HC2IU, HK3s HY RQ, HP1s AC (65) 21-22, IE (18) 18, JAs 1DWN/mm (60) 18, 7AD (28), KG6AA* (27), KZ5s FZ (89) 22, WE, LZ1FO (40) 21, OAs CG NQN (85) 0, PZ1s BH CK, T12FP (110) 0, UA0EH (29), UB5FG, VP's 2MM (33) 19, 5GT 5NK 8GQ (26) 17, VQ2BC (70) 18, W4WQQ/VP9 (54) 19, WP4s BKS (150) 0, BNL (110) 23, HNT (120) 23, BOF BOJ (110) 22, BOR, YN1AA, YO7DO, YVs 4BE (56) 0, 5BOA, ZB1RM (48) 21, 5H3J, 5N2ACB, 5U7AC (25) 17, 6W8DF, 9Q5s AB and TJ (30) 18-19.

15 Novice correspondence from WNs 2JFQ 2JJK 8HGR and 9ICQ mentions catches like CP5EEZ (140) 15, GTIUT, DJ2SR, HP1AC (150) 16-17, KG4BH (135) 15, KH6s EHR (135) 19, ESU (135) 20, KZ5s DGN EHN IQ NZN (140) 19, PY5AS, T12FP (135) 23, WG6AOM, WP4s BKS BNT BOF BOR BPR, XE1s AX (135) 0, C'DX (135) 19 and ZL3BLEF (135) 23. The lads keep the ball rolling, sunspots or no.

10 phone's north-south path remains entertaining. Africa pops in once in a while, but Europeans are as rare as Asians. W5ERY and K2YFE specify comebacks from CR6BR (310) 19, CT1PM (310) 19, CXs 1AAM (508) 19, 9PP (600), HC1EL, HKs 1XT (570) 20, 0AI, HR3DW (600) 21, KZ5s CD SS (510) 19-20, OA6AI (610) 20, PY7BV 19-20, T12EA (600) 20, VPGNV (610) 18-19, YV5BRI (510) 21 and a half dozen dependable LU brethren.

40 c.w. displays an attractive assortment for sampling by Ws 6YKS 7DJU, Ks 1VWL 5JVF 6SXX/4 6TZX 7QXG 0JPL, WAs 2ZVJ 6GNU 6WTD 8BPV 9FMQ and WB6DEJ. Namely VY9SX, DM3YFH, DU7EV, FG7XC (18) 11, FY7VK (10) 10, HI3PC (7) 10, HKs 1QQ 3RQ (12) 6, HL9KH (10) 10, HP1IE (1) 5, JAs 1EQM 1EYR 1HXX 1NLX 2BVS 2CFZ 2GG/mm 3BHO 3BQH 3EXJ 3TL 3YBQ 5AKC/mm 6AHY/mm 7AKQ 7APP 8ACQ 8ZC, KC4USN (8) 5, KG4AM, KL7PI, KP4BJI, KV4AA (9) 11, KX6AJ, KZ5s KW MQ (15) 6, L03ZL, LZs 1KAA 2KAB, OA6W (29) 9, OH9QB (2) 7, PJ2ME (5) 2, SM3CAE/mm, TG9AD (15) 5, T12FP (10) 10, UA0s EQ (12) 9, LH, UB5KEP, UW0FK (2) 14, plenty of VKs, VP's 2MM 2VS (9) 4, 6AQ (21) 9, 6RB, VR2s EH (3) 11, EK (90) 8, VS1LU (14) 0, W4WQQ/VP9 (13) 8, W0GZM/KP4, XEs 1GGR 2CB (90) 4, 2DX 2FJ 2MK 2UB 2ZZZ, YNs 1AA (24) 10, 3KM (8) 13, YOs 0F OU, YVs 3BW 3OS 6BW, lots of ZLs and Marion Islander ZS2MI (6) 9. Ks 1VWL and 6SXX/4 tried 40 phone for KC4USV (225), T12JIC, VP7NX and some maritime mobiles, all on single-sideband.

80 c.w. still looks rather pale, but Ws 1SWX/1 and 7DJU shook the 3.5-Mc. tree for DLs 1FF 1KB 7AA, EI9J, some Gs, KL7AUG, KP4APY, KV4CI, LZ2KSK, OK1MG, OX3DL, PY1BTX, SM5s BAU GZ, SP8ART, VKs 2EO 2VN 4YP, ZK1BW and ZLIAZE.

160 c.w. fireworks, already underway, will be accelerated by the Annual 160-Meter Transatlantic and World-wide DX Tests, a tradition established way back in 1932. As announced by ringleader W1BB, DX efforts will be especially concentrated between the hours of 0500 and 0730 GMT on these dates (Sundays): December 1 and 15, January 5 and 19, February 2 and 16. It is recommended

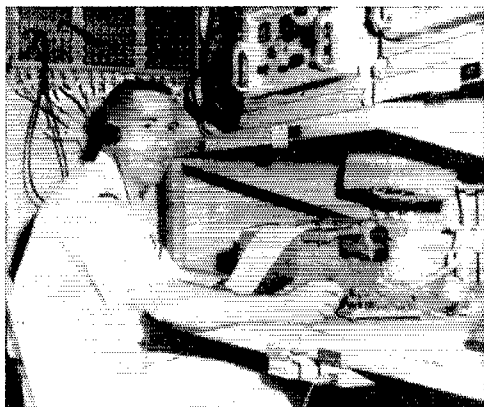
that W/K/VE stations call CQ DX TEST for the first five minutes of the hour, listen carefully for the next five minutes, call again during the third five-minute period, etc., until the DX ball starts bouncing. Obviously, your clocks should be synced with WWV to avoid overlap. As Stew puts it, "Working DX on 160 is challenging and extremely interesting. Obstacles such as static, BC harmonics, QRMI, Loran, 1.8-Mc. fading and other low-band characteristics require extreme patience, a topnotch station and expert operating techniques." Once again we caution those preparing to fire up on 1.8 Mc. to inspect page 60, July '63 QST, wherein will be found power input and frequency limits applicable to particular locations. Good fishin'—please keep W1BB and this column apprised of your DX results on old 160!

* * *

No space for a 14-Mc. check this month, but thanks to Ws 7DJU 7YRO 9GFF, Ks 1UJW 1VWL 3SLP 4GD 6SXX/4 6TZX 7KTE 0JPL, WAs 2ZVJ 4CZM 5AER 6VAT 6WTD 8BPV 8EWT 9FMQ 0BMM 0EAS, WVs 2BEV and 6DEJ for 20-meter data. Next issue, perhaps.

Where:

ASIA—WB6FTD, who signed HL9KT circa 1960-'61, discusses Korean hamming and DX QSLing in general. Some of the points he emphasizes: "The military APO mail system is efficient (in most cases) and cheap. Mail to APO addresses goes at the same rate as ordinary U.S. mail back home; I wish I had the money wasted by W/Ks who do not realize this. As HL9KT I received all kinds of mail addressed APO 301, San Francisco, Korea, with 25 cents postage when only 8 cents would do. Airmail transit normally required three days from the U.S.A. to Seoul, while surface mail would be en route for a month or two. Since the normal tour of Korea duty was thirteen months, some HL9 calls changed hands quickly. I still receive QSLs for HL9KT QSOs made long after I left that station; these I forward to the chief op of AB4USA (MARS call of HL9KT) but I don't know what happens to them after that. I think most QSLs are eventually answered after finally



KC4USP's ham shack aboard USS Hissem will make many an ex-Navy brasspounder nostalgic. That's K0CSJ at the key. Hissem is an Operation Deepfreeze support ship operating out of Dunedin, New Zealand, and KC4USP is regularly heard on 14,270-cc. single-sideband.

getting into the right hands. When I reactivated HL9KT in 1960 I was the first ham there in twelve months. My three nonham operators and I cleared up a box of unanswered QSLs left by the preceding 'administration' and thereafter tried to keep everything up to date. Sgt. Dan Dawson and I finally convinced the company commander that the ham station was a very worthwhile project and we received authorization to use 'postage paid' envelopes. Until we accomplished this, my Pfc. later SP/4, salary didn't go far toward covering the cost of QSLs, postage and stationery." WB6FTD stresses that QSL channels for HL9 (U.S. military) and HAM (Korea civilian) are practically two different worlds. Liaison between the two is necessarily limited and variable, so you'll do best to send HL9 cards only via APO channels, HAM cards only via civilian addresses or via KARL. This goes for other regions where U.S. troops are stationed. We might add, with some exceptions, . . . KA2CAM, FEARL secretary, writes that some 300 KA2USF QSLs for that society's July field day operations met with printing delays but were dispatched via bureaus in September. Replacement cards are available for those gone astray . . . UA1CC/UL8 and JT1CA tell LIDXC and KRC members that QSL shipments are en route for their recent pile-up activity. JT1CA favors self-addressed stamped envelopes for quick response (we understand that W2SAW's foreign mint stamp supply continues available). This approach works well with 9N1DD, too, for International Reply Coupons are not redeemable at Bill's QTH. . . . VS1L tells K9BGM "I'll be glad to forward QSLs to any VS1. It's no trouble because this spot is only 27 by 14 miles in area." . . . Airmail to the States from Aden costs five IRCs first class, three IRCs second, according to VS9ADV via NCDXC.

AFRICA — "I will QSL all contacts through W8WBT, or direct from Katanga if foreign postage is an object," offers 9Q5GF. Glen finds the Congo Republic's picturesque new wildlife stamps in wide demand among QSL-hunters . . . QSL aide WA4CNR requires s.a.s.e. or IRCs with applications for HL1JC QSLs. . . . VE4OX iterates, "I handle all QSL chores for 9G1s EO EX FW and GN. So far as I know, none of these stations answers cards sent direct. QSLs received with s.a.s.e. are cleared as quickly as possible. Others are answered via bureaus every couple of months. GMT reference is a must." While unused (unstuck) U.S. postage is acceptable at VE4OX, it cannot be used on out-bound Canadian mail, so there's no use sending him U.S.-stamped s.a.s.e. . . . WGDXC has it that K9ECE is working hard to thaw CR5AR's cold, cold QSL heart, results as yet unspecified.

OCEANIA — W4YHD clarifies, "I was on Palau from August 27th to September 10th and operated as KC6BO during that period. Since my QSL total exceeded KC6BO's supply of QSLs, new stock was printed. Cards for KC6BO contacts made only between those dates may be sent to my home address. S.a.s.e. or IRCs will be sent direct to non-W/Ks who forward s.a.s.e. or IRCs, and other DX stations will receive replies via bureaus." . . . K1KSH, still at large in the Pacific regions, wants pal W1ECH to underscore his instructions that QSLs be sent only through W1EFC. Cards sent elsewhere may never catch up with Sparks, or may be much delayed doing so. . . . Regarding Hammarlund's DXpedition of the Month series, LIDXC has it that QSL mailings for VK9BH were completed by September 24, F9RY/FC October 5, F9UC/FC October 15, HV1CN September 30, and VK9DR shipments were due to commence October 15. Hereafter it should not be necessary for completion of operations before QSLing starts, as lots will be received more periodically. . . . VK2AGH confirms through WGDXC that he retains the Willis logs of VK4s HG and WV.

EUROPE — Tip from K3CUI concerning glomming U-type QSLs: "All larger Russian cities have radio clubs, and they are often good places to send your QSLs for delivery to hams in those cities. Mail should bear the Russian ham's call followed by 'Radio Club', then the city in which he lives. Remember, though, that this will work only for the larger cities — the capitals of the fifteen Union Republics and other major cities." . . . HA5BB of Hungary's Central Radio Club notifies us that CRC's new address is Postbox 214, Budapest 5. . . . HCNS assures WGDXC's *Bulletin* that all HV1CN contacts are confirmed via the bureau route. . . . HCWN promises 100-percent response on receipt of QSLs for October's action by 9A1s CWN and NU. . . . QSLs for F9RY/FC contest work in late October may go to Hammarlund DXpedition of the Month, P.O. Box 7388, General P.O., New York 1, N.Y. In this case s.a.s.e. or IRCs are not required.

HEREABOUTS — This month's "QSLers of the Month" include DL3ZI, EP2RC, FG7XK, FY7YJ, G6KQ, HK3RQ, HL9KII, HP1IE, KA7TB, KC6BO, KC6SA, KZ5FZ, OK1MG, PX1IE, PY1MC, PZ1AI, TF2s WHT W1C, TP2FP, UD6BB, UQ2KAL, VE8PK, VP8 2M1M 5GT 9BO, VR8 3E 6TC, W6FAN/4KP, WP4s BNL BOJ, YN8KM, ZD8HB, ZS2MI, 3A2CL, 5A3CJ, 5N2ACB and 9M2UF, plus QSL managers Ws 2CTN 9VZP, Ks

1KDP 9R9Q and ZS10U, all nominated by "How's" correspondents Ws 1SWX 8KXH, Ks 1IUW 6TZX 8RXX, WAs 6SLU 6WTD 8AJZ 0BMW, WB2BEV and WN9ICQ. Three cheers and a pile-up to those OMs for punctual production of prompt pasteborders. Any candidates for such kudos in your mailbox lately? Zip us their calls for commendation in this category. . . . Halpl W7BTH wants a tracer on operator Al of CN8FU '61 and Lou of CN8JF '62; K2UTC seeks connection with Dick of HL9KT '58, Dave of JZ0PB '58 and Keith of KA9MF '60; K4WVT needs the word on VP2s BB '61 and VL '62; and K7QXG will settle for aid toward FK8AT's QSL. . . . K8TUP, WA9BYR and WN9ICQ offer QSL-managerial assistance to overseas ops in bona-fide need. . . . WA6VAT credits HL9KH, KC6BK, KV1CF, VR6TC and YV5ACP with "Best Looking QSLs of the Month" status. (Jeeves votes for the pastebord of F08AX of a few years past.) . . . W7QB is receiving so many pleas for Montana QSOs and QSLs that he thinks s.a.s.e. may be in order. Seems reasonable: anyone who really yearns mightily for another's QSL when the hunger isn't mutual should be willing to defray the mailing cost whether it be a rare country or rare state. . . . Here's a rundown on individual postal suggestions that appeared in this month's mailsack. Please consider that the recommendations are necessarily neither "official," accurate nor complete. Dig in:

GOZVQ (via FARAC)
CR4AY, P.O. Box 12, St. Vincent, Cape Verde Islands
GR6FW, Box 156, Benguela, Angola



KH6J (left) finally shook the hand of on-the-air pal F8EX after thirty years of steady c.w. friendship. Front, center, is Mrs. F8EX. F8AH's XYL, right, also joined the party at F8EX's Parisian villa. KH6J opines, "Such unions as this transcend all barriers and convince one that ham radio is truly wonderful. This meeting alone was well worth a trip halfway around the world."

CR6GO, Box 86, Malange, Angola
DJ0KA, F. Kekich (W9GCZ), Postfach 702, 8630 Coburg/
Obfr., Germany
EP2BE, Box 1472, Tehran, Iran
EP2DJ, APO 295, New York, N. Y.
ET3OH, c/o USAMERCC, APO 843, New York, N. Y.
FG7XJ (via W2CTN)
ex-F08AF P.O. Box 2203, Brazzaville, R. C.
HB1QN (to HB9QN)
HC2SB, S. Enderica, Box 5595, Guayaquil, Ecuador
H8XJC, Box 313, Richardson, Texas
HK1QQ (via W4DQS)
HS1GM, Box 69, Chiangmai, Thailand
IS1VAZ, G. Marconi 137, Quartu S. Elena, Cagliari,
Sardinia
K2EEA/VO1, M. Polite, RMC USN, CPO Bks., Navy 103,
FPO, New York, N. Y.
K0DID/VP9, R. Hill, U. S. Immigration, APO 856, New
York, N. Y.
ex-KA2AB, T/Sgt V. Smith, 896th Radar Sqdn., Tonopah
AFB, Nevada
KA2CJ, Navy 830, Box 15, FPO, San Francisco, Calif.
KA2USF (via FEARL, attn. KA2CAM)
KA8MA (to K1RTD)
KC4USP, USS *Hissam*, DER-400, FPO, New York, N. Y.
KC6BO (see preceding text)
LU3ZI, Bulnes 349, Ramos Mejia, Argentina
LU6DLK (via RCA)
M1XS (via DARC, attn. DL1XS)
OE2BSL, J. Buketits, Box 579, Salzburg, Austria
ON4DY, R. Doerniere, Magleinstraat 1, Gent OV,
Belgium
ON5ES (via URA)
P15MF (via VE6TP)
PVs 1CBW 2CO 2SO 7PO 7VJZ (via LABRE)
PY5AN, P.O. Box 326, Curitiba, Brazil
PZ1BA, Box 494, Paramaribo, Surinam



OX3DL pushed this layout to some 2000 QSOs and 360,900 points in the 1963 ARRL DX Contest, second highest single-op score for North America. Ole prefers the homebrew approach and likes to chase 80-meter DX. (Photo via W1YYM).

Club, have recently been amended. AHC International was founded in 1957 by several European amateurs as the first club of its kind. Our operation is along lines set forth for amateur radio by the International Amateur Radio Union, and we shall be glad to send further information about the Award Hunters Club to any amateur upon request. U.S.A. qualifiers so far are W1s HWH NIAI UOP VG, W2s FLD FXA GVZ PTD QIHI SAW WP, K2s CPR PFC QXG TGH UKQ ZRO, W3s AYD BNU CGS DKT GHD LIA MDE OP RPG SOH WGH, W4s EEE HLY MLL, K4DKK, W5s AWT LEF LGG NXF PSB RU, K5s BGT XBIU UYF, W6s CHY FGH GPB KG NTR NWT QJW YC YY, K6s BX CQM DDO EIE, W7s UVR YIU, W8s DLZ JIN KPL QJHW WT, W9s ABA OQR YNB, K9s EAB KDI, W0s CVU IUB MLY, KH0s BPF and DKA. Canadian winners include VEs 2AFC 3BWX 3HB 3JZ and VO2NA. Attention, 3.5-Mc. DX diggers! G3IRAL announces the 1963 TOPS C.W. Club's 80-Meter Test, an affair to run from 1200 GMT on the 21st of this month to 1200 the 22nd. The serial exchange is the customary RST001, RST002, etc. W/K/VE/VOs score five points for each station worked outside North America, three points for each station worked in North America outside their own call areas, plus ten points for each set of "WAC" collected. For final score these total points are multiplied by the number of countries and W/K/VE/VO-U-VK call areas accumulated. Log entries, postmarked before January 12, 1964, should be sent to P. Lumb, G3IRAL, 10 Lake Avenue, Bury Saint Edmunds, Suffolk, England. Up with those long-wires, men. Europe's Radio Liberty celebrates its tenth anniversary of Iron Curtain broadcast penetration, welcoming reports of reception by radio amateurs throughout the world. Special "QSLs" will acknowledge data mailed to Radio Liberty, 30 E. 42nd St., New York, N. Y. DL7FT encountered much birdy QRm from Radio Monte Carlo while operating 3A2CU in September on 20- and 80-meter a.m. Next year he hopes to return with s.s.b. gear to sample San Marino and/or Vatican DX conditions as well. WIHGT says G3HZL can fill you in the Mercury Award, a sheepskin offered by G3BZU, station of the Royal Naval Amateur Radio Society. 11s CNU and NU moved a truckload of gear into San Marino for their October s.s.b./c.w. doings as 0A1s CWN and NU, including an 8X-115, 8X-117, HT-32B, SR-150, TA-33 beam, Clegg and Mosley 2-meter apparatus.

ASIA — KA2s AE AP BC CF CM DO HO LL MP SF LA RC RF RJ YA and YP had a famous time as KA2USF on FEARL's summer field outing with a BC-610, HT-37, homebrew 4-400 final, a 1-A receiver and two 14-Mc. rotaries. CAAs KCA and KZD were the first of KA2USF's 300 contacts with 30 countries and 35 United States. "FEARL's first field day is now a matter of record," states KA2CM. "Stations were installed, antennas raised, operating schedules made, and emergency power units set up. It was fun!" The KAs have the f'd huge, all right, as confirmed by KA2CM's parting remark, "Next year we look forward to much improvement." As is traditional with field days, the lads got rained on despite forecasts of fine weather. "At the time I was signing HL9KT, some years ago, things were a good deal different in Korea than they are today," reminisces WB6FTD, ex-W9QPI. "I didn't get much chance to ham over there, for we averaged about 2000 messages monthly as AB4USA on MARS schedules. Our three BC-610s, live receivers and associated apparatus were located in the middle of a valley with the biggest communications battalion in Korea. We had all sorts of interference varying from the hash of local communications nets to Seoul city trolley cars. HL9KH is lucky to have his power supplied by Osan air base. At old HL9KT our line voltage, powered by Seoul's city plant, swung from 40 to 145 volts and from 20 to 100 cycles. There were many times when I had to yank the big switch to keep from ruining equipment. At 145 line volts our BC-610 250THs ran white and the p. a. plate milliammeters were pinned tight, but we really got out." VSILS writes K9BGM, "Please pass the word that I'm looking for Stateside contacts. Still haven't worked a Nine. By the way, VS1s GZ LQ and LV all use the same rig. Gets a bit crowded at times!" "I've changed QTH to England," notifies ex-1S7ES-VS7ES, a long-time Ceylon DX favorite. "My entire Collins station in Colombo has been donated to my old regiment, the Ceylon Engineers, and they are now using it as 4S7RE. My new call is G3SDN and I'm very active again, mostly on 14-Mc. s.s.b. with a 30L-1 and TH-4 beam, looking for W/K friends. Best wishes to you all, not forgetting dear old Jeeves whose adventures are still as funny as ever." 9M2JJ (W8SWN) writes, "9A2JT, a K3 back home, is with me here in the Peace Corps. He will be active as soon as he completes power supplies for his CR-150 receiver and TCS transmitter. I've been on 15, 20 and 40 a.m. and c.w. with 9M2GD's HRO-M and 9M2FR's 6146 rig, and I'm now trying single-sideband with an 1LX-20/HR-20 combination which just arrived. A 7-Mc. vertical will soon be added to my all-band dipole and inverted-V. My off-the-air duties include teaching radio and electronics at Ipoth's Secondary Trade School. It's continually 'summer' here, in the 90s by day and 80s at night, and I don't miss those Michigan winters one bit!" More Asian items courtesy afore-

- TA4SO (via ISWL)
 TF3KB, K. Benediktsson, Barmahlid 55, Reykjavik, Iceland
 TL8SW, Box 302, Bangui, C.A.R.
 UA2AC, Radio Club, Kaliningrad, U.S.S.R.
 UR2BU, Box 27, Tartu, Estonian S.S.R., U.S.S.R.
 VP2SY, P.O. Box 80, St. Vincent, W. I.
 VP2SYL (to VP2SY)
 VP2VS (via VE6TP)
 VP3UN, Box 413, Georgetown, B. G.
 VP5NK (via VP5BB)
 VP8GQ (via G3PAG)
 VP9FD (via RSB)
 VQ1MH, Box 96, Wete, Pemba, Zanzibar
 VS1s GZ LQ LV, Amateur Radio Club, RAF Stn., Changi, Singapore 17
 VS1LS, D. Llewellyn, P.O. Box 25, Paya Lebar, Singapore 19
 VS9HAA (via W4ECD)
 VS9PHH (via W2CTN)
 W4WQQ/VP9 (to W4WQQ)
 W8KWC KH6, 1603, Iwi Way, Honolulu, Hawaii
 YV2AH, P.O. Box 182, Merida, Venezuela
 YV5BOL, Box 2737, Caracas, Venezuela
 YV5BRG (via RCV)
 ZE4JS (W/K/VE/VO via W3HNC)
 3A2CU (to DL7FT)
 ex-4S7ES-VS7ES, Dr. E. Savundra, G3SDN, 80 Hendon Ln., Finchley, London N. 3, England
 5B4FF (via CAR8)
 5H3JL, Box 127, Singida, Tanganyika
 5H3JR (via W2SNM)
 5H3JV (via R5EA)
 5N2LAF (via 5N2JKO)
 5U7AG (via W9RKP)
 5X5JG, Box 355, Kampala, Uganda
 6W8AB, Box 3028, Dakar, Senegal
 9A1s CWN NU, P.O. Box 19, Torino, Italy
 9G1DZ, A. Bardewyk, P.O. Box 1974, Accra, Ghana
 9L1JC (via WA4CXR)
 9L1TL, T. Lloyd, Founah Bay College, Freetown, Sierra Leone
 9Q5AB, via A. Nickel, W2HAMJ 4, 3326 Sargeant Dr., Charlotte 8, N. C.
 9Q5GE, Dr. G. Eschtruth (K8MZG), Piper Memorial Hospital, Kapanga, Katanga, R. C. (or via W8WBT)
 9U5ID, Box 170, Usumbura, Burundi
 9X51B, M. Berkman, Box 14, Usumbura, Burundi

These possible QSL routes are donated gratis by generous Ws 1BDI ISWX 2CUC 2NXC 7UVR, Ks 1EUK 1IUU 2YVE 3CUI 5JVF 6SXX 6TZX 7KTE 7QXG 9BGM 9CVB 9JPL, WAs 41ZU 6SLU 6VAT 6WTD 8BPV 9BAM, WB2BEV, WN9ICQ, H1CWN, KA2CM, G. Foreman, DARC D X-MB (DLs 3RK 9PP), DX Club of Puerto Rico D Xer (KP4RK), Far East Auxiliary Radio League News (KA2s CM LL), Florida DX Club D X Report (K4HP), International Short Wave League Monitor (12 Hadwell Rd., London N. 8, England), Kanawha (W. Va.) Radio Club Spaliter (K8WAMQ), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association D X Bulletin (W1BPW, K1MOL), Northern California DX Club D Xer (WA6TGY), VERON's D Xpress (PAAs FX LOU VDV WWP) and West Gulf DX Club D X Bulletin (W5IGJ). Is it your turn to feed the QTH kitty? Fatten up the pot, OM.

Whence:

EUROPE — SRAL secretary OH2YV notifies, "The organization and duties of AHC, the Award Hunters

mentioned clubs and groups: VS9PHH expects to spend another eight months or so on Socotra. . . . AC5PN should continue active with the SR-150 and 2-el. beam left behind by Gus. . . . JA4XW of rare Tottori prefecture responds on 7030-kc. phone to c.w. callers. . . . U8KAA is workable on a.s.b. with UA1CC's old exciter and beam, and a high-power linear is under construction. . . . TC5ZA (W3ZA) anticipates more activity from Turkey on 14,002, 14,085, 14,115 and 14,315 kc. . . . KA8 ZDS (W5EGL), 2LR (WA2JQ), 2RD (W9NTJ), 2RF (K2TKG), 28F (KH6DJO), 9FM (W5LEY) and 9WB (WA5CCN) are new FEARL members or renewals. The society's *News* has a new address, Box 38, Navy 3923, FPO, San Francisco, Calif. . . . KA2EB sums up DX conditions in Japan: "You have to stay up till the wee hours to hit the U. S. east coast these days. Even Sixes are in and out, and Europeans are rare." . . . Ex-KA2AB, now W4CJD/7 in Nevada, finally received a Rhode Island QSL to complete his made-in-Japan WAS. . . . KA2LR, expecting to sign his own HS1 call soon, finds that the King of Thailand is HS1PK. . . . Last month's Kuria Murias manifestations were planned on a large scale by the Aden RAF bunch and guest W4BFD with Gus, VS9s HAA HRK, VQ4IN and other ops racking up points. Two tons of DXpeditionary gear and a large supporting party were involved. After his VS9HAA visit Gus resumes independent DX plans which were interrupted after Afghanistan. . . . VS1LP, still investigating PK possibilities, says that K4ORQ (ex-EPIAD), who helped break the hamming ice in Iran, continues efforts to impress Jakarta authorities with the desirability of a liberalized amateur radio policy. VS1LP intends to hit 80 and 160 hard this season with a new Valiant. "I'm sure I can get through to the U.S.A. on 160 since Sixes came through so well here on 3.5 Mc. last January and February."

AFRICA — 9L1JC, fresh Freetown entry, tells friend A WA4CXR that pile-uppers will find him available on 14,008 kc. almost any Sunday around 1730 GMT. . . . After three years in Tanganyika, W3EHG finally is active as 5H3JR at his Mwanza mission. This month Chuck will add a four-81s kilowatt linear to his KWM-2. A stacked Vee beam on New York should keep him in close touch with his QSL aide, W2SNM, mainly on 14,270 kc. around 1900 GMT. . . . K8MZG, newly franchised as 9Q5GE in Katanga, uses a DX-100, SB-10, NC-1831, Mosley tri-band and 7-Mc. doubler. "I'm operating evenings here, 1700 GMT, mostly on 21,390-kc sideband or straight a.m. but sometimes on 14,250 kc." . . . "A big vote of thanks to 5N2ACB for making a good one workable on 7 Mc.," declares K5JVF. "He really dug to give every caller a brief QSO and he worked 'em coast to coast." . . . WA0BMW finds 6O1ND (W1W1Q) hot after Nevada to complete his 20-c.w. WAS. . . . Africa addenda via the clubs press: VQ9HB may make it to VQ8B-C-R regions at any time now. . . . 9X5MV puts Rwanda on 14,101 kc. around 1430-1500 GMT. . . . ZS6BBB has a six-month permit to invade ZS8-9 areas for single-sideband maneuvers. . . . VQ2BC's 50-watt 5763-6146 c.w. rig works 40 through 10 meters with a simple end-fed wire and has accounted for some 53 countries since June. . . .

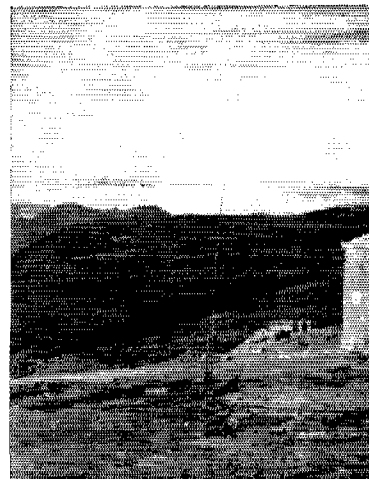
OCEANIA — K1KSH writes W1ECH from Port Moresby where he finds a pair of 170-foot towers available to further his DX aspirations. Immediate operation as K1KSH/VK9 was disallowed but Sparks should be a full-fledged VK9 before you read this. Those towers are 250 feet apart, a happy happenstance for 160-meter work. "My QSO total from Gnam and Marcus almost reached 1500, all via c.w. on 20, 40 and 160 meters, and my 1.8-Mc. contacts with W1BB were the highlights." . . . W5LAK's tour of VK areas is scheduled to conclude shortly. John had hoped to enjoy rare status on Norfolk and Lord Howe islands before returning Statesward. . . . K5JVF finds VK3KS, XYL of OT VK3XB, a competent 7-Mc. c.w. op

. . . . W4YHD writes of high c.w. sport at KC6BO in August and September totaling some 2500 QSOs with 100 countries, mostly 20- and 40-meter work. Ws 8J1N and 9HTUZ were hooked on 80, and 7-Mc. commercial QRM, even near the low edge, was fierce. Jim found, "A maximum QSO rate could be maintained by answering on frequency, although during peak hours this was modified to answering one kc. up." Contest-minded K8ETI and WB2ELT are permanently stationed with Page Engineering on Koror and should keep KC6BO henceforth available on phone and c.w. . . . VK3AZY is a QRP man's QRP man who managed to work KC6BO with a 100-mw. transistor rig. . . . More Pacific pointers via club journalists: DU5DM was a mid-October Leyte special commemorating MacArthur's WW-II return. . . . Ex-ZK1BS fishes for a Caribbean assignment, possibly VP7. . . . VR1B is back for a two-year Tarawa hitch. . . . Vks 4JQ and 9DR, Willis and Christmas isles, stepped up their leisurely DX operations in October, VK4JQ likes 14,128 and 14,248 kc. at 1300-1400 GMT, while VK9DR uses 14,104-kc. s.s.b. (listening on about 14,255) and 14,034-kc. c.w.

SOUTH AMERICA — October was a large month on the southern DX scene with maximum multiband, multi-mode DXpeditionary work planned by FDXC as CE0ZI on Juan Fernandez. . . . K5JVF noted W3ZQ's plans to put PJ, FG7 and other Caribbean prefixes into the DX fray in late autumn. . . . PY2CQ's XYL, PY2SO, can match c.w. with the OMI, according to K5JVF. . . . The venerable 807 of LU7FAG, whose homebrew 15- and 20-meter phone signals are landmarks up our way, soon will give way to 6146s. . . . Further S. A. notes by way of club organs: FM7WQ was cloberbed by unlaydlike Edith, and W4OPM coordinates efforts to help Pierre return to the air. . . . Easter's CE0AD lately infests 7025-7050 kc. at 0000-0200 GMT with a half gallon of c.w. and a.m. . . . FDXC maps out a major San Felix CE0XA DX offensive for 1964. . . . Collectors might check with PJ3AO concerning the new Aruba Certificate.

HEREABOUTS — "Ten meters is fine for extended-ground-wave QSOs 24 hours a day, 365 days a year," emphasizes K2YFE after c.w. contacts with W1HQV, Woonsocket, over a rugged 250-mile path on 28 Mc. Indeed, for the next few years our 10-meter band will, for the most part, exhibit v.h.f. characteristics and can be expected to deliver interesting results through use of v.h.f. QSO techniques. While 28-Mc. antennas are more cumbersome than their 6- and 2-meter counterparts, almost all marketed h.f. paraphernalia hits ten conveniently. How far can you work on 10 when the band is "dead"? . . . Put a ring around March 21 on your 1964 calendars, gang, 'cause that's when North Jersey DX Association will hold its First Annual W2-DX Banquet in Scarsdale, N. Y. A gala program already is on the drawingboard, W2VCZ supervising. . . . VE3WSB, DU1BSP and XE1DDH were among participants in the Boy Scouts 6th Jamboree-on-the-Air in October. VE3CBII assisted VE3WSB's activity in Ottawa. . . . From K5JVF: "HPIIE hopes to give 160 a try but he doesn't think his noise level will permit much serious operating. I personally know what he means about the tropical sizzle on such frequencies." Dave says the big noticeable difference about chasing DX on 1.8 Mc. is that the phones speak English. . . . K0GVB stopped in at Guantanamo Bay on an 18-day cruise. "Operated KG4AN for a few hours on c.w. and found the prefix in great demand, especially among Europeans who piled up in fine style." . . . K2UVU heads for Korea, so NEDXA DX Bulletin editorial duties fall to W1BPW and K1NOL. . . . DXpediter VP2GAC inherits the Yasmie HT-32 used to much DX advantage by VP2VB/min. . . . Ws 2B1B 2G1IK 3AEC and KP4BT are new DXCPR recruits. Member KP4BFC (ex-K4PUJ) is the son of late KP4KD, famous pioneer P.R. amateur. QST

FX1s MO and QX were activated in September by F2s MO and QX (left to right) with this installation on an Andorran mountainside. "Single-sideband, straight a.m. and c.w. were used with plenty of good pile-ups," testifies F2QX. "Another trip will be made next year."



YL news and views

CONDUCTED BY JEAN PEACOR, * K1JIV

YLs and the ARPSC

WITH the birth of the ARPSC (Amateur Radio Public Service Corps) in October, there are many YLs who deserve bouquets for their efforts in providing many of the necessary links which enabled the first combined drill of AREC and NTS to operate so smoothly.

It's difficult to know how many YL radio operators were active. Just how many are ECs, ORS, OPS and the like? Many YLs who have been active in these fields have graced the pages of this column in the past. We can be sure that there are many more such YLs who well deserve recognition.

The combined efforts and talents of this group during the first ARPSC drill doubly strengthens the feeling of pride we all have in being radio amateurs. Messages flew fast and furious, and every means was used to pass along a maximum amount of information in the shortest possible time. Full advantage was taken of all facilities and radio amateurs proved their ability to play a vital role in communications. Even more, it showed the readiness and willingness of amateur radio operators to use their knowledge in the interests of serving the public.

To all who loaned a helping hand during the initiation of ARPSC, bravo!

Hunting Season

The members of the Tri-State Amateur Radio Association of Huntington, W. Va., decided to perk

* YL Editor, QST: Please send all news notes to K1JIV'S home address: 139 Cooley St., Springfield, Mass.

up activities with a transmitter hunt in the local city park. Sparked with interest, the question arose among the members, "How do we go about it?" No one had ever organized such a hunt before.

The club admits a few mistakes were made in preparing for the hunt. The date chosen was only two weeks away. Also, they chose 75 meters on a Sunday afternoon.

The ARRL *Mobile Manual* proved very helpful (see page 216, Second Edition) in organizing technical details. It was decided to use an Army-surplus handie-talkie, running $\frac{1}{4}$ watt, as the transmitter to be hidden and hunted. Kay Anderson, W8DUV, would be the radio operator.

On the day of the hunt, promising not to climb a tree, Kay departed from the starting point to hide the transmitter. With the use of a disguise for herself, as well as for the handie-talkie, she circled back and lounged quite near the starting point where she could watch the fun.

The d.f. antennas worked fine. The spot was located almost immediately, but no one recognized the operator. It took 45 minutes to recognize Kay. W8AFX was first, then W8DUW, who could be heard laughing all over the park, followed by W8GIO.

Other members who joined in were W8ACF, W8ACH, W8AOW, W8FVI, K8IYU, W8NIWQ, W8KCI, W8NJI, W8SDO, W8SDU, K8UHC, and K8VNL. They had so much fun that plans are already being discussed for the next hunt.

If you are thinking of ways to test emergency equipment, this is one way to not only test it but to also have a lot of laughs.

A Notable YL

Vera Russell, K8BPQ, is principal of the Grand Blanc Elementary School in Grand Blanc, Michigan.



"Do blondes have more fun?" Kay Anderson, W8DUV, of Huntington, W. Va. looks very happy with either shade.



(left) Audrey King, VU2YLZ, of New Delhi, India, is the only known licensed XYL in India. A contact with her is indeed rare DX. Pictured with Audrey are front row (l. to r.), VU2CK, VU2HV, VU2JG; second row (l. to r.), VU2RN, VU2YLZ, W7QYA; third row (l. to r.), VU2AK, Les and also Audrey's OM, VU2OP, VU2NR.



(right) Have you talked with (l. to r.) Janette Barker, ZL1ANA Pat Barker, ZL1LD; or Judith Holland, ZL1AWM? They are shown at ZL1TB's radio shack. Pat operates s.s.b. on the high frequencies on weekends. Janette and Judith operate mostly on 80 meters. (Photo courtesy of W7QYA from her recent world tour)

This rather demanding position, with its long hours, has not dampened her amateur radio activity. Rather, it encouraged her to obtain her General Class license.

In her job as principal, storm warnings or threatening weather are the signals for her to turn on the communications receiver in her office. She tunes to 29.480 Mc., the frequency used by a local emergency net. The net includes stations from civil defense headquarters, the weather bureau, and several mobile radio amateurs in surrounding areas who act as weather observers. In this way, Vera has immediate knowledge of expected conditions and can more ably make decisions involving the safety of students, well in advance of notification given schools through normal channels.

Her activities in emergency nets continue after school with a mobile G-76 transceiver. She assists with her radio club sponsored "Project Monitor" system which provides at least one fixed station on assigned duty 16 hours daily. This system has proven a worthwhile encouragement for local hams to use mobile rigs. You may also hear Vera operating 20- and 40-meter DX from time to time from her home station.

A member of the Genesee County Radio Club, Vera is the first YL to ever wield the gavel as president in the club's thirty-year history. She has also been the club's secretary and edits their monthly bulletin.

Her advancement in a few short years from "BC radio tuncer" to an active amateur radio operator is a fine example for those who "just can't get that code", or are "just too busy" for the rewards of amateur radio.

YL Clubs

The Portland Roses announce newly elected officers as follows: pres., Bettie Mayer, K7BED;

vice pres. and treas., Donna Gettman, W7QKU; secy., Mary Govig, K7BII; pub. chairman, Beth Taylor, W7NJS.

YL Nets

Baylarc announces a new YL net which meets Thursday evenings at 1930 PDST on 3.885 Mc. Net control station is W6QYL.

Coming Events

Floridora Week will be January 20 to 24, 1964. Floridoras will try to join as many YL nets as they can and just generally be on the air to give as many contacts as possible.

QST



Vera Russell, K8BPQ, is the first YL to be president of Michigan's 30-year-old Genesee County Radio Club. (Photo courtesy of WA8BAH)





CONDUCTED BY SAM HARRIS,* W1FZJ

The Radar Interference Problem

THE 50- and 144-Mc. bands, being exclusively amateur in this hemisphere, are little plagued by interference from the "government radio-positioning service." True, some annoyance has been experienced from the 50-Mc. "Big Noise," which comes and goes with no apparent rhyme or reason, but we now know its source and have assurance that this type of interference will be only occasional, and of short duration. Thus it doesn't represent any real deterrent to 50-Mc. activity.

Many v.h.f. operators are plagued with ignition-type noise, but in general this is a transient problem that can be lived with in most cases, without making a big production of it.

On 220 and 420 Mc., however, the situation is quite different. These bands are not exclusively amateur, but are shared with stations in the government radio-positioning service, which has priority.¹ Thus the operator on 220-Mc. or higher bands may encounter signals the nature of which he may not understand; signals which do not identify what they are transmitting or where they are located.

For some time now, these stations have been accepted as part and parcel of amateur operation on the higher bands, but outside of an occasional gripe about "that big radar out on Long Island" there has been little done to alleviate the real problem that the pulse-type emission of these high-powered stations creates. The radar interference does have one distinct advantage: it's one of the best indications of propagation conditions on 432 Mc. If the radar is very strong, obviously conditions are good — but this doesn't help much if the radar buzz is so strong that only locals can be heard through it. Too often, then, the receiver is turned off and the evening is spent watching television. This does not help the 432-Mc. activity picture!

The interference is very disheartening, and I have received many communications from 220- and 420-Mc. men all over the country of late, regarding

the problem. In some areas 220 is the worst affected. In others 420 gets the worst dose. The higher bands are not without their radar problems, either. On 432, operators along the eastern seaboard have observed that with a beam pointed along the Boston-Philadelphia axis it is often possible to register mixer crystal current with the converter injection stages turned off, due to received radar pulses; this at distances of 100 miles or more from the source of the interference! At such times amateur signals, even those normally well over the 59 level, may be completely unreadable. What to do?

A standard answer to complaints arising from u.h.f. radar interference is to suggest use of some type of noise blanker, preferably one that eliminates the radar pulses before they get into the selective portion of the receiver. This answer generally falls on deaf ears, however, as a noise blanker is a "thing," and as the feller in Pennsylvania told me, "I've got all I can do to keep my farm equipment going, without trying to design a noise blanker, whatever that is!" Now it is true that the father of i.f.-type noise silencing, J. J. Lamb, invented the first such device, and wrote about it in *QST* away back in 1936.² Since that time many and various types of noise blankers have been devised, and some were even incorporated in commercial receivers, notably the SX-28 and KP-15 and KP-81.

Unfortunately, when home-constructed, noise blankers appear to give more trouble than results. The only recent constructional article describing a noise blanker was one in January *QST*,³ intended for use in working through Loran interference in the 160-meter band. I cannot recommend this article as a basis for a radar blanker for I have not tried it, but I can see no reason why it should not work quite well.⁴ Construction of this device is rather tedious

² "A Noise-Silencing I.F. Circuit for Superheterodyne Receivers," J. J. Lamb, February 1936, *QST*. Additional developments in April 1936.

³ "Minimizing Interference from Loran on 160 Meters," Herbert Hoover, Jr., January 1963, *QST*.

⁴ Because of the difference in pulse length between Loran and u.h.f. radar, the Loran blanker may be relatively ineffective in the u.h.f. application. Putting the blanking device nearer the receiver front end, to prevent overload problems, is also desirable. — *Editor*.

* P.O. Box 334, Medfield, Mass.

¹ FCC Docket 12404 which details the conditions under which we now use 220-Mc. and all higher bands is quoted in *QST*, June 1958, p. 63.

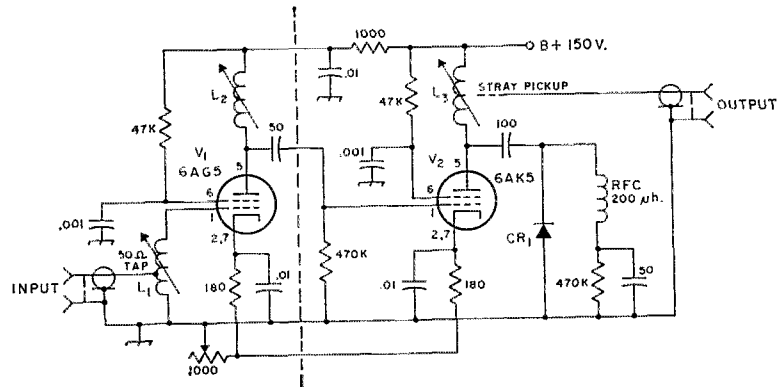


Fig. 1—The "Swamp-gator." See text for details.

and complicated, however. Frank, W1E1F, still hasn't got the coils uncentred from the slugs for the one he is trying to build!

The most recent article on noise blanking was that by W2PUL in October 1963, *QST*. This is a very learned discussion, and it gives sufficient information so the ham with any initiative can get busy and build a blunker. Some work has been done with it here, with very satisfying results, though the gate is not quite able to handle the peak of radar interference encountered on 432 Mc. It does, however, result in a very substantial reduction in interference.

While engaged in testing this noise blunker, I was apprised of the fact that a noise-blanking system is available from Hammarlund for use with any receiver employing an i.f. of 455 kc. or thereabouts.⁵ This kit can be readily adapted to any such receiver and it does a magnificent job of blanking ignition, Loran, and other impulse-type noise. Unfortunately, for the u.h.f. man who uses a converter in front of his receiver, the overload problem is involved before the blunker has been reached. Apparently the use of a noise blunker in the receiver itself is entirely adequate for normal interference, but the radar problem on 220 and 420 Mc. is of such intensity that amplification ahead of the blunker is ruinous. The obvious place, then, to put a noise blunker is between the u.h.f. converter and the receiver.

Basically, a noise blunker is a gate, so designed that when open it will allow the desired signal and all noise to pass, and when closed will prevent noise or radar pulses from doing so. This gate is installed in series with the coax feed from your converter to your receiver. It now becomes only a matter of sampling some of the incoming signal, amplifying it sufficiently and separating out the noise pulses from the desired information. These separated-out noise pulses are then applied to the gate in such a manner that the gate closes and does not allow passage of any signal while a noise pulse is present. When there is no noise present the gate opens and passes signals in the normal way.

The pulse you feed to the gate to tell it when to be open and when not to be open is not the original pulse, but a reconstituted pulse of your own devising. As a result, noise blankers of this type, while performing in a seemingly miraculous manner on almost all types of noise, still allow some radar-type interference to leak through, and signals which are just at the readable level in the normal receiver noise are still obscured by the interfering radar.

To cut a long story short, the result of our investigations into the noise-blanking field was a device we call a noise-blanking amplifier, later renamed by W1E1F a "Swamp-gator." It is quite simple, and operates on a principle which eliminates the above problem with gate-type blankers.

As can be seen from Fig. 1, the Swamp-gator consists of a two-tube amplifier tuned to the converter i.f. output frequency. This amplifies both signals and noise pulses from the converter and feeds them into a shunt diode, CR₁. Normal signals and noise are rectified in this diode, but the signals appearing at the plate of the second amplifier, V₂, are still substantially the same as the original signals. A very small amount of i.f. signal appearing at the plate or the tube is coupled to the output connector of the blunker. This pickup should be adjusted so that insertion of the unit in the line between the converter and the receiver results in the same amount of signal going into the receiver as was the case before the blunker was inserted.

⁵ "Hammarlund I.F. Noise Silencer," Recent Equipment, June 1961, *QST*, p. 46.

2-Meter Standings

W1REZ	32	8	1300	W5EDZ	8	5	1375
W1AZK	28	8	1205	W5YO	7	4	1330
W1KCS	24	7	1150	W5UNH	6	3	1200
W1AJR	23	7	1130				
W1AMN	22	8	1200	W6WSQ	15	5	1300
W1JSM	22	7	1330	W6NLZ	12	5	2510
W1HDQ	22	6	1020	W6DNG	9	5	1040
W1LZY	20	7	1080	W6AJF	6	3	800
K1CRQ	19	6	800	W6ZL	5	3	1400
W1RPH	18	6	1000	K6HMS	5	3	1010
W1WY	15	8	920	K6VY	4	2	800
K1AFR	17	6	675	W6MMU	3	2	950
W2CXV	37	8	1360	K7HKD	20	7	1330
W2ORY	37	8	1320	W7LEH	10	4	1170
W2NLY	37	8	1300	W7CJM	5	2	670
W2BLV	35	8	1020	W7JTP	4	2	900
K2IMG	35	8	1290	W7JU	4	2	235
K2GQI	35	8	1365				
W2AZL	29	8	1050	W8KAY	40	9	1245
K2IEJ	27	8	1060	W8PT	39	9	1260
K2CEH	25	8	1200	W8SDJ	37	8	1220
W2AMT	25	6	960	W8RST	35	8	980
W2ADR	25	8	1100	K8AXU	34	8	1275
W2RXG	25	8	1200	W8SEF	34	8	1040
W2SMX	23	7	1090	W8LOP	32	8	1060
W2LWJ	23	7	1050	W8GGH	32	8	1180
K2HOD	23	7	950	W8BAX	32	8	960
W2AWJ	23	6	860	W8RTH	32	8	1110
W2PAU	23	6	755	W8MVE	31	9	1155
W2ESX	21	6	750	W8NOH	31	8	1090
K2KIB	21	5	700	W8EHW	31	8	860
W2LTH	20	7	880	W8SVI	30	8	1080
W2WZE	19	7	1040	W8RHW	30	8	860
W2RQV	19	8	720	W8LJP	29	8	850
W2ZMA	19	6	1010	K8RQK	28	8	690
W42ZE	18	6	750	W8WRN	28	8	680
W2RLG	17	6	980	W8DX	26	8	720
K2OFI	16	6	1010	W8ILC	25	8	500
K2JWT	16	6	550	W8JWV	25	8	940
				W8VNM	25	8	900
W3RUE	33	8	1100	W8GFT	25	8	540
W3SCA	31	8	1070	W8LCV	23	7	680
W3TDF	30	8	1125	W8BLN	21	7	610
W3GAP	30	7	1180	W8GFR	17	7	550
W3KCA	28	8	1110	W8NRM	17	7	550
W3BYE	28	8	1070				
W3RPH	28	8	1100	W9KLR	41	9	1170
W3RST	28	6	800	W9WPK	40	9	1160
W3LNA	21	7	720	K9UIF	36	9	1000
W3NKM	20	7	730	W9AAG	35	9	1050
W3LZD	20	7	650	W9GAB	34	9	1075
K3EDW	12	6	1015	K9AAJ	33	8	1070
				W9BGM	31	8	850
W4HQJ	39	8	1150	W9ZIH	29	8	830
W4HHK	37	9	1280	K9SGD	29	8	1100
W4LTL	34	8	1160	W9PBP	28	8	820
W4XLU	34	8	954	W9LVC	27	8	950
W4WNH	34	9	1050	W9OJL	27	9	910
W4MKJ	34	8	1149	W9ZEL	25	8	700
W4QD	30	8	1120	W9RBY	25	7	930
W4LVA	26	8	1000	W9CUX	24	7	1000
K4EUS	26	7	1130	K9AQP	24	7	900
W4EQM	25	8	1040	W9WDD	23	7	900
W4AIB	25	8	900	W9LFL	23	7	825
W4RPR	24	9	820	W9KPS	22	7	690
K4LXC	23	8	1225	W9ALU	18	7	800
W4TLP	23	7	1000				
W4JC	23	6	725	W0BFB	39	9	1350
K4QIF	21	8	1000	W0IHD	31	8	1030
W4RMU	21	7	1080	W0LFE	29	7	970
W40IK	20	6	720	W0SAL	29	9	1075
W4WGL	19	7	1080	W0RGT	25	7	1300
K4YUX	18	8	830	W0BNC	25	8	1225
K4VWE	18	6	590	W0RUP	23	7	900
W4MDA	17	6	757	W0MOX	23	6	1150
				W0IC	22	7	1360
W5RCL	39	9	1280	K0TTF	21	6	940
W5FYZ	38	9	1275	W0NFK	21	6	830
W5AJG	32	9	1360	W0TGC	21	7	870
W5JWL	29	7	1150	W0RYQ	20	8	925
W5DPV	29	9	1300	W0DQY	20	7	700
W5PZ	28	8	1300	W0JAS	19	7	1130
W5LPG	25	7	1000	W0DZE	19	7	700
W5KTD	23	8	1200	W0AZT	18	7	1100
W5WVY	20	5	960	K0AQM	16	6	1120
W5ML	16	6	700	W0IFS	16	6	1100
W5KPU	15	5	1360				
W5UGO	13	4	835	VE1CL	8	4	800
W5FSC	12	5	1390	VE3DR	36	9	1330
W5VZ	12	5	1250	VE5WZ	24	8	1340
W5UKQ	14	6	1150	VE3BP	24	7	950
W5CWW	11	5	1180	VE3BQ	22	7	790
W5NDE	11	5	620	VE3AQQ	18	8	1300
W5WAX	11	5	735	VE3DR	17	8	1340
K5TOP	11	4	1170	VE3HW	17	7	1350
W5VY	10	3	1200	VE3LO	1	1	915
W5BEP	9	3	1000	VE7FJ	2	1	365

The figures after each call refer to states, call areas and mileage of best DX.

When a noise pulse is introduced into the amplifier the diode is driven into its conduction region and transfer of signal from the amplifier to the receiver is prevented. Effectively the diode is applied as a dead short across the amplifier output during pulse periods, and as a relatively open connection during normal signal reception. The result is a considerably

larger on-to-off ratio than with previous types of gates. To date we have yet to find a radar signal which can overload the blanking action of this device.

The coils, L_1 , L_2 and L_3 , are tuned to the i.f. output frequency of your converter. Layout and construction should be such that the amplifier is unconditionally stable. Any regeneration should be eliminated before you attempt to use the device as a noise blanker. The amount of gain required in the amplifier depends on the gain of the converter you are using. For example, some converters with 14-Mc. output can be blanked effectively with only one stage. Some converters operating in the 30-Mc. range may require the null gain of two stages to do the job. The diode can be any high-switching-rate type such as the 1N64, or other diodes of like characteristics.

The only claim we make for this scheme is that it eliminates all traces of radar on any weak signal you might encounter, leaving the signal completely untouched from the standpoint of readability. In the presence of no interference the readability of a weak signal is not impaired. When interference

comes on, to the point of eliminating the signal when no blanker is used, the signal will remain readable with the blanker in.

As Frank says, "Now that we've eliminated the radar problem, let's put up a bigger antenna!"

144 Mc. and Up

Aurora! Aurora! Aurora! Reports of dwindling activity on 144 Mc. and up suddenly drop off when the auroral season begins. During this past spring the auroral sessions were not up to expectations, but from the looks of it at this writing the fall session is really building up activity and also scores in the "States Worked Boxes." A few moments ago, while on my way to the kitchen, I stopped to idly tune the 50-Mc. receiver and guess what? There it is again — aurora! And this time I had to put temptation behind me, pass up and continue on my way to the desk, typewriter and this column. Only report we can give of the present aurora (October 23) is that there is one. If we stop to listen to what's coming in on any of the v.h.f. bands via aurora, we'll just never finish the column.

From New Jersey, WA2UDT reports hearing assorted 8's in Ohio and Michigan, 4's and a weak W9 on 144 Mc. Bill was having the usual luck of a v.h.f. man in that his rig was in pieces waiting for the new final. He'll soon be looking for 420-Mc. contacts and skeds as tripler and 16-element beam are complete and converter nearly finished. John, WB2ALF notes aurora during the contest when VE1's and VE3's were coming through on two meters. Four new states worked via aurora brought WA2PZE's score up to 18 states worked and into the "two-meter box." Michigan, Indiana, Illinois and West Virginia were the lucky states for Steve. He's looking for skeds, meteor or otherwise, to the deep south and 0 land. During the same session, WA2YXS at Long Island brought his score up to 14 states worked by nabbing West Virginia and Michigan. Barney also heard Indiana, Ohio and Illinois but was unable to catch 'em. At Wappingers Falls, New York, W2LWI reports that extent of coverage of the September 22 aurora at his QTH was south to North Carolina, Kentucky and Tennessee; west to Wisconsin, and Illinois and of course the states in between. Dave, K2LMI, worked K4CLE in Tennessee for a new state, K4QIF in North Carolina, and K4BUS in Virginia. WA0HZD (location unknown) was also heard. Dave sez it's the best aurora heard on 144 Mc. for over a year and a half.

At New York City, W2LVQ was tuning 144 Mc. around eight o'clock in the evening on September 22 when he heard VE3EZC calling "CQ-A." That was the beginning of the evening for Gerald. In quick succession he worked VE3EZC, W8LCA, W8DQR and W4FNSO, thus accounting for Ontario; Canton, Ohio; Toledo, Ohio and North Carolina. Next W4VSH in Florida was heard and called to no avail, and K4QIF in Georgia was heard and called but disappeared. From then on, according to Gerald, 144 Mc. was a "mad house," with 4's, 8's, 9's, VE2's and VE3's coming through via aurora. W9DZS, of Hopkins, Minnesota, was heard and called by W2LVQ, but by this time the entire band was alerted and QRM made things difficult. "The one thing I noticed which was unlike some of the other aurora openings," sez Gerry, "was that I had to jockey my beam about between the north and about 30° west of north quite often." (Here on the east coast we frequently have to swing the beam from northeast to due west to keep the aurora signals at their peak.) Evening of the 23rd was a repeat of the previous evening, but session only lasted about three hours at the New York City QTH. In Delaware, K3OBU heard his first two-meter aurora on the 22nd when he was hearing 1's, 2's, 3's, 4's and 8's. September was a good month for Joe on 144 Mc. On the 5th he worked W1AZK in New Hampshire, and good tropo conditions prevailed also on the 7th with the band open to New England and 2-land. Contest on the 14th and 15th brought forth West Virginia and Rhode Island, and eastern and western Massachusetts for Joe. Now if only those Rhode Island stations would QSL he'd be all set. Between September 14 and 22, K4QIF, in Salisbury, North Carolina, brought his "Two Meter States Worked" total from 8 up to 21 with the help of a couple of good tropo openings and the auroral session of the 22nd. Howie sez: "I have been operating 144 Mc. for nearly 3 years and the above are the first band openings in which I've been able to participate. Even though the band was open, the old kilowatt really paid off." In the words of

220- and 420-Mc. STANDINGS

220 Mc.		KØITF.....6 3 515	
W1AJR.....11 4	480	KH6UK.....1 1	2540
W1AZK.....9 3	412	VE3AIB.....7 4	450
W1BU.....14 5	600	VE3BPR.....3 3	300
W1HDQ.....12 5	450		
K1JX.....11 1	615	420 Mc.	
W1OOP.....12 4	400	W1AJR.....11 4	410
W1RFU.....15 5	480	W1BU.....10 3	390
W2AOC.....15 5	530	W1HDQ.....9 3	210
K2AXQ.....9 3	240	W1JX.....5 3	230
W2BAH.....4 2	667	W1MFT.....8 3	170
K2UBA.....13 7	660	W1OOP.....11 3	390
K2DIG.....4 3	140	W1QWJ.....10 3	230
W2DWJ.....15 5	740	W1UHE.....10 4	430
W2DZA.....12 5	410		
K2DZM.....12 5	400	W2AOD.....6 4	290
K2JTF.....10 5	265	W2BLV.....12 5	360
K2JTB.....11 5	265	K2CBA.....8 4	220
K2JVT.....6 3	244	WA2DTZ.....6 3	190
K2KIB.....12 4	300	W2DWJ.....10 4	200
K2LRJ.....10 4	250	W2DZA.....5 3	130
W2LWI.....12 4	400	K2DZM.....10 4	390
W2NTY.....12 5	300	K2GGA.....4 4	383
K2PZG.....11 4	400	W2HQE.....5 4	280
K2QJG.....13 5	540	K2KIB.....1 2	100
W2SEU.....11 5	450	W2NTY.....3 2	100
K2UUR.....6 3	210	W2OTA.....10 3	300
		K2UUR.....9 3	280
		W2VCG.....9 4	250
W3AHQ.....4 3	180		
W3FE.....11 6	350	K3CLK.....9 4	250
K3IUV.....8 3	310	K3EOL.....6 3	296
W3JYL.....8 4	295	W3EY.....8 4	310
W3RZL.....4 3	250	K3IUV.....3 2	310
W3KKN.....10 4	255	W3LCC.....3 2	300
W3LCC.....10 5	300	W3RUE.....6 4	410
W3LZD.....15 6	425	W3UJG.....2 4	350
W3RUE.....10 5	480		
W3UJG.....13 5	400	W4HHK.....9 4	550
W3ZRF.....5 4	112	W4RFR.....5 2	665
		W4TLV.....4 2	590
K4TFE.....3 4	400		
W4TLG.....5 1	315	W5AJG.....6 2	665
W4UYB.....7 5	320	W5HTZ.....5 3	440
		W5RCI.....12 3	660
W5AJG.....3 2	1050	W5SWV.....7 3	525
W5RCI.....8 5	700		
K6GTT.....2 1	240	K6GTG.....1 1	180
W6MMU.....2 2	225	W7LHL.....2 1	180
W6NLZ.....3 2	2540		
K7ICW.....1 1	250		
		K8AXU.....5 3	660
K8AXU.....11 5	1050	W8HCC.....3 2	355
W8LJG.....9 5	475	W8HRC.....3 2	250
W8LPD.....6 4	480	W8IJA.....6 3	275
W8NRM.....8 4	390	W8NRM.....3 3	390
W8PT.....10 5	660	W8PT.....8 5	400
W8SVM.....6 4	520	W8ROI.....6 3	270
		W8TTY.....9 5	580
		W8UST.....3 2	25
W9JCS.....6 2	340		
W9JEP.....9 4	540	K9UIF.....8 5	390
W9OVL.....6 3	475	W9AAJ.....7 3	425
W9UED.....1 4	605	W9GAB.....9 4	608
W9ZIH.....10 5	500	W9OJT.....6 3	330
KØDGU.....5 3	425	KØITF.....3 2	158

The figures after each call refer to states, call areas and mileage of best DX.

(Continued on page 178)



Correspondence From Members -

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

CLOSE CALL, HAPPY ENDING

Many thanks for the League's letter enclosing a copy of FCC's an "Order to Show Cause" issued against my station.

You were quite right in your assumption that the original FCC citation did not reach me and, in fact, the follow-up was not received either. The "Order to Show Cause" was sent to my new address and it was only then that I realized that I had neglected to change my address after a recent move and for some unexplained reason my mail had not been forwarded.

I am quite impressed by the service provided by the League and I appreciate very much your calling this matter to my attention. I have replied to the order, although not having seen the original citation. I have no idea of what my alleged violation was. Since I highly value my station license, I hope it will not be necessary for me to ask for further assistance from the League. — *Name withheld by Editor*

Editor's Note: There is a happy ending to this case for the amateur. After receipt of the League's letter, he got in touch with the Commission immediately, voluntarily left the air, and explained his previous failure to respond. The FCC took into account the amateur's previously clean record and his voluntary suspension, and terminated the revocation proceedings with a warning only.

UHF TRAFFIC NETS

Many amateurs feel a justifiable pride in noting that amateur high-frequency (160-10 meters) operation is generally comparable to the best commercial techniques used in the same portion of the spectrum.

However, a serious deficiency exists in two fields that are related to each other: traffic handling and ultra-high-frequencies.

Amateur traffic handling is generally comparable to commercial techniques of the 1930's—inter-connected high frequency nets with much handling and relaying of messages.

Commercial practice for some years has been to handle the greater part of its traffic via microwave relay stations. It is somewhat surprising that amateurs have failed to utilize these already-well-developed techniques, especially in the light of the crowded nature of amateur high frequency bands. Proper microwave technique could multiply by several times the bandwidth available for long-distance communication.

Commercial practice employs approximately forty relay stations to provide a reliable "pipeline" for the flow of information from one coast to the other. Forty amateur stations forming a microwave relay chain from, say, San Francisco to Newington, could handle more information than all the amateur stations in the entire high frequency spectrum working together.

We at K6NCG are interested in trying to work out something along this line. 1215 or 2300 megacycles seem promising—but we would be interested in any likely frequency or combination of frequencies.

We would like to know of any amateurs or amateur clubs interested in forming such a relay chain. Needless to say any station along the chain could feed traffic in and tap traffic from such a "pipe," and it could be made nearly immune to atmospherics. Difficulty in crossing the continent is great, and perhaps a north-to-south pipe from Portland to San Diego, or Newington to Miami, might be tried first.

We throw this out to the amateur fraternity and would like to hear some comments. — *V. P. O'Neil, Pres., K6NCG, Box 105, Treasure Island, San Francisco, Calif.*

KUDOS TO S.C. ELECTRIC

For months I was plagued with intermittent noise that rendered reception impossible, although BC and TV reception were not affected. It was not related to weather or any appliances, and by using a transistor radio I localized it at several 115 volt service entrances and utility poles in my vicinity. Finally I notified the South Carolina Electric and Gas Co. and the next day received a letter from their vice president, Mr. Harold A. Pettit, promising an investigation. Later that day a long distance phone call from their engineering department in Columbia set up an interview for the following morning.

Two men arrived, Mr. Bryson Lowman from Columbia who turned out to be W4TTH, and Henry Coleman from Charleston, W4MRJ. They were on the job until midnight, finally replacing a lightning arrester on a pole a block away and my troubles were over. They continued to check for the next two days to be sure they had the culprit.

This is an outstanding example of cooperation on the part of the utility company and I have expressed my appreciation to all individuals concerned. — *G. L. Countryman, W4JJA, Charleston, S.C.*

QSL COURTESY

Am I expecting too much of amateurs today to ask for a QSL card? When I work a state for the first time and ask him to please QSL, the common answer is, "Be glad to QSL." I just might receive a card but the odds are against it about 10 to 1.

Please tell the boys if they're not going to QSL to say so, so I (and a majority of newcomers) will not waste my time waiting for that new state to come. — *Bill Davis, K3VTP, Crum Lynne, Pa.*

It has always been known that the final courtesy of the QSO was the QSL, but I guess that has gone. When you have to beg for a QSL and spend all the money for postage over and over again it is getting past the hobby stage. I have sent over 200 foreign QSL cards in less than a year and don't get 5% return there. Must be something gone wrong with the sport. — *Clarence O. Abeo, W2NR, Buffalo, N.Y.*

Yesterday the 21-Mc. band opened to Africa. African contacts are as rare in Montana as Montana contacts are in W2-land. Every time I called an African, I was greeted with a barrage of static calling me on the DX station's frequency! Obviously I did not answer any of them.

If the East Coast gang wants to QSO me and get my card, they'll have to call off of the DX station's frequency. This is nothing more than plain courtesy.

Incidentally, I imagine the Africans would like a Montana card, too.

I hate to do it, but I'm going to start having to ask for s.a.s.e. The load is too great. — *Wes Bell, W7QB, Lewiston, Montana.*

YES, VIRGINIA, THERE'S A WB

¶ It seems to me that many a ham does not know that there is such a thing as a WB prefix. I have answered many stations and all I have ever gotten back is a QRZ. With all the WBs coming into being, all hams should know what it sounds like. — *WB3CAN, Jesse D. Sheinwald, Long Beach, N.Y.*

... HOW YOU PLAY THE GAME

¶ I am about fed up with some of the DXers about nowadays. Not the DXer who sits up all night with the cans on and ears bloodshot eyes by searching through piles of QRM for that one weak, chirpy signal and then bravely pits his 15 or 20 watts against the hoards. Not even the all-out type with an antenna system to make an insect blush and power to make him the friend of the light company. These aren't the guys I'm after.

My kick is at the so-called "big DX gun" who thinks a General Class license means that he can use his call or anyone else's anywhere and anytime he pleases. This type carries interesting little lists with him so he can work those rare ones from the spot they come in best, not only for himself, but for all his buddies, too. It gets a little hard to figure how a W0 can be a local in California or a W8 in Missouri. I've heard both. Just goes to show how radio makes the world smaller, I guess!

Of course, another type read the rules wrong and thought that 1000 watts input meant into the grid! I've seen 4-1000A linears operating where I thought for sure the plate was ready to puncture, properly tuned and everything. Of course the meters read a very Scotch kilowatt. (The reading was probably the same whether the rig was on or not!)

Sure these guys get high scores in the contests; why shouldn't they! Radio Moscow is running them a close second but radio Moscow can't turn its antenna as easily.

I guess I'm missing all the fun in DXing, but I'll just poke along with my own little six digits and direct reading meters and maybe eventually I'll get some type of award. But at least I can be proud of mine! — *Larry W. Strain, WA0EWS, Rolla, Mo.*

¶ I would like to add something to the a.m. vs. s.s.b. controversy. It seems to me that intelligent and mature people could accept all modes of transmission. This however, is not the case. For the past year, on and off, I have had the misfortune of hearing a local station purposely, maliciously, and anonymously jamming s.s.b. communications near 14,203 kc. This jamming usually consists of an unidentified series of Vs sent with a bug. I have noted that these transmissions zero-beat with the s.s.b. station have caused more interference to nearby a.m. stations than to the s.s.b. station. We should be gentlemanly, as the *ARRL Handbook* puts it. Let's put an end to this lid type of operation. — *Mortie C. Smith, WA6SNE, Santa Monica, Calif.*

NOTHING TO DO?

¶ Amateur radio no longer reflects the desire to "Be One of Those," but is rather a nation-wide gripe session.

I'm still using the air; I devote my spare time and interest to private flying! — *Perry Mowery, K9DMG, Bartonville, Ill.*

THE HAM SPIRIT

¶ An "Old Timer," ON4UL, is at present ill and has been immobilized for 7 months. He is practically on the verge of a final QRT.

This situation is extremely painful for his family, which owing to this fact finds itself in a most difficult financial position.

The thought occurred to me that similar cases can occur among all of the OMs of the world, and that it would probably be very easy to find a solution that would permit them to be helped by creating between all members of ARRL a link of solidarity which, in view of the great number of its members, would not represent a real financial burden for anybody. I would suggest the "one cent a day" formula.

Each member of the association would be free to contribute according to his own possibilities, to a worldwide help-scheme reserved in principal to the OM with a minute sacrifice of one cent a day.

I think it is not necessary to enlarge upon the details of such a scheme which could be definitely useful and would still reinforce the bonds uniting all OMs of the world. — *Ph. le Grand, Brussels, Belgium.*

NARROW BAND MANNERS

¶ There are some operators on the bands who like to break into other people's QSOs, and tell them they're a bunch of jerks, kids, and sub-novices. They may have their opinions of who is and isn't a good operator, but I think it is altogether rude and unjustifiable to mess up someone's QSO. I think that they give ham radio a black eye and are unwanted on the bands. Some of them have two-letter calls and are Extra or Advanced class amateurs. This just goes to show you that theory does not always make a man a good operator. — *Dennis Austin, WB2ECL, Olean, N.Y.*

RC, GOOD STUFF

¶ I started in radio control 18 months ago and am now flying Multi (Taurus) — have read everything I could find on the subject. Just wanted to tell you that the article by George Wilson, W1OLP, is by far the most constructive piece of info any beginner could come in contact with.

Let's have some more like it. — *Jay Wallis, W5DLA, Gulfport, Miss.*

HOW'S YOUR ACCENT?

¶ Congratulations on your *QST* reprint, "Your Novice Accent" by W6DTY. I feel all Novices should read this and learn the basic procedure signals for a QSO. This pamphlet is excellent for all new Novices and possibly several old timers. — *Alan Strassberg, WB2JET/6, Sherman Oaks, Calif.*

OUR LEAGUE

¶ I would very much like to take this opportunity to express my sincere appreciation and gratitude for ARRL and the wonderful help it has been to me and my fellow amateurs through the fine publications and activities which it sponsors. It is through the efforts of ARRL that our heritage in amateur radio has been preserved and enriched. At this time, when our enjoyment of a very rewarding and stimu-

(Continued on page 176)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide

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WIAW Code Practice Expanded. Starting immediately ARRL announces the availability of extra tape-sent code practice from WIAW. This will be a daily transmission on all c.w.-listed WIAW frequencies occupying the half-hour period just ahead of our eight o'clock (EST) 18 w.p.m. bulletin-to-amateurs. Speeds of 10-, 13-, and 15-w.p.m. will be covered each day, 0030-0100 GMT.

The full fall-winter WIAW schedule is indicated elsewhere in these columns, also the details on our 5- to 35-w.p.m. practice periods that continue at 0230-0320 GMT. The designated times for 7-Mc. c.w. and phone "general operating" contact with our station have been moved to 2330-2400 GMT to make this extra half hour of practice transmission possible. The "earlier hour" code practice in the important speed range needed to attain General Class ratings should be as welcome availability to all—and we point out that even those who can presently copy but five to seven w.p.m. should listen regularly to this. (To attain higher speeds one *must* practice copying above what he can take "solid"!)

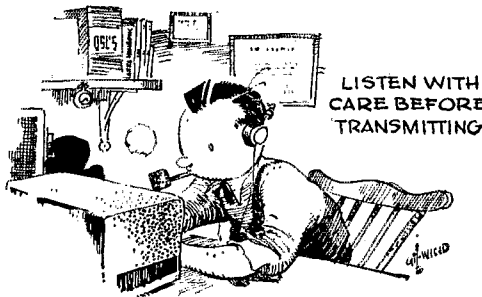
Twenty meters has shown a habit on the coast of "early evening drop-out" this season. Our additional earlier transmission should give a dependable 14-Mc. signal in the far west and northwest over most all of the year. This new schedule also will permit good code practice for those who must use their later-evening hours in other ways. This advantage of more practice at a different hour of course applies to amateurs in all parts of the country. During December and January WIAW's 3555- and 7080-ke. transmissions can normally be received at great distances. On late-evening reception when 80 and 40 are skipping, as at Boston and New York, for example, may we suggest tuning instead to our 1805-ke. or 50.7- or 147.8-Mc. frequencies, one of which should be helpful for bulletins or code practice at near-by points.

Attention, Traffic Netters. We hope you were reading those remarks above. Little we need tell you about the skip we experience on this part of the sun spot cycle. NCS will please encourage all concerned, both c.w. and phone

netters, to have "alternate" equipment either for 160 or v.h.f.s. Try out *net periods* using 1.8 Mc. or v.h.f. Select the alternate band of popular choice with your group for use these months when local-skip is bothersome. ARRL would like to have word of your "alternate" set up. ECs and VHF-PAMs are urged to establish new local nets too. Tie such nets in with all possible section level (h.f. band) nets to expand the daily-communicating coverage for amateur traffic—to meet this seasonal poor-propagation problem.

New Highs in Field Day! We're proud to present the report on ARRL's June FD in this issue of QST. A whopping new high was recorded in the number of logs, units afield, and the scores! We had thought this impossible in the face of a 9% increase just last year, and steady earlier growth in interest. This was our 27th official ARRL Field Day. The annual emergency-equipment test is training in making setups for disasters in areas without communication, and a test of operators and operating ability as well. The fun and teamwork know no parallel. Mindful of the solid accomplishments of those who took part we are moved to quote the slogan from our "10th FD" special QSL card: **THERE'S NOTHING LIKE AN ARRL FIELD DAY.**

Holiday Traffic. Why not make this a traffic-Christmas? Reach old friends and demonstrate amateur radio for those folks next door as well as your own family this year. There's a special appeal for all in exchanging holiday greetings; no better time to tie amateur radio and these



alendar days together. In the United States and Canada we amateurs can freely relay and deliver messages, holiday or other season, so long as we receive no form of compensation, direct or indirect, from use of our FCC station authorization. Such traffic work is a privilege *not* permitted amateurs in most other countries. Radio communications in nearly all are run by the government itself, and government revenue is entailed. The difference between a message that we voluntarily handle and the commercial one is, of course, that the carrier has to *guarantee* delivery and fast service; amateurs cannot do that. Nevertheless, the dedicated amateurs who man our amateur-band domestic nets make up an outstanding group of communicators. Message accuracy and swift-as-possible deliveries through our NTS-ARPS nets are part of their tradition. If you tie in with them (consult ARRL's Net Directory or find section net frequencies in *QST's* Station Activities) your holiday traffic filings will have the best chances of accurate transmission and delivery. We suggest you make up the list of those for whom, and to whom, you will start seasonal amateur radiograms *early*. Traffic originated through your station in the first two weeks of December stands the best chance of getting through without running into delays such as from overloaded circuits.

How to Start Traffic. Proper message form, if you're not already acquainted with this, can be achieved just by filling in your message using the spaces on an ARRL message blank. A full specimen message in proper form was given in Traffic Topics last month. You can consult the text of *Operating an Amateur Radio Station*.

First you draft the message. Next to get your message on the way: if not on the air yourself you can still *file your amateur radiogram* by calling an Official Station SCM-appointed. ORS, OPS and OES know the ropes. Most of them are members of h.f. nets (v.h.f. nets in the case of the OES). It may have occurred to you to *handle*



In late July, following the devastating earthquake which destroyed the town of Skopje, Yugoslavia, the *Savez Radioamatera Jugoslavije*, YU amateur society, organized communication between the stricken town and Belgrade. YU1SJ (above) was active for five days continuously on 40 meters. YU3ZRS also was active.

your message direct. This can be accomplished, perhaps, by doing a lot of monitoring of the bands for a station at the point of destination—or you might find an active operator indicated in *QST's* Station Activities, or you can look up stations in the call book. With the many specialties within amateur radio, of course not *all* these operators you hear will have the traffic know-how and the reliability you seek.

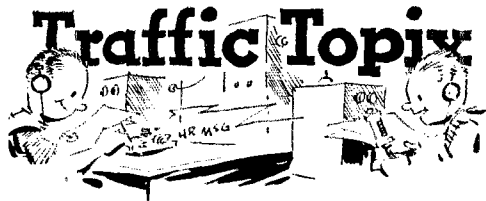
The easiest, as well as dependable, way to start one's message is to use your local ARRL Section Net. (The majority of such nets have connections to all states and provinces through the region and area nets of the National Traffic System.) Use this c.w. or voice net, having ascertained its frequency. Call in at the proper time when the NCS calls the roll. Indicate that you have traffic (and where for) and stand by until the net control station (NCS) tells you what station to give it to. When this station receipts to you for your traffic it is successfully on the way. A variation in this method is to consult the Net Directory to find the time and frequency of a net in or near the place of destination and report directly into the NCS of *that* net. But the propagation conditions are not always favorable, especially for contact with nets at considerable distances. For reliable outlets we recommend that all amateurs make a practice of reporting in from time to time to *their own section net*, rather than breaking into nets not their own. The principle involved is, for this holiday traffic, to put it in the hands of operators who specialize and find their fun, enthusiasm and reward in public service and traffic-handling work.

ARRL Numbered Text Messages. In the back of every ARRL log you will find a complete list of numbered-text messages. Some of the texts are designed for holiday greetings, while others have been devised for use in disaster work. The ARRL system of texts helps amateur radio do a bigger seasonal job of handling greetings and emergency messages, and reduces the transmission time required on the circuits when a peak load of traffic is to be expected.

We'll be pleased to send CD Form 3 (the Numbered Text list), including a number-sheet form to assist in next year's consecutive numbering of the messages you start through your amateur station, if you will but send us an amateur radiogram request.

These fixed-text messages carry the identifier ARRL *both* in the check and in the text preceding the numeral that identifies the desired text. We recommend *spelling out* these as well as other numerals to avoid errors and make sure the right holiday text is delivered to the addressee. Put the ARRL indicator ahead of *each* number in a text that has more than one to prevent running the numbers together. On receipt of this type of message it is the receiving operator's responsibility *always* to expand the message and spell it out, since the numbers are merely system designators within amateur radio and have no meaning to the addressee.

—F.E.H.



Traffic Topics

The only way to shake some of these old-time traffic men out of their apathetic complacency is to take the bull by the horns and institute some new procedures, then sit back and wait for the storm. This is precisely what we did in the case of precedences and handling instructions in message preambles. Oh, we asked for comments first, in the time-honored manner, but we didn't get them, and what's more we *knew* we wouldn't get them. Now that *the* new procedures are officially a part of the ARRL recommendations, we are getting some of the reaction we should have got long ago.

Now, however, we are committed to use of these procedures, so it's too late. They are being printed in the ARRL log book and will be available separately as Form 3. We expect we'll provide space for them in the next printing of the ARRL message blank and message delivery cards. In other words, we are going to give them a real try, so let's all familiarize ourselves with them and use them as the occasion arises. In the case of precedences, it now becomes standard procedure to use a precedence indicator on *every* message, even though in normal times 99% of them will be "routine." If you receive a message without one, put one on when you relay or deliver it; messages without a precedence designator will be designated "routine." Don't ever drop a precedence designator, or change one. The originating station sets the precedence. If you think he is cockeyed, O.K. to tell him so, but don't change it unless he authorizes you to. See page 94, Oct. QST, for explanation of the three ARRL precedences and their use; or, get a Form 3 from us.

Handling instructions are optional and, we suspect, won't be too numerous. Nevertheless, properly used they are a useful tool, and all good traffic men should be familiar with them so that if they get an "HX" thrown at them they will not be thrown by it. At present, the HX list is small; it may grow as other meanings are suggested or occur to us. When we say it is "optional," we mean that the originator of the message may have it in his message or not, as he desires (but we suggest *not* unless he has a good reason). The term "optional" does not apply to relaying stations, whose duty it is to relay the message as they receive it, with nothing added nor taken away except to correct the message's form.

The new count for book messages has excited some comment, too. History has shown that opportunists, if given the chance, will set up "traffic mills" to originate hundreds, even thousands, of messages, all with the same text, in "book" form in order to qualify for BPL with the least possible effort. Our feeling has always been that making BPL is not, or should not be, the object in handling the traffic. The object should be to render service. Of course you can render service through book messages too, but there seems to be an element of unfairness in giving the same credit for the comparatively little effort in handling book messages as for handling individual, complete messages. The question thus delineated, then, is whether traffic count should be based on point fairness, on service rendered, or on effort expended. The answer is, of course, all three — and the present counting system is a compromise, since the three bases are not always in accord with each other.

Incidentally, many amateurs are not aware that messages may be made into "books" if they contain *any* common parts. It doesn't have to be the text, for example; you can have the same addressee with different texts, or different addresses and texts with the same preamble (except number) and signature, or any other combination. You send the message as "book of," follow with all the common parts, then after a break sign you start giving the numbers and the variable parts. Your count (either individual or net) is obtained by giving a point for each three messages in the book plus another point for any over an exact multiple of three. However, book messages are not eligible for this counting procedure unless the address or two other parts of the message (besides the number) are variables. For example, if the signature is the only variable, the special counting system cannot be used.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for September Traffic:

Call	Orig.	Recd.	Del.	Total	
K6BPI	78	2561	2167	197	5003
K9ONK	192	2094	2017	105	4408
W9OZ	25	1642	1576	3	3246
W91LA	16	1009	943	3	1987
W9LGG	96	841	774	69	1780
W5PPE	1248	175	161	14	1598
W6RSY	45	695	480	230	1450
K4AKP/6	33	659	596	62	1350
W7BA	2	655	632	25	1314
W3EAL	35	593	521	14	1163
WA2TQI	326	400	210	190	1126
W6WPF	14	551	502	49	1116
W0SCA	14	536	503	1	1054
K5IBZ	8	477	463	14	962
WA4AVM	15	421	390	1	830
K3DRH	29	370	358	7	764
K7IWL	14	343	334	15	734
W6GYH	104	326	286	23	739
W6EOT	5	371	355	6	737
K9KZB	3	362	341	21	732
WA2GPT	62	334	299	29	724
W56BBO	30	324	303	17	724
W4VRS	15	240	227	7	725
WA9CCP	16	248	209	138	711
WA6BRG	39	343	305	18	705
WIPEX	36	316	279	28	659
W9AOW	0	319	307	9	635
W9DYG	90	287	236	22	635
WA2GCR	28	301	263	38	630
K61WV	4	307	292	15	618
WA4PDS/					
W42WBA	19	309	280	8	616
W8UPH	8	295	246	47	596
W42UZK	17	290	274	7	588
W9EYB	31	274	208	72	585
K9DHN	15	297	259	13	584
W5ED1	580	0	0	0	580
W4DLA	26	268	269	5	568
W3CTL	26	271	223	46	566
WITXL	103	236	206	9	554
W0AYB	37	240	201	76	554
W4ZJY	34	288	231	0	553
WA2BIV	19	263	248	19	549
K7CTP	57	263	178	15	543
K1WKK	36	260	235	10	541
W4KIS	14	263	241	22	540
W8DAB	54	251	163	69	537
WA4BMC	18	203	183	16	504
K9IMR	40	257	107	120	524
K1WJK	47	238	222	14	521
W2MTA	20	254	223	24	521
K7JHA	19	281	220	1	521
W42VLC	17	232	230	36	515
VE7BJV	20	272	202	14	508
K1RYT	1	251	247	3	502
K5TEY	9	261	225	7	502
W2OE	98	230	166	7	501
Late Reports:					
W6WPI (Aug.)	30	364	325	39	758
W6YTH (Aug.)	214	297	231	19	731
K3GST (Aug.)	0	549	101	0	650
WB6BBO (Aug.)	51	284	253	23	611
K61WV (Aug.)	8	259	237	22	522
W31VS (Aug.)	31	246	240	6	523
VE7BJV (Aug.)	20	272	202	14	508
WA6KWV (Aug.)	0	251	236	15	502

More-Than-One-Operator Station

Call	Orig.	Recd.	Rel.	Del.	Total
W6YDK	2216	1401	1346	55	5018
W6IAB	184	2339	2242	74	4839
KR6MD	1732	88	38	50	1908
KR6CF	391	75	632	73	1801
W5AC	301	108	95	13	517

BPL for 100 or more originations-plus-deliveries

K5OCK	407	W5DTR	130	W5BFC	105
K8GJD	315	VE7BHH	130	WA2CCF	103
K6GZ	240	K4SJK	121	WB2ALF	101
W3CUL	219	K4CDZ	117	Late Reports:	
W7APS	217	K5QXV	116	WA2PZD	(Aug.) 130
W9NZZ	177	WA2WGN	115	K3APM	(Aug.) 105
W9EY	153	W3TNN	110	W6AOK	(Aug.) 105
K8GOU	136	K8ADD	107	W7GUH	(Aug.) 100
		K2SPG	105		

More-Than-One-Operator Station

K3ORS	374	KR6MH	234	Late Reports:	
WA6VFM	310	W8FY/8	228	VE7ARK	(Aug.) 314
				W5AC	(Aug.) 204

BPL medallions (see Aug. 1964 QST, p. 64) have been awarded to the following amateurs since last month's listing: K1WKK, WA2RMP, WA4IXI, K5VMJ, WA6WFK.

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

Stations reporting into nets with book messages need not indicate that the messages are books. The net control couldn't care less. But he does care about the net traffic count, so it is up to the reporting station to break the traffic down according to count. For example, if he has a book of ten, he will report it to the NCS as "QTC 4," not as "book of ten." If the book has to be broken up and sent to different net stations, he will report it to the NCS in accordance with what the net count will be; for example, if four of the book must be sent to W9XYZ, four to W9XXX and two to W9XAB, he will report in as having two, two and one for the three stations (or their coverages) respectively.

This all may sound complicated, but it's quite logical, and logical things are usually ultimately simple. And remember, we are not kids playing at a hobby; we are mature amateur licensees rendering a service — an amateur service.

— WINJ.M.

September net reports:

Net	Sessions	Check-ins	Traffic
Early Bird Transcon	30	—	13
7290	42	1417	1033
Northeast Area Barnyard	—	715	10
75 Meter Interstate SSB	30	1226	778
All Service	5	45	36
Eight Ball Traffic	40	211	126
20 Meter Side Band	22	328	1656
North American SSB	—	666	930

National Traffic System. During the Simulated Emergency Test, on Nov. 5-6, we "planted" a dozen messages with active SECs located strategically around the country, with instructions to originate them some time during the weekend on local or section nets. The messages contained emergency-sounding texts and were given the precedence "TEST EMERGENCY." We wanted to see what would happen to such messages on NTS circuits.

Since the test, tracers instituted on all twelve of these messages haven't had time to tell us much, but we have already arrived at certain preliminary conclusions, based entirely on the state of each message as it arrived here and the time it took to make the trip, presumably over NTS circuits.

The first thing we note is that at least one of the SECs did not follow instructions and gave the message a precedence rating of "TEST P," so its value in this test was thereby negated; we suspect that one or two other SECs did the same thing, for reasons that escape us. Of the ten messages which arrived (two never did arrive, and perhaps were not originated), only four carried the "test emergency" precedence they were supposed to have originated with. Four carried no precedence at all; and the other two arrived with precedence "TEST P." Of the four which arrived with the proper precedence, one had no filing time, so we are not yet able to calculate its transit time. The other three had an average transit time of 17 hours, 9 minutes, the best time being three hours, four minutes, the poorest being 25 hours, 2 minutes. The routes taken by these messages are being carefully analyzed, to see what we can learn about our procedures and determine how to improve them. If we get the cooperation of relaying stations, we'll have more on this later, but don't expect any kind of revelation of who made the mistakes. No one is going to be pinned to the wall, even though you might say that some of them deserve it. This isn't a witch hunt, it's a careful study of procedures to reveal faults and seek ways to correct them.

One thing that seemed apparent was that our NTS nets, especially at lower (section and local) echelons, don't "dig" these precedences. We suspect that many arbitrarily drop them, not knowing what they are. Of the several received at WINJ.M., only one had the proper electrifying action of stopping all other traffic, and this was in an area

net. Those received at section level were mixed in with all other traffic, both priority and routine, in random order.

A "precedence" (accent on the second syllable to distinguish from the plural of "precedent") is an order of handling. The messages with the highest precedence are handled *first*, those with the lowest *last*. A message with a precedence of "emergency" (this is *never* abbreviated to E, even on c.w.) is a net-stopper. Priority messages precede routines in normal flow, but transmission of routine messages are not usually interrupted by the appearance of priorities; however, they are inserted at the first break. For example, Station A reports into the net with two P's for Station B, who is busy down 5 sending five R's to Station C. The net control QNQ's Station A down 5 ahead of all other stations holding R's for Station C, but Station A doesn't "break in" on Station B's transmission; he waits until the five R's are cleared. However, if Station B had a string of ten or fifteen R's, net control might have instructed Station A to break in on the transmission at the first QSL.

Now read that example over again, carefully, and be sure you understand it. In this as in most net matters, the net control has to exercise good judgment. This is one of the things net controls are for. When we get around to revising CD-24, we hope to include this type of detailed instruction on how to use precedences in nets. This is a matter of *operating efficiency*, and it is important. It doesn't make our net operation any easier. It will require us to *think*, use our heads; all steps toward efficiency require this, make no mistake about it. — WINJ.M.

September net reports:

Net	Sessions	Traffic	Rate	Average	Representation ('.')
EAN	30	2058	1.183	68.5	99.1
CAN	30	1766	1.174	58.8	92.2
PAN	30	1497	.911	49.9	100.0
1RN	60	524	.361	8.7	65.0
2RN	60	894	.697	14.9	100.0
3RN	60	692	.413	11.5	96.6
4RN	58	815	.583	14.1	95.4
RN5	60	1544	.755	22.5	90.0
RN6	60	820	.354	10.3	98.3
RN7	59	512	.296	10.8	79.5
8RN	59	451	.261	7.6	89.6
9RN	42	606	.583	14.1	75.0
TEN	47	592	.497	12.6	56.6
HCN	27	122	.210	4.5	59.3 ¹
RWN	29	202	.341	7.0	57.9 ¹
Sections ²	1115	5535		5.0	
TCC Eastern	120 ³	614			
TCC Pacific	93 ³	1061			

Summary	1826	20135	EAN	10.1	PAN/2RN
Record	1829	21234	.942	15.4	100.0

¹ Region net representation based on one session per day. Others are based on two or more sessions per day.

² Section nets reporting: (43): SGN (Me.); TPTN, FATN & WFPN (Fla.); NCN & NCSN (N.C.); OQN (Ont.-Que.); Wolverine & QMIN (Mich.); NJN, NJ 6-2, NJ Phone Tfc (N.J.); Tenn. Phone, Tenn. CW, E. Tenn. Phone; TSSN (Tenn.); Ark. Emerg. Fone & Ark. CW; AENT, AENS, AENP, AENP Morn, AENO, AENM, AENH, AENJ, AEND, AENB (Ala.); MSN (Minn.); MDD & MDDS (Md.-Del.-D.C.); OFN & GBN (Ont.); SCN (S.C.); NRB (Nebr.); Badger WIN (Wis.); SCVSN (Calif.); NTTN (Texas); BUN (Utah); RISP (R.I.); CN (Conn.).

³ TCC functions reported, not counted as net sessions.

If you'll study the above closely, you'll see that EAN holds the new record "rate" for September and that CAN also exceeded the previous record. In number of net sessions we came mighty close to the all-time record for the month.



A special net of Southern Michigan amateurs was set up on August 25 to handle communications for the Michigan Women's Small Airplane Race. Shown at one of the control stations, in the photo at the left, are, seated at left, K8JLN and K8HAS and (holding mike) W8NZQ.

QST for

Traffic and average also shows signs of increasing. Next month, with the boost from SET, we should be over the top in several categories.

W2EZB cites the troubles with long skip, coming early this year, and requests that region net managers provide at least two representatives to every EAN session. W9DYG wants it known that despite the troubles he has mentioned in previous reports, CAN is still the "best darn net in the U.S.A." The biggest trouble right now is lack of representation from TEN. K4AKP/6 makes his first PAN report, and it's a beauty, as usual. W3UE tells us that some 60 different stations are now QNI 3RN during a month, quite an improvement from the handful ten years ago; 3RN is still making itself known, he says. Manager W4SHJ has issued a 4RN certificate to W4JLH. K5IBZ was high QNI of the month on RN5. W6BB0 waxes enthusiastic about the great bunch of traffic men she inherited from K6LKD, and looks for great things to come. K7JHA says old reliables keep RN7 going, particularly K7IWD and W7APS. W8CHT has shifted 8RN's 0230Z session to 2315Z, in hopes of escaping skip; an excellent 3-page 8RN bulletin was issued for October. W9QLW makes his first report for 9RN. W0BYV submits his last as TEN manager. W0LXB says activity is increasing on TWN as the fall season approaches.

Transcontinental Corps. We are moving into another period of erratic conditions, as the sun spots continue at minimum, resulting in general long skip but in a pretty unpredictable way. This imposes a hardship on our TCC functions. Stations are particularly needed on the west coast who can report into PAN at 0430Z (2030 PST) to receive east coast traffic, then keep a schedule the following day with an east coast station to relay this traffic — preferably in the early morning between 1500 and 2000Z (0700 and 1200 PST). Any help, out there?

September reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	120	70.0	1760	614
Pacific	93	64.2	2122	1061
Summary	213	67.1	3882	1675

The TCC roster: Eastern Area (W3EML, Dir.) — W1s EMG NJM, K1NEF, W2MTA, K2UAT, W4s BLV VAT VLK, W3EML, K3s MVO QPG, W4s DLA DVT, K4s POA PQL, W8s BZX CHT ELW QFO. Pacific Area (W7DZX, Dir.) — K4AKP/6, K6GID, W6s EOT HC, W4s BFG ROF, W7DZX, W6s EDH EDK.



Here is W8ZHB, EC for Montmorency County, Michigan, displaying his latest portable rig.



A visitor t'other day was asking us about our policy with regard to clearing a frequency on which an emergency net was conducting a drill. This particular net, he told us, fired up without warning right on the frequency on which he was having a QSO. What should he have done?

We asked him what he *did* do.

Well, he said, he continued the QSO for a while, expecting all the time that the net control would call him and ask him to move, but they never did. The net just kept right on operating. Our visitor said he *knew* he and his buddy were QRMing the net, so how come the NCS didn't call them and ask them to move? The net just ignored them. So, finally, somewhat resentfully, the two rag-chewers moved off the frequency *without* being asked.

Our visitor made it very plain that he and his contact resented (1) the net firing up right on "their" frequency without so much as a by-your-leave, and (2) being ignored by the net despite the QRM they were causing.

We have heard people say that they would rather be hated than ignored. Nevertheless, the net in question did exactly the right thing, just what we have been recommending for these many years. No amateur or amateur net "owns" a frequency in any amateur band, even one which they are occupying at the time. Most any net conducting a session in our crowded bands will find it impossible to avoid causing QRM to a QSO going on. It is not practical to find a "clear spot" for a number of reasons which should be obvious to almost anyone. With so many amateurs occupying so few frequencies, comparatively speaking, especially in the higher frequency bands, QRM is something we have to contend with. Because of this fact, we have been a little impatient with complaints of this nature.

In an emergency situation, there is an FCC regulation for clearing frequencies: Section 12.156. If it so desires, FCC can invoke this section to make it a citable offense to QRM the cleared frequency or segment. In practice, they have seldom, if ever, done this; the notice usually takes the form of a "voluntary" observance, in which FCC "requests" the clearing of certain segments of certain bands in view of an existing emergency. Under most such circumstances, the magic of the FCC name alone is enough to cause compliance.

But actually, fellows and gals, we should be able to do our own monitoring, without FCC's teeth. During drills and tests, we let the QRM fall where it may, and anyone complaining about it is "chicken." In an actual emergency, however, monitoring is best carried out by stations *outside* the emergency area specifically designated for that purpose. Such stations should park themselves at least five kilocycles on either side of the net frequency and devote all their time to calling and making contact with casual stations interfering with emergency net operation, and asking them in a tactful manner to cooperate. It should be a point of pride with us *not* to go running to FCC for help.

By "tactful manner," we do not mean simply to add the word "please" to an otherwise truculent and arrogant demand to vacate the frequency. Casual amateurs, always on the lookout for a "hole" in the band, are apt to plop down on top of a weak station on emergency power. Unless they can be convinced that there is a real need for their cooperation, they may want to talk it over with you, so the phrasing of any such request should be carefully calculated both to be convincing and to require no reply — at least not on the net frequency. This is no cinch, unless you happen to be a professor of elocution or diplomacy. We suggest that, after giving the station in question a long enough call to be reasonably sure he has you tuned in, you say (without standing by to see if he is listening) something like this: "Say, Old Man, you probably aren't aware of it, but there is an emergency in (briefly outline the situation) and the (name of net) is handling some emergency traffic on the same frequency you are using. Some of the stations are on emergency power and can't put much of a signal on the air, so you may not even hear them. We very much need a clear spot to handle this situation properly, so can you help us

out on this for a while, just until the situation gets back to normal? If you want to talk about it, or ask any questions, just slide down (or up) to my frequency, will you? Otherwise, there is no need to reply at all. Thanks a lot, and we'll be seeing you."

A great majority of amateurs so contacted will gladly cooperate. If you do get an argument from one of them, it is best to refuse to argue about it; just tell him to forget it and go about your monitoring work. Veiled threats or exchange of harsh words will accomplish nothing; once you have asked for cooperation, you have done your duty. Unfortunately, there are some amateurs who will deliberately QRM an emergency operation, but they are very few. The chances of our being able to clear our own frequencies in an actual emergency are very good, if we go about it properly. — *WINJAI*.

On the evening of Mar. 6, the Spaulding Dam in Norwich, Conn., burst and flooded a large portion of the town's business district. WITVL established an AREC emergency net and within 15 minutes *K1s* SRF NLX MRL WQL, *W1s* GEa UBM and FOZ reported in. *K1DYT*/mobile reported in later. *K1SRF* took over control and *W1s* TVL and NLX went mobile into the disaster area with auxiliary police. Communications were maintained far into the early morning hours. — *K1SRF*, Asst. EC for *W1GEa*, Emergency Coordinator, Norwich area, Conn.

On June 6, the Norwich, Conn., EC was notified by auxiliary police that a child had been reported lost on the west side of town and that mobile communications were urgently needed. The AREC group was alerted via radio and telephone and within 30 minutes mobile units *K1s* MRL SRF TFX and WITVL reported to the scene with WITVL acting as net control. Walkie-talkie units were used to good advantage for the first time during this operation. The net was secured at 0100 when the child's body was found. — *K1SRF*, Asst. EC Norwich area, Conn.

On the evening of July 25, the Weather Bureau in Honolulu, Hawaii, was unable to contact Palmyra Island and had reason to suspect the existence of a severe storm in that area. All other means failing, KH6BG was consulted and succeeding in making contact with W6FAY/KP6 at 1950 Hawaiian Time on 14,285 kc. sideband. — KH6BG.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

Dec. 5: CP Qualifying Run — W6OWP
 Dec. 19: CP Qualifying Run — W1AW
 Jan. 3: CP Qualifying Run — W6OWP
 Jan. 1-5: V.H.F. Sweepstakes
 Jan. 11-13: CD Party (e.w.)
 Jan. 17: CP Qualifying Run — W1AW
 Jan. 18-20: CD Party (phone)
 Feb. 8-9: DX Competition (phone)
 Feb. 1-16: Novice Roundup
 Feb. 6: CP Qualifying Run — W6OWP
 Feb. 11: Frequency Measuring Test
 Feb. 22-23: DX Competition (e.w.)
 Feb. 15: CP Qualifying Run — W1AW
 Mar. 11-15: DX Competition (phone)
 Mar. 28-29: DX Competition (e.w.)
 June 13-14: V.H.F. QSO Party
 June 27-28: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Dec. 7-8: New England QSO Party, Conn. Wireless Assn. (p. 146, this issue).

Dec. 8: Wisconsin QSO Party, Milwaukee Radio Amateurs' Club (p. 132, this issue).

Dec. 14-16: Virginia QSO Party, Roanoke Valley ARC (p. 158, this issue).

What might have been a serious fire in Purry Creek Canyon, B.C., near Loch Lommond, was reported promptly through the efforts of VE7KR, a B.C. Fish and Game Inspector, on Sept. 14. Noticing that a splash fire set by a logging company had been fanned by the wind into a stand of green timber, he decided it could be dangerous and that authorities should be notified immediately. A CQ call from his mobile rig brought no response, although there were stations audible, so in desperation VE7KR put out a QRRR call which was heard by VE6II in Alberta. He took the message and relayed it to VE7ABS in North Surrey, B.C., who contacted the R.C.M.P. detachment at Burnaby, who in turn relayed it to the B.C. Forest Ranger at Squamish. All concerned were later contacted and thanked for their participation. — *VE7KR*.

Thirty-seven reports were received from SECs for August activities, representing 18,493 AREC members. In December 1962 *QST* we mentioned that the 34 SEC reports for August were five more than ever received for August before, and the 15,000-odd members represented over 3000 over any previous August figure. This year's August record tops that by three reports and another 3,000 or so AREC members. So we're still climbing upward. Sections reported: Del., Mich. Minn., E. Mass., NYC-LI, So. Texas, Ohio, Nevada, No. Cal., Ark., Ind., Alberta, S.N.J., Ont., Wash., Okla., Utah, E. Fla., Va., Ore., Kans., N.M., Ala., W. Va., Mo., Tenn., Ariz., So. Dak., W. Pa., W. Fla., N.N.J., R.I., E. Pa., Iowa, B.C., Ga., Los A.

RACES News

The Eau Claire County AREC has supplied a c.d. shelter located in an underground bunker eight miles from the city of Eau Claire with radio communications gear and RACES operators. The bunker is on about the highest spot in the county, and all materials, labor and services were donated, including electric power by the Eau Claire Electric Co-op. Eau Claire County EC W9BEW says it was a lot of hard work and required everybody's cooperation, but the job is done and the communications center is ready to go at any time.



We are advised by Nebr. SCM W6GGP that K4MZF/6 has been appointed state civil defense communications and warning officer, replacing W6KVM, who has now been appointed deputy state director of civil defense.

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of ARCs, Inc., Bettie Jane Mayer, K7BED, Secy., P.O. Box 1335, Portland, Ore. 97207.

British Columbia AR Assn., Dave Gilmour, VE7YG, Secy., 1150 Comox St., Vancouver 5, B.C., Canada.

Chicago Area Radio Club Council, Inc., Diane Price, Secy., 6123 N. Rockwell St., Chicago, Ill. 60645.

Federation of Eastern Massachusetts Amateur Radio Associations, Eugene Hastings, W1VRK, Secy.-Treas. 28 Forest Ave., Swampscott, Mass.

Indiana Radio Club Council, Inc., Frank R. Anderson, K9BGF, Secy., 1002 — 25th St., Bedford, Ind. 47421.

Los Angeles Area Council of ARCs, Larry R. Hoffman, K6LDC, Secy.-Treas., 16945 Covello St., Van Nuys, Calif.

Puget Sound Council of ARCs, William Brown, K7LED, Secy., P.O. Box 6273, Riverton Heights, Seattle, Wash.

Radio Society of Ontario, Inc., Wm. F. Choat, VE3CO, Secy., 38 Grenview Blvd., N., Toronto 18, Ont., Canada.

CONTEST CORRECTIONS

In the September *QST* report on the June VHF QSO Party, W91Q's score should have appeared in the Wisconsin tabulation. In the October report on the ARRL International DX Competition, the following should be noted: W7DIS is the phone winner for the Willamette Valley DX Club. W7VGQ (sabotaged by a staple) is the phone section winner for Washington with a score of 26,738-71-126-BC-44. W4QVJ should have appeared in the "box" listing of countries worked on phone with a multiplier of 12, W6PHF inadvertently appeared as W6PHE in the Santa Clara Valley and W8JSU copped honors by Murphy allowing us to get his call wrong in 3 separate places! Sorry, fellas!

NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040 14,090, 21,090 kc.
WIDE BAND FM 52.525 146.94

GMT CONVERSION

To convert to local times subtract the following hours
ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, NST -7, PDST -7, PST -8, Hawaii -10, Central Alaska -10.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Dec. 19 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6WVP only will be transmitted Dec. 5 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. 19 becomes 2130 EST Dec. 18.

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.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun, Mon, Wed, Fri. (GMT date) from 0230-0320 — 15, 20, 25, 30, 35 w.p.m. on Tues, Thurs, Sat. (days in GMT) from 0230-0320 — 10, 13 and 15 w.p.m. daily from 0030-0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. 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* 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. 2: *It Seems to Us . . .*, p. 9

Dec. 10: *The Single-Sideband Sixer*, p. 11

Dec. 20: *Two Plus Two Equals Four*, p. 48

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Dec. 23: Station Accessories, p. 13

Dec. 27: Some Needed Fundamentals, p. 15

W1AW SCHEDULES

(December 1963)

Operating Visiting Hours

Monday through Friday: 3 P.M.-3 A.M. EST.

Saturday: 7 P.M.-2.30 A.M. EST.

Sunday: 3 P.M.-10.30 P.M. EST.

The ARRL Maxin Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent on request. The station will be closed Dec. 25, Christmas Day, and Jan. 1, 1964, New Years' Day.

Operating Frequencies

C.w.: 1805 3555 7080 14,100 21,075 28,080 50,700 145,800.

Voice: 1820 3945 7255 14,280 21,330 29,000 50,700 145,800.

Frequencies may vary slightly from round figures given: they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

C.w.: Mon. through Sat., 0100; Tues. through Sun., 0500.
Voice: Mon. through Sat., 0200; Tues. through Sun., 0430.

Caution: Note that in the U. S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from any amateur station in accordance with the following schedule:

GMT	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0120-0200 ¹	7080	3555	7080 ²	3555 ²	7080
0210-0230 ¹	3945	50.7 Mc.	145.8 Mc.	3945	3945
0330-0430	3555	3945	7080	1820	3555
0440-0500 ¹	3945	14,280	3945	14,280	3945
0520-0600 ¹	3555 ²	7255*	7080 ²	7080 ²	3945
0600-0700	14,280	14,100	3555	14,100	.....
0700-0800	7255*	3945	7080	3945	7255*
2000-2100	14,280	21/28 Mc. ³	14,100	.....	.....
2100-2200	14,280	21/28 Mc. ³	14,100	21/28 Mc. ³	21,330	.....
2200-2300	14,100	14,280	21.075 ²	14,280	14,100	.....
2330-2400	7255*	.....	7080	.....	7255*	.....

¹ General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.

² W1AW will first listen for Novices before checking the rest of the band for other contacts.

³ Operation will be conducted on either 21,075, 21,330, 28,080 or 29,000 kc.

* Operation may be on s.s.b. as announced at the beginning of the period.

Station Staff: W1QIS, W1WPR, K1MET.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

The following-listed Honor Roll clubs are scheduled to receive our "100% ARRL club" certificates shortly after the distribution of this issue of QST, June '63, page 95, carried the earlier section of our '63 Honor Roll including all then-known affiliates having recorded for '63 their 100 per cent ARRL membership. Each year our listings are completed 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 will be 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 and are additional to those commended with such special recognition in June QST.

Amateur V.H.F. Institute of New York, Maspetch, N.Y.
Berks Amateur Radio Club, Reading, Pa.
Blue Ridge Radio Society, Inc., Greenville, S.C.
Butler County V.H.F. Association, Hamilton, Ohio
Casper V.H.F. Society, Casper, Wyo.
Chicago Radio Traffic Association, Chicago, Ill.
Chisholm Trail Amateur Radio Club, Inc., Duncan, Okla.
Coffee Dunkers, Detroit, Mich.
Decatur Amateur Radio Club, Decatur, Ala.
East Kootenay ARC, Kimberley, B.C., Canada
East Whittier Radio Club, Whittier, Calif.
Enid Amateur Radio Club, Inc., Enid, Okla.
Ernest Harmon Air Force Base ARC, New York, N.Y.
Kankakee Area Radio Society, Inc., Aroma Park, Ill.
Inglewood ARC, Inglewood, Calif.
Laké Success Radio Club, Great Neck, N.Y.
Largo Junior High School Amateur Radio Club, Largo, Fla
Loudon County Amateur Radio Club, Lenoir City, Tenn.
Lower Columbia AR Assn., Inc., Longview, Wash.
Magie Valley Radio Amateurs, Inc., McAllen, Tex.
Mid Island Radio Club, Rockville Centre, N.Y.
Milwaukee School of Eng. ARC, Milwaukee, Wis.
Norfolk County Radio Association, Norwood, Mass.
Northern New Jersey Radio Association, Englewood, N.J.
Northwest St. Louis Amateur Radio Club, Florissant, Mo.
Order of Boiled Owls, Columbus Ohio Chapter, Columbus, Ohio
The Order of Boiled Owls of New Mexico, Albuquerque, N. Mex.
The Palmetto ARC, Inc., Columbia, S.C.
Perrinit Basin Amateur Radio Club, Odessa, Tex.
Peterborough ARC, Peterborough, Ont., Canada
Point Radio Amateurs, Ltd., Junction City, Wis.
Porterville Amateur Radio Club, Porterville, Calif.
Radio Amateur Transmitting Society, Nashville, Tenn.
Radlons, Lancaster, N.Y.
Rhododendron Swamp VHF Society, Medfield, Mass.
Scarboro Amateur Radio Club, Scarborough, Ont., Canada
Sheridan Radio Amateur League, Inc., Sheridan, Wyo.
South Bay Amateur Radio Society, San Diego, Calif.
State Line Radio Club of New York and New Jersey
Submarine Base Medical Research Lab Amateur Radio Club, Groton, Conn.
Westlake Amateur Radio Association, Rocky River, Ohio
William Penn Radio Club, Philadelphia, Pa.

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 Section. 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	SUM	Present Term Ends
West Indies	Dec. 10, 1963	William Werner	Aug. 10, 1963
Wisconsin	Dec. 10, 1963	Kenneth Ebnetter	Oct. 10, 1963
Utah	Dec. 10, 1963	Thomas H. Miller	Oct. 28, 1963
Eastern New York	Dec. 10, 1963	George W. Tracy	Feb. 10, 1964
Virginia	Dec. 10, 1963	Robert L. Follmar	Feb. 11, 1964
Ohio	Jan. 10, 1964	Wilson E. Weekel	Mar. 28, 1964
San Joaquin Valley	Feb. 10, 1964	Ralph Saroyan	Apr. 10, 1964
Manitoba	Feb. 10, 1964	M. S. Watson	Apr. 10, 1964
Alaska	Feb. 10, 1964	Kenneth E. Koestler	Apr. 10, 1964
Tennessee	Feb. 10, 1964	David O. Goggio	Apr. 15, 1964
Arizona	Feb. 10, 1964	Kenneth P. Cole	Apr. 15, 1964
Washington	Feb. 10, 1964	Robert B. Thurston	Apr. 30, 1964
Louisiana	Mar. 10, 1964	Thomas J. Morgavi	May 31, 1964

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.

San Francisco C. Arthur Messineo, W6UDL/K6CWP Aug. 14, 1963
Rhode Island John E. Johnson, KIAAY Oct. 12, 1963
Illinois Edmond A. Metzger, W9RPN Dec. 15, 1963

In the Vermont Section of the New England Division, Mr. E. Reg. Murray, K1MPN, and Mr. Burtis W. Dean, W1NLO, were nominated. Mr. Murray received 63 votes and Mr. Dean received 44 votes. Mr. Murray's term of office began Oct. 17, 1963.

DXCC NOTES

Announcement is hereby made of two additions and five deletions to the ARRL Countries List. The five deletions are as follows: VS1 Singapore, 9M12 Malaya, VS4 Sarawak, ZC5 British North Borneo and C9 Manchuria. The two additions are concerned with the Malaysia Federation and will appear on the list as VS1,9M12 . . . Singapore, Malaya and VS4, ZC5 . . . Sarawak, North Borneo. Confirmations for these two new listings must be for contacts made September 16, 1963 or later. DXCC credit claims for these two new listings may be made starting February 1, 1964. Confirmations received for these listings received before February 1, 1964 will be returned without credit.

The separation of the Malaysia Federation into two separate entities is in accordance with Point 2(a) of the criteria as shown in a DXCC Note in the July, 1963 issue of QST.

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, 1961 through September 30, 1963. New Members in DXCC for the period from September 1, through September 30, 1963 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, 1963 was 9475), 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 of receipt. All totals shown represent submissions received from September 1, through September 30, 1963.

W1FH... 311/332	W1ME... 309/327	G4CP... 308/327	W3LMA... 306/323	W2BOK... 304/317
W4DQH... 311/329	W2TQC... 309/323	W4GD... 307/324	W8MPW... 306/320	OB1ER... 304/322
W2AGW... 311/330	W9RBI... 309/329	HB9J... 307/326	W8BKP... 306/323	DL3LL... 304/316
W6GUO... 311/331	W3KPT... 308/327	CE3AG... 307/326	VE7ZM... 306/325	G5AAM... 303/322
W8BRA... 310/328	W9DMD... 308/325	W6Y... 307/323	W4ATM... 306/324	W4AAT... 303/321
PY2CK... 310/328	K2GFO... 308/325	W1JYH... 307/325	W1BIF... 306/325	W9AMU... 303/316
W1GKK... 310/330	W2HMJ... 308/323	W8EWS... 307/326	LU6DJX... 305/324	G3FKM... 303/317
W3GHD... 310/329	CX2CO... 308/325	W8KML... 307/323	G2PL... 305/323	W7ENW... 303/322
W9NDA... 310/329	W9LNM... 308/326	W1CLX... 307/325	W3JTG... 305/323	W5KC... 303/322
KV4AA... 309/329	W5ADZ... 308/326	W8LKH... 307/323	W6AIW... 305/323	W5AFX... 303/323
W8KIA... 309/328	W7C9W... 308/327	W5JBI... 307/322	W6ELA... 305/323	W5CKY... 303/318
W7PHO... 309/323	W2LPE... 308/324	W2BXA... 307/326	W2VZV... 305/324	W0ODF... 303/316
4X4DK... 309/323	W5MMK... 308/324	W6GPB... 307/324	W2LW... 305/319	W1ZW... 302/315
W9YFV... 309/328	W8DU... 308/325	W6AM... 307/327	W8DAW... 304/322	W7AC... 302/321
W8JIN... 309/329	W2JT... 308/322	W3JNN... 307/326	W2ZX... 304/319	K2BZT... 302/315
W8UAS... 309/325	K3UPG... 308/327	W9QVZ... 306/323	W5ABY... 304/317	K6EVR... 302/315
W7GUV... 309/328	W5ASG... 308/327	W4OCW... 306/319	K2DCA... 304/317	W2ZGB... 302/314
W8BF... 309/325	W9HUZ... 308/324	W6EBG... 306/326	K6ENX... 304/317	

Radiotelephone

W3RIS... 311/331	W8GZ... 308/326	W8BF... 308/324	V04ERR... 304/322	W2BXA... 300/317
W4GXB... 310/328	4X4DK... 308/322	W6YY... 306/322	W4DQH... 304/320	W6ATW... 299/316
W7PHO... 309/323	W1FH... 308/324	W8KML... 306/322	W2ZX... 304/319	VE7ZM... 299/312
W9RBI... 309/327	CX2CO... 308/325	W3JNN... 305/321	W8PQQ... 302/315	W6AM... 299/318
			P74TK... 302/315	W2JT... 299/310

320 W4VPD	308 W2LAX	K2LWR	K5BGB	W3WGH	287 W100S	W46EYP	W60BH	ZS10U	W9PQA	W0LWG	I1XK	256
W9KOK	W5EGK	W3NKM	W7ADS	W6BSY	W100S	W6HX	W6SZS	W9PQA	W0BSK	K25WZ		W3VKD
	W4OPM	W4BYU	G3AAE	W0BTD	W5BUK	K0RAL	272 K2CPR	W6MXX	W6BMCX	V01DX	260	W5LCI
318 W4GXB	W5CE	W6EPZ			W6UHA	VE3RE	VE6JR	W6BKR	F3YR		W2LSX	W0SNL
G3YF	W7XMK	W7HKT	298	292	KH6CD	LA3DB	LU5AQ	F3YR	264	W2EMW	K2KZU	W0YCR
	W9GIL	G5VT	298	292				W6BYB	LA5HE	W4JLJ	G2BOZ	G3BHN
317 W2GUM	311 W2CYS	W3RND	298	292				DL7AB	SM5CCE	W4PAA		
ZL1HY	W3BES	W3RNT	298	292				DL2HP	ZL2HP	W6BIL		
	W3IYE	G5VT	298	292				PA0LU	ZL3IS	W6BUT		
316 W4MR	W4PLL	W89TL	298	292						W6WYK		255
W8HWG	K4R1D	SM5LL	298	292						W6KUT		W1FPH
	DJ1BZ		298	292						W6R1P		W1MQV
	W4CFD		298	292						W6GHB		W9HKL
315 W1HZ	W4EPA	301	298	292						W6R1P		ZP5ET
W2QHH	K06C	W6NGA	298	292						W6R1P		W1MQU
W50LG	W9QG1	DL31R	298	292						W6R1P		W9HKL
W6RZE		W1BAN	298	292						W6R1P		ZP5ET
W8NTA		W2GNQ	298	292						W6R1P		W4VZB
OH4DM		W2H0	298	292						W6R1P		W5PWV
		W41MI	298	292						W6R1P		W9HLI
		K6RWO	298	292						W6R1P		W9HIN
		W9GFF	298	292						W6R1P		DL1EE
		OH2NB	298	292						W6R1P		253
		W5HDS	298	292						W6R1P		K6BHM
		W80NA	298	292						W6R1P		K80CH
			298	292						W6R1P		W3RWB
			298	292						W6R1P		W5WW
			298	292						W6R1P		W81BX
			298	292						W6R1P		252
			298	292						W6R1P		TG9AD
			298	292						W6R1P		W2RWE
			298	292						W6R1P		W2ELS
			298	292						W6R1P		W3AYS
			298	292						W6R1P		W5EAT
			298	292						W6R1P		W6AMZ
			298	292						W6R1P		W6BIF
			298	292						W6R1P		W7AUS
			298	292						W6R1P		W9ERU
			298	292						W6R1P		W9HB
			298	292						W6R1P		ST2AR
			298	292						W6R1P		251
			298	292						W6R1P		W1AJG
			298	292						W6R1P		W2AYU
			298	292						W6R1P		W2QJY
			298	292						W6R1P		W4MS

(Continued on page 120)

• 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

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3DUI, PAM: K3CAH, RM: W3EML, V.H.F. PAM: W3SAO and W3SGI, The E. Pa. C.W. Net had a QNI of 349 with a QTC of 475 for September. W3ADE is renovating and moving the shack to the 2nd floor. W3YPF has a 40-meter antenna and a 150-watt transmitter. K3YQJ got RCC and QRP certificates. W3BUR has a new oil heater for the shack and W3FU is now heating the house with raw a.c. (electric heat). KN3FEW is a new Novice in the Milton area. K3EHO and K3VRP are now General Class while K3OMP is Advanced Class. K3PPR has a portable location 2300 feet elevation. K3QNT is stationed on the USS Page County and interested in getting traffic back to Bryn Mawr. The ARTICS are now league affiliated. WB2AXW/3 is operating in the Philly area with a Heath Sixer. New officers of the Delmont ARC are K3BHQ, pres.; K3GAG, vice-pres.; W3EFY, secy. Lehigh Valley ARC officers are W3DCR, pres.; K3JTW, vice-pres.; W3RPZ, secy.; K3AJH, treas. K3HTZ now has 100 countries worked and is active in the QRP club. W3DFY, K3ABC, K3BFB, K3DNP and K3PPR are Asst. ECs in Bradford County. Please mail all traffic and activity reports on or about the first of each month. Some reports arriving late had to be missed. K3EHQ is now a General Class holder. The following countries have no Emergency Coordinators: Luzerne, Lebanon, Lycoming, Sullivan, Columbia, Montour, Union, Snyder, Perry, Susquehanna, Wayne, Pike, Monroe, Cumberland, Wyoming, Wayne, and Northampton. If interested in the appointment contact this office. A Merry Christmas and a Prosperous New Year to All. Traffic: (Sept.) W3EML 1163, W3IVS 723, W3CUL 566, K3CAH 457, K3BUI 360, W3HKN 344, K3MQE 110, W3AXA 79, K3BHU 79, W3ZRQ 66, W3JKX 61, K3KTH 55, K3GSU 49, K3YQJ 42, K3TSO 34, K3JSX 26, W3FLP 23, K3HNP 21, W3BKF 16, W3ELI 14, W3QDW 14, K3LTI 11, W3EEN 10, K3JHF 10, K3KNP 10, W3BFF 8, W3LC 8, W3PDJ 7, W3VAP 6, K3AKN 5, K3ARR 5, W3OY 5, W3DUI 4, W3LXN 4, K3NZD 4, K3RFF 4, K3SZE 4, K3HTZ 3. (Aug.) K3GSU 650, W3IVS 523, K3RJX 110.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE, RMs: K3JYZ, W3TN (for the MDD Traffic Net which meets on 3649 kc. daily at 0000Z). W3ZNV (for the MDSD (slow) Traffic Net on 29.1 Mc. at 0130 daily). PAM: W3EQK. The MEPN meets on 3820 kc. M.W.F. at 2300Z and on Sat. and Sun. at 1800Z. W3AHQ is an OBS and sends the ARRL Bulletins each Sat. on the NCVHF Club frequency of 50.3 Mc. at 8 p.m. K3LLR is getting the station and antennas ready for winter. W3MCG had a great time working in the VE Contest and Karl is using a full-sized three-element 40-meter beam on a 112-ft. tower. W3OHI is very proud that his grandson, age 12, has received his General Class license with the call K3WPN. K3OAE is back at Cambridge, Mass. K3ORS makes BPL on originations. K3ORW reports that K3OJH will be on 6 meters with a 100-watt rig from his Taneytown, Md., QTH. W3PZW is back on the air handling traffic and working DX. Dick's latest is AC3 and AC4. W3QCW has returned from a tour of duty in Greece and now feels at home handling traffic on the MDD. K3QFG is back in school. K3RGB, K3SGD, K3WIT, K3VPZ and others held a 23-hour marathon QSO on 10 meters. K3RQH is building an electronic keyer. K3SMT has his CP-30 certificate. W3TN reports that 45 different stations checked into the MDD during Sept. K3SXA is now on active duty in the Navy. K3RUQ is at Charlotte Hall Military Academy. W3YYC has returned to the East Coast and is back on the MDD Net. W3ZNV asks that anyone interested in handling traffic at a slow speed check into the MDSD on 28.100 Mc. at 0130Z daily. This net should be of interest to the 10-meter amateurs who

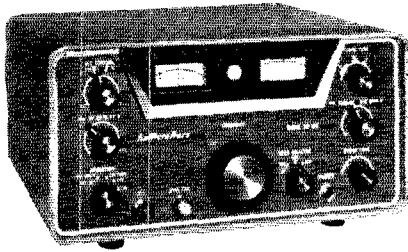
want to handle traffic. W5WS, formerly W3SG from Lisbon, Md., would like to contact members of the 10-Meter Net. Al is on 20 meters. Traffic: (Sept.) K3ORS 397, K3SMT 335, K3GUD/3 323, K3QFG 301, W3TN 249, W3PZW 80, K3QOO 79, W3HQE 54, W3QCW 51, W3EOV 48, W3ATQ 45, K3GZK 38, K3WBJ 26, W3PQ 25, W3OHI 20, K3ORW 14, W3BKE 12, W3MCG 11, K3LLR 6, K3RGB 2, W45GVF/3 2. (Aug.) K3WPM 192, (July) K3QDD 366.

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC, RM: W3EEB. The DEPN meets Sat. on 3905 kc. at 1830 local time. The DSMN meets Tue. on 50.4 Mc. at 2100 local time. Renewals: K3CNI as OES; K3CNI as OBS. The new 1963-64 officers of the Delaware ARC are K3WOS, pres.; K3UNH, vice-pres.; K3NHL, secy.-treas. The club, the oldest in Delaware, is in the process of rebuilding and is looking for members. If you are interested in joining, call K3OWS at OL5-1633. W3CFA has finished building an 8-watt rig and is now reporting into the DSMN on 50.4 Mc. W3HKS is off to work for a few weeks in Puebla, Mexico. W3RDZ, an OO, has been busy monitoring the bands. The service rendered by OO/OBS appointees is for the benefit of all of us; always appreciate their efforts. Traffic: W3EEB 21, K3GKF 11, K3KAJ 3, W3CFA 1.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY, PAM: W2ZI, RM: WA2VAT. New appointments: K2SHE as OPS and WA2LRL as OES. WA2BLV made BPL in Aug. and Sept. W2ZVW was NCS on 2RN during the SFT. Ed is Burlington County EC. NJ Phone & Tie, Net totals: QNI 563, sessions 30, traffic 186. W2BLV worked K2SQM/VEI on 50 Mc. Both are NJRA members. Thanks to K2LVN, Salem County Radio Club president, for the club news. Andy and his family vacationed in the Poconos. W2CDZ received his General Class ticket. K2PZD is back on the air after being off for a year. Look for the Gloucester County AREC net Fri. nights on 50.9 Mc. The Gloucester County ARC meets in the Owens-III, Club house Glassboro. Contact the club's secretary, W2YNR, for information. The Levittown (N.J.) Radio Club reports fine progress with its training class. W2QOS, Riverside, was elected vice-pres. of the Burlington County Radio Club. The club's calls are K2KED and K2QGE. No news was received from the Cape May or Mercer County clubs. The NJN's roster lists 45 members. Traffic: (Sept.) WA2RLV 549, WA2VAT 204, W2RG 90, W2ZVW 66, W2ZI 42, W2MMD 35, K2RXB 16, K2SHE 10, WA2KAP 9, K2KJC 4, W2BEI 2. (Aug.) WA2VAT 152.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ, RMs: W2RUF, W2EZE and W2FEB, PAM: W2VPL, NYS C.W. meets on 3670 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 1800. NYS C.D. on 3610.5 and 3993 kc. (s.s.b.) at 0900 Sun. and 7102.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900. IPN on 3980 kc. at 1600. 2RN on 3690 kc. at 0045 and 2345 GMT. Those making BPL are WA2KQG and W2QOE. Congratulations! Our sympathy to W2RQF, whose XYL passed away recently. WA2VZA has an HE-456. WA2DAC is looking for skeds on RTTY a.f.s.k. on 2 and 6 meters. K2ISO gave a talk to the RAWNY on alternators, and transistorized ignition. K2KIP and W2UHH hosted W1HDQ and his XYL recently. W2ICE tells us that the AWA has a new call, W2AN. The GRAMS recently activated the 2-meter net on Tue. at 2000, frequency 146.85 Mc. Erie County is establishing a 10-Meter AREC Net. Contact W2ICZ for crystals. The ARATS is conducting advanced theory class for members. Clara, W2RUF, spoke to the RARA on traffic-handling. Contact W2RUF if interested in a state-wide AREC C.W. Net. Sorry to report that W2RLI is a Silent Key. Tests are currently being made for a New York State V.H.F. RACPS Net. Each Tue. W2RTE, in Poughkeepsie, is operating on 144.125 Mc. He beams east from 2130 to 2200. He is using s.s.b. and all interested are urged to QSO by any mode. The RAGS Phone Net is on Mon. on 28.625 Mc. at 2000. We hear that the Seneca Drums ARA held a fine Clambake. The Auburn ARA group operates RTTY a.f.s.k. on 6 and 2 meters. Operators include WA2HOH, WA2LVW, K2ZOD, WA2KMZ, WA2EIX and W2FEL. W2VCI is conducting code and theory classes for the ARATS under adult education in Kibler Jr. High in Tonawanda. The course runs 22 weeks and you can join now. K2RTQ has recovered from a recent operation. Traffic: (Sept.) WA2KQG 630, W2OE 501, W2RUF 320, K2KTK, 174, W2FEB 116, WA2HSB 88, W2RQF 27, W2BDDP 21, K2OFV 19, WA2DAC 16, WA2SWK 16, K2RYH 14, K2HOH 12, WA2IYB 10, WB2-

(Continued on page 128)



think small...*

TALK BIG

no one but Hallicrafters could shoehorn such sheer, unadulterated talk power into so beautifully compact a package as the new SR-160 Tri-band Transceiver. Why Hallicrafters alone? Eight productive, successful years of SSB and transceiver experience, leading to such advanced, exclusive techniques as AALC (Amplified Automatic Level Control) providing up to 12 db. of effective compression . . . RIT (Receiver Incremental Tuning) with ± 3 kc. for superior net and CW operation . . . and a superbly designed crystal lattice filter which makes the most of the desirable SSB transmission characteristics. A built-in changeover relay permits direct operation with the HT-45 or other linear amplifier. Sensitivity is less than 1 μ v for 20 db. (yes, 20) S + N/N ratio. The receiver employs a separate AVC amplifier providing a figure of merit of 100 db. These and a dozen other outstanding features make the new SR-160 your best transceiver buy. Write for complete specifications or see your Hallicrafters distributor today.



- * *Small size: 13" x 6 1/2" x 11"*
- Small weight: Only 13 1/4 lb.*
- Small price: \$349.50 less power supplies and mobile mounting kit.*

NEW SR-160

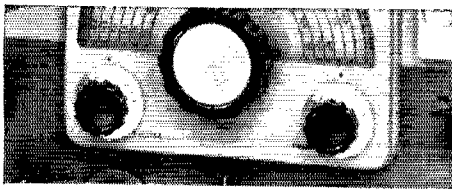
Tri-band SSB/CW
Transceiver



by *hallicrafters*

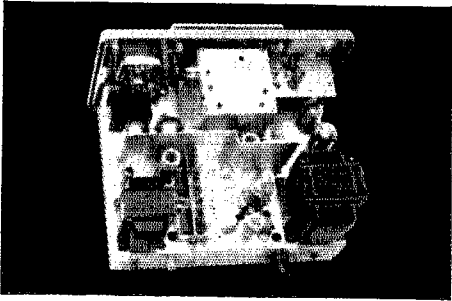
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Export: Hallicrafters International Div. Canada: Gould Sales Co., Montreal, P.Q.



EASY TUNING

Basic tuning controls are located on the VFO dial escutcheon—QSY within the phone or CW portion of a band is usually possible by merely changing the VFO frequency setting.



FEATURES

Built-in temperature compensated, extremely stable VFO—separate, calibrated bandspread dial scales for all 7 bands—highly efficient pi-network tank circuit—flexible, timed sequence keying system—self-contained power supplies—effectively TVI suppressed!

Some may call it "ancient modulation", some simply call it AM phone—but whatever you call it, AM still represents a major portion of today's amateur activity—and the "Ranger II" is one of today's most popular AM rigs! For AM or CW operation, for 160 through 6 meters—the "Ranger II" offers the "biggest-little" 75 watts you'll find on the air! Rated at 75 watts CW and 65 watts high-level AM, the "Ranger II" delivers communications quality audio with the necessary punch to break through today's QRM! An excellent "first" transmitter for the Novice or the new General, the "Ranger II" will drive any of the popular kilowatt level tubes and will provide a high quality speech driver system for high powered modulators without modification! What else? The "Ranger II" offers attractive styling in a compact cabinet and is available at a reasonable price.

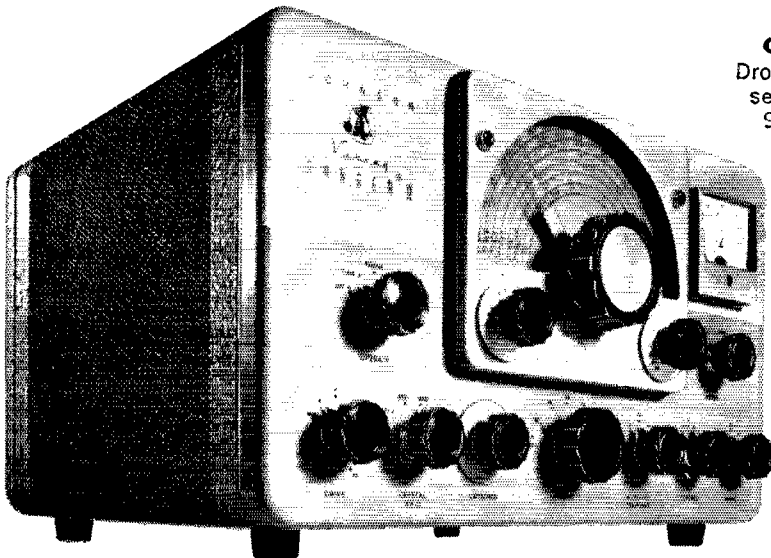
Cat. No. 240-162-1... "Ranger II" Kit ... Net \$249.50

Cat. No. 240-162-2... "Ranger II" Wired Net \$359.50

RANGER II

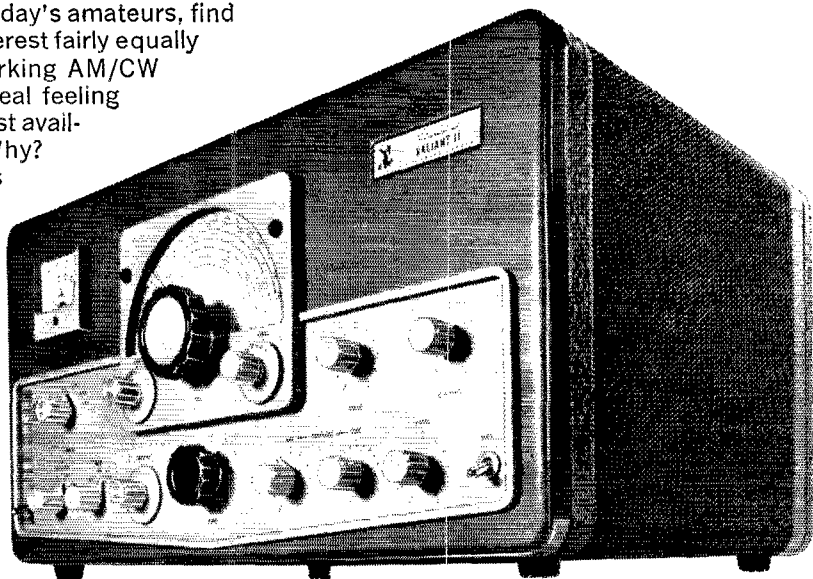
COMPLETE CATALOG

Drop us a card and we will send you Amateur Catalog 962 which gives the full "Ranger II" story, as well as detailed information on our complete line of amateur transmitters and accessories..

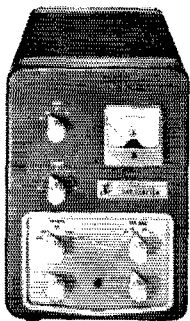


If you, like many of today's amateurs, find yourself with your interest fairly equally divided between working AM/CW and SSB, there's a real feeling of frustration with most available equipment. Why? Because most AM rigs require extensive modification to operate SSB—and no SSB rig offers high level AM and Class "C" CW—and the end result is compromise in one mode or the other!

Not so with the Viking SSB Adapter/Valiant II combination, for here's the package that gives you 275 watts CW and SSB plus 200 watts high level AM phone! Now, keep your contacts and work old friends no matter what portion of the band they are operating in, and no matter what mode they are using—and do it with maximum punch!



VALIANT II SSB ADAPTER



SSB ADAPTER

Filter-type SSB generator—bandswitching 80 through 10 meters—more than 50 db sideband suppression—more than 45 db carrier suppression. Features built-in multiplier requiring VFO input only—design and front panel make operating practically foolproof!

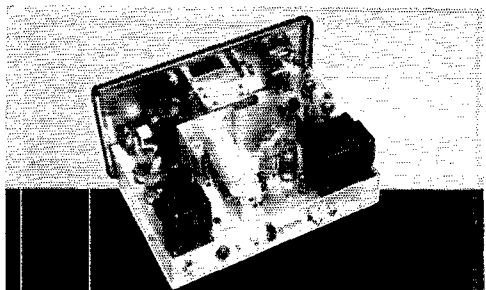
Cat. No. 240-305-2 . . . Wired, tested . . . Net \$369.50

VALIANT II

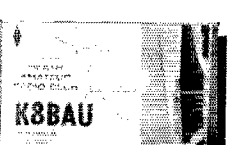
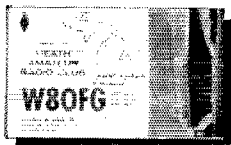
Outstanding flexibility and performance in a compact desk-top rig! Bandswitching 160 through 10 meters—275 watts input CW or SSB (with Viking SSB Adapter) and 200 watts AM!

Cat. No. 240-105-1 Kit Net \$375.00

Cat. No. 240-105-2 Wired Net \$495.00



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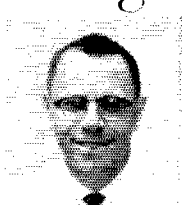
JOE SHAFER K8DCE
Senior Amateur Radio
Engineer



BILL DENK
W8LUH



DAR EVANS
K8ADS

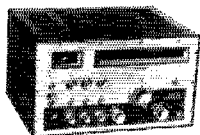


DOYLE STRANGLUND
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HEATHKIT DELUXE SSB RECEIVER: 80 thru 10 meter coverage. Linear tuning with features for finest reception!

Kit **SB-300** . . . 17 lbs. . . . no money dn., \$25 mo. . . **\$264.95**



HEATHKIT "MARAUDER" SSB TRANSMITTER: Deluxe features & performance make it the most versatile ham transmitter. 180 WATTS SSB & CW 80 thru 10 meters.

Kit **HX-10** . . . 95 lbs. . . . no money dn., as low as \$22 mo. **\$334.95**



HEATHKIT SSB SINGLE-BAND TRANSCEIVERS FOR 80, 40 OR 20 METERS: Perfect for "mobile" or "fixed" amateur communications! 200 watts P.E.P. input, 15 lbs. ea.

HW-12 (80-Meter), **HW-22** (40-Meter),
HW-32 (20-Meter) **\$119.95 ea.**



HEATHKIT MONITOR SCOPE: Displays envelope, AF & RF trapezoid transmitted patterns, and received envelope patterns. Simple to install. Use on 160 thru 6 meters. Kit **HO-10** . . . 11 lbs. . . . no money dn., \$6 mo. . . . **\$59.95**

W8CXY

W8LTV

K8SYI

K8GND

K8GNA

K8JGZ

K8SSD

K8IXS

K8HYV

K8INM

K8IXT

K8GMV

W8UVK

K8LZY

WA8BTK

K8SAJ

W8YRW

WA8IHH

K8DKY

WA8KEW

WA8KEV

K8MBI

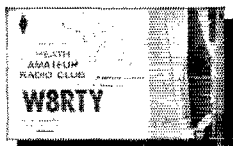
K8WJS

W8DEJ

K3GHR/8

WN8IFJ

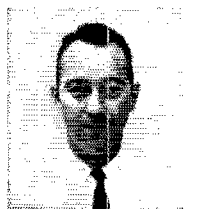
. . . and more



GREETINGS

HEATHKIT HAMS

Heathkit gear!



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K8NVR



PAT DUFFNER
W8CYX



BUD GOUKER
K8RFC



LARRY HOUGHTON
K8ZVF



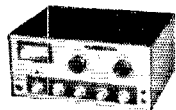
HEATHKIT HX-30 6-METER SSB TRANSMITTER: Operates SSB upper/lower sideband, AM & CW. Completely self-contained. A tremendous value for the VHF amateur!

Kit HX-30 . . . 46 lbs. . . . no money dn., \$18 mo. . . . \$189.95



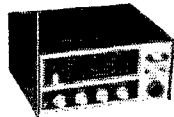
HEATHKIT 6-METER LINEAR AMPLIFIER: Perfect companion for HX-30 transmitter! Provides extra power for extended-range communications. 125 watts P.E.P. input SSB, 75 watts DC input AM.

Kit HA-20 . . . 38 lbs. . . . no money dn., \$10 mo. . . . \$99.95



HEATHKIT DX-60 PHONE & CW TRANSMITTER: 90 watts input phone or CW on 80 thru 10 meters. An excellent rig for the novice amateur! Beautifully designed throughout for easy assembly.

Kit DX-60 . . . 24 lbs. . . . no money dn., \$8 mo. . . . \$79.95



HEATHKIT NOVICE HAM BAND RECEIVER: Tunes SSB, AM & CW signals 80 thru 10. Ham band coverage only for maximum stability & accuracy! An ideal first receiver with pre-built, aligned front-end!

Kit HR-10 . . . 20 lbs. . . . no money dn., \$8 mo. . . . \$79.95



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AM-134

FOR TOP MULTI-BAND PERFORMANCE

- Hy-Gain VERTICALS radiate equally well in all directions
- Can be installed in limited space without compromising performance
- Adapt to multi-banding better than any antenna configuration
- Are economical to purchase, install and maintain

Every basic antenna configuration has its merits but the one basic configuration most commonly overlooked is the vertical antenna. Sure, where space for installation is a factor, a vertical is many times the only answer. But, vertical antennas have other merits, too...merits that are often forgotten. For example, there is no other antenna configuration that lends itself to multi-banding

The incomparable **HY-TOWER** for 80 thru 10 Meters

By any standard of measurement, the Hy-Tower is unquestionably the finest multi-band vertical antenna system on the market today. This virtually indestructible antenna system features automatic band selection on 10 thru 80 meters through the use of a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical $\frac{1}{4}$ wave length (or odd multiple of a $\frac{1}{4}$ wave length) exists on all bands.

Fed directly with 52 ohm coax, the Hy-Tower delivers outstanding omni-directional performance on all bands. It also works exceptionally well on 6 meters and, with the addition of a base loading coil, it delivers excellent performance on 160 meters. Structurally, the completely self-supporting Hy-Tower is built to last a lifetime. Its hot-dipped galvanized 24 ft. tower installs on a mere 4 square feet of real estate and requires no guyed supports. The top mast, which extends to a height of 50 feet, is of 6061ST6 tapered aluminum. The unique decoupling system is totally impervious to weather or wear. All hardware is iridite treated to MIL Specs. If you're looking for the epitome in vertical antenna systems, you'll want Hy-Gain's Hy-Tower.

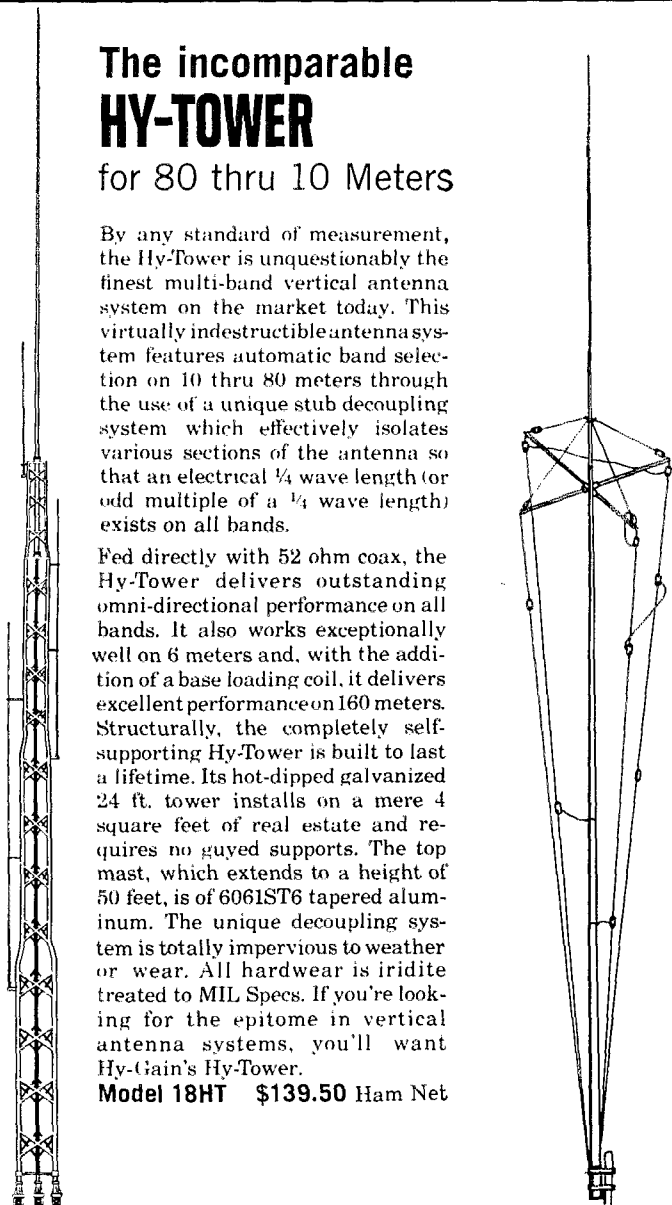
Model 18HT \$139.50 Ham Net

The Sensational **HY-TOWER JUNIOR** for 80 thru 10 Meters

As the name implies, the Hy-Tower Junior doesn't completely measure up to the Hy-Tower...probably nothing ever will. However, the Hy-Tower Junior is one sensational all band vertical antenna system in its own right. It is trapless... features automatic band switching through the use of Hy-Gain's unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical $\frac{1}{4}$ wave length (or odd multiple of a $\frac{1}{4}$ wave length) exists on all bands.

Fed directly with 52 ohm coax, the Hy-Tower Junior delivers outstanding omni-directional performance on all bands. Structurally, the lightweight Hy-Tower Junior is rugged. Self-supporting in winds up to 40 mph, it resists winds up to 100 mph when properly guyed. The mast, with an overall height of 36 $\frac{1}{2}$ ft. for phone and 38 ft. for C.W., is constructed of heavy gauge 6063T832 aluminum alloy tapering from 2 inches to $\frac{7}{16}$ inches O.D. Wire elements are 7-24 copper clad steel. Insulators are ceramic and injection molded Poly-Styron plastic. The Hy-Tower Junior weighs only 30 lbs. and is easily installed by one man on 1 $\frac{1}{2}$ to 2 inch steel pipe (not furnished) driven into the ground. If you're looking for outstanding omni-directional performance...SWR of less than 2:1 on all bands...rugged construction...all at a modest price, you'll want Hy-Gain's Hy-Tower Junior.

Model 18JR \$79.95 Ham Net



Hy-gain VERTICALS HAVE IT!

better than a vertical. Verticals radiate equally well in all directions without compromise in performance. They are versatile...can be installed in cramped space or wide-open space... and, they can be phased for additional gain. Vertical antennas are economical...one antenna serves a multiple of bands without requiring additional accessory equipment. They are easy to install. And, by and large, they are virtually maintenance-free. Dollar for dollar, it's just pretty hard to beat the over-all performance of a vertical antenna...especially if it's a Hy-Gain vertical. That's why Hy-Gain, the world's largest manufacturer of HF communications antennas, offers you the world's largest selection of high performance verticals...each one tailored to fit an individual need whether used as a single omni-directional antenna or in a phased array.

The Versatile **MODEL 18V** for 80 thru 10 Meters

Hy-Gain's Model 18V is a low-cost, highly efficient vertical antenna that can be tuned to any band...80 thru 10 meters...by a simple adjustment of the feed point on the matching base inductor.

Designed to be fed with 52 ohm coaxial cable, this 18 ft. radiator is amazingly efficient for DX or local contact. Constructed of heavy gauge aluminum tubing, the Model 18V may be quickly installed on a short 1 1/2" mast driven into the ground. It is also adaptable to roof or tower mounting and, as a self-supporting unit, will survive winds up to 50 mph. One of the most popular features of the Model 18V is its portability...it can be quickly knocked down to an overall length of 5 ft. and re-assembled in minutes for field days and other events. The Model 18V represents a tremendous buy in an antenna with multi-band capability. Priced at only **\$16.95** Ham Net.



PHASE 'EM for Additional Gain

Phasing two complementing Hy-Gain vertical antenna systems will result in your attaining up to 4 db of additional gain. Write for Hy-Gain's Engineering Report describing the exacting procedures involved in attaining maximum performance from a phased antenna array.

World's Most Popular Vertical **MODEL 14AVS** for 40 thru 10 Meters

Hy-Gain's Model 14AVS is an optimum performance, automatic band switching antenna for 40 thru 10 meters that has proven to be the world's most popular vertical antenna. The Model 14AVS is a self-supporting antenna that is completely factory pre-tuned to maintain an SWR of 2:1 or less across the entirety of each band. It features Hy-Gain's exclusive "Slim Line" solid state traps permanently encased in high impact molded Poly-Styron for maximum weatherability. The "Slim Line" traps effectively isolate sections of the antenna so that true 1/2 wave resonance exists on all bands making possible a low angle DX radiation pattern. The Model 14AVS also delivers excellent performance on 80 meters when adapted with Hy-Gain's Model LC-80 Loading Coil. Ruggedly constructed, the Model 14AVS may be either ground or roof mounted. Truly an outstanding performer on 40 thru 10 meters, the Model 14AVS has an overall height of 21 ft. and weighs 10 lbs. It's a real buy at only **\$29.95** Ham Net.

Model 12AVS for 20, 15 & 10 Meters

Hy-Gain's Model 12AVS for 20 thru 10 meters is a companion antenna to Hy-Gain's Model 14AVS. Featuring Hy-Gain "Slim Line" traps, it is completely self-supporting for ground or roof mount and is factory pre-tuned to maintain an SWR of 2:1 or less across the entirety of each band. Overall height is 13.5 ft. Net weight, 9 lbs. It's sensibly priced at **\$21.95** Ham Net.

Hy-Gain superior performance vertical antennas are available from over 3,000 Hy-Gain Distributors located throughout the world. See them today at your favorite Hy-Gain Distributors, or write for the name of the distributor nearest you.

HY-GAIN ANTENNA PRODUCTS CORPORATION

8403 N.E. Highway 6 - Lincoln, Nebraska

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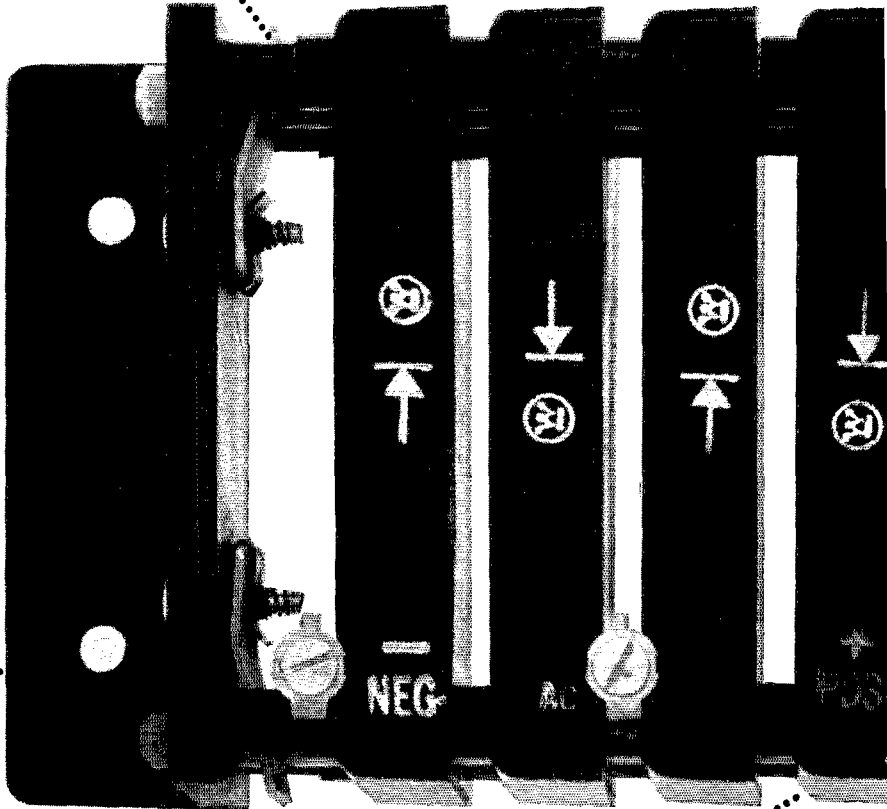




Westinghouse applies its heavy duty industrial experience to your ham transmitter.

SOMETHING NEW! SILICON RECTIFIER ASSEMBLY CAN

Its name is Oz-Pak. The first solid state rectifier unit designed by a major manufacturer with the amateur radio operator in mind. Oz-Pak is a highly engineered unit for operation under all known environmental conditions (heat, cold, humidity, etc.).



In addition to replacing tubes, Oz-Pak eliminates two to four sockets, one to three filament transformers plus connectors, insulators and high voltage wiring problems. All rectifier maintenance disappears as well as "stand-by" rectifier hash present with gaseous tubes.

Oz-Pak is lightweight and compact. Only 3 pounds. Measures 2" x 4" x 9½". If you want an additional choke and/or filter capacitors, there's plenty of room.

To get your Oz-Pak, order from your favorite distributor or any distributor listed (right). Send check or money order. But act now. You can be sure... if it's Westinghouse.

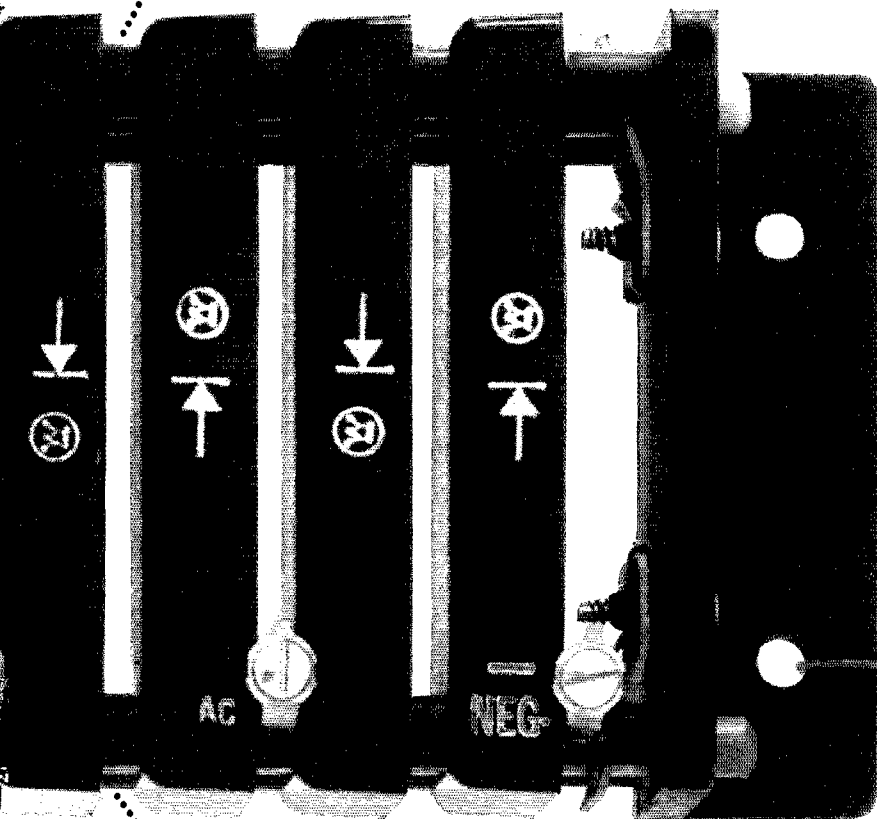
SC-1104

Henry Radio Co., 211 N. Main Street, Butler, Missouri
 Walter Ashe Radio Co., 1125 Pine Street, St. Louis 1, Missouri
 Harrison Electronics Corp., 227 Greenwich St., New York 13, N.Y.
 Elmar Electronics Corp., 140 Eleventh St., Oakland, California
 Ack Radio Supply Co., 3101 Fourth Ave., S., Birmingham 5, Ala.

REPLACE ALL OF YOUR RECTIFIER TUBES IN 15 MINUTES!

Use Oz-Pak two ways. To build your own equipment. Or to replace the tubes in your present transmitter. 15 minutes... and it's installed. Mounts on any surface. No special brackets or insulators needed.

Think of it! No tubes to burn out. Forget all those familiar rectifier tube problems. Goodbye to aging-in... to pre-heating... to hot weather arc backs... to cold weather starts. Hello to a rectifier life so long we can't even predict it.



Rated output is 1 KW. Here are the DC load conditions. (Operation in ambients to 100 degrees F using natural convection cooling.)

1500 V @ 666 ma	2500 V @ 400 ma
2000 V @ 500 ma	3000 V @ 333 ma
3300 V @ 300 ma	

Another bonus. You can tune up to 2 KW p e p for sideband operation (even when using up to 120 mfd of output filter capacity).

Westinghouse experience with industrial and commercial rectifier assemblies helped us produce Oz-Pak as economically as possible. The heavy-duty assemblies have gone 40,000,000 stack hours without failure!

\$69.95

Manufacturer's
suggested
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Mytronic Co., 2145 Florence Avenue, Cincinnati 6, Ohio
Newark Electronics Corp., 223 W. Madison St., Chicago 6, Illinois
Allied Radio, 100 North Western Avenue, Chicago 80, Illinois
Cramer Electronics, Inc., 320 Needham Street, Newton, Mass.
World Radio Labs, 3415 W. Broadway, Council Bluffs, Iowa

We never forget how much you rely on
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IS DECIDED IN THE MARKET PLACE, BY PUBLIC CHOICE. AN ANTENNA THAT SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED. THE FREAKS, EXPERIMENTS, AND REJECTS DISAPPEAR FROM VIEW.

OVER 20,000 GOTHAM ANTENNAS HAVE BEEN SOLD. ONLY GOTHAM HAS BEEN CONSISTENTLY ADVERTISING FOR OVER 10 YEARS AND NEVER MISSED A QST IN ALL THAT TIME.

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THE ULTIMATE PROOF OF THE FINE PERFORMANCE OF THE GOTHAM VERTICAL ANTENNAS IS IN THE ACTUAL FIELD RESULTS, BY HAMS ALL OVER THE WORLD.

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71

"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 XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., 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.

BEAMS

Rugged Yagi design, full half-wave, Gamma-matched

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- Mount it at any convenient height.
- No relays, traps, or gadgets used.
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- Many thousands in use the world over.
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- Non-corrosive aluminum used exclusively.
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- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

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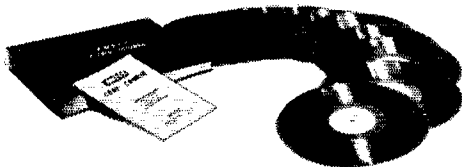
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FOR THE BEGINNER



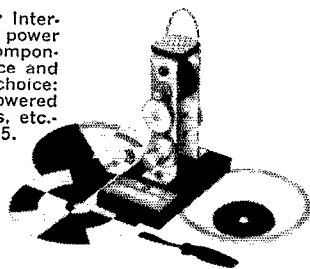
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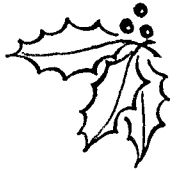


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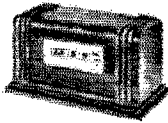


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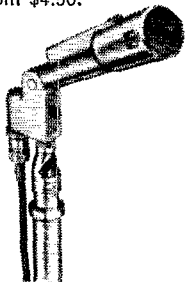
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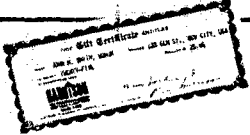
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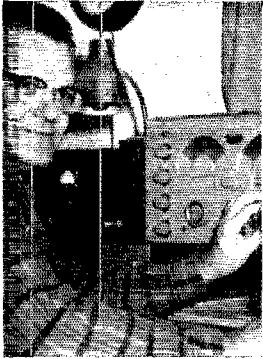
DX Century Club

(Continued from page 105)

W7CSW W8LY W9LTR W9TKD W0AII/ VE3 DL3ZI FSP1	VE7CE JA2JV FA0VB	K1SHN W2JB W2NOY W6PZ W9KMN DL1FK DL5MK CF2FO KP4AOO	221 W3GKS W4RNP K4TKM W5LGS W6CG W8JAE K8KAE W9AZP W9QGR	DL7HU G3CRK G5KQR ZS6A	W0EWH LA7Z PA0VO	198 F9MS G3DOU	K5KET W9BYN W0AII CR9AH F8SK I1BAF	178 W1DBM F8FM GM3BCL ZB1CR	WA2AYM K2BG W2GKZ W2MOM K4CIA W46KNE W6MKD K8VDV K8VSL K9G7K K9H0L W9PMM VE3CYL DL1YQ DJ4HR DL9CT EL4A G3GNM G8UK I1IF OK1GT SP5HS SP9TA	UA3CA ZE3JO	WA2HUV W2RWP K4MPE W0FDL W0VFE DL1LD SP8HT SV9WZ ZL1NG	W0IVX K9ZQV K9BHM W0NCN W0QKC VE7BV VE7PU G2LNO LA5LJ O4HKH OK1HY PY4AYO ZL2BG ZS3S VQ4WLH ZS6YQ	HK3RQ I1ZPB YV5BS					
250 W1HGY W1ICV W1LZE W1OHA W1OQA W1PFA W2BAK W2KJZ W2PZI K2QKQ W2ZVS W3KA W4AVY W4BFR K4EDF W4HUE W4JH W4RZB K4TEA K4J4 K4WIS K5KBI W6GDB K6EIV W6GMC W90AQ VE2WA VE73K VE7MD G3KZL JA8AQ	242 W1QMM W4HVQ W4IKL W6CIRX W7BA	230 K2JFV W2YXU W32NI W3WPG W4FNG K4SXR W6PHF W6MCO W6SBO K4HQL W7ABO W9HQJ K91YV W9VY W9ACV K4A3Q K14RK K1K1C WINS W1WK W6MEL W6OF W6AFTG K9GZK DL1QT SM5BCE	220 K2JYH K3DCP W3YZI K4HYL W4JBQ W4LZW W4NWX W4QVZ W5V5Q W6AGO W6SJC W6ZMV W7ATV W7NRB W8YFN W9M1C DL9HK DL9YX G2GM G5VT HFO OESWB YV5BZ ZL3AB	209 W5ACL W5FTE W5NUT K5UXP K6CTV W6QDE W8CUT K8DYX W9DSO W9KQJ W9NAN W9WHY W9GVH W0STL W0EVB W0LTX DL1DK F9IL G2FYT H2NLT HKDB W2MJ W3QMG K4GSS W4YMG K5RJA K5RFX W8WLK VE3AAZ V6PPT G3FPK OHLTM ZK1BS	200 W1KMY W1WEQ K2BML K2DBN W2DXX W3MNR K2H1Y W7PSP Y03RD W3FSF UC2AA	191 K6HJ W8AYS V3AGC DL1FZ DL1PM DJ4OP DL7FW F3ZU G8QZ I5IFC O4HTO Y01EH	179 W5JCY W5LBI W5PAK W5VGR W6AFI K8CJQ K9LJO W4SIB K1L6DL W7DIS W1MLJ W2DEO W4SHX W5TVR W6MUF K6H6A W8YPT W9PVA DL8CH K1IIF W8HEV K6LAE K7C7T K7L7M W8R3G G3HJJ W77ML DL6EQ	180 W1XZZ W2DDB W4SUV W6MUF K6H6A W8YPT W9PVA DL8CH K1IIF W8HEV K6LAE K7C7T K7L7M W8R3G G3HJJ W77ML DL6EQ	181 K1DIR W1DGG W2PXE DL3AR W4SNU OK3UI O29N SM5BFE SM7ACB	173 W1GDY W2HDW W2JWJ W3CLP W4HKJ W8YGR W9LJE W0FLK W0VLP DJ2BO G3G3Z SM5CXF UA3CT V42DK	166 WAUHC	165 W2GCHK WA6GLD H89FK PA0FAB T2WA ZL1A5 ZS6ASW	159 W11MT W0RJV DJ5VQ SM7BHF SP5ADZ	150 W11P K1MEN W1PNR W2ADQ W42DJ K2DNA W2GGE K2KBI W2KOY ZL2BB K20US K2UVV K2YOR W3LSG K5JCC W6YC KH6DLD VE5GF DL9NA W1BD HB9UD K8GFL K9OKD VE1DB DJ5HW H89TF I1ZN I1ZQ SM5BEU SM5MC	151 W1EZZ W1WTF W1XQF W2ASF W4HOS W5LJT K5UFT W6DFR W6AHR W7MCK W7VTV W8ZDF K9LSN F2PO F3PM G3ASG HB9TU HB9UE O68SH UA3FT	145 K4HMX W7AEA YV5AO DL3L DL5LA G2BUL G2DNG W8WBT W93HE W9UCY DJ5TM PA0NL SM5KG VQ2JM	144 W2CZF K3MNV W61ET G3DCC G2BUL V17NQ VQ2IE	139 W1BRX W1YPH K3ZCD K4RLD W6AJJ W8DSZ W9WYQ W0CDV
248 W1QM K4BQV W9ABB VE5RU YV5AE	238 W1WLW W8DUS VE3CIO HB9EO	227 W1AUR W1KQF W1GUP W4BVF W4BEQ W9LBI DL1JW DJ2AE	218 W2CDP W7ACD Z84MG W6IPH K8MTI	208 W2ZY W3JZY W3LZE K1ATK W8QWI W9JGQ	192 W1WGT K2AFQ K3ABJ O43NY W1WJ W2REH W4GHP W0FLK W0VLP DJ2BO G3G3Z SM5CXF UA3CT V42DK	182 K1DIR W1DGG W2PXE DL3AR W4SNU OK3UI O29N SM5BFE SM7ACB	174 K6EXO K6YD DJ2WN K4AL OK1AEH T12CMF W4PDP UQ2AN VQ8AD W6QWQ KH6AC W7AIB K7BJE W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	167 WA4DCP W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	160 W1CSC W10PB W28LV K2EAC WA2JBV W2UA K2YMD W3CDG K4AL OK1AEH T12CMF W4PDP UQ2AN VQ8AD W6QWQ KH6AC W7AIB K7BJE W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	152 W2ODZ K4HJJ W5OJL K2EAC WA2JBV W2UA K2YMD W3CDG K4AL OK1AEH T12CMF W4PDP UQ2AN VQ8AD W6QWQ KH6AC W7AIB K7BJE W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	146 K1HVV W1WJL K1MWB K4OYR W6MFW W8CFL W8BQV K8CJD K8ZBY K9OYD W0CAW K4HMX W7AEA YV5AO DL3L DL5LA G2BUL G2DNG W8WBT W93HE W9UCY DJ5TM PA0NL SM5KG VQ2JM	140 W1VJZ K1LPL K1LWI K1R1B W1UUK K2FG WA2FQG DL5DA DL9VZ W2LDM K2OXN K3MJJ W4CWO W4CWO K4BHO W7MH W47VQ K6COP L9UCK Z86JZ W61AY WA6GFE WA6OZL W6TMX K6TGO W7CNL W8CFL W8BQV K8CJD K8ZBY K9OYD W0CAW K4HMX W7AEA YV5AO DL3L DL5LA G2BUL G2DNG W8WBT W93HE W9UCY DJ5TM PA0NL SM5KG VQ2JM						
244 W1BOD K2GON K4HRH W5RDA VE2YA DL9LA G13IM O81FF	232 K4JEY K4YCW F8EJ OK1KTI O2ZY	213 W2GFV W3KDF W8JXY W9ZB K9MNO EA4CR	207 W3MQC W4EUV W6VJG K7DOB K8QJH DL3SZ DL1YA	190 W1ALR W1NTH WINTH W4AIS I5IFC O4HTO Y01EH	183 K3HJQ DJ3BB MP4BBE Z54F	175 W2HIC G4YN HB0TT W2DEO LA2B SM5BVF W5TVR W6MUF K6H6A W8YPT W9PVA DL8CH K1IIF W8HEV K6LAE K7C7T K7L7M W8R3G G3HJJ W77ML DL6EQ	168 W1WKO K2ZYR W4WNS W5EJV W6CHL EA7CP K91FL VE2AFC WA2JBV W2UA K2YMD W3CDG K4AL OK1AEH T12CMF W4PDP UQ2AN VQ8AD W6QWQ KH6AC W7AIB K7BJE W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	153 W1AJZ W2HUG W4JDM K4VUR W6WLY W9NGM H0NIE W1EJ ZS6JZ ZS6WS	142 K2IQP W2KHT W5CME K5MIW K5MWH K61XS W6WGC K6ZFL W7DQM W7JPC W7YAQ W7YOA K3NAC G5GH	136 K4HDR W9GMS W9QYH DL1AM IT12A U16KOD ZS5UP								
243 W1VAN W1ZL K2MGR K2XYX W4THZ W6ATO W8ZJM W9EHW	231 W0CPM DL7CS W8AEB W9MZZ	211 WA2CBB W3HDZ K4IBX W6P1T K8PIU K9PIU W1QV K2DJD W3AFU W9WJH	204 W1LKE W3JFY DL1IA U15ARL U3H1T V7PNS V51FZ W6CUI W8MAF UA3AV	187 DL4ND W3BXY W3DAO W3HTF W3RZL	176 W2GUR G3JOC W6MKN SM5AJR SP9KAD Z54F	169 5N2JEO	168 W1WKO K2ZYR W4WNS W5EJV W6CHL EA7CP K91FL VE2AFC WA2JBV W2UA K2YMD W3CDG K4AL OK1AEH T12CMF W4PDP UQ2AN VQ8AD W6QWQ KH6AC W7AIB K7BJE W7JWE W8RQV K8GHG K8KZT W8OQV W8VVD K8ZPK K9DJN K9RVU W0RZU VE2DR EA3GF HB9HZ H89FK PA0FAB T2WA ZL1A5 ZS6ASW	154 DL6OS EA2FN W9KXZ HB9JG V3XWT G3GNM G8UK I1IVS LA5LD OH3TQ TG9AL ZL2JO ZS6VX	147 W3VQE W8CJ K9QIE LAIMB K4VUR W6WLY W9NGM H0NIE W1EJ ZS6JZ ZS6WS	135 W1MXX K2INP								

(Continued on page 189)

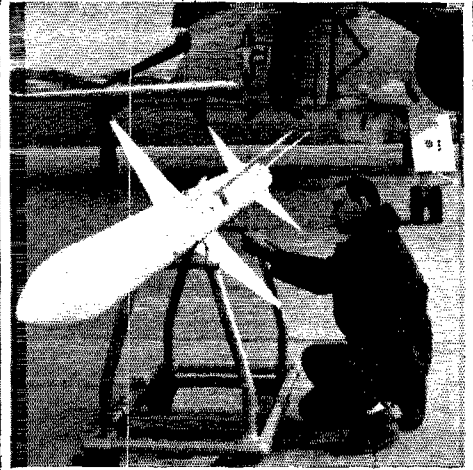
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 RELAY LEAGUE, INC.**

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K2LGI K5DCO K6SDR W6VUN W9OW JA3BB OH2SB SM3FY ZS8E	L7AL W8GFH K8YCM W9ARV W9MCF K9OPF W9RUB K9RZV W9DZZ W9TZZ K9TOE W9EUV W9ITW W8ESG G8IZJ OH5NM PA8NIR ZS7M	122 K6COF W6OMR W8ESG G8IZJ OH5NM PA8NIR ZS7M	133 K8RDE VE2BCT F0BB HB9YL T09AZ I02AS VQ9NT VQ4DW	129 W3HNI K4CEF W5FJ W7QAP W8LKM W9NVJ K0JQJ F2BR W8SHW W8CTQ G8LGH JA8IW SM3BHC W1ZJJ PA0RF U1KAG	131 W2HWA W2HXC W4KJL W4UFI W5QJZ K6QVH K6BIE K6JBP K6HGA W7NPF W70EB K9ORC DJ2XP DJ3ZV DL0YC EP1AD GC2CNC ILCWN LA3UT OH2EW OK1TW U43HK VQ8AT VU2JG 7G1A	127 W6VHT K8JXK K9WKE SM5TU SM8AU U4AKED U49BZ	120 W1WFS W1WSN W2AYJ G2CMN W2ELW W2TKG W2TKG K3CUI W3KID W3TEC K4BYN SM5AZ SP2BK	125 W2JKH W2SQT W5LQC W5DHF W8SCD W9HUV W9JHO W9UTQ W9YMZ CB7BD DJ1IK JA3AH SM7TV SM7VAC	124 W1LBA W3AVQ W3JO K5IZM W6WKE K8YER DJ6QB HB0LB JA1BN	123 W2JKN W3AAZ W5AAKH W5HHE CR6DB DL1XA DJ4VU K1ZYT K5BBS W4SCB W8NXX K5STL K6POC	ZD2CKH W4YSY W9AFX F2KZ	118 W2AIS W3YDL W44JL K6UWD W8NPF W8PNS K8QYA K8VIX VE3UC G3JKY	117 K1NHR W2AQT K4ORJ W6REH W6UQT DJ7BB G3DRQ OH2SF YV5BOA	121 W1CPI W4ZBR K2SMQ K3AIG K4EF W4CYA W6AGYU W9BTD K9ELT K9KFS K9KUS W9QHT U1KAG	115 K1AWX W1GOG W4HZ W4KJY W8KHP K6CPT W8EW W8CVZ W42KL W2JYE K2YFE K3CNS W3LOS W3ZVT K4HIF W4MLE K4YSK KH6BG K7ADD W8JOB K9ASF CX6CB DL1AD DL1NB DJ58A DL8AU DL9KJ GM3OEV OH2AA OK1AAW YO6XI YO8CF YU2AKL	110 W11RW K2CTF W3QOR W8UH K4DNW W46BJ W6RBJ W6RCV W8WRN K9KGG W9PTN VE2BCK VE3BCF F3CWF VE3PE DJ1OJ DJ3OK E12V F2IU G3BZU G8PP H04IE H18DGC JA1EM LA7JF OH2A OH2BC PA6GNI PA6FK SM2BQE SM4BZH V8IGC ZL1CH	109 W1MND W1PLA W1TIV W2VT W2RQE W5AEV W6NCG K6ROV W8KTT W8KOS W8LWU W9RAR W9TUS DJ2BG DJ6OR DL9OL G2HMG HC4MD K9ASF OK1NB U08VG YV1EL Z4L8A Z5FLB Z57R	105 W1LJO W10QP W4ADQM K4JUO W4VFM W6BKT WAGFY K6MQG W7JEN W8GMX K9INA W8NQF W9BWM K9OSV K9OSW DJ2JX DJ4XE DJ7CX G8OZU GW3IEQ HB4F HB9AC JA1BL JA1GV OK4AI OH1VA SP3AFL U42KAA U83MZ U92KAE Y03RK Y04CR 601MT	104 W1CWU K1EAT WA2VOH W3CAA W3FDH W3MCH W8FEM K5VVT W8QYH K7LHW W8CAT K8OCO K9CVZ W9ECF W3BLL V7BFN VE8RG CP5EZ DJ2QM DL8BG EP2BB K8BPE G3SRJ G3FTQ HB9PP HB9SJ JA6ZD KP4BBN L42V OK3IC OK3KAG O71RO U43RWA U46ME	DJ6RX G3NPF JA1AO O15CQ W6LRV W6QIV K6TZX K7CHE K7EQM K7MKW KL7JDO W84YV W8WVH K9AMD W9HGP W9KQB K9WJU W9YTF W9PAH DL9LI DU1OR G3OGE JA1BYM JA2AB KR8GR OK3JR PABL P80PV SP2LV H18DGC JA1EM LA7JF OH2A OH2BC PA6GNI PA6FK SM2BQE SM4BZH V8IGC ZL1CH
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(Continued on page 124)

C·P COMMUNICATION ANTENNA SYSTEMS

—mean CERTIFIED PERFORMANCE!

BASE STATION STATIONMASTER ADVANCED DESIGN ANTENNA (4X-Omnidirectional Gain)
U.S. PATENT NO 3,031,668

Cat. No. 200-509 Frequency Range 130-174 MC*

Cat. No. 200-509 Stationmaster Collinear Gain Antenna is designed to meet the ever increasing need for high antenna gain in minimum space and at lowest cost. This antenna, consisting of a number of collinear radiating elements fed inphase and encapsulated in a continuous weatherproof fiberglass housing, meets the above requirements. Low overall weight eliminates the need for extensive erection equipment required by previous antennas offering equal power gain. The input fitting on these antennas is a standard Type N male connector mounted at the end of an 18" flexible terminal extension. Designed for maximum strength with minimum cross-section, Cat. No. 200-509 is capable of withstanding winds in excess of 100 MPH.

Electrical Specifications:

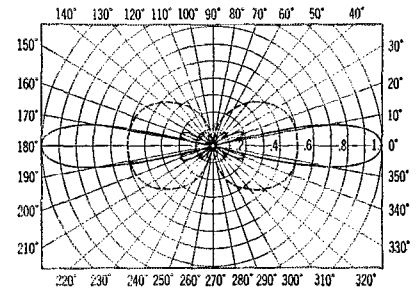
Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	±0.3%
Maximum power input	500 watts
Internal feedline	RG-8A/U
Flexible terminal extension	18" of RG-8A/U
Termination	Type N male with Neoprene housing
Omnidirectional gain	144-174 Mc 5.8 db 130-144 Mc 5.5 db
Vertical beam width (½ power points)	18°
Lightning protection	Direct ground

Mechanical Specifications:

Radiating element material	Copper
Element housing material	Fiberglass
Element housing tip diameter	.4"
Element housing butt diameter	1.7"
Element housing length	19'
Ground plane element length	18"
Support pipe	2 3/4" dia. hot-galvanized steel, 22" available for mounting
Rated wind velocity	100 MPH
Lateral thrust at rated wind	.45 lbs.
Bending moment 6" below ground plane at rated wind	.450 ft. lbs.
Weight	30 lbs.

*Exact frequency must be specified

Vertical field strength pattern of Cat. No. 200-509 Stationmaster Antenna. A dipole pattern is shown for reference.

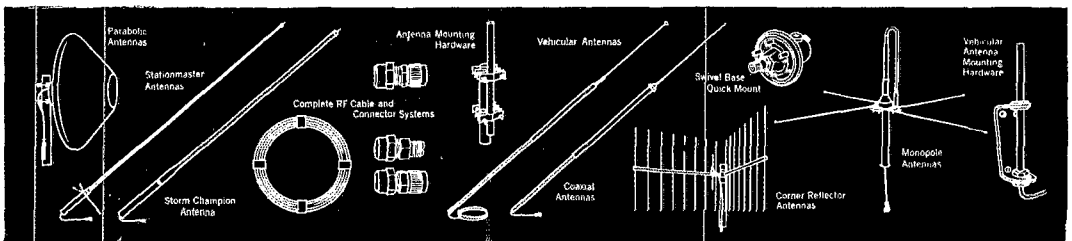


Communication Products Company
DIVISION OF



PHELPS DODGE ELECTRONIC PRODUCTS CORPORATION

MARLBORO, NEW JERSEY — Telephone HOpkins 2-1880 (Area Code 201)
LOS ANGELES 65, CALIF. — Telephone CHapman 5-1143 (Area Code 213)



A WORD From WARD . . .



THANKS FOR THE MEMORIES

As the bells of Christmas toll over the land, most of us start thinking of what the Old Man with the white beard and red suit is going to leave us on Christmas morning.

Today, I'd like to turn the tables a bit. Instead of asking Santa what I'm going to get, I'd like to offer something to him. And the main thing I'd like to give Santa this Christmas time—is my thanks. So here goes.

Dear Santa:

Thanks for keeping our country on an even keel when so many other parts of the world are torn with discord and strife.

Thanks for giving us leaders who are big enough to rise to any emergency—yet humble enough to know they're the servants of the people.

Thanks for giving us an economic system wherein a company as modest as mine can find its place in the sun.

Thanks for letting us at Adirondack Radio hold our own and grow and prosper simply by trying to put into practice the Golden Rule.

Thanks for giving us the privilege of doing business with so many hundreds of people—who start out being our customers and end up as our friends.

Thanks for giving us another year of wonderful business as you have in every year since 1936.

THAT'S IT, SANTA! And a very Merry Christmas to YOU—and all our friends and customers!

Ward J. Hinkle W2766

ADIRONDACK RADIO SUPPLY

185-191 W. Main St., Amsterdam, N. Y.
Phone: Victor 2-8350 Ward J. Hinkle, Owner

UAØBN V87GP V51DN YUØCG ZE3JS	ZS6JH Z06QK 106	OK1BY OZ5MJ PY2BBO	KMF WA6GJJ K6ØBA	ZS6AZQ	K4ØLQ W4YFE W4ZYQ	K9PZD K9QBZ W9SCV
WIGAG W1HOZ K1PNN K1RFY K1NDX W2CXM W2NR K28BW W3MVB K4AUL W4LSG W4ØJ1 K4PYX K5AEB K5BBA K5W7B W61VZ KL7-	K1NDX W2GUZ K31CA K3JØZ K3PK1 K4ADU W4HVN WA4- W4CHU K41CA K4KJC K4LPR W4MVB	SM6AJN SPIAFM W6Y1J UA1KBR UA2BD UAØDM UAØWL UAØJB UAØSK UAØSDQ V2PMY VE2ØK Y1U1AH1 Y1U1SF ZC4SJ ZS6AMS 4X4MR	K7ADL K7CLA W8APN K8EXX K8LNL K8TNE K8Z1P K9BJM W9LKT K9ØBQ K9TZY W9CXY KØUKN W1E1KG VE1TG VE5J1	W1BA W1FRFX K1JFF K1NFP K1NOL K1PVG W2LHB/1 K2BJR W2CUC W2DØS K2DQ1 W2EAF W2FOO K2INQ WA21ZV W2JGF W2AKMV K2KXW K2KYS K2MRB WA2- NWV	K4ØLQ W4ZYS W4FLA K5J1U K6MUX W5PØ K5REN K5RUØ K5SGK K5SVE W5DØS K5VTA W5WJV K5WSE W6AF K6BOB W6CLZ K6CNB W6CZP W6FZD K6HCL K6S1N W6IVM K6P1L K6TAY W6TYM K6VFO W6WXC K6HBBT W7CL5 W7KMU W7NTN W7ØP W8CQN K8HFJ K8HFT W8LZY W8URU W8W9H W8WBH K4AMC W4AQL K4DRU W4HEDY W4HNN K4GXS W4GYP K4LYX W4MQB	K9PZD K9QBZ W9SCV W9ZMK WØDYM WØFFEY KØLUX KØPUR KØYD KØTZH KØVSH VE1ZE VE3ATF VE3ØZ VE3M1 VE4MF VE4SC VE4FN K6CNB DJ2VKC DJ4VO DJ51H DJ51H DL5DQ DJ61D EA2CG ET3LF G2CCK G3JUE G3JUL G3NOZ G3NKK H8MMN H1BØL ØZ4PM SM2AHX SM5BH SM5BKZ UA2AB UA4Ø1 UAØG1 W9AØW W9BHD VØK2AX VP3MC VØ21H YØ3HY ZL1AØV ZL2AYJ ZS2MI WØNNC WØKMI 9Ø5AAA

K8KCO K8NMG K8PMD K9P1T W9ØIZ VE1AGE VE2JD VE4SX VE6IZ DJ3LE DJ4YQ DJ4PM DJ5FZ DLØEM G2DF H8SCF JA1DC H92M JA1HTK KR6ML ØA4JH ØH2BR ØH6ØV SL5CX SM3AST SM7AML UA1CE UT5CC YU1DO YU3IE ZL4MD ZS1VT	K1NTS W1ØEL K1TFS K1TSP W5FPN K6PAW K6EQW K8DTF W8LLC K8PTM W9DGC K9WRK WØDR1 KØMLN KØMLN VE1AEC VE1VN H91UV DJ1XF DJ2GL DJ2VA DZ6ZB F2DG Ø8EFS H85BT K81AA K81AF J47KY LA4R Ø83HY Ø85LX ØK1AF	W1ATP K1CXP W1ET W1HZE K1LQP W1HGU W2CVW W2DFV W2LSQ W42KZ G3ADZ G3HFF H45FO H8AAF HØ9RK ØK7ZT JA2DØ JA2TH JA9CQ KR6J1 ØH2DP ØK1ADP ØK1BP SM6AØQ SP8KAB UA4KCA UØKCA UØBKA UØQCC W4ØBØ W6FS W86- W1E1TG EØ2AT DJ2JE DJ3NQ DL4BM DJ4YQ D67HE FK8AW G3ADZ H8AAF HØ9RK ØK7ZT JA2DØ JA2TH JA9CQ KR6J1 ØH2DP ØK1ADP ØK1BP SM6AØQ SP8KAB UA4KCA UØKCA UØBKA UØQCC W4ØBØ W6FS	VE7AGC VE8RX EØ2AT DJ2JE DJ3NQ DL4BM DJ4YQ D67HE FK8AW G3ADZ H8AAF HØ9RK ØK7ZT JA2DØ JA2TH JA9CQ KR6J1 ØH2DP ØK1ADP ØK1BP SM6AØQ SP8KAB UA4KCA UØKCA UØBKA UØQCC W4ØBØ W6FS ZS2EX	263 SM5LL 262 W2RGV W5MMK WØGKL 261 W1HX W1WZ W4SKO W4TDW 260 W1DCE W2BQM W4AZD W4HA K9ØCE W9LW K9LUT Ø3FNN YØ5EC 259 W8NGO 257 W8VDJ H8M ØN4SZ 256 W1YDO WØMLY PAØHBO 255 W1PST W5KCC ZP5ET 254 K2BZT W4JGO W8WT	245 W3CGS 244 W1Y1H WØTMA WØEXY WØSFR PY1AQ 243 W1B1H WA6EYF 242 W3FGB H1RF TØ2LA VØK3AO YØ5AJK 241 W1CWD WØBEK Ø8PI G3AIZ ØN4DH 240 W1CDD W1ICV K2CJN K6LGF W6MBD L47Y YØ5AB 239 W1W9 W61YG D2BWB 248 W1FPH W5LZW ØE31L 237 WØBMQ ØT1PK L451H 236 W5HJA WØRCD G3AAR SM5VJ
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RADIOTELEPHONE

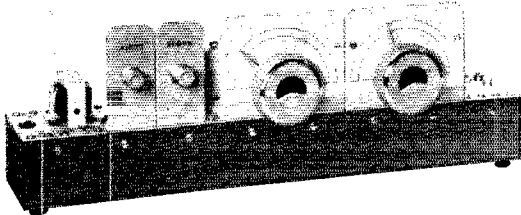
309 HAMU ON4DM	WØJYW G2PL Ø3FKM	SM3BIZ W1ADM W2VCZ	274 W1ADM W2VCZ	263 SM5LL 262 W2RGV W5MMK WØGKL	253 W1CWD WØYBZ VE2WV DLØØH	245 W3CGS
308 W9WHM	296 W5AFX W8UAS H8ØTTL	W8NKM DL7BA ZP5CF	273 W5TYU	261 W1HX W1WZ W4SKO W4TDW	252 W1HX W2CKY W4PAA TØ9AD ZS1DO	244 W1Y1H WØTMA WØEXY WØSFR PY1AQ
307 W9NDA HC1FG	295 K4AIM	W4KEE W8J1N W8PUD K8RTW	283 W1UØP W4ØM KHØG DL6EN	260 W1DCE W2BQM W4AZD W4HA K9ØCE W9LW K9LUT Ø3FNN YØ5EC	251 W3WGH WØBEK Ø8PI G3AIZ ØN4DH	243 W1B1H WA6EYF
306 W3KT W8HWG	294 W5POA WØQVZ	W3ECR W4PDL VE3KF	282 W2PTE W8ZET ZS5JM ZS6Q	259 W8NGO	250 W1CDD W1ICV K2CJN K6LGF W6MBD L47Y YØ5AB	242 W3FGB H1RF TØ2LA VØK3AO YØ5AJK
305 W4CØW W9J1P W9YSX DL3LL	293 W2FXN W5KBU W8BKP DL11N H8ØJ CZ7FG	W1CLX W3MAC W7HIA ØE1ME	281 W1CLX W3MAC W7HIA ØE1ME	267 K1LXG	252 W1CDD W1ICV K2CJN K6LGF W6MBD L47Y YØ5AB	241 W1CWD WØBEK Ø8PI G3AIZ ØN4DH
304 T12HP	292 W2OKM W8DMD	W1ØØS W9LNM	280 W1ØØS W9LNM	257 W8VDJ H8M ØN4SZ	253 W1CWD WØYBZ VE2WV DLØØH	245 W3CGS
303 W2OKM W8DMD	291 W2WZ W4ANE	W2LV W6ØBH MP4BBW	279 W2LV W6ØBH MP4BBW	258 W1YDO WØMLY PAØHBO	254 W1W9 W61YG D2BWB	244 W1Y1H WØTMA WØEXY WØSFR PY1AQ
302 W9RNX W3GHD	289 W2HTI	DØ2YI	278 DØ2YI	255 W1PST W5KCC ZP5ET	255 W1CDD W1ICV K2CJN K6LGF W6MBD L47Y YØ5AB	243 W1W9 W61YG D2BWB
300 W6GVM K6LAS Ø5VT ZL1LY	288 W1BAN Ø5VT ZL1LY	W1ØRV W21ZS W81H ØX2AX	277 W1ØRV W21ZS W81H ØX2AX	256 W1YDO WØMLY PAØHBO	256 W1YDO WØMLY PAØHBO	242 W3FGB H1RF TØ2LA VØK3AO YØ5AJK
299 Ø18KS LU4DMG	287 W1LLF W2G1P W8BAP GØLX	P21AX	276 P21AX	257 W8VDJ H8M ØN4SZ	257 W8VDJ H8M ØN4SZ	241 W1CWD WØBEK Ø8PI G3AIZ ØN4DH
298 W1ØNK	286 G3DO	W1JFG W8QJR Ø81VJ	275 W1JFG W8QJR Ø81VJ	258 W1YDO WØMLY PAØHBO	258 W1YDO WØMLY PAØHBO	240 W1CDD W1ICV K2CJN K6LGF W6MBD L47Y YØ5AB

(Continued on page 126)

EXPERIMENTER, SWL or RADIO AMATEUR

Select your receiver, transmitter, or VFO from easy-to-build International AOC Kits.

Simple step-by-step instructions show you how to assemble factory prewired units. Designed for top performance at a low cost!



RECEIVER KITS

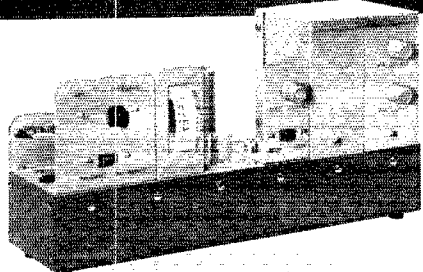
This new line of International receiver kits cover a wide range of amateur, citizens band and special frequencies. Designed for AM, CW, or SSB reception, this basic receiver using a superheterodyne circuit* with regenerative second detector may be expanded to a more elaborate receiver by the addition of other Add-On-Circuits. Sensitivity usable to below 10 microvolts for voice and 1 microvolt for code. Nuvistor rf amplifier, mixer, oscillator, I.F. transformer, detector/1st audio, and power audio amplifier. Tube lineup: 6DS4 nuvistor, 6BE6, 6U8, 6AQ5. Shipping weight: 15 lbs.



Receiver kit includes 4" speaker and power supply.

Kit	Frequency	Price
AOR-40	Special	\$69.00
AOR-41	150 kc — 450 kc	62.50
AOR-42	2 mc — 6 mc	62.50
AOR-43	6 mc — 18 mc	62.50
AOR-44	30 meter/10 meter	62.50
AOR-45	15 meter/10 meter	62.50
AOR-46	6 meter	66.50
AOR-47	2 meter	66.50
AOR-48	Citizens 27 mc	62.50

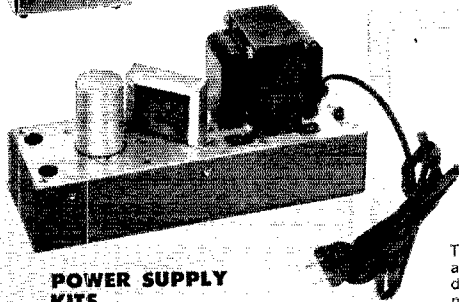
*AOR-41 uses a tuned rf circuit with 6BA6



TRANSMITTER KIT

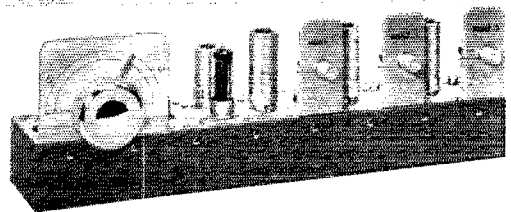
A compact package delivering a plate input of 50 watts for CW operation on 80 or 40 meters. 12BY7 crystal oscillator—6DQ6 power amplifier. Pi-network final. When used with AOR-44 receiver, transmitter operates from receiver power supply. Meter and TR switch.

AOT-50 transmitter kit less power supply and key, but with one 40 meter novice band crystal. Shipping weight: 5 lbs. \$35.00



POWER SUPPLY KITS

AOP-100 350 volts, 150 ma intermittent or 100 ma continuous service, 6.3 volts @ 5 amps. Shipping weight: 8 lbs. \$18.50
AOP-200 650 volts, 250 ma intermittent or 200 ma continuous service, 6.3 volts @ 10 amps. Shipping weight: 10 lbs. \$32.50



VFO KITS

The International AOF series of variable frequency oscillator kits is available in three versions. For example, the AOF-91 kit is a complete driver unit to be used with 6 meter and 2 meter transmitters. Approximately .5 watt of power is available on both bands. Tube lineup: 6BH6 oscillator, OB-2 voltage regulator, 12BY7 buffer-amplifier/multiplier. Shipping weight: 5 lbs.

Kit	Frequency	Price
AOF-89	VFO 8 mc — 9 mc and buffer	\$22.00
AOF-90	VFO 8 mc — 9 mc plus buffer multiplier and 6 meter output	29.00
AOF-91	VFO 8 mc — 9 mc plus buffer multiplier, 6 meter/2 meter output	36.00

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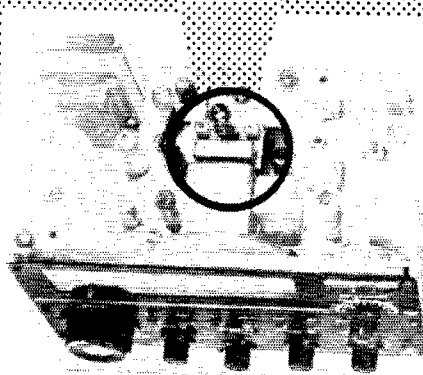
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TRULY SUPERLATIVE SSB RECEIVER.

Imported

MODEL DMF-2

\$29.

UNIT COMPLETELY
WIRED, READY FOR
EASY INSTALLATION!



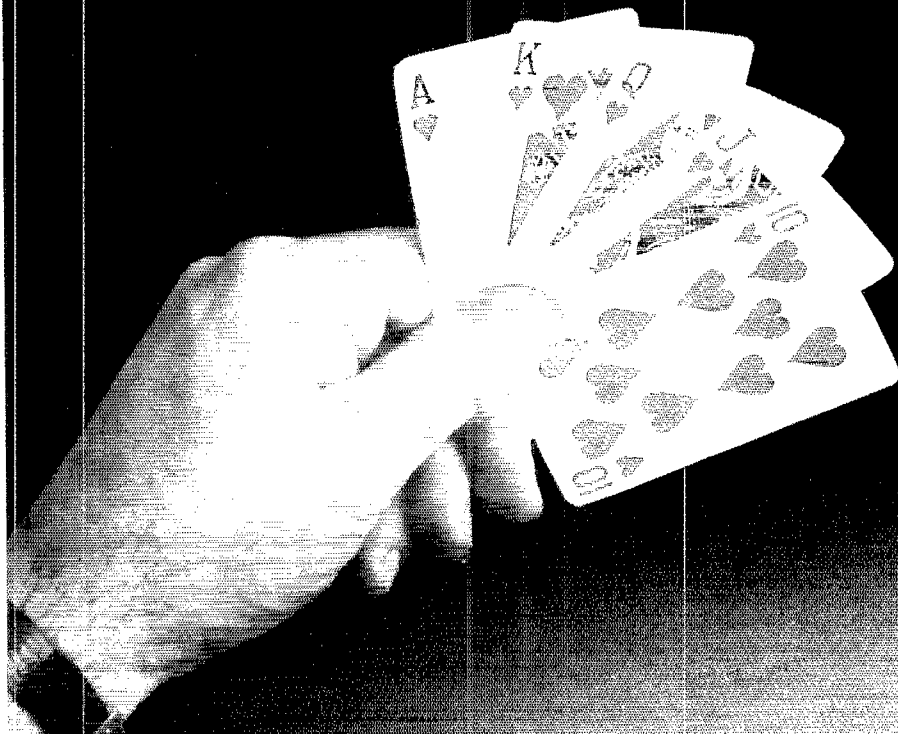
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235 W2GNQ W0PFI	W3PVD K5QWZ W6CYT	WA2EQQ W2FGD W2HXG W3ICQ W4PJI W5LBI W5PWV W4VZU W9ZSZ OY7ML	182 WILSZ K2FW W28N1 W3HCO K4LPW W5RDA	167 W8LAV W0LBB SM7ACB	151 WA6DET W9GAI K0KKN W0SFU	W8TTN DL3NE EA2EL PY7EC
234 W9HB	215 W3FII W4BYU W4VZU W9ZSZ OY7ML	210 W4RWP W8SZS W9LTR PA0FX	196 K9COS H89FE W8WC CT1MB EP2AG G2AFQ YV5AQ5	166 F9MD H1PDN W7BTH CT1QP S08CK	140 W10HA K2KGS ON4AR VP6WD X22SY Z5AMG	
233 ZS6FN	214 K1EJO W2SUC W5ABY W9HP W9CPM	211 W2YBO VE3ES XE1CV	195 W4EEU W4EFC DL7HU	165 WA6MAZ	150 W1BPM W1PNR W2MOP K2UTC W3QIR CR7LU	
232 W5KFT W6CHV W9UZZ PY1NC	213 W4RWP W8SZS W9LTR PA0FX	212 WA2ELS W3HLX W4RLS W9NZM OZ3Y YV5AXQ ZL1PV	194 SM5RY	164 W7ALX ZL3AB	149 W2MOP K2UTC W3QIR CR7LU W4QT W4YQB W4ZKM W5HZZ W0ANF	
230 W1GKK W4NYN DJ3CP YV5AIP	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	178 W1DBM W4HUE G3HCU	163 W3LPP K4HRG W6USG W8AJH W0ANF	
229 W4UWC K8LSG DL3RK HKDB YV5AFF	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
228 W3AYD W6QOG W8CVU PY7YS	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
226 W2GBC W2JY K8NZD VE2YU	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
225 K2JFV W4GRP W5VU W6YMY W7DLR W8ONA W8QGI VK4FJ	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
224 W2PTM W8AJW W9YFV K0RAL	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
222 W2BOK W2QKJ W3BVL K8ONV	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
221 W1LHZ W3V5U W0BFB W0NFA	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
220 W2HMJ K4HYL W4NJF W5ERY W8IJZ G13JM HK3LX	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
219 VE1WL	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
218 W1AOL W6BSY W9PQA YS10	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
217 K1ASU W9YJ DL1FK	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	
216 K1JMV	210 W3YZI K8PUU K0MNO G3BID	211 W2YBO VE3ES XE1CV	193 W2YTH	177 W1BHP H9E9E ZS5PG	162 W2FXE K4OEI K4OCT W0MRJ K0TJW VE3PV VE5GM VE5LM CT1HF DL9OV G3M VV HAM LA5LG OE1PC VK4JQ YU1AG ZS1DC	

(Continued on page 128)

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K2JMY W2MAM K4BMS W4LVV W4NI K4VIS W5NKF W8YZQ YE2BCT FE8AH EP3RO KG6ALD ZS6AHW	G4MNP PA0UC 123 K5RWB W6DFR W6PAL W9PYA W9ZTD VE3DCX CR8DH DJ4OP TC9US UA3CG	W6PNS 1ICID OQ5TE PA0PRF 117 W3LEZ W4AXE W4DEO W4YSY W8BDP W8RDX CN8HX 1DJ7AA F2FO G3KLL	W4VCB/ K17 W9KXX VE8RSJ DL4ZS DL7FW KR6BQ VQ1DW 110 W1QOC K9JAV WA3- WDV K3BNS W3CLP K3MNV K9YRV/4 K5GOE W5LDH KH6BXU DJ2UU W8NCV VRIG VE3AGC CR7IT GM3OCV 11SCA OZ8EA SM5ATN VSIGC	VE3CCR VE7AAA DL2OX JHL KR6GR OK1MP PY7ABG YV5ALC ZS1TZ 102 K2DQI W2FXA W2LLI W2A2JD W2FDB W45HF K4UAS W5RKR/ W6OHU W5WLD K6RSY K7CHT K4LYG/7 K9ZEQ 1IAKI JAZKX O44GG W30GE ZS6QW ZS6YB GH1AB W2AGO W2V0H ZLIARY 101 W4NHH W4WFD W6REH K6KCI F3YO G3HQT 11WZ KG6AH K6GHI PA8QJ SM6RS VR2DS YV5ED ZB4JN 103 W1FJJ K10LT W3GRS K6GHU W4UAF/ KH6 W8MNO W9TKM W7MT W8CAU/ CN8 DJ6G EA4GZ 1IALM W4PLL K4V0F W7QPL W5DNL W7PRL W9JJC	YV5AIG ZS8NM 5R8CO 100 K1LBR W1TTY W1NLU W10GU K1QJT K2DHL W42FW W2JDA K2APJ W42SF W3EGC W3MPS K4ICJ K4FTY W4FZO K4LPR W4MVB K4PSR K48BH K5LXA K5OPT K6EDA K6HSW W6TNI K6VNU KH6EDY K8AGX W2ONE W8FEP W8FGS W3MYE K4JCA W4WJR K5JDD/ K6TRP K4PHY K4WNL W5BVI W5EDX K5JLX W5LEF W6GESB VE4OX CN8AW DL4FC DL4ZW K74CK K25US O4A1 O66FJ PA0WR VP2AB VQ2AT YN1AT YV1EL YV3CT YV5DA ZS6JH 5R8BZ
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Station Activities

(Continued from page 106)

FPG 4, K2PB 4, W2QIQ 3, W2EMW 2, K2TIDG 2, W42WEE 2, W82GLD 1.
WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC, W3LIV, RMs: W3KUN, K3-OUU and W3NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets 2330 GMT Mon. through Fri. on 3585 kc. KSSN will take the place of WPA week ends at 2400 GMT. Congratulations to K3DKH, EC for Butler County, on making the BPL K3CJH is back home from the Armed Forces. K3DCG has an IT-37 and a Drake 2B. K3UTR now has his General. A new Novice in the Johnstown area is KN3ZKN. The Western Pennsylvania Mobeilers report via *The Whip*: The Mobeilers again assisted the Oakmont Auxiliary Police on Halloween evening; W3RSB was presented with the "Man of the Year" award as an outstanding citizen of Churchill Borough by the Churchill Town Meeting Assn.; Silent Keys are W3NEA and W3IMB. K3MTY is at Penn. State. The Steel City ARC now has a stacked 2-meter twenty-element spiral ray beam. Coke Center RC reports: K3QQN dropped the "N" from his call; K3TFK is using an Erico 720 and 730 combination; K3VXS now has his General. Up Erie way: K3KPJ and K3HFL attended the V.H.F. Ragchewers' Picnic held by the Niagara gang; W3UQG now is on 6 meters; W3KNQ is conducting code classes at the local Erie YMCA. The

(Continued on page 130)



{ Number two hundred fifty-eight of a series }

ONE of the most popular misconceptions about communications receiver design is that the number of conversions used in the receiver is the primary index of its performance . . . and that a triple conversion receiver must automatically be better than a single or double conversion box. Not surprisingly, much receiver advertising is slanted to appeal to this myth. 'Tain't necessarily so.

THERE is only *one* important reason for using more than one conversion in a communications receiver — to achieve selectivity without sacrificing image rejection. The lower the I.F. frequency, the easier it is (using conventional tuned circuits) to obtain the narrow I.F. bandwidths necessary for selectivity to meet crowded band conditions. Many modern receivers, such as our NC-303, employ a last I.F. of 50 Kc, 60 Kc, or 80 Kc for precisely this reason. On the other hand, a receiver converting directly from signal frequency to a last I.F. of 50 Kc, for example, would have extremely strong image response to signals only 100 Kc away from the desired signal. Accordingly, such a receiver usually uses two conversions to get down to the selective last I.F. — typically, the first conversion is to approximately 2 Mc; placing the primary image response 4 Mc away from the desired signal to improve image rejection, and then converting again down to 50 Kc to obtain the required selectivity. Since there is also a lesser *secondary* image response resulting from the second conversion, occasionally the second conversion may be made to a frequency around 500 Kc, and then down to 50 Kc or so. We now have triple conversion. We also have one *heck of a lot of oscillators and mixers* in the receiver, and the *problem of keeping down harmonic and mixer "birds"* is greatly increased. In addition, as mentioned above, each additional conversion produces an additional set of lesser image responses — and a triple conversion receiver would have four more potential image responses than would a double conversion equipment.

THERE are some distinct advantages to multiple conversion receivers which obtain their selectivity from low frequency I.F. circuits — two important features are the ease of varying bandwidth by changing the amount of coupling between individual tuned circuits, and the availability of sufficient Q to provide an effective Notch Filter or Q-multiplier. But remember, the *prime* justification of a multiple conversion receiver is good selectivity together with good image rejection.

THE advent of the high frequency crystal lattice filter changed all the ground rules. Now a single conversion receiver (such as that used in the popular NCX-3) can simultaneously possess both excellent selectivity *and* image rejection. The NCX-3 lattice filter operates at 5.2 Mc, thus placing the image response 10.4 Mc away from the desired frequency, and in addition, provides selectivity similar to the best low frequency I.F. circuits — 2.5 Kc at 6 db, with a shape factor of approximately 2.8:1. Some important benefits are realized with only one conversion — simplicity, excellent resistance to crossmodulation and overload because the filter is relatively close to the R.F. and mixer stages, and complete absence of secondary or tertiary images. True, a Q multiplier won't work at 5.2 Mc, and separate filters would be required for separate bandwidths, but the important criteria are met — superior image rejection *and* selectivity.

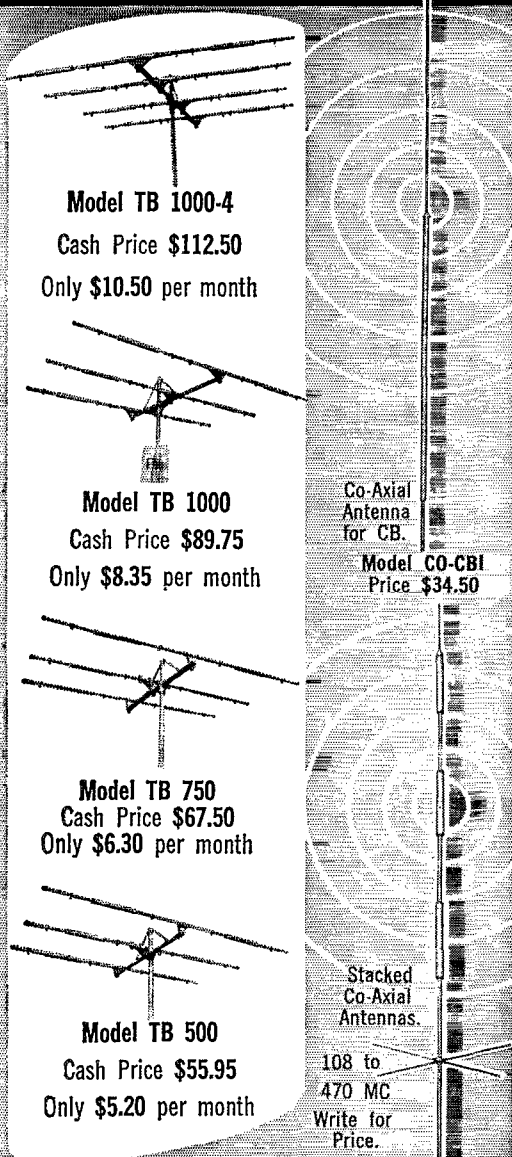
So keep in mind that a *properly designed* single conversion receiver can provide the same basic performance as does a multiple conversion unit, and that both techniques have distinctive advantages which may be very important to you as a prospective owner.

MIKE FERBER, W1GKX

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SATISFACTION GUARANTEED

Uniontown ARC reports via *The Magpie*: The Club's 14th Annual Gabfest was well attended; the present officers of the club were all reelected. The recent S.E.T. Operation (Oct. '63) was very well covered by the c.w. traffic nets. EPA, WPA and 3RN, who continuously kept their nets going the entire weekend during the afternoon and evening. All stations who participated deserve a "Well Done". Traffic: K3DKH 764, K3NZB 382, W3NEM 230, W3KUN 140, K3PXS 66, K3OWN 50, W3OEO 41, W3IYI 26, K3OOO 25, K3TEZ 24, W3UHN 19, K3COT 4, K3EXE 4, W3UTU 2, K3RGV 1.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9DSR. PAM: W9VWJ. EC of Cook County: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. The EC Net meets every Sun. at 1600 GMT on 3840 kc. with SEC W9RYU as net control. The Elgin Radio Society (W9IKW) provided communications for the Palentine Polio Sunday Drive. W9SPT's new QTH is Granada Hills, Calif. The Chicago Area Radio Club Council participated in the National Electronics Conference Show at Chicago's McCormick Place and operated its club station, W9TEM. K9LJA has a new 40-foot tower and 2-meter beam. New appointments are WA9-HQK and WA9FIH as OESs; K9QLC as OO. WA9DKM is organizing a new net on 220 Mc. W9ERU has returned from a 6000-mile western trip transceiving with fabulous results with his NCX-3. New calls in Princeton are WN9TO, WN9JSF and WN9JTN. K9WYX is now active on s.s.b. with an Invader. WA9CHG is a new General. From reports sent in, the various clubs sponsoring code and theory classes are reported to be the largest in quite a few years. WA9INH is the new call of the Illinois Institute of Technology Amateur Radio Assn. The Chicago Area Emergency Net's new name is Chicago Area Traffic Net. W9OKI received his A-1 Operator Club certificate. The Hilltopper Net (Hillsboro) will be on 145.5 Mc. handling traffic from Central Illinois into St. Louis Tue. and Thurs. at 0130 GMT. New officers of the Sangamon Valley Radio Club Inc. (Springfield) are W9UYP, pres.; W9KQL, vice-pres.; K9YER, secy.-treas.; K9KKL, member of the board. A new call heard is W9HAS. K9LXB is now serving in the Air Force in Biloxi, Miss. Net traffic: North Central Phone Net, 823; 75-meter Interstate Single Sideband Net 778; Chicago Area Traffic Net, 23; ILN 154. WA9CDI is bringing in the hard ones on a new Mosley TA-33 Jr. W9IDA, K9KZB and WA9CCP are recipients of the BPL award. Traffic: (Sept.) W9IDA 1987, K9KZB 732, WA9CCP 711, WA9AJF 239, W9AKV 156, WA9DKM 127, K4KWQ/9 122, WA9HQK 75, W9JXV 63, K9LRN 61, K9DRS 69, K9CYZ 52, W9USR 49, W9VWJ 20, K9GSD 15, WA9INH 12, W9PRN 12, W9GEG 11, K9UCG 7, W9DBO 6, W9SKR 5, W9CKI 1, W9LNQ 2, W9SXL 2. (Aug.) W9AKV 100, K9ISP 10.

INDIANA—SCM, Donald L. Holt, W9FWH—Asst. SCM: Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: K9KTL, K9CRS, K9GLL. RMs: W9TT, K9DHN, W9JOZ. Net keds (all times in GMT): IFN, 1330 daily and 2300 A1-F on 3910 kc. ISN (s.s.b.), 0030 daily on 3920 kc. QIN (training), 1700 M-W-F on 3745 kc. QIN, daily at 0000 and RFN, at 1200 Sun. on 3656 kc. Please note the new time of the QIN (training) Net and encourage Novices and others to participate. New appointments: K9LVK as EC of Miami County. W9YYX as OPS and WA9AUM as OBS. Thanks to W9ZYK for a job well done. WA9HFF, a new General, was listed incorrectly as a Tech. W9DOG and WA9EEI are new stations on 8-meter s.s.b. W9PWH wishes to thank you all for the splendid cooperation during his term as SCM and your continued support will be gratefully appreciated by the new SCM, W9YYX. QIN honor roll: WA9AUM, K9VHY, K9DHN, WA9ECX, K9INF, K9ZLA and K9KTL. Those making BPL: W9JOZ, K9DHN and W9NZZ. *Amateur radio exists as a hobby because of the service it renders.* September net reports: IFN 218, ISB 1025, QIN 216, QIN (training) 0, RFN 30, Hoosier V.H.F., 131, 9RN 806. Indiana represented 95 per cent. Traffic: (Sept.) W9JOZ 3246, K9DHN 584, K9INF 250, W9VAY 270, W9NZZ 268, K9ZLA 264, WA9AUM 215, K9VQG 182, W9TT 172, W9QLW 157, K9KTL 143, K9RWQ 95, K9CRS 79, WA9EED 73, W9OG 69, WA9ECX 65, WA9BF 62, W9FWH 60, W9CC 59, K9GEL 52, K9ZLB 36, W9QYQ 32, W9BUQ 30, K9INF 29, W9RTH 29, K9UXX 29, W9YYX 26, WA9BGI 25, K9BSI 24, W9RTZ 24, K9QXI 24, W8KCN/9 22, WA9ELY 20, WA9DWH 19, W9UQT 19, W9SNQ 17, K9VHY 17, K9ILK 16, K9MWC 15, K9FPA 14, W9DGA 13, W9FJH 11, W9EJW 9, W9DOK 8, K9UHQ 7, K9DHF 6, W9DZC 6, K9ARW 5, WA9DVJ 5, W9AQW 3, W9ZZR 3, WA9AEL 2, K9GHN 2, K9MAN 2, K9SUH 2, K9PNP 1. (Aug.) W9VAY 65.

(Continued on page 132)

BETTER THAN EVER FOR '64!

Clegg's GREAT NEW

INTERCEPTOR

B



HERE'S THE ULTIMATE RECEIVER FOR THE SERIOUS VHF OPERATOR WHO WANTS TOP PERFORMANCE ON AM, CW, OR SSB

Now the top favorite of VHF Amateurs everywhere, Clegg's INTERCEPTOR receiver, in 1964 offers even more spectacular performance.

The new "INTERCEPTOR B", now available at your dealers, is a dual conversion 50-54 mc receiver with a self-contained crystal controlled converter for 144-148 mc reception. A switchable crystal lattice filter permits extremely sharp selectivity for SSB and CW as well as providing 8 KC of bandpass for strong local signals and net operation. Both diode and product detection are provided. Automatic and variable threshold noise limiters function respectively for AM and SSB/CW reception. A new electrical band spread control provides ± 1 KC to the receivers main tuning dial for ease in tuning SSB and CW signals.

Converter input provides for 220 - 432 mc and up, as well as for excellent general coverage of the lower frequency bands using Clegg's new ALLBANDER converter/speaker combination (described to the right).

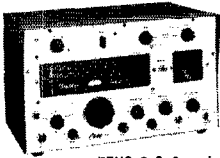
Space will not permit a complete description of this fine new receiver, but we'd like to suggest that you see one at your dealers or write to the factory for complete data

Shortly after the first of the year, Clegg Laboratories will release the new INTERCEPTOR ALLBANDER, converter/speaker combination which will extend the tuning range of your Interceptor (either B or earlier model) to superb general coverage of all frequencies between 3 and 30 megacycles.

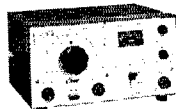
Designed to sell as \$129.95, this unit, in matching cabinet, will not only provide excellent coverage of the 80 through 10 meter ham bands, but also the intermediate frequencies where many desirable signals (WWV, citizens band, foreign broadcast, etc.), are found.

For other Squires-Sanders products see page 139

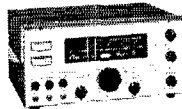
Visit your distributor today and see the famous Clegg family that is making VHF history.



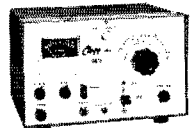
ZEUS 6 & 2 meter transmitter 185 watts AM & CW . . . \$695.00 amateur net



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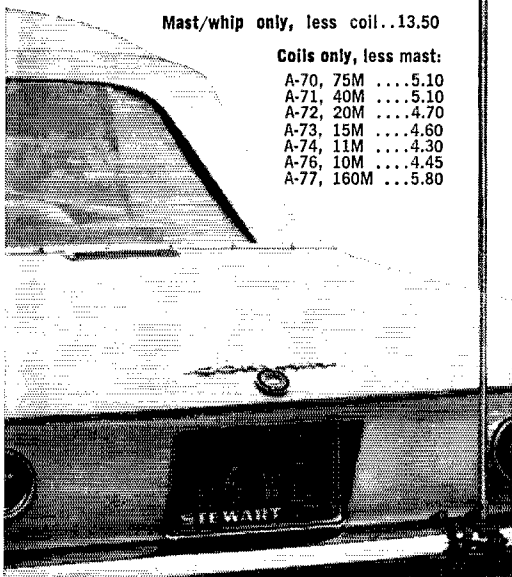
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Complete antenna assembly consists of mast w/whip and A-70 series coil.



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Number _____ Street _____

City _____ Zone _____ State _____

WISCONSIN—SCM, Kenneth A. Ebnetter, K9GSC—SEC: W9BCC. RAs: WA9AKE, W9KQB. PAMs: W9-NRP, K9IMR, W9NGT. Nets: WIN on 3535 kc. daily at 0045Z; WBSN on 3985 kc. daily at 2315Z; BEN on 3950 kc. daily at 2400; SWRN on 50.4 Mc. Mon. through Sat. at 0300Z; and our newest net, the Wisconsin Training Net, on 3710 kc. Tue. through Sat. at 0130Z. Net certificates went to WA9FOM for BEN; WA9BWD and WA9AOI for WBSN. New appointees: K9IMR as PAM, WA9AKE as RM, WA9FOM as EC for Green County, WA9EOO as CES. Renewed appointments: W9RYA, W9EWC, K9KJT, W9SAA, W9AJU and W9VRI as ECs; W9SAA, W9CXV, K9WIE, K9GDF, K9ELT and W9ZB as ORSs. W9CCO as OO, K9LGU and W9SAA as OPSs. Thanks to W9SAA for an FB job as PAM the past two years. W9ZB reports he has worked 252 countries since 1960. W9VSO says that Sept. was a wild month on 144 Mc. W9VSO led Wisconsin OOs for Aug. and Sept. with 109 and 28 notices sent. W9SZR will be in the Dominican Republic next summer. K9REB is moving to Eau Claire. Net reports: WBSN 1249 stations cleared 656 of 803 messages; BEN 1046 stations cleared 298 of 421; WIN, 201 stations cleared 68 of 100. BPL certificates for Sept. traffic went to W9AOW, K9IMR and W9DYG. Traffic: (Sept.) W9AOW 635, W9DYG 635, K9IMR 624, W9CXV 371, W9SAA 80, WA9BWD 74, K9GSC 67, WA9AKE 53, W9NRP 43, K9UUT 41, K9DJY 40, WA9FOM 21, W9YT 18, W9OTL 17, W9VHP 17, WA9CWW 16, K9BLN 13, W9MWQ 10, W9ZB 8, W9UEB 5, W9APB 4, K9FHI 4, K9GDF 3, K9FPM 2, WA9EOO 1, W9FXA 1, W9VII 1. (Aug.) W9MWQ 14, W9ZB 1.

WISCONSIN QSO PARTY

December 8, 1963

All Wisconsin amateurs are invited to take part in a QSO party, sponsored by the Milwaukee Radio Amateurs' Club in order to promote friendship and operating ability within the section.

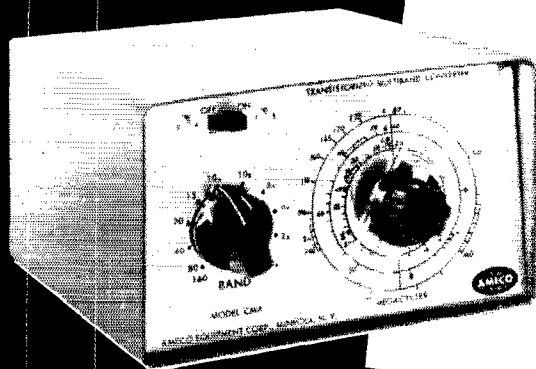
Rules: (1) The party will begin at 1600 GMT and end at 2259 GMT Sunday, December 9. To facilitate log checking, the use of GMT is requested of all contestants. (2) The general call will be "CQ WIS". (3) Exchange will consist of a QSO number (starting with number 1), RS or RST report, county and operators name. You are not required to give time over the air. (4) Logs must show time of contact, station worked, signal reports, sent and received, band, type of emission, power input, QSO numbers sent and received, and name of operator and name of county worked. Sheets from the ARRL log book may be used with the additional information required being entered in the data column. (5) You may operate on either CW or Phone, but not both, unless you submit separate logs. CW to phone contacts will be permitted but cross-band contacts are not allowed. To encourage the use of bands other than 3.5 to 4 mcs. and to enable you to increase your score, you may work the same station once per band. Suggested times for 14 mc, 1800; 7 mc, 2000; 21 mc, 2100; 28 mc, 2200 Z. (6) Scoring: Each message sent and acknowledged will count one point and each message received will count one point, for a maximum of two points per contact. Each Wisconsin county worked counts as a multiplier and to obtain your final score, multiply your total contact points by the total number of band counties worked. Only QSOs with other Wis. hams count, and the log entries must be complete. Any violation of the contest rules or F. C. C. regulations may result in disqualification. (7) Send logs, postmarked not later than Dec. 16, 1963, to Russell Burss, W9-RKP, 6258 S. Bass Dr., New Berlin, Wis. The decision of the Contest Committee will be final in judging of logs received. Suitable awards will be given to the 1st, 2nd, and 3rd place winners for CW only, Phone only, mobile, and Novice entries. Mark your calendar now for December 8. Get on the air during the contest period and see how many Wisconsin stations you can work. Meet the gang and have fun with "CQ WIS"

DAKOTA DIVISION

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—SEC: W0SCT. Sioux Falls ARC thanks everyone who helped make our convention a success. The official attendance was 268. A new call in Sioux Falls is W0HGO, the daughter of W0FNM. All appointments have been brought up to date, effective Oct. 1. K0GSY has accepted an RM appointment, succeeding K0BMBQ. K0—
(Continued on page 134)

AMECO*Leader in Compact, Quality Ham Gear**Amazing but True...***ALL BANDS... 2 THRU 160 METERS IN ONE CONVERTER**

- TRANSISTORIZED
- CRYSTAL CONTROLLED

**The NEW****Model CMA**

Model CMA covers all frequencies from 1.7 to 54 Mc. and 108 to 174 Mc. The output can be fed to a standard broadcast set or any communications receiver. The CMA has better than 1 microvolt sensitivity. It can be operated from an internal battery or from the 12 volt car battery. Model CMA has an RF stage, tuned by a panel dial for best image and spurious rejection. Up to 10 crystals can be selected by the band-switch. Size — 3 3/4" x 6" x 6 3/4". For more detailed information, write for special "Converter Information Sheet".

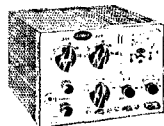
Model CMA, wired and tested,
less crystals \$64.95
Crystals each 3.50

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE**Model CN****CN-220K in kit form. (specify IF.) \$34.95**

Has 3 Nuvistors (2 RF stages & mixer) and 616 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 \$24.95**

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 Guide50
Radio Operators' Lic. Guide, EL 1-275
EL 3 1.75 EL 4 1.25
Amateur Log Book50
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. Q12 Ameco equipment at all leading ham distributors.

AMECO EQUIPMENT CORP.

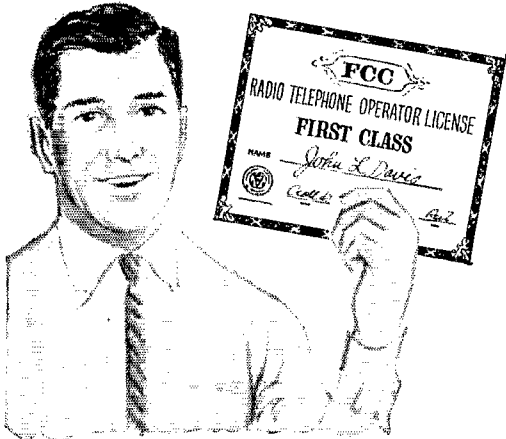
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| <input type="checkbox"/> Broadcast Engineering | <input type="checkbox"/> _____ other _____ |

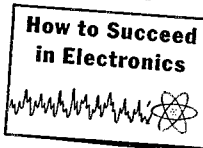
Your present occupation _____

Name _____ (please print) Age _____

Address _____

City _____ Zone _____ State _____

Accredited Member National Home Study Council



BMQ discontinued his morning net when the Weather Net started Oct. 1. W0AYP passed the General Class exam at the convention. K0YCB, Brookings, has been appointed OPS and ORS. Traffic: W0SCT 232, K0GSY 103, W0DVB 78, K0BMQ 16, K0VYY 14, W0ZWL 13, W00ARZ 10, W0DJI 10, W0IGG 10, K0ZBJ 10, W00A0Y 8, K0BSW 8, W0RWM 4, K0TXW 4, W00CKH 2, K0HQD 2, K0KOY 2, W00FP 1.

MINNESOTA—SCM, Mrs. Helen Mejdrich, W0OPX—Asst. SCM; Emerson A. Mejdrich, W0RIQ, SEC; K0KKQ, RMs; K0ZRD, K0LJU, PAMs; W0YHR, K0VPJ, MSSB, PAM; W0HEN. Appointments issued are W0KYG, K0FLT, W0ARA, as OPSS; W0ARA as ORS; K0ZKK as EC, Endorsed as EC; W0HEN, W0PHD, of Warren, is very active on 2- and 6-meter s.s.b. He runs 650 watts to a 4CX300 and uses Hy-Gain 6 and 2 antennas plus a 75-ft. high 32-element co-linear. If you are wondering where some of the prewar gang are: W9ICU is now W2RRX, W9TUF is now W5PGG, ex-SCM W9FUZ is now K0EA, W9HBI also is a W6. Division Director W0BUO, SCM W0OPX, SEC K0KKQ, PAM K0VPJ, EC K0IKU, K0JYJ, W00BYO, W0FHH, W0MXC, W0ZOB, W0QXF, W0QKA, K0LWK and many other Minnesota hams attended the Dakota Division Convention and enjoyed the fine hospitality of the Sioux Falls Radio Club. K0EYV has returned to Rochester after an extensive tour of Europe. W0AGL and his XYL, K0JXX, sked their daughter in Germany. KJZ continues as NCS on CAN. Until further notice MSPN Eve. will meet at 5:30 to avoid long-skip QRM. A glance at the calendar reminds us that by the time this report reaches you that time of happy spirit and traffic pile-ups will be here. Merry Christmas everyone from your SCM. Traffic: W0ARA 213, W00BYO 194, W0ATO 151, K0ZRD 65, K0LJU 60, W0HEN 37, W00DXV 47, K0SRK 45, K0ZKK 39, K0UXQ 38, W0KYG 37, W00QF 35, W00DGV 31, W00DVH 31, W00FNS 29, W0UMX 28, W0YHR 26, K0LWK 23, W0OPX 23, K0HD 22, W0BUO 21, K0VPJ 20, W0KJZ 16, W0THY 15, K0JFJ 13, K0FLT 12, W0RQJ 12, W0ALW 10, W00BZG 10, W0RIQ 10, K0JYJ 9, K0GPI 8, K0ICG 7, K0IKU 6, W00ASV 5, K0FTB 5, K0KNL 5, W0IRF 5, W00CCB 4, W00EPX 4, W00FCJ 2.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC; W0PHR/5, PAM; K5SGG, RM; K5TYW. Our new SEC is W0PHR/5, Samuel M. Meeks, 1917 B Fifth St., Blytheville AFB, Ark. 72317, W5KRO has resigned because of lack of time. The SET was a success. New appointments: W0PHR/5 as SEC; K5WSS as EC of Phillips County. New officers of the ARC of the U. of A. are K5TCK, pres.; K5GXR, vice-pres.; K5KSB, secy.; K5LEH, treas. Net reports for September:

Net	Freq.	Time	Days	Sessions	QTC	QNI	Ave. Rate
OZE	3790	0100Z	Dv	30	136	295	4.5 .144
AFN	3885	1200Z	M-Sat.	25	105	1087	4.2 .144

W0PHR/5 transmits Official Bulletins daily except Sat. on 3790 kc. at 0045Z (1845 CST). Does your county have an Emergency Coordinator? Are you an AREC member? Help make amateur radio worth its stuff—support an emergency communications group. Traffic: W0PHR/5 409, W5DTR 323, K5TYW 121, W5A5VO 108, W5YM 39, W5HPL 27, K5SGG 27, W5A5BIB 24, W5RYM 14, K5UEK 14, W5BBS 7, K5YEP 6, W5FML 5, W5A5CAG 2, W5CUJ 2, W5DYL 2, W5A5AMM 1.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Next June 1 will mark the start of a new term for the SCM. I have held this elected post for five two-year terms. It is about time for someone else to take over the job. Clubs and groups in the Louisiana section should start grooming someone for the job. The Delta Division Convention chairman, K5VDF, died on Oct. 1. John was a gentleman and a fine ham. He will be missed. W5WZR has taken over the duties of chairman. W5KC, long-time ORS and DXer, underwent another operation and at last report he was doing fine. W5CEZ reports plenty of activity when Cindy was headed in his direction. W5-HHA has his RTTY going FB and worked W5TZS for Harry's first RTTY contact. W5TAV is scrounging for Art-13 power supply parts. W5CDI put up a 100-ft tower for his beam. W5EA has his Art-13 on 80, 40 and 20 meters. K5OKR is busy handling traffic on MARS and the ham bands. The Jefferson ARC had a meat-ball and spaghetti dinner at the club house with a movie following. It was a grand success. W5UKF has a new HW-12 transceiver. After reading the report card from K5FYI, I came to the conclusion that Bill has gone sticker-mad. K5DGI is going after his Masters Degree at Michigan State. Traffic: W5CEZ 370, K5QXV 157, K5OKR 81, W5MXQ 36, K5FYI 17, W5TAV 13, W5EA 8, K5TJG 8, W4A-HG/5 7, K5MOJ 3, K5VJT 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—The Mississippi Single Sideband Traffic Net was formed (Continued on page 136)

SSB COMMUNICATIONS

Announcing

TWO NEW FIXED CHANNEL SSB RECEIVERS FOR COMMERCIAL APPLICATIONS

Model RF-501, Single Channel Strip Receiver

FREQUENCY RANGE: 1.6 to 28 Mc with Four plug-in heads

FREQUENCY STABILITY: 3 parts in 10^7 per day

SENSITIVITY: 1uV for 10 db S+N/N

IMAGE REJECTION: 65 db

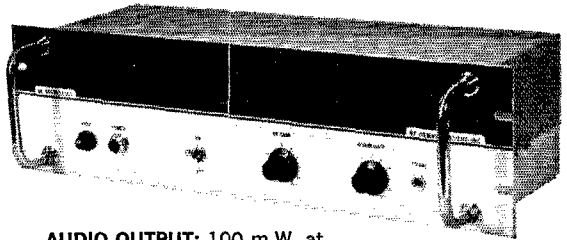
IF REJECTION: 70 db

IF BANDWIDTH: 2.1 KC, Mechanical Filter

AGC: 3 db Audio Variation, 10uV to 100,000uV
Time Constant 0.02 seconds charge
2.0 seconds discharge

AUDIO RESPONSE: 350 to 2450 cycles

ANTENNA IMPEDANCE: 50 ohms unbalanced



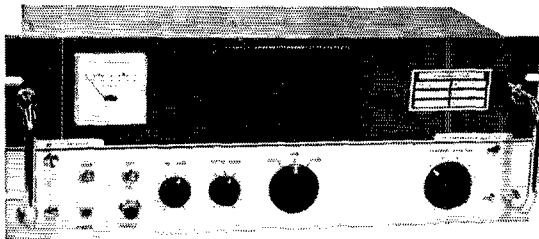
AUDIO OUTPUT: 100 m.W. at
600 ohms balanced, 1 watt at 3.2 ohms

POWER INPUT: 115/230 volts, 50/60 cycles
Approximately 65 watts

SIZE: 5 1/4" H x 17" W x 6" D

WEIGHT: 15 pounds, approximately

Model RF-503, Six Channel SSB Receiver



METERING: "S" Meter

POWER INPUT: 115/230 volts, 50/60 cycles
Approximately 70 watts

SIZE: 7" H x 17" W x 8" D

WEIGHT: 17 pounds, approximately

FREQUENCY RANGE: 1.6 to 25 Mc

MODE: SSB-Selectable upper/lower sideband
and Compatible A.M.

FREQUENCY STABILITY: ± 2 part in 10^6

SENSITIVITY: SSB-1uV for 10 db S+N/N
A.M.-1.5uV for 10 db S+N/N at 30%
Modulation

IF BANDWIDTH: SSB-2.1 KC Mechanical Filter
A.M.-7.0 KC

AGC: Fast/Slow Time Constant

AUDIO RESPONSE: 350 to 2450 cycles

ANTENNA IMPEDANCE: 50 ohms unbalanced

AUDIO OUTPUT: 100 m.w. at 600 ohms bal-
anced 1.5 watts to built-in speaker

SPEAKER: 4 x 6 inch

Write for details on this and other items in the world's most complete
line of fixed channel commercial SSB communications equipment.

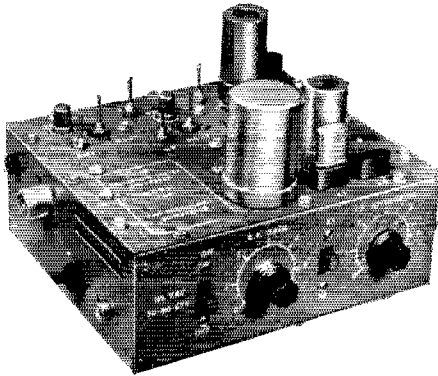


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... is engineered to give **YOU** complete control over **ALL** signals—weak or strong, narrow or broad. This converter is designed to perform as an **integrated part** of your receiver system. **There is no other converter on the market like it today.**

+ ANY I.F. The 6-meter (50-54 Mc.) model accommodates any i.f. range from 6 to 30.5 Mc. The two meter (144-148 Mc.) and 1½ meter (220-225 Mc.) models will drive any i.f. range from 6 to 50 Mc. Provision for 2 crystals per converter.

+ MAXIMUM SENSITIVITY. Lowest practical noise figure (under 3 db for 50 or 144 Mc.) assured by use of premium Nuvistors. Tube complement: 6DS4, 6CW4, 6DJ8/ECC88, 6J6.

+ FLAT BANDPASS. 4 Mc. bandpass, flat, with 3 db under 1 megacycle off low and high ends of each band. Bandpass may be operator-shifted to peak on a desired portion of the applicable band, thereby increasing skirt selectivity in areas with strong signals adjacent to the amateur band covered.

+ EXTENSIVE SHIELDING. All power wiring circuits extensively shielded through L/C and R/C isolation, preventing strong localized R.F. fields from creating interference. Compartmentalized construction.

+ MAXIMUM GAIN. 1 μ V input produces 20 db thermal noise quieting. 1/10 μ V input produces 6 db signal-plus-noise to noise ratio. Wide open circuit gain, 30 db.

+ MAXIMUM STABILITY. High frequency .005% crystals, low order multiplication for freedom from spurious responses, maximum calibration accuracy.

+ MAXIMUM SYSTEM PERFORMANCE. Designed to give the operator complete control over his receiving installation at all times for maximum elimination of cross-modulation, receiver desensitization and spurious responses. If you can't hear it on a Criterion, it can't be heard!

+ BUILT-IN, full wave, power supply solid state rectifiers.

50-54 Mc.; 144-148 Mc.; 220-225 Mc.

\$49.95 ea. SEE IT AT YOUR DEALER, OR WRITE

THE EQUIPMENT CRAFTERS

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in October to handle traffic only. This net meets on 3890 kc. Mon.-Fri. at 1800 CST. We would appreciate check-ins to give complete section coverage to coordinate with the Magnolia Phone Net, Mississippi C.W. Net, RN5 and NTS. W4VEH/5 now is in Denver and W5BWN is maritime mobile with his new boat. K4IQK made a trip to Turkey and K5YTO went to New York. W5UOO is back from the hospital. Congratulations to K5MDX on winning top honors in 80 out of 100 contests and for his e.d. citation for Operation Chlorine. The Biloxi Picnic was attended by W4VEH/5, K5YTO, W5LLB, WA5GPG, K5CIT/5 and W9MFI/5 with XYLS and Jr. ops. Appointments are open. Traffic: W5JDF 150, W5WZ 48, WA5CAC 39, W5EMM 22, K5RUO 14.

TENNESSEE—SCM, David C. Goggio, W4OGG—SEC: W4WBK, RM: W4ZJY, PAMs: W4RMJ, K4WWQ and WA4AIS. All section nets are now operating as ARRL affiliated nets with regular liaison to the National Traffic System. New appointees: K4ICH as Hamilton Co EC.; W4WBY as Cumberland Co EC.; W4TJZ and K4EPS as OBSs; WA4HRG as ORS; WA4GLS as OPS; K4PZT as OES; W4YAU as OO. The East Tenn. Net celebrates its 10th Anniversary. Net reports Sept.:

Net	Freq.	Time	Days	Sessions	QTC	QNI	Average
TPN	3980	0645C	Daily	30	159	1156	38
TN	3835	1900C	M-Sat	25	69	152	6
TSSN	3980	1830C	M-Sat	25	64	338	34
ETPN	3980	0640E	M-Fri	21	40	485	23

It is with great pride and a big thanks to our hard-working Emergency Coordinators that we announce Tennessee was rated the No. 1 section in the nation for AREC reporting during 1962. Nominations for the SCM office should now be made. Submit a petition to ARRL with the signatures of 5 Full Members. All section phone net operators are urged to check into the C.W. Net. Our best wishes for a Joyful Holiday Season. Traffic: W4ZJY 553, W4PQP 230, W4OCG 209, W4MXF 137, W4WBK 49, WA4GLS 44, W4KAT 42, WA4HRG 38, W4PFP 35, WA4IEG 32, W4RMJ 29, K4WWQ 28, W4WTS 25, W4TZJ 21, W4YAU 19, W4OQG 17, W4JVV 15, WA4AWG 14, K4HRV 14, W4VJW 13, WA4BUP 12, K4TYE 12, W4TYV 12, W4HPN 11, W4CVG 10, W44DPJ 10, K4FZJ 10, WA4KOG 10, WA4MBZ 10, WA4AIS 9, WA4AVX 9, W4SZE 9, W4LJL 8, K4CMM 7, K4JXG 7, K4EPS 6, WA4HX 6, K4JIG 6, WA4OHF 6, K4PSH 6, W4RRS 6, W4MFM 5, WA4CRH 4, WA4DU 4, K4MIF 4, K4MW 4, W4CMT 3, W4JVM 3, WA4LAX 3, K4RQP 3, K4DLC 2, K4ENA 2, W4PLW 2, W4GGM 2, K4JMF 2, WA4MBL 2, K4NZN 2, K2WUH 2, WA4IUM 1, W4WBY 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: W4TFK, PAMs: WA5ZB, W4BEJ, WAUSE, RM: W4CDA, Asst. RM: K4NYO, RM (KNN): WA4-APU. The EMKPN reports 21 sessions with 49 QTC and 304 QNI. The KPN reports 21 sessions with 105 QTC. K4VUD is at the U. of K. giving W4JP, the university station, a work-out. W4BCV won the 1962 CQ DX Contest for W4 and was third highest in the nation. Jefferson County held an SET Oct. 26. RACES and AREC cooperated in this venture. W4JUI is taking down beams and painting his place for the winter. The East Ky. Amateur Radio Society held its fall "Eatin' Meetin'" in Protonsburg Oct. 13. W4BEW is feeling better after a bout in the hospital. If any YLs or XYLS are interested in forming a Ky. YL Net, please inform K4QIO. Traffic: (Sept.) W4BYG 341, W4BAZ 202, WA4LCH 95, W4CDA 51, K4HOE 51, W4USE 47, W4BEJ 45, WA4CQG 45, WA4BSC 42, K4TOZ 41, W4EON 38, K4QIO 30, K4YDO 30, K4ZTQ 23, W4AAPU 22, WA4GFN 21, W4BTA 18, WA4NUQ 17, K4NHY 15, WA4RLK 14, K4NLV 14, W4AJQR 8, W4KKG 8, K4LOA 5, W4KJP 4, K4SWL 3, W4JUI 2, K4KWQ 1. (Aug.) W4LEK 18.

MICHIGAN—SCM, Ralph P. Thetens, W8FX—SEC: W8LOX, RMs: W8EGL, K8QLL, W8FWQ, K8KMQ. PAMs: W8CQU, K8LQ, V.H.F. PAM: W8PT. Appointments: W8BST, K8CKX, W8PCZ, W8QGG, K8OMS, W8VXB as ECs; K8BYX and K8QLL as ORS; W8AAM as OPS; K8YRV as OBS; W8CVO and W8HHTL as OESs. We regret to say that W8MY died Sept. 9. "Saggie" was a Charter member and a spark-plug of the Detroit ARA from 1930 to 1941. New officers—Catalpa ARS: K8IIN, pres.; K8DZH, vice-pres.; W8AMZ, sec. serv.; W8MGQ, corr. serv.; W8CPT, treas. Genese CRC: K8JEB, pres.; K8YHR, vice-pres.; K8ROO, vice-pres.; K8IWP, vice-pres.; K8BPQ, sec. K8KMQ, treas. Motor City RC: W8VWY, pres.; K8SGA, vice-pres.; W8MID, sec.; K8OVJ and W8MIRI, treas.; W8SS, trustee. Good OES reports were received from: W8CVO, W8EAM, W8MBH, K8PBA, W8PT and K8IFL. The Council of Amateur Radio Clubs of Southeastern Michigan asks each radio club in this area to send two delegates to the CARC meetings. Queries referred to the SCM. This is necessary if the Detroit Convention next year is to be a success. K8ZKH made General.

(Continued on page 138)

**FIRST
and ONLY!**

remotely tuned ROTATABLE DIPOLE!
 DESIGNED SPECIALLY FOR
 40 AND 75 METERS IN
 LIMITED ANTENNA SPACE

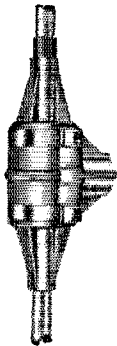
**NEW-TRONICSTM
 CLIFF-DWELLER**



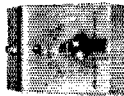
PAT. PEND.

ELECTRICAL FEATURES

- Antenna resonance finger tip controlled from transmitter location in shack.
- VSWR: 1.1 to 1 or less across entire band
- Feed-point variable to compensate for antenna environment
- No traps . . . no baluns . . . no matching devices of any kind
- Feed direct with any length 52 ohm cable
- Power handling capacity — maximum legal limit



Housing for motors and gear trains with mounting yoke



Resonance and band switching control

The CLIFF-DWELLER is another New-Tronics first. Here's a tuneable dipole ideal for hams who live in apartments or in homes on small lots. The CLIFF DWELLER will give you unbelievable performance even in limited space.

MECHANICAL FEATURES

- Approx. lengths
 28'-6" — 26'
 30'-6" — 26'
 31'-4" — 26'
 7.0-7.3 mc
 3.5-4.0 mc
 Two-Bander
- Self supporting, accepts 1 1/4" threaded pipe for mounting in standard rotators
- Maximum turning radius approx. 15'-8"
- Sturdy aluminum die cast housing for motors and gear trains which drive end sections of dipole
- Heat treated aircraft type, 1 1/4" heavy wall aluminum tubing
- Completely waterproofed resonators and housings

MODEL NO.	FREQ. MC	WEIGHT	NET PRICE
CD 40	7.0-7.3	Under 20 lbs.	\$ 92.50
CD 75	3.5-4.0	Under 20 lbs.	99.50
CD 40-75	Two Bander	Under 20 lbs.	129.50

See the CLIFF-DWELLER and other fine NEW-TRONICS products at your distributor or write us for descriptive literature, Dept. Q.

NEW-TRONICS CORPORATION

3455 VEGA AVENUE • CLEVELAND 13, OHIO

Tri-Ex HERE IS THE TOWER WE PROMISED YOU— YOUR BEST BUY IN A FREE STANDING TOWER

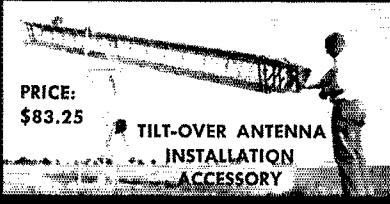
Here at last is a low cost free standing tower with all the quality of design and construction that the biggest most expensive TRI-EX TOWERS are famous for. This crank-up tower is free standing — no guying is required — even in hurricane winds with extremely large antenna loads topside! Write today for complete data on these and other TRI-EX towers. There is a TRI-EX tower to fit YOUR antenna requirements.

MODEL HM-354 3 SECTIONS (ILLUSTRATED)	PRICE (STANDARD FINISH)
Tower complete with steel base assembly for concrete (nothing else to buy) Tower equipped for tilt-over feature complete with steel base assembly for concrete (nothing else to buy)	\$425.75
	\$509.00

Extended height 54'; Collapsed height 20'-1".
Hot dip galvanized after fabrication also available at slightly increased price.

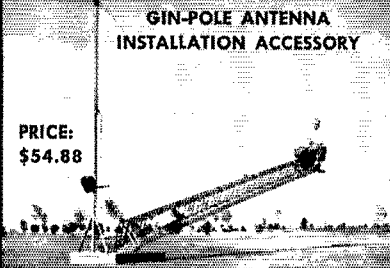
NOTE THESE WIND LOAD CAPABILITIES:
(Based on a six foot mast above the tower, with the center of the antenna at the top of the mast: i.e. 60 feet above ground.)

UNIFORM BUILDING CODE WIND PRESSURE	ANTENNA projected area
20 lbs./sq. feet	10 sq. feet
30 lbs./sq. feet	5 sq. feet
L.A. City Code (Strong Winds and Earthquakes)	10 sq. feet



PRICE:
\$83.25

**TILT-OVER ANTENNA
INSTALLATION
ACCESSORY**



PRICE:
\$54.88

**GIN-POLE ANTENNA
INSTALLATION ACCESSORY**



W8EGF/DYL has had the second successful cataract eye operation. Make plans now for next spring to attend the Fourth Annual Old Timers Night and the Morse Telegraph Club at Henry Ford Museum and the Great Lakes Amateur Radio Convention. Watch *QST* for dates. The Michigan Chapter of the QCWA still hold meetings on 3900 kc. each Sun. morning at 8, with W8-CAM as NCS. In his July report your SCM reported the passing of W8JX, but through a typographical error this was shown as W8JK. Our sincere apologies. Traffic: (Sept.) K8GOU 474, W8QFO 305, W8DNZ 224, K8NJW 211, K8KMQ 178, W8BDZP 173, K8BYX 161, W8ELW 146, K8ADD 111, W8BEZ 102, K8TIG 101, K8-YZP 101, K8LQA 86, K8YAY 75, W8RTN 51, W8FX 45, W8PBO 42, W8FWQ 38, K8QLL 34, W8EU 31, K8LNE 28, W8AUD 20, W8ZLK 20, VE3CYG/W8 15, W8TBP 13, W8UFS 13, K8TFE 12, W8HKT 10, WA8SK 9, K3-DCB/8 8, K8VDA 7, W8AHV 6, W8EGI 6, WA8ASV 3, K8JED 3, K8OMS 3, W8DSE 2, W8NCGN 2, WA8ENO 1, K8GJD 1. (Aug.) W8IBB 98, K8LQA 36.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM; J. C. Erickson, W8DAE, SEC; W8HNP, RMs; W8DAB and W8BZX, PAMs; W8VZ, K8BAP and K8UBK. The Professional Football Hall of Fame was dedicated in Canton and the Canton ARC is sponsoring a very nice certificate. It can be had free by working eleven members of the club, any band or mode, DX stations need only five. Log data; date, band, mode and call letters of station worked in a legible manner, numbering contacts. This list shall be certified by two other amateurs or a club officer and sent to Mrs. Shirley Rex, K8MZT, 2225 Mt. Vernon Blvd., N.W., Canton, Ohio 44709. The Canton ARC elected W8QVY, pres.; W8OJW, vice-pres.; K8RMY, secy.-treas.; W8NAL and K8OBW, directors. Findlay held another large hamfest with about 2000 attending; 1100 registered and about 650 were licensed amateurs. In the women's section 270 attended, 87 were licensed amateurs and 45 of these were Buckeye. Belles. Prizes were won as follows: An NCX-3, by C. W. Howman, an AF-68 by Bill Shock and a Sony TV by K8-BAT. K8BXT sends this news: W8PKC and K8QDQ vacationed in Canada, K8AZY received an electrical engineering degree from General Motors Institute and W8-LCA, K8CXX, K8ERV are active on 2-meter RTTY. The Six Meter Nomads *The Amateur Extra* tells us that K8VIL has gone to college and the club provided communications for the Broadview Heights Labor Day Parade with W8JBS, W8URV, K8CDT, K8VIL, K8VGF, W8AGEO and W8GFV taking part. K8SRA and K8-SOU have a new baby boy and K8CDA visited his brother in Argentina. K8ZWE, W8EFL and W8ELR received their General Class licenses. K8RXD received QRP-50, HTH-50, W-Del and WASP awards. Dayton ARA's *R-F Carrier* says the club has started its code and theory classes. South East ARC's *Ham-Fax* says the club held a clam bake. Queen City Emergency Net's *The Listening Post* tells us the members held their annual picnic. Parma RC's *P.R.C. Bulletin* tells us code and theory classes have been started with W8CZM, W8ACV and K8IU as instructors. Bob Brooks showed a film of the Sylvania modern receiving tube plant and K8DHT moved to Detroit. Massillon ARC's *MARC Newsheet* informs us that K8QHJ completed his HBR-16 receiver and K8EKG left for a six-month tour in the Army. W8AJZ received the CHC award. Toledo's *Ham Shark Gossip* names W8HYE as its Ham of the Month. Appointments made in September were K8BAX, K8-PFD and W8ILC as ECs; K8YML as ORS; K8YWF as OFS. W8DAE, W8FY/8 and W8UPH made the BPL in September. This is a very small column this month because there was very little or no news in the bulletins received from the clubs. Traffic: (Sept.) W8UPH 598, W8DAE 537, K8LGA 291, K8DIU 288, W8FY/8 243, W8-BZX 154, W8MGA 106, K8UBK 98, W8CXC 92, W8-CXY 92, W8BXN 62, K8LGB 59, K8SQK 56, W8CKY 52, K8ONQ 52, K8BNL 50, K8RXD 49, K8PBE 40, K8-BAP 32, W8AJD 31, W8CXM 30, W8DGH 20, K8AAG 16, W8DQD 15, W8ETO 13, W8ARZ 12, K8DDG 12, W8EEW 11, K8HDO 11, W8AJZ 10, W8DTH 10, W8-ADR 9, W8PZS 8, K8RFU 6, K8YML 4. (Aug.) K8BXT 1. (July) W8BXN 13.

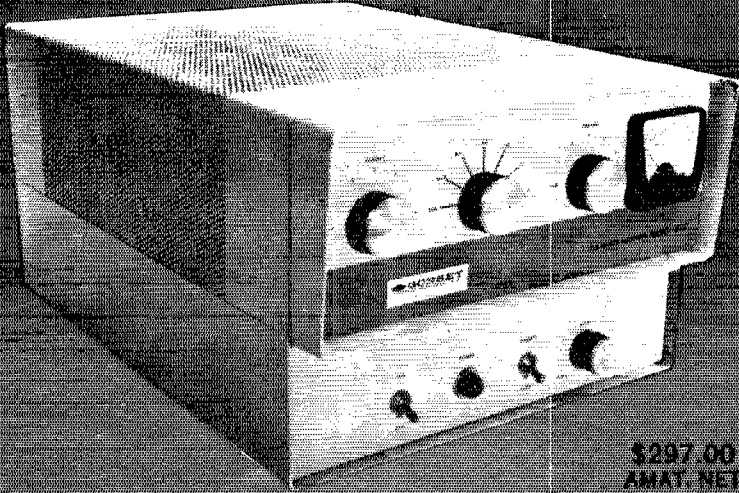
HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC; W2KGC, RMs; W2PHX and K2QJL, PAM; W2JG. Section nets: NYS on 3870 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; FSS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0130 GMT. Appointments: W2FYE and W2FXB as OFSS, Endorsements: W2HZZ and K2HNW as ECs; W2HZZ and W2EKE OHSS; K2HNW and W2MID as OPSs; W2WGE as OFS. New officers of the Niskayuna H.S. Club, W2-AFV, include W2ULM, pres.; W2JER, vice-pres.; W2PZX, secy.; W2FRM, treas. Around the club cir-

(Continued on page 140)

GSB-201 RF LINEAR AMPLIFIER

GONSET'S LITTLE POWERHOUSE!



\$297.00
AMAT. NET

Powerful with 1500 watts PEP,* GSB-201 is an outstanding example of the modern trend toward high power in a small package. And this little powerhouse is really small...only a foot across the front...fits neatly on your desk or table top...integrates smoothly with your existing equipment. Fine looking, functional, with every operating convenience. Finished in attractive blending light colors.

Powerful in all transmission modes: 1500 watts PEP for SSB... 1000 watts input for CW... 400 watts input AM. Can be driven by exciters in the 65-150 watt category, GSB-100 and similar equipment. Stable, efficient grounded-grid circuitry. Substantial portion of drive power appears as useful amplifier output.

Versatile. Full bandswitching with pi network output for five bands, 80, 40, 20, 15 and 10 meters. Full vision panel instrument reads plate current or relative RF output...simplifies loading, monitors output. Panel switch allows tuneup at low power.

Economical. Four, low-replacement-cost 811A's are used in output. Long life silicon diodes in HV power supply eliminate less modern vacuum-tube-type rectifiers. Antenna changeover relay and bias supply are built-in.

TVI-Proofing. All control leads from amplifier are shielded and filtered.

SPECIFICATIONS:

Coverage: 80, 40, 20, 15, 10 meter bands,

Power input: 1500 watts PEP, SSB.
1000 watts input, CW.
400 watts input, AM.

Power consumption: Approx. 2000 watts peak.

Driving requirements: 65 to 150 watts depending upon input.

Input impedance: 50 ohms nominal.

Output impedance: 50 ohms nominal with SWR less than 3:1.

Output circuit: Pi network. Antenna relay built-in.

Tubes: 4-811A's. (Silicon diodes used in bridge circuit for high voltage supply.)

Dimensions: 8½" high, 12½" wide, 17" deep.

Model number: #3340.

*Twice average DC.



GONSET, INC.
1510 18th Street
San Francisco, California 94134



●●●●● BARRY ELECTRONICS ●●●●●

- **In stock:** Antenna Specialists ZEUS MODEL ASP-1000, ●
- 1 KW Gas Generator. Puts out 115 VAC @ 60 CPS, ●
- 1 Phase, 63 lbs. \$148.13. ZEUS MODEL ASP-1250 ●
- (1250 Watts) 115 VAC @ 60 CPS, 1 Phase \$190.88; ●
- ZEUS MODEL ASP-3000 (3 KW) 180 lbs. Puts out ●
- 115 or 230 VAC @ 60 CPS, 1 Phase \$431.25. ●
- **PLEXIGLASS SHEET:** 1/4" sheet. Good for high voltage ●
- insulation for power supplies or for panels to show ●
- equipment. Good, clean condition. (1) 38" l x 25 1/4" ●
- W x 3/4" thick. \$4.95. (2) 25 1/4" l x 18 3/4" W x 3/4" thick. ●
- \$2.95. ●
- **MASTER MOBILE ADJUSTABLE LOADING** ●
- **COIL:** 16" overall size. \$6.95. ●
- **COAXIAL CABLE:** RG8/U @ \$8.50 per hundred ●
- feet; RG8A/U @ \$8.50 per C' (52 Ohms). ●
- **COAXIAL CONNECTORS:** (Limited qty): UHF ●
- Type: So-239 (83-1R) Chassis type female coaxial ●
- connector for RG8/U, RG11/U, etc. Flange is 1" ●
- square with 4 holes for #8 screws to mount in 3/8" hole ●
- 25¢ ea. R/E ●
- **BNC TYPES:** UG-260B/U — Male type cable con- ●
- nector for RG-59/U coaxial cable, etc. 40¢ ea. ●
- UG-274/U T-conector @ \$1.25 ea. R/E ●
- UG-290/U Flange type female coaxial connector. ●
- @ 30¢ ea.; R/E ●
- UG-306/U Right angle adaptor. One male and one ●
- female. @ 75¢ ea. R/E ●
- UG-492B/U Chassis type Dual Female Coupling. ●
- Mounts in 1/8" round hole. @ 90¢ ea. ●
- **AMECO ALL BAND PREAMPLIFIER.** Factory ●
- Wired. Model PCL. Covers all frequencies from 1.8 to ●
- 54 Mcs. Uses 2 Nuvistors in cascade. Gain exceeds 20 ●
- db. With sheet for installation in all HAM Receivers, ●
- Transceivers, or SW recvr's. \$24.95. ●
- **GLEGG ZEUS VHF XMTR with matching Inter-** ●
- **ceptor VHF Recvr.** Write or Call ●
- 2 MFD 7500 W.V.D.C. OIL CAPACITOR. \$13.50. ●
- **Mounting Brackets for above \$1.00 per pair.** ●
- 10 MFD @ 1500 VDC G.E. OIL CAPACITOR: \$2.50. ●
- **IBM IMPULSE SWITCH:** 10 position ratchet and ●
- two cams. Pulsed by a 40 V.D.C. Solenoid. Compact. ●
- 3 ozs. 90¢. ●
- **FASCO BLOWER:** 115 V. 60 CPS, 1 Phase with 3" ●
- x 3" throat. \$9.75. R/E ●
- **FASCO 220 VAC/60 CPS, 1 Phase Squirrel Cage** ●
- **Blower.** \$9.95. R/E ●
- **FASCO 220 VAC @ 60 CPS 1 Phase Squirrel Cage** ●
- **Blower.** \$9.75. R/E ●
- **FASCO 220 VAC @ 60 CPS 3 Phase Squirrel Cage** ●
- **Blower.** \$12.95. R/E ●
- Following Items in Factory Sealed cartons will be ●
- shipped prepaid continental USA if money order or ●
- certified check accompanies order: HO-180ACRECVR ●
- \$449.00; HO-110AC RECVR @ \$259.00; HO-170AC ●
- RECVR \$379.00; HX-50 SSB XMTR with ZBZ factory ●
- installed \$483.90; NATIONAL NC-400 general ●
- coverage SSB Recvr \$895.00; National NCX-3 Tri- ●
- Band SSB Transceiver \$369.00; NCX-A AG PWR ●
- SUPPLY for NCX-3 \$110.00; NCX-D12 V.D.C. ●
- PWR SUPPLY for NCX-3 \$119.95. ●
- **SILICON RECTIFIER:** Epoxy type. Tested @ 600 ●
- PIV/750 Ma. 36¢ ea. ●
- .001 MFD DISC CERAMIC CAPACITORS: Used as ●
- Surge Limit Capacitors in Silicon Circuits. 10¢ ●
- GONSET G-43 All-Band Recvr. \$89.50; GONSET ●
- G-66 Mobile Recvr \$115.00; COLLINS KWM-1 with ●
- COLLINS 516F-1 AC Pwr Supply. Both for \$425.00 ●
- (excl. cond.). COLLINS 75S-3A Recvr. \$650.00 (like ●
- new). ●
- **DRAKE TR-3 TRANSCEIVER — \$550.00 — AC P.S.** ●
- — \$79.95; DC P.S. \$129.95. ●

COME IN AND BROWSE. MONDAY TO FRIDAY —
Thousands of items that we cannot list in an ad. MON.
TO FRI. 9 to 6. SATURDAYS 10 to 2 P.M. (Free parking
on Street Sat.) Mon. to Fri. parking lot 501 Broadway.
WE BUY AND SELL AND SWAP AS WELL...
LET'S HEAR FROM YOU!

BARRY ELECTRONICS DEPT. Q-12
512 BROADWAY, NEW YORK 12, N. Y.
WALKER 5-7000 (AREA CODE 212)

Enclosed is money order or check and my order. Prices
P.O.K. N.Y.C. Shipments over 20 lbs. will be shipped collect for
shipping charges. Less than 20 lbs. include sufficient postage.
Any overage will be refunded. Fragile tubes shipped via Rail-
way Express.

Send copy of #12 "Green Sheet" Catalog.
 Send information.
 I have available for trade-in the following.....

.....

Name..... Title.....
Company.....
Address.....
City..... State.....

as OBS; WB2ALF as ORS, WB2ALF as OPS, WB2IIB
as OBS, WA2LEQ as OBS. Attention Novices: A traffic
training net for Novices is run by WA2SRK Tue. and
Thurs. on 3725 kc. at 7:20 p.m. local time. WA2ZQH. OPS.
has a new H1Q180A. OKSs WB2ALF, WA2UDT, K2OEI
and K2KDJ report much action in the September V.H.F.
QSO Party. K2OKA has changed his Mon. OBS schedule
from 8 to 11 p.m. on 50.4 Mc. EC K2OEI reports a
good turnout at his organizational meeting of the
AREC. The result was the formation of a much-needed
club in the Keypart area. WA2VYN reports 5 stations
on 220 Mc. in northern Monmouth County. K2IBC con-
tinues code practice 6 p.m. local time week days on 3675
kc. Other clubs, please report your code practice trans-
missions to the SCM. The Simulated Emergency Test
was a success from the standpoint of the National
Traffic System, but SEC K2ZFI reports the percentage
of ECs who took part in the section nets was not good.
However, we thank those who participated and hope the
remainder will come around in the future. Some report
a great deal of confusion, but think of what would hap-
pen in a real emergency! We need constant practice so
that operating procedure and message format will be
second nature when we are called upon to operate under
the strain of an actual emergency. Traffic: (Sept.)
K2VNL 462, WB2ALF 269, K2UCY 210, WA2SRK 182,
WA2CCF 137, K2ZFI 105, W2QNL 104, KSBS 100, WA2-
WAJ 89, WA2UCG 80, WB2HBC 78, WA2GQZ 74, WA2-
KVQ 62, WA2MYB 53, WB2DEF 52, W2CVW 36, W2-
BVF 34, WA2AKM 22, W2SJB 19, WB2FT 18, W2OXL
16, W2TFM 16, WA2ZTK 16, K2SLG 15, W2PEV 14,
WA2GQI 13, W2FAX 11, K2OEI 11, W2LQP 10, W2ABL
9, K2AGJ 8, WA2ABY 8, W2CFB 8, K2UKQ 7, K2EQP
6, K2MPX 5, WA2QXP 5, W2DRV 3, W2MZR 3, WA2-
ZQH 3, K2VVL 2, W2EWZ 1, W2NTY 1, (Aug.) W2CFB
9, K2VVL 2, (July) K2VVL 1.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, W0NTB—SEC: K0-
EXN. PAMs: W0LSF, K0BBL. New appointee: W0-
LGG as ORS. Our section mourns the death of Clarence
Anderson, W0TTC, who passed away at his operating
position Sept. 9. The section sends its sympathy to his
family. I need a half dozen good e.w. men for our
Tallcorn Net. Please get in touch with me. Ten w.p.m.
will do if you are interested. Again I ask your solid
support for ARRL. It can help you more if you sup-
port it well. The League needs you now. Do not be
misled by rabble rousers, by purveyors of half truths
and downright lies; it is possible they may be working
for people who would like to have our amateur fre-
quencies. Passing an Advanced Class license test is a
mighty small price to pay for continued use of voice
frequencies. However, I spent thirty years on e.w. and
want to say that lots of fun can be had with the
"woodpecker talk." That moment of truth is nearly
four years away on 75 meters and much can be done in
that time. Nets for Sept.: 160 Meter, QNI 644, QTC 23,
sessions 30; 75-Meter, QNI 812, QTC 197, sessions 26;
Jasper Co. QNI 162, QTC 4, sessions 10; Hamilton
County, QNI 120, QTC 3, sessions 29. Traffic: (Sept.)
W0LGG 1780, W0SCA 1054, W0NTB 156, K0QKD 133,
W0DUA 132, W0JSL 76, K0BRE 30, W0REM 21,
K0BBL 15, W0JPJ 13, K0KAQ 13, W0BXT 12, W0-
YDV 10, W0GQ 8, K0JMA 7, K0TDO 7, K0AFI 5,
W0FMZ 3, W0QVZ 3. (Aug.) W0DUA 57, (July) W0-
DUA 84.

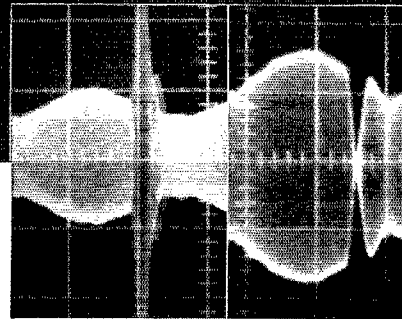
KANSAS—SCM, C. Leland Cheney, W0ALA—SEC:
K0BXP. PAMs: K0EFL, W0BOR, RMs: W0QGG,
W0PFG, V.H.F. PAMs: W0HAJ, K0VHP. September
net reports:

Net	Freq.	Time	Days	Sessions	QTC	QNI	Ave.
KPN	3920	1245Z	M-W-F	18	169	316	17.5
KPN	3920	1400Z	Sun				
QKS	3610	0630Z	T-T-S-Su				

NCSS: W0ORB, K0QKS, K0EFL, K0YTA.

In looking back over the past year it becomes readily
apparent that we should all take stock and evaluate our
activities from an amateur radio standpoint. Have we
done all we could or have we left the job for Joe to do?
Without the support of all amateurs in the section our
job is far from completed. Much is left to be desired,
both from the point of section activity and in net activ-
ity. With a new year just around the corner let us all
make a resolution to give more of ourselves to the ser-
vice of our section and build it to its proper status. Let's
work together as well as play together. I want to ex-
press the gratitude of your SCM to those who have
so willingly given of their time during the past year.
Your cooperation has been sincerely appreciated. We
have made progress. Let's make this next year resound
with bigger and better programs. Your SCM wishes each
and every one of you a very Merry Christmas and a

(Continued on page 144)



Impulse Noise In — Readable Signals Out...

The SS-1S Pre-IF Noise Silencer¹ makes possible *solid copy* of barely detectable signals (S2 or less) in the presence of overwhelming (S9 or greater) impulse noise caused by ignition, neon signs, switches, power leaks and similar high peak, short duration disturbances. The truly spectacular performance of this accessory results in part from the exceptional overload and cross modulation characteristics of the unique SS-1R Receiver design² as well as from two most important design concepts: a) broad band noise detection (*full receiver front end bandwidth*), and b) gating the receiver (quietly and rapidly with low insertion loss) *before the noise pulse has been lengthened by receiver selectivity*. The oscillograms at right show the net effect of this silencing.

The SS-1R offers other extremely attractive performance characteristics: frequency precision and stability exceeding that of most frequency meters; digital frequency display requiring no mental arithmetic; autocalibration of all amateur bands with WWV; easy and exact sideband tuning (10 kc. per revolution with manual control) plus push button motor tuning fast traverse — to mention just a few. SS-1R is *The New Standard of Performance*. Now available at your favorite dealer.

¹"A Pre-IF Noise Silencer", W. K. Squires, W2PUL, QST, Oct. 1963. ²"A New Approach to Front End Design", *ibid.*, Sept. 1963

SPECIFICATION PROFILE

- **Frequency Coverage:** 80 through 10 M (eight 500 kc. segments). Fixed tuned WWV at 10.0 and 15.0 MC; 5.0-5.5 MC auxiliary (WWV 5.0 MC). Two general coverage 500 kc segments
- **Selectivity:** 5 kc./2.5 kc./0.35 kc.
- **Stability:** Less than 500 cps warmup drift (typically in less than 5 min.); less than 100 cps thereafter including low to high line variation
- **Sensitivity:** 1/2 μ v, or better, for 10 db S/N on 10 M with 5 kc. bandwidth
- **I.F. and Image Rejection:** Greater than 60 db
- **Cross Modulation:** Example: Receiving a 10 μ v signal with 2.5 kc. selectivity, an unwanted 0.1 volt signal 20 kc. away produces negligible cross modulation
- **Internal Spurious:** None at stated sensitivity
- **AGC:** Attack — 1 ms., Slow release — 1.0 sec., Fast release — 0.1 sec. Audio rise less than 2 db from 5 μ v to 0.3 volt
- **ANL:** I.F. type; operates on AM, SSB, and CW
- **Size:** 7 3/4" H x 16 1/4" W x 13" D, 25 lb.

For other Squires-Sanders products, see Clegg Laboratories advertisement, page 131

Squires Sanders, Inc.

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VERY HIGH PERFORMANCE COMMUNICATION ANTENNAS

BEAMS High Forward Gain



Rugged, Lightweight, and real performers. Booms 1" aluminum tubing, elements $\frac{1}{8}$ " aluminum rod pre-assembled on booms. Reddi Match for direct 52 ohm feed. Add on stacking kits available for dual and quad arrays.

Model A144-11—11 element, 2 meter, boom 12'	\$12.75
Model A144-7—7 element, 2 meter, boom 8'	8.85
Model A220-11—11 element, 1 1/2 meter, boom 8 5/8'	9.95
Model A430-11—11 element, 3/4 meter, boom 3'	7.75

6 METER BEAMS: Full size, wide spaced, booms 1 1/4" and 1 1/2" diameter, elements 3/4" diameter aluminum tubing. Reddi Match for direct 52 ohm feed 1:1 SWR.

Model A50-3—5 element, 6 meter, boom 6'	\$13.95
Model A50-5—5 element, 6 meter, boom 12'	19.50
Model A50-6—6 element, 6 meter, boom 20'	32.50
Model A50-10—10 element, 6 meter, boom 24'	49.50

COLINEARS Broad Band Coverage

Ideal all around VHF antennas featuring lightweight, mechanical balance, high power gain, major front lobe, low SWR, low angle of radiation, and large capture area.



Model CL-116—2 meter, 16 element colinear	\$16.00
Model CL-216—1 1/2 meter, 16 element colinear	12.85
Model CL-416—3/4 meter, 16 element colinear	9.85
Model CL-MS—Universal matching stub matches 300 ohm 16 element antennas to 200, 52, or 72 ohm feed lines	4.75

Add on stacking kits available for 32, 64, and 128 element arrays.

TWIST Another CushCraft! For Tracking Oscar III



For satellite tracking, back scatter, or point to point communications. The Twist provides either vertical or horizontal and left or right circular polarization. Ideal as a combination point to point or base to vertical mobile antenna. Reddi Match driven elements for direct 52 ohm feed. Cut to frequency within 130 to 150 Mc. range.

Model No. A144-20T Single 20 element TWIST	\$24.95
--	---------

Dual and Quad arrays available.

BIG WHEELS & HALOS 360° Coverage



The amazing Big Wheel is a horizontally polarized, broad-band, omnidirectional gain antenna. It provides direct 52 ohm coaxial feed.



Model No. ABW-144 Single 2 meter Big Wheel	\$10.95
Model No. WBW-220 Single 1 1/2 meter Big Wheel	9.95
Model No. ABW-430 Single 3/4 meter Big Wheel	8.95
7 Bay stacking Kits available	3.95
4 Bay stacking Kits available	11.75

MOBILE HALOS: Aluminum construction; machined hardware; Reddi Match for 52 or 72 ohm direct feed. 2 meter. Dual halo two bands one 52 ohm feed line.

Model AM-2M—2 meter, with mast	\$8.70
Model AM-22—2 meter, stacked Complete	14.95
Model AM-6M—6 meter, with mast	12.50
Model AM-26—6 and 2 dual halo, with mast	17.45

NEW ZIPPER PORTABLE BEAMS 6 & 2 Meters

with wing nut construction for sturdy swing out portability, and ZIP assembly.

Combination ZIPPER with 5 elements on 2 meters, 3 elements on 6 meters Model No. A26-ZP	\$15.95
6 Meter 3 element ZIPPER Model No. A50-ZP	\$10.95

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MANCHESTER N. H.

uit in September: Albany featured W2FEN on "The Use of Transmitters"; Westchester heard WA2LDP's talk on "SSB Transceivers for LP"; New Rochelle featured Russ Gerstein speaking on "Transceivers and their Shortcomings"; Schenectady hosted Mike Ercolino of Telrex, who discussed "Beamed Power." College professor and EC K2LNUW spent the summer as a consultant in Los Angeles. W2BXC is the proud possessor of a new tower and rotator. K2PEF and W2AZII have been appointed zone chiefs for RACES in Schenectady. WA2DTF is chairman for the Christmas Party for the Albany Club. Nearly half of the New York State qualified amateurs have obtained call-letter plates, according to K2SJO. The New Rochelle Club's Beef Dinner will be held Dec. 28. Traffic: WA2UZK 588, WA2VYS 300, WB2FZC 87, K2SJK 58, W2PKY 50, W2THE 38, K2MPK 33, W2EFU 28, WB2HYB 22, W2URP 19, WA2YHA 14, K2DEM 3.

NEW YORK CITY AND LONG ISLAND—Acting SCM, John S. Brandau, K2OVN—RM: W2WFL, V.H.F. PAM: W2EW. Section nets: NLL 3630 kc. at 1500Z nightly; NYCLIPN, 3908 kc. at 2230Z nightly; V.H.F. Net, Tue.-Wed.-Thurs. on 145.8 Mc. at 0100Z and Fri. through Mon. on 146.25 Mc. at 0000Z; Mike Farard on 7238 kc. at 1700Z; All Service Net at 1900Z on 3925 kc.; Q5 Net on 3935 kc. at 2100Z daily. The Hudson Amateur Radio Council will present the 1964 National ARRL Convention in August and will operate an amateur radio station at the 1964 World's Fair. Your help is needed in buying tickets early and to serve on the many committees. See your HARC representative at the next club meeting. All of us should keep in mind that amateur radio is not a right but a privilege and it is up to us to do some public-service operating to earn this privilege. A good method is to sign up, and be active, with AREC ARPSC, C.D.-RACES or a traffic net. W2EW reports a need for low-frequency operators with 2-meter gear to help with long-haul traffic on the 2-meter V.H.F. Net. A few operators are doing a great job and can use help. BPL certificates for excellent traffic-handling during the month of September went to WA2TQT, WA2GPT, WA2MTA, WA2VLK, WA2WGN, W2EW and K2SPG. The New York Radio Club reports its meeting will be held at the George Washington Hotel, 23rd St. and Lexington Ave., Manhattan. WA2MMW is Acting EC for Manhattan and is looking for operators and suggestions. W2IAG and W2LKG have completed handy-talkies for local Queens AREC work. 420-Mc. transceivers from the 1963 Handbook have been constructed by WB2s JFK and EFJ and they hope to start a 420-Mc. AREC Net. WA2RAQ was appointed Asst. EC. of the Kings County AREC 6 Meter Net. New officers of the Stuyvesant HSRC are WB2EUV, pres.; WA2OXY, vice-pres.; WN2GPT, secy. New officers of the Amateur Radio Society of City College are WA2-QFB, pres.; WB2CBU, vice-pres. Club station W2HJ is on 80-15 meters s.s.b. c.w. WA2GPT is 1964 chairman for the 2nd District YLRL and would appreciate news and tid-bits from the girls. K2SPG acquired a new TX 50-75 SSB. WA2WGN is conducting experiments on 1296 Mc. under water. W2PF is on 75 meters with a 3061 amplifier. WA2PMW received a Worked All Delaware Counties Award. Our part in the SET was a success. AREC units handled local traffic and NTS handled long-haul traffic with dispatch and ease. Congrats and thanks to all. WB2AXW/2 has moved all his gear to Philadelphia and has closed down his New York station. He will be looking for skeds from New York to Philadelphia. Write to him for a week-end sked. Happy Holiday and Greetings to you and your families. Traffic: (Sept.) WA2-TQT 1126, WA2GPT 724, W2MTA 521, WA2VLK 515, WA2WGN 349, W2EW 328, K2SPG 225, WA2LJS 119, WA2EXP 108, WA2UQ 103, K2KYS 84, W2GKS 54, K2-THY 39, WA2ZXR 23, WA2VZN 22, WB2GKX 17, W2-DBQ 16, W2EC 15, WA2UYQ 15, W2IAG 11, WA2TYT 11, WA2PMW 10, WA2YNH 6, W2OBU 4, W2PF 4, K2YQK 3, WB2AOU 2, WA2EFN 2, WA2KSD 2, WA2VKK 2, WA2RAQ 1. (Aug.) WA2GPT 375, WA2WGN 193, WA2-UYQ 183, WA2FZD 130, WA2IZV 6.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—NNJ Amateur Radio Public Service Corps Nets—Sept.:

Name	Freq.	Time	Days	QNI-QTC	Managers
NJN	3695 kc.	2400Z	Dy	497-436	W2QNL-RM
NJ Phone	2900 kc.	2300Z	Ex. Sun.	563-186	K2SLG-PAM
NJ6-2	51.15 Mc.	0400Z	Sun.		
NJ Phone	3900 kc.	1400ZT	Th, SN	137-145	K2VNL-PAM
NJ6-2	146.70 Mc.	0300Z	W, Sn		
NJNN	3725 kc.	0020Z	W, F		Novice WA2SRK-RM

AREC local net skeds are available from K2ZFI, SEC. Congratulations to WA2RIN and WB2BUP on the receipt of their General Class licenses. New appointees: WA2SRK as RM; K2OEI as EC; W2DME and W2NZC (Continued on page 148)

HOW TO CONVERT SURPLUS RADIO GEAR INTO AMATEUR AND C.B. EQUIPMENT

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VOLUME II—BC-454 or ARC-5 Rcvrs.; AN/APS-13 Xmtr./Rcvr.; BC-457 or ARC-5 Xmtrs.; ARC-5 V.H.F. Xmtr./Rcvr.; GO-9/TBW Xmtrs.; BC-357 Marker Rcvr.; BC-946B Rcvr. as Tuner; BC-375 Xmtr.; Model LM Freq. Meter; TA-12B Bendix Xmtr.; AN/ART-13 (Collins) Xmtr.; Simplified Coil-Winding Charts; Selenium-Rectifier Power Units; AVI-112A Light Aircraft Xmtr.; AN-26/AIC to a Hi-Fi Ampl.; Surplus Beam Rotating Mechs.; ARB Rcvr. Diagram Only. Book #322

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THE SURPLUS HANDBOOK (Receivers and Transceivers)—\$3.00* ea. (foreign \$3.50)

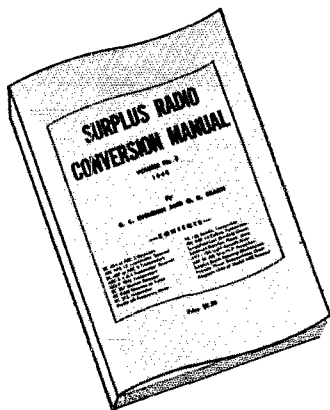
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Less than 9 oz.

**4 VERSATILE MODELS, UHF, N, BNC
AC or DC OPERATION TNC and C
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COIL RATINGS: 6, 12, 24, 28, 32, 48, 110 and 220 V DC @ 2 watts. 6, 12, 24, 110 and 220 V AC @ 6 VA, 50-60 cps. Special coil voltages available on request. Coil terminals are solder connections feed-through insulators.

r.f. RATINGS: 1 kw power rating to 500mc. 20 watt power rating to 500 mc in DK60-G and DK60-G2C in de-energized position. The DK60-G and DK60-G2C have a special isolation connector in the de-energized position to reduce crosstalk to a minimum.

AUXILIARY CONTACTS: Form 2C (DPDT) on DK60-2C and DK60-G2C. Bifurcated contacts rated at 5 amperes at 110 V AC non-inductive.

VSWR: Less than 1.15:1 from 0 to 500 mc (50 ohm load). 72 ohm relays available.

ISOLATION: Greater than 60 db @ 10 mc in DK60 and DK60-2C Greater than 100 db from 0 to 500 mc in DK60-G and DK60-G2C when in the energized position.

OPERATING TIME: Less than 30 milliseconds from application of coil voltage; less than 15 milliseconds between contacts.

Standard Relays with	DK60	\$12.45
UHF Connectors include:	DK60-G	\$13.70
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NEW DK2-60B TRANSFER SWITCH

Designed to meet switching needs when using transceiver as exciter to drive any linear amplifier.

Performs necessary switching to either transmit directly with transceiver or to transmit with transceiver amplifier combination.

Distributors
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SPECIFICATIONS: Freq. range 0 to 500 mc. to 1 kw; VSWR 1.15:1; Isolation 30 db at 500 mc, 50 db at 30 mc; Insertion loss 0.03 db at 30 mc; Available in all std. AC and DC voltages. Connectors: UHF std., type N, BNC, TNC and C available.

DK2-60B with UHF Connectors....\$19.00

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Thief River Falls, Minnesota

most joyous New Year. Traffic: KÖYTA 266, WÖCET 190, KÖJMF 150, KÖGII 100, KÖJID 24, KÖEFL 21, WÖALA 18, WÖBWI 10, WÖTSR 9, WÖBRK 4.

MISSOURI—SCM, Alfred E. Schwanke, WÖTPK—SEC: WÖBUL, RAs: KÖONK, WÖUD, PAs: WÖBUL, WÖBVL, WÖMM, KÖONK, WÖGOR is the new EC for the six counties around Trenton. A new OBS on 10 and 15 meters is WÖDJG. KÖYYP is a new OPS. KÖJPL is getting married. St. Louis ARC station KÖAXU is moving. KÖTCB and his XYL, KÖTGU, hold weekly RACES net drills and monthly base station exercises in the K.C. area. The Lecomma Lid Society Net on 50.46 Mc. has more than 90 check-ins. WÖEEQ is NCS. KÖSPE is NCS of the Clay-Platte C.D. Net. MON needs new members, especially in the St. Louis area. WÖRTW has resigned as recorder for MON after more than 5 years. The new ARPSC includes the v.h.f. nets, too. Net reports for Sept.

Net	Freq. Mc.	Time GMT	Days	Sessions	QNI	QTC
MON	3.580	0100	Tu-Son	23	154	172
MSN	3.715	2300	M-F			
		1300	Sat	25	37	16
SMN	3.580	2300	Sun	5	31	23
MIEN	3.885	2100	M W F	13	280	111
MoSSB	3.963	2100	Tu Th	10	104	110
PON	3.810	2100	M-F	20	189	144
Red Cross	7.210	2230	Tu	4	104	21

Traffic: (Sept.) KÖONK 4408, WÖAYB 554, KÖFFC 292, KÖTGU 286, KÖVNB 188, WÖHTO 173, WÖUD 101, WÖKIK 92, WÖTPK 59, WÖOCWV 43, KÖBWE 35, KÖTCB 24, WÖBVL 22, WÖBUL 18, KÖRWK 18, KÖVIQ 15, WÖDJG 12, KÖWOP 6, WÖRTW 4, WÖFLL 2. (Aug.) WÖJWF 15.

NEBRASKA—SCM, Frank Allen, WÖGGP—SEC: KÖTSU. Endorsements: WÖCCD as OPS. Net reports: Nebraska Emergency Phone Net, WÖEGQ, QNI 868, QTC 177, 30 sessions; 100 per cent check-in; WÖOBES; new members, WÖAAS, WÖEGK/M. West Nebraska Net, WÖNIK, QNI, 454, QTC 37; 100 per cent check-in, KÖMIE, WÖBYK, WÖNIK. Nebraska Storm Net, WÖFIG, QNI 883, QTC 35. Nebraska C.W. Net, WÖJCF/O, QNI 48, QTC 3, 17 sessions. Late report: C.W. Net (July) QNI 26, QTC 17, (Aug.) QNI 65, QTC 11. Nebraska turned out well for the SET in October with 55 counties represented. There are openings for 2 more OOs and a v.h.f. PAM in Nebraska. Volunteers should contact the SCM, KÄMZF/O is the new state RACES officer, succeeding WÖKYM who is now Deputy State C.D. Director. Traffic: (Sept.) WÖABES 235, WÖFIG 153, WÖLOD 72, WÖBID 82, WÖJCF/O 51, WÖICP/O 40, WÖEQ 31, WÖDXS 29, WÖAAS 28, WÖADNV 28, KÖZEZ 28, WÖGPH 20, WÖVEA 19, WÖBYK 16, WÖBKW 14, WÖHYD 13, WÖLBE/O 10, WÖNIK 10, KÖJFN 8, WÖADES 7, WÖYFR 7, WÖGGP 6, KÖINT 6, KÖDGV 5, KÖKJP 5, WÖBOQ 4, WÖACDQ 4, WÖLJO 4, KÖVTD 4, WÖVZJ 4, KÖYZP 3, WÖCIW 2, KÖFBD 2, WÖFBJ 2, KÖJPP 1. (Aug.) WÖJCF/O 17, (July) WÖJCF/O 153.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Robert J. O'Neil, WIFHP—SEC: WIEKJ, RM: KIGGG, H.F. PAM: WYBBI, V.H.F. PAM: WIFHP. Nets meet as follows: CN, daily at 1845 on 3840 kc.; CPN, Mon. through Sat. at 1800 on 3880 kc., Sun. at 1000; CVN, Mon., Wed. and Fri. at 2030 on 145.980 Mc.; Conn. Coordinator Net, Sun. on 3880 kc. at 0900. Alternating Net Control Station. All stations with reports, please send to the SCM immediately after the first of each month. They are arriving later each month and can not make the column on time. Thanks for your help with notices from your clubs. The 1963 SET found many good ideas for ECs to follow up on next year. New ECs are KIRPQ, Bristol; WIEOR, Manchester; WYXB, Guilford. Endorsements: WYBBI as OPS; WÄLAL, KIJAD and KIWKK as ORS. Traffic reports for CPN; 30 sessions with an average attendance of 24 stations; 187 messages, average of 6 per session; high QNI to WIDAV, KIOJZ, KILFW, NTR, SRF, BOP, WILUH, LWV, FXS, YBI, KIUQQ, and KIRTL. CN report from KIGGG: 29 sessions with an average of 14.98 traffic and 11.5 stations per session; high QNI goes to KIWKK, KIUYZ, KIUQQ and WÄLAL. Good conditions were noted. The net meeting was held with a good attendance. OES appointments are still coming in for request of v.h.f. frequencies. Activity showed good signs during the first part of the fall season. We are transferring all AREC applications direct to the ECs for their action and files. Please note and send to your local EC or SEC first to save time in getting your certificate. Traffic: KIWKK 541, KIWKJ 521, KIDQC 166, WÄLAW 138, WÄNJM 129, KIGGG 101, WÖBR 89, WIRZJ 83, WÄBDI 81, WICTI 80, KIUQQ 76, WIFHP 65, KIJAD 65, WÄMPW 53, WÄCSM 40, KIRTI 37, WÄLALZ 36, KIZND 33. (Continued on page 146)

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PROVIDES FOR SEPARATE TRANSMIT- RECEIVE FREQUENCY CONTROL

Full coverage of 20, 40, and 80 meters. 100 kc calibrator. 15 mc reception of WWV. Vox control operation. Built-in speaker. AC power supply may be included if desired.

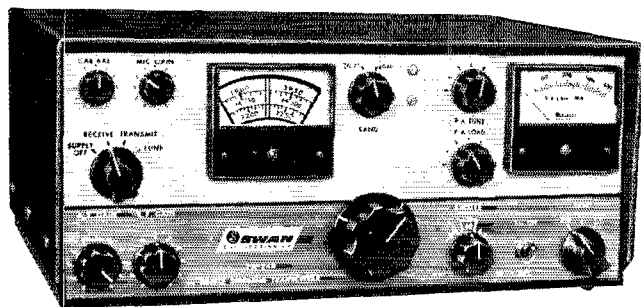
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complete with
connectors and
installation kit
for use with
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THE FABULOUS SW-240 TRANSCEIVER



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Provides both opposite sideband and AM receive position. **\$18**

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With 5x7 speaker and phone jack. **\$95**

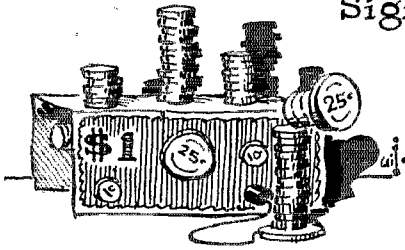
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Has pre-wired cables and installation hardware. **\$115**

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KIDGK 32, KITGX 32, K1QPN 28, KISRF 28, KIUYZ 28, KINTR 22, W1YBH 17, K1OJZ 12, W1QV 12, W1BNB 11, W1CUH 10, W1CHR 6, K1PLR 6, K1MBA/1 5, K1LQV 4, W1GEA 2.

NEW ENGLAND QSO PARTY

December 7-8, 1963

sponsored by
The Connecticut Wireless Association

ALL AMATEURS IN THE SIX STATE AREA are invited to take part. The Conn. Wireless Assn. calls this its SEVEN-ELEVEN PARTY because the three operating periods are from 7 P.M. to 11 P.M. EST Saturday night, 7 A.M. to 11 A.M. Sunday morning, and 7 P.M. to 11 P.M. EST Sunday night. 7-11 are lucky numbers. . . . Try your luck!

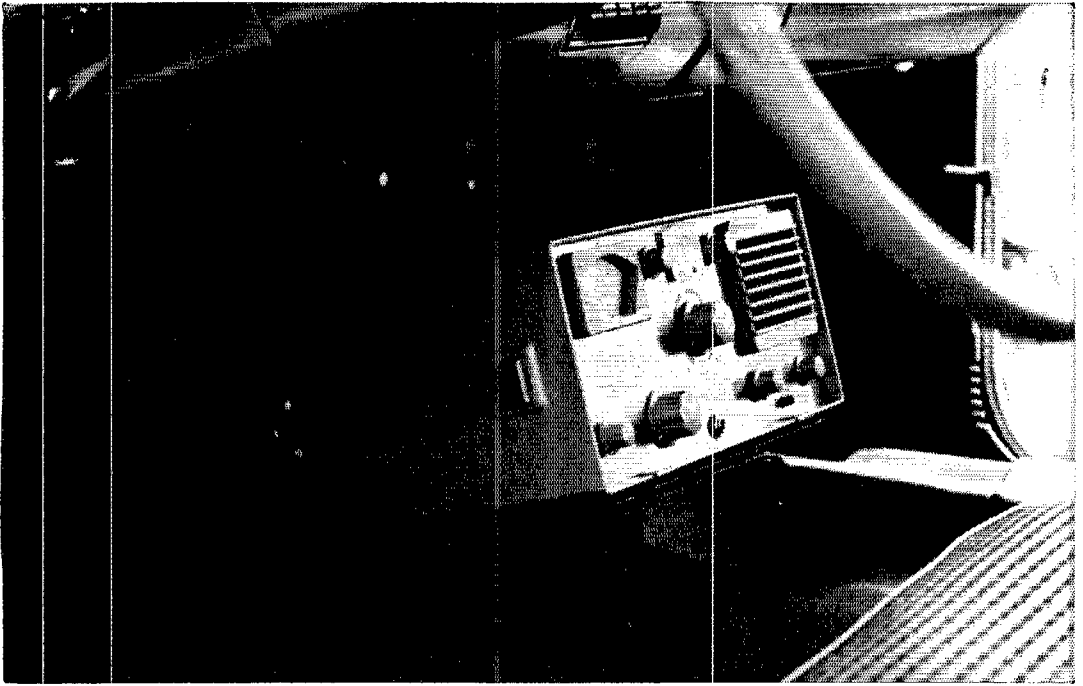
Eligibility: All licensed amateurs in New England are eligible and invited to participate. Only single-operator entries will be considered for awards. CWA members are not eligible for awards. **Times:** Three operating periods during the week end of December 7-8 will be utilized: 0000Z to 0400Z Sunday (Dec. 8), 1200Z to 1600Z Sunday (Dec. 8), and 0000Z to 0400Z Monday (Dec. 9). See above for SEVEN-ELEVEN EST times.

Frequencies: All amateur bands may be used. A station may be worked twice per band, once on phone and once on c.w. It is suggested that the 25 kc. on the low edge of each band and sub-band be used. **Exchanges:** Call "CQ New England" on phone and "CQ NE" on c.w. The exchange will consist of QSO number, RST(T) report, name (or abbreviation) of county and state. For example WINXX might send: "NR 7 589 CUMBERLAND, MAINE." **Scoring:** Count one (1) point for each contact. Multiply total contact points by number of different counties worked. Multiply again by number of states worked. For example, WINXX works 50 stations, 35 different counties and 6 states. His score would be $50 \times 35 \times 6 = 10,500$. Maximum possible county multiplier is 67. Maximum possible state multiplier is 6. **Awards:** A handsome plaque, engraved with the winner's name and call, will be awarded to the highest scoring station. A certificate will be awarded to the 1st and 2nd high scorers in each state; to the high scoring Novice in New England; and to the high scoring Technician in each New England state. **Logs:** Logs must show date and time of each contact, complete exchange information, call and address of operator and final score calculations. Mark each new county and state as worked. Mail copy or carbon of logs to: Conn. Wireless Assn., c/o J. H. Thompson, W1BIH, P.O. Box 1, Torrington, Conn., not later than January 13, 1964.

MAINE—SCM, Arthur J. Brymer. **W1AHM—SEC;** K1DYG. **PAM:** K1ADY. **RM:** K1MZB. Traffic nets; Phone; Seagull Net. 3940 kc. 1700-1800 daily except Sun. Pinetree Net, 3596 kc. 1900 daily Mon.-Fri. First Regional Net, 3650 kc. 1815-1930 daily. Main State C.D. Net meets Sun. at 1100 EDT on 3993 kc. and Wed. at 1900 on 3530 kc. **W1BYK** is NCS. The AREC Net meets Sun. at 0900 EDT on 3940 kc. **K1DYG** is NCS. The SPARKS meets the 1st and 3rd Mon. at Loring AFB. **K1ACT** has a new NCX-3. **W1QQY** is waiting for his. **W1GKJ** worked mobile while in Vei-Land. **W1NJL** now is attending Colby College. **K1NTC** is a freshman at M.I.T. Look for him as **W1MX**. **K1ADY** and her OM had a nice vacation on the Gaspé. Welcome to **W1KS** who has now taken up residence in the state in Augusta. The following are new hams in the state: **W1FZD**, **K1SWN**, **K1ZML**, **K1ERI**, **K1LDM**, **W1GJZ**, **K1WJE**, **W1ALQ**, **W1AALT**, **W1A1RV**, **K1EJF**, **W1LXA**, **K1QCQ** and **K1WZV**. Quite a few endorsements have been made and more are expected from the upper part of the state. Your SCM always monitors the Seagull Net and will check in if any of the hams are looking for him, mostly toward the end of the month for traffic reports. Traffic: (Sept.) **K1LMI** 46, **K4BSS/1** 27, **K1MDM** 23, **W1ISO** 10, **K1LHE** 7. (Aug.) **K1LHE** 25, **K4BSS/1** 20. (July) **K1MZB** 75.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., **W1ALP—W1AOG**, our SEC received reports from **W1s AAU**, **FON**, **K1s PNB**, **ICI**, **QLG**. New appointees: **W1UIR** as PAM for 75; **K1VOK** as ORS and OPS; **W1A1FD** as OFS; **W1AOG** as OBS; **K1ESG** as

(Continued on page 148)



SMALL INVESTMENT..BIG RETURN

SB-33, SSB transceiver is an exceptionally small package, but a few hours of on-the-air operation will convincingly point up the fact that the *only* thing small about *SB-33* is its size, (and its price). Performance, on a multi-band, work-the-world basis is *big*—operating pleasure, owner satisfaction are in keeping.

This small size—5½"H, 11¾"W, 10¼"D—ideal for mobile—is achieved primarily by advanced techniques—by using transistors and diodes (18 of each) to replace vacuum tubes in all but PA and RF driver stages. These reliable solid-state devices offer many other advantages; no filaments—far less current drain—lower internal heat. *And because life expectancy is great, long-term savings on ultimately-replaceable tubes can be substantial.* There's more.

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- and... built-in 115V AC power supply
- and... upper or lower sideband selection by a front panel switch
- and... a steep-slope Collins mechanical filter
- and... a built-in speaker

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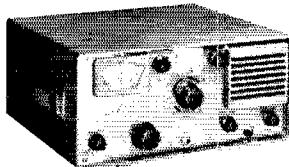
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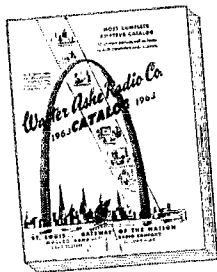
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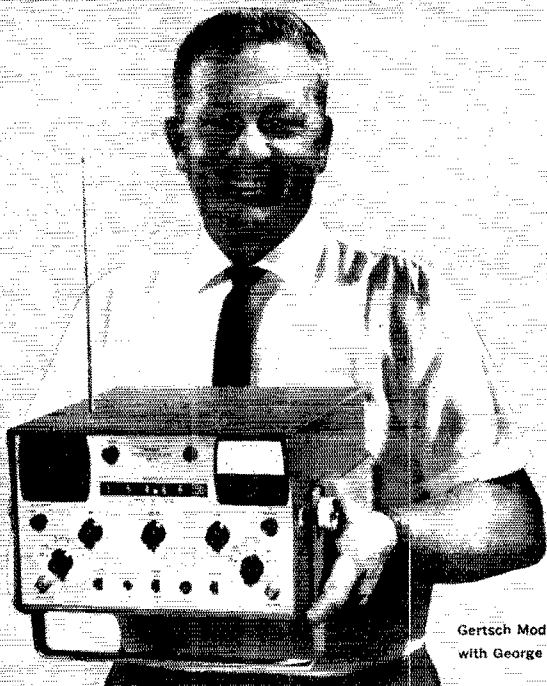
Send Reconditioned Equipment Bulletin.

ORS; K1HZU, Newburyport, as EC. I hope that you will give WIUIR your support on our Mass. Phone Net. WIAAU has mobile on 6. WIUIR spoke at the Whitman Club. WISS spoke at the Waltham Club. WIAOG and WIALP spoke at the Bedford Club. KIZBZ is on 2 and 6. The Cape Cod & Islands ARA held a meeting and a discussion on "Aims & Objectives for '64." WINT is on the Morse Net on 3531 kc. The 6-Meter Cross Band Net had 20 sessions, 383 QNTs, 53 traffic. KIFPR, Lynn is on 6. Quite a few attended the N.E. DXCC meeting. The Middlesex ARC held a meeting with new officers. The T-9 Radio Club met at WIIB's and WIWNK's. New officers of Tufts College ARC. W1KN, are K1-EFW, pres.; K1HBJ, vice-pres.; K1LKY, secy.-treas.; K1ONW, trustee. WIHBD a new member of the Old Old Timers Club visited W1MPP in Maine and is getting the history of AMRAD I/E/WGI Medford Hillside. Anyone got any early dope? K1NNV is KIMCS's XYL. W1AGI is new in Wayland. K1PPP is manager of the Central N.E. Net which meets Mon. through Sat. on 3842 kc. from 0630 to 0730. W1HLL got the Marauder running right, is on 6 with a Clegg 99er and took a trip out West with mobile. WINJL, a freshman at Colby College, has an NCX-3. The QRA's officers are W1LEL, pres.; WIHBB, vice-pres.; W1HUL, treas.; K1COW, secy. and editor of news. The Whitman Club has a net on Thurs. at 8:30 p.m. on 30.7 Mc. for the handling of traffic. Appointments endorsed: W1AOG as SEC; W1SUU Holbrook, WIWNP Concord as ECs; K1MCL as OO; K1-KCG as OBS; W1EAE as ORS and RM for 80-meter c.w. WIPEX made the BPL again. The Townsend AREC meets Tue, at 0000 GMT on 50.52 and 28.64 Mc. K1MTT has a new mobile rig on 6. The Townsend ARC meets the 2nd Mon. of each month at 7 p.m. in the Spaulding School. K1ESG is on our c.w. net and also the Eastern Area Slow Net on 3748 kc. at 1800. K1YOK says 10 meters opened up some and he was in the CCPX Contest. K1VGM, in Quincy, is in our 10-meter net. WIHGT worked quite a bit on 6-meter aurora c.w. He will be moving to W3-Land. Sorry to hear that W1DPO has been in the hospital since June. Luck, Paul. K1MYN is busy running for councilman in his city. Traffic: (Sept.) W1PEX 659, W1EAM 160, K1PNB 114, W1SSZ 113, W1-OFK 106, W1EAE 103, W1LES 83, K1ESG 81, K1WJD 76, W1DOM 64, K1GKA 48, W1AOG 40, W1SIV 30, K1-YOK 21, K1LCO 19, K1VGM 18, WIHGT 10, K1JVO 6, K1OCD 6, W1VYS 5, W1FON 4, W1ONW 3, W1PAN 3, W1ALP 1. (Aug.) K1WJD 41. (July) K1WJD 6.

WESTERN MASSACHUSETTS—SCM. Percy G. Noble. W1BYR—SEC: W1BYH/K1APR, RM: K1JY, PAM: K1RYT, WMN (3560 kc. daily except Sun. at 7 p.m.) is exceedingly active, with the following in attendance during Sept.: K1ZBN, K1SSH, W1BYR, K1-LIV, K1LBB, K1YMS, K1ZVJ, W1AMG, W1DWW, K1-VPN, W1DWA, W1AMI, W1ZPB, W1LNL, K1VLU, W1-MND, W1ZEL, W1QFI, (Stations listed in order of activity. Who says c.w. is dead?) New England Director W1EFW gave a fine talk at the Hampden County Radio Club. New officers of the Montachusett ARC are W1-MDS, pres.; W1JTL, 1st vice-pres.; K1DPP, 2nd vice-pres.; W1VBT, secy.-treas.; W1BYH, K1DPP, W1GIV, trustees. N.E. Dir. W1EFW was guest speaker at the installation. The Mass. Phone Net now has its two managers—K1RYT and WIUIR. K1MEB is in the Navv. K1YPN is building a 200-watt 6-meter rig. W1DWA is chasing DX on 15 meters. Ex-W1RPT is now W9GWT. The Pittsfield Radio Club is giving code practice for beginners. W1HRC is president of the West. Mass. Chapter of the Telephone Pioneers of America. W1BKJ is back on the air after some s.s.b. troubles. There still is a goodly supply of certificates on hand here just awaiting applications for same. Let us know for which ones you qualify. Traffic: K1RYT 502, K1JY 127, W1-BYR 114, K1SSH 100, K1LNC 89, K1ZBN 66, K1LBB 30, W1ZPB 16, W1MNG 13, K1TTT 11, K1ZVJ 11, W1-DWA 7, K1YPN 7, K1JQT 4.

NEW HAMPSHIRE—SCM. Albert F. Haworth. W1YHL—SEC: W1TNO, PAM: K1NXV, RM: K1BCS. Endorsements: K1AEG as OO; W1EWN as ORS; W1-YHF as OPS; K1HK as OO. OPS. ORS. Appointments: W1SWX/1 and K1QDA as OBSs; K1WPM as OBS. K1-DWK received a 6-Meter Cross Band Net certificate. Asst. ECs: K1NYS and W1IQ. New 10- and 2-meter emergency nets are operating in Belknap, Grafton and Carroll Counties. Hillsborough and Merrimack Counties held SET exercises that proved successful. K1PPP is the new manager of the Central New England Net. Retiring as manager is W1JXZ. Congratulations, George, on a job well done. Welcome to the AREC. K1EXC and W1YHF. Attention OPS appointees: GSPN needs area coverage and an Asst. NCS. K1ZDZ is operating 10 meters now. W1TA has been issued to the Nashua Mike & Key Club. W1SWX and W1BXM worked in the V.H.F. Contest with grand success. Monthly reports are required from all appointees; please forward them early in the month.

(Continued on page 150)



Gertsch Model FM-9 photographed
with George (Skipper) Maynard — K6RTD

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FREQUENCY METER
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IN A SINGLE, PORTABLE PACKAGE — \$1,495**

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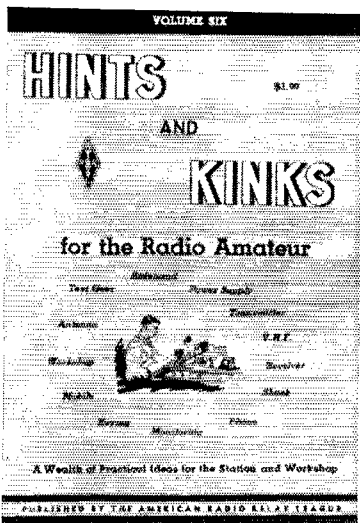
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THE AMERICAN RADIO RELAY LEAGUE

NEWINGTON 11, CONN.

RHODE ISLAND—SCM, John E. Johnson, KIAAV—SEC: WIYNE, RM: WIBTV, PAM: WITXL. New appointments: K1PAM as OES and OO, Endorsements: K1NEF as ORS, WIPOP as EC for Johnston and W1JFF as EC for Newport. A Section Net certificate was issued to K1MNZ, R1SPN report: 30 sessions, 607 QNI, 123 traffic. At a recent meeting of the NCRC of Newport, W1JFF lectured to the members on modern electronics construction techniques. After the lecture the members worked on the construction of a transistorized code oscillator. K1YQP became this year's first teenage member of the club to pass the FCC exam for his General Class ticket. WITXL now has his new 2-meter converter in operation. WIYRC is on s.s.b. with a 20A exciter and a Vallant as a linear. K1SXY has a real ham family. His XYL is K1PZK; K1ZEM and K1ZIU are the calls of his sons-in-law. K1NJT is building a transmitter for 2 meters and a v.f.o. for 6 and 2 meters. K1KAZ is now working 6 and 2 meters with his new transmitter. K1STB has the same name as a recent escapee from the state prison so the boys on 6 meters had their man. STB, of course, was not related to the escapee. Traffic: (Sept.) WITXL 554, K1NEF 331, K1TPK 80, WIYNE 55, WIBTV 51, K1NJT 30, K1STB 28, K1SXY 12. (June) WIBTV 20.

VERMONT—SCM, E. Reginald Murray, K1MPN—The Green Mt. Net meets on 3855 kc. at 2130Z daily; the Vt. Fone Net on 3855 kc. at 1300Z Sun.; the Vt. C.W. Net on 3520 kc. at 2500Z daily. Vt. s.s.b. frequency is 3955 kc. W1OAK has her pilot's license. W1KJG is back on 75 meters again. W1RNA is State Director for Air Force MARS. W1SEO is a member of the QCWA. K1HDB is a proud papa—a boy. K1PQN has purchased W1MNN's v.h.f. gear. K1LHN is going to U.V.M. The CVARC supper meeting will be held next May instead of February. Net manager W1VMC is issuing Net certificates for those qualified. It would be appreciated if all clubs would put me on their mailing list for news. Green Mt. Net traffic: 36 with nearly 400 check-ins. Traffic: K1BQB 42, K1LLJ 15, W1KJG 12, K1MPN 8, K1SLU 7, K1YLD 7, W1WZ 5, K1RMG 3, W1JLF 2.

NORTHWESTERN DIVISION

IDAHO—SCM, Raymond V. Evans, K7HLR—Only a few of the old faithfuls are reporting to the SCM. New officers of the FARA Net are W7FA and K7ULJ. W7-EMT reports that moving sure knocked the traffic score down but he is back in business now from Star where receiving conditions are extra good. The Magic Valley group reports on the SET exercise of Oct. 8. No other reports have been received as of this date. The Com Net urgently needs more participation. Let's keep Idaho a part of the National Traffic System. Traffic: K7HLR 24, K7OAB 24, W7EMT 22, K1NEY 12, W7GGV 10.

MONTANA—SCM, Walter R. Marten, W7KUH—Asst. SCM/L.F. PAM: Dr. Marvin F. Hasli, W7YHS. SEC: K7AEZ, V.H.F. PAM: W7TYN, RM: W7FIS. The Mont. SSB Net meets on 3910 kc. at 6 p.m. Mon., Wed. and Fri. The Mont. State Net (MSN) meets on 3520 kc. at 7:30 p.m., Tue., Thurs. and Sat. Appointments: K7PKV, K7SVR, K7PWY and K7UPH as OPSs. Endorsement: W7EGN as OES. Station activity reports were received from W7FIS, K7NHV, W7EWZ, W7NPV and K7SVR. The new Mont. S.S.B. Net had 275 check-ins during September. The MSN Net had 33 check-ins during September. W7EGN developed a 50-Mc. chirplevee oscillator, built a push-pull grounded grid final using 4X150 tubes, finished developing a 160-meter to 10-meter low-band receiver, developed a circuit using beam amplifier tubes in straight through amplifier that requires no bias, no screen voltage and no neutralizing even on 50 Mc. and developed an unconventional grounded grid circuit for triode tubes in the front ends of v.h.f. receivers. I want to thank everyone for handling my traffic during the recent illness in my family. Traffic: K7EWZ 136, K7NHV 23, K7SVR 8, W7FIS 7.

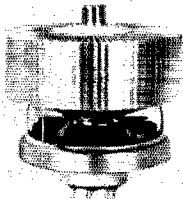
OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP, RM: W7ZFH reports OSN sessions 18, attendance 100, traffic 62. BRAT awards to W7ZFH and K7IWD. This net meets 5 nights per week at 0230 GMT on 3585 kc. It also is a part of the National Traffic System (NTS) and will function under the new ARPSC system. The Oregon AREC and other amateurs have set up a statewide monitoring system on mobile frequency 3865 kc. For further details see "With the AREC" in this issue. W7GUH has had a little trouble with the rig blowing up, which has slowed him down in his traffic activities, but managed to work in the V.H.F. Contest. K7-SHC reports working WA6TAM, who was running 500 milliwatts input into a folded dipole on 80 meters RST 569. K7IWD made the RPL again. K7JRA now has a 6-meter mobile 40 watts and is using International converter TRC-4B, W7DEM, EC, is manager of the MARS V.H.F. Net and hopes to get it into the AREC in the future. W7DIS, a new OO, sends in a large list of stations observed and information cards mailed out. Traffic: (Sept.) K7IWD 756, W7ZFH 94, W7GUH 23, W7MAO 20.

(Continued on page 152)

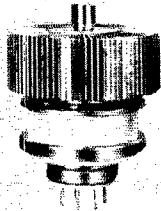
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Tube Type	Plate Diss., W.	Plate V., Max.	Plate I., Max.	Screen Volts, Max.
PL-175A	400	4000	350	800
PL-177WA	75	2000	175	600
*PL-8295/172	1000	3000	1000	600
*PL-8295A (ceramic)	1000	3000	1000	600
*PL-8432 (ceramic)	1000	3000	1000	600
PL-4E27A	125	4000	200	750

* Special sockets, chimneys available

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High- μ power triodes designed especially for grounded-grid rf amplifier applications.

Tube Type	Plate Diss., W.	Plate V., Max.	Plate I., Max.	μ
PL-6569	250	4000	300	45
PL-6580	400	4000	350	45

POWER TETRODES

Popular power tubes, built for reliable performance, long life, high efficiency.

Tube Type	Plate Diss., W.	Plate V., Max.	Plate I., Max.	Screen Volts, Max.
°PL-6775	400	4000	350	800
PL-8165/4-65A	65	2000	150	600
PL-8166/4-1000A	1000	6000	700	1000
*PL-4D21 (4-125A)	125	3000	225	600
†PL-4D21A	175	3000	225	600
PL-5D22 (4-250A)	250	4000	350	800
PL-4-400A	400	4000	350	800

° Ruggedized version of 4-400A

† Ruggedized version of 4D21 (4-125A)



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K7SEC 15, W7KTG 8, W7DEM 7, (Aug.) W7GUH 210.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC; Everett B. Young, W7HMQ, RA1; W7AIB, PAM; W7FLA. Approximately 270 were in attendance at the 17th Annual Walla Walla Picnic held at Wildwood Park. Amateurs from Oregon, Washington, Idaho and Montana were present, including the Director and Vice-Director of the division and the SCM and SEC of the Section. George Larsen, of Richland, walked off with the top prize. K7CTP made the RPL for the third time. Congrats, Van, W7AIB and his XYL took a trip to Reno and were off the nets for two weeks. Hap received his new HQ-180A receiver. W7AMC was QRL with a Zepp dipole for 160. W7IEU was recovering from a bad case of burned hands. K7SRI now has his home-brew v.i.o. working. Anyone interested in the QRP Club should contact K7JRE, in Bellevue. K7OFW/K7OFX has a TR-3 transceiver generating Donald Duck noises from the Richland area. K7BFI will attend B.Y.U. W7JH has his NC-300 on the block. K7RSM is mounting a two-element tri-bander on his 40-ft stick. W7HMQ, our SEC, visited a number of clubs throughout the section and gave a good rundown on the AREC and League programs. The Northwest Slow Speed Net (NSN) is drawing up new by-laws for the net. K1RFX/7 is looking for 200-v. for his home station. K7VAC is chief op at K7REA, Fairchild AFB (Spokane). The c.d. boys and AREC gang in the Tacoma area had their second big workout when another big fire hit the Tacoma area recently. One of the sufferers this time was W7LIR who, incidentally, was on a fishing trip at Westport and received the word by radio. K7GBW now is a Midshipman at U.S. Naval Academy. K7CWO is moving for the fifth time to Ellensburg. Herb is taking a course in Life Insurance in San Francisco. K7VSN is a new Technician. K7TV is moving to a new QTH in Nevada. The section went over the thousand mark in the AREC membership drive in September. Congrats to the SEC and the ECs on a job well done. Traffic: W7BA 1314, K7CTP 543, K7JHA 521, W7APS 300, W7OEB 132, K7RSD 33, W7AIB 25, W7AMC 23, W7BTB 20, K7PIG 8, W7IEU 5, K7SRI 4, W7EVW 3, K7PRE 3, K1RFX/73.

PACIFIC DIVISION

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC; W7JU. The Nevada Amateur Radio Association of Reno will meet this year in Room 326 in the new Electrical Engineering Building at the University of Nevada the 2nd Tue. of each month. The Las Vegas Radio Amateur Club held its annual picnic at the beach on Lake Mead with a very nice turnout. The annual SET, under the direction of W7GK, EC for Boulder City, was a success even if it was a surprise. The Over-The-Hill Net now meets at 2000P Thurs. on 145.8 Mc. The Nevada Centennial QSL cards are available now but are not to be used until 1964. Traffic: (Sept.) W7PBV 6, K7OLQ 4. (Aug.) K7KLT 48, W4CJD/718.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Edward Turner, W6NVO. RA1; K6KCB, PAM; W6HVN. V.H.F. PAM; W6RRH. Because of the pressure of work, W6EIC, our SEC for the past year, has been forced to resign. Ed has done an excellent job of organization in the section and we are sorry to lose him. May I take this opportunity to thank Ed for his organizational work in the AREC and RACES for the past few years. I'm sure that I speak for the entire section. The SCVSN reports 16 sessions, 79 check-ins and 12 traffic for the month of September. W6RRH has been advertising at local meetings and radio stores and expects that the net will pick up soon. Net certificates were issued to W6YDF, W6BADM and K6UEY. W6BB is taking outgoing traffic for the SCVSN. W6RSY suggests more use of the new priority system for traffic. K6GZ is active on 2-meter c.w. K6DYX sends Official Bulletins on RTTY at 0445Z Wed. on 7105 kc. Numerous stations and groups in the section spent the last part of September in preparation for the SET. Preliminary reports show that it was a success. Full details next month. Traffic: (Sept.) W6RSY 1450, K6GZ 207, K6DYX 281, W6DEF 177, W6ZRJ 130, W6ATT 98, W6YBV 70, W6AUC 69, W6PLS 64, W6HC 60, W6PLG 27, W6OII 20, W6RFF 19, K6MTX 13, W6AUM 2. (Aug.) W6HC 50.

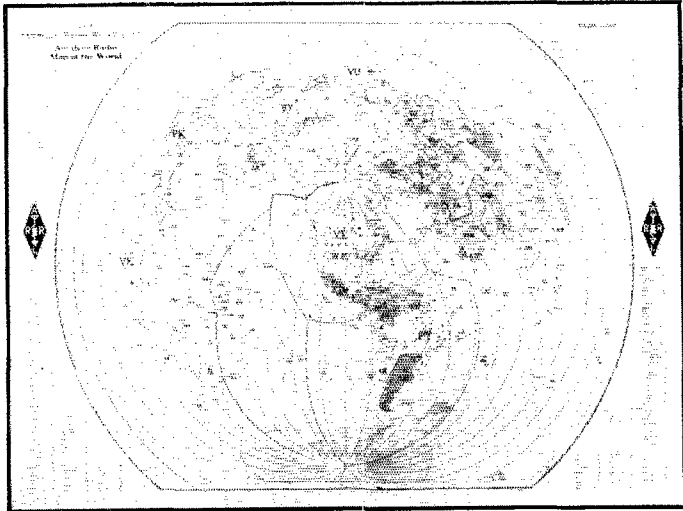
EAST BAY—SCM, B. W. Southwell, W6OJW—First of all in response to many requests, the Zip Code number here is 95620. W7QOH/6 has left for KA2-Land. W6AKB still is plugging away on the Mission Trail Net. The SARO has the Mt. Vaca t.m. repeater of 144 Mc. working FB. K6GK is back after toning all over Europe. W6ECCF has a new Alarader and is building a monitor scope and electronic key. W6AVAT has a new 14-Mc. quad. W6MJJP is QRL building new equipment as the QRN was too much. W6BSE and W6RTY got General Class tickets. W6SUT is now a Technician. W7QOH/6 and his XYL, Anne, have a new YL harmonic. The MIDARC again provided communications coverage

(Continued on page 154)

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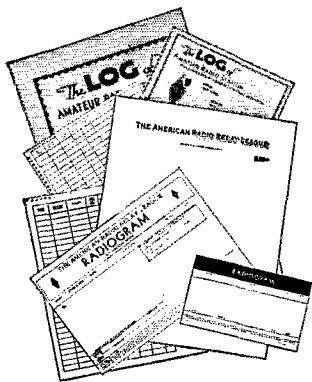


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for the Trail Ride Association of Walnut Creek, K6IMV and his XYL, K6OBB, had a nice vacation trip to Conn. The LARK had an FB turnout at its Sept. Picnic. The Silverado club members are using 420 Mc. for local QSOs. K6RQX has transferred to the L.A. section, K6BLN has a new Swan on 75 meters, W6SJA is now on 50 Mc. W6NOP is RACES R.O. for the NAPA area with W6NDR as Alt. W6LRT and K6BYQ worked each other for a 49-mile QSO on 430 Mc. The Silverado ARC held its fall V.H.F. Party from atop Mt. St. Helena. W6HC was guest speaker for Sept. at the SARC. WA6VQF is touring the U.S. on vacation. WB6GWV is a new member of the LARK. The Greater Bay area second Annual Hamfest was a real success from all reports. Ye SCM had to work that week end, unfortunately. K6JNW and WA6ALF have twos in operation. WN6GVF is a new HARC member. W6CUB is looking for a TVI-less 6-meter rig. W8MIGW was a recent visitor at the HARC. Traffic: K6GK 24, WA6MIE 15, WA6VAT 2.

SAN FRANCISCO—SCM, C. Arthur Messineo, W6-UD1/K6CWP-1 must first express my heartfelt thanks to W6BIP for the help he has given me at the start of this new assignment. Secondly, it is my sincere wish that you will all help me to keep the ball rolling with those wonderful reports the first of each month. W6URA, vicespres. of the San Francisco Radio Club, gave the membership a wonderful talk and demonstration on crystal grinding. The Greater Bay Area Hamfest was a great success. The working committees are to be congratulated on their tremendous efforts. Excellent speakers, a swap table, MARS and teletype displays and other items of interest were the order of the day. The BAYLARC put on a fashion show and luncheon for the ladies, followed by a SWOOP party and initiation. W6PZE writes that a new club is forming in Petaluma. K6ALI reports increased activity in the Santa Rosa area. W6IPO, K6-JGX, W6KUF, W6CXU, W6TBY, W6HST and K6PPO worked the annual Dipsea footrace over Tamalpais for the Martin Club. Fixed stations and mobiles were used and W6JBZ coordinated things so well no hitches developed. K6JID has been transferred to KH6-Land and asks that you look for him on 20 and 40 meters. The CCRC held its Annual Dinner Meeting at Hamm's Brewery with representatives of local clubs present. Pacific Division Director W6HC was guest and Tom Lott, VE2/6, gave a report on the proposed Oscar III shot. K6TWK is now at Cal-Poly and active with a G-76 from the southland. W6YKS is a new OES in Fortuna and I will process all certificates and applications as soon as the pile-up eases a little. Don't forget that this is your column, so let's have all of the clubs and individuals send in news and information they feel the rest of us should know. WA6IVM has worked JA-Land on 160. That's good going! And I'm going now—see you next month. Traffic: (Sept.) WA6IVM 30, W6UDL 21, K6PZE 16, K6TJW 6, WA6QXV 4. (Aug.) K6TJW 78, WA6IVM 36, W6PZE 23, W6UDL 11.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The MTN reports for Aug.: 104 QTC, 1486 QNI, 186 QSO, 18 QST, 41 QSP. W6KOB is heard on 75-meter s.s.b. WA6WXP has an NCX-3. K6ACO also has an NCX-3. W6DIY is heard on 75-meter s.s.b. W6-TZJ has a 75A-1 and is experimenting on 420-Mc. s.s.b. K6ENQ is operating out of Yosemite with an s.s.b. exciter and a DX-100 final. W6OHT is on 75-meter s.s.b. WN6GZT has a Heath all-band transmitter. WN6HIP is the newest call in Fresno. W6JUK has a Model 15 RTTY and perforator and is receiving RTTY. WN6HAI has a Knight T-10 and a Knight R-100 and is active on 40-meter c.w. W6ARE and WA6TQL are on 2-meter f.m. mobile and will be working through the Meadow Lakes Repeater. The club members of the Tulare County Radio Club displayed their s.s.b. equipment to the gang at a recent meeting. WB6DOY is a new call heard in Lindsay. The MARS RTTY Net meets every Tue. at 9 p.m. on 49.980 Mc. with the following checking in: K6PBL, K6PBN, W6BJI, W6TZJ, K6UDX, WA6REA and W6-DUD. W6BJI is in charge. W6GEG was a recent visitor in Fresno and is now a proud owner of a 60-ft. tower on which to hang his antennas. I would like very much to take this opportunity to wish each and every one of you a Very Merry Christmas. Traffic: (Sept.) W6ADB 204, WA6ESH 85, W6ARE 66. (Aug.) W6ESH 45.

ROANOKE DIVISION

NORTH CAROLINA—SMC, Barnett S. Dodd, K4-QFV/W4YZH—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK, RAM: W4AFJA, PAM: K4ODX, V.H.F./PAM: K4MHS. The Carolina V.E.F. Society held its annual election meeting in High Point with approximately 60 members present. Officers elected for the coming year are W4IVY, pres.; K4HGX, vice-pres.; K4GPL, secy.-treas. K4CDZ made BPL for the third consecutive month. WA4PDS/W4ZWB made BPL the third time in five months. WA4CXW won the CRML membership contest award. Congratulations to all. W4COJ sent in a very

(Continued on page 156)

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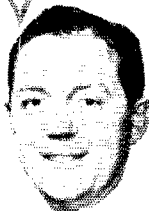
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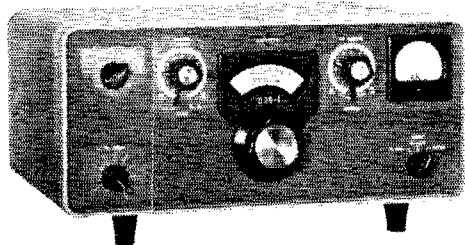
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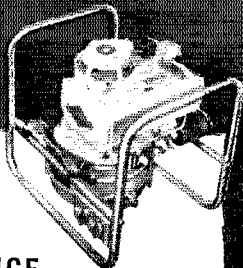
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good report on V.H.F. Net activity in High Point. W4VSI reports organization of the Hertford County AREC Net with nine members. K4CWW has added an s.s.b. transceiver to his station equipment. Received a very nice report from W4FDV complimenting K4FMW on doing a very fine job as EC for Wake County. Net traffic: NCN, 309, C2EN, 97, NCSN, 83. Traffic: (sept.) WA4PDS/WA2WBA 610, K4CDZ 190, W4LWZ 141, W4EVN 87, W44ANH 81, K4BUJ 74, W4PCN 67, K4CWW 56, W44FJM 51, W44ANI 34, W4BAW 32, W4COJ 30, K4YYJ 28, K4QFV 25, W44EIS 20, K4MPE 18, W4FDV 14, K4QDO 9, W4VSI 5, W44EYA 4, K4EO 2. (Aug.) W44ANI 62. (June) K4MSJ 32.

SOUTH CAROLINA—SCM, Lee F. Worthington. K4HDX—SEC: W4BCB, RM: K4LND. S.S.B. PAM: K4JOQ. Nets: C.W., 2400Z and 0300Z, 3795 kc.; A.M., 0100Z, 3930 kc.; S.S.B., 0100Z, 3914 kc. On Oct. 12 K4LND took office as the new Route Manager for the state. Bill is stepping into the shoes left by W4PED after three years of faithful and energetic work. A well-done to Charlie and congratulations to Bill, W4ALPV and WA4AGT have been awarded C.W. Section Net certificates for their excellent work on the SCN. The Greenville area still is going strong on y.h.f. with W4VTW and W4TLC reporting good activity on 6 meters and up. Reports in at this time indicate the SCN carried the load during the NET with two six-hour sessions and full liaison with the ARN/NTS. K4KCO has relinquished his appointment as A.M. PAM after two years of excellent work under adverse conditions. S.C. still needs more qualified Official Observers. If you are interested, contact the SCM for details. Net traffic: C.W. 93, S.S.B. 80. Traffic: K4LND 108, W4AKC 70, W4ALPV 52, K4WOI 46, W4PED 42.

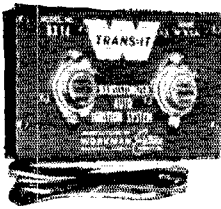
VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM/SEC: H. J. Hopkins, W4SLL, RM: K4MNF, W4ZAU, W4SLL, W4QDY. Traffic Nets: VN, 3680 kc. 0000 GMT; VSN, 3680 kc. 2330 GMT; VFN, 3835 kc. 0000 GMT; VSN, 3935 kc. 0300 GMT. W4EUL still is fighting antenna and rig troubles. W4OOL is bewildered and confused. W4ZAU (mer. VSN) is using parallel 807's in final with 100 watts input and says 80-meter conditions are getting rough. New officers of the PARC: W4KFC, pres.; W4ZAL, vice-pres., act. mgr.; W4YGY, secy.; W4YR, treas. W44EPI is on 75 meters with a new Heath s.s.b. transceiver and reports that W44AS is a new Tech. WN4QNM a new Novice and W4EKH reactivated with a new Marauder. V.I.o. troubles are bounding W4PTR, W4RIL, is working on an antenna and is getting ready for winter. K4WVT reminds us again that the Virginia QSO Party will be held Dec. 14-15. K4SQG also is working on antennas again. K4SDS lost his 24 inch to his satisfaction. Football is keeping W44DUW occupied. Asst. SCM W4SHJ reports an FB meeting of Roanoke Division SCMs and Director Anderson in Rock Hill Oct. 12. Traffic: W4DLA 568, W4DVT 277, W4RHA 158, W4SHJ 157, W44FCS 150, K4FSS 131, K4WVT 128, W4LK 107, K4ITV 65, K4MNF 55, W4IXU 54, W4EUL 44, W4PTR 43, W4ZAU 36, K4KNP 35, K4SDS 34, W4OOL 33, W4QDY 32, W44EPI 30, W4NLC 30, K4DCN 29, W4BZE 28, W4JMA 23, W41UJ 22, W4ZAI 16, W4TE 15, K4HAY 13, W4MK 10, K4KLO 9, K4SQG 9, K41P 8, W4RLN 8, W4NVX 7, W4OYV 5, W4KFC 4, K4YTZ 4, K4CTA 3, K4IYO 2, W4WBC 2.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA, PAM: K8EPI. Congratulations to W8CPY on getting the C.W. Net moving again. W8FTC made BPL on the WVN, SRN and WYPON Nets. W8ETJ, W8ACF, W8PVI and W8DUW in the Huntington area, have been meeting on 145.3 Mc. nightly at 2000. I regret to inform you of the passing of W8DSP and W8DTL. W8MIS has been DXing on 3501 kc. W8WSL lost his high-gain 3.9-Mc. antenna in a recent storm. W8DGE is a new ORS and OPS. The MARA is starting code and theory classes for those interested in Advanced and Extra First Class licenses. Officers of the Blennerhassett ARC are K8HYE, pres.; K8BOT, vice-pres.; K8PCF, secy.-treas.; WN8JDR, activity. As we come to the end of our Centennial year, my sincere congratulations to all amateurs who helped to publicize our Centennial. The Centennial Award, QSO Party, QSL Cards, State Convention and V.H.F. Award were excellent examples of club's cooperation with Centennial Chairman K8HID. Traffic: K8VFK 218, K8TPF 174, W8FTC 172, W8SDGE 139, W8CKX 129, W8CPY 91, W8CKN 60, K8EPI 58, W8SCRW 5.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, K0TTB—SEC: W0SIN, PAM: W0CXW, W0GNK, RM: W0LXB, K0FDH, K0ZSQ, K0DCW. The new address for the SCM is Box 223, Alamosa, Colo. The rig is back on the air now. It is with great regret that we have to report that W0IA, of Boulder, passed away. He will

(Continued on page 158)



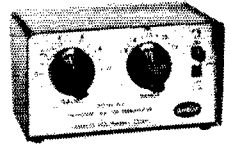
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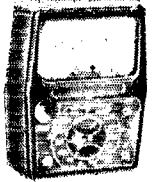
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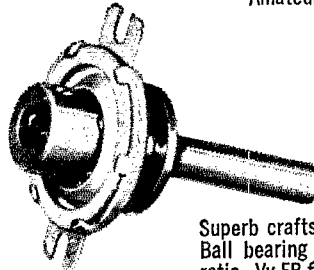


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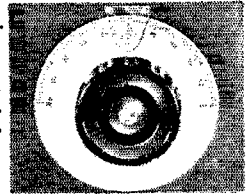
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Model 6100



Our thanks to QST Magazine for a job well done in their vivid and accurate review of the new B & W Model 6100 Transmitter in the September issue. (Page 58)

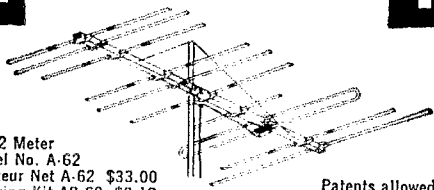
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VIRGINIA QSO PARTY

December 14-16, 1963

All amateurs are invited to participate in the Virginia QSO Party, sponsored by the Roanoke Valley Amateur Radio Club, Inc. Virginia stations are urged to work as many out-of-state stations as possible to permit others to earn credit for the Old Dominion County Award, the Virginia Civil War Centennial Award, and USA-CA.

Rules: (1) Contacts will be made during the 36-hour period from 1500 GMT Saturday, December 14, to 0300 GMT Monday, December 16. (2) No power or minimum time limits. (3) The same station may be worked and counted on different bands and modes. (4) The general call is "CO Virginia". Virginia stations are requested to identify themselves by signing "DE VA" on CW and "This is Virginia" on phone. (5) Virginia amateurs residing in cities will use their discretion in determining the county they will use in contest exchanges and may use only that county throughout the entire contest period. (6) CW and phone will be considered separate contests and separate logs must be submitted. No distinction will be made between SSB and AM.

Exchanges: Virginia stations will send QSO number, RS/RST report, and county (such as "NR 23 579 CRAIG"). Out-of-state stations will transmit QSO number, RS/RST report, and state, province, or country.

Scoring: Virginia stations will count one point for each completed contact, including those with other Virginia stations. Multiply this total by the number of states, provinces, countries, and Virginia counties worked to obtain the final score. Out-of-state stations multiply the number of QSO points by the number of different Virginia counties worked.

Prizes: Highest scoring station in each state, province, and country will receive a certificate. Virginia stations will compete for First-, Second-, Third-, Fourth-, and Fifth-place certificates.

Suggested frequencies are 3575, 3830, 3930, 7030, 7205, 7235, 14,070, 14,250, and 14,340 kcs. Logs, showing dates, times, stations contacted, bands, modes, locations, and final scores, must be received not later than January 31, 1964. Send logs to: Roanoke Valley Amateur Radio Club, Box 2002, Roanoke, Virginia.

be missed by all who knew him. Gene spent many years helping hams and was very active. His latest activity was the Colorado WX Net, a very important link in ham radio for the public here in Colorado. Net activities have been down some, mostly caused by band conditions. The Columbine Net reports 27 sessions with QNI 755 and QTC 104. Nine states now check into that net. Reports from other stations have been very good here. W0LXB, the new TWN mgr., is doing a very good job. Give him all the help you can. High Noon Net: QNI 291, QTC 97. Traffic: W0LXB 585, K0ZSQ 301, K0DCW 84, K0WGC 71, W0ETT 19, W0SIN 12, K0TTB 9.

UTAH—SCM Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX. SEC: K7BLR. W7ZC has been appointed OO and OBS. W8VUW/7 has moved to Salt Lake City from Los Angeles and will be making a big noise on 20-meter s.s.b. with a 4-400 final. W7VTJ again helped out on BUN when conditions were rough. W7LQE has joined TWN and is giving his bug a workout. W7LQE has also accepted an appointment as OBS K7SGN. W7ONA, K7JHI, K7YLT, W7QDY, K7NYHD, W5PR/7 and W7TQE were active in the annual Simulated Emergency Test from Box Elder County under the direction of EC W7TQE. The project of recording technical material for the blind is expanding. There have been several volunteers from various parts of the Rocky Mountain Division in response to Carl Smith's latest newsletter. Traffic: W7OCX 79, W7LQE 31, W7VTJ 25, W7QWH 12.

WYOMING—SCM, Lial D. Branson, W7AMIU—The Pony Express Net meets Sun. at 0830 MST on 3920 kc. The YO Net is a c.w. net on Mon., Wed., and Fri. at 1830 MST on 3610 kc. The TWN Net is a daily net at 2000 MST on 8570 kc. W7BXS went to Los Angeles for the new Trailer House, K7VWA. Margaret, a new license and a new HT-37 transmitter. K7VRS, Ruth, holds a General Class ticket now. K7AHO had a fire in his house at Worland. W7ARC and his XYL were Casper visitors for a few days; W7AMIU, Wyoming SCM,

(Continued on page 160)

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SR150.....	499	HQ110AC.....	177	HA-10 LINEAR.....	189
DC SUPPLY.....	77	HQ140X.....	119	DX100B.....	159
MOBILE MOUNT.....	32	HQ145X.....	179	DX360.....	37
SX101A LATE.....	279	HQ150.....	147	DX40.....	37
SX111.....	177	HQ170C.....	214	DX20.....	27
SX100.....	199	HQ170A/ENS.....	277	HQ10 VFO.....	32
SX115.....	339	HQ180.....	297	HEATH VOX.....	24
SX110.....	99	SP600.....	399	T60.....	34
SX140.....	74	HX50.....	299	T150.....	84
SX396.....	129	HRO60.....	267	R100.....	69
SX99.....	87	NC300.....	177	R100A.....	85
SX62A.....	229	NC270.....	167	RAW-6100.....	147
SX62.....	147	NC183D.....	177	B&W-6100.....	647
SX43.....	129	NC125.....	79	LA400C.....	129
S76.....	79	NC109.....	99	AF68.....	99
S118.....	69	NC101X.....	77	PMR7.....	87
S108.....	87	VPO62.....	37	EICO 720.....	45
S107.....	34	DRAKE 1A.....	147	EICO 723.....	37
S53A.....	47	DRAKE 2A.....	189	AMECO 86W.....	79
S94.....	20	DRAKE 2B.....	209	AC SUPPLY.....	27
CRX-2.....	67	DRAKE 2BQ.....	124	NUVISTOR 2 MTR.....	44
SR34/3way.....	239	MOSLEY CM-1.....	47	CONV.....	44
HT30.....	147	R9A.....	210	NUV 6 MTR. CONV.....	44
HT32.....	347	LM2 6900.....	54	ZENITH 1000D.....	139
HT33.....	219	RME DB23.....	209	SHERWOOD 83000.....	89
HT37.....	299	GPR90.....	299	FISHER FM90X.....	117
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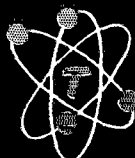
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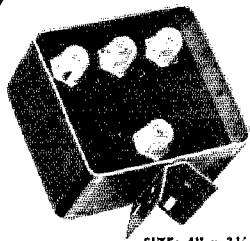
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SIZE: 4" x 3 1/2" x 2 3/8"; Wt.: 1 lb., 8 oz.

Weatherproof coaxial relay for remote switching of r.f. sources. Mounts on mast with remote switching to 3 antennas. Not a rotating or stepping switch, but the common connector can be switched from any of 3 positions directly to any other 3 positions. Also may be operated so that any multiples of the 3 positions may be connected simultaneously to connector. Simple installation, save money by running one cable instead of several to your antenna array.

SPECIFICATIONS — 0 to 500 mc; power rating r.f. contacts (cold switching) — 1 kw; VSWR — less than 1.1:1 at 100 mc; Isolation — greater than 40 db at 100 mc; Life expectancy — over 1 million operations; Duty — continuous; 50 ohm impedance.

COIL VOLTAGES — 6, 12, 24, 28, 32, 48, 110 and 220 D.C. and 50-60 cps A.C. (Additional charge of \$2.70 for 110 and 220 VDC.) Recommended voltages for exterior installations are 6, 12, 24, 28 v DC or AC.

MOUNTING — Supplied with bracket that accommodates 2 standard TV mounting straps for easy installing on antenna mast.

MODEL DK72 with UHF Connectors — \$22.95
Available with type N, BNC or TNC coaxial connectors at \$26.95.

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Please specify coil voltage and type connectors other than UHF. Dow-Key Guarantee. At your dealer, or write:

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attended a ham picnic sponsored by both Cheyenne clubs Aug. 25. The Sheridan Radio Club, with W7QPP in charge, sponsored the well-attended Wyoming Hamfest held at the Pines Lodge in early Aug. The main speaker was W0BWI, Rocky Mountain Division Director, with much interesting information from ARRL. Many fine prizes were provided. Traffic: W7BIIH 82, W7HLA 21, K7TTR 15, K7VVK 8, W7AMU 5, K7HAW 4, K7CRP 2, K7QYG 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—SEC: W4NML, RM: W4USM, P.A.M.s: K4BOT, K4DIR (v.h.f.), K4TNS, K4WHW. September reports of all reporting section nets (all times GMT):

Net	Freq.	Time	Days	Sec- sions- Ave.	Tfc.- Ave.	At- tend- ance
AENB	3575	0100	Daily	31	2.3	7
AEND	3725	2200	Mon.-Sat.	23	1.43	8.3
AENM	3965	0030	Daily	30	3.2	38.5
AENO	50.55	0115	M.W.F.	12	2.63	31.8
AENP	3955	1230	Mon.-Sat.	26	1.8	15
AENP	3955	0000	Daily	35	3.3	27
AENT	3970	2230	Daily	35	3.91	13.714

Two new trophies have been added to those to be given high Alabama scorers in ARRL contests. Ack Radio (W4ECI) has agreed to buy one for the c.w. and one for the phone Alabama high scores in the ARRL DX Contest. Traffic: (Sept.) W4AVM \$30, W4USM 124, K4WOP 110, K4WHW 108, K4BSK 93, K4AOZ 89, K4WVP 87, K4NUW 71, W4NML 68, K4EJD 50, W4OQT/K4NGD 25, W4AEXB 24, W4CUE 23, W4HLXC 22, K4BRZ 19, K4FZQ 19, K4GXS 16, W4LGF 16, K4ANB 14, W4AEEC 13, W4NET 12, K4HJM 11, K4DSO 10, K4BTO 8, W4AEDF 7, K4GRA 7, W4DS 6, W4PAC 6, W4LSB 5, W4CII 3, K4GHX 2, W4LXK 2, W4RLL 2, W4ACWV 2, W4DFE 2, K4FQC 2, K4FTC 2, W4ABDW 1, W4DGH 1, W4TST 1, (Aug.) W4AEXB 73, W4HGN 6, W4ACWV 3, W4LSB 2, K4GHX 1, W4AHI 1, K4TDJ 1.

EASTERN FLORIDA—SCM, George E. Cushing, K4QVJ—SEC: W4IYT, W4BMC installed an 628-1 and RTTY for 80-2-meter coverage. K6SXX/4 received CP-30 and passed the Extra Class exam. W4NDL is now W2OGH. W4BRB. the first 80-meter c.w. postwar DXCC has now antennas and is back in the DX chase on 80 meters. Gene now has over 120 confirmed on 80-meter c.w. The Duval County 2-Meter Net meets Thurs. at 0100Z on 147.3-Mc. f.m. Mae Burke, W3CUL/4, reports in from Sarasota, 50.250 Mc. is monitored 6 days weekly during daylight hours. W4AFVD has the Marathon Club under way and is planning gear for all v.h.f. bands, including 1296 Mc. The National SET went smoothly with Flora nearby throughout the operation. The FSBN averaged 57 messages per hour for the first portion of the SET. See details in *Florida Skip*. W4QVJ operated from Juan Fernandez Islands in late October as CQZI. The Tropical Hamboree is just a few days away. Plan to attend the Florida State ARRL Convention held at this outstanding Hamboree. Sorely needed is QFN, c.w. net representation from Jax on 3650 kc. K6CIT/4. Largo is a welcome addition to the DXers. Dick is a displaced Californian. Traffic: (Sept.) W4KIS 540, W4BMC 525, W3CUL/4 401, W4LJH 379, W4MIN 223, W4BGW 226, K4BY 215, K4EYH 192, K4KDN 172, W8LDU/4 145, K4SJH 135, W4TRS 110, W4AFGE 109, W4VVL 97, W4A-GBM 89, W4AJR 55, K6SXX/4 55, W4GJ 49, W4IYT 39, K4DBT 37, W4OGX 36, K4LLE 28, W4AKSC 21, W4CJC 20, W4SMK 17, W4ZJZ 14, K4MTP 12, K4EQP 11, K4DAX 9, K4OSQ 6, W4FVD 5, W4UEO 4, K4CMK 3. (Aug.) W4AFGE 51, W4VVL 18, K4CMK 5.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: W4WEB, V.H.F. PAM: W4ZGS, RM: W4BVE, Tallahassee: W4OUX is a new ham. W4MLE now has an HX-20 driving a pair of 4-400s on s.s.b. and c.w. W4AQX has a new Galaxy 300. W4EAO will be mobile soon. W4AGES put up a beam on a 50-ft. tower. Panama City: W4MFC finally received his Conditional Class ticket. W4NFOX is a new ham. W4AJM spent some time in the hospital. W4FIJ/FJF received A-1 Operator certificates. They are mainstays of WFPN. Fort Walton: W4SRX, W4ZGS and W4NOFN took part in the V.H.F. QSO Party. W4IHH/4, K4DDD won a trip to Chicago. Traffic: K4-VFY 220, W4MLE 187, W4ZWD 175, W4FIJ 50, K4SMB 36, W4WEB 25.

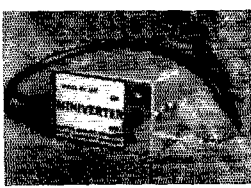
GEORGIA—SCM, James A. Giglio, W4JG—SEC: W4VE, PAMs: W4FVH, K4PKK and W4RZL, RM: W4DDY, GSN meets Mon. through Sun. on 3505 kc. at 1900 EST and 2200 EST. GCEN meets on 3995 kc. at 1800 EST, Tue. and Thurs. 0800 on Sun. W4GPA is now sharing his operating time with H.S. Pothball. K4-BAI has entered Law School at Mercer University. K4QKL received the A-1 Operator award. W4RZL has

(Continued on page 182)

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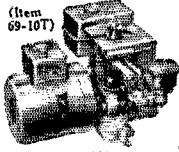
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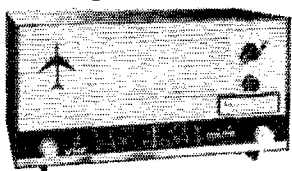
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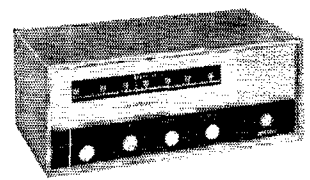
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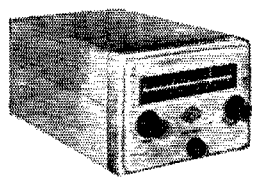
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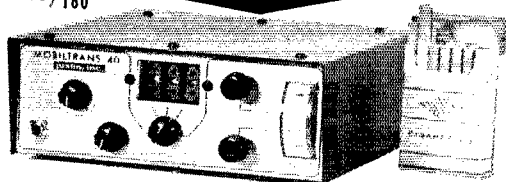


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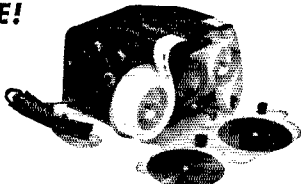
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NEW JERSEY

added an NCX-3 for more flexible operation of his FB station. Mobiles with good s.s.b. sigs are W4SLP, W4-MGV, WA4CGN, W4LAN, W4YYE, K4TZC and K4PRR. K4NQQ is bothered with rig trouble again. WA4CZM reports he is happy with his new TA-33 Jr. beam, K4VJJ, WA4HNP and WA4HLX have very active stations on 2 meters in the Winder area. Contact WA4AGT on GSN if you need Echols County for Worked all Counties award. K4WWY hopes to collect insurance for the recent damage to his antenna. Someone cut it into little pieces. Stations with TVI take note. W4YE is enjoying his 6-meter transceiver. W4FUE has constructed a monitoring scope and reports good results. Traffic: K6ETX/4 164, W4DDY 105, WA4AGP 101, K4MCL 99, K4FRM 92, K4WVY 62, K4QKL 58, W4YE 34, W4HYV 20, W4VY 10, K4YRL 10, WA4GPA 8, K4FUE 4, WA4HSN 3. (Aug.) K4BA1 81, K4YRL 15.

WEST INDIES—SCM, William Werner, KP4DJ—C.D. Radio Officer: KP4MC, KP4CH and KP4CK renewed as OBSs. KP4WT, KP4AFL and KP4WE received endorsements as OPS. KP4BCA, San Juan EC, was reappointed for another year. Thanks to KP4WT, KP4AFL, KP4AWH, KP4BCA and KP4BJU for sending in Station Activity reports each month for the past six months; also to KP4BJD and WP4BLS for their activity reports. Your SCM now works for ITT, which will explain our non-appearance in the Station Activities columns since May. We especially thank KP4WT, who came from Mayaguez to inquire about us, and to KH6FHC (ex-KP4TZ) for his letter of inquiry. We wish you all a Merry Christmas. Happy New Year and a Happy Three Kings Day. Traffic: (Sept.) KP4AFL 2. (Aug.) KP4WT 130. (July) KP4WT 112. (June) KP4WT 62. (May) KP4WT 87, KP4BJD 29, KP4AFL 2, KP4BJU 1, WP4BLS 1. (Apr.) KP4WT 71.

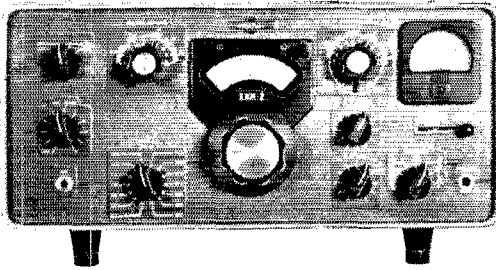
SOUTHWESTERN DIVISION

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: Richard H. Ingham, WA6DJB. SEC: K6-YCX. Asst. SEC: WIKUX/6. RMs: W6GYH, W6QAE, WB6BBO. PAMs: K6PZM, W6ORS, WA6TWS, WA6-WTX has a new DX-100 and new antennas, W6MLZ and his XYL spent the last part of July in Hawaii. W6NKR is working on v.h.f. repeaters for RACES. WA6MGO completed a home-brew 250-watt c.w. rig. K6SLX received a G6MTH certificate. WA6TWS is trying to find help in putting up a new beam. WA6USU vacationed at Crater Lake working DX. W6IQB is getting a new Marauder on the air. WB6BBO has added five new keys to her fabulous collection of antique keys. K6OZJ is helping youngsters in North Hollywood to get their licenses. K6HIT went on a well-deserved vacation. W6VOZ is back from a trip to Washington, D.C., and getting the bugs out of the new final. WA6GAG is active on 2 meters. Congrats to BPL-award-winning stations W6WPF, W6GYH, WB6-BBO, K6IWW and WA6VFM, multi-operator at Pomona Fair. WB6BBO, a recent addition to the section's list of Route Managers, was awarded a special certificate from the Third Region Net as a member of the team that placed first with the NTS in 1962. It is certainly gratifying to have people of this caliber move to the section. The SET in this section was a tremendous success with extreme cooperation from NTSs all the way. Support your AREC by applying for membership today. Contact K6YCX, Frank Merritt, 3131 Riverside Dr., Pomona, Calif. Look tor and check into the Southern California Net, SCN at 0300Z on 3600 kc., and So Cal Six on 50.4 Mc. at 0200Z. Traffic: (Sept.) W6WPF 1116, W6GYH 739, WB6BBO 724, K6IWW 618, WA6OUK 325, WA6VFM 310, W6QAE 285, WA6WTX 177, K6LIT 127, WA6TWS 124, WA6ZID 118, WA6USU 92, W6BHG 83, WA6GAG 62, WA6WVZ 59, WA6WZB 53, WB6BBH 52, WB6AJT 49, WA6IQS 28, WA6NIXM 26, WA6ORS 18, W6NAA 14, K6SIX 13, WA6CKR 12, W6BPKD 10, W6SRE 10, W6VOZ 10, W6CK 8, WA6CXB 8, K6CFD 7, W6GXY/9 7, W6ORS 5, W6FNE 3, W6AM 2, W6NKR 1, WA6RJJ 1. (Aug.) W6WPF 758, W6GYH 731, WB6BBO 611, K6IWW 526, WA6KIVV 502, WA6OUK 375, WA6TWS 238, WB6BBH 181, W6QAE 174, K6HIT 118, WB6AJT 104, W6BHG 100, K6PZM 95, WA6WTX 91, WA6GAG 70, W6KAW 61, WB6EUI 49, WA6USU 44, WA6VFM 42, WA6AAH 39, W6FNE 39, WA6TWC 34, WA6CXB 24, W6MLZ 23, K6SIX 22, W6NAA 15, K6OZJ 13, W6ORS 10, WA6QMC 8, WA6CKR 7, W6NKR 6, W6VOZ 5, W6SRE 4, K2PHT/6 1.

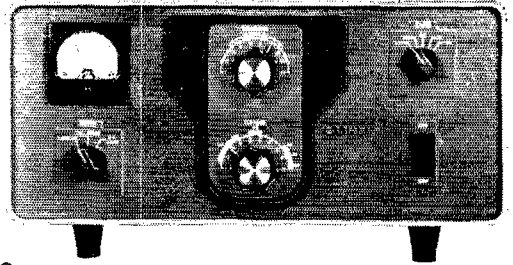
SAN DIEGO—SCM, Don Stansifer, W6LRU—A well done to all those San Diego hams who made the October Southwestern Division Convention possible by giving their time and talents for long months of planning and work. Special thanks to Convention Chairman K6BPL and Council Chairman W6SK. The SORAR Club also was in there working all the time helping as a club. Both WIBDI and WIWPO from ARRL Headquarters attended, as well as League President W6ZH and numerous Directors, Vice-Directors and SCMs. New officers of the Newport Amateur Radio Society are W6KNP, pres.;

(Continued on page 164)

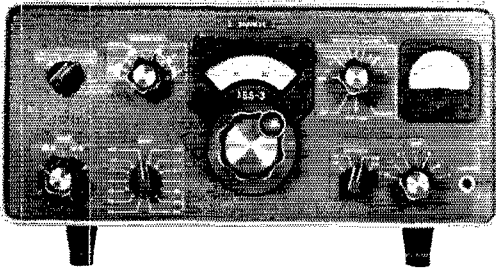
Either your ham equipment



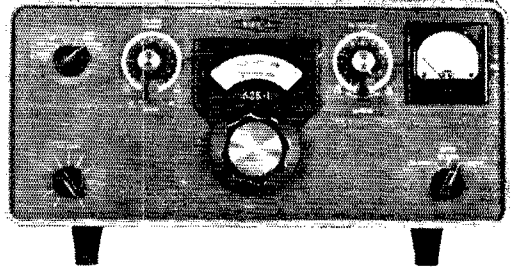
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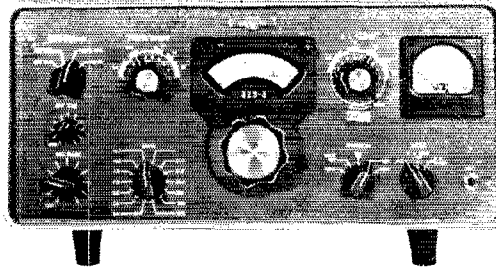
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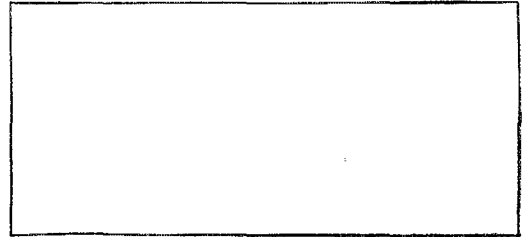
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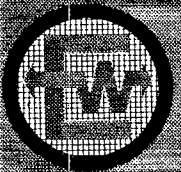


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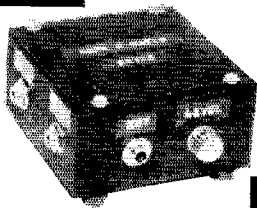
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WA6VJV, vice-pres.; W6WYH, secy.; K6IME, treas. A new OO in the section is WB6HQR, an ex-W1 now living in San Diego. The October meeting of the San Diego DX Club was held at the home of W6OME. The Anaheim Amateur Radio Club held its Annual Dinner Dance Nov. 23 and a good time was had by all. Sorry to list two Silent Keys in the section, K6SYU, of Anaheim, a charter member of that club, and K6OAR, of Encinitas, K6BPI led the single traffic operators with 5003; K4AKP/6 with 1350 and WA6BRG with 705 made their first BPL awards in the section. K4AKP/6 is the new manager of PAN. WA6CDD has a new 15-meter beam. I enjoyed meeting so many of the section hams at the convention in person. Season's Greetings, and all the best in 1964 to all from your SCM. Traffic: W6-YDK 5018, K6BPI 5003, W6LAB 4839, K4AKP/6 1350, W6EOT 737, WA6BRG 705, WA6ROF 169, K6IME 64, WA6CDD 47, W6WRJ 20, WA6ATB 8, K6GJM 4, K6RCK 4.

SANTA BARBARA—SCM, William C. Shelton, K6AAK—SEC: WA6OKN, RM: W7WST/6. The Lionpcp Club publishes a very newsy paper, the *Modulator*. How about some c.w. activity up there? They held a building contest, auction and picnic all in the same month. The *Arcs and Sparks* of the LERA Club is another newsy paper in this section. The club sponsors a swing shift club also, W6BGZE is very active on traffic along with the RM, and is very faithful in reporting. K6HV was the Sept. speaker of the SBARC, according to its paper, *Key Kite*. This club is the oldest in the section, founded in 1926. W6KZO has another harmonic born Aug. 18 and named for W6ICG. The Pointsettia Club paper, *Overmodulation*, outlined a very nice technical program under the direction of K6VBC. Congrats, Ben. Traffic: W7WST 314, K6AAK 18, W6BGZE 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG —The Abilene ARC held its annual Swapfest Sept. 29 with a total attendance of 225 and 185 made donations to the club. No registration was required but only those making a donation were eligible for a prize. Thirty members of the KC Club visited the FCC monitoring station at Ambrose, Tex. near Denison, with the idea of learning how the FCC checks on the various radio services. W5LGL was in charge at the time of the visit and explained to the group the operation and purpose of the installation. Harry stressed the importance of proper identification and time interval of announcing your call. The FCC depends to a great extent on amateurs policing their own frequencies. W5BGP recently completed an all-band s.s.b. transceiver that compares very favorably with a well-known commercial rig. Congratulations to Maurice on getting his driver's license. WA5EEM has been appointed ORS. K5KNX has started fixing his own TV dinners since Susan, his XYL received her Novice call. WN5IFA, Susan worked five states in as many days. W5KFU has assembled the Heathkit HW-12 and reports FB results. Charles says the 2-meter band shows indications of good conditions coming up and low-power Oklahoma stations coming in well. He worked W0DDX and W0IAY. WA5GMS reports the Wichita Falls area has received its RACES license. Traffic: W5DTA 477, W5BKU 220, W5API 175, W5ACK 95, K5PNV 17.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil P. Andrews, W5MFX, SEC: K5DLP. The Okla. City V.E.F. Club really promoted amateur radio at the Okla. State Fair. I would like to thank all who made this an outstanding affair. W5EHC also showed the spirit of amateur radio by donating a transmitter to one of the Okla. City schools for its radio club. Thanks, Carl, W5FFW has been real active in helping to police the band as an OO. The Bartlesville Club had a picnic and was surprised by the presence of hams from Kansas and nearby towns including Tulsa. Keep it up, fellows, and maybe this will be an annual affair. K3UTG gave a talk at Bartlesville before over 5000 people. However, he touched on ham radio a very little. Hi. The Tulsa Electron Benders have their school in full swing and by the time of this report will have several new hams in Tulsa from this school. The c.w. nets, OLZ and SSZ, are in full swing with the promise of more checking in. W5JJR set up a civil defense station at the Tulsa State Fair to show that we are well fixed for communications in case of any disaster. Crosser has worked the emergencies in Northeastern Oklahoma for many years and is well versed in any emergency. Traffic: (Sept.) W5PPE 1598, K5TBZ 962, W5TUI 580, K5TEY 502, K6OCX 413, K5-VNJ 149, W5KTY 107, K5DLP 38, W5WAX 37, W5PML 33, K5MTC 29, K5ZEP 27, K5KTP 20, WA5FLU 19, K5JOA 14, K5ZCJ 13, W5UYQ 11. (Aug.) K5TBZ 208.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: W5AIR, The Tex C.W. Traffic Net had 57 sessions, 276 QTC, QNI 303 time 1090 minutes. W5BRZ has been mobiling around West Texas. K5ANS is the new Bulletin Station for the college station. He also has

(Continued on page 168)

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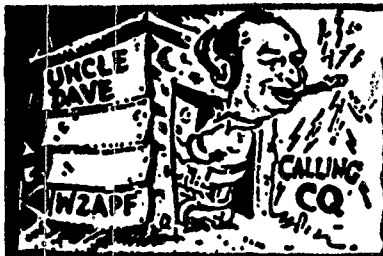
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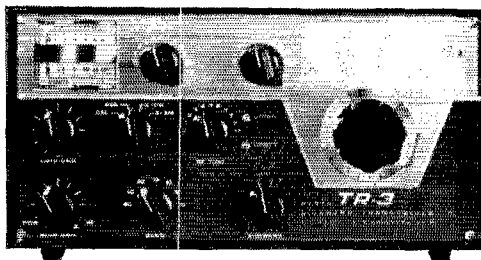
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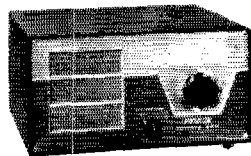
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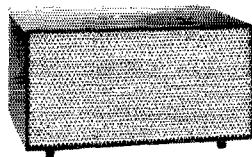
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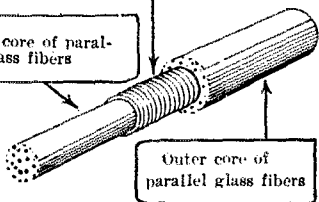
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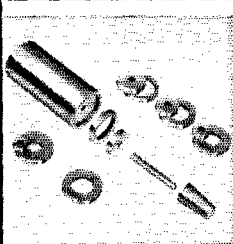
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his RTTY working, so you RTTY fans might watch for him. There was an antenna-raising party for WN5-HZX by WA5CTL and WA5EON. There is nothing unusual about this, except that WN5HZX is 72 years young. Congratulations, Texas A&M University has a high concentration of c.w. operators, including K5ANS, K5WIC, K5LZA, K5JFP, K5UGD and K5DNM. W5AC's code and theory classes are coming along nicely with about 12 enrolled and more coming. The new officers of the Orange Amateur Radio Club are WA5AUZ, pres.; W5TLD, vice-pres.; K5BBN, secy-treas.; W5ICL, *Key Click* editor, W5THD, activities; K5BJB, equipment; K5SUB, publicity; W5ICL, EC. W5YCK and his XYL are the proud parents of a new baby girl, after three boys. Our sympathy to W5FEM on the loss of his mother. W5PQQ and his XYL are off to Egypt and Italy. K5TDH, who is a Highway Patrolman, is having quite a time stopping hams and asking for their amateur licenses. While his vicious stammer and hunt, he tells them "I'm K5TDH." His latest victims were W5ITA and W5ZPD. K5IQJ is organizing the Winter Gardens Radio Club for Crystal City and Zavala County. K5ZSC has a new NCX-3. Listen for him mobile soon. W5GMIT is mobile with a new Swan. Traffic: (Sept.) W5AC 517, W5AIR 96, W5ZPD 31, K5JFP 22, K5VXP 22, K5IQJ 2, K5ZSC 1. (Aug.) W5AC 204.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and H. C. Hillyard, VO1CZ. New appointments include VE1MX as ORS. The SONRA Club sent a certificate to the RSGB on the occasion of its 50th anniversary (artistry by VO1CZ, our Asst. SCM). VO1CZ attended the dinner on behalf of SONRA. VE1AFP reports he has received the WANE (87 counties) and CHC (50) awards. SONRA reports 35 would-be amateurs commenced a course for qualifying as "hams"! Newly-elected officers of the Argentinia Club are WA4NNS, pres.; W5CPD, vice-pres.; W52CBD, secy-treas. (Congratulations to Elizabeth, VO1GE, who is the first Newfoundland-Canadian YL to hold an F8 license. Her call is F8C1. Newly-licensed amateurs include VO1GO and VO1GP. The Codfish Net is active every evening on 3770 kc, immediately following the NFLD Net. VO1EC has a new linear, a new tower and a new all-band vertical. VO1BL and VO1DZ are active on RTTY. Ex-VE1-YQ is now active as VO1CK. VE1OM is mobile on 8 meters. Traffic: VE1OM 8.

ONTARIO—SCM, Richard W. Roberts, VE3NG—Congratulations are in order to VE3CJ, our Canadian Director, and VE2BK, Vice-Director, on the reelection to their respective posts in the Canadian Division of the ARRL. The Ontario Division ARRL Convention was a huge success. The Hamilton ARC is to be congratulated on its fine effort. VE3DOO is in the hospital in Windsor and progressing slowly. Also in the body shop are VE3-ADA and VE3LH, in Toronto and VE3DGX in Sault Ste. Marie. All are progressing at this time. VE3CWP got hitched. The Windsor 2-meter group is thinking of a net. The Scarboro ARC is Canadian winner of the Trophy for Field Day. Windsor ARC was runner-up. The trophy is donated by the Radio Society of Ontario. The Sudbury ARC had a large group of delegates to the ARRL Ontario Convention. VE3CFR, delegate from London, advises that his club expects to host the ARRL Division ARRL Convention for 1964 in London, Ont. The Niagara ARC held an FB Weiner, roast. The Ottawa ARC elected VE3CDS, pres.; VE3BSG, vice-pres.; VE3BCO, secy.; VE3CDL, treas.; VE3GI, tech. advisor. There are lots of QSL cards in the Bureau. Send VE3UW your envelopes for your cards. Congrats to the Scarboro ARC from all VE3 operators and clubs on winning Field Day. Correction on Ont/Que Net: It meets *daily*, including Sun, on 3535 kc. Traffic: (Sept.) VE3NG 139, VE3BZB 109, VE3CFR 80, VE3EHL 67, VE3DPO 59, VE3GI 55, VE3FGV 51, VE3AKQ 48, VE3-BUR 47, VE3DRF 41, VE3BAQ 37, VE3CAM 35, VE3-ETM 30, VE3AML 29, VE3BLZ 26, VE3CB 13, VE3BZT 7, VE3VD 6, VE3CWA 1. (Aug.) VE3CYR 162.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Jean P. Achim, VE2ATL. With deepest regret we record the passing of two OT's: VE2HV and VE2WX. VE2HV had kept daily skeds with W2SCU for 33 years. A tribute to VE2BEC, who sponsored the pleasant Hamfest at Cornwall. Those unable to attend the first fall meeting of the MARC missed a stirring address by Noel Eaton, ARRL Canadian Division Director. He stressed the importance of more serious planning by amateurs for future survival. VE2BK and VE2BE attended the Hamilton Convention. We welcome OBS and OO appointment applications. VE2AGQ arranged an evening for members of the OQN. Guests comprised VE3GI, VE2GP and VE2SD. Much useful discussion took place. VE2HB reports hearing VE2AL, VE2ZY, VE2IK, VE2IM and VE2BBC on 2 meters. The Radio Club of Quebec elected VE2HB, pres.; VE2LG, vice-

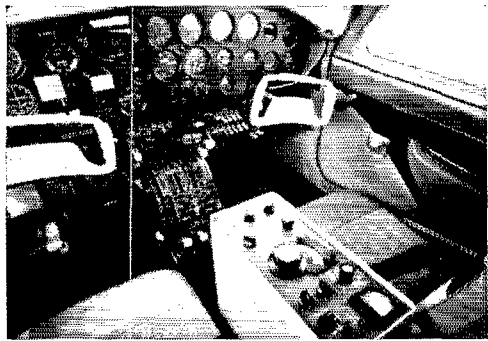
(Continued on page 168)



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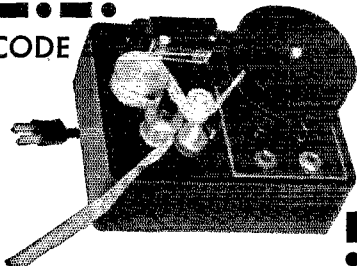
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pres.; VE2BIB, secy.; VE2PFB, treas. The Montreal group assisted the Inter Airlines Club during a 40 car rally with successful communications. VE2ALH received a well-deserved ORS appointment. Anyone hearing F8PAP, please contact VE2PY. The new North River Radio Society at Canut sponsored a get-together meeting. Traffic: VE2ALH 116, VE2AGQ 75, VE2DR 73, VE2AIR 23, VE2-AQV 22, VE2BHH 22, VE2AJD 11, VE2BG 10.

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FS, PAM: VE6PV, RM: VE6AEN, ECs: VE6FK, VE6SS, VE6ABS, VE6AJY, VE6AFJ, VE6PZ, OPS: VE6CA, VE6PV, VE6HAL, VE6SS, VE6BA, OOR: VE6HM, VE6NX, VE6PL, OBSs: VE6HM, VE6AKV, ORS: VE6BR, OESs: VE6DB, VE6HO, VE6AKV, Report from VE8-Land; VE8RG left on a Expedition to Antigua, British Virgin Island, Island of St. Martin where he will be PJ5MF, then to Anguilla, then to VP-Land. He has 204 countries confirmed. The Western Polar Net is now reactivated and works M.W.F. on 3760 kc, at 8 p.m. MST. Edmonton is busy organizing the AREC. Red Deer is doing the same. Calgary is already for the provincial AREC test. Vulcan is starting a new class of 15. Nice going, fellows. VE6SS is busy harvesting. By the time you read this APN should be on a winter sked. To all ECs, please get your monthly reports in on time so that the SEC can get his report in to me on time. Traffic: VE6HM 42, VE6TG 7, VE6WN 2, VE6UH 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —There was no August reports as we were on holiday and busy at VE7ALY. We visited VE7XW and was pleased to see such nicely constructed homebrew gear. VE7ACM is doing well and it seems that his QTH is the stopping place of all visiting amateurs. We intended to visit many more in the Capital City but did not have time. VE7DH is active on 2 and 6 meters. The club's project is 6 meters for all members, including setting up a base station at the club's meeting place, C.D. Headquarters. VE7AC reports apples need picking, also he finds time to pick some DX. VE7BHW made WAC and yet he complains about poor band conditions. Look for big doings in Vancouver for 1964. The QCWA will hold its convention in June and the program is well on the planning boards of VE7BHH, VE7ANU is well on the way to recovery after serious surgery. Many old calls are reappearing on the AREC Net. It is nice to have them back. VE7BK has returned from a trip south. The Vancouver Club elected VE7ANE, pres.; VE7APG, vice-pres.; VE7AGX, secy.; VE7QK, activty. Your call sign for 1964 license plates is being looked after by VE7ALE. Traffic: (Sept.) VE7BHH 195, VE7AC 12, VE7JQ 8, VE7BHW 6, VE7AMW 4, (Aug.) VE7BJV 508, VE7ARK 318, VE7BHH 136, VE7KZ 95, VE7AC 14, VE7JQ 11, VE7BHW 10, VE7DH 7.

MANITOBA—SCM, M. S. Watson, VE4JY—It is with extreme regret that we report the passing in September of John S. (Sandy) Gray, an amateur of many years standing. A report from VE4UM indicates the University Society has been active as NCS for the Canadian Universities and also had 6 mobile units participating in the Freshie Parade on Sept. 21. VE4FO, our popular EC, is moving to Vancouver. Sorry to lose Dave and we wish him the very best. At a recent meeting of the ARLM Roy Brownell, ex-VE7AFK, showed interesting color slides taken during his recent trip to Pakistan and Hong Kong. VE4GA has taken over the editorship of the Satellite from VE4DX, who has resigned. Thanks, Jim, for a good job over the past years. VE4CZ and VE4DA are very active in promoting classes for the Garden City ARC. The AREC was active in providing communications for the attempted swim of Lake Manitoba. Your SCM, after four years in office, is retiring. Nominations for SCM are in order to take over in December. Traffic: VE4HF 7, VE4JA 7, VE4QD 4, VE4NW 2, VE4PW 2, VE4IW 1, VE4JY 1, VE4UM 1.

SASKATCHEWAN—SCM, Jack Robinson, VE5BL— We extend a welcome to the following new licensees: VE5UN, VE5VT, VE5VW, VE5OZ, VE5WZ, VE5CC. Your SCM spent two weeks at La Ronge on business and had an eyeball with VE5GX, who had two 60-ft. sticks up and two more to go. VE5CM has a new QTH in Regina and the gang assisted him in putting up a new 40-ft. tower. VE5UK and VE5DN are now out of the hospital. VE8JS and VE4VX were in town for a visit. VE5VD has a new mobile. Ex-VE5QK is now VE6VM at Whitecourt, Alberta. Our congrats to VE5UU on acquiring an XYL. The Saskatoon Amateur Radio Club is holding a QSO Party from 0600 Jan. 18 to 0600 Jan. 20, 1964 (GMT) with the express purpose of promoting the Wheat Belt Award. All bands and modes will be used. VE5NT has moved to Manitoba and now signs VE4EZ. Traffic: VE5EM 28, VE5TQ 7, VE5EO 4, VE5IR 1.

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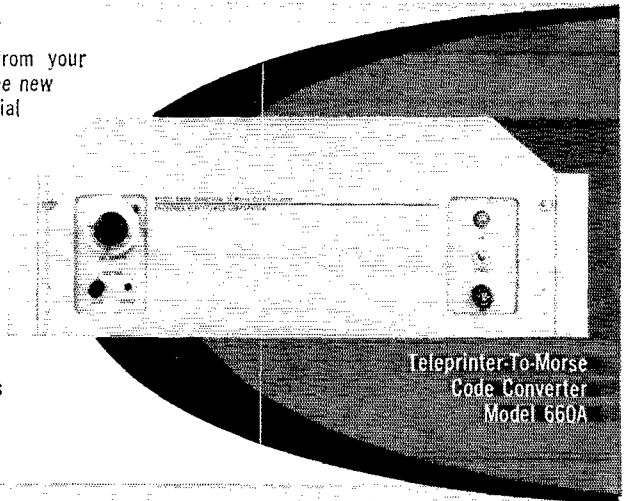
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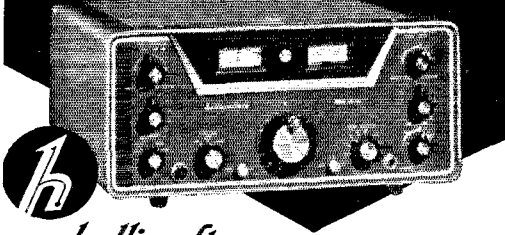


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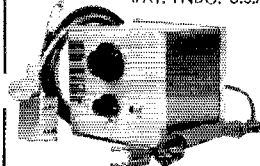
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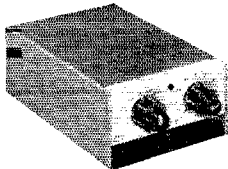
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(Continued from page 77)

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W4QDF 1356-113-12-A	W4LTU 690- 46-15-B	W4SFL 194- 97- 2-R	W4SFL 194- 97- 2-R	
W4NUT 684- 76- 9-A	W4NUT 684- 76- 9-A	W6CGM 176- 44- 4-AB	K6BPC (4 ops.) 1175-235- 5-AB	
K4PUD 294- 49- 6-A	W4AJWC 140- 35- 4-B	K6DLY/6 (K6DLY, WB6CR)	095-197- 5-AB	
W4RMS 36- 11- 5-AB	WN4KCO 22- 11- 2-B	W6TJ (WA6s PYB TJJ)	616-154- 4-AB	
K4JWZ/4 (K4s JWZ, STR)	2512-157-16-AB	W6SD (7 ops.) 447-149- 3-A	43- 43- 1-A	
K4WYS (W4KRK, K4WYS) 280- 56- 5-A	<i>West Virginia</i>		<i>San Diego</i>	
<i>Arizona</i>		K7YSE 43- 43- 1-A	W6GZK 384-192- 2-A	
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K0LES 32- 42- 1-A	K0ELE 47- 37- 1-A	W5LOW 132- 44- 3-AB	W5PZ 65- 13- 5-B	W5ACXB 18- 24- 2-AB
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K7CLX/7 (5 ops.) 114- 57- 2-AB	<i>New Mexico</i>		VE2ALE 75- 25- 3-R	VE2AYD 72- 18- 4-B
<i>Ontario</i>		VE3CVX 3750-250-15-AB	VE3CRU/3	2790-186-15-AB
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<i>Western Florida</i>		WA4FIJ 266- 38- 7-AB	W4ZGS 104- 26- 4-AB	
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(Continued from page 56)

and with a purple panel at that!"

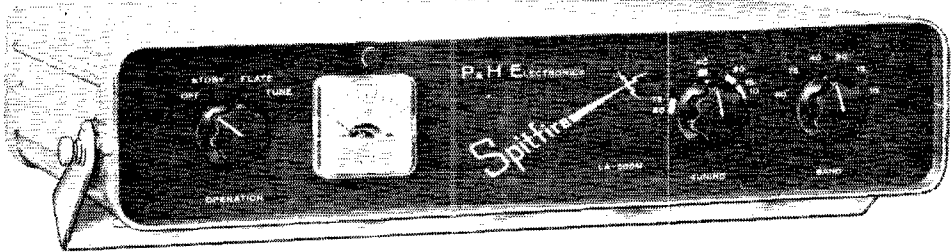
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(Continued on page 172)

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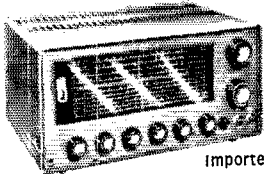
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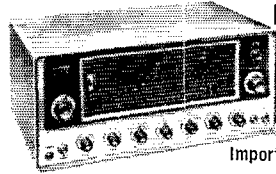
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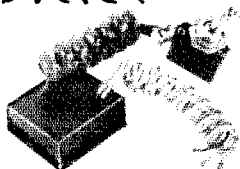
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where Junior is going to make a little change for the OM.

"Noooo, of course, I'm really not mad, Charlie. It's an annual game now. The OM spends all year conniving and contriving ways to get the latest and greatest stuff into the shack on Christmas. This year he lost.

"But, really, that chartreuse color wasn't at all . . . bad . . . really . . . quite good taste. You know it does rather . . . match . . . the color of . . . myyyy . . . eyyyees . . . yes. HmMMM, well, maybe I'll let him win next year. "And Merry Christmas, Charlie — from the OM too." QST

Strays

Stand up and be counted! If you can count 1,1,2- in front of the "trichloroethane" on the label of your epoxy solvent or teleprinter cleaner (see Hints and Kinks, August QST, page 47), then it's the wrong stuff! WASGTM says there are two trichloroethanes. 1,1,1-whatsis is not too hazardous, but 1,1,2- — watch out! It's rated highly toxic.

The World Above 50 Mc.

(Continued from page 94)

W4HHK: "Aurora tonight!" It was visible at Collierville, Tennessee shortly before 1900 CST with aurora signals coming in from 2's, 4's, 8's and 9's. Last signals heard about 2115 CST. Paul made a brief test with W8IFX on 432 Mc. trying for an auroral contact on that band, but "no dice." However, it was the first time that radar was heard to the NNE on 432 Mc. at Paul's QTH. Incidentally, he now has a beacon on 144,011 Mc. in hopes of catching more aurora. Paul also reports that on September 20, while attempting to work K5SDM in Houston on 432 Mc., he heard him faintly but no contact. However W5RCI did work K5SDM on 432 that same night. On September 23, W4HHK was surprised to hear W5AJG in Dallas calling him on 432 after a beacon transmission to the southwest. After a 5-9-9 contact over a 450-mile path, Paul alerted W4RFR who got on and also worked W5AJG, about a 650 mile path. Paul sez that W5AJG was much stronger at his QTH than W4RFR in Nashville. Interesting report from K5TQP in Albuquerque, New Mexico, to the effect that he "heard my first aurora signal since leaving W1 land yesterday (September 22). At 1729 MST, W0IC was calling W9UNN (wonder if he made it) and at 1744 he called W5RCI. His signals were 5-8A when first heard. I also heard a weak unidentified signal at 1800 on 144.118. Monitored until midnight, calling often, but heard nothing more. I'll be listening this fall and winter when possibilities it may happen again calling CQ on 144.100. Might move a kc. or two lower to avoid QRM from W0IC." Good to get an aurora report from New Mexico, Fred. Now that the gang knows you're hearing it I'm sure everyone will be trying for New Mexico on aurora.

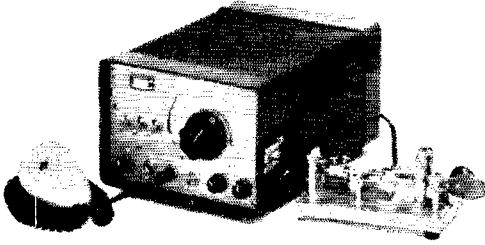
Report from 7-land sez that on September 14, K7IHKD and W8KAY made it on 144 Mc. via aurora. Congratulations to both of these boys and wonder if K7IHKD was heard any farther east than Akron, Ohio. W7JRG, in Billings, Montana, got on the band and worked W0EMS in Nebraska for state number 19 (making it #30 for W0EMS). Ken sez that K7IHKD was in with terrific auroral signals most of the time. He was also in on the September 22 session working W0AZT in Colorado and K0UDZ in South Dakota. W8PT noted auroral openings on September 14, 20, 21, 22 and 24 with all call areas heard except 6 land. No new states on 144 Mc. for Jack, but he did nab W3RUE on 432 Mc. during a tropospheric opening for state number 8 on that band. The session of the 24th gave W8MED his first opportunity to try out his 50-Mc. rhombic to the north. Results were good with fifteen contacts from Massachusetts to Minnesota, including nine states. Also in Michigan, K8IFL noted the September 22 aurora but was unable to work it due to the usual — rig laying around the shack in

(Continued on page 174)

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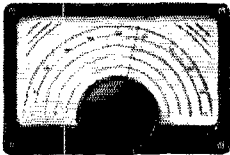
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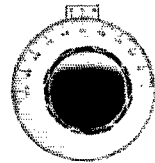
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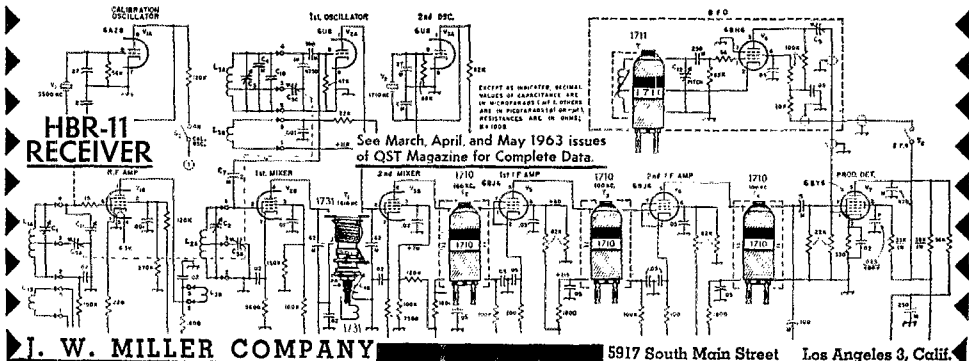
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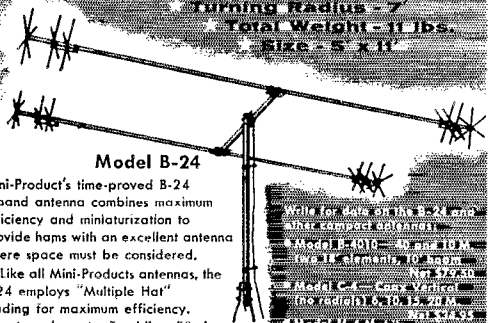
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pieces! W8WRN, K1CRQ/8 and W9KLR/8 all in Ohio came through with auroral reports. K1CRQ 8 sez that "W1BU came through with nice signals during the 9/22 aurora." Stew now has 28 states worked on 144 Mc. from his Ohio QTH, having recently added South Carolina, New Hampshire and Maine. Bill Rose, W9KLR/8, sez that he noticed the aurora while driving to Columbus, Ohio on 9/22, and of course had no receiving gear in the car. "By ten to eleven p.m. there were lots of colored streamers and rays and the aurora was clear directly overhead in central Ohio." Bill comments that he is surprised that no one has yet over 41 states on 144 Mc. This is probably due to the fact that he got #41 on the band on January 5, 1959, almost five years ago. Since that time he hasn't been at his home QTH long enough to make and keep skeds. In Columbus, Ohio, W8WRN logged 58 stations between 1930 on September 22 and 0106 on the 23rd (all of these on 144 Mc. via aurora) and included seven call areas plus VE3. In West Virginia K8AXU sez that aurora time is the time to think of hiring a book-keeper for log keeping, letter writing, etc. Al worked the aurora openings on 9/20 and 21 hearing a total of 22 states. Only new one for him was W4FWH in Georgia for #34. K9SGD at Sparta, Illinois was hearing 1's, 2's, 3's, 4's, 8's and 9's via aurora on September 21 and 22, plus VE3's. Joe's total states worked is also climbing with W0RSP in South Dakota making it 29 for him. Lots of s.s.b. activity in the Sparta area on 144 Mc., with at least 6 side-band KW's within 50 miles.

Appleton, Wisconsin, and W9FBC report "wild, wild opening on September 14 and 15 with VE3AIU being best DX, and also worked Michigan, Ohio, Minnesota and West Virginia." Maurie's auroral report tends to the same enthusiasm with "wild, wild aurora — a brilliant display of rapidly flickering streamers nearby to the southern horizon. Six states were heard, plus VE3BQN." Weak aurora was heard at Appleton on the 25th when 8's and 9's were heard but not worked. In Marion, Iowa, WA6DZII brought his total states up to 19 on the 22nd when he worked five new states. During that session Lon heard a total of 14 states on 144 Mc. via aurora. Final report on 144-Mc. aurora comes from W0ENC in Rapid City, South Dakota, who worked Kentucky, Ohio, Kansas and heard Montana, Colorado and Oklahoma. Bob sez that at times stations in Illinois and Kansas were QR'ing each other. (And this on 144 Mc.)

220 Mc. had a share in the auroral sessions, too. In New England K1JIX added W8CSW in Ohio to his score and W1BU added W8CSW and K8AXU in West Virginia. W8CSW sez he has been looking for Massachusetts for six years on 220 Mc. and finally got two of us the same evening. (What's that old saying? Somethin' about rain?) Chet also worked K2GUG, W2AOC, W3UJG and heard K2FMB. W2AOC sez: "On 220 Mc. I worked W3UJG, K8AXU, W8CSW and heard W1BU, K2CBA, K2DZM and a K2TM? (B?). This is the most active 220 aurora session that I have been involved in since getting on 220 Mc. eight years ago." Marv mentions that it is unfortunate that the majority of 220-Mc. stations do not make use of c.w. His total is now up to 15 states worked on 220 Mc. Al, K8AXU, writes that he worked his first 220-Mc. aurora and got K2CBA, W2AOC and W1BU, with W1BU being a new one which brought his states up to 11 on 220 Mc.

50 Mc.

Aurora has hit 50 Mc. too, of course, and a goodly portion of the reports this month concern this type of "opening." W1HGT in Massachusetts reports that 2's, 3's, 4's, 8's and VE3 were worked on six-meter c.w. during aurora in September. Ralph sez that the aurora teamed up with sporadic E to provide some mid-west QSO's with 9's and 8's. K1VPJ, also of Massachusetts, reports no skip during September, although he did notice quite a bit of interference on the 23rd and 24th. (That was it Bruce! Next time turn your beam to the north and peak it on the noise!) From New Jersey K2KDQ and K2RPZ make aurora reports to the effect that they were heard on September 14 and 22. Jack, K2KDQ sez that he heard VE3, VE4, VE8, Vermont, Ohio, Indiana and West Virginia on the 14th, and of course he had the v.h.f.ers luck with no contacts. Three miles in the shack — all bad! K2RPZ had better luck on the 22nd when he worked Ohio and Virginia. Stu also heard K1HNB in Vermont and heard him saying that he had heard VE4's, VE5's and a K1L7. We've had no word from George in Vernon, Vermont, so have no details. In Schenectady, WA2DRP noted one of the best visible auroras he's ever seen at 0600 on the 14th. Didn't hear or work anyone at that

(Continued on page 176)

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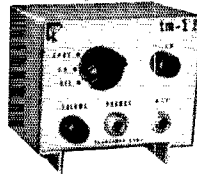
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time on 50 Mc. In Delaware, K3KEO heard all call areas except 5 and 6 on 9/21 and 22, and also heard VEs. Sam is still looking for Vermont, New Hampshire and West Virginia on 50-Mc. s.s.b. So far he has 40 states, 2-way s.s.b. confirmed, on 50 Mc. At Clarksville, Tennessee, WA4FHY observed his first auroral session of the season on September 23. Although hearing 9's and 8's, Paul had no contacts because of receiver problems. K4SFHY in Kingsport reports "an exceptional auroral opening on September 22 when VE4MA was heard over a long period of time with over S9 signals. Other stations with strong signals were K7BAG (Washington), W2EAP (New York), W7VTB (Wyoming). All call areas but 5 and 6 were heard and most stations were S2-S7 with characteristic aurora flutter. In all, ten states plus VE4MA were copied. Best aurora opening I've heard on six meters." Although his time was quite limited during September, K4KYL was fortunate enough to catch the aurora on the 22nd and 23rd. Ten states heard at his QTH in Knoxville, Tennessee. In North Carolina WA0AB started copying snatches of auroral QSOs during mid-afternoon on 9/22. Signals peaked between 2000 and 2015 EST. Although numerous stations were heard, all were in the 2nd and 3rd call areas. W8MBH reports that KBAPF worked all call areas except 5- and 6-lands during the 9/22 aurora, and KSREM was heard working into 7-land on the 21st. From Hiram, Ohio, K1JQJ/W8ELI heard sixteen states via aurora on 9/22, during a two hour period. WA9FIH reports 1-, 4- and 8-lands heard via aurora on the 22nd. **QST**

Correspondence From Members

(Continued from page 98)

lating hobby is threatened, both from international activities on one hand and from stagnation within our ranks here at home on the other, the only obvious solution left to us is to close ranks behind the proposal for incentive licensing. As I see it, aside from the commercial interests now making their views known, the big objection comes from that group constantly associated with the "let George do it" attitude. We find the latter group with us wherever we go, unfortunately. It makes its presence known in club and committee meetings and in other activities where a worthwhile project requires the solid support of all. We should forget our petty differences and do whatever is necessary to insure the incorporation of this proposal in order that amateur radio may continue to maintain the stature it has achieved in the past.

I'm enclosing my check for the "Gateway to Amateur Radio" booklets. I would like to get another fellow started on the right foot in amateur radio. — W. D. Kinghorn, WB6BAS, Santa Maria, Calif.

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☐ Enjoyed a visit to your new building a few weeks ago. It's real nice and long overdue for your staff use. — W. G. Brown, New Britain, Conn.

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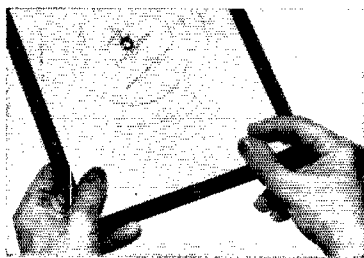
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Technical Correspondence

(Continued from page 34)

you had your receiver tuned. By the time you find that burst it may have vanished, and another may occur 50 kc. in the other direction. Meanwhile, a "rumble" might have occurred near nominal frequency that you missed completely. Chasing after these wide-ranging bursts certainly is not easy, but it is fun, and it may also be practical. Consider this: About the best that can be done on east-west paths on 50 Mc. at this time in the sunspot cycle is about 1000 to 1500 miles,⁶ that via sporadic-E and meteor-trail reflection. Now, satellite interactions have been observed quite frequently at 800 miles altitude. If we assume a vertical radiation angle of ten to fifteen degrees, fairly representative of tower-mounted beams for this frequency, this gives us possible DX, in the east-west direction, of over 3000 miles.

So far we have not mentioned those ugly words "orbital predictions." For this application you simply do not need them. There are so many satellites now in orbit — approximately 150 — that one will come into range every minute or two, 24 hours a day. Of course, not all satellite passes produce interaction effects. However, some can produce more than one, and a satellite does not even have to be around for some reflective region which it induced several minutes ago to appear over our path. The reflective regions are so unpredictable, to start with, and each hour provides so many opportunities for their formation, that satellite predictions will be of very little assistance in this type of work. You won't be able to prove it was a satellite, but you will still be able to communicate — and that is the important point.

The communications procedure is fairly simple. Make an advance schedule with a station whose state or call area you may need, and when the time comes, both of you get on c.w. with your beams pointed at each other, and call. Because of the random and short-lived nature of the signal bursts, high speed and very fast break-in procedure should be employed, along with the utmost in brevity. It might even be desirable for you to spot the two transmitting frequencies sufficiently far apart so that both of you can listen while sending, à la WIBU. When you hear the other station, give him a report in meteor-scatter language. As in meteor scatter, considerable repetition will be necessary if any meaningful information is to be interchanged. When listening, remember the likelihood of Doppler shifts and frequency smears.

Except for the need for faster break-in (even duplex) and for more tuning around, the operating procedure is thus seen to resemble that for meteor scatter.

— *Raphael Soifer, K2QBW/K1WXC, Harvard Business School, Soldiers Field, Boston 63, Mass.*

⁶ Prospects for 50-Mc. DX are not quite this bleak. During the summer of 1963 quite a bit of multiple-hop sporadic-E propagation was observed, and transcontinental contacts were made on numerous occasions. Despite the approach of a solar-activity minimum, 1963 conditions for E_s DX seem to have been as good as any year on record. — *Editor.*

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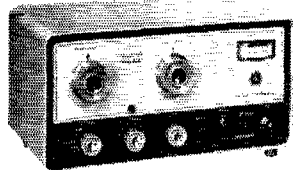
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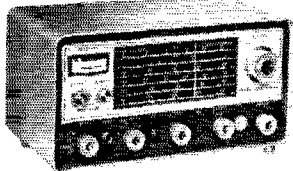
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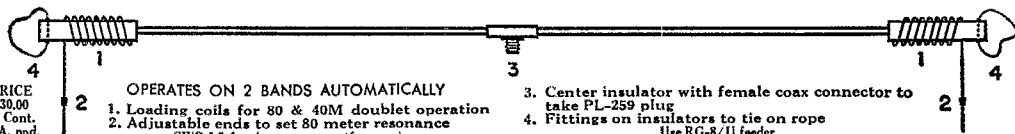
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70' LONG, 80 & 40 M

Power rating 2 Kw. P.E.P. or over



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OPERATES ON 2 BANDS AUTOMATICALLY

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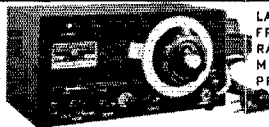
THE QSO THAT

STARTED ME UPWARD FINANCIALLY!

As the skip shortened up on 20 one morning and the VK5 I was QSO QSB'd out, a W8 called me. My contact with him was so long that it could have qualified me for the RCC! But it brought me something much more tangible: from this W8 I learned of the big money many hams are earning in commercial and public-safety 2-way radio maintenance. He told me how several years ago he had sent in a coupon from a Lampkin ad in QST—and received a free copy of "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE". It started him on the road to a high extra income.

So after signing him out in the log, I found and mailed the coupon from a Lampkin ad. Now I, also, am in high-paying mobile-radio maintenance.

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MFG. DIVISION, BRADENTON, FLORIDA

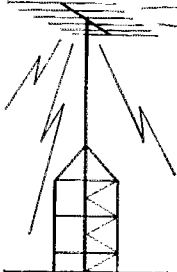
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Write Dept. A

Skylane PRODUCTS 406 BON AIR DR
TEMPLE TERRACE FLA

Harris's Theorem

(Continued from page 36)

- 1750 Phone rang. Hurriedly put low-pass filter back on.
- 1800 Cleaned coax relay. Heard lots of African and South American stations, but no answers.
- 2330 Suicide only alternative. Climbed beam.
- 2331 Found coax connector full of water. Dried it out. Climbed down beam. Ripped knee of pants. Skinned knee.
- 2345 Beam loads OK. Now band dead.
Feb. 19
- 0200 Two locals on 10 report vertical still louder than beam.
- 0300 Tried 80-meter doublet again — it won't load.
- 0302 Outside in yard — doublet down again. Neighbor advised it caught him under chin while crossing yard in dark. Apologized.
- 0400 K4MXF called — said I'm louder with key up than with key down.
- 0405 Tried keying v.f.o. — no backwave now — but a chirp!
- 0426 Eureka! Worked a T12 — he said I chirp!
- 0430 Pulled rig to pieces — driver and final bias supplies shot. No spare filters.
- 0450 Decided the heck with chirp — went back to v.f.o. keying.
- 1740 VE1 called me. Thought I was a DX station. Said I sound like a homesick chickadee.
- 1845 Worked a CO7. He wasn't happy about my "/W4". Thinks I am still in Montreal.
- 1900 Back to 20. Noted that receiver goes "dit — dididit — dit — dit — dit" when I tuned v.f.o. across band.
- 1905 Found v.f.o. running on seven frequencies at once.
- 1907 Banged on v.f.o. Broke 5763 with screw-driver handle.
- 1908 Replaced 5763. V.f.o. running on only one frequency.
- 1912 Tried final keying to get rid of chirp. Back-wave again.
- 1914 Inspiration! Detuned driver and doubled in final. Key-up signal only S5. Key down S8.
- 1918 Still no answers.
- 1919 Receiver quit. Filter shorted and took receiver with it.
- 1920 Took up stamp collecting. QST

NEW BOOKS

Understanding Transistors — And How To Use Them, by the Publications Division of Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Illinois. 5½ by 8½ inches, paper cover, 96 pages. Price, \$5.50.

This is a good manual for the hobbyist and experimenter who wants an easy-to-understand introduction to the subject of transistors. History and development of the
(Continued on page 182)

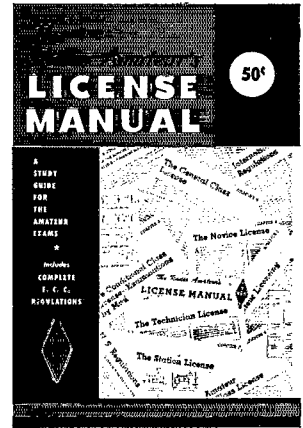


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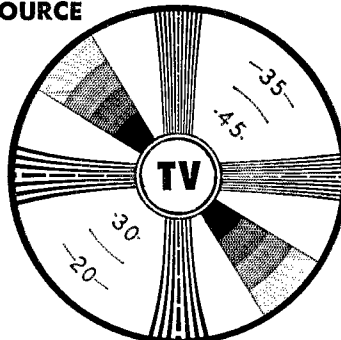
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transistor, performance characteristics and various types of circuits are covered. A special section in the booklet has circuits and details on construction of transistor devices, such as a code practice oscillator, audio amplifier, one-transistor receiver and capacity-operated relay.

RCA Receiving Tube Manual, RC-22, published by the Radio Corporation of America, Electronic Components and Devices, Harrison, New Jersey. 8¼ by 5¾ inches, 544 pages, paper cover. Price, \$1.25.

This is the largest RCA Receiving Tube Manual yet. More than one thousand receiving tubes (although RCA has yet to include gas-regulator tubes in this manual) with their data are in the book, and the text includes information on the new novar and nuvistor types. The theory, installation and application of electron tubes, and interpretation of tube-data sections have been revised, expanded and brought up-to-date. New material includes information on tube and circuit noise, and audio preamplifiers.

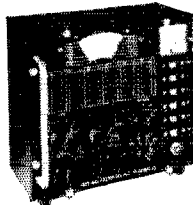
The tube data itself follows the same general outline as it has in the past. One new feature in the data section is the inclusion of "related types" after the main heading of a tube type. The related types are those tubes that have the same mechanical and electrical characteristics, except for the heater or filament voltage and current. (Example: 6CW4 — Related types: 2CW4, 13CW4).

The circuits section, located at the end of the manual, contains 33 circuits including those of interest to radio amateurs. Typical circuits are a 10-meter preamplifier, code-practice oscillator, all-purpose power supply, oscilloscope, and a 144-Mc. superregenerative receiver.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

(Act of October 23, 1962; Section 4369, Title 39, United States Code.)

1. Date of Filing: September 18, 1963.
 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: Richard L. Baldwin, 26 Ridge Road, Simsbury, Connecticut.
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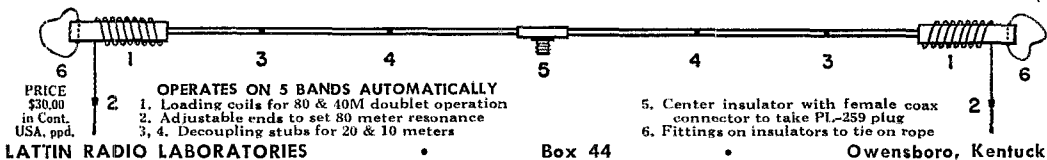
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- 3, 4. Decoupling stubs for 20 & 10 meters

5. Center insulator with female coax connector to take PL-259 plug
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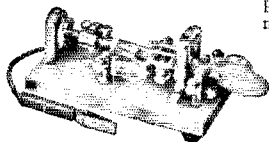
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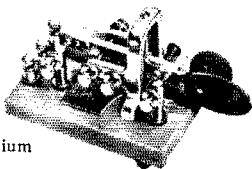


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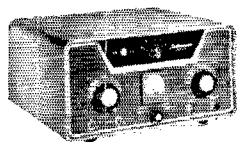


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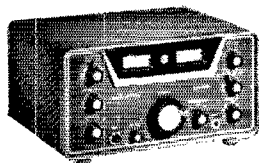


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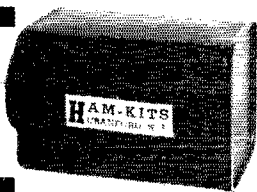


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W2, K2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J.

W3, K3 — Jesse Bieberman, W3KT, P.O. Box 264, Chalfont, Pa. 18914.

W4, K4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta 20, Ga.

W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.

W6, K6 — San Diego DX Club, Box 6029, San Diego 6, Calif.

W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.

W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.

W9, K9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois.

W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.

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VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.

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VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.

VE8 — George T. Kondo, VE8RX, % 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.

KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P. R.

KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.

KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.

KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z. (Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)



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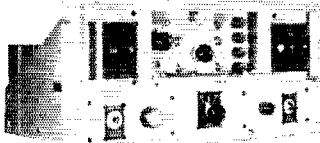
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HAM-ADS

(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 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Ads 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 that signatures and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(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.

MERRY Christmas to all. K6TVO.

MERRY Xmas and a Happy New Year from WOCVU. Fifty years on the air; 1913-1963. First Empire DX certificate awarded by K5GB on 1-Way SS1B to WOCVU.

THANKS to the 1485 plus hams and manufacturers who made the Dallas "Big Store" a Texas-size success. BCNU at the next one August 15, 1964.

MERRY Christmas to all de DL4QU/KINNC.

A MERRY CHRISTMAS and a Happy New Year to my friends all over the world from Al of W9EHW.

DAYTON Hamvention. Always the best, now better. New location. Wampers Ballerina. April 24-25. Box 426, Dayton, Ohio, for details.

S.R.K.C. Hamfest: June 7, 1964. Write for details after April 1, 1964. Starved Rock Radio Club, W9MKS/W9QLZ, RFD #1, Box 171, Oglesby, Illinois.

14 WEATHER Instrument Plans \$1.00. Saco Industries, Box 2513, South Bend, Ind.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. See description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

We buy all types of tubes for cash, especially Eimas, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDs: Uncased 88 Mhv. like new. Dollar each. Five/\$4.00. P. P. DaPaul, 309 South Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllogg 8-0500.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hv-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: Military or Industrial laboratory test equipment. Electromeriff, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Gayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 10:30 to 1:30 Monday through Saturday. Roy I. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan, Tel. NOrmandy 8-8262.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

TOROID RTTY Kit: Mark-Space discriminator and bandpass filters. Includes 4-88 Mrv and 1-44 Mhv uncased like new condx, toroids; information sheet, mounting hardware and six mylar capacitors. \$5.00 ppd. Toroids; specify 88 or 44, less capacitors. \$1.00 each. 3/\$4.00, ppd. KCM Products, Box 88, Milwaukee 13, Wis.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-Walker-5-1000.

SELL, Swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

QSLs? WPE? Personalized made-to-order one-day fast service. Largest variety samples, 25¢ (refundable). Sakkers, W8DED, Holland, Michigan (Religious QSL samples, 25¢).

C. FRITZ QSLs. Highest quality consistently for a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Ariz. (formerly Joliet, Ill.)

QSL SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elm, Hamilton, Ohio.

QSL Specialists. Distinctive Samples 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago 39, Ill. 60639

QSLs; samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLs "Brownie." W3JH, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSLs-SMS. Samples 10¢. Malco Press, Box 375 M.O., Toledo 1, Ohio 14107.

DELUXE QSL. Petty, W2HAZ, Box 27, Trenton, N.J. Samples, 10¢.

QSLs. Special, 100 50 Star U.S. Flags on glossy cards, \$3.70. Ppd. Other samples 10¢ or 25¢ refunded. Dick, W8VXX, Rt. 4, Gladwin, Mich.

QSLs-SWLS, 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7575, Kansas City 16, Mo. 64116

QSLs. Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

CREATIVE QSL Cards. Free, new catalog and samples. Personal attention given. Wilkens Creative Printing, P.O. Box 1064-J, Atascadero, Calif.

QSLs, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs, SWLS, XYL-QMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazzy, unparaphrased cards (WOW). Rogers, K9AAB, 961 Arcade St., St. Paul 6, Minn.

SUPERIOR QSLs, samples 10¢. Ham. Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLs 300 for \$4.35. Samples 10¢. W9SKR, "George" Vesel, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041

QSLs. Samples 25¢. Rubber stamps, name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo. 63118

QSLs 3-color glossy, 100, \$4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegel Ridge, Milford, N.J.

QSLs. Kromekote 2 & 3 colors, attractive, distinctive, different. Free, ball point pen with order. Sample 15¢. Agents for Call-D-Cal decals. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

QSLs \$2.50 per 100. Free samples and catalog. Garth, Judith, N.J.

QSLs. All kinds, free samples. W7IIZ Press, Box 183, Springfield, Ore.

QSLs. Stationery. Design your own. Samples 10¢. Brigham, Colson St. No. Billerica, Mass.

AT Last! Something new in QSL cards! All original designs. Send 10¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

PHOTOSTAMPS of your station with gummed back for your QSLs, 100 \$1.50. Samples 10¢. Morgan, W8N1W, 443 Euclid, Akron, Ohio.

QSLs from the "Hobby Horse" printer. Glossy, red and green. \$2.00 per 100 postpaid. Free sample, Hobby Print Shop, Umatilla, Fla.

DON'T! Buy QSLs until you see my free samples. Bolles, W5QWC, Box 9363, Austin, Texas.

QSLs. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs 100, \$2.50. Samples free. Amec's Printery, Bob, W9FXO, Box 13A, Oak Lawn, Ill.

RUBBER Stamps \$1.00. Call and address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N.J.

RUBBER Stamps to make your own QSL cards. Complete QSL kit includes 3 stamps, ink and pad, also 5 year certificate for QTH and call changes. Complete \$6.50. Write for free information and sample impressions. E & R Rubber Stamp, 50 Gerald Rd., Kaintoul, Ill.

RUBBER Stamps for hams, sample impressions, W9UNY, Hamm, 542 N. 93, Milwaukee, Wis.

SPECIAL: 3-line rubber stamp, \$1.00. Andrew Travis, 2002 West 8th, Austin 3, Texas.

1 1/2" Call QSLs (2 sides printed) 100, \$3.15. Sample free. Gariepy, 2624 Kroemer, Ft. Wayne, Ind.

BLANTON'S QSLs. Write for samples. Box 7064, Akron 6, Ohio.

1964 QSL Catalogue. New designs. 10¢. Longbrook, Box 393-A, Quakertown, N.J.

QSLs-SWLS, 3-colors, 100 \$2.00. Samples dime. Bob Garra, Leighton, Penna.

FINE QSLs. Dime. Filmercrafters, Box 304, Martins Ferry, Ohio.

QSLs. Large selection of styles, including photos. Fast service. Samples dime. Ray, K7HLR, Rte. 3, Twin Falls, Idaho.

Q-STAMPS Add a smile to your QSL's. Your phot in either of two postage-stamp sizes: 100 small or 50 large. \$2.00, per gummed-back, perforated sheet. Free samples! Send self-addressed, stamped envelope to Q-Stamp, Box 149, Dept. 1-A, Gary, Indiana 46401.

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QUALITY QSLs. New designs monthly. Samples, 10¢, 25¢, 50¢. Savory, 172 Rosevelt, Weymouth, Mass.

ATTRACTIVE QSLs: Guaranteed largest variety of individual samples, (25¢ deductible) Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSL-SWLS. Rainbows. Cartoons. Unusual styles. Highest quality. Immediate service. Low prices. Samples 10¢ refundable. J. Harms, WA4FJE, (WIGET, W2JME, W3COP), 905 Fernald, Edgewater, Fla.

QSLs, Samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60303.

INTERESTED in two-meter linear amplifiers, transmitters, receivers, etc. If the price is reasonable, for members of St. Mary's Radio Club, or as tax exempt donation to Missions. K8WLB, St. Joseph's Mercy Hospital, Centerville, Iowa.

304TL tubes wanted. Also other xmtrs 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.

HAM Discount House. Write us for lowest prices on Ham Equipment. Factory sealed cartons. Specific equipment wanted. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

CALL Cards, badges, decals, "All the Goodies". Illustrated literature with samples 25¢. (Clubs!) Write on your letterhead for special prices. Decker, K1VRO, c/o Errol Engraving, 36 Hampden St., Westfield, Mass. 01085.

HALLCRAFTERS SR-150 amateur band. Fixed/mobile receiver and its accessories for \$695.95. Contact Michael Reed, 1021 Garrison St., Fremont, Ohio, Tel: 332-3453.

COLLINS 75A3 with product detector. \$300; Collins 32V2, \$200. Must sell, John P. Tiedeck, WA2SDE, Indian Run Farm, Woodstown, N.J.

ATTENTION! Mobiles Heavy-duty Leece-Neville 6 volt 100 amp. system, \$50; 12 volt amp. system, \$50; 12 volt 6 amp. system, \$60; 12 volt 100 amp. system, \$100. Built-in silicon rectifier alternators 12 volt 60 amps. \$100; 12 volt 100 amps. \$125.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel Dewey 6-7388.

MUST Dispose: 82 copies Proceedings of the IRE, 3 volumes complete, 1926 to 1952. Real bargain for lot. Write for list Mrs. Miriam Y. Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel: 521-2055.

WE Have some excellent bargains in new and used antennas, transmitters and receivers. Write for list. Hornet Antenna Products Co., Box 808, Duncan, Okla.

SELL: KWM-2 Sr., 11858, 312B-5 Sr., 10390, 516F-2 AC power supply, in new condx, used but few hours. \$1200. Rev. A. J. Tamulis, W9POS, Macon, Ill. Tel. ROCKWELL 4-3795.

USED Dial telephones. \$4.00; Magnet, \$8.00 plus postage. Guaranteed in working condx. Write for information and quantity discount. John Vogel, Owendale, Mich.

WANTED: Parts, sets, as is GRC-9, BC-610, GRC-27, Autodyne, 236 Park Avenue, Bethpage, L.I., N.Y.

PARTS Sale: Too many—both new and surplus. New K, W, Modulation transformer, PE-103's, tubes, filament transformers, relays, etc. What do you need? Send stamp for list, W4NJE, Box 4192, Lynchburg, Va.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel: GArfield 471-2020.

STEAM Engine driven generators. 500 watts AC/DC, kits, \$34.50 up, Catalog, \$1.00 refundable. Richardson Const. Corp., Sterling, Va.

WINDMILL Generators: 300 to 2000 watts kits, \$19.00 up, Catalog, \$1.00, refundable. Richcraft Engineering, Sterling, Va.

CASH promptly paid for your ham gear. Trigger, 7361 North, River Forest, Ill. PR 1-8616.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Irones, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. UL 5-2615.

PROFESSIONAL Quality microphones 440SL, 440-444 Shure Bros. Send card for attractive offer. W. J. Miller, 55 E. Washington, Chicago 60602.

\$1.00 will change all your old xtals to new freq. where you want them, safe etching method, complete, no gimmicks, air-mailed. Ham-Kits, dummy loads, Crantord, N.J.

GONSET Twins, G-77, G66B, 3-way pwr. supplies, with mike, cables, ant., ready to go on the air; \$200. Bob, K6TKZ, 637 E. Harvard, Ont., Calif.

ESTATE OF K9DMZ: Heath HX-30, 6 meter SSB. used only 2 months; Johnson 6N2 and Eico modulator factory-wired. Reasonably priced. Contact K9PRB, 329 Dwight, Joliet, Ill.

COMPLETE stations for sale: HQ170C and GSB100: VHF-1 and H.B. 2-6-10 receiver; all operating and very clean. No reasonable offer refused. Bob, 626, 26, Cairo, Ill.

WANTED: All types of aircraft or ground ratios. 17L, 618F or S 388, 390, GRC, PRC, 51J, RVX. 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, W2KUU, 308 Hickory, Arlington, N.J.

COLLINS Owners! Work AM: Wired kit, \$5.00. No soldering, holes, chassis removal! Switch In-Out! (State model) Kit Kraft, 8763 Harlan, Ky.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

COMPLETE Ham Station with Collins S-Line transmitter and receiver, 516F-2 power supply and 312B-4 station control, brand new. Present market price over \$2100 plus provincial taxes. Will consider all reasonable offers. Write J. Long, 920 Chenier Ave., Ottawa 13, Ont.

WANTED For personal collection: QSTs March, April, May and August 1916; ARRL Handbook Edition 1. W1CUT, 18 Mohawk Dr., Unionville, Conn.

DOES Anybody have an old radio made by Kennedy or Wireless Specialty Co.? Will also buy other pre-1925 radios. Worcester, R.D. #1, Frankfort, N.Y.

FOR Sale: Complete instructions including 28-p. booklet and 26" x 36" schematic for converting the AR13 transmitter to AM and SSB. \$2.50. Satisfaction guaranteed. Sam Appleton, K5MK1, 501 No. Maxwell St., Tullia, Texas.

COLLEGE-Bound! Need money! Complete station: Gonset G-50, \$250; E-V 951 mike w/desk stand, \$15; AR-22, \$15; Hy-Gain 5-EL 6M w/v 12 ft. mast, \$70; 100 continuous feet RG8/U, \$5.00. Package: \$280.00. RCA Senior volt/hmyst, \$45.00. Contact Bob Goldfarb, WA4DMM, 1414 Madison St., Hollywood, Fla. 33020.

SELL: Viking II with Heath VFO, \$125.00; HQ-110 revr, \$135.00; HB Custom KW, \$300; Elmac A54 with DC to DC conv. 12v, \$40.00; Regenc conv. \$40.00; Hall S2OR with Q-mult., \$40.00. WAZNVN, Jack Swanson, 33 Central Ave., Red Bank, N.J.

DX-20 \$25.00. Bill Martle 15 N. Main St., Carthage, N.Y.

COLLINS Grab boxes (a treasure of goodies), \$2.50; Collins xmtrs for transceiver supplies, \$5.00; flexible hi-voltage wire 30KV 16-18 ft. coils, \$1.00, Hunter Bandits, \$460; Johnson Thunderbolt, \$280.00 20-A, \$115.00. We have most everything Write Emrad, P.O. Box 3564, Urbandale Station, Des Moines (50322) Iowa.

MUST Sell Collins KW-1 transmitter, Excellent condx. Will sell to the highest bidder. Friar Tom, St. Anthony Friary, Hudson, N. H.

FOR Sale: KWS-1 No. 449, \$700; 75A4 No. 4871, \$475. Both reworked by Collins Radio recently. KWM1 with all accessories, No. 761, \$600; transceiver for 30S1, 11.5-220/3800 VDC at 800 Ma., with matching choke, new, \$75; choke is also used in KWS1, B&W L100A, new, \$175; 813s, new, \$5; 4B32, new, \$3; 4-400A, new, \$20; TS-375 A/U VTM, \$50; transformer, 115/3750-03750 at 500 Ma., \$40. Matching choke, \$10; 12V, 50A, Leece-Neville alternator system, \$50; roller coil from BC375, \$35; 15 M coils for Gonset Bantam beam, new, \$10; Stancor, 45/7 1/2 at 100 mtd., \$10; oil capacitor, 100 mtd., 4 KV, new, \$35; KWM1 mobile mount, new, complete, \$35. Matchbox with directional coupler, \$50. Maj. James W. Craig, W3VRO, 1646-B Sycamore Dr., Blytheville AFB, Arkansas 72317.

B & W 5100 transmitter in exlnt condx. Stable as a rock for beautif beautiful c.w. and A.M. \$220 or your best offer. WA2PPE, Randy Brook, 25 Parkway Ave., Bronxville, N.Y.

ESTATE of K6LDD, Viking Ranger, \$130.00; RME 6900, \$240.00; BC-348-0, ext. supply, \$40.00; RCA Volt/hmyst, Jr., \$20.00. Mrs. M. A. Casey, 615 West 11th St., Corona, Calif.

SELL Or Swap for ham sound or photo gear 16 mm films or equipment. Metco metalizing gun, G-E recording volt-ammeter. L. Meister, 321 River Rd., Nutley, N.J.

COLLEGE: Must sell Johnson Pacemaker, Exclnt SSB, AM or CW rig. In mint condx, \$175.00 or your best offer. K0VBA, Wallace Gingerich, Goshen College, Goshen, Ind.

SELL: New Loudenboom Mark III rotorator. Cost \$225, prepaid to you for \$170. W0AIIH, 814 4th St. So., Virginia, Minn.

WANTED For cash: NC-100, -X, NC-101, -X, also Meissner FX. Only top mechanical condition. Need not operate electrical. State price. K0CF5, 8527 Trouville, Playa Del Rey, Calif.

SR-150, AC and DC power supplies, mobile rack, Three months old; \$200. No time to operate. John Norton, WA2SOZ, 11 Audley Circle, Plainville, N.Y.

SELL: DX-60 and HG-1 VFO. In exlnt condx! \$100. Bob Walker, 1025 Catalonia, Coral Gables, Fla. Tel: H1 5-3366.

FOR Sale: 2 kw. PEP linear amplifier using pair 4-250As in pi network. Jennings vacuum variable spare tube, \$175.00 with power supply using 3-B28s, 269; 500 watt modulator with Multi-Match transformer, \$49.00, with power supply, \$98. Everything for \$349.00 including Bud deluxe dual rack 42 in. high, 5-3/2" square, Simpson lighted meters. Was custom-built at original cost of \$2500. J. L. Wyner, W1PST, Tel 617-566-0427, 33 Martha's Line, Chestnut Hill 67, Mass.

OLD C. Dayton XLT20 for sale. In gud condx, including tubes. W3CFW, 324 Main St., Reisterstown, Md.

HEATH Sixer HW29 transceiver, 12V power supply, mike, crystal, \$40. W. Steen, 8 N. 3rd St., Selah, Washington.

SELL: Eico sweep generator, model 368, like new, \$45.00; Eico grid dipper model 710, like new, \$20. K2VGM, 13 Acorn Road, East Rockaway, N.Y.

75A3 with 3 Kc filter, xtal calibrator, manual, mint condx, \$300. Globe King 500B with manual, in exlnt condx, \$350.00. Will ship, you pay express. Florian Smith, K5MY S, 100 E. Main, Ada, Okla.

FOR Sale: Knisht R-55 receiver. WN4NUJ, Briercliff Rd., Knoxville, Tenn.

FOR Sale: Viking Ranger, factory wired, PTT, FB condx, with mike; Johnson low-pass filter. Dow-key antenna changeover relay; factory rebuilt Vibroplex bug. All for \$180.00. K2QDC, 71-11 Austin St., Forest Hills, L.I., N.Y.

FOR Sale: DX-100, best offer over \$140. K2MEM, Tel EM-3-6517, Blue Point, L.I., N.Y., 11715.

SELL: Professionally wired Eldico 1K-751V like new w/ins, book, case, and xtals for 80, 40, 20, 15 and 10 mtrs. \$29.00 or highest offer. Johnson semi-auto bug, \$9.00. Wanted: Vibroplex Original, K1WKN, 89 Stadelj Rounk Rd., Danbury, Conn.

SELL: SX-110, DX-35, V-F-T for \$130.00 or separately. New condition, Lawrence Krasnow, Pin Oak Lane, White Plains, N.Y.

WANTED: For cash or trade: Atwater Kent variometer Model radio, Brandes Superior or Murock headphones, Wm. B. Duck Catalog, State price and condition. R. C. Baughman, 981-22nd St., Mason, Iowa.

FIX your neighbor's TV, make friends. Good Hickok TV alignment gear, 193B 5-in. scope, \$90; 691 marker adler, \$80; 660 Universal TV-FM alignment generator with 38 crystals, \$125.00. All one lot \$265. Jones MM2 52 ohm MicroMatch, \$10; professional photo print dryer, \$20 (trade). May deliver on trip east, or ship express collect. K7MSL, Carpenter, Wyoming.

DRAKE TR-3, \$550; AC supply free! Jim, Box 11437 Ft. Worth, Texas.

PMR-8 and 1070 power supply in mint condition, \$145 or deal on Shawnee, K8OXI, 24131 St. Mary Ct., Farmington, Mich.

FOR Sale: Collins 30L1, in mint cond. Operated about 8 months on 220 volt only. Four new 811As installed and used one week. Will ship prepaid to first check for \$385.00 with cables and manual. Jake Phares, K5WYJ, 445 Jay St., Beaumont, Texas.

FOR Sale: SR-150, mod. PS-150 AC pwr. supply; PS-150 DC pwr. supply; MR-150 mobile mount, New-Tronic ant. Turner 350 mike (station 4 months old) \$600.00. Keith Meadows, Arthur, Illinois 61911, WA9AME.

TRANSISTOR corres. course, Philco with kit, \$60. Local preferred. Steve Gray, 219 West 81st St., N.Y. 24, Tel: LY 5-9244.
SELL: 20-meter Swan transceiver; A.C. supply, \$330.00; GSB-201 final 1500 watts P.E.P. \$240.00. KICNK, Friedman, 76 Kay Rd., W. Haven, Conn.

F/W Valiant, \$225.00; K.W. Matchbox, \$75.00; Elmac PMR6-A with AC pwr. supply; DX-40, \$35.00, K3DPO, 166 Carnation, Pittsburgh 15229.

WANTED: 6-meter transceiver with 12 volt power supply. Will trade new hand-rubbed oil finished Springfield 03-A3 cal. 30.06 Sporterized rifle with Balvar mount. Bench fired only. Slep Greenberg, WBCVCK, c/o Bosser Pharmacy, 539 Claremont Pkwy, Bronx 57, N.Y.

PHILADELPHIA: 120-watt 75 and 80 meter transceiver, \$55; 15-meter converter, output to 80 meters; Dumont 'scope, mod. #247, 2 pron-pitch motors, converted; 32" enclosed panel-rack; new Rohm 50 ft. tower model PT-6 and base for concrete, sells for about 200. First check for \$125. With thrust bearing. K3BPK, David Gindin, 6504 Roosevelt Blvd., Philadelphia, Penna.

SILICON Rectifiers, 400 PIV, 0.5A, 4 for \$1.00 ppd. While they last! Surplus Sy, 71 Corbin Pl., Brooklyn 35, N.Y.

SELL: HBR-16 (Oct. 1959 QST) in oversized cabinet, with 100 kc. calibrator, and other added features, \$75.00. Also DX-35, with T/R switch and companion VFO (sold as unit only), \$60. F.o.b. this QTH, Tom Johnson, W3TDZ, 305 Bickmore Dr., Wallingford, Penna.

RTTY Equipment for sale: MXD (3-headed TD) sync motor driven, \$25.00, f.o.b. 11/16" strip paper 35¢ each or 3-1/10 any quantity, f.o.b. 88 mby toroids, 75¢ each, W9DGV, 711 44th St., Rock Island, Ill.

TRADE OR sell: Financing for right party. Factory wired and tested Invader 2000 transmitter, National NC-303 receiver with matching spkr and xtal calibrator, Nine months old, less than 50 hours operating time. F.o.b. Bainbridge, Georgia W4ZYI, Clyde.

SELL OR trade for gnd 6 meter rig, DX-20, \$20; S-120, \$35.00, KT-200, \$45.00. All in gnd condx. WB2ADT, 248-24 87 Dr., Bellrose 26, N.Y.

WANTED: Kilowatt Matchbox, HRO-60, coils AA, AB, AD, W5JNO, 6714 Gaston, Dallas 14, Texas.

ELMAC 4-400A, new, W1VG, L. A. Morrow, 99 Bentwood Rd., West Hartford, Conn. 521-0416.

NEW Embossed QSLs (raised print), \$5.90 per 100; 2-color, \$8.00. Samples 25¢. Larry Johnson, WA6KLU, Box 1824, Glendale, Calif.

FOR Sale: Complete Sideband station, Swan SW-120 transceiver, Heath HP-20 supply, Electro-Voice 72SR mike and stand. In perf. condx., used less than 24 hours, never mobile, \$225.00. W8PEY, 204 North James, Ludington, Michigan.

FOR Sale: BW model 425 52 ohm low-pass filter, \$8.00; BW model 380B electronic T/R switch with coax T-fitting, \$12.00. Transistorized mobile power supply for the Gonset G-76, \$45.00; Heath mobile tuning meter, \$4.00; Heath SG8 RF signal generator, \$12.00; Mosley 10-15-20 meter "tote-tenna", \$35.00. William Matulaitis, 224 New Hampshire Ave., Bay Shore, L.I., N.Y. 11706, WA421A.

SELL: 32 S1 with AC supply, less than 2 hours use. Will throw in old Dumont 'scope, \$50.00. Edico SSB 100F linear, \$300; Edico SSB 100F exciter, \$400; Transenna I-R switch, new \$45.00; Edico low pass filter, \$5.00. Sony CS-300 stereo tape recorder, \$225. Concertone professional recorder, 7/4" and 15", five heads, 10" reels, \$500. All f.o.b. Lamb, 1219 Yardley Rd., Morrisville, Penna.

F/W Valiant, HQ-170C, D-104, G-stand, Dow-Key relay, Drake low-pass filter, \$475.00. John Folino, K1OBA, 78 Main, Watertown 72, Mass. 617-924-3768.

MUST Sell: Central Electronics 200V, \$650, 100V (late model), \$475; 600L, \$275; MM2, \$70; 75S1, \$350; Natl. RBL-5 (15 Kc to 600 Kc receiver), \$65; H.T. 33A Mark, \$450; RTTY mod. 6, with carriage, rets., and line feed, \$75; converter CV57/URR, \$75; ATC-1, All band 12 V. converter, \$35. Ameco SNL 12V. Squelch & noise limiter, \$10. Facsimile transceiver FXI-B, \$85. W-U telefax, \$20; BC-221, \$35.00, Edico TFP-1, \$35; RCA-IT5 television 1939, \$50. H.P. V1VM 400H, \$200. Eico VTVM, \$20. Simpson 479 gen. \$175. Hickok 27X, \$185. Sid Ruger, W2FUR, 1096 Laux Pl., N. Bellmore, N.Y. Tel 516-925-6876.

FOR Sale: Serviceman wants quick sale of 30 L 1 exlnt condx. \$400 or best offer. K1EJO, 6 Summit St., New Milford, Conn. Tel: EL-4-8154.

NEW 6146 G-E tubes, \$2.95, W4GJO, Box 1294, Sarasota, Fla.

FOR Sale: Going Collins: Complete Ring 4 months old, in mint condx. Heath MAudster, aligned by Heath, \$350. Drake 2B QBO and calibrator, \$260; Heath Warrior, \$225; Johnson 250 Matchbox with coupler, \$60; Dow-Key relay, new, \$10.00. Extra tubes and B&W linear switch. First check for \$840 takes all. Swap or sale: Apache and SX-111, \$300 or swap for transceiver. WBZHZ, Saul, 2023 Quentin Rd., Brooklyn N.Y. DE-9-2897. HT-37 for sale. Perfect in every respect. In original shipping carton, \$350.00. Will deliver. H. B. Walsh, 29B Glover Ave., Lansley A.F.B., Va.

SELL: TV camera RCA HA-1, control unit HC-1 and Tripod. Connects to TV set. Cost \$1,100. Like new. Will trade with cash or best offer. Need Ampex professional tape recorder, studio mics, in Collins ham equipment, W2APR, 2 Brookside Dr., Baldwin, N.Y.

CENTRAL Electronics 200V, \$650.00; Hallcrafters SX-101A, \$300; Electro-Voice mike, mod. 664, \$35.00. Meticulous condx. K4NME, J. D. Logan, 350 High St., Salem, Va.

SELL: Valiant, Used 30 hours: \$225.00. Arthur Tait, K9DHC, RR #2, Box 129, Goshen, Ind.

FOR Sale or swap: one new and two slightly used 833A tubes with 6-8 meter, VFO meter. Want: vacuum variable condensers such as UCSL 250 and UCGL1000, or UCGL2000 and 4CX300A tubes. W5KXG, 2011 Douglas, Midland, Texas.

TRADE With cash: NC-300 with xtal calibrator, 2 and 6 meter converters, cabinet, exlnt condx., cor. 57 or JP Volkswagen. W2MAE, Bennett, 40-11, 67th St., Woodside, L.I., N.Y.

WANTED: Invader. Will consider complete station with NC-303 or HQ-170. WA2WYT, 7 Honeyman, Succasunna, N.J.

SELL: HT-37, \$350; Gonset 101, \$225; SX-11, \$175. Perfect condx. WA2OGT, George Gromm, 1622 President St., Brooklyn, N.Y. PR 3-8038.

SELL: Gonset 11-2M, hi-fi, Hogen-Presto turntable, cartridge and 2-001 diamond needles, Nyaco pre-amp., Eico 14 w. amp. and Aktron 8" coax spkr and cabinet, Box 124, Tulane University, 31 McAlister Dr., New Orleans, La. 70118, Phone: 504-866-2741-484.

HALLCRAFTERS S-107, in gool condx. Highest offer. Will ship. Robin Martin, Box 63, Glen Head, N.Y.

MULTIMETERS, R.F. meters: Modification, calibration, repair, special ranges, special dials, special custom applications. See our ad July 1963 QST, p. 179. Med. Electronics, Inc. United Instrument Laboratories Div., 102 W. Jefferson St., Falls Church, Va.

NEWLY Started Swedish amateur radio club seeks donors of radio literature, QST, CQ, 73 Maxazines. We pay postage. Skelleftea Radio Amatorer, Furtenbacksgrand 6, Skelleftea, Sweden.

HEATH HG-10 VFO, in exlnt condx; \$20.00, WA6ZMR, David Fisher, 243 Cimmemon, Glendora, Calif.

HT-33A, in exlnt condx, w/current modifications: \$550.00, W5ARV, Rte. 1, Haslet, Texas.

IRE Proceedings wanted, WA2VSF, 200 Highland, Ithaca, N.Y. 14850.

SALE: HQ-145X, clock, calibrator, \$210.00; VHF-152A, \$30; Ranger, \$135.00; Sixer, \$35.00; DX-35, \$37.50. James Cotten, W5PY1, Weatherford, Texas.

COLLINS KWM-1 transceiver, AC supply, noise blanker. In exlnt condx. Shipped prepaid U.S. \$500. Lt. Col. Bob Foss, 36 Sugarloaf Lane, Bangor, Me.

WANTED: Complete BC-610 and speech amp. Would prefer antenna tuner. Will pay shipping. Please state condition and price. Lee Trick, WA8CWO, 214 N. Saginaw, Durand, Mich.

SELL: SX-99, \$85; Matching spkr, \$8.50; B&W FC-15 choke, \$4.95; B&W plate choke, \$2.25; 2 RCA 811-As for \$5.00. Jack, 1164 W. Forest Ave., Decatur, Ill. 62522.

KVM-2 Transceiver with PM-2 power supply and MM-1 mobile hand microphone. Just Collins factory tuned. Cables, instrux book, misc. spare parts, \$950. Don Snodgrass, 4802 McKinney, Dallas, Texas.

RANGER. Excellent appearance, operation and calibration. Sequence keying and push-to-talk per factory. New function switch. Instruction manual, inquiries answered, \$120.00 F.o.b. Ben Holloman, W5ENE, 9916 Harwich, Dallas 20, Texas.

PAWNEE with Ameco Nuvistor preamplifier, \$215.00; 6-element Telrex beam, ground plane and C-D rotator mounted on heavy aluminum tubing, you remove, \$25. Nat Bersin, W2GSK, 451 Westminster Rd., Brooklyn, N.Y. 212-1N2-1100.

TUBES: Diodes, transistors wanted. High cash prices paid. Astor Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

COLLINS "S/Line", 32S1, #11351, 75S-1, #10862, 516F2 supply, spotless condx. Also original boxes and manuals. \$875. Elmac socket for 4CX1000 tube (SKR80A) new! \$25.00. Jack McVicar, K9BOQ Adel St., Jansville, Wis.

SWAN 175 transceiver. HP20 with built-in spkr; SW12A Topaz exlnt condx, \$225.00. Shipping extra. Prefer pick-up deal. W2PZS, Phone TRenton 1U-7-3509.

SX101 Mark III, Come and try it. Take it home for \$175, K9LFG, Raymond R. Roy, 758 Cobb Blvd., Kankakee, Ill.
G-76 Gonset transceiver, v. clean, in original carton with manual, \$250. Richard Subin, K2EJVW/3, 3250 North Broad St., Philadelphia 40, Penna.

FOR Sale: Collins 75S1, \$325; Central 100V, \$450. W8EXJ, Vern Pake, 1969 Manz St., Muskegon, Mich.

SELL: RME 6900 revr, \$200; Hallcrafters S-85 revr, \$45; 3" homebuilt hambands \$25; Eico 425 PP 'scope, \$20; HC221 Q freq. meter w/book less PS, \$50. All in exlnt condx. F.o.b. Phila. W3VXE.

CLEAN Equipment, Johnson Viking 500, factory-wired and factory reconditioned recently. Jones Micro Match and D-104 mike. All for \$400. Also NC-303 plus National spkr, \$200. First \$550 takes all. Waman S. Hasset, W1VH, N. Main St., Petersburg, Mass.

SELL: HA-1 keyer, \$40; SX101 M3 best offer over \$100. Local sale preferred on receiver. Will not ship. sry. W9MZZP, Niles 48, Ill. Phone YO-7-7525.

DRAKE 2-B, spotless, used 20 hours, \$235; Eico 720 transmitter, \$45; Heath SWR bridge, \$10; Dow T-R switch 60-GZC, \$10. Package deal: \$280. K3RSO, 821 Montico Rd., Wilmington 3, Del.

POWER Supply parts. 600V to 4500 V. Cheap. Send for list. G. Pollock, 314 Wilde Ave., Drexel Hill, Penna.

WORLD Radio Laboratories has big discounts on overstock of used equipment, due to so many trades on the fabulous new Galaxy SSB transceiver. Save on reconditioned equipment now. Write for our latest "Blue Book" list, over 1,000 items. WRL, Inc., W4CFLQ, Box 919, Council Bluffs, Iowa.

TRADE: Want high grade shotguns over and under of doubles preferred, others considered; Collins 75S-3, Heath OP-1 'scope, Precision 88 VTFVM, K-W pmer supply 5000 volts 3 amps, \$100. Variacs: all equipment in exlnt condx. WA2CVV, Box 337, Pearl St., Newfield, N.J.

SELL: Lincoln 6-meter rig, new, \$40. WA9BYR, 119 Hillside, Barrington, Ill.

APACHE: SB-10, both for \$195.00. Gud condx. Gone transceiver. W3CO. 7116 Longwood Dr., Bethesda 34, Md.

SX-140, \$100; HT-40, \$70, slightly used, approx. 20 hours. WA8GWV, 1250 Pearson, Ferndale, Mich.

SELL/Trade Collins KWM-1 SSB/CW transceiver mint, Hallcrafters SX-101A receiver. W9OZY.

MUST Sell due to death of husband WAYUW. NC-300 receiver, spkr. \$200; Valiant I transmitter, mike, cables, serial No. 25502, \$200. All in gud condx. Will ship. E. Rogers, 804 S.E. 14 Dr., Deerfield Beach, 33441, Florida.

SELL Or Trade: Gonset G-76 and both power supplies. Webster Bandsman antenna and bumper mount. All for \$385, best trade or offer. Melvin Topacka, K6AFC, 3225 Baker Dr., Concord, Calif. 682-1268.

FREE: Write for copy of latest issue Hams Hobbymart. Hundreds of buy, sell and trading ads. c/o Kruse, P.O. Box 38, Rowayton, Conn.

NATIONAL HRO-60 and Collins 32V-1 for sale. Both exceptionally clean, unaltered and with manuals. Receiver complete with all coils (including AC coil), matching spkr, DCU-50-2 calibrator, HRO-60, only \$259; 32V-1, only \$149. Will package and ship prepaid on receipt of certified check or money order. Larry Guenther, W9ACS, 1065 Pine St., Galesburg, Ill.

WANTED: Commercial, Military, All types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URR, URM, TS, 618S, 17L, 51R, others. Ritco, P.O. Box 156, Annandale, Va.

ELECTRONIC Bargains, Discounts from net, free brochure. Franklin Electronics, Box 51b, Brentwood, N.Y. 11717.

FOR Sale: HT32B, \$450; HT41 in original carton, \$295; 75S1, \$295. If interested in any piece contact K5CZC, M. L. Sowell, 3206-32nd St., Lubbock, Texas.

VARI-TYPER Model A20, Ser. 510603, lining attachment, with 10 fonts and Craftsman lathe, model 109.20630. Either or both for a rig. Watch got? R. Kleinhenn, Fostoria, O., K8EAJ.

SELL: HX-10 Marauder. In immaculate condx. used by little. Guaranteed to be scratch-free and in perfect electrical and mechanical condx or no deal. Wiring exceeds factory job. Best offer over \$300. Duane Brummel, K9SFI, Box 340, Palmyra, Wis.

COMPLETE Station: Viking II, VFO, Matchbox, Hallcrafters SX-71, electronic bug, J-30, phone. \$350.00. Bolling, 18608 Parkmount Ave., Cleveland 35, Ohio.

COLLINS R-390/URR receiver. In beautiful condx. Trade for similar condx Collins 511-4. Contact K2IOCC.

CHEAP. F/W Challenger and Johnson 122 VFO, \$90; Johnson low pass, \$8, 150 ft RG7-8-U, \$8; mike, \$4.00. Got more. WB2ENK, NYC, TR 3-0007.

SALE: Health Monitor scope, HO-10, \$48 and VFO, VF-1, \$140. Both in kit form in original packing. KOAMY, Gary Clinton, 1511 7th Ave., Scottsbluff, Nebraska.

ASTATIC D-104 mike and press-to-talk stand, new, \$22.00; Homebrew model 9138 G-grid, all band, net amplifier, \$35.00; new hi-fi Roberts 97 stereo tape deck with 2 Nortronics recording amplifiers, \$150. Will trade. Inquiries answered, C. M. Pruett, K4BH V, 2060 Highwic Rd., S.W., Atlanta 11, Ga.

HEATH Apache, \$195; SB-10, \$80; SX-111 Mark I, \$200. All in A-1 condition. Tom Markley, 500 So. College, Salinda, Kansas.

KWM-2, 516F-2 power supply and SM-1 mike, same as new. Never been off operating desk, never been out of case. \$895.00. Will ship in original cartons. M. B. Johnson, 1135 Tamarack Trail, Crattanooga, Tenn.

GPR-90 with speaker, perfect. \$325.00; 32V-3 exlnt condx, \$225.00, both for \$500. W0HJC, 9011 Bellevue Blvd., Omaha, Neb.

EIMAC 4X500A, \$50. Brand new, never used. K1NFO, Mark Kubelbank, 152 Ranchwood Dr., West Haven 16, Conn.

SELL: Seneca VHF1 and SX28A with matching skr and Ameco 6 and 2 meter converters with P/S. Seneca has been modified for equal FB phone and c.w. for both hands and receiver and speaker custom paint-sprayed this summer. Gud condx. Eugene Likes, WA8DYL, 4162 Canterbury Rd., North Olmsted, Ohio.

NOVICES: Globe Chief 90 with 10 crystals. \$40.00. Wendell Morrill, WA0CRJ, Madison, South Dakota.

NC-300 w/xtal calibrator, exlnt. \$200; Eimac AF-67 w/AC power supply, \$100; Gonset Super Six (12V) W/Noise clipper, \$35. Harry Chahl, 2022 Country Place, Bethlehem, Penna.

GOLDWATER In '64. Bumper Stickers. Help elect Barry, K7UGA/K3UIG, 4 for \$1.00. Phil Bartling, W4RVU, Box 121, Largo, Florida.

APACHE Transmitter, \$215; Mohawk receiver, \$210, w/spkr, all 3 for \$400. Will guarantee wiring and condx. Year old. New 1-4-400s, \$25 ea. 1-4CX/1000 w. G.G. socket and chimney, \$75. Used KW tubes, mod. v. pit. xtfrms and mech. filters. Send SASE for list. K0WMM, J. Bau, 638-40th St., S.E. Cedar Rapids, Iowa, 52403.

SELL: Late model 75A4 with 2 filters, \$475. N. Konos, 842 Summit Ave., Salem, Mass.

COLLINS 30L-1, never used, \$400. Will ship. H. Disharoon, 377 Westgate, Park Forest, Ill.

"HOSS-TRADER" Ed Moory plays Santa Claus. Demonstrator models, factory warranty. Swan SV-240, \$259; Galaxy 300, \$339; SR-130, \$489; SX-115, \$419; TR-3 old price, \$495; New Hy-Gain TH-4 beam and Ham-M rotor, \$179; package deal: New KWM-2 and a D.C. supply and mobile mount, \$1165, new Hunter Bandit, \$495, used gear, unheard of prices: HT-37, \$285; 2-B, \$199; 2-A, \$179; 10-A, \$49; KWM-2, \$699; 75S-3, \$429; 75A-4, \$419; 200-V, \$539; SX-111, \$139; Mosley CM-1, \$89; HT-32, \$3; HT-32-A, \$349; 75 meter swan, \$149; factory reconditioned Thunderbolt, \$295; Pacemaker, \$139; 32V-2, \$145. Terms, cash. Ed Moory Wholesale Radio, W5BDR, Box 506, DeWitt, Ark. Phone Whitney 6-2820.

CODE Practice tape, 30 minutes. Excellent list, 5-20 WPM. Text sheet included, \$2.00 pp. William Levey, WA4FAT, 3406 Montevallo Rd., Birmingham, Ala. 35213.

HT-33A, new condx, 60 hrs. logged, \$500. Hil. Van Ness, 3715 47th Pl., N.E. Seattle, Wn.

WANTED: Conversion done on receiver. Navy type CG-46115 unit No. 1 CW-7350826 RAX-1. J. Towey, 1511 17th Ave., 98122 Seattle, Washington.

WANTED: Handbooks, literature, manuals, everything concerning ham radio. Zapateria, Lopez 13, Mexico City.

SELL: Valiant filtered in gud condx: \$200. KOHTS, 940 27th St., Marion, Iowa.

FOR Sale: 75A1, \$140.00; Q-Multiplier, \$9.00; new; Ohmite 50-ohm 100-watt load, \$7.50; Biley 100 kc. xtal with oven, \$8.00; Cabinet perforated 8X13X13, \$3.00; bus; 100 kc. calibrator, \$5-42, \$2.00 ea. 250.00, \$2.50; \$4.00; Johnson capacitors, \$5-42, \$2.00 ea. 250.00, \$2.50; Collins ant. relay, \$5.00; Knight Broadcaster, \$7.50; homebrewed 100 kc. calibrator, xtal, \$4.00; 6 meter converter, power, \$8.00; Novice xtals, 75¢ ea. F.o.b. Zimmerman, 2925 Wildwood Ct., N.E., Cedar Rapids, Iowa.

KWM-1, late ser. no., AC P/S, matching spkr, Electro-Voice EV-606 w/touch-to-talk stand, In exlnt condx: \$575. Various xtfrms. K4YIM, 7026 Budapest Way, Orlando, Fla.

VIKING II, factory-wired, like new condx; Heath VFO, 2 spare 6146s, 2 807, \$145.00, K9GLN, 12924 So. Lowe Ave., Chicago 28.

THUNDERBOLT Linear L/N, \$375.00, W2DTD.

HEATHKIT SB-300 Recvr, expert assembly and testing: \$65.00, 2 weeks trial, money and kit back guarantee. Inquire about this and other kits. Jim Speer, K5OOM, 814 Park Lane, Lufkin, Texas.

SELL: Exclnt Drake 2-A, \$190; Knight VFO, \$20. Keeth Lawrence, 13212 Stanbridge, Downey, Calif.

FOR Sale: Going 40 c.w. Complete 6M station; New Tecraft trans., with HB power supply; new 1K-60-G-2C relay; new Turner 254C mike; 3-9L, HB beam; nice HB and tube, July 1958 CQ rcvr with HRO NP-UO dial, all coax, connectors, ready to go on air. \$100. Richard Gannon KZZWG, 8 Halstead Ave., Owego, N.Y.

TOROIDS 88 mhy, 60¢ ea. or 5 for \$2.50. Fasold, WA6VVR, Box 34, Dixon, Calif.

COOL Mod. KW rig, fully metered, desk with built-in control panel, VFO, driver, speech amplifier, clipper, and power supply in rack. Exlnt condx, \$325. SX-101, perf. \$225. Extras. Pick up. N.C. S. Egelberg, OL 3-1039.

HQ-180C, matching speaker, factory I.F. noise silencer. Perfect. \$200 takes it. Srv no shipping. Will deliver within 100 miles. W2IDL, 82 Boston, Massapequa, L.I., N.Y. Tel: 516-LI-19355. KW Final fully metered, 4-400A, pi-net output, with bias supply \$125.00. Most HV supply parts, \$15.00 w/2 866As. Write: WA2-DZB, Bill, 31 Franklin Ave., Pompton Plains, N.J.

VALIANT, \$250.00; Ranger, \$150.00; SX-96, \$125.00. Perfect. Lally, W2BXS, Watermill, N.Y.

FOR Sale: Perfect Clegg Thor VI scvr, Like new condx. Shipped freight paid. \$305. K5MTR, 3007 Acadia, Marshall, Texas.

HAMMARLUND HC-10, SSB I-F converter, recently re-conditioned, all adapters. Yours for \$90.00. G. R. Metzger, RD #2, Boonton, N.J.

SELL: Hammarlund HQ-170C, exlnt condx, \$235.00. Wes McBrean, 5561 Emerald St., Torrance, Calif.

SALE: Central Electronics 200V, in exlnt condx, v. little use, in original packing crate and book: \$500. U pay frac. WA4NSA, James I. Stone, 1113 Hickory Lane, Cocoa, Fla. Phone 305-636-1658.

AMATEUR Handbook and QST circuits constructed, Components and workmanship guaranteed. Reasonable. Write for list. WA6KIV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

813's, new, cartoned only, \$8.95 each. Other tubes at similar prices. We buy tubes and equipment. Write or come to store. Rex Radio, 84 Cortlandt St., New York 7, N.Y.

FOR Sale: NC-303, in perf. condx. \$285.00, WA2DYK.

PACEMAKER, \$199; DX-40/VF-1, \$65; HQ-150TR, \$135; SX-140, \$70; NC-109, \$119; all in mint condx, with manuals. K2TID, M. Blank, 280 East 16th St., Brooklyn, N.Y. Tel: UL 6-4498.

FOR Sale: HQ-110C w/spkr, \$160; Viking I w/PTT, Heath VF-1, spare 807s, \$R48, \$100; S53A, \$40; NC-100, \$20; misc. 2-in. panel meters at \$2.00; 1500-0-1500 300 Ma. pwr. xtfrms, dual primary, \$15, each. David Kurtz, 124 Garden, Cambridge 38, Mass. Tel: 547-1333.

WANTED: Coils 1, 5 and 7 for Navy receiver RAS-5 by National. Just getting started. Write R. W. Hubbard, 691 N. Henderson Rd., King of Prussia, Penna.

SWAN: SW-175, unmodified, like new condx. Topaz mobile supply with cables, Will ship. \$225. Drake 2B rcvr, xtal calibr., spkr/Q-Mult, combo, All in mint condx, Orig. cartons. All for \$250. SB-10, \$75, perf. condx. K5ANE/5, Box 3678, University, Miss.

G-76, AC supply, 1 year old, v. gud condx. Certified check or postal money order for \$300 firm. J. Wilson, K9FIP, RR #1, Northwood Dr., Carmel, Ind.

NO Time to operate. Selling new S/Line still under warranty. Cost over \$2300. All for \$1600 including D-104, spare tubes, all units, or as follows: 325-3, \$625; 75S-3, \$475; 30L-1, \$400; 516F-2, \$100; 312B4, \$125. I would prefer local (NYC) deal. Srv no trades! WA2NDJ, Samuels, WA2NDJ, Fieldstone 3-5153. Arrange for demonstration. 76-13 251 St., Bellerose 26, N.Y.

COLLINS 32S-1--516F-2 power supply and Drake 2B, Little used, in mint condx. Best reasonable offer. WA4FPH, 1110 Melba Court, Largo, Fla.

SELL: Drake 2B and 2BQ in mint condx. Best offer. W1VVA, 25 Lincoln Ave., South Norwalk, Conn.

SELL: Hallcrafters SX-101, Mark III, exlnt amateur band receiver in top condx, \$165. Ed Piller, W2KPO, 157-32 20th Ave., Whitestone 5, L.L., N.Y. 212-IN-3-6834.

MOVING! Must sell everything. Send for list. NC-183: HT-9, Globe Chief, etc. K10TA, 6 Pembroke St., Quincy, Mass.

APACHE Transmitter, D-104 mike, stand, cables, \$210; HQ-110-C. Matching spkr. \$175. All in exlnt condx. K9SLD, Sam Gerstein, 3031 West Belden, Chicago, Ill. 60647.

WANTED: Drake 2B rcvr. Bob Heiser, WB6GEF, 521 Park Lane, Petaluma, Calif.

SELL OR trade: HT-32, \$340.00; 755-1, \$300. Want mobile SSB rig. Orville Carter, W0FII, 210 East Signal, Rapid City, S.D.

SELL: Hammarlund HX-50, factory up-dated to latest standard Ser. 1963, in mint condx. W9WVQ, 134 Forest Avenue, River Forest, Ill.

WANTED: HRO-60. Advise bottom price. Prefer deal within 400 miles of NYC. K2EGL.

WANTED: Collins KWL for missionary station at OA5C. WALMY, 304 Elizabeth Dr., McLean, Va.

HEATH HR-20 rcvr, HX-20, HP-20 pwr supp., all in use less than 90 days, built by professional elec. engineer. Meet or exceed Heath specs. New kit value \$364.40, will sell for \$325.00 and throw in HD-20 xtal calibrator for cash deal before Christmas. K4ZJF, 4030 Hallmark Dr., Pensacola, Fla.

HAITI Bound. I need any kind of equipment to replace confiscated and ruined receivers, transmitters caused by hurricane Flora in our missions. Would also be glad to accept all types of trading stamps to redeem them for necessary equipment. Please help put us back on the air. Radio is important for our survival and survival of natives. Any and all help greatly appreciated. Fr. John Henault O.M.I. WIEPA, 2900 7th St., N.E., Washington, 17, D.C. or 76 School St., Revere, Mass.

FOR Sale: Collins 32V-3, NC-300 with spkr. In exlnt condx; \$400 cash. Won't sell separately or ship, sry. W3UQJ, 1434 Whiteford Rd., York, Penna.

HEATH V1VM, \$10; TS-375A/U V7VM, \$35.00; Hickok V7VM, \$35.00; Heath T-50, \$35.00. Will trade for single lens reflex camera or 35mm enlarger. John Bagwell, W4DQK, Nomerville, Tenn.

SALE: Best offer—DX-100 transmitter, mod. 1R-2 rtor, 19 mtr. 3-el. beam, D-104-C mike. All exlnt condx. Write K4JB, 5317 Clifton St., Springfield, Va. Phone 256-7214.

FOR Sale: S-108 receiver, in gud condx, \$75. Mrs. Henry Martin, 125 Westminster Ct., Staten Island 4, N.Y.

COLLINS 75S-1, S/N2152 rec., \$325.00; 10B with VFO, \$78; Millen GDO mod, 90651, \$48.00; Hammarlund 15-watt modulator, \$15; 8138, \$7.50 eac., 100FH, \$3.00; BC-375-E xmt w/tuning unit, \$24.00. Cleaning out! Write for list of other small items. Inx. W2LYE.

COLLEGE Expenses force sale: Heath DX-35, \$30; National NC-125 with matching speaker and Heath Q-Multiplier, sensitive, very selective, \$70; Weston 776 R.F. oscillator, #8, Hugh Smyser, W3GNZ, Box 483, Student Union, Williams College, Williamstown, Mass.

WANTED: HT-37 or other SSB xmt. Cash. Must be reasonable Also wanted: Donations of gear for Church missionary project. Receipt furnished for your income tax deductions. Marion Shields, K9BEM, Friends Church, Watseka, Ill.

COLLINS KWS-1 and 75A-4 to the highest bidder within reason. Also HO-180 to highest bid above \$275. This equipment used vry little and is in exlnt condx. K7BBB, Rte. 2, Box 129, Gaston, Oregon 97129.

VALIANT: Perfect condition, with manual. Factory-wired. Sell for \$280. Contact Dave, K8KMT, 3536 Biddle, Cincinnati 45220, N.C.X.-3 Transceiver. Brand new, in factory carton. Warranty card. \$329.00. W5NGX, 2532 East 10th St., Odessa, Texas.

HOWARD Radio: Pre-Christmas sell-out: KWS-1, \$85.00; 308-1, \$90.00; 75A-4 w/VFO and 800 cv. fil., \$25; 75S-1, \$35.00; 72S-1 and 16F-1, PS, \$25; 75A-2, \$190; 75A-1, \$190; 100B, \$220; \$100, \$190; 370B Slicer, \$55; HRO-50 w/6 coils and rack spkr., \$175; NC-183, \$165; NC-183D, \$225; NC-155 new demo \$155; G-66B and 3/way PS, \$125; SX-101 Mk III, \$190; Globe 500B \$325; Globe 350 \$210; WRL DSB-100 \$69; RME-6900, \$225; KRM-4350A, \$110; Invader 200, \$405; Ranger \$35.00; Viking I, \$80; HQ-170C, \$195; HQ-160C, \$190; HQ-100C, \$99; AF-67, \$65; G-76 w/AC PS, \$299; DX-100, \$100; 32V-1, \$160 and many other fine bargains. Write P.O. Box 1269, Abilene, Texas 79604.

FOR Sale: In exlnt condx: Hallicrafters HT-32, \$295. Need money for school, K9HEY, David Comer, RR-12, Lafayette, Ind., c/o Harold Kull, Phone SH 24203.

SWAN: SW-175 transceiver, 10paz 800 volts supply, dynamic mike, bumper mount, Master Mobile Mount antenna. Complete outfit: \$260. Jim Fowler, Minneola, Kans.

WANTED: Plate transformer, 1500 VDC, 500 Ma. Allen J. Fehl RFD 4, Brookville, Ind.

KWM-2 and 516F2 AC supply and 351D-2 mount and MP-1 mobile supply, new in February 4, 1963. \$1050. W7WRS, 4200 Lorna Pl., Las Vegas, Nev.

FOR Sale: Collins CC-1 carrying case, \$65; 310-B exciter, \$150; Drake 2B w/spkr and CC, \$200; Heath Apache, \$225; SB-10, \$70; Hattie, HT-37 Exciter, \$334.50; Hammarlund HQ-129-X2/ spkr and SSB set, \$145; HQ-100, \$125; HQ-110, \$140; Johnson Valiant, \$275; Ranger, \$145.00; National NC-188, \$99.75; RME 4350, \$135. Grice Electronics, Inc., P.O. Box 1911, Pensacola, Fla. 32502.

HT-32A, in exlnt condx, \$325; APR-4 receiver with tuning heads for 38-1000 Mc. and manual, \$125; TS-147 B/UP signal generator, \$50; Gillfillan Type 167G telemetering receiver, 175-260 Mc., \$100; Globe AT-4 600 watt antenna tuner with built-in SWR Bridge, \$45. Modulation monitor, \$20. K8CFU.

HQ-180, new condx, purchased October 1962, repacked in original carton February 1963, in dry storage since \$330. Pre-paid continental US. W4A4PH, Box 246, Savannah, Ga.

HUNTER Bandit, 000A in unopened carton. Make offer. Collins 136-C noise blanker for 75A-4, new with instructions, \$69; Collins VFO, #1 and 70E-24, \$39 each; Johnson Viking Ranger, \$119. Richard E. Mann, 7205 Center Drive, Des Moines, Iowa.

CRYSTALS By the hundreds. Free list. Cash paid for your surplus xtals. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

F.W. Ranger, \$150; HQ-170, \$220; AF-67 with mtg rack, 110V supply, mobile supply, G66B and 3-way supply, mike, \$195. All gear exlnt condx. L. Solberg, K9KDV, RR #3, Hartford City, Ind.

MUST Sell: SSB rig, in mint condx. Heath Marauder SSB xmt, \$350; HQ-170C, with matching speaker, \$250 or best offer for both. K3LXS, 1000 Prospect St., Lakoma Park, Md.

BOOST Reception: 3.5-30 Megacycle SK-20 Preselector kit, \$18.98; boost modulation, AAA-1 clipper-filter kit, \$10.99; Reduce noise NJ-7 noiselector, 1F, wired, \$4.49. Postpaid! Literature free. Holstrom Associates, Box 8640-1, Sacramento 23, Calif.

SALE: Valiant transmitter, perf. condx, \$200; HQ-180C, new, \$275. Richard Dennis, 3912 Cedar, South Little Rock, Ark.

FOR Sale: SX-111, like new \$190. Fred Behn, WA0DUB, Preston, Iowa.

ATTENTION! Have you seen "Equipment Exchange"? Buy, sell, swap offers galore! Rush card for interesting sample copy. Brand, Syracuse, Ill.

HARMONIC Due in December. Need green stamps. Have new NCX-3 with NCX-A-NCXD Bandslicer. Asking \$490. New Johnson 6N2 xmt, M. Albuquerque, Box 505, Borough Hall Sta., Jamaica 24, L.I., N.Y.

FOR Sale: Complete ham station! Collins 32V-2 and 75A-1, ant. coupler, two element 15-meter beam, Extra 4D32 tubes and other items. Cash and carry deal. \$500. W3OPQ, Jeannette M. Ebur, 5325 Madison Ave., Bethel Park, Penna. Phone 835-4432.

TOOB Grab Bag! While they last! New, surplus and pulls. Five for a buck. Postpaid in continental US. 616, 616, 5U4, 5T3, 6A65, 6A15, 6AU6, 6BA6, 6BC5, 6K6, 6SN7, 6V6, 6BO6GT, etc. All check AOK. Krauss W8SPR, 906 Morris, Salem, Ohio.

DX-HAPPY: Subscribe to Florida DX Report. Info on DXpeditions. QSL Managers, etc. \$4.00 year. K4HIF, Attaway, Box 205, Winter Haven, Fla.

HQ-129X modernized including 7360 product detector, adjustable AVC, CW monitor, additional voltage regulation, 3 Kc switchable audio filter. Original owner excellent condition, \$120 including speaker, W2PZP, John Hillman, 35 Karyn Terrace, Middletown, N.J.

JOIN The International Short Wave League. Free service to members including two-way QSL Bureau for Amateur/Broadcast stations. Translation and identification services. DX certificates, contests and activities for the SWL and transmitting members. Monthly magazine "Monitor" containing articles of general interest to Broadcast and Amateurs, SWLS, transmitting section and League affairs, etc. League supplies such as badges, headed notepaper, QSL cards, etc. are available at reasonable cost. Send for League particulars. Membership including monthly magazine, etc. \$3.00 a year. Cheques, International money-orders accepted. Please add 30c to payments by cheque. I.S.W.L., Dept. QST, 12 Gladwell Rd., London, N. 8, England.

75A-1 with all original manuals. Central Electronics Model B Slicer with Q-multip., 3.5 Kc mech. filter, 100 Kc. xtal calibrator, perf. condx. No scratches. Complete \$275. Bob Fitzgerald, 6 Sharon St., Geneva, N.Y.

SX-99, spkr in superior condx, \$85. G. Brady, Smith St., Uniondale, N.Y. Phone 516-IV5-3190.

SALE: Heathkit AR-3 rcvr with cabinet, \$23; Collins 70E-8A P10 with power supply parts, \$40; Manuals included. Surplus ARB rcvr (0.2 to 9 mc) with control units, conversation instructions, \$23. M. Tanaka, Box 392, Wailuku, Maui, Hawaii.

KWM-2, \$800. Huston, Rte. 3, Cedar Rapids, Iowa.

75S-1 receiver, perfect, \$330. Heath DX-60, modified, \$35. K6V1E, 10234, Vista LaCruz, La Mesa, Calif.

HP-20 AC. power supply unused. In perf. condx, \$30. WB2IHT, Ed Hamer, 800 1/2 West Gray St., Elmira, N.Y.

SELL: Invader, \$400; HQ-180C, \$300 with speaker, in exlnt condx. Pick up deal only. WA2YB1, 35 Stephen, Bayport, L.I., N.Y.

PACEMAKER Wanted: state condx and lowest price. For sale: Ranger, \$120.00. F.o.b. W9TJG, 3581 S. 47th St., Milwaukee, Wis. 53220.

RME 4350-A receiver, in exlnt condx, \$150. Bill Murtough, 5635 Netherland Ave., Riverdale, N.Y.

SELL: Heath Iwoer, xtal, 5-el. beam; model train equipment. Want: Linear amplifier, D-104 mike, HQ-100 monitor scope. WAREC D, 19252 Rainbow Dr., Lathrup Village, Mich.

TV Camera, Hallamore C-440 Eng. prototype. Works fine. Spare Vidicon and yoke, \$485. G-76 transceiver with DC supply, H.B., A.C. supply, \$320. Will ship. Herb. WB6UEN, 517 Elder St., Anaheim, Calif.

NATIONAL VFO 62 with 1000 Kc xtal, \$35.00; Johnson 6N2 converter, \$39; New Globe DSB-100, \$65; Terafit 220 Mc. converter, \$25; PTR-2, \$20; HA-5 with 6N2 crystals, \$39; new Collins Noise Blanker, \$59; Vinyl tape embosser, \$5.50; P & H 600A, \$39. Clean-up list for stamp. W4API, 1420 South Randolph, Arlington, Va. 22204.

SPECIALTY Engineering new replacement transformers GSB 101, \$39.85; GSB 201, \$32.00. F.o.b. 9007 Avalo Blvd., Los Angeles, Calif.

RCAF Surplus 2000 Mc line of eight terminals (2). Built 1954 by an Indian in a 6" rack including 110v power supplies, Xtal-controlled receiver and transmitter, modulator, fault-locator, etc. Also 8 1/2 ft. parabolic reflector with feed, 5 watt final 2C39A K1klystron, \$250 for one, \$400 for both. W. Poellnitz, 147 Lincoln, Franklin, Mass.

FOR Sale: Johnson Viking II with model 122 VFO. Vry clean condx; \$150. K1LAG, 113 Farmington Ave., Plainville, Conn. or Dial 204-747-2617.

COLLINS 32V-1 transmitter, in exlnt condx, manual, mike, just QST, p. 7. A beauty, in 1Kc-new condx; \$575. S. Sullivan, cables, \$140; 75A-1 receiver, matching spkr, manual, immaculate, \$190; Collins F-25024 filter, \$20; Morrow 5BR1 converter, mtg cable, manual, carton, \$30. W0LWZ, 1030 So. Dudley, Denver, Col. 80226.

755-1 Revr. \$299; National FRR-24 dual diversity receivers and converters, etc. \$495; HT-32 SSB xmt, \$289; FRR-21 low freq. revr, \$175; 74A2A, 3.1 filter, \$276; SP-6000X17, \$425; R-390/URR, \$300; 300 V. Armc, \$675; C-10B SSB xmt, \$119; 700 V. \$625; URA8A, \$195; 511-3, \$675; Boehme Aut. keyer, \$125.00; Wheatstone perforator, \$175. Alltronics-Howard Co., P.O. Box 19, Boston, Mass. 02101 (RM 2-0048).

SELL: NC-303, xtal cal., 21 conv. \$330; Apache, SB-10, \$225; Hy-Gain TH-3, \$50; Hallcrafters I.O. keyer, key, \$65; HT-40, \$60; 15-watt 2-meter transceiver, \$100; 50-watt transmitter, \$25. WAZRIF, Avon Drive, Essex Felis, N.J.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or budget. Graham Radio, Dept. A, Reading, Mass., 01867, Tel: 944-4000.

NEW Hammarlund HQ-110A. Received as a Christmas gift, still in factory carton. Will answer all reasonable offers. W2EYJ, 3637 Willett Ave., Bronx 67, N.Y. FA 4-4818.

SELL Heath HA-10 KW linear with built-in high voltage relay, \$175; DX-60 with VF-1, VFO, \$75; NC270 revr. \$185. Heath "Sixer" with 2 xtals and 12-volt supply, \$35. LW 6M converter and pre-amp, \$20. W. J. Christof, K8RCA, Wesch Rd., Lake Columbia, Brooklyn, Mich.

WANTED: 5 or 6 element Telrex 20m beam. W2UGM, 66 Columbus, Closter, N.J. 201 PO 2-1884.

RCVR for sale: TMC commercial gen. coverage Mod. 90RDX, .54 to 31.5 Mc. Similar to new GBR-91RDX. Illustrated in August QST, p. 7. A beauty, in like-new condx. \$575. S. Sullivan, 277 Herrick Ave., Teaneck, N.J. Tel: 836-7632.

COLLINS 310-B3 VFO/xmtr. 15W output, 10 thru 80 meters, \$79.50; two surplus 813s for \$9.00; two Thordarson and one Stancor, multi-tap, modulator-driver xmtrs, \$5.00 ea. Want: VOM, C. Malinowski, WIDQA, South Deerfield, Mass.

JOHNSON Valiant factory-wired, excellent condx with Johnson Matchbox, \$250. F.o.b. Caldwell, Dr. Patrick, Box 103, Caldwell, Idaho.

APACHE, \$190.00; SB-10, \$70 Mohawk, \$249; BC-221, \$55. All in excellent condx. Will include interconnecting cables if Apache and SB-10 go together. Free delivery within 100 miles of Boston. KICRI, 159 Fairfield St., Needham, Mass.

KWM-2 with Waters rejection tuning SN 10679, 516F-2 supply/spkr. Seven months old. Used less than 30 hours. Same as new, \$825. No time to operate. W8DYA, Box 1275, Bluefield, W.Va., Tel: 327-9234.

BEST Offer takes 1 Kw AM on 2-meters. Wilcox 99A transmitter in good condx. Also tubes, misc. hi-power components. Trade for good camera or what have you? W5MAM, 2298 Green Valley Dr., College Park, Ga.

SELL: Noise blanker for KWM-2, like new, manual, leads, complete with antenna, \$150 value. \$80 postpaid, Hy-Gain traps for 40-10 antenna, new, \$15.00, W4KCN, 3584 Galloway, Memphis, Tenn.

FOR Sale: HQ-129-X receiver, \$85; with 6 KC mech. filter installed, \$110. Knight T-60 transmitter, \$35. Will deliver within 150 miles. David B. Slark, W4OKC, 821 Kent Road, Waynesboro, Va. 22980.

WANTED For cash: Collins 314B-4 console and MM-1 mike. W0DVZ, Box 475, Ottumwa, Iowa.

600 Watts SSB for \$340; CE-20A 600 L with VFO and lo-pass filter. Will deliver 100 miles. No shipping, sry. W9HXM, 234 Cummo Ave., Glen Ellyn, Ill.

SR-150, Hallcrafters transceiver, like new condx, 4 months old, with P-150AC, A-C supply; P150DC, DC supply and mobile rack, \$615.00 complete. Box 273, Palos Heights, Illinois.

WANTED: SX-117 receiver, new or used. Will buy best offer. W0BEW/S, S. Milligan, 4714 Cerise Ave., New Orleans, La. 7127, Tel: 2-5888.

WANTED: Lampkin 205-A, PPM, Heath SWR, Seco 510B, S. A. Dept. 1, FM-11-940A. Quote your best price. Alvan Eddy, Box 111, Hampton, S.C. W4HHW.

HT-37, \$350; NC-303 with calibrator, \$300 Swan, SW-120, \$175. All equipment in perfect condx. S. Lomback, W42PKO, 1133 Midland Ave., Bronxville, N.Y. 914 WO 1-8767.

RME-6900 revr, like new condx, \$200; DX-100 in gud condx, \$75; LW-51 2 mtr. trans, new, \$50. W6EMN, H. Miller, 5842 Olivias Ave., Lakewood, Calif.

SELL: Lafayette KT-320 revr. In exlnt condx. With spkr, xtal calibrator, 8-meter and headphones. \$80. P.O. Box 30, Snohomish, Wash. K7UVV.

TEC Circuits needed. Bought discontinued S-15 and FM-15MX to convert. Need circuits, replacement cases. Help, anybody? Uptide, W4LAM, Thornton Hall, University of Va., Charlottesville, Va. 22901.

DRAKE 2A, \$169; MM-2 'scope, 50 Kc RM adaptor, \$65. Both clean and in mint condx. W4GIMN, Box 371, Lebanon, Va.

VACUUM Antenna relay with 18-24VDC coil, new, in foam packaging. \$9.00; 416B, \$7.00. Transistorized audio compression amplifier, \$13.00. WAZIKL.

ELMAC PMR-7 with installed TNS, PSR-612 supply and manual. \$105. W2LPU, 2300 Windsor Rd., Baldwin, L.I., N.Y.

SR-150, \$485; HX-20, \$165; 813 linear, \$50. Sry, no shipping. Harris, Concord, Calif. 689-3334.

KILOWATT Sideband station for sale to highest bidder or bids. Johnson Invader 2000 complete with spares for all tubes, TV filter, T.R. switch, Drake 2A revr with Q.M. unit, and 100 Kc osc. On air every AM new 3930 at 6 AM EST, W9YJH, 965 Ravenswood, Evansville, Ind. 812-422-2952.

VALIANT Drake 2-A, \$450. Excellent, K8VYV.

JOHNSON Thunderbolt linear amplifier, in exlnt condx. \$325.00. Will deliver within 150 miles of Philadelphia. Must sell immediately. Jan Carman, 942 Rundale Ave., Yeadon, Penna.

BANJO Hunter Richelieu still on the prowl for a Bacon plectrum. W9IS. Trade?

SELL: HRO-50T1, coils 80-10, xtal calibrator, speaker, gud condx. \$185. W42L1Y, 1710 State Fair Blvd., Syracuse 9, N.Y.

SELL: 75A4 2.1 filter, \$450.00; HT-37, \$330.00; Thunderbolt, \$325.00. All are in exlnt condx. Bill O'Bryne, WA2DTX, 36-39 172nd St., Flushing 58, L.I., N.Y. Tel: IN 1-2432.

FOR Sale: 3600-0-3600 at 1000 Ma. plate transformers with dual 110V and 220V primaries, \$35; General Electric 120 Mfd 3000V filter capacitors, \$30. Peter W. Dahl, 5331 Oaklawn Ave., Minneapolis 55424, Minn.

SELL: Bell & Howell "Filmsound" 16 mm sound movie projector, trade or \$100; Eico Model 230 tape recorder (with new microphone), \$30; Webster 50-watt amplifier, \$20; Collaro 3 speed record changer, \$12; Masco 2 station intercom, \$8. Astatic "G" p-t-t mike stand, \$6. V. R. Hein, 418 Gregory, Rockford, Ill.

CRYSTALS Airmailed: Kits, SSR, Nets, MARS, Marine, CD, CAP, etc. Custom finished FT-243, .01% any kilocycle \$300 to \$600, \$1.75. (Five or more mixed or same frequency, \$1.50), (ten or more same frequency, \$1.25). 1710 to 20,000 kilocycles, \$2.25. Overtones supplied above 10 meacycles. Fundamentals 10,000 to 13,500, \$3.25. Add 50¢ each for .005%. For HC-6/V miniatures above 2000 add 65¢ each. QST kits, FT-243, "SSB Package", live mixer, \$11.95, seven matched filter, \$11.95, "DCS-500", "Three band converter", "IMP", \$79.95/set. Write regarding specific needs. 375 to 540 kilocycles, .01% FT-241A, \$2.95; HC-6/V miniature, \$3.95. Add \$1.00 for .005%. Air-mailing 10¢ crystal, surface 5¢. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, Calif.

FOR Sale: Like new SX-117, in original carton. First cashier's check for \$295 gets it. Also a Viking Navigator C.W.VFO xmt, \$95.00. W0OGL, P.O. Box 147, Rocky Ford, Colorado.

HAM BURGERS, Used Equipment, money-back guarantee. Collins 32V3, mint, \$294.95; Collins 7553, 9 mo. old, \$499.95; Collins KWS-1, \$995.00; Globe Champ, 300A, \$264.95; Gonset 6 meter linear, \$75.00; Gonset GS100, \$295.00; Gonset Comm. 17.7 meter, \$99.00; Hallcrafters SR-34 matched filter, \$175.00; Hammarlund HX-55, \$124.95; Heath SB-10, \$79.95; Iohrite Viking II, w/VFO, \$175.00; Johnson Pacemaker exlnt, \$269.00; National HRO 60 w/7 coils, \$395.00, Trades. Write for free list. Ham Burgers, Wyncote, Penna. CA 4-1740.

FOR Sale: New complete station designed for fixed, portable, or mobile use. Gonset G-76 with AC and DC supplies, manual, mike, spkr, and all cables in case 14 x 15 x 19. Completely auto tuned antenna loading and matching system for above: \$500.00. K2DJL, Art McComas, 366 Speedwell Ave., Morris Plains, N.J.

CE-10B new condition, \$85. Late P&H 6-150 6M transmitting converter \$165. HQ-145, \$165, all prepaid. K0BCW, 7120 Clay, Westminster, Colo.

SWAP, Sell, trade with other hams! Special subscription to Ham Trader", 12 issues \$1.00. Box 153Q, Franklin Square, N.Y.

SELL: T-60 Transmitter, \$30.00; self-powered Knight VFO, \$15; Courier 2-811As linear, \$140; D-104 mike, \$12.00. K2KGU, MO 6-8513.

SELL: Marauder with antenna relay and JT30, \$325.00; Drake 2B live spkr and Heath Q-Mult., \$200, both pert., \$220.00. Stu Personnel, W4ZKHC, 212-OK 42381, 3230 Cruiser Ave., Bronx 67, N.Y.C.

FOR Sale: 755-3 receiver, \$495; 32S-1 receiver, \$325.00; 32S-1 transmitter, \$475 and 312B-4, \$140.00. All in like new condx. Contact: W. A. Barker, W5LLV, 1414 Mistywood, Denton, Texas.

JOHNSON Valiant II, factory-wired, exlnt condx, orig. carton, v. few hours of operation, \$375. Roy E. Pellegrini, K9GNR, 21 W. 215 North Ave., Lombard, Ill.

FOR Sale: Collins 755-3 receiver, used less than 10 hours, \$485. Serial No. 12499. Maj. Kent, PMS, Texas Christian University, Ft. Worth, Texas.

SELL: SX-110, HD-11 O-mult., exlnt condx, \$120.00. Dan Turkisher, W2FVD/WN2FVD, Pin Oak Lane, White Plains, N.Y.

FOR Sale: SSB Adapter SB-10, assembled, like new, \$70. Stewart Lee, K1OJTF, 16 West Way Road, Wavland, Mass.

POLISHED Chrome cigarette lighter, American made, lifetime guarantee, gift boxed, engraved call and handle. \$2.98 Ppd. Check or m.o. Tennesseans add 3% tax. BLM Sales Co., Box 2305, Donelson, Tenn.

COLLINS 755-3. Absolutely in mint condx. First certified check or m.o. for \$300 takes it. Carton, manual, etc. W1KHW, P. G. Balko, Hillcrest Rd., New Canaan, Conn.

FOR Sale: HQ-110C/V speaker A-1, \$160; BC342 115VAC, \$45.00; TCS Collins 2-12 Mc 115VAC complete with all accessories, \$35.00; Millen secondary standard 1000, 100, 25, 10 Kc., \$25.00; Millen 90902 rack 'scope/w spare tube, \$20.00; Westinghouse Type TA industrial analyzer, \$75; V-700 transistorized radiation detector, new, \$25.00, GR1170-A frequency modulation meter, \$30; GR1176-A, 1000 Hz. freq. meter, \$20.00/2KC, \$20.00/6KC, \$45.00, RCA W4V97-A, VTM, \$17; Webster mobile band-spanner antenna, \$10; GR 8 330 Mc UHF signal generator, \$55.00; Boonton 78F standard generator, \$30; chokes, HV condensers, tubes, etc. Unloading. W3BBV, P. O. Box 722, York, Penna.

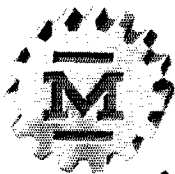
FOR Sale: Perfect Drake 2A, \$165.00; Heath VF-1 VFO, \$10.50, new RCA WO-33A 'scope, \$53.00; Mosley TA-33 SR, \$40.00, new Rohn 50 ft. self-supporting tower, \$50.00; new Millen grid dipper A-1, all coils, \$33.00, W5VMF, 10521 Brockbank, Dallas 29, Texas. Phone FL 7-4428.

HEATH Shawnee, 6 mtr. transceiver, professionally wired, absolutely in A-1 condx. 4 months old! \$189.00. Complete with mobile and AC power cables; P.T.T. mike, portable whip antenna, and manual. College bound, must sell. Vincent Traina, K2ONID, 2044-21 Drive, Brooklyn 14, N.Y.

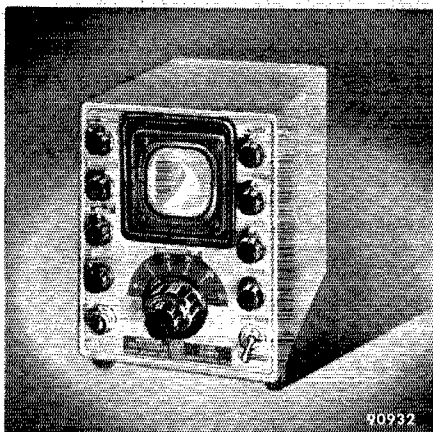
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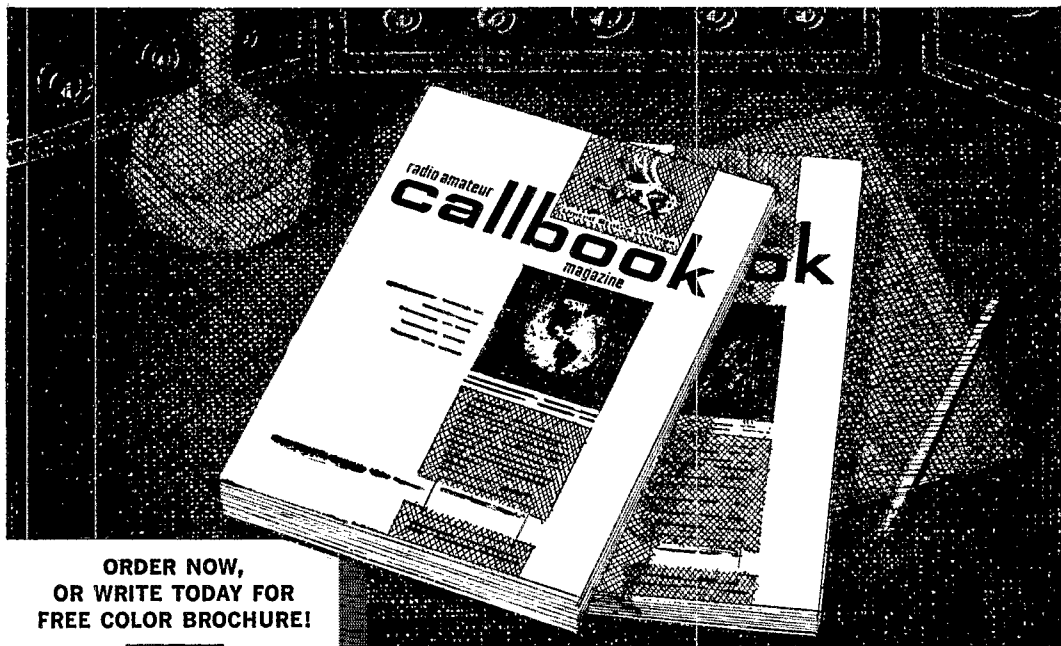
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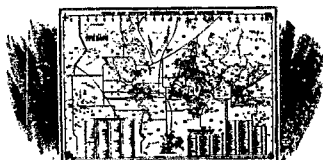
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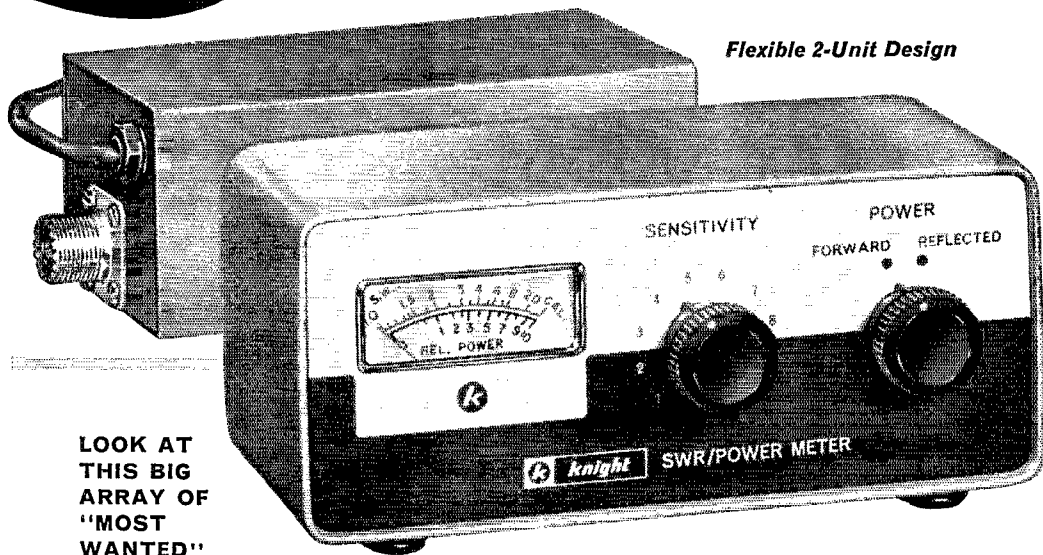
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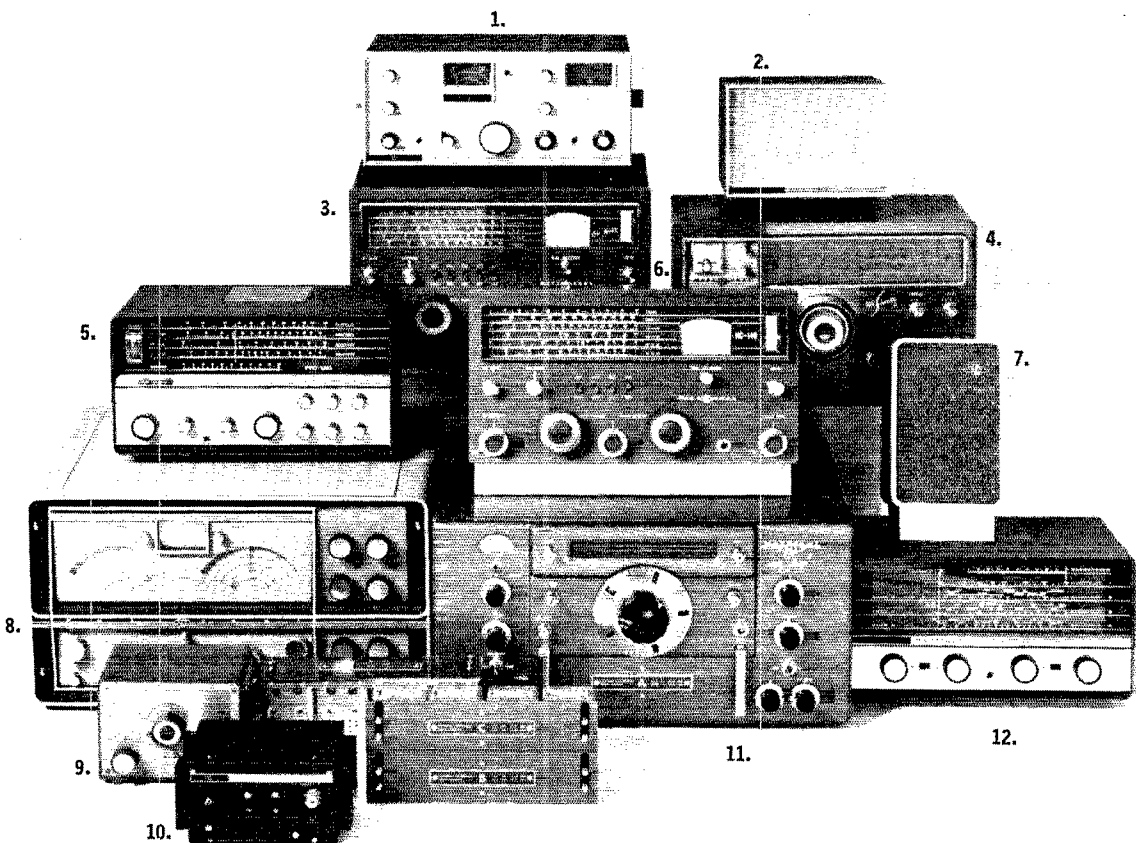
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*64** in '64
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*Message Sixty-Four (64) in ARRL Log Book: "Most sincere wishes for health, happiness and prosperity on this occasion."