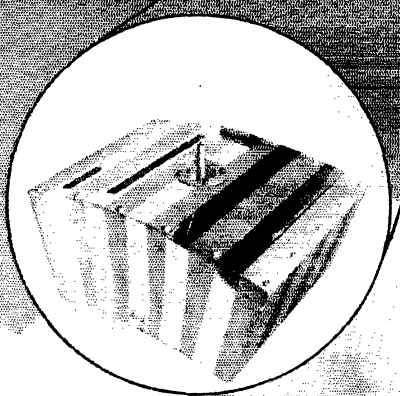
February, 1962
50 Cents
55c in Canada

QST

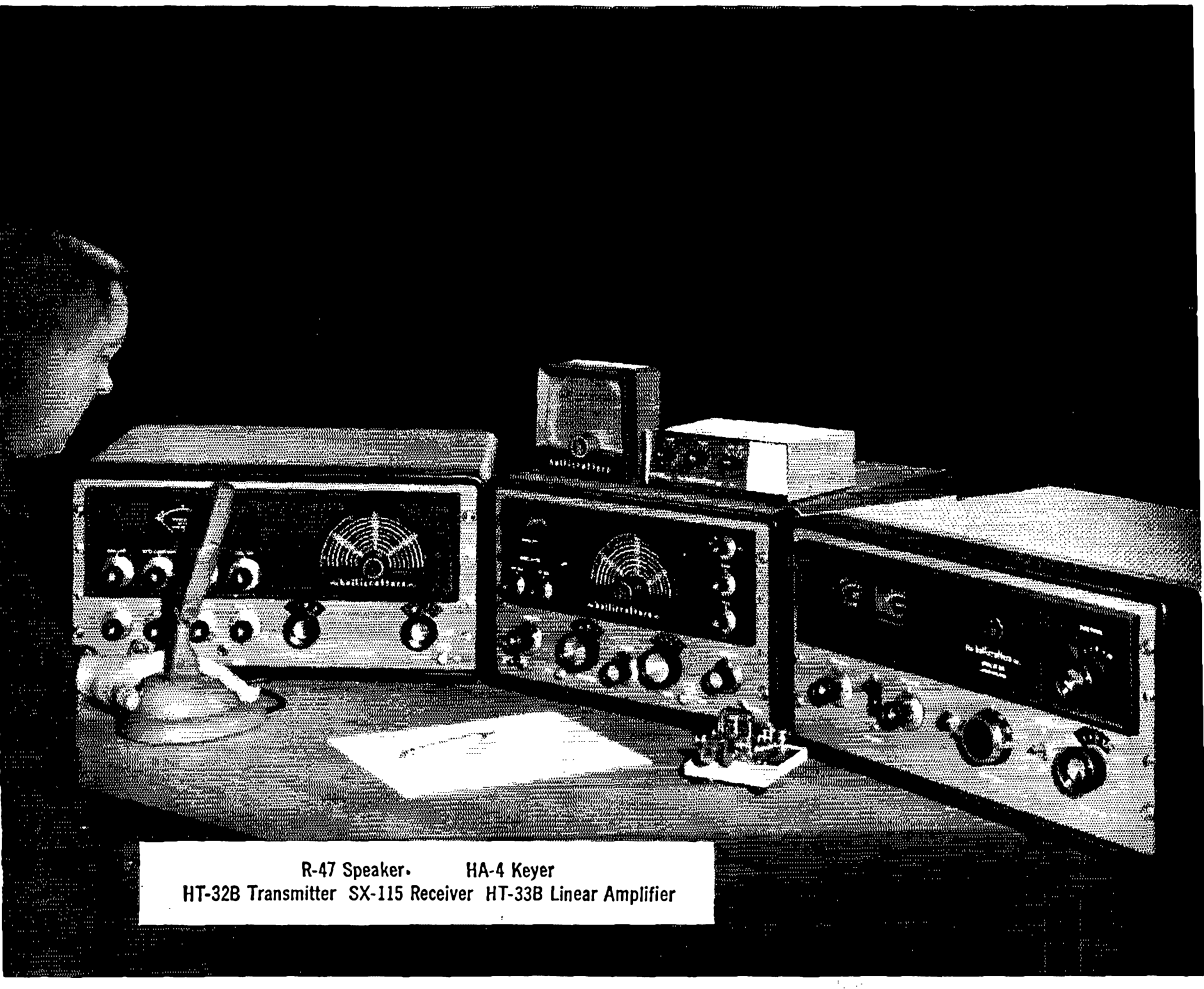
devoted entirely to

amateur radio



IN THIS ISSUE—THE COMPLETE OSCAR STORY!

hallicrafters is 1st . .



R-47 Speaker. HA-4 Keyer
HT-32B Transmitter SX-115 Receiver HT-33B Linear Amplifier

The time-proven excellence of hallicrafters' HT-32B and HT-33B . . . the incomparable performance of the new SX-115 . . . the HA-2 and HA-6 transverters . . . and the fully transistorized HA-4 electronic keyer . . . now team up to bring you maximum flexibility and full coverage of 80 through 2 meters on SSB, CW and AM.

with 80 through 2
in one complete SSB/CW/AM station!

Examine these outstanding features

HT-32B TRANSMITTER.
FEATURES: Beam-deflection, high level sideband modulator for low-noise, high-stability signal, Hallicrafters' exclusive 5.0 Mc. quartz crystal filter with sideband rejection of 50 db. or more; CTO direct reading in kilocycles to within 1 kc.; 144 watts plate input (P.E.P. two-tone). Five band output (80, 40, 20, 15, 10 meters). All modes of transmission—CW, AM, SSB. Unwanted sideband down 50 db. or more. Both sidebands transmitted on AM Precision gear driven CTO. Exclusive Hallicrafters patented sideband selection. Logarithmic meter for accurately tuning and carrier level adjustment. Ideal CW keying and break-in operation, push-to-talk and full voice control system built in. Keying circuit brought out for teletype keyer.

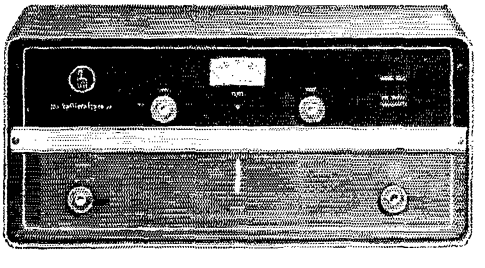
HT-33B LINEAR AMPLIFIER.
FEATURES: Rated conservatively at the maximum legal input. Third and fifth order distortion products down in excess of 30 db. Built-in R.F. output meter greatly simplifies tune-up. All important circuits metered. Maximum harmonic suppression obtained through pi-network. Variable output loading. Protection of power supply assured by circuit breaker. HT-33B is a perfect match to Hallicrafters' famous HT-32B in size, appearance and drive requirements. *CIRCUIT DETAILS:* This power amplifier utilizes a PL-172 high efficiency pentode operating in class AB1. The tube is grid-driven across a non-inductive resistor, thus assuring the maximum stability under all possible conditions. Band switching is accomplished by one knob which selects the proper inductance value for each band. The output circuit is a pi-network with an adjustable output capacitor, accommodating loads from 40 to 80 ohms. 2 panel meters are provided: one is circuit switched to measure grid current, screen current, plate voltage and R.F. output voltage. A second meter continuously monitors cathode current of the PL-172.

SX-115 RECEIVER.
FEATURES: High order of mechanical and electrical stability; linear tuning; constant tuning rate; separate noise limiters for SSB/CW/AM; amplified dual loop AVC with fast attack-slow release; spurious signal and image rejection better than 60 db. 1 kc calibration marks; transmitter-type VFO with differential TC; 100 kc crystal calibrator; crystal controlled 1st and 3rd conversion oscillators; selectable sidebands; selectivity variable in five steps from 500 to 5000 cycles; product detector for SSB/CW envelope detector for AM; I.F. type noise limiter for SSB/CW automatic threshold series type for AM; band gain equalization; audio inverse feedbacks; "S" meter functions with AVC off. *SENSITIVITY:* Less than 1 microvolt on AM—less than ½ microvolt on SSB/CW. *FREQUENCY COVERAGE:* Nine 500 kc segments covering 3.5-4.0 Mc.; 7.0-7.5 Mc.; 14.0-14.5 Mc.; 21-21.5 Mc.; 28.0-30.0 Mc.; (4 segments); and WWV.

HA-2—HA-6 TRANSVERTERS. A sensible, new approach to VHF operation! Engineered with the usual Hallicrafters precision, these transverters will convert your present 10-meter station to VHF . . . AM, CW, SSB, RTTY, FM capability. All modes of transmission and reception on your present equipment are useable with these units. A nuvistor front end in the receiver section provides excellent sensitivity and noise figure.

FEATURES: Converts received VHF signals down to 10 meters for reception. Converts 10-meter signal to VHF for transmission. 5894 tube in transmitter final amplifier can be driven up to 120 watts input. Can be driven by exciters with 10 to 100 watt capability. Built-in coaxial antenna relay.

HA-4 "T.O." KEYER. Compact design, employs digital techniques. Fully transistorized. **R-47 SPEAKER.** Designed for communications. Flat response from 300 to 2850 cps. Input impedance: 3.2 ohms.



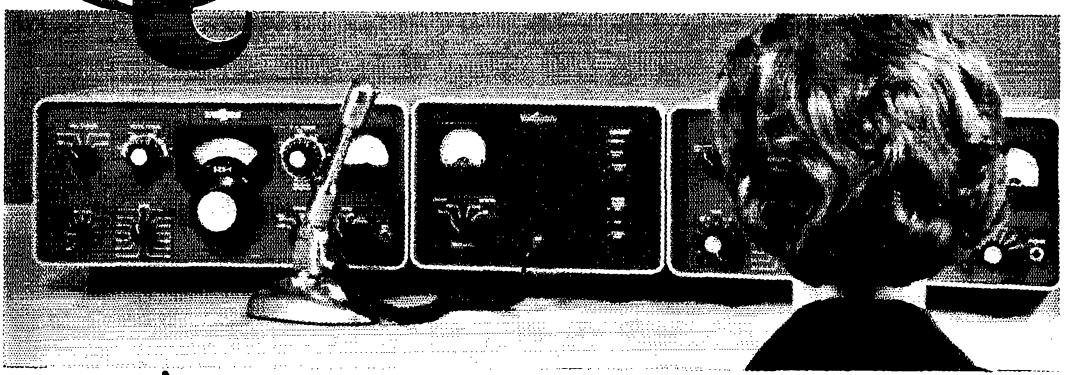
HA-2—HA-6

The new ideas in communications are born at...

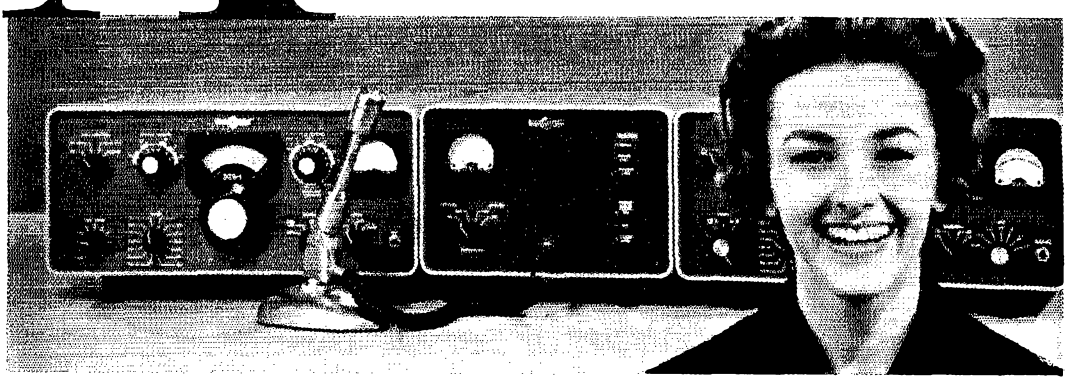
hallicrafters

Export Sales: International Division, Raytheon Mfg. Co., Waltham Mass. Canada: Gould Sales Co., Montreal, P.Q.

Q *how do XYL's really feel about ham gear?*



A *enthusiastic... when it's styled by Collins!*



The clean, smooth lines of the famous Collins S/Line make this system-engineered single sideband station most welcome in your den or the family room. Collins S/Line wins the XYL's acclaim because it is stylish and blends with the decor of any room. Collins is the finest... it takes up less room... there's no clutter... and it's economical.

P. S. These are only plus factors. What *you'll* go for is Collins' performance.

COLLINS

QST

FEBRUARY 1962

VOLUME XLVI • NUMBER 2

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut
TEL.: ADams 6-2535

Subscription rate in United States and Possessions, $5.00 per year, postpaid; $5.25 in the Dominion of Canada, $6.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

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

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

—CONTENTS—

CHART YOUR COURSE TO EIMAC

for dependable, high quality power tubes

EIMAC TYPE	CLASS OF OPERATION / SERVICE	TYPICAL OPERATION — SINGLE TUBE								
		D.C. PLATE VOLTAGE	D.C. PLATE CURRENT (AMPERES)	D.C. SCREEN VOLTAGE	D.C. GRID VOLTAGE	APPROX. MAX. DRIVE POWER (WATTS)	APPROX. D.C. SCREEN CURRENT (AMPERES)	APPROX. D.C. GRID CURRENT (AMPERES)	APPROX. MAX. POWER OUTPUT (WATTS)	FILAMENT VOLTS / AMPERES
3-400Z	B / SSB	3000	.100 / .333(3)	—	0	32	—	.12	655	5.0 / 14.5
3-1000Z	B / SSB	3000	.240 / .670(3)	—	0	65	—	.30	1360	7.5 / 21.3
4CX250B(1)	AB1/SSB	2000	.1/.25(3)	350	−55(5)	0	0/.005(3)	0	300	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	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	6.0 / 10.5
4-65A	AB1/SSB	3000	.015/.065(3)	360	−85(5)	0	0/.006	0	130	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	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	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	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	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 / 2C39A	C/CW(7)	800	.08	—	−20	6	—	.03	27	6.3 / 1.0
	C/AM(7)	600	.065	—	−16	5	—	.035	16	

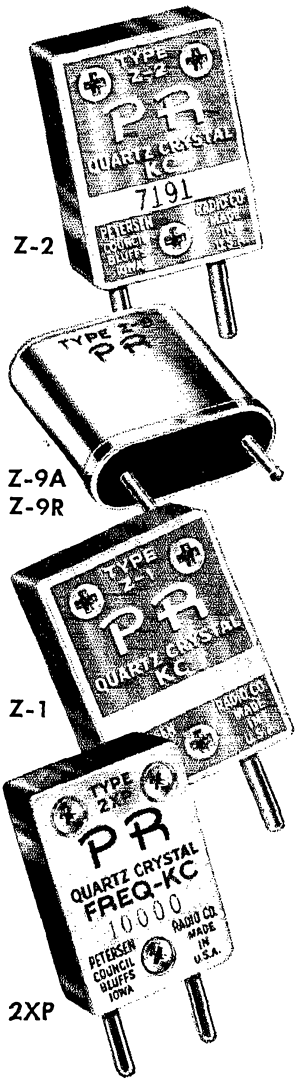
(1) Ratings also apply to 4X250B.
(2) Ratings apply to 4-250A within plate dissipation limitation.
(3) Zero signal and maximum signal dc current.
(4) Grid and screen grounded, cathode driven.
(5) Adjust to give stated zero-signal plate current.
(6) For operation below 250 Mc only.
(7) At 500 Mc.

Above you see popular Eimac tube types suitable for ham transmitters. Remember this chart when you need a tube. And remember the name Eimac. It means power. Quality. Dependability. For Eimac has more know-how, more experience with power tubes than any other manufacturer. Your local Eimac distributor can supply you with any of these tubes listed and Eimac sockets to match. Or for complete data, write Amateur Services Department, Eitel-McCullough, Inc., San Carlos, California. Subsidiaries: Eimac, S. A., Geneva, Switzerland; National Electronics, Geneva, Illinois.

It pays to insist on

PR *crystals*

STANDARD OF EXCELLENCE SINCE 1934



AMATEUR TYPES

Fundamental, PR Type Z-2

Frequency Ranges in Kcs.: 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M).

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting; ±.500 cycles..... **$2.95** Net

(All Z-2 Crystals calibrated with a load of 32 mmfd.)

Third Overtone, PR Type Z-9A

Hermetically sealed; calibrated 24,000 to 24,666 and 25,000 to 27,000 Kc., ±3 Kc.; .050" pins..... **$3.95** Net

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$4.95** Net

CITIZENS BAND CLASS "D"
Type Z-9R, Transmitter

FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.255, calibrated to .005%. (Be sure to specify manufacturer and model number of equipment) $2.95 Net

CITIZENS BAND CLASS "D"
Type Z-9R, Receiver

Specify I.F. frequency, also whether receiver oscillator is above or below transmitter frequency. Calibrated to .005%. (Be sure to specify manufacturer and model number of equipment.) .....$2.95 Net

Type Z-9R, Radio Control

FCC assigned frequencies in megacycles: 26.995, 27.045, 27.095, 27.145, 27.195, 27.255; calibrated to .005%. (Be sure to specify manufacturer and model number of equipment.).....$2.95 Net

Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc., (Fund.) ±5 Kc..... **$3.45** Net

12001 to 25000 Kc. (3rd Overtone) ±10 Kc..... **$4.45** Net

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

COMMERCIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

Type Z-1, MARS and CAP

Official assigned frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc..... **$3.45** Net

Type Z-1, TV Marker

Channels 2 thru 13.... **$6.45** Net

4.5 Mc. Intercarrier, .01% ..... **$2.95** Net

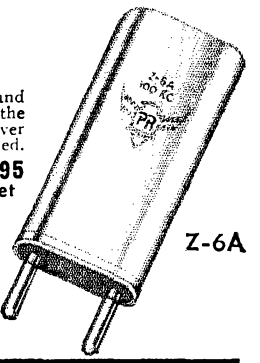
5.0 Mc. Signal Generator, .01% ..... **$2.95** Net

10.7 Mc. FM, IF, .01% ..... **$2.95** Net

Type Z-6A, Frequency Standard

To determine band edge. To keep the VFO and receiver properly calibrated.

100 Kc. ... **$6.95** Net



Z-6A

PETERSEN RADIO CO., *Inc.* 2800 W. Broadway
COUNCIL BLUFFS, IOWA

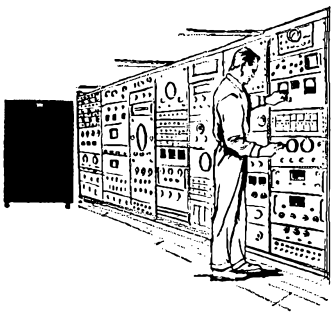
EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

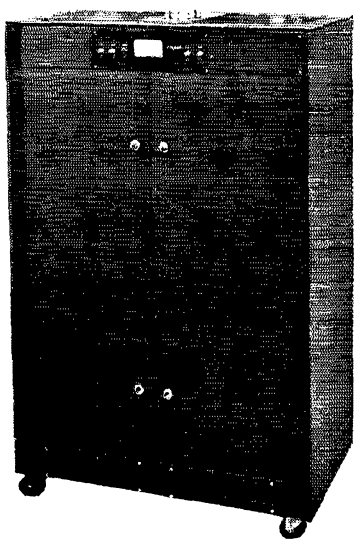
Section Communications Managers of the ARRL Communications Department

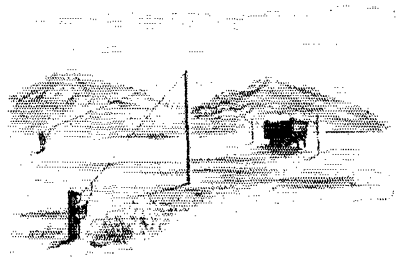
Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members 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, RM 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.

ATLANTIC DIVISION				
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua
Maryland-Delaware-D. C.	W3JZY	Andrew H. Abraham	RFD 1	Smithburg, Md.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.	Palmyra
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive	Buffalo 26
Western Pennsylvania	W3UHN	Anthony J. Mroczka	475-5th St.	Donora
CENTRAL DIVISION				
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield
Indiana	W9PWH	Donald L. Holt	1312 East 28th St.	Anderson
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauona Trail	Portage
DAKOTA DIVISION				
North Dakota	W0HVA	Harold A. Wengel	1416-6th Ave.	Williston
South Dakota	W0RRN	J. W. Sikorski	1900 S. Menlo Ave.	Sioux Falls
Minnesota	W0KJZ	Mrs. Lydia S. Johnson	1258 Van Buren St.	St. Paul 4
DELTA DIVISION				
Arkansas	K5CIR	Odia L. Musgrove	1321 W. Baraque Ave.	Pine Bluff
Louisiana	W5FMO	Thomas J. Morgavi	3409 Beaulieu St.	Metairie
Mississippi	W5MUG	Floyd C. Teetson	2469 Paden	Jackson 4
Tennessee	W4UIO	R. W. Ingraham	105 West Park Drive	Kingsport
GREAT LAKES DIVISION				
Kentucky	W4BEW	Elmer G. Leachman	P. O. Box 406	Ashland
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road	Detroit
Ohio	W8AL	Wilson E. Weckel	2118 Tuscarawas St., W.	Canton 8
HUDSON DIVISION				
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	W2OBU	George V. Cooke, Jr.	3 Daisy Lane	Commack
Northern New Jersey*	W2APY	Daniel H. Earley	216 Grove Ave.	Metuchen
MIDWEST DIVISION				
Iowa	W0NTB	Dennis Burke	1418 Douglas Ave.	Ames
Kansas	W0FNS	Raymond E. Baker	1014 Lincoln St.	Neodosha
Missouri	W0BUL	C. O. Gosch	711 S. Oakland St.	Webb City
Nebraska	W0EXP	Charles E. McNeel	Route 3, RFD	North Platte
NEW ENGLAND DIVISION				
Connecticut	W1CHR	Henry B. Sprague, jr.	Cartbridge Rd.	Weston
Maine	W1BCB	Albert C. Hodson	370 Capisic St.	Portland
Eastern Massachusetts	W1ALP	Frank L. Baker, jr.	91 Atlantic St.	North Quincy 71
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.	Westfield
New Hampshire	W1IIQ	Ellis F. Miller	Box 395	Wolfeboro
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket
Vermont	W1EIB	Miss Harriet Proctor	P. O. Box 9	East Middlebury
NORTHWESTERN DIVISION				
Alaska	KL7DG	John P. Trent	P. O. Box 82	Kodiak
Idaho	W7GGV	Mrs. Helen M. Maillet	Route 1, South	Pocatello
Montana	W7SFK	Ray Woods		Brady
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave.	Portland
Washington	W7PGY	Robert B. Thurston	7700-31st Ave., N.E.	Seattle 15
PACIFIC DIVISION				
Hawaii	KH6DVG	John E. Montague	1108 Kukila Place	Honolulu
Nevada	W7VIU	Charles A. Rhines	Box 1025	Elko
Santa Clara Valley	K6DYX	W. Conley Smith	67 Cuesta Vista Drive	Monterey
East Bay	W6OJW	B. W. Southwell	200 South Seventh St.	Dixon
San Francisco	W6BIP	Wilbur E. Bachman	880 Dartmouth St.	San Francisco 2
Sacramento Valley	W6BTY	George R. Hudson	2209 Meer Way	Sacramento
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno
ROANOKE DIVISION				
North Carolina	W4RRH	B. Riley Fowler	Box 143	Morganton
South Carolina	W4GQV	Dr. J. O. Dunlap	P. O. Box 447	Rock Hill
Virginia	W4QDY	Robert L. Follmar	1057 Dune St.	Norfolk 3
West Virginia	W8JM	Donald B. Morris	1111 Alexander Place	Fairmont
ROCKY MOUNTAIN DIVISION				
Colorado	W0NIT	Donald S. Middleton	920 West Adams St	Pueblo
Utah	W7QWH	Thomas H. Miller	1255 East 17th St.	Salt Lake City 5
New Mexico	W5ZHN	Carl W. Franz	2323 Krogh Court, N.W.	Albuquerque
Wyoming	W7AMU	L. D. Branson	342 South Elk	Casper
SOUTHEASTERN DIVISION				
Alabama	K4PHH	Harvell V. Tilley	RFD 1, Box 10	Ethelsville
Eastern Florida	K4BJH	Albert L. Hamel	1300 N. E. 42nd St.	Pompano Beach
Western Florida	W4RKH	Frank M. Butler, jr.	494 Elliott Rd.	Fort Walton Beach
Georgia	W4CFJ	William F. Kennedy	1687 Fairway Hill Drive, S.E.	Atlanta 17
West Indies (P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman Rio Piedras, P. R.
Canal Zone	KZ5TD	Thomas B. DeMeis	P. O. Box 1111	Balboa
SOUTHWESTERN DIVISION				
Los Angeles	W6JQB	Albert F. Hill, jr.	861 No. Millard Ave.	Rialto
Arizona	W7QZH	Kenneth P. Cole	4132 North 18th Ave.	Phoenix
San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 7
Santa Barbara	K6CVR	Robert A. Hemke	728 W. Mission	Santa Barbara
WEST GULF DIVISION				
Northern Texas	W5BNG	L. L. Harbin	4515 Calmont	Fort Worth 7
Oklahoma	W5DRZ	Adrian V. Rea	Box 33	Ketchum
Southern Texas	W5QEM	Roy K. Eggleston	1109 Vernon Drive	Corpus Christi
CANADIAN DIVISION				
Maritime	VE1WB	D. E. Weeks		Harvey Station, N. B.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2DR	C. W. Skarstedt	62 St. Johns Rd.	Pointe Claire Montreal 33, P. Q.
Alberta	VE6TG	Harry Harrold	1834-5th Ave.	N. Lethbridge, Alta.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4JY	M. S. Watson	249 Lanark St.	Winnipeg
Saskatchewan	VE5BL	Jack Robinson	4527 Elgin Rd.	Regina

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







FROM 250 WATTS TO 50 KW

DUMMY LOADS AND ANTENNA TERMINATORS/DISSIPATORS)

WITH TMC Models TER

TMC MODEL NUMBER	MILITARY NOMENCLATURE	FREQUENCY RANGE	AVERAGE POWER (In watts)	PEAK ENVELOPE POWER (In watts)
TER-250-300 U		DC to 30 mc	250	500
TER-500-70 U		DC to 30 mc	500	1000
TER-500-600 B	DA-199/U	DC to 30 mc	500	1000
TER-1800-300 U		DC to 30 mc	1800	3600
TER-3500-70 U		DC to 30 mc	1750	3500
TER-3500-600 B	DA-200/U	DC to 30 mc	1750	3500
TER-5000-70 U	DA-210/U	DC to 30 mc	5000	10,000
TER-5000-300 U		2-30 mc	5000	10,000
TER-5000-600 B	DA-201/U	DC to 30 mc	5000	10,000
TER-18KA-50 U		DC to 30 mc	18,000	36,000
TER-18KC-50 U		DC to 30 mc	18,000	36,000
TER-18KA-70 U		"	18,000	36,000
TER-18KC-70 U		"	18,000	36,000
TER-18K-600 B		4-28 mc	18,000	36,000
TER-18K-600 BF		4-28 mc	18,000	36,000
TER-25KA-50 U		DC to 30 mc	25,000	50,000
TER-25KC-50 U		"	25,000	50,000
TER-25KA-70 U		"	25,000	50,000
TER-25KC-70 U		"	25,000	50,000
TER-25K-600 B		4-28 mc	25,000	50,000

For companion RF Broadband Transformers refer to Sales Service Bulletin #8015.

Request Technical Bulletin 8009

Models TER-18K and Model TER-25K are new additions to TMC's family of dummy loads and antenna terminators/dissipators that cover the power range of 250 watts average to 50 kw peak. Models TER-18K and TER-25K are provided in 50, 70, and 600 ohm terminations and are housed in metal cases provided with casters for mobility. A meter to indicate forward and reflected power for computation of VSWR is provided as an optional item. Model TER-18K-600-BF, a 600 ohm terminating unit in a fiberglass reinforced plastic case, is used to terminate a Rhombic antenna in high powered transmission service of up to 50 kw PEP, over the frequency range of 4 to 26 megacycles.

The **TECHNICAL MATERIEL CORPORATION**
MAMARONECK, NEW YORK

and Subsidiaries
OTTAWA, CANADA • ALEXANDRIA, VIRGINIA • GARLAND, TEXAS
LA MESA, CALIFORNIA • POMPANO BEACH, FLORIDA

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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

Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914–1936
EUGENE C. WOODRUFF, W8CMP, 1936–1940
GEORGE W. BAILEY, W2KH, 1940–1952

Officers

President . . . . . GOODWIN L. DOSLAND, WØTSN
Moorhead, Minnesota

First Vice-President . . . . WAYLAND M. GROVES, W5NW
P.O. Box 586, Odessa, Texas

Vice-President . . . . . FRANCIS E. HANDY, W1BDI
38 La Salle Road, West Hartford, Connecticut

Vice-President . . . . . ALEX REID, VE2BE
240 Logan Ave., St. Lambert, P. Q., Canada

Secretary . . . . . JOHN HUNTOON, W1LVQ

Treasurer . . . . . DAVID H. HOUGHTON
38 La Salle Road, West Hartford, Connecticut

• • • • •

Secretary & General Manager Emeritus . A. L. BUDLONG, W1BUD

• • • • •

General Manager . . . . . JOHN HUNTOON, W1LVQ

Communications Manager . . . FRANCIS E. HANDY, W1BDI

Technical Director . . . . . GEORGE GRAMMER, W1DF

Assistant Secretaries . . . . . PERRY F. WILLIAMS, W1UED
GEORGE STEVANS, JR., K1LVW RAYMOND HIGGS, W6OGI/1
38 La Salle Road, West Hartford, Connecticut

• • • • •

General Counsel . . . . . ROBERT M. BOOTH, JR., W3PS
1735 DeSales St., N. W., Washington 6, D. C.

DIRECTORS

Canada

NOEL B. EATON VE3CJ
R.R. 3, Burlington, Ontario
Vice-Director: Colin C. Dumbrille VE2BK
116 Oak Ridge Drive, Baie d'Urfee, Quebec

Atlantic Division

GILBERT L. CROSSLEY W3YA
Dept. of E.E., Penna State University
State College, Pa.
Vice-Director: Edwin S. Van Deusen W3ECP
3711 McKinley St., N.W., Washington 15, D. C.

Central Division

JOHN G. DOYLE W9GPI
4331 N. Wildwood Ave., Milwaukee 11, Wis.
Vice-Director: Phillip E. Haller W9HPG
6000 S. Tripp Ave., Chicago 29, Ill.

Dakota Division

CHARLES G. COMPTON . . . . . WØBUO
1011 Fairmount Ave., St. Paul 5, Minn.
Vice-Director: Martha J. Shirley . . . . . WØZWL
Box 78, Black Hawk, S. D.

Delta Division

FLOYD C. TEETSON W5MUG
2469 Paden, Jackson 4, Miss.
Vice-Director: Graham H. Hicks W5IHP
100 Magnolia Place, Natchez, Miss.

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2979 Observatory Ave., Cincinnati 8, Ohio
Vice-Director: Robert B. Cooper W8AQA
132 Guild St., N.E., Grand Rapids 5, Mich.

Hudson Division

MORTON B. KAHN W2KR
22 Birch Hill Rd., Great Neck, N. Y.
Vice-Director: Harry J. Dannals W2TUK
RFD 1, Arbor Lane, Dix Hills, Huntington, L. I., N. Y.

Midwest Division

ROBERT W. DENNISTON . . . . . WØNWX
Box 631, Newton, Iowa
Vice-Director: Sumner H. Foster . . . . . WØGQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa

New England Division

MILTON E. CHAFFEE W1EFW
28 Reussner Rd., Southington, Conn.
Vice-Director: Bigelow Green W1EAE
12 Gloucester St., Boston 15, Mass.

Northwestern Division

R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont.
Vice-Director: Robert B. Thurston W7PGY
7700 31st Ave. N.E., Seattle 15, Wash.

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Joseph F. Abernethy W4AKC
768 Colonial Drive, Rock Hill, S. C.

Rocky Mountain Division

CARL L. SMITH . . . . . WØBWJ
1070 Locust St., Denver 20, Colo.
Vice-Director: John H. Sampson, jr. W7OGX
3618 Mount Ogden Drive, Ogden, Utah

Southeastern Division

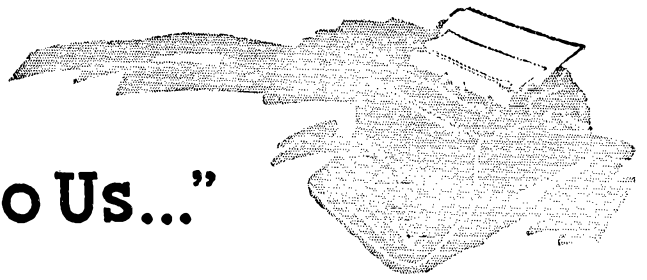
JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta 17, Ga.
Vice-Director: Thomas M. Moss W4HYW
P.O. Box 20644, Municipal Airport Branch, Atlanta 20, Ga.

Southwestern Division

RAYMOND E. MEYERS W6MLZ
Box R, San Gabriel, Calif.
Vice-Director: Howard F. Shepherd, jr. W6QJW
127 South Citrus, Los Angeles 36, Calif.

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1656, Corpus Christi, Texas
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City 19, Okla.



"It Seems to Us..."

OSCAR

Oh, Mr. Printer — How many exclamation points have you got? Trot 'em all out, as we're going to need them badly, because WE GOT ACROSS! ! ! ! !

THUS, jubilantly, did *QST* hail the first reception of American and Canadian amateur signals in Europe on December 7, 1921. Now we need all those "screamers" again, because OSCAR GOT UP! ! ! ! !

At 2040 GMT, December 12, 1961, an automatically keyed 2-meter amateur station hitchhiked into the space age and history aboard the Air Force's Discoverer 36 launch vehicle, the first non-Government satellite ever in orbit. Minutes later, Oscar's friendly greeting was received at KC4USB in the Antarctic, confirming to the amateur world that many months of work had paid off. A substantial portion of this issue of *QST* is devoted to recording this major milestone in amateur accomplishment.

Perhaps to a greater extent than any previous achievement, this was a team effort — and exclusively amateur, though of course participating hams often drew on their many and varied professional talents and associations. Sparked by W6TNS' partly serious, partly whimsical "piggyback" concept, west coast amateurs formed the Project Oscar Association. Missile and electronics engineers designed and built the transmitter, its housing and antenna. Others gave it standard environmental tests in their employers' labs. Washington, Bay Area and West Hartford hams fought the battle of the Potomac, securing cooperation and necessary approval of Government agencies concerned. Pilots took the Oscar package up for actual air-ground tests over California. Traffic hounds set up the communications and reporting networks. Public relations men made sure the press and broadcasters were kept informed to the extent that secrecy surrounding the parent vehicle permitted. Hams at the Voice of America publicized the launch and used the Spacewarn system so that amateurs overseas could listen and contribute data. Others plotted orbits and predicted times and places where future passes could be heard. And thousands of amateurs made their contribution — really the ultimate one, without which the whole thing would have been only a stunt — by monitoring 144.98± Mc., counting the HIs and reporting to the nerve center of the entire operation, Project Oscar headquarters in Sunnyvale, California.

These thousands shared in a great thrill: the uncertainty whether their gear was good enough to hear one-tenth watt some hundreds of miles away, followed by doubts as to the calibration of their receivers and beam indicators, all disappearing in a wave of jubilation with that first "....." Put down the exact time! What's the antenna azimuth? Would you call that S8 or S9? Joe, did you get the HI rate? Don't touch the receiver — that's Doppler shift! Is it still there? Yes, yes . . . now it's gone. Fire up on 20 sideband and let's get in this report. Hey, Marge — did you hear that? That's Oscar, the ham satellite! ! !

NEW HANDBOOK

About the time you read this, we'll be shipping first copies of the 1962 *Handbook*, and shortly thereafter they'll be appearing in distributor stores. We'd particularly appreciate your comments on this year's edition because of a number of changes we have made in the production process. The book has been restyled, has a few more pages, the paper is softer texture to avoid reflections, and the illustrations should be sharper and more detailed. We have the usual assortment of new gear, though of course the sections on theory and principles remain the same. As always, let us know what you think of the content — but in particular, tell us whether you like the new format, paper and printing process. We produce the book for *you*, and it is your acceptance — or criticism — of its usefulness which will guide our decisions on future editions.

QST

Have you written your Senators supporting Senate Bill 2361? See pages 9 and 73 of October *QST* — then do it!

COMING A.R.R.L. CONVENTIONS

April 7–8 — New England Division, Swampscott, Massachusetts.
April 13–14 — Michigan State, Grand Rapids, Michigan.
May 19–20 — Roanoke Division, Roanoke, Virginia.
June 1–3 — Southwestern Division, Anaheim, California.
September 1–3 — ARRL National, Portland, Oregon.
September 1–3 — Delta Division, New Orleans, Louisiana.
October 13 — Hudson Division, New York, N. Y.
October 19–20 — Ontario Province, Toronto.

Hamfest Calendar

New Jersey — The East Coast V.H.F. Society will hold its fourth annual dinner and hamfest on Saturday, Feb. 24, at the Swiss Chalet at Ramsey Circle, Route 17, Ramsey, N. J. The program will commence at 1900 EST, and will include entertainment, awards, installation of officers, and a banquet. Tickets must be purchased in advance (none sold at the door) and prior to Feb. 11. Cost — $5.00 per person. Ample parking plus motel accommodations available at the Chalet. For reservations contact Jack Tompkins, K2HHS, 135 Herbert Terrace, Saddle Brook, N. J.

New York — The first annual dinner dance of the Rochester ARA has been scheduled for Saturday evening, Feb. 10, at the Manger Hotel. This will be a social affair with a hamfest atmosphere, and you are encouraged not to come stag. The Ontario Room of the Manger will be arranged with small tables in an intimate style, and you may order from the menu. Tickets are $4.00 per person. Further information and reservations are available from Harold Smith, WA2KND, 153 Mason Ave., Rochester 15, N. Y.

Strays

The Quarter Century Wireless Assn. will hold its 5th annual QSO Party Feb. 9–11, starting at 2300 GMT Friday and ending at 2300 Sunday. The Boston-Providence and Delaware Valley Chapters are this year's hosts. Contest logs for members east of the Mississippi River go to W1PO, Stearns Poor, 128 Will Street, Hanover, Mass. All those west go to W2RG, Edward Washburn, 6748 Rogers Ave., Merchantville, N. J. QCWA award applications go to K6BX.

OUR COVER

The picture of a rocket sitting on a launching pad and belching flame and smoke has become a familiar one in recent years — old hat, you might say. However, *this* firing was the shot heard 'round the world by radio amateurs, for it carried Oscar I aloft, sending HI a number of times each minute on 145 Mc. as it orbited the earth once every 91 minutes. Eyes right, and read about Oscar and about the hours of effort that went into the advance preparations and about the exultation resulting from its successful orbit.

ARRL NATIONAL CONVENTION

Portland, Oregon — September 1–3

Portland, Oregon, will be the host city for the 12th National ARRL Convention, September 1–3. It will be held in Portland's new Memorial Coliseum, according to Stan Loye, K7BHI, executive chairman for the 1962 convention committee.

"The National Convention this year in the Pacific Northwest," said Loye, "offers a double opportunity. In addition to participating in the ARRL convention, amateurs will also have an opportunity to visit the 'Century 21' World's Fair in Seattle." This event runs from April 21 to October 21, and Seattle is 180 miles to the north of Portland.

Portland's Memorial Coliseum, completed just a year ago, is a *nine-million-dollar* structure, capable of handling convention crowds up to 13,500. It boasts a spacious arena with comfortable theatre-type seats, a large exposition exhibit hall, and numerous meeting rooms with modern facilities. It is located just five minutes from downtown Portland, on the east bank of the Willamette River. Also within walking distance is the new Lloyd Center, known as the world's largest shopping center.

The 1962 Portland National ARRL Convention is sponsored by the Affiliated Council of Oregon Amateur Radio Clubs, Inc. Jim Strickland, W7SEZ, is president of Affiliated Council and coordinator for the event. Other host officials and their responsibilities are Jim Loomis, K7BQE, finance; Don Johnson, W7RFV, program; Earle Skow, W7ADU, entertainment; Ernie Austin, W7AXJ, registration, and George Griffis, K7EIS, promotion. Additional information about the convention, such as accommodations, registration, rates and program will be announced in the near future.

All convention inquiries should be addressed to Ed Weinbaum, Convention Manager, 1962 ARRL National Convention, P. O. Box 1335, Portland, Oregon.

25 Years Ago this month

February 1937

. . . Technical articles included dope on emergency-powered setups, a medium-power pentode transmitter, harmonic radiation, the Doherty amplifier, radio fadeouts, a kw. DX transmitter, high-power crystal oscillators, microphones, and the usual hints and kinks.

. . . The 9th annual DX competition was announced. Each section, phone and c.w., ran for eight days!

. . . W4DLH had an all-continent phone round-table going, with all stations hearing each other. Probably on 14 Mc., although the article doesn't say so.

. . . On February 17, the first transmissions from W1AW (in lieu of W1MK) were scheduled to commence, from the Hq. offices in West Hartford. W1AW, formerly held by the League's late president, Hiram Percy Maxim, was especially assigned by FCC, and the February 17 date was in commemoration of Mr. Maxim's death in 1936. QST

The spirit of adventure lies buried in every man's soul. Strike the spark and ignite the soul and the impossible is accomplished. So it was on December 12, 1901 on a chill, Newfoundland morning. The first self-proclaimed radio amateur, Guglielmo Marconi, bent intently over his crude receiving instruments and heard the letter "S" transmitted across the stormy Atlantic Ocean, from a station in Cornwall.

The spirit of adventure again made its mark sixty years later on December 12, 1961. The locale this time was an experimental aerospace base on the border of the Pacific Ocean. A group of radio amateurs saw launched into orbit the first amateur radio space satellite. Born in a burst of flame, the 10-pound, home-made beacon satellite transmitted to the world that the spirit of adventure and quest that drove Marconi down the road of history was still goading the radio amateur in his eternal search after the mysteries of nature. This is the story of a small portion of that quest.

Sixty Years of Radio Amateur Communication

Marconi to the Oscar Satellite

BY WILLIAM I. ORR,* W6SAI

FEBRUARY, *1959: The radio amateur gazed thoughtfully for a moment at the white paper in his typewriter. Suddenly his fingers sprang into action and the keys flashed the fateful words, "Currently being tested is a solar powered six-to two-meter transistor repeater which could be ballooned over the Southwest. Can anyone come up with a spare rocket for orbiting purposes? . . . 73, Don, W6TNS."*[1] *He slapped the page from the typewriter, setting in motion a chain of events that conclusively proved that truth is indeed stranger than fiction.*

The local time is 0200 on a cold, starless 1961 December morning. The location is Vandenberg Air Force Base, California. It is a cheerless, predawn moment. Inside the reinforced block house, the combined USAF and contractor crews are busy at work. The block house walls are lined with TV monitoring screens. Along one side is the launch control console. Communications, radar and propellant monitors are on; talkers and other intercommunications people are at their stations. The key personnel are locked in unison by a single communications net. All wear headsets and microphones so that they can use their hands freely. A complex network permits several simultaneous conversations. The outpouring of this network culminates in a teletype transmission to the Program Director located 170 miles away in Inglewood, California. The RTTY channel springs to life and begins to clatter: . . . FM 6565TH TEST WING VAFB CALIF TO SSD LOSA CALIF THIS IS A CONTINUOUS MESSAGE. . . . R MINUS 500 AND COUNTING. . . .

In the cold night illuminated by a thousand lamps, the Agena-Thor aerospace vehicle sits on the reinforced launching pad. Known as Discoverer XXXVI, this intricate, calm, sophisticated spire of brute power awaits the command to hurl itself into space. From it will eject man-made satellites, orbiting the earth hundreds of miles above. One of these will be of great interest to the radio amateur. It is Oscar.

Of the thousands of readers of Don Stoner's article, none was struck more forcibly than Fred Hicks, W6EJU, of Campbell, California. An old-timer in the communications game, Fred was now employed by a large missile contractor in the San Francisco bay area. Fred had been present in the blockhouse at Vandenberg for the first six Discoverer

. . . T MINUS TEN AND STILL COUNTING. . . . Tension builds up as moment of launch nears. (Left to right): Capt. Turner (USAF); Bill, W6SAI; Ray, W6MLZ; Dos, WØTSN; and Chuck, K6LFH. Chuck talks to Oscar Control Center, WA6GFY, to make sure that traffic net to South Pole is ready for acquisition of Oscar as it passes on initial revolution. (*Photo: USAF*)

* Project Oscar Association, Box 183, Sunnyvale, California.

[1] "Semiconductors" *CQ*, April; 1959, page 84.

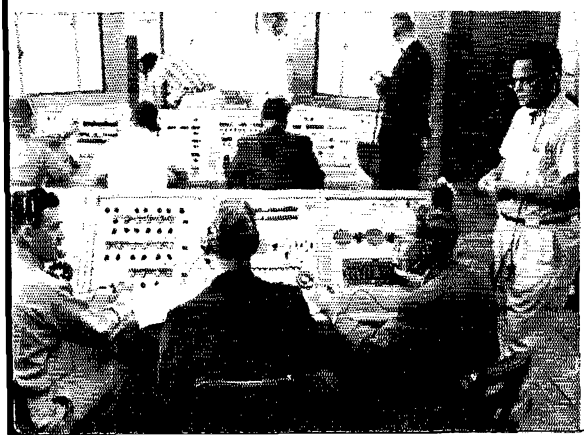
launches. To Fred goes all credit for grasping the true nature of Don's message, and interpreting it in terms of the full spirit of amateur radio.

Fred dropped the magazine on his desk, pushed aside a cup of coffee and reached for the telephone. He dialed a number and listened to the automatic stepping switches go through their complicated dance in the earpiece of the instrument. "Hello, Chuck? . . . Hey, buddy, did you read Don Stoner's article this month? . . . Well, he said in effect that the radio hams could build a satellite if they could only find somebody to launch it for them. . . ." The voice on the phone crackled. "Right! That's what I was thinking. Why don't you drop Don a line and get this thing organized? . . . If old K6LFH and W6EJU and their buddies can't do the job, why, nobody can!" Fred chuckled to himself as he hung up the phone. Chuck was right. Why not *build a ham satellite? The idea wasn't so crazy after all. A lot could be learned from such a device. The satellite would . . . it would . . . well . . . Fred suddenly realized that such a simple, beguiling idea could not be defined and would entail a lot of work and planning to even begin to be coherent. Obviously it was a fine project for a club, or group of hams. One ham couldn't handle this "brainbuster." As H. P. M., The Old Man, might have said, "It was an idea without a handle to grab it." . . . Truly, W6EJU was blessed with the spark of adventure.*

The count down begins at R minus 500 minutes and is divided into more than twenty tasks. More than 1500 separate instructions must be given from the launch console before the vehicle is ready for the great voyage into space. Guidance checks, polarity and phasing checks, vehicle erection, re-check of destruct systems, orbital electronics and control checks, propellant tank checks, telemetery operational checks, and satellite operational checks must go on in infinite, precise detail. The voice of the teletype chatters endlessly. . . .

. . . R MINUS 350 AND STILL COUNTING. . . .

Vandenberg control and tracking station pin-points the Discoverer as it races in orbit around the earth at 18,000 miles per hour. Oscar satellite follows its own orbit at approximately same speed as the parent satellite. Orbital data is plotted on boards at the rear of the room from the acquisition and control consoles in the foreground.
(Photo: Lockheed)



13 October, 1959

"Dear Don:

"I remember you wrote an article for CQ some time ago that described a small transistorized two-meter station, and appealed for 'anyone with a space vehicle, please?' . . . Though I do not hold out any too much hope for this, I will do my best to interest certain parties . . . please send me the exact weight of the installation and space it occupies. . . . Actually, the 'Discoverer' is ideally suited to such a ham project. I will sound out the local hams . . . look for me on 14,285 kc . . . 73 and I certainly hope we can pull this off! . . . Fred, W6EJU."

The die was cast. The spark of adventure had found fuel and was burning brightly. The fateful letter was on the way; was in the mail. It would start a thousand minds dreaming and planning, and the concept would eventually involve high level decisions in the U. S. Government. Now, at this moment in time it was a gossamer; a fancy that might be lightly discarded as a mere exercise of the imagination. (After all, why not? Would not a homemade satellite be yet another convincing proof that amateur radio was indeed in the public interest, convenience, and necessity? At the very least it would be a self-educational program, introducing the great body of amateurs to space communications. Of course.)

Bob Herrin, K4RFP/6 (Launch Operations Manager), was listening on the count down net in the communications and control laboratory, at the launch site. He joshed a few words with other technicians and engineers, intent upon their tasks. The package had been carefully placed into its egg-crate shaped compartment in the Agena second stage of the immense vehicle a few days earlier. Soon the package would fall into line in the check-off procedure that was now running at a rapid pace. Would the antenna erect itself? Would the squib fire the spring that would place the 10-pound satellite into a free orbit of its own? Would the compact, transistorized beacon spring into life, as it had done thousands of times in the shacks of the builders? Or would Oscar I merely become a footnote in the history pages of amateur radio? . . . R MINUS 180 AND HOLDING FOR FIFTEEN MINUTES chattered the teletype.

Bob looked up and his heart jumped. Even though he was an old hand at the launching game, the sound of the "hold" announcement never failed to affect him. "I hope it's only a technical hold," he wished to himself as he continued with his duties. He noticed that the black sky was breaking in the East. Daylight was near. It was always easier in daylight, for some reason. . . . R MINUS 180 AND RESUMING COUNT. . . .

15 October, 1959

"Dear Fred:

"To say I was elated to receive your letter would be the understatement of the year. However, before

I allow myself to get too excited, I am going to submit a proposal to you and see what happens. . . . As you say, I hope we can pull (or is it push) this thing off. Best regards, Don."

The radio amateurs seated around the conference table grinned as Fred, W6EJU, Chairman, read the message. The first meeting of the Oscar Committee was about to be called to order. There were: Chuck Towns, K6LFH; Bernie Barrick, W6OON; Stan Benson, K6CBK and Nick Marshall, W6OLO. These amateurs are the trail-blazers into space in the year 1959!

In Los Angeles, Don Stoner had many conversations with Ray Meyers, W6MLZ, and Henry Richter, W6VZT. Gradually a concept of a suitable radio satellite package was being pounded out. The phone bill between W6TNS and W6EJU began to grow to alarming proportions, supplemented by sideband schedules on 7 Mc. Don suggested that the rapidly growing group of hams be called the Oscar Association: Orbital Satellite Carrying Amateur Radio! A natural name. So was Oscar born in spirit.

At 7 A.M. Bill, W6SAI, rolled over in bed in the BOQ at Vandenberg Air Force Base, California. He reached across and shook Chuck, K6LFH, awake. "0700 local time," he said as Chuck turned his face to the wall and tried to go back to sleep. "We meet the press at 0800, and go to the pad at 1000. Today we'll either be heroes or tramps!" Chuck sat up in bed and looked at his watch. "The count down started at about two A.M." he said. "They must be down to about R minus 180 by now."

. . . R MINUS 180 AND COUNTING. . . . CLEAR AREA TO LOAD FUEL . . . CHECK LOG TO DETERMINE FINAL ULLAGE REQUIREMENTS. . . .

The tension in the block house was quietly growing. A charged atmosphere punctuated by short commands and remarks served only to emphasize the quick passage of time. The sun would rise in a few moments and the air was growing warmer. A cool, mild breeze was coming in from the Pacific and the sky, which was not yet red, was a flat steel color. An Air Police helicopter hovered briefly by the launching site then slanted away on some mysterious mission, its huge rotor chopping the air. The Discoverer stood waiting, a white tall spire, gleaming dully in the faint light of dawn, yet bathed on all sides by spotlights. Soon it would burst into space.

21 October, 1960

"Federal Communications Commission:

We thank you for your comments regarding our proposed Oscar program and will attempt herein to clarify our objectives. . . . The former Oscar Committee has been reorganized as the Project Oscar Association . . . the Board of Directors have approved the project plans . . . the proposed satellite will be transmitting in the 2-meter amateur band, and will be electronically keyed . . . it will have a restricted life of perhaps 20 days. . . .

Ready to go! Oscar completes its qualification tests with flying colors! At final check-out are: (left to right): Gail Gangwish; Nick Marshall, W6OLO; Don Stoner, W6TNS; Chuck Towns, K6LFH; and Fred Hicks, W6EJU.

Fred H. Hicks, W6EJU, for Project Oscar."

26 September, 1960

"Dear Mr. Hicks:

This will acknowledge receipt of your letter regarding Project Oscar. . . . It appears that, with the exception of the requirement for positive control of the transmitter by the station licensee, you may be able to meet the other rule requirements in question . . . you realize that this project must receive the sanction of the other government agencies before final approval could be granted. . . . Ben F. Waple, Acting Secretary, FCC."

By now the Oscar Association had grown to the point where items of hardware could be built and tested for the proposed satellite. Project volunteers had been assigned jobs and an Oscar mailing list was created. Because of the press of business, W6EJU turned the chairmanship of the Oscar program over to Mirabeau ("Chuck") Towns, K6LFH, to implement and carry on the ultimate dream of having an amateur radio station in orbit about the earth. For it was only a dream. . . .

"Really, Mr. Towns. I admit the idea has some merit to it, but I do not see what earthly good it would do to have a bunch of amateurs engage in such an effort. After all, the government has spent millions of dollars in establishing exotic tracking stations . . . really, now, let's be serious for a moment. . . ."

Bill, W6SAI, looked dully at the plate of congealed eggs and the cup of cold coffee. "To heck with breakfast," he said to Chuck. "I'm too excited to eat." The other amateurs were equally elated: Don Stoner, W6TNS, who had been invited to the launch to see his dream come true; Goodwin L. Dosland, WØTSN, President of ARRL; and Ray Meyers, W6MLZ, Director of the Southwestern Division, ARRL. Absent because of illness was Harry Engwicht, W6HC, Director of the Pacific Division, ARRL. Two hundred miles to the north Fred, W6EJU, now acting as Operations Director, and the complete Oscar Tracking network were standing by, waiting to flash word of Oscar orbit to waiting radio amateurs. "Let's get the show on the road," said

"Dos", reaching for his overcoat. "It's almost ten minutes to eight and we have to attend the pre-launch press meeting."

The radio teletype chattered its endless song. . . .

R MINUS 150 AND COUNTING. . . . CLEAR AREA TO LOAD OXIDIZER. . . . CHECK ULLAGE REQUIREMENTS BEFORE ZEROING FLOW METER. . . .

10 November, 1960

"John Huntoon, ARRL

As I have mentioned to you, a proposal has been made to place an amateur satellite in orbit, using a future space vehicle as a 'piggy-back' carrier . . . a need exists for strong, amateur leadership from a group that represents a majority of the amateurs, rather than a small, local club. I believe that the only organization that can truly represent the amateur in this matter is ARRL. Without ARRL sponsorship, the amateur satellite program will wither and die . . . 73, Bill, W6SAI."

In the meantime, Oscar had enlisted additional support. George Jacobs, W3ASK, Propagation and Space Communications Editor of CQ, had volunteered to be the Washington, D. C., contact man for Project Oscar. George spent many hours discussing the project with sympathetic officials of the FCC and the State Department. He tried to discover what conditions must be met by such a unique undertaking in order to receive approval from key government officials, some of whom had only a hazy concept of the ideals and dreams of the radio amateur. George worked in close collaboration with John Huntoon, General Manager of ARRL. Finally, in the early spring of 1961, after a trip to Hq. by K6LFH and W6SAI for a conference with League officials, the ARRL adopted Project Oscar, granting its endorsement to the project and providing important, vital backing in the name of the amateurs of the United States.

The launch site was atop a scrubby sand dune in a far corner of Vandenberg AFB. A jolting Air Force bus crossed innumerable sand dunes and washes, carrying the amateurs and reporters who would soon observe the launch. Dry brush dotted the rough landscape. Suddenly, the Discoverer atop the launch pad was visible on the horizon. It stood majestically alone, surrounded by lesser objects that emphasized its size. It was a clear white, with the motto "United States" emblazoned on it. A single plume of evaporating liquid oxygen curled lazily from one side. There was no movement about the vehicle, and the area seemed deserted and asleep. The bus, loaded with newspaper, radio and TV reporters and the group of radio amateurs ground to a halt atop a small plateau about five hundred yards from the launch site. The riders dismounted and slowly walked to a clear spot from which the Discoverer rocket was in clear view. At one corner of the plateau stood a small gasoline generator, a communications truck, a table with a battery of telephones, and a portable loud speaker plugged into the base communications system.

. . . R MINUS 80 AND STILL COUNTING. . . .

The Air Force Thor booster, standing on the launching pad had completed the touchy fueling operation in which thousands of pounds of RP-1 (a souped-up version of aircraft jet fuel) and LOX (liquid oxygen) had been pumped into it. On top of the booster, the 25-foot long Agena brought the total height of the satellite-vehicle combination to 81 feet. The sun was climbing higher in the sky and the wind had died down now, and the site was clear and warm.

. . . R MINUS 50 AND STILL COUNTING. . . . TANK PRESSURES CHECKED. . . . DESTRUCT SQUIBS ARMED. . . . RECORDERS ARE ON. . . .

"Why do you employ an 'R' count instead of a 'T' count?" asked W6SAI of Captain Barbato (USAF), the Public Information Officer.

"The R-count is in minutes and is used up to about minus ten minutes. At that time we switch to the T-count, which is run in minutes or seconds," explained the Captain. The communications truck gave notice from the Missile Flight Safety Officer that the range was clear, and that it was clear to launch.

Directors of the Project Oscar Association. Left to right: Fred Hicks, W6EJU; Bill Orr, W6SAI; Harley Gabrielson, W6HEK; Tom Lott, VE2AGF/W6; Chuck Towns, jr., K6LFH (Chairman); B. Barrick, W6OON; Dick Esneault, W4IJC/W6; Harry Workman, K6JTC; and Nick Marshall, W6OLO. Not present at the time the photo was taken were Stan Benson, K6CBK; Jerre Crosier, W6IGE; Harry Engwicht, W6HC; and M. K. Caston, WA6MSO.

31 July, 1961

"Secretary of State, U. S. State Department:

The American Radio Relay League, the national nonprofit membership association of amateur radio operators, requests the cooperation of the Department of State concerning space communication and experimentation by radio amateurs. A group of skilled radio amateurs on the West coast, which is incorporating as the Project Oscar Association, has designed and constructed communications equipment suitable for launch into orbit. The Association is nonprofit and is entirely noncommercial and nonmilitary. It is affiliated with and has the full support of the American Radio Relay League . . . an informal session was held in Washington recently, with the following results:

a) Air Force representatives stated that Project Oscar has been approved by HQ AFSC for incorporation in the Discoverer series of launchings, subject to coordination with other interested government agencies . . . it is our hope that the information contained herein will be sufficient to enable the Department of State now to undertake the procedure outlined and agreed to at the meeting — i.e., to solicit the formal concurrence of the several agencies concerned in this matter so that the project may go forward . . . (signed) John Huntoon, General Manager, ARRL."

Simultaneously, the Project Oscar Communications link was being organized under the direction of Tom Lott, VE2AGF/W6. It was desired to have early acquisition of the Oscar satellite by a responsible party, so various amateurs were contacted at the South Pole bases by Captain David Veazey, W4-ABY USN, Assistant for Communications, Special Projects Office. Dave promised to arrange a suitable amateur tracking station to be set up on the Antarctic continent by the KC4 hams to flash back word of Oscar, once it achieved orbit.

The crowd at the Discoverer site had grown to a small army. General Francis H. Griswold, K3RBA, Director of the National War College, Washington, D. C., had arrived. In addition, a group of scientists from California Institute of Technology had heard of the launch, and had interrupted their important work to watch the world's first home-made amateur radio satellite hurled into orbit.

. . . T MINUS 30 AND COUNTING. . . . REPORTING WILL BE BY EYEBALL AND F.M. RADAR AFTER LIFT-OFF. . . . TERMINAL COUNT WILL START AT T MINUS 11 MINUTES. . . . GUIDANCE LOCK ON COMPLETE. . . . BTL READY AND STANDING BY FOR LAUNCH. . . . RANGE GREEN. . . . T MINUS 20 AND COUNTING. . . .

The sky had clouded over and a slight overcast settled down above the poised bird. "Do you require a clear sky for launch?" asked Ray, W6-MLZ. "No," replied the Public Information Officer. "This overcast won't affect the launch."

Now the news service wires were open, and Chuck, K6LFH, placed a long distance call to the Oscar control center, WA6GFY. Was everything ready in Sunnyvale? . . . Good. . . . Good. . . . South Pole link through W4ABY and KC4-USB is open. . . . W6EJU at the other end of the land line queried as to the exact time of launch. . . . "Sorry, Fred, can't announce the time until after lift-off. . . ." Fred laughed, "I can tell from the sound of your voice it will be within a *very* few minutes," he said. As if to verify his words, the communications speaker over Chuck's shoulder blared into the telephone, "T minus 16 and counting!!!"

15 September, 1961

"John Huntoon, ARRL.

Reference is made to your letter of July 31, 1961, requesting the cooperation of the Department of State concerning space communication and experimentation by radio amateurs, specifically with respect to 'Project Oscar'.

"In reply I am pleased to inform you, after consultation on this subject with other interested agencies of the Government, that the Department perceives no objection to the carrying out of Project Oscar. . . . For the Secretary of State: Edwin M. Martin, Assistant Secretary."

T MINUS 14 AND COUNTING. . . . ONE MINUTE UNTIL START OF TERMINAL COUNT. . . . TERMINAL COUNT WILL START ON MARK. . . . MARK. . . . PHASE ONE PROCEEDING NORMAL. . . . PHASE ONE COMPLETE. . . . PHASE TWO PROCEEDING NORMAL. . . .

Don, W6TNS, plugged his tape recorder into the a.c. outlet on the portable generator. Bill, W6SAI, climbed atop a sand dune immediately behind the plateau. The Air Force men looked to their recording cameras and the babble of voices on the press telephones rose in pitch. The Air Police helicopter scooted overhead, looping about the press area, and inquisitively shot behind a sand dune. The pulsating beat of its rotor could be heard above the noise of the preparations.

. . . The teletype pounded on in a relentless beat. . . . PHASE FOUR PROCEEDING NORMAL. . . . ORBITAL STAGE TLM AND BEACON BEING VERIFIED. . . . FUELING COMPLETE. . . . MAIN SAFETY RECEIVERS INTERNAL. . . . PHASE FOUR COMPLETE. . . . PHASE FIVE PROCEEDING NORMAL. . . .

Suddenly 'Dos,' WØTSN, laughed out loud.

"What's so funny, Dos?" asked Don. "The incongruity of the situation just struck me," said Dos. "Here I am, a radio ham and an attorney, on a launching pad in California! It's 14 below zero in Minnesota and a judge and jury are in recess until I return! Who would imagine I'd be here today watching Oscar fly?"

Who indeed? There were many doubters and some who had damned the project with faint praise. Many times the future of the Oscar Project looked black, as some insurmountable road block loomed ahead. The support of interested amateurs was great comfort in such moments:

PA0VF: It is with much interest that amateurs in the Netherlands were reading of Project Oscar . . . we thank you for your kind information. . . .

GM5NQB: . . . those with whom I have talked are tremendously interested. . . .

VU2NR: . . . I would be quite happy to make any kind of observations required in regard to Oscar . . . good luck!

LU9HAT: . . . please send me information. . . . I am a member of the local amateur satellite observers' group. . . .

(Continued on page 130)

Oscar Congratulations

From the Vice President of the United States

Congratulations to all those who have made Project Oscar such a success. To me this project is symbolic of the type of freedom for which this country stands: freedom of enterprise and freedom of participation on the part of individuals throughout the world.

LYNDON B. JOHNSON

From the National Aeronautics and Space Council

Project Oscar is [an] orbiting ambassador of international good will. We are pleased with its technical success and even more pleased with the participation in the project by radio amateurs throughout the world. Congratulations to those who built it and to all those who are free and able to listen to it.

E. C. WELSH
Executive Secretary

From the Department of State

We in the Department of State have noted with great satisfaction the recent success of the community of American Amateurs in bringing about with the cooperation of the Air Force the successful launching of the first Project Oscar satellite. This accomplishment marks another milestone in the list of significant amateur contributions to the communications art.

I wish to take this opportunity to offer the Department's sincere congratulations to the American Radio Relay League and the Project Oscar committee.

ARTHUR L. LEBEL
Acting Chief
Telecommunications Division

From the U. S. Information Agency

[The] Voice of America heartily congratulates radio amateurs throughout the world on [the] success of Project Oscar. Oscar's story [was] carried to all corners of the earth in many of 36 languages broadcast by VOA. May Oscar's radio beacon, now sending HI, guide the way to newer and greater communication horizons in a spirit of world peace and brotherhood among all peoples.

HENRY LOOMIS
Director, Broadcasting Service

From the Federal Communications Commission

The Commission extends its congratulations to the American radio amateurs on successful orbiting of Oscar, another triumph for amateurs in the field of experimental radiocommunications. This is exemplary of the traditional amateur spirit of exploring the unknown, adding to our scientific knowledge and further proof of the public value of this important radio service.

Needless to say I have personally joined the Commission in this expression and I am sure that the American radio amateurs will keep up their good work.

NEWTON N. MINOW
Chairman

From the Department of the Air Force

May I offer my sincere congratulations on the success of your Oscar experiment.

I hope that the "space-available" ride aboard our Discoverer vehicle has served to crystallize and direct the interest of many amateur radio operators throughout the world toward a better understanding of the complexities of the space age. The youthful amateur operator of today, inspired through his participation in Project Oscar, may produce tomorrow's breakthrough in space communications.

JOSEPH V. CHARYK
Under Secretary of the Air Force

The efforts of the radio amateur in Project Oscar have once again established him as an important part of our scientific endeavor. Participation in this project, and others like it, has assisted this country in its aerospace progression.

As an active amateur, I am sincerely proud to be a member of our fraternity and as a member of the defense team I am grateful for the spirit of patriotism and cooperation that prompted this undertaking.

CURTIS E. LEMAY (K4RFA)
General, USAF
Chief of Staff

From the Department of the Army

In behalf of the United States Army Signal Corps and its many hundred radio operators, I wish to extend congratulations to the American Radio Relay League and others involved in the unique and successful launching of Project Oscar.

The present Oscar satellite, and those to follow, will provide unprecedented stimulation to the use of our v.h.f. bands. This stimulation comes at a most opportune time and will serve the amateur fraternity well as the sunspot cycle decline adversely affects conditions on our lower frequency bands.

Oscar is a timely project, well executed and gratefully received; a typical example of American amateur ingenuity, cooperation and communications progress. As an active amateur (first licensed in 1926), I fully appreciate the many contributions amateurs have made in furthering the electronic science. Oscar again reiterates the worth of the amateur in furthering the aims of mankind.

EARLE F. COOK (W4FZ)
Major General, USA
Deputy Chief Signal Officer

From the Department of the Navy

The successful launching and orbiting of the amateur radio satellite Oscar, an event that has attracted deserved world-wide interest and attention, marks another milestone in the communication accomplishments of the "ham" radio fraternity.

U. S. Naval Communications congratulates those dedicated members of the Project Oscar Association whose imagination, initiative and technical skills made this achievement possible. Oscar's planning and engineering were of the highest caliber. The Navy, long active in encouraging "ham" operations, is particularly gratified that an American amateur radio group has demonstrated to the Nation and world-at-large that it is capable of successfully organizing and implementing a space project of this scope.

It is a pleasure and a privilege for me to extend a hearty "Well Done!" to America's radio amateurs on the occasion of one of its most historic and major accomplishments.

BERNARD F. ROEDER
Rear Admiral, USN
Director, Naval Communications

From the Institute of Radio Engineers

As a long-time member of the American Radio Relay League, let me congratulate the radio amateurs for the launching of Oscar. As usual, amateur radio is in the vanguard of new developments. One wonders if the time may not come when the amateurs will have their own relay satellite to aid in low-power world-wide power communication with one another. Perhaps Oscar is the first step toward this.

L. V. BERKNER
President

From the Armed Forces Communications and Electronics Association

Not only the members of AFCEA who are "hams", but every other member of the Association have followed with great interest the performance of America's radio amateurs in connection with Project Oscar. The outstanding success achieved with the ham-designed and ham-constructed satellite package merely reflects what the AFCEA membership has known all along . . . that there have been practically no technical advances in the radio art since its inception in which amateur participation has not been evident and made a significant contribution.

AFCEA is gratified to note the lastest achievement in the world of "ham" radio, and to be reassured that our interests are parallel with respect to radio communications. The Association, both the military and industrial segments, believe that in the years to come our common abilities and goals will be complementary and will contribute materially to the continuance of the state of superiority of the U. S. radio art.

As President of AFCEA, and as a lifelong radio "ham", it is my great pleasure to convey to the Project Oscar Association and all participating amateurs our hearty congratulations on the glowing success of Project Oscar.

FRANK A. GUNTHER (W2ALS)
President

From our ARRL President

This first experiment of amateur radio in space has been highly successful, not only from our amateur point of view, but also from the standpoint of scientific accomplishment. We amateurs are all immensely proud of hams in the Oscar Association, whose courage, far sightedness, and ability made possible this great accomplishment.

We amateurs are also very grateful to the various Government agencies who cooperated with ARRL and the Oscar Association in making the launching possible. Such cooperation between Government and private citizens significantly typifies to the world our American way of life.

We also appreciate and recognize the many hundreds of individual amateurs and radio clubs and groups whose efforts in tracking and reporting Oscar contributed so much to the final success of this first milestone of amateur radio in space.

Congratulations to all hams throughout the world who participated in making this great success!

GOODWIN L. DOSLAND (WØTSN)

The Honor Roll: Oscar Participants

There are some who hear a different drummer, and who march a different pace
—Thoreau

THE tattoo of the "different drummer" beats nowhere more strongly than it does among the ranks of the radio amateur. Our hobby, in fact, is a collection of fascinating sub-hobbies. The amateur has a wealth of pursuits to follow. He may be a traffic handler, experimenter, DX man, v.h.f. enthusiast, equipment builder or "rag-chewer." He may be active on phone, c.w., radioteletype, sideband or even TV! Or he may be inactive, merely enjoying his hobby through friendly, personal contacts or via *QST*.

Project Oscar combines the skill of the traffic handler and the DX man in an amalgam with the knowledge of the experimenter and the techniques of the v.h.f. enthusiast. You will find all these branches of our beloved hobby represented among the ranks of ham-volunteers who have given of their time and efforts to bring Oscar to a smashing triumph. The following were the Oscar crew. To them belongs the satisfaction of a job well done!
— *W6SAI*

Oscar Association, Board of Directors

Mirabeau C. Towns, jr., K6LFH, Chairman
Stanley R. Benson, K6CBK, Planning
Harley C. Gabrielson, W6HEK, Data Handling
Fred H. Hicks, W6EJU, Field Operations
William I. Orr, W6SAI, Publicity
Nicholas K. Marshall, W6OLO, Engineering
Harry M. Engwicht, W6HC, ARRL Coordinator
Thomas M. Lott, VE2AGF, Communications
Jerre H. Crosier, W6IGE, Club Coordinator
Harry E. Workman, K6JTC, Secretary
Richard N. Esneault, W4IJC/6, Treasurer
Donald L. Stoner, W6TNS, Project Design

Advisors

Richard T. Black
Orrin H. Brown, W6IIB
Milton K. Caston, WA6MSO
Steven S. Cerwin, K6OJO
John J. Dougherty, W2LHB/3
Lou Haire
Otis R. Hill, K6MLZ
Leonard Jaffe, K3NVS
George F. Jacobs, W3ASK
Morton B. Kahn, W2KR
Henry L. Richter, W6VZA
Oswald G. Villard, jr., W6QYT
F. D. Virden, Rear Admiral, USN

ARRL Coordinators

Jean A. Gmelin, W6ZRJ
Raymond E. Meyers, W6MLZ

Communications

George Christofferson, K6MTZ
Leigh H. Irvine, W6PRB
Elton J. Jones, K6MTX
Howard E. Koehler, WA6GXI
Don G. Peterson, WA6GQE
Robert F. Mead, K6GZ
Larry A. Smith, WA6GGX
Fredric A. Streib, W6QPM
David J. Veazey, W4ABY
Fred Walters
Robert B. Whitely, K6UPX

Data Reduction

Carl H. Buchhass, WA6GGW
Joseph S. Chandler, WA6LOJ
Leo E. Clarkson, W6BCD
Charles L. Clavell, K6JKI
James P. Endsley, W6RRU
John G. Gibson, K6YGS
Edgar A. Hilton, W6VKP
Dorothy N. Ligon, K6ZLQ
Donald E. Norgaard, W6VMH
Carl E. Shaw, W6HTR
Leslie C. Vickery, W6AKR
Arthur M. Walters, W6DKH
Ralph E. Wells, K6QMJ
Harold E. White, K6RNX
William W. Hawkins, jr., WA6GAU
Carl B. Hillesland, K6LFI
Francis S. Humphrey, W6OQA

Design

Clarence A. Andrews, jr., W6LHV
Douglas K. Beck, WA6QQI
Albert R. Diem, W3LSZ/6
Albert F. Gaetano, W6VZT
Russell Garner, K5VPN/6
Gail Gangwish
H. Hughes
Howard Linnenkohl, K6SDD
H. E. Poole
Charles S. Smallhouse, WA6MGZ

Launch

Kingdon A. Davidson, WA6KPP
Robert G. Herrin, K4RFP/6
R. McIntosh, WA6LZC

Liaison

Robert W. Carter, W6QKW
Frederick R. Heward, K6EER
Walter A. Read, W6ASH

Procurement

Neil Arnett, WA6RIS
Burnell B. Barrick, W6OON
Orville J. Dalton, K6UEY
Donald T. Rozak, WA6JNJ

Recording

Scott Lee, W6COI
Robert L. Fleming, K6JTW

Secretariat

Arthur W. Davis, K6AFR
Wilbert R. Hilbrink, WA6LLZ
Clifford E. Martin, WA6QOH
Jay C. Merchant, W6ITF

Test

Lance G. Ginner, K6GSJ
G. R. Goodwin
Hubert R. McLain, K6SPK
Alf H. Modine, K6TWF
Theodore J. Netoff, K6CRV
Wallace S. Raven, WA6AID

WA6LZC ("Rep") at Vandenberg, California is in an enviable QTH. From the shack window he can often see the silver streak of a space vehicle carrying a satellite into orbit, and can hear from afar the deafening roar as the rocket leaves the launching pad. On December 12, 1961 at 2042 GMT, WA6LZC was in QSO on 7-Mc. s.s.b. with K6QEZ, the Oscar Communications station in Redwood City, Calif. Discussing the forthcoming Oscar launch, Rep suddenly said, "Hey, fellows — I can see a missile leaving the pad! I bet it's Oscar!" Thus, the first news of the launching reached the outside world!

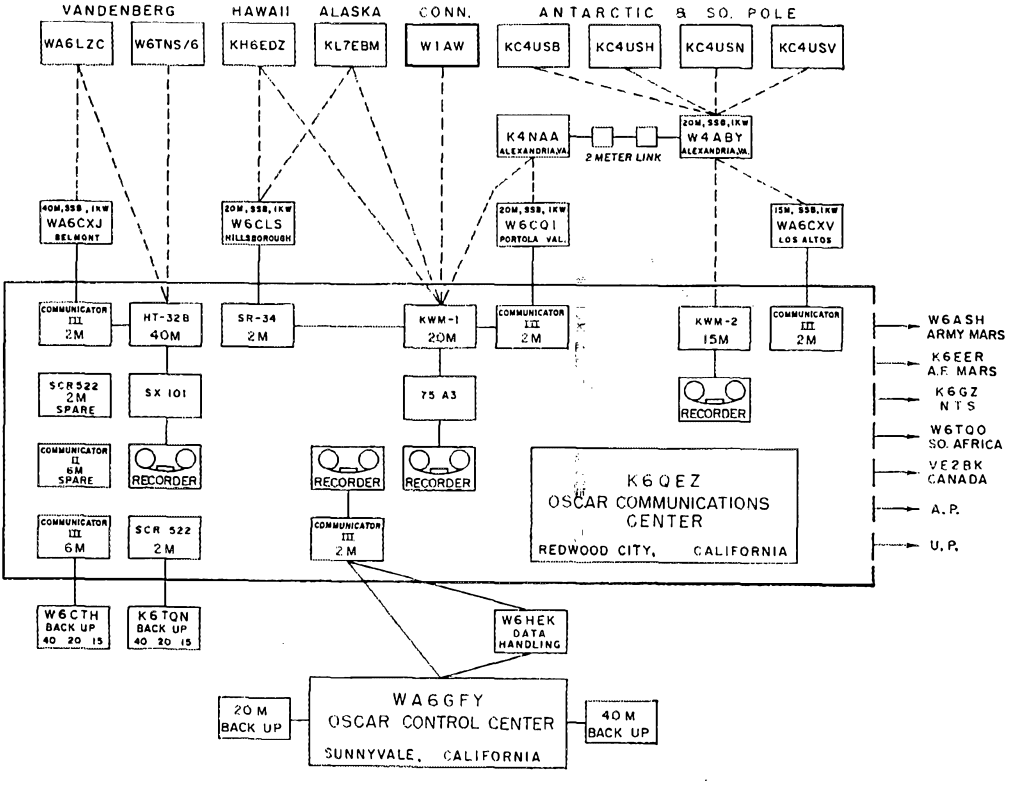
Communications for Project Oscar

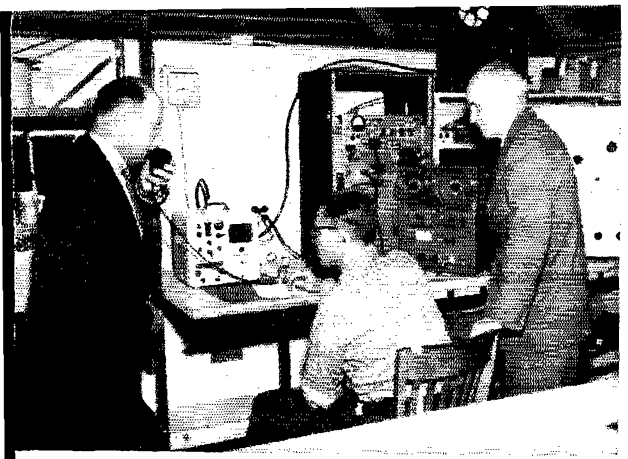
BY T. M. LOTT,* VE2AGF (ex-G2CIN)

Setting up a system of rapid and reliable communications with radio amateurs in strategic locations around the world to ensure immediate and accurate verification of the Oscar satellite being in orbit presented a considerable problem. Matters were not made any simpler by security restrictions imposed by virtue of Oscar being carried into space aboard an Air Force vehicle. This meant, of course, that we could not tell any of the Oscar stations the date and time of firing prior to the launch, but had to have them standing by in a state of readiness for two or three days beforehand. Once the vehicle was off the pad, security restrictions were lifted, and the Oscar communications net could spring into life.

In view of the importance of instant and reliable communications, it was decided that every circuit should have an emergency back-up (see Fig. 1), and that every piece of operating equipment should have an operating spare alongside it. To guard against power failure, the Ampex Radio Club provided a 5-kilowatt Field Day a.c. generator in stand-by condition. To insure that the network was in working order, several communications drills were held in the weeks prior to launch, and a full-scale dress exercise was held two days prior to launch. A practice message was flashed from Oscar Communication headquarters (K6QEZ) to KC4USB at the Marie Byrd Base, Antarctica. In turn, the hams at the Pole sent back an acknowledge message to K6QEZ.

* Project Oscar Association, Box 183, Sunnyvale, Calif.

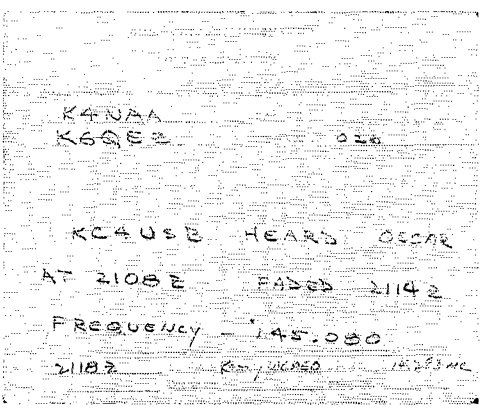




At the left, above, Tom Lott, VE2AGF, Director of Communications, passes on the news from the Communications Center to the Control Center via the 2-meter link. Looking on are Clyde Haggbloom, W6WZF (seated), and Mr. Alexander Poniatoff, founder and Chairman of the Board of Ampex.
At the right, the exciting news comes in from Marie Byrd Land—Oscar is being heard at the South Pole! Dave Keresey, W6AEO, operates the 20-meter rig at this historic moment.

Because of space limitations at K6QEZ and previous field day experience in operating several one-kilowatt rigs in close proximity, it was decided to have several external amateur stations linked into the center by means of 144-Mc. equipment. These back-up stations were chosen for their operating ability and signal punch on the DX bands. Power level at K6QEZ was held to 120 watts to reduce cross-talk and interference, as simultaneous transmissions on six bands were to be used.

As single sideband voice was used on all long-distance links (and a.m. on 2- and 6-meter links) it proved relatively easy to operate the remote kilowatt transmitters by feeding the 144-Mc. received signal into the sideband transmitter, thus actuating the VOX circuit. Telephone facilities were also available at all operating positions for use if needed. Messages coming into the Oscar Communications Center (K6QEZ) from WA6GFY (Oscar Project Control Center), Sunnyvale, were written on specially made carbon-interleaved message forms and passed to the operators at the 15-, 20-, and 40-meter positions. Incoming messages received at K6QEZ were written on single forms and given to the 144-Mc. control-link operator for retransmission to WA6GFY.


K4NAA
K6QEZ 0226
KC4USB HEARD OSCAR
AT 2108Z FADED 2114Z
FREQUENCY — 145.080
2118Z

To accommodate all the extra circuits, additional beam antennas were erected on the roof at K6QEZ, and the beams for the 2- and 6-meter links were permanently aligned on the respective terminal stations. In view of the historical significance of the forthcoming event, tape recorders were spliced into all the major circuits and when time is found to edit the rolls (more than eight miles of tape!) we hope to have an interesting story of the eventful day of December 12, 1961. In the excitement of the moment, when word was flashed from the Antarctic station that Oscar was in orbit, I am sure many things were said and done of which we now have little or no recollection, but which one day may be of interest to posterity! I am waiting to hear again the thrilling visual description of the lift-off of Discoverer XXXVI given on 40-meter sideband by WA6LZC from Vandenberg, and the excited voice of K4NAA on 20-meter s.s.b., relaying the historic message that KC4USB had heard Oscar's greeting as it swept overhead in orbit! The biggest thrill of all was the sideband message from KL7EBM

(Continued on page 136)

Operators at K6QEZ on December 12, 1961

Tom Lott, VE2AGF
G. Christofferson, K6MTZ
Dave Keresey, W6AEO
Pat Casias, K6RCD
C. Haggbloom, W6WZF
Fred Streib, W6QPM
Bob Sferra, WA6FLY
J. Michaelis, K6KOP
Dean Grant, WA6LGK
Lloyd Honey, K6GXH
Bill Widera, ex-WV6DQM
Erno Fechner (recording)

Operators at WA6GFY on December 12, 1961

John Ruzik, K6HPO
Jim Cox, W7QIS/6
Don Peterson, WA6GQE
Jerre Crosier, W6IGE
Fred Hicks, W6EJU
Fran Evans, W6GBS (recording)
Stan Benson, K6CBK
Hugh McLain, K6SPK
Woody Koehler, WA6GXI

There have been many amateur stations shown in QST *which have been described by amateurs as being "out of this world." The Oscar beacon satellite, however, is the first one literally to make the grade! This paper is a review of the design and construction of this unit, touching briefly on the nature of some of the problems involved in building equipment that must operate in a space environment.*

The Oscar Satellite

BY HARLEY GABRIELSON,* W6HEK

THE design objective of the Oscar program was to produce a package that would withstand the rigors of vehicle launch and that would work properly in the environment of space. The broad requirements called for equipment capable of radiating a 2-meter signal from orbit some 300 miles above the earth. This signal required a simple identifier, and it had to be capable of being heard and tracked by amateurs using relatively unsophisticated receiving equipment. A 140-milliwatt, crystal-controlled, c.w. transmitter, suitably keyed, and having an operating life of about three weeks, met these requirements.

Anticipating that the Discoverer vehicle was a likely source of launch into space, the packaging requirements for inclusion in this rocket were determined and were found to limit the equipment to a maximum weight of ten pounds contained within a rectangular-shaped configuration, curved to fit the outer circumference of the vehicle (Fig. 1).

The Reliability Problem

The most important consideration in building a suitable space-radio beacon was reliability. Construction of Oscar involved much more than simply whipping up a 140-milliwatt transmitter and keyer, and then providing a set of batteries ample to run it for a few weeks. Oscar must be physically rugged enough to withstand the rigors of a rocket launch, following which it must operate normally without the benefit of retuning or "knob tweaking." All this must be accomplished with the end in view that the equipment will be operating in a rather unusual environment — the utter cold and stillness of outer space!

It is not sufficient to use the best components and the most rugged and conservative design — although these are necessary and vital ingredients to ultimate success. In addition, it is necessary to prove the reliability of the design by subjecting the complete equipment package to punishment in the laboratory under conditions as strenuous as the worst to be expected in actual operation. It must be emphasized that the launch of any satellite is an "all or nothing" operation. There is no chance to call the rocket back to correct some defect observed after the launch has taken place! This sober thought remained uppermost in the minds of the Oscar crew responsible for the design and testing of the package. Failure of the equipment after launch meant that many thousands of man-hours of work, plus the hopes and dreams of the Oscar volunteers, would be to no avail. It also meant that valuable space in the launching vehicle would go to waste, and time and effort spent by others assisting this venture would

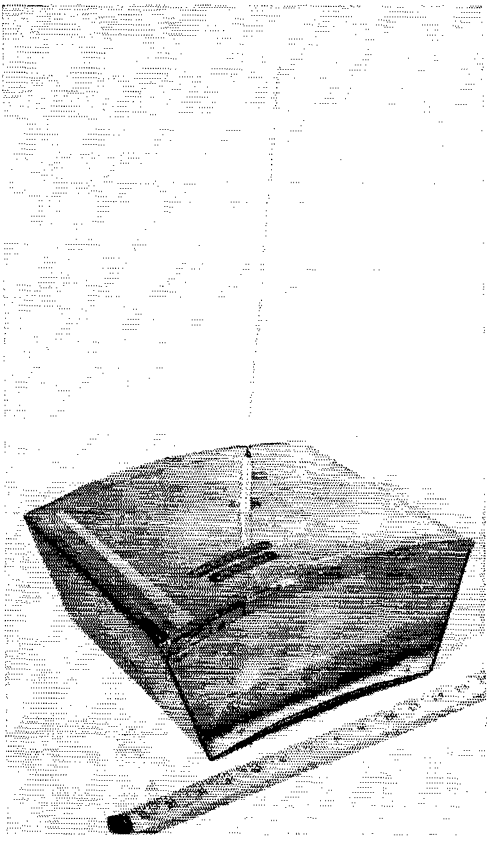


Fig. 1—Mock-up of the Oscar satellite used for preliminary design tests. The container is rectangular in shape and curved to fit the outer circumference of the launching vehicle. Final version of Oscar was gold-plated and had black strips across case to regulate internal temperature of package.

*Project Oscar Association, Box 183, Sunnyvale, Calif.

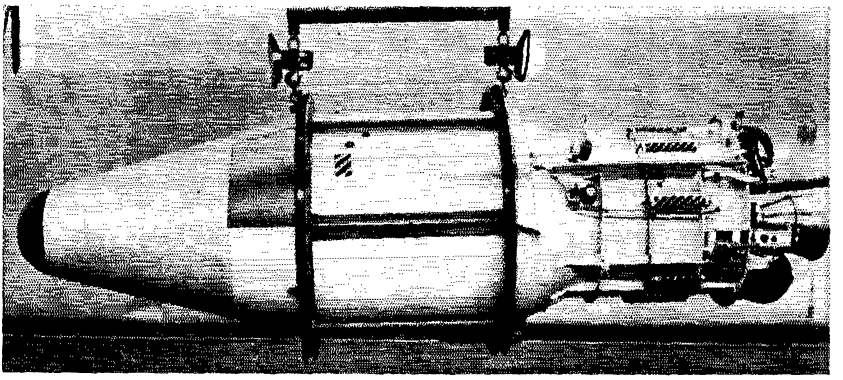


Fig. 2—The Agena-B satellite, "mother ship" for Oscar. Used in the Discoverer program, the Agena-B tips the scales at more than 8500 pounds when it is boosted space-ward by the Thor IRBM vehicle. In orbit, Agena weighs about 1700 pounds after the liquid propellant has been exhausted. The Oscar satellite was placed in the aft equipment rack (extreme right in photograph). Once in orbit, the "piggy-back" Oscar beacon was ejected from the Agena, to go into its own orbit about the earth. Nose cone of Discoverer XXXVI was recovered in Pacific area after four days of orbiting about the earth, while Oscar continued on his journey alone!

have passed for naught. It was imperative, therefore, that every possible step be taken to make sure that Oscar would work once it had been blasted into the reaches of space. The Association, in addition, had to demonstrate to the launching agency that the equipment would meet the demands placed upon it, yet at the same time would not jeopardize the primary objectives of the launching vehicle. Further, it must be demonstrated that the Oscar equipment would have a high probability of performing correctly once it reached orbit.

The Oscar Package

The first design problem of any satellite package concerns the matter of the container in which the equipment is to travel. The housing must hold things together, and this is no mean task during the acceleration phase of the launch. In addition, the container must provide the proper temperature environment for the electronic components while they are whirling about in orbit. During the period the satellite is between the earth and the sun, the container is directly exposed to radiation from the sun without the benefit of protection from the atmosphere. On the other hand, for something less than half of the time the container will be hidden in the shadow of the earth and will be radiating its heat into the cold blackness of space. (The heat generated within the container by the equipment will have a negligible effect on the over-all heat balance.) The problem, therefore, is to cause the package to absorb the same amount of heat during the period it is exposed to sunlight as it loses by radiation during the time the satellite is hidden behind the earth. In this way, an average internal temperature can be maintained, well within the limits that the electronic components can withstand.

The heat balance of the Oscar package has been established by plating the surface of the container with gold to reflect most of the incident heat from the sun and then canceling part of the reflection by covering a portion of the gold surface with a pattern of absorptive paint which will absorb just the desired amount of heat to maintain the proper temperature balance.

This system of heat balance will establish an average temperature, but the day-to-night variations will be quite extreme unless a further precaution is taken. The electronic equipment in the Oscar package is protected by a thick coating of epoxy foam. The foam coating accomplishes two important functions: First, it helps strengthen the equipment by holding the components firmly in place. Second, the foam serves as a heat insulator which inhibits the transfer of heat into and out of the electronic gear. As a result, the internal temperature of Oscar will average out the extremes seen at the surface of the container. The final evaluation of this design feature will be obtained when the "HI" rate reports are reduced to equipment-temperature readings.

The Oscar container is made of a magnesium alloy to hold weight to a minimum and measures approximately 12 by 14 by 6 inches in size. It is curved to conform to the circumference of the Agena satellite. When the Agena achieves orbit, the "piggy-back" Oscar package is ejected upon command. An adapter fitting is rigidly attached to the Agena in the aft-equipment rack near the motor housing (Fig. 2). The Oscar satellite is fastened into this adapter and held in place with an explosive bolt holding an ejection spring under compression. Upon receipt of the ejection command the bolt is released by a pin-puller, permitting the spring to eject the ham satellite from the parent vehicle at a speed of about 5 feet per second (3 miles per hour). As there is no air resistance to slow it down, the Oscar satellite will continue to separate from the carrier satellite at this rate indefinitely. At the time of separation, a latch is released which al-

lows the antenna to spring upright into operating position. Dual snap-switches actuated by the release mechanism turn on the operating power to the 145-Mc. transmitter and Oscar is on the air!

The OSCAR Transmitter

In the interest of obtaining high primary-power efficiency, light weight and small volume, the Oscar transmitter is transistorized and is constructed upon a set of glass-epoxy printed wiring boards. This method of assembly provides the physical ruggedness and electrical stability required for the extreme environments which Oscar encounters. The r.f. and keyer assemblies are built as separate modules (Figs. 3 and 4). Modular construction makes it possible to use the functional units in later phases of the Oscar program, and also improves the flexibility of installation in the event that the container shape is changed at the last moment.

The R.F. Section

The r.f. unit, Fig. 5, consists of a 2N1493 crystal-controlled oscillator operating on the fifth overtone of the crystal to produce a 72.5-Mc. signal source. The signal is amplified by a 2N1506 buffer stage which is base-driven. The r.f. level of the buffer stage output is about 180 milliwatts. A Varicap diode doubler stage (VC_1) delivers approximately 140 milliwatts at 145 Mc. The output tank circuit is tapped at the proper point to provide a match to the 50-ohm coaxial line which feeds the antenna.

Curiously enough, one of the problems encountered during the development of the transmitter was that of too much power output! A fine balance had to be achieved between power output and primary battery life. Too much output meant that battery life would be unreasonably short. In the final unit, the over-all transmitter efficiency is better than 30 per cent at a power output level of 140 milliwatts. This balance permits good battery life, yet allows a good signal to be radiated.

The Keyer Section

A unique, recognizable identification was required for the Oscar satellite. A waiver was obtained from the FCC so that the Oscar call, W6EE, need not be transmitted. The symbols "HI" were chosen as the identifier as they are relatively easy to generate, because they have a low duty cycle, and because they are easily recognized on the air (even by phone men!). Last—but by no means least — the greeting "HI" is internationally recognized as a friendly salutation among amateurs. From the design standpoint, the important factor is that "HI" has a low duty cycle — that is, the time-off is large in comparison to the time-on, which helps minimize the average power drain of the transmitter r.f. section.

The transmitter keyer makes use of digital circuits which may not be familiar to many amateurs. Space does not permit a detailed description of the keyer in the present article, but the circuits in general are similar to those that have been used in electronic keyers. (For those readers who wish to pursue this fascinating subject further, the Navy publication, *A Handbook of Selected Semiconductor Circuits*,[1] should prove to be very interesting.)

The Antenna

A nondirectional antenna pattern is desired because the orbiting package will not be stabilized and quite likely will be tumbling as it revolves about the earth. But while it would be possible to generate a nondirectional radiation pattern, such a requirement would impose additional undesirable weight and complexity upon the Oscar package. For this reason, a simple ground-plane antenna is used. A quarter-wave monopole operates against the metal case of Oscar which (after a fashion) serves as the other half of the dipole. The resulting pattern, Fig. 6, is similar to that of a half-wave dipole in space. Here is one situation where the free-space pattern of an antenna is utilized in practice!

It would have been desirable if the deep nulls of the pattern could have been eliminated; however, they should have little detrimental effect upon signal reception. In fact, the roll rate of the package may be determined from the ampli-

[1] U.S. Government Printing Office, Washington, 25, D.C. BuShips NObsr 73231, NAVships 93484, price $2.25.

Fig. 3—Bottom view of Oscar printed-circuit boards. The electrical connections between circuit components are made by means of thin copper plated to the insulating board.

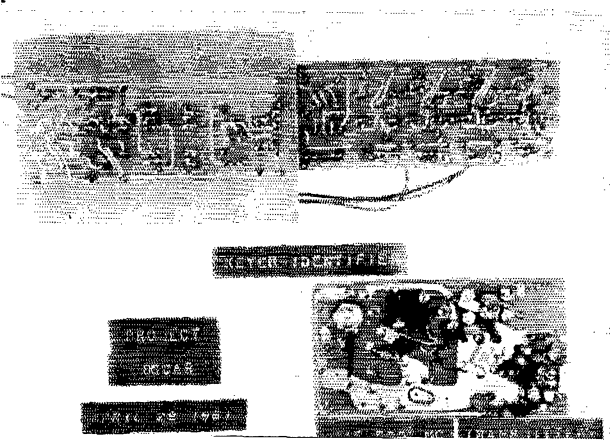
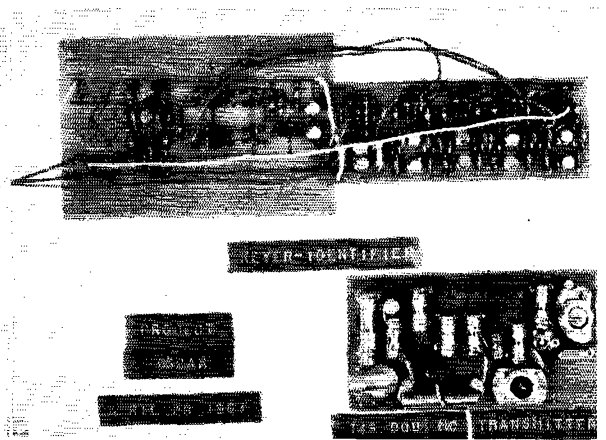


Fig. 4—The Oscar unit is built upon two printed-circuit boards. At top is the keyer and pulse-generator unit. The 145-Mc. transmitter is below. Sixteen transistors, a number of diodes and a "Varicap" semiconductor are used in these circuits.



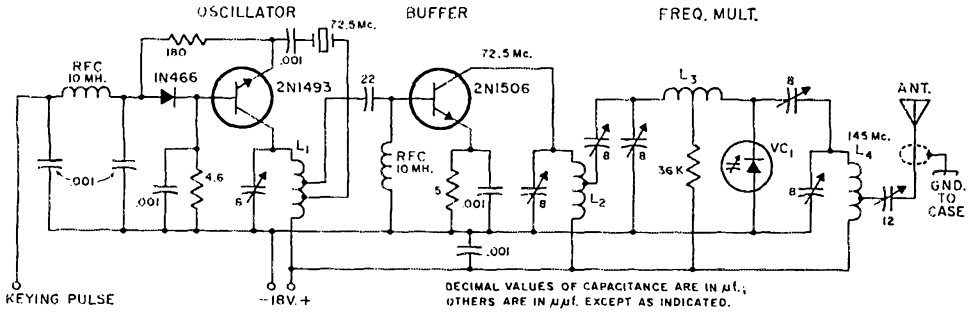


Fig. 5—The Oscar transmitter circuit. Tuning capacitors are 8-$\mu\mu$f. trimmers. R.f. coils are wound with No. 22 tinned wire on nylon forms, 0.2-inch diameter, threaded 20 turns per inch.

L_1—9 turns, tapped at 3 and 6½ turns.
L_2—9 turns center-tapped.
L_3—31 turns center-tapped.
L_4—7 turns, tapped at 2¾ turns.
VC_1—Variable-capacitance diode (Pacific semiconductors 115-10).

tude modulation of the signal produced by the rotation in space of the nulls. The antenna is held closely against the package during launch, but springs into a vertical position when Oscar is flung into separate orbit.

The Power Supply

During the preliminary study of the configuration, it was decided that small internal batteries would be sufficient to provide power for the beacon for three- to four-week operation at the 140-milliwatt power level. Characteristics demanded of batteries to be used in space application include the following: high power output per pound of weight, operation in any position, insensitive to temperature extremes, low electrical leakage, nonexplosive in event of failure, and capable of being used in a high-vacuum environment. Mercury cells similar to those used in the Vanguard satellite were selected to power the unit. Three 18-volt batteries were connected in parallel to meet the capacity requirement. Each battery is protected against reverse current by a series diode should one of the batteries fail in service. Two of the three batteries are sufficient to power the equipment for 30 days under normal operating conditions, giving a total transmitter life of about 45 days under ideal conditions. Debited against the total life must be the time consumed during pre-launch check-outs, leakage loss during the waiting period after assembly, and drop in efficiency of the cells at low temperatures. At the end of battery life, the voltage drops rapidly to the point where the equipment will cease operating. This serves as an automatic "turn-off" switch after the designed operating life of approximately 28 days has elapsed.

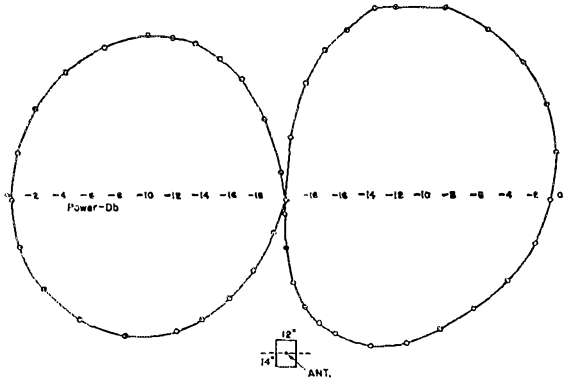


Fig. 6—Polar plot of Oscar radiation pattern with the container in vertical position, whip in horizontal plane. Plot in horizontal plane is a circle.

Testing the Oscar Beacon

Once the average amateur completes the construction of a piece of gear, he gives it a quick once-over to see that nothing looks amiss, then he turns on the power for the proverbial "smoke test." For a unit designed for operation in outer space, such a test is just a good beginning! For example, the operational tests must be much more thorough to insure that the unit is performing as intended, as once in the launching vehicle there is no means to realign *this*, or adjust *that!* Normal operational tests for the Oscar beacon include: D.c. power input level, r.f. power output, keying rate and proper code formation. These measurements are made during the environmental testing.

To insure that the unit will operate when it reaches orbit, the equipment is subjected to test conditions that are comparable to those expected in normal operation. These conditions include temperature extremes of 0 to +150 degrees F. (−35 degrees to +65 degrees C.), shock (50G, maximum), acceleration (15G, maximum), vibration (15G, maximum), and altitude (over 200,000 feet).

The detailed specifications required for the environmental testing of the Oscar payload were written by Nick Marshall, W6OLO. Suffice to say, these tests were passed with flying colors by the Oscar beacon. Laboratory equipment necessary to conduct these tests was utilized over week-end periods at some of the electronic laboratories located in the immediate area. Other items of test equipment were homemade, and their construction and use would be a story in itself.

(*Continued on page 132*)

• *Beginner and Novice*

An Easy-To-Build V.F.O.

BY LEWIS G. McCOY,* W1ICP

ONE of the many advantages in having a General Class ticket is that the holder of the license is not required to be crystal-controlled. Any Novice getting ready to "graduate" will want to add a variable-frequency oscillator to his station. A v.f.o. can be substituted in place of crystals and will permit the user to change his frequency to any point in the amateur bands.

For those hams who like to build their own gear, this article describes the construction of a v.f.o. that will provide enough drive to the crystal stage in any transmitter. In other words, the v.f.o. can be substituted in place of an 80- or 40-meter crystal.

There are three general rules that should be followed when constructing a v.f.o. First, the mechanical or physical construction must be very rigid, at least in those parts of the circuit that make up the frequency-determining elements. Any component that is not mounted securely, particularly the v.f.o. coil (L_1 in Fig. 1), can vibrate or move, which will cause the oscillator signal to vary in frequency.

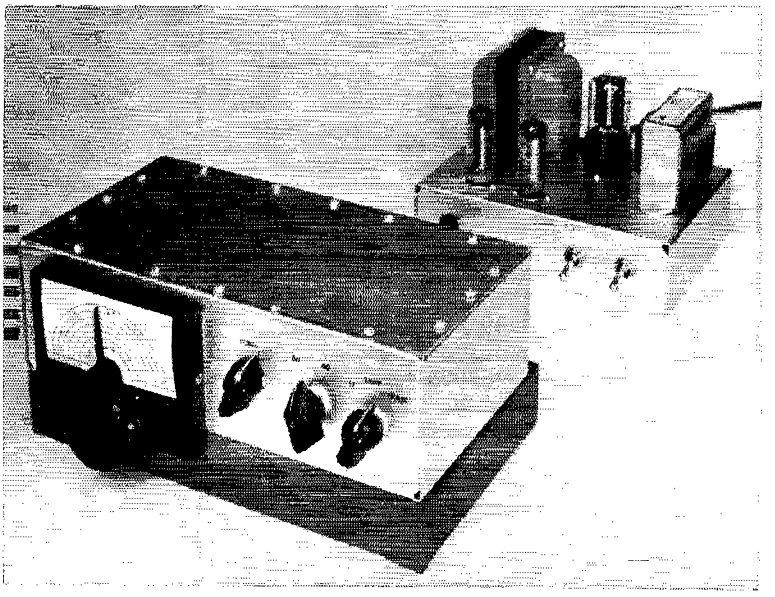
Second, the plate and screen (if the tube has a screen) voltages of the v.f.o. tube should be regulated. Otherwise, an unregulated voltage on the plate of the oscillator could change under changing load conditions and cause the frequency to be unstable.

Third, if possible, the power supply for the v.f.o. should be mounted on a separate chassis. More often than not, you will get hum vibration from the power transformer which in turn will cause mechanical vibration of the entire chassis. As mentioned above, any vibration of the frequency-determining elements will cause the oscillator signal to change frequency. In the case of a power transformer it usually vibrates at a 60-cycle rate, and this can cause the oscillator tube elements to move at this same rate, putting a 60-cycle hum on the signal.

Another point that should be followed in constructing a v.f.o. is that all fixed capacitors in the frequency-determining elements should have good temperature-compensation ratings. If the value of a capacitor changes when it becomes hotter or colder, it can make the frequency change in an oscillator. The result is a "drift" in frequency. The unit described here uses silver mica capacitors which have good temperature stability. Because of the heat problem, it is always good procedure to mount any heat-producing components, such as tubes, away from frequency-determining elements. The unit described in this article meets all these rules and the result is a very stable v.f.o.

Circuit Information

The circuit of the v.f.o. is shown in Fig. 1. This particular circuit is a more-or-less Chinese



This view shows the completed v.f.o. and power supply. The switch on the right on the power supply chassis is S_3, and S_4 is on its left. On the v.f.o. C_1 is to the right of the v.f.o. dial, then S_2 and S_1 at the far right.

* Technical Assistant, *QST*.

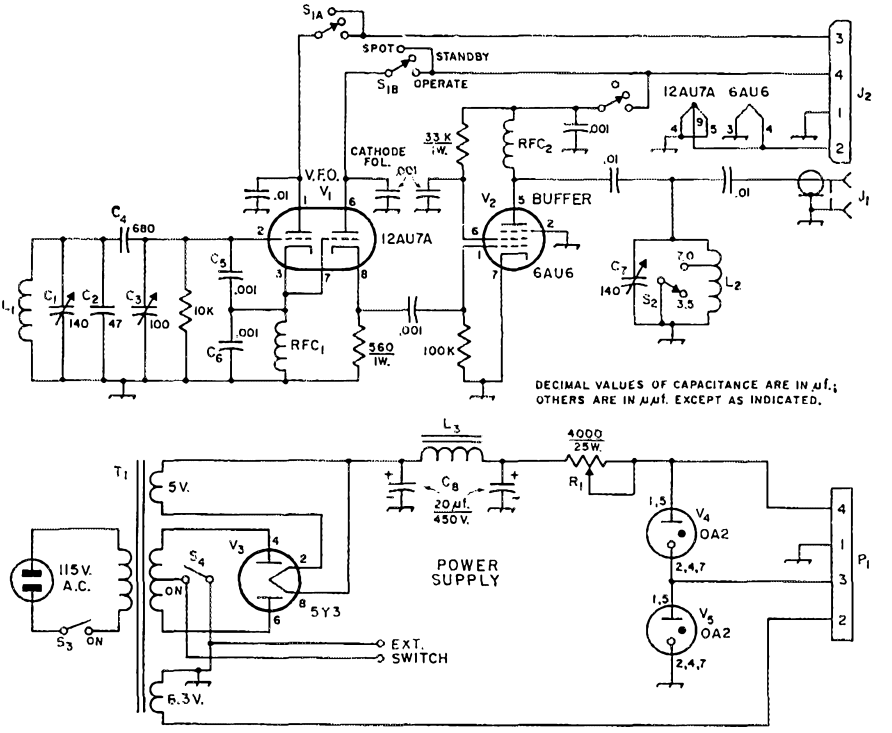


Fig. 1—Circuit diagram of the v.f.o. and power supply. Capacitors marked with polarity are electrolytic, resistances are in ohms, resistors are ½ watt unless indicated otherwise.

C_1—140-$\mu\mu$f. variable (Hammarlund MC-140-S).
C_2—47-$\mu\mu$f. silver mica.
C_3—100-$\mu\mu$f. air padder (Hammarlund APC-100).
C_4—680-$\mu\mu$f. silver mica.
C_5, C_6—1000-$\mu\mu$f. silver mica.
C_7—140-$\mu\mu$f. variable (Hammarlund (APC-140-B).
C_8—Dual-section, 20-μf.-per-section, 450-volt electrolytic.
J_1—Coax chassis fitting.
J_2—Octal chassis connector, male.
L_1—14 turns No. 20, 16 turns per inch, 1-inch diam. (B & W Miniductor 3015).
L_2—33 turns No. 20, 16 turns per inch, 1-inch diam. (B & W Miniductor 3015). 40-meter tap 21 turns from ground end.
L_3—15-hy. 75-ma. filter choke (Stancor C-1002, Knight 62-G-138).
P_1—Octal cable plug, female.
R_1—4000-ohm 25-watt, with slider.
RFC_1, RFC_2—R.f. choke, 750 μh. (Millen 34300-750).
S_1—3-pole, 3-position wafer switch (Centralab 2507).
S_2—Single-pole double-throw switch (Centralab 1460).
S_3, S_4—Single-pole single-throw toggle switch.
T_1—Power transformer, 500 volts center tapped, 70 ma., 5 volts, 2 amp.; 6.3 volts, 2.5 amp. (Knight 61-G-464, Triad R-108A).

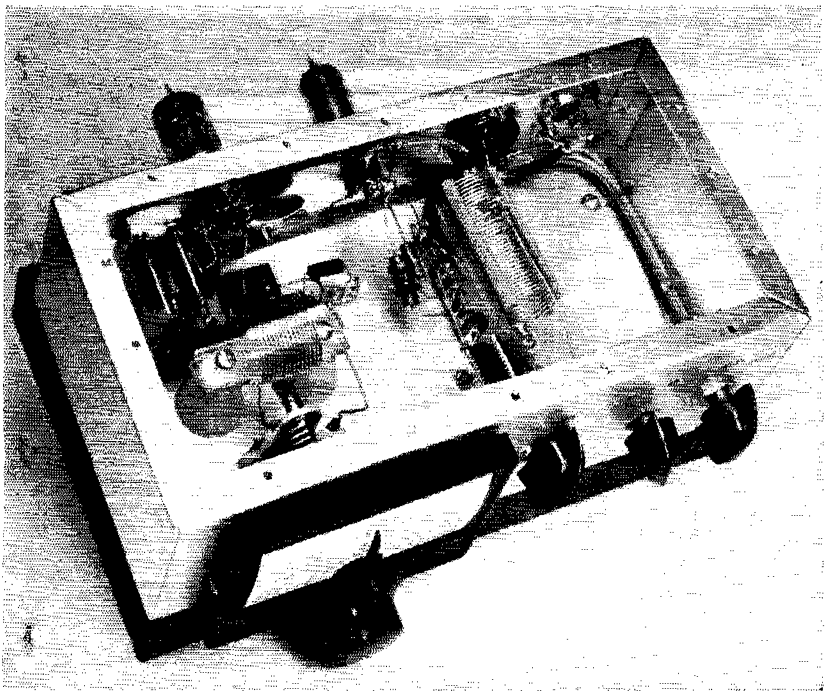
copy of one described by George Hanchett, W2YM.[1] It consists of a Colpitts-type oscillator, high C, with basic coverage of the 3.5- to 4.0-Mc. frequency range. Practically the entire tuning range of C_1 is required to cover the 80-meter band. C_2 serves as the band-set capacitor. The tube capacitances are practically swamped out by the use of large (0.001-μf.) silver micas as a capacitive voltage divider from grid to cathode to plate of the oscillator tube, which is one section of a 12AU7. The second half of the 12AU7 is used as a cathode follower to isolate the v.f.o. from succeeding stages. The output from the cathode follower is used to drive a buffer multiplier 6AU6. The output of the 6AU6 can be tuned to the 80-meter band, and also to 40 by shorting turns on L_2 with S_2.

The switch, S_1, is a three-pole job, one portion of which is used to turn on the plate voltages for the oscillator and cathode follower. This provides enough v.f.o. output for "spotting" your own frequency. In another position the switch puts the v.f.o. unit on standby, and the last, or "operate," position turns on the multiplier.

The power supply consists of T_1, V_3, and a capacitor-input filter, C_8 and L_3. A 0A2 and 0C2 provide the regulated voltages for the oscillator, cathode follower, and multiplier. Regulated voltage is 225 volts for the multiplier and cathode follower and 75 volts for the plate of the oscillator.

S_4 is used to turn off the voltages of the unit by opening the center tap of the power transformer. In addition, a pair of terminals connected across S_4 permits using an external switch, which may be mounted at a convenient location at the operating position. This same external switch, if d.p.d.t., can be used to control the antenna changeover relay if one is used in the station. It is

[1] Hanchett, "Stability with Simplicity," *QST*, October, 1960.



Looking down into the chassis, L_1 is mounted on the two isolantite standoffs at the left in this view. The coil towards the right is L_2. On the back wall at the far left is C_3. The tubes V_1 and V_2 are mounted on the rear chassis wall.

also true that S_1 can be used to put the v.f.o. on standby, but an external switch, as mentioned above, will probably be more convenient.

There is no provision for keying the v.f.o. as all keying should be done at the transmitter, as it was with crystal control. Keying a v.f.o. along with the rest of the transmitter can cause some problems. It would be a simple matter to key the cathode of the v.f.o., but the first problem you would likely encounter would be clicks on your signal. When you attempt to do shaping of the signal to get rid of the clicks you get chirps, so the easiest way around the problem is not to key the v.f.o. It is true that you can key a v.f.o. and get a good clean signal with no clicks or chirps. However, this usually requires elaborate circuitry. Details on this type of keying can be found in the keying chapter of the *ARRL Handbook*.

Construction Details

A 3 × 5 × 9½-inch aluminum chassis is used to house the complete v.f.o. unit. In order to obtain mechanical strength, the aluminum chassis is mounted on top of a steel chassis which is 1½ by 5 by 9½ inches, and secured with several screws and nuts. This system prevents any flexing of the aluminum chassis. Note from the top-view photographs that V_1 and V_2 are mounted on the back side of the chassis. This keeps the heat from the tubes from reaching any of the frequency-determining components mounted inside the chassis.

The coil L_1 is mounted on two isolantite standoffs, one inch high. In our first installation the coil was cemented to a polystyrene bar which was attached to the two standoffs. However, the cement didn't do a good holding job, so another method was used to hold the coil firmly in place. This used two poly bars, ⅛ inch thick, ½ inch wide and 2 inches long. The coil is sandwiched between the two bars, which are screwed down on the standoffs. It is important that this procedure be followed as the coil must be held rigidly in place. C_1 is mounted to the base of the chassis with two screws and, in addition, is held to the front of the chassis with the mounting nut that comes with the type capacitor used.

Just to the rear of the L_1 installation is a terminal strip which is used to mount C_2, C_4, C_5 and C_6. C_3 is mounted on the back wall of the chassis. The tank circuit for V_2 is mounted at the right-hand side of the chassis as viewed from the front. C_7, S_1, and S_2 are installed on the front of the chassis to the right of the v.f.o. dial. The dial for the v.f.o. is a Millen type 10039. An octal plug, J_1 (Amphenol type 86-CP8), is mounted on the back wall of the chassis.

The power supply is mounted on a 2 × 5 × 7-inch aluminum chassis with T_1, L_3, V_3, V_4, and V_5 mounted on top of the chassis. The remaining components are placed below deck. A three-foot length of four-conductor cable terminating in P_1 (Amphenol 78RS8 socket and type 3-24 cap) is used to connect the power supply and v.f.o. together.

Adjustment Procedure

The first adjustment to be made is to find the

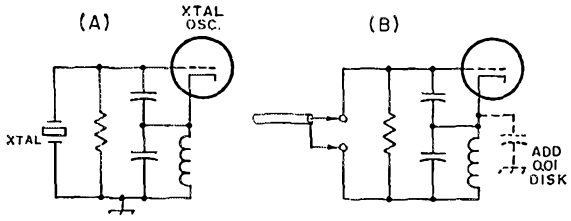


Fig. 2—Circuit diagram of a typical crystal-oscillator stage at A. At B, the only change required to use the same stage with v.f.o. is the addition of a 0.01-disk ceramic capacitor as shown.

right value for R_1. Insert a 0-50-ma. meter between R_1 and Pins 1 and 5 of V_4. The slider on R_1 should be adjusted for a reading of about 30 ma. Be sure to turn the supply off when making adjustments as the voltage can be dangerous.

When R_1 is correctly adjusted, tune your receiver to 3500 kc. and adjust C_3 to bring the v.f.o. signal to this point. You'll find that nearly complete rotation of the v.f.o. tuning knob is required to cover the 80-meter band. There is enough range in the v.f.o. circuit so that you shouldn't have any problem in setting C_3. If you find for some reason that the circuit does not quite cover 3.5 to 4.0 Mc., check all your component values carefully, particularly the number of turns on L_1.

The first position of S_1 should give you enough output from the unit for zero-beating. Never change the v.f.o. frequency with the transmitter on the air. Nobody likes to hear signals swishing up and down the band causing unnecessary interference. That's why you have a spotting switch on your v.f.o.

Connecting the V.F.O. to Your Transmitter

Naturally, there is no way of knowing what type of rig the reader will be using with this v.f.o. However, there are some general rules that can be followed. You'll need about two feet of coax cable to connect the v.f.o. output (from J_1) to your crystal socket. The length of coax is important because it is part of the tuned plate circuit of the 6AU6 amplifier. Two feet of RG-58 U has about 50-$\mu\mu$f. capacitance, and this amount is across the tuned circuit C_7L_2. The circuit will still tune to 80 and 40 with three feet of coax, and this is the most you should use. If you use more than three feet there will be too much capacitance across the tuned circuit C_7L_2 and the circuit won't tune to 80 or 40. In this case you would have to remove turns from L_2, the number depending on how long the coax is. The circuit could be checked with a grid-dip meter and altered accordingly.

Many of the commercial rigs have two inputs, one for crystal and the other for v.f.o. In such case all you need do is connect the v.f.o. to the transmitter v.f.o. input. When a rig has only crystal input you may have to make a slight modification in the crystal stage in order for the rig to work with the v.f.o. However, before making any modifications try the v.f.o. and see if you get grid drive to the crystal stage. Also, when connecting the cable to the crystal input the inner conductor of the coax should go to that terminal on the crystal socket which is connected to the grid of the oscillator stage. In other words, you may have to reverse the v.f.o. plug in the crystal socket in order to get excitation to the crystal oscillator.

If your transmitter is one designed only for crystal input and won't work with the v.f.o., you will have to make one slight change in the crystal oscillator stage. Most transmitters of this type use the oscillator circuit shown in Fig. 2A. The only modification required to make it work with v.f.o. input is shown at Fig. 1B. This consists of adding a 0.01 disk ceramic capacitor between the cathode terminal on the oscillator tube and chassis ground. If you want to operate with either crystal or v.f.o., it will be necessary to install a switching arrangement to switch the 0.01-μf. capacitor in or out of the circuit as needed. Otherwise, you'll have to unsolder the capacitor if you want to use crystals.

As mentioned earlier, the transmitter is keyed in the normal manner and the v.f.o. is put on standby during listening periods. The two terminals on the power supply connected in parallel with S_4 can be connected to a switch at the operating position. If the switch is double pole, it can be the same one that controls your antenna changeover relay. If you are interested in break-in keying, it is suggested that the keying chapter of the *ARRL Handbook* be studied for suggestions.

In using the v.f.o. you have the option of using 80- or 40-meter output. However, when possible, operate the setup so that the ex-crystal stage is working as a doubler. This will reduce any chances of the crystal stage "taking off" and oscillating on its own. You can check to see if the setup is stable by turning off the v.f.o., but leaving the transmitter on. If you get output from the final stage then the rig is taking off on its own. The only band where you are likely to run into this trouble is on 80 when the ex-crystal stage operates as a straight-through amplifier. If it does take off, it might be possible to stabilize the circuit by putting a resistor in series with the grid of the ex-crystal stage tube directly at the grid. You might have to try different values of resistors, starting off with a low value, say 25 to 50 ohms. You'll also probably find that you have more drive to the crystal stage than when using a crystal. This can be taken care of by tuning C_7 to give approximately the same amount of final-amplifier grid current as with a crystal.

QST

Strays

Want to attend a radio club auction? Kent County ARC is holding one at 8 P.M. on Feb. 13 in the basement of the Kent County Courthouse, Dover, Del. Bring along the gear you'd like to sell. You may set a minimum price sales on 10% commission basis. For further info, contact Edward Brown, K3OCE, Cheswold, Del.

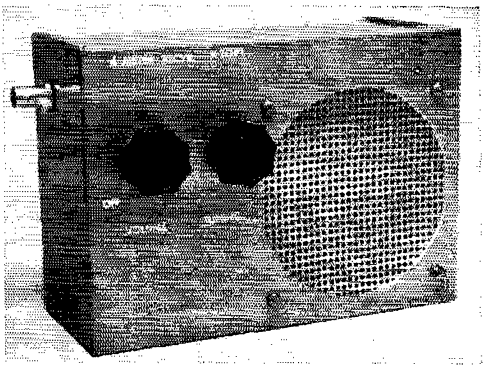
High Performance, Low Battery Drain and Extreme Portability in 50-Mc. Reception

An All-Transistor Six-Meter Receiver

BY

SAMUEL W. DASKAM,* K2OPI,

and ANTHONY TROIANO*



The 50-Mc. transistor receiver is completely self-contained. Speaker and batteries are included in a 7 by 5 by 3-inch box, with enough room left for a small transistor transmitter, if the builder is interested in a complete station.

A COMPLETELY self-contained receiver for the six-meter band is useful for many amateur and RACES purposes, but most of the transistorized v.h.f. receivers previously described have left something to be desired in performance and in cost. One of the difficulties which is common to both the superregenerative and the superheterodyne types is drift due to voltage and temperature variation and changes in transistor characteristics. These changes, especially those in transistor characteristics, make tuning readjustments a necessity. In addition, a superregenerative receiver lacks selectivity and has a poor signal-to-noise ratio, while a superheterodyne receiver is more complicated and higher in cost.

The receiver described here is a modified type of superheterodyne, battery powered and completely self-contained, making it ideal for portable use. It has reasonably high sensitivity and selectivity, practically no drift, and it is low in cost. Frequency drift is made negligible with the use of crystal-controlled conversion and a variable intermediate frequency. The r.f. amplifier gives good sensitivity and low noise figure, and assures freedom from image problems. Operation of the receiver is simply a matter of adjusting the tuning capacitor for maximum signal and the volume control for the desired audio level. Although a regenerative detector is used, no additional adjustments are required after the initial alignment, which is fairly simple.

Circuit Features

The receiver uses five transistors: two 2N384s, a 2N274, a 2N406 and a 2N408. The r.f. amplifier, Q_1, is broadly tuned to the center of the band to be covered. The high capacitance across the r.f. amplifier input coil, L_1, is used to develop some selectivity at the signal frequency. The low L/C ratio is necessary to maintain adequate operating Q, with the low input impedance of the r.f. amplifier.

The second 2N384, Q_2, serves as both crystal oscillator and mixer. This is followed by a 2N274, Q_3, which with diodes CR_1 and CR_2 acts as a tunable regenerative detector, and is reflexed as an audio amplifier. The i.f. signal from the mixer is fed to the base of Q_3 through the 270-$\mu\mu$f capacitor at the hot end of L_8. A portion of the amplified i.f. signal at the collector of Q_3 is coupled back into the base, through the regeneration-control capacitor, C_3, in proper phase for regeneration. This increases both the gain and the selectivity of the stage.

The amplified signal at the collector is also fed to the diodes, where it is demodulated, and the resultant audio voltage is fed back to the base. The amplified audio signal at the collector goes through the i.f. choke, RFC_1, which acts as a low-impedance path for the audio to the primary of T_1.

Possible Variations

The receiver as described covers 500 kc. in the 50-Mc. band. With a 47.75-Mc. crystal, the frequency range is from 50.0 to 50.5 Mc., the most active part of the 6-meter band. The intermediate frequency is varied from 2.25 to 2.75 Mc. If more frequency coverage is desired, the i.f. tuning range can be extended, or additional crystals can be provided. For 50.5 to 51.0 Mc., use a crystal at 48.25 Mc., and additional crystals at increments of 500 kc. higher for each additional 500-kc. tuning range.

* Semiconductor & Materials Div., Radio Corporation of America, Somerville, N. J.

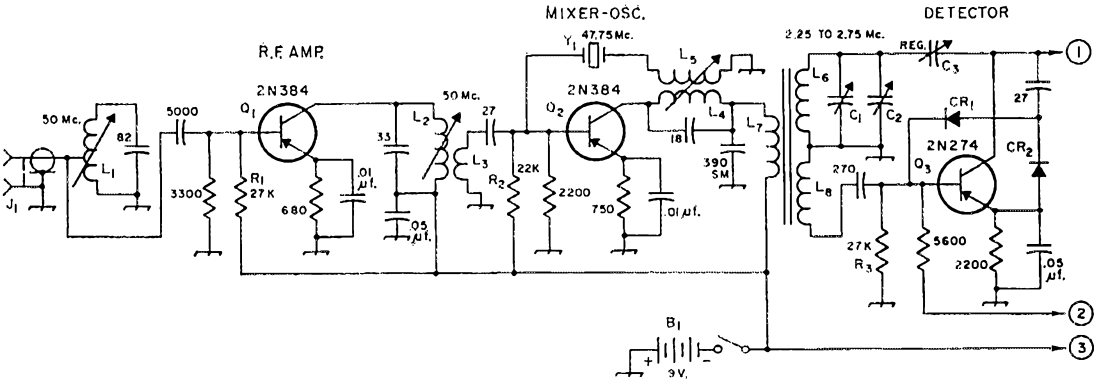


Fig. 1—Schematic diagram and parts information for the 50-Mc. portable receiver. Unless otherwise indicated, decimal values of capacitors are in µf. Others are in µµf. Resistances in ohms, resistors ½ watt. Capacitors with polarity marked are electrolytic. SM indicates silver mica. Where two values or types are specified below, the first is for 9-volt service, the second for 12 volts. An alternate circuit for Class-B audio is shown at the lower right. Impedance values given for the various transformers are approximate.

B_1—9-volt battery.
C_1—8-60-µµf. mica trimmer (Elmenco 404).
C_2—50-µµf. variable (Hammarlund HF-50).
C_3—0.9-7-µµf. mica trimmer (Elmenco 400).
CR_1, CR_2—1N34 diode.
J_1—Coaxial chassis connector.
L_1—4 turns No. 22 enam., 3/16 inch long, on 3/16-inch diam. iron-slug form (CTC PLST). Tap at 1 turn.
L_2—7 turns No. 26 enam., close-wound on form like L_1.
L_3—1 turn, same, over low end of L_2.
L_4—7 turns No. 22 enam., close-wound on 3/8-inch iron-slug form (CTC PLS5).
L_5—2 turns, same, below L_4. See Fig. 2.
L_6—39-µh. r.f. choke, single layer, 7/32-inch diam., iron-core form (Miller 4628).
L_7—16 turns No. 32 enam., close-wound over low end of L_8.
L_8—14 turns like L_7, wound over it. See Fig. 2.
Q_1, Q_2—2N384.
Q_3—2N274.
Q_4—2N406.
Q_5, Q_6, Q_7—2N408 for 9-volt service; 2N109 for 12 volts.
R_1, R_3—27,000 or 33,000 ohms.
R_2—22,000 or 33,000 ohms.
R_4—1000 or 2200 ohms.
R_5—100 or 130 ohms.
R_6—0.5-meg. control, with switch (S_1).
R_7—75 or 50 ohms.
R_8—4700 or 6000 ohms.
R_9—3900 or 10,000 ohms.
RFC_1—1-mh. r.f. choke (Miller 952).
T_1—Transistor interstage transformer, 100,000 to 1000 ohms.
T_2—Same, but 20,000 to 1000 ohms.
T_3—Output transformer, 1000 ohms to speaker.
T_4—Driver transformer, 10,000 to 2000 ohms, sec. c.t.
T_5—Output transformer, 800 ohms c.t. to speaker for 9-volt service; 1000 ohms c.t. for 12 volts.

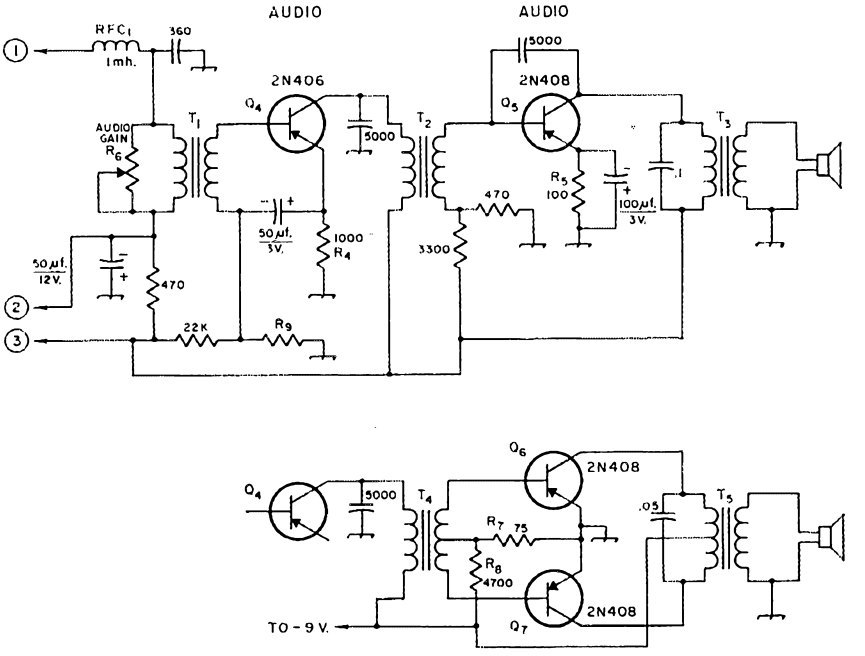
The receiver was field tested at various stages of development and several improvements and changes were made. It was found that the audio power output was sufficient except in very noisy surroundings. For more audio power, a Class-B push-pull audio output stage may be used as shown in Fig. 1. If operation only on a single net frequency is desired, peaking the r.f. coils at this frequency will increase the sensitivity. Recently the receiver was used on 50.68 Mc. in a mobile unit during a RACES drill, to monitor the net-control station while the car engine and mobile rig were turned off. It has also been pressed into service when the regular mobile receiver has developed trouble.

A supply voltage of 9 volts from dry cells is recommended. If mobile operation is anticipated, the receiver may be built to operate at 12 volts. Values for the components for 12-volt operation are included under Fig. 1. One word of caution about mobile operation using the automobile battery — the positive end of the supply to the receiver is connected to the chassis. An automobile with a negative battery ground requires that the receiver chassis be electrically isolated from the case. If wrong polarity of voltage is applied to the receiver, some of the transistors may be ruined. The current drain is about 15 ma. with the single transistor output, but is dependent upon the volume setting when a push-pull amplifier is used. Penlight cells give long life, but a single 9-volt transistor radio battery works fine and helps to minimize the space problem.

It will be noted from the photographs of the receiver that there is a great deal of room in the battery space. If the batteries are stacked next to the speaker, it is possible to include a small transistorized a.m. transmitter in the same 7 × 5 × 3-inch Minibox. A rig such as described by K8NIC in the February, 1960, issue of *CQ* can be included, if a little thought is put into the placement of parts. It may be desirable to put the coax connector near the center of the box, along with a wafer switch to change from transmit to receive. The speaker can be used as a microphone, or a jack may be included for handset operation.

Construction

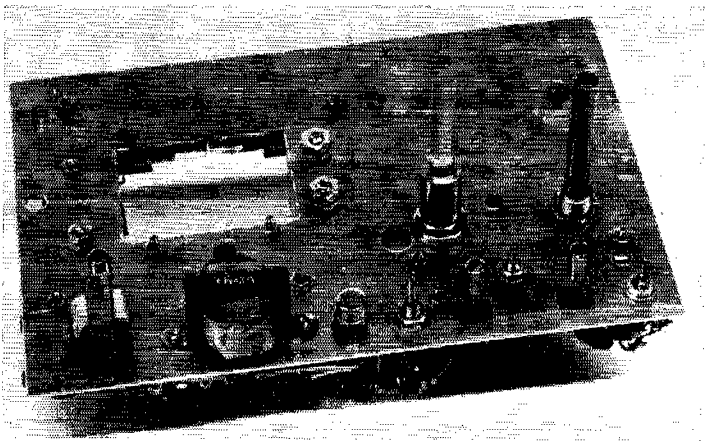
Some of the parts used in the receiver, such as the volume control, tuning capacitor and loudspeaker, may be changed to smaller types than those shown, if space for the batteries and transmitter demands it. All of the transistors have



been mounted in sockets on the underside of the chassis. The arrangement of the parts for the r.f. and i.f. sections should be the same as shown, but the audio section may be rearranged as desired. The choke RFC_1 was made by removing the phenolic ring from a Miller type 952 choke to conserve space. It is mounted on the screw that holds the first audio transformer. The crystal is mounted on a terminal strip instead of using a socket, as it is a permanent part of the circuit in the receiver described. If more space is needed on the wiring side of the chassis, the electrolytic capacitors and the output transformer may be mounted on the other side.

The chassis is held in place by an L bracket which attaches to the side of the speaker. The speaker leads are brought through the chassis and attached to a terminal strip. This facilitates removal of the chassis from the Minibox for circuit changes or repair. The chassis layout, Fig. 3, gives a general idea of component arrangement. The mounting holes for the transformers, batteries, terminal strips and transistor sockets were not included because these will vary according to the particular components used. Hole sizes for the transistor sockets will also depend on the type sockets used and therefore only the position of the hole centers was given.

The r.f. coils required are simple to make, though some additional explanation is required for the mixer and detector circuits. The construction of L_4 and L_5 is shown in the upper portion of Fig. 2. For purposes of illustration, the secondary winding is shown next to, instead of



Practically all components of the receiver are mounted on a 4½ by 6¾-inch plate, which can be removed easily from the case for servicing or adjustment.

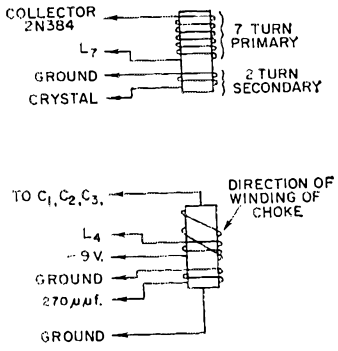


Fig. 2—Details of the mixer and detector coil assemblies of the 50-Mc. receiver. In order to show the winding directions, they are shown adjacent to one another, instead of being wound in layers.

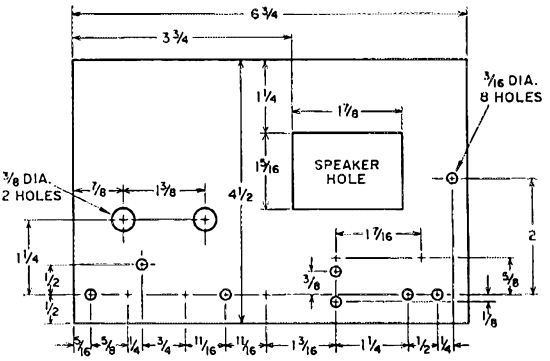


Fig. 3—Chassis layout for the 50-Mc. transistor receiver. Not all holes are shown, as some components will vary in size, depending on the manufacturer.

directly over, the low end of the primary. The two-turn secondary winding must be wound in the same direction as the primary and over the end of the primary which is connected to L_7.

The detector coil assembly is constructed by adding two windings over a commercially available 39-microhenry choke, as shown at the bottom of Fig. 2. They are wound in the same direction as the choke, L_6, and over the low end (the end connected to ground). L_7 is wound first and then L_8 is wound over it in the same direction. Again, for purposes of illustration, the windings are shown next to each other instead of over each other.

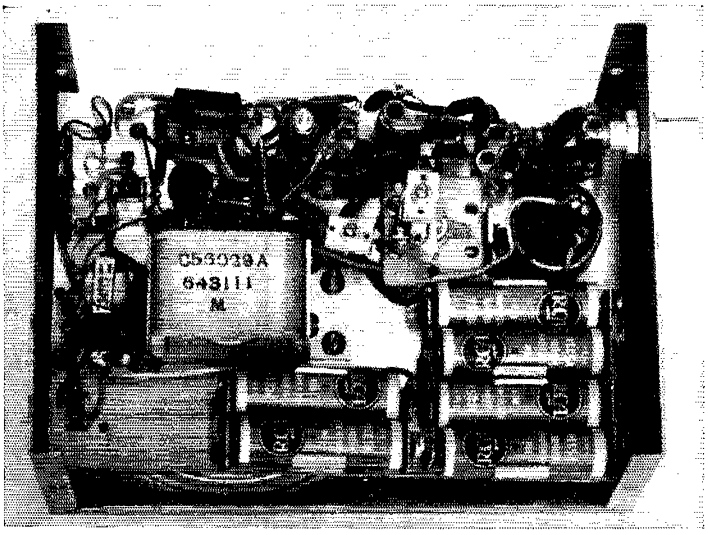
A push-pull Class-B output circuit, which may be used if higher audio output power is required, is given in Fig. 1. The circuit can be used with either 9 or 12 volts and proper values are given for both voltages. With a 12-volt supply, 2N109 transistors must be used instead of 2N408s.

Alignment

A signal generator which will supply modulated signals in the frequency ranges of 2 to 3 Mc. and 50 to 54 Mc. is helpful for alignment. For monitoring the output, a vacuum-tube voltmeter is best, but the audio output from the speaker may be used if a v.t.v.m. is not available. Before alignment is started, the slugs of L_1, L_2, and L_4 should be adjusted halfway into the coils. C_1 and C_3 are set at minimum capacitance and C_2 for maximum, and a short is placed across L_4. The receiver is turned on and the volume control set to the maximum-volume position. The v.t.v.m. is switched to a low a.c. voltage range and connected between the collector of the output transistor and ground. For the push-pull circuit, either collector can be used.

The signal generator is set for maximum output at 2.25 Mc., with audio modulation, and connected to the input. Adjust C_1 for maximum

(*Continued on page 136*)



Bottom view of the 50-Mc. receiver, with the assembly mounted in the case. Penlight cells or a single 9-volt battery may be used for power. Provision is also made for 12-volt operation, with minor changes.

Hints and Kinks For the Experimenter

SURE-HOLD KNOT FOR PLASTIC LINE

IT IS almost impossible to find a Boy Scout knot that will hold securely in plastic line; even the old standby bowline will shake loose. Local crab fishermen (who use plastic line) use what they call a "double thumb knot" (sometimes called an Englishman's Tie or fisherman's knot) which, when once set, will hold securely in any of the plastic lines — laid, woven or monofilament.

To join two lines together, make a loose overhand knot near the end of No. 1 line. Pass the end of No. 2 line through this knot. Make an overhand knot in No. 2 around the standing part of No. 1. Now pull the lines taut. As the loops snug up, they will squeeze over the line ends so that they can't pull out.

To make a loop in a single line (for attaching an insulator, for instance), throw a loose overhand knot a foot or so from the end of the line. Pass the "bitter" end through the insulator, or what have you, and then through the knot. Now make another overhand knot in the end of the line around the standing part of a line. There are, of course, two ways to tie an overhand knot. The right way, in this case, makes both knots come out more or less in parallel. The wrong way will make the lines cross at right angles.

— *Dick Carruthers, K7HDB*

ANTENNA ROTOR HARDWARE

THOSE interested in building their own antenna rotators should check with local canvas and awning companies since these firms usually carry many types of cleats and anchors, along with awning gears of the self-locking worm type. The gears are available in ratios from 8 to 1 to 30 to 1 and come with or without ball bearings.

— *Arnold Borenstein, W9CYJ*

SAVE BURNED-OUT TRANSFORMER

A POWER transformer with an open primary winding can still prove useful. Connect the 6-volt winding of the defective transformer to the 6-volt winding of another transformer and the defective transformer will supply high voltage as before. Of course, this scheme should be employed only as an emergency or breadboard method. Be sure not to exceed the power ratings of the transformers.

— *Robert B. Hazelton, K3RBH*

ARCING IN THE G-76 TRANSCEIVER

SOME of the G-76 transceivers, which incorporated the 12AQ5 clamper tube, developed a switching transient in the modulator section when going from transmit to receive. This transient can cause an arc-over at the function switch or neutralizing capacitor. This transient can be eliminated by replacing C_{40} (0.25 μf. at 600 v.d.c.) with a 50-μf. electrolytic capacitor with a 25 to 50-volt d.c. rating.

— *Bob Austin, K6SOF*

BENDING COPPER TUBING

ALTHOUGH this is not a new idea, it is worthwhile repeating for the newcomers. When bending copper tubing for coils, first fill the tubing with a fine grade of sand and seal the tube ends by crimping or soldering. The winding can then be done without any danger of kinking or denting the copper.

— *Wallace B. Shapiro, WA2OHN*

HEATHKIT WARRIOR MODIFICATIONS

THE Hint & Kink by W1NXY in December, 1961 *QST*, concerning modifications to the Heathkit Warrior, prompted a letter from the Heath Company informing us that the bias-supp y ripple problem in the Warrior was cured within several weeks of first kit shipments. As far as the "impulse noise" in the rectifiers is concerned, Heath has changed tube brands and rectifier hash is no longer a problem.

SIMPLE DUMMY LOAD

A SIMPLE dummy load for transmitters up to about 300 watts input can be made by using a pair of stainless-steel electrodes immersed in a salt-water solution. A readily-available polyethylene or acrylic icebox container can be used to contain the solution, and a standard coax fitting attached to the container for soldering to the electrodes.

In my dummy load, about two and one-half inches of No. 18 wire (alloy 302 soft tie wire) was soldered to lugs on the coax connector and then the wires were bent at right angles to each other. The salt-water solution is composed of one pint of distilled water into which some USP sodium chloride is added — pinch by pinch — until the s.w.r. approaches unity. I have found that an s.w.r. of 1.5 to 1.0 can be obtained throughout the range of 80 to 10 meters with little radiation from the load itself.

If difficulty is encountered in soldering to the stainless-steel wire, try Salmet flux and a multicore solder. Be sure to keep the electrolyte level about ¼ inch below the coax connector lugs and provide an air vent or hole in the container top to allow any warm air or gases to escape.

For periods of use of more than five minutes, I found that the transmitter input power should be reduced to around 200 watts.

— *Ralph W. Campbell, W4KAE/5*

The de luxe modulator includes a speech compressor and a clipper-filter, along with a power supply that takes care of everything except the modulator plates. Miniature tubes, going from right to left, are: front row, 6AN8-A speech amplifier, 6AL5 compressor rectifier; second row, 6DT6-A compressor amplifiers; back row, 12AU7-A clipper, 6CG7 compressor driver and final voltage amplifier, 6CG7 driver. The 6GW6 modulators and modulation transformer are at the rear left; the components at front left are for the power supply. The multisection capacitor on the chassis above the clipper switch contains the three filter capacitors in the speech-amplifier section.

Zero-Bias Sweep-Tube Modulators

BY GEORGE D. HANCHETT,* W2YM

In many years of building modulators, the writer has used 807s for various medium-power transmitters. Although the 807 is an excellent modulator for this power range, the problems of supplying bias and a reasonably well-regulated screen-grid supply tax the designer's ingenuity as well as his pocketbook.

Old-timers will recall that the type 46 of fond memory was commonly connected as a triode, and worked well as a zero-bias Class B modulator. In 1947, Mack Seybold, W2RYI, published an article in RCA *Ham Tips* on the use of triode-connected 807s in Class B audio. He used a resistor in series with grid No. 1 so that the driving voltage would be divided properly between grids Nos. 1 and 2. This arrangement required several watts of driving power. When the same method was tried with the very-high-perveance horizontal-scanning tubes of today, such as the 6GW6, it was found that the resistor values had to be such that there was almost no swing on grid No. 1. On grounding grid No. 1 and applying signal voltage only to grid No. 2, it was found that although the grid swing required in this arrangement was a little more than that needed for both grids, the driving power was greatly reduced.

Several driver tubes were tried. When a 6AQ5-A was used without feedback, the distortion was much higher than was desirable. With

* Semiconductor and Materials Division, Radio Corporation of America, Somerville, N. J.

By using TV sweep tubes as low-μ zero-bias (yes, that's what we said!) Class B amplifiers, you can get 60 watts of audio at plate voltages in the 450–500 range. Driving power is small enough to be supplied by an ordinary double triode. The coupling system between driver and amplifier is unusual — and simple as well as cheap.

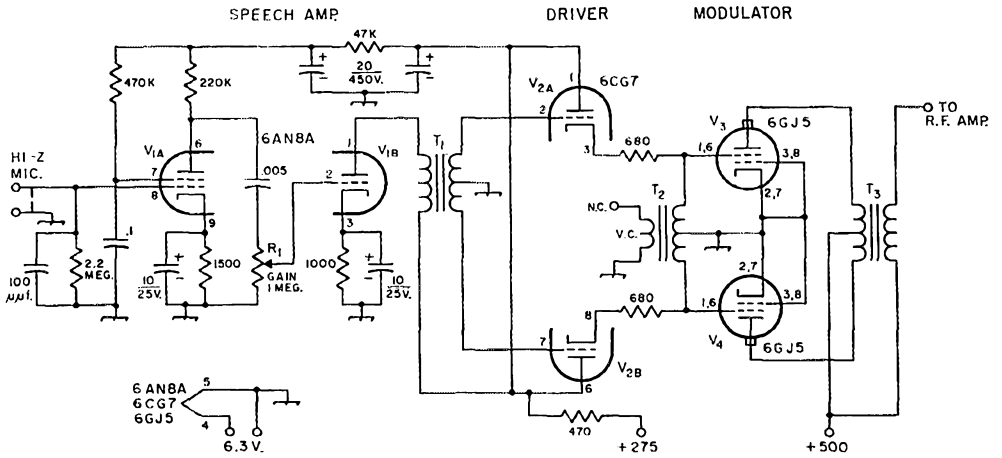


Fig. 1—Circuit diagram of the 50-watt modulator. Capacitances are in μf. except as indicated; capacitors with polarity marked are electrolytic. Resistances are in ohms; fixed resistors are ½ watt unless otherwise indicated.

R_1—1 megohm control, audio taper.

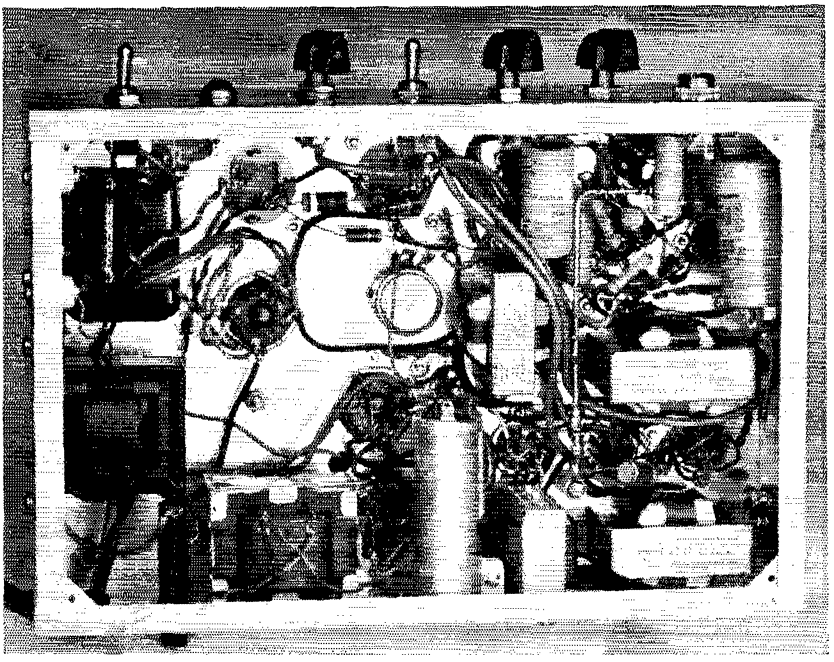
T_1—Interstage audio, 1:3 primary to total secondary; 10-ma. primary (Stancor A-73-C or equivalent).

T_2—Universal output, push-pull primary, voice-coil winding not used (Stancor A-3496 or equivalent).

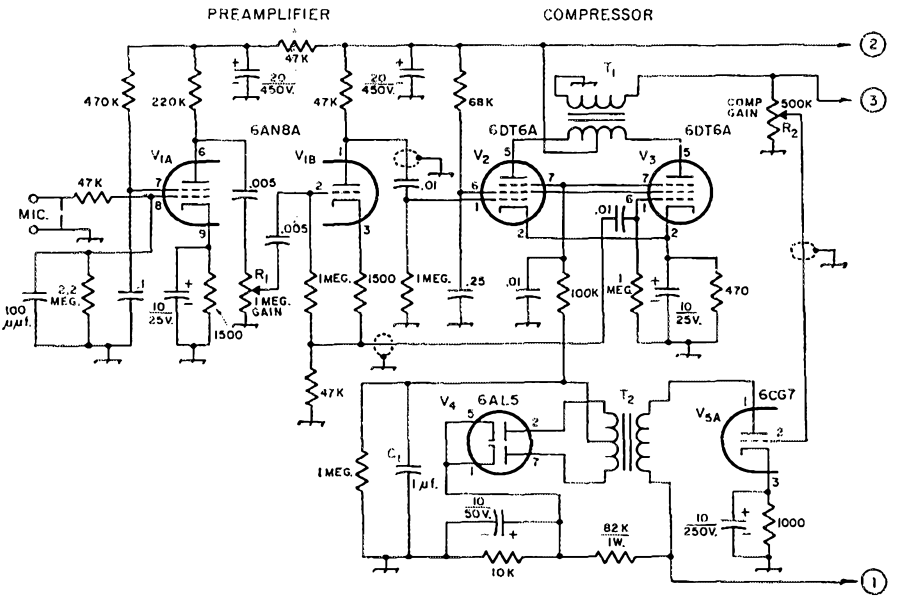
T_3—Multimatch modulation, 60 watts (Stancor A-3893 or equivalent). Adjust ratio for 5000 ohms plate to plate.

feedback, the distortion was about 5 per cent, which was acceptable. However, a suitable driver transformer was not commercially available.

Cathode-follower drivers were then tried. These drivers required only an inexpensive center-tapped audio inductor, and a universal push-pull output transformer served the purpose (see Figs. 1 and 2). Because the gain of a cathode follower is less than unity, a step-up transformer is required to feed its grids. A universal single-plate-to-push-pull-grid transformer having a 1:3 ratio is adequate because only voltage, not power, is needed. A peak signal of approximately 3 volts on the grid of the triode amplifier driving



Below deck, the various audio transformers and chokes are mounted adjacent to the speech tubes in the right-hand half of this view. The filament transformer, T_7, is on the left-hand wall. The power-supply filter choke and a filter capacitor are mounted on the chassis wall at the bottom. Note the ground bus, running vertically at the right in this view, to which all audio grounds are made. The large resistor is not shown in the circuit diagram since it is not actually a part of the modulator; it is the screen dropping resistor for the final amplifier of a transmitter described earlier by the author.



the cathode follower will provide an output of 60 watts when the 6GW6s or 6GJ5s are operated at a plate voltage of 450 volts. The total harmonic distortion is in the order of 1.75 to 2 per cent. Characteristic curves for the 6GW6 or 6GJ5 with grid No. 1 grounded and the signal applied to grid No. 2 are shown in Fig. 3. A plate-to-plate load of 5000 ohms seems to provide the best balance between plate efficiency and distortion.

Inexpensive Modulator

Fig. 1 is the circuit of a modulator built to go with the writer's 144-Mc. fixed-frequency transmitter-receiver. A 6AN8-A was used as a microphone preamplifier and voltage amplifier, a 6CG7 was used for the dual cathode follower, and 6GJ5 novar tubes were used as zero-bias low-μ Class B modulators. With a T-3 Astatic crystal microphone, the audio output is more than enough to provide 100 per cent modulation of the 829-B final, which operates at an input of approximately 100 watts.

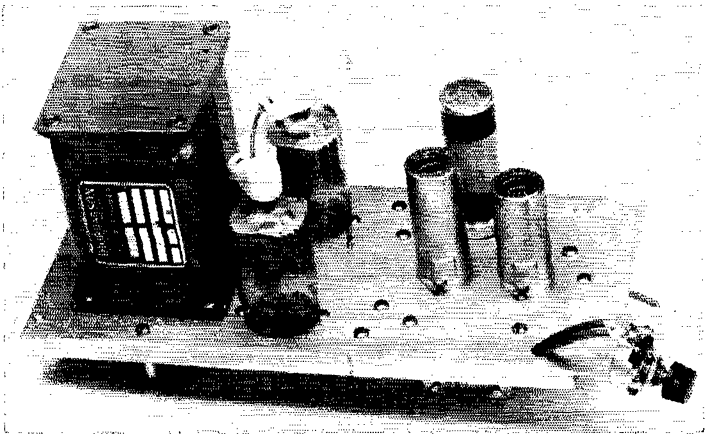
A top view of the modulator, which is mounted on a 5 × 10-inch aluminum plate serving as a chassis, is shown in one of the photographs. The physical layout used is not critical. The modulator has a common bus ground system to eliminate hum pickup.

The 275-volt source indicated in Fig. 1 should be capable of supplying about 30 ma. for the plates of the preamplifier and driver. The modulator takes around 200 ma. at maximum output with tone input. A 150-ma. supply will easily handle voice peaks having the same power output. Heater current for all four tubes totals approximately 3.5 amperes at 6.3 volts.

De Luxe Modulator

Fig. 2 is the circuit of a "de luxe" design. This modulator is used with the transmitter described in the March, 1961 issue of *QST*.[1] Its output is more than enough for full modulation of a pair

[1] Hanchett, "Compact Packaging for the 6146 Transmitter," *QST*, March, 1961.



Low-cost modulator using 6GJ5 novar-based tubes in the output stage. This was built as one unit of a transmitter constructed in sectionalized fashion for mounting on an inverted chassis. An ordinary chassis of approximately the same size could be substituted. The gain control, at the right on flexible leads, mounts on a panel when the modulator and transmitter are assembled. The modulation transformer at the left is a surplus item equivalent to the one specified in Fig. 1.

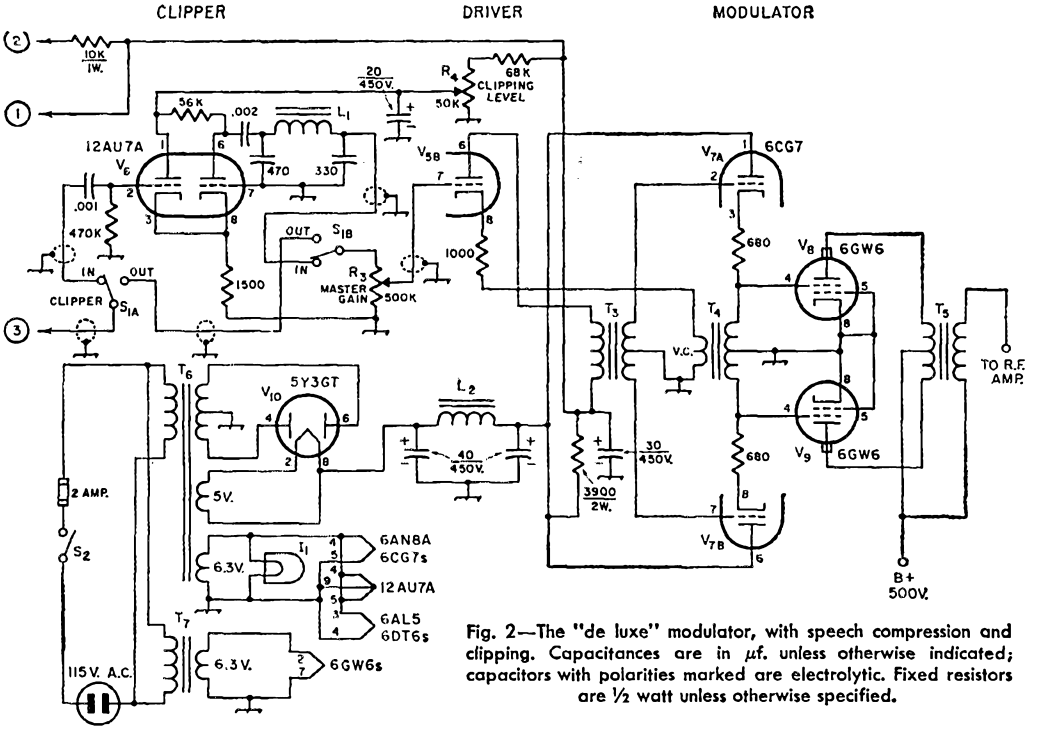


Fig. 2—The "de luxe" modulator, with speech compression and clipping. Capacitances are in μf. unless otherwise indicated; capacitors with polarities marked are electrolytic. Fixed resistors are ½ watt unless otherwise specified.

I_1—6.3 v. dial lamp.
L_1—20 henrys, 15 ma. (Stancor C-1515 or equivalent).
L_2—8 henrys, 75 ma. (Stancor C-1355 or equivalent).
R_1—1-megohm control, audio taper.
R_2—0.5-megohm control, linear taper.
R_3—0.5-megohm control, audio taper.
R_4—50,000-ohm control, linear taper.
S_1—D.p.d.t. toggle.
S_2—S.p.s.t. toggle.
T_1, T_3—Interstage audio, 1:3 primary to total secondary; 10-ma. primary (Stancor A-73-C or equivalent). Grid winding of T_1 is used as primary.
T_2—Driver, 2:1 primary to ½ secondary (Stancor A-4713 or equivalent).
T_4—Universal output, push-pull primary (Stancor A-3496 or equivalent).
T_5—Multimatch modulation, 60 watts (Stancor A-3893 or equivalent). Adjust ratio for 5000 ohms plate to plate.
T_6—Power, 600 volts c.t., 70 ma., 5 volts, 3 amp.; 6.3 volts, 3 amp. (Stancor P-8175 or equivalent).
T_7—Filament, 6.3 volts, 3 amp. (Stancor P-6466 or equivalent).

of 6146s. A push-pull volume-compressor stage and a clipper are included. The 6DT6-As in the volume-compressor stage were used because they have a high-μ grid No. 3. With properly adjusted compressor-bias level and loop gain, it is possible to obtain 95 per cent modulation of the transmitter with the preamplifier gain control about one-third open. Increasing the gain control to the two-thirds position (approximately 20 times the signal) does not cause overmodulation.

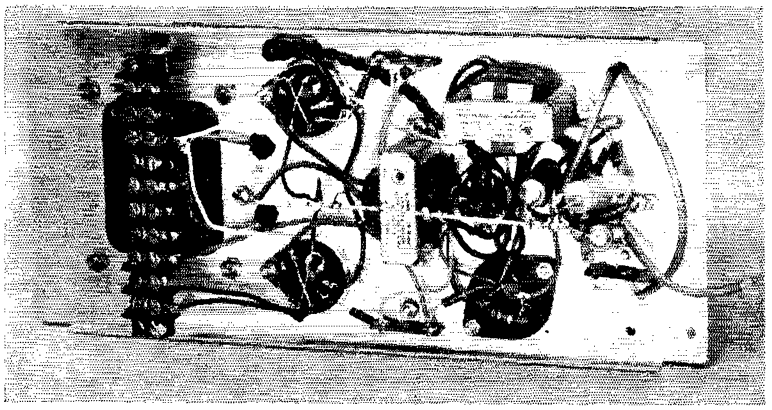
Push-pull amplification and full-wave rectification are used to provide the required smoothness of compression. In a single-ended volume-compression stage, there is a decided "plop" as the compressor goes into operation. A push-pull circuit eliminates this problem.[2] In conventional pentodes, such as the 6AU6, the μ of the suppressor grid (grid No. 3) is so low that large control voltages are needed. Consequently, the control rectifier and amplifier require high loop gain and a step-up transformer. When the 6DT6-A is used, however, only moderate loop gain is needed, and a step-down transformer performs best. This latter arrangement further stabilizes the compressor because the impedance level is lower.

The value of capacitor C_1 determines the hold-in time of the compressor. With a 1-μf. capacitor as shown in Fig. 2 the hold-in time is a little less than 1 second. Values of C_1 as low as 0.25 μf. have been used with success.

The clipper circuit was taken from a late edition of *The Radio Amateur's Handbook*. The level at which clipping will occur is a function of the plate-supply voltage, so a voltage divider network is used for adjusting the clipping level. It is made from a 68,000-ohm, 1-watt resistor and a 50,000-ohm control, R_4. The setting of this control determines the amount of clipping. The control is mounted on top of the chassis, and is adjusted with a screw driver. A simple pi-type filter is used after the clipper to minimize the higher-order harmonics developed in the clipping process.

The complete speech amplifier and modulator are constructed on an 8 × 10 × 3-inch aluminum chassis. Again, bus-type grounding is used to

[2] Tonne, "Compression *and* Clipping," *QST*, September, 1956.



Below-chassis view of the low-cost modulator. This amplifier also has a ground bus, running over the transformer at the center and extending about half the length of the chassis. All audio grounds are made to this bus. The terminal strip at the left is used in connection with the sectionalized transmitter arrangement. The dangling shielded wire at the right goes to a microphone jack on the panel after assembly.

reduce hum pickup. Wherever possible, the audio transformers are mounted with their cores at right angles to each other to minimize inter-transformer coupling. A power supply is incorporated for the speech amplifier. The plate voltage for the Class B modulators is obtained from the transmitter; the plate-current requirement is the same as for the circuit of Fig. 1.

Adjustment

An audio oscillator and oscilloscope are needed for adjustment of the compressor and clipper. The oscillator may be a single-tone unit, but it must not be permitted to overdrive the pentode section of the 6AN8-A. A signal of about 0.1 volt at 1000 c.p.s. is recommended. The adjustment procedure is as follows:

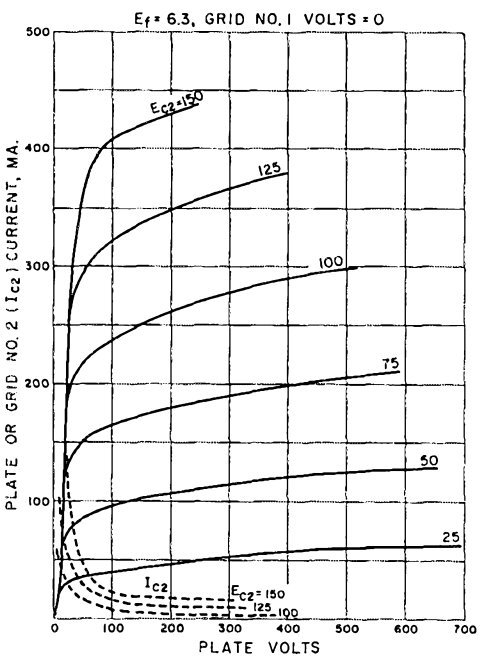


Fig. 3—Plate family with control grid tied to cathode, for selected values of positive voltage on grid No. 2. These curves apply to the 6GJ5, 6GW6 and 6DQ6B.

Connect the oscilloscope and a pair of headphones to the voice-coil winding of T_4. With the oscillator or microphone disconnected, and the preamplifier, compressor, and master gain controls set to zero, apply the power. If there is oscillation after warm-up, reverse the connections of the feedback (v.c.) winding of T_4. Set the master gain control to maximum. Little or no hum should be heard in the headphones. Next, advance the preamplifier gain control and, at or near the full-gain position, check for tube hiss noise. The hum should be very low.

Connect the audio oscillator, and with the master gain control, R_3, set approximately two-thirds open, adjust the preamplifier gain control, R_1, for a peak a.c. voltage of approximately 6 volts on the grid of V_{5B}. Make sure switch S_1 is in the non-clipping position. Set the compressor gain control, R_2, to about one half. Advancing the preamplifier gain control should only slightly increase the signal on the grid of V_{5B}.

The clipper may be used with or without the compressor. Set the clipping level with the aid of the oscilloscope as a modulation monitor; use either the trapezoidal or envelope pattern for checking. The higher the setting of the clipping control, the greater will be the clipping. Once set, this control will not need readjustment unless it is desired to change the amount of clipping. Because the clipper has a small amount of gain, it may be necessary to reset the master gain control. QST

Strays

Applications from clubs or any groups of three licensed Michigan amateurs are being accepted by the Central Michigan ARC in connection with the annual Cosmo G. Galkins Memorial Award. This award gives recognition to the Michigan amateur having done the most for ham radio in Michigan during the past year. Submit nominations in writing prior to March 15, 1962, to the Central Michigan Amateur Radio Club, 119 N. Foster Ave., Lansing 12, Michigan. The award will be presented at the ARRL Michigan State Convention to be held in Grand Rapids on April 14.

Building an Antenna Coupler

Basic Principles and Their Application

BY HORNER KUPER,* K2CU

This article describes the functions of an antenna coupler and the basic principles upon which it operates. Also included is practical information on how to build a coupler that will work efficiently with your particular antenna.

An antenna coupler is capable of performing three functions, any one of which, or any combination of which, may be required, or at least desired, by the amateur. The most prevalent type of pi-network transmitter output circuit with fixed taps on the coil is designed primarily for coupling into a low-impedance (50–70 ohms) load. An antenna coupler provides a means of transforming a wide variety of loads, such as is encountered in multiband operation of end- or center-fed "long wire" antennas, to the low impedance required for normal operation of the pi network and will, as a second function, add to the harmonic attenuation of the latter. In the case where a center-fed antenna system is used, the antenna coupler will also provide the means for the necessary transfer from the unbalanced output of the pi network to the balanced circuit represented by the center-fed antenna.

Although, in general, a workable coupler can be built by simply using any coil and capacitor combination that will tune to the band or bands desired, and adding a primary winding, this method is not likely to result in an efficient device that behaves nicely on all bands. When faced with an out-of-the-ordinary load, cut-and-try procedures may not produce a happy result within a reasonable length of time.

Principles

The desired qualities in an antenna coupler will be more easily attained by an understanding of some of the basic principles involved.

* Box 266, Setauket, N. Y.

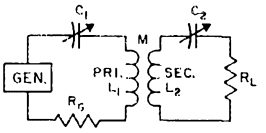


Fig. 1—Typical antenna-coupler circuit with series-tuned primary and secondary circuits. C_1L_1 and C_2L_2 are the tuning and coupling elements in the respective primary and secondary circuits. R_G represents the internal impedance of the generator (the output impedance of the transmitter in a practical case), while R_L represents the resistive component of the load impedance (antenna-system feed-point impedance). M is the mutual inductance existing between L_1 and L_2 as a result of their interlinking fields.

Fig. 1 shows a typical coupler circuit with series tuning in both primary and secondary. The same principles will apply to parallel tuning, of course, since any series circuit may be converted to an equivalent parallel circuit. The load that the generator sees will depend not only on the impedance of the secondary circuit, but also upon how tightly the two circuits are coupled. This load can be expressed as

$$Z_P = X_M^2/Z_S,$$

where Z_P is the load impedance that the generator sees, Z_S is the impedance of the secondary circuit when not coupled to the primary, and X_M is the mutual inductance, M, existing between the two coils. With both primary and secondary circuits tuned to resonance, the individual reactances of L_1 and L_2 will be tuned out, as well as any reactive component in the secondary load Z_S, and the load seen by the generator will be a pure resistance

$$R_P = X_M^2/R_L.$$

Critical Coupling

Now we know from elementary descriptions of the behavior of coupled circuits [1] what happens if the primary and secondary are separately tuned to the generator frequency with loose coupling (M very small) and then L_1 and L_2 are brought close together (M increased). The current in R_L will increase to a maximum at "critical coupling," and then will decrease if the coupling is made *more than* critical, as a result of detuning because of the mutual interaction. The response curve develops two peaks with a saddle in the middle. The heights of the two peaks are practically the same as that of the single peak at critical coupling.

We know that maximum power will be delivered to the load when the resistance seen by the generator (R_P) equals the generator resistance, R_G, and this condition prevails when we have critical coupling. So now we can write the condition for critical coupling as

$$R_G = X_M^2/R_L, \text{ or } X_M = \sqrt{R_G R_L}.$$

In other words, to match a load to a generator it is necessary that the mutual reactance be at least equal to the geometric mean of the generator and load resistances.

[1] See *The Radio Amateur's Handbook*.

Over Coupling

Let us consider what happens if M is made larger than the critical value; let us say X_M is two or three times $\sqrt{R_G R_L}$. Looking at the response curves, we see that essentially the same secondary current as that obtained with critical coupling can be realized if we detune the secondary circuit an appropriate amount. By doing this, the secondary circuit no longer reflects a pure resistance and we find that the coupled impedance in the primary now consists of a coupled resistance plus a coupled reactance. However, the coupled reactive component can then be tuned out by detuning the primary the proper amount, and we can end up with the desired resistive load for the generator. The reactance coupled into the primary is of opposite sign to that introduced in the secondary. However, it does not matter what the sign is; we can achieve our aim by detuning the secondary in either direction (with the primary detuning going the same way). So we find that with greater than critical coupling there are two pairs of tuning adjustments that result in the desired match, corresponding to the two peaks in the overcoupled response curve.

Load Adjustment

Since it is rather awkward to provide variable coupling controlled from the front panel (and the commercially-available swinging links frequently do not have enough inductance to achieve critical coupling), it is common practice to build antenna couplers with fixed coupling greater than critical and use this detuning scheme to provide the necessary loading adjustment.

It is well to bear in mind the price paid for this mechanical convenience. The fact that reactance is involved in the detuning process means (as the response curves indicate) that more frequent retuning is necessary in covering a band than would be the case were the coupling adjusted for a single broad-hump response. Hence the objective when using this scheme is to build in enough overcoupling to provide a reasonable range of adjustment, but not much more than that.

Circuit Efficiency

In this less than perfect world it is sad but true that practical components are never ideal, so we must consider the losses in the circuits making up an antenna coupler. All too often we hear of cases where a coupler misbehaves on a particular band. Although it will load the transmitter reasonably well, it does not put all of the energy into the antenna, but dissipates an undesirably large fraction in warming itself up. In this connection two Qs are of importance, the circuit or unloaded Q (Q_0) and the loaded or operating Q (Q_1). The fraction of the power consumed in the circuit is Q_1/Q_0, hence the efficiency is $100(1 - \frac{Q_1}{Q_0})$ per cent. For high efficiency, we want the operating Q to be low. Other considerations, such as harmonic suppression, and the need for getting more than critical coupling, may set a lower limit of 5 to 15 for Q_1, so for good efficiency Q_0 should be high, preferably over 250. This means that coils used in an antenna coupler should be of low-loss construction, tap switches should be avoided if possible, and large hunks of metal or lossy dielectric kept out of the field. Altogether too often an amateur believes that because he is going to work the *circuit* at low Q_1 he can take liberties with respect to Q_0.

Tank Q and Coupling Coefficient

If the product of the loaded Qs of the primary and secondary circuits is 25 or so, it should be quite easy to attain greater than critical coupling (even for coils arranged in line). Since for critical coupling k (the coupling coefficient) = $\frac{1}{Q_P Q_S}$, k need only be 0.2 if $Q_P Q_S = 25$. Although there are slight differences in the shapes of the selectivity curves obtained when the ratio Q_P/Q_S is varied, these are of little or no concern to the amateur: the main thing is that the product of the Qs be large enough to achieve an overcoupled condition with a practical coupling coefficient. However, it should be mentioned that, for a given product of the Qs, the circuit losses will be a minimum if the primary and secondary loaded Qs are equal. This minimum is fortunately a rather broad one, but extremes, such as a primary Q of around 2 and a secondary Q of 12 or more, should be avoided.

At this point it might be well to remind the reader that for a series circuit the expression $Q = \frac{2\pi fL}{R}$ is usually the handiest. On the other hand, for a shunt circuit (invariably used in the secondary when the antenna feeders present a high impedance) it is usually easier to use $Q = \frac{r}{2\pi fC}$ where r is the shunt resistance (load) across the circuit.

Coupling Adjustment

Earlier in the article it was pointed out that when operating with fixed (greater than critical) coupling, a match can be obtained by detuning in either direction. For all practical purposes the efficiency and power transfer will be exactly the same at either of these two points. However, it will be found in general that the variation in load on the transmitter for modest frequency shifts will be quite different around the two "match" points. When operating around one of the matched conditions it may be found that as the v.f.o. is tuned, the final plate current goes through a broad shallow minimum at the frequency for which the match has been set up. Around the other "match" point it may be observed that the plate current rises rapidly when the frequency is shifted in one direction and falls with a shift in the opposite direction. Obviously, it is well worth the couple of minutes it takes to locate and log both match points and determine which is the

most desirable one to use. This can hardly be calculated in advance since characteristics of the antenna system, coupler, coaxial line, low-pass filter (if used) and transmitter output pi network are all involved. As an instance, I found on at least one band where the most desirable point shifted from one side of resonance to the other, depending on whether or not I had the low-pass filter in the line.

Determination of M

In designing a coupler it is obviously necessary to have a method for estimating M. This can be done in two ways. One can guess at, or measure, k as described by Maresca[2] and use the formula $M = k\sqrt{L_1 L_2}$. This is useful for estimating a starting point but, if one has some coils already wound, it is preferable to measure M directly. This can readily be done using the formula for the inductance of two coupled coils in series — $L = L_1 + L_2 \pm 2M$. Just connect the two coupled coils in series and measure the inductance by any convenient method, such as the grid-dip meter and reference capacitor. Then connect the coils in series, with the polarity of one coil reversed, and measure again. The desired value of M will be one quarter of the difference between the two readings. The average of the two readings gives $L_1 + L_2$, so a third measurement of either coil alone gives the complete story — the values of L_1, L_2, and M.

Design and Tune-Up Procedure

At the start, it is well to make up a table of impedances seen at the input end of the feeders on the various bands. For most cases it is sufficient to know merely that the impedance is high (over 2000 ohms) or low (70 ohms or less). In doubtful cases it is worth while to take the antenna drive-point impedance[3] and transform to the bottom of the feeders using the Smith chart.[4]

Next, pick values of L and C for the secondary that will resonate in the desired band and give a reasonable Q. With low load resistances, a series circuit is best; for high resistances, use the parallel connection. If the resistance is neither very high nor very low, it may be necessary to tap down on the secondary coil to get the desired Q with a variable capacitor of reasonable size.

Complete the value of M necessary to transform to the desired 50- or 72-ohm link resistance. Allow enough extra mutual inductance to give a reasonable range of adjustment, and to take care of errors in estimating the load resistance.

Next, pick values for primary L and C that are compatible with the desired M and primary Q. Some readjustment of adopted values for the secondary may be needed at this point.

After winding the coils (or cutting them from a length of commercial coil stock) set up the circuit and tune up, using some form of s.w.r. bridge or reflectometer.

If a minimum is obtained in the s.w.r. but it cannot be brought down to unity, the coupling is probably not tight enough. Move the coils closer together, or increase the inductance of one or the other, or both. If the secondary is tapped, it may be necessary only to move the taps closer together.

If a perfect match is obtained, log the settings and find the other match point. To find the second point, start with the primary capacitor set near the other end of its range; i.e., if you started with the capacitor near maximum, try beginning with a low value. It is possible, of course, that you might hit critical coupling accidentally so that only one match point is found, but this is highly unlikely. In any event, to allow for any possible changes in antenna characteristics, it would be a good idea to increase coupling until two distinct match points are found.

Now determine which of the match points gives less variation in load for reasonable frequency shifts, and check to make sure that the tuning range is sufficient to reach this point at any frequency in the band. Check the primary and secondary coils for heating by running the transmitter for a few minutes and then shutting down and feeling the coils. If either coil shows appreciable heat, reduce the Q of that circuit and tighten coupling, if necessary. Now log the settings and proceed to the next band.

If trouble is experienced in getting anything like a match, the first thing to suspect is the secondary tuning. Check to see that the secondary is actually resonant in the band with the antenna connected, preferably using a grid-dip meter. Frequently, the reactive component of the antenna-system impedance will surprise you unless, of course, you have calculated it as mentioned above. If the resistive component is far from what was expected, it may be necessary to tap down on the secondary if using parallel tuning, or to switch from series to parallel tuning, or vice versa. Another, though less likely, source of trouble would be failure to hit resonance in the primary circuit.

Practical Example

By way of illustration, a description of my own coupler may be worthwhile. My problem was a fairly common one — no way to hang up a full-size antenna and keep it in the clear. The best I could do was a 66-foot antenna. The antenna is center fed with a 550-ohm open-wire line. A convenient length for the feeder turned out to be 33 feet.

Once the antenna and feeder lengths have been picked, the next step is to make up a table of "guesstimates" of the impedance at the sending end of the line. Since I was interested in checking out my calculations, I made the rather detailed estimates summarized in Table I, but it is ordinarily sufficient to know merely if the resistance is "high" or "low" and whether the

[2] Maresca, "Simplified Design of Inductively-Coupled Circuits," *QST*, October, 1959.

[3] Curves included in a paper, "The Self-Impedance of a Symmetrical Antenna," by King and Blake, published in the *Proceedings of the I.R.E.* for July, 1942, are most useful in determining feed-point impedances for the center-fed antenna at various frequencies.

[4] Cholewski, "Some Amateur Applications of the Smith Chart," *QST*, January, 1960.

TABLE I

Frequency (Mc.)	Series Components (center of antenna) R	X	Series Components (sending end of line) R	X	Parallel Components Resistance (ohms)	Cap. to tune (μμf.)
3.5	11 ohms	−11 ohms	5.5 ohms	−220 ohms	—	—
4.0	15	−870	6.6	−90	—	—
7.0	55	−75	880	+1980	5250	9.5
7.3	65	−8	4120	+1650	4880	1.7
14.0	4400	+2500	797	+1925	5400	5
14.35	6400	+600	2035	+2860	6060	2.55
21.0	79	−250	143	+622	2700	11.9
21.45	81	−150	330	+990	3220	6.8
28.0	1600	+1950	264	+841	2860	6.2
29.7	4800	−1800	5390	−275	5400	−.07

This table of calculated values is for a 66-foot antenna center-fed with 33-foot 550-ohm open-wire feeders. Columns to the left show series values of resistance and reactance at the center of the antenna. Those at the center show corresponding values at the input to the open-wire line due to impedance transformation through the line. Columns to the right show the equivalent parallel value of resistance and the capacitance required to tune out the parallel reactive component.

reactance is capacitive or inductive. As might have been expected, series tuning or some other special arrangement is required for the 80-meter band, but all the other bands can be handled by shunting the feeders across secondary tank circuits. To simplify calculations for the parallel-tuning cases, I have expressed (in the last two columns) the feed-point impedance in terms of shunt resistance and the capacitance change required to restore resonance when the feeder is connected.

Band-Changing System

Since the switching required to change from series to parallel tuning is quite complicated, I soon decided to give up all ideas of band switching and to use plug-in coils. I had available a 100-μμf. split-stator variable capacitor with generous plate spacing, which would do nicely for the secondary tuning capacitor, and a 300-μμf. variable with a reasonable voltage rating for the primary. Both capacitors were mounted on insulators. By providing some additional banana jacks on the plug-in strip one can gain valuable flexibility by using the capacitor sections in series or parallel, and do other useful tricks. The circuit I came up with is shown in Fig. 2, and some of the various arrangements which may be found useful are shown in Fig. 3. Construction of the plug-in strips is facilitated by cutting a number of 1 × 7-inch strips of insulating material about 3/16 inch thick, stacking them and drilling the nine holes at one time. The unused holes in the plug-in strips are simply left blank, and the holes are spotted in an asymmetrical pattern so the coils cannot be plugged in in the wrong position.

The basic connection scheme for parallel tuning, used where the feeders present a high resistance, is shown in Fig. 3A, with a variation to get larger maximum secondary capacitance in Fig. 3B. Note that the secondary coils are shown split in the center with the primary between the two halves. Although this makes it a little more difficult to calculate the secondary inductance or the mutual inductance, it should reduce the capacitive coupling between primary and secondary. A typical series-tuned arrangement is shown in Fig. 3C. This would normally be used where the feeders present a low resistance (under 100 ohms or so). Ordinarily this arrangement would be used for the 80-meter band but, as explained later, I found it better to use an arrangement like the old-fashioned "loose coupler" as shown in Fig. 3D.

An extra jack is provided to furnish a through connection for any coax-fed antenna, using a jumper between points 1 and 9 (Fig. 2), and in this way the need for changing connections when switching antennas is obviated. The connections of Fig. 3E provide a pi-network configuration which may be found convenient in some applications.

Finally, for general-coverage reception (reception only) I wound a little balanced-to-unbalanced transformer (Fig. 3F) on a piece of ferrite rod ("loopstick"). The secondary is wound in two 3-turn sections, one on either side of the 9-turn primary, with the turns of the sections wound in opposite directions.

Coil Dimensions

The guesstimates in Table I suggested that it might be possible to cover the 10- and 15-meter bands with a single coil so, as a trial, I wound a 2-turn 2½-inch diameter (8 turns per inch) primary and made a 4-turn secondary with 2 turns on each side of the primary, spaced ½ inch away. This combination works nicely over the

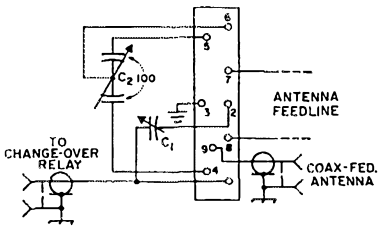


Fig. 2—Wiring of the socket for the antenna-coupler plug-in coils. In this case, C_1 is a 300-μμf. variable used for series-tuning the low-impedance primary circuit, while C_2 is a split-stator capacitor having a capacitance of 100 μμf. per section and is used for tuning the secondary.

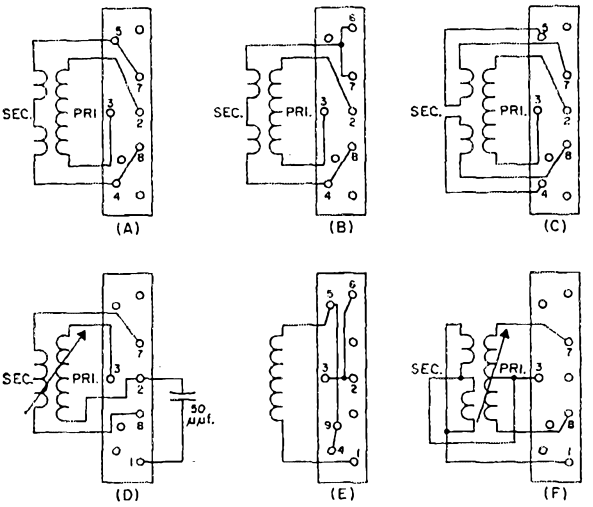


Fig. 3—Methods of arranging coil plug-strip connections for various circuit configurations. A—Parallel tuning with sections of C_2 in series (used on 20, 15 and 10 meters). B—Parallel tuning with one section of C_2 (used on 40 meters). C—Series tuning with sections of C_2 in series. D—No tuning capacitor (coil with capacitive reactance of antenna resonates at operating frequency—see text). A fixed capacitance of 50 μμf. is added in parallel with primary tuning capacitor, C_1. Coupling between coils is adjustable. E—Connections for converting to a pi-network circuit. F—Balanced-to-unbalanced coupling for receiving purposes only. See text for coil dimensions and other details.

15-meter band, but does not quite tune the entire 10-meter band, so a separate coil with 1-turn primary and 2-turn secondary was called for.

For 20 meters I again used a 2½-inch diameter, 8 turns per inch, with a 3-turn primary and 8-turn secondary, and the two halves of the secondary separated from the primary by ½ inch.

For 40 meters I went to a 3-inch diameter and 7½ turns per inch (just because this happened to be handy) and used 4 turns in the primary and 13 turns in the secondary, with the two halves spaced ⅝ inch from the primary. The connection of Fig. 3B was used to give a secondary tuning capacitance of 100 μμf. maximum.

Fig. 4 shows sample tuning curves for the 40- and 20-meter bands (those for 15 and 10 are similar, of course). In each case the solid curves represent one of the match points and the dashed ones the other. The rather large separation between the secondary tuning curves indicates that it would be all right to use less mutual inductance (smaller primary or secondary, or looser coupling), but I felt that these results were good enough. If I were really ambitious, I would redo

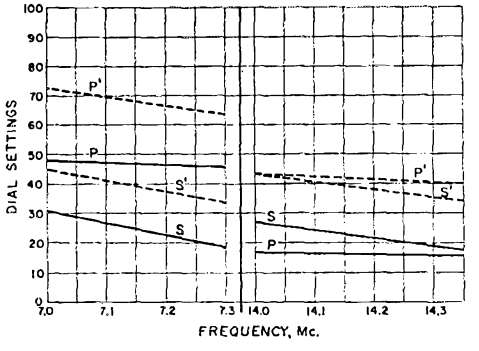


Fig. 4—Tuning curves for the 40- and 20-meter bands. "P" and "S" refer respectively to primary and secondary tuning curves. The dashed lines indicate tuning characteristics around one of the humps of the double-humped response curve of the overcoupled circuits; the solid lines were plotted for the region around the opposite hump.

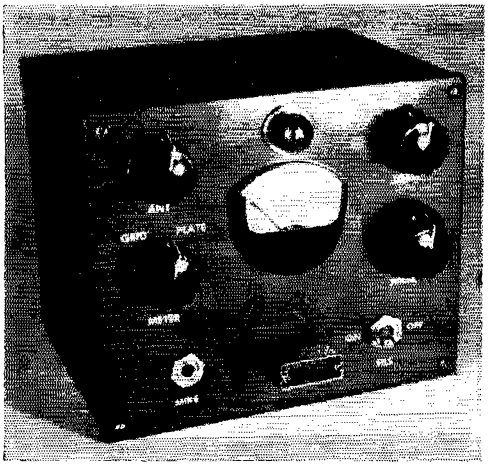
the coils to get slightly lower loaded *Q*s in the secondaries and somewhat higher primary *Q*s but, since all coils run cold at full input to my Apache, I haven't bothered.

80 Meters

When it came to 80-meter operation, however, things did not go so easily. The first attempt using conventional series tuning in the secondary was most discouraging. As shown in Table I, the antenna system presents a rather low resistance and a capacitive reactance which decreases as the frequency increases. In order to couple to the system we need a coil whose inductive reactance is large enough to offset the capacitive reactances of the antenna and whatever series-tuning capacitor we employ. Remembering that the reactance of the coil will increase with frequency, it turns out that it would require a fabulous capacitance range in the series-tuning capacitor to cover the band. And furthermore, the *Q* of the secondary system is sure to be distressingly high. Sure enough, in several trials I was unable to tune over the band, adjustments were very touchy, and the coils ran hot.

A great many schemes were tried both on paper and in the flesh, with indifferent results at best. The standard approach simply would not work because of the unfortunate variation of reactance with frequency. I could have helped matters somewhat by adding to the length of the feeder, but there was simply no place to coil up a lot of open-wire line. So I finally came up with the "loose coupler" scheme of Fig. 3D. In this case the secondary is simply a coil chosen to resonate the antenna somewhere near the center of the band. The primary is series-tuned as usual and the coupling is adjustable. Since rather tight coupling is required away from the frequency at which the secondary is resonant; i.e., as we approach either band edge, the coils were made to telescope. The primary was made movable (sliding on a bakelite rod) and consists of 14 turns, 2 inches in diameter, 10 turns per inch. The sec-

(Continued on page 138)



It is difficult to believe that this 5 × 6-inch panel hides a complete 50-watt transmitter and modulator. Controls may be identified by the panel labels. A slot cut in the underside of the plastic dial-lamp jewel provides illumination for the meter.

Complete Mobile Installation for Compact Cars

Today's compact car calls for some concentrated head-scratching when it comes to making a mobile installation. In this article, W4NIQ describes a series of ultra-compact units that will not only provide an answer for the ham who drives an import, but will reduce mobile installations to child's play for owners of Detroit iron.

The Beetle Box

BY DAVE HARPER,* W4NIQ

WITHIN the last several years, the 12-volt electrical system has become standard in automobiles of American manufacture. This is fine, except for those who happen to own a small foreign car or an older Detroit model employing a 6-volt system. After two years of a "make-do" mobile rig in the author's 1958 VW, he came to the conclusion that the small car calls for a small rig especially designed for it. As the '58 VW had accumulated quite a few miles, it was turned over to the XYL and a '60 model was acquired. The new VW came equipped with an all-transistor radio which inspired the use of transistors in the ham installation wherever it was consistent with cost and performance.

The complete installation is shown in block form in Fig. 1. This includes the transmitter, a transistorized power supply, a transistor converter and a field-strength meter. What follows is a brief description of each circuit.

The Transmitter

As indicated in Fig. 2, the main object was simplicity in both circuitry and operation. The transmitter was designed for crystal operation on the 75-meter phone band. The 6V6GTA operates in a simple crystal triode oscillator circuit with a fixed-tuned plate circuit requiring no adjustment from 3.8 to 4.0 Mc. A miniature tube would probably work just as well.

The 6146 in the final operates straight through into a link-coupled tank circuit. The tank circuit shown in one of the photos was "robbed" from an AVT-112A aircraft transmitter. However, any components resonating to the desired frequencies should be satisfactory. The meter M_1 can be switched by S_2 to read either plate or grid current in the final-amplifier stage.

Modulator

The modulator is nearly identical to the author's 12-volt version described in a previous article.[1] It consists of a Class B stage driving a second Class B stage to approximately 25 watts output. The microphone output is fed into the 150-ohm side of T_1. Microphone current is dependent upon the value of R_4 which should be selected to give the proper over-all gain without causing excessive microphone current. This resistor also serves as part of a hash filter in conjunction with the two 125-μf. capacitors. The two resistors in the driver stage form a bias network to minimize crossover distortion.

* Route 4, Fayetteville, Tenn.

[1] Harper, "A 12-Volt 50-Watt Transistor Modulator," *QST*, June, 1960.

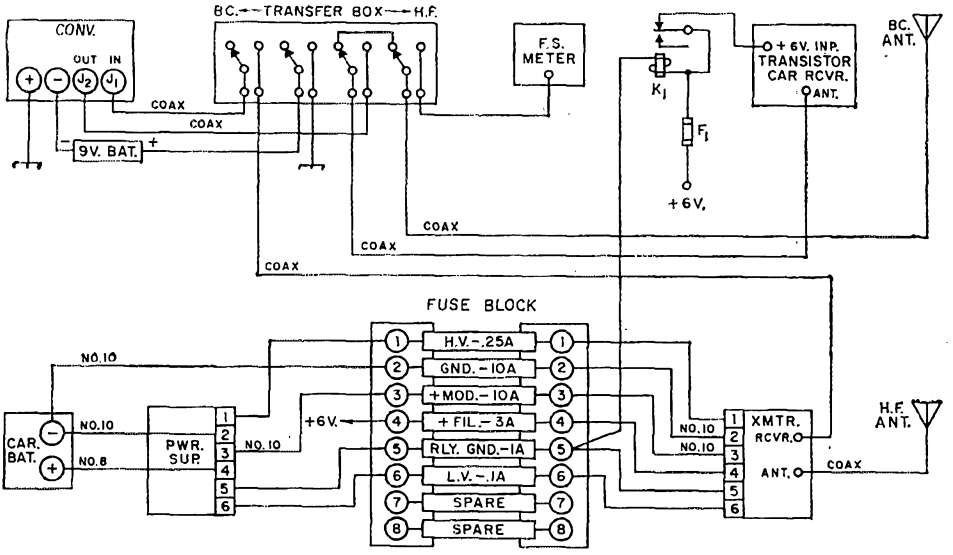


Fig. 1—Block diagram showing W4NIQ's over-all mobile installation. The various units are described in the text. Any 6-volt d.c. relay will serve for K_1. F_1 is the customary car-radio fuse.

Although it is not absolutely necessary, the driver and output transistors should be matched pairs, if possible. This will allow maximum audio output and efficiency with minimum distortion.

T_3 was designed by the author for use with a 6146 running 500 volts at 100 ma. (5K), but taps for 3K and 4K are also provided. This transformer is available from the source indicated under Fig. 2.

Construction

The transmitter chassis and cabinet were both handmade. The chassis is 6 inches wide, 4 3/16 inches deep, and 1 1/8 inches high, while the cabinet is 6 1/8 inches wide, 4 7/8 inches deep, and 5 1/8 inches high. For those who are not adept at metal forming, a Bud 6 × 6 × 6-inch utility cabinet with attached chassis should prove adequate. In either case, the cabinet should be well perforated for ventilation.

The modulator output transistors were mounted on a 2 1/2 × 3-inch plate of 1/8-inch aluminum and allowed to protrude through the back of the cabinet to facilitate cooling. All transistors must be insulated from ground and from each other.

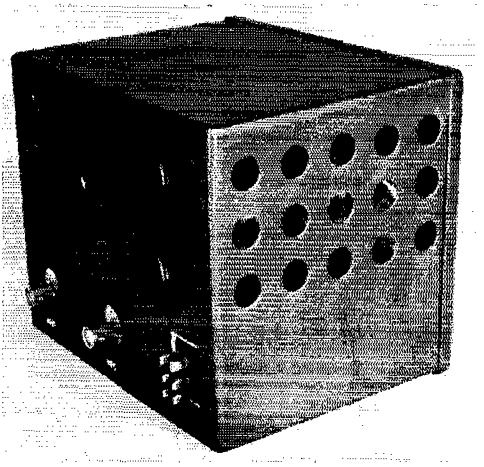
No particular precautions were taken in the layout or wiring other than to follow accepted practice.

Testing

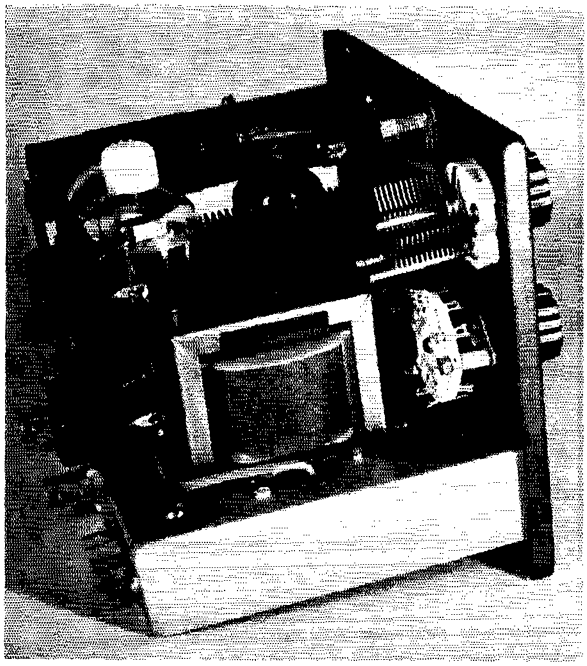
Either a 50-ohm resistive load or the antenna itself may be used for the following tests:

With 250 volts d.c. applied to Pin 6 of J_4 (Fig. 2) and 500 volts to Pin 1, there should be between 2 and 3 ma. of grid current to the 6146. If the current is higher or lower, it can be adjusted by changing the value of R_1. A crystal at the low end of the band and one at the high end should be used to check oscillator activity. If oscillation does not occur at one end of the band, change the value of C_1 slightly and then recheck the other end. A value of C_1 should be found that provides operation over the entire 75-meter phone band. The only tuning necessary is in the final where C_2 is tuned for minimum plate current, and C_3 is adjusted for the amount of loading desired. Here it should be kept in mind that the impedance which the modulator will look into is the final plate voltage divided by the plate current in amperes. The tap on the secondary of T_3 should be selected accordingly.

The transmitter may be checked for 100 per cent modulation by applying 6 to 7 volts to Pin 3 of J_4 and observing the modulated r.f. output on an oscilloscope coupled to L_2/L_3. Procedures for



This exterior view of the transmitter shows the ventilating perforations in the cabinet and the clearance hole for the modulator transistors. Antenna, receiver-input and power connectors are lined up across the rear.



End view of the transmitter. In the foreground are the modulation transformer, meter switch, and the antenna-link tuning capacitor, C_3. The modulator driver transistors are mounted on the chassis, below the switch. The output tank-circuit components are behind the 6146 and 6V6 tubes. The modulator transistors are mounted on the blackened aluminum plate at the left.

checking modulation may be found in the *ARRL Handbook*. If desired, a static test of the modulator only may be made as described in the *QST* article mentioned previously, using a load resistor of 5000 ohms, 25 watts. Total supply current to the modulator will be in the order of 6 amperes when the unit is delivering 25 watts of audio output.

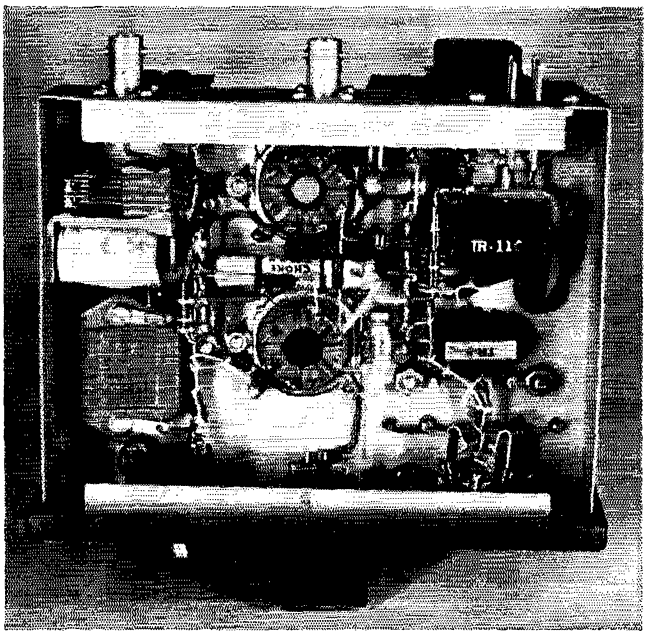
Converter

The converter shown schematically in Fig. 3 is one designed by W6TNS [2], with the exception of L_3 which was wound on a smaller core to reduce the physical size. No attempt will be made here to discuss the operation of the converter, since this was covered amply in the original article. As usual with Don's designs, performance is excellent.

Power Supply

The power-supply circuit of Fig. 4 is a common-emitter arrangement. R_1 and R_2 were selected to

[2] Stoner, "W6TNS's Transistorettes" (Semiconductors, p. 57). *CQ*, May, 1958.



Bottom view of the transmitter chassis. The antenna change-over relay is to the left; modulator speech transformers to the right. The r.f. choke used as L_1 lies between the two sockets. A receiving-type mica may be substituted for the high-voltage unit below the relay. This is the fixed capacitor in parallel with C_3.

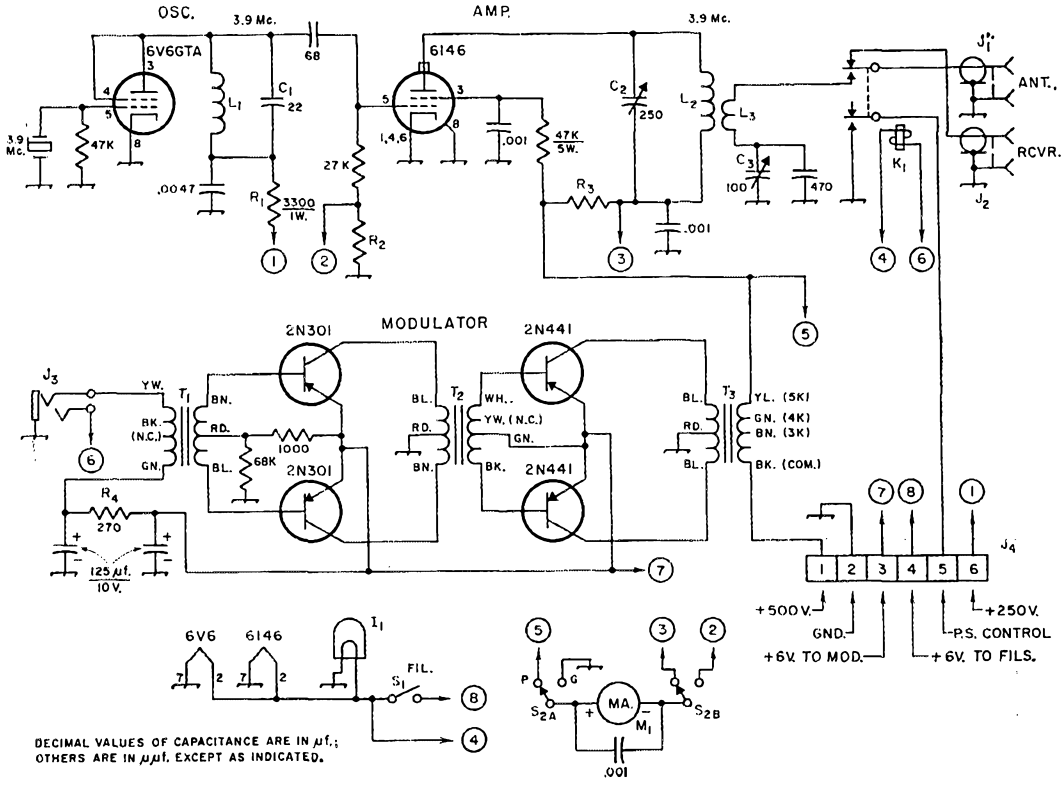


Fig. 2—Circuits of the transmitter and modulator. Resistances are in ohms and, unless indicated otherwise, resistors are ½-watt composition. Fixed capacitors of less than 0.001 μf. are in μμf. and capacitors are mica; others are disk ceramic, except those marked with polarity, which are electrolytic or tantalum.

C_1—Nominal value (see text).

C_2—250-μμf. variable (Hammarlund MC-250-M or similar).

C_3—100-μμf. miniature variable (Hammarlund MAPCB-100 or similar).

I_1—6.3-volt dial lamp.

J_1, J_2—Chassis-mounting coaxial receptacle (UG-290/U).

J_3—Three-conductor microphone jack.

J_4—Six-contact male chassis connector (Cinch-Jones P-306-AB).

K_1—6-volt d.c., double-pole double-throw relay.

L_1—21 μh.—175 turns No. 30 enam., ¼-inch diam., 2 inches long (Ohmite Z-28 r.f. choke).

L_2—12.5 μh.—31 turns No. 20 enam., 1-inch diam., 1⅜ inches long.

L_3—9 turns No. 20 enam., ¾-inch diam., ⅜ inch long, mounted inside L_2.

M_1—1½-inch 0-1-ma. d.c. meter (Marion MM-1).

R_1, R_4—Nominal value—see text.

R_2—10-times shunt for M_1 (11 ohms for 100-ohm meter).

R_3—150-times shunt for M_1 (0.66 ohm for 100-ohm meter).

S_1—S.p.s.t. toggle switch.

S_2—One-section 2-pole 2-position ceramic rotary switch.

T_1—150-mw. transistor transformer, 490-ohm c.t. pri., 150-ohm c.t. sec., turns ratio 1.81:1 (Thordarson TR-5).

T_2—300-mw. transistor transformer, 48-ohm c.t. pri., 16-ohm c.t. sec. (Thordarson TR-110).

T_3—Transistor modulation transformer, 25 watts, 2.5-ohm c.t. primary, 5000-ohm secondary (Brown Engineering Co.,* *part* No. BR-103).

* 1100 Meridian St., Huntsville, Ala., $6.95 pp.

give the best starting characteristics as well as to allow maximum efficiency at the desired operating level. A diode bridge is used for rectification, while two 10-μf. capacitors with equalizing resistors are connected in series for filtering the high-voltage output. A single 4-μf. capacitor filters the low-voltage output from the transformer secondary center tap. K_1 connects the battery to the power supply when S_1 and the antenna relay in the transmitter are closed.

For those who have not had the experience of winding a toroidal coil, excellent instructions are included in K2BQK's article in April 1960 *QST*.[3]

The power supply was assembled in a 5¼ × 3 × 2⅛-inch Minibox (Bud CU-3006-A). As shown in the photograph, all of the rectifier and filter networks are mounted on a fiber board which, in turn, is bolted to the chassis along with T_1. No wiring or layout precaution need be taken other than to assure good mechanical rigidity.

For test purposes, a 5000-ohm 50-watt resistive load should be connected across the high-voltage output (Pins 1 and 2 on J_1). If an audible oscillation is not heard as soon as the input voltage is applied, reverse the feedback winding connected to the bases of the transistors. The high-voltage

[3] Tetz, "Design and Construction of Transistor Power Converters," *QST*, April, 1960.

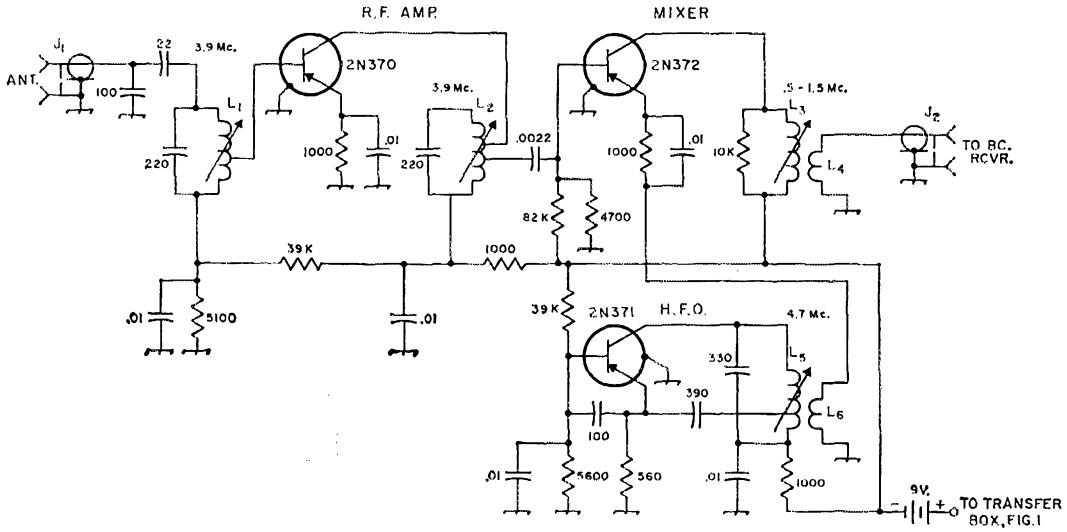


Fig. 3—Circuit of the 75-meter transistor converter. Fixed capacitances less than 0.001 μf. are in μμf., and capacitors are mica; others are disk ceramic. Resistances are in ohms, and resistors are ¼ watt.

J_1, J_2—Chassis-mounting coaxial receptacle (UG-290/U).

L_1—Approx. 7 μh.—30 turns No. 26 enam., tapped at 5 turns from ground end on ⅜-inch ceramic iron-slug form.

L_2—Same as L_1, but also tapped at 12 turns from ground end.

L_3—Approx. 300 μh.—Scramble-wound over-full to ⅝-inch diam. on ⅜-inch iron-slug form with No. 26 enam. wire. Slug length doubled by cementing two together (Miller 4411 coil may be used as substitute).

L_4—50 turns No. 26 enam. scramble-wound over L_3 at low-potential end.

L_5—Same as L_1, but tap at 6 turns from ground end.

L_6—2 turns No. 26 enam. over ground end of L_5.

Coil dimensions for other bands may be obtained from article of Footnote 2.

output should be approximately 500 volts at 100 ma. If the input voltage is 7.2 volts, as is normal in the VW with the engine running, the output will be slightly higher. In the author's installation, the output was 500 volts at 120 ma.

Field-Strength Meter

The field-strength meter (circuit shown in Fig. 5) is merely a repeat of an old reliable design. The meter could be a 0-1 ma. and still have adequate sensitivity if connected to the broadcast antenna as it is in the author's installation. A 2¾ × 2⅛ × 1⅝-inch Minibox (Bud CU-3000-A) was used as an enclosure.

Fuse Block

The fuse block indicated in Fig. 1 was fabricated by mounting two Cinch-Jones type 8-140 barrier terminal strips on either side of a ⅛-inch piece of bakelite measuring 3 by 5 inches. Fuse clips were mounted on the two inner rows of the terminal strips, and the strips were spaced to accept standard 3AG fuses.

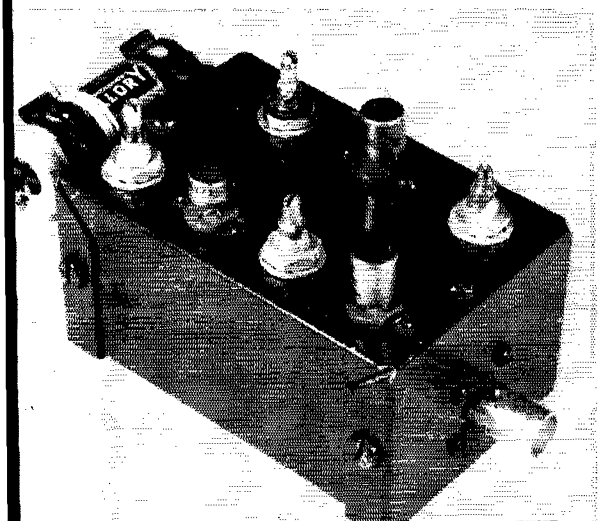
Transfer Box

The transfer box, also indicated in Fig. 1, is a 3¼ × 2⅛ × 1⅝-inch Minibox (Bud CU-3001-A) containing a four-pole two-position ceramic rotary switch, five UG-290/U coax receptacles and four 5-way binding posts. Four of the coax receptacles are mounted on one end of the box, while the other one is mounted on the opposite end along with the binding posts. The switch is mounted in the center of the top of the box.

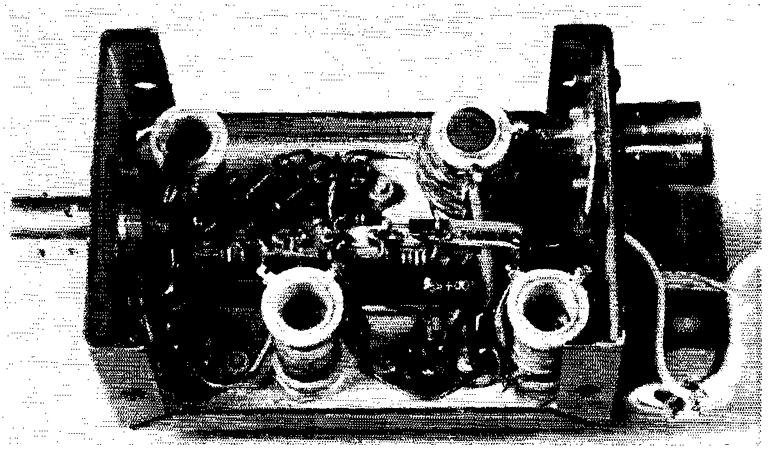
The relay indicated in Fig. 1 is mounted on the back of the receiver, and serves to remove the voltage from the receiver during transmissions.

Installation

The converter, fuse block and transfer box are all mounted behind the dash. The transfer box is mounted under the speaker, and is held down by a second nut on the switch shaft which is mounted through a ⅜-inch hole in the underside of the



The 75-meter converter. Lined up to the left, from left to right, are L_5/L_6, the 2N371, L_2 and the 2N370. To the right are L_3/L_4, the 2N372 and L_1. The antenna connector J_1 is in the foreground.



Interior view of the 75-meter converter. An 8-terminal barrier strip provides tie points for small components. The battery is to the right, mounted in clips below the output connector.

dashboard. This allows operation of the switch from inside the car. The converter is placed in front of the transfer box, and is held in place by wedging the coax receptacle on one end under the speedometer cable housing. The fuse block is mounted on the metal brace which normally holds the turn-signal blinker. The blinker was moved around to the back side of the brace.

The transmitter is mounted underneath the dash, in the center and far enough back to allow plenty of clearance for shifting gears. The field-strength meter is mounted immediately to the left of the steering column. A thin sheet of rubber is suggested for mounting the transmitter and field-strength meter to prevent rattles.

The power supply is mounted or laid on the floor underneath the rear seat on the side opposite the battery. This prevents excessive voltage drop from the battery.

The antenna base was mounted on a handmade bracket which, in turn, was attached to the left rear bumper mount.

The upper section of the antenna is a 90-inch Shakespeare "Wonderod." The coil is a Master Mobile "Hi-Q." The base section is 12 inches long and handmade, while the mount is a heavy-duty Master Mobile unit.

Routing the Cables

Fig. 1 indicates the actual electrical hook-up along with recommended wire sizes where necessary. To begin with, the insulation on the driver's side of the engine compartment must be temporarily removed, as well as the left-rear side panel inside the car. (Loosening this panel at the bottom only may suffice if you have small hands and infinite patience!) Also, the dome light will have to be pulled out temporarily.

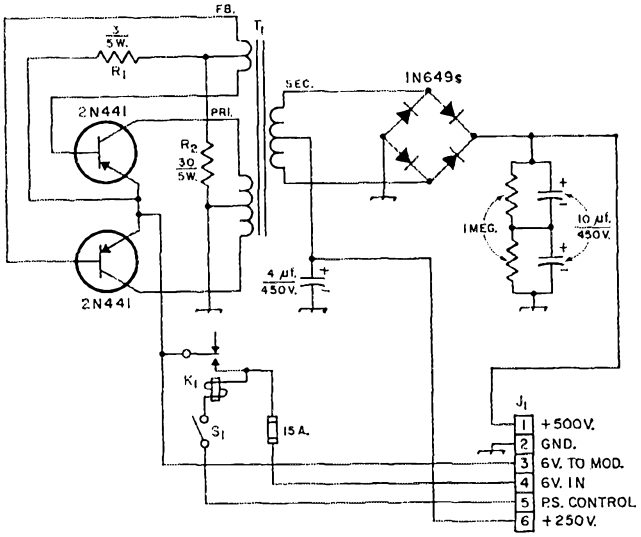
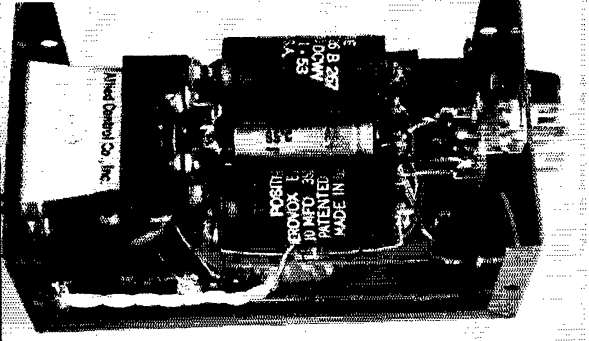


Fig. 4—Circuit of the mobile power supply. Capacitors are electrolytic. Resistances are in ohms and resistors are ½ watt unless indicated otherwise.

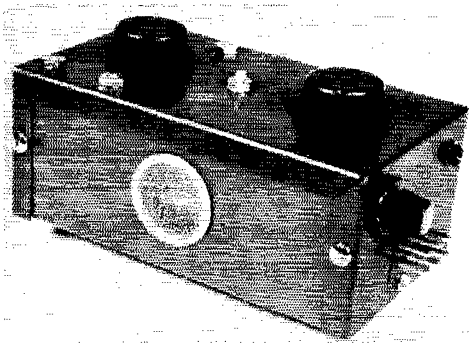
J_1—6-contact male chassis connector (Cinch-Jones P-306-AB).
K_1—6-volt s.p.s.t. relay, 15-ampere contacts (Advance PC/1C/6VD or similar).
R_1, R_2—See text.
S_1—S.p.s.t. toggle switch.
T_1—Toroidal power transformer: primary 40 turns No. 14, c.t.; secondary 1750 turns No. 30 c.t.; feedback 20 turns No. 22, c.t.; core Magnetics, Inc., Butler, Penna., type 51030-2A (see text).



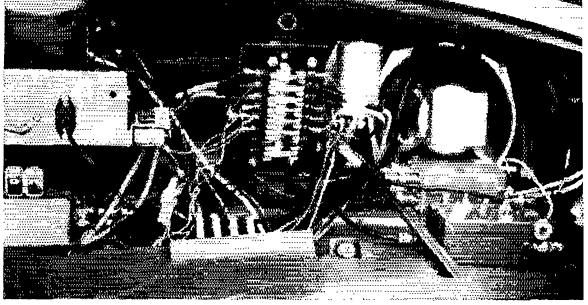
The power relay to the left takes up almost half of the space in the power-supply box. Rectifiers and filter components are mounted on a bakelite plate covering the toroid power transformer.

Other than mounting holes, it will be necessary to drill three holes in "Ye Olde Beetle." The first is in the left-rear fender well to allow the coax (RG-58/U) to pass from the antenna to the inside of the engine compartment. A watertight fit is preferred here, so the author drilled a ¼-inch hole and then put some rubber cement around the coax after it was pulled through. The second hole is in the bottom center of the luggage compartment, placed so as to be immediately behind the transmitter. This hole will have to be of larger size, since it has to pass two pieces of coax and two No. 10 wires, as well as several smaller wires. The last hole is drilled in the metal partition at the end of the rear seat to allow the cabling from the battery and power supply to pass into the side panel.

A stiff wire or "snake" should be used to pull the cabling through. The method used by the author was first to pull the coax through the fender well and then through the overhead channel and out the hole normally occupied by the dome light. Next, the coax was fed back into the overhead channel and forward to the luggage compartment. If you are lucky, you might be able to pull the coax straight through without the detour via the dome-light hole, but the author found it a lot easier to take advantage of the latter. The coax can now be passed behind the dash, and hence through the previously drilled hole to the back of the transmitter.



The power-supply unit showing the mounting of the transistors, fuse and power connector. The tip jack is for checking the high-voltage output. A 1-inch vent-hole plug is used in each side of the box.



Behind the instrument panel. The transfer box and converter are in front of the speaker, fuse panel at the center, and the transistor b.c. receiver to the left.

The cabling from the battery and power supply is fed through the No. 3 hole into the side panel and then through the left doorpost and out from the dome-light hole. It is then routed the same as the coax to the luggage compartment where everything is tied to the terminal block as shown in Fig. 1. The rest of the cable routing should be obvious.

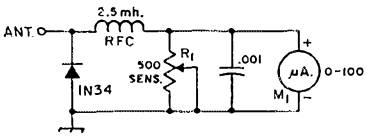


Fig. 5—Circuit of the field-strength meter.
M_1—1½-inch d.c. meter (Marion MM-1).
R_1—500-ohm control.

Operation

Ignition interference should be practically nonexistent if a separate battery is used for the converter as recommended. However, if trouble is experienced, the installation of resistor spark plugs (AER-6) and a suppressor-type rotor button should cure it.

The author has been using the above-described rig for approximately one year and has had excellent results in working out, as well as some very flattering reports on the audio quality. All of the good reports have been exceeded only by the comments on the "heap big antenna for such a little car." QST

Strays

Here's the February schedule for Air Force MARS Eastern Technical Net, meeting Sundays at 1900 GMT on 3295, 7540, and 15,715 kc.

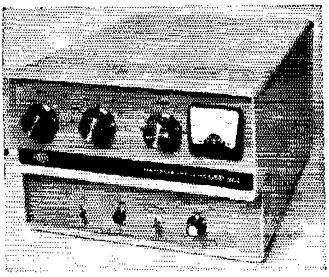
Feb. 4 — Advances in Broad Band Communications.
Feb. 11 — Exploring the Ionosphere with Satellites.
Feb. 18 — High-Performance Amplifiers Using Low-Cost Drift Power Transistors.
Feb. 25 — Applications of Rectifiers.

—•••—

Do it now! Do what? Why, let your Senators know of your support for Senate Bill 2361.

• Recent Equipment —

Gonset GSB-201 Linear Amplifier



THE GSB-201 is a linear amplifier that covers the 80- through 10-meter bands and is capable of inputs up to 1500 watts p.e.p. (approximately twice average d.c. input) on s.s.b., 1000 watts on c.w., and 400 watts on a.m. Drive requirements for the amplifier are 65 to 100 watts. Nominal input and output impedances are 50 ohms.

R.f. circuitry in the GSB-201 closely resembles that in the GSB-101 described previously in this column.[1] Four 811-A triodes are connected in a grounded-grid circuit, and a link-coupled neutralizing circuit insures stable operation. The output circuit consists of a pi network and, on the 75-80-meter bands, loading capacity is added to the circuit when the BANDSWITCH is advanced. A single knob controls band changing and doubles as a coarse loading control. A LOADING control is provided for fine loading adjustments. One other knob associated with the r.f. section is a TUNING control to resonate the amplifier tank circuit.

The GSB-201 has its own built-in power supply which includes a high-voltage plate supply, a bias supply, and a d.c. supply for antenna-relay power. All of the circuits use silicon rectifiers and, in the case of the high-voltage supply, the circuit consists of sixteen 600-p.i.v., 500-ma. diodes connected in a full-wave bridge. A swinging choke and 20 μf. of capacity make up the filter section.

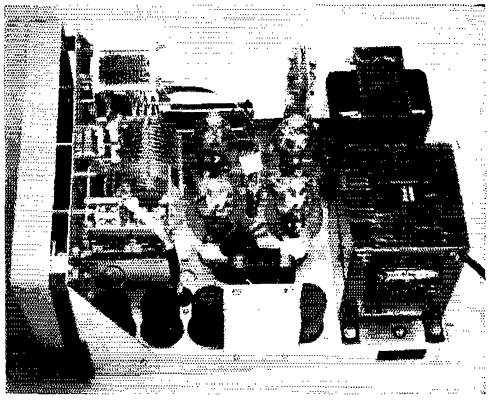
Operating bias of about negative 4 volts is developed by rectifying voltage from the a.c. filament supply. The ground return for the bias circuit terminates at a terminal strip on the chassis rear. These terminals are normally jumpered but they can be used for applying additional bias to cut off the 811-As during stand-by.

Another power supply using a silicon rectifier applies rectified line voltage to the antenna relay. D.c. operation insures "chatterless" relay operation. The relay has contacts for grounding the receiver during transmit, as well as transferring the antenna to either the amplifier or receiver. Controlled line voltage for the relay must be fed via terminals at the chassis rear.

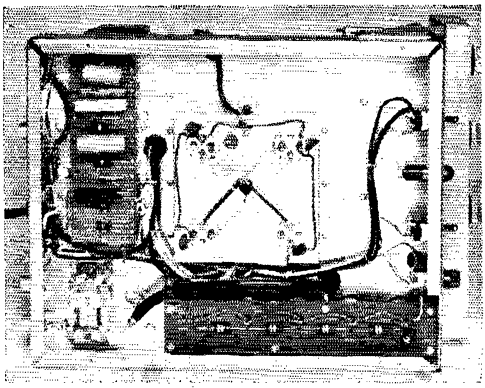
Other rear-apron connections include the r.f. input and output connectors (SO-239 type), receiver antenna (SO-239), line cord and bias terminal strip.

The GSB-201 is housed in a perforated light gray cabinet with black trimmings. All of the amplifier tuning controls and an indicating meter are mounted on a panel which projects out of the

[1] "Recent Equipment," *QST*, August, 1960, page 45.



With the GSB-201 cabinet removed, most of the major power-supply and amplifier components are visible. The large plate transformer and power-supply filter choke dominate the rear of the chassis; the filter capacitors run along the bottom side of the photograph. Silicon rectifiers, used in the high-voltage, full-wave bridge circuit, are mounted on the board that projects up from the chassis just to the left of the filter choke. The cooling fan for the four 811-A tubes is attached to a bracket which projects up and over several of the filter capacitors at the bottom of the photograph.



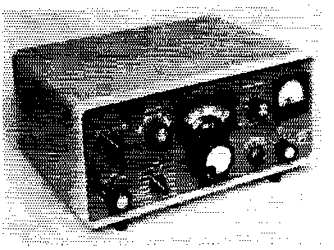
This bottom view of the GSB-201 shows the symmetrical layout of the four 811-A sockets. The component board at the upper left supports some of the bias and relay power-supply components. High-voltage power-supply bleeder resistors are mounted on the board at the bottom right of the photograph. The antenna change-over relay is visible at the lower left.

cabinet box. Below this, on another panel, are power, control, and meter switches. A red panel lamp lights when the power is turned on. The OPERATE/TUNE toggle switch connects a 100-watt resistor in series with the high-voltage supply when in the TUNE position.

The rotary meter switch selects either amplifier plate current (1000 ma. full scale) or relative r.f.-output meter indications. A semi-conductor diode samples r.f. from the amplifier through a small capacitor connected to the tank circuit. A potentiometer, which is part of the meter switch, controls the sensitivity of the meter when it is operating as an output indicator. — *E. L. C.*

Gonset GSB-201 Linear Amplifier
Height: 8½ inches.
Width: 12⅝ inches.
Depth: 17⅛ inches.
Weight: About 75 pounds.
Power requirements: 117 volts, 60 cycles, 2000 watts peak.
Price class: $100.
Manufacturer: Gonset Division, Young Spring & Wire Corp., Burbank, California.

Collins 75S-3 Receiver



You don't have to be an old-timer to remember when communication receivers were heavy, cumbersome devils that brought on a lot of "teeth-clenching" when they were moved from one place to another. That's why it's such a pleasant surprise to note that the new 75S-3 receiver weighs only 20 pounds!

The unit is the latest of a series of S-line receivers from the Collins Company and, since none of the line has been covered before in this column, a complete run down on the specifications will be given.

A few of the obvious differences from previous S-line models are the separate tunable b.f.o., the addition of a *Q* multiplier, and a superselective crystal filter. The receiver is capable of tuning any frequency in the range of 3.4 to 30.0 Mc., in 200-kc. increments. Although this range can't be covered without changing some crystals, the receiver can tune the 80-, 40-, 20-, and 15-meter bands, the 28.5- to 28.7-Mc. portion of the 10-meter band, and the 15-Mc. WWV frequency on a single set of crystals which is furnished.

The block diagram of the 75S-3 is shown in Fig. 1. A 6DC6 r.f. amplifier is followed by the triode section of a 6U8A, operating as a first mixer. Injection is supplied by the pentode section of the 6U8A in a crystal-controlled oscillator circuit. The r.f. amplifier grid, the first-mixer grid and the crystal-oscillator plate are all tuned by variable slug inductances which are mechanically ganged and linked to a panel PRESELECTOR tuning knob. The required tuning range for each circuit is obtained by switching in the proper

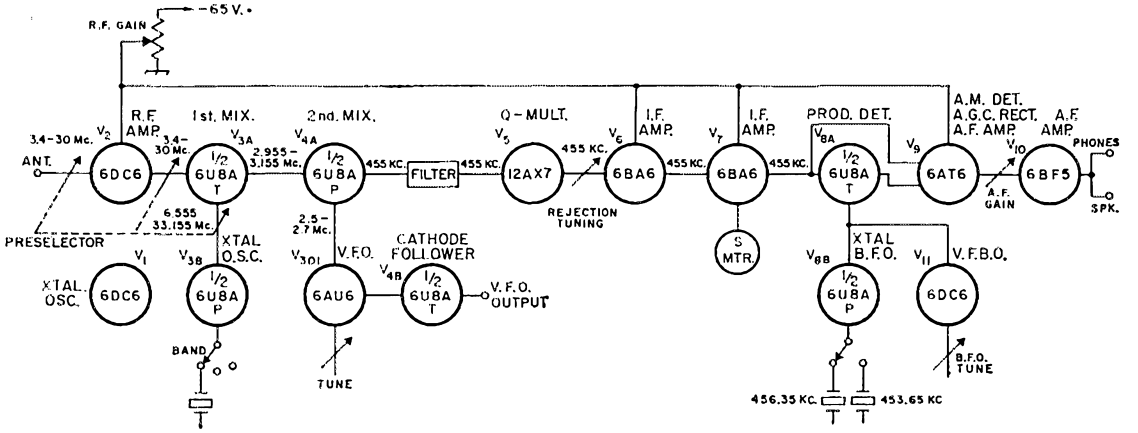


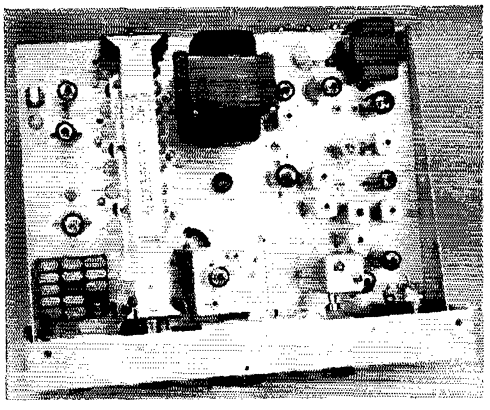
Fig. 1—Block diagram of the 75S-3.

values of fixed capacitance in parallel with a single slug-tuned coil. This tuning principle of covering a wide frequency range with a single inductance was first used in the Collins KWM-1, and later in the 75S-1 receiver. The same switch that chooses the appropriate capacitor (labeled BAND on the front panel) also switches in the proper crystal for the crystal oscillator, V_{3B}, which always operates 3.155 Mc. higher than the lower edge of the selected band. As mentioned earlier, the receiver coverage is in increments of 200 kc. for each BANDswitching setting. Any time a new 200-kc. band segment is switched in, the PRESELECTOR must be peaked up.

The receiver comes with a set of 12 crystals, although there are 14 bandswitch positions. Other crystals may be added or substituted for those furnished, to provide coverage on other than ham-band frequencies in the range of 3.4 to 30 Mc.

Output from the first mixer, V_{3A}, is in the frequency range of 2.955 to 3.155 Mc. It is coupled through a broad-band transformer to the grid of the second mixer, the pentode section of a 6U8A, V_{4A}. A 2.5- to 2.7-Mc. signal from the tunable v.f.o., V_{301}, heterodynes the desired signal to the second i.f. of 455 kc. in the second mixer, by way of cathode injection.

The v.f.o. is basically the same oscillator as those used in other Collins equipment, with fixed capacitance across a variable inductance to obtain the required tuning range. One interesting feature of the oscillator circuit in this receiver is shown in Fig. 2. The diode, CR_1, remotely switches capacitor C_1 in or out of the v.f.o. tuned circuit. When the capacitor is properly adjusted (at the factory), it will shift the v.f.o. frequency the correct amount when the panel EMISSION switch is moved from LSB (lower sideband) to



Looking down on top of the 75S-3 chassis. The large transformer at the top center of the photograph is the power transformer, and the small one at the top right is the power-supply filter choke. The supporting mechanism for the preselector slug-tuned coils, which are mechanically ganged and tuned with the PRESELECTOR tuning knob, runs the length of the chassis and is just to the left of the power transformer in this view. Crystals in the high-frequency oscillator plug into the crystal board at the bottom left corner of the photograph.

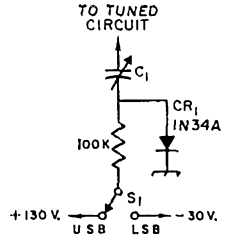


Fig. 2—The 1N34A diode switches C_1 in or out of the v.f.o. tuned circuit, depending on the polarity of the bias which is switched by S_1. In the USB position, the diode is not conducting and C_1 is in the tuned circuit.

USB, so that the calibrations on the v.f.o. dial will remain accurate without necessity for retuning. This remote electrical switching is accomplished by placing a bias voltage of the proper polarity on the diode. With +130 volts (USB) connected, the diode conducts and offers a low impedance path to ground for the capacitor, C_1. When −30 volts is applied (LSB), the diode is nonconducting and the capacitor is effectively out of the circuit.

The stability of the tunable v.f.o. is extraordinary. From a quick glance at the block diagram, you can see that no regulated voltage is provided. Even so, the over-all frequency stability of the receiver is rated at 100 cycles after warm-up. Just for fun, we connected a Variac between the 75S-3 and the 117-volt line. Using WWV to provide a beat note, we ran the line voltage from 95 to 125 volts. The beat note shifted only 100 cycles!

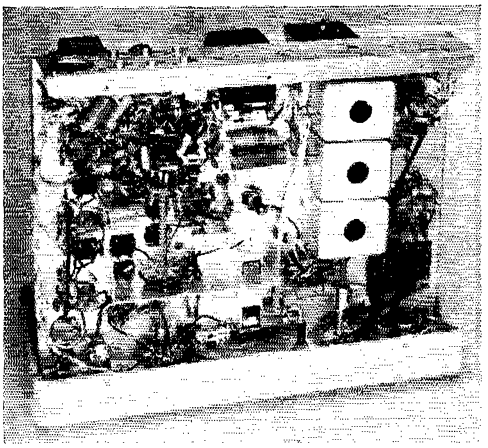
The dial accuracy of the 75S-3 is rated better than 1 kc. on any band after calibration. A note should be made here of the improved tuning knob on the receiver. In addition to the edge flutes, it contains a crater indent on the front of the knob for rapid finger cranking.

Output from the tunable v.f.o. is also coupled by way of a cathode follower, V_{4B}, to a jack on the chassis, for use when the receiver is operated as part of a transceiver combination.

Three reception modes are available in the 75S-3: s.s.b. (and RTTY), c.w., and a.m. The desired mode is controlled by a panel EMISSION switch with four positions: AM, LSB, USB, and CW. One section of the EMISSION switch connects the 455-kc. output from the second mixer, V_{4A}, to either one of two bandpass filters or to a 455-kc. tuned circuit. When in either of the sideband positions, a 2.1-kc. (at −6 db. points) mechanical filter is used. For c.w., a 250-cycle crystal filter is selected, and in the a.m. position two cascaded 455-kc. tuned circuits give 4.5-kc. selectivity. For someone accustomed to even 500-cycle selectivity, the 250-cycle filter in the c.w. position requires a little "getting used to." It has a "ring" that goes along with this kind of selectivity and which can become quite tiring after a long period of operating.

After the filters, the 455-kc. signal passes through a series-type Q multiplier,[1] V_5. The re-

[1] Recent Equipment, *QST*, April, 1955, page 42.



Bottom view of the 75S-3 with its cabinet removed. The three side-by-side cans contain the preselector slug-tuned coils.

jection notch, centered at 455 kc., can be moved through the passband of the i.f. by the REJECTION TUNING knob on the front panel. A switch that shorts out the *Q* multiplier in the OFF position is also part of this control.

Two stages of i.f. amplification, V_6 and V_7 are used in the 75S-3. The cathode of V_6 is returned to ground through a variable resistor for internal adjustment of over-all i.f. An S-meter circuit is also part of the i.f. amplifier stages.

(Continued on page 142)

Collins 75S-3 Receiver

Height: 6 9/16 inches.
Width: 11¾ inches.
Depth: 11½ inches.
Weight: 20 pounds.
Power requirements: 115 volts a.c., about 90 watts.
Price Class: $600.
Manufacturer: Collins Radio Company, Cedar Rapids, Iowa.

Strays

FEEDBACK

A note from KØIAX/9 says that 6025-kc. crystals were the ones that averaged 36.1 Mc. in his oscillator ("Six-Meter S.S.B., the Simple Way," January 1962 *QST*), not 6050-kc. units. This changes the suggested figure of 5975 kc. to 6009 kc. Crystals at 5975 wouldn't be out of the band, but would throw off the 14-Mc. calibration of the exciter. He also mentioned that reducing the 5763 grid resistor from 33K to 15K will make a slight improvement in the linearity.

—•••—

It has been called to our attention by WA6SYE that the 15K resistor in Fig. 13, page 55, December, 1961, *QST* should be 150K, in order to make the multiplier 25 times. Lew North, W4GEB, author of this popular article on transistor applications, confirms this. Lew also wants to add a caution concerning the statement in the article that changing from n.p.n. to p.n.p., or vice versa, is simply a matter of reversing battery voltage; this is true of the d.c. circuits, but if polarized electrolytics are in the circuit, their terminals will have to be reversed, too.

—•••—

In reporting the results of the September V.h.f. Party, December, 1961, *QST*, page 28, we credited K6DBZ/6 with having made the highest score of any western station. They were close, but the "best in the West" was turned in by W6GGV/6. With K6LLK and W6GGV as operators, W6GGV/6 worked 244 stations, amassing a section multiplier of 22, for 5632 points.

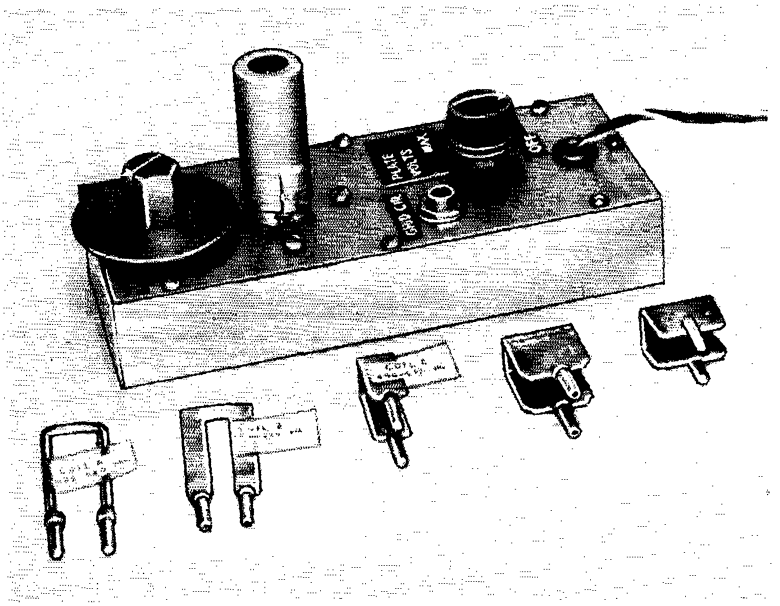
—•••—

For anyone who may wonder how to bend the copper grid line used in the 144-Mc. amplifier described by W9MOX (December, 1961, *QST*, page 46), the strip in its bent form, as shown at the lower left of Fig. 2, page 46, should be 1½ inches high at the left end and 2 inches high at the right end.

—•••—

The Jackson Brothers Ball Drive Dial described in the New Apparatus column in January *QST* is distributed by other companies in the United States besides Arrow Electronics (whose address of 65 Cortlandt Street was incorrectly shown as 64). The U. S. agent for all Jackson Brothers products is M. C. Swedgal Electronics, 258 Broadway, New York 7, N. Y.

The Arizona Semi-Centennial Certificate, pictured above, will be issued in celebration of Arizona's 50th year of statehood to any amateur working 35 Arizona stations during 1962. Use any mode on any band. Make up a list of your Arizona QSOs (giving date, time, location, and mode), have it certified by two other hams or a radio club officer (QSLs not necessary), and mail to the Arizona Amateur Radio Club, Box 7155, Phoenix 11, Arizona. No fee.



The completed grid-dip oscillator with "coils" in the foreground. *(Photo by W8JDV).*

A U.H.F. Grid-Dip Oscillator

BY WILLIAM L. SCHWESINGER,* W8TCO

THIS grid-dip oscillator was built to facilitate tuning a 420-Mc. transmitter and converter. The frequency range is 300 to 600 megacycles. The circuit does not seem to oscillate very well below 300 Mc. but would probably operate well above 600 Mc. if a sufficiently small coil could be made and still maintain enough coupling to the external circuit under test.

The circuit, shown in Fig. 1, is similar to the 420-Mc. converter oscillator circuit shown in ARRL *Handbooks* of some years ago, with the exception that shunt plate feed is used. Parallel feed has the advantage of keeping the plate voltage off the coil.

Coils

The coils of this g.d.o. plug into contacts soldered to the tuning capacitor. These contacts were salvaged from an old wafer-style four-prong tube socket. Each coil has pins soldered to it that were taken from a four-prong tube base. One large and one small pin were used in each case. This polarizes the coil so that it will be plugged in the same way every time and thus preserve the calibration. Five coils are used to cover the range of approximately 300 to 600 Mc. The table shows the coil dimensions and the frequency range covered with each.

*6023 Winnetka Drive, Cincinnati 36, Ohio.

The Capacitor

The split-stator tuning capacitor is a rebuilt surplus APC-type air trimmer (25-$\mu\mu$f. size or larger). The various steps in the alteration are shown in the sketch of Fig. 2. The stator unit was removed by unsoldering, and then both stator and rotor plates were removed with a pair of long-nose pliers. Two of the stator plates were trimmed as shown in Fig. 2B. These plates were

TABLE I

Coil Data

Coil	*Frequency Mc.*	*Description*
A	295–340	No. 10 bare copper wire, **U**-shaped, 1¾ inches long, ⅝ inch wide.
B	330–402	0.018 inch thick sheet copper, **U**-shaped, 1⅞ inches long, 1⅜ inch wide with window 1⅝ inches long, ¼ inch wide.
C	406–483	0.018 inch thick sheet copper, 1/16 inch wide, bent into **U**, 1 inch long, ½ inch across.
D	447–530	0.018 inch thick sheet copper, ⅞ inch wide, bent into **U**, 1 inch long, ½ inch across.
E	510–580	Two 0.032 inch thick sheet copper strips bent into **U**, ¾ inch long, ½ inch across. These strips are bent together so that they are in parallel. Strips are ⅛ inch wide.

then remounted by the remaining ear, using spacers and 4-36 machine screws in the stator-rod holes of the ceramic end plate as shown in Figs. 2C, D and E. Two pairs of rotor plates were then replaced on the shaft, the pairs being oriented, as shown in Figs. 2C and D, so that they meshed with the stators. Be sure that all plates are flat before mounting, tapping them lightly with a hammer if they have been bent during the removing process. Also, after mounting, make sure that there is no contact between rotor and stator plates over the full travel. The type that I used was for screwdriver adjustment, so it was necessary to solder on a section of ¼-inch shaft. The result is a very compact split-stator capacitor which is difficult to find ready-made. The butterfly type could be used, but its 90-degree rotation reduces the bandspread.

The capacitance of this rebuilt unit runs from 2 to 6 $\mu\mu$f., approximately, per section. This gives approximately 1 to 3 $\mu\mu$f. effective for tuning. A standard small-size 0-to-100 dial was used. The capacitor was mounted close enough to the edge of the panel to allow a little of the dial to hang over the edge to make tuning easier.

Assembly

The unit was built on an aluminum panel measuring 6¾ by 2¾ inches. This was then mounted on an aluminum case 1⅜ inches deep. The sheet stock is about 1/32 inch thick. A flange ¼ inch wide was made on the open end of the case, and the panel was fastened to it by means of six 6-32 screws. The coil protrudes from the bottom of the case through a 1¼-inch hole. The 6J6 tube with a standard shield was mounted on top of the panel, so that it is not enclosed inside the case. A ceramic 7-prong socket with a shield base was used.

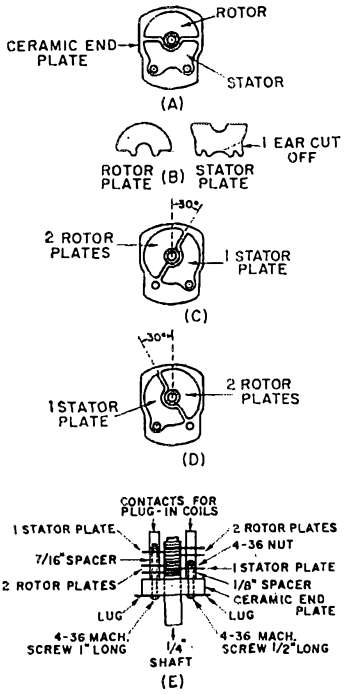


Fig. 2—Sketches showing modification of APC-type capacitor. A—Original capacitor. B—Alteration of stator plates. C and D—Mounting of the two new stators. E—Side view of revamped capacitor.

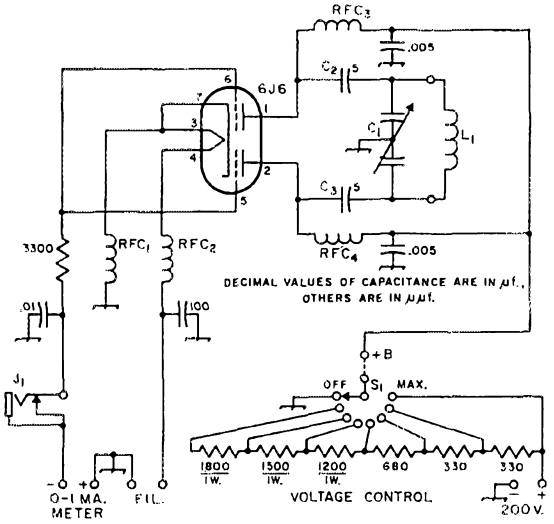
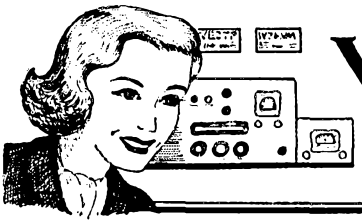


Fig. 1—Circuit of the u.h.f. grid-dip oscillator. Fixed capacitors not listed below are disk ceramic. Resistances are in ohms and resistors are ½ watt.

C_1—Dual variable, approx. 6 $\mu\mu$f. per section (see text).
C_2, C_3—Tubular ceramic.
J_1—Closed-circuit headphone jack.
L_1—See table.
RFC_1–RFC_4—10 turns No. 22 enameled wound on ¼-inch polystyrene form.
S_1—Single-pole 8- (or more) position rotary switch.

Operation

The meter and power supply are external to the unit. A 0-to-1-ma. meter is used and anything that will give 6.3-volt filament power to a 6J6 and about 200 volts at 50 ma. should be satisfactory. The plate-voltage control in this case was made up of a single-pole, 8-position rotary switch with 1-watt resistors connected as shown in the schematic. A wire-wound rheostat could be used here provided it will safely carry 50 ma. and has adequate resistance range. This rotary-switch system was used because it, with the resistors, was available in the junk box. When the switch is in the No. 1 or "off" position, plate voltage is off, and the unit can be used as a wavemeter. The sensitivity is rather low compared to that of a conventional wavemeter, as it is with most grid-dip meters used at lower frequencies. By plugging headphones into the jack, the unit will also serve as a calibrated monitor. A frequency calibration was made by the use of Lecher wires and checked against a calibrated wavemeter. A calibration chart was made for every 10 divisions on the 100-division dial, and the chart was fastened on the bottom of the case for easy reference. QST



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

AH YOUTH! — when it's coupled with ham radio and in the feminine gender, it can be especially wonderful. The pictures of KN7QNN and WN8AXM (see below) certainly speak for themselves, and we'll let the enthusiastic letters of the two young men who submitted the photos read for themselves.

From K7KBN, Las Vegas, Nevada:

"I, an OM, am writing you in regard to a girl friend of mine, KN7QNN. Her name is Kitt Carr, she is 16 years old and a junior at Las Vegas High School, where she is currently Secretary-Treasuress of the LVHSARC, K7HYP. She also plays first clarinet in the school Wildcat Band. Recently when I was visiting her, we sat down to a little session on Novice 40 meters. A CQ was called, and an XE2 answered. After a short QSO (en Español), a wild idea entered our minds — namely WAC. I didn't believe it, but in the space of 1½ hours a beautiful sheet in her brand new log was filled out. She made it — WAC on Novice 40! She worked XE2, HK7, UA3, JA1, ZS1, and for Oceania, a beaut — JZ0! This I think is quite an achievement!

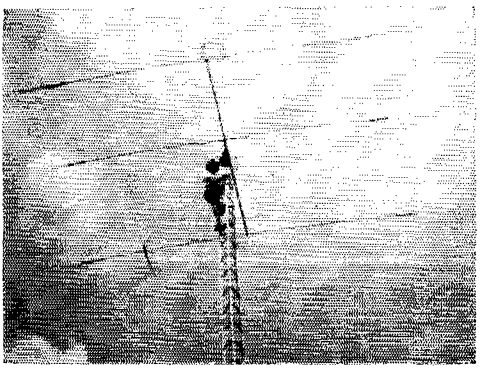
Kitt's rig consists of a Viking II, running 75 watts with the clamp run down, making it impossible to exceed 75 watts. This feeds a folded dipole on 40 only, and she receives with an SX110, aided by a QF-1.

I am enclosing a picture of Kitt. By this one can readily see the crying need for more activity on amateur TV. (Me, I'm lucky — I live near her!)"

* YL Editor, *QST*: Please send all news notes to W1QON's home address: 318 Fisher St., Walpole, Mass.

And from K8LNL, Cincinnati, Ohio:

"I have enclosed two pictures of a very unusual and wonderful girl. Her name is Charlyn Ann Hoppes, WN8AXM. She is my fiancee, and we will be married sometime in the near future.



I imagine the pictures speak for themselves, but for a little explanation, she is working on my antenna at the height of 60 feet. The whole thing started when I dared her to climb the tower, and to my surprise, she did. 'After the first time,' she tells everybody, 'it's easy'. Now she finds any little excuse to climb it. One night when the wind was blowing hard, I commented on the guy-wires, and before I knew it she had talked me into going up and checking them with her.

Charlyn is 19 years old. She works mostly 80 and 40 c.w. and plans to try her general exam soon. The first day she was on the air, she worked four South American countries and a number of states."

Ham radio gets more interesting all of the time, doesn't it?

ANNIVERSARY PARTY RESULTS

Winner of the Corcoran Award for the second time in the 22nd YLRL Anniversary Party, conducted Oct. 25 and 26 and Nov. 8 and 9, 1961, was Harriett Woehst, K5BJU, of Texas. Placing first in the phone section and second in the c.w. section of the contest, Harriett reaped the highest combined c.w. and phone score, with a total of 16,086 points.

Other high scorers were second place phone, Barbara Houston, K5YIB, and third place phone, Doris Anderson, K5BNQ. In the c.w. section Joyce Polley, KØIKL, won top honors and Lanola Putnam, W9MLE, placed third. Congratulations to all winners!

Onie Woodward, W1ZEN, Vice President of the YLRL, who tabulated the contest results, was gratified that so many participants followed the log-checking procedure suggestions (published in the Oct. '61 column), thus lightening the log-checking chore. Onie cautions, however, that a number of contestants still did not record on their logs the contest number *received* as well as given. Also, a common error in multipliers occurred when Maryland, Delaware, and the District of Columbia were considered as three multipliers instead of only one. Log forms and ARRL sections list are available for an SASE to the YLRL Vice President.

Gold cups have been awarded to highest phone and c.w. scorers K5BJU and KØIKL. The Corcoran Award, a handsome copper plaque donated by W8TPZ and her OM, will remain in K5BJU's possession for a second year. (It takes a three-time win to retain it.) Certificates have been issued to the second and third place top scorers and to the highest phone and c.w. scorers in each U. S. and VE district and DX country.

Top Anniversary Party scores are always close. Note just how close they are this year!

YL AP SCORES

Only the station and the total score is given below.

PHONE

W1RLQ.....7800
W1ZEN.....6370
K1IZT.....6095
W1YPH.....4436
K1EKO.....3978
K1LCI.....3780
K1IIF.....3325
K1OLM.....1152
K1NST..... 756
K1OGU..... 44
K1NZK..... 44
K1IJV..... 44

K2JYZ.....6815
K2ETC.....5336
WA2GPT.....4350
W2OWL.....2663
W2EBW..... 531
K2FBM (W4HWR)..... 396
W3MDJ.....3488

K3HZY.....2584

K4DNL.....6613
K4RNS.....4004
W4WPD.....3420
W4UF..... 920
W4VIM..... 650

K5BJU.....12,980
K5YIB.....12,825
K5BNQ.....12,600
K5SBN.....9281
K5OPT.....9234
W5DVV.....8100
K5FXX.....7430
K5TXQ.....5906
W5JCY.....5700
K5SGJ.....4455
K5YQG.....4323
W5WXT.....3063
K5MIZ.....1953
K5IHF.....1519

K5IMD..... 510
K5YTT..... 408
W5RZJ..... 146

K6OAI.....7696
W6JZA.....7050
K6KCI.....7063
W6YZV.....2698
WA6AOE.....2596
WA6KLP.....2380
W6UHA.....1664
K6VFE.....1176
K6UHI.....1014
W6DXI..... 839
K6JCL..... 585
K6QPG..... 83

K7MIRX.....5794
W7TGG.....4200
K7CHA.....3827
W7HHH.....3420
K7ADI.....1921

W7GGV.....1575
W7OUE.....1150
K7KSF.....1000
W7DIF..... 160
W7GXI..... 56

K8ITF.....3570
W8HWX.....3259
W8WUT.....2475
K8LHF.....2175
K8MQB.....1531
W8OTK.....1250
W8ATB.....1224
K8ONV..... 903

K9JDE.....4339
K9ILK.....3610
K9CQF.....3461
K9QGR.....2190
K9UJT.....2131
K9AXS.....1938

W9AXV..... 698

KØIKL.....9585
KØHEU.....7105
K5OPS/Ø.....6624
WØRAW.....4095
KØGIC.....3106
WØVTX.....2701
WØZWL.....2210
KØLQS.....1121
KØKLQ..... 700
KØUOK..... 425

CT1YE.....1000
DL6VM..... 124
KP4CL.....3913
KZ5EJ.....4193
OA4GR..... 910
OA4HK..... 138
OH5SM..... 20
YV4DU.....4278
ZE1JE..... 45

C.W.

K1NST.....1716
W1YPH.....1406
K1LCI..... 720
W1RLQ..... 608
K1IJV..... 113

K2UKQ.....3080
K2JYZ.....1680
W2EBW..... 248

W3TSC.....1188
K3HZY..... 594

W3MDJ..... 563

W4UF..... 908
K4RHU..... 425
K4LMB..... 244

K5BJU.....3106
K5TXQ.....2700
K5BNQ.....2406
K5YIB.....2351
K5LIU.....1994
K5OPT..... 176

K5OKR..... 20

K6OWQ.....2054
WA6AOE.....1156
W6PCA.....1040
K6QPG..... 531
W6DXI..... 420
K6VFE..... 272

W7OUE.....1006
K7RAM..... 368

K8ONV.....1792
W8WUT.....1260
K8MQB.....1188
W8HWX..... 960
W8LHF.....8009
W8OTK..... 510
W8NAL..... 489
K8HKU..... 315
K8ITF..... 193

W9MLE.....2775

W9UJT..... 45

KØIKL.....3238
KØGIC.....1950

OH5RZ..... 20
OH2YL..... 1
VE6ABV.....1344
VE6YW..... 125
VE7ADR.....1094

COMBINED SCORES

W1RLQ.....8408
W1YPH.....5843
K1LCI.....4500
K1NST.....2558
K1IJV..... 156

K2JYZ.....8495

W2EBW..... 775

W3MDJ.....4089
K3HZY.....3178

W4UF.....1828

K5BJU.....*16,086

K5YIB.....15,176
K5BNQ.....15,006
K5OPT.....9234
K5TXQ.....8606

K6VFE.....1448
*W6DXI.....1259

W7OUE.....2156

W8HWX.....4249
K8ITF.....3763
W8WUT.....3735
K8LHF.....2975
K8MQB.....2719

W8OTK.....1781

K9UJT.....2176

KØIKL.....12,823
KØGIC.....5056

* Corcoran Award Winner

COMING EVENTS

YL-OM Contest — The thirteenth annual, conducted by the YLRL. Feb. 24 and March 10. See complete rules page 144.

Annual California YL Get-Together — March 30, 31, and April 1, 1962 at the Whitcomb Hotel, San Francisco. Room reservations to be handled by the hotel. Registration from 3:00 P.M. Friday, March 30. Sat. March 31, luncheon and banquet at the hotel. Prizes and special program for OMs. Esther Given, W6BDE, is Program Chairman. Send $2.00 for pre-registration to Rose Buckley, 901 Grafton Ave., San Francisco 12, Calif. Luncheon $3.50; banquet $4.50. BAYLARC is hostess club, Eleanore Sloper, WA6JGR, President.

12th Midwest YL Convention — May 18-19, Flint, Michigan. Esther Stuewe, W8ATB, G-4098 E. Atherton Rd., Flint, Michigan, Chairman. Registration $2.00 in advance to W8ATB.

Ladies Day — The second Monday of each month is reserved for just plain YL ragchewing on all the bands. Let the laundry go in favor of a fun day of YL QSOing.

YLRL Appointments

YLRL President W1ZEN announces the following appointments for the 1962 term:

(*Continued on page 144*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Why?

K4XYZ (big signal but awful fist): VQ7AA VQ7AA VQ7AA VQ7AA DE K4XYZ K4XYZ AR

VQ7AA: K4XYZ DE VQ7AA RST 479 BUT I JUST WORKED YOU K

K4XYZ (sending worse than ever): YES OM THIS IS FOR MY LEFT HANDED DXCC PSE QSL . . .

We were auditing a prodigious pile-up on HV1CN a few weeks ago — Vatican op W9IOP was in top form — and a fellow observer in the shack burst out, "But *why?*"

"Why what?" we inquired.

"That W6 and those two K5s — they were calling Larry three hours ago and haven't raised him yet. Why do they hang on?"

He was no true DX man, obviously, but it was a reasonable question. What's with this current obsession for the numbers game and weird wall paper? 'Twas not always thus, this rage for such specialized operational conquest. Hams once took their DX in cool stride or left it alone, and a rare prefix on 14 Mc. caused excitement in very limited circles.

We kicked the subject around while the pile-up screamed on like a berserk Russian jammer. HV1CN kept peeling them off, but new worshippers arrived to swell the throng. The W6 and those K5s gave it all they had on the high fringe, the low fringe, and in the middle. No luck. But they hung on.

The philosopher among us declared this business to be an inevitable phase in amateur radio's development. He pointed out that OM Veblen predicted and defined it at the turn of the century when all radiops were amateurs. Could be — the introductory to *The Theory of the Leisure Class* goes, in part, like this:

> When the community passes from peaceable savagery to a predatory phase of life, the conditions of emulation change. The opportunity and the incentive to emulation increase greatly in scope and urgency. The activity of the men more and more takes on the character of exploit; and an invidious comparison of one hunter or warrior with another grows continually easier and more habitual. Tangible evidence of prowess — trophies — find a place in men's habits of thought as an essential feature of the paraphernalia of life. Booty, trophies of the chase or of the raid, come to be prized as evidence of preëminent force. Aggression becomes the accredited form of action, and booty serves as *prima facie* evidence of successful aggression. As accepted at this cultural stage, the accredited, worthy form of self-assertion is *contest* . . .

Perhaps in the past decade or so we hams have emerged from some sort of peaceable savagery (rag-chewing and rig-building) to reach a predatory phase. In earlier days it was quite a feat to get a decent-sounding signal on the air and keep it there, much less to work the world at will. Relieved of most of the necessity for devising and troubleshooting equipment, hamdom now finds itself a kind of leisure class. We have more time for operating, and we're on the air with a vengeance!

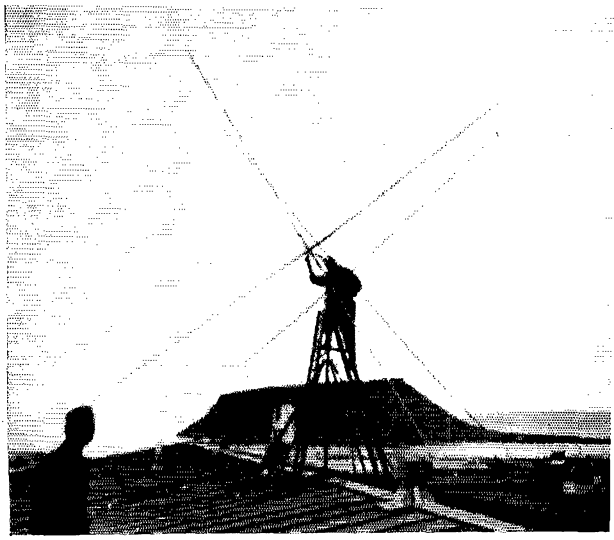
The 1962 ARRL DX Competition, for instance — miss it and you'll not only miss DX. You'll lack a conversation piece for months to come.

What:

Our ham-band DX conditions are quite goofy enough these days, but have you checked the 550-kc.-and-up BC band lately? Carefully chosen frequency assignments that kept interference at a minimum during "normal" propagation years no longer necessarily enjoy peaceful service-area isolation. WMAL on 630 kc., for example, has been urging listeners to supply detailed reports on severe Spanish-speaking QRM bouncing right into its own D.C. back yard. Similar harrassment is encountered by other Stateside BC-band broadcasters, according to the Newark News Radio Club — looks like a great DX day dawning for 160! And it's beginning to look like high noon on good old

40 c.w. if we may judge from DX commentaries mailed in by K1s JFF KSH SGV, K2MRB, WA2s HLH KWB LDC, W3WPG, K3CNN, K4s SQS WVT, K5s ALU JBW TER/6, W6RCV, K6MQG, WA6IVM, W7s DJU LZF POU, W9NN (164 countries confirmed on 7 Mc.), K9s LIO QMJ, WN9AEO, WØEEE, KØJPL (33/17 on 40), KH6DVG, VE3PV and 5N2JKO. Loads of goodies available — **CE1AD**, **CM8RM** (7022 kc.) at 0300 GMT, **CP5s** AA SX, **CR7CI**, **CXs** 1FB 1RY 2CO, **DU7SV**, **EP2BB** (25) 0-1, **FA8RJ** (3) 7, **HC1s** DC AGI, **HH2LD**, **HK0QQ** (10) of San Andre, **HP1s** IE LE LM (20), **HV1CN**, **JAs** 1BTH 1BZQ 1CC 1DDH 1FDF 1GIV 1HZN 1NI 1VX 1YL 2AW 2FG 3AQN 3BQH 4UE 4YZ 5ADR 5MZ 6BJW 7AAV 7AKC 8AEP 8AJS 8AHL 8FC 8LN 9FB 9NA/1 ØPF, **JT1KAB**, K4JQV/**VP9**, **KA2KS**, **KG1s** AA FD, **KR6s** LJ NW, **KV4CI**, **KW6DG**, **KX6s** AJ BU DE, many KZ5s, **LU1ZL** 5, **LZs** 1KNB 1KSV 1KSZ 2KBA 2KRS, **PJ2AE**, **SP7IIX**, **TI2s** LA WR, **UA0s** LH LJ KDA KFG KJA KZA KZB, **UB5s** KAB KAG KSR, **UF6AP**, **UL7LE**, **UM8KAC**, VE8s DM RX, **VKs** 2GW 3ADB 5JE 7SM, **VPs** 2DQ 2SH 5BL 1, 5ML 7DP 7NQ 8AI 8EG 8GQ 9BO 9QQ (150), **VR2DK**, **VS9AAC**, **WH6DUX** (155) 1,

*7862-B West Lawrence Ave., Chicago 31, Ill.



KG1BX of Thule can be readily worked on 7204, 14,275 and 21,430 kc. between 2200 and 0400 GMT. A 40-meter doublet supplements that quad. K3LYO is shown operating; at right W9EHR makes antenna repairs with Mount Dundas in the background.

XE2MM, YN1s CAA OC (5) 5, abundant YVs, **ZB2AD, ZLs** 1NG 2PM 3JQ 3OR 4NA, curious ZM1BL, **ZSs** 1A 1AG 6KO 6NE (4) 4, **4X4**DH, **5A1**TB, **5N2**LKZ, **7G1**A 3 and **9M2**FK . _ . _ . _ K5ALU cracks **40-phone** obstacles for stuff like **VPs** 2DA 3MC 4TR 6KL, **KP4**AEB and **KZ5**SW's sideband.

80 c.w. won't be far behind if 7 Mc. is *'way* out. WA2LDC, K4WVT, K5JVF, WA6IVM, W7s DJU JC and W9CTF palaver with **CT1s** NT SX, **EI9J, EL4A, GI3ATH, GW3NAM, JAs** 1EZM 1GIV (14) 10-11, 1HTY 2SL 2WB 3CAF 4GD 6AK 7KX 8LN (5) 7, **KH6IJ, KP4s** BDS TIN, **KV4CI, VKs** 6SM **9GP, XEs** 1AX 2UA and a New Zealand contingent led by **ZL2ANT** . _ . _ . _ **KZ5SW** reports much single-sideband fun on **75** — plenty of W/Ks and a big sig from VE3HF.

20 c.w.'s daylight DX prosperity is appreciated by W1CKA, K1s JFF (96/87 countries worked/confirmed), K1SGV, W2s JBL WMG, K2UYG, WA2s LDC KWB, K3s CNN MNJ, K4s DWU (63/41), WVT, K5s ALU (116/75), TER/6 (54), W6RCV, K6MQG, WA6ORS, W7s DJU LZF POU (87/73), K9LIO, W0s BEB EEE, KØs BHM JPL (124/110), RNK UJI VSH, I1ER, KH6DVG, ZS2U and 5N2JKO (190/160) whose dandy DX income includes **CE9AS** (35) 2, **CO7AI, CRs 7IZ** (37) 18, kaput **8AC** (105) 23, **CTs 2AI 3AB** (60), **DMs** 2BCN (30) 22, 3DN/XPN, **DUs** 1OR 7SV, **EA8CI** (50) 21, **EL4A, EP2BB** (20) 22, **FG7XI, FO8s** AC (55) 4, AG AQ, **HCs** 1AGI 1LE (20) 21, 2CS, **HK1AAF** (50) 22, **HMs** 1AJ 4AQ (80) 22, **HP1s** IE (10) 23, LO, **HRs** 2FG 0, ØAD, **HV1CN** (27) 21, **HZ1AB, IS1FIC, JAs** 1CG 1VX 2MJ 5FQ ØAQ ØUH, **JT1KAA** 9, K4JQV/**VP9, KA2s** JL 0, KS 23, MA, **KCs** 4USV (40), **6BD** (50) 1-9, **KGs 1AA 1BB** IBO (30) 21, 1FD 1GD **4AO 6AJS, KH6EDY, KR6s** AD (50) 20, GP LD MD NG (55) 19, **KV4s** AA (81) 23, AP CK, **KW6s** DG DU, **KX6s** AD AJ BU (25) 3, **LU1ZL, LX1AS, LZs** 1AM 1KSZ 2KUD (40) 22, **MP4s BCP QAQ** (53), **OA8D** (20), **OX3UD** (84) 16, **PJs** 2AE (35) 19, 2ME (22) 19, 3AD, **SV0s** WC (70) 21, WI (5) 21, WR 21, **TF3AB** (52) 19, **TI2s** DL PZ, **TN8s** AG 9, AT 6, AX 17, **TT8s** AA (55) 16, AG 17, **TU2AL** (58) 7-21, **UA1KAE** (40) of Russia's antarctic outpost, **UAØs** AZ (50) 16, EK FR KFG KFM KJA KZB, **UB5KAG, UC2s** AA CS (75), KAA (50) 15, **UF6KAF, UL7s** FA (30) 21, KAA (42) 12, **UM8KAA, UN1AE, UP2KAF, UQ2AJ** (100), **UR2s** AO (37) 15, BV, **UT5BX** (40), **UWs** 3ME **ØFC**, VEs 8BC 8JJ 8RX ØMC, VO1s AW (70), EW (35) 22, **VKs** 1AAF of Canberra, **9GP ØJB**, VPs 2VB/mm **5BF** (40) 0, **5BL** (10) 12, **5MJ 6CG 6PJ** (40) 13, **6RG 0, 7BP** (1) 0, **7NP** 8FD **8GQ** (105), 9EP, **VQs 2AA** 14, **2W** (40) 13, 3HZ **4IN** (58) 19, **4RF** (80) 19, **5IG** 14, **8BL** (40) 14, **VRs 1B 1J 2DC 2DK 3L 4CV, VSs** 4RS 14, **9AAC** 6, **9AGV 9ARW, VU2s** AJ 3, KU, **XEs** 1PJ 2FJ 2KH, XT2A, **YO3KBJ, YS1s** JM (45) 0, O (60) 0, **ZBs** 1FA (12) 16, **2AD** (3), **ZC4s** PC TX, **ZD1S** (70) 23, **ZEs** 1AO (5), 4JS (71) 19, 8JJ, **ZK1AR** (20) 4, **ZP5OG, ZSs 2MI 3AZ** (80) 19, **7M** (55) 19, **4X4s** FA 15, HC JU, **5As** 1TW (4) 17, 4TC, **5N2s** CPH JKO 22, LKZ (25) 20, RDG (45) 22, RDL, **5U7AC, 6W8s** BQ (72) 22, DD DE 23, **7G1A** (25-50) 22, **9G1s** DE 23, DT (20) 22 and **9Q5AAA.**

20 phone, s.s.b. headquarters de luxe and DX, has K1SGV, K2TDI, W4s LJV NJF, K5ALU and VE3PV conferring with **EL5E** (330) 22, **EP2AP** (345) 50, **FY7YI** (303) 12, **HK1QQ** (290) 12, **MP4BBW** (337) 13-14, **OK3KAB** (280) 12, **PJ2MC** (333) 12, **TF2WFH** (308) 13, **TG9TA, TY2AA** (380) 21 who may do it again, **UI8AG** (305) 13, VE3BQL/**SU, VPs 3YG** (304) 13, **5BL** (338) 23, **9EW, VQ2AP** (306) 22, **VS9AAC** (316) 18, **XZ2s** AD SY (300) 13, **YV1EE** and **9G1BF** (310) 0. With the 1962 ARRL DX Test's phone week ends at hand it's doubly important that you digest the editorial on page 9, July 1961 *QST*, concerning 14-Mc. mikework.

15 phone activity, well supported by the ex-28-Mc. crew, sees W2WMG, K2s MRB TDI YFE, WA2s KWB QMJ, K3MNJ, W4s LJV NJF, K4s DWU IKV KSY, K5ALU, K6MQG, WA6s IVM ORS, WØEEE, KØBHM, KH6DVG and 5N2JKO fraternizing with **CN8s** AG IK* MT MZ, **CR7s** CK IT 19, **CT2AI,** EL4YL, **FG7XL** (196) 17, **GD3UB, HC4CD, HH2s P*** (400) 22, Y, **HK6IV, HPs** IBA 2RL, **HR2PG** (200) 20, **JAs** 1HIX 2BPH 3BAT 4UE 5MU 6CY 7XV 8AG 9UU all between (200-250) and 22-1, **KG4AI,** KH6ECO/**KJ6***, **KR6s** LY (200) 2, NG (250) 0, NW (220) 13, OC (248) 0, OH (200) 3, **KW6s** DF* DG*, **KZ5s** EZ (200), SS (375), TD, **LX1DC, OA4IW, OD5CU, PZ1s** CF CG (234) 18, SL6BA of Sweden, **TG5HC, TI2s** JR OA PT, **TY2AA** (249) 17, VEs 3BQL/**SU** 8YG (240) 14, **VPs 2LA 2LS 2SY 3FM** (277) 21, **5AH** (240) 20, **5BB** (259) 21, **5LR, VQs 2AB*** (412) 18, **2AT*** 19, **2JK 2MS 2TM** 18, **4DT 4IL** (270), WA6KMD/**KW6*** (400) 19, XEs 1CCC 1CCK 1EW 2FW (230) 19, 2R, **XW8AL** (230) 16-17, **YN1s** FB FF, **ZB1HC, ZE2JA, ZS3X, 4X4FF, 5As** 1TW 3CAD 3TY, **5R8AO, 6W8BL, 9G1GN*** (331) 14 and **9U5DS**, the asterisks denoting s.s.b. endeavor.

15 Novice DX possibilities are exploited by WN4CMW ane WV6SBO (56/39!) in the flavorful form of **CEs** 1EK 3BQ, **CX1FB, DLs** 5HI 6EN **ØIB, DU7SV, EA3III, Fs** 3DT 3LD 8VN, **Gs** 2IO 3CM 3MEA 3NSY 3ZC, **GM3NIO, JAs** 1ACA 1BYU 1CIB 1CPZ 1CRT 1CZD 1DOD 1DRB 1DTP 1EFE 1EVC 1FHF 1ISA 1ISB 1YL 2AIT 2AYX 4DZ 6KZ 8AAC 8ABB 8ADQ 8AFK 8AFU 8AIF ØAET, **KA2KS, KB6BS, KR6s** LD LY NG USN, **KW6DG, LZ1ZH, LUs** 1DEN 1JV 8NA, PI1VKL, SM6CWP, **SP9KDU, UAØGF,** VK5NQ, **VP8EE** of Grahamland, **WH6s** ECO ELW, **WL7EAO, WP4s** AYI BDG BDM, **XE1VB,** YN1CAA, YV5APX, **YS1O, ZL2s** GS JA and RC. Most of these fell prey to WV6SBO who scored his 100th JA QSO recently but, strange enough, still needs Africa for his WAC.

15 c.w. developments among the five-year men are such that K1SGV, W2WMG, K2YFE, WA2s, KWB LDC MJF, K3s ILC (72/44), MNJ, K5ALU, W6s RCV SFM, K6MQG, WA6s IVM ORS, W7POU, K8OKM, K9LIO, WØs BEB EEE, KØs BHM JPL RNK VSH, KH6DVH, I1ER, VE3PV and ZS2U associate with **CEs** 1AD 4EC, **CN8EU** 17, **CO5RV, CRs 5SP** 16, 7IZ (30) 17, **CX2s** BT CO, **DM2BCH, EA6AM** 16, **ELs** 1C 4A 5A 18, **EP2BB** 6, F2BA/mm (160), **FR7ZD, GD3UB** 16, **HA1KSA, HC1AGI, HK7s** YB ZT, IT1AGA (50) 15-16, **JAs** 1BZS 1CIB (70) 0, 1DFN 1DOD 1DZC 1EM 1EUV 1YL 2AEY (70) 0, 2AYX 3AVD (40) 0, 3IW 6PY (67) 0, 7AD 7KY 7RH 8AAA 9TS (37) 0, ØUU, **KGs** 1FD 1FG **4BN, KM6CB, KRs 6DI 6KS 6LJ 6LY 8AB** 17, **KW6DG** (40), **KX6BU** (10) 23, **LZ1KSV, MP4BDH** 16, **OA4s** AA JH, **PJ2AE, PZ1s** BH BW, SL5AS, **SV0s** WI 7, WT WZ 9, **TI2WA, TU2AL** 7, **UAs 9MC 0GF, UB5KBB, UO5AA** 6, **UP2s** KBC KNP NS 15, **UQ2AS,** VE8s MD RX, **VPs 4TR** (60) 16, **5BH 7BP 8AI, VQs 2JC** 16, **2MS 2W** 19, **2WR** 20, **3BK** 18, **4RF 5IG** 19, **8BC** (20) 17, **VS9MB** 13 of the Maldives, **XE1s**

AX 17, CCC IX JP OK, **YS**1O, **YV**5HL, **ZBs** 1HC 8, 2A (20) 17, **ZC4**IP, **ZEs** 3JJ 5JF (50) 19–20, 7JV, **ZK1**AR, **ZP**9AY, **5N2s** JKO 17, LKZ, **6O1**MT, **6W8**DD (30) 18, **7G1**A 12, **9G1**DT 11, **9Q5s** AAA 19, EJ 13, PW and **9U5**DS (50) 20.

10 phone is productive for the day shift's patient beam-turners. K2YFE, WA2MJF, W4LJV, K4DWU, K5ALU, WA6IVM, K8s OKM PSV and KØRNK run up their gains for **CR6**BY (490) 18, **HC1**AM, **HKs** 3LX 4EB, **HR**2HA, one **JT1**AX, **KZ5**HR, LUs 1DAB 7DDC, **OA**8T, **PJ**3AD, **TI2s** SW PT WA, **VK2**FU, VO2WW, **VP5**LG (410) 19, **XEs** 1CCP 2TF, **YN**9DL, **YVs** 1DG 5HZ (500) 16, **ZE2**JA, **ZLs** 1FS (320) 0, 2FY, **ZSs** 3HT and 9G.

10 c.w. diehards K2YFE, WA2MJF, K3ILC, K5ALU, WA6IVM, K9LIO and KØBHM still conjure up **CX**s 1FB (80) 21, 2CO (100) 19, 9AJ (80) 21, **DL7**BK, **Gs** 3LHJ 6OX, **HC1**AGI, **KH6s** DMW (50) 20, IJ (80), WW (50) 21, **KW6**DG (50) 21, **KZ5**DF, **VP5**GT (80) 17, **YN1s** AA EM and **ZD6**RM but the band is getting harder to find.

160 c.w.'s transatlantic QSOs were growing almost routine at deadline time — 1.8 Mc. is cementing its position as just another darned good DX band. But, as W1BB says, the variant technique involved on 160 is attractive enough to interest DXers who seek the unusual. W1PPN glommed **G3s** ERN LIQ MBN OIT OQT PU, G5s JU RI, G6BQ and **GD3**UB in mid-December. Neighbor K1KSH clicked with Gs 3CHN 5RI and **WØJEH/VP9**, successfully switching to phone with the G3 and the Bermudan. **KH6**DVG gets transpacific kicks with W6HRG, and says that **KH6s** DVD EGL and VF are also game for the same. KP4AXU, lacking transmitting privileges on 160, nevertheless reports reception of large signals from the western U. S. A. gang. Remember that the Transatlantic and World-Wide DX Tests dates for this month, as announced by W1BB, are the 4th and 18th. Happy huntin'!

Where:

Oceania — "Prior to my transfer from Midway I endeavored to see that all c.w. contacts with KH6ECD, Kure, were verified," writes WØFPL, ex-KM6BQ. "Additional requests have been forwarded to me here in Denver. I am in possession of KH6ECD c.w. logs and will respond to future inquiries. No doubt some stations have been overlooked, and I should like to have this obligation of our DXpedition fulfilled." . . . . A consignment of valuable VKØVK logs bound for QSL manager W1AGS narrowly escaped destruction by fire in an air crash at Wilkes Base last November. "The envelope was all but obliterated," states Mac, "but his complete W/K/VE logs are intact. Cards are going out as fast as possible. Say, it's heartening to note that for the past six months almost all cards received bear time in GMT. The boys are having trouble with dates, however. As soon as December's *QST* came out I started getting mail at my new Connecticut QTH regarding VKØVK confirmations. I've sent out over a thousand cards so far, but 49 requests failed to include self-addressed stamped envelopes." . . . . "Henry Worthington, JZØHW, is authorizing me to act as his QSL manager," notifies W6DLN. "It will be necessary for those who desire cards from him to forward me s.a.s.e." . . . . WGDXC understands that WA6HOH's KJ6BV logs include no QSOs prior to 1961.

Asia — FEARL QSL chief KA2CM finds more cards coming through as conditions decline, a paradox that might be explained by (1) fewer DX openings that leave more time for catch-up bookkeeping these days; and (2) the tougher DX is to work, the more thorough the pursuit of QSLs. Curt still has unclaimed cards on hand for KAs 2KC 2KW 2OV 2RB 2RR 5MC 7SN 8AB 8CS 8DD 8JR 9CG and 9MF, plus undeliverable confirmations for an ungood KA2DL . . . . . W9NN learns from RSGB that the 1956–'57 YT2OT is considered spurious . . . . . "JA9UU worked about 200 U. S. phones in recent 21-Mc. openings," learns WA6IVM. "All QSLs went out in one batch in November." . . . . West Gulf DX Club "Where" liftings: Over 200 VKØFZ cards have gone forward thanks to W5WW but a hundred or so stations as yet haven't bothered to claim theirs by filing QSLs with self-addressed stamped envelopes. . . . S.a.s.e. bearing a Swiss stamp got W1UOP his JY2NZK confirmation from HB9PL. . . . XZ2SY's QSLs are oversized, so QSL manager W4ANE will settle for postage in lieu of s.a.s.e. — W/K/VEs only. Cal's log reference begins September 28, 1961. QSLs for earlier XZ2SY QSOs should be withheld until further notice. . . . AC5PN claims that QSL aide W8PQQ is armed with log transcripts for contacts through November 18, 1961.

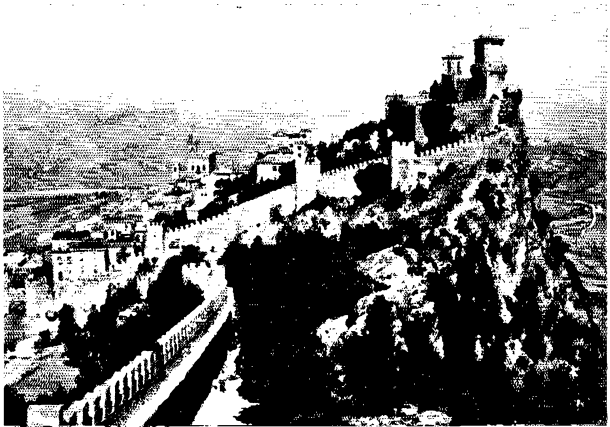
Africa — W8KX believes that a letter in French might pry a card from TU8AF. Walt's was "No. 14." W8KX also inquires of the whereabouts of ex-ET2KY operator Bob Kelly in behalf of friend JA6PA . . . . . Via KV4AA, leading V.I. DXcavator: ZS5AL is wondering what happened to the sixty QSLs he sent out for his Natal DX QSOs as ZS4AK. *No* returns. Joe is returning to Kimberley and ZS4AK (address to follow) and welcomes any inquiries concerning pasteboards for past ZS4AK and ZS5AL activity . . . . . WGDXC points out that International Reply Coupons are not valid on Ascension isle, also that this QTH is an expeditious route to ZD8JP: J. Packer, Ascension Auxiliary Air Force Co., via Patrick AFB, Florida.

Europe — From SVØWI: "I'm getting a number of inquiries as to where to QSL for my Rhodes DXpedition of Nov. 19th-25th. It's still the same 'USASG, APO 223' or via ISWL. My wife handles all the cards, answering every valid one received. If s.a.s.e. or IRC is not included, reply goes via ISWL for distribution. I'm surprised at K5CDA/mm's QSL-returns statistics in November's 'How's'. After 5000 contacts from Athens I find 40-per-cent U. S. A. returns, 10- to 20-per-cent Russian replies, and a 60-per-cent response from the rest of Europe — 179 countries worked, 147 confirmed. Cards improperly addressed to SVØ stations usually end up at the MARS station, SVØWS, where SVØWN does a nice job of sorting and forwarding. Use of Box 564 for SVØs may result in delay, for there is no set procedure for collecting and distributing these cards. Americans at present are allowed use of the call series SVØWA-SVØWZ. There's a waiting list, of course, and when a vacancy shows up the suffix is immediately given to the next person in line. For this reason many of us receive cards for contacts made by previous holders of our calls. We try to get these QSLs to the proper persons but we meet with scant success unless forwarding addresses are available."

South America — W8XX reminds us that neophyte DX enthusiasts sometimes pass up LUs with "Z" suffixes as just more Argentinians. And even after receiving QSLs from them it may not be realized that, for example, Islas Orcadas means South Orkneys . . . . . W4NJF takes over PY2ON's QSL worries for QSOs dating after November, 1961 . . . . . W4CKB of Florida DX Club's *DX Report* may be of assistance toward QSLs from HKs 1QQ and/or 9QQ.

Hereabouts — W4NJF, WA6ORS, VE7BBB and ZS2U nominate as our "QSLers of the Month" HC4CD, KH6EDY, VK7SM and 9G1DP. FB, OMs! And W8KX moves for a larger vote of thanks to all DXdom's hardworking QSL managers, particularly ARRL's QSL Managers, especially those agents who bear up so gracefully under misplaced criticism when tardy or lost log transcripts put them on the spot . . . . . Kenneth Kopp, W5TKI/4, 7415 41st Ave. N., St. Petersburg 9, Fla., offers his services

Like scenery from some Disney fairyland, picturesque San Marino beckons to DXpeditionary devotees. HB9EO decided that his periodic Liechtenstein trips were becoming too commonplace, so he packed up his Valiant, HQ-180 and multiband skywire to sign M1/HB1EO for ten days last November. Ralph is a stickler for dependable QSLing, by the way, and observes that too many recent DXpeditionary performances have been long on operating but short on bookkeeping. (Photos via W1s TS VG)



as QSL aide for deserving DX stations. He'll become a full-fledged Four shortly . . . . . Re the "Stray" on page 53, October 1961 *QST*, K9VRV/4 desires to hear from more W/Ks who have old ARRL *Handbooks* to ship DXward . . . . . FDXC calls attention to the W3KT QSL Service, an arrangement for forwarding W/K QSLs to DX destinations . . . . . W4SUS, HP1LM's second operator, assures 100-per-cent QSL for his share of the station's emanations . . . . . "I automatically QSL all 75-meter phone QSOs via bureaus," declares KZ5SW, feeling that many of the 3.8-Mc. gang find themselves involved with DX for the first time in their ham careers. For other QSOs Ted answers incoming cards via the bureau route unless s.a.e. and IRCs are supplied (no U.S. postage usable). KZ5SW has launched 3500 cards so far with no signs of a let-up . . . . . From W1QLT of oceanic research renown: "I'm disturbed by the number of cards coming in, from guys we didn't work, asking for XE9QLT QSLs." Could be a few oddniks trying a fast one, or evidence of pirating, or — most likely, we feel — the result of careless operating by wishful-thinking optimists . . . . . Regarding p. 78, December *QST*, LeRoy Waite of the SWL/QSL Bureau so described wants it stressed that his function is primarily to disseminate DX QSLs to U.S. and Canadian listeners, *not* to distribute incoming foreign s.w.l. cards to W/K/VE amateurs . . . . . Many thanks to W1s BDI CKA UED WPO, W2JBL, K2UYG, WA2HLII, K3s ILC MNJ, K4s DWU IKV, W6SFM, K6MQG, W7s LZF UVR, W8KX, K8WOU, K9s JPL VSH, KP4AXU, VP5CW, Florida DX Club, International Short Wave League, Kanawha Radio Club, Japan DX Radio Club, Newark News Radio Club, Northern California DX Club, Polar Bears Radio Club, Holland's VERON, and West Gulf DX Club for these individual postal recommendations:

CM8RM, R. Morcate, Box 662, Santiago, Cuba
EL5E, P. Boyer, New Hope Mission, Cape Palmas, Liberia
ET3AZ, Box 3142, Addis Ababa, Ethiopia
FG7XL, P.O. Box 109, Pointe-a-Pitre, Guadeloupe, F.W.I.
FK8AC, F. Franchette, P.O. Box 101, Noumea, New Caledonia
ex-FY8C (to TN8AF)
HC1DC, NASA, % U.S. Embassy, Quito, Ecuador
HC3RT/2, R. Tapia, P.O. Box 4258, Guayaquil, Ecuador
HP1LM (via LPRA or W4SUS)
JA1BF, Y. Suzuki, 1217 Babacho, Tsurumiku, Yokohama, Japan
JZ0HW (via W6DLN)
KH6ECD (to W0FPL for c.w. QSOs)
KL7DIR/2, M. Padgett, 1546a Cedar St., Fort Dix, N.J.
KZ5EZ, R. Christensen, Box 58, Gamboa, C.Z.
KZ5SS, P.O. Box 5054, Cristobal, C.Z.
LU1ZL (via W9ADM)
LU1ZR (via W9DHQ)
MP4BDN (to G3LMT)
OA8D, A. Lane, P.O. Box 154, Iquitos, Loreto, Peru
PY2ON (via W4NJF; see preceding text)
PZ1AX (via W2CTN)
SU1IM (W/Ks via W9DRS)
TN8AG, ex-FQ8AM (via REF)
TT8AA, H. Gondouin, B.P. 235, Ft. Lamy, Tchad
UB5FG, P.O. Box 231, Odessa, Ukrainian S.S.R., U.S.S.R.
UC2KAG, Byelorussian Polytechnic Institute, Minsk, White Russian S.S.R., U.S.S.R.
VE8NA, S. Youell, Federal Electric Corp., International Airport, Winnipeg, Canada
VK5XK/VK9 (to VK5XK)
VK9AM, L. McInnes, Nauru Island, S. Pacific
VP2AB (via W2CTN)
VP2LS, L. Ellis, P.O. Box 171, Castries, St. Lucia, W.I.
VP2VA, J. Roy, Tortola, British Virgin Islands
VP5s BB CH CW GT, GMRD, Box 4187, Grand AAFB via Patrick AFB, Fla.
VP7BP (via W2CTN)
VP8AI (via W2CTN)
VP8GO, % J. Davies, G3PAG, 139 The Fairway, Leigh-on-Sea, Essex, England
VQ2AT (via WA6HOH)
VQ4RF (via W4MCM)
VS1JX, L. Peck, P.O. Box 1675, Singapore
VS4RS, R. Skelton, ACT. P&T, Sibu, Sarawak
VS9AAC (via W3KVQ)
VU2NR (via W0ZSZ)
W6MUB/VO2 (to W6MUB)
YA1AN (via DL3AR)
YV2CT, M. Perez, P.O. Box 83, Barinas, Venezuela
ZB1HC (via W4MS)
ex-ZC4CB (to VQ3HZ)
ZD1A (via VE7ZM)
ZD1JWC, J. Collins, U.S. Embassy, Freetown, Sierra Leone
ZD1S (via K8MTI)
ex-ZD2HIP (to VS4RS)
ZD8JP (to G3NRD or via address in preceding text)
ZP9AY, (via W2CTN)
ZS4AK, J. Leask, ex-ZS5AL, 1 Milner St., Kimberley, C.P., So. Africa
ZS7M (via W2CTN)
3A2AE (to DJ6OG)
5H3KRL (to VQ4KRL)
5N2CPH (via RSGB)
5R8AD, C. Larriu, Box 78, Antsirabe, Malagasy Republic
5U7AC (via W9RKP)
6W8AP (to F3WV)
6W8BQ (via W9RKP)
6W8DD, Box 190, Dakar, Senegal
9G1DT, G. Sturgen, GPC Hospital, P.O. Box 16, Worawora, Ghana (or via W4HUE)
9G1GN (via VE4IM)
9Q5AAA (via W2HMJ)

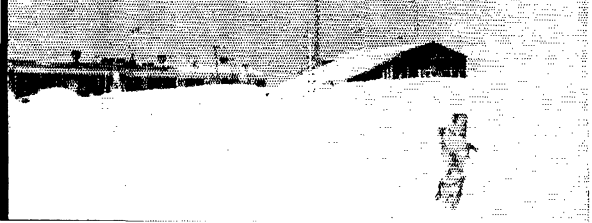
NOTE: As usual, no claim of accuracy or officiality accompanies the preceding QSL suggestions. G'luck!

Whence:

Europe — Highest scorers in their respective call areas in the 1961 c.w. French Contest were K1JTL, W2NCG, W4HQN, W5KC, W8JIN, W9WIO, VE1AE, VE2AFC, and KP4CC with W8JIN highest U.S.A. scorer. K4TFL was the lone YL entry, while VE2AFC was the only North American phone entry. This year's REF affair has its c.w. week end on the 24th and 25th of February, commencing 1400 GMT and closing 2200 GMT, and its phone contest same times the week end of April 14-15. Exchanges will be the usual RS001, RS002, etc.; count three points per contact per band to be multiplied by the sum total of French departments and DUF countries worked per band (Fs will indicate their department number or DUF country in the QSO). Send logs to REF, BP 4201, Paris, France. Contest logs are good for confirmation of QSOs for the DUF, DPF, or DDFM awards. Good luck . . . . . San Marino DX commentary thanks to HB9EO of M1/HB1EO: "Well-known M1B has been practically QRT for three years but Mario is rebuilding his rig and may be active again this year. M1D, newly licensed, is on 40-meter a.m. occasionally with 150 watts. M1H works in Rimini so his activity also is rare, week ends on 20 and 40 a.m." . . . . . KØRNT, in the beauteous Bavarian Alps for Uncle Sam, has his NC-300 ready to go but lost an Apache to salt water corrosion. Jack intends to have some s.s.b. on 20 and 15 beginning next month, call not yet designated . . . . . SP4JF needs only Vermont to clinch his WAS, according to WA2EFN, and SP6BZ tells K3CUI that the SP DX Club now boasts thirty members . . . . . K9ECE would like to see OY7ML outfitted with a rotary beam to foil worsening prop conditions. Anyone interested in the project can contact Don . . . . . "Hope to be back on Rhodes in March or April," teases SV0WI.

Asia — "The band hasn't opened decently to the States in over a month," writes HS2M re 20. "Three of us are quite active — HS1s K and X on sideband, myself on c.w. HS1s B and R haven't been heard lately, and HS1F is QRT. The HS2M countries total is 101/57 and a number of certifications are applied for. I'll be here for another year

CE9AL, Gonzalez Base, Antarctica, has an eight-man Chilean Air Force staff and depends upon amateur radio for reliable contact with the outside world. Sergio and Alvaro manipulate a 350-watter and CR-91 at right. (Photos via W8KX)



ZC4CT persistently pursues DX with a DX-40, G-209 and G5RV-styled dipole, 20 c.w. preferred. Colin hopes to sign such MP4 suffixes as BDK MAL QAU and TAP beginning this month or next. (Photo via K2UYG)

to add to the 4500 DX contacts now in the log." Mike confirms that the participation of Thai nationals in amateur radio is restricted to military personnel. HS2M's fluctuating line voltage has produced a dearth of 1- and 3-amp. fuses in his vicinity. . . . . W2AYN expects to conclude Stateside leave next month for return to possible HL9KU action. Frank's previous EP5X-EQ5X-EQ2AT doings still reverberate. . . . . Some fine DX personalities showed up at Hongkong Amateur Radio Transmitting Society's 31st anniversary dinner in December: CR9s AH A1, VS1GC, XW8AS, XZ2AD, a flock of VS6s, XYLs and friends . . . . . W6SFM was the 67th QSO for KR8AB of Naha, 21-Mc. c.w., who QSLs promptly. . . . . WA6IVM now includes 3.5 Mc. in his work-every-JA pursuits. "JA8LN is on 3505 kc. almost daily, 0600-0700 GMT, with good signals. He has worked about a thousand U.S. Sixes in the past two years on 40 meters." . . . . "The VU gang is very active on c.w. and phone near 7010 kc. around 0200 GMT," reports VE3BQL/SU. "Also lots of 20-meter activity from them on 14,175 kc. at 0330-0500 and 1700-2000 GMT, frequent roundtables." . . . . Near and Far East dispatches via NCDXC, PBRC, VERON and WGDXC: EP2s AT DE and RO keep Iran workable on 21-Mc. phone most week ends. . . . W3RYX is reported miking from 9K2AM. . . . AP5CP ably administers East Pakistan c.w. on 14,010-14,080 kc. almost daily, 1200-1600 GMT. . . . BV3HPT still keeps his 50-watter and 18-tube inhaler hot. . . . SM5ZQ/ZC6 is a cutie spotted on 21,260-kc. phone just after 1400 GMT. . . . SS *Hope* radioman W6PHF visited pleasantly with VSs 1FZ 6EN, XZ2s BB and TH in late '61. . . . UAØKJA, UD6BE, UF6AB and UG6AW are rarish Russians now on s. s. b.

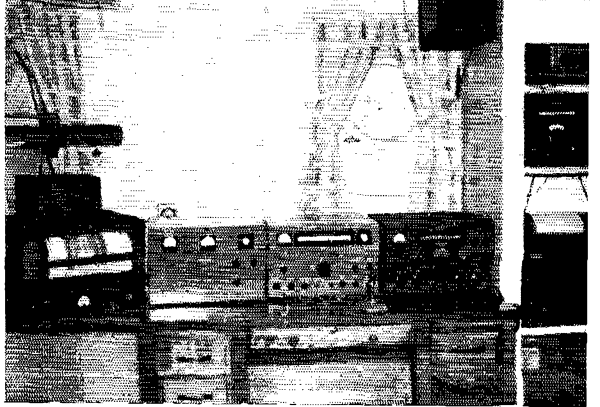
Africa — "SU1IM has returned to Cairo and 14 Mc. with 100 watts and a new antenna," apprises W9DRS. "He's looking for W/Ks but says conditions are very poor for U.S.A. contacts." . . . . W4NJF learns that 9G1GN (VE4GN), who likes 15-meter s.s.b. in the Canadian phone segment between 1400 and 1800 GMT, is on loan to Ghana BC authorities from the Canadian Broadcasting Co. Wes also works 20 sideband with S-line gear and a TA-33 beam, mostly 1900-2300 on the high edge. . . . . The noticeable DX recession of EL4s A and YL is caused by illness and technical difficulties. Ken writes, "Ye olde Ranger limps along minus v.f.o. with flat tubes and makeshift replacement parts. You people in the States don't know just how lucky you are to be able to plug the rig into the wall and know you'll get proper a.c. at 60 cycles. Our mains jump unpredictably between 60 and 160 volts; voltage adjustment in the shack can't cope with it. Pleasant visit from K6RPY and a K4 aboard U.S. Navy ships that docked in Baffu Bay for a few days. Lots of fine gear aboard including two KWM-2s." . . . . W4LJV finds ex-6W8AP now active on 15 phone as F3WV. . . . . We hear that the U.S. gang in ET2-land is working patiently toward return to the amateur bands. . . . . "All ready for 160 now," announces VE3BQL/SU. "Fifteen has been holding up for *my* skeds with VE3RCS but 20 has been sad. We get into North America well on 40 but short skip and BC interference are fierce." . . . . K2UYG notes that 6W8s BQ and DD seem to have a lively private DX contest going on 20 c.w., also that 5N2AMS has his DXpeditionary eye on TR8-land. . . . . Nigeria DX panorama courtesy 5N2JKO: "5N2s ATU BRG HHT IJS and KHK are vacationing at present, and 5N2RJO goes on leave in March. 5N2JAH suddenly appeared on s.s.b. after several inactive years. Ex-VP5LG is here awaiting his 5N2 call with a KWM-2 ready to go. 5N2EBL has been testing his rig and doing quite well, but 5N2DCP does not expect to resume activity while concluding his tour here. Ex-ZD2GWS is still in Ekona, Cameroons Republic, with no license as yet. Ex-ZD2HJG returned to the U.K. after nonhamming stops in VP7 KL7 and the U.S.; he expects another Bahamas swing. 5N2LKZ continues his liberal c.w. activity along with myself. As for conditions here, 10 is poor with occasional European openings at 1200-1500 GMT, North America around 1600, and South America 1400-1600; 15 is good to the U.S.A. between 1400 and 1900, spotty to Asia at 1600 or so; 20 is fair to the Pacific for brief openings at 0700 and 2100, while W/K/VEs hold forth from 1500 to 0000. 40 has good U.S.A. signals coming through at 0300-0700 but the QRM from Europe is deplorable; 80-meter signals from North America are heard 0400-0600 but I have no suitable antenna on 3.5 Mc. at this time." . . . . .

FDXC and WGDXC supply further Africa items: 3V8CA returns to the air after a U.S.A. visit and expects another two-year Tunisian tour. . . . DL7AH is having a DX ball with his 9Q5AAA label. . . . TL8AC likes 14,054-kc. c.w. at 1900-2200 GMT, and TL8AE has a new 250-watt outfit. Gabon's TR8AB is said to be intermittently available on 21,250-kc. a.m., and neighbor TR8AA pops up now and then. . . . There may be special certification made available to those who confirm QSOs with all French outpost FB8s WW (Crozet), XX YY and ZZ, says VQ4AD. . . . ZD8JP's 20-watter lurks near 14,022 or 14,062 kc. on Thursdays, keeping schedules with St. Helena on a wire-wound bamboo vertical. . . . Nyasaland rundown: ZD6s FC GA HK PR RM use a.m., ZD6s GA HK PR have s.s.b. on tap, while ZD6s FC and RM keep c.w. handy. ZD6s HJ and HN are inactive, ZD6s DT and JL are in ZE-land, and ZD6JC is a VQ . . . . ZD1JWC makes lots of friends on 21-Mc. phone with 150 watts, an HQ-150 and long-wire skyhook.

Oceania — "VS4RS, ex-ZD2HIP, began activity in November," *allirms* ZD2JKO. "Ron writes, 'My score to early December was 75 countries worked. I've also QSOd VS5s GS and WF, neither of whom QSLs, unfortunately. Not much luck with Europe and Africa so far but I'll soon have a beam for 15 meters.'" VS4RS is G3HIP back home . . . . . ARRL Treasurer Houghton relays word from Honiara: "First opened up as VR4CV on July 11, 1961, and I'm active most days from 0600 to 0800 GMT depending on conditions. My transmitter is an RCA 19-watter, my receiver a borrowed AR-88, and the antenna is a dipole." . . . . . K2UYG mentions VK8OW's springtime CR1Ø DXpeditionary intentions but prospects obviously aren't

(Continued on page 140)

W2ZXM/mm, Captain "Stay-Put" Carlsen of Flying Enterprise fame (p. 29, February 1952 *QST*) still roves the waves as one of hamdom's favorite ambassadors of good will. Kurt, always an ace builder-technician as well as an expert operator, brings us up to date with this view of his present seagoing hamshack. In addition to the 51J, 75A-4, SSB-100F, SSB-1000F, CV-898/VRA-8A RTTY gear and other equipment visible, Capt. Carlsen recently completed construction of a Gyrobeam directional indicator from spare parts, and a "Loudenboomer" g.g. final. Talk about your automation—before Kurt bundles up for the bridge he can consult his facsimile SEAFAX outfit for the latest weather patterns spark-produced on sensitized paper. W2ZXM's activities truly epitomize the possibilities of amateur radio at sea. (Photo via E. D. Collins, ARRL)



Happenings of the Month

ARRL AWARDS PRESENTED

At opposite ends of the continent, ARRL awards were recently presented to outstanding amateurs. The 1961 ARRL Merit Award went jointly to F. S. Harris, W1FZJ, and the Rhododendron Swamp VHF Society, O. H. Brown, W6HB, and the Eimac Gang Radio Club for their 1215-Mc. moonbounce work. The citation read: ". . . For their outstanding work in space communications in making the first amateur two-way contact via moonbounce propagation."

One plaque bearing this citation was presented to Hank Brown at a special awards dinner in San Mateo, California, by Pacific Division Director Harry Engwicht, W6HC. Sam Harris received a similar plaque from Robert White, W1WPO, of the headquarters staff, at the Eleventh Annual New England DXCC Dinner in Dedham, Massachusetts.

Director Engwicht also presented *QST* Cover Plaques to William I. Orr, W6SAI, R. F. Rinaudo, W6KEV, and R. I. Sutherland, W6UOV, for the best article in the August issue, "The Grounded Grid Linear Amplifier," and to Mr. Sutherland and Harold C. Barber, W6GQK, for the best article in the September issue, "High-Power Zero-Bias Grounded-Grid Linear." The headquarters staff wishes to join the Board of Directors in congratulating these members on their outstanding work for the benefit of the League.

LEAGUE ASKS MORE POWER ON 420

Ever since the 420–450 Mc. band was made available to the amateur service shortly after World War I, it has carried a severe power restriction because of sharing with other services. The League has regularly discussed with government authorities the possibility of relief from this restriction, but heretofore the associated problems seemed insoluble. Continuing liaison having indicated that removal or relaxation of the power limit might now be feasible, at the direction of the Executive Committee the League has filed the following petition with FCC:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D.C.

In the matter of
Amendment of Section 12.111(k) of the Commission's Rules and Regulations to Remove Power Restrictions on 420–450 Megacycles } RM-

PETITION FOR RULE MAKING

The American Radio Relay League, Inc., by its General Counsel, respectfully requests that Section 12.111(k) of the Commission's Rules and Regulations pertaining to amateur radio operation in the 420 to 450 megacycle band be amended to delete at an early date the following power restriction:

> "The maximum DC plate power input to the final stage of the transmitter shall not exceed 50 watts."

In support whereof, the following is respectfully submitted:

1. The 420–450 Mc band first was made available for amateur use shortly after World War II as the result of a general frequency reallocation. Because some aeronautical radio altimeters developed during World War II operated in the band, severe power restrictions were imposed upon amateur operation for fear of interference to altimeters. Although no cases of interference were known to the League, the original power limitation of 50 watts peak to the antenna later was reduced in 1955 to 50 watts plate input to the final amplifier stage.[1] In 1958, Section 12.111(k) again was amended to add the following additional restriction:

> "In this band the amateur radio service shall not cause harmful interference to the government radiopositioning service."

2. Section 9.312(1) of the Commission's Rules provides that "the aeronautical radionavigation service will not be permitted to use the band 420–460 Mc. after February 15, 1963." It is understood that radio altimeter operation in the 420–450 Mc. band has diminished almost to the point of non-existence. Therefore, the restrictions intended to protect the aeronautical service no longer are necessary. It is understood that the characteristics of the government radiopositioning service are such that the possibility of interference from amateur operation with increased power is most remote. To date, the League knows of no complaints of interference to the government radiopositioning service.

3. The 420–450 Mc. band is unique and most important

[1] The word "reduced" is used because relatively inefficient frequency multipliers frequently are used.

Award ceremony in the West: W6IVZ, W6MUC, W6CDT, W6UOV, W6VSV, W6HC, W6UF, K6GSO, W6SAI, W6WBC, W6HB, K6GJF, W6KEV, W6FBR, WA6BAN, W6ZVV, W6NBD and K6AXN.

to amateur radio because it is the "jumping off" place from *v.h.f.* to *u.h.f.* It is the lowest frequency amateur band where coaxial and cavity tank circuits replace the familiar coils and capacitors, where crystal mixers and parametric amplifiers may be used for optimum results, where highly directive antennas having reasonable dimensions are possible, and where frequency multiplication in the final amplifier is frequently employed. The propagation and wave length characteristics of the band, including duct and scatter effects and reflection from meteorites, other celestial objects and man-made satellites, require extensive study which the amateurs are qualified to conduct provided they are permitted to operate with increased power.

4. Until the power limitation was changed from 50 watts peak power to the antenna to 50 watts plate input to the final amplifier stage, amateurs were more interested in the 420–450 Mc. band than in the 220–225 Mc. band. The use of a relatively inefficient frequency multiplier in the final stage of the transmitter was feasible and widespread because no penalty was imposed because of its inefficiency. However, because of the inefficiency of vacuum tubes operating as frequency multipliers and amplifiers in this band, the power output obtainable with 50 watts plate input is so low as to discourage use of the band.[2]

5. Removal of the present power limitation will greatly stimulate amateur experimentation and undoubtedly will develop most important propagation data. The recent California-Hawaii transmissions on 432 Mc. are but one example of the ability of the radio amateurs to conduct most important studies. Significantly, the 420–450 Mc. band is the only band above 144 Mc. where the long distance record for two-way communication is not held by United States amateurs.

6. The League believes that the power limitation now may be removed from the entire 420–450 Mc. band without causing interference to any other present or possible future users of the band. However, should the Commission have some doubts as to whether the limitation should be removed from the entire band at this time, the League suggests that the Commission set aside at least a 4 Mc. segment for use with high power, narrow band, stable frequency transmitters. The segment from 432 to 436 Mc. is suggested so as to permit frequency tripling from the existing 144 Mc. amateur band.

7. It may be that the Commission has some classified information not available to the League. Therefore, should it be impossible to remove the power limitations from either the entire band or a segment of the band, the Commission is requested to grant such other relief from the present power limitations as may be appropriate.

Wherefore, the premises considered, it is respectfully requested that Section 12.111(k) of the Commission's Rules and Regulations be amended to remove or relax the 50 watt plate power input limitation.

Respectfully submitted,

THE AMERICAN RADIO RELAY LEAGUE, INC.
ROBERT M. BOOTH, JR.
Its General Counsel

1735 DeSales Street, N. W.
Washington 6, D. C.
December 21, 1961

MINUTES OF EXECUTIVE COMMITTEE MEETING
No. 283
November 20, 1961

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met in West Hartford, Connecticut, at 3:55 P.M., November 20, 1961. Present: President Goodwin L. Dosland, in the chair; Directors John G. Doyle, Robert W. Denniston, Morton B. Kahn and Raymond E. Meyers; General Manager John Huntoon; Vice President F. E. Handy; and Treasurer David H. Houghton.

On the motion of Mr. Meyers, unanimously VOTED that the General Manager is directed to file comment in FCC Docket 14349 expressing the favorable view of the League toward the proposal to provide the frequencies 7245–7255 and 14,220–14,230 kc. for RACES use in Alaska and Hawaii.

[2] Because of the inefficiency of frequency multipliers in these frequencies, the plate input power frequently is four to five times the peak output power.

Award ceremony in the East: W1FZJ and W1WPO

After hearing a report from the General Manager on further developments in the matter of the League's continuing efforts to obtain a restoration of shared operating privileges in 1800–2000 kc., on motion of Mr. Denniston, unanimously VOTED that the General Manager is directed to file with the Federal Communications Commission a formal request for a review of the status of Loran operations in 1800–2000 kc. looking toward the expansion of present amateur privileges therein.

After hearing a report from the General Manager on further developments in the matter of the League's continuing efforts to obtain a relaxation of the present power limit in the amateur 420-Mc. band, on motion of Mr. Meyers, unanimously VOTED that the General Manager is directed to file a formal request of the Federal Communications Commission for a review of the status of other services operating in this band, looking toward an increase in the amateur power limit.

On motion of Mr. Kahn, unanimously VOTED to approve the holding of a Hudson Division Convention in New York City on October 13, 1962.

On motion of Mr. Doyle, unanimously VOTED that the League agrees to become one of the sponsors of a proposed celebration, sometime in 1962, of the golden anniversary of the licensing of amateur radio operators.

On motion of Mr. Kahn, unanimously VOTED that the General Manager represent the League in plans to set up a suitable amateur radio exhibit and station during the period of the 1964 World's Fair in New York City.

On motion of Mr. Doyle, affiliation was unanimously GRANTED to the following societies:

Beeville Amateur Radio Klub.....Beeville, Texas
Benzie County Amateur Radio Association.....Michigan
East Shore V.H.F. Radio Club.....Euclid, Ohio
Greene County Amateur Radio Society
Springfield, Missouri
High Plains Radio Society, Inc.....Cheyenne, Wyoming
Kaman Amateur Radio Club.....Bloomfield, Connecticut
Milliwatt Mobiliers Amateur Radio Club
Crawford County, Indiana
Shelton Emergency Radio Association.Shelton, Connecticut
Shiawassee Amateur Radio Association..Owosso, Michigan
Warren Amateur Radio Association, Inc.....Warren, Ohio
The Winter Haven Amateur Radio Association, Inc.
Winter Haven, Florida
Radio Press Association, Inc...East Paterson, New Jersey
Lincoln United Wireless Ass'n.....Lincoln, Illinois
Goshen Amateur Radio Club.....Goshen, Indiana
Rockford Amateur Ass'n., Inc.....Winnebago, Illinois
The Staunton High School Radio Club..Staunton, Illinois
Bureau County Amateur Radio Club...Princeton, Illinois
Catalina Radio Club.....Tucson, Arizona
Martin Van Buren High School Amateur Radio Club
Queens Village 27, New York

During the course of the meeting the Committee discussed, without formal action, Project OSCAR, reciprocal licensing, progress toward the new Headquarters building, ARRL publications in Braille, status of earlier League petitions to FCC, League business affairs, and legal matters affecting amateur radio.

There being no further business, the Committee adjourned, at 5:17 P.M.

JOHN HUNTOON
Secretary

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS, W1FZJ

PROJECT OSCAR

THE successful launching of Oscar I, the world's first amateur radio satellite, is an accomplished fact. Actual launch date was December 12, 1961. Operating on its own battery-powered system the OSCAR I transmitter was predicted to have a 30-day life in orbit. This means that in all probability you cannot now receive its cheery "Hi, Hi" as it circles the globe. Of all the koodos properly belonging to the hard working group who made "Project Oscar" a successful reality, in my opinion the choice of the message text should receive the highest plaudits. What better expression of amateur ingenuity and persuasiveness than a globe circling satellite genially chuckling a "Hi, Hi, Hi, Hi" for all the world to hear. A small percentage of the people who listened to Oscar I's signals on 145 Mc. are integrated into the Oscar Satellite Tracking Program and have reported their reception in the properly prescribed manner. As a matter of interest, and in an effort to evaluate the two-meter listening ability of this column's readers, I would very much appreciate receiving a post card from all who received the Oscar signal. All the information required is the date, time and equipment used. I am particularly interested in obtaining the earliest reception times of the satellite.

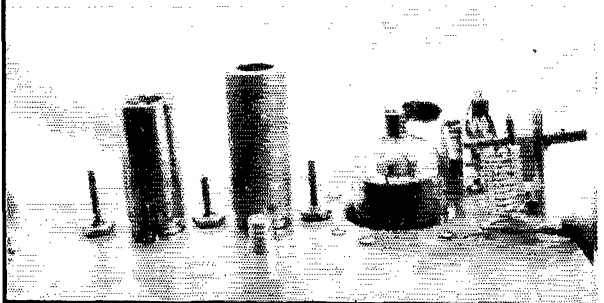
While on the subject of satellites I call your attention to the planned launching of ECHO II (now called A-12) in the early spring. The exact launching date has not been released but *this* is the time to prepare your equipment. ECHO A-12 will be a 135-foot (diameter) rigid sphere. It is planned to launch it into a polar orbit at an initial altitude of 600 miles. The orbit is expected to be fairly circular. This type of orbit would result in a fairly long orbit flight time, possibly two years or more. Since the sphere is rigidly constructed, it should retain its shape and reflectivity for most of that time. To use the words of R. Soiffer (K2QBW) I quote: "It is not our purpose to cover the technical details pertaining to the satellite's usage at amateur v.h.f. frequencies. This will be done in future issues of *QST*. We simply would point out that, for the serious and well-equipped v.h.f. operator, the satellite offers immense long-time possibilities for increasing his DX record. For example, if your station is presently capable of regular contacts over a 500-mile range at 144 or 220 Mc., with the proper antenna modifications your reliable range using ECHO A-12 should be at least 1500 miles. There is the additional possibility of signal enhancement due to interaction of the satellite with an auroral cloud, or a fast-moving corpuscular stream. Should such an enhancement occur with ECHO A-12, transatlantic or transcontinental work would not be impossible." One of the prime requirements for obtaining optimum results using ECHO A-12 as a reflecting medium is a tiltable antenna array. If you do not have such an antenna now, you should build one. If you do have, you should write an article on how you accomplished the feat so that others may benefit from your experience.

If you are interested in joining a planned program to make optimum use of ECHO A-12 when it is launched, please communicate your willingness to the personnel chairman, Ed Tilton, W1HDQ. Watch *QST* for further information on this program.

50-Mc. S.S.B.

At the Pittsburg VHF Hamorama we were privileged to hear W4UCH describe his simple sideband system for v.h.f. use. There is no doubt in my mind that Bob's system is a good one and if you are interested in constructing one for your own use, I would suggest dropping him a line. Despite its success, the majority of the sideband activity on 50 Mc. starts off with a low-frequency sideband exciter. The use of such a low-frequency exciter requires, of course, the construction of a sideband converter to convert the low-frequency output of the generator to the 50-Mc. band. Having built at least three different versions of such a converter, I was pleasantly surprised to receive a visit from Ed Simonian, K1ISR, complete with 50-Mc. s.s.b. converter. Now I wouldn't say that this was the best 50-Mc. s.s.b. converter I ever saw. I wouldn't say it was the simplest converter I ever saw. I do, however, feel safe in stating that it is the best combination of the two that I have ever tried. On the next page you will find a circuit diagram for Eddie's converter complete with all the pertinent details. The information pertains to a 21-Mc. to 50-Mc. converter. If other input frequencies are desired, coils L_1 and L_2 should be modified to accept the new crystal frequency. 50-Mc. output is anywhere from 5 to 15 watts depending on the high-voltage supply. Bias on the 6146 should be set for a 60-ma. plate current with no signal from the sideband exciter. During receiving the 6146 bias should be increased to cut-off level. If you are really interested in building this converter, you can obtain a complete parts list and layout diagram by dropping a postcard to K1ISR, 11 Pawnee Drive, Arlington, Massachusetts. If you are an OES appointee, put your request on your next report form and I will pass it along.

* P. O. Box 334, Medfield, Mass.



Top view of 50-Mc. s.s.b. converter, showing submounting of 6146.

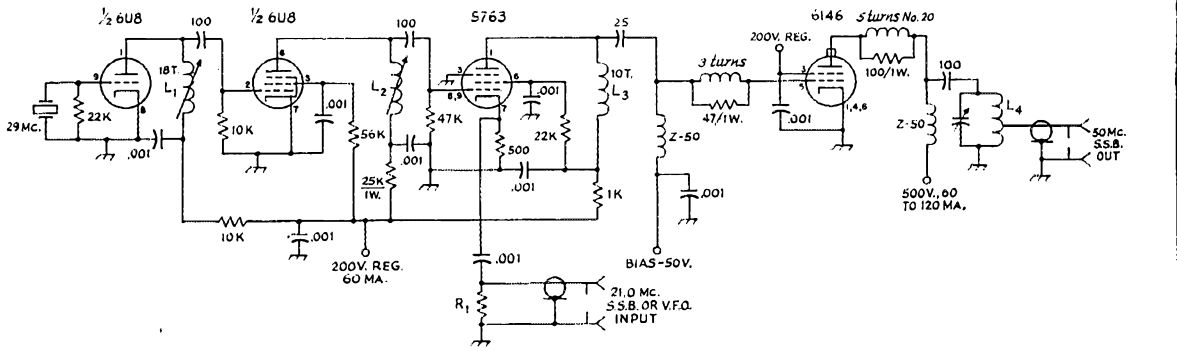


Fig. 1—50-Mc. s.s.b. converter diagram.

L_1—15 turns No. 20, close spaced.
L_2—12 turns No. 20, close spaced.
L_3—7 turns No. 20, spaced wire diameter.
L_4—9 turns, No. 20 ⅝-inch diameter. Tapped 2 turns from bottom.
(L_1, L_2, L_3 wound on National XR50 forms.)
R_1—50 ohms, 20 watt, non-inductive. Can be made up from four 200-ohm, 5-watt units in parallel.

(Note: Choose an operating frequency above 50.1 Mc.)

50 Mc.

Only one "heard" report concerning KL7FLC this month and that one by Pete, VE8BY, who heard them on November 19 for about an hour. On November 18 while looking for KL7AUV Pete heard a signal which turned out to be VE4JX and on turning his beam worked VE4YW, VE6OH, W7EGN, W7EQB and K7EEK. Pete said that with the opening going from East to West he did have hopes that it might end up in Alaska and give him a contact with Jack, KL7AUV, with whom he has been keeping skeds for over a year. No luck! Only one heard report for him from Alaska and that from Margie, KL7BLL, who heard Pete for two or three minutes one night during November. Pete is thinking very seriously of building up a high-power rig for 144 Mc., so that group had better get busy with the receivers.

Word comes from Bob, WØENC, of new 50-Mc. activity in South Dakota, so you fellas who need that state can start listening for it whenever the band opens. K9PTB/Ø, WØFII and WØFNE are all newcomers to the area and all active on 50 Mc. November turned out to be a good groundwave month for Norm, WA2TQT, of New York City. Norm worked Connecticut, South Jersey, Pennsylvania and Maryland quite frequently during the month and heard K1BHY in Massachusetts an S9. Norm is interested in several phases of v.h.f. work and is presently constructing a pair of walkie talkies for the six-meter band, to be used for testing the effects of low power *vs.* distance worked on 50 Mc. K4UMK tells us that on November 14 a signal was heard at his QTH at 50.410 — 10 kc. f.m. Signal was first noted at 1800 EST and last heard at 2140; it seemed to be east, along the coast, and moved from NNE to SSE, varying in signal strength and direction. Bob also informs us that the local "Wind Bag Net" meets each Saturday at 2035 EST on 50.750 Mc. and that they have ten to fourteen stations check in each week. (Why 2035?) Also — K4VAZ 4 can be heard on some mountain top in Virginia or North Carolina at least one week end each month. (Makes counties interesting!) Also — K4UMK is listening in the first 20 kc. of the 50-Mc. band (phone, that is) for any s.s.b. stations.

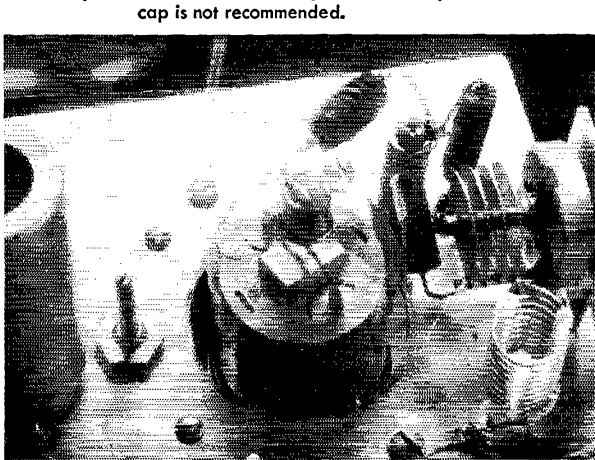
Jim Rule, K4KYL, in Knoxville, Tennessee sez that the month was very quiet on 50 Mc. during November with no real openings. On November 19 a few 5's were heard just breaking through for about ten minutes, but they were so weak that none were identified. Huntsville, Alabama, comes through via Dave, K4IQU, with the info that Dave is now using sixteen elements dual diversity on 50 Mc., running 300 watts screen-drive linear.

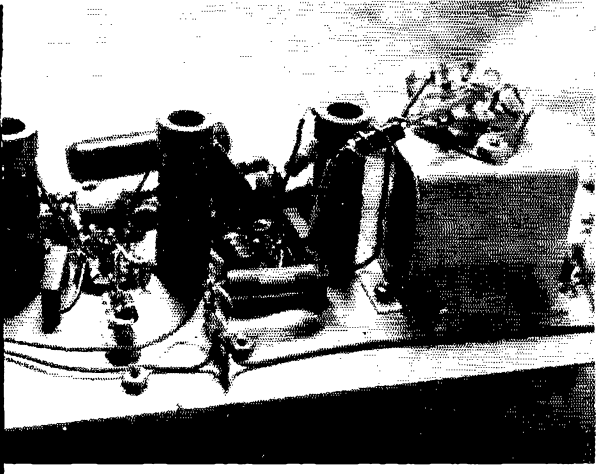
A very good report was received from K2PQY, a great deal of it concerned with n.b.f.m. and f.m. operation. We'll quote a portion of the letter. "I have been trying to spur local hams to use n.f.m. on six meters for evening work, rather than vacate the band. From 2000 EST on the six-meter band on Long Island drops dead, most hams going to two meters. I believe that n.b.f.m. on six meters during evening hours should be made a 'Picon' project. I do not believe that this is backing down to the public. My understanding of amateur radio is that amateurs should find the best way to operate with the least bother to everyone concerned. I believe that this method is better than losing a band to commercial or citizen interests (who would probably use f.m. anyway). I do not believe that a great cost to the amateur is involved. Most technicians can build n.f.m. adaptors and devices to create f.m. in their transmitters. I will in the future forward a circuit for crystal stabilized f.m. oscillator, to plug into any transmitter using 8.35 Mc. crystals to anyone interested." (August Occhsli, K2PQY, 85 Nassau Rd., Massapequa, N. Y.) He then goes on to say that Long Island stations using either n.f.m. or f.m. include K2IPC, K2QLC, WA2BJL and K2PQY. W2IDL and K2JDH are contemplating the use of n.f.m. and K2JDH is "under construction."

From the Detroit, Michigan, area W8MBH sez that ground conditions on six meters are fair in that area with Cleveland, Ohio, being heard frequently and worked by some of the Detroit gang. Reg also mentions that the sidebanders are quite active on six meters in the Detroit area with K8THW, K8SOF, W8SWC, W8TFI, and W8EPD on the air almost every night on that band. Word received from K4RBR mentions his contacts (two of 'em) into Puerto Rico on October 28, and another brief opening into 2 land on October 26. Both openings occurred about 0300 GMT. And — W4CIN in Birmingham sez that 50-Mc. groundwave has been very good during the month of November, with stations in the 250-mile range holding steady for long periods of time. Gloversville, New York, represented this time by K2PBU, had normal ground wave conditions for the month of November according to George. Conditions very quiet on six meters although 48 were heard on November 5, and a very good aurora came up on December 2. The aurora lasted several hours and stations were heard in 1, 2, 3, 4, 8, and 9 districts by George, with both phone and c.w. being represented.

Can't resist finishing up this portion of the column with

6146 output circuit. Note—Soldering to the tube plate cap is not recommended.





Bottom view of 50-Mc. s.s.b. converter. Note shield between driver coil and base of 6146.

the following quote: "Nothing unusual happened on either 2 or 6 meters. Most important event at this station was the appearance of a Junior Operator who was given the initials C.W. (Carl William) in the hope that he will be in the ranks of amateur radio operators very soon." We are real glad to know that Gus, K6SIX, was able to find some names to fit those initials, and hope that the XYL likes ham radio. Good luck to all of you Hirshs!

Last minute report from Jack, KL7AUV, tells of success (finally) on contacting VE8BY. December 2 was the date that Jack heard Pete about 0350 with S9 signals; listened to him work VE6IP and VE4TX and finally raised him at 0421. Jack sez that Pete's signal dropped out at 0435 for about three minutes, but other than that the signal was S9 from 0350 to 0505 when he suddenly dropped out. Stations now active in the Fairbanks, Alaska area are KL7DPL, K6TWP, KL7, KL7FAY, KL7EAH, KL7CUH, KL7BET, and KØMML KL7. Also — in Kodiak, Alaska, KL7JDO is keeping 50 Mc. warm, and in Clear, Alaska, KL7EBR is stirring up 50 Mc.

Another DX station heard from is Jon, K8AFN, who is now in Buenos Aires, Argentina, and expects to be on the air on six meters around the first of January, 1962.

144 Mc.

I tried to make it plain last month that *I* was not suggesting that the c.w. band on 144 Mc. be put to use. The suggestion was made by a group of serious v.h.f. operators in solemn conclave. I was merely passing on their comments for your observations. And boy! Did I get 'em! So far the observations are solemnly in favor of leaving things the way they are. One very kind-hearted feller said he'd go along with what the rest of the boys did. Nobody was in favor of it. I may at this time hasten to point out that while I mentioned W1AZK it was only as an illustration and did not represent his feelings on the matter. As a matter of fact, he had no more than read my column when he packed up and left for Germany and hasn't been back since. When he does come back, please don't charge him with being disloyal as his connection with the matter was purely a matter of illustration rather than fact.

Of interest to 144-Mc. operators in the East Coast area is the newly originated VE2 night. The past few months have seen a considerable increase in the 144-Mc. activity in the Montreal area and in order to foster an increase of activity to the south they have set aside Monday evenings after 2000 EST as a special "Let's work some W's" time. The plan is to tune from 144.5 to 144 Mc. for any phone or c.w. stations to the south who are kind enough to point their beams north. Technicians interested in working VE2-land should address inquiries to Ross, VE2APN. Many of the contacts over this path will be relatively weak signal contacts and tuning the entire band for weak signals is an obvious impossibility. The plan to tune only the first 500 kc. is therefore justified and if other frequencies are to be operated a special schedule would obviously be required. I received a letter from K3KKM of 1633 Woodbrook Lane, Philadelphia 50, Pa., inquiring for information on anyone interested in global or interspacial v.h.f. communications. Elmer is particularly interested in establishing a country-wide relay net. Anyone interested please address your inquiries to Elmer Smalling at the above address.

Meteor-scatter schedules from W7RT to W6YXN, WA6OQZ on 144 Mc. during the Leonids Shower were unsuccessful. Only a few pings heard at both ends. WØENC managed a 20-second burst including three call sequences from WA6MLX but only a few pings for the rest of the schedule, no contacts.

W4VVE caught the December 2 auroral opening in time to work W9ZIH in Chicago on s.s.b. Incidentally v.h.f.ers in the eastern half of the United States will be interested to know that Dick, W4VVE, will be leaving his Hampton, Virginia, QTH on the 15th of January. He is moving to the Houston, Texas area, where it is hoped he will provide a new burst of u.h.f. activity.

220 Mc. and Up

We received a letter from Mike Baker, K2LZF, outlining his problems in operating 220 Mc. after the local Channel 13 station came on the air a few years back. In essence his problems which were shared by K2GRI, K2CBA, K2TLM can be broken down into a series of things to do. The first step to do if you are suspecting that your local TV station is causing interference is to prove that the interference is occurring at the station and not in your converter or receiving set-up. The FCC recommends a test with a half-wave shorted line connected in parallel with the feed line from your antenna at the converter. The technique is to listen to the garbage signal on the receiver while moving the shorting device up and down the line, thus tuning through the components of the TV signal and the garbage signal. It is apparent that if two nulls of the spurious signal are observed on the receiver it does not exist as part of the output from the TV station, and is being generated in the receiving gear. However, if three nulls are observed, the spurious signal is real. The same results can be obtained by using a 220-Mc. coaxial tank circuit (See February, 1961, *QST*, page 65). The important thing is to definitely establish that the interfering signal is in fact being generated elsewhere than in your receiving setup. When this hump has been passed and the interference is definitely proven to be the fault of the TV station, the second phase of the project is to contact the engineering department of the TV station in question. To quote Mike's letter, "You can imagine the skepticism and cries of overload! that our early advances to the TV station were greeted with." If you are on solid ground with your Step 1 measurements, it is quite likely that you will receive cooperation from the offending station. Step 3 in the operation should only be undertaken after all efforts in Step 2 have produced no results. This step involves writing a letter to the FCC stating the result of your Step 1 tests and the result of your Step 2 tests. A word of caution. Remember that this is not a project to be undertaken lightly. A carefully thought out cooperative effort by several amateurs is required before any rash statements are made to anyone. Remember that in general converter

50 Mc. WAS

1 W0ZJB	21 K6EDX	41 K9DXT	61 W7MAH
2 W0BJV	22 W5SFW*	42 W6BAZ	62 W8ESZ
3 W0CJS	23 W0ORE	43 W6ABN*	63 W2BYM
4 W5AJG	24 W3ALU	44 VE3AET	64 W7ACD
5 W9ZHL	25 W8CMS*	45 W9JFP	65 K6PYH*
6 W9OCA	26 W0MVG	46 W0QIN	66 W4JOB
7 W6OB	27 W0CNM	47 W0WWN	67 K0JJA
8 W0INI	28 W1VNH	48 K9ETD	68 K6RNQ**
9 W1HDQ	29 W0OLY	49 W0FKY	69 W9QWT*
10 W5MJD	30 W7HEA	50 W8LPD	70 W6EDC**
11 W2IDZ	31 K0GQG	51 W0ZTW	71 K6VLM**
12 W1LLL	32 W7FFE	52 W6GCG	72 K6GOX**
13 W0DZM	33 W0PFP	53 W2RGV	73 W0EDM
14 W0HVW	34 W6BJI**	54 W1DEI	74 W9JCI*
15 W0WKB	35 W2MEU	55 W1HOY	75 W0LLU*
16 W0SMJ	36 W1CLS	56 W6ANN	76 W7RT**
17 W0OGW	37 W6PUZ	57 W1SUZ	77 W7RDY**
18 W7ERA	38 W7ILL	58 W1AEP*	78 W6KIN**
19 W3OJU	39 W0DDX	59 W5LFH	79 W6OKR**
20 W6TMI**	40 WØDO	60 W6NLZ**	

* 49 states ** 50 states

VE7CN	45	EI2W	37	LU3DCA	27	SM5CHH	20
KL7AUV	44	CO2XZ	36	LU3EX	27	LA7Y	20
VE1EF	42	ZS3G	32	ZE2JV	26	VQ2PL	18
VE4HS	41	SM6ANR	30	LU9MA	26	JA8AO	18
XE1GE	39	CO2ZX	30	CO2DL	25	JA8BU	17
VE2AOM	38	SM7ZN	29	CT1CO	24	JA1AAT	17
KH6UK	37	PZ1AE	28	CO6WW	21	JA1AUH	16
		SM6BTT	28	LA9T	21	VP5FP	7

overload is the real problem. In any event, the boys in upstate New York were successful in improving their 220-Mc. situation to a considerable extent.

Don, W3LCC, caught a 220-Mc. aurora opening into Ohio resulting in a solid contact with W8CSW in Powell, Ohio. Signals were between S6 and S8 on both ends. The opening lasted for over two and one-half hours. Naturally no one else was heard. W7RT notes that K7IRR, K7ISI, and K7GIJ are now all active on 220 Mc. John predicts a new high in 220-Mc. activity in his area. Jack, W8IPT, sends in the first report of the big noise being received on 220 Mc. During a contact on November 27 with W9REM, W9SKN, W8CVQ and W8GOV the big noise wiped out all stations at all locations. I'm sure the 50-Mc. operators will be glad to know that operation "Big Noise" is moved to 220 Mc. John reports W9FXV, 220.052 and K9DPU 220.172 are now active in Fort Wayne, Indiana.

2-METER STANDINGS

W1REZ	32	8	1300	W5UNH	6	3	1200
W1AZK	28	8	1205				
W1KCS	24	7	1150	W6WSQ	15	5	1390
W1RFU	24	7	1120	W6NLZ	12	5	2540
W1AJR	23	7	1130	W6DNG	9	5	1040
W1HDQ	22	6	1020	W6AJF	6	3	800
W1MMN	21	7	1090	W6ZL	5	3	1400
W1IZY	20	7	1180	K6HMS	4	3	850
K1CRQ	19	6	800	K6GTG	4	2	800
W1AFO	18	6	920	W6MMU	3	2	950
K1AFR	17	5	450				
				K7HKD	13	5	1130
W2NLY	37	8	1390	W7JRG	12	4	1040
W2CXY	37	8	1360	W7LHL	5	3	1050
W2ORI	37	8	1320	W7CJM	5	2	670
K2GQI	33	8	1200	W7JP	4	2	900
W2BLV	30	8	1020	W7JU	4	2	235
W2AZL	29	8	1050				
K2IEJ	27	8	1060	W8KAY	38	8	1245
K2LMG	25	8	1160	W8PT	38	9	1260
W2AMJ	25	6	960	W8SDJ	37	8	1220
K2CEH	24	8	1200	W8IFX	35	8	980
W2ALR	24	8	1100	W8SFG	34	8	1040
W2DWJ	23	6	860	W8LOF	33	8	1060
K2HOD	23	7	950	W8RMH	32	6	910
W2PAU	23	6	755	W8GGH	32	8	1180
W2RXG	23	8	1200	W8BAX	32	8	960
W2SMX	23	7	1090	W8NOH	31	8	1090
W2LWI	21	6	700	W8SVI	30	8	1080
K2KIB	21	5	900	W8EHW	30	8	860
W2ESX	21	6	750	K8AXU	29	8	1050
W2UTH	20	7	880	W8LPD	29	8	850
W2WZR	19	7	1040	W8WRN	28	8	680
W2RGV	19	8	720	W8DX	26	8	720
K2RLG	17	6	980	W8ILC	25	8	800
K2DDK	12	4	270	W8JWV	25	8	940
				W8WNM	25	8	900
W3RUE	33	8	1100	W8GFN	23	8	540
W3GKP	31	8	1180	W8LCY	22	7	680
W3SGA	31	8	1070	W8BLN	21	7	610
W3TDF	30	8	1125	W8GTR	17	7	550
W3KCA	28	8	1110	W8NRM	17	7	550
W3BYF	28	8	1070				
W3EPH	32	8	1090	W9KLR	41	9	1160
W3LNA	27	7	720	W9WOK	40	9	1170
W3NKM	20	7	730	W9GAB	34	9	1075
W3LZD	20	7	650	W9AAG	33	8	1050
				K9AAJ	31	8	1070
W4HJQ	38	8	1150	W9RRM	31	8	850
W4HHK	37	9	1280	W9ZIH	30	8	830
W4ZX1	34	8	950	W9PBP	28	8	820
W4LTU	34	8	1160	W9LVC	27	8	950
W4MKJ	33	8	1149	W9OJI	27	8	910
W4AO	30	8	1120	W9ZHL	25	8	700
W4VLA	26	8	1000	W9BPV	25	7	1030
K4GUS	26	7	1130	K9AQF	24	7	900
W4EQM	25	8	1040	W9LF	22	7	825
W4AIB	25	8	900	W9KPS	22	7	690
W4WNH	24	8	850	K9SGD	21	7	1100
W4JCJ	23	6	725	W9CUX	21	7	800
W4VVE	23	6	724	W9ALU	18	7	800
W4RMU	21	7	1080				
W4TLV	20	7	1000	WØBFB	37	9	1350
W4IKZ	20	6	720	WØIHD	31	8	1040
W4OLK	20	6	720	WØSMJ	29	9	1075
W4RFR	18	9	820	WØLEE	28	7	1050
K4YUX	18	8	830	WØQDH	27	9	1300
W4LNG	18	7	1080	WØRUF	23	7	900
W4CPZ	18	6	650	WØIC	22	7	1360
K4VWH	18	6	590	WØMOX	22	6	1150
W4MDA	17	6	757	WØINI	21	6	830
				WØTGC	21	7	870
W5RCI	37	9	1215	WØRYG	20	8	925
W5AJG	32	9	1360	WØAZT	18	7	1100
W5FYZ	29	9	1275	WØJAS	18	6	1130
W5JWL	29	7	1150	KØAQJ	16	6	1120
W5DFU	28	9	1300	WØIFS	16	6	1100
W5PZ	27	8	1300				
W5LPG	25	7	1000	VE3DIR	30	8	1330
W5KTD	23	8	1200	VE3AIB	28	8	1340
W5ML	16	5	700	VE3BQN	19	7	790
W5FSC	12	5	1390	VE3AQG	18	8	1300
W5HEZ	12	5	1250	VE3DER	17	8	1340
W5SWV	12	4	745	VE3HW	17	7	1350
W5CVW	11	5	1180	VE3BPB	14	6	715
W5NDE	11	5	620	VE2ABF	10	4	580
W5KFU	11	4	1300	VE7FJ	2	1	365
W5VY	10	3	1200				
W5EDZ	8	5		KH6UK	2	2	2540
W5YYO	7	4	1330				

The figures after each call refer to states, call areas, and mileage of best DX.

My mention of 10,000 Mc. prompted a reply from both W7JIP and W7LHL concerning their activities on this frequency. Both, I'm happy to say, are working on crystal-controlled transmitter receiver systems for use at 10,000 Mc. In case you think it's easy I hasten to point out that both Ernie and Len have been building their crystal-controlled equipment for almost a year now. They hope to have it finished by the end of this winter season and will probably try for a new DX record come spring or summer. If you are sincerely interested in their efforts, I am sure that a letter to either will supply you with the details of their present activities.

432-Mc. stations within striking distance of Virginia should bend every effort to nurture the interest of Sam, K4EUS, and K4UMI. Sam is transmitting a CQ to the north on 432.2 Mc. at 2200 EST every night. If you hear his signal and cannot raise him, please send him a post card so he can work harder on his receiver. Remember, Chick, W4VVE, will be leaving in the middle of January and Virginia will be pretty hard to get on 432 Mc.

Clubs and Nets

"The Carolina VHF Society" seems to be another very active v.h.f. group. At a recent meeting of the club a "committee for the promotion of u.h.f. operation" was appointed by the president. W4ACY, W4BSS and W4RUZ were given the task and word is out that they will provide diagrams and data for publication in the club publication, *Ragchewer*, in the very near future. Target band — 432 Mc.

The Six Meter Club in Detroit, Michigan is putting on a monthly program at the veterans hospital. It consists of operating a station in the hospital lounge and the patients who are interested talk to their friends on the air. A very worthwhile project which makes a big hit with the patients. All contacts are on 50 Mc. and time is the first Tuesday of each month.

Local net in southern Ohio and West Virginia, The Wagon Train Net, has elected K8JHR of Warwood, West Virginia as Foreman. Pending certificates will be issued posthaste according to news received. To obtain certificate one must work five members of the net and send list of contacts to Helen Rush, Old Cadiz Pike, Bridleport, Ohio. The net meets every Monday at 2130 on 50.160 Mc. and breaking is welcomed.

Word received from a member of the Sudbury, Massachusetts, radio club tells us that that group is working on a kw. for 50 Mc. to be used during contests. "Details classified, reports encouraging." The Sudbury group is also reviving their net on 144 Mc. but no details on that move either.

Officers of the new formed "Midwest VHF — UHF Amateur Association" are K9RVG, Coordinator; K9VUX, Ass't. Coordinator; K9UYG, Secretary; WN9AHZ, Publicity Secretary; K9VTT, Sgt. at Arms. Aim of the club is to create more activity on the higher frequencies during contests and to get the stations to submit their logs for contests. Anyone in the midwest interested should write to Jack Dietrick, WN9AHZ, Publicity Secretary, 9343 Hamilton Ave., Chicago 20, Illinois. The club 2-meter emergency net meets every Monday at 1930 CST on 145.42. CST

Strays

Practically all amateurs are well endowed with the gift of gab, but a few among us are silver-tongued orators.

W8BKP, fighting a restrictive tower ordinance in his home town of Washingtonville, Ohio, appeared at a council meeting armed with background data and ammunition supplied by ARRL General Counsel Booth. He received a standing ovation at the end of his presentation, the ordinance was withdrawn — and in a local election a few days later W8BKP, although not a candidate, was elected to the village council by write-in votes!

Hurricane Carla

Amateurs to the Rescue in the Worst Storm in Texas History

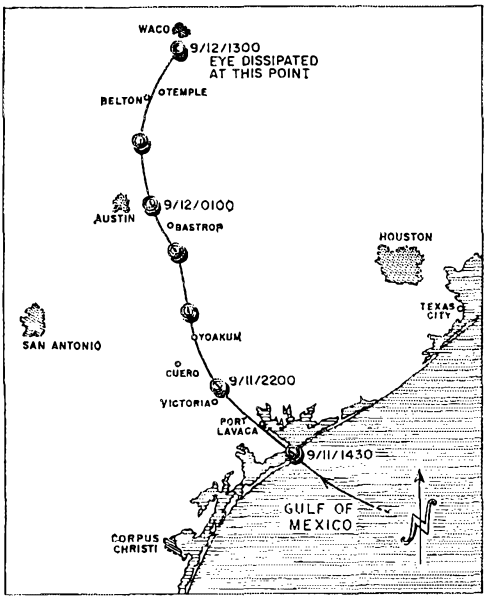
BY GEORGE HART,* W1NJM

HURRICANE CARLA was one of the most destructive of hurricanes. Coming in from the vast Gulf of Mexico, her eye went inland on the Texas Coast at Port Lavaca, traveled a few hundred miles and then gradually broke up into squalls, downpour and, just to write a ghastly conclusion to an already grizzly career, tornadoes. All hurricanes have these potentialities, but Carla made the most of them, exploiting all to wreak the greatest damage possible. Her wide area of low pressure brought high tides and salt water flooding. Her counterclockwise winds blew down thousands of houses, creating an exodus unparalleled in Texas history, fraught with difficulties caused by the dumping of millions of gallons of water on the countryside, along the roads, in the cities, and she wound up her orgy of fury by hurling tornadoes like well-aimed lightning bolts at several spots along the perimeter of her main area of destruction.

The map follows the course of the eye of the hurricane, but Carla was one of the largest ever, and her destructive power was not restricted to the immediate area of the eye. On the contrary, it extended for hundreds of miles in all directions, her churning winds chewing away like a giant buzz saw at the Texas Coast and on inland from Corpus Christi to Galveston and beyond to Brownsville and Port Arthur, inviting the ocean into coastal cities, deluging others with rain, driving people, animals and even reptiles from their homes into unaccustomed places. Hurricane Carla was a manifestation of an erratic Mother Nature on a rampage.

The amateurs along the Texas Gulf Coast, as well organized as anywhere under the leadership of SEC Jerry Sears, W5AIR, and RACES State Radio Officer Frank Cox, K5TRY, did a job of emergency communicating during this disaster the praises for which are still echoing, and reports of which are still reaching us as this is being written, late as it is. The list of amateurs reported to us as having taken part looks like a roster of all the amateurs in Texas, Louisiana and other adjoining states, but we know that even so it is far from complete.

* National Emergency Coodinator, ARRL



How to Write Up an Emergency

Many reports received were sketchy, spotty. We knew that somewhere in the pile there reposed a concise, complete, chronological account of what the amateurs did and how they did it. The trick was to dig out the pieces and put the puzzle together. The first thing to do was to make a complete list of all amateurs mentioned in the reports, to make sure that all would ultimately be mentioned in the write-up. Then came the task of reducing and paraphrasing each report to the basic facts of emergency communications life. This done, we had but to tie each report to each other report by dint of studying times and geography involved, put a lead on the front, a supplement of calls not already mentioned and a peroration at the end — and there's your article. Doesn't sound hard, does it? Actually, it takes hour after endless hour stretching into days, weeks, full of frustration, and you wind up with something much less concise than you had hoped for. You turn it in, hoping that the next major emergency will be a long time coming.

This emergency was no different from any others in that respect. Everybody tells us what a wonderful job the amateurs did and many give us extensive lists of the amateurs who did it, but there seems a reticence about telling us *what* they did, *how* they did it, *when* it was done and specifically *where* these things took place. Sometimes it seems as though there is a great deal more interest in seeing that each individual who took part gets his Public Service Award than in seeing that the record of the amateur service be accurately and completely chronicled.

Nets

But enough of this, let's get on with the write-up. Most of the net operation in the emergency took place on the crowded 75-meter phone band. Principal among these were the Texas

RACES Command Net, the South Texas Emergency Net, the West Gulf Emergency Net, and the Louisiana Delta Net. Some nets were on 80 c.w., such as the Weather Amateur Radio Net (WARN) and the North Texas Net (NTX). Then there was the 7290 Traffic Net, which was in continuous session throughout the emergency period from Sept. 9 through Sept. 11.

Naturally, the boys on 75 had their troubles. The usual QRM was aggravated by evening propagation conditions causing long skip; thus, the QRM was coming largely from stations outside the disaster area who knew little or nothing about the hurricane, and some of whom apparently cared less. Frequencies were cleared, with the aid of the FCC District Office in Houston, on both the low and high ends of the band which, once established, were well guarded and protected so that operation could continue unhindered. Even so, many amateurs from outside the area had to be used to relay information and traffic from station to station within the disaster area. Little use was made of the v.h.f., except by the West Gulf Emergency Net and one or two local nets. Even most of the latter used 75-meter phone.

Preparation

Hurricane emergency operation was preceded by extensive preparation. For example, W5FJU in Freeport noted the Red Cross long-range forecast in July that a hurricane would hit the Texas coast in mid-August, give or take a month, and started preparation for emergency operation almost two months before Carla actually appeared on the scene. Other RACES, AREC organizations and emergency nets were kept informed of the path of Carla as she approached and were ready for her when she arrived. Our techniques on such things are far advanced from 1900, when a hurricane engulfed Galveston Island and 5000 people perished. This hurricane was worse than that one, but they knew it was coming and were ready. Without amateur emergency communications, however, Carla might easily have taken *more* than the 5000 lives claimed by the 1900 breeze.

Reports

We asked South Texas SEC W5AIR and Texas State RACES Officer K5TRY to collect all information and consolidate it into a chronological sequence of events, but this proved an impossible task. Too many things were going on at once at too many different points, and Carla was too big a hurricane to have a well-defined path of destruction. Thus, we'll just summarize the over-all reports, then take the ones covering smaller areas and finish off with amateurs not mentioned theretofore.

Probably the most extensive report received was that from SEC W5AIR, who starts from the very beginning. Hurricane Carla was born, it appears, between the hours of 1400 and 1700 EST on Sept. 6, in the Caribbean Sea, and obtained hurricane force in the area about 430 miles

Some 67 men were isolated by Carla in the Carbide Plant at Texas City. Two of them kept the rest in touch with the "outside world," operating club station K5BHF. Above are K5VHH (foreground) and K5EFH, who did the operating. "It wasn't so bad," said K5VHH. "At least we were inside where it was dry."

southwest of Key West, Fla. All weather eyes focused nervously on her path as she passed through the Yucatan Channel into the Gulf of Mexico to threaten the entire Gulf Coast from the tip of Florida to the Coast of Mexico, depending on which way she headed. As she slowly but inexorably ground her way across the gulf, by the late morning of Sept. 9 it became apparent that she would strike the Texas Coast, and amateurs in southern Texas sprang into action. Some had gone on alert, with their nets, on the 8th; the rest became active on the 9th. The South Texas Emergency Net activated all three of its sections: a.m. on 3855, s.s.b. on 3810 and c.w. on 3780. West Gulf Emergency Net went on alert at 1426 CST Sept. 9 on 3995 kc. and 50.4 Mc. under W5AIR and W5BGA respectively. K5HZR activated the 7290 Traffic Net. The Louisiana Delta Net on 3905 kc. s.s.b. went into action under W5GKT. And the Texas State RACES net was alerted by State RO K5TRY on 3996. Local AREC groups were activated in Harris County (Houston), Nueces County (Corpus Christi), Orange, Port Lavaca and Point Comfort.

As the hurricane moved in toward the Texas Coast preparations were made for the evacuation of many thousands of people from coastal areas, and this posed additional communications problems. Some towns were completely evacuated. In the Houston area, 35 public buildings were opened as shelters and each was provided with amateur communication, either mobile or portable with emergency power on 3995 kc. or 50.4 Mc. Communications were furnished for Red Cross, Civil Defense and other agencies.

SEC W5AIR kept busy checking into WARN for latest weather advisories and into various other nets in the section, including STEN, RACES and WGEN. Amateurs were busy in Texas City, too, keeping the communications lines open for the Union Carbide and Monsanto plants down there.

Carla's eye remained stationary in the Gulf, about 65 miles due east of Corpus Christi, for

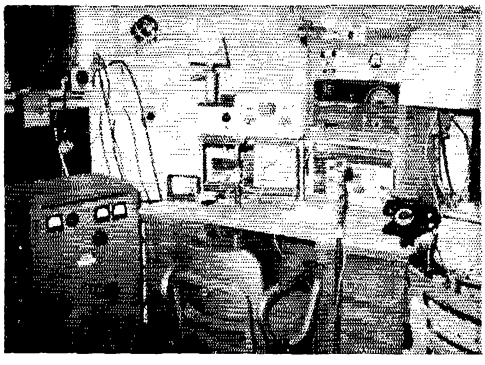
about six hours on Sept. 11, as though unable to make up her mind. Then, some time in the late morning or early afternoon of Sept. 11 she struck inland in the Port O'Connor-Port Lavaca area and proceeded to tear up the countryside in a northwesterly direction. Amateurs of the Port Lavaca and Point Comfort Amateur Radio Clubs were ready for her. W5URW was in action at the Port Lavaca courthouse, as was W5BQN at the Red Cross station in Point Comfort, the latter under W5ZPJ's direction. On the tenth, the courthouse lost its commercial power and went on emergency power until the following Wednesday. Early Sunday (10th) telephone lines out of Port Lavaca went down and the sheriff's radio antenna was damaged, amateurs then being the only means of contact until the following Wednesday. The eye passed over Port Lavaca Monday afternoon and everybody took a breather for a couple of hours until the back side of the storm passed over the area. Civil defense, welfare and press traffic kept everyone busy for some time. By Tuesday morning the winds had abated and the tides were down, but traffic remained heavy. The operators at c.d. headquarters and at W5BQN were relieved by W5JZP and K5DJC, who came down from Edna to take over.

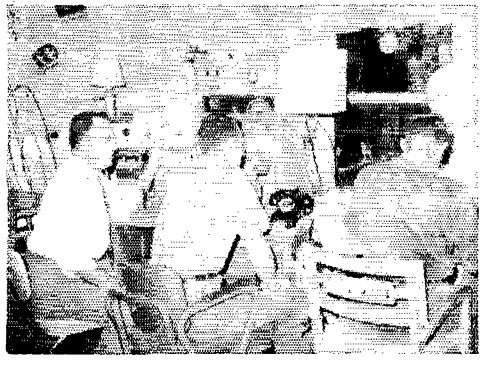
To assist in maintaining contact with many coastal towns that had been hard hit, five s.s.b. mobiles from Houston came to Port Lavaca on Tuesday, Sept. 12. These were manned by *W5s* VWF CQI BRM SDA YVJ FDZ HUX and K5JLQ. K5PJB mobile arrived later, from Commanche, and these six mobiles furnished reliable around-the-clock communications between outlying towns and c.d. headquarters until Sept. 14. W5BQN at the Red Cross was secured on Wednesday and W5ZPJ got his home station on the air and handled welfare traffic until the following Sunday. Operators on duty at c.d. headquarters, Port Lavaca, during the Storm were W5URE, W5KTC and K5DNA. Operators at W5BQN at Point Comfort were *W5s* SPJ and SBL. *K5s* DRA and DQG assisted with welfare traffic after the storm was over.

Texas C.D. Communications Officer K5TRY summarizes the RACES operations and sends along reports from the Houston and Corpus Christi radio officers. The Texas RACES Command Net was activated at 1200 on Sept. 9 to clear the frequency (3996) and assist in handling evacuation traffic. At 1330 the primary state control station, K5GDH, assumed control. On special request, FCC cleared channels at 7245–7255 and 3990–4000 kc. for emergency operation. K5GDH remained on the air continuously from 1330 Sept. 9 until 1800 Sept. 14. Operators on duty during this time were *W5s* OHR FJD HFG, *K5s* ERF RDJ ZOZ MER EBZ PFG YCZ VZG VZK PVP CNE PKJ UFB and W2TVG/5. Operation was from K5GDH's home, with a six-meter link to the control center. Among those who performed outstanding service in the network were K5HZR in San Antonio, who kept the 7290-kc. net open; a 14-year-old operator named Bill Gordon (call unknown) who operated K5HRR at Smithville for some 50 hours without relief and was the only link with that county for several hours; W5URW, who kept the circuit open to Port Lavaca, as already mentioned and K5PKO of Bay City who, forced to evacuate, put K5TRY on the air while Frank was busy elsewhere, then later returned to Bay City and began handling traffic from there. Skip troubles brought some distant amateurs into service at night to keep things going. Those helping to serve as relays included *W0s* AYL NNW VCB, *W7s* HDS CMI and K9IVG. The 75-meter frequency was shared with W5AIR's West Gulf Emergency Net, and the two nets worked excellently together.

RO W5VW from Houston reports that power went out at that point on Sept. 10, and he operated mobile as long as possible. A gasoline-driven generator will be on hand in the future. Even so, he was able to get two rigs going and supply a number of operators and mobile rigs for the job to be done.

From Corpus Christi, Radio Officer W5QEM reports that they went on 24-hour standby on Sept. 9, operating on 3855 kc. from the Red Cross building and using a 2-meter link for intercity work, with units scattered about town in strategic locations such as the Weather Bureau,





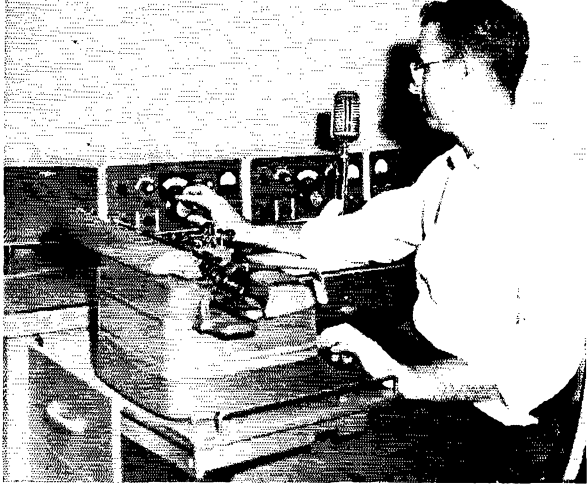
K5GDH, before and during. At left is the Texas RACES Command Net control station ready to go, as it always is. At right, the station as it looked while Carla was doing her worst. Operators are, left to right, W5OHF, K5GDH and K5RDJ. Operators changed on regular schedules.

police station, mayor's office, newspapers and broadcast stations. Two meters worked fine for this purpose, under EC W5AQK. Additionally, W5BRZ was leading a group at Sinton and had San Patricio County pretty well covered with *W5s* VPI TYJ UUB ZX and K5WTK. W5OUA offered his services to the Red Cross in Rockport but was turned down. But all in all, the amateurs did an admirable job.

Outstanding during the emergency was the work of the South Texas Emergency Net, one of the oldest and biggest in operation. Net Control W5CIX sends in a long list of STEN members who participated in the emergency work.[1] The net was first alerted at 1500 Sept. 9, was given emergency clearance on 3810 and 3820 kc. on Sept. 11 and remained in this status until the evening of Sept. 12. STEN was also active on 7210 kc., its 40-meter section under W5SCI. Jack mentions the excellent work done by K5CBZ, who was confined to an iron lung in Corpus Christi and had emergency power for both the lung and the rig and wasn't going anywhere anyway, and of K5BJU of Houston, who took over as net control with emergency power when power was lost in Houston and the regular NCS had to QRT, for eight continuous hours without relief.

Through devious channels we procured a copy of *Stenscope*, the bulletin of the South Texas Emergency Net, with details of some of the operation during Carla conducted by various sections of the STEN organization. Space does not permit us to go into this much detail, but we feel we should list some of the actives listed in *Stenscope* that did not "make" W5CIX's list above.[2]

A big job was done in Corpus Christi during the Carla emergency. Nueces County EC W5AQK gives us a good report. Amateur operation was conducted on 75, 6 and 2 meters, the latter to tie the 75-meter net with the 6-meter Bluebonnet Net, K5YXG serving as liaison. A two-meter link was also arranged with the STEN SSB Net on 3810 kc. through W5QKF. Operation started Saturday, Sept. 9, and was in full tilt the following day, assisting with the evacuation of beach areas. Most operation was by emergency generator, commercial power gradually going out as the hurricane's effects were felt. Gusts of wind up to 173 m.p.h. were felt on Monday morning, Sept. 11, as Carla remained stationary 50 miles out on the gulf. Then she started moving northward and the winds gradually dropped off. W5MS, the Corpus Christi Amateur Radio Club Station, remained on the air the full 84 hours of the emergency, handling traffic for disaster and relief agencies and many welfare messages. EC



W5YHX tunes W5GQJ for a weak one during Carla. This station is located in the State Disaster Control Center in Austin and is just one of hundreds that did such a wonderful job in the height and aftermath of the worst hurricane in Texas history.

W5AQK gives special tribute to W5ZN, who worked around the clock to provide Port Aransas with its only means of outside communication. But there were many other red-eyed and fatigued operators of the immediate area worthy of commendation.[3]

In the 7290 Traffic Net, K5HZR was outstanding with long hours on the air. K5BWM handled an extra-heavy traffic session as NCS. K5CRJ represented Galveston area and handled nearly all the traffic to and from Galveston. K5DWE went mobile to Port Lavaca, and W5GXA reportedly worked 72 hours without sleep. These are the most noteworthy, but a great many others performed service in this net.[4]

In Bee County, EC K5FPJ and W5PIL set up a station in the Bell Telephone Co. basement, where emergency power was available. No count of messages handled, but K5FPJ says there were plenty.

Operations in Orange County got under way Sept. 8, with Hurricane Carla still some 400 miles out in the Gulf. The Orange Amateur Radio Club called the 6 Meter Emergency Net together at 1400 CST, with club station W5ND as net control. Rigs were set up at Radio Station KOGT, the Red Cross, Stark High School, Cove Junior High School, Bridge City High School, West Orange High School, the Odd Fellows Hall, First Methodist Church, Little Cypress High School, Vidor Fire Department, National Guard Headquarters, the Navy Base, CAP Headquarters, Wallace High School, Orangefield High School and the Sheriff's Department. These stations were manned from Sept. 8 at 1600 until the all clear at 1630 Sept. 11. However, some of them were activated again the next morning at 0400

[1] *W5s* AIR AEL BD CIX DGI ETA FKE IVU MSA OUA QKF SG URW UNE ZPJ, *K5s* BJU BZS CBZ DCT DFL HAL IBT JOY KRZ PPV SCR SJA SOV SOT TLP UMH VEN, KØTOA.

[2] *W5s* BRM BES CVQ CRO HSX IZJ IGJ IT LMU MS OUH PIL RTF UUB UME VPI VYJ WPC ZN ASD BGY CXB FOL IBJ JBU JEU KND PEV PUS SAC SOL TSM WPK ZAK; K4EID, W4BAW.

[3] Not already mentioned: *W5s* BOY BKG DQQ GMI GPV HQR INN MX PC QEM SIL UUC WQF YCV, *K5s* CNF EWK EGD EBK GGB GBK LJI SAR TXG YRW YAW.

[4] Such as *W5s* AFI ARY FBJ HIT VW VBT DND EIJ HUS ILL KSI KTZ IZA MXO OUA QAT QXV RGT VZB YIF, K1HMQ 5.

and remained active until late afternoon because of flooding caused by high tides. W5ND handled much welfare traffic, K5QET doing the bulk of the operating, occasionally relieved by other operators and by K5AVN at his home station. Over 30 amateurs were active in this AREC performance, always one of our best.[5]

Wharton County EC W5FBI reported having handled 13 messages during Carla, one of which was a message regarding a funeral for a body recovered during the hurricane. K5DCT was also involved in this incident.

An outstanding job was done by W5FJU in Freeport and later in Angleton. Operation commenced on Sept. 8 from Freeport, with traffic to W5EBH until his beam, telephone and lights went out, then to K5AKY, K5DFT and later to W5AWG and W5BGA. On the 9th the station was evacuated to Angleton, but atmospherics were so bad they were unable to work into Houston until the beam was put up — a good trick in 100-m.p.h. winds and driving rain. W5FJU served civil defense by setting up on teletype and getting weather reports direct from Miami in lieu of the Sheriff's teletype, which was out. On Sept. 11 they returned to Freeport and found much damage, with insufficient communication with the outside; so they set up and went to work again. *K5s* AKY DFT PZM LEP and W5BGA came down from Houston to relieve the regula crew, which consisted of K5UYU and W5BAM in addition to W5FJU. During the nine-day operation, communications services were performed for the mayor, chief of police and city manager of Freeport, the water superintendent, National Red Cross officials, c.d. officials, the county commissioner, sheriff's deputies and many high ranking officials of the Texas Army National Guard.[6]

At the request of c.d. officials, members of the Jasper High School Radio Club installed antennas and equipment at the city hall of Jasper, Texas, on Sept. 9. K5PFL then reported into the South Texas Emergency Net from his home and operation was switched to the city hall station using the same call. The station was on the air continuously until Sept. 12, a total of 75 hours. Standby transmitters and emergency power were available if needed. Most operation was on 7210 and 3810 kc. Messages handled totalled 55, some direct from official to official and some welfare. The Jasper area, while not affected by the storm, was flooded with evacuees and a communications problem definitely existed to keep c.d. officials in touch with Jefferson County headquarters and establish contact with state c.d. and Red Cross concerning care and feeding of the large number of people. Even after the storm was over, telephone lines were overcrowded and the amateur facilities were put to good use. Much local praise was given to the operation of this station by *K5s* OTG PFE PFL ZJK JFM and W5NIY.

Amateurs in Louisiana were active, too. W5GKT spent many hours as control for the Louisiana Delta Net, without sleep. W5ISP reports that quite a number of amateurs were active in Northwestern Louisiana.[7] And during the hurricane alert, Louisiana Area 6 C.D., manned by AREC members at Lafayette, La., received word that a tornado spawned by Carla had struck Kaplan, La., six miles away. Assistant EC K5SGK went mobile and took K5UEZ/mobile, K5CHK mobile, K5VJZ and K5YRB to Abbeville and with K5QXQ set up a relay line on 3860 kc. In spite of heavy QRM, 24 vital official messages were handled until some land lines could be run to the tornado-stricken town.

A twenty-meter net was formed under the control of K4ZRY. With local emergency work being performed on 80, 40, 6 and 2 meters, this 20 meter net handled mostly weather information, long-haul emergency and welfare traffic, with stations from all over the U.S. calling in to offer their services.

The Weather Amateur Radio Net (WARN) operated from Sept. 8 through Sept. 13 on 7115 and 3795 kc., mostly controlled by W5CEZ, K5LZA and K4AKP, during that period. This net's chief function was passing along information on storm progress and weather conditions, although some traffic was also passed. During the five-day period a considerable number of amateurs from all over the country contributed to this activity.[8]

A few miscellaneous items of interest, conveyed to us by W5AIR: Mobile *W5s* OP IKX (with K5IBW), *K5s* TCD and VOW operated many hours during the storm at Webster, Texas, 25 miles from Houston, later supplemented by W5FJG mobile and K5KGB. W5FJG got a reputation as a "can do" artist when he procured a wrecker from Ellington AFB to pull some of the fellows out of the mud, and later a doctor when one was needed. K5MWH operated his mobile after his home and ham gear were under water at Baytown, handling traffic for the Red Cross Shelter there; at least three other amateurs in Baytown were flooded out. W5JNW mobile operated many hours from the parking lot at Red Cross Headquarters in Houston, later relieved by K5VJA mobile and K5VOW mobile. Advised that he could leave, W5JNW elected to stay on because there were too many people who might need communication. K5KGB mobile cruised the streets locating downed power lines;

(*Continued on page 134*)

[5] Not already mentioned: *W5s* APE CIF CIM ICL NMV QEY QLE RCG RLS, *K5s* AAM ATS BJB CGZ CGU EVE HMB LNV PCT PIH ROA RJQ RTB RZB RZF SUB TDL UVE VXP YIY YPJ.

[6] Other amateurs with whom traffic was handled: W5BAM, *K5s* OIX ZNE GVX.

[7] *W5s* ARL FYZ GZT ISP IGQ KQS KAT PJW QIX TEB VMC ZBC ZUA, *K5s* ZQY DWM TXQ WOD FQL QLD, K4ABG/5.

[8] An incomplete list: *W5s* ASA AHC APX BVG DS EA FKX GIV IGZ IV JMY NMV PXN VLW ZNH ZAY, *K5s* ABV BES ESN EJU FPS HMB JFP JCC KLA KUR LGU OKR PFG PXV PSK QWR RKW TEC TYW WNH YOQ, *W3s* EOV CVE, *K3s* JYL QOK JYZ LKF MZY, *W4s* SHJ PNM BVE PIM IYT MLE ROM ATF SHA PED, *K4s* LNJ UBR YUD PWE JDW SGQ CNY KDN KON CPX, K8MIY/5, *W0s* OHJ OKO.

Correspondence From Members-

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

OSCAR

¶ MAY I EXTEND MY CONGRATULATIONS FOR A JOB WELL DONE! — *HERBERT HOOVER, JR., W6ZH.*

¶ THE SPIRIT OF THE FATHER OF RADIO EXTENDS ALL GOOD WISHES TO THE AMERICAN AMATEURS RESPONSIBLE FOR OSCAR. — *MRS. LEE DE FOREST.*

¶ OSCAR HEARD 0055 GMT THIRTEENTH STRENGTH NINE CONGRATULATIONS — *RADIO SOCIETY OF GREAT BRITAIN.*

¶ The message "Oscar in orbit" was one of the most inspiring I have received in many years. This is truly an accomplishment of great magnitude. For me, the most important part of the Oscar program is the spirit and enthusiasm which started it and saw it through to success. It confirms once again the initiative and vitality which exists in our free world. This is indeed most encouraging. My congratulations and best wishes for further successes to your organization. — *Alexander M. Poniatoff, Chairman of the Board, Ampex Corp.*

¶ Not only ham radio operators but persevering amateurs in every field should share with the Oscar group the thrill of having put over a space age first that keeps saying hello around the world. With the passage of two weeks of continuous operation, the success of Oscar has been solidly confirmed. Congratulations to all who took part in the Oscar program. — *L. Eugene Root, President, Lockheed Missile & Space Co.*

¶ Congratulations to the Project Oscar Association and to ARRL for the first amateur radio satellite in orbit. This event will increase our knowledge of the universe and add laurels to the credit of amateur radio. This is a fitting memorial to Marconi's transatlantic message sent 60 years ago, December 12, 1901. — *J. A. McCullough, W6CHE and W. W. Eitel, W6UF.*

¶ Oscar is a "HI" point not only in the history of amateur radio but also in the history of radio itself. Let us hope that Oscar's progeny will fill the skies with messages of international good will. Mike Villard, W6QYT, joins me in congratulating you on the success of an enterprise of which we can all be proud. — *Victor R. Frank, President, Stanford Radio Club, W6YX.*

¶ We are very glad to present to all of you our most sincere congratulations for the outstanding performance in the Project Oscar. — *Eduardo Grillo, HK3CV, President, FCRA.*

¶ Recorded Oscar early this morning and KRLD-TV ran on evening newscast. Also WFAA and KLIF both had news bulletin so I knew about launching by the time I arrived home. Congratulations. — *Roy Welch, W5SLL.*

¶ Please congratulate all affiliated with the Oscar project, on behalf of the v.h.f. group in Sydney. Passover recorded on tape. — *H. J. Hart, VK2HO.*

¶ Congratulations on the fine job. It is gratifying to see the favorable publicity. Tracked Oscar three times. — *Irma, K6KCI; Lou, K6GHU; Lynn, WA6IBR.*

¶ Only in our great country is it possible to place in orbit a civilian satellite — one that speaks a language understood by radio amateurs on both sides of the Iron Curtain. Every one of us should be grateful for this miracle. It makes us proud to be American radio amateurs. Profound congratulations! — *Sophie K. Heintz, W6SH and Ralph M. Heintz, W6RH.*

¶ Congratulations to everyone in Project Oscar for a job well done. Oscar by far is the greatest accomplishment in amateur radio history. Many excellent ideas will come from material gathered on Oscar I and the future will be even greater for the fine fraternity of radio amateurs. Long Beach *Independent* as well as *Press-Telegram* newspapers gave front-page copy to Oscar. — *Microwave Society of Long Beach, Ralph Steinberg, Trustee, K6GKX.*

¶ Oscar picked up here Wednesday A.M. Cleveland *Press* carried story Wednesday editions. Channel 5 WEWS-TV carried film of my reception and sound of Oscar, with good reaction. WGAR carried story also. Congratulations and 73. — *Joseph Zelle, W8FAZ.*

¶ Congrats to ARRL on the Oscar publicity and those who implemented this project. — *SCM Henry Sprague, W1CHR.*

¶ Wonderful job you are doing on all, especially Oscar. — *John F. Tate, W4LPG.*

TRANSMATCH FB

¶ Just a line to let you know how well the "50-Ohmer Transmatch" in July 1961 *QST* works. I have made 1/1 s.w.r. on 10 & 15 anywhere in the band and 1.15/1 on 20 which is a remarkable improvement. It is very easy to tune once you get the hang of it and produces excellent results. I use it with a TA-33JR beam which formerly had 2/1 on 20, 1.6/1 on 15 and 1.3/1 on 10 at resonance. I think everyone should build a "transmatch" coupler.

Keep up the good work! — *Stuart H. Willcox, K9VJE, Rockford, Illinois*

LEUTZ STORY WANTED

¶ I need information about Charles Ronald Leutz who built the mid-20's line of Silver Ghost (and other) receivers and who wrote the 340-page book, *Modern Radio Reception* in 1924 and revised it in the immediate years thereafter. He operated as "Experimenters Information Sevice, Inc., 476 Broadway" and listed his business card in back of book as "Charles R. Leutz, Consulting Engineer, Forest Hills, N. Y."

I have made patient searches, with ample staff assistance, in the public libraries in Raleigh, Fayetteville and Charlotte but drew perfect blanks. . . . Won't you please pass this note on to anyone who might help me with some information? — *Wayne M. Nelson, W4AA, Box 72, Concord, N. C.*

GIFT HANDBOOKS

¶ The program of sending ARRL *Handbooks* from Stateside hams to overseas amateurs has been moving very well.

I need more amateurs who will mail their extra handbooks to DX amateurs overseas. I also need names of deserving DX stations who desire a ARRL *Handbook.*

I hope I can generate support for my program. I feel that we can make more friends in other countries by putting more information in their hands. My being in the USAF and visiting many of the various countries I can appreciate the effect of a DX ham receiving a helping hand thru a ARRL *Handbook.* Any further information can be received by contacting me. — *Pete Smith, K9VRN, 4, 1940 Richmond Rd., Petersburg, Virginia*

MARCONI'S MIRACLE

¶ In regard to "Marconi's Miracle", in December, *QST:* I certainly do recall the "Marconi Sends 'S' Across Atlantic", headline in the New York *Evening Journal,* not realizing then that after a time I would be working for Mr. Marconi.

I wonder if there are some "older heads" around today who recall "older heads" at the time, "murmuring in awe and consulting their Bibles" at this wonderful event? — *Richard Y. Sandford, K2YEK, New York, New York*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, W1DGL, Ass't. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

Attention DXers and Novices. There are two major ARRL operating activities this February, each designed for separate types of interest.

The *28th Annual ARRL DX Competition*, announced on page 20, January *QST*, will have lots of DX participation. The two week ends for phone and two week ends for c.w. during February and March increase the chance that conditions will be fruitful at least one month. Overseas amateurs get a chance to advance their WAS standing. The DX Contest is the best way for newer DXers to get started on their first 100 countries for DXCC.

The *Novice Roundup* can expand personal operating ability of the Novice. Just a little time each day, February 3 through 18, as you run across a contestant sending CQ NR, will give you many QSOs in your log to report. The Novice Roundup also invites Oldtimers to work Novices and impart proper operating technique to the newer licensees. An ARRL Code Proficiency certificate, obtained by submitting copy of a monthly W1AW or W6OWP run, can be claimed by Novices for bonus points. See page 24, January *QST*, for proper log form. And don't forget to write ARRL for free log forms. Good luck in both of these ARRL activities.

Greenwich Mean Time. With Oscar in orbit, this gave thousands of amateurs a challenge to intercept Oscar's signals. Without such a common time language as GMT, how could W1AW have given out understandable prediction data? Oscar's activity reached out to every time zone and continent on the globe.

With this striking example of amateur radio's use for universal time, GMT has come into full vogue in Sweepstakes exchanges, and schedules of all kinds, especially for those across time zones. Every up-to-date station should have a clock in GMT, in addition to local time. For newcomers who need to review the whys and the wherefores of GMT, we suggest a careful reading and study of "World Time Keeping," an article by W4RXY which appeared in April 1961 *QST*. It is not enough to leave GMT to the DX and traffic men. Oscar proved Greenwich Time essential for precise clear reporting of the intercepts for scientific evaluation. All amateurs should standardize on using GMT. Official Experimental Stations and v.h.f. men in general will, we hope, in just a month or two have a new and challenging opportunity. ECHO II is to be a rigid 135-foot sphere in a much lower orbit than ECHO I. The chance for working new states using "bounce" QSOs on 144 and 220 Mc. seems

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for November Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	239	2416	1714	672	5041
W3IVS	21	1078	1019	46	2164
W0LGG	320	788	734	52	1894
K6BPI	76	892	811	86	1865
VE2AZI/W1	28	843	808	35	1714
K0ONK	132	650	615	35	1432
K2UAT	352	452	318	0	1122
W7BA	9	558	508	47	1122
K4AKP	56	526	488	36	1106
W9MM	1	560	530	5	1096
W0SCA	18	531	522	4	1075
WN4BMC	185	411	235	87	918
W7DZX	6	441	375	23	855
K3IMP	12	426	388	26	852
W6WPF	3	424	400	24	851
W3VR	59	392	361	7	819
W3EML	19	390	343	51	803
W4WHK	25	364	336	49	774
W8DAE	33	363	240	85	721
K4SJH	66	396	241	13	716
K6WAE	74	339	276	26	715
W9JOZ	4	343	341	1	689
K2UBG	13	353	294	11	671
W4PL	12	321	292	18	643
W0OHJ	3	318	302	16	639
W8UPH	10	307	254	53	624
WA2GPT	26	303	268	26	623
W0BES	47	288	256	32	623
W1SMU	20	307	273	16	616
K0LTJ	202	192	151	41	586
W4TUH	8	286	268	13	575
W1TXL	88	227	140	97	552
W0ZWL	1	381	2	168	552
K4KGB	151	230	166	4	551
W0BDR	4	302	223	12	541
W1AWA	36	228	103	173	540
K2GAO	117	208	154	55	534
K4UBR	57	258	197	22	534
K6KCB	23	264	227	16	530
K6EPT	25	250	149	101	525
W3WRE	27	247	165	81	520
W9DYG	45	249	188	25	507
K4GBS	183	162	153	8	506
Late Reports:					
K6WAE (Oct.)	1105	273	237	27	1642
K2GAO (Sept.)	212	303	265	38	818
W9ZYK (Oct.)	27	232	230	13	502

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6YDK	1635	91	58	28	1812
W4PFC	45	484	404	47	980

BPL for 100 or more *originations-plus-deliveries*

K0WWD	270	W9RTH	133	KL7DIR	
K9IVG/9	189	K8KMQ	128	(Sept.)	153
W2EW	184	W4CNZ	123	K0HGI	
W9IDA	184	WN4COR	122	(Oct.)	140
W2GKZ	179	W3NEM	120	KL7DIR	
W4PIM	165	K4RDX	119	(July)	137
KINPS/VO1		K8EFK/		KL7D1R	
	164	VO1	113	(Aug.)	113
WN4AKU	160	W4DVR	112	K6WAE	
K4DBT	151	W0ZLN	105	(Sept.)	109
K6GZ	151	WA2VAT	100	WA2CCF	
K4FSS	150	K4EVY	100	(Oct.)	103
K0EGL	147	Late Reports:		W4IDR	111
W0ANT	146			K0YRQ	107
WA2CCF	133	W4MLE			
		(Oct.)	175		

More-Than-One-Operator Stations

K2FO 129

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: K2GAO, WN4BMC, W5GY, K0VPH.

The BPL is open to all amateurs in the United States, Canada, and U. S. Possessions who report to their SCM a message total of 500 or 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.

increased. ARRL will give all possible assistance through orbital prediction data *in GMT*.

In Time Conversion, Watch Dates. In logging GMT with 4-figure entries remember that the time and date must go together with the *date* likewise in accordance with GMT. The ending of one GMT day at 2400 coincides with the start of the next day at 0000. At this time jot down *the next date* in your log, even though the date hasn't yet changed in local time. In recording satellite transmissions or bounce, you can best keep your time right on the nose by referring to WWV or CHU. ARRL Operating Aid No. 10, "Time Conversion to GMT," is available to League members gratis on radiogram request. Included are hourly comparisons of EST, CST, MST, and PST to GMT. The card explains 24-hour logging, and the meanings of the time zone letters often associated with date-time groups. In *date conversion* (as well as time conversion) note that the announcement of the Code Proficiency Program, and W1AW contact and bulletin schedules are given in GMT, so that in local time in the U. S. and Canada, these hours fall on *the evening of the previous day*. — *F. E. H.*

HIGH CLAIMED SCORES
1961 A.R.R.L. SWEEPSTAKES

Follows the high claimed scores for the 1961 ARRL Sweepstakes Contest held in November. Included are only those *claimed* c.w. scores over 150,000 points, and those *claimed* phone scores over 100,000 points. Should your log entry have qualified but not be listed below, drop a card to ARRL so that the difficulty may be ascertained. *QST* will carry the full *official* Sweepstakes Results as soon as checking is completed. Figures below show the score *claimed*, number of QSOs, and the number of different sections worked.

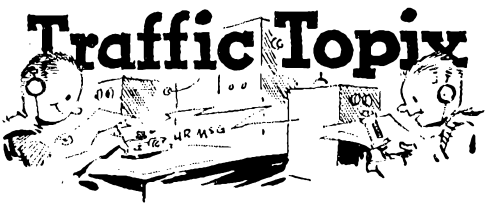
C.W.

W9WNV	288,624-	1586-	73
W5WZQ	287,255-	1582-	73
W9IOP	276,852-	1517-	73
K2DGT	255,500-	1400-	73
W4KFC	251,193-	1377-	73
K5UYL	226,665-	1242-	73
W4DQS	225,935-	1240-	73
K5VJT	216,639-	1226-	71
W9RQM	211,518-	1160-	73
W3MSR	206,043-	1130-	73
K4GSU	205,686-	1136-	73
W7KEV	204,765-	1125-	73
W2AYJ	204,400-	1120-	73
W3ALB	201,115-	1102-	73
K4TML	200,250-	1116-	72
K6CTV	198,540-	1112-	72
W8NBK	197,640-	1098-	72
K4PUZ/4	192,185-	1069-	72
W3HHK	189,973-	1041-	73
W6SBB	188,640-	1049-	72
W3GRF	187,610-	1033-	73
W2DMJ	187,063-	1026-	73
W0A1H/VE3	184,590-	1026-	72
W3GQF[1]	184,508-	1011-	73
W3BES	182,573-	973-	73
W4JAT	180,218-	990-	73
W0YCR	180,000-	1000-	72
W5BUK	179,640-	1002-	72
W1EOB	177,833-	1003-	71
W8OYI	177,323-	999-	71
W9ZAB	177,025-	970-	73
W6ULS	176,751-	973-	73
K4BAI	174,470-	956-	73
W2HDW	173,338-	996-	70
W3TMZ	171,733-	942-	73
WA6TGY	171,550-	940-	73
K4AMC	170,640-	963-	72
W3WJD	170,090-	935-	73
W9TIP[2]	169,680-	1212-	70
W3EIV	168,813-	925-	73
W3KFQ	166,075-	910-	73
W9RCJ	165,984-	910-	73
W6UTV	165,060-	917-	72
W3JNQ	164,150-	938-	70
W5CWX	164,250-	902-	73
K1HTV	163,478-	921-	71
W4CKD	162,856-	919-	71
WA6BUX	162,180-	901-	72
W9IPT	162,180-	901-	72
K8HGT[3]	161,525-	910-	71
W7ZMD	161,370-	911-	72
K5OCX	160,726-	908-	71
K8QJH	160,418-	883-	73
W1BIH	160,235-	881-	73
W4RQR	158,220-	879-	72
W1NJL	158,528-	919-	69
W8IBX	157,080-	928-	68
W6MVQ	156,426-	869-	72
W8AEB	153,125-	875-	70
W3GHM	152,843-	841-	73
W8FAW	151,650-	813-	72

PHONE

W0MLY	162,060-	740-	73
W7ESK	160,218-	796-	69
K5MVK	135,474-	702-	67
W5KC	134,784-	625-	72
K5MDX	131,948-	603-	73
K4LPW	131,847-	614-	71
K2GXI	129,824-	613-	71
K3DVS	116,903-	601-	65
K5ALU	109,935-	531-	70
W1HKK[4]	108,953-	500-	73
KZ5SW	104,910-	544-	65
W0AXE	102,027-	482-	71
W5MYM	101,184-	503-	68

[1] Multiple-operator station; [2] W9DOB, opr.; [3] K8HVT, opr.; [4] K1KTH opr.



The subject of the discourse this month will be "Counting Message Traffic" — how you count it, when you don't count it, and the different kinds of counting. This topic seems to be particularly timely these days because our correspondence concerning some of the traffic totals appearing in the BPL is on the increase. In one case (and probably several more) we have found the party in question to be counting incorrectly — not with intent to defraud, but simply in ignorance of the rules.

This sort of thing we can prevent, simply through an "educational" program. But our traffic count and our BPL operate strictly on the honor system. We're not about to demand to see any station's traffic file; we take the operator's word for it. This is partly because your "traffic" department doesn't have time or personnel to engage in investigative research, but also because we cling desperately to the belief that traffic men are basically honest and rule-abiding and wouldn't *want* to operate our BPL under any other rule. The basic principle is this: the count and the honors that go with it or come from it, as the case may be, are strictly incidental to the public service performed in handling the traffic. The primary objective should be *always* to *get the traffic handled*, correctly and efficiently. If you find that the best way doesn't give you the most points, there should be no question about which way to do it, in the mind of any traffic man worth his salt. Get the traffic handled the best possible way, worry about the count later.

The present counting system is about as simple as it can get, but admittedly it is not always equitable. It has one or two basic faults which might appear to discriminate against "iron men" traffic handlers if they are followed to the letter. It does not allow any extra credit for handling the traffic in "books," even though the book may contain hundreds of addresses. It does not allow any extra credit for a long text, or an especially difficult address, or the fact that you are handling it through exceptionally heavy QRM or QRN, or the fact that you only run fifty watts input to a poor antenna in a bad location. If we took all those things into consideration, we would have a set of rules as long as your arm, and as complicated as your income tax form. Traffic handling is not a contest; it is a public service. You deserve as much credit for doing it as anyone else — but no more.

The rules for counting traffic are in the booklet *Operating an Amateur Radio Station*, free on request to ARRL members, two bits apiece to others. We won't go into them here, but let's consider a few "what ifs" that have come up. For example, on book messages we show a book of four, with preamble, text and signature common and different addresses. What if the address is the same and the signatures and preambles different? Makes no difference, if sent in book form it still counts only one each time it is transmitted.

What about MARS refiles? MARS is not amateur radio; as far as we are concerned, any traffic handled by MARS might just as well have been handled by telephone, wire or the U. S. mail — and that's how we count. A message originating in MARS and received at your station is *re-originated* if put on amateur circuits, just as you would if you had received it by mail. The amateur origination does not carry the MARS legend in the preamble unless the message originally came from some foreign country which is not authorized to swap amateur traffic with the U. S. You give it *your* number, *your* station of origin, the *amateur* check, the MARS place of origin (if known) followed by *your* location, the time and date the message was received at *your* station. When you send it, it counts as one *originated* (not relayed), because as far as the amateur service is concerned, this message originated at your station.

We have complaints of amateurs "making" BPL in half an hour. Fellows, this is impossible. Making BPL is a hard job, takes a lot of time and effort. It might be possible to make it in one night, by originating 100 or receiving and

relaying for 500 points, but even that is going some. The only way you could originate 100 in a half hour would be in book form, and if done this way it counts as *one* originated. There is no "easy" way to make BPL — not legally.

Don't forget, messages that are held over 48 hours before relaying or delivering do not count. Also, strictly speaking, messages not handled in proper ARRL form do not count; this would rule out those without checks, those without complete address, and those in which you substitute the word "same" for a sizeable block of words or prosigns. Any message, to be counted in your traffic total, should be sent as a complete message, from number to signature. If parts are left out, it does not (or should not) count.

Thus, it is not "legal" to count 50 relays when you start out with a complete preamble and thereafter substitute "same" for the entire preamble except the number. Not according to present rules, anyway.

Service messages are counted the same as any other message, and they *do* carry a check. A service message is used only when you are discussing with another amateur the delivery status of another message.

The above refers to counting individual traffic. In counting *net* traffic, the same basic principle is used —that is, you give the net one point each time a message is sent from one net station to another during directed (by an NCS) net session. However, there is no breakdown, as there is in individual traffic counting, and of course a net cannot "deliver" a message — only a person can do that. If the NCS tells Station A to send 5 message to station B and he does so, that's five message points for the net. It's that simple. You do *not* count traffic handled during QNF (no NCS) or outside the net.

Hope this helps to clear up some questions on traffic counting. — *W1NJM*

—•••—

November Net Reports:

Net	*Sessions*	*Check-ins*	*Traffic*
20 Meter Interstate SSB	23	765	2475
7290 Traffic	22	1739	683
Early Bird Transcon	30	——	526
East Coast Traffic	4	22	68
Eastern Area Slow	30	92	27
Fourth Region Day	30	330	500
Mike Farad E & T	49	461	1095

—•••—

National Traffic System:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN.....	30	1126	.729	37.5	100.0
CAN	30	887	.571	29.5	100.0
PAN.....	30	1053	.626	35.1	100.0
1RN	53	632	.451	11.9	58.2
2RN.....	54	472	.355	8.7	90.9
3RN.....	60	1181	.427	19.7	100.0
4RN.....	57	663	.433	11.6	91.7
RN5.....	55	440	.261	8.0	83.9
RN6.....	50	655	.375	13.1	77.3
RN7.....	49	305	.201	6.2	42.6
8RN.....	47	284	.206	6.0	90.0
9RN.....	60	676	.515	11.2	63.7
TEN.....	85	771	.354	9.0	57.5
ECN.....	20	80	.190	4.0	70.0[1]
TWN.....	30	250	.277	6.9	78.0[1]
Sections[2]....	1222	7610		6.2	
TCC Eastern	120[3]	559			
TCC Central	90[3]	783			
TCC Pacific.	116[3]	620			
Summary...	1932	19047	EAN	8.8	——
Record.....	2025	24014	.931	12.6	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 reported: WSSN & WIN (Wis.); ILN (Ill.); NEB (Nebr.); BUN (Utah); Ohio Fone; NJN (N. J.); MDDS (Md.-Del.-D. C.); SCN (Calif.); RISPN (R. I.); Wis. SSB; GSN (Ga.); Fla. CW; VSN, VSB, VN, VFN; OSN (Ore.); QKS (Kans.); Texas CW & NTX; WSN (Wash.); SCN (S. C.); PQI (Hawaii); AENT, AENP Eve, AENT Morn, AENO, AENM, AENB (Ala.); Tenn. CW; NLI (NYC-LI); CN & CPN (Conn.); GSPN (N. H.); MSN, MJN, MSPN Noon (Minn.); S. Dak. CW, S. Dak. 75, NJQ; SGN (Me.).

[3] TCC functions reported, not counted as net sessions.

Another non-record-breaking month, but we hope it won't discourage anyone. We're doing just fine, considering the deteriorating conditions; and everyone is complaining about it, but few are dropping out. This is just the way it was ten years ago. Our cue is to keep on fighting, and for nets to help each other — especially those late region nets. Although it is not possible to schedule anything on a regular basis, NTSers who hear local nets having a tough time copying each other while all their signals are rolling in might QNI just for the purpose of helping out. And for the benefit of amateurs of less than ten years, what we are beginning to experience is the "down" part of the 11-year sunspot cycle in which "skip" becomes "long" after dark and stations near each other but not within ground wave distance are unable to copy each other, although 500 miles away your signal might be loud and strong.

All region and area net managers griped about conditions in November, so we'll just skip that part of their reports and confine ourselves to other remarks. *W8SCW reports* that all regions were 100%, first time in many years. W9DYG writes a long letter on the back of his CAN report urging adoption of the "help thy neighbor" policy among NTS nets. WA6ROF is about to get hitched; well, it was nice knowing you, Jer. W1BVR excuses some of the reason for the low representation in 1RN this month, but opines that most of it is dadgum laziness. Beginning Dec. 1, 2RN reverted to its former schedule with sessions at 2345 and 0045, in an attempt to combat poor conditions in the late session. Some of you other region net managers may want to consider this possibility, too; see CD-24 for the options. W3UE is getting more QRL work, but hopes to hang onto the manager's job. *W5GY reports* that traffic moving to XEland fine thru RN5; Mississippi is still weak; W4SEZ has been awarded his RN5 certificate. W8DAE has issued 8RN certificates to *K8s* ONQ MYU IUZ SQK EXE HLR and W8HCR; the net experienced QRM from the SS Contest during November. W0DUA finds that being a net manager interferes with his traffic handling. W0FEO is putting out some really terrific bulletin material for TWN these days.

Transcontinental Corps. Nets may rise and nets may fall, but it seems the TCC marches on forever. If a function is missed or fails, there are later functions to take up the slack. W1SMU, W0BDR and W7DZX are doing admirable jobs of hanging in there trying to get the job done under most difficult circumstances, and our hats are off to them. The TCC crew too (listed below) are to be commended for their efforts. If the traffic doesn't get through, it's not because we didn't have a darn good try at it, and that's about the most anyone could expect.

November reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern.....	120	71.5	1394	559
Central.....	90	91.1	1578	783
Pacific.....	116	80.9	1233	617
Summary.....	326	80.3	4205	1959

The TCC roster: Eastern Area (W1SMU, Dir.) — *W1s* AW EMG NJM OBR SMU WRF, *K2s* SSX UAT UYW, WA2APY, K3IMP. *W3s* EML FAF WRE, *W4s* DLA DVT, *W8s* CHT ELW UPH, VE2AZI, W1. Pacific Area (W7DZX, Dir.) — W5ZHN, *K6s* ZYZ DYX LKD GID, *W6s* EOT HC, WA6ROF, *K7s* IEY NWP, *W7s* GMC DZX, *KØs* EDH DTK EDK, *WØs* BES WME KQD WHE/7.

—•••—

In past months and years, in this column, we have honored several prominent traffic handlers: W4PL, W9NZZ and W3CUL, just to name a few of them. We don't remember ever having written a *squib* on Loyd Peck, W7BA, who has been gracing our BPL column for a good many years, usually right up near the top. In the post-war BPL honors, he rates third, only W3CUL and W4PL ahead of him — and if you don't think that's a lot of traffic handling, go back over the BPL and count it up! What's more, Loyd's traffic is not just junk; a great part of it is for servicemen overseas and other people isolated at Arctic, Antarctic, Alaskan, Far Eastern and Pacific bases and their families. Loyd has also received three special citations in the annual Edison Award for 1957, '58 and '59. Lest it be alleged that we are discriminating aginst one of our best, here is a salute to Loyd Peck, W7BA, a senior man among our senior traffic handlers

The RACES group of North Attleboro, Mass., held a combination field day and c.d. exercise on Sept. 9 and 10, 1961, under the leadership of RO W1JPJ. Here they are, pretty happy about the outcome: Left to right, K1TKW, K1NTS, K1PEF, W1JPJ, K1NFY, Eddie Herbert, K1PBI, K1IBP, K1CHD and Ray Lacasse.

A network of amateur operators relayed a distress call more than 500 miles on Sept. 6 to bring medical aid to ten persons injured in an automobile accident at Cariboo, B. C. First report from the scene came from KL7CPD/VE7 mobile. His emergency call was answered by VE7AOI, a lighthouse keeper at the northwest tip of Vancouver Island, by VE7FK at Ganges, by VE7AQQ at Royal Oak and by VE7XX in Victoria. VE7XX called VE7ST, a constable who telephoned the Royal Canadian Mounted police at Quesnel, resulting in three doctors and two ambulances being at the scene of the wreck in less than an hour. Frequency used was 3755 kc.

— • • • —

Little enough information has been received so far on the Southern California fires which were so destructive and in which we know there was extensive amateur participation. From K6OZA we have a brief report to the effect that on October 30 the Salvation Army Disaster Communications Net operated for 24 hours and a total of 1440 man hours and handled six messages for Salvation Army mobile units. Net controls were *K6s* PUI, MDD TRV, W6KKW and *WA6s* LOI NKL and GAG.

— • • • —

Two emergency reports from the Cincinnati area, thanks to K8WGH. On Nov. 20 at 2216 EST, K8WGH mobile was driving north on the expressway in Cincinnati, in QSO with K8YJR on 6 meters when, rounding a curve, he saw a car on fire in the southbound lane. He immediately notified K8YJR who called the fire department and within four minutes a pumper arrived and extinguished the blaze.

On Nov. 22 a large tractor trailer rig loaded with steel ran out of control on Kemper Road, overturned and pinned the driver. K8OPH mobile drove to the scene to volunteer his services, which were used by a WLW-TV camera-reporter to relay bulletins direct to the studio news room via K8RIZ.

— • • • —

In the afternoon of Nov. 22 an anxious mother appealed to W8ZEI of Steubenville, Ohio, to bring home her son, who had been taken ill, from elementary school. W8ZEI mobile picked up the child, but it was decided to go via a doctor's office, so he put out an urgent call for someone to pick up the mother. WN8AKN responded and transported the mother to the doctor's office. It was then decided to take the child to the hospital and W8ZEI mobile undertook this task while WN8AKN mobile called Steubenville police and arranged for an escort. Despite rush hour traffic, the trip was made in record time and the child was under medication within an hour of the mother's first appeal. WN8ALE was also involved by helping to clear the 2-meter frequency for the emergency. — *K8VBH, EC Steubenville, Ohio.*

— • • • —

On Nov. 25, amateur radio was instrumental in locating some lost hunters in the area of Splithand Lake, Minn., near Deer River. The hunters were first located from the air and radioed their position back to KØFFH at the 707th Radon Squadron, where WØAJJ was operating. The message was then relayed to WØDVG who relayed to W7JJM/6 and WØASF, both mobile operating with the sheriff's posse searching for the hunters, who were subsequently rescued.

— • • • —

At approximately 1841 EST on Nov. 27, an Air Force B-47 bomber crashed south of Plattsburgh, N. Y., just fifty feet from U. S. Route 9. AREC mobile units and fixed stations were immediately dispatched to the scene and a net was called. Some mobile units assisted state police and sheriff's deputies in maintaining road blocks. Stations taking part were fixed stations *K2s* FDW GJJ VXF, W2OZY, *WA2s* CEC DAC GNZ JLC JPB NVT THZ (NCS) TRI UHS WDW, and mobile stations K2MEB, *WA2s* GCH GLA HSB JJY JOI LAJ MSA PTZ RLW SNW. — *WA2GCH, EC Clinton Co., N. Y.*

— • • • —

The AREC of Pottawattamie County, Iowa, put on quite a "spook hunt" on Hallowe'en. The police force of Council Bluffs was supported by 20 AREC amateurs to help curb overzealous pranksters. There were groups on 6 and 10 meters, each with its own control. Each group was responsible for two of the town's four areas. Each unit was assigned to patrol of a certain neighborhood, checking schools, parks and other potential targets of mischief, maintaining reporting contact with control as they went. Other units were on roving patrol and available for dispatch to investigate reports from group units. As a result of this activity, Council Bluffs had one of the quietest Hallowe'ens on record.

— • • • —

Looks as though only *twenty-four* SECs submitted reports for October, representing 12,262 AREC members. Last October (i.e., 1960) we had 27 reports and 11,423 AREC members, so the increase in members represented continues and so does the decrease in SEC reports. October reports received from Tenn., Utah, Okla., Iowa, Minn., S. Dak., Nevada, Wash., Ore., E. Fla., Ohio, S. Texas, Los A., E. Mass., Maine, Colo., N. Y. C.-L. I., Ga., Alberta, Sac. Valley, Mich., Ind., Eastern Pa., Santa Clara Valley.

RACES News

Los Angeles RACES, on Nov. 22 & 23, had the beginnings of an emergency in the San Dimas Canyon area when a drainage area of approximately 100 square miles channeled to the valley bottom and resulted in considerable damage. The Red Cross director of the Pomona area alerted Area "12" civil defense. K6YCX, who is SEC of Los Angeles, was contacted and asked to provide emergency communications. Equipment was forthwith transported to the area, but was not needed that night because there was no immediate danger. The following day, however, the equipment was activated on 3850 kc. and contact established with K6OAG in Claremont. Contact was not satisfactory on phone so c.w. was used with complete success. By the time the net was established, an emergency situation no longer existed and the net was closed and equipment dismantled. — *K6YCX*

On Nov. 4 and 5, RACES amateurs in Valley Park, near St. Louis, Mo., took part in a c.d. exercise called "Operation Flood." Some 33 amateurs took part on 2, 6 and 10 meters in nets controlled from three points, two of them c.d. centers and the third a c.d. truck set up at police headquarters. The drill was based on the records of an actual past flood to give the exercise realism. Mobiles took various posts as the reports of rising water were received and detoured around spots supposed to be flooded. At one point a report of a real emergency almost broke it up, when a mobile reported an ice house explosion near Kirkwood; a mobile was dispatched to the scene, but it developed that no communications were needed. Other parts of the exercise included simulated sabotage, QRM, evacuation of population and the handling of some 935 messages. It was an impressive exercise, very educational, and a lot of fun besides. — *K0YTI.*

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

Feb. 2–4: DX Competition (phone)
Feb. 3–18: Novice Roundup
Feb. 8: CP Qualifying Run — W6OWP
Feb. 16: Frequency Measuring Test
Feb. 16–18: DX Competition (c.w.)
Feb. 20: CP Qualifying Run — W1AW
Mar. 2: CP Qualifying Run — W6OWP
Mar. 2–4: DX Competition (phone)
Mar. 16–18: DX Competition (c.w.)
Mar. 21: CP Qualifying Run — W1AW
June 9–10: V.H.F. QSO Party
June 23–24: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Feb. 9–11: QCWA QSO Party, Quarter Century Wireless Assn. (p. 10, this issue).
Feb. 10–12: NYC-LI QSO Party, South Shore Amateur Wireless Assn. (p. 100, this issue).
Feb. 24–26: First Rhode Island QSO Party, Providence Radio Assn., (p. 108, this issue).
Feb. 24–26, YL-OM Phone Contest, YLRL (p. 144, this issue).
Feb. 24–25: The French Contest (c.w.), REF (p. 62 this issue).
Mar. 10–12: YL-OM C.W. Contest, YLRL (p. 144 this issue).
Apr. 14–15: The French Contest (phone), REF (p. 62, this issue).

CONTEST NOTES

The following corrections are to be noted in the Field Day report of November *QST*. The map of call area leaders on page 23 has incorrectly identified the leaders in W9- and KL7-land. As the tabulation clearly shows, the highest W9 score was registered by the Northwest ARC, W9RK/9, with 10,338 points. Likewise the highest score from Alaska was made by the Adak ARC, KL7AIZ/KL7 with a final score of 3204. Apologies to these two clubs and congratulations on being tops in your call area. Also the Class B score of W6BAM/6 with WA6CFA should have been listed in the *two* transmitter unit/individual class, and thereby top scorer in that department.

—•••—

Add the following to the 1962 ARRL DX Contest Countries List that appears on page 22, January *QST:*

7G1.....Rep. of Guinea
9G1.....Ghana
9K2.....Kuwait
Delete the listing of ZD2.....Nigeria.

—•••—

In reference to the Sept. V.H.F. Party summary in December *QST*, K2LNS of NNJ should be listed as a single-operator station; however, W2GKR remains certificate winner as announced.

—•••—

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 in West Hartford, Conn., on or before noon 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 nomination form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the .....

.....ARRL Section of the.....

Division, hereby nominate.....

as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
North Carolina	Feb. 9, 1962	B. Riley Fowler	Apr. 11, 1962
Arizona	Feb. 9, 1962	Kenneth P. Cole	Apr. 15, 1962
Washington	Feb. 9, 1962	Robert B. Thurston	Apr. 30, 1962
Louisiana	Mar. 9, 1962	Thomas J. Morgavi	May 31, 1962
Quebec	Apr. 10, 1962	C. W. Skarstedt	June 10, 1962
Ontario	Apr. 10, 1962	Richard W. Roberts	June 15, 1962
Eastern Massachusetts	Apr. 10, 1962	Frank L. Baker, jr.	June 15, 1962

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.

New Mexico	Carl W. Franz, W5ZHN	Feb. 10, 1962
Virginia	Robert L. Follmar, W4QDY	Feb. 11, 1962

In the Maryland-Delaware-District of Columbia Section of the Atlantic Division, Mr. Andrew H. Abraham, W3JZY, and Mr. Carl E. Andersen, K3JYZ, were nominated. Mr. Abraham received 582 votes and Mr. Andersen received 192 votes. Mr. Abraham's term of office began Dec. 20, 1961.

FREQUENCY MEASURING TEST
FEBRUARY 16

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0230 GMT, Feb. 16. *CAUTION*: Note that since the date is given in Greenwich Mean Time, the early run of the frequency measuring test actually falls on the evening previous to the date given. *Example*: In converting, 0230 GMT Feb. 16 becomes 2130 EST Feb. 15. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3541, 7027, and 14,069 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0236. It is suggested that frequencies be measured *in the order listed*. Transmission will be found within 5 or 10 kc. of the suggested frequencies.

At 0530 GMT, February 16 W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3569, 7084 and 14,081 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on over-all *average* accuracy, as compared with readings made by a professional lab.

—···—

DXCC NOTES

A revised Operating Aid No. 7 (Countries List) is now available. Just drop a line to Headquarters and we will be glad to send you a copy.

DX CENTURY CLUB AWARDS

From November 1, to December 1, 1961 DXCC Certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

HONOR ROLL

KV4AA....318
W3JNN....317
W2AGW....317
W8JIN....317
W4DQH....317
PY2CK....316
W9RBI....316
W2HUQ....316
W6CUQ....316
W1GKK....315
W8BRA....315
W6AM.....313
W3KT.....314
W7GUV....313
W5ADZ....313
W8DMD....313
W8BF.....313
W9NDA....312
W1ME.....312
W9YFV....312
CE3AG....312
W3GHD....311
W6EBG....311
W8BKP....311
W8UAS....311
LU6DJX....310
W5ASG....310
W2BXA....310
W9LNM....310
G4CP.....310
W8KIA....310
W7GBW....309
W8KML....309
W1CLX....309
W2HMJ....309
W1JYH....309
4X4DK....309

Radiotelephone

PY2CK.....316
W8GZ......313
W8BF......312
W8RBI.....311
W3JNN.....309
VQ4ERR....308
W4DQH.....308
W8KML.....306
W8PQQ.....306
W7PHO.....306
4X4DK.....306
W6YY......305
CX2CO.....303
W6AM......302

NEW MEMBERS

UA3AW....188
G5GH.....142
W3FSF....134
SM5MC....126
OZ4H.....125
I1IF.....123
K5RFJ....115
W0QHT....112
KH6ACC....111
W5ELN....110
SP9ADU....110
ZP5LB....109
UB5UG....107
WA2ELS....106
SM3AFJ....106
W8RMF/5..105
W8NQF....105
UA2KAA....105
W3FHH....104
W2NR.....103
WA6LCK....103
SM3ASF....103
W7LZF....102
OL6ZB....102
DL9YC....102
G3EFS.....102
K5LXA.....101
K9PZH.....101
W0DRI.....101
WA2AEI....101
K5FKD.....100
W5MBB.....100
K6TAY.....100
W7OPO.....100
K8HFT.....100
W8USP.....100
I1BOL.....100
KP4APY....100

Radiotelephone

VK3AHO....242
W3FII.....215
CT1YE.....155
WA6HOH....150
CT1JF.....113
K8NZD.....104
F3YO......104
YU3OV.....104
W2OWL.....102
W2MM.....101
K1GHT.....100
K5LXA.....100
W8NQF.....100
F2KC......100

ENDORSEMENTS

W2ZX.....301
W7AC.....301
W1ZW.....300
W2QHH....300
DJ1BZ....300
OE1ER....300
W6UUY....294
K2OEA....290
W9WHM....290
W6CAE....284
W6FOZ....283
PA0FX....282
W4VPD....281
W2CYS....280
W3WGH....280
W4BYU....280
W4OPM....280
W2AEB....273
K9EAB....272
WA2IZS....270
W9FVU....270
W9GFF....262
W1GYE....261
K6LGF....253
W8ZCQ....253
IT1TAI....253
KV4BQ....252
VE2YU....251
VE7MD....250
W1AEW....248
K5KBH....244
W4BJ.....242
W1CKA....210
W4BFR....210
K4RJN....210
VE1WI....210
W1ICV....204
W6AEI....202
W4EEX....201
W6QDE....201
W9LQF....200
DL4TJ....200
W9ZTD....193
G2FYT....193
W5ACL....191
W6ABA....191
LA3SG....191
W1IKB....190
W4QT.....190
W0DIB....190
K2DJD....188
W6PHF....188
W7HDL....187
W6JU.....186
W2WMG....184
LA5Q.....184
K4TEA....183
K8ONV....183
G2AFQ....182
K8IQQ....181
W8IEV....180
HB9NL....180
F8SK.....177
W6WQT....174
YU3OV.....174
W4HUE.....171
KH6DKA....170
OZ7KV.....170
W0MAF.....169
W3HTF.....168
W8YGR.....165
F3DM......164
W4BHG.....160
W4PDP.....160
W6ERS.....160
W8BQV.....160
K8GHG.....160
K9GFK.....160
K8OHG.....156
K4TWF.....155
W8JAQ.....153
ZS5LU.....152
W3YZI.....150
K4TKM.....150
W0NCS.....150
KP4AQQ....150
ZS1ACD....150
W4ORT.....143
K1DIR.....141
W4NYF.....141
K2BG......140
W2MES.....140
K3DCP.....140
W3LSG.....140
W4W8Y.....140
W7STC.....140
K9OKD.....135
DJ5VQ.....133
W8KSR.....132
W8DSZ.....131
G2DCG.....131
G3LGL.....131
GC2CNC....131
W1OPB.....130
W2BWC.....130
W6VUN.....130
K0EUV.....130
K5UXP.....129
W2SQT.....125
W8CCD.....125
W9JUO.....125
W5NGW.....123
WA2HUV....122
W9YAE.....122
OH8NC.....122
WA2EGK....120
K2ZCD.....120
K5OGP.....120
K9RZV.....120
SV1AA.....120
K5VJT.....114
K9WTS.....114
W8QNW.....112
W4OEP.....111
LA5QC.....111
W2NCG.....110
W6FAY.....110
W8AYV.....110

Radiotelephone

LU4DMG....285
W3KT......283
W4QCW.....265
W8JIN.....263
W0JYW.....263
W3DHM.....262
ZL1KG.....260
W8JBI.....251
W1ADM.....250
W1DCE.....250
W1LLF.....242
W3WGH.....223
PZ1AX.....222
W4SKO.....220
K8RTW.....213
K6LGF.....212
K5MDX.....211
W1ICV.....204
W1BIH.....203
WA2IZS....203
K9KYF.....202
W1ZW......201
W2HMJ.....201
LU8CW.....200
PA0FX.....200
DL3TJ.....197
W4EEX.....195
W4BYU.....192
K1IXG.....191
W6HYG.....191
OE1FF.....183
SM5RY.....183
W6CHY.....180
VE2YU.....180
G2AFQ.....180
F8SK......172
W1OHJ.....169
K9EMG.....160
ZL3AB.....153
W4QT......150
W0DIB.....150
YU1AG.....150
W0MAF.....149
I1PDN.....149
W9UMJ.....140
OD5AU.....140
VP6WD.....136
W2PTM.....131
W2MOF.....130
CE3WN.....130
F2MO......130
LA3SG.....129
TG9AZ.....129
W1LAY.....124
VE2BR.....124
W9ZTD.....123
K1JNE.....122
K0RDP.....120
K8ONV.....113
W4CWO.....110

U. S. Canada Call Area and Continental Leaders

KH6CD....261
KL7PI....261
WØQVZ....308
VE1PQ....264
VO1DX....255
VE2WW....290
VE3DIF....284
VE4XO....200
VE5RU....220
VE6NX.....256
VE7ZM.....307
VE8AW.....195
ZS6IW.....294
ZL1HY.....308

Radiotelephone

W1FH.....289
W2ZX.....296
W5BGP....270
KH6OR....261
KL7AFR....190
WØAIW.....291
VE1PQ.....172
VE2WW.....240
VE3QA.....260
VE4RP.....102
VE5RU.....203
VE6TF.....190
VE7ZM.....290
EA2CQ.....285
ZL1HY.....296

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 RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

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, MST −7, PDST −7, PST −8, Honolulu −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 Feb. 20 at 0230 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,700, and 145,800 kc. The next qualifying run from W6OWP only will be transmitted Feb. 8 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 Feb. 20 becomes 2130 EST Feb. 19.

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.

W1AW conducts code practice daily at 0230 GMT on all frequencies listed above with speeds of 15, 20, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 7½, 10, and 13 w.p.m. on other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of *QST* text is sometimes reversed. To improve your fist, try to send in step with W1AW.

Date	Subject of Practice Text from Dec. *QST*
Feb. 7:	*Qualifications for Radio Amateurs*, p. 17
Feb. 10:	*The Mechanisms of Space Communications*, p. 22
Feb. 12:	*A Novel Antenna for 40 and 80 Meters*, p. 18
Feb. 14:	*Amateurs at the Boat Races*, p. 27
Feb. 19:	*A Two-Way Power Supply*, p. 37
Feb. 27:	*Unit-Type Receiver Construction*, p. 31
Feb 28:	*A Combination Band Checker . . .* , p. 40

W1AW SCHEDULES

(February 1962)

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 Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request. The station will be closed Feb. 22, Washington's Birthday.

Operating Frequencies

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800 kc.
Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800 kc.

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 Greenwich Mean Time.

C.w.: Monday through Saturday, 0100; Tuesday through Sunday, 0500.
Voice: Monday through Saturday, 0200; Tuesday through Sunday, 0430.

Caution: Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

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*
0030–0100	.....	.....	7255	.....	7080	.....	7255
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	3555	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	.....

[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.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the *preceding month*. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: DUT. RM: EML. PAM: IVS. New appointments are EEN and K3IMP as OPS. K3EWC replaces K3EUG as EC for Adams County. K3HWX replaces IVS as EC for Delaware County. 4DVT made some antenna changes which he claims touled up his SS score. K4LPR swapped his call for K3RFH. 2UZN/3 is leaving us for 1-Land, Rhode Island in fact. KNK is moving to Broomall, Pa. EML. DUT and EU had a bit of trouble with *E* equals *I R*-rigs blowing up, v.f.o.s shorting out and a.c. lines heating up. That's why the fuse was invented. K3IMP reports a new net on 7110 kc. at noon and has QNK lots of his leftover traffic. New officers. Carbon ARC—GZI, pres.; AMC, vice-pres.; K3JLW, secy.-treas.; K3JHU, act. mgr. Haverford Jr. High School RC—K3JHF, pres.: K3MTE, vice-pres.; K3PWM, treas.; K3OMP, secy. K3MNJ added VP6, 5U7 and 6W8 for No. 88 on his countries list. BNR/6 wants to know where the E. Pa. stations are on 10 meters. UIU and the EPA Net still are looking for a station in the Scranton-Wilkes-Barre Area interested in traffic-handling. New Gear Dept.: GJA is mobile with a "Sixer" he inveiled from the Brass Pounders. JKX has completed a 30-watter. K3BFA added a Viborplex Deluxe. JPS went QRO to 500 watts. KN3ROL and ROM are welcome additions to the section, plus ISV and K3IUV as Generals. IWO and K3AVX are working on antenna systems to get on 2 and 80 meters, respectively. K3CNN needs Utah, KL7 and KH6 for WAS. CUL and VR are planning a new rig setup for their Florida location. NOH took time off from his OO work to operate in the SS. K3GNQ is now a Conditional Class license holder. Traffic: W3CUL 5041. IVS 2164. K3IMP 852. W3VR 818. EML 803. UIU 151. W4DVT 150. K3MVO 125. W3ZRQ 93. MJM 91. AXA 86. K3JSX 51. HTZ 42. KTC 38. W3JKX 35. LC 32. ITI 23. K3BHU 22. W3BFF 19. K3CAH 17. W3RUR 9. K3ANU 8. W3EEN 8. NNL 6. OY 6. TEJ 6. IOW 4. HNK 3. AVX 2. BNR 2. ELI 2. GJA 2. K3LKQ 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—Asst. SCM Delaware: M. N. Nelson, jr., K3GKF. SEC: W3CVS. MDD Traffic Net meets on 3650 kc. at 0015Z daily; MDDS (slow) Net on 3650 kc. at 0130Z daily; MEPN on 3820 kc. at 2300Z week days and 1800Z Sat.-Sun.; Del. Emer. Net on 3905 kc. at 2330Z Sat. Check in with any one of these active nets. November appointments: K3BBR and LQY as OBSs; K3EBB, K3EWK and K3NPA as OPSs; EKO, K3GVE, K3LGJ and K3NPA as ORSs; K3LEC as PAM Delaware; JDG as EC for Harford Co., Md. The big upsurge of Delaware activity overshadows other events for the month. K3AMC and K3AXW check in from Wilmington. K3AZH says the Delaware 6-Meter Net provided communications for the New Castle County Little League football. BUD is pushing 29,640 kc. for section-wide NCFF. Let's hear some comments. K3BYJ is busy as EC in Northern Delaware. CFA reports the 1st State ARC had two successful transmitter hunts. The RCARA awarded a $100 bond to KN3NCQ for the best Novice built homebrew gear. CDQ still is busy ragchewing. K3CXX says school interferes with his traffic skeds. K3EBB reports Delaware 50-Mc. traffic activity. EEB has been keeping Delaware on top in the MDD Net. The Greenbelt ARA HAD ØGTG as a speaker at the Nov. 18th meeting. EIV says the SS and other contests keep him jumping. EOV is looking for RTTY manuals. K3EWK sends in a nice traffic count. 4EXM/3 is back from Okinawa and enjoying a vacation. GQF, at Johns Hopkins, made 1000 SS contacts. BHK is the new communications chief for PG County C.D. Hq. K3GVE checks in from Timonium. K3HDW says his 2-meter turnstile is a big improvement over his vertical. JFR is busy as EC for Kent Co., Del. Welcome to HTH, formerly 4JNE/3. IVC expects to apply for ORS appointment. IYF says he is rebuilding for the DX Contest. K3IZM turns in a good report on 50-Mc. activity. The PVRC would like to know if they won the 1961 SS gavel! K3JYZ turns in a nice traffic report. Andy is taking over as manager for MDD. KHA had a power transformer go up in smoke. KLA is moving to a new QTH. LDD is now busy with the Havre de Grace RC. K3LFD continues his high level of traffic activity. K3LLR says the wind took his new tower. MCG helped MSK run up a big DX score. K3MDL continues his OBS schedule. The Washington RC visited the local C.G. station on its Nov. 10th field trip. K3MZY keeps up his traffic count. K3NCM says he is now Mon. NCS for MEPN. K3NKX has a new all-band vertical. OHI was elected director for MEPN. K3OWX is busy converting a Command set to 40 meters. OYX reports there is a new RACES organization in Washington Co., Md. Traffic: K3-JYZ 159. WBJ 125. W3IVC 110. K3LFD 102. W3ZNW 73. K3MZY 46. W3UE 46. EOV 38. MCG 38. TN 38. EEB 36. K3EWK 23. W3GQF 15. K3MDL 15. AMC 14. W3BUD 13. K3LLR 12. W3BKE 9. EKO 9. K3MQP 8. AXW 7. W3HKS 7. K3NCM 6. OWX 5. AZH 4. W3EJU 2. OHI 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. RMs: W2BZJ, W2ZI and W2HDW. We are pleased to announce the appointment of WA2OZQ as EC for Atlantic County. SJRA's 1962 officers are K2HOD, pres.; K2MKD, vice-pres.; K2BG, treas.; WA2MGV, rec. secy.; WA2HSP, corr. secy. Burlington County RC's new president is K2YEL and vice-president is W2ZNF. WA2VAT, Audubon, made BPL in November. WV2WLT is a new call in the Audubon Area. N.J. Phone & Tfc. Net totals for November: 30 sessions, QNI 452, traffic 188. W2ZI, the net's manager, was guest speaker at the Raritan Bay RAC Annual Banquet. K2RXB, Margate, expects to go s.s.b. soon. WA2KWB is quite active on 160 meters. He also has a 500-watt plate-modulated rig on 15 meters WA2MEQ, Moorestown, worked 64 sections in the recent SS. W2BEI, Audubon, reports transmitter trouble. W2BAY, Haddonfield, advises that all antenna repairs have been made. Ed works 2 through 160 meters. W2IU, Absecon, has a new tower up 90 feet and more to go. K2ECY, Riverton, now stationed in KX6-Land, is forwarding logs to K2BG for QSLing. Gloucester County RC's new officers will be announced next month. Traffic: (Nov.) WA2VAT 439. W2-RG 146. K2RXB 133. W2ZI 28. K2SOX 26. WA2HJD 23. WA2KWB 19. WA2ARJ 6. WA2MEQ 6. (Oct.) W2IU 4.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PVI. NYS C.W. meets on 3615 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 1800. NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun., TCNP 2nd call area on 3970 kc. at 1900. IPN on 3980 kc. at 1600. 2RN at 2345 GMT and 0230 GMT on 3690 kc. Congratulations to W2OE and K2GAO on making the BPL. WA2BPE passed the General Class exam. WA2DAC completed his 6-meter kw. exciter. Clinton County AREC took part in the emergency operation connected with the crash of a B-47 at Plattsburgh AFB, reports EC WA2GCH. The ARATS elected K2VOX, pres.; WA2LDM, vice-pres.; and treas.: and K2RTQ, secy. Officers of the Fulmont ARC are K2PBU, pres.; K2JIR, vice-pres.; WA2MUO, secy.; WA2PDR, treas. Most members are on 6 and 2 meters. The club has over 70 members and a membership contest is in progress between the members in Fulton and Montgomery County members. K2PBU reports that WA2DVL and WA2LDJ and himself took part in the search for a lost hunter in the Speculator area. K2UOQ raised his tower and also is building a d.s.b. rig. K2JYC, in the Lockport Area, reports success with the latest code class. Ten students passed the General Class exam and two received their Tech. Class licenses. K2GKM is interested in Satellite Scatter and is looking for scheds. WA2UGA is a new Tech. Class licenses. W2RUF reports the NYS C.W. Net is looking for dependable outlets in Syracuse and Chautauqua County. We still are looking for volunteers for organization of a state-wide v.h.f. net, interested amateurs and nets, please contact your SCM. I would like to appoint a PAM to be in charge of details of organization. There are many more outlets available on v.h.f. and the band is more dependable than 75 and 80 meters. Traffic: (Nov.) K2GAO 534, W2FEB 434, W2RUF 256, K2RTQ

136, WA2OPG 134, K2QDT 101, W2PVI 55, K2OFV 36, WA2KZQ 35, WA2FTM 26, W2RQF 25, WA2KQG 21, K2DG 20, K2PBU 19, W2QQK 19, W2TAB 16, K2HOH 14, K2BBJ 11, WA2HEC 11, WA2AFE 10, WA2CTG 10, K2EE 10, K2JBX 10, K2RYH 10, K2ZRC 9, W2MJN 5, K2TDG 5, WA2GLA 4, W2EMW 2. (Oct.) W2TAB 3, W2EMW 2. (Sept.) K2GAO 818.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: WRE. RMs: KUN and NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2330 GMT on 3585 kc. Mon. through Fri. It is with deep regret that we record the death of BSO who was a charter member of the ATA of WPA. At this time I wish to announce the appointment of WRE as the Section Emergency Coordinator (SEC) to replace OMA, who was SEC for many years. Thanks, Walt, for your fine support. The new SEC's address is 639 Russell Ave., Johnstown, Pa. YA, our Division Director, was guest speaker at the Conemaugh Valley ARC. LSS got his new beam up. The Cumberland Valley ARC's *Valley QRM* reports: ZQU had DL4SY as a guest; RFO is building a 2-meter receiver; K3HOS is considering going on 2 meters. The Foothills RC has code and theory classes after each meeting; UVD built the electromonimuter keyer. K3DKE is moving to a new QTH. The Nittany and Huntingdon AR Clubs now publish a joint newsletter and report; KN3PGL won the H-CAR Novice Round-up; the Huntingdon Amateur Radio Emergency Service (HARES) Net meets every Sun. at 0830 local time on 53.380 Mc.; new Generals are K3NXO and K3PCB; K3LAO has a new 15-meter beam; K3MMB tied the knot; NEM made BPL in November. K3KMO is in D.C. on military reserve training. CVI is on tour with the "Ink Spots." WKN and K3BWG edit the *Mon Valley ARC News*. KFH has a new vertical. The Butler County Party Line meets each Wed. at 0100 GMT on 29 Mc. The Washington County ARC showed the ARRL film "Hams Wide World" at its November meeting. The Mercer County Radio Assn. is progressing very nicely. K3AKR built a 6-meter v.f.o. ZZO has his linear on 6 meters. Coke Center RC reports: K3PLO received his General Class license. Traffic: W3WRE 520, NEM 288, MFB 254, KUN 142, LSS 110, K3DKE 95, W3SMV 91, UHN 54, K3KMO 23, GQA 14, DFU 8, W3LOD 7, OEO 7, IDO 5, K3COT 4.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9PSP. RM: W9USR. PAM: W9RYU. EC of Cook County: W9HPG. Section net: 1LN, 3515 kc. Mon. through Sat. at 1900 CST. The Lincoln United Wireless Association, the Bureau County Amateur Radio Club, the Staunton High School Radio Club and the Rockford Amateur Association, Inc., have been approved by the ARRL Executive Committee for league affiliation. The Illinois Institute of Technology ARROTC MARS station has been assigned the call W9ENF. Our deepest sympathy to the family and friends of K9MDS, who has joined the ranks of Silent Keys. K9QMJ is operating at the Niles Seminary as W9CSC. K9PRB has a new 6-meter five element Telrex bringing in the hard-to-get signals. W9MTW has gone to 2 and 6 meters. W9OAR is recuperating at home after a three-week hospital siege. W9MSG, the newly-appointed W/K9 QSL Bureau manager, asks us to remind you that he must have an envelope from you, self-addressed and stamped, so that he can send your QSL cards to you. An envelope 4"x9¼" is preferred with your name and call in the upper left-hand corner. The newly-elected officers of the Starved Rock Radio Club are Jack Ashley, pres.; R. M. Nicholson, vice-pres.; George Keith, secy.-treas.; and Edward Rogalla, editor of the club bulletin. New appointees include K9HJO as OES, W9CTY as OO and K9HLT as EC of Schuyler and McDonough Counties. K9OAD reports that the North Central Phone Net traffic count was 329 messages and W9USR reports that the 1LN traffic count was 304. K9QVA is now on 6-meter mobile. K9THU is now radiotelephone first-class. W9KCR is about to throw away his crutches after several weeks of using them as a result of a serious auto accident. New calls heard in Bureau County are WN9APN, WN9AYJ and WN/WA9AZB. K9AQW and K9HLC are both mobile now with Heathkit "Sixers" and halos. W9PSY has a new Drake 2B receiver. W9IVU and W9ISP are sporting new 15-meter Cushcraft beams. K9WTS has gone s.s.b. with a 10B. K9VJE has a new Hammarlund HQ-110. W9YRI is now 2-metering on f.m. The Perfect Copy Rag Chewers Net Club of Chicago has a new certificate. Contact K9QPA for the details. W9AXV and K9LXG are listening for contacts on 2 meters using their Heathkit "Twoers" with a 5-over-5 antenna 70 feet high. The Chicago Area Emergency Net traffic for November was 49, according to NCS K9UOV. Those making the BPL are K9OZM and W9IDA. Traffic: (Nov.) K9OZM 460, K9UGY 459, W9JXV 407, W9IDA 361, K9UOV 200. W9USR 167, K9BTE 116, W9OXS 80, W9FAW 74, K9OAD 59, K9OCU 55, K9CRT 54, W9AKD 41, K9ZQT 40, W9IMN 31, K9LXG 27, W9MAK 25, K9RAS 25, W9PRN 8, K9TVA 8, W9WPC 7, W9HPG 2, K9SPW 2, W9YYG 2, K9QPA 1. (Oct.) W9USR 285, K9UJT 77, K9SCP 68, W9AKV 43, K9OCU 40, W9EET 10, K9RAS 9, K9IJP 6. (Sept.) W9AKV 6.

INDIANA—SCM, Donald L. Holt, W9FWH—Asst. SCM: Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: W9MM, W9RVM and K9GLL. RMs: W9DGA, W9TT, W9VAY and K9OET. Net skeds: 1FN, 0800 daily and 1830 M-F on 3910 kc.; ISN (s.s.b.), 1930 daily on 3920 kc.; QIN (training), 1800 M-W-F on 3745 kc.; QIN, daily at 1900 and RFN 0700 Sun. on 3656 kc. Contact K9GLL for the member net in your locality. New appointments: K9WET as RM for QIN training net, K9ZLB as EC Marshall County, K9IGS as EC Vigo County, K9GEL as OO Class II. New hams in Seymour: W9HZL and K9BGH (ex-W4OGR). W9KMR is a new operator at Seymour State Police Post. K9BGU has a new jr. operator. W9BF is the call of the Steele memorial station on Tri State College Campus. New officers of the Michigan City ARC are K9SGZ, pres.; W9TWU, vice-pres.; W9LBE, secy.; and K9TTX, treas. New officers of the Madison County ARC are K9RPZ, pres.; K9KFX, vice-pres.; K9QVZ, secy.; and K9TZJ, treas. *Amateur radio exists as a hobby because of the service it renders.* Those making BPL in November: W9MM, W9JOZ K9IVG/9 and W9RTH. November net reports: 1FN 251, 1SN 589, QIN 213, QIN (training) 15, RFN 47, Hoosier V.H.F. Net 137. Traffic: (Nov.) W9MM 1096, W9JOZ 689, W9ZYK 440, W9VAY 297, K9IVG/9 227, W9TT 218, K9OET 215, W9SVL 142, W9RTH 139, K9GLL 98, W9NZZ 89, W9UKU 81, K9JSI 73, W9BUQ 66, K9HYV 65, K9WET 57, W9QYQ 52, W9FWH 51, W9GJS 51, K9AUI 32, K9CRS 32, K9ILK 30, K9HMC 28, W9FDS 26, K9VRU 24, K9SGZ 22, K9RPZ 21, W9CC 20, K9YJW 20, W9YYX 18, K9LZN 17, W9OG 16, K9RCZ 16, W9DKR 15, W9DOK 15, W9SNQ 14, W9EJW 13, W9IMU 13, K9BSU 12, W9DZC 11, K9JCD 10, K9LJP 10, W9SWD 9, K9KTL 8, K9SPH 8, W9BSV 7, K9DZW 7, W9VIC 7, W9BF 6, K9ONY 6, W9WDQ 6, K9WWJ 5, K9CBC 4, K9QWI 4, W9VCF 4, W9YEW 4, K9FVL 3, W9YYS 3, K9ZUP 3, W9CKW 2, K9MAN 2, K9IXD 1, K9JCE 1. (Oct.) W9ZYK 502, W9VAY 252, K9LZN 32, K9HEL 23, K9FOG 16, K9GEL 6, K9CMG 2.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. PAMs: W9NGT, W9NRP and W9SAA. RMs: W9VHP and W9VIK. New appointees: W9IHN as ORS, K9WIE as OBS. W9YQH as OBS on RTTY. W9SAA as PAM. The Wisconsin Side Band Net, on 3985 kc. at 2400 GMT, is doing very well with 33 stations having received WSBN certificates. W9ZPV is chairman of the Milwaukee-Waukesha Red Cross communications committee. K9PSU has a quad antenna up. W9KQD reports Boy Scout Operation Bigfoot was a big success. W9LVR was tops in MRAC in the Sweepstakes. K9RRS has a new Ranger. K9OCA has a new phone schedule. The Wisconsin Council of Clubs is in full swing towards reactivation now. W9KQB is working on an 80-meter WAS and a new 1-watt rig; he is the new delegate to the WNA for the WIN and is its new secretary. The other WNA officers are W9NRP, pres.; W9VHP, treas.; Editor W9NGT has the WNA bulletin available at one dollar per year. New officers of the MSOE Radio Club are W9WYH, pres.; K9GDF, vice-pres.; Michael Chier, secy.; K9SHN, treas. K9WIE has a new triband beam up 50 feet. W9IDH is now teaching in New Mexico. W9SZR and K9ELT operated W9YT during the SS. Traffic: (Nov.) W9DYG 507, W9SAA 274, W9CXY 144, K9BSC 78, K9GDF 64, W9VHP 60, W9YT 45, K9GSC 36, W9NRP 36, W9VIK 30, W9KQB 28, K9DTK 24, K9HDL/9 20, W9IRZ 16, W9CBE 15, W9APB 14, W9OTL 14, K9KBI 11, W9WJH 9, W9IHN 8, K9DOI, 7, K9WIE 7, W9MWQ 2, K9OCA 2. (Oct.) W9WJH 55, K9GDF 22, W9LFK 17, K9ZMI 13, W4VRD/9 8, W9HHX 7, K9UTQ 2.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. The North Dakota 75-Meter Phone Net reports for October: 23 sessions, total check-ins 535, 32 maximum, 13 minimum check-ins, 65 formal and 62 informal messages handled with 16 relays. No report on the 75-Meter Net was received for November. KØRSA is NCS for Mon., replacing WØBHF. The Goose River Net reports for October: 5 sessions with 115 check-ins and handled 1 formal and 8 informal messages handled. For Novemger: 4 sessions with 96 check-ins and 2 formal and 12 informal messages handled. The Goose River Net meets every Sun. at 9 A.M. CST on 1990 kc. with WØCDO as NCS. Traffic:

(*Continued on page 94*)

HOW'S YOUR CW I.Q.?

To test your CW I.Q., fill in the blank spaces in the list below.

1. At 13 words per minute, a dot is ..... sec. long.

2.* The spacing between parts of a letter should be ..... sec.

3.* The spacing between letters should be ..... sec.

4.* The spacing between words should be ..... sec.

5.* A dash is ..... seconds in duration.

6. The world's record for copying CW is ..... WPM.

7. The "Q" signal which means "send more slowly" is .....

8. The abbreviation TMW means .....

9. The holder of the world's speed record for copying CW is ....

10. The receiver bandwidth necessary to copy CW at 25 WPM is ..... cycles.

11. The code speed requirement for amateur extra class license is ..... WPM.

* Assuming a speed of 13 WPM.

R. W. Drobish, W9QVA

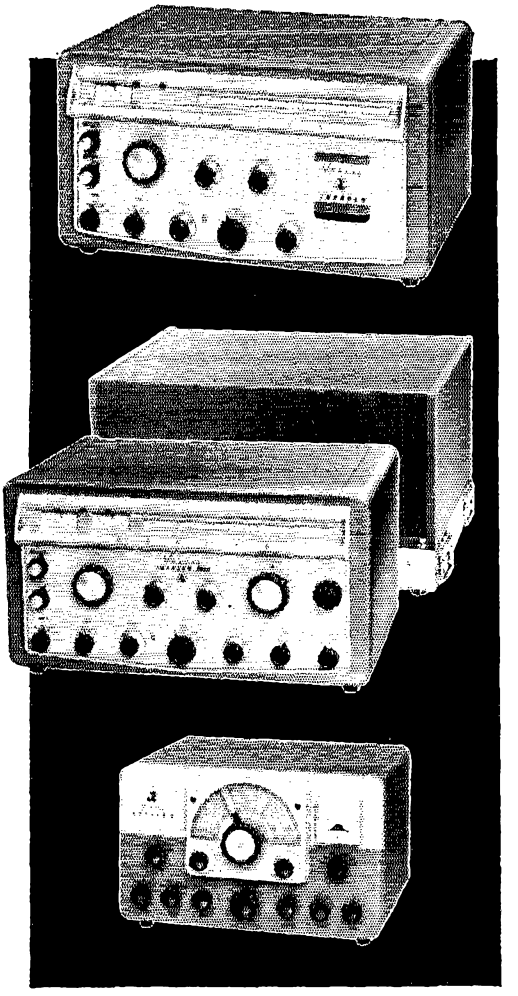
6. 75.2
5. 288 Mill
4. 672 Mill
3. 288 Mill
2. 86 Mill
1. 96 Mill

11. 20
10. 100
9. T. R. McElroy
8. Tomorrow
7. QRS

Bud Halligan Jr. W. J. Halligan W9AC for hallicrafters

Choose your next transmitter

3 of the hottest and newest!



INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 through 10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts input AM. Built-in VFO—exclusive RF controlled audio A6C and ALC (limiter type) provide greater average speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested with tubes and crystals.

Cat. No. 240-302-2—Amateur Net $619.50

HIGH POWER CONVERSION—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

Cat. No. 240-303-2—Amateur Net $619.50

INVADER 2000—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts input AM! Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested with power supply, tubes and crystals.

Cat. No. 240-304-2—Amateur Net $1229.00

RANGER II—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 through 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying, TVI suppressed. Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No. 240-162-1
Viking "Ranger II" Kit—Amateur Net . . . $249.50

Cat. No. 240-162-2—Viking "Ranger II"
Wired and tested—Amateur Net $359.50

FREE
New Catalog
Write today for our newest amateur Catalog! Available now . . . contains photos, schematics and detailed specifications!

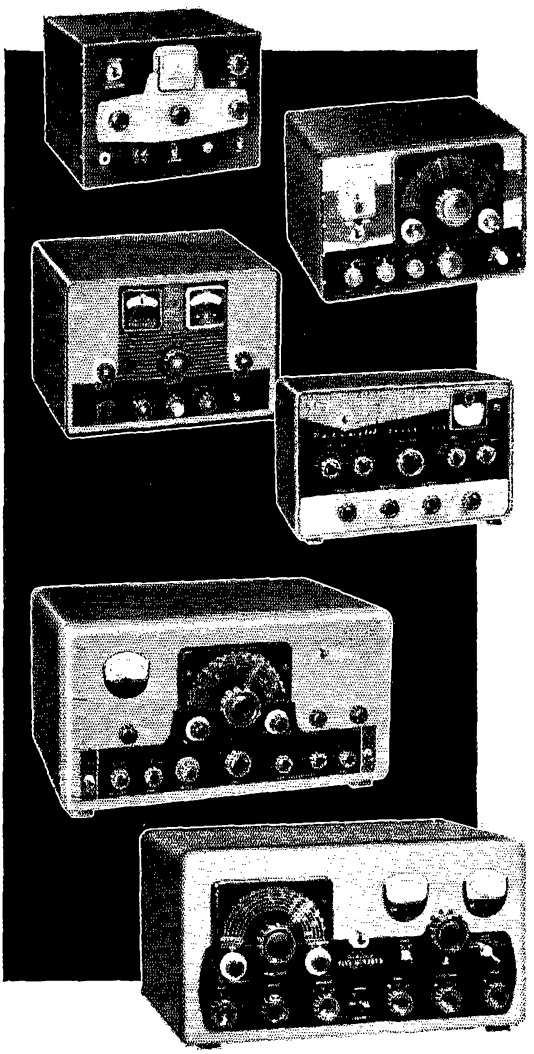
FIRST CHOICE AMONG THE NATION'S AMATEURS

Viking®

E. F. JOHNSON COMPANY • WASECA, MINNESOTA

from the VIKING line . . .

6 popular feature-packed transmitters!



ADVENTURER—Self-contained . . . 50 watts CW input . . . rugged 807 transmitting tube . . . instant band-switching 80 through 10 meters. Crystal or external VFO control—wide range pi-network output—timed sequence keying. With tubes, less crystals.

Cat. No. 240-181-1 Kit—Amateur Net . . . $54.95

NAVIGATOR—40 watts CW input . . . also serves as a flexible VFO exciter. 6146 final amplifier tube—band-switching 160 through 10 meters. Built-in VFO or crystal control. With tubes, less crystals.

Cat. No. 240-126-1 Kit—Amateur Net . . $149.50

Cat. No. 240-126-2
Wired and tested—Amateur Net $199.50

CHALLENGER—70 watts phone input 80 through 6; 120 watts CW input 80 through 10 . . . 85 watts CW on 6 meters. Two 6DQ6A final amplifier tubes. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes, less crystals.

Cat. No. 240-182-1 Kit—Amateur Net . . $114.75

Cat. No. 240-182-2
Wired and tested—Amateur Net $154.75

6N2—Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with "Viking I, II", "Ranger I, II", "Valiant" or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

Cat. No. 240-201-1 Kit—Amateur Net . . $129.50

Cat. No. 240-201-2
Wired and tested—Amateur Net $169.50

VALIANT—275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant band-switching 160 through 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

Cat. No. 240-104-1 Kit—Amateur Net . . $349.50

Cat. No. 240-104-2
Wired and tested—Amateur Net $439.50

FIVE HUNDRED—Full 600 watts CW—500 watts phone and SSB (P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

Cat. No. 240-500-1 Kit—Amateur Net . . $749.50

Cat. No. 240-500-2
Wired and tested—Amateur Net $949.50

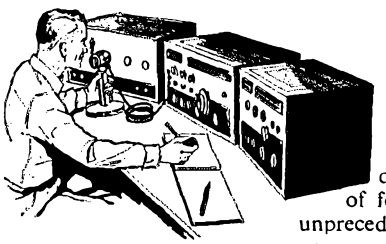
FACTORY AUTHORIZED SERVICE

Instead of shipping to our factory, equipment to be serviced may also be sent to:

Empire State Elect. Service
139-140 Hillside Ave.
Jamaica, New York

Park-Armature Co.
1218 Columbus Ave.
Boston 20, Mass.

COUNT EM! 33 GREAT FEATURES ON



Presenting the "Marauder" . . . performance and features that cannot be duplicated for less than twice the price!

Over two years were spent in the development of this new Heathkit Single Sideband transmitter to bring you performance, quality and dependability unheard of in this price range! The outstanding array of features listed, plus its beautifully styled exterior all add up to an unprecedented amateur radio value!

The attractive front panel layout with edge-lighted meter and slide-rule tuning dial is accented by chrome-plated die-cast zinc knobs. All controls are located in front, where you want them, for maximum ease of operation . . . no doors or hatches to open or equipment to move! Here is a transmitter that was designed with "you" in mind, a transmitter to fill the requirements of the most demanding amateur radio operator, a transmitter you will be proud to own and operate for years to come! Order your Heathkit HX-10 SSB transmitter today! Send for free schematic. 92 lbs.

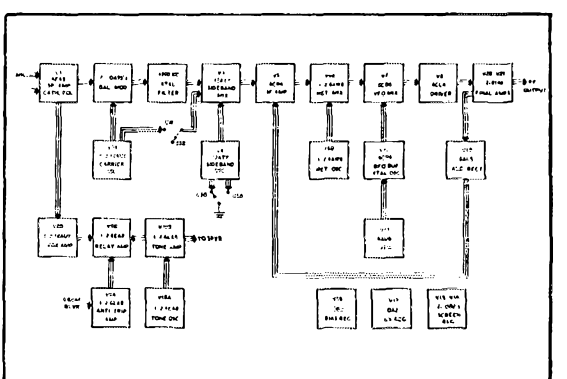
(Available after Feb. 25th)

Heathkit HX-10...no money dn., as low as $22 mo.....**$334.95**

SPECIFICATIONS—Emission: SSB (upper or lower sideband), CW, AM and FSK. **Power input:** 180 watts PEP—SSB and CW, 75 watts AM. **Output impedance:** 50 to 75 ohms with not more than approximately 2:1 SWR. **Frequency range (MC):** 3.5 to 4.1; 6.9 to 7.5; 13.9 to 14.5; 20.9 to 21.5; 27.9 to 28.5; 28.5 to 29.1; 29.1 to 29.7. **Frequency stability:** within 100 cps, overall. **Carrier suppression:** 50 db below peak output. **Unwanted sideband suppression:** 55 db below peak output. **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone using grid-block keying. **Audio input:** High impedance microphone **Audio frequency response:** 400 to 3000 cps at ± 3 db. **Power requirements:** OFF 14 watts; STANDBY—200 watts; KEY DOWN—400 watts at 117 volts, 50/60 cycles AC. **Cabinet size:** 19" W x 11¾" H x 16" D.

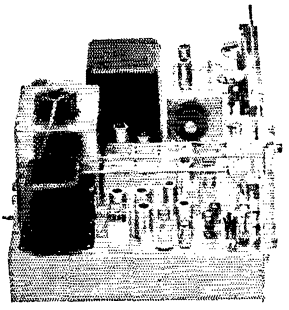
MICROPHONE ACCESSORY—Ideal for use with the HX-10, this Electro Voice dynamic microphone has been modified to our specifications especially for SSB operation. Frequency response is limited from 300 to 3,000 cps with sharp cutoff above 3,000 cps. Chrome-plated mike stand has grip-to-talk switch with lock. Hi-Z output. Complete with 6' single and 6' multiple conductor shielded cable and instructions to accommodate any installation. 2 lbs.

HDP-21 . . . No money dn., $5 mo.....$29.40

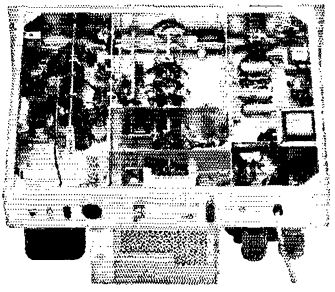


HEATHKIT'S NEW HX-10 SSB TRANSMITTER

1. FIRST FILTER-TYPE SSB TRANSMITTER IN KIT FORM!
2. COMPLETE, NOTHING EXTRA TO BUY!
3. ALL POWER SUPPLIES ARE BUILT-IN.
4. ALL CRYSTALS FURNISHED FOR FULL 80 THROUGH 10 METER COVERAGE
5. BEAUTIFULLY DESIGNED & RUGGEDLY BUILT—OVER TWO YEARS IN DEVELOPMENT
6. OPERATES SSB (upper or lower sideband), CW, AM, & FSK
7. 180 WATTS PEP—SSB & CW . . . 80 THROUGH 10 METERS
8. CARRIER SUPPRESSION 50 DB; UNWANTED SIDEBAND SUPPRESSION 55 DB
9. MULTI-SECTION, HERMETICALLY SEALED CRYSTAL BAND-PASS FILTER
10. DUAL CONVERSION; CRYSTAL CONTROLLED HETERODYNE OSCILLATOR
11. PREHEATED, TEMPERATURE COMPENSATED VFO FOR HIGH STABILITY
12. AUTOMATIC LEVEL CONTROL FOR HIGHER TALK POWER WITHOUT DISTORTION
13. BREAK-IN CW OPERATION (VOX CONTROLLED)
14. STRAIGHTFORWARD CIRCUIT LAYOUT AND WIRING HARNESS FOR EASY ASSEMBLY
15. UNIQUE ALIGNMENT PROCEDURE, REQUIRES ONLY A CALIBRATED GENERAL COVERAGE RECEIVER AND VTVM WITH RF PROBE
16. 165 to 1 WORM GEAR, SPRING-LOADED TUNING ASSEMBLY FOR SMOOTH ANTI-BACKLASH TUNING
17. APPROXIMATELY 10 KC PER TURN FOR SHARP, EASY FREQUENCY SELECTION
18. SPINNER KNOB FOR RAPID FREQUENCY EXCURSIONS
19. LOGGING SCALE FOR EXCELLENT RESETABILITY
20. AIR COOLED, SHIELDED FINAL AMPLIFIER—NOISE-FREE FAN
21. SPOT CONTROL ALLOWS "ZERO BEAT" OR "TALK-ON" FREQUENCY SPOTTING
22. FRONT PANEL CONTROLLED VOICE CONTROL (VOX) & PUSH-TO-TALK (PTT)
23. MONITORING OSCILLOSCOPE JACK WITH BUILT-IN VARIABLE AMPLITUDE CONTROL
24. SEPARATE HIGH AUDIO INPUT ON REAR CHASSIS APRON
25. METERED GRID, PLATE, ALC, RELATIVE POWER & HIGH VOLTAGE CIRCUITS
26. FSK JACK FOR DIRECT RTTY POLAR RELAY KEYING
27. FULL FUNCTION ACCESSORY OCTAL SOCKET FOR RECEIVER MUTING, AMPLIFIER CUTOFF BIAS, 117 VAC ANTENNA RELAY POWER, RECEIVER SPEAKER MUTING.
28. SWITCHED 117 VAC OUTLET FOR ACCESSORY EQUIPMENT SUCH AS MONITOR SCOPE.
29. PARALLELED 6146's IN FINAL OPERATING CLASS AB1
30. HEAVY-DUTY 16 GAUGE STEEL CHASSIS AND CABINET CONSTRUCTION
31. COPPER-FLASHED CABINET INTERIOR FOR EXCELLENT SHIELDING
32. ALL ADJUSTMENTS, CONNECTIONS AND TUBE NUMBERS ARE CLEARLY SCREENED ON THE CHASSIS FOR EASY IDENTIFICATION
33. ALL CONTROL FUNCTIONS ARE LOCATED ON THE FRONT PANEL—NO DOORS OR HATCHES TO OPEN—CONVENIENT TO OPERATE



TOP VIEW—Quality components used throughout assure years of dependable, trouble-free performance. Shielded final amplifier is forced-air cooled by a noise-free fan. Chassis screening clearly identifies all tubes, adjustments, etc. for future reference.



BOTTOM VIEW—Compartmental construction provides necessary isolation and shielding of transmitter sections for top performance . . . adds rigidity to the chassis for rugged, dependable service and long life. Neat circuit layout through careful design and a precut, cabled wiring harness permit easy assembly.

NOW... PROOF OF DX PERFORMANCE

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-T12TG)

OR IS K4ZRA THE NEW CHAMP?

Read his letter, and see his diagram of a typical installation and what it achieved:

2539 Christie Place
Owensboro, Kentucky

GOTHAM
Miami Beach, Florida

Gentlemen:

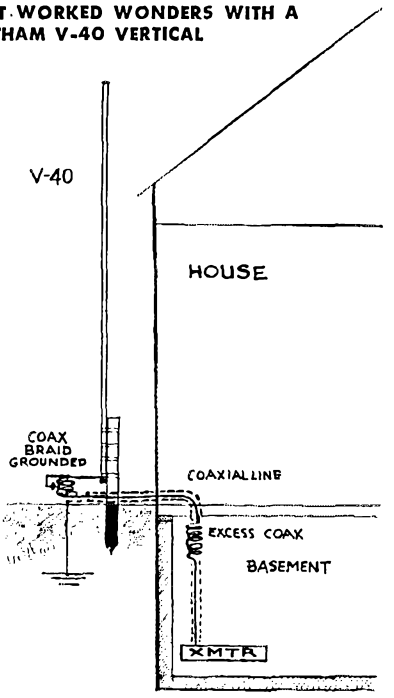
During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallicrafters reboxed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield.

Daniel F. Onley, K4ZRA

K4ZRA's INSTALLATION

THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL



FREE

Send a card for our valuable catalog of 50 different antennas with specifications and characteristics. Gives bands and frequencies covered, element information, size of tubing used, boom length, shipping weight, feed line used, polarization, and other data.

WHY

THE GOTHAM V-80 IS THE BEST ALL-BAND ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- 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. ONLY $16.95.

73
GOTHAM

DO YOU KNOW

1. YOU WILL HAVE NO DIFFICULTY INSTALLING YOUR GOTHAM VERTICAL ANTENNA IN JUST A FEW MOMENTS, REGARDLESS OF YOUR PARTICULAR PROBLEM, SO ORDER WITH CONFIDENCE EVEN IF YOU HAVE RESTRICTED SPACE OR A DIFFICULT SITUATION.
2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED; IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

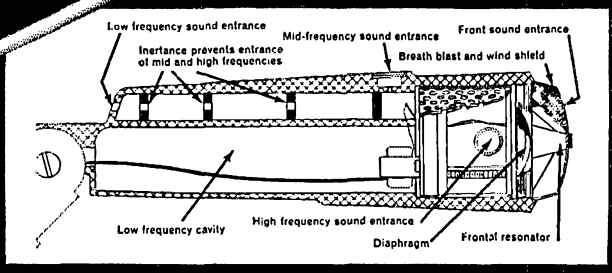
Address.....

City.....Zone.....State.....

The Least Expensive Way to Increase

Flat response penetrates QRM more effectively because it permits an actual increase in RF power output! More effective cardioid pattern, essential for SSB, cuts accidental tripping of VOX circuit!

MODEL 664



HERE'S HOW IT WORKS

Exclusive E-V Variable-D* (Variable Distance) provides three sound-cancelling entrances at different fixed distances in back of the diaphragm. These entrances, utilizing the proper acoustical impedances, combine to form an effective front-to-back spacing which varies in distance from the diaphragm inversely with frequency. The resulting phase and amplitude conditions provide a uniformly true cardioid pattern at all frequencies. **Pat. Pending*

Here's What the Top Radio Amateur Operators in the World Say About These E-V Microphones:

CX2CO "My new 664 resulted in better and more consistent QSO's."

W8KML "The 664 surpasses its claims in difficult operational environments."

ZL1HY "During QSO's . . . everyone preferred the 951."

W3JNN "I am really sold on the 664."

W8BF "I have had many unsolicited compliments since using the 729."

VQ4ERR "The performance of the 664 matches its thoroughbred appearance."

PY2CK "My 664 microphone vastly improved my SSB transmission."

Average Peak-Power and Intelligibility!

CHOOSE AN Electro-Voice® MICROPHONE

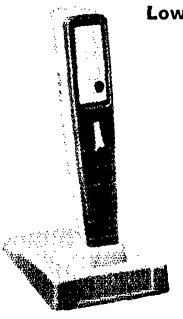
Model 664 for Highest Front-to-Back Discrimination Manufactured, Plus Peak-Free Wide-Range Response!

The effective strength of all sounds arriving at the sides of the 664 are reduced by as much as 50%, and arriving directly at the back of the microphone by as much as 90%. This uniquely effective design permits you to work at twice the distance from the microphone . . . a perfect invitation for "arm chair" QSO's—with no VOX tripping problems.

Smooth, peak-free response guarantees maximum P.E.P. Remember, a peak in response in or *out* of the voice range will limit maximum modulation and result in reduction of P.E.P. You do not have to talk with your lips on the mike. For best results, sit back and talk naturally.

Virtually indestructible Acoustalloy® diaphragm withstands high humidity, temperature extremes, corrosive effects of salt air and severe mechanical shock. Extra ruggedness means extra service, year after year.

MORE 664 FEATURES: Output—55 db. On-off switch (can be wired for relay control). 150 ohms or Hi-Z output selected at cable connector. Satin chromium finish. High-pressure die-cast case. Pop-proof filter plus magnetic shield. 90° swivel mounting. 18 ft. cable. 7 1/16 in. long (less stand coupler) by 1 1/8 in. diameter. Net Weight 1 lb., 10 oz. Amateur Net, $51.00. Matching desk stand with DPDT switch. Model 419S, $9.00. Less switch. Model 419, $6.00.



MODEL 729SR

Lowest-Cost Ceramic Cardioid Available ...Includes Every Feature Essential For SSB Operation. Flat, Smooth Response From 300 To 3,000 CPS!

Rugged enough for mobile operation, the slim, small Model 729 fits easily in your hand or slips into the desk stand or floor stand adapter provided, without any hardware adjustments. Hi-Z output -60 db. Two-tone grey, pressure die-cast and plastic construction. Shielded, 8½ ft. cable. 7¾ in. long by 1⅛ in. wide. Net weight 1 lb. Ceramic element unaffected by high heat, humidity. Model 729. Amateur net, $14.70. Model 729SR with relay-control switch. Amateur net, $15.90.

MODEL 951

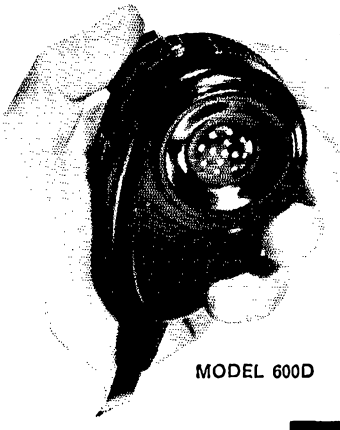
First True Crystal Cardioid With Variable-D Design. Combines High Output With Excellent Noise Rejection At Modest Cost!

Finest crystal microphone available for SSB. Variable-D design of Model 951 cuts room noise, interference from receiver speaker to a minimum. Allows greater working distance to microphone. Peak-free rising response for high intelligibility. Hi-Z output -60 db. High-pressure, die-cast finished in Metalustre grey. On-off switch. Shielded, 18 ft. cable. 5¾ in. long (less stand coupler) by 1¾ in. diameter. Net weight 1¼ lbs. Model 951 Amateur net, $32.70. Matching desk stand with DPDT switch. Model 418S, $9.00. Less switch. Model 418, $6.00.

The World's Finest Mobile Microphone. Model 600D Dynamic Widely Known As Military Types T-50 And M-105/U!

Designed for high articulation under rugged mobile conditions, the Model 600D provides all the advantages of a dynamic element with peak-free, flat response for maximum P.E.P.

High-impact case soaks up physical abuse, feels comfortable at any temperature, fits hand naturally. Extremely high output of -55 db. is ideal for mobile equipment with severe audio requirements. Available in 50, 250 ohms or Hi-Z. DPDT switch. 6 ft. coiled cord. Panel mounting bracket included. Model 600D Amateur net, $28.50.



MODEL 600D

See your Electro-Voice distributor and choose an Electro-Voice Microphone . . . For the fastest, easiest and least expensive way to boost the efficiency and quality of your rig! Satisfaction is guaranteed or your money refunded!

ELECTRO-VOICE, INC., Commercial Products Division
Department 222Q Buchanan, Michigan

Electro-Voice®

(Nov.) WØCAQ 18. (Oct.) KØITP 84, KØQWY 50, KØIVQ 49, KØTVI 27, WØIRN 14, WØYCL 13, WØAYJ 10, WØMQA 10, KGGI 9, KØRSA 3, KØTYY 3, WØBHT 2, WØBHF 1.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. Congratulations to WØZWL, who was elected vice-director for a second term. She also made BPL for the second consecutive month. New-comers to the Rapid City Area are K9PTB/Ø, WØFII and WØFNE, all on 50 Mc. Rapid City has an informal net every night at 2000 MST on 50.175 Mc. The Huron ARC reports WØNGM is its top DXer, with 162 countries worked, 150 confirmed. KØYBZ has installed a 20-meter beam. New calls: WØFNM, Sioux Falls: KNØGZV, KNØHAC, KNØHAD and WNØAKH, Huron. Traffic: (Nov.) WØZWL 552, WØSCT 206, WØDVB 144, KØBMQ 129, KØAIE 70, WØOFP 53, KØVYY 28, WØCTZ 25, WØRSP 20, KØWJT 19, WØGWW 6, WØFJZ 4, KØTVJ 4, KØTNW 4, KØRQY 4, WØRWM 2, KØZBJ 2, WØACG 1, KØAUR 1. (Oct.) WØDVB 130. (Sept.) KØBMQ 76.

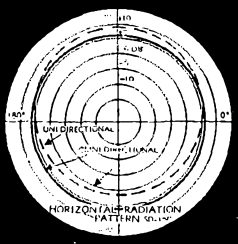
MINNESOTA—SCM, Mrs. Lydia S. Johnson, WØKJZ—Asst. SCM: Charles Marsh, WØALW. SEC: KØJYJ. PAMs: WØOPX and KØEPT. RMs: WØKLG and KØAKM. Congratulations are in order for Director WØBUO and Vice-Director WØZWL on winning in the recent election. EC KØRDP reported that WØAJJ, WØDVG, WØASF and W7JJM/Ø did an excellent job of working with the Splithand Sheriff and posse supplying communications in locating lost hunters in Itasca County. Joyce, KØIKL, placed first in the Annual YLRL Anniversary Party and will receive a gold trophy. WØZQB has a new triband beam up. The Itasca Radio Club held its first meeting at Grand Rapids and will meet the first Wed. of each month. Hams in the area, contact W7JJM/Ø for more information. KNØJFJ is the newest member on MJN. Novices interested in participating in the Minnesota Junior Net should write Route Manager KØAKM in Rochester, informing him of your desire to become a member and including your name, call and crystal frequency. OOs WØKLG and WØWMA listed a total of six violations. WNØABU and WNØJFV are new RCC members. KØPWE, KØRGP, KØEVS, KØGLP and KØJXE were among the semi-finalists in the National Merit Scholarship at John Marshal High School. KØMGT, of Dassel, is employed and working in Minneapolis. KØSNC renewed his ORS appointment. KØIZD averaged a grade of A-minus at the end of the first quarter. Traffic: (Nov.) WØKJZ 325, KØOTH 137, WØKLG 109, WØLST 105, WØOPX 92, KØQBI 92, WØCQY 88, KØAKM 81, WØHEN 75, WØYC 71, WØRIQ 61, WØUMX 61, WØTHY 47, KØZKK 47, KØPAIL 45, WØALW 42, KØORK 34, WØOEZ 31, WØATO 30, KØVPJ 30, WØDQL 27, KØIDV 23, WØWMA 23, WØBUO 20, KØICG 15, KØLWK 14, WØRQJ 14, KØJYJ 12, WØSLD 10, WØGCR 8, KØUKU 8, KØMIZ 7, WNØABU 6, WØSZJ 5, KØSNG 4, KØZRD/ZRC 4. (Oct.) KØSBB 11, WØSLD 6, KNØIHD 5.

DELTA DIVISION

ARKANSAS—SCM, Odia L. Musgrove, K5CIR—SEC: K5IPS. PAM: W5DYL. RM: K5TYW. With holiday traffic out of the way things are now getting back to normal. The long skip has had the early morning nets messed up most of the winter but it has been good for the stations working the higher frequencies; 15 and 20 meters has been extra good with DX coming in from every corner of the world. 160 meters has been good in the morning and in the evening and would be a good frequency for a local net. The Weather Net has moved up to 3995 kc. and is now a part of RACES. K5QCC spent two weeks in the hospital. The SEARC Radio Club has finished installing the mobile equipment in the school bus which will be used as an emergency communication center. It will operate under the club call, K5DAK. W5KRO has a new Central Electronics 200 V. The Fayetteville Radio Club has a code class going. Traffic: W5SZJ 56, W5HPL 22, K5PAM 18, W5FPF 15, K5IPS 13, K5UEK 13 K5USE 12, K5CIR 8, K5YCM 8, K5MEA 6, W5DYL 4, K5CIX 3, K5GTN 3, K5KGJ 2, W5NLL 2.

LOUISIANA—SCM, Thomas J. Morgan, W5FMO The Lafayette ARC held its Annual Banquet and awards meeting in December with your SCM and SEC attending. K5SGX was master of ceremonies. A Baton Rouge group got together for a dinner meeting to reorganize the radio club. About 60 hams and their wives met at Oak Manor with W5GDY as MC. Your SCM attended along with director-elect W5MUG. W5CEZ, who pounds brass most of the time, finds his 200-V opens up still another way of handling traffic and his traffic count shows it. W5MXQ, our SEC, is doing more s.s.b. work now that his invader is working again. W5EA has his ham gear going at BC station KNOE. W5HHA has a work sked that puts him on MARS more than on the ham bands. Ken makes 75 on Wed. and Thurs. evenings. K5-

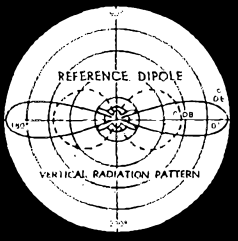
(Continued on page 96)



Power on Demand

with these

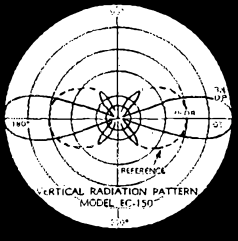
HY-GAIN 150 MC COMMERCIAL ANTENNA SYSTEMS



BASE STATION ANTENNAS

6.1 db gain stacked jaypole

This Model SD-150 develops 6.1 db omnidirectional gain, in one favored direction with a slight re-orientation of the staggered jaypole positions. An unique phasing and matching harness is center fed and maintains a perfect parallel phase relationship. 15mc bandpass of the array makes possible optimum performance for duplex, multi-frequency or mobile relay operation. Metal surfaces iridite treated. Models 148-159 mc band, 159-174 band, and special frequency designs available.

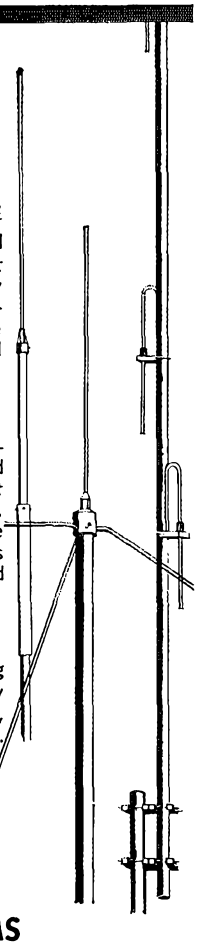


3.4 db gain 5/8 wave coaxial

Model EC-150 is an extended 5/8 wave length base station antenna, shunt fed through a hermetically sealed matching stub, placing all parts of the antenna at direct DC ground potential for maximum lightning protection. Of light weight aluminum, the entire antenna is iridite treated to military specifications. Mounting accessories are available, as well as two models for 148-161 mc and 161-174 mc.

unity gain ¼-wave ground plane

A low cost ground plane, Model GP-150 uses drooping radials for impedance matching and to maximize low angle radiation. It is built to commercial duty standards, but constructed of light weight aluminum, iridite treated.



AVAILABLE SOON
A complete line of low band and 450 mc band antenna systems.

MOBILE ANTENNA SYSTEMS

unity gain ¼-wave mobile whip

Rooftop mounted vehicular whip with high impact styron base assembly mounting easily from top of roof with grip locking mechanism. Solderless connector for RG58U cable. Tapered stainless-steel, extremely flexible.

3.0 db gain 5/8 wave mobile whip

Double effective power both receiving and transmitting with the Model MWG-150 stainless steel whip, 52" high. Hermetically sealed matching inductor. Single hole top mounting base and soderless RG58U connector.

hy-gain

Send for complete engineering data

CZV is becoming interested in frequency measuring. K5HIU is a new General in Ville Platte. K5UEW now is on s.s.b. K5GUQ dropped the "N" recently. K5AGJ is sporting a new KWM-2. W5EBK has a pair of 4-125s in his linear. W5CEW is doing a stint as net control on the Ole Delta 75. W5BSR is back in Lake Charles after an extended stay in the Northwest. Traffic: W5CEZ 352, K5QXV 104, W5MXQ 102. K5CZV 15, W5EA 7, W5HHA 3.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—K5MDX reports making a fine score in the Sweepstakes. He had 604 contacts in 73 sections. Good Going, Dave. The Magnolia Net reported that 395 check-ins were recorded for the month. W4WDR/5 reports that his third harmonic has arrived. Congratulations, Chet, we'll be looking for our cigar. I hope that several of you will be able to report on the tracking of OSCAR. I hope to be able to meet with many of you during the coming year. Let me hear from you regarding meetings. Traffic: K5RUO 100, W4WDR/5 40, K5MDX 5.

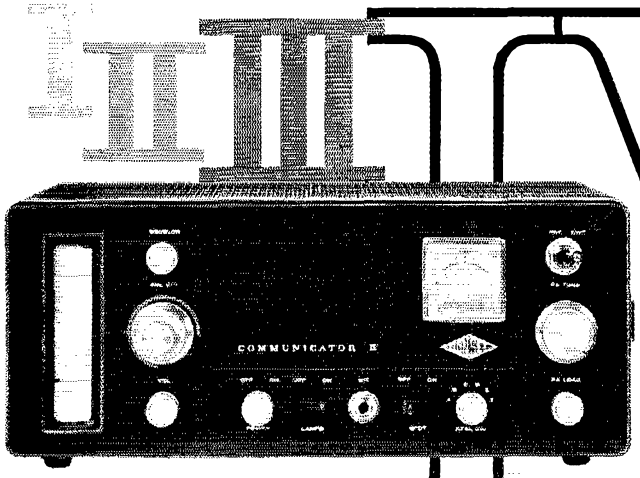
TENNESSEE—SCM, R. W. Ingraham, W4UIO—SEC: K4OUK. RM: K4AKP. PAM: W4PQP. New officers of the Delta Club in Memphis are K4WWQ, KN4ZZR, K4RKQ, K4QZV, K4DJO, K4ETG, K4ABY and W4SLB. The Chattanooga AREC 6-Meter Net provided communications for the bowling tournament. W4PQP reports there is a fine 6-meter c.d. net in Nashville under the watch of K4JAA and that K3LWT has a new General Class ticket. K4PUZ has moved to Nashville. W4TDZ likes a halo for 6-meter mobile, especially for reduced ignition noise. K1RIG is looking for Tennessee stations on 20-meter phone from a VO2 location. His address is Box 217, APO 677, New York. Reports were received from: SEC K4OUK; OBSs W4VJ, W4SGI and W4TDW; OESs K4KYL and W4TDZ; OOs K4RIN, W4ZBQ and W4TDW; nets W4PQP, K4AKP and W4UIO; Nashville, Delta and Oak Ridge Clubs. Traffic: (Nov.) K4AKP 1106, W4PL 643, W4FX 352, W4OGG 282, W4PQP 180, W4VJ 66, W4ZJY 46, K4WUG 45, K4AMC 29, W4PFP 23, W4UVL 23, W4TZG 18, W4UIO 13, W4JVM 11, W4VNU 5, W4SGI 2, K4VOP 2, W4VTS 2. (Oct.) W4VNU 7, W4VTS 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Elmer G. Leachman, W4BEW—SEC: J. B. Wathen, III, W4BAZ. PAM: W4SZB. RM: K4KWQ. V.H.F. PAM: K4LOA. KNN: WN4AGN. The Morning Kentucky Phone Net held 31 sessions, 567 call-ins and handled 69 messages. K4CSH, W4KJP, K4OLT had 100 per cent attendance; 11 stations 50 per cent or more. WN4AGH reports KNN held 25 sessions, handled 22 messages K4MPV will handle traffic into Fort Knox and is working on Bowling Green. We regret the passing of W4SBI, a beloved old-timer and former SCM. K4CGW soon will move into a new home. *Smoke Signals* says K4CSH is Kentucky "ham of the month." W4KWO will take Lexington traffic on MKPN. W4CDA, our long-time editor of *Ether Chippings*, continues to improve under doctor's orders. Our fine OES boys in Northern Kentucky, W4HIZ, W4SMY, W4NMQ and W4ZOW, are going well on 420 Mc. The goal is four bands at one time, 54, 145, 220 and 420 Mc. An OES report also was received from W4ADH. K4ZQR reports that the Louisville Area Emergency Net meets Mon. at 0030 GMT on 51.17 Mc. with W4MDY as NCS. Traffic: K4KWQ 137, W4BAZ 90, K4CSH 77, K4RBI/4 73, W4ZDB 64, W4RHZ 34, WN4AGH 22, W4BEW 22, W4CDA 21, W4KJP 21, W4SZB 21, W4YYI 18, K4ZQR 18, K4TOZ 16, K4LDA 15, K4TRO 12, K4VDO 11, K4HSB 10, K4ZRA/4 8, W4ADH 5, W4MWX 5.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8ELR. RMs: W8SCW, W8EGI, W8QQO, W8FWQ and K8KMQ. PAMs: W8CQU and W8JTQ. V.H.F. PAM: W8PT. Appointments: W8QFQ, W8QGQ and W8TOX as ECs; W8MGQ and K8KVV as ORSs; W8FSZ and K8LNV as OPSs; W8RMH as OO; W8ZHB as OBS. New officers: Saginaw Valley ARA—W8QQK, pres.; K8KWG, vice-pres.; K8JLD, secy.; W8LNE, treas. The Genesee County RC—K8ACQ, pres.; K8NOB, vice-pres.; K8PBQ, secy.; W8VGG, treas. S. E. Michigan Council of Clubs: W8OFI, pres.; W8TQN, vice-pres.; K8DST, secy.; W8NBF, treas. This group is doing a fine job of coordinating major ham activities in this area. Western Mich. O.'s 7th V.H.F. Conference was a big success, with W8CVQ in charge. W8ELW described the "clover leaf" stacked antenna for 144 Mc. and W8UCG showed a working horizontal beam. K8OKB showed a modified surplus receiver for 1225 Mc. Those in attendance at the Halloween Party held by the Kent County Sheriff were W8ONH, W8SPX, K8DCS, K8EQO, K8EXG, K8IFR, K8JOI, K8LZL, K8OTF and K8ZVG. The City of Detroit now allows hams to have 75-ft. towers, but they must have an approved tower permit, which runs concurrently with the ham license. We must thank W8MGQ for this good luck. W8IRO instructs a

(Continued on page 98)



Model—3341
for 2 meter operation
Model—3342
for 6 meter operation
Model—3351
for 1¼ meter operation
(220 mc)

NOW!

GET THE BEST IN 2, 6 AND 1¼ METER OPERATION WITH THE GREAT GONSET COMMUNICATOR IV SERIES!

For more than a decade Gonset Communicators have set the standard for amateurs who want the finest. The COMMUNICATOR IV is the newest and the best in the famous series, containing many advanced features and maintaining the Gonset tradition of outstanding performance and superior workmanship.

The COMMUNICATOR IV SERIES provides increased output in all models, features vernier tuning and triple conversion receiver with 3 stages of IF, resulting in greater sensitivity and vastly improved selectivity.

Along with the 2 and 6 meter models, the COMMUNICATOR IV SERIES offers coverage of the popular 220 mc band, thus opening new vistas to amateurs in VHF and UHF.

GONSET VFO, completely compatible with the above models and operates with COMMUNICATOR I, II and III. Also provides NBFM. VFO adds the ultimate in frequency control, enables the amateur to operate effectively with both transmitter and receiver on the same frequency.

GONSET COMMUNICATOR SERIES is certified by OCDM for matching funds participation and is approved for CAP applications.

Call your authorized Gonset distributor now.

Model—3357

GONSET®

DIVISION OF YOUNG SPRING & WIRE CORPORATION

801 SOUTH MAIN STREET, BURBANK, CALIFORNIA

code/theory class at Henry Ford High School. K8KCO now is at M.I.T. W8RTN is editor of *Q.M.N.*, the Michigan traffic bulletin. K8KMQ made BPL again. W8MPD made a 144-Mc. converter for the OSCAR project. K8QCJ works 6 meters with a Clegg 99-er. W8EMD has 150 watts on 2 meters. K8LOS finally got his 813 going. Traffic: (Nov.) K8KMQ 206, W8OCC 132, VE3CYG/W8 84, W8ELW 76, W8JTQ 71, K8QLL 70, W8PBO 69, W8RTN 67, W8EGI 58, K8IUZ 58, W8INJ 57, K8MEG 55, W8WQH 55, W8FWQ 52, W8ZHB 43, W8HKT 39, K8EXE 38, W8FX 36, W8QQO 36, W8DSE 33, W8MPD 32, W8EOI 29, W8FDO 27, K8QCJ 25, W8OQH 23, K8PYW 21, W8ILP 20, K8HLR 19, K8JED 13, W8AUD 11, W8EU 10, K8GJD 9, W8EMD 7, W8TBP 7, K8IRC 6, K8KVM 6, K8LZF 6, W8ALG 3, W8BEZ 3, K8NHC 3, K8OTJ 2, (Oct.) W8QQO 34, W8ILP 9, K8KVM 4.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, W8VTP and K8ONQ. PAM: K8KSN. November appointments were K8SUB and K8SVM as EC; W8AQB and W8RPW as OO; W8CHT and W8OYI as ORS; K8QPA and K8RPO as OES. K8BXT sent these news items: K8OZK is in Germany, K8RMO is conducting code classes at Champion High School. K8TUJ is conducting code classes at Niles High School, K8CMQ is now WA6RMP, KN8WZD is vacationing in Italy and KN8CYI is in the Army. The Sunday Noon Naggers Net held a banquet near Millersburg with 42 present and presented K8PAC with a cup trophy for his high attendance in checking in. K8QIO won a Spiral Ray beam and K8DFN a Johnson 6 & 2 v.f.o. K8SYW has a new Ranger 2. K8PYD received DUF No. 1 certificate and took first place in the 8th district in the PACC Contest, c.w. section. K8ZDE received his General Class license. K8JSQ is on s.s.b. with GSBs 100 and 101. K8JYI is mobile with a G-76. Canton ARC's *Freedline* pictures K8OBW and K8VKT, another family team in Canton, on the cover page, the club held a weiner roast. K8s ACZ, PVX and ZCO received their General Class licenses. W8FSM and K8LBZ have new HQ-170s, W8IKM has a new Hy-Gain TH-4, W8HR has a new Mosley V-4-6, the stork brought K8UKH a baby boy. K8HDJ is in the Philippine Islands with the Navy, K8s WVG and WVK are new hams, the team of K8MZS and K8MZT has a new SX-115, W8IGA raised his tower higher and W8EAX moved to Arizona. The Seneca RC's 1962 officers are K8KRK, pres.; and K8KFY, secy.-treas. Dayton ARA's *R-F Carrier* informs us that the club heard a short talk on computers and W8NAF spoke on the elimination of key clicks and also the construction of a vacuum keyer. W8DG spoke on construction using low-cost parts and W8NAF told how to assassinate the harmonics in your transmitter. *Smoke Signals* from the Indian Hills RC says the club heard a talk and saw a demonstration of microwave engineering procedures and told about the club's code and theory classes with thirty enrolled. The OH-KY-IN V.H.F. Society's *Q-5er* states that K8RNB has moved to a new QTH. The Cuyahoga County AREC for the fourth consecutive year set up a Goblin Patrol to work with the Olmsted Falls Police using 10, 6 and 2 meters with W8AEU, W8LHX, W8NZI, W8PVQ, W8QBF, W8SUS, W8VFU, W8ZJQ, K8AAG, K8ABA, K8DPA, K8EJH, K8GBH, K8HVH, K8IBE, K8IDU, K8IZL, K8JGH, K8QNK and K8SYK taking part. Warren ARA's *Q-Match* reports that W8RBI, of WEWS-TV, spoke on TVI and its cures. W8FKC, of Standard Oil Research Labs., spoke on satellite tracking, the club held a dinner-dance. K8OZK left for overseas. Parma RC's *P.R.C. Bulletin* informs us that W8PYR gave a talk entitled "Know your Antenna" and K8BUM is the TVI chairman. Traffic: (Nov.) W8DAE 721, W8UPH 624, K8SQK 221, K8BDZ 195, W8BZX 183, K8ONQ 161, W8CHT 99, K8RYU 81, W8ZYU 80, K8QHH 78, W8LZE 52, W8AL 38, K8KSN 38, W8YGR 23, W8PMJ 19, K8BNL 13, K8OZG 13, K8PBZ 7, W8WYS 5, W8BEW 4, K8KXS 4, K8EJI 3, W8OUU 3, K8HTM 2, W8IBX 2. (Oct.) W8ZYU 117, K8MAZ 6, K8JSO 4, K8PBZ 3, W8AZL 2, W8DG 2, K8LBU 2, K8PBE 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2IJG. Section nets: NYS on 3615 kc. at 0000 GMT nightly; NYSPTEN on 3925 kc. at 2300 GMT nightly; ESS on 3590 kc. at 2300 GMT nightly; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-Club on 28.690 Mc. Mon. at 0130 GMT. Appointments: W2DQW and W2WXP as EC. Endorsement: K2GCH as EC. Welcome to the new Inter-Club Net sponsored by Westchester ARC. The objective is to help all clubs in the section; secure speakers, announce activities, assist with legal matters, etc. Call in if your club would like to join. K2SJN reports the HQ-110 has been relieved by a new SX-101A. Not exactly a ladies' man, but K2DEM reports YLCC-200. An inverter into his HQ-140 solved

(Continued on page 100)

FOR 6 & 2 in '62

get the best in VHF with one of these great ham stations by CLEGG!

BUT DON'T TAKE OUR WORD FOR IT. Any owner of a Clegg Zeus or 99'er will tell you. Ask him about the wonders he's working with DX—the plaudits he's receiving from fellow hams about his signal—and the incomparable design, construction and operating features so unique with his Clegg unit!

CLEGG ZEUS VHF TRANSMITTER for 6 and 2 Meters

- ★ Highly efficient 185 watt AM, high power VHF transmitter for full coverage of amateur 6 and 2 meter bands and associated Mars frequencies.
- ★ Automatic modulation control with up to 18 db of speech clipping. Gives you "talk power" greater than many kilowatt rigs!
- ★ Self-contained stable VFO. Simple band switching and tune-up.

Amateur net price: $675. Completely wired and tested with all tubes, Modulator, Power Supply, VFO, cables, etc.

99'er 6 Meter TRANSCEIVER

- ★ A true ham station, ideal for both fixed station and mobile operation.
- ★ Double conversion superhet gives you extreme selectivity and freedom from images and cross modulation.
- ★ Transmitter section has an ultra-stable crystal oscillator which also may be controlled by external VFO.
- ★ Efficient, fully modulated 8 watt final works into flexible Pi network tank circuit. Large S meter serves for transmitter tune-up procedure.

Amateur net price: $139.95.

We're sure you've heard glowing reports like these typical unsolicited comments that we are constantly receiving:

About the Zeus

". . . I have been in amateur radio since 1912 and have been active ever since and will say that this transmitter is the finest that meets my opinion of what a transmitter should be . . ."

George R. Mathias, W9ZHR, Illinois

". . . more than exceeds my expectations. I am in QSO with stations I never knew existed before . . ."

Leo Winter, Jr., D.D.S., WA2TIA, New York

"Have been using this rig for less than a month and all ready have worked twenty or more states on six meters. It is equally good on two meters. Get wonderful reports up and down the coast of California . . ."

Jay Mahoney, W6YDF, California

". . . I am doing very FB with the Clegg, getting more than my share of DX . . . I have had some remarkable QSO's on your Clegg . . ."

William T. Shaw, W6BWK, California

ABOUT THE 99'er

". . . Like all hams the first thing I did when I got home was to take it apart. We were amazed with the wiring job. Clegg did it better than the wiring in equipment costing $1,000 . . ."

Ellis B. Hersh, W3IXL, Pennsylvania

Write for complete information today!

Clegg LABORATORIES
502 RT. 53, MT. TABOR, N. J.
OAKwood 7-6800

Dick's d.c. power line problem in his Yale dormitory. W1FZJ, was guest speaker on v.h.f. at the Schenectady Club November meeting. Five hams in one family are K2CKV (OM), W2ODC (son), WA2VSV (grandson), W1TSN (son) and W2DYL (son-in-law). Fortunately, they all don't reside in the same house but all keep regular skeds. W2LCB just finished a 15-tube receiver built on an old NC-200 chassis. Not an afternoon project, says Irv. The ESS Net recently published a 3-page directory, courtesy of W2MTS. Sparking the drive for call-letter plates are K2SJO, W2AAO, W2EIC, WA2MAJ and K2GTY. Receive a free monthly bulletin and check in the N.Y. Red Cross Mutual Aid Nets the first Sun. of each month at noon (3550 kc., 3875 kc., 7220 kc., and 50.70 Mc.). Traffic: WA2HGB 119, W2THE 105, W2EFU 87, K2QJL 58, K2SJN 33, W2PHX 32, K2HNW 14, K2TXP 14, W2PKY 12, WA2JTK 7.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke jr., W2OBU—SEC: W2ADO. RM: K2UFT. PAM: W2UGF. V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc. at 0015 GMT nightly; NLI (Late) 3630 kc. at 0345 GMT nightly; NYC-LIPN, 3908 kc. 2230 GMT nightly; V.H.F. Traffic Net, 145.8 Mc. at 0100 GMT Tues.-Wed.-Thurs.; the Mike Farad Net, 3610 kc. at 0500Z and 7238 kc. at 1700Z daily. For excellent traffic-handling K2UAT, K2UBG and WA2GPT received BPL cards by their high totals and W2EW, W2GKZ and K2FO earned their cards by origination and delivery totals. WA2FRW has been appointed EC for the 6-meter Kings County AREC-C.D. group, 50.4 Mc. on Mon. at 2030. WA2FUL built up his station with a new SX-111 and a five-element Telrex. W2PF had a fine trip visiting Israel, Greece, Spain and Portugal and spent some time with 4X4FB in Tel-Aviv. WA2QJU is seeking more check-ins for the Q5 Net on 3935 kc. nightly at 2200Z. The new '62 slate of officers of the Martin Van Buren H.S. Club are WA2FIT, pres.; K2IVE, vice-pres.; WA2MPP, secy. The club's new call is K2LUO. WA2NYO sure is enjoying his new RME-6900. WA2NXF made General Class and acquired a new Ranger and Thunderbolt. The Suffolk County ARC elected the following officers for 1962: W2OQI, pres.; K2JQO, vice-pres.; W2FGD, secy.; W2OKK, treas. W2TUK, proxy of the HARC, announces the 1962 Hudson Division Convention will be held in the Hotel Statler Oct. 13, 1962, under the sponsorship of the council. Better start saving your sheckels. Many of the members of the Kings County AREC received Public Service Awards for their work in the airplane crash almost a year ago. The Five Towns RC official staff is as follows for 1962: K2KXJ, pres.; K2KPO, vice-pres.; K2CTK, secy.; and WA2HTI, treas. WA2OGA, in addition to teaching typing to the blind in the Queens Lighthouse, now conducts classes on code and theory to encourage the handicapped in the institution. Help is always needed to carry on this most helpful endeavor. W2EW, GQN and K2OWD are going in heavily these days for RTTY and plan to utilize same in conjunction with the local 2-meter traffic net. Results of an election for officers of the Amateur V.H.F. Institute of N.Y. for '62 are as

(Continued on page 102)

NYC-LI QSO PARTY

February 10-12

The South Shore Amateur Wireless Assn. invites all amateurs to participate in the New York City-Long Island QSO Party by contacting as many NYC-LI stations as possible.

Rules: (1) *Contest Period:* 2300 GMT Feb. 10 to 0500 GMT Feb. 12. (2) *General Call:* On c.w. "CQ NL" or "DE NL." On phone "CQ New York City-Long Island." (3) *Scoring:* Stations outside NYC-LI count two points for each NYC-LI station worked, and multiply by the number of counties worked (7 maximum). NYC-LI stations count two points for each station worked, and multiply by the number of ARRL sections worked; NYC-LI-to-NYC-LI contacts count one point. Multiply final score by 1.25 if power 150 watts or less at all times. Phone and c.w. are considered the same contest. (4) *Exchange:* QSO number, RS(T), and ARRL section (county for NYC-LI stations). (5) *Awards:* Certificates go to section winners (if two or more entries), county winners, and Novice high scorer. (6) *Frequencies:* 3560-70, 3900, 7030-40, 7250, 14080-90, 14250, 21050-60, 21350, 28010-20, 29000 kc., and 50.4 and 145.5 Mc. (7) *Entry:* Logs must be postmarked no later than Feb. 28, 1962. Participating logs confirming WNYC-LI will be issued certificates to those stations complying with the rules for the award.

solid

HQ-145X

$269.00* AMATEUR NET

A sign of the times... and one which is appearing with ever-increasing frequency at distributors all over the country. There's good reason for the swing to HAMMARLUND'S HQ-145X. This unit now offers all of the superb features found only in 'Big Money' receivers. These include dual conversion, crystal filter/slot filter selectivity, continuous tuning from 540 KCS to 30 MCS, improved noise limiter—in fact, everything you want in a quality receiver...

PLUS THE NEW FEATURES OF THE HQ-145X

- High precision crystal controlled channel for use at any point within the entire frequency range. (Crystal not supplied)
- Improved electrical and mechanical VFO stability
- Unsurpassed CW performance through continuance of the exclusive Hammarlund crystal filter—used in conjunction with a slot filter.

IT'S A FACT—you just can't buy a better receiver at this price!

"PERSONAL TOUCH" ELECTRONIC KEYER—HK-1B

Half the price—twice the value. Fully comparable to keyers costing twice as much. Individual dot/dash control, automatic, semi-automatic (bug) or straight key operation. Guaranteed Hammarlund quality at the lowest cost ever.

$39.95 (less battery)

*Clock Tuner $10 optional
†KC-100P Plug-in Crystal Calibrator $15.95 optional

HAMMARLUND
MANUFACTURING COMPANY, INC.
A Giannini Scientific Company
53 West 23rd Street, New York 10, N.Y.

Established 1910

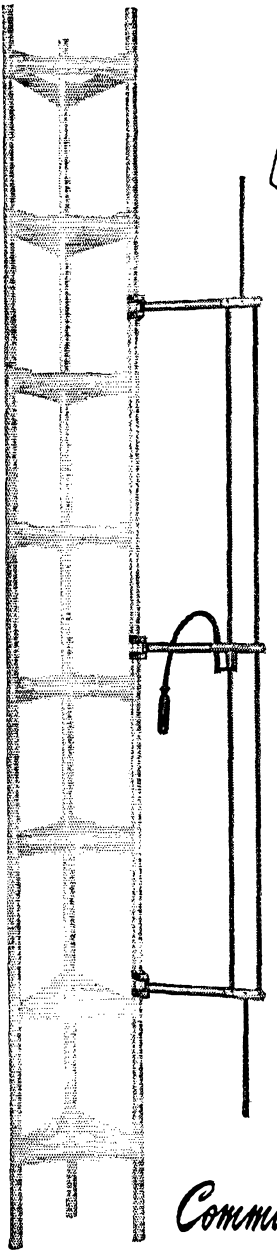
follows: K2DDK, pres.; W2JCI, vice-pres.; W2HVL, rec. secy.; W2KQL, corr. secy.; W2AUF, treas. K2IPC, K2QLC, WA2BJL and K2PQY are using n.f.m. or f.m. on 6 meters to overcome evening problems with TV and are finding same very successful. K2PQY is looking for any W1 call area n.f.m. station to continue experimentation on this mode. Many appointments are due for renewal. In order to stay on the active list, please check and forward certificates to your SCM for signature. Traffic: (Nov.) K2UAT 1122, K2UBG 671, WA2GPT 623, W2EW 421, W2GKZ 395, K2FO 350, K2UFT 217, WA2QAT 156, WA2NCE 138, WA2BWO 123, WA2TQT 76, WA2NWG 66, K2THY 66, K2KYS 56, WA2EFN 53, WA2FRW 20, K2-CMJ 16, WA2PUE 14, WA2WEA 13, WV2VKK W2EC 8, K2OVN 7, WA2RAS 6, WA2FUL 5, W2OME 4, K2-APG 4, K2YQK 4, W2PF 3, K2PHF 3, WA2QHT 3, W2TUK 3, WA2BJK 2, W2DUS 2, K2QBW 2, WA2QJU 2, WA2RAQ 1. (Oct.) W2DUS 5.

NORTHERN NEW JERSEY—Acting SCM, Daniel H. Earley, WA2APY, SEC: WA2APY, RM: K2VNL, PAM: K2SLG. V.H.F. PAM: K2KVR. Section nets: NJN meets daily at 0000 GMT on 3695 kc. There were 30 sessions held with an attendance of 423 to handle 288 messages. In October 31 sessions were held and 381 attended for 322 messages. The NJPN meets Mon. through Sat. at 2300 GMT, Sun. on 1400 GMT on 3900 kc. The net held 30 sessions with 452 stations to handle 188 pieces of traffic. In October 31 sessions were held and 599 attended for 260 pieces of traffic. The NJ 6&2 net meets at 0400 GMT Thurs. and Sun. on 51.15 Mc. and at 0300 GMT Wed. and Sun. on 147.75 Mc. and for October reports 21 sessions with 150 attending for 33 messages handled. Appointments renewed: WA2JHQ, WA2APY, W2EBG, K2UKQ, W2EWZ, WA2COO, and W2CFB as ORSs; W2DMM and K2VZJ as OOs; WA2PBN and K2QGD as OESs; K2SLG as PAM; WA2IGQ, WA2COO, WA2ASY, WA2CCF/UZH as ECs. The NJN Net held its annual meeting Nov. 4 on the sidewalks of New Brunswick. I suppose they drew a little attention until the doors to the American Red Cross were unlocked. The members stopped drinking coffee long enough to elect WA2GQZ as their next RM. It seems that WA2OLZ and WA2CCF have gone to MARS? The Freehold Regional High School Radio Club, K2JRJ, held its first meeting Oct. 5. The N.J. Phone and Traffic Net held its annual dinner Nov. 18. W2JAE is a new OO. The Westrex Corp. seems to be keeping W2ADE from the nets. WA2FCB will have to share his rig with WV2VQG, his mother. K2UKQ has a new 40-ft. tower. W2CVW put a 500-cycle filter on his 75A-4. Drop a line to K2ZFI about the Morris-Sussex Co. 10-Meter Net. WA2VLE got his Tech. class ticket. This writer gave WA2SGR his Novice test. WA2GQZ is trying to get a "Tower" on mobile. WA2IGQ has a new Gonset IV; W2AZZ says singing is cutting into his hamming. K2AGJ has a new 30L-1 linear on the air. The NJPN held a dinner on Nov. 18. WA2TWL, the Rutgers station, is looking for a tower or antenna that can't be seen (aren't we all?) W2BVE is foolin' with RTTY. Driving by K2AGJ's one can feel the magnetic flux. Eileen's new ham shack ought to be done by now. The Hudson Amateur Radio Council would like a better representation from Northern New Jersey. Traffic: K2-UCY 399, K2VNL 273, WA2CCF 217, WA2JHQ 208, WA2APY 188, W2CVW 35, K2SLG 24, W2CFB 15, W2-BVE 12, WA2UZH 10, K2EQP 8, K2VNK 6, K2AGJ 2, W2EWZ 2, K2UKQ 2, K2PQR 1. (Oct.) K2UCY 462, WA2GQZ 292, K2VNL 282, WA2JHQ 234, WA2APY 202, WA2CCF 155, WA2AKM 48, K2SLG 48, W2CVW 47, K2HFL 40, WA2LGQ 21, K2MFF 20, WA2UZH 20, K2-ZFI 18, K2JTU 14, W2ADE 13, W2AZZ 10, W2EWZ 10, W2DRV 9, K2AGJ 7, W2BVE 4, K2UKQ 4, W2NIY 3, K2QGD 3, WA2TWL 2. (Sept.) WA2GQZ 350, K2SLG 19, W2CVW 2.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Russell B. Marquis, WØBDR. SEC: KØEXN. PAM: WØPZO. RMs: WØDUA and WØBDR. OO: KØAZJ. Talleorn is alive again. WØBDR is a new RM. He needs your help to rejuvenate this once worthy traffic net. WØNWX was a guest of the Ames Radio Club in November. Congratulations, Bob and Sum, upon your reelection as director and vice-director, respectively, of the Midwest Division. To the runners-up, thanks for trying; competition is good in any group. New ECs: KØYHO, Tama; WØQJM, Iowa; WØAWQ, Fayette. ORS: K6SXA/Ø, Grinnell. Net reports: 75-Meter Phone, QNI 1455, QTC 155 sessions 26, average 6. 160-Meter Net, QNI 845, QTC 49, sessions 30, average 1.6. 75-Meter Teenage Net, QNI 106, QTC 4, sessions 26. Traffic: (Nov.) WØLGG 1894, WØSCA 1075, WØBDR 541, WØDUA 381, WØCZ 179, KØMMS 128, WØNTB 88, WØPZO 43, WØBTX 25, WØLJW 22, WØJPJ 17, KØAFG 15, KØKAQ 9, KØEVC 8, KØUAA 8, KØGOT 7, KØYDV 7, WØIO 6, KØVBM 6, KØMYU 5, KØQXD 5, WØGQ 4. (Oct.) WØLJW 24.

(Continued on page 104)



C-P COMMUNICATION ANTENNA SYSTEMS

—mean

CERTIFIED PERFORMANCE!

New!

BASE STATION SIDE-MOUNT ANTENNA

CAT. NO. 320-509

Cat. No. 320-509 Side-Mount 2.5 db Gain Antenna is designed for applications requiring an antenna which must be side mounted on existing or new towers. This antenna has essentially a cardioid pattern and has approximately 2.5 db gain in the forward direction. High strength aluminum alloy is used for all antenna parts, except the mounting clamps, which are made of stainless steel. All insulators are made of the best available materials for the various uses involved. Each antenna is supplied cut to the desired operating frequency and is assembled ready for installation.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	±1.0%
Maximum power input	500 watts
Flexible terminal extension	18 in. of RG-8A/U
Termination	Type N male with Neoprene housing
Lightning protection	Direct ground

Mechanical:

Radiating element material	6061-T6 aluminum
Insulated support material	Phenolic
Feed point insulator	Polycarbonate
Overall length	10 ft. at 50 Mc, 16½ ft. at 30 Mc
Spacing from tower	8"
Rated wind velocity	100 MPH
Lateral thrust at rated wind	45 lbs. at 30 Mc
Weight	15 lbs. at 30 Mc

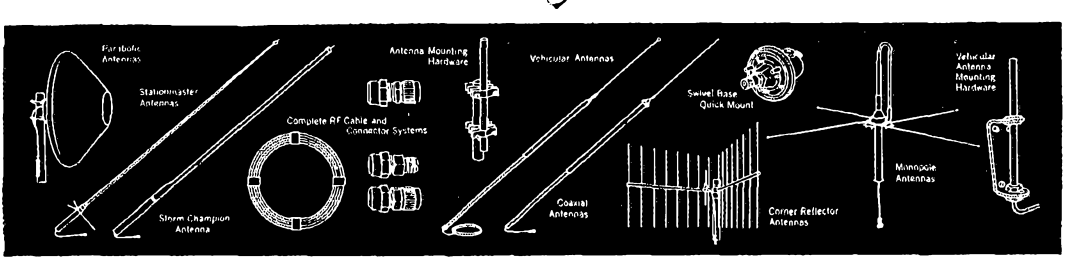
Stainless Steel Mounting Clamps supplied to mount antenna on round tower legs 1 in. to 1½ in. diameter.

Communication Products Company, Inc.

Communication Antenna Systems for American Business

SINCE 1933

Marlboro, New Jersey
Tel. HOpkins 2-1880 (Area Code 201)
Los Angeles 65, Calif.
Tel. CHapman 5-1143 (Area Code 213)



KANSAS—SCM, Raymond E. Baker, WØFNS—SEC: KØBXF. Asst. SEC: KØEMB. RM: WØQGG. PAM: KØEFL. V.H.F. PAM: WØHAJ. Nets: KPN 3920 kc. Mon., Wed., Fri. 1245Z, Sun. 1400Z, NCSs KØQKS, WØFHU, WØIFR and WØORB, 17 sessions; QTC 87, high 15, low 1, average 5.1; QNI 534, high 57, low 20, average 31.4. QKS, 3610 kc. daily 0030Z, 30 sessions; NCSs KØBXF, WØBYV, WØIFR, WØQGG, WØSAF, WØTOL; QTC 176, high 20, low 0, average 5.86; QNI 276, high 15, low 5, average 9.2. KSN, 3925 kc. Mon. through Sat. 0001Z, NCSs KØEMB, WØLHF, WØOMM; 25 sessions, 597 stations reporting no emergency sessions. HBN, 7280 kc. Mon. through Fri. 1800Z, Mgr. KØWNZ. Traffic: (Nov.) WØOHJ 639, KØHGI 364, KØYRQ 259, WØBYV 173, KØBXF 122, WØFNS 111, WØABJ 102, WØQGG 92, WØTOL 71, WØORB 35, KØHVG 31, WØIFR 25, WØBSS 10, KØEMB 10, WØGCJ 10, KØJID 7, KØQKS 7, WØBLS 6, WØFDJ 6, WØFHU 6, KØPSD 6, WØAXZ 5, KØGII 5, KØJWW 4, KØGHO 3, KØGIG 3, KØGQO 3, KØVQC 2. (Oct.) KØYRQ 163, WØORB 18, WØFDJ 4, WØAHW 3, WØVBQ 3, KØVQC 3.

MISSOURI—SCM, C. O. Gosch, WØBUL—SEC: KØLTP. Asst. SEC: KØLTJ. RMs: WØOUD and KØONK. PAMs: WØBVL, WØOVV and WØLFE (v.h.f.). Net reports: (Nov.) SMN (3580 kc., 2200 GMT, Su.) 4 sessions; QNI, 22; QTC 19; NCS WØOUD 4. MON (3580 kc. 2400 GMT Tu.-Su.) 26 sessions; QNI 206; QTC 198; NCSs WØOUD 9, KØVPH 8, WØKIK 4, WØRTW 4, KØFPC 1. MSN (3715 kc. 2200 GMT M-F) 24 sessions; QNI 192; QTC 221; NCSs KØONK 7, KØVPH 3, KNØGFA 5, KNØGOB 4, WØUDL 5. Mo. S.S.B. (3885 kc., 2400 GMT, Tu.-Th.) 9 sessions; QNI 109; QTC 59; NCSs WØOMM 6, WØEEE 2, WØTPK 1. MEN (3885 kc., MWF, 2400 GMT) 13 sessions, QNI 397; QTC 261; NCSs KØONK 5, KØMMR 3, KØVPH, KØWNZ, WØBUL, WØOVV, WØBUL/WØOVV 1 each. Appointments: KØOLW as OBS; KØIFL as OO Cl. II to IV; KØJPL as OPS. Endorsements: KØBWQ as OES; KØONK, KØIHY and WØANT as OPSs; WØOUD as ORS; WØOVV as PAM/MEN mgr. Cancellation: WØOVV as OBS (by his request); KØETV as OO (by his request). Club station KØAXU/Ø participated in the SS and completed the requirement for WAS. KØVPH has a new CM-1 receiver which she reports is quite satisfactory. Traffic: (Nov.) KØONK 1432, KØLTJ 586, WØANT 365, KØVPH 195, WØZVS 137, WØOUD 123, WØOMM 114, WØZLN 113, WØKIK 98, KØRPH 76, WØRTW 68, KØIHA 62, WØBVL 54, WØMKJ 53, KØPCK 51, WØBUL 50, WØPXE 40, KØJPL 39, WØWAP 37, KØMMR 32, WØDCR 30, WØOVV 15, WØAYB 13, WØKCG 11, KNØGFA 10, KØWNZ 8, WØGBJ 5, WØEPI 1. (Oct.) KØVBU 6.

NEBRASKA—SCM, Charles E. McNeel, WØEXP—SEC: KØTSU. The Western Nebraska Emergency Net, KØRRL as NC, reports QNI 132, QTC 106. The Western Nebraska Net, WØNIK as NC, reports QNI 661, QTC 443, 100 per cent reporting for November. KØAIE, KØBMQ, WØDVB, WØOCU and KØTUH. KØDGW reports The Nebraska Morning Phone Net had QNI 631, QTC 150. WØOKO, NC for the Nebraska Section Net "C.W.", reports QNI 163, QTC 66 and 31 sessions. The Western Nebraska and Kansas Semi-Annual SideBand Dinner was held at Phillipsburg with a growing attendance. A farewell party was held at the Cedar Bowl for WØOYN, who is moving to Denver where he is on the staff at the University of Denver. Traffic: (Nov.) WØGGP 430, WØOKO 175, KØBFQ 158, KØDGW 78, KØYDS 68, WØZJF 67, WØNIK 64, KØOAL 61, WØOCU 61, KØKJP 48, KØRRL 46, KØTAL 35, WØNYU 34, KØUWK 31, KØODF 30, WØWUV 29, WØAHB 26, WØRIH 23, KØMSS 22, KØZAM 22, WØVZJ 21, WØBOQ 15, WØLOD 14, WØUJI 12, WØYFR 12, WØLFJ 11, WØKLB 10, KØGAT 9, KØSBV 9, KØVAD 9, KØIWF 8, WØHOP 7, WØVEA 7, KØZYA 7, KØELU 5, WØWKP 4, WØCRK 3, WØFXS 3, WØCIW 2, WØDDT 2, WØZWG 2. (Oct.) KØRRL 73, KØYDS 10.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., WICHR—SEC: EOR. RM: KYQ. H.F. PAM: YBH. V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 2300Z, Sun. 1500Z on 3880 kc.; CN, daily 2345Z and 0300Z on 3640 kc.; CVN, Tue., Thurs. and Sat. 0130Z on 145.98 Mc.; CTN, 1400Z on 3640 kc. The Kaman ARC and the Shelton Emerg. Radio Assn. are now ARRL affiliated. YBH reports the CPN had 30 sessions, handling 239 messages for an 8 average. Attendance averaged 23. Honor roll for attendance lists DAV, VQH, YBH, K1s PPF, AQE, ONZ and PUG. KYQ advises CN had 30 early sessions handling 418 messages for a 13.9 average and 22 late sessions handling 36 messages for a 1.6 average. Attendance averaged 14.9 on the early and 2.4 on the late with K1s IFJ, GGG and JAD with high QNI.

(Continued on page 106)

FREE

INTERNATIONAL 1962 CATALOG

. . . your buying guide for precision radio crystals and quality electronic equipment . . .

- Amateur Crystals
- Commercial Crystals
- Citizens Band Crystals
- Transmitters
- Oscillators
- Converters
- Transistor Subassemblies
- Power Supplies
- Citizens Band Transceivers
- Citizens Band Antennas/Accessories

AMATEURS • EXPERIMENTERS • CITIZENS LICENSEES

Mail today for your FREE copy of International's 1962 complete catalog.

INTERNATIONAL
CRYSTAL MFG. CO. INC.

18 NORTH LEE — OKLA. CITY, OKLA.

International Crystal Mfg. Co., Inc.
18 North Lee, Oklahoma City, Okla. T2
Please rush FREE 1962 International Catalog.

NAME.....
Please Print
ADDRESS.....
CITY.....ZONE.....STATE.....

K1QPN is organizing a club at the U. of Hartford and giving code classes to YLs. QV visited KH6-Land. KN1s TVI, TVD and TMT are new New Haven hams. FML is leaving for Guam. HAX is building new rigs for 80-10 and also 2 meters. The Tri City ARC formed a Women's Auxiliary, which put on the appetizing end of a pot-luck dinner affair Dec. 12 attended by members and many guest hams, including heavy representation from the Shore Line ARC. EFW and CHR were privileged guests at the festivities eminently "emceed" by K5OEA/1. EJH, Bridgeport EC, has appointed K1JKJ as asst. and reports that new AREC members are K1s KSD, QNE and KN1SPA. K1PTK works into Boston consistently on 2 meters. K1TKJ is installing a Gonset II in his car and reports K1TVE and K1TZD are new local hams. Traffic: (Nov.) W1KYQ 239, AW 204, RZG 195, K1IFJ 141, W1OBR 126, YBH 124, K1AQE 112, JAD 100, GGG 90, PUG 58, W1NTH 50, K1PPF 50, PQS 36, W1-ROX 35, K1QPN 27, DGK 26, MBA 21, W1LV 17, CUO 16, CHR 14, QV 14, K1PBW 11, EIC 10, W1CUH 7, BNB 6, GEA 6. (Oct.) K1QPN 5. (Sept.) K1PQN 4.

MAINE—SCM, Albert C. Hodson, W1BCB—Welcome to K1TXJ/, ex-W5GCK, now in Houlton. Congratulations to K1LHE for the fine Frequency Measuring Test measurements within 28.3 parts per million. GRG is on the air with a Globe King 500. WTG was married Nov. 18. K1ACF now has a DX-100. LHD and his XYL, K1LQZ, have a new Hornet tribander. AHM also has a tribander. K1MDM reports several visitors at Togus Veteran's Center and some new facilities so that several patients have been able to talk with their families. The Westbrook Amateur Radio Club held its First Annual Supper Nov. 16 and had a successful gathering. Because of the weather, EFW, New England Division Director, sent congratulations on the club's affiliation with ARRL, instead of being able to present the certificate in person. The writer would appreciate more reports of club activities and notice of any special meetings or hamfests well in advance of the date so notice can be properly given in *QST*. By the time this goes to press, several Maine amateurs should be displaying the new call letter auto license plates. It appears that high cost kept many from obtaining them. So let's strive for a reduction in fees next time. Traffic: K1MBM 114, IMI 57, K4BSS/1 50, W1GRG 50, ISO 26, K1MDM 13, BZD 12, W1YA 9, K1KSG 6. (Oct.) K4BSS/1 58.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—*SEC*: AOG. FMW is EC for Cambridge. We all wish to extend our sympathy to BVR on the death of his wife. K1DIO is a Silent Key. SAD and COL have moved to California. Heard on 2 meters: KSI, KJ, RRN, EAE, FGD, DNO, K1s SOD, SLZ, QVU, PKW, NEU, MOC, KN1RZM, KN1s TTP and TTQ are on 40-meter c.w. CCP is K1QVU's dad. IHV, THL, K1OGA and MMI are on 10 meters, also K1s NDA, IPB, RSZ, ILR, EAF, NJE, OTA. W1s NOV, IH, JTS, NCT and AYG are mobile. Heard on 6 meters: K1s TUT, QVU, RVV, OCD, MAK and LZM. K1SNA, No. Reading, is on 75 meters. K1MBU is on many bands. EUJ writes from Ft. Monmouth, N.J. His dad is K1JPW. NF still is working DX. K1JLP and K1GFR are on 6 meters. IAU has been staying in N.Y.C. PTR took part in the SS. OLP put up a Lazy H. K1TKI, Foxboro, is on 80-meter c.w. The T-9 Club met at Doc Savage's. K1RHZ has his General Class license. The Bedford Radio Club held a banquet. K1QJT has a tilt-over tower and an HT-32B. YHY is putting up an antenna for 75 meters. The QRA held an auction. BB held the annual get-together of his c.d. group at his QTH. Guests were RM, DOF, MPP, PS, LFA, JJE, GAG, YPH, DWY, ALP and his XYL. K1NTS is on 2 meters with a five-element beam. A demonstration of traffic net operation was held at the Boston Museum of Science. K1DXJ is on 75 meters. K1BUF is on 1RN. New officers of the Mass. V.H.F. Society are QXX, pres.; KCO, vice-pres.; K1AAA, secy.; K1s ISL and EJW, board of directors. The EM2M Net held 22 sessions, with 316 check-ins, 158 traffic. K1s PLU and ROA have net certificates. K1JKR is in Germany. K1KZP now is at Harvard Observatory. K1s BTF, KYN, MPJ and SIV went on a cruise. JSS is very busy. ALP attended a meeting of the Wayland Club. The Framingham Club held an auction. The Milton Club visited Northeast Airlines at Logan Airport. SMO is in the V.A. Hospital in Brockton. K1WAS, N. U. MARS Club, is back on the air on 40- and 75-phone with a BC-610, two 51J-2 receivers, and an 0-39/TRA-7 (v.f.o.). K1OFD, in Framingham, has a home-built rig on 6 meters and an SX-101. EM75PN had 493 stations, 247 traffic, 30 sessions. KN1UAN, Weston is on 2 meters. Traffic: (Nov.) W1AWA 540, EMG 311, PEX 186, DFS 129, W8-ARB 77, W1DOM 66, K1KBO 62, W1OFK 57, K1DGI 51, W1ZSS 49, K1OCD 43, W1AUQ 31, AOG 28, VYS 24, K1-CMS 19, W1HGN 18, K1PLU 14, W1DIY 13, K1GKA 12, QNZ 12, GTX 10, W1SIV 9, K1MYN 5, QOG 4, W1WYX 4, K1MEM 3, BGK 2, DRB 2. (Oct.) W1AWA 391 K1-

(*Continued on page 108*)

your choice of 2 GREAT EICO® TRANSMITTERS...

designed by Hams... for Hams...

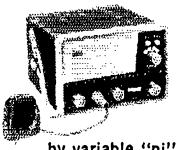
to the highest Ham standards

90-WATT CW TRANSMITTER* #720
Kit **$79.95** Wired **$119.95**
*U.S. Pat. #D-184,776
"Top quality"—ELECTRONIC KITS GUIDE
Ideal for veteran or novice. "Clean" 90W CW, 65W AM-phone with EXT plate modulation. 80 through 10 meters.

60-WATT CW TRANSMITTER #723
Kit **$49.95** Wired **$79.95**
"Compact; well-planned layout. Clean-sounding, absolutely hum-free carrier; stable." — ELECTRONICS WORLD.
Perfect for novice or advanced ham needing low-power standby rig. "Clean" 60W CW, 50W AM-phone with EXT plate modulation. 80 through 10 meters.

TRANSISTOR CODE PRACTICE OSCILLATOR #706
Complete with battery. Select variable tone, flashing light, or both together. Phone jack for private use. Efficient speaker: clean loud signals.
Kit **$8.95** Wired **$12.95**

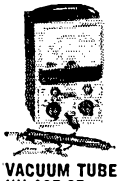
New! **CITIZENS BAND WALKIE-TALKIE #740**
Complete with rechargeable battery and charger. 9 transistors, 1 diode. Full superhet. U.S. made.
Kit **$54.95**
Wired **$79.95**



CITIZENS BAND TRANSCEIVERS
Superhet; prealigned xmitter osc; match different antennas by variable "pi" network. Single & multi-channel models.
From Kit **$59.95** Wired **$89.95**

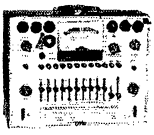
HIGH-LEVEL UNIVERSAL MODULATOR-DRIVER #730
Kit **$49.95** Wired **$79.95**
Delivers 50W undistorted audio for phone operation. Can plate-modulate transmitters having RF inputs up to 100W. Unique over-modulation indicator. Cover E-5 $4.50.

GRID DIP METER #710
Kit **$29.95** Wired **$49.95**
Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.



PEAK-TO-PEAK VTVM #232 & exclusive ***UNI-PROBE®**
Kit **$29.95**
Wired **$49.95**
VACUUM TUBE VOLTMETER #221
Kit **$25.95** Wired **$39.95**
*U. S. Pat. No. 2,790,051

DC-5MC LAB & TV 5" OSCILLOSCOPE #460
Kit **$79.95**
Wired **$129.50**
5" PUSH-PULL OSCILLOSCOPE #425
Kit **$44.95** Wired **$79.95**



DYNAMIC CONDUCTANCE TUBE & TRANSISTOR TESTER #666
Kit **$69.95** Wired **$109.95**
TUBE TESTER #625
Kit **$34.95** Wired **$49.95**

RF SIGNAL GENERATOR #324 (150kc-435mc)
Kit **$26.95**
Wired **$39.95**
TV-FM SWEEP GENERATOR & MARKER #368
Kit **$69.95** Wired **$119.95**

EICO®
ELECTRONIC INSTRUMENT CO., INC.
3300 NO. BLVD., L.I.C. 1, N. Y.
Export Dept., Roburn Agencies, Inc.
431 Greenwich St., N.Y. 13, N.Y.

EICO, 3300 N. Blvd., L.I.C. 1, N. Y. QS-2
☐ Send free Catalog & name of neighborhood distributor.
☐ Send free "Short Course for Novice License." ☐ Send 36-page STEREO HI-FI GUIDE: 25c enclosed for postage & handling.
Name.....
Address.....
City.....Zone.....State.....
Add 5% in the West.

ENGINEERS: *Excellent career opportunities in creative electronics design. Write to the Chief Engineer.*

DGI 60, W5GQB 42, K1PLU 12, DRB 6, QOJ 5, OJQ 2. (Sept.) K1PLU 6.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. RM: K1IJV. PAM: DXS. The West. Mass. C.W. Net (WMN on 3560 kc.) handled 65 messages during November in 26 sessions. K1CPG is now becoming quite active in the net. K1LRB has moved to 86 Haywood Street, Greenfield. K1SGV is now General Class and is operating 10- and 20-meter phone and 40-meter c.w. with a DX-40. QV was the November speaker at the Hampden County Radio Association. The Berkshire County Amateur Radio Association now has a total of 69 members with the following newcomers: K1PYX, KN1SPD, K1TRZ and W2GLN. K1HFI passed his 2nd class commercial exam. LPQ and K1DGA are active on 6 meters. Major Edwin Schaad, Post Signal Officer at Fort Devens, demonstrated several pieces of field radio equipment and presented a film at the Montachusett Amateur Radio Club. New Technicians on 6 meters in the Fitchburg Area are K1QDV and K1PCK. K1KBS has a new 75-ft. Telrex tower. K1APR is active on 220 Mc. No news was received from the West. Mass. Phone Net. PAM DXS is now at 40 Dayton Street, Worcester. Your SCM had the very great misfortune to lose his bride of 3½ months by a heart attack on Nov. 27 after a very brief illness. Traffic: K1LBB 138, IJV 126, W1BVR 62, K1LRB 21, W1DVW 14, FAB 9.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1HQ—SEC: K1GQK. PAM: K1JDN. RM: K1ITS. The GSPN meets Mon. through Fri. at 2400 and Sun. at 1430 on 3842 kc. The CNEN meets Mon. through Sat. on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330 on 3685 kc. Appointments: K1JDN as PAM, PYM as OO. Endorsements: K1MOZ as OBS, KVG as OPS, AIJ as OPS and ORS. Another SET was held Nov. 19 on 50.82 Mc. AREC tests are growing in scope and popularity. K1JDN has taken over as PAM and is doing a fine job. Good luck, Bart. Let's all give Bart the support he needs to keep things rolling. Old Sol has done us dirt. Propagation conditions have taken their toll of attendance and traffic on the lower frequency nets. We hope this is only a temporary condition. KN1TGZ, at Jaffrey, is looking for contacts on 220 Mc. Any takers? KN1TZW, in Peterborough, is now on 144 Mc. Traffic: (Nov.) K1BCS 81, W1TA 72, K1JDN 52, W1PFU 31, IIQ 25, CUE 16, YMJ 7, JNC 3, K1APQ 2. (Oct.) W1CUE 53.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. RISPN reports 30 sessions, 468 QNI, 92 traffic. The net held its semi-annual meeting at the QTH of its net manager, K1DZX. Present at the meeting were TXL, BQH, JFF, K1AAV, AUN,

(Continued on page 110)

RHODE ISLAND QSO PARTY

February 24-26

The Providence Radio Assn., W1OP, announces the First Rhode Island QSO Party and invites world-wide participation.

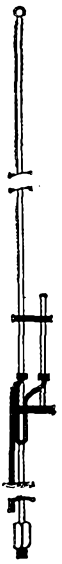
Rules: (1) *Time:* 2300 GMT Feb. 24 to 0500 GMT Feb. 26. (2) Phone and c.w. are considered the same contest. A station may be worked twice per band, once on phone and once on c.w. (3) *General call:* "CQ RI." R. I. stations will identify themselves by signing "DE RI" on c.w. and "Rhode Island calling" on phone. Only phone-to-phone and c.w.-to-c.w. contacts count. (4) *Suggested frequencies:* 1815, 3530, 3850, 7020, 7250, 14040, 14275, 21060, 21225, 28080 kc., and 29, 50, 144 Mc. (5) *Exchange:* QSO number, RS(T), and QTH (state, province, or county). R. I. stations will send the county for QTH and RI for RI-to-RI contacts. (6) *Scoring:* Outside stations multiply the number of stations worked times the number of counties (maximum of 5). R. I. stations multiply the number of stations worked times the total number of states, provinces, and countries. (7) Awards will be sent to the highest scoring station in each state, province, and country (2nd and 3rd place certificates where necessary), and 1st and 2nd place awards in each R. I. county. Novice and Technician awards will also be issued. Certificates will be presented at the annual PRA Dinner-Dance to the winners present. (8) Logs must, in addition to the above information, show date, time, band, and emission and be received no later than April 10, 1962. Send logs to: K1LPL, 108 Whitehall St., Providence 9, R. I.

WATCH YOUR "S" METER!

The Ham You Are Working May Be Using

THE NEW *Master Mobile* "J"

2 METER MOBILE/FIXED ANTENNA



If you like the way his signal pins your "S" meter, get one of these signal-hurlers yourself, and get your 2 meter signal "way out."

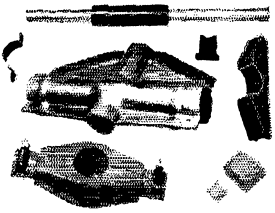
- **Substantial gain over mobile whip**
- **Directly matches 52 ohm line**
- **Overall height 86 inches**
- **Exact impedance match**
- **Low radiation angle**

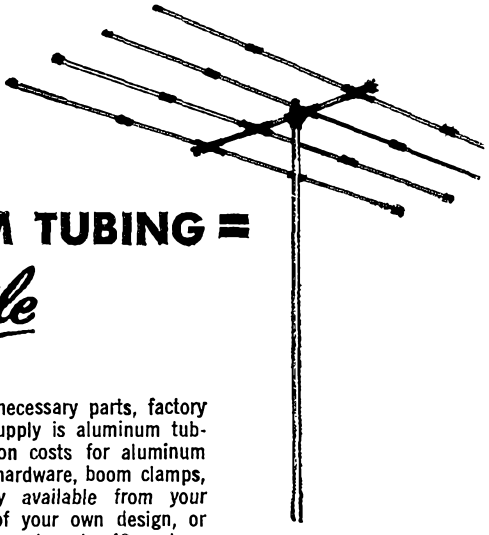
An ideal mobile 2 meter antenna, it also serves as a perfect fixed station multiplier! Can be switched from mobile to fixed use in a jiffy, using Master Mobile E-Z Off Connector. Fits any auto mount (body or bumper) with 3/8"-24 thread, or any fixed base mount with same thread.

Give it a close look at your ham dealer now . . . or send for complete technical bulletin and name of nearest parts jobber.

Amateur Net 14.95

MODEL AM-28





THESE PARTS + ALUMINUM TUBING =

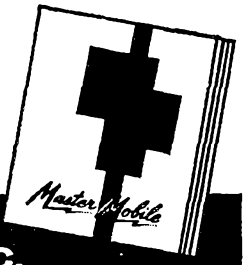
NEW from *Master Mobile*

DESIGN-IT-YOURSELF BEAM PARTS

Master Mobile offers the do-it-yourself antenna builder all the necessary parts, factory pre-built, to design his own beam. The only thing we do not supply is aluminum tubing, which can easily be obtained locally. Why pay transportation costs for aluminum tubing? The heart of any well constructed beam is the mounting hardware, boom clamps, element supports, thin-line traps, etc. These are individually available from your Master Mobile parts jobber so that you can build any beam of your own design, or pattern it after any commercial beam on the market . . . 10 meters to 40 meters, tri-banders, 2 elements or 6 . . . you name it . . . at tremendous savings! Using Master Mobile parts you are assured of the finest mountings and clamping assemblies to withstand high winds and ice loading. These are identical to the high-impact cycolac parts used in the manufacture of many famous beams, but you buy only the parts you want, and only as you need them. Traps and mount assemblies are available for verticals also.

Send for beam data sheets, price information and technical bulletins. Name of nearest stocking parts jobber on request.

FREE New Giant Catalog — Just off the press, fully illustrated, covering all our antennas and accessories, fixed and mobile.



Master Mobile **MOUNTS, INC.**

"Leading the Antenna Industry Since 1945"

4125 W. JEFFERSON BLVD. LOS ANGELES 16, CALIF.

PZY, GRA, NJT, QIY, CPL, PNI, DUH, EBX and MYU. At a recent meeting the RI YLs elected K1DUH, pres.; SQS, vice-pres.; ZOK, secy.; and CEW, treas. The YLs recently presented the Veteran's Hospital RC with a code oscillator. The NCRC of Newport held a "Project OSCAR" meeting where instructions for tracking the satellite were given. K9CMO was a guest of the club at the meeting. The W1AQ Club of Rumford has added an AR-22 rotator and a Hornet triband beam to its station. The club issued WRI certificate No. 13 to HOY. FUS was elected to membership. The Roger Williams V.H.F. Society elected LJY, pres.; K1KEM, vice-pres.; and PNI, secy.-treas. Traffic: W1SMU 616, TXL 562, K1DZX 42, PZY 37, GRC 11, JOD 9, GRA 6, AAV 5, KAZ 4.

VERMONT—SCM, Miss Harriet Proctor, W1EIB—SEC: K1DQB. PAM: HRG. RM: KRV. We regret the auto injury to K1LDR and his family, who have been hospitalized in Vermont as a result. RACES activity in Vermont is on the increase. A Lincoln, Vt., Youth Fellowship group met with EIB for a demonstration on amateur radio. K1GCX is off for Japan. KJG has been assigned the call K1TJJ for his Colchester location. AC, who printed the new Vermont certificate, is very busy with an expanding business. The CVARC still is getting out an attractive newsletter. We'd appreciate postal cards with new items about you and your neighbors. Traffic: VE2AZI/W1 1714, W1KJG 2.

NORTHWESTERN DIVISION

ALASKA—John P. Trent, KL7DG—BZO sends the following news: The Anchorage Radio Club at the last '61 meeting elected CDG, pres.; ALA, vice-pres; CZU, secy.; 7AUV, treas. RACES nets work on 3995 kc., 3506 kc. and 145.3 Mc. CUK, RACES officer, invites amateurs to try the new radiological monitoring 16-hr. course (5 amateurs now graduate instructors). Marg. and Chuck, YG-PJ, are on cloud nine; 'twas a boy. BJD made a hit, playing the organ for the ARC Christmas Party. EAU had a ski mishap but is back from the hospital. DIR/2 toted up some grand July, Aug., Sept. traffic totals before leaving for New Jersey. Traffic: (Sept.) KL7DIR 153. (Aug.) KL7DIR 113. (July) KL7DIR 137.

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Long skip has been taxing the patience of traffic-handlers on local 80-meter nets. In spite of it, net controls have been faithful in meeting their schedules. UNA, Boise, NGA, Twin Falls, and UKH, Pocatello, handled traffic for Air Force Reserve Squadron during their monthly drills and will continue to do so until they establish their own communications system. The autumn issue of *HAM-BONE* was mailed to Idaho hams with an appeal to keep it in publication by sending news and dues. The Magic Valley Club held its Annual Christmas Dinner Party in Twin Falls with BMF and EAW as guest speakers on early amateur radio. FARM Net: Traffic 32, check-ins 473, sessions 20. Gem State Net: Traffic 21, check-ins 59, sessions 24. Traffic: K7KYB 57, HLR 47, W7EEQ 13, VQC 12, GGV 9.

MONTANA—SCM, Ruy Woods, W7SFK—SEC: BOZ. PAM: YHS. RM: K7AEZ. The MPN meets on 3910 kc. at 1800 hours M-W-F; the MSN meets at 1830 hours on 3530 kc. on T-T-S. WZW and K7KJH visited Billings hams a while back. MQI is heard from Glasgow now. The Yellowstone Radio Club has KN7MOS, pres.; K7EYX, vice-pres.; KN7QLP, secy.; OGF, MVN, LGV and JAT, directors. The West High Radio Club has 13 members in its club at Billings. LUT and SVE are heading for their cattle ranch on a permanent basis. LHK still is watching the 6-meter band openings. EWZ is putting a Ranger 2 kit together. K7PQM, RG and PCY are new calls in Great Falls. K7PGN is a new call at Laurel, also KN7REN. K7ELW has started a code class at Laurel. LBK is working on a comb filter for RTTY. JAU is in basic training at Fort Ord. AEZ and BKH are on RTTY now we hear. ZUK and ZUJ have a new grandson. A new call in Butte is K7RJF. WDE is at Battle Mountain, Nev. now. Traffic: K7EWZ 246, NHV 126, W7TVX 30, K7LDZ 16, W7FIS 2.

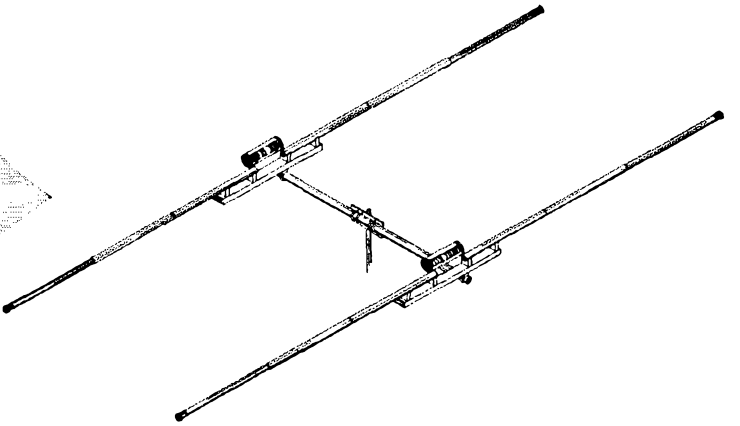
OREGON—SCM, Everett H. France, W7AJN—New appointment: K7IWD as OO Class IV. Endorsements: NJS as PAM; DEM, PPG and K7CJC as ECs; BDU, LT and K7AXF as ORSs; K7KBK as OPS; K7GSR as OES. ADR, a new OES, sends in a very good report as to his activity on 6 meters and propagation observances. K7RDP is a new ham in Grants Pass. K7PNT has a DX-40 and an HQ-145A in his service station. K7BZP has added a Mohawk to his station lineup. K7EZP, of Forest Grove, reports daily skeds on 6-meter groundwave with K7GGJ of Yakima, Wash. UQI reports 2-meter activity with IGI, ZLR, SO, GEX and K7CNZ working east over the Cascades into Bend and Redmond with very good results. K7KTP is very active as an OO.

(*Continued on page 112*)

It's The

GREATEST!

the
All
New



40 Meter SIGNAL MASTER

by Mosley

Model S-402 Features . . .

- Excellent Forward Gain and F/B Ratio!
- Efficient Link Coupled Feed!
- 100% Rust Proof!
- Heavy-wall 6061-T6 Aluminum Boom and Elements!
- 2 Elements for True Beam Performance!

"Forty" is the *hot* band now and the all new Mosley Signal Master Beam is the antenna to give your signal real authority! This rugged beauty is designed and engineered to provide the performance you need whether you are DX hunting or relaxing in a pleasant rag-chewing session.

You'll want a Mosley Signal Master Beam . . . see it at your favorite Ham Equipment Dealer's store!

Amateur Net, $124.50

Mosley Electronics, Inc.

4610 North Lindbergh Blvd. – Bridgeton, Missouri

OSN manager MTW reports: sessions 21, QNS 170, traffic 49, with BRAT awards to AJN, MTW, ZFH and K7IWD. LT has been going out as radio operator in the Merchant Marine during the year which accounts for his inactivity in amateur operating. K7DVK, as OES, has moved to a new location and is using Yagi antenna systems, 8 elements on 6 meters, 10 on 2 meters, 5-over-5 on 220 and 20 on 432. Traffic: (Nov.) K7AXF 125, W7-ZFH 65, K7JVN 49, W7MTW 35, K7IWD 29, W7DEM 12, AJN 10, LT 9, K7IMH 7, W7ESJ 3. (Oct.) K7CJB 37, CBA 26.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—The Puyallup Club, HZ, and the Tacoma Club, DK, are to be congratulated on their outstanding efforts in placing one and two in the nation in the 1961 FD. MHL is QRL building a new QTH. K7s HFN and HEF are working on 220-Mc. gear. K7GZM has a new Drake-2B. K7KSE and K7KSF have completed their Apache and SB-10 combo. PQT is Skagit County C.D. coordinator. K7IEY says school work has cut down his operating time. The VARC is converting 100-mw. walkie-talkies to 29.51 Mc. JJK/m now is walking (he didn't see the other car). UZE is being heard on 6 meters. The Pierce County RACES group now has a new 5-kw. generator. We understand that MPH gets his deer the hard way by buying 40 acres and waiting at the gate for it. OUI is going 2-meter mobile. The SEC reports that the Washington section has over 700 members in the AREC now. JFB and LTV have joined the ranks of Silent Keys. RTTY operation in the Spokane Area is going great guns. AMC is QRL 6-meter gear. The Bremerton Club now is on 51.2 Mc. K7PXV is looking for RTTY gear. All hands are complaining of the very bad conditions existing on the lower frequencies. OIV renewed his EC appointment. RGL was QRT during December while in Japan and the Philippines on Government business. NCC and UFO have been helping a blind boy to get started in amateur radio. WSN is moving the net time to 1800 PST on 3535 kc. to try and beat the fade-outs on the 80-meter band. All ARRL appointees are urged to check appointment expiration dates. If they have expired and you desire to continue please forward certificates for the annual endorsement. OIH and OEB guard 29.51 Mc. with squelch receivers in the Richland Area. HPA has completed a beautiful transistorized keyer (circuit was from *QST*). KN7NIH has a new KWM-2. K7IYR has a new Collins KW S/line. K7IGW renewed his EC appointment. Traffic: (Nov.) W7BA 1122, DZX 855, GYF 159, APS 66, QLH 49, ACA 39, AMC 35, K7PXV 34, W7KZ 33, OEB 27, IST 17, JC 15, AIB 11, BTB 7, JEY 5, K7CWO 3, CHH 2, W7RGL 1. (Oct.) W7OEB 38, K7IEY 31, W7EHH 26, GAT 1.

PACIFIC DIVISION

NEVADA—SCM, Charles A. Rhines, W7VIU—KHU is keeping up the fine work as OO and still turning in nice traffic totals. YKC is doing a nice job as EC in Las Vegas and is now our second OO in the section. BYR returned from an African hunting trip. The NARA handled admission day communications in Carson City again this year. K7KBN sends in Las Vegas News: MER needs Vermont for WAS and completed s.s.b. WAC; DNE is experimenting with RTTY; ADD is now 4X4NJ; YL KN7QNN made WAC on one evening; QNM is another YL; RBM is another new Vegas Novice; FYV is attending the U. of Nevada; CTK lost his 10-over-20 array in a windstorm; YKC is starting an AREC Net on 7255 kc. at 0400 GMT; PBV checks into the Golden Bear Net. UVR visited VIU recently. Traffic: W7KHU 244, PBV 4, VIU 3, YKC 3.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—The CCRC held a dinner meeting in San Mateo on Dec. 6 honoring the following new officers for the coming year. W6UGO, Pres.; WA6ALL, Vice-Pres.; W6QMO, Secy.; and W6ACN, Treas. The San Mateo RC held a dinner Dec. 13 for the installation of officers. Everyone is interested and concerned over the new ordinance by the San Mateo City Council requiring a $50 use permit for radio transmitting installations. It seems nothing has really come to a head yet but the amateurs concerned have been assured of full support in their pending battle. The SCCARA ran a class through December for Novices to advance to Generals. The Monterey Bay BJs had a shore dinner at the Wharf in Monterey in November to discuss the formation of a RACES group in Carmel Valley. The Northern California Net (NCN) held a dinner in San Francisco on Dec. 9 for the discussion of perrenial traffic problems. WA6EIC has inaugurated a 2-meter traffic net called the Santa Clara Valley Section Net. Meeting nightly on 146.7 at 0400 GMT, the net offers good local coverage and effective liaison with NTS. Traffic: (Nov.) K6WAE 715, K6KCB 530, K6GZ 187, W6AIT 135, WA6OLQ 124, K6DYX 101, W6DEF 64, W6AUC 41, W6RFF 24, K6YKG 15, K6ZCR 15, W6OII 14, WA6EIC 10, K6VQK 8, K6EQE 6, WA6-

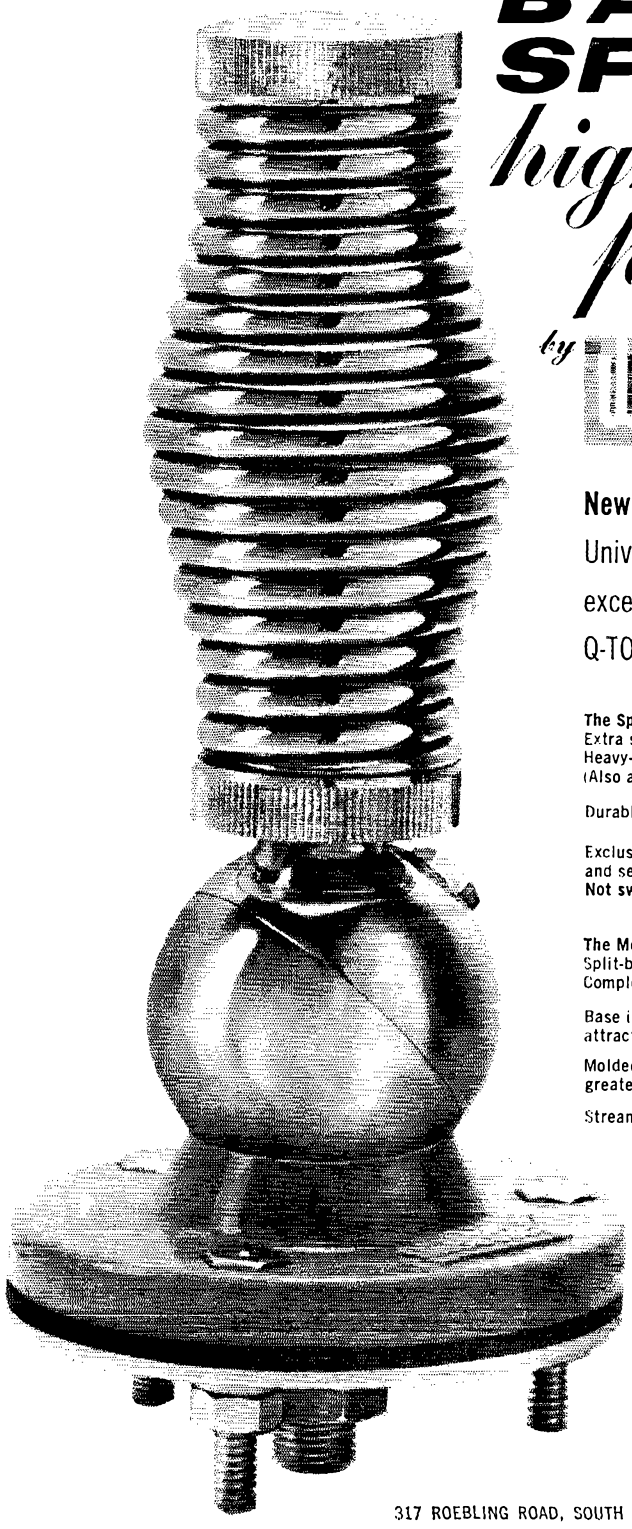
(Continued on page 114)

Another

BAND-SPANNER

high quality product

by Webster



New . . . ultra quality Type BD split-ball Universal Mount and Heavy-duty Spring . . . excellent for Bandspanner, WEB-WIP, Q-TOP and similar antennas.

The Spring:
Extra strong — sturdy.
Heavy-duty knurled end pieces, tapped 3/8-24 (F)
(Also available with hex end pieces)

Durable protective plating throughout.

Exclusive! By-passing braid inside spring is lugged and secures to tapped end pieces with machine screws. **Not swaged.** Positive . . . noise free . . . lasting.

The Mount:
Split-ball is bronze, beautifully chrome plated. Completely rust-proof — years of service.

Base is molded of high-impact-strength material . . . attractive warm gray color. Blending.

Molded-in contour in base seats ball firmly, gives greater support area, extra strength.

Streamlined . . . Recessed mounting bolt heads.

Judge for yourself . . .

See this top quality combo on the WEBSTER FAMILY TREE on display at your Webster distributor

317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIFORNIA

Webster

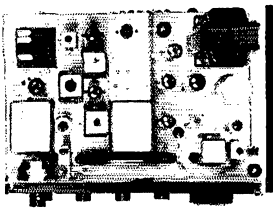
HRS 6, K6BBF 4. (Oct.) K6WAE 1642, K6YKG 21, K6MTX 10. (Sept.) K6WAE 238.

EAST BAY—SCM, B. W. Southwell, W6OJW—SEC: WA6HYU. ECs K6VXK, W6FAR, W6WAH, K6HTJ and WA6MHJ. WA6LVX is working part time at KANG-FM/AM. K6ZYZ has his skywires up at a new QTH, and is asst. mgr. of NCN. K6KLY says activity on 50 Mc. is poor, but 144 Mc. is booming and he is going RTTY on 144 Mc. WV6RQS is building a new Allied receiver and is awaiting results of the Tech. Class license exam. W6JI is an old-timer who just received his old 1913 call from the FCC. W6JI is enrolling in AREC and OTC. New OESs this month are WA6MXI and WA6FKN. WA6FKN also is a new OPS. The LARK visited the V.O.A. station in Dixon with a good turnout. The LARK club station, WA6ODF, is on the air and received its QSL cards from the printers. W6GMQ is putting up a 60-ft. tower. W6OJW finally joined the QCWA and is certificate-chasing for CHC award endorsements by knocking off 11 certificates this past month. K6KLY is now a General. Congrats. W6IIF is mobiling through the western states. K6YBS vacationed at Clear Lake. We note with regret the passing of W6WFK. The MDARC is looking for a new Field Day chairman for 1962. Anyone interested? W6QEN has a new 60-ft. tower. K6TFC and K6TFB worked in the DX Contest of the MDARC. The Boys Rehabilitation Center at Byron is looking for used radio gear to get a station going. Contact K6CXP at Four Corners Pharmacy if you have any gear to donate. The ORC heard a talk on Ham TV by W6UAH at its November meeting. The BARA held a surprise birthday luncheon for K6DOQ at the Seawolf Restaurant. W6FDJ is head of Radio Communications section of the American Red Cross, succeeding the late W6TI. K6VQC is back from a lengthy Southern California stay. W6WIT has a new 50-ft. skyhook. W6BFU and W6FDJ lost their prized antennas in a wind storm. K6YYS has a new electronic keyer. The BAYLARCS wants to increase its membership and would like all YLs and MYLs, licensed or not, to become members. If interested, contact Lee Fisher, K6UCV, 740 Southgate, Daly City, Calif. Traffic: WA6LVX 137, WA6MIE 68, K6ZYZ 64, K6KLY 4.

SAN FRANCISCO—SCM, Wilbur Bachman, W6BIP—The San Francisco Club enjoyed having K6OBK, Stan Benson, staff engineer at Lockheed Corp., as guest speaker. W6BDE Esther Given, and Bob Lyon, ex-W6AM, underwent surgery but are recuperating nicely. K6OMG also is feeling better after a recent illness. W6PNS is in Greenland as an Eimac representative and W6QMO was relayed a message on her net through W6NAZ. The CCRC held a Christmas Dinner and an election of officers. W6LGL Hayward Club, pres.; WA6ALL, Livermore Club, vice-pres.; W6ACN, Oakland Club, treas.; and W6QMO, "NCN", secy. Thirty-eight club representatives in the Council meet the 1st Wed. each month. The purpose of the council is to act as a center of information and as coordinator of the activities for the various clubs in the CCRC, to hold and sponsor radio contests and in general to promote amateur radio. WA6ASW is disaster chairman for the Marin Radio Club. K6BTN is plowing in a tremendous signal all over the state. W6DIX still is running up his DX score. The "Nitwits," from the Tamalpais Club, are working together to assemble a new MARS Station at Hamilton. K6BAZ is the new power house of Marin. W6OPL still is listening in, especially on the emergency nets on the National Calling Frequencies. WA6GQC is teaching Scouts the code. The parents of the Scouts are delighted with the results. Elsie's two jr. operators are doing fine with the code. Bip's youngest nine months old —will be at the key also before we know it. WA6MDL still is liaison as RN6 from NCN, K6SAA and K6JFY both are on duty as auxiliary. They are prepared to take over RN6 if necessary and also to help with overflow traffic to first RN6 only. W6GQA just completed his 35th consecutive Frequency Measuring Test. WA6MDL sent in his first report. K6NCG, Treasure Island station, had an election of officers. W6FDU, WA6ADX and K6BGH are putting up a 120-ft. antenna. FDU and ADX worked on equipment to track Project OSCAR. W6FDU has skeds each Sat. and Sun. for CO2JK and family. His wife's father is XE3AQ in Mexico and CO2JK held a daily sked with him for 15 years, while living in Havana. W6KZF is working hard as SEC and hopes to have fellows report highway accidents to the proper source when mobiling. K6DJC has been holding skeds with his dad, W6BIP, who is in the East. BIP visited Headquarters. W6JWF reports 149 messages were sent via radio and 83 good replies were received during the last SET. Traffic: W6QMO 132, W6JWF 40, K6SAA 37, W6GGC 20, W6OPL 18, W6GHI 4.

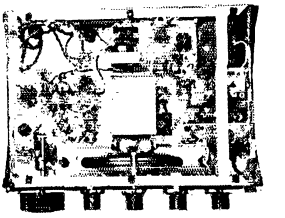
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—SEC: K6IKV. ECs: K6BNB, K6GOT and K6BYS. OBSs: W6AF W6WGO and K6HHD. PAM: W6GQS. OOs: W6WLI, W6GDO, K6ER, W6ZJW and

(*Continued on page 116*)



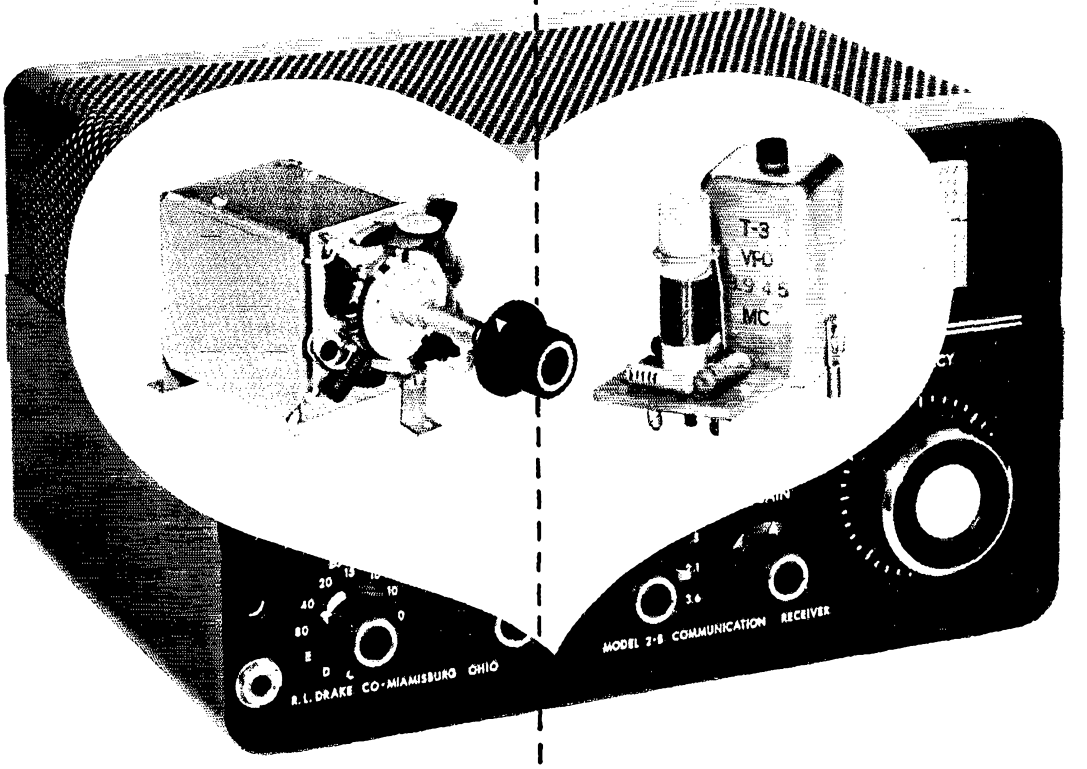
INSIDE THE

DRAKE 2-B RECEIVER



Essentials for SSB operation:

SELECTIVITY | STABILITY



PASSBAND TUNER

Newly designed, with .5 kc, 2.1 kc, and 3.6 kc switchable bandwidths. Continuous passband tuning functions on each bandwidth. All three bandwidths are steep-sided and can be used for SSB . . . the 3.6 for Hi-Fi SSB, the 2.1 for crowded band SSB and the .5 for extreme interference conditions.

VARIABLE FREQUENCY OSCILLATOR

This low frequency VFO, with latest materials and techniques for improved resistance to high humidity and temperature, maintains the 2-B's crystal-controlled frequency stability . . . less than 400 cycles warm up; less than 100 cycles after warm up; less than 100 cycles for plus or minus 10% line voltage change.

With the Model 2-B you have all the advantages of a "Ham Band Only" receiver. Superior SSB, AM, and CW in seven band switch positions . . . plus . . . five extra positions on the bandswitch for interchangeable plug-in crystals to permit reception of any 600 kc bands in the 3.5 to 30 mc range. Amateur Net, $279.95

Write for free brochure on the 2-B Receiver:

R. L. DRAKE COMPANY MIAMISBURG, OHIO

K0EIL. ORSs: W6WGO and W6CEI. OESs: W6PIV. OPSs: W6WGO. K6EIL, W6PIV, W6GWS, WA6PVT and WA6OXK. From up Placerville way K6SJN reports that the Eldorado County ARC is mixing theory with each monthly meeting and is considering affiliating with ARRL. W6ZJW is active on 20- and 40-meter c.w. and is involved in organizing a new RACES group for Glen County. K6YZU says conditions on 80 meters at NCN time were very poor. WA6OXK has been letting football practice and final exams interfere with ham radio. W6WLI participated in the recent RTTY SS and made 56 contacts. The section welcomes two new-comers to Sacramento: MaryAnn, WA6HYU, and Alex, K6HHY. Watch for them on s.s.b. It is with deep regret that we report the untimely death of W6IHX, ex-OPS. Danny was an active amateur for many years and his voice will be missed by all OTs who knew him so well. A radiogram from K6SXX/4, Coral Gables, Fla., advises he hopes to represent Sacramento Valley in next year's SS. K6EIL has a new all-band vertical. Traffic: W6WGO 22, WA6PVT 16, K6YZU 2.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The new officers of the Fresno Amateur Radio Club for 1962 are K6OER, pres.; K6BKZ, vice-pres.; K6CBR, secy.; K6PBL, treas. Six and 75 meters were used to provide communication for the Motorcycle Enduro Run. Those taking part were W6BAN, WA6DRH, W6DUD, WA6FFJ W6HIA, K6JGH, K6OGX, W6OUX, W6OWL, K6OZY, W6QOS and WA6UOD. W6ARE has moved to Visalia. K6ROU has a new Ranger and is operating with NCN and RN6. W6VFS is heard on 75-meter mobile. W6OWL has his KWM-2 mobile and is reporting good results. W6KTW is modifying his Valiant to work with an SB-10 exciter. W6BAN is getting the bugs out of his 200-watt mobile rig. W6JUK has a new 30L-1 amplifier to go with his KWM-2. W6QFR is experimenting with radar speed trap devices. W6RRP is building up a new final using a 4-1000. The San Joaquin Valley Ne reports 560 check-ins, 28 contacts, traffic 5. QST 1, 7 phone calls, 11 bulleting, and 26 sessions in November. W6EFB spent two weeks in the hospital but is out and back on the air. This is directed to the Stockton Area: How about some news of activities around your parts? Same goes for Madera, Merced, Modesto and Bakersfield. Take five minutes a month, on the 1st, and drop me a line. If you are in Fresno on the 2nd Fri. come on up to the 10th floor of the PGE Building and attend the Fresno Radio Club meeting. Traffic: K6ROU 29, W6ARE 28, W6EFB 9.

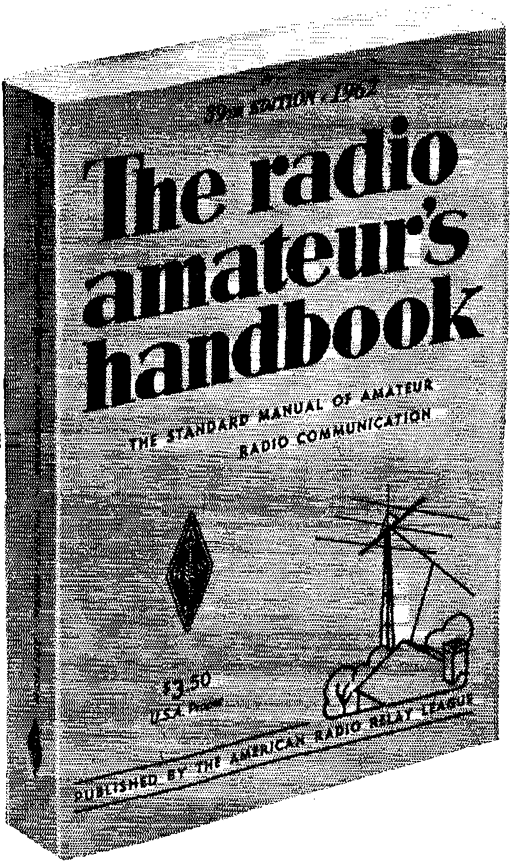
ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—PAM: W4DRC. V.H.F. PAM: W4ACY. RM: K4CPX. W4MFK recently was appointed EC for the Hillsboro Area. K4PBG, EC for Rutherford and McDowell Counties, sent along a good organization report. At present he has ten active AREC members. Other ECs are W4BAW, New Bern; W4RJ, Whiteville; W4QC, Elm City; W4YQX, Concord; K4YYJ, Salisbury; W4AJT, Greensboro; W4AEH, Graham; W4CPI, Winston-Salem; W4DGF, Gastonia; K4AI, Morganton. These are the active ECs in the section. Each of you should register your station with the nearest EC and become a member of the AREC. RM K4CPX sent along a good report of the activity of the NCN C.W. Net. I would like to get a report of all nets in the section. Amateurs who are interested in becoming ORS should be cleared with the RM. He in turn will approve or disapprove your application and send it along to me for appointment. Please do not send your application directly to me. The RM knows of your activity and is in a position to recommend good ORSs. As noted above, many areas do not have an EC. How about sending along the name and address of a good amateur in your area to be the EC? How about you fellows who are active in amateur radio clubs getting together and naming a man from your area?

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. PAM: K4KCO. RM: W4PED. The newly-formed State Council of Radio Clubs is looking forward to its first meeting. The officers of the Rock Hill RC are K4WOI, pres.; K4YFK, vice-pres.; W4UNP, secy.; KN4BJZ, treas. The Publication Committee of the SCARAB consists of W4AKC, W4GQV, W4UMW and W4NDH. The bulletin will be issued quarterly instead of monthly. The new net time for SSB on 3915 kc. is 1900. W4HDR made BPL in November. Newly-elected officers for the Blue Ridge Society are K4KEE, pres.; K4SUG, vice-pres.; K4MOK, secy.-treas. Officers of the Mike and Key Club of Greenville are K4SUV, pres.; K4TJP, vice-pres.; W4TLC, secy.; K4TXV, treas.; W4DEN, board of Governors. K4KIT and K4WJR have been issued 4RN certificates. All new secretaries of clubs are requested to send the roster of new officers to the SCM at once if it has not been done already. Traffic:

(Continued on page 118)

1962 EDITION



NOW AVAILABLE

AN INVALUABLE reference work and text for everyone—radio amateurs, engineers, lab men, technicians, experimenters, students, purchasing agents.

Annual revision is a feature of the *Handbook*, always with the objective of presenting the soundest and best aspects of current practice. The big, 1962 Edition contains many new descriptions of equipment. Semiconductor and vacuum tube tables are brought up to date. Every important aspect of amateur radio is covered: transmitting, c.w., a.m., sideband, radioteletype; receiving; mobile; v.h.f.; propagation; antennas; construction; theory; charts; diagrams; transistors; vacuum tubes; station assembly and operation. The complete handbook!

$3.50 USA proper $4.00 US Possessions and Canada $5.00 Elsewhere
Clothbound Edition $6.00 USA, Possessions and Canada, $6.50 Elsewhere

The AMERICAN RADIO RELAY LEAGUE, Inc.
WEST HARTFORD 7, CONN.

W4HDR 186, K4ZHV 161, W4AKC 85, K4OCU 49, K4HDX 33, K4WJR 29, W4PED 25, W4CHD 14, W4TWW 10, K4UOH 9, W4VIW 8, K4KIT 5, K4YFK 2, W4YPD 2.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, W4SHJ. SEC: W4VMA. RMs: W4LK, W4QDY, K4KNP and K4MXF. PAMs: W4BGP, K4JQO and K4PQV. Officers of the Lynchburg Club for 1962 are W4DLA, pres.; K4PQM, vice-pres.; K4JFG, treas.; and W4TVI, secy. The VSN set an attendance record Nov. 17 with 18 QNI, then broke it on Nov. 28 with 19 QNI. W4DLA points out that local v.h.f. nets are a good source of traffic. Any 6- or 2-meter net or net member interested in getting the traffic ball rolling may contact the SCM office for details. W4NVX now emits with a kw. input while W4DLA has moved up to 250 watts. K4TSJ also is anticipating a power increase. W4PVA is back in Manassas and W4AAD has moved to Texas. In the DX department K4UVT is at 113/36 and 2 more cards will give him WAS. W4DLA worked 30 countries on 40 meters in between traffic-handling during November. W4ZM, who traveled recently in Northern Europe, observes that the 80- and 40-meter bands appear quite different from that side. Net managers and NCSs continue to denounce the poor conditions on the lower frequencies. General activity, or at least the reporting of it, seems to have hit a low for this time of year. In particular, we note that not a single report was received in the SCM's office from OOs. Traffic: (Nov.) W4PFC 980, K4PQL 329, W4DLA 220, K4FSS 212, W4NVX 177, W4LK 166, K4MXF 147, K4EVY 109, K4PQV 77, W4FOR 72, K4YZT 72, W4SHJ 63, W4RHA 59, K4AL 53, W4IA 47, W4WDZ 45, W4TE 34, K4WMP 29, K4TSJ 27, W4WRG 21, K4ORQ 15, W4KX 13, W4ZM 12, W4AAD 6, W4LRN 6, K4BAV 5, K4IAN 5, K4SGQ 5, K4HP 4, K4JYL 3, W4PRO 3, K4DAL 2, K4ITV 2, W4OWV 2. (Oct.) W4JUJ 14, K4UVT 13, K4JQO 10.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—K8LOU reports WVN C.W. held 22 sessions in November with 149 stations handling 70 messages. The Opequeon Radio Society of Martinsburg graduated K8SDH and K8UXP to General Class. K8AKD has overcome antenna problems and is back on 75 meters. W8NYH has been working in Kentucky. The Kanawha Radio Club's officers for the coming year are W8VMP, pres.; W8IRN, vice-pres.; K8SUB, secy.; K8YBU, treas.; and W8MLX, act. mgr. K8ZNJ has a new 4-1000A rig on the air. W8SSA visited W8RXN and W8JM. Two YLs graduated from the East River ARC, are WN8AVG and WN8AWO. New officers of this club are W8KBU, pres.; W8SSA, vice-pres.; W8OFE, secy.; and K4YDD, treas. It took 12 years for the first WACWV on any band. Who has the most counties worked on v.h.f. at this time? The Mountain State Transmitter ARC meets the 5th, 15th and 25th of each month at King Summit School, Elkins. Traffic: W8NYH 48, K8LOU 24, K8HID 21, W8JM 18, W8GAD 7.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald S. Middleton, WØNIT—SEC: WØSIN. PAMs: WØCXW, WØIJR and WØGNK. RM: WØFEO. OBSs: KØDCC and KØEPD. New appointments include WØGNK as PAM, KØBCX as EC for Delta County and KØYGH as EC for El Paso County. The new PARA president is RSA. The Pueblo Steel City Amateur Radio Club will start 1962 as an ARRL affiliate. All new officers are members of the League. The club's Novice classes ended on Dec. 15 with four students awaiting licenses. WWJ is building a Geiger counter. WØQMH/Ø has received a divisional award for his high score in the '61 Field Day Class A tenth call area. Grand Junction amateurs participated in a successful Minuteman Drill held Nov. 15 in conjunction with the setting up of the emergency hospital at the Grand Junction High School. Congratulations to MOX for his fine article on v.h.f. efficiency in December *QST*. The next issue of *Who's Who in American Women* will carry a short biography on KØBTV, Kay Barclay, of Boulder. BPL awards go to WØBES and KØWWD. Traffic: WØBES 623, KØWWD 345, WØFEO 260, KØDCW 96, WØKQD 65, WØEQD 58, KØEVG 57, KØRTI 47, WØENA 23, KØZSQ 19, WØBWJ 16, WØETT 15, KØWWJ 15, WØCWD 13, KØWGC 12, KØLCZ 4.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, OCX. SEC: BLR. The Salt Lake AREC had a successful Simulated Emergency Test with K7s DDL, JIZ, HFV, BLR, KJK and W7s DQW and QWH taking part. BHE and HVF conducted a two-day ham radio demonstration during American Fork's Annual Steel Days celebration. The amateur group also assisted in assembling and pacing the Steel Day Parade using 10-meter mobile units. ELE, W7GKT and KNQ were the other members of the group. BHE is leaving on a mission for the LDS church to Hawaii. HVF is president of the BYU ARC. OCX has taken over as

(Continued on page 120)

manager of the Weber County C.D. Net. BAJ has a new 40- and 80-meter antenna. VTJ earned a net certificate on BUN. Traffic: K7NWP 335, W7OCX 95, QWH 27, K7BHE 10.

NEW MEXICO—SCM, Newell F. Greene, K5IQL—Asst. SCM: Carl W. Franz, W5ZHN. SEC: W5BQC. PAM: W5ZU. V.H.F. PAM: W5FPB. RM: W5ZHN. The Breakfast Club meets daily except Sun. at 0700 MST on 3838 kc. NMEPN meets Tue. and Thurs. at 1800 and Sun. at 0730 on the same frequency. TWN meets daily at 2000 on 3570 kc. The Los Alamos Club has moved into new quarters. New calls in that area are W5IUK and K5CND. Meetings are scheduled to promote mountain-top repeaters, linking Roswell, Albuquerque and El Paso on 2 meters. Your SCM has moved to Dexter (P.O. Box 406) promptly staking claim on the village water tower as part of the antenna farm. Also, the shack now boasts a Model 19 in the RTTY department. W5IXR (ex-W2PST) is a new "regular" on the nets from Parkview. Traffic: W5PDO 129, W5UBW 66, W5MYQ 44, W5GB 18, K5ZWI 12, K5ONE 7, K5HTS 3.

WYOMING—SCM, L. D. Branson, W7AMU—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 1800 MST on 3160 kc. AMU, Wyoming SCM, attended a regular meeting of the Casper V.H.F. Society on Dec. 4 —a nice meeting and a good talk on v.h.f. operation and conditions. The society is going well with almost 100 per cent ARRL membership. The club expects to set up a 6-meter RACES net in liaison with the County Area Two RACES Net. Those present were PSO, UFB, pres., VDZ, VTB, GLL, EPZ, K7EEP, K7LJB, Gary Wockovich, a prospective ham, and AMU. AMU has a new sideband rig. Traffic: W7DXV 61, BHH 34, HH 18, K7MGM 16, ONK 16, W7AMU 11, K7AHO 8, W7ION 8, AEC 6, CQL 6, EUZ 5, GSQ 4, IBU 4, HDS 3, BKI 2, BTE 2, CSW 2, LKQ 2, CQX 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—SEC: K4JDA. RM: K4YUD. PAMs: K4BTO, K4PFM and K4KJD. New appointments: K4LET as Houston County EC; K4UMD as OPS. The Franklin Amateur Radio Organization held its first meeting Nov. 7 and elected K4NXC, pres.; K4NXB, vice-pres.; K4NSU, secy.-treas.; K4WHX, act. mgr. W4CIU reports more than 12 new Novices in Jasper, with WN4OQZ right next door. High School teacher K4IYM is credited with this increase via his electronics class. K4HVN has moved into a new home in Gadsden. K4DJR has a new SX-101. *Notice*: Send all future reports and correspondence to your new SCM, Harvell Tilley, Route 1, Ethelsville, Ala. Traffic: (Nov.) K4YUD 163, K4PFM 111, W4HYI 96, K4AOZ 84, K4HJM 38, W4RLG 37, K4PHH 33, K4JDA 30, K4WSH 30, K4ROR 29, W4CIU 26, W4WHW 23, K4KHC/4 21, WA4BDW 19, K4DSO 19, K4PBY 19, K4DJR 17, W4MI 17, K4BTO 14, W4OXU 12, K4TDJ 12, K4WHW 11, K4GXS 10, K4ZYO 10, K4KJD 7, K4WVD 7, K4KDE 6, W4TOI 5, K4WSK 5, K4UMD 4, K4ZBX 4, K4FTC 3, K4BRZ 2, W4DFE 1, K4LET 1, K4MIR 1. (Oct.) K4ZXX 28, K4AAU 3.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM: K4KDN. RM RTTY: W4EHU. PAMS: 40, W4SDR; 75, K4LCF; v.h.f. W4RMU; s.s.b., W4CNZ. The new 6-meter traffic net meets on 50.250 mc. at 1600 and 2130 EST Mon. through Sat. with K4YSN as mgr. Goodbye and good luck to K4PXY, off to service school at Portsmouth, Va., for a year. Traffic: (Nov.) WN4BMC 918, W4WHK 774, K4SJH 716, W4TUB 575, K4KGB 551, K4GBS 506, K4RDX 379, WN4AKU 344, K4DBT 317, K4LCF 314, K4BY 244, K4COO 243, K4KDN 236, W4CNZ 229, WN4COR 186, W4DVR 181, K4FMA 165, K4RNG 156, W4AKB 113, K4LVE 109, W4TRS 108, WN4AZZ 105, K4ILB 104, W4HTH 87, K4AHU 78, W4EHW 74, K4AKQ 71, K4ENW 68, K4YPN 63, K6SXX/4 61, K4YSN 60, W4ZAK 54, K4AX 50, K4VNA 50, W4QVJ 49, K4BOO 46, W4YPX 46, K4YOQ 44, W4VCX 41, W4IYT 36, W4BKC 35, W4LMT 35, K4MTP 27, W4CWD 23, W4UHB 22, K4VSA 22, W4DDW 20, W4HFR 20, K4JWM 20, W4ARV 19, K4GUE 18, K4PPX 18, K4QQE 18, W4TRU 15, W4DKJ 14, W4HRC 14, W4LSA 12, K4MXH 12, K4RHL 12, K4ZIF 12, W4HFD 10, W4AZK 9, K4OTJ 9, K4OZS 9, K4WEJ 9, K4DAX 8, K4IWT 7, W8LDU/4 7, K4OSQ 7, W4SMK 7, W4AYD 6, K4DAD/4 6, K4VGD 6, W4BBZ 5, W4YOJ 5, K4MZR 3, K4LMIL 2, W4OHA 2, W4OVE 2, K4VEJ 2. (Oct.) K4BY 320, W8LDU/4 224, KN4NTA 213, W2MTA/4 182, W4GAC 180, K4OTJ 146, K4YSN 121, W4DVR 96, W4OVE 86, K4FMA 84, K4YOQ 79, W4DPD 55, W4CCC 53, W4DFU 34, W4TAS 30, W4CWD 29, K4QQE 29, K4PPX 24, K4BII 23, K4RNS 23, WN4BGK 14, K4ZRP 13, WA4AII 12, K4MXH 12, WN4NLX 12, K4YLX 11, K4OZS 9, K4VGD 9, K4EHY 3, WA4BGL 2, W4LUV 2, K4PEO 2, K4VEJ 2.

(Continued on page 122)

40 AND 80 METER "DUO-BAND" KIT

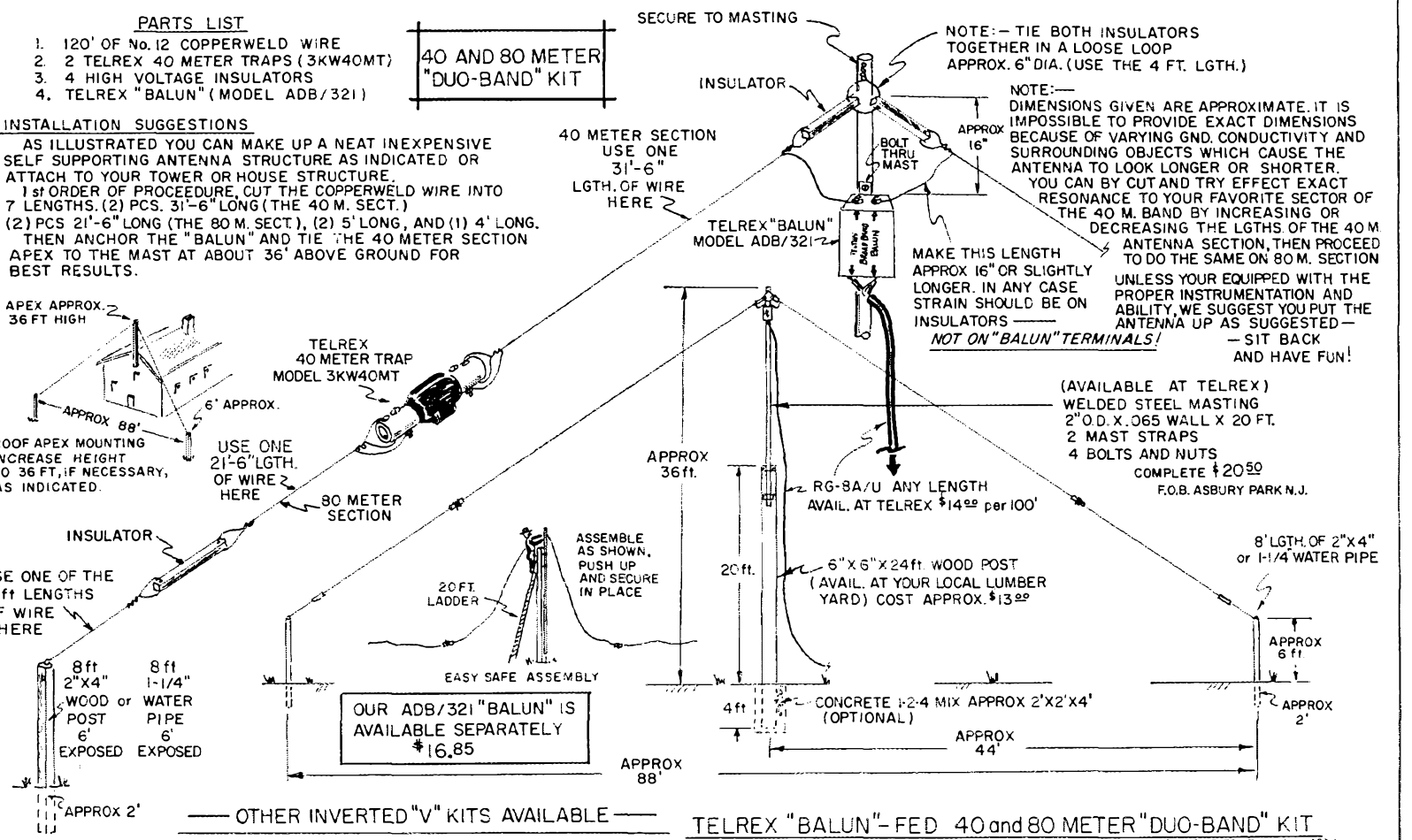
PARTS LIST

1. 120' OF No. 12 COPPERWELD WIRE
2. 2 TELREX 40 METER TRAPS (3KW40MT)
3. 4 HIGH VOLTAGE INSULATORS
4. TELREX "BALUN" (MODEL ADB/321)

INSTALLATION SUGGESTIONS

AS ILLUSTRATED YOU CAN MAKE UP A NEAT INEXPENSIVE SELF SUPPORTING ANTENNA STRUCTURE AS INDICATED OR ATTACH TO YOUR TOWER OR HOUSE STRUCTURE.

1st ORDER OF PROCEEDURE, CUT THE COPPERWELD WIRE INTO 7 LENGTHS. (2) PCS. 31'-6" LONG (THE 40 M. SECT.) (2) PCS 21'-6" LONG (THE 80 M. SECT.), (2) 5' LONG, AND (1) 4' LONG. THEN ANCHOR THE "BALUN" AND TIE THE 40 METER SECTION APEX TO THE MAST AT ABOUT 36' ABOVE GROUND FOR BEST RESULTS.



—— OTHER INVERTED "V" KITS AVAILABLE ——

20 (AND 15) METER KIT	MODEL DBBFD/12	22.50
40 (AND 15) METER KIT	MODEL DBBFD/14	23.50
20, 40 AND 80 METER KIT	MODEL TBBFD/248	68.00

TELREX "BALUN"-FED 40 and 80 METER "DUO-BAND" KIT

MODEL DBBFD/48

Price $48.00 F.O.B. ASBURY PARK N.J.

MFG. UNDER TELREX PATENT No 2,576,929

Send For PL77— Tech info on 10? Antennas

ANTENNAS SINCE 1930 — Communication and TV Antennas

telrex LABORATORIES

ASBURY PARK 40, NEW JERSEY, U.S.A.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE. PAM: W4WEB. RM: K4UBR. Pensacola: K4SWQ is reorganizing the AREC in Escambia County, assisted by K4VND, W4OOW, W4EQR and K4IVD. W4IMY is preparing a certificate to be issued by the V.H.F. Club for contacts with Pensacola v.h.f.-ers. K4NER is on phone. W4HQ is heard on 75-meter mobile. W7VLC is a new member of the PARC. W4MEA is announcer for a local t.m. station when not attending PJC. K4HYL has renewed OBS, OO and OES appointments. He was section winner of the last two V.H.F. Contests. Jack runs twenty-two elements on 2 meters. K4YYE is having mobile rig troubles. The NAS Club is getting a bunch of new gear. Traffic: (Nov.) K4UBR 534, W4BVE 314, K4VND 21, W4CMG 11, K4BDF 5. (Oct.) W4MLE 327.

GEORGIA—SCM, William F. Kennedy, W4CFJ—SEC: W4PMJ. PAM: W4LXE. RM: W4DDY. GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs. 0800 Sun. GSN meets Mon. through Sun. on 3595 kc. at 1900 EST with W4DDY as NC. The 75-Meter Mobile Net meets each Sun. on 3995 kc. at 1700 EST with W4LG as NC. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4KIH as NC. The Atlanta Ten-Meter Phone Net meets on 29.6 Mc. at 2200 EST each Sun. with W4BGE as net mgr. The Ga. S.S.B. Net meets Mon. through Sun. on 3975 kc. at 2000 EST with W4RZL as net mgr. New officers of the Atlanta Radio Club are K4YID, pres.; K4HJW, vice-pres.; K4UOW, secy.; W4LG, treas.; K4VSP, act. mgr.; W4VIM, Editor. W4MMQ has a new 32S-1 and 30L-1 linear amplifier. W4PIM made BPL again in November. K4QPL has a home-brew T.O. keyer on the air now. W4HYW participated in the November Sweepstakes. W4LNG now is working for Aeroscience Electronics, Inc. Your SCM was very happy to visit with the Birmingham (Ala.) Radio Club in December and met many new hams and old-timers there. More new hams are showing up on 2 and 6 meters lately. K4INU and K4MNL are living in Forrest Park, Ga. Traffic: W4PIM 341, W4DDY 300, K4BAI 94, K4QPL 93, K4BVD 32, W4HYW 17.

CANAL ZONE—SCM, Thomas B. De Meis, KZ5TD—Sweepstakes activity showed SW on s.s.b., MQ and TD on c.w. It looks like s.s.b. is picking up nicely for contest activity and is giving the c.w. boys a good run for their money, but with the early folding of the DX bands it was almost impossible to push through a signal on 40 meters until about 2300 EST. This brought up the point that even if the bands fold up in the continental U.S. you can always get close-by contacts on 40 and 80 meters, but the SS stations outside the U.S. cannot fall back to active close-by stations and a multiplier credit might help us. New hams are SS, LW, AQ, EE and NT. KR completed his TU unit and has been active on 21-Mc. RTTY. DS is back from his short stay in Belize, Honduras. SW will be putting up a new triband Quad. Traffic: KZ5JW 31, OA 22, CD 20, TD 18, AD 15, FG 14, VF 12, OB 9.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: K6YCX. PAMs: W6ORS and K6PZM. RM's: W6BHG, WA6ROF and K6LVR. The following stations earned BPL for November traffic: W6WPF, W6GYH and K6EPT. Congrats, fellows! Congrats to the Duarte Amateur Radio Assn. Its first officers are W6RPX, pres.; WA6CDY, Radio Officer; K6BOD, secy.-treas. The 80-meter gang has reported bad skip conditions making traffic rough. K6CDW reports good conditions during the SS. K6SIX welcomed a new harmonic and promptly gave him the initials C.W.! WA6ODF is building a new preselector. WA6OWM is running 100 watts on all bands with a Sonar SRT-120. W6AM is now up to 314 countries confirmed and 302 on phone! Nice going, Don! WA6ROF is now a neighbor, having moved to Corona. K6YVN is getting up a new antenna for 80 meters and plans to liaison between SoCal 6 Net and SCN on 80-meter c.w. W6NKR and W6CIS made a flying trip to Barstow recently. W6WAW lost his antennas during the wind storm, but all are back up again. K6SUJ reports a new 2-meter net in Alhambra for c.d. and AREC. K6TVC is learning the fine points of a scope and GDO. WA6KGA is the call of the Gonset Radio Club in Burbank. Hallicrafters SX-140 receiver, Serial ORA 54061, was reported stolen. Any information on this should be sent to K6HOK. WA6INH has a new KWM-2 and is moving to Sunnyvale. Good luck, Chuck! W6SRE is making trips to New York, New Jersey and San Francisco. Support your section nets: On c.w., the SCN meeting at 0300 GMT on 3600 kc. daily; on phone the SoCal 6 Net meeting on 50.4 Mc. at 0300 GMT. Traffic: (Nov.) W6WPF 851, K6EPT 525, K6IWV 164, WA6ROF 137, WA6KQN 118, K6YVN 117, K6SIX 79, WA6OUK 65, WA6GRG 62, WA6KAW 52, W6BHG 48, WA6JDB 21, W6USY 20.

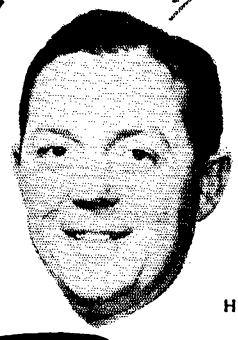
(*Continued on page 124*)

"CALL ME for Personal Service"

Bob Henry
WØARA
Butler, Mo.
ORchard 9-3127

ON

"CALL ME for Personal Service"



Ted Henry
W6UOU
Los Angeles
GRanite 7-6701

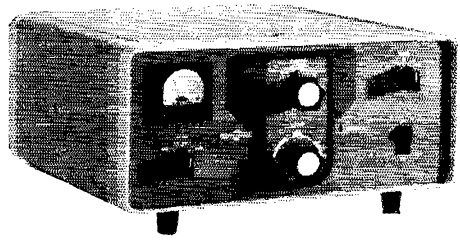
OPEN NOW
THE 3rd
HENRY RADIO STORE
931 N. Euclid Ave.,
Anaheim, Calif.

Collins

WORLD'S BEST TERMS

Because we finance our own terms . . .

- Only 6% a year finance cost
- 20 months or longer to pay
- Only 10% down (or your trade-in as down payment)
- No finance charges if paid within 90 days
- Reduced charges if paid off ahead of time
- You get more flexibility of financing in the future (such as re-financing) because we handle our own financing



75S-3 Receiver	$ 620.00
30L-1 Linear Amplifier	520.00
KWM-2 Transceiver	1150.00
32S-1 Transmitter	666.00
516F-2 AC Power Supply	115.00
MP1 12V DC Power Supply	198.00
75S-1 Receiver	520.00
30S-1 Linear Amplifier	1556.00

Write, phone or visit either store today!

Inquiries and orders from military men and others outside USA wanted

A-1 Reconditioned Apparatus

Nearly all makes and models. Big savings! Ten day trial—90 day warranty. 90 day full trade back on new apparatus. Write for bulletin.

Butler 1, Missouri
ORchard 9-3127

Henry Radio Stores

11240 West Olympic Blvd.
Los Angeles 64 Ph. GRanite 7-6701

BIG TRADE-INS

"World's Largest Distributors of Short Wave Receivers"

W6CK 18, K6HOV 18, W6NKR 11, WA6CKR 9, W6VOZ 8, WA6ODF 7, W6CLS 6, WA6DWP 3, K6SUJ 1. (Oct.) WA6KQN 233, K6PZM 118, W6LIP 22, W6NAA 10, WV6QNN 4. (Sept.) K6PZM 79.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: George Mezey, K7NIY. PAM: OIF. RM: LND. The Copper State Net meets at 1930 MST Mon. through Fri., the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. The Annual Amateur Picnic was held in Casa Grande Dec. 3, the scheduled baseball game was rained out. Through GPQ we were able to meet in the high school auditorium. Entertainment was furnished by CET and his XYL, of Tucson, who are accomplished pianists. Your SCM then presided over a joint meeting of the Tucson and Phoenix amateurs in which various problems were discussed. It was unanimously decided that another Casa Grande picnic will be held Sun., Feb. 4, 1962, at 1230 in the city park and recreational area. All amateurs are invited. You are asked to bring one covered dish to be placed on the community food table, your eating utensils and a plate. Coffee will be furnished. *Zero Beat*, the newsletter of the Catalina Radio Club, has a new editor, Phyllis Douglas, the XYL of UCX. Traffic: W7AMM 48, WØWHE/7 38.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Asst. SCM: Thomas H. Wells, W6EWU. SEC: None. RM: W6EOT. K6BHM in San Diego, is now OBS and puts out Official Bulletins on 7040 kc. at 0300 GMT Mon. through Fri. nights. W6WCK has gone to Italy. K6LKD in Escondido, was very active during the SS on 40 and 80 meters. K6TFT, in National City, is now RACES Radio Officer. The National City Radio Club's call is WA6UUO. WA6BDW is now mobile on 6 meters. WA6ATB is active on the traffic nets after a vacation. New Orange County Radio Club officers include K6LJA, pres.; W6DEY, vice-pres.; W6WRJ, secy.; W6PJU, treas.; K6EEL, activities; W6UWL, public relations; K6IQ, TVI. WV6SBO is up to 51 countries. The December San Diego DX Club meeting was held at the home of W6OME. A group of between 75 and 100 old-timers and XYLs met in San Diego in December to consider affiliation with the QCWA and to organize a local chapter. Pre-1930 gear was displayed and a good time was had by all. W6BKZ and W6EWU organized the meeting. W6EWU, it might be mentioned, was active in 1908. K6JLJ resigned as president of the North Shores Club because of illness, and was replaced by W6ZBE. W6LYF, Section Emergency Coordinator for a number of years, was forced to resign because of illness in the family. Our thanks to Harold for his work as SEC. W6DEY, in Santa Ana, is now handling AREC applications and matters pertaining to emergency work for Orange County. Traffic: K6BPI 1865, W6YDK 1812, W6EOT 310, K6LKD 96, WA6CDD 91, WA6ATB 33, WA6BDW 14, K6TFT 13.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR —W6REK has a new skeleton slot antenna up for 2 meters. He said the band sounds like 75-meter phone. A new OO is W6YK. Bill is very active in hunting DX as the other DX men well know. WA6FGV claims 400 contacts during the last Sweepstakes. W6YK says he did quite well but thinks W6ULS will be in first place for the Santa Barbara section. K6DXW has a Swan transceiver installed in the mobile. The SCM hasn't received any news from the Radio Club or the Poinsettia Club in quite some time. Make sure your club secretaries get the news in before the first of the month. K6ARK extended his mast to raise the beam above the trees. Now he is trying to figure out some way to camouflage the whole thing so the neighbors don't get wise. A new-comer to the Oxnard Area is K9VGO. Rex Gage received his General Class ticket and is now WA6ULV.

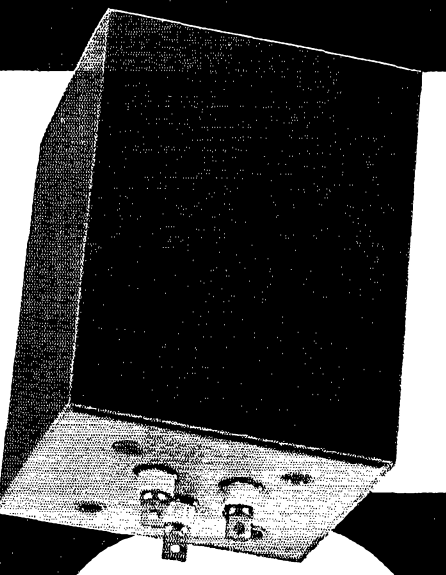
WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG —Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. PAM: W5AYX. RM: W5LR. Because of a bad cold I was unable to attend the Annual Brownfield Swapfest Nov. 12. More than 500 attended and I think the Terry County ARC should be commended for its ability to put on such a jamboree without a registeration fee. Members of the Tarrant County 6-Meter Emergency Net have obtained permission to erect a portable building on Government property at Lake Grapevine with the idea of providing a summer camp for the use of its members. The Arlington ARC holds an annual meeting at Christmas time and I am sorry I was not informed of the exact date this year so I could announce it. Watch for it next year and try to attend; you will have a good time. The Dallas ARC held Old Timers night Nov. 7 with 125 present. Many old-timers attended including ZC, former West Gulf Director, and IP, the only holder of Issue

(*Continued on page 126*)

AGAIN AVAILABLE AT

HARVEY RADIO



TOROID

LOW PASS FILTER

Low pass audio filter that contains 5 Toroidal coils in an L/C network — Pass band 300 to 2,500 cps ± 3 DB — Extremely sharp cut off at 3,200 cycles — Impedance 600 ohm in and out...

Weighs 3.6 lbs.
Dimensions: 3⅜" x 3⅜" x 5"

- ► Handle up to 25 to 30 watts of audio
- ► No maintenance
- ► Better than a Speech Clipper

AN UNBEATABLE VALUE! WORTH TWICE THE PRICE

You can put it to use in so many ways—

- ★ In single side band applications
- ★ In 500 ohm line from speech driver to modulator
- ★ In 500 ohm receiver output
- ★ As a telephone line filter for broadcast stations

ONLY $9.95 F.O.B. New York

Take advantage of this sensational *below manufacturer's cost* offer. It's the buy of a lifetime you can't afford to miss. Order by mail today.

Send check or money order inclusive of shipping charges to

HARVEY RADIO CO., INC.

103 West 43rd Street, New York 36, New York

No. 1 *QST* in this area. IP was one of the originators of the Wouff Hong and has in his possession the original script prepared by this group. PXV has a new inverted "V" and reports excellent results. K5TSA has a new home-brew Class B linear. OPSs and ORSs: Did you report activities for this month? I need views. Traffic: W5RKH 284, W5GY 228, K5LBG 128, K5VWJ 51, K5PXV 45, K5HTM 44, W5BNG 38, W5GNF 27, K5TSA 23, W5CUI 9, K5BAJ 7.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—Commendations to all RMs, PAMs and NCSs for faithful work in long skip conditions. WN5ASX is a new Novice. K5EZD is General Class. W5NS is home after a siege in the hospital. K5DJA made the big leap—to s.s.b. A hunting accident has silenced the key of K5MSW. Allen had many friends in the v.h.f. bands and will be missed by them. W5EHY is the new EC of Sequoyah County. New officers of the Chisholm Trail Club are K5IBZ, pres.; K5ICC, vice-pres.; W5UGA, secy.-treas.; K5SWL, act. mgr.; W5QMI, W5CZS, K5YTB, K5LDF, K5BPY and K5DYW are owners of new Drake 2B8s. K5DYW also has a new Valiant. W5JMQ, ex-KØTNW, is a welcome addition to the Oklahoma traffic nets. K5BNQ is now West Gulf Division Assistant Director. New officers of the Oklahoma City Amateur Radio Club are K5HTF, pres.; K5LIL, vice-pres.; K5VDT, treas.; K5DCF, secy. The executive board is composed of K5GDM, W5UYQ, W5UZV, K5OCX, K5MPT and W5QAC. Traffic: (Nov.) K5MBK/5 144, W5DRZ 108, K5IBZ 69, K5AUX 61, W5FWW 52, W5FKL 34, W5JXM/5 26, W5ICQ 20, K5VVD 20, W5JMQ 19, K5VNJ 14, K5DMS 13, K5OOV 13, W5UYQ 13, W5WDD 10, W5CCK 9, K5JOA 9, K5ZCJ 9, W5BNQ 5, W5PNG 5, W5EHC 3, W5JCY 3. W5CCV 2. (Oct.) K5PDM 5.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK and H. C. Hillyard, VO1CZ. New appointments include RT as Official Observer. Newly-elected officers of the Halifax Club include YQ, pres.; MM, vice-pres.; YE, treas.; OB, secy. AFN, FQ Bulletin editor. K1NPS/VO1 and K8EFK/VO1 both qualify for Brass Pounders' League certificates in traffic-handling of the month. Many section amateurs participated in the recent C.D. Exercise Tocsin II and are to be congratulated on their efforts. MM was the "Ham of the Month" in a recent CBC staff bulletin. Welcome to JF (ex-3EUG). Ex-VO2AW is now VE2JJ. Recent visitors to Halifax include VE3s CLJ, DF and DNW, VE2YH, VE1s MZ and ER. Amateurs who have TVI and BCI should benefit from the experience of AGW. Recently, while Harry was absent, an irate neighbor entered and dropped both transmitter and receiver out the window to the ground below (distance 30 ft.)! Latest reports from Harry indicate that he will be off the air for some time! Wylie Barrett, ex-VE3BIZ and ex-VE1CW is now VE1YN. Traffic: (Nov.) K1NPS/VO1 259, K8EFK/VO1 258, VE1OM 32, ADH 23, WB 10.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Ottawa Valley Mobile Club had a Christmas party for the members' children. The Club members held their own party earlier in December. AGU is in the hospital. BOH visited Toronto. UOT advises there is more activity this season. VE5ER is now VE3ETA. AYR is in charge and looking for other Varsity stations. DBO has his Advanced Class ticket. The St. Thomas ARC meets Sun. on 29.5 Mc. in the A.M. for a rag-chew. DUU was in the hospital, but is back on the net. CFR holds 25 certificates from four countries. Officers of the Grey Bruce Net are DPO, pres./treas.; EBI, vice-pres.; DUD, secy. The Belleville-Kingston ARC held a very successful ham convention in Napanee in mid-November with almost two hundred present. Guest speakers included NF, NG and AML. Officers of the Niagara ARC are SU, pres.; CKU, vice-pres.; DQX, secy.-treas. DQJ has his Advanced Class ticket. BCA and ARF got a deer. RG topped them with an assist on a moose. VF and BZU had a good trip. AML visited the Windsor Club at its Past-President Dinner. VE8TH is looking for Windsor stations at 1400 to 0100 GMT on 20 meters. EBQ has a new DX-60. The North Bay Club has moved. The Nortown Old Timers Assn. held its annual get-together in Toronto, officers are RU, pres.; HE, vice-pres.; BXF, secy.-treas. Fifteenth Anniversary of the Ontario Phone Net was held at Oakville. Traffic: (Nov.) VE3CYR 163, DPO 154, BAQ 125, NG 117, BZB 77, BUR 64, CFR 55, FAS 50, EHL 43, AML 40, CKG 28, GI 28, DWN 23, DZA 23, DH 20, LK 18, NO 16, SG 15, RN 13, PR 12, CE 8, VX 7, DYK 5, OT 4, QOT 3. (Oct.) VE3BAQ 80, OT 8, SG 13.

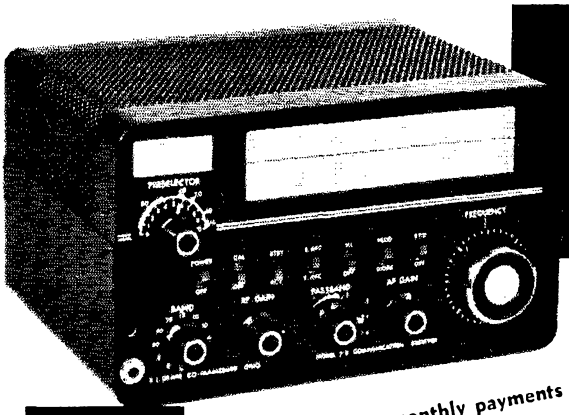
QUEBEC—SCM, C. W. Skarstedt, VE2DR—Let us start the new year right by supporting the traffic nets: OQN, 3535 kc., daily at 0001Z, and the Quebec Fone Net, 3780 kc., daily at 2345Z. Our congratulations to BK, who was elected ARRL Vice-Director for Canada. A c.d.

(Continued on page 128)

LEO I. MEYERSON, WØGFQ, SAYS:
President

SELECTIVITY STABILITY for SSB operation

NO MONEY DOWN with CHARG-A-PLAN SYSTEM



DRAKE MODEL 2-B RECEIVER

The Model 2-B offers superior SSB/-AM/CW reception of the ham bands, 3.5 to 30 mc, in seven 600 KC ranges, plus five extra positions for the special frequencies such as MARS. New 3-position selectivity for optimum passband of 3.6kc - AM; 2.1kc - SSB; 500cy - CW. Other features include continuous passband tuning, slow or extra fast AVC, front panel crystal control, triple conversion and product or diode detector.

$279.95 Amateur Net

2 Yr. Charg-A-Plan monthly payments only $14.00

Even lower with Trade-In

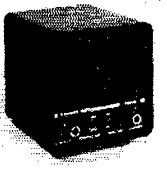
Only $29.95

WRL DesKit

Especially for ham or experimenter. Features sloping top, slide out leaf. Sturdy ¾" Nova-Ply with wood mosaic finish, holding over 500 lbs. of equipment. 49½x29¾x31". 99 lbs.

SMALL MONTHLY PAYMENTS

2 BQ Deluxe Speaker



The new 2BQ is a deluxe speaker with a built-in Q Multiplier and featuring improved fidelity. The unit plugs directly into the 2B Receiver and provides variable frequency peaking or notching. $39.95

The 2BS Speaker is identical to the Model 2BQ but without the Q Multiplier feature. $16.95

IMMEDIATE SHIPMENT • WORLD'S GREATEST TRADES

Easily installed to terminals of 115V antenna relay. Heavy gauge steel, grey finish.

1¾x2⅞x6⅜" small unit $2.49
10½x3½x3" large unit $4.95

2 AC Calibrator $16.95

Complete with tube and crystal, this unit plugs directly into the 2B Receiver and provides accurate calibration check points every 100kc.

WRL WORLD RADIO LABORATORIES, INC.

Q-2

3415 West Broadway • Phone 328-1851 • Council Bluffs, Iowa

LEO: PLEASE RUSH ME COMPLETE INFORMATION ON THE

☐ DRAKE ☐ WRL COMET KITS ☐ CHARG-A-PLAN

NAME: _____ CALL _____

ADDRESS: _____ CITY & STATE: _____

exercise of some magnitude, Tocsin 2, brought a number of hams into action. Our main purpose was standby readiness in case of regular communications failures. These, however, functioned well throughout the 24-hour period. AAH was main control station on 3780 kc., closely supported by our SEC and various ECs. The MARC held a very successful Christmas party. The South Shore Club's Annual "do," will be held in March. UN, McGill University, has been very active this year. AUU contacted many ZL and VK stations on 75 meter s.s.b. AJD, BJ and EC have ten aspiring hams under their wings. BKD and ANK are additions to the ever-growing 2-meter contingent. CK is expected back on the air shortly. AGM is moving to St. Bruno. BIII now signs PX. NV put out a nice signal on 20 meters with a Valiant transmitter. AGN is an enthusiastic newcomer in La Tuque. Traffic: VE2DR 155, AUU 63, AGM 48, EG 26, BG 25, AUV 16, AGQ 15, AZF 13, UN 9, BAC 8, BDV 5, QG 1.

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: FS. PAM: PV. RM: AEN. ECs: IU, SS central. OPS: CA. OO: HM. OBS: HM. ORS: WG. OES: DB. Our PAM reports that W7DZX now is checking into the Alberta Phone Net, and that we may have to change our time as conditions are very poor on 75 meters. Our SEC reports that SS is coming along very well with the emergency group in the central part of the province, and that IU is busy getting his new house so is slowed down with his group for the time being. AEN (RM) wishes that the boys would check into the new c.w. net and help him to get started. Our OBS reports that all Official Bulletins have been put out over the air but conditions have been bad and that some of the boys had some luck in helping out with exercise TOCSIN. Our OPS reports there is quite a lot of long skip on 75 meters and that lots of nights he cannot copy stations 30 miles away. Traffic: VE6HM 239, TG 9, VE8CW 5, VE6AEN 4, SS 4, ABE 3, UH 3, VE 3, ABS 2, CO 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —After three years of inactivity Dawson Creek ARC has become active with a nice party. The calls from the North are FF (XYL) 3DGB/7, XY, AN, AHP, ATL, AKS and GE. CC lost his house and all its contents by fire. BBB still is collecting certificates and now has 10-meter phone endorsement. BGE and BFN are now Class A. AAF, Route Manager, and BAZ have moved to a new location to get free of TVI problems. AOY is our new c.w. traffic man for Trail. Cowichan ARC's new officers are APR, pres.; AW, vice-pres.; BFP, secy, AIK, CF and ALU were among those attending a four-day c.d. course in Victoria. AIK is communication officer (c.d.) for Nanaimo, also EC for Nanaimo District. During Tocsin "B" exercise, DH put in 24½ hours without a break. The British Columbia Amateur Radio Association is preparing for a big party for Feb. 17, 1962, to be called "Old Timers Night." CR and ASE seem to be the only ones active in East Kootenay. Frank made it and is now ALU. AMW has his ORS certificate and now is EC for Vancouver. AOY is our new PAM and net manager for the BCAREC Net. Where is our Lois, AUF,? For over two years she has not been heard from Spring Island. Traffic: VE7BGE 37, BFK 23, BBB 26, BDP 25, AMW 3, AOY 2.

MANITOBA—SCM, M. S. Watson, VE4JY—The newly-elected officers of the ARLM are RP, hon. pres.; TJ, pres.; VP, vice-pres.; RS, secy.; TT, treas.; CX, technical; GE, membership; PE, program chairman. Congrats to EF, elected as president of the Manitoba Trustees Assn. We regret the resignation as EC of TL, who has been elected commodore of the Redboine Boating Club. KF has been appointed as an OO. The ARLM has deferred its hamfest for 1962 in favor of the Dauphin Club. RS recently was presented with the WAW Award, being the ninth since its inception. SA and his XYL are on an extended trip to England. BF, 1961 president of the ARLM, has been elected business manager of the WARA. Brandon "*SPARKS*" has just completed a series of articles on "How to Make a Wireless Set" yet old spark gap style for antique purposes. Traffic: VE4KN 18, EF 7, QD 6, MK 4, AN 2, EG 2.

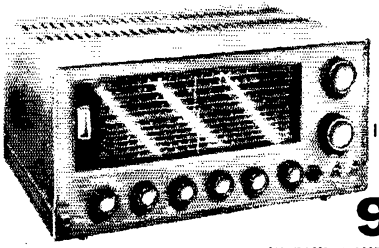
SASKATCHEWAN—SCM, Jack Robinson, VE5BL—As your new SCM any station or club report sent in would be appreciated. Officers elected for the Moose Jaw Club for the new year are EI, pres.; DF, vice-pres.; SY, secy.; KG, act. mgr.; IL, c.d. liaison officer. New calls heard in Regina are DJ, KQ, NZ, SE and TN. OF is doing an FB job as instructor of a course for newcomers with sixteen hams-to-be taking part. The code practice session before the Sun. afternoon net is working out fine. The Regina Club paper is off to a fine start with GI as editor. KZ now is located at his new QTH in Moose Jaw. Saskatoon and Regina had stations on the air taking part in the Boy Scout Jamboree. The Saskatoon Club nosed out Regina in the Field Day activities. A number of hams attended the funeral of 7QE, ex-5GA. HP has received his phone ticket.

LAFAYETTE RADIO

WORLD WIDE STATION FOR AMATEUR EQUIPMENT

THE LAFAYETTE HE-30

Professional Quality
Communications Receiver



Imported

99.50

- TUNES 550 KCS TO 30 MCS IN FOUR BANDS
- BUILT-IN Q-MULTIPLIER FOR CROWDED PHONE OPERATION
- CALIBRATED ELECTRICAL BANDSPREAD ON AMATEUR BANDS 80 THRU 10 METERS • STABLE OSCILLATOR AND BFO FOR CLEAR CW AND SSB RECEPTION • BUILT-IN EDGEWISE S-METER

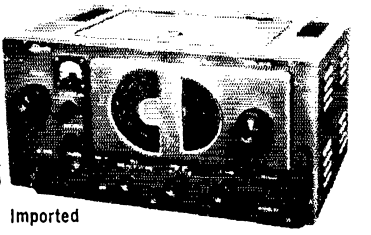
Sensitivity is 1.0 microvolt for 10 db, Signal to Noise ratio. Selectivity is ± 0.8 KCS at —6db with Q-MULTIPLIER. TUBES: 6BA6—RF Amp, 6BE6 Mixer, 6BE6 OSC., 6AV6 Q-Multiplier—BFO, 2-6BA6 IF Amp., 6AV6 Det-AF Amp. ANL, 6AQ5-Audio output, 5Y3 Rectifier.

TOP VALUE COMMUNICATIONS RECEIVER

NO MONEY DOWN

KT-200WX
in Kit Form
64.50

HE-10 WIRED AND TESTED
79.95



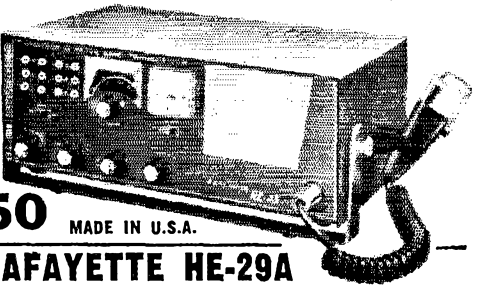
Imported

- SUPERHET CIRCUIT UTILIZING 8 TUBES AND RECTIFIER TUBE • BUILT-IN "S" METER WITH ADJUSTMENT CONTROL • FULL COVERAGE 80-10 METERS • COVERS 455KC TO 31 MC • VARIABLE BFO AND RF GAIN CONTROLS • SWITCHABLE AVC AND AUTOMATIC NOISE LIMITER

The Communications Receiver that meets every amateur need—available in easy-to-assemble kit form. Signal to noise ratio is 10 db at 3.5 MC with 1.25 microvolt signal. Selectivity is —60 db at 10 kc, image reflection is —40 db at 3 MC. Tubes: 3—6BD6, 2—6BE6, 2—6AV6, 1—6AR5, 1—5Y3.

New! LAFAYETTE HE-45 DELUXE 6-METER TRANSCEIVER

- Highly Sensitive Superheterodyne Receiver Section for 50-54 Mc
- Effective Series Gate Noise Limiter
- 3-Stage, 12-Watt Transmitter with 2E26 Final
- Illuminated Panel Meter for Plate Current and "S" Readings
- Pi-Network Transmitter Output
- Built-in 117 VAC and 12 VDC Power Supplies
- Push-To-Talk Ceramic Microphone



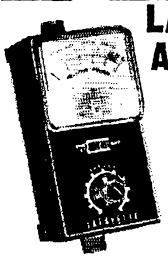
NO MONEY DOWN

Provides maximum convenience and flexibility in either mobile or fixed operation.

LAFAYETTE HE-50 10-METER TRANSCEIVER
Similar to above except for 10 meter operation

109.50

MADE IN U.S.A.



Imported

LAFAYETTE HE-34 SWR AND FORWARD POWER METER 16.95

- Reads SWR and Relative Power Output up to 1 KW
- For Continuous Use in 52 Ohm Lines
- Switch Selects SWR or Forward Power—No Reversing Necessary
- Highly Compact—Only 2½x5x2½"

The ideal aid in adjusting beams, trap antennas, matching networks, etc., or for tuning transmitters for maximum output.

LAFAYETTE HE-29A 9-TRANSISTOR C.B. "WALKIE-TALKIE"™

Imported

NO MONEY DOWN

39.95 2-For-78.88

- 9 Transistors plus Diode and Thermistor
- Transmits and Receives up to 1.5 Miles
- Crystal Control on Transmit and Receive
- Uses Inexpensive Penlight Batteries
- 46" Telescoping Antenna
- Push-To-Talk Operation
- Complete With Leather Case, Earphone, Batteries and Crystals for Channel 10

SEND FOR LAFAYETTE'S NEW 1962 CATALOG

FREE!

LAFAYETTE RADIO, DEPT. VB.2
P.O. BOX 10
SYOSSET, L. I., N. Y.

☐ Send FREE 1962 Catalog 620 featuring the full line of Lafayette Amateur Equipment
..... enclosed for Stock No.....

Name.....

Address.....

City..... Zone..... State.....

Sixty Years of Radio

(Continued from page 15)

ZS3G: Send us full details, as we intend building equipment for Oscar. . . .

Indeed, there were those who believed in Oscar. Actually, many more than was known at the time. These amateurs knew the spirit of adventure, too.

. . . PHASE FIVE PROCEEDING NORMAL. . . . ORBITAL STAGE ON INTERNAL POWER. . . . BOOSTER AND BTL ON INTERNAL POWER. . . . ENGINE SLEW COMPLETE. . . .

The missile stood silent, awaiting the final seconds before the powerful motor would burst forth. The culmination of months of work of thousands of people was rapidly approaching a climax. The atmosphere was tense on the plateau. People spoke to each other now in half-whispers, as the newsmen unfolded the story into telephones. "Put me on the air now . . . launch will be in about ten seconds."

High-speed cameras near the launch site were now whirling and the telescopic cameras at the plateau were aimed at the bird. The master tape in the Communications Center was recording every action and sound. The air was literally charged with electricity. Oblivious to the tension, Discoverer XXXVI resembled a giant finger, pointed serenely at the heavens. Within its giant frame, the tiny Oscar package waited . . . the teletype went mad with speed. . . .

. . . LAUNCHER CLEAR TO FIRE. . . . CLEAR TO LAUNCH. . . . RANGE CLEAR TO LAUNCH. . . . ON MARK WILL BE T MINUS TWO SECONDS. . . . MARK. . . .

November 3, 1961

"John Huntoon, ARRL:

"I am pleased to advise that the Air Force will undertake to place in orbit an Oscar package in conjunction with a military space vehicle launching. Our Space Systems Division has been instructed to accomplish the Oscar package launching at the earliest feasible date on a non-interference basis to the performance or mission of the launch carrier vehicle. . . . Please be assured of the complete cooperation by the Air Force toward successful accomplishment of this amateur experiment. . . . (Signed) Joseph V. Charyk, Under Secretary of the Air Force."

. . . LIFT-OFF . . .

A brilliant flash of red-orange flame burst from the Discoverer. An awesome outpouring of sound marks the birth of space flight. The roar splits into frightful stridencies that beat upon the men as ocean waves attack the land with hurricane force. The red-orange ball of fire grows with astounding speed as the solemn silver shape rises on a plume of flame. Slowly, but with astounding acceleration, the flame grows, with the Discoverer at its head. The shouts of the observers are lost in the forest of noise. Now Discoverer is free of the land: It glories in its upward flight . . .

(Continued on page 132)

faster and faster . . . the track of flame marks its progress into the heavens . . . the program control starts to tilt the vehicle in the proper direction out over the Pacific Ocean . . . the teletype could once again be heard tapping out history. . . .

. . . GOING UP. . . . LOOKS GOOD. . . . STILL CLIMBING. . . . ON COURSE. . . . ON AZIMUTH. . . . ON COURSE. . . .

And so, on December 12, 1961, at 2042 GMT, Discoverer XXXVI was launched into orbit, carrying into separate orbit Oscar I guided in its flight into history by the thoughts and prayers of thousands of radio amateurs who stand on the threshold of tomorrow. QST

Oscar Satellite

(Continued from page 24)

Kudos

The work performed in the development, construction and testing of the Oscar beacon was the result of the cooperative efforts of a large number of radio amateurs and other interested persons working together on a voluntary basis. Nick Marshall, W6OLO, Project Oscar Technical Director, and Dick Esneault, W4IJC/6, Project Manager, made sure the project remained true to the original aim and supervised closely to a successful completion. Al Diem, W3LSZ/6, Project Engineer, designed the r.f. assembly and handled battery and encapsulation problems. Harry Hughes worked out the ideas and surmounted the problems of the code generator. Gail Gangwish and Doug Beck, WA6AAI, packaged the keyer assembly into launchable shape. The antenna work, including patterns, was done by C. A. Andrews, W6LHV, and Jim Daly. Wally Raven, WA6AID, and Jim Barnett were consultants on mounting and heating problems. Howard Linnenkohl, K6SSD, designed the container. Walt Read, W6ASH, got it built. Lance Ginner, K6FEJ, ran the injection tests. Jerre Crozier, W6IGE, handled the drafting and layout work. Chuck Smallhouse, WA6MGZ, Orv Dalton, K6UEY, and Herman Poole designed and built a second transmitter that served as a stand-by unit. Alf Modine, K6TWF, and Will Jensby wrote the test procedures.

There were gratis contributions of hard-to-obtain materials and services by local industries who had their spirit of adventure stirred by the project. Components, materials, laboratory and testing facilities were made available by Philco Corporation, Western Development Laboratories, Palo Alto, Calif., and by Lockheed Missiles and Space Co., El Monte, Calif. Transistors were contributed by Fairchild Transistor Co., Mountain View, Calif., Philco Corp., Radio Corporation of America, Diodes, Inc., and Pacific Semiconductors, Inc. Crystals were provided by X-tron, Inc., Oakland, Calif.; and Midland Crystals, Kansas City, Kansas; mercury batteries were supplied by Burgess Battery Co.

Countless other firms and individuals contrib-

(Continued on page 134)

BE AMONG THE FIRST TO OWN THIS

HALLICRAFTER

Model HT-41 Linear **AMPLIFIER**

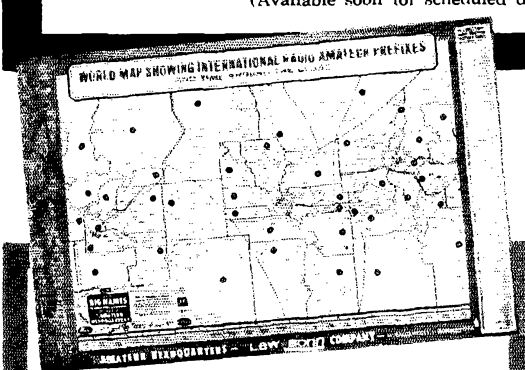
This is the amplifier you have been asking for. An ideal companion for the HT-37 in both styling and price. Beautifully engineered with conservatively rated components. It will assure you one of the big signals on the air. Can be driven by any SSB exciter that delivers 20-100 watts output.

10% down $39.50 ($395.00)

(Available soon for scheduled delivery)

CHECK THESE HIGH PERFORMANCE HT-41 FEATURES!

- ★ Complete coverage 80-10 meters.
- ★ Adjustable Pi-network output.
- ★ All important circuits metered.
- ★ Built in R.F. output meter to simplify tuneup.
- ★ Built in driver pad.
- ★ Stand by bias supply for complete cut off during receive.



FREE! LARGE, 38"x25" WORLD WALL MAP

Showing radio prefixes and time around the globe. Send 50c, in coin for this easy to use colored map. Enjoy the thrills and fun of contacting licensed stations all over the World. Fifty cents will be refunded with your next order. Use coupon on right to order your Model HT-41 Hallicrafter and World Map from Hamateur Headquarters.

THE Lew Bonn CO.

DISTRIBUTORS OF NATIONALLY KNOWN AMATEUR EQUIPMENT

BARGAINS ON DEMONSTRATOR AND USED HALLICRAFTER EQUIPMENT*

LION-SIZE VALUES!

1	SX43	$115.00	
1	SX-42	$169.00	
2	CB-1	$ 65.00	
2	HT-33	$450.00	
1	HT-37	$350.00	
1	Sky Champ	$ 45.00	
1	HT-32	$425.00	
1	HT-32A	$500.00	489.00
1	HT-33A	$500.00	
1	ST-62A	$325.00	New Demo
1	SX-25	$ 75.00	Defiant
1	S-38E	$ 39.00	
1	S-53	$ 45.00	
1	S-38	$ 30.00	
1	SX-140	$ 89.00	

*Subject to prior Sale

THE LEW BONN CO.

Dept. QS-262 • 1211 LaSalle St. • Minneapolis 3, Minn.
— Call, write or use this coupon —
ATTN: JOE HOTCH—KOUFE—FEderal 9-6351

☐ I am enclosing 50c in coin, please send me large wall map. I understand 50c will be refunded with my first order.
☐ Please place my order for scheduled delivery, Hallicrafter Model HT-41.
Enclosed find $_____
☐ Send complete specifications on Hallicrafter Model HT-41.

Name_____ Call Letters_____

Address_____

City _____ Zone____ State_____

uted suggestions and support to this unique project. To all of them, the Oscar Association extends its sincere thanks and points with pride to the results of this heartwarming amateur radio experiment: the "III" of Oscar as it circles the globe! QST

Hurricane Carla

(*Continued from page 74*)

when found, he'd report same and get someone to stay there until a repair truck arrived, while he went looking for more. He also made the rounds of several shelters to keep the gang informed of developments. W5QKF operated over 50 hours without rest. W5FJ devoted over 48 hours conducting communications in and out of Houston on 40 meters. K5HZR and K5BWN spent many a long hour in the 7290 kc. Phone Net handling emergency traffic. K5CRJ in LaMarque did a remarkable job for the Texas City and Galveston area.

And so the story goes, a continuous tale of exploits of an amateur here, a group of amateurs there, RACES and AREC organizations performing what they have trained themselves to do, untrained operators springing to the task and often showing remarkable adaptability to the emergency situation. We want to mention all the amateurs who participated that we can [9], and we'd like to mention every individual's and group's contribution in detail, but space does not permit us to cover them all. Nevertheless, let the story of Carla go down in the annals of amateur radio as one of the finest contributions of the fraternity to the public necessity QST

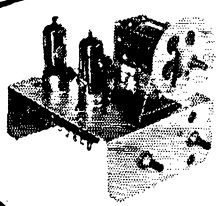
[9] The following were not mentioned above, but were listed as active in emergency communications activity during Carla: *W5s* AEQ AUD AUM AYX APH AYH BAA BBV BJB BMB BKH BZN BZV CMF CKO CPP CWS DYR DIE DGJ DLC DON DQT DNE DJD DJC EPC EML EFH FNW FPJ GQJ GQE GY GOS GEL HKJ HGG IYF IAQ IVC JRW JNE JQN JSU JFU KSQ LR LZA LRI MIS MRY MIF MIN MPH MWH NHB NKZ OCN OX OWA PBA PDR PTP PEV QFQ QFH QJS QQU RIN RPH RVY RFC RWS SHD SNW TFH TIJ TBT UV UMZ USA UMC UFH URN UVO VWE VCE VCA WGQ WYK YHO YVU YCK YIU ZIH ZTB, *K5s* AEC ANK AEY AMK ANS AON AFN BVH BEQ BHF BLW BHP BQG BIT BAH BPH BWN CAN CEG CIS CAD DNE DCC DIM DJD EKJ EKO EPL EKN EFH EYZ FYG FPJ FYE FEZ FWQ FDU FTT GIY GJQ GHS GCW GZT GTZ HDX HXR HUA HHD HMF HTM HQU HVI IEN IBG INH ISH INK ITA IUY JFM JBQ KJK KEI KZQ KYN LLM LGB LTK LUG LXQ MWF MFA MVK MFS MJA MRY MMV NAS OLJ OIT OME OKA OVO PEQ PLH PKY PEI PUW PFC RDP RBM ROH RQI RKM SCT SLH SRO SXQ SMW SFR TOL TSL TCV TKY TAW UYU UWK UHF UAD VDD VIY VLW VQY VZM VUY VGY VHH WWE WYJ WFS WMS WXS W1U WVU WJB YLU YSI ZZI ZSE, *K2s* EIU QHH, *K3s* IJS NNC, *W4s* SQV PXN ATF, *K4s* ENW AVM GXW GRO HMC OAZ, W6MLZ, *W7s* GVS CRO MES, K7LRV, *W0s* PAM NYF, K0QOA.

MEMBERSHIP CHANGES OF ADDRESS

Four week's notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of *QST* without interruption.

BULLSEYE BUYS at ARROW!

AMERICAN GELOSO V.F.O.'s



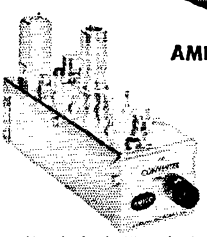
Wired, tested, calibrated, ready for use. Mod. 4/104 for driving one 807 or 6146 final in AM or CW under Class "C" conditions.

Mod. 4/102 for driving two 807's or 6146's final. Has 5 bands. Supplied with Mod. 1640 dial ass'y.

Mod. 4/103 for 144-148 mc bands. Combines VFO primary freq. of 18 mc with xtal fundamental freq. of 12 mc. Supplied with Mod. 1647 dial ass'y.

Mod. 4/104, 4/102 or 4/103 less tubes and xtal, each $29.95

AMECO NUVISTOR CONVERTERS



Choice of separate models for 50, 144 or 220 mc bands. Output frequency easily changed for present and future requirements. Three RCA 6CW4 Nuvistors used, two as RF amps, one as mixer with 6J6 oscillator. Noise figure: 2.5 db for 50 mc model, 3.0 db for 144 mc, and 4.0 db for 220 mc model. Image, spurious and IF rejection better than 70 db. Power required: 100-150 V @ 30 ma, 6.3 V @ 1 amp.

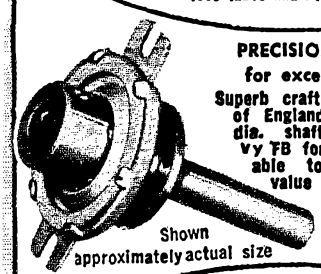
Specify desired IF output for converter model selected.

Kit: CN-50K, CN-144K, or CN-220K, each $31.95

Wired & Tested: CN-50W, CN-144W or CN-220W, each $44.95

PRECISION PLANETARY-VERNIER

for exceptionally fine tuning

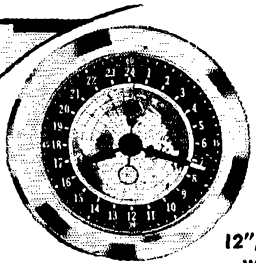


Shown approximately actual size

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. shaft, 1⅛" long, 6:1 ratio, vy FB for fine tuning. Easily adaptable to any shaft. Comparable value — $5.95.

Amateur Net $1.50 ea.
10 for $13.50

24 HOUR CLOCK



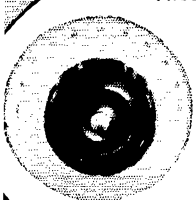
24 hr. chrome plated 8" metal wall clock. Inner dial with south polar projection map of world indicates time around world. Polar projection dial adjustable for various time zones. Shpg. Wt. 2 lbs.

110 V. 60 cy. $8.47

12", 24 hr. clock, 110 V. 60 cy., without world map, $13.95

These prices include tax

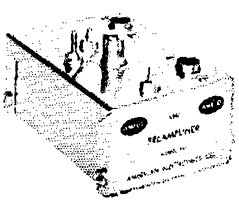
PRECISION BALL DRIVE DIAL



Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard ¼" shaft. For that velvet touch...

Amateur Net $3.95

AMECO NUVISTOR PREAMPLIFIER



FOR 50, 144 or 220 mc. Over 20 db gain plus a lower noise figure, 2 tuned ckts, 6CW4 Nuvistor completely neutralized. Noise figure is 2.5 db @ 50 mc, 3.0 db @ 144 mc and 4.0 db @ 220 mc. Power requirements: 100-150 v. @ 8 ma, and 6.3 v. at .13 amps. Specify frequency desired.

Mod. PV, wired and tested $13.95

Versatile Miniature Transformer

Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

Amateur Net $1.39

3 for $3.49 10 for $10.75

ARROW Authorized distributor of HEATHKIT equipment

MAIL ORDERS PROMPTLY PROCESSED
SAME DAY SHIPMENT FROM STOCK

TO SAVE C.O.D. CHARGES, PLEASE INCLUDE SUFFICIENT POSTAGE WITH YOUR ORDER. ANY EXTRA MONEY WILL BE RETURNED.

ALL PRICES F.O.B. N. Y. C.

Arrow's Export Dept. Ships To All Parts Of The World!
Prices Subject To Change Without Notice.

ARROW ELECTRONICS, INC.

65 Cortlandt Street, New York 7, N. Y. • Digby 9-4730
525 Jericho Turnpike, Mineola, N. Y. • Pioneer 6-8686

TRADE-INS WELCOMED

Transistorized 6-Meter Receiver

(Continued from page 32)

audio output. If no signal can be heard, check the audio stages and the detector for possible wiring errors, shorts, or improper values of components. As the sensitivity increases, the generator output should be decreased for lower audio output. Then adjust C_2 to minimum capacitance and the signal generator frequency for maximum output. The generator frequency should read 2.75 Mc., or slightly higher in frequency. Leaving the generator at the same frequency and increasing the capacitance of C_3 (regeneration control) will increase the output. The output should be kept low by decreasing the generator output, and the frequency of the generator adjusted for maximum. This is continued until the circuit oscillates. C_3 is then decreased slightly by loosening the adjustment screw approximately ⅛ turn.

Next, the signal generator is adjusted for maximum r.f. signal output at a frequency close to the center of the portion of the six-meter band to be covered by the receiver. For example, if 50.0 to 50.5 Mc. is to be covered, the generator is adjusted to approximately 50.25 Mc. The short across L_4 is removed and C_2 is adjusted to midposition. The signal generator frequency is varied slightly until output is obtained and the test signal is decreased to keep the output from the receiver at a low level. If no signal can be heard, vary the adjustment on L_4 slightly until output is obtained. Then L_1 and L_2 are adjusted for maximum output. The receiver can be checked for proper frequency coverage, and for tendency toward instability anywhere in the band. To obtain greater sensitivity the capacitance of the regeneration control, C_3, can be increased slightly and the receiver rechecked for instability anywhere on the band. QST

Communications for Project Oscar

(Continued from page 20)

at Kodiak, Alaska, reporting that Oscar had been heard, proving without a doubt that orbit had been achieved and Oscar was well on his way around the world! The excitement of the operators at K6QEZ can be imagined! The tape recordings will also show that the 11 minutes between the estimated time of Oscar's arrival over the South Pole and the time K4NAA's message was received was *really* only 11 minutes and not the three hours it felt like, nor the ten years the K6QEZ crew aged in the interim! Dave's voice (K4NAA) went from his usual mellow baritone to a high-pitched tenor as he fairly yelled, "Oscar acquired at the Pole! Go! Go! Go!!!" It was quite a scene, as jubilation reigned supreme at K6QEZ! Similar scenes were also taking place at WA6-GFY and at the hams at the launching site at Vandenberg Air Force base.

In closing, in behalf of the Oscar Association, I appeal to all radio amateurs to send reception reports and tracking reports to us. Any reports from foreign countries are valuable and most wel-

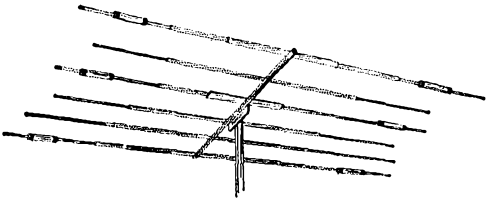
(Continued on page 138)

FORT ORANGE
Radio Distributing Co. INC.

904 BROADWAY ALBANY 4 N. Y. U. S. A.
AMATEUR HEADQUARTERS

Cable Address "Uncledave" **CALL ALBANY HE 6-8411** **NITES GR 7-5891**

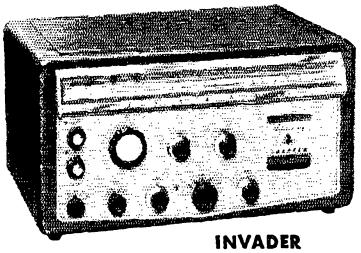
ROSES ARE RED, VIOLETS ARE BLUE, UNCLEDAVE SAYS YOU WILL BE, TOO—IF YOU DON'T TREAT YOURSELF TO SOME OF THE SWEETHEART ITEMS BELOW. UNCLEDAVE, W2APF, AND TINY, WA2KNH, WILL BE HAPPY TO SHOW YOU THEIR VALENTINE SPECIALS.



MOSLEY TA-36

4 Elements on 10
3 Elements on 15
3 Elements on 20

Price.....**$129.50**



JOHNSON

INVADER

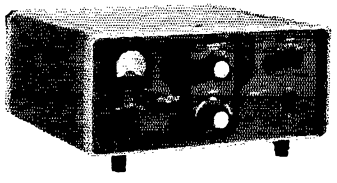
Power input: 200 watts PEP, 200 watts CW, 90 watts AM

Price.....**$619.50**

INVADER 2000

Power input: 2000 watts PEP (twice average d.c.), 1000 watts CW, 800 watts AM

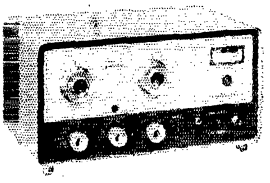
Price.....**$1229.00**



COLLINS
30L-1
Linear

Power input 1000 watts PEP

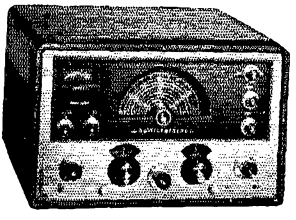
Price.....**$520.00**



HALLI-KIT
HT-40
Transmitter

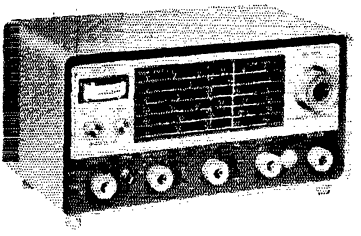
Complete coverage of all amateur bands 80 through 6 meters
Maximum d.c. power input, 75 watts

Price (wired and tested).....**$109.95**
Price (kit)..... **89.95**



HALLICRAFTERS
SX-115.....**$595.00**

New triple-conversion heterodyne receiver. Frequency coverage: Nine 500-kc segments:
3.5— 4.0 Mc.
7.0— 7.5 Mc.
14.0—14.5 Mc.
21.0—21.5 Mc.
28.0—30.0 Mc.
(4 segments)
WWV.



HALLI-KIT
SX-140
Receiver

Complete coverage of all amateur bands 80 through 6 meters

Price (wired and tested).....**$124.95**
Price (kit)..... **104.95**

Write Uncledave W2APF with your needs and problems.

TRADE-INS ACCEPTED *AND* FOREIGN TRADE SOLICITED
BANK FINANCING

TIME PAYMENTS 18 Months to pay. Life Insurance at no extra cost

UNCLE DAVE'S RADIO SHACK
A SUBSIDIARY OF *FORT ORANGE RADIO* DISTRIBUTING CO.

come. All reports will be of use in checking the accuracy of orbital predictions and variations in Oscar's internal temperature.

I would like to thank those amateurs who loaned equipment to K6QEZ and who have aided with project communications. Without their assistance we could not have possibly succeeded. I would also like to thank those amateurs across the country whose on-the-air help and consideration enabled net operation to remain QRM-free for the six vital hours directly after vehicle launch.

Finally, I am sure that the spirit of the late Lloyd Schellabarger (ex-W6EE) of Oakland, Calif., must be very proud that his call is being perpetuated by an out-of-this-world c.w. operator named Oscar! A photostat of the FCC station license of W6EE, issued for special space events, was enclosed in the globe-circling satellite, which sent friendly greetings to radio amateurs throughout the world. QST

Building an Antenna Coupler

(Continued from page 43)

ondary has 7½ turns, 2½ in diameter, 8 turns per inch. Every reasonable effort was made to keep the losses in these coils low, since the loaded Q is still undesirably high. For this reason I found it advisable to avoid taps on either coil. A 50-$\mu\mu$f. padder was mounted on the 80-meter plug strip to center the tuning range properly.

Sample tuning curves for this arrangement are shown in Fig. 5. Note that here there is only a

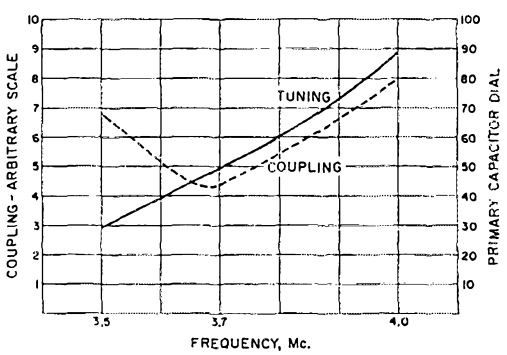
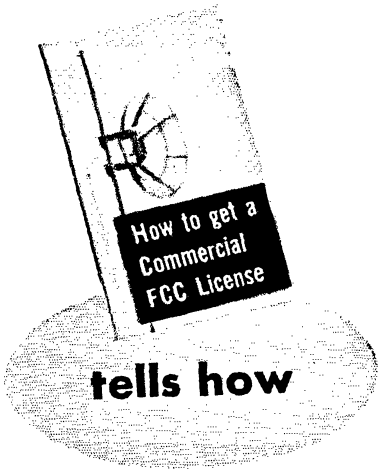


Fig. 5—These curves represent the adjustments required in primary tuning capacitance (solid line) and coupling (dashed line) for the special case of the 80-meter band and the antenna described. On the arbitrary coupling scale, 10 represents the condition with the movable primary coil centered inside the secondary coil. Each lower number on the scale represents a withdrawal of the primary of about ⅜ inch.

single match point, and that the coupling is loose near the band center and must be increased as we tune toward the band edges. This arrangement is very easy to handle, with no trace of crankiness or fireworks. The loaded Q is higher than I would like, and after a long transmission the primary coil is perceptibly warm to the touch, but this apparently is part of the price that one must pay

(Continued on page 140)



FREE

Completion of the Master Course (both Sections) will prepare you for a First Class Commercial Radio Telephone License with a Radar Endorsement. Should you fail to pass the FCC examination for this license after successfully completing the Master Course, you will receive a full refund of all tuition payments. This guarantee is valid for the entire period of your enrollment agreement.

Your FCC Commercial License —or your money back

"License and $25 raise due to Cleveland Institute training"

"I sat for and passed the FCC exam for my second class license. This meant a promotion to Senior Radio Technician with the Wyoming Highway Department, a $25 a month raise and a District of my own for all maintenance on the State's two-way communication system. I wish to sincerely thank you and the school for the wonderful radio knowledge you have passed on to me. I highly recommend the school to all acquaintances who might possibly be interested in radio. I am truly convinced I could never have passed the FCC exam without your wonderful help and consideration for anyone wishing to help themselves."

CHARLES C. ROBERSON, Cheyenne, Wyoming

Cleveland Institute Announces

A New And Dynamic

Technician Training Program in Computers, Servo Mechanisms, Magnetic Amplifiers, and Others

Puts all the commonly used conversion factors, formulas, tables, and color codes at your fingertips. Yours absolutely free if you mail the coupon today. No further obligation!

GET THIS HANDY POCKET ELECTRONICS DATA GUIDE

FREE...

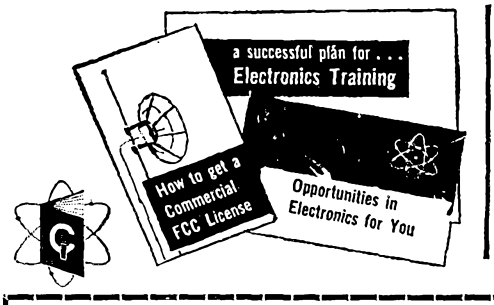
Other advanced fields covered include Basic Math, A. C. Circuit Analysis, Pulse Circuitry, Color TV, Radar, Advanced Measuring Techniques, Industrial Electronics, Instrumentation, Automation, Radio Telemetry. Send for information today.

TO GET THIS FREE GIFT, MAIL COUPON TODAY!

Cleveland Institute of Electronics
Desk QT-2 1776 E. 17th St. Cleveland 14, Ohio

CIE HELPS TRAINEES GET BETTER JOBS

Get All 3 Booklets . . . Free



Cleveland Institute of Electronics
Desk QT-2, 1776 E. 17th St., Cleveland 14, Ohio

Accredited by National Home Study Council.

Please send Free Career Information Material prepared to help me get ahead in Electronics. I have had training or experience in Electronics as indicated below.

- ☐ Military
- ☐ Radio-TV Servicing
- ☐ Manufacturing
- ☐ Telephone Company
- ☐ Amateur Radio
- ☐ Broadcasting
- ☐ Home Experimenting
- ☐ Other

In what kind of work are you now engaged?.....

.....

In what branch of Electronics are you interested?.....

.....

Name ..... Age.....

Address .....

City..... Zone..... State.....

QT-2

for using an antenna that is much shorter than a half wavelength.

The antenna coupler as described is very convenient in actual operation and permits me to get the most out of the transmitter and the limited space for the antenna. With the coax line between the transmitter and coupler (including the effective length of the low-pass filter) a half wavelength at 40 meters, I have no difficulty with harmonics or other spurious signals at any frequency covered by the Apache. QST

How's DX?

(*Continued from page 68*)

bright . . . . . W8KX figures that 7 Mc. is just the band on which to glom the KH6-CC sheepskin as a wintertime DX diversion . . . . . G3JFF, through W1HGT, reports 397 contacts with 37 countries as VR1M last September. Mike may get back to the Gilberts next month to add to his VR1M-VR2EA-YJ1MA QSO collection . . . . . A combination of unfortunate circumstances kept FK8AS from signing FW8AS on Wallis in late '61. Achille tells W9RBI and friends that April may be the magic month . . . . . W6DLN advises, "JZ0HW rolls through here near 21,320 kc. between 0000 and 0300 GMT. He has a Valiant on a.m. inasmuch as single-sideband operation is permitted in Netherlands New Guinea only commercially." . . . . . VK0VK is scheduled to knock off his antarctic action any time now, according to W1AGS (ex-K2QXG). Till then Steve will be hunting Mont., N.Dak., and Wyo. to wind up his WAS, concentrating on 20 c.w. and sideband at 0600-0700 and 1600-1700 GMT . . . . . NCDXC, PBRC and WGDXC provide more Pacific patter: K6LNL/KJ6 is mentioned in conjunction with 20 c.w. and 0800 GMT . . . PK1Z (off limits for W/K DXers, Ban List) is banging away on 7 and 14 Mc., phone and c.w. . . . VP2VB/mm's Yasme *III* developed engine trouble en route the Marquesas but is expected to be producing FO8-type QSOs as this is read. . . . Canton Island local QRM is caused by KB6s BC and BS on sideband near 14,285 kc.; the latter also works a.m. on the lower edge. KB6s BR and BU remain quiescent but KB6BV may soon emit 15- and 20-meter s.s.b. with a 30S-1 and Hy-Gain whirler.

South America — VP8CQ (G3LET) — who signed VP8EG for a few weeks — tells W1CKA he expects to be active in the South Orkneys for a couple of years with a 500-watt s.s.b.-c.w. installation. He likes both 20 and 40 . . . . . W8KX remarks on the potent 10-watt signal of OA8D (ex-OA3D). A four-element beam is the secret . . . . . PYs 1AV 2BCB 2BCZ 2GG 4AD 4AO 4AS 4AVW 4AXN 4BC 4CB 4QA 4TK and 4ZS honored star DXer PY2CK with a friendly lunch in Belo Horizonte last October . . . . . W6SFM hears from PY2AJK in, of all places, Tokyo. Rod visits enjoyably with the JA/KA gang during a one-year sojourn in Japan. He has no hamming privileges but he will doubtless get a chance to say hello to dad PY2DV via the airwaves . . . . . SL3ZO notes that LU4ZO occasionally pitches in to help CE9AS dispense South Shetlands QSOs, 14,050 kc. between 0300 and 0400 GMT.

Hereabouts — OM Wes Morris, who kindly forwarded last month's KC4USN landscape — er, *snow*scape — to W8KX, now has an antarctic mountain named after him in recognition of his three rugged tours of meteorological service down under . . . . . "HP1LM can usually be found on 7020 kc. shortly after 0100 GMT," informs second-op W4SUS. "We have a Globe Scout going now, and plans for securing an HT-37." . . . . . W1QLT reports this year's Alacran reefs (XE0QLT) venture called off but Towne looks forward to a possible Indian Ocean assignment come 1963 . . . . . "The governor at Nassau has been kind enough to issue a few VP7 calls to U. S. Missile Range employees who hold General Class licenses," records VP7BQ (W8UYX). "VP7BO and I are quite active on phone, 10 through 75 meters." . . . . . W3WPG fired up after a two-year layoff in time to catch the phenomenal 7-Mc. DX opening of November 26th-27th. "In six years of heavy 40-meter activity (101 countries worked) I had never heard a JA. Then *boom!* dozens of 'em, plus much juicy stuff." . . . . . VE7BBB finds herself in considerably urgent demand as many a W/K 14-Mc. c.w. hound's first B.C. YL. Eva also gets a kick out of QSOs in Spanish . . . . . K2YFE deplores out-of-subband 21-Mc. phone DX chasing by W/Ks frequently heard just below 21,250 kc. A paucity of proper markers or pure DX-hog sneakery? Either cause is inexcusable in an enlightened electronic age . . . . . K6BX announces Certificate Hunters Club 1962 officers: W5AWT, pres.; SM5WI and W2SAW, veeps; Ws 1AGS 3AYD 8AJW 8WT, Ks 2UKQ 5UYF 0IKL, DL9KP, F9IL, KH6DLD and VE3BWY, staff. QST

HARRISON'S AT THE TOP OF THE TOP TEN WITH THE TOP EQUIPMENT!

QUA COLLINS AMATEUR
DISTRIBUTOR NEWSLETTER
JULY 1961

COLLINS TOP TEN DEALERS

These dealers are our top ten in equipment volume sold this fiscal year. We congratulate them on a job well done.

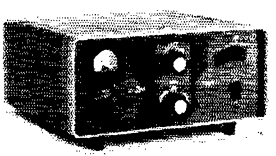
Harrison Radio Corporation, New York City, N. Y.

There's a good reason why Harrison sells the most Collins gear! To its top quality of design and construction, Harrison adds an extra measure of helpful assistance that means full performance, greater satisfaction, more value.

This is the policy that makes "Ham Headquarters USA" your headquarters for Collins —

73, *Bil Harrison*, W2AVA

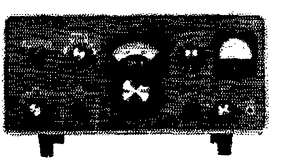
COLLINS



30L-1 KILOWATT LINEAR

Powerful – 1000 watt PEP input!
Portable – weighs only 38 lbs.
Compact – same size as the KWM-2! (Including self-contained high efficiency silicon rectifier power supply.)
Compatible – works with any 100 watt exciter.
Features – ALC, RF inverse feedback, hi/lo power switch, automatic antenna transfer, etc.
Easy to own – yours for monthly amounts as little as **$25**

COLLINS



NEW 75S-3 RECEIVER

The latest addition to the famous S/Line! A versatile receiver for SSB, CW, RTTY and AM. Sharpest selectivity – SSB – 2.1 kc, CW – 200 cycles. Q Multiplier, with 50 db rejection notch. Variable BFO, with calibration marks for RTTY use, and crystal BFO for upper and lower SSB. Fast/slow AGC. Spinner tuning knob.

Connects with 32S-1 for single PTO control of transmitter and receiver.

You can be enjoying this FB receiver now, for monthly payments as little as **$29**

HARRISON

225 GREENWICH STREET / NEW YORK 7, N. Y. / BArclay 7-7922
[LONG ISLAND—144-24 Hillside Avenue / Jamaica / REpublic 9-4102]

Recent Equipment

(Continued from page 84)

Output from the second i.f. amplifier, V_7, is coupled to a separate a.m. diode detector and to the product detector, V_{8A}, which is used in all modes except a.m. Injection for the product detector is furnished by either a crystal-controlled b.f.o. or a variable b.f.o. The crystal-controlled b.f.o., V_{8B}, uses separate crystals to provide the proper b.f.o. frequency when in the USB or LSB modes. The appropriate crystal is switched in by the EMISSION switch.

The frequency of the variable b.f.o. is adjusted by a front-panel BFO tuning knob. This control is actually a potentiometer that varies a positive d.c. bias on a voltage-variable capacitor diode in the b.f.o. tuned circuit. The voltage for this circuit is regulated by a Zener diode. The BFO control performs a dual function in that it also contains a push-pull switch that selects either the fixed or tunable b.f.o.

A.g.c. voltage applied to the r.f. and i.f. amplifier stages is developed in a diode section of V_9. Two a.g.c. time constants are available (FAST and SLOW). You will note from the block diagram that a variable resistance, labeled RF GAIN, is connected to the a.g.c. line. This is a voltage divider connected across a negative 65-volt bias line. At the maximum setting of the RF GAIN, the minimum operating bias for the r.f. amplifier is established. When the control setting is lowered, the bias increases and reduces the gain of the stage. This circuit operates whether or not the a.g.c. switch is on.

When the EMISSION switch is in the AM position, the a.m. diode detector, V_9, feeds the detected signal to the triode audio amplifier section of V_9. After preamplification, the audio voltage is coupled by an AF GAIN control to the audio power amplifier, V_{10}. Audio output impedances of 4 or 500 ohms are available at the rear of the receiver. A phone jack on the front panel automatically disconnects the 4-ohm speaker terminal when headphones are inserted.

The 75S-3 power supply, consisting of semiconductor rectifiers, furnishes the heater, bias and high voltages for the receiver. There is no voltage regulation (except for the Zener diode that furnishes regulated voltage for the variable b.f.o. circuit), but it apparently just isn't necessary! All of the tube filaments and pilot lamps are connected in a series-parallel arrangement so that they may be operated from 6, 12, or 24 volts, for mobile or portable operation. Provision is also made for the connection of an external high-voltage power source in mobile work.

(Continued on page 144)

"MATT" MATTHEWS, K4KMF, enjoys occasional skeds with other members of the "Raytheon field team" and members of the headquarters staff.

FIELD ENGINEERING WITH A FUTURE

Man on the move

Meet Matt Matthews, Raytheon Field Engineer and truly a man on the move. Since joining Raytheon's Electronic Services Division in late 1958, Matt has held a series of increasingly responsible assignments that have provided him with the necessary technical and administrative background for his present position. As the Raytheon representative at a major SAC base, Matt's current project responsibilities include on-the-spot engineering and logistical support.

From his basic orientation program at Electronic Services Division headquarters, Matt progressed to comprehensive in-plant and field training assignments that broadened his knowledge of the latest airborne inertial guidance systems and advanced capability radars.

It is possible that you too can qualify for a Raytheon Field Engineering future. Requirements for a career in this area of engineering specialization include an E.E. degree or its equivalent in practical experience in guided missiles, fire control, radar, sonar or communications equipment.

Raytheon's extensive benefits program includes attractive starting salaries with regular merit reviews; life and hospitalization insurance; liberal retirement benefits; educational and relocation assistance, and an outstanding opportunity for advancement.

For details concerning Raytheon Field Engineering, please forward your resume to Mr. R. E. Guittarr, Electronic Services Division, Raytheon Company, Northwest Industrial Park, Burlington, Massachusetts. An equal opportunity employer.

RAYTHEON

RAYTHEON COMPANY

ELECTRONIC SERVICES DIVISION

In addition to the already-mentioned rear-apron connections on the 75S-3, there are also MUTE and ANTI-VOX jacks. The MUTE jack is normally grounded in the receiver by a panel-controlled function switch. When the function switch is in the STBY position, however, the ground is lifted, placing cutoff bias on the first mixer, V_{3A}, and muting the receiver. The receiver muting can also be controlled remotely by leaving the function switch in the STBY position and grounding the terminal of the MUTE jack.

The ANTI-VOX jack is a 500-ohm audio output which can be applied to anti-VOX circuits in an associated transmitter.

A crystal calibrator built into the 75S-3 provides 100-kc. marker signals. The front-panel function switch turns the calibrator on and off.

— *E. L. C.*

Silent Keys

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

K1DIO, Joseph T. Callahan, sr., Winchester, Mass.
K2AJ, William A. Eubanks, Roosevelt, N. Y.
W2HFP, Wilfred T. Gerlach, Roselle, N. J.
W2HKR, Charles J. Bachman, East Orange, N. J.
W2KCT, Harold Barbagallo, Irvington, N. Y.
W2NHK, W. Edward Walker, jr., New York, N. Y.
W3BSO, Roy R. Richeimer, Pittsburgh, Penn.
W3CUO, Walter F. Clevenstine, Spring City, Penn.
W3NUN, Russell N. Jones, Harrisburg, Penn.
W3RED, Louis A. Raub, Erie, Penn.
W3WNX, Florian A. Niesen, Washington, D. C.
W4ACH, Earle R. Bolden, Ashburn, Ga.
W4EFN, Albert J. Martin, Jacksonville, Fla.
W4RVV, Larry J. Smyth, Montgomery, Ala.
W4SBI, Robert E. Fields, sr., South Williamson, Ky.
W5BKL, Harvey W. Eversole, San Antonio, Tex.
K5OLA, Edward F. Sirjak, Austin, Tex.
W6JFS, James T. H. Burns, Long Beach, Calif.
W6QE, Heber H. Clewett, Pomona, Calif.
W7DQX, S. John Rankin, Walla Walla, Wash.
W7LTV, Richard Hovila, Bremerton, Wash.
K7NLD, Richard S. Fisher, Spokane, Wash.
W8AVQ, Percival J. Smith, Comstock, Mich.
K8BAK, William E. Collins, Cleveland, Ohio
W8UAL, Anthony J. Basarabski, Grand Rapids, Mich.
W9HUU, John W. Woodring, Downers Grove, Ill.
W9HWN, Wayne E. Douglas, Chicago, Ill.
K9MKP, Gilbert L. Crossett, Milwaukee, Wisc.
W9PUP, William R. Peterson, Skokie, Ill.
W9VVU, Frederick C. Hoffman, Kewaunee, Wisc.

News and Views

(*Continued from page 58*)

Chairmen
Publicity — Alice Ginsberg, K4TGA
Advertising — Martha Edwards, W6QYL
Supplies — Virginia Bush, KØGZO
Librarian — Vada Letcher, W6CEE
Budget & Finance — Beth Taylor, W7NJS
Budget & Finance members:
Catherine Barclay, KØBTV
Lois Brickman, WA6NFS
Eastern Membership — Helen Harris, W1HOY
Western Membership — Midge Rommel, K6BUS
International Membership — Betty Becker, K5MJW
Novice Membership — Alice Sturdevant, W7DVH
Nominating Committee — Jane Anderson, W1ICV

Gladys Eastman, W6DXI, has been appointed editor of *YL Harmonics*.

(*Continued on page 146*)

RULES 13th ANNUAL YL-OM CONTEST

TIME: 35 hours

PHONE — Starts Sat. Feb. 24, 1962, 1300 EST to Sun. Feb. 25, 1962, 2400 EST. (1800 GMT Sat. to 0500 GMT Mon.)

C.W. — Starts Sat. March 10, 1962, 1300 EST to Sun. March 11, 1962, 2400 EST. (1800 GMT Sat. to 0500 GMT Monday)

ELIGIBILITY: All licensed OM, YL, and XYL operators throughout the world are invited to participate.

OPERATION: All bands may be used. Crossband operation is not permitted.

PROCEDURE: OMs call "CQ YL." YLs call "CQ OM."

EXCHANGE: QSO number, RS or RST report, ARRL section or country. Entries in log should also show band worked at time of contact, time, date, transmitter, and power. (ARRL section list available for s.a.s.e. to V.P. K2JYZ.)

SCORING: (a) Phone and c.w. contacts will be scored as separate contests. Submit separate logs.

(b) One point is earned for each station worked, YL to OM or OM to YL. A station may be contacted no more than once in each contest for credit.

(c) Multiply the number of QSOs by the number of different ARRL sections and countries worked.

(d) Contestants running 150 watts input or less at all times may multiply the result of (c) by 1.25 (low power multiplier).

LOGS: Copies of all phone and c.w. logs, *showing claimed scores* and *signed by operator*, must be postmarked not later than March 25, 1962 and received no later than April 8, 1962, or they will be disqualified. Please file separate logs for each section of the contest. Send *copies* of logs to Lillian Byrne, K2JYZ, 24 Stillwell Place, Freeport, Long Island, N. Y.

AWARDS:

1st place phone: YL — Cup OM — Cup
1st place c.w.: YL — Cup OM — Cup

The winner of the phone cup is also eligible for the c.w. cup. Certificates will be awarded to high place phone and c.w. winners in each district and country. No logs will be returned. Be sure it is a *copy* of your log that is sent in for confirmation.

Please note that this year the multiplier has been changed from states to ARRL sections. Please know your own section.

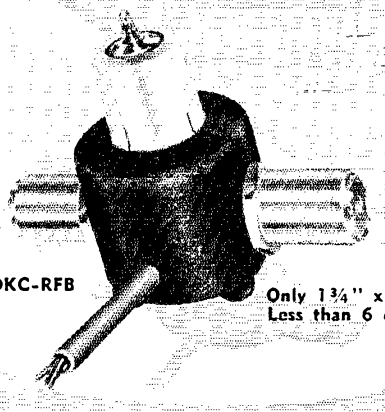
NET NEWS

The Loaded Clothes Line C.W. Net meets Wed. 1600 GMT (9:00 A.M. MST) on 7100 kc. The LC'L Phone Net meets Mon. 1600 GMT (9:00 A.M. MST) on 7235 kc. Custodian for the net certificate is Lucille Miller, K5GYZ, whose new QTH is 116 So. Glenwood St., El Paso, Texas.

A new net, initiated in Oct. 1961 by K9YIC, is known as the Indiana Michigan Petticoat Sisters. The "IMPS" meet Mon. thru Friday on 50.4 Mc. at 1800-1900 GMT (1:00 P.M.-2:00 P.M. EST). A certificate will be issued for contacting five IMPS (except during net time). K9YIC is NCS. QST

DOW
PRE-AMPLIFIER

BROADBAND ★ FULLY GUARANTEED



DKC-RFB

Only 1¾" x 2"
Less than 6 ozs.

DKC-RFB BROADBAND PRE-AMPLIFIER - - **$10.75**

Not available with type "N" connectors

See any one of our 700 Dealers and Distributors in U. S. and Canada for catalog sheets or write:

GET SIGNALS YOU DIDN'T HEAR BEFORE!

The DKC-RFB is a highly useful, practical precision-made accessory for the amateur receiver, and an amazing booster for mobile equipment using convertors.

A brand new, fully tested and proven booster! It is essentially a 50 to 70 ohm impedance matching "Broadband Pre-amplifier" not a pre-selector. Designed specifically for medium-high to less sensitive receivers in use the world over by amateur operators. It is guaranteed to increase over all gain by 1 to 6 "S" units of any receiver*, all bands, 1.5 to 30mc. A slight gain is noted through 60 mc, and the booster need not be removed when operating at this frequency. The DKC-RFB is the long-awaited accessory which will enable the amateur, using less costly equipment to improve the sensitivity potential, to work more DX, to bring up weak and unintelligible signals and to enhance the potential of the antenna. The amazing RFB is especially advantageous to mobile equipment where convertors are used.

A tuned antenna system, a coax connector at the receiver are necessary for the best results.

(*The RFB is not designed or intended to increase the receiving quality of expensive receivers; however, a gain of 2 or 3 "S" units is noted.)

★ **BROADBAND COAXIAL PRE-AMPLIFIER**
Designed specifically for less sensitive receivers, 1.5 to 30 mc. Receivers needing "front-end" drive.

★ **NO ADJUSTMENTS REQUIRED**
Antenna trimmer will aid in matching RFB to receiver on various bands.

★ **SIMPLE INSTALLATION**
Small, light-weight, compact, simple and easy to install, either fixed station or mobile.

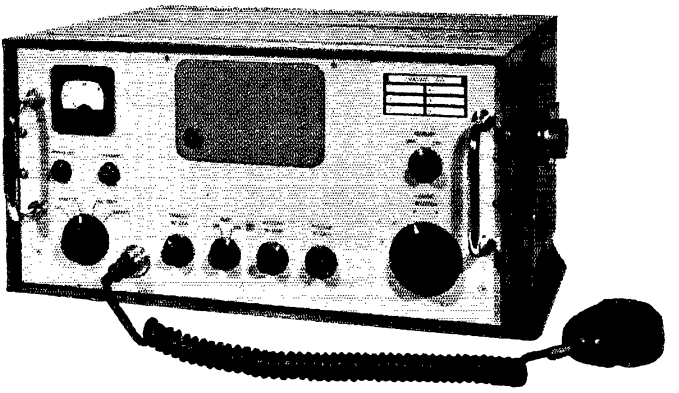
★ **NOISELESS**
The RFB properly installed does not inject additional noise.

Manufactured by DOW-KEY COMPANY, Thief River Falls, Minnesota

---

MOBILE SINGLE SIDEBAND

TRANSCEIVER
MODEL
SB-6M



GOV'T NETWORKS • OIL EXPLORATION • MINING • CIVIL DEFENSE

12 and 24 Volt Models Available
6 Crystal Controlled Channels
Sideband Output—125 W., P.E.P.
AM Output—50 W., Carrier

Weighs 34 Pounds
18½W x 9H x 14D Inches
Remote Coupler for 9 ft. Whip
Remote Control Available

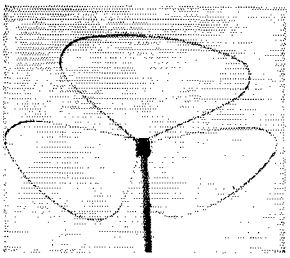
FOR USE BY UNSKILLED PERSONNEL

Contact us for details

R F COMMUNICATIONS ASSOC., INC.
13 CANAL STREET • ROCHESTER 8, NEW YORK • BAker 5-8332

THE BIG WHEELS* ARE ROLLING!

Cush-Craft offers "New Dimension" to Mobile and Fixed Station Communication in Amateur and Commercial Services.



* . . . the brain child of Dr. Robert Mellen and Carl Milner plus the production know-how of Cush Craft now presents this new VHF-UHF antenna. This new clover leaf antenna gives fantastic performance: omni-directional, it has horizontal polarization and extremely low Q. This results in improved band width, ease of matching and large "capture area." Dual stacked, Big Wheel gain figures (in all directions) compare favorably with the 7 element Yagi in its favored direction.

PERFORMANCE SPECIFICATIONS

Pattern: 360 horizontal, variations of ± 2DB or less

Band Width: SWR 1 : 1.2 or less over 4 Mc

Gain:

Single bay — approx. 5 DB over Halo

Two bay — approx. 5.5 DB over single bay

Four bay — approx. 7.5 DB over single bay

PRICES

1 BAY							
¾	meter	Model	No.	ABW	— 420	—	$ 8.95
1¼	meter	Model	No.	ABW	— 220	—	$10.95
2	meter	Model	No.	ABW	— 144	—	$12.95
2 BAY							
¾	meter	Model	No.	ABW2	— 430	—	$20.75
1¼	meter	Model	No.	ABW2	— 220	—	$26.95
2	meter	Model	No.	ABW2	— 144	—	$29.65
4 Bay							
¾	meter	Model	No.	ABW4	— 430	—	$44.50
1¼	meter	Model	No.	ABW4	— 220	—	$55.50
2	meter	Model	No.	ABW4	— 144	—	$62.75

Complete with brackets and harness ready for your mast and 50 ohm cable.

For Further Information & Illustrations Refer to: Page 42 September QST and Page 60 October QST

Cush Craft 621 Hayward Street Manchester, N. H.

• A FULL LINE OF AMATEUR COMMUNICATION ANTENNAS

THE VHF AMATEUR Our **January 1962** issue is our "antenna edition," containing such items as a "Four over Four for Six" (yep — that's what it's called!), "A Five Element 144 mc array," and many more. Also a good crop of construction articles, our SSB Column, our Moonbounce column, and our brand new DX Report column (covering DX conditions on 50, 144, 220, and 432!). Ask about our "Reader's Report," and how you can participate. *COMING IN FEBRUARY: 144 mc NUVISTOR converter by K2PCG.* If you need free hi-pass filters, ask to start with Dec. '61 issue. *Send 35¢ for sample.* **Subscriptions: $2.00** for year, $5.00 for three years. Editor: Bob Brown, K2ZSQ.
The VHF AMATEUR, *Dept. BA*, 67 Russell Ave., Rahway, N. J.

FREE

212 PAGE 1962 B-A CATALOG!

BURSTEIN-APPLEBEE CO., 1012 McGEE ST., KANSAS CITY, MO.

DUMMY LOADS

52 OHMS
NON-RADIATING
SWR BELOW 2:1
ALL BANDS
THRU 2 METERS

100 Watts	ICAS	**$4.95** Wired
200 Watts	ICAS	**$7.95** Wired
500 Watts	ICAS	**$12.95** / **$15.95** Kit
1000 Watts	ICAS	(Wired, Add **$4.00**)

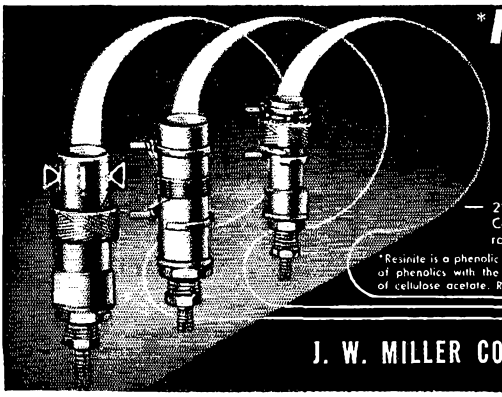
Write for new catalog — Postpaid U.S.A.

Coming soon: Filter for SSB.

HAM KITS *SEE YOUR DEALER OR DIRECT* **308 EDGAR AVE. CRANFORD, N. J. Box 175**

---

*RESINITE ADJUSTABLE R. F. COILS



— 20A000RBI (form only): ¼" dia. x 13/16" long. Coils wound on this form have an inductance range of .079 uh to 1.25 mh.

— 21A000RBI (form only): ⅜" dia. x 1⅛" long. Coils wound on this form have an inductance range of 0.68 uh to 12.5 mh.

— 22A000RBI (form only): ½" dia. x 1⅞" long. Coils wound on this form have an inductance range of 5.70 uh to 125.0 mh.

*Resinite is a phenolic impregnated tubing which combines the mechanical and dielectric advantages of phenolics with the high dielectric strength, moisture resistance, and non-corrosive properties of cellulose acetate. Resinite can be certified to MIL-P-79B Type PBG

MILLER QUALITY PRODUCTS

J. W. MILLER COMPANY 5917 South Main St., Los Angeles 3, Calif.

(AVAILABLE THROUGH YOUR LOCAL DISTRIBUTOR)

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 noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.**
(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

RECEIVERS: Repaired and aligned by competent engineers *using factory standard instruments*. Factory service at reasonable prices on Collins, Hallicrafters, Hammarlund, Gonset, National, Harvey-Wells. Our 25th year, 90 day guarantee. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, $1.50; General $1.75; Extra, $2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

TRIGGER. Cash paid for ham equipment. 7361 W. North Ave., River Forest, Ill. PR 1-8616. Chicago #TU 9-6429.

TOROIDS: Uncased 88 Mhy. like new. Dollar each. Five/$4.00 P.P. DaPaul, 309 So. 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. KEllog 8-0500.

WANTED: All types of aircraft or ground radios. 17L, 618S, 388, 390, GRC, 51V, 51X2 units. Especially any item made by Collins Radio whatsoever. Also large type tubes and test equipments. For fast action write Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

SAN Francisco and vicinity: Receivers repaired and realigned. Factory methods. Special problems invited, any equipment. Associated Electronics, 58 South P Street, Livermore, Calif. Skipper, W6KF.

ATTENTION Mobileers! Leece-Neville 6 volt 100 amp. system, $50; 12 volt 50 amp system, $50; 12 volt 60 amp system, $60; 12 volt 100 amp syst. $100. Guaranteed no ex-police car units. Herbert A. Zimmermann, Jr. K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA. Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmany 8-8262.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

TELEPRINTER Converter CV89A/URA8A, audio input, 2" 'scope indicator, copies any shift from 10 to 1000 cycles, $245.00; Collins 51J2, 51J3, R-390A receivers, Hammarlund SP-600JX. Teletype and Kleinschmidt printers. Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

WANTED: KWM-2 Transceivers and any old issues of QST from inception through 1925. Al T. O'Neil, Camp Lakeview, Lake City, Minn.

OUTSTANDING QSL Samples. Largest variety, 25¢ (refunded). Religious QSL samples (with bible verses) 20¢. Sakkers, W8DED, P.O. Box 218, Holland, Michigan.

C. FRITZ QSLs guarantee greater returns! Samples, 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Ill.).

QSLS. Twenty exclusive designs in 3 colors. Rush $3 for 100 or $5 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSL-SWL-WPE. Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

SPACE AGE 3-D QSL cards. Don't miss out! Free sample brochure. 3-D QSL, Dept. QF, 5 Wood End Road, Springfield, Mass.

QSLS "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Samples, 10¢; with catalog, 25¢.

QSLS-SWLS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo, 1, Ohio.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢

SUPERIOR QSLS, samples 10¢. Ham Specialties, Box 823 Bellaire, Texas

QSLS, 3-color glossy, 100—$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

PICTURE QSLs. Cards of your shack, home, etc., Made from your photograph, 1000, $13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

QSLS, 300 for $4.35, Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill.

QSLS-SWLS. Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

1½" Call QSLs (2 sides printed), 100, $2.75; sample free. Gariepy, 2624 Kroemer, Ft. Wayne, Ind.

QSLS. Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

YLRL specials. OM's reasonable, nice designs, samples dime. W2DJH Press, Warrensburg, N.Y.

QSLS. Samples dime. Rubber stamps: name, call and address $1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLS-SWLS, 100 2-color glossy, $3.00; QSO file cards, $1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS, $2.50 and up. Samples 10¢. RBL Print M.R. 12, Phillipsburg, N.J.

QSLS. Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

QSLS. Kromkote-3 color. Order 200, get 25 each of 8 different styles—many styles. Samples 10¢. Progress Printing, Box 1154, Biloxi, Miss.

QSLS, SWL's that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

QSLS-SWLS Free Samples, David Spicer, 4615 Rosedale, Austin 5, Texas.

RUBBER Stamps, $1.00. Call and Address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N. J.

QSL's 100 glossy 4 color $3.70 Postpaid. Samples 10¢, or send 25¢ for large assortment and "Danger, High Voltage" sign. Dick, W8VXK, Rt. 1, Gladwin, Michigan.

EYEBALL QSO cards. Exquisitely distinctive. Samples, 10¢. 1,000 $5.00. Call Signs, Box 933, Aurora, Ill.

HUNDRED QSLS: 80¢. Samples, dime. Meininger, Jesup, Iowa.

CERTIFIED QSLS-SWLS, unique designs, speedy service. Catalog 25¢ (refundable) Certified Printing, Box 1023, Whittier, Calif.

OUTSTANDING QSLs. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLS-SWLS 3-colors 100 $2.00 samples dime. Bob Garra, Lehighton, Penna.

RUBBER Stamps for hams, sample impressions, Hamm, W9-UNY, 542 North 93, Miwaukee, Wis.

QUALITY QSLS. New designs month, samples 10¢. Giant, 25¢. Savory, 172 Roosevelt, Weymouth, Mass.

ATTRACTIVE QSLS: Large variety of styles, cartoons. Multicolored same price. Samples 25¢ (deductible). Personal ham stationery. Paul Levin, K2MTT, 1460 Carrol St., Brooklyn 13, N.Y.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs. Kromekote samples 10¢. W4ZMC Press, Steve Lawrence, College Grove, Tenn.

QUALITY QSLS, attractive, different. Samples, 10¢. K8IAI Press, 19470 Derby, Detroit, Mich.

QSLS. Large selection styles including photos. Lowest prices. Fast service. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

QSL Cards printed, $1.00 per 100. Lewalski, 1367 Perkiomen, Reading, Penna.

DON'T Buy QSLS-SWLs until you see my free samples. Bolles, 7701 Tisdale, Austin, Texas.

QSLS. Samples, dime. Printer, Corwith, Iowa.

CANADIANS! QSLS in fluorescent colors, by silk screen process. Free samples. Martin, 314 Delatre St., Woodstock, Ont.P., Canada.

CANADIANS: DX-100 with push-to-talk professionally wired, $180.00. Want commercial Sideband rig. Give model, serial number and best price. VE7YZ, 1550 East 61st Ave., Vancouver, BC., Can.

SELL Or trade: 2—833A's, 7—872A's, 3—878A's, all unused. Broken run of QST from 1928. Older issues wanted. VE7AKP, Box 574, Chemainus, B.C., Canada.

CANADIANS! Am closing down second station and have following equipment for sale, used only a few hours: Hallicrafters HT-30 SSB exciter, $350.00: Hallicrafters HT-33 2 Kw. linear, $625.00; National NC-303 with crystal calibrator and WWV adapter, $435.00; also Hallicrafters S-102 2 meter receiver, $35.00; Pye 15W 2-meter transmitter, $90.00; Morrow WT-30 13 tube walkie-talkie, crystal controlled on any frequency 25-60 Mc. (commercially licensable), $180.00; Telrex 3 el. 20 metre beam, $75. VE4CP, Blair MacAulay, 119 Handsart Blvd., Winnipeg, Canada.

COLLINS 75S1, 32S1, 312B4 station control; 516 F2 A.C. P. sup., 51611 D.C. p.sup., Mosley TA33 and rotor, Mosley TM5 mobile ant., perf. condx, $1500. Less for cash. C.o.d. QTH: VE2BCL, 10615 L'Esplanade St., Montreal 12, P.Q., Canada.

CANADIANS: Sell or trade: NC-109, Heath SG8, BC1 and baluns, 12 volt dynamotor supply, etc. Write for list. All letters answered. Gordon Harrington, 89 Church Rd., Quebec P. 10, Quebec, Canada.

CANADIANS: Complete station: DX-100 modified, Lynmar T/R switch, neutralized, perfect order; SX-100 and matching speaker, like new. Heath SWR meter; B&W low-pass filter; homemade antenna coupler, control box with overload relay; EV 927 microphone; Skillman bug, phones and key, spare tubes, 100 ft. coax, 6 years run QST and CQ. A deal at $500, shipped collect. Reason: Moving to Europe. Moe, VE2VZ, 570 Laporte, Apt. 3, Sherbrooke, Que. P., Canada.

SELL: KWS-1, works like new. Looks like new. Serial 503 for first certified check $800.00. Will deliver up to 500 miles or meet you in your station wagon that distance. Berry Rozar, Box 654, Hobe Sound, Florida, W4ERT.

WANTED: QSTs before 1923 and CQ May 1945. Have QST 1931 to 1956 and CQ 1946 to 1956 at 25¢ each. W2HO, Rte. 2, Box 156, Monroe, N.Y.

LOWEST Prices. Factory fresh sealed cartons, Central Electronics, CDR, Dow-Key, Drake, Electro-Voice, Gonset, Gotham, Hallicrafters, Hy-Gain, E. F. Johnson, Mosley, P & H Electronics, Telrex. Self-addressed stamped envelope for lowest quotation on your needs. Gonset G-33 brand new factory sealed cartons, $75.00. Brand new PL-172 and socket, $125.00. Used, perfect Ranger, $150.00; Valiant, $275.00; SX-110, $125.00; SX-100, $180.00; DX-40, $50.00; Sonar-120, $50.00; Adventurer, $35.00. H D H Sales Co., P. O. Box 73, Rowayton, Conn.

PROCEEDINGS Of the I.R.E. 1918 through 1948. Most volumes complete. Will sell any copy or copies. Excellent price on entire lot. (Mrs. Miriam Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. JAckson, 3-7560.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-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: QSTs for personal collection: January through August, 1916. ARRL Handbooks for personal collection: Editions 1, 2, 4, 5 and 14 (1937). W1CUT, Box 1, West Hartford 7, Conn.

WANTED: Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

SSBers! Keep up with SSB news and views! Join the Single Sideband Amateur Radio Association, dedicated to furthering good SSB operating; promoting advancement of SSB equipment and disseminating SSB technical information. Read "The Sidebander", official publication of the SSBARA. Dues $3.00 yearly. Write for membership application sample "Sideband-er", to SSBARA Membership, 1385 Richmond Court, East Meadow, N. Y.

CHICAGOLAND Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Globe, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKyline 5-4056.

KWS-1 $900. W2ADD.

SELL Or swap. Old radio equipment, magazines, tubes, surplus gear, etc. All inquiries answered. Laverty, 118 N. Wycombe, Lansdowne, Penna.

AMATEUR Radio and citizens radio equipment installed and serviced. Mystic Electronics, 119 New London Rd., Mystic, Conn.

CUP-Core inductances, excellent for sharp or band-pass 50 to 100 K.C. IF or HFO. Very high Q. Unused, cased, adjustable; solder terminals. Type 1, 2.9 Mh, type 17, 3.7 Mh. Dollar each postpaid U.S. Circuit suggestions included. Woods, 2346 Clover Lane, Northfield, Ill.

FOR Sale: Precision tube-tester and set tester, $15; Mobile PS, 12V 500V, 200Ma and 225V, 60 Ma., $15; Dynamotor 12V, 450V 200 Ma., $6.00; Vibropack 6V new, 270V 80 Ma., $5; Command receiver and transmitter, new, $6.00; transmitter blower, small, new, $4; electric motor 1/3 HP, new, $6.00; receiver PS 12V dynamotor 235V 90 Ma, filters, $5.00; BC-221 perfect condition, $40. W1ZOU, Box 574, Belton, Mo.

SALE: Good S40-B receiver, $60.00 freight prepaid. K4NGZ, Box 1157, Ft. Eustis, Virginia.

FOR Sale: BC348 110V AC with manual, $50.00; AR3 with cabinet, $25.00. Both in good condx. Howard Brown, 122 Almon, Howell, Mich.

NEWLY Formed St. Joseph's Radio Society will accept equipment and/or parts from anyone who would like to help us help our H.S. students into ham radio. We'll pick up equipment in 100 m. radius. Father Stan, WA2ECX/1PX. St. Joseph's Rectory, 1010 Liberty St., Camden 4, N.J.

TAPE Recorder, portable, transistorized, cowhide case, brand new. Lists for $129.50. Will ship and include A.C. supply, extra tape and telephone pick-up for $85.00. Total value $158.10. R. L. Atkinson, K8PNH, 2717 Morton Ave., St. Joseph, Mich.

MUST Sell KWS-1. Best offer over $900. Also have KE93, $195.00, with A.C. power supply. Dave DeArmond, 226 Hobart, San Mateo, Calif. W6MSD.

TRADE Or sell cheap, Collins KWS-1, #471. What have you? Write for deal, Paul Schrader, W4BCV, 7906 Tip Top Lane, Louisville 19, Ky.

75S-2 Collins extended tuning range receiver. Complete, new, never used. $450.00. S. Wolf, 3 Lawrence Lane, Lexington, Mass.

SELL: Viking 500. Perfect condition, $550. No shipping. Walter Robinson, 500 North Montgomery, Gary, Ind.

KITS: Professionally wired. Contact Easton, K9OMO, 521 Alden Road, Muncie, Indiana.

HAMMARLUND Receiver 110, like new, $160.00; Globe Scout 680-A with power booster, factory-wired, excellent condition, $65.00. Call Walker 5-7168, 9 to 6, or ULster 4-0083, 7 to 10. Mannie Teitch, K2VQU, 628 East 8th St., Brooklyn 18, N.Y.

200W amplifier for 220 Mc., 8W drive, 100W output. With 4X250M and blower, $39. WA6LEN, 2705 Russmar, San Diego 11, Calif.

"CV-89A/URA-8A RTTY Terminal Unit wanted. Will pay fair cash price. State condition. KØSBS, 6212 Girard, Omaha, Nebraska"

YOU Name it . . . we need it. The newly formed Rutgers Amateur Radio Club will put to good use equipment that you will never use again. All offers greatly appreciated. Will pick up in central New Jersey area. WA2TWL, K.A.R.C. Rutgers University, New Brunswick, N.J.

HEATH VFO near new, $15.00; DX20 used 7 hours, $30.00; AR22 rotator with control, $17; pair 110V selsyns, $4.50. F.o.b. K7DHL, Box 189, Grand Canyon, Ariz.

SELECTED Reconditioned equipment. B&W 5100 w/51SB, $295.00 (spotless); Central 20A w/QT-1, $179.00; "B" Slicer, $49.00; GC-1, $65.00; Collins 75A1, $229.00; 75A4 (late), $529.00; 75S1, $399.50; 500 cy. filter, $35.00; Drake 2A, $219.00; Hammarlund HQ129X w/spkr, $139.00; HQ-110, $189.00; HQ170C, $295.00; Hallicrafters SX99, $99.50; SX96, $169.00; SX101 III, $295.00; HT37, $389.00; Heath DX-40, $59.50; SB-10, $75.00; Mohawk, $229.00; Cheyenne, $99.00; Johnson Ranger, $189.00; Viking II, $169.00; National NC-300, $239.00. Write for complete listing. Radio Distributing Co., South Bend, Ind.

SELL: Gonset 2M III, gud condx, first offer over $175.00 takes it. K1MIZ, Riverbank Rd., Stamford, Conn.

CAlifornia hams: 75A1, prod. detector, spkr, $190.00, Deliver 125 miles radius. Also several 4X150As, used but good, $6.00; 4CX250Bs, $15. K6SGO, 1870 Petaluma, Long Beach 15, Calif.

HRO-7 in good condition with coils, A,B,C,D, speaker, power supply and manual; $125.00. Kurt Hubner, 786 Montrose Ave., Palo Alto, Calif., Tel. DA 1-3074.

JOHNSON Thunderbolt, less than year old, perfect condition, $365.00. Sry, cannot ship. Andy, K3BPS, 307 Woods Road, North Hills, Penna.

SELL: Heath DX40 and Hallicrafters S38E with DK60 coaxial AC relay; Hallicrafters SX-17 Super Skyrider receiver with 12 in. external spkr and baffle. Pierre Berk, 36-14 165 St., Flushing, L.I., N.Y.

COLLINS S Line less than 7 months old: high serials 30S-1, $1075; 32S-1 with 516F2, $550; 312B4, $135.00; 75S-1, $365. All for $2,000; firm KWS-1 $1000; 32V-2, $195. Cleaning house. W2BBV, 49 Frum Ave., Yonkers, N.Y.

SELL: Direction Finder Heath DF-2, $25.00; Signal Generator Hickok 191X, $25; power transformer Stancor P8035, $20.00; modulation transformer UTC CVM4, $15.00; filter chokes Stancor C1415 and C1405, $10.00 each; Filament Stancor P6302, $12.00; Bandswitch B&W 850A, $12.00; meters 3 inch, 150 VAC, 50 ua, 100 ua, 200 ma., 500 ma., $2.50 each. Will not ship. K1DLT, 21 Harvest Hill Lane, Stamford, Conn.

FOR Sale: Collins 51J3 like new, $675; Hallicrafters HT-33A Mark I, factory-modified to HT-33B, $575; Central Electronics 100V, $575; Collins 75S1, $450.00; Jones MicroMatch, 261 coupler and 262 indicator, $25.00. All the above equipment in a like-new condx. Sidney Gogel, 1096 Laux Place, North Bellmore, L.I., N.Y. Tel. SUnset 5-6876.

SELL: National 303 receiver, crystal calib., $300; Collins 75A2, crystal calib., $225.00; Navy CAY receivers, high and low freq., no pwr., $30.00 each; CE-A slicer w/API, $50; Gonset Commander Trans., VFO, $65.00; Viking 500 trans., $600; new Johnson 100DD70 var. cond., $5.00; powerstat 120V, 20A, $20; Variac 120V, 5A, $8; 100 kc crystal calib., $8; pair German field telephones, $15.00; new 6146s, 811s, $2.50 each; 807s, $1.50, asst. relays, var. cond., meters, etc. Kimeldorf, 127 Nesbit Terrace, Irvington, N.J.

SURPLUS Equipment, power supplies, racks, cabinets, transformers, etc. Gonset G66-B E-G77A complete w/dual pwr. supplies & cables $325.00 perf. condx. J. Christiano, W1EVX. Call GRanite 2-1397, 237 Water St., Quincy, Mass.

COLLINS 75A-3 receiver, product detector, vernier dial, 3.1 and 800 cycle filters, 100 kc. crystal calibrator, $400; Collins 310-B-3 exciter, TVI-suppressed, $100; Hallicrafters HT-20 transmitter, spare 4D32, $200; prefer cash and carry deal. Blue Racer Vibroplex Deluxe, $10; Johnson 100 kc. crystal calibrator, $8.00. McKegney, W2GZK, 35-58 165th St., Flushing 58, L.I., N.Y.

SELL: Gonset G-66B and G-77 mobile twins, $225.00. Includes mike, all-band antenna, bumper mount, cables and manuals. Perfect condition. You pay shipping. Glenn Rose, 106 Rosewood Drive, Hampton, Va.

FOR Sale: 75A4 w/spkr, ser. No. 4862, new condx, $550.00; 6 Kc filter, $25; will ship in original carton. HT32A with new 6293 tubes, like new, $450.00. Central Electronics Model B Slicer, $50.00. K2KPM, Irving Boilen, 456 Schenectady Ave., Brooklyn, N.Y. PR 2-5612, after 5 PM.

HALLICRAFTERS S-85 receiver. Like new in appearance and operation, $85.00. Woller, K8BCT, 1037 Michigan Ave., Adrian, Mich.

APACHE, 2 years old; expertly wired; in exc. condx, built-in Lynmar TR switch; new 6293's, fair price for known quality, $270.00. Bud Codemaster oscillator-monitor, $15.00. PR xtals 7037 and 7177, $2.00 each. K1OGA, Boston.

FOR Sale: 4-1000 socket new Eimac, $12.00. Also have R-391 receiver. What's offered? W8BPT, 358 Clark Ct., Groveport, Ohio.

SELL: Lafayette KT-200, $50; Eico HF-12 hi-fi amp., w/t, $50; National SW-54, $15; Weston 0-3 r.f. ammeter, $10; BC-645A, $18; 815, $6.00. K1PUR, 53 Carter St., New Canaan, Conn.

SELL: Used Triband vertical Mosley V-3 Jr. Will answer all inquiries. $15.00. M. Long, Rte. 3,Box 87, Susanville, Calif.

KWS-1 Ser. 1267. Bob Cava, 113 Wood St., Salinas, Calif.

SELL: DX-100 with "B" revision, $150.00; HQ-129X receiver, $125.00. W2STG, Mahr, 20 Millford Drive, Plainview, N.Y. Tel. WEIls 8-9154.

ELDICO SSB-100F 100 watt exciter, small quantity factory rebuilt, excellent condx, $375.00. W2HKY, Kraus. Reeves Instrument Corp., Lakewood Road, Farmingdale, N.J.

WANTED: HRO-50T1 plug-in coils for 50-100 Kc and 6 meters. State price. W5GYP. 200 No. 4th Ave., Edinburg, Texas.

SELL: Model 15 teletype, $150.00. Tape distributor, $65.00. W6MJK, 2408 Castle Heights Ave., Los Angeles 34, Calif.

DX-100 tested. Steve Bedell, 260 Autumn Ave., Brooklyn 8, N.Y.

SELL: Collins 75S-1. $275; Gonset Communicator III, 6 meters, $125.00. W3QEW, 2215 Riverside Drive, Scranton, Penna.

SELL: SX-111, $200; Knight equipment; xmtr with modulator, $30; VFO, $20; GDO, $15. Rawls, 2323 Bob Wallace, Huntsville, Ala.

SELL Or trade for mobile rig: NC-88 with QF-1 and xtal cal., $75.00; DX-40 with VF-1 and B-1 baluns, $75.00. Also homebrew accessories. H. Ostrowski, 3798 Platt Road, Ann Arbor, Mich.

75A4, #5048: HT37 in new condition. Original cartons and manuals. $975. Pick up or will deliver within 150 miles radius. Sry, no shpg. K8LDC, 738 Truesdale Rd., Youngstown 11, Ohio.

KWM2 Serial #11612 and 516F2 power supply. Used less than 25 hours. R. J. McMahon, K1TUD, 15 Thackery Rd., Wellesley, Mass.

SELL: Model 9-1090 signal shifter, $25.00. W. H. Kibbe, 2130-18th Ave., Monroe, Wisconsin.

SELL: QSTs 1950 thru 1961. Top condition, $2.50 per year. Will not break this run. W. J. Tancig, K9MYZ, Beecher, Ill.

COLLEGE Bound: 75S1 (Ser. Number 11,977); Hallicrafters S-85, 41A converters; RME VHF-126 and DB-23; Clegg Climaster; 6 mtr. kilowatt; Globe HiBander; Rohn Tower; Panadapter; ARC-5; APX-6 Bird wattmeter; Telrex 6M24(2); RTTY printer and converter; Jones VHF-SWR; 220-432M.C. tripler-amplifiers; Heath test equipment; other equipment and VHF tubes; list, postage. Edwin Elbert, WA2DEK, 554 Webster, New Rochelle, N.Y.

BEGINNERS: Code bothering you? Now learned in one hour. New Method. Quick approach towards ham ticket. Used in Armed Services, Ham Radio, Scouting. "Ketchum's Hour Code Course", $1.00 postpaid. Guaranteed. Oaks Ketchum, 10125 Flor Vista, Bellflower, Calif.

SELL Globe 350 transmitter, $275; Eldico EE-3A electronic key, $40.00; Lampkin 103-B freq. meter, $195; Collins 136A-1 noise blanker for 75S-1 receiver, $95.00. Robert Ireland, Pleasant Valley, N.Y.

SELLING Out: Complete KW station including HQ-129X receiver, phone or c.w., 10-20-40. Pitch motor and two beams. Lots of spares. $300. Parts alone would cost many times this price. This is not junk. Send postal card for details or work me on 7265 Kc. Will not ship at this price, you haul it. WØDST, 1519 14th St., Bettendorf, Iowa.

RADAR Transmitter: Magnavox APS19 with 2J55 magnetron and 5956 hydrogren thyratron. Brand new, unused Govt. surplus. Cost $1,183.50. With tubes, $45.00. Less tubes $20.00. Shipping weight 40 pounds. L. H. Carver, 2828 Rainbow Rd., Jacksonville 17, Fla. W4H1W.

For Sale: ATJ television camera in perfect condition, less power supply, $75.00; with power supply, $90.00, or will swap for Viking Challenger. Peter Donneau, W1YIX, 11 Blanche Ave., Manville, R.I.

SELL: Valiant, HQ-150, Viking 6N2, CE20A with Deluxe VFO, 500 W. Linear, D-104C with G stand, Rohn 42 ft. tiltover tower, Ham-M rotator, AR22 rotator, Mosley TA33, Tel-Rex 15 el. 2M beam, Tel-Rex 8 el. 2M, Skysweeper 3-el. 6M beam, Tapetone 2M converter, Tecraft 6M converter, relays, filters, TR switch, etc. Sell all or in part. No reasonable offer will be refused. All equipment in operation. Sry, no trades! Call MItchell 2-6677. Norman Dornfield, W2VSO, 797 Broad St., Newark 2, N.J.

COLLINS KW-1, perf. condx. Sell for best cash offer. W2OCG, 3 Henry St., Great Neck, N.Y.

THUNDERBOLT, used only two months. In perfect condx. $375.00. Ranger PTT. few scratches, works FB, good buy at $150.00. Both for $500. George Mack, W4HUE, 4108 S W 5th St., Ft. Lauderdale, Fla.

BROOKLYN: HT32B, under 30 hours logged; new in original carton, $550.00; SX-100, same condition, $175.00. Owned by Extra amateur. No shipping, sry. Call or write. Armando Villamor, K2ZZH, Tel. UL 3-2698. 425 41st St., Brooklyn 32, N.Y.

FOR Sale: Globe King, all band, 755 VFO, $240.00; R9'er, coils, $9.00; Precision E200 Sig. Gen., $20.00. Partly constructed 200W c.w. transmitter and power supply, $17.00. Harold F. Cushing, W1EUS/6, 2348 Menzel Place, Santa Clara, Calif.

HAMMARLUND HQ-100 with clock and matching speaker, $110.00. Only one year old. Bought new, in original container and directions. Dr. R. Goldrich, 90 Audubon Ave., Jersey City, N.J.

DETROITLANDERS—4-1000A, 4X150D's, 4-65A, 6293's, 6L6's, 250TH's, 304TH, 1250V-1A, 7HY-1A, Kw parts. Paul, K8CJX. DU 1-5766.

NUVISTORS: 6CW4's, $1.59, tubes 6146's, $2.98; 5763's, $1.39; OB2's, 89¢; 811A's, $3.89; 866A's, $1.89; 807's, $1.49. All tubes tested, boxed, guaranteed perfect on arrival. No C.o.ds. Shipped prepaid Electronic Traders, 608 S. Dearborn, Chicago 5, Ill.

OSCILLOSCOPE 5 in. model OR1 Heathkit, $60.00. W6HAB, P.O. Box 282, Hilmar, Calif.

SELL: DX-20, $30.00. Mint condition. You pay shipping. WN9AND, 724 West Camp St., Lebanon, Indiana.

JOHNSON Pacemaker $275.00. Good, reconditioned; Knight R-100, $100. Cash on the barrelhead. Will ship collect. James Campbell, WA2MFD, 2 Loudon Heights No., Loudonville, N.Y.

RADIO Transmitter, BC223A with tuning unit Tu17A. Range 2000 to 3000 kilocycles, also a generator power unit for operating transmitter. Complete for $150.00. C. E. Monroe, 10303-3rd N.W., Seattle 77, Wn.

PLATE Transformers rebuilt unconditionally guaranteed. Advance Winding Co., 2813 (rear) East Washington St., Indianapolis, Ind.

HEATH Mobile. $185.00; Cheyenne xmittr, Comanche rcvr. Jacob P. Watson, Rt. 4, Resh Rd., Hagerstown, Md.

PACKAGE. Must pick up. KWS-1 es 75A4(3) filters, also relay, $1425. K2EZW, F. J. Maher, 389 Tremont St., No. Tonawanda, N.Y.

WANTED: Wide line pen for BC1016 recorder. W8SPX, 1312 Crosby St., Grand Rapids 4, Mich.

SELL: Viking Ranger FW $170; Matchbox, $25.00; 75A1 with HC10, $285; PMR6A w/12 volt supply, $65.00. W2SHC, 151 Whitney, Pompton Lakes, N.J.

HAM Kits, change x-tal frequency, including plated type. Safe method, ammonium bi-floride, containers, holders, instructions. $1.00. 5 element 2-meter beam, 9db gain coax or twin-lead feed aluminum complete, $3.00. Shipped postpaid Ham Kits, Box 175, Cranford, N.J.

300 Watt modulated amplifier, 80 thru 6. Can be driven by any low power transmitter. $115.00. Jim House, 1610 Avalon Ave., Joliet, Ill.

SELL Heath, excint condx, Cheyenne MT-1, $98; power supply PS-3, $35; 10-meter transceiver HW-19, $35; RF Sig. Gen., SG-8, $17.00. J. R. Howard, 720 Chesterfield, Birmingham, Mich.

GONSET Twins, G77, G66B and 3-way power supply, $295 or will trade for Gonset GSB100. R101A/ARN6 automatic DF receiver, renew by Dare 1960, $45.00; FR-72/UP, new X band freq. meter can hit 10 Gc. ham band, $40.00. Eico 760 CB rig, $45.00; Hy-Gain 3 band vertical, $10.00. Will trade for old rack type HRO w/o PS. W5EIM. 1212 So. Sandusky, Tulsa, Okla.

ALUMINUM for every ham need. Write to Dick's, 62 Cherry Ave., Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

NC-190 for sale. Used only few hours. $165.00, plus shipping cost. W1SUZ.

SELL: Fisher 101R stero-tuner, $150.00; Bell 3030 stero preamp and amp, $100; Roberts stero 4 track tape recorder with amplifiers, $300. KWS1, $890. 75A3, $325. Lamb, W3VDE, 1219 Yardley Rd., Morrisville, Penna.

STATION For sale: Elmac AF-68, PMR-7 rcvr, Eimac M-1070 pwr.supply (supply brand new, no cables); Turner xtal neckmike, two 50 Mc. xtals, Webster Bandspanner and mount, Mark Heliwhips for all bands (4 whips inc. Tribander), and mount, "S" meter, in exc. condx, value $586.00. Will sell for $375.00. Also Carter rotary converter 12V DC to 115V AC, 150 watts, $35.00. Also Vibroplex Presentation Bug, and case, unused, $25.00, 50% on C.o.d's. Contact W2PJD, 25 Jackson Ave., Northfield, N.J.

SELL: Hammarlund PR0310 receiver. In mint condx. Can't be told from new. This is a gem. $265.00. Sold for $595.00 new. Also R-44/ARR-5 receiver, 27 Mc.-145 Mc. Brand new with 110V power supply, $85.00; Tapetone XC-50-C2, 6 meter converter with 110V power supply. For Collins 75A4, like new, $50.00. Merrill W. Roscoe, 1880 18th St., East Moline, Ill.

SELL: DX-100B, SX-99, spkr, Dow-Key ant. relay with 110V coil, 30 ft. RG-58/U. Package deal. Best reasonable offer. Cannot ship, sry. Dunn, WA2IBH, Tel. TW 6-6606, 63-39 Booth, Flushing, L.I., N.Y.

100 Watt voltage dropping resistor. Allows use of 6 volt equipment on 12 volt system. Each, $1.00. T P Electronics, 14106 Lambert Rd., Whittier, Calif.

DX-35, VF-1, more. Send for details. WA2SRU, 1557-45 St., Brooklyn, N.Y.

"HORSE-TRADER" Ed Moory, sells cheaper: Used and Guaranteed: HT-37, $349.00; Drake 2-B, $225.00; 75A-4 perfect, $489.00; KWM-2, $859.00; 20-A, $145.00; 75A-3, perfect, $349.00; 32V-3, $279.00; used Viking Invader, $449.00; Viking Valiant Demonstrator, $269.00; 30S-1 linear, $939.00; 30L-1 linear, $379.00; 75S-1, $349.00; 32S-1, $479.00; 312B-4 speaker, $145.00; 10-B, $89.00; Globe King phone and c. w. xmtr, $89.00; new 200-V factory warranty, $775.00; HT-32B demonstrator, $459.00. Used 200-V, $659.00. Terms cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

DX-20 Heath Radio transmitter, $30; S-108 Hallicrafters radio receiver, $85.00; 6-BD Hy-Gain radio antenna, $35.00. Tel. LYnbrook 9-0267. Call after 4 PM. Goldberg, 215 Main, East Rockaway, L.I., N.Y.

WANT: 32S1. State price, serial number, condition. Leo Liebl, Medford, Wis.

SELLING Like new KWM-1 with 516F1 AC supply, $450.00 and 75A4 receiver, three filters, $595. both for $975 f.o.b. WØKFA, Box 627, Cedar Rapids, Iowa.

HQ-129X w/xtal calibrator, spare tubes. Excellent condx, $115.00; Knight 50W xmtr, $30.00; Heath VF-1 w/power supply, $15.00; Dow coax relay, $6.00. Best offer around $150.00 takes all. Jan Sonsteby, K2SZQ/1, 3 Ames St., Cambridge, Mass.

SELL from W2SSH estate: Central Electronics 200V Partically new $600; Viking Ranger excellent $165; Sideband Slicer with Q Multiplier $50; Morrow CD Monitor $35; Eldico 2m rcvr and power supply $45; Homebrew transmitter 600 watt, PP 4/125A tubes, 805 modulators, two power supplies, vacuum variable condenser, rotary inductor, metering, micromatch, grey cabinet $200 (parts worth more); Telrex R100 rotator $75; Dumont Electron Switch 185A $35; large wall clock $5; VT voltmeter $10; Lafayette 70 watt audio amplifier KT400 and master control center KT300 both for $60; Geloso dynamic mike, $15; assorted power tubes, meters, many other components. Sorry, cannot ship. Mrs. R. L. Cassell, Bound Brook, N.J.

75A4 with 3 filters, $550. or best offer. Excellent condition. Serial #1750. W9JKC, Sharpe, 634 Vernon Ave., Glencoe, Ill.

HT-37, $385; HT-33A, $525; SX-101A, $330; R-48. $10, in A-1 condx. $1150 cash takes all f.o.b. in original cartons. WA2HPT, L. Macomber, Qtrs. 9, Miller Army Airfield, S.I., N.Y.

SPECIAL Bargain VHF operators! 220 feet with one elbow 3/8 in. Andrews type 452 transmission line 51.5 ohm, worth $1500. Sell or trade for SSB gear. Please write Frank Lucas, Canonsburg, Penna. W3CRA.

COMPLETE 6 and 2 meter station. New RME 126 converter and Heath Seneca trans. Factory-wired; also Hammarlund 779 receiver. Make honorable offer. W1JYE, Westfield, Mass. 303 Southwick Rd.

SELLING Out: Collins 75A4 Serial 5213, HT-32, both in mint condx: $825.00. Joseph DiLiberti, K2IQZ, 206 Central Ave., Murray Hill, N.J.

2 KVA Variac wanted. Need swing of 0-280 volts. Write to WØAIH.

GETTING Out of Ham Radio. First reasonable offer takes NC-300, Ranger, other items. Walt Berry, WØYNL, 715 Division St., Webster City, Iowa.

MUST Sell: DX-100, $140; Mohawk, $225; Johnson Matchbox, $30; Heath reflected power meter, $10; Johnson lo-pass filter, $10; D-104 mike w/stand, $15. Or everything for $400, plus shipping. Warren Culpepper, K4LNQ, Andalusia, Ala. 119 McRainy Loop.

SELL: Viking II, Viking VFO, Viking Matchbox. Won't split up. Group price, $200. Trades considered. W8JKB, 2359 Woodford St., Toledo, Ohio.

GONSET 2-meter Communicator II, 6v/110v, xtals, mike, antennas, A-1 condition, complete, $135.00; Heath DX-20 used less 10 hours excellent, $30. W2NDP, 910 Smith St., Uniondale, L.I., N.Y. Tel. IVanhoe, 5-3190.

WANTED: Commercial or Surplus Aviation and Ground Transmitters, Receivers, Test Sets, 18S, 17L, 51R, 618S, GRC, PRC, ARN14, MN85, Bendix, Collins, Others—RITCO, Box 156, Annandale, Virginia

TECRAFT 2-meter converter, $30; Tecraft 2M transmitter, $44; Collins 310C1 VFO w/power supply, $75; RCA 21" color TV good condx, $200. Cash only. Will ship. Ray Bohnert, Medford, Wis.

WANTED: Millen 90881 RF Amp., price and condition. Frank Lewis, RR. 1, Harrod, Ohio.

WANTED: 4-1000A8s, BC221 or LM freq. meter, FM signal generator, audio signal generator, VTVM, and prerecorded stereo tapes. Have for sale, trade, Brush tape recorder cheap, Simpson 260 VOM, surplus 250TH, 6C21's, 4-125A's, several 304TL's, new 4E27A, and pair of new BC645's. W4BBL.

75A-4, Serial #4136. Hardly used. Must sell, $510. Tom Brunoski, 45 Ridge Ave., Passaic, N.J.

SELL B&W 5100B, in exc. condx: $395.00. K5RBA, 707 Jackson-Keller Rd., San Antonio, Texas.

LAMPKIN 205-A for sale, $190.00, guaranteed. Two surplus R.F. amplifiers. AM 18/APT, make offer. W3PVV, Box 63, Freeland, Penna.

CENTRAL Electronics 200-V, $595 for pick-up only. Ron Levine, K2JXB, 447 Rutherford Blvd., Clifton, N.J.

FOR Sale: E. F. Johnson vertical Matchstick antenna, complete with installation manual, in exc. condx, $60.00. Daniel Spinazzola, W3ZVA, 312 East Grant Ave., Altoona, Penna.

SURPLUS Sale QSTS November 1933 to July 1955, (four copies missing), nine earlier issues. Eleven years in QST binders. All 22½ years $50.00. Will throw in eight Handbooks 1941-50, plus 60 different CQs, 1947-1952. None sold separately. BC221Q frequency meter, $35.00. Unconverted prop pitch motors, $10; unused Wilcox F3 crystal controlled fixed frequency superhets, $20 each. Heathkit VTVM, $10; Heathkit oscilloscope and voltage calibrator, both $25. Everything working. 500-watt unused multi-match modulation transformer, $40. Also other unused transformers. Will deliver locally, otherwise FOB. Herbert Florance, W2IXQ, 196 Oak Ridge Rd., Hillsdale, N.J.

TRANSISTORIZED Mobile power supplies! 30 watts output, $49.50. Write Dick Tims, 3441 Feather Ave., Baldwin Park, Calif.

PE 103A (like new) with all cables, PE 104 (new), $25.00 for both. W1OKE, 109 Glenwood St., Lowell, Mass.

WILL Sell E-Z Way Tower, 55 ft., together with Telrex Tri-band beam and Ham-M rotor and all cables, or will trade on Gonset 76 or KWM-2. Joe Mullen, K4JKR, Cobbs Creek, Va. Mathews County. Tel. PArk 5-2155.

WANTED: A.C. Supply for KWM-1. State condition, serial and best price. Mike Rosenberg, W2FNF, 35 Strawberry Lane, Roslyn Heights, N.Y. Tel. MAyfair 1-4798.

PREMIUM Quality used equipment. Over 1,000 units. Reconditioned with trial plan and full 90 day guarantee. Terms available. Write for free lists and top trade-in offer on your present equipment. World Radio Laboratories, Box 919, Council Bluffs, Iowa.

FOR Sale: HRO-60C2 deluxe receiving installation including HRO-60R, rack, speaker, enclosed coil compartment, XCU-50-2 calibrator, A,B,C,D, AC coils. Extremely hot DX receiver in absolutely new condx. Best offer over $325.00 FOB. New RME DB-23, $35; new Dow-Key DK60-G2C relay; new Paco Z80 sig-tracer; Good used 4-1000A, $10. New Precision E-200C sig.-gen., $75. All F.o.b. W4LF.

WANTED: Collins mech. filter, 500 Kc. I.F., 3.1 or 2 Kc. F7BI Det. 2, 1141 Sq., APO 11, N.Y.

APACHE SB10. Sell in new condition. Leon Reckinger, 31-22 84th St., L.I. 70, N.Y.C. IL 7-3772.

COLLINS 75A-4 receiver, orig. owner selling with speaker, vernier tuning knob, 3.1 Kc filter. Serial #3653. In exc. condx, $550. Kenneth H. Engstrom, W5CUM, 833 Oak Forest Dr., Dallas 32, Texas.

KWM-1, DX Adaptor, AC supply, works perfectly, $550 or best offer. W2KOY, 1740 Front St., East Meadow, Li., N.Y.

SELL: Gonset G66B G77, Heathkit DX-100, Harvey-Wells TBS50D VFO dynamotor, G4ZU Minibeam and rotor, Signamax Pre-selector, QST 1957-60. K2SFI, 49 Clarkson Ave., Brooklyn, N.Y.

GLOBE Champion, Mod. 350, Mint condx. 350W—c.w., 275W—a.m. H. Webb, K2GKH, 125 Ocean Ave., Jersey City, N.J.

DX-100, perfect appearance and operation, $150; RME-4350A, crackle finish, 100 Kc calibrator, $145.00; Knight Span Master receiver kit, new, $20.00. Pair of new 4-250A's, trade for VHF gear. K7KYC, Gene Williams, 6902 E. Earll, Scottsdale, Arizona.

FOR Sale: KWS-1/75A-4, $1400; Gonset GSB-101, $275; B&W L-1001-A, with 2000V supply, $275.00; 75S-1, No. 2555, $375. James Craig, 72 E. Sixth, Peru, Ind. Tel. GR 3-9306.

COLLINS 75S-1. 5 hours use. Sacrifice at $450.00. Howard Dunlap, 108 Woodberry Lane, Marietta, Ga.

ELMAC 6-12 v. power supply v.g. condx, $25.00. Want 115 a.c. supply. Heath AR-3, cabinet, 6 mos., $30.00. Best offers considered. Tyma, Augustinian Seminary, Holland, Mich.

GLOBE Scout 680, complete with VFO and power supply, $65.00. Mosley Tri-band vertical, $12.00. K3EWK, 103 Stimson Place, Wilmington, Del. Phone SY 8-6518. Deliver within 30 miles.

G-E Generator output D.C. 115v—2A and 1200V—.167 Am. $40.00; G-E generator output DC 1500V, .257 am.—3000V—.4 am., $40. Both ball-bearing, in new condition. RCA model TDQ-2, m. trans with manual. Fb condition. $40.00. W11ZJ.

MUST Sell: Hallicrafters SX-101 receiver and Johnson Viking Ranger transmitter. Both in cherry condition. No scratches. First $500 takes both. P. L. Hildreth, 465 Leo Ave., Shreveport, La. Tel. 865-3962.

SALE! HQ180C w/spkr, $325.00; B&W 5100B, $225; 6-meter Communicator II, $119.00; LM10 freq. meter, mod. and cal. book, $49.00. F.ob., W3NCX, 1005 Wyoming, Allentown, Penna.

SELL Central Electronics 20-A with 458 VFO, $175.00; Viking Ranger, $150.00; BC-221, $40.00. Hays Sneed, W5RY, 4049 Berkley Drive, Jackson, Miss.

SALE Trade. Hallicrafters HT32-A, used less than six hours, no reasonable offer refused. Will take Collins 32V or Johnson Ranger in trade, teletype Model 26 with T.U., $100; Meissner signal shifter, $15; Gonset Super Six converter, $12.00; Gonset G-50 Communicator, $210. Will deliver within 150 miles. W3LSS, 58 W. Main St., North East, Penna.

TOROIDS: 88 mhy. with mounting hardware; uncased, like new. Information sheet included. $1.00 ea., 5/$4.00 postpaid. KCM, Box 88, Milwaukee 13, Wis.

FOR Sale: 4-1000A's, $30; 4-400A's, $20; 4-250A's, $15; 833A's, $12.50; 4-125A's, $7.50, also 3600-0-3600 at 1000 ma. plate transformer, $35.00. Peter W. Dahl, KØBIT, 5331 Oaklawn Ave., Minneapolis 24, Minn.

DRAKE 1-A receiver with crystal calibrator. Has late serial number and is in perfect condition. You'll never find one cleaner. Will pack and ship—$189.00. John M. Anderson, Winnebago, Minn.

HAVE RME VHF 126 and Globe Electronics Hibander. Will trade up to Collins SSB rig, or sell for $200. Hal Blough, W9SP, Forest Park, Ill.

NEW Condition Elmac AF-67 with manual, $99; never used mobile, W8GTT/1, 50 Warren Rd., Framingham, Mass.

CLEANING House. Excint condx. EICO 720, brand new, $70 Ameco Codepractic oscillator converted to monitor, $9.00. BC-683 tunable 26-42 Mc., with AC supply, $24. Will ship. Gil Kellersman, Stony Brook Rd., Darien, Conn.

COLLINS 30-I.1 in factory packing, has never been plugged in, $425.00; SX-71 in exc. condx, $135.00. 20% cash balance c.o.d. F.O.B. Kent. Burt Rotnem, W8CRO, 722 Allerton, Kent, Ohio.

KWM-1, Excint condx. Never used mobile, $495 or with 516-F1AC supply, $575. W4KLS, 1006 Seaway Drive, Ft. Pierce, Fla. Phone HO 1-4267.

VIKING II, Factory-wired, with added in push-to-talk GD-104 mike and stand, Heathkit VFO, includes manuals, 2 spare 807s, 2 spare 6146s, $199. Will demonstrate. Pick up at 61 Lawrence Ave., Malverne, N.Y. Tel. LY 9-3766. WA2KQL.

SELL Two Meter Link 60 watt base station, $60. W5BLZ.

WANTED: Mobile transmitter receiver. Must be in excint condx. W5OSA, 4011 Roanoke, Meridian, Miss.

HALLICRAFTERS, HT-32-A with 10-D mike, $525. Also Collins 75-S-1, $450. Both mint condx. W8RL, 903 High St., Bedford, Ohio.

SELL: HQ-160; 7205 S. Euclid, Chicago 49, Ill. Tel. FA 4-9174.

FOR Sale: PR-810s Final, 80 mtr. coils, no PS; Model FRA RTTY 20 tube conv.; ARC-5 3-4 Mc. exciter-regulated PS; 2 mtr. Bendix 19 tube MRT-9A Packset; 5" Knight General Purpose scope. All in exc. condx. Write. Lawyer, W2LBE, 45 Sturgis Rd., Bronxville, N.Y.

SELL: Two 4-250As new, never used, $30 each. Bob Littleton, K4YLS, Box 105, Lenoir City, Tenn.

SELL: Viking II and Johnson VFO. Reasonable. Wanted: HT-37 or HT-32A or 32S-1 with AC supply. State price and condx. Bennett, 23 Hampton Rd., Lynbrook, N.Y.

SELL: NC-173 receiver and matching speaker, gud condx, $55.00. Heath O-8 'scope, $15.00. W2HFM, 60 Lindgren, Merrick, L.I., N.Y.

SELL: Viking mobile transmitter; dynamotor, 12 v., antenna relay; carbon mike; instruction manual; good condx, $50.00. P. Block, 59 Hinchman Ave., Denville, N.J.

COLLINS 30S1 Linear perfect condx, less than 1 year. Complete with cables. Instruction Book, in original packing case, $1050.00. Will ship. WØLIL, 1863 De Soto, St. Paul 17, Minn.

JOHNSON Viking kilowatt, $650.00. W5FJR, 823 West Grant, Baton Rouge, La.

AUCTIONFEST. Ft. Lauderdale, Fla. Armory, SW 24th St. and 4th Ave. Saturday, March 10th. Doors open 8 A.M. Schmidt, W4NYK, Chairman, Broward Amateur Radio Club.

APACHE and SB-10 like new, $275.00. John Bagwell, Somerville, Tenn.

HAMMARLUND 170C, speaker, manual, original carton, in mint condx, $295.00; Globe Scout 680 and Glone 755A VFO, fine rig in fine condx, $95. Charles Catledge, Box 2542, State College, Miss.

CRYSTALS Airmailed: SSB, MARS, Novice, Net, CD, etc. Custom finished FT-243 .01% any kilocycle 3500 to 8600 $1.49. (10 or more same frequency, FT-243, 99¢) 1707 to 20.000 $1.95. 20.001 to 30.000 $2.25. Overtones above 10 mc. Add 50¢ each for .005%. Add 65¢ for HC-6/u hermetics. QST projects—FT-243 crystals—"SSB Package" five mixer $9.95, seven matched filter $7.95. October 1961 "Sectionalized Receiver" including 390 kc. $9.95—also other project crystals and sets. Be specific, write. Airmailing 9¢/ crystal, surface 5¢. Crystals since 1933. C-W Crystals Box 2065-Q, El Monte, California.

CLEANING House: GSB-101, $250; Drake 1A, $175; Drake Q multiplier, $17.50; Hammarlund HC 10 SSB Converter, $75.00; Super-Pro BC-779 rcvr w/PS, $65.00; ARR15 rcvr, $35; ARR7 rcvr, $50; Gonset Bowtie, 20m, $25.00; TriBand Hy-Gain 3-el., unopened carton, $50.00; Meissner Ex Sig, shttr, $25.00; xfrmrs 4600vct 350 Ma., $15.00; 5000V ct 500 Ma., $25.00; 6200VCT, 700 Ma., $40.00; 3041H, $10; 450TL, $15; 4X250B, $20 all new. W.F.R., 2903 Yearling St., Lakewood, Calif.

GLOBE CHIEF 90A, $35.00. K8UUX, 729 Allerton St., Kent, Ohio.

SELL: New Viking II, factory-wired in factory-sealed carton, $225.00 or best offer. Harold Miglin, WA2SED, 18 Windy Bush Lane, Sparta, N.J.

SALE: Viking II with VFO, $170; Gonset Communicator, $120; Harvey-Wells Z Match, $60; National 1" oscilloscope, $18, excint condx. W2DCQ, 208 Phillips Ave., Trenton, N.J.

SX-101A/R-48 speaktr, late nunber, very excellent condition. Both $335. "Ric" WA2SSQ, N.Y.C. BO 1-7614.

WANT Copy of January 1947 Electronics Magazine. Will pay $1.00. Lonnie Utt, W4JNH., Cana, Va.

399C-1 Collins PTO and speaker for KWM2, trade for receiver or make offer. WØNHP, R. E. Mann, 7205 Center Drive, Des Moines 12, Iowa.

SWL Letters, $1.00 per 100. Martin, 828 Schuykill Ave., Reading, Penna.

WANTED: Good clean Hammarlund SP-600 receiver, standard model. Give full details and lowest cash price. W5AMK, Box 31, Temple, Texas.

WANTED: Hycon Model 2215KB. W3GHS.

SELL: One complete KW AM1000, CW1000, SSB2000 P.E.P. station. Most is new 10 through 80. TVI suppressed. May operate to your satisfaction before purchasing. Consisting of HT32A KW amplifier. Pair 4-400 final custom professionally built, power supply cables, etc. One Harvey-Wells Z Match antenna coupler dummy load, Johnson filter, Dow relay, parts and components finest. All above installed in 6 ft. rack. All easily removed. Rack on casters. Also new HJ-180. Full new guarantee. New Telrex rotator and indicator. TC99 Telrex Triband antenna. Many extras. Best offer accepted. WA2LYT, 122 South St., Freehold, N.J.

SELL: HQ-129X w/spkr, Millen Preselector with 4 plug-in coils. All in excellent condition. $120.00. Harvey Stein, 1532 Marine Parkway, Brooklyn. Tel. CL 2-6320.

NEW HRO-50 coils with scales 50-430 Kc., $80, 27-30 Mc., $25. W2ORG, 223 Grimsby, Buffalo, N.Y.

SELL: SX-99 clean ,unmodified, $90. Will not ship, sry. Pick up. R. Doherty, W1GDB/4, Apt. T-205 Tyler Bldg., Arlington Towers, Arlington 9, Va.

WANTED: Hi-voltage transformer for Globe King 500C. WRL part number 1201-006A. Write immediately. Am off air. Henry Galbraith, 1214 South Alvord Blvd., Evansville 14, Ind.

HT32B, like new, with crystals, used only few hours and kept in protected console. Perfect condition, highest offer. Also have SX-101/III and tube T.O. keyer. Same situation as above. W3FBT, Jay L. Davis, 1326 Markley St., Norristown, Penna.

FOR Sale: In perfect condition, all changes to date made; Collins equipment, KWS1, $925.00; KWM1 with speaker and power supply, $550.00; KWM1 mobile mount, unused, $40.00; new 12VDC mobile power supply 516E1, $175; Hallicrafters SX62A, $250.00. W2GFY, 8610-34 Ave., Jackon Heights 72, New York.

SELL: G76 transceiver $300; AC supply, $90; DC supply, $90; Valiant, $300; Thunderbolt, $325.00; B&W TR switch, $10; Eldico EE3A key, $30; HQ100 timer, $100; DB23 Preselector, $25; Lafayette AF-35, $45.00. Transceiver/6V supply, A. Knopf, W2OSU, 67-54, 171 St., Flushing 65, L.I., N.Y. Tel. HI 5-0003 evenings.

GONSET G-76 transceiver with a.c. pwr. supply and xtal calibrator, used about 10 hrs. $400.00; 3 transistor mobile pwr. supplies, all 12 vdc in. 600 and 300VDC, outp. at 200 ma., $30; 500 & 250 VDC outp. at 250 Ma. $35.00; 450 & 225 VDC outp. at 150 Ma., $25.00; Tubes: 7094, $11 ea.; 100TH, $8 each; 4E27, $7 ea.; 6146, $2.50 ea.; 6883, $2.50 ea.; UTC choke #74, $6.00; two Sprague CR101 10 mfd. 1000 VDC capacitors, $5.00 ea.; SW54 Natl. rcgr, $30. G. Williams, WA2FKZ, 64 Prospect Ave., Apt. B-3, Hackensack, N.J.

GIVING DX-40 xmtr., $45. Ronnie Myers, Wisconsin Academy, Columbus, Wis.

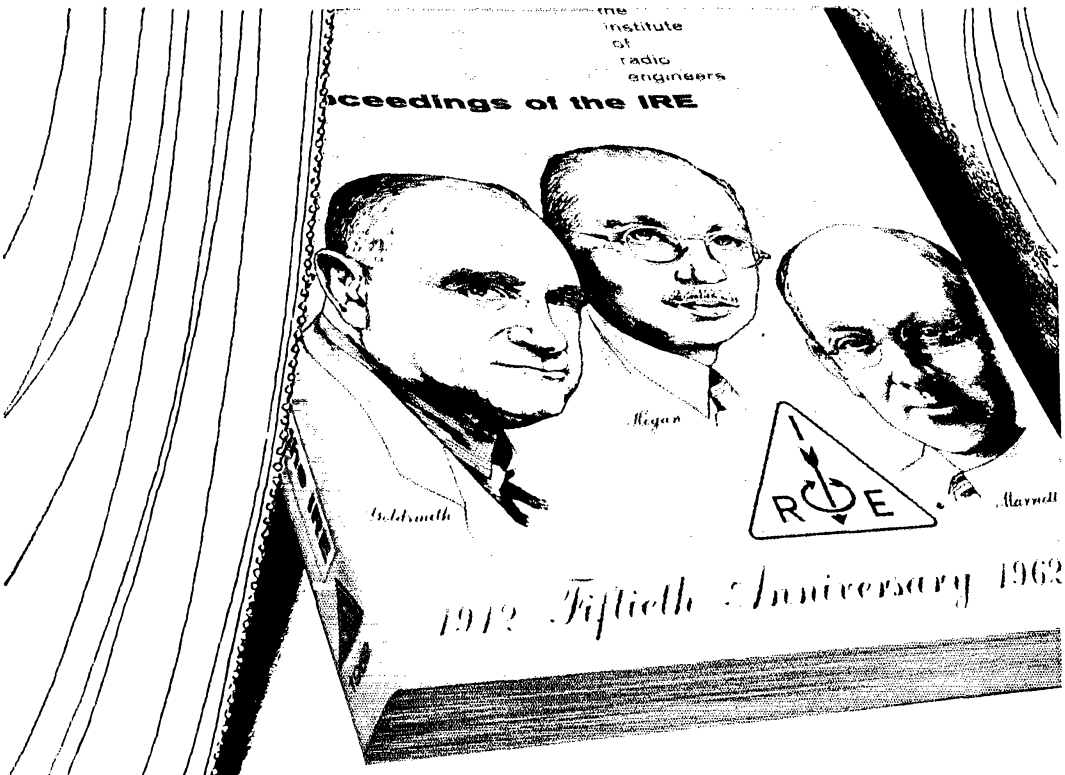
SACRIFICE: Collins 75A4, B&W 5100B and matching SSB generator. Write. All letters answered. Might take smaller rig in trade. Gerald Skeen, Box 8, Ripley, W. Va.

A-1 reconditioned equipment. On approval. Trades. Terms. Hallicrafters S-85 $79.00, SX-99 $99.00, SX-100 $199.00, SX-111 $199.00, SX-101A $299.00, HT-32, HT-37; Hammarlund HQ-100 $129.00, HQ-110 $179.00, HQ-150 $199.00, HQ-160 $229.00, HQ-170 $289.00; National NC-183D $199.00, HRO-60 $345.00; Gonset G-50 $229.00; Central 20A $149.00, Viking II $159.00, Valiant $279.00, Thunderbolt linear $299.00. Collins 75S-1, 32S-1, 32V-1, 32V-3, 75A-4, KWM-2; Elmac, Globe, Gonset, Heath, Johnson, RME, other items. List free. Henry Radio Company, Butler, Missouri

DX-100, A1-OK. $150.00. Ship exp.-collect, also tubes, meters, xfrmrs, stamp for list. W2QND, 176 Winding Way So., Little Silver, N.J.

SELL: HRO60, in excint condx. Coils 80-40-20-15-10 xtal calibrator. Speaker. Will ship Prepaid $375.00. W8NBK, Rte. 1, Dennison, Ohio.

Index of Advertisers



FROM THE WORLD'S GREAT ELECTRONICS EXPERTS,
A REFERENCE WORK YOU WILL TREASURE ALWAYS

GOLDEN ANNIVERSARY

ISSUE OF **Proceedings**

In honor of the IRE's 50th anniversary, the May 1962 issue of *Proceedings of the IRE* will survey the progress of electronics from 1912 to 1962. It will forecast the future of electronics for the next 50 years. And this special issue of *Proceedings* will have more than 600 pages of additional editorial text, discussing developments in

Nuclear Science	Electronic Computers	Antennas and Propagation
Circuit Theory	Automatic Control	Broadcast and Television Receivers
Broadcasting	Vehicular Communications	Product Engineering and Production
Education	Communications Systems	Reliability and Quality Control
Audio	Engineering Management	Radio Frequency Interference
Instrumentation	Industrial Electronics	Space Electronics & Telemetry
Electron Devices	Bio-Medical Electronics	Microwave Theory and Techniques
Components Parts	Ultrasonics Engineering	Human Factors in Electronics
Information Theory	Military Electronics	Aerospace & Navigational Electronics

Reserved for IRE Members only!

Electronics experts from all over the world contribute to make this anniversary issue concise yet all-inclusive. 100,000 copies will be printed. Only members of the IRE, in good standing in May 1962, and subscribers will receive a copy. We regret that unlike special issues of the past, no copies can be made available to non-members, or for single copy sales. As a member of the IRE you will find the May anniversary issue of *Proceedings* the master reference work you will treasure always.

The Institute of Radio Engineers • 1 East 79th St., New York 21, LE 5-5100

ONLY AT **ALLIED**

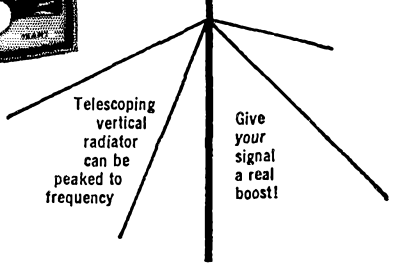
once-in-a-lifetime 6-METER BUY!

BONUS PACKAGE DEAL!

LINCOLN TRANSCEIVER
COMPLETE WITH
HY-GAIN GP-2C ANTENNA

COMMERCIAL GRADE FIXED STATION GROUND PLANE ANTENNA

BOTH FOR ONLY
$74.40
NO MONEY DOWN



Order your Lincoln Transceiver complete with the famous Hy-Gain GP-2C commercial grade fixed station ground plane antenna, regularly sold at $21.90—get the combination—get top 6-meter action—and SAVE!

20 SX 351-2. Complete Lincoln 6-Meter Transceiver with Hy-Gain GP-2C Antenna. *No Money Down. Only*.....**$74.40**

ALLIED's own

LINCOLN
6-METER TRANSCEIVER

SUPER-VALUE ONLY

$57.50

NO MONEY DOWN

GET THE MOST FOR YOUR MONEY

- **Vernier Tuning Superhet Receiver Covers Entire 6-Meter Band, 50-54 mc**
- **Adjustable Noise Limiter**
- **Front-Panel Crystal Socket**
- **7 Watts Input—6CX8 Final**

Join the gang—get in on the 6-meter fun with this Allied special! It's *complete*—all set to go, with built-in 115-volt AC supply, 50.2-mc crystal and crystal mike—tops in value for 6-meter work. Vernier tuning, 50-54 mc; built-in TVI filter; tunable output network matches any 30-100 ohm antenna (see money-saving combination at right); uses 3rd-overtone crystals for front-panel plug-in; neon modulation indicator. Tubes: 6U8A RF amp/mixer; 6U8A osc/IF; 6AL5 det/ANL; 6CX8 xtal osc/RF output; 12AX5 AF/mike amp; 6V6GT AF output/mod. Handsome cabinet, 5½ x 16¼ x 6⅜". 6 and 12 volt DC supplies available (listed below). Shpg. wt., 11 lbs.

78 SZ 195S. *No Money Down.* NET.....**$57.50**

12-Volt Power Supply. 2⅜ x 5⅜ x 4¾". 4 lbs.

78 S 163. NET.....**$10.95**

6-Volt Power Supply. 2⅜ x 5⅜ x 4¾". 4 lbs.

78 S 164. NET.....**$10.95**

order from **ALLIED RADIO**

Get Every Buying Advantage at ALLIED!

- **Largest stocks for same-day shipment**
- **Highest trades • Top reconditioned gear buys**
- **No money down credit plan—bigger buying power**
- **Ham-to-ham service you'll like in every way**

6-METER BONANZA

ALLIED RADIO, Dept. 15-B2
100 N. Western Ave., Chicago 80, Ill.

Ship me the following:

☐ 20 SX 351-2 Lincoln Transceiver with Hy-Gain Antenna
☐ 78 SZ 195S Lincoln 6-Meter Transceiver
☐ 78 S 163 12-Volt Power Supply
☐ 78 S 164 6-Volt Power Supply
$.....enclosed

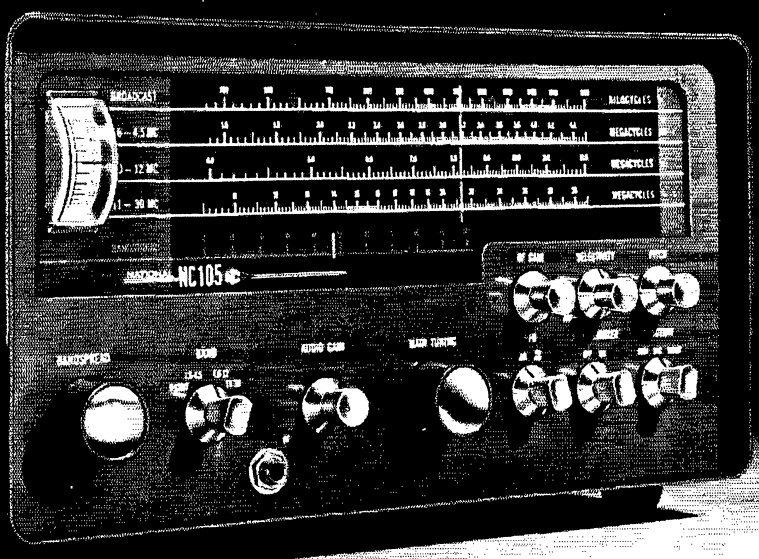
☐ Send Free 1962 Allied Catalog

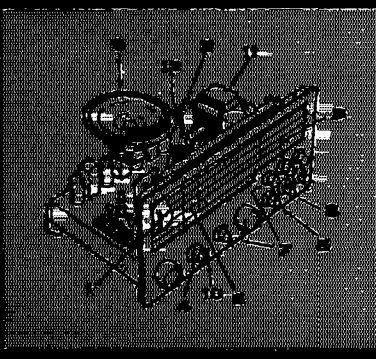
Name_____
PLEASE PRINT

Address_____

City_____ Zone____ State_____

National's new, low-priced NC-105





1 Large illuminated edge reading "S" meter operates on all modes
2 Exclusive National peaking Q multiplier works on CW as well as AM
3 Separate product detector/BFO for CW and SSB reception
4 Continuous coverage from 550 KC to 30 MC in four bands
5 Automatic gain control operates for all modes of reception including CW and SSB
6 Bandspread calibration charts included for all popular amateur and foreign broadcast bands.
7 Separate RF and audio gain controls
8 Famous distortion-free National noise limiter
9 Built-in 5" speaker
10 Front panel headphone jack
11 Full wave transformer power supply
12 Exclusive tuner output

All the Features You Want and Need!

Very few beginners want to invest two or three hundred dollars in a first receiver. The choice has always been to spend either that much, or compromise on second-hand or inadequate equipment. Now, National gives you a new and better choice — a feature-packed, top quality receiver at only $119.95!

Look over the chart at the right. Have you ever seen so many advanced features at such a remarkable price? These are features the novice wants and needs. For example... exclusive National Q multiplier circuitry operates on CW as well as AM . . . where it's really needed. There are separate RF and audio gain controls. AGC works in all modes of operation!

Only National, with 47 years experience in the specialized design and manufacture of fine quality receivers could bring you gear like the new NC-105. If you are looking for an exceptional receiver at a modest price, ask your dealer for a demonstration. $119.95 in functional steel cabinet.*

Also available at $139.95 in hand-rubbed oiled walnut for living room or den.*

National Radio Company, Inc.
Melrose 76, Mass.
A Wholly Owned Subsidiary of National Company, Inc.
Q-02
Export: Ad Auriema Inc., 85 Broad St., N. Y. C.
Canada: Tri-Tel Assoc. Ltd., 81 Sheppard Ave. W., Willowdale, Ontario

Rush me complete details on your new NC-105

Name.....

Address.....

City.....State.....

*Slightly higher west of Rockies and outside U.S.A.

designed specifically for the novice!

HAM TIPS

NUVISTOR PREAMPLIFIER

For Amateur Receivers

MORE RECEIVER "PEP"—RCA NUVISTOR PREAMPLIFIER DELIVERS 25-35 db GAIN

RCA nuvistors in amateur receiver gear provide outstanding performance. The unique capabilities of these tiny triodes have been proved again—in a preamplifier that can add 25 to 35 db gain ahead of the receiver on the 10- and 15-meter bands, and 15 to 20 db gain on the 6-meter band.

Described in the September, 1961, issue of RCA Ham Tips, the preamplifier uses a pair of RCA-6CW4 high-mu nuvistor triodes in a TV-tuner type rf-amplifier circuit.

Get your copy of this special nuvistor issue of RCA Ham Tips today from your RCA Industrial Tube Distributor, or write to RCA Commercial Engineering Dept. B-37-M, RCA Electron Tube Division, Harrison, N. J.

The Most Trusted Name in Electronics