

QST

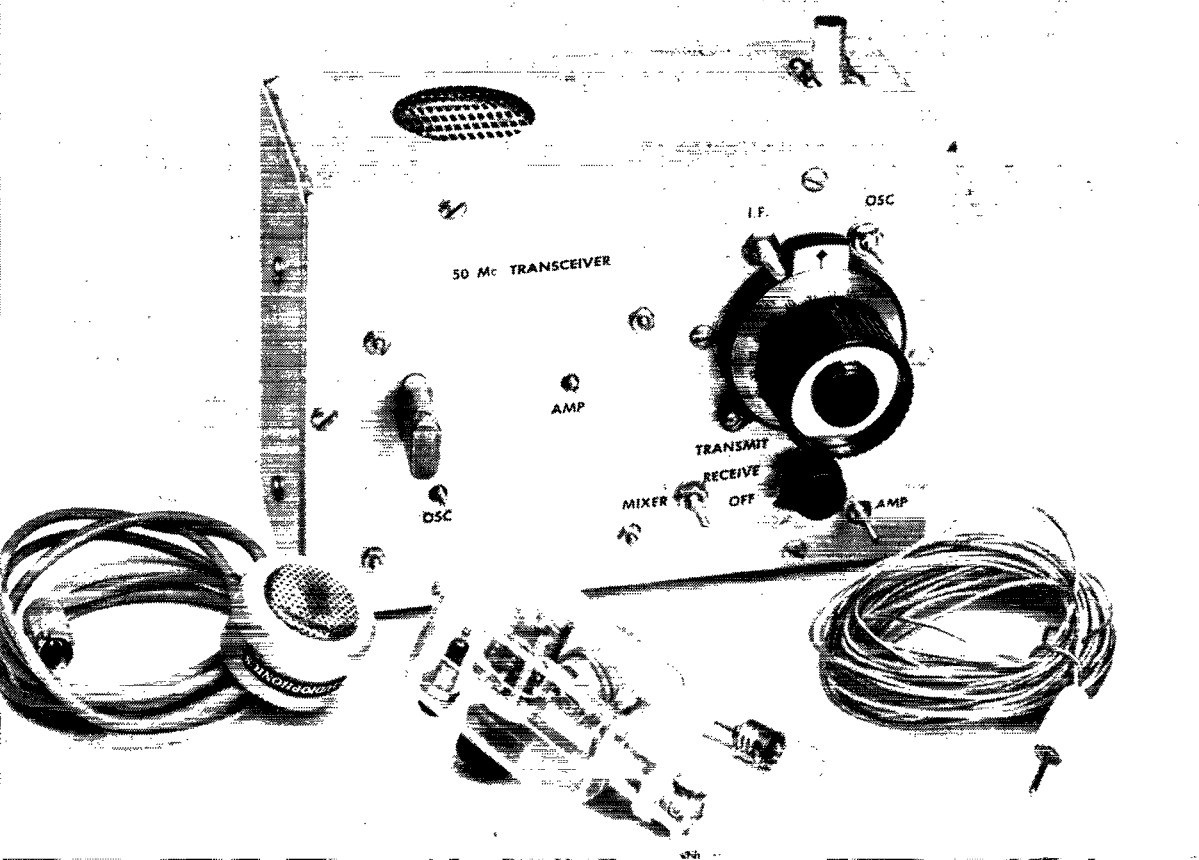
50th

Anniversary

devoted entirely to

amateur

radio





OUNCER™

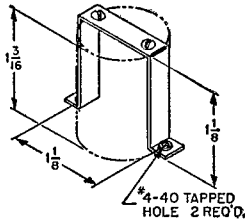
AUDIO TRANSFORMERS & INDUCTORS FOR TRANSISTOR & TUBE APPLICATIONS

"O" Series



**STANDARD
OUNCER**

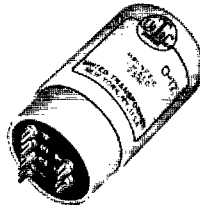
Dia. 7/16"
Ht. 1 3/16"
Term proj. 1/32"
Mfg. 1 1/8"
Scr. 2-56
Wt. 1 oz.



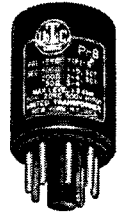
O-BR

Ouncer chassis
mount bracket

"P" Series



Hipermalloy Shield
shown fitting
over ouncer unit



**PLUG-IN
OUNCER**

Dia. 1 1/2"
Ht. 1 1/2"
Skt. St. Oct.
Wt. 2 oz.

IDEAL FOR HAM, PORTABLE BROADCAST,
HIGH FIDELITY, CONCEALED SERVICE,
HEARING AID AND SIMILAR APPLICATIONS

For over thirty years UTC engineering and production talent has lead the industry in the development of high quality transformers, inductors, electric wave filters, magamps and high Q coils.

The UTC OUNCER series pioneered a breakthrough in the reduction of size and weight. "O" series units are fully impregnated and sealed in drawn aluminum cases. Highest quality characteristics are inherent in the conservative design. Frequency response from 30 to 20,000 cycles within ± 1 db. A hipermalloy shield providing 25 db is available.

Plug-In "P" series OUNCERS are identical to the "O" series but are sealed in bakelite housings of submersion proof design, with plug-in base to fit standard octal socket.

IMMEDIATE DELIVERY

From Stock

OUNCER TYPES	Pri Imp Range, Ohms	Sec Imp Range, Ohms	Level Range, mw
INPUT & MIXING TRANSFORMERS	From 7.5 to 50,000	From 50 to 1/2 megohm	From 6.3 to 30
INTERSTAGE TRANSFORMERS	From 25 to 100,000	From 10 to 1 megohm	From 6.3 to 1 watt
OUTPUT TRANSFORMERS	From 4 to 30,000	From 3.2 to 600	From 6.3 to 1 watt
INDUCTORS	From .25 hy to 300 hys		

Write for latest catalog of over 1,200 STOCK ITEMS with UTC high reliability

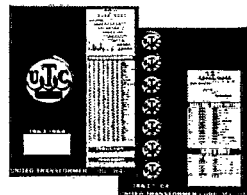
UNITED TRANSFORMER CORP.

150 VARICK STREET, NEW YORK 13, N. Y.

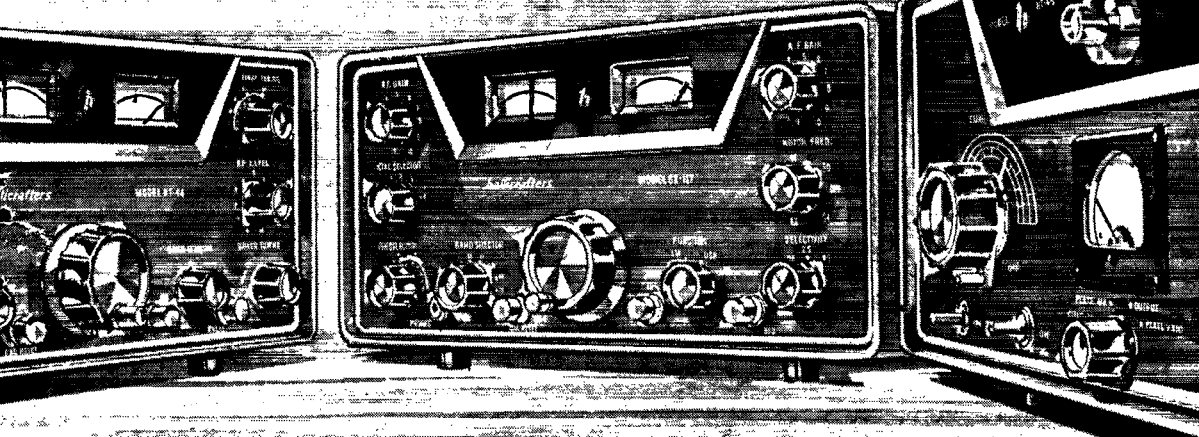
PACIFIC MFG. DIVISION: 3630 EASTHAM DRIVE, CULVER CITY, CALIF.

EXPORT DIVISION: 13 EAST 40th STREET, NEW YORK 16, N. Y.

CABLE: "ARLAB"

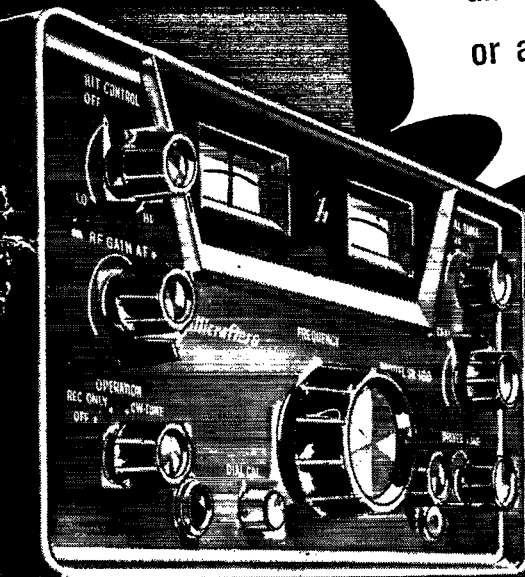


Got a hot idea?

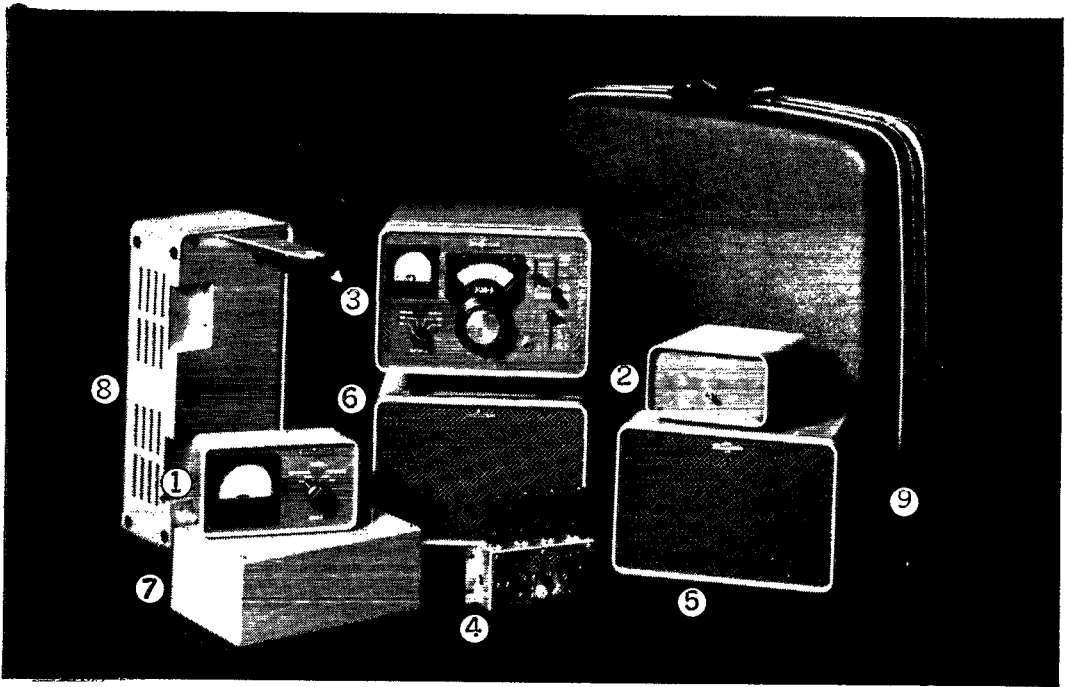


*Your new idea for contributing
to amateur radio may win a
COMPLETE, DELUXE HAM STATION ...
an HA-8 SPLATTER GUARD ...
or an SR-160 TRANSCEIVER!*

for complete details, turn the page ...



Improve your rig with these Collins accessories



1. 302C-3 Directional Wattmeter—For fixed or mobile applications. Measures forward and reflected power on 200- and 2000-watt scales accurately (3.4 to 30.0 mc) without calibrating adjustments.

2. DL-1 Dummy Load—A 100-watt resistive load for all HF frequencies. Connects permanently in antenna coax line, with in-out relay switching. Provides easy comparison of antenna SWR and nonband interference tune-up. Type N and RCA antenna connectors are provided.

3. 312B-5 Speaker Console and External PTO—For use with KWM-2 in fixed station operation. Provides limited separation of receive and transmit frequencies, speaker, directional wattmeter, and switching for functional control system.

4. 136B-2 Noise Blanker—For use with KWM-2 in mobile operation. Effectively reduces impulse-type noise in the transceiver. Requires separate antenna resonance at 40 mc.

5. 312B-3 Speaker—Contains a 5" x 7" speaker and connecting cable. Styled to match S/Line and KWM-2.

6. 516F-2 AC Power Supply—Operates from 115 v ac, 50-60 cps. Provides all voltage for 32S-3 and KWM-2.

7. MP-1 Mobile Power Supply—Transistorized inverter powered from a 12 v dc automobile, aircraft or boat storage battery to the voltages required for operating the KWM-1, KWM-2 or KWM-2A.

8. PM-2 Portable Power Supply—Compact, lightweight and supplies all voltages needed for KWM-2. Operates from either 115 v ac or 220 v ac at 50-400 cps to give you a completely portable SSB station. An auxiliary speaker is included.

9. CC-2 Carrying Case—Specially designed Samsonite Silhouette case for KWM-2/PM-2 or 30L-1. Molded Royalite interior protects equipment against rough handling. Also available in model CC-3 for accessories.

These are just a few of the Collins accessories which can help you improve your rig. There are many more... mounts, microphones and adapters, to mention a few. Ask your authorized Collins distributor to demonstrate the advantages of Collins accessories. A new Collins book, *Amateur Single Sideband*, will be an invaluable addition to any ham's library.



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

STAFF

JOHN HUNTOON, WILVQ
Editor

RICHARD L. BALDWIN, WIKE
Managing Editor

E. LAIRD CAMPBELL, W1CUT
Assistant Managing Editor

GEORGE GRAMMER, W1DF
Technical Editor

DONALD H. MIX, W1TS
BYRON GOODMAN, W1DX
Assistant Technical Editors

EDWARD P. TILTON, W1HDQ
V.H.F. Editor

LEWIS G. MCCOY, W1ICP
E. LAIRD CAMPBELL, W1CUT
DOUGLAS A. BLAKESLEE, W1KLK
Technical Assistants

ROD NEWKIRK, W9BRD
SAM HARRIS, W1FZJ
HELEN HARRIS, W1HOY
JEAN PEACOR, K1HV
JOHN TROSTER, W6ISQ
Contributing Editors

LORENTZ A. MORROW, W1VG
Advertising Manager

EDGAR D. COLLINS
Advertising Assistant

DAVID H. HOUGHTON
Circulation Manager

J. A. MOSKEY, W1MY
Assistant Circulation Manager

OFFICES

225 Main Street
Newington, Connecticut 06111
TEL.: 666-1541
Area Code 203

Subscription rate in United States and Possessions, \$5.00 per year, postpaid; \$5.25 in 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.

Copyright 1964 by the American Radio Relay League, Inc. Title registered at U.S. Patent Office. International copyright secured. All rights reserved. *Quedan reservados todos los derechos* Printed in U.S.A.

INDEXED BY

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

—CONTENTS—

TECHNICAL —

Balanced Modulators for V.H.F. and U.H.F. Sideband <i>J. V. O'Hern, W2WZR and T. L. Sly, K2QCX</i>	11
Updating the I-177 Surplus Tube Tester <i>W. T. Bradley, K4YPY</i>	21
Featherweight Portable Station for 50 Mc. <i>E. P. Tilton, W1HDQ</i>	24
Flagpole Without a Flag..... <i>N. H. Davidson, K5JVF</i>	36
A Tuner and Dual I.F. System for an Amateur-Band Receiver..... <i>D. W. Baker, W2MUH</i>	40
Cleaner Break-In With the 32S-3. <i>D. P. Shafer, W4AX</i>	46
Accuracy of S.W.R. Measurements..... <i>J. Hall, K1PLP</i>	50
Technical Topic: Transistor Voltage Limitations.....	31
Recent Equipment: Heathkit HamScan Panoramic Adapter, Model HO-13	54

BEGINNER AND NOVICE —

An Indicating Wavemeter.... <i>Lewis G. McCoy, W1ICP</i>	18
--	----

OPERATING —

Announcing the 31st ARRL Sweepstakes.....	16
Some Fine Points in Message Handling — Part II <i>George Hart, W1NJM</i>	32
Standards for EC Appointment.....	62

GENERAL —

Commemorative Stamp for Radio Amateurs.....	10
Do It and Rue It..... <i>Robert Weinstein, K4KXR</i>	44
Hammanship..... <i>John Troster, W6ISQ</i>	48

FIFTY YEARS OF A.R.R.L. —

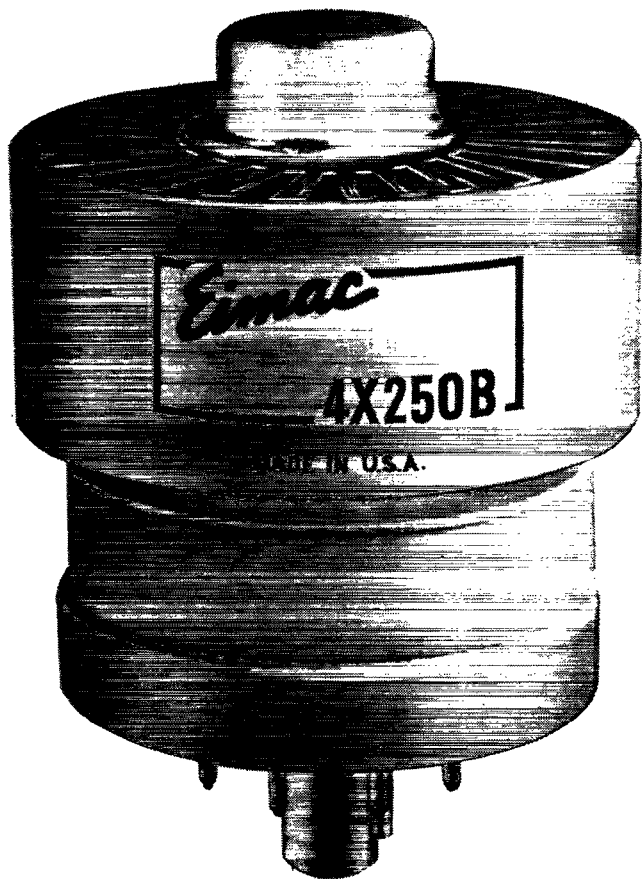
ARRL, 1954-1959 — Growth and Stability.....	65
Operating in the Late 50s.....	68
Emergency Communications.....	70
Technical Progress.....	71
Stabilization.....	73

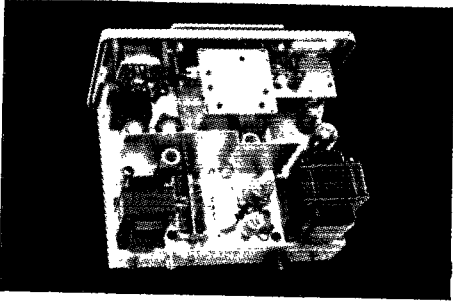
ARPS.....	62	New Books.....	15
ARRL QSL Bureau.....	162	Operating News.....	83
Coming Conventions.....	10	Our Cover.....	24
Correspondence From Members	82	Silent Keys.....	160
Hamfest Calendar.....	35	Station Activities.....	88
Happenings of the Month.....	56	World Above 50 Mc.....	75
How's DX?.....	77	YL News and Views.....	60
Index to Advertisers.....	172	25 Years Ago in QST.....	49
"It Seems to Us".....	9		

EIMAC

**4X250B tetrode
chalks up 20,000
hours—and is
still going strong!**

Back in 1960 an original-design Eimac 4X250B tetrode was placed in operation in a UHF communications system belonging to the County of San Mateo, California. 20,000 operating hours later—February, 1964—it was removed by San Mateo Chief Radio Engineer Walter Harrington, W6MX, for test and evaluation. Returned to the Eimac laboratory, this 4X250B tetrode passed acceptance tests with flying colors—within specification in all respects and equivalent in performance to a brand new production tube! This is another example of the way Eimac designs quality tubes for power, dependability, long life. For data on Eimac original-design tetrodes to meet your needs write: Amateur Service Dept., Eitel-McCullough, Inc., San Carlos, Calif.





Some may call it "ancient modulation", some simply call it AM phone—but whatever you call it, AM still represents a major portion of today's amateur activity—and the "Ranger II" is one of today's most popular AM rigs! For AM or CW operation, for 160 through 6 meters—the "Ranger II" offers the "biggest-little" 75 watts you'll find on the air! Rated at 75 watts CW and 65 watts high-level AM, the "Ranger II" delivers communications quality audio with the necessary punch to break through today's QRM! An excellent "first" transmitter for the Novice or the new General, the "Ranger II" will drive any of the popular kilowatt level tubes and will provide a high quality speech driver system for high powered modulators without modification! What else? The "Ranger II" offers attractive styling in a compact cabinet and is available at a reasonable price.

Cat. No. 240-162-1... "Ranger II" Kit ... Net \$249.50
 Cat. No. 240-162-2... "Ranger II" Wired Net \$359.50

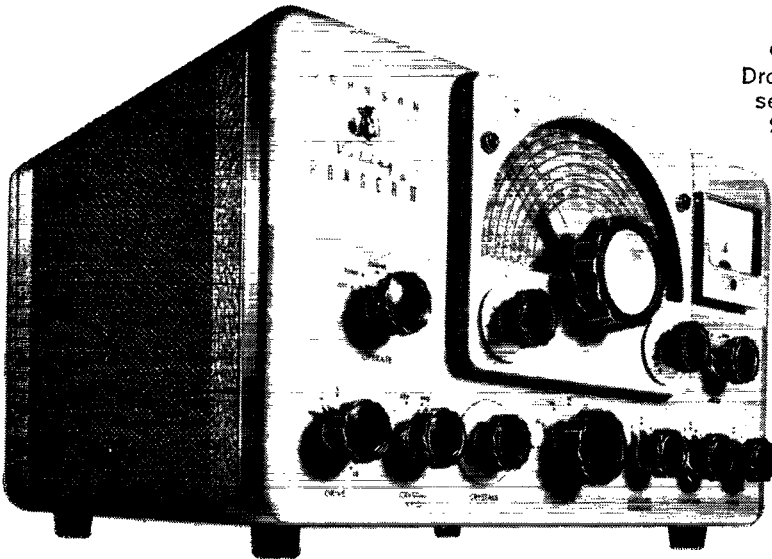
FEATURES

Built-in temperature compensated, extremely stable VFO—separate, calibrated bandspread dial scales for all 7 bands—highly efficient pi-network tank circuit—flexible, timed sequence keying system—self-contained power supplies—effectively TVI suppressed!

EASY TUNING

Basic tuning controls are located on the VFO dial escutcheon—QSY within the phone or CW portion of a band is usually possible by merely changing the VFO frequency setting.

RANGER II



COMPLETE CATALOG

Drop us a card and we will send you Amateur Catalog 962 which gives the full "Ranger II" story, as well as detailed information on our complete line of amateur transmitters and accessories.



E. F. JOHNSON COMPANY
 WASECA, MINNESOTA, U. S. A.

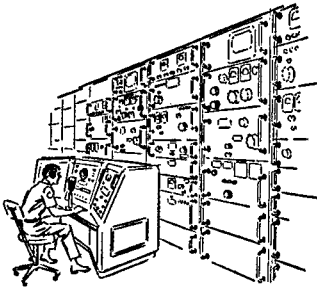
Section Communications Managers of the ARRL Communications Department

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 SCAM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCAMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCAMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

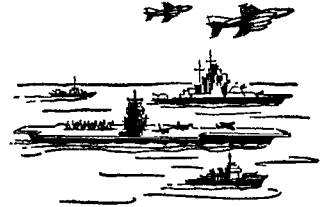
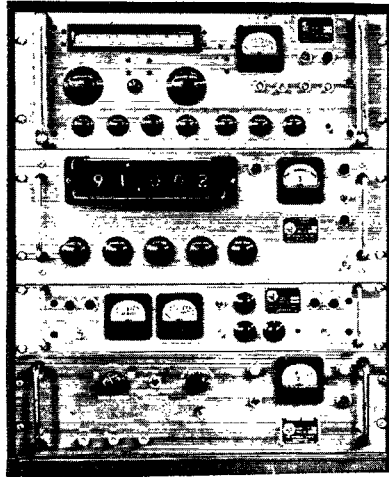
ATLANTIC DIVISION			
Delaware	K3CKF	M. F. Nelson	505 Milltown Rd.
Eastern Pennsylvania	W3ZRQ	Allen R. Brelner	212 Ruce St.
Maryland-D. C.	W3JZY	Andrew H. Abraham	RFD 1
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.
Western New York	K2HUK	Charles T. Hansen	211 Rosemount Drive
Western Pennsylvania	W3GJY	John F. Wojtkiewicz	1400 Chaplin St.
CENTRAL DIVISION			
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.
Indiana	W9YXX	Ernest L. Nichols	RFD 7
Wisconsin	K9GSC	Kenneth A. Ebnetter	822 Wauona Trail
DAKOTA DIVISION			
Minnesota	W0OPX	Mrs. Helen Meidrich	Route 3
North Dakota	W0HVA	Harold A. Wengel	805-3rd St., S. W.
South Dakota	W0RRN	J. W. Sikorski	1900 S. Menio Ave.
DELTA DIVISION			
Arkansas	W5DTR	Curtis R. Williams	Route 3, Box 230
Louisiana	W5FMP	J. Allen Swanson, Jr.	RFD 1, Box 354-E
Mississippi	W5EMM	S. H. Hairston	2321-27th Ave.
Tennessee	W4UVP	William Scott	115 East Holston Ave.
GREAT LAKES DIVISION			
Kentucky	K4QIO	Mrs. Patricia C. Shafer	732 Greenridge Lane
Michigan	W8FX	Ralph P. Thureau	27209 W. Six Mile Road
Ohio	W8AL	Wilson E. Weckel	1317 Logan Ave., N.W.
HUDSON DIVISION			
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive
N. Y. C. & Long Island	K2IDB	Blaire S. Johnson	268 Cypress St.
Northern New Jersey	W2CVW	Edward F. Erickson	13 Robert Circle
MIDWEST DIVISION			
Iowa	W0NTB	Dennis Burke	1418 Douglas Ave.
Kansas	W0AIA	C. LeJand Cheney	8114 Levitt Dr.
Missouri	W0TPK	Alfred E. Schwanecke	Edgar Star Rte
Nebraska	W0GGP	Frank Allen	Box 272
NEW ENGLAND DIVISION			
Connecticut	W1FHP	Robert J. O'Neill	Hard Hill Road
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.
Maine	K1DYG	Herbert A. Davis	Lakes Ln.
New Hampshire	W1RHI	Albert F. Haworth	20 Plummer Rd. (Bedford)
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.
Vermont	K1MPN	E. Reginald Murray	3 Hillcrest Drive
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.
NORTHWESTERN DIVISION			
Alaska	KL7BZO	Kenneth E. Koester	2005 Sunrise Dr.
Idaho	K7HLR	Raymond V. Evans	Route 3.
Montana	W7TYN	Joseph A. D'Arcy	1119 East 5th Ave.
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave.
Washington	W7PGY	Robert B. Thurston	7700-31st Ave., N.E.
PACIFIC DIVISION			
East Bay	K6LRN	Richard Wilson	107 Cordova Way
Hawaii	KH6BZF	Lee B. Wical	45-601 Luluku Rd.
Nevada	W7BPV	Leonard M. Norman	622 Utah St.
Sacramento Valley	W6BTY	George R. Hudson	2209 Meer Way
San Francisco	W6OPL	Fred Laubscher	655 Wakerobin Lane
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.
Santa Clara Valley	W6ZRJ	Jean A. Gmein	10835 Willowbrook Way
ROANOKE DIVISION			
North Carolina	W4BNU	Barnett S. Dodd	420 West Franklin St.
South Carolina	W4PED	Charles N. Wright	711 Merriweather Dr.
Virginia	W4QDY	Robert L. Folmar	1057 Dune St.
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane
ROCKY MOUNTAIN DIVISION			
Colorado	K0TTB	Donald Ray Crumpton	P.O. Box 223
New Mexico	K51QL	Newell Frank Greene	P.O. Box 406
Utah	W7MWR/W7OAD	Marvin C. Zitting	P.O. Box 1813
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.
SOUTHEASTERN DIVISION			
Alabama	K4KJD	William S. Crafts	Route 3, Box 233
Canal Zone	K2ZTD	Thomas B. DeMeis	P.O. Box 1111
Eastern Florida	W4GJI	Guernsey Curran	P.O. Box 48
Georgia	W4EZL	Howard I. Schouher	P.O. 1502
West Indies (P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Liovet
Western Florida	W4RKII	Frank M. Butler, Jr.	494 Elliott Rd.
SOUTHWESTERN DIVISION			
Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.
Los Angeles	W6FNE	John A. McKowen	3430 So. Hills St.
San Diego	W6LRU	Don Stansifer	4427 Pescadero
Santa Barbara	W40KN	Cecil D. Hinson	1933 Coventry Court
WEST GULF DIVISION			
Northern Texas	W5BNG	L. L. Harbin	4515 Calmont
Oklahoma	K6KTV	Bill P. Lund	1220 S. Orasso
Southern Texas	W5QEM	Roy K. Eggleston	1109 Vernon Drive
CANADIAN DIVISION			
Alberta	VE6TG	Harry Harrold	1834-5th Ave.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.
Manitoba	VE4HW	William H. Horner	6 Hart Ave.,
Maritime	VE1WB	D. E. Weeks	
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.
Quebec	VE2DR	C. W. Skarstedt	62 St. Johns Rd.
Saskatchewan	VE5QC	Mel Mills	1012-10th St., East
			Marshalltown Tamaqua 18252 Smithsburg, Md. 21783 Palmyra 08065 Buffalo 26 Coaway
			Springfield Bloomington Portage 53901
			Atkin Minot Sioux Falls
			Little Rock 72205 Covington Meridian Johnson City
			Louisville 7 Detroit 48240 Canton 44703
			Schenectady Massapequa Park, L. I. South Amboy 08879
			Ames 50010 Wichita 67207 Rolla 65401 Gering
			Bethlehem Braintree 02135 Ellsworth Falls Manchester 05102 Pawtucket 02860 Montpelier 05601 Westfield 01085
			Anchorage Twin Falls Anaconda Portland Seattle 98115
			Concord Kaneohe 96744 Boulder City 89005 Sacramento San Rafael Fresno Cupertino
			Salisbury North Augusta Norfolk 23503 Fairmont 26554
			Alamosa Dexter Salt Lake City 84110 Casper 82601
			Athens 35611 Balboa Palm Beach Columbus 31902 Urb. Truman Rio Piedras, P. R. Fort Walton Beach 32548
			Phoenix Los Angeles 90007 San Diego 7 Thousand Oaks
			Fort Worth 76107 Tulsa 20 Corpus Christi
			N. Lethbridge, Alta. Vancouver 8, B. C. Winnipeg Harvey Station, N. B. Willowdale, Toronto, Ont Pointe Claire, Montreal 33, P. Q. Saskatoon

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

RELIABILITY



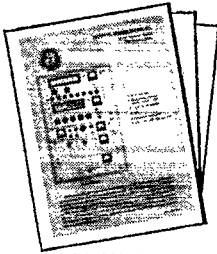
MODEL LRRA-1



MODEL LRRB-1

with

SOLID STATE VLF/LF/MF COMMUNICATIONS (10 TO 600 KCS)



REQUEST
BULLETIN 3011
BULLETIN 3015
BULLETIN 3017

- SENSITIVE (.1 u/v)
- STABLE (1 Part in 10^9)
- SELECTIVE (4 IF Bandwidths)
- SIDEBAND (AM, CW, FSK, FAX modes)
- DEPENDABLE (electronically switched emergency batteries)
- SHIP AND SHORE MODELS AVAILABLE



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, NEW YORK

OTTAWA, CANADA • ALEXANDRIA, VIRGINIA • GARLAND, TEXAS • OXNARD, CALIFORNIA
SAN LUIS OBISPO, CALIFORNIA • LUZERN, SWITZERLAND • 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 Newington, Connecticut.



Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914-1936
EUGENE C. WOODRUFF, W8CMP, 1936-1940
GEORGE W. BAILEY, W2KH, 1940-1952
GOODWIN L. DOSLAND, W8TSN, 1952-1962
(President Emeritus)

Officers

President HERBERT HOOVER, JR., W6ZH
900 Wilshire Blvd., Los Angeles, California 90017

First Vice-President WAYLAND M. GROVES, W5NW
1406 West 12th Street, Odessa, Texas 79761

Vice-President FRANCIS E. HANDY, W1BDI
225 Main St., Newington, Connecticut 06111

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

Secretary JOHN HUNTOON, W1LVQ

Treasurer DAVID H. HOUGHTON
225 Main St., Newington, Connecticut 06111

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 General Manager RICHARD L. BALDWIN, W1KE

Assistant Secretaries PERRY F. WILLIAMS, W1UED
RAYMOND HIGGS, K1FLG GARY L. FOSKETT, W1ECH
225 Main St., Newington, Connecticut 06111

General Counsel ROBERT M. BOOTH, JR., W3PS
1735 DeSales St., N. W., Washington, D. C. 20036

Associate Counsel ARTHUR K. MEEN, VE3RX
Suite 2212, 44 King St. West, Toronto 1, Ont.

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
734 West Foster Avenue, State College, Pa. 16801
Vice-Director: Edwin S. Van Deusen W3ECP
3711 McKinley St., N.W., Washington, D.C. 20015

Central Division

PHILIP E. HALLER W9HPG
6000 S. Tripp Ave., Chicago, Ill. 60629
Vice-Director:

Dakota Division

CHARLES G. COMPTON W0BUO
1011 Fairmount Ave., St. Paul, Minn. 55105
Vice-Director: Charles M. Bove W9MXC
1611 1/2 East Lake St., Minneapolis, Minn. 55407

Delta Division

PHILIP P. SPENCER W5LDH/W5LXX
29 Snipe St., Lake Vista, New Orleans, La. 70124
Vice-Director: Franklin Cassen W4WBK
925 North Trezevant St., Memphis, Tenn. 38108

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2975 Observatory Ave., Cincinnati, Ohio 45208
Vice-Director: Charles C. Miller W8JSU
4872 Calvin Drive, Columbus, Ohio 43227

Hudson Division

MORTON B. KAHN W2KR
22 Birch Hill Rd., Great Neck, N. Y. 11020
Vice-Director: Harry J. Daunals W2TUK
RFD 1, Arbor Lane, Dix Hills, Huntington, L. I.
11743

Midwest Division

ROBERT W. DENNISTON W0NWX
Box 631, Newton, Iowa 50208
Vice-Director: Sumner H. Foster W0GQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa 52403

New England Division

MILTON E. CHAFFEE W1ELW
28 Roussier Rd., Southington, Conn. 06489
Vice-Director: Bigelow Green W1EAE
236 Marlboro St., Boston, Mass. 02116

Northwestern Division

R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont. 59102
Vice-Director: Robert B. Thurston W7PGY
7700 31st Ave., N.E., Seattle, Wash. 98115

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose, Calif. 95126
Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif. 94558

Roanoke Division

P. LANIER ANDERSON, JR. W3MWH
428 Maple Lane, Danville, Va. 24541
Vice-Director: Joseph P. Abernethy W4AKC
764 Colonial Drive, Rock Hill, S.C. 29730

Rocky Mountain Division

CARL L. SMITH W0BWJ
1070 Locust St., Denver, Colo. 80220
Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah 84403

Southeastern Division

THOMAS M. MOSS W4HYW
P.O. Box 20644, Municipal Airport Branch,
Atlanta, Ga. 30320
Vice-Director: Charles J. Bolvin W4LVV
2210 S.W. 27th Lane, Miami, Fla. 33133

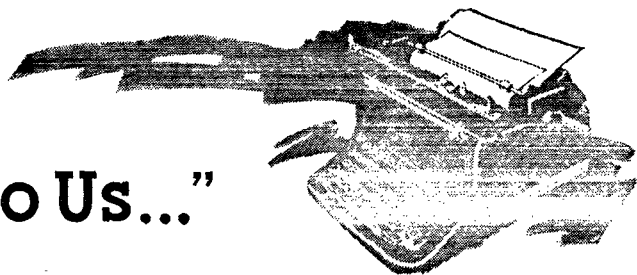
Southwestern Division

RAY E. MEYERS W6MLZ
Box R, San Gabriel, Calif. 91778
Vice-Director: Virgil Talbott W6GTE
1175 Loughlin Way, Monterey Park, Calif. 91754

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1656, Corpus Christi, Texas 78403
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla.
73159

"It Seems to Us..."



Accomplishment

During the past year or so, discussions relative to amateur matters at club meetings, hamfests and conventions, as well as on the air, seem to have been more spirited than at any time in our recent recollection. This is all to the good.

But sometimes we are obsessed with a particular phase or aspect of our personal interests and activities, and fail to stand back for a look at the over-all picture of our League — especially its progress and its accomplishments. Taking just the last few years, let's tick them off:

An expanded program, the Amateur Radio Public Service Corps, to help justify our use of valuable radio frequencies.

A commemorative postage stamp honoring hams.

A new headquarters administration building, fitting the stature of the national amateur organization, with modernization of WIAW in process.

Expanded privileges on the 160-meter band.

A larger and (we hope you agree) better QST.

A revised and updated working arrangement with the American National Red Cross for disaster communications.

Removal of power restrictions in the 420-Mc. band.

A successful bill for reciprocal operating privileges.

Relaxation of RTTY dual identification requirements.

Permission for launch of amateur experimental satellites.

A new "junior" Handbook—Understanding Amateur Radio, with new v.h.f. and operating manuals in process.

Participation in the new "Inter-American Union of Radio Amateurs" to strengthen amateur ties in this hemisphere.

Attaining these objectives required the cooperation of many people, both inside and outside the League. But from the amateur standpoint, let us point out we list these as accomplishments of the *League*, not of Hq. nor of any individual. The League is 100,000 members; the Hq. is the staff hired to help carry out ARRL objectives. Neither could exist successfully without the other. The League's membership — you — provide support and, through the Board of Directors, guidance and direction for objectives. The management and hired staff coordinate and implement activities and aims, and simply *represent* the membership in relations with federal and other agencies to accomplish the objectives such as those listed. Successes have come from teamwork.

Through the League organization, we coordinate our organized operating activities — contests, awards, code practice, self-policing, traffic and emergency networks, civil defense communications — to write a continuing record of amateur performance in the public interest, convenience and necessity. Your League provides a myriad of services for individual members and affiliated clubs — technical information, TVI help, a library of films on loan to clubs without charge, licensing advice, a planned community public-relations program, guidance in legal difficulties such as zoning ordinances, etc. Your League serves as headquarters of the International Amateur Radio Union, coordinating activities of some 60 national amateur radio societies around the world.

Most important of all, your League is the representative of the amateur in national and international regulatory fields. This work, to protect and enhance amateur operating privileges, is vital to our existence.

Your membership in the League supports and ensures the accomplishment of objectives such as we have listed. It is improbable that any individual or uncoordinated group could have attained even a few of them, much less all. However trite, there is still no truer statement than "in union there is strength."

QST

The Commemorative Stamp

A Reminder

Although no exact date of issue of the commemorative stamp has yet been released by the Post Office Department, it *will* make its appearance before the end of 1964. In the meantime, ARRL Headquarters is receiving orders for thousands of the special first-day "covers" (envelopes) that were announced on page 26 of the September issue of *QST* and page 99 of the October issue.


Briefly, the League has arranged for official first-day covers, printed in sets of three each in a different color, to be serviced on the first day of issue of the commemorative stamp. On the day the stamp is released, we will frank these special envelopes with the new stamp, have them cancelled with a special postmark at the first-day city, and then forward them to you or others of your choice. These will be collectors' items for both amateur radio operators and philatelists.

Prices are as follows:

- Single envelope with a single stamp — 25 cents
- Set of three envelopes with a single stamp on each — 70 cents
- Pair (two stamps on one envelope) — 30 cents
- Block (four stamps on one envelope) — 40 cents
- Plate block (four stamps with identifying number of printing plate) on one envelope — 75 cents

Please send your orders to:

Commemorative Stamp Department
American Radio Relay League
225 Main Street
Newington, Conn. 06111.

Don't miss out by getting your order in *after* the commemorative stamp release date, because there will be no way we can back-date these special first-day covers for you. Act now! 

Strays

Stolen Equipment — On Sept. 14, 1964, the following items were stolen in Oakland Park, Fla. (a) Drake TR-3 transceiver Ser. No. 817 with a.c. power supply and speaker (b) Eldico electronic keyer Model EE-3 (c) D-104 Astatic microphone. Info on these items should be relayed to the Oakland Park police department.

— — — — —

Stolen Equipment — The following item was stolen from WA6AWY, 828 No. Lucia Ave., Redondo Beach, Calif. Drake TR-3 transceiver, Ser. No. 1188 with a.c. power supply. If you have any info, call him collect at 213-372-4461.

— — — — —

The Eye Bank Net (see p. 79, May, 1963, *QST*) continues its record of outstanding public service. Since the Net went into operation on December 20, 1962, it has been responsible for locating 449 eyes which were required for emergency use. Morning sessions of the Net meet on 3970 kc. beginning at 1100 GMT, while evening sessions are on 3963 kc. at 0100 GMT. Contact WØGET or WØNTI if you'd like to know how you can participate.

— — — — —

Just at press time we are saddened to receive word that John L. Reinartz, K6BJ, died at Fort Word Army Hospital, California, on Monday, October 5. K6BJ was the first recipient of the Hiram

COMING A.R.R.L. CONVENTIONS

October 31 and November 1 — Oklahoma State, Lake Texoma

January 23-24, 1965 — Florida State, Miami

February 20, 1965 — Michigan State, Muskegon

March 26-28, 1965 — Delta Division, Memphis, Tennessee

April 24-25, 1965 — New England Division, Swampscott, Mass.

July 2-5, 1965 — ARRL National, San Jose, Calif.

July 9-11, 1965 — West Gulf Division, Oklahoma City, Oklahoma

Percy Maxim award, for his pioneer work in opening the short waves during the early twenties, and the gold medal was presented to him just a few days before his death. A complete story will appear in a subsequent issue of *QST*.

— — — — —

Bill Stegner, WØZMR, although blind since birth, has been granted FCC permission to serve as an engineer at KGHM. In addition to serving his regular trick as broadcast engineer, he does some maintenance work and fills in as disc jockey.

Balanced Modulators

for V.H.F. and U.H.F. Sideband

Dual Circuit for Phasing Systems

Direct phasing provides a comparatively easy way of generating a double- or single-sideband signal at the higher frequencies. A feature of the 144-Mc. balanced modulator described here is a simple method of obtaining the required 90-degree r.f. phase shift.

SOME time ago, an article by W2WZR on the generation of 144-Mc. single-sideband signals, using the direct-phasing method, appeared in *G-E Ham News*.¹ In the system described, four triode tubes were used in the double balanced modulators. Several of those who built similar units encountered difficulty in

* 103 West Rosewell Ave., Nedrow, N. Y.

** Shellmans Drive, R.D. 1, Clay, N. Y.

¹ O'Hern, "A 144-Mc. Direct S.S.B. Generator," *G-E Ham News*, Sept.-Oct., 1962.

obtaining matched tubes. Once a good set was obtained, everything worked well. However, physical construction of the unit proved to be rather difficult for the average home-brew artist.

Seeking a simpler scheme, and even better performance, the authors of this article decided to approach the problem independently, and incorporate the best features of all known systems that could be utilized. At first, a solid-state-diode approach looked promising. Although a functioning system was produced ultimately, several problems remained. Among these were low output, fussy impedance matching, undesired phase shift within the modulators themselves, and temperature difficulties. Before abandoning this approach, several days were spent in trying to improve the situation. It was finally decided that, in the interests of simplification, solid-state diodes were out.

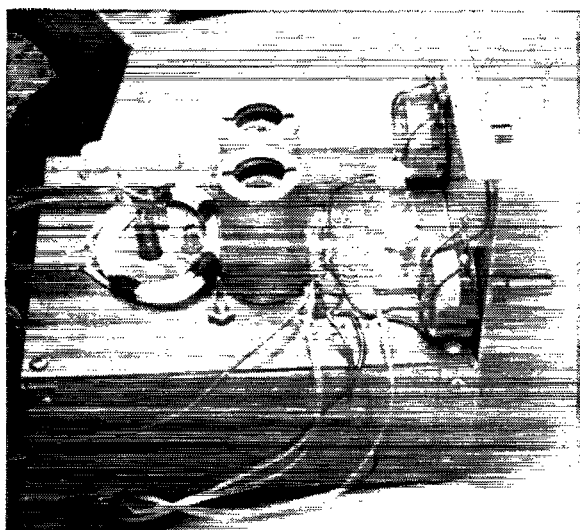
Suitable Balanced-Modulator Tubes

Since the number of tubes should be held to a minimum, the next step was to look at the various dual triodes available with regard to electrical

BY JAMES V. O'HERN,* W2WZR

AND THOMAS L. SLY,** K2QCX

Fig. 1—The two r.f. balancing potentiometers and the r.f. phasing-line connectors (BNC) are to the right of the tubes; the output balun is to the left. The modulator output connector (also BNC) is in the rear right-hand corner of the chassis, as viewed from the panel. Audio input connections are made to the feedthroughs in the foreground.



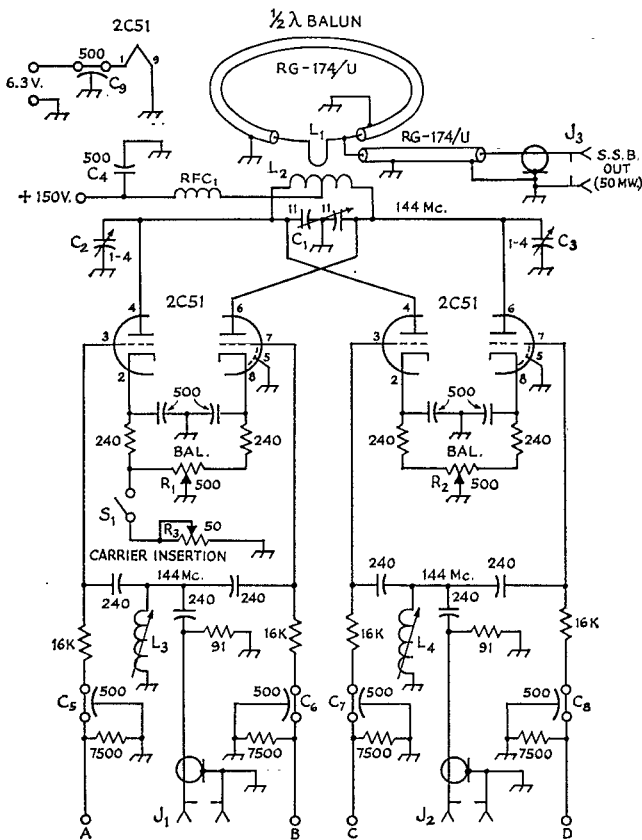


Fig. 2—Circuit of the double balanced modulator. Capacitances are in pf. ($\mu\mu\text{f.}$) and resistances are in ohms (K-1000). Fixed capacitors not listed below are dipped silver mica. Fixed resistors are $\frac{1}{2}$ -watt composition. Lettered terminals connect to corresponding terminals in Fig. 7.

- C₁—Butterfly air variable, 11 pf. per section (Johnson 160-211).
 C₂, C₃—Piston-type trimmer, 1-4 pf. (Central 829-4 or similar).
 C₄—Silver mica.
 C₅, C₆, C₇, C₈, C₉—Button-type feedthrough capacitor (Erie 654-017 501K, or similar).
 J₁, J₂, J₃—Chassis-mounting BNC receptacle.

- L₁—Single turn No. 20, $\frac{1}{2}$ -inch diam. inserted between halves of L₂.
 L₂—4 turns No. 12, $\frac{1}{2}$ -inch diam., center-tapped, with slight space at center for L₁ (see Fig. 3).
 L₃, L₄—See text.
 R₁, R₂, R₃—Composition control.
 RFC—See text.
 S₁—S.p.s.f. toggle switch.

symmetry. Most of the garden variety failed to meet the requirements. The choice finally narrowed down to the 2C51, 5670, or the W.E. 396-A. A few years back, we used to cuss these tubes because they didn't conform with the rest of the dual triodes. However, they are just what the doctor ordered as far as symmetrical wiring is concerned, and we would like to thank those who were responsible for this basing configuration.

Circuit and Construction

Figs. 1 and 3 show how one of the units was constructed, and the circuit diagram appears in Fig. 2. It is best to build this modulator in its own box, separate from the rest of the transmitter, although one version built (see Fig. 5) included a pair of cascaded 6360 AB₁ linears which drive a parallel 4CX250B 1-kw. final. In any event, special care should be used in the placement of components and in the wiring to

maintain the closest possible electrical symmetry throughout the modulator circuits. Corresponding leads in both modulators, and in each side of each modulator, should be of equal length, even though it may mean making an occasional lead longer than necessary to achieve this.

In the barefoot unit shown in Figs. 1 and 3, the underside of the chassis is divided into three compartments, one for each modulator input circuit, and the third for the common output circuit. Double-sided printed-circuit board $\frac{1}{32}$ inch thick makes excellent partitions, and if a piece of the same material $\frac{1}{8}$ inch thick is used for the top of the chassis, things are real easy. Ground connections can be made at the nearest point by simply soldering to the copper facing. Holes can be enlarged easily in the soft material with a reamer, cutting down on the assortment of drill sizes required. If the copper-coated board is not available, gasoline screen or flashing copper may be used for the partitions. The transverse

partition has cutouts in its bottom edge which straddle the two tube sockets, between the grid and plate terminals.

The four button-type feedthrough capacitors, C_5 , C_6 , C_7 and C_8 , are mounted through the transverse shield in pairs, as shown in Fig. 3. The 7500-ohm resistors lie along the output side of the partition, with one end of each resistor connected to a capacitor terminal on that side, and the other end soldered to the shield. On the input side of the shield, the four 16K resistors are connected between the capacitor terminals on this side and the tube grid terminals. Leads are then run from these same capacitor terminals to four feedthrough insulators which provide topside terminals A , B , C and D for audio input.

The cathodes are bypassed at the socket terminals, and the d.c. connections are brought to the top of the chassis in small feedthrough insulators to which the potentiometer connections are made. These controls may be remotely located, if desired.

One side of each filament is grounded. The other side of each filament is brought through a feedthrough bypass capacitor to the top of the chassis where the capacitor terminals are connected together and to the 6.3-volt source.

Dimensions of L_3 and L_4 are not critical. These coils are provided to compensate for the input capacitance of the tubes. Those shown in Fig. 3 each have four spaced turns of No. 22 wire on $\frac{1}{4}$ -inch iron-slug forms.

On the output side of the transverse shield, the tank coil L_2 is supported by soldering its leads to the stator terminals of C_1 . The center tap connects to the r.f. choke, RFC_1 , which is mounted in a hole in the chassis, immediately under the coil. The plate bypass C_4 connects to the other end of the choke as it emerges from the top side of the chassis. The choke was made by filling a 1-megohm 1-watt resistor with No. 30 Formvar wire, close-wound. The plate-supply voltage is connected at this point. The 4-pf. piston trimmers, C_2 and C_3 , may not be necessary. They are an aid if the tubes are not exactly matched, but all tubes tried here have matched adequately for very good carrier suppression.

The one-turn output link L_1 is fed via feedthrough insulators to the top of the chassis where it connects to the half-wave balun. RG-174/U is used for the balun which is formed into a coil, as shown in Fig. 1. A twisted pair of No. 36 Formvar wire may also be used for the balun; the velocity factor is approximately 0.66. With either type, the length will be approximately 25 inches. One side of the link goes to a BNC output connector. The outer conductors of the balun and output line are grounded at a common point. If twisted pair is used, one of the wires is grounded at both ends, and the other wire makes the link connections. This about does it so far as construction is concerned.

Carrier Generator

A low-level 144-Mc. source may be used to

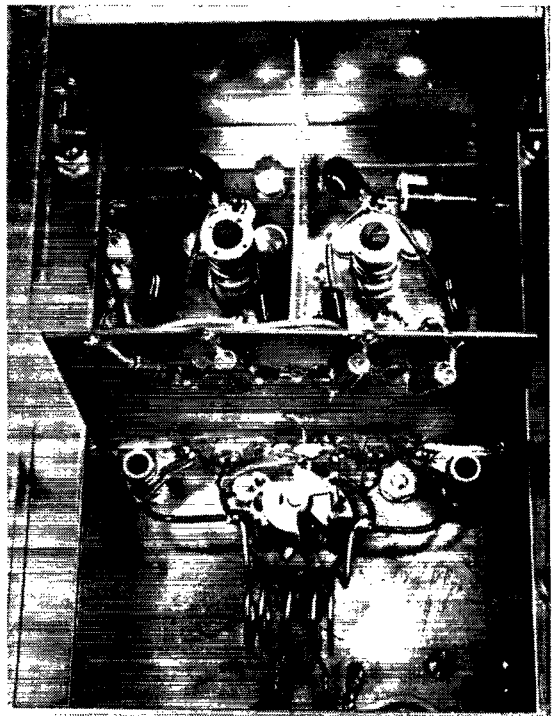


Fig. 3—Bottom view of the chassis shown in Fig. 1. The vertical shield at the top separates the two r.f. input circuits. The output tank components are below the transverse shield which straddles the two tube sockets between the plate and grid terminals. The tubular trimmers, C_2 and C_3 , are to either side of the butterfly tank capacitor.

drive the balanced modulators, but its frequency output must be rock-stable. The transitron oscillator shown in Fig. 4 is recommended. This type of oscillator is sluggish, so it should be left running all of the time. This will cause no difficulty in receiving, since the oscillator operates at 24 or

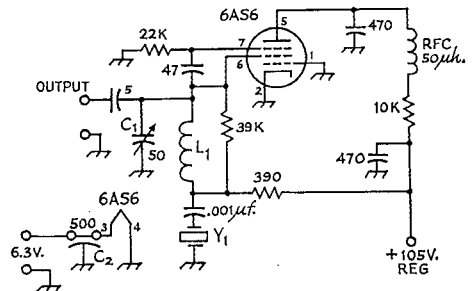


Fig. 4—Circuit of the transitron oscillator. Unless indicated, capacitances are in pf., and resistances are in ohms (K=1000). Fixed capacitors are silver mica or NPO ceramic; resistors are $\frac{1}{2}$ -watt composition.

C_1 —Air trimmer.

C_2 —Feedthrough type.

L_1 —See text.

Y_1 —Third-overtone crystal in 24- or 36-Mc. range (see text).

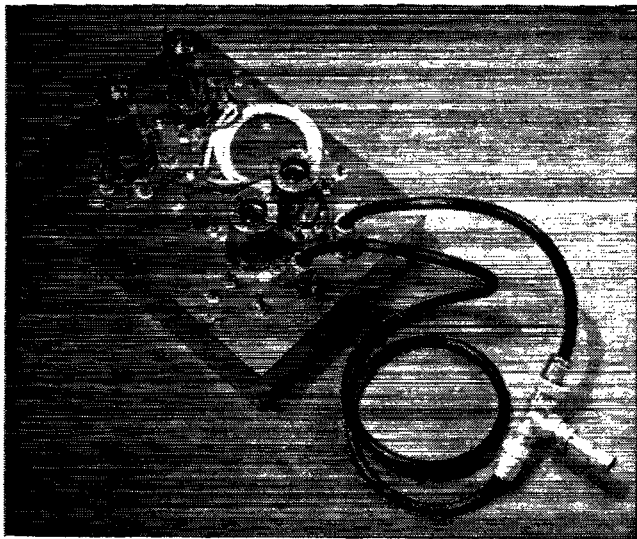


Fig. 5—R.F. phasing lines and T connector, as described in the text. Cable connectors are BNC type. The coil of white cable at the center is the half-wave modulator-output balun. This version of the double balanced-modulator chassis includes two 6360 linear amplifiers (at left) following the modulators (right).

36 Mc. and generates no noticeable harmonics. The 39K resistor may be omitted if large excursions in frequency are not contemplated.

At 2 meters, the frequency of oscillation will be from 5 to 20 kc. lower than the frequency for which the crystal is normally marked. If an exact frequency is desired, the crystal should be ordered specifying series-resonant operation.

The inductance L_1 should be made as large as possible, using just enough capacitance to resonate the circuit over the range of crystal frequencies to be employed. In our exciters, the oscillator is followed by a 6AK5 buffer, a 6AK5 doubler or tripler (depending on whether the crystals are at 36 or 24 Mc.), and another 6AK5 doubling to 144 Mc. The tank circuits in these stages are adjusted to resonate with a capacitance of 60 pf. at 24 Mc. (or 40 pf. at 36 Mc.) 20 pf. at 72 Mc., and about 10 pf. at 144 Mc. The 144 Mc. doubler delivers $1\frac{1}{2}$ volts r.m.s. across 50 ohms which does the trick at W2WZR and K2QCX.

R.F. Phasing

As in the *Ham News* unit, the balanced modulators are driven from a 50-ohm r.f. source, split by a coaxial-line T arrangement, shown in Fig. 5. One branch of the T is $\frac{1}{8}$ wavelength of RG-62/U and feeds one of the dual triodes. The other branch is $\frac{3}{8}$ wavelength of the same type cable which feeds the second dual triode. For 2 meters, the lengths figure out to be 9 and 27

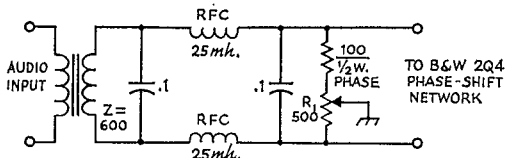


Fig. 6—Circuit of the low-pass audio filter. Capacitances are in $\mu\text{f.}$, resistances in ohms. R_1 is a composition control. The upper output terminal connects to Terminals 1 and 5 of the 2Q4, lower output terminal to Terminals 3 and 7.

inches. This arrangement gives a very accurate 90-degree r.f. phase shift over a wide band of frequencies. By using terminated sections, instead of a single quarter-wave line, the r.f. amplitudes at the output ends of the T are equal, and the v.s.w.r. is low.

Audio Phasing

Audio can be taken from an existing phasing-type exciter, or from a unit built up to one's own liking. A low-pass filter with a 3-kc. cutoff should be used in the audio system. For 600-ohm drive-impedance levels, the circuit shown in Fig. 6 is adequate. This conserves frequencies and keeps the phase tolerance within bounds if a YL happens to operate the rig.

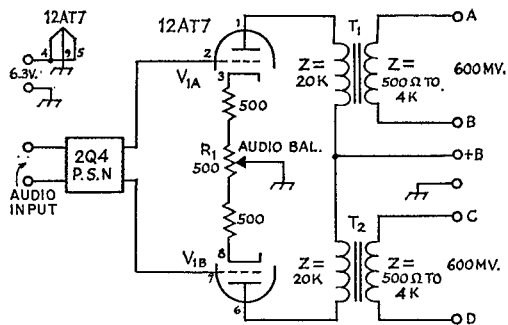
Four phases of audio are required to drive the pair of balanced modulators, and Fig. 7 shows how this can be derived. A function switch may be used to route appropriate phases to the balanced modulators. However, since everyone seems to be using upper sideband on 2 meters, it is easier to hook the phases up as shown in Fig. 7. Then, if you happen to arrive on lower sideband, just reverse the 9- and 27-inch pieces of RG-62/U, or transpose the secondary leads of one transformer, and the sidebands will invert.

Operation

The 50-mw. output from this generator may be amplified by any system the builder may choose consistent with good linear-amplifier practice. Line-up is straightforward, and the receiver S meter may be used as a carrier-null indicator. It is best to sample the r.f. output of the final transmitter stage in determining carrier-null settings. This should be done through an attenuator at the receiver terminals fed by a shielded line terminated with a link coupled to the final to avoid any direct pickup from the carrier generator.

This system has been duplicated by a number of hams, and has been in use for over a year at

Fig. 7—Audio driver for the balanced modulators. Resistances are in ohms. R_1 is a wire-wound control. Fixed resistors are $\frac{1}{2}$ -watt composition. T_1 and T_2 may be any type having a 20,000-ohm primary and secondary impedance of 500 to 4000 ohms. Output transformers from ARC-5 receivers may be used if the internal connection to the case is removed, or the case insulated from ground. The two transformers should be identical.



K2QCX and W2WZR. Operation is very stable and sideband suppression is good. The output is clean and free of birdies, and the carrier null stays put. The rig is grid-block keyed with the carrier inserted, and the c.w. signal is just as clean as the best you'll hear on 40 meters. The r.f. phasing system can be used on any frequency where the length doesn't make the coax lines too cumbersome. It works well on 50 and 220 Mc.

and, with some care, 432-Mc. operation is not out of the question.

While receiving, it is necessary to apply blocking bias to the carrier generator (except the oscillator), as well as to linear amplifiers following the sideband generator. On transmit, the carrier-generator grids are returned to ground, and operating bias is applied to the higher-level amplifiers. QST

NEW BOOKS

Inside Electronics, by Monroe Upton. Published by the Devin-Adair Company, 23 East 26th St., New York 10, N. Y. $5\frac{3}{4} \times 8\frac{3}{4}$ inches, 262 pages, including index, cloth cover. Price, \$5.95.

This book is certainly recommended for the novice or experimenter who is in search of an easy-to-understand introduction to electronics. Because of the author's humorous writing style, a list of the chapter headings wouldn't give much more than a provocative hint of their content. (examples: "The Imponderable Fluid," "Twist That Dial, Turn That Knob," etc.). However, the book starts off with a discussion of the basic facts of electronics including basic electricity, introduction to radio, and the like. Later chapters deal with vacuum tubes, television, and amplifiers. The book definitely fills the gap between the oversimplified and too-technical approaches to electronics.

Modern Dictionary of Electronics, new second edition, by Rudolf F. Graf. Cat. No. DIC-2. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. 448 pages, including index, 6 by 9 inches, cloth cover. Price, \$6.95.

This electronics dictionary contains 2,400 new terms in electronics and related fields, in addition to the 10,000 terms contained in the first edition. The additions include terms in the fields of microelectronics, semiconductor devices, reliability, computers, data processing, programming, and other specialized areas. Numerous illustrations have been added and the pronunciation guide has been expanded. A feature of this latest edition is the inclusion of tables of greek-alphabet symbols and abbreviations positioned inside the front and back covers for quick reference.

Test Equipment Maintenance Handbook, by Robert G. Middleton. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. 160 pages, $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, paper cover. Cat. No. CTE-1. Price, \$2.95.

The title of this book just about sums up its content: all

you need to know about the repair, calibration, and modification of test equipment. Information is included on VOM's, VTVM's, tube testers, transistor testers, CRT testers, oscilloscopes, audio oscillators, square-wave generators, r.f. generators and color generators. One section of the handbook provides information on evaluating trouble symptoms, tracking down intermittents, using instrument manuals, factory consultation and special waveforms and components values. Certainly a good book for the service shop or "home lab."

Modern Communications Course, by Edward M. Noll. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. Vol. 1, cat. No. MCN-1. 256 pages, $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, paper cover. Price, \$4.95.

This first of a three-volume course covers radio-frequency systems. The main purpose of this volume is to serve as an introduction to radio communication with emphasis on circuits used to generate, amplify and radiate radio-frequency energy. Included in the manual are practical experimental projects on such things as modulation, r.f. oscillators, r.f. amplifiers, antennas, transmission lines and matching sections. Circuits and maintenance procedures directly related to equipment used in modern communications systems are discussed.

Basic Electricity, second edition, by Rufus P. Turner. Published by Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York 17, N. Y. 412 pages, including index, $6\frac{1}{2}$ by $9\frac{1}{4}$ inches, cloth cover. Price, \$6.00.

Although one might think from looking at this title that this book is an introduction to the fundamentals of electrical theory, it is actually much more. The introduction leads up to and includes sections on basic electronics with discussions on alternating current theory, magnetism and electromagnetism and the current flow in liquids and gases. This second edition has been expanded to include information on new developments in the field of electronics, such as ultrasonics and lasers. The chapter on electrical instruments and measurements has been revised and up-dated. Some chapter titles include, phase relations and impedance, transformer action and transformers, generators and motors, rectifiers and telegraph and telephone fundamentals.

Announcing the 31st ARRL Sweepstakes

November 15 (phone) and 22 (c.w.)

How many different amateurs in the ARRL field organization can you contact in a 24-hour period? How many sections can you come up with? Who will set new records in the modified periods? Many questions like these will be answered the 2nd and 3rd weekends in November. In each case, the SS will begin at midnight GMT Saturday and end 24 hours later. Put in as much or as little time as your schedule will permit, score listings will still show the time used to permit score per hour comparisons.

This year both the time period and the separate weekends are new to the historic SS. For the first time full c.w. operation will not jeopardize a good phone score and vice versa. Club scores we're sure will show interesting totals reflecting increased participation and versatility in both modes.

The basic exchange (a simulated message preamble), stays as in '63. Follow the example shown, using the *year* of your first license as the **check** and the *month* and *day* (not year) of birth as the message **date**. Remember to send this information as it refers to you, the operator, whether you operate your own or another station.

Certificate awards will go to the section and club leaders, both phone and c.w. Novice and Technicians may be eligible for awards too, see contest rule 6. A handsome coco bolo gavel will be awarded to the club with the highest aggregate score.

Log forms and Operating Aid No. 6 (to avoid duplicating QSOs) are now available. Please request your forms as soon as possible from the ARRL Communications Department, 225 Main St., Newington, Connecticut 06111. Logs must be postmarked by Dec. 16, 1964, to be eligible for score listing and awards.

CU in the SS!

Rules

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

2) **Time:** All contacts must be made during the contest period indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 73 sec-

CONTEST PERIODS			
Starts		Ends	
Sunday, Nov. 15	PHONE	Sunday, Nov. 15	
0001 GMT		2400 GMT	
Sunday, Nov. 22	C.W.	Sunday, Nov. 22	
0001 GMT		2400 GMT	

tions. Yukon-N.W.T. (VE8) counts as a separate multiplier. Time spent in listening counts as operating time.

3) **QSO:** Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. C.w. stations work only c.w. stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) **Scoring:** Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see p. 6) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either point(s) or multiplier. Apply a "power multiplier" of 1.25 to c.w. entries and 1.5 to phone entries if the input to the transmitter output stage is 150 watts or less at all times during contest operation.

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

5) **Reporting:** Follow the sample shown in reporting contest results. Printed contest forms will be sent free on request. Indicate starting and ending times and dates for each period on the air. All Sweepstakes reports become the property of ARRL and none can be returned.

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

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously is not allowed. Contest reports must be postmarked no later than December 16, 1964, to insure eligibility for *QST* listing and awards.

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

6) **Awards:** Certificates will be awarded to the highest c.w. scorer and to the highest phone scorer in each ARRL section. A c.w. certificate will also be awarded to the highest scoring Novice or Technician in each section where at least three such licensees submit c.w. logs; similarly, a phone

HOW TO SCORE

Each preamble sent and acknowledged counts one point.

Each preamble received counts one point.

Only two points can be earned by contacting any one station, regardless of the frequency band used.

For final score: Multiply totaled points by the number of *different* ARRL sections worked; that is, the number in which at least one bona fide SS point has been made. Multiply c.w. scores by 1.25 and phone scores by 1.5 if you used 150-watts-or-less transmitter input at *all times* during the contest.

WG1SQ's "AA" CITATION REQUIREMENTS

(See page 144 November 1963 *QST* for further information.)

Conterminous U.S.A.

All Canada, plus KH6, KL7, KP4, KZ5, etc.

Novice

	C.W.		PHONE	
	Points	Sections	Points	Sections
Conterminous U.S.A.	65,000	71	40,000	58
All Canada, plus KH6, KL7, KP4, KZ5, etc.	25,000	55	15,000	50
Novice	6500	42		

EXPLANATION OF "SS" CONTEST EXCHANGES

	<i>Send Like a Standard Msg. Preamble, the.....NR</i>	<i>Call</i>	<i>CK</i>	<i>Place</i>	<i>Time</i>	<i>Date</i>
<i>Exchanges</i>	Contest serial numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (Last two digits of year first licensed)	Your ARRL section	Send GMT time of transmitting	Send month and day of birth (not year)
<i>Sample</i>	NR 1	WINJM	30	CONN	0001	NOV 1

SUMMARY OF EXCHANGES ARRL NOVEMBER SWEEPSTAKES

CALL USED... WINJM CW OR PHONE... R.W. SECTION... CONN.

SENT (1 point)								RECEIVED (1 point)							
B A N D	TIME ON OFF	NR	STN	CK	SEC- TION	TIME	DATE	NR	STN	CK	SECTION	TIME	DATE	NR. DIFF SEC.	P T S
3.5	2301 NOV.9	1	W1 NJM	30	Conn	2302	NOV 1	1	W3AA	12	Del.	2303	MAY 1	1	2
		2				2304		3	W4QQQ	50	VA	2306	JAN 4	2	2
		3				2310			W1WPO						1
		4				2315		8	K2PPP	60	NLI	2317	APR 20	3	2
	2325					2320		15	W1WPO	38	CONN	2321	NOV 5	4	1
14	1900 NOV.10	5				1903		200	K6SS	20	SBAR	1905	OCT 15	5	2
	1915	6	↓	↓	↓	1910	↓	99	W0SL	57	Colo	1912	AUG 17	6	2

Enter summary below on last sheet used

SCORING:12.....points X6.....sections X 1.25 power Mult.* =90.....CLAIMED SCORE
 *power multiplier: C.W. -- 1.25, phone -- 1.5 for 150 watts, or less, at all time.

Nr. different stns. wkd...6....., nr. diff sections wkd.6....., input.75.watts, hr. op...1...
 Type transmitter (tube line up if home built).....
 Receiver..... Antennas.....

CHECK ONE: Single Operator Station Multioperator Station
 If multioperator, please show calls of all operators.....
 Participating for award in the following club.....

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge.

.....
 Signature Call Mailing Address

(Please don't forget to enclose your comments for soapbox, photos, etc., and mail promptly to ARRL Communications Department, 225 Main Street, Newington, Connecticut, 06111.)

certificate will be earned by a Novice or Technician in each section where a total of three such licensees submit phone logs. A certificate also will be awarded to the highest scoring Novice and Technician from sections of less than three entries . . . that in the opinion of the Awards Committee displayed exceptional effort. Only single-operator stations

are eligible for certificate awards. Multiple-operator scores will receive separate QST listing in the final results.

A gavel will be awarded to the highest club entry. The aggregate scores of phone and c.w. reported by club secretaries and confirmed by the receipt at ARRL of contest logs

(Continued on page 184)

• *Beginner and Novice*

An Indicating Wavemeter Or How To "See" R.F.

BY LEWIS G. McCOY*, WIICP

I NEED help! I received my Novice ticket a month ago and still haven't been able to make a contact. My transmitter appears to be working properly but I call and call with no results. Can you help me?"

This type of question is quite common. Whenever we chase down the problem, 99 percent of the time the answer is the same—the Novice is transmitting on one band but actually listening on another. To put it another way, the Novice tunes up on what he thinks is the 80-meter Novice band but actually his rig is on 40, or even worse, outside the 40-meter band.

Whether you have a commercial or home-built rig, in many cases it actually is possible to tune the transmitter to the wrong band even though the bandswitches are set correctly. One sure way to find out what band you're really on is with an absorption-type wavemeter.

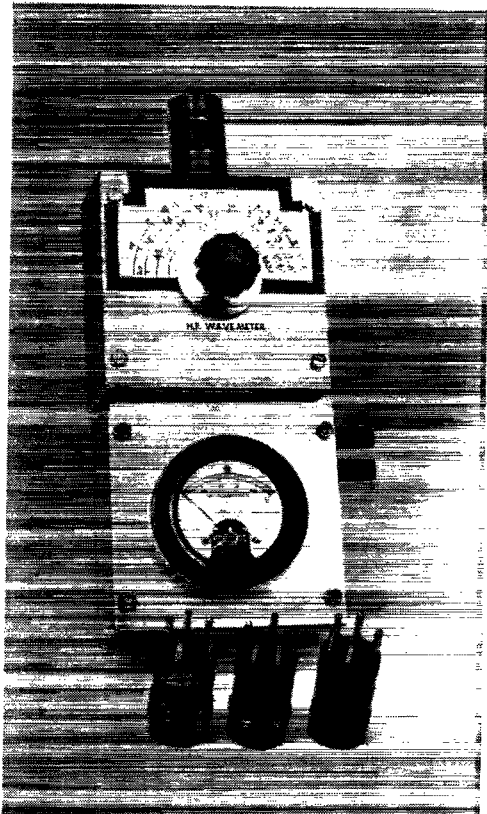
The Absorption Wavemeter — What It Is

Just about the handiest test device around a ham shack is an absorption wavemeter. Simply, an absorption wavemeter is a device that permits you to detect and "see" the presence of radio frequency energy. When the wavemeter is coupled to an r.f. field, as for example, near the tank circuit of a transmitter, the coupled r.f. energy can be rectified in the wavemeter circuit and converted to d.c., which can then be observed on a milliammeter. One important point here: an absorption wavemeter is *not* an accurate frequency meter. It won't give you an exact frequency measurement, but it will show you what amateur band you are tuned up on. This is accomplished by using a tunable circuit in the wavemeter. Fig. 1 is the circuit of the wavemeter. Whenever the combination of C_1 and the coil is tuned to the same frequency as the r.f. field being checked, and the coupling is tight enough, the r.f. is rectified by CR_1 and the resulting d.c. is fed to the meter, M_1 . By using plug-in coils we have a wavemeter that provides a continuous range from 1.6 Mc. to 55 Mc. Before getting into the actual construction of the unit let's see what all the different uses there are for a wavemeter.

Different Uses For A Wavemeter

First, and most important to a Novice, is using the wavemeter to determine if he is tuned up on the correct band. The wavemeter can be coupled either to the final amplifier or to the feed line to check the approximate output frequency.

*Technical Assistant, QST.



Here is the completed wavemeter ready for use. The two terminals at the right are for the direct connections to the meter. Black masking tape is used to hold the paper dial calibration in place.

You can tune up your rig using the plate meter for indicating resonance by the "dip" but, as we stated earlier, you cannot be sure of the output frequency without a device similar to the wavemeter.

Also, many Novices find that even though they are on 80 meters, they receive citations from the FCC for second-harmonic violations. The wavemeter can be coupled to the feed line and tuned to the second-harmonic region. If there is an indication of any energy at this frequency flowing in the feedline, you *know* immediately that you should take steps to eliminate the harmonic.

One problem that some Novices have is that of determining whether or not they are actually getting power to the antenna. The wavemeter is an excellent r.f. indicator, and it can be coupled to the feedline to show if power is actually flowing in the line to the antenna. The wavemeter should be loosely coupled to the line and the rig tuned for maximum reading on M_1 . If the reading goes off scale just reduce the coupling.

Whether you use home-built gear or commercial equipment, the wavemeter is almost indispensable as a piece of test equipment. You can couple to the oscillator stage in a rig to see if the oscillator is oscillating, and then to the multiplier stage to see if it is multiplying to the correct frequency. You can determine if the input and output sections of the amplifier are operating correctly. In receivers you can couple to the oscillator stages to check if they are operating.

Another use of the wavemeter is as a field strength meter for checking performance of antennas, particularly beams and mobile installations.

We could go on and on about the uses of such a device, but it should be apparent by now that an indicating wavemeter that detects the presence of r.f. and gives a close approximation of the frequency is a "must" instrument around the shack.

The Circuit and Construction

As you can see from Fig. 1 and the photographs, the circuit and construction are quite simple. Two Miniboxes, each $2 \times 4 \times 4$ inches, are used for the wavemeter. One box houses the meter and the other the tuned circuit. The two boxes can be plugged together with P_1 and J_2 . An advantage in having the meter in a separate box is that you may wish to use the meter

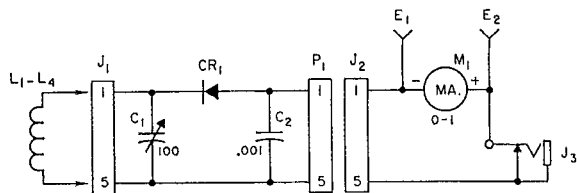


Fig. 1—Circuit diagram of the absorption-type wavemeter.

C_1 —100-pf. variable (Hammarlund HF-100).

C_2 —0.001- μ f. disk ceramic.

CR_1 —1N34A germanium diode.

E_1, E_2 —Binding posts.

J_1 —Five-prong socket.

J_2 —Octal socket.

J_3 —Phone jack, closed circuit.

L_1 —63 turns No. 32 enameled, closed spaced, 1-inch diam., 100 μ h. Frequency range 1.7 Mc.-4.0 Mc.

L_2 —28 turns No. 32 enameled, closed spaced, 1-inch diam., 27 μ h., Frequency range 3.0 Mc.-8.0 Mc.

L_3 —13 turns No. 22 enameled, closed spaced, 1-inch diam., 5 μ h. Frequency range 7.0 Mc.-20 Mc.

L_4 —4 turns No. 22 enameled, closed spaced, 1-inch diam., 0.84 μ h. Frequency range 17.0 Mc.-55.0 Mc.

M_1 —0-1 milliammeter (microammeter if more sensitivity desired).

P_1 —Octal plug.

for other purposes. For example, the meter could be used as the indicating unit for a Monimatch,¹ saving the cost of having two meters. We mounted two terminals E_1 and E_2 on the meter box which are connected permanently to the meter. When the meter is used externally, the two terminals provide a connection point to the meter without removing the back of the box.

Headphones can be plugged into J_3 and the wavemeter used to monitor modulated transmissions. High-impedance phones (2000 ohms or more) should be used for greatest sensitivity.

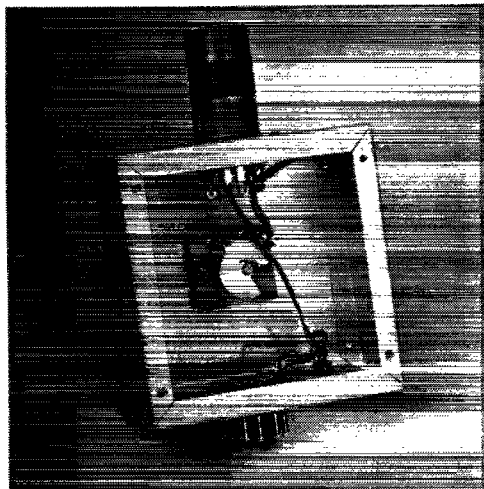
The capacitor C_1 should be mounted at the center of Minibox top as shown in the top view photograph. This will provide adequate space for the calibrated dial. CR_1 and C_2 are mounted on a three terminal tie-point which is installed near P_1 . When soldering the leads of CR_1 , hold the lead being soldered with a pair of pliers, between the body of the diode and the point being soldered. This will prevent excessive heat reaching the diode and ruining it.

The four coils are wound on Millen series 45005 coil forms which are 1 inch in diameter. Any plug-in forms of the same diameter can be used.

Calibrating The Wavemeter

If you know a ham or radio repair man who has a grid dip meter, a quick and easy way to calibrate the wavemeter is with a grid dip meter. Just couple the coil in the grid dip meter to the coil in the wavemeter, tune the grid dip meter to the point where you get an indication on M_1 , and then mark the C_1 dial accordingly. You don't need tight coupling between the two units, just

¹ McCoy, "Monimatch Mark III and IV," *QST*, Sept., 1964.



This view shows the construction of the tuned circuit. Heavy leads were used for the connections from the coil to the variable in order to reduce any stray inductance.

having the coils side by side is sufficient. You'll find that with each of wavemeter coils, you'll have a wider frequency spread near the maximum-capacitance setting of C_1 (plates fully meshed) with crowding of the range as you approach minimum capacitance. As you will note from the coil data in Fig. 1, each coil covers at least two amateur bands. For example, L_1 covers both the 1.8 Mc. and 3.5 Mc. bands with the greatest bandspread on the 1.8 Mc. band. L_2 covers 3.5 Mc. and 7 Mc. with the greater spread on the 80-meter band.

Another way to calibrate the wavemeter is with your communications receiver. Take a piece of wire about 12 inches long and connect one end to the receiver antenna terminal and the other end to the receiver chassis. Make a one or two-turn loop in the wire and put the loop around the coil of the wavemeter. Tune in a signal on the receiver and then carefully tune C_1 . You'll find a spot where the signal will definitely peak up. Just read off the frequency on the receiver and transfer it to the wavemeter dial. Still another way to calibrate is with your transmitter signal—if you are sure of the frequency. Just hold the wavemeter near the final amplifier and couple enough energy to get a reading on M_1 . However, the grid dip or receiver method is best.

As A Field-Strength Indicator

Using the wavemeter as a field-strength indicator is quite simple. For example, suppose you

want the check a mobile installation. Set the wavemeter a short distance, say 20 feet, from the mobile antenna. Turn on the transmitter and then adjust the wavemeter for a reading. If you cannot get enough sensitivity for a reading, make a small pickup antenna from a piece of stiff wire about three feet long. Connect one end of the wire to the wavemeter case, form a couple of turns around the wavemeter coil, and let the remaining wire extend up from the coil. Any adjustments made at the mobile rig or its antenna that increase the reading of the wavemeter mean that the mobile setup is radiating better.

For adjusting beam antennas the wavemeter should be placed several wavelengths away from the beam. A pickup antenna is required. This should be a half-wave dipole, preferably placed at the same height as the beam and broadside to it. The pickup-antenna feedline is brought down to the wavemeter and coupled to the wavemeter coil with a couple of turns of wire. The beam is then adjusted for maximum wavemeter reading.

One word of caution when using the wavemeter and checking around "live" circuits in a transmitter. Voltages around a rig can be lethal, so use the utmost caution about touching any circuits. One way to cut down the chance of dangerous shocks would be to use a clip lead between the metal case of the wavemeter and the chassis ground of the rig.

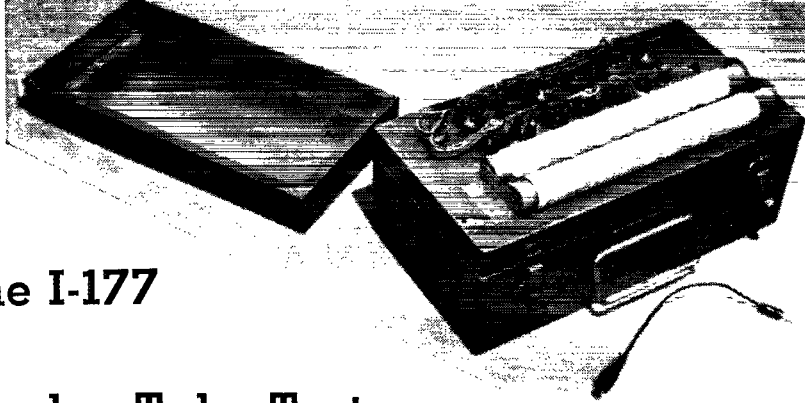
Once you use a wavemeter, you'll wonder how you ever got along without one. QST

Strays



During the Democratic National Convention in Atlantic City in August, the Southern Counties Amateur Radio Association, K2BR, set up two ham stations to handle traffic from the delegates and other visitors. The SCARA mobile unit (above left) was located right on the Atlantic City boardwalk where passers-by could learn about amateur radio and file messages. Traffic originated there was relayed to a kilowatt station located at the Absecon Lighthouse, about two miles away, where a 20-meter beam was located on top of the 170-foot structure (above right). Among the SCARA club members who participated in this public service event, during which over 500 messages were handled, were W2s OTB, PJD, TUR, UMC,

VCR; K2s BKG, CIR, HBA, RXB, SOX; WA2s GUK, JPA, OZQ, WPM; WB2s ERO, EWD, FPV, MRB, MRD; and WN2s NWJ, NUE.



Updating the I-177

Surplus Tube Tester

A Modern Checker at Low Cost

BY W. T. BRADLEY,* K4YPY

It is estimated that about 40,000 of the I-177 tube testers were produced. Many of these were furnished to amateurs through MARS channels. If you have one of these units, or can locate one in surplus, the modification described here will provide an up-to-date tube tester at minimum cost.

THE I-177 (ABC) surplus tube tester is of the dynamic type, and one comparable on the market today will run from \$200 up. Its drawback is that it will not handle tubes developed since the last World War (it doesn't even have a 9-pin socket); therefore, it is practically useless as it stands.

There have been several articles published describing an adapter that was issued by the armed forces to supplement the tester. These adapters will work, but it is necessary that you look up the circuit diagram of each new tube to be tested, set up the adapter connections to match the diagram, test a new tube to determine the settings of dials L and R for a good reading, then record these readings for future use. Over a period of time, a log of L and R settings for the more popular tubes will be developed. This is slow, expensive and tiresome, and we gave up after logging about a half dozen tubes.

Not wanting to discard this valuable tester, we began comparing circuit diagrams of modern dynamic testers with that of the I-177. Basically, they were about the same, so we decided to select a tube chart from a good tester and work backwards to adapt the I-177 to the chart.¹

Most companies that manufacture tube testers

* 1018 Grassland Lane, Nashville, Tenn. 37220.

¹ The chart used is one supplied with the Hickok tester type 6005, and is obtainable from Hickok Electrical Instrument Co., 10314 DuPont Ave., Cleveland 8, Ohio, at a cost of \$2.00 plus 15c postage.

This adapter for the I-177 tube tester is built into the cover of the unit. A new cover is made by cutting a standard 8 × 17 × 2-inch aluminum chassis down to a length of 15½ inches, and attaching it to the original cover with long bolts. The two rollers carry the new test chart.

sell adapters that will update any tube tester, but all of the old sockets will have to be added in updating the very obsolete I-177. These sockets can be added in a Minibox attached to the adapter and connected, pin for pin, to the sockets in the adapter. For those wishing to construct their own adapter, it can be built into the lid of the tube tester, as shown in the photos, or as a separate unit. There are about 2400 tubes listed on the tube chart roll selected. Our I-177 will now test all of these except those showing "press button B." There are very few such tubes listed, and we leave this problem with you.

Construction

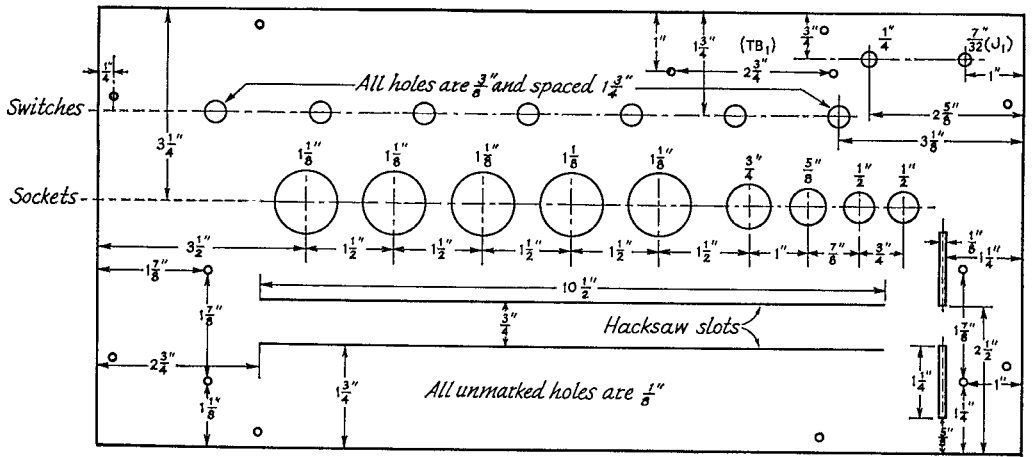
1) Close the lid of the I-177 and mark holes as shown in Fig. 1A. Remove the lid from the tester, drill and punch all holes, and make the hacksaw cuts.

2) Mount all sockets. You may mount any sockets desired, keeping in mind that no socket on the original tester is to be used again.

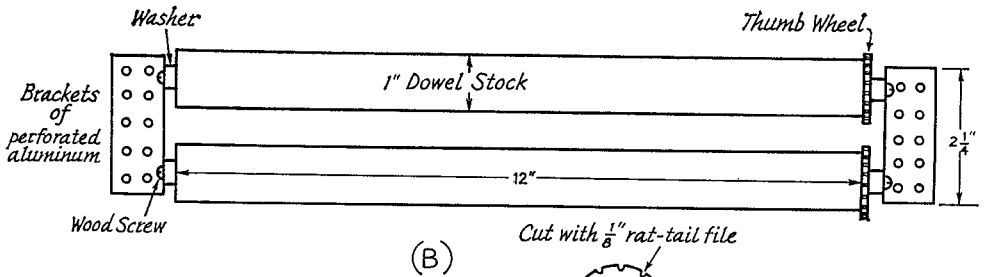
3) By observation, make sure that the rotating arm of all seven switches (Fig. 2) rests beneath the common connection. (They usually come from the factory this way.) Mount all switches so that the common connection will be at 6 o'clock.

4) Mount the 6-pin tie point TB₁, Fig. 2.

5) With but two exceptions, connect all similarly-numbered switch terminals (see Fig. 2) and similarly-numbered tube-socket terminals (where such exist) together. In the first exception, the No. 12 terminal of S₆ is connected to Terminal 12 of the Compactron socket; no connection is made to any of the remaining No. 12 switch terminals. The second exception refers to the Nuvistor socket whose Terminal 10 connects to the No. 1 terminal line, and whose Terminal 12 connects to the No. 3 terminal line. Terminals 2, 4 and 8 of this socket connect to similarly-numbered lines. The banana jack, J₁, connects to the No. 10 terminal line.



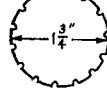
(A)



(B)

Fig. 1—Sketches showing the location of holes and slots in the cover of the 1-177 (same view as in photo on preceding page) at A, and the chart rollers at B. Drawings are not to scale. Socket holes from left to right are for 4-, 5-, 6- and 7-pin large sockets, octal, Compactron, 9- and 7-pin miniature, and Nuvisor sockets. Switches are mounted in the order shown in Fig. 3, with the orientation described in the text. The long hacksaw cuts are started by drilling a series of very small holes at one end filed into a slot.

Cut with $\frac{1}{8}$ " rat-tail file



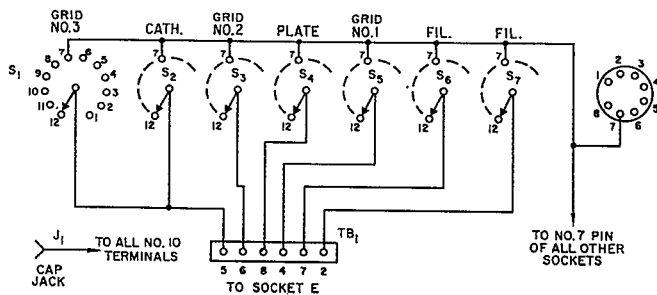
Cut from $\frac{1}{16}$ -inch aluminum

THUMB WHEEL



The completed adapter for the 1-177 tube tester. The paper chart is fed through slots cut in the cover with a hacksaw. The plug-and-clip lead in the foreground is for use with tubes having cap connections.

Fig. 2—Diagram showing connections to switch arms, as viewed from the rear of the switches. Switch contacts are connected as described in the text. Terminal 7 connections are shown as an illustration. Switches are single-pole 12-position rotary (Mallory 32112J). J_1 is a banana jack, and TB_1 is a 6-terminal tie-point strip. This strip connects to socket E in the I-177 tester.



6) Connect the arms of the seven switches as shown in Fig. 2.

7) Connect a 6-conductor cable from TB_1 to similarly-numbered terminals of socket E in the tube tester. If a separate adapter is constructed, this cable should terminate in an octal plug inserted in socket E of the tester.

8) Dial plates for the seven selector switches can be made from disks cut from thin Bristol board or cardboard, labeled as shown in Fig. 3, covered with thinned dope or shellac, and mounted under the switch-mounting nuts. New dials for L and R are constructed in the same fashion and calibrated to read zero to 100, instead of zero to 80 as originally. There are several such commercial dials on the market, if preferred.

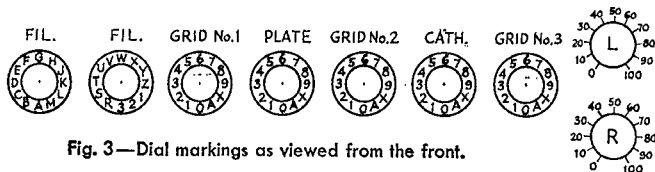


Fig. 3—Dial markings as viewed from the front.

9) Attach pointers to all switch shafts, pointing to 6 o'clock.

10) Turn the shaft of the potentiometer R fully counterclockwise and adjust the pointer to zero.

11) Turn the shaft of potentiometer L fully counterclockwise and adjust the pointer to 10. This pointer would normally be set to zero, but the calibration we made gave readings that were too low and, by checking the same tube on an expensive Hickok tester and on the I-177, it was learned that the setting should be as described above. This potentiometer is the meter shunt, and a little experimenting may be required.

12) Instead of making a chart roller (see Fig. 1B), you may wish to cut the chart up into pages, mount the pages on heavier stock, punch holes and use in a loose-leaf binder. Regardless of which method you use, the tube-chart columns should be labeled as follows:

TYPE, FILAMENT, SELECTORS, R, L, PRESS, MICROMHOS.

(Note that L and R are purposely reversed.)

13) Label the press buttons on the tester as follows:

- Amplifier Test — A
- Diode — C
- Rectifier Std. — D

At this point, we must admit that we have not determined what press button B actually is. Again, we leave this to your ingenuity.

Operation

1) Place the pointer of dial A to 4, and the pointer of dial B to 2. These pointers are to remain in these positions. So as not to turn them accidentally, we removed the pointers and replaced them with small, 1/2-inch knobs for the sake of appearance.

2) Tests as outlined in the pamphlet accompanying I-177 tester should be made, using the chart for settings and micromho readings.

3) The micromho reading as shown on the chart is the minimum reading for a good tube,

and might be compared with the lower end of a green space in the red-and-green general test. Many tubes will show a micromho reading of 1 1/2 to 2 times that shown on the chart; this condition is normal. A tube that shows a reading under the minimum might be entirely satisfactory for low-frequency and audio use, but is not recommended for v.h.f. use. An r.f. amplifier that would not operate satisfactorily at 144 Mc. might perform for many months as a 50-Mc. (or lower) amplifier; and one that will not perform even as high as 30 Mc. might still be satisfactory for use in an audio circuit.

QST—



Contest Corrections

In the July report on the January V.H.F. SS, K3BGZ should be noted as the Michigan section leader as well as winner of the Central Michigan Amateur Radio Club award. In the Sept. report of the June V.H.F. QSO Party, the section heading "South Texas" was inadvertently dropped. It should precede the calls of K5s PTK and DRF and WA5ABG. K3YFD of E. Penna. turned up as K3YFZ, sorry fellas!

The October CD Bulletin should show the 76,500 point Ohio c.w. score along with K8RXD's call.

A Featherweight Portable Station for 50 Mc.

1000 Miles Per Watt — 40 Miles Per Pound, on 6

BY EDWARD P. TILTON,* W1HDQ

Would you like to "get away from it all" and still take your v.h.f. station with you? Here's how: a complete 50-Mc. rig that weighs less than three pounds, including power supply, microphone and a good antenna system. Its receiver has performance to spare, and people who have worked the station speak highly of its "talk power." Transistors and some interesting antenna ideas are the answer.

THE receiver portion of this little rig was built first. After many hours working with various transistors and circuits, we had reception good enough to warrant a test of the little box at home. Its performance turned out to be fairly close to that obtained with our converter and communications receiver in reception of weak signals. This was pleasing, but not wholly unexpected.

Then on to the transmitter and more cut-and-try. Again, we had some finding-out-about-transistors to do, but eventually we developed enough reasonably stable power output to show in a 2-volt 60-ma. pilot light used for a dummy load. Now we had something to try! Would anyone hear this peanut whistle delivering a massive 0.07 watt to the antenna? We gave it the acid

* V.H.F. Editor, QST.

test: with no preliminary warming up the channel with the home-station rock-crusher, we put the transistor job on and called CQ. We made it a good long one, inserting plugs for the flea power in case anyone happened to hear the thing. Someone did: K1MRL, 47 miles away over the hills of Western Connecticut, answered. This represented something over 500 miles per watt — not bad for the first try.

Next morning we worked three more stations on a single CQ, one 30 miles away in Springfield, off the back of the beam! We're not quite ready to junk the home-station kilowatt, but we cite these initial results as evidence to any doubters that QRP can get answers, even in these days of ever-increasing power.

Working portable with a fraction of a watt can be real fun, if you have the patience for it. This pursuit is not exactly new to the writer, who became a ham for the express purpose of working from New England's high spots on 5 meters many years ago. In the early '30s portable stations kept the 56-Mc. band humming every summer weekend — but what portables they were! This was a young-man's game; to operate W1HDQ/1 atop New Hampshire's famed Mt. Monadnock in the 1934 Field Day, W1FME and the writer packed 65 pounds apiece up those rocky slopes, yet the power delivered to our antenna was hardly more than the 2-pound handful described here provides. In receiving ability our transistor job runs rings around the best we could build with tubes, then or now, and stay in the truly low-drain category.

Fig. 1—The 50-Mc. transistor station, complete with microphone, battery and antenna system, weighs in at under 3 pounds. The antenna coupler built in a small plastic parts box is used with random "long wires." Coax-fed antennas connect directly to the BNC fitting on the top of the case.

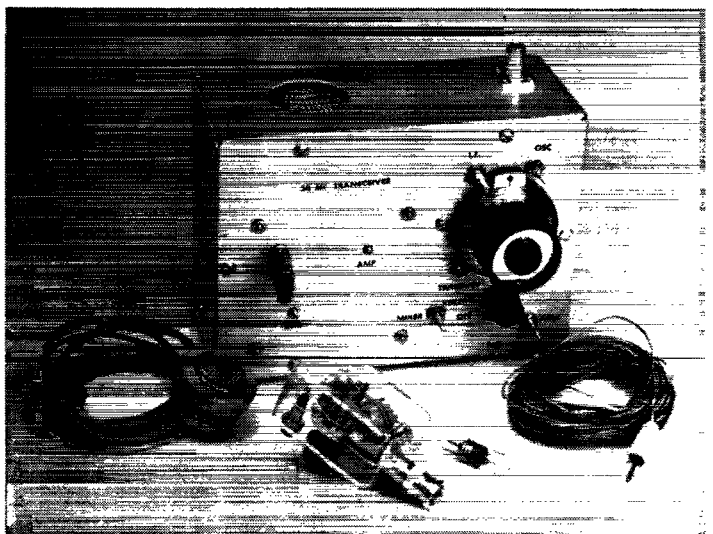
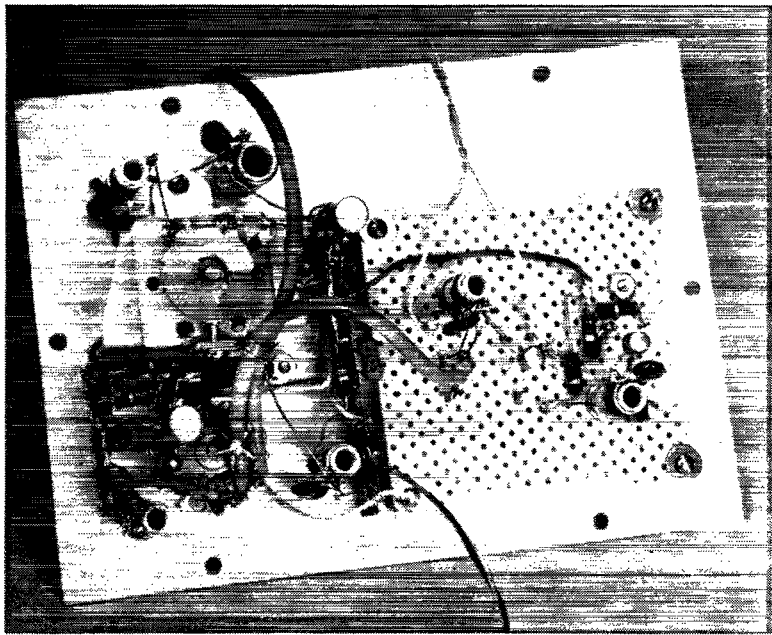


Fig. 2—Interior view of the transistor rig. The converter portion is at the left. The coil above and to the right of the tuning capacitor is the i.f. output coil, L_5 , which couples to a small broadcast receiver visible in the upper part of the case in Fig. 6.



Most v.h.f. gear using transistors described to date has been intended for hand-held use with whip antennas, mainly in emergency communication. What we wanted was an effective portable station for normal v.h.f. hamming; light enough to carry easily to the most inaccessible high spots. Above all, it had to be easy on battery power, an attribute conspicuously lacking in generations of portable rigs we've lugged up mountain trails in years long gone.

What's Inside the Box?

True portability today means standardization on transistors. Fortunately, we now have a wide choice of these little gems that work well in the v.h.f. range and yet are moderately priced. Our receiver idea came from an article by W4GEB.¹ A simple two-transistor converter works into a small pocket broadcast receiver of the \$8.95 variety. The selectivity provided by the broadcast receiver is a marked improvement over the superregenerative detector arrangement commonly used in small portable v.h.f. transceivers. The sensitivity is far greater than we'll ever need in working with a transistor transmitter. This is by all odds our best portable receiver; a genuine pleasure to operate in a mountain location. More details later.

The transmitter uses two moderately-priced transistors in the r.f. section. The modulator is a ready-made audio unit requiring only minor modifications to adapt it to the purpose. You couldn't buy the parts and make your own for the price of these little printed-circuit jobs.

The question of how far to go in transmitter power always arises in designing a portable station. This one delivers no more than about 100 milliwatts output, which is many decibels down

from most stations you'll want to work, but it is about the maximum that is entirely practical with small batteries.

One more transistor would raise the power by perhaps 10 db., but would the greater power drain be worth the small increase in working range? That is a choice everyone must make for himself, and for this writer the answer is no. As it stands, we have a station that will run for many hours on a small built-in 9-volt battery. Provision is made for plugging in an external battery of larger size, for round-the-clock operation at home or afield.

The Receiver Section

Tuning dials on pocket broadcast receivers are not good enough for the v.h.f. application, so a crystal-controlled converter is out. Furthermore, leaving the receiver set at 1600 kc. gives uniform image rejection across the band and prevents interference from nearby broadcast stations. We used the W4GEB approach: a tunable oscillator working at half the desired injection frequency, tuning from 24.1 to just above 25 Mc. The second harmonic of the oscillator beats with signals from just below 50 to about 52 Mc., to give an i.f. output of 1600 kc. Transistors are marvelous devices; one transistor serves as both mixer and oscillator, and does the job very well.

An r.f. amplifier stage is used ahead of it, to give some gain and selectivity. We tried several types of transistors: 2N384, 2N1177 and some numberless MADT's we bought at five for a dollar from a bargain house. All worked, but 2N1177's gave the best noise figure of any inexpensive transistors tried, so we felt that their price (83 cents each) was justified.

The converter occupies about one third of the 5- by 7-inch panel. Parts layout is not critical, as components are so small that it is virtually

¹ North, "A 50-Mc. Double-Conversion Transistor Receiver," *QST*, July, 1963, p. 24.

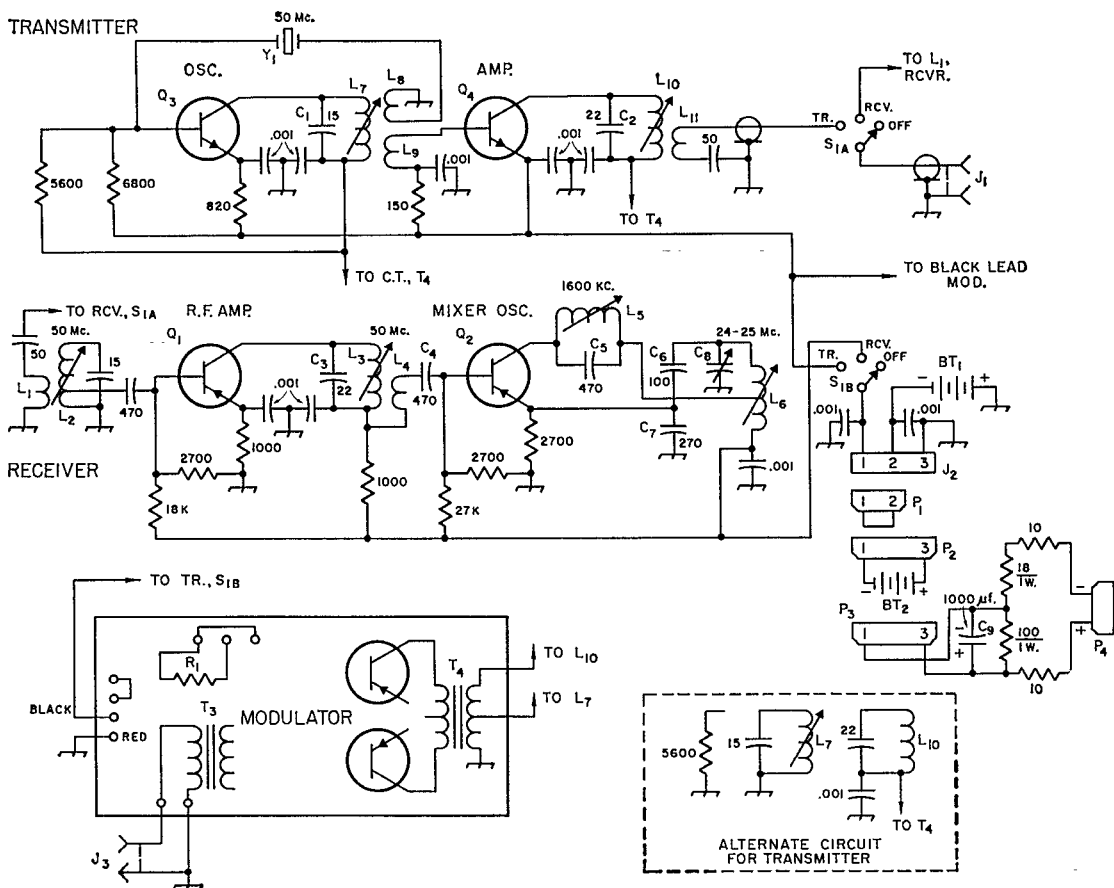


Fig. 3—Schematic diagram and parts information for the complete 50-Mc. station. Resistors are composition, 1/2-watt or less, unless specified. Capacitors C₁ through C₇ are dipped silver-mica. Others are ceramic unless indicated. Decimal values are in $\mu\text{f.}$; others in p f. unless indicated.

- BT₁—Internal 9-volt battery. (Eveready No. 246, Burgess 2N6 are largest usable size).
- BT₂—External 9-volt battery. Can be 6 flashlight cells in series or any 9-volt unit.
- C₈—15-pf. miniature variable (Hammarlund HF-15, modified for desired bandspread; see text).
- C₉—1000- $\mu\text{f.}$ 12-volt electrolytic.
- J₁—Coaxial chassis fitting, BNC type.
- J₂—Crystal socket modified as per text, or 3-pin male power connector.
- J₃—Phono jack or other microphone connector.
- L₁—2 turns No. 22 enamel wound over bottom turns of L₂.
- L₂—10 turns No. 22 enamel closewound on 1/4-inch iron-slug ceramic form (Miller 4500). Tap at 4 turns.
- L₃—8 turns like L₂; no tap.
- L₄—2 turns No. 22 enamel over bottom turns of L₃.
- L₅—14.8 to 31- $\mu\text{h.}$ adjustable coil (Miller 4407).
- L₆—8 turns No. 22 enamel, 3/8 inch long on 1/4-inch iron-slug ceramic form (Miller 4500). Tap at center.
- L₇, L₁₀—7 turns like L₃.
- L₈—2 turns No. 22 enamel wound near middle of L₇. Connect top of winding to ground, but wind in same direction as L₇.

- L₉—3 turns No. 22 enamel over bottom of L₇, in same direction.
- L₁₁—2 turns No. 22 enamel at bottom of L₁₀.
- P₁, P₂, P₃—Crystal socket, or 3-pin female plug.
- P₄—Plug for automotive cigar lighter socket.
- Q₁, Q₂—Germanium v.h.f. transistor. 2N1177 preferred, of several p.n.p. types tried.
- Q₃, Q₄—Silicon v.h.f. or u.h.f. transistor, n.p.n. type, 2N3478, 2N2857, or 2N706; see text.
- R₁—Resistor substituted for gain control, value to suit microphone and desired voice level, 470 to 820 ohms.
- S₁—2-pole 3-position wafer switch, subminiature type.
- T₁, T₂—Integral parts of the Lafayette PK-544 audio amplifier, not shown in above diagram.
- T₃—Miniature microphone transformer, 200,000-ohm primary, 1000-ohm secondary (Lafayette TR-120).
- T₄—Miniature modulation transformer, both windings 500 ohms, center-tapped (Lafayette AR-162). Substitute for T₃.
- Y₁—50-Mc. crystal for desired transmitting frequency (International Crystal Mfg. Co. Type FA-5 or FA-9. FA-5 has small pins).

impossible to have long leads. We tried several mechanical arrangements, and all worked equally well. Only two precautions are necessary. First, if you use one of the miniature vernier dials, be sure that the mounting arrangement does not introduce drag. The torque capability of these little imports is very slight, but if the capacitor turns freely the dial will handle the tuning job as nicely as anything you can buy. Miniature dials imported from Japan are sold under many names; this one was an Argonne AR-405, 2-inch model. The knob was replaced by a larger one (National HRT-M) for easier operation. Second, the i.f. output coil, L_5 , must be in such a position that it couples inductively to the loop-stick antenna in the broadcast receiver. This coupling is not critical; we found that a variation in position of a half inch in any direction was permissible.

There are so many types of small receivers available that a detailed layout cannot be given. Ours is mounted in the top left portion of the case, a standard 3 by 5 by 7-inch aluminum box. The combination volume control and switch on the receiver is accessible through a rectangular hole cut in the back wall of the case. The receiver ear-phone jack is also reached through a hole in the rear wall. Two small aluminum brackets hold the receiver against the top of the case, as shown in Fig. 6.

Looking at the front panel, Fig. 1, we see the send-recv switch just below the vernier dial. In the lower right corner of the panel is the slug adjustment of the r.f. coil, L_2 . At the left is the interstage coil adjustment, L_3 . At the upper right is the oscillator coil, L_6 . To the upper left of the main dial is the mixer output coil, L_5 . This is tuned to 1600 kc. by the 470-pf. capacitor across it, which looks like an r.f. bypass to the 24-Mc. energy from the oscillator circuit.

The back-of-panel view, Fig. 2, shows that most of the converter parts (left side) are mounted on tie-point strips. There are three of these: one running vertically at the edge, one horizontally between the tuning capacitor and the send-recv switch, and a third vertically at the right, adjacent to the transmitter assembly.

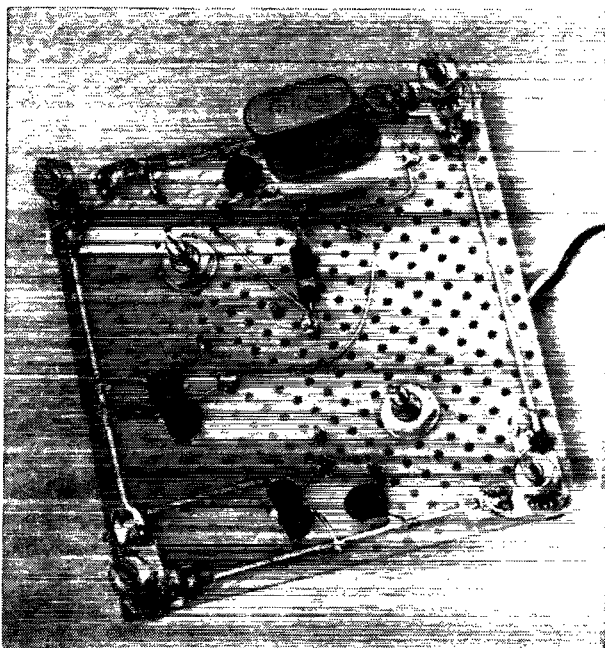
The transistors are soldered into the circuit without using sockets. Some transistors have leads long enough for this purpose. Some 2N1177s are designed for sockets, so extension wires must be soldered to their short leads. Do this quickly, with a minimum of heat. The r.f. amplifier, Q_1 , is at the lower left, the mixer-oscillator, Q_2 , is near the upper center of the rear view. The heavy grey leads are small-size coax, connecting the output fitting to the send-recv switch and transmitter output.

The Transmitter

Of many transistors tried for transmitting service, three types, all n.p.n., gave outstanding results. Since the opposite polarity, p.n.p., worked best for receiving we have some circuit differences between the transmitting and receiving portions of Fig. 3. The whole station is wired for positive ground, which is more-or-less standard procedure in transistor work. (The packaged audio unit and the broadcast receiver are wired that way.) If the station is to be operated from the battery in an American car, the case should be isolated from ground.

The transistors are silicon types (germanium in the receiver) of moderate price. The 2N706, available from several makers, is the least expensive one that we found satisfactory for transmitting. The 2N3478, a new RCA type made for u.h.f. converter oscillator service, works extremely well. The RCA 2N2857 is also excellent,

Fig. 4—Panel side of the transmitter assembly. Holes are drilled in the front panel for mounting the peg-board chassis, and to permit the crystal socket and coil slug screws to project through. Note grounding bus around edges.



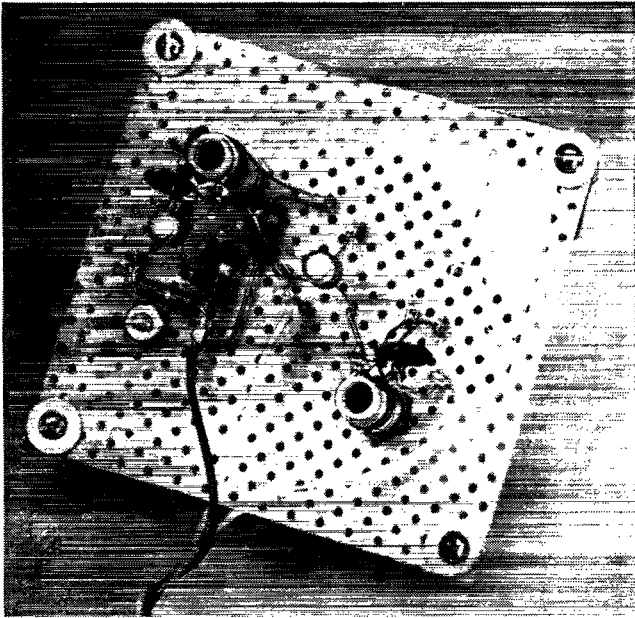


Fig. 5 — Back of the transmitter section, showing the two transistors and tuned circuits. The crystal oscillator is at the left.

though more expensive. With the biasing shown, input to the oscillator is about 50 milliwatts and the amplifier 200 milliwatts, with a new 9-volt battery. Since the allowable dissipations of the three types mentioned above are 200 to 300 milliwatts no heat-sinking is necessary.

The transmitter is assembled on perforated insulating material known as *Vectorbord*, $2\frac{1}{8}$ by $2\frac{1}{4}$ inches in size, using push-in terminals made for this product for mounting and wiring in small components. Mounting screws at each corner are joined with No. 18 wire, which acts as a ground bus for bypassing. The side of the transmitter toward the panel is set away from it by $\frac{3}{16}$ -inch metal pillars and 4-40 nuts at each corner.

Though we had some fun finding optimum arrangements as to coupling and biasing, it would seem that little trouble should be encountered in duplicating results, now that these points have been resolved, so long as transistors of types similar to those recommended are used. Note the polarity of the crystal oscillator feedback loop, L_8 , and the amplifier coupling, L_9 , with respect to the oscillator collector coil.

Installing the Modulator

The modulator is a 5-transistor audio amplifier available ready-made from Lafayette Radio Electronics Corp., Model PK-544. It is capable of more audio than we need, but it is a Class B amplifier, drawing almost no current except when driven, so the extra power capability is no problem. The PK-544 is intended for use with a speaker, so its output transformer has an 8-ohm secondary. For modulator service this transformer should be replaced with one having 500-ohm center-tapped primary and secondary windings. Lafayette supplies an Argonne AR-162 for this purpose. If a high-impedance crystal or ceramic microphone (latter preferred) is used,

an input transformer with a 200,000-ohm primary and 1000-ohm secondary is required. Lafayette's TR-120 is suitable.

No gain control is included with the PK-544, and none is really needed. A fixed resistor, R_1 , is connected across the gain control terminals, the value selected to suit the user's preference as to voice level and microphone. We found 470 to 820 ohms suitable for various microphones tried. With a high-output inexpensive ceramic job intended for lapel use a 470-ohm resistor gave about the right amplifier output for close talking.

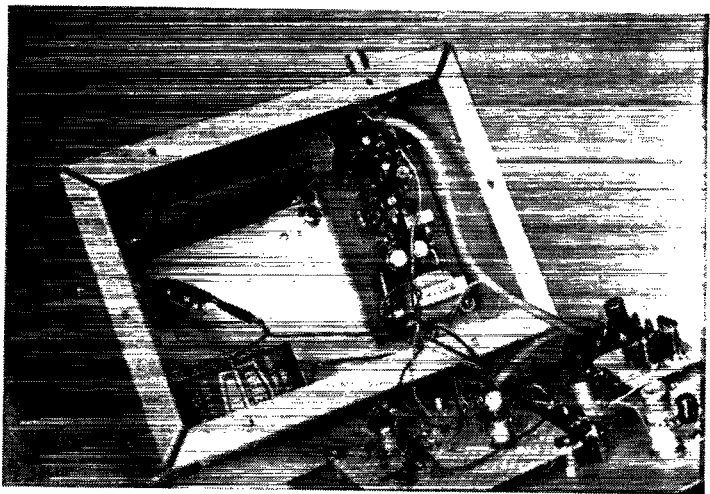
The modulator is mounted on the inside back wall of the case, in back of the converter. The microphone connector is also on the back wall, near the modulator input terminals. The modulator is shown in outline form at the lower left of Fig. 3, with the various terminals at the approximate positions of the original.

Modulation may be applied in two ways, also indicated in the schematic. Where it does not cause appreciable frequency modulation, the audio may be applied to both oscillator and amplifier, as shown in the main diagram. This gives excellent "talk power," and is largely responsible for the rave reports we've received on the audio punch the little rig shows on the air. Some transistors that work well otherwise may show quite a bit of f.m. along with the a.m. when the modulation is done this way. In that case, modulation may be applied to only the amplifier stage, as shown in the insert at the lower right side of Fig. 3.

Battery Options

Provision is made for use of the internal battery, BT_1 , an external battery of larger size, BT_2 , or a 12-volt car battery. The car battery may be either positive or negative ground, but if it is the latter be sure that the case of the rig is isolated

Fig. 6 — Looking into the case we see the small broadcast receiver, upper left, the ready-made modulator, right, and the built-in 9-volt battery, lower left.



from the car ground. With the simple plug-in arrangements shown, no switching is required to change the power source. A modified crystal socket, J_2 , mounted on the rear wall, has short stubs of wire soldered into the socket terminals. No. 18 will do for miniature crystal sockets, No. 12 for the FT-243 type. To use the internal battery, BT_1 , the terminals of J_2 are shorted by plugging another crystal socket (with its terminals shorted) onto it. This is P_1 of Fig. 3. To use an external battery, BT_2 , a third terminal at the same spacing from Pin 1 is provided for grounding to the case. A piece of wire under the screw used to mount J_2 is bent into position so that a crystal socket can be plugged onto it and Pin 1 of J_2 . The same type of socket is also used to connect the car battery circuit, to be described later. P_1 , P_2 and P_3 are identical crystal sockets; the terminal numbers 1, 2 and 3 being used merely to clarify the circuit as shown schematically. Obviously this job could be done with standard fittings if desired.

The broadcast receiver can be operated from its own battery, if you intend to use the receiver for broadcast as well as 50-Mc. reception. In this case, you turn it on and off with its own volume control and switch when it is used as the i.f. system for the converter. But if you are going to leave the receiver fastened in the 50-Mc. station permanently it will be more convenient (and more economical on battery drain) if you wire it as shown. Cut a small notch in the receiver's plastic case to bring out battery leads unobtrusively, and the receiver can be restored to its original condition readily. The connections can be made "plug-on." Insulated battery terminals can be purchased for this, or you can get them from the top of a discharged battery. The same trick can be employed with the modulator, though it was not done here as we anticipated no other uses for that unit.

This is a station for hams who like to go where there are no cars, but now and then you might want to run it off the car battery. A communications emergency that goes on for days is an example. A dropping resistor of about 100 ohms

will maintain the input voltage at a safe level, but the regulation is poor with such a resistor and the modulation percentage and quality suffer accordingly. A better arrangement is shown in the schematic diagram. The plug P_3 connects to the rig in the same manner as P_2 . A bleeder across the battery gives better regulation than the dropping resistor, and C_9 , a low-voltage high-capacitance electrolytic, helps in this respect. The 10-ohm $\frac{1}{2}$ -watt series resistors connected in the line to a cigar-lighter plug, P_4 , act as fuses, in case you inadvertently ground the aluminum case when working with a car having negative ground. American cars are negative ground; some foreign cars oblige with positive, which is just fine for our purposes.

Adjustment and Use

Putting the receiver to work is mainly a matter of tuning for maximum noise and signal strength. Set the broadcast receiver at the high end of its range and apply voltage to the converter. The noise level will rise markedly if the oscillator is working. Adjust the slug in L_5 for maximum noise, and you should be able to hear any strong 50-Mc. signals if the oscillator tuning range is right. Set the band where you want it by means of the slug in L_6 . Peak L_2 and L_3 for maximum response on a 50-Mc. signal, and you're in business. If you have a calibrated signal generator available, it should be possible to hear a modulated signal as weak as 0.3 microvolt. With carefully selected transistors and everything peaked to perfection, we've gotten down to where the leakage of a good generator can be heard, but this is gilding the lily. With a small fraction of a watt coming out of the transmitter, you're not going to need that kind of receiver sensitivity!

Bandspread and tuning range can be adjusted to suit one's preference by modifying the tuning capacitor, C_3 , or the capacitive feedback network, C_6 - C_7 . To make for easy tuning, we cut C_8 to one rotor and two stator plates, which provides about two megacycles tuning range. You can get a rough check on the oscillator tuning range

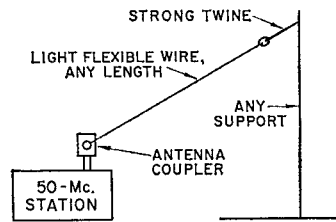
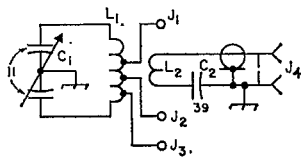


Fig. 8 — Circuit of the antenna coupler and its application in feeding a long wire in portable work. Tip jacks J_1 and J_2 may be used for a balanced-line system. Any of the three jacks may be used for random-length long wires, merely by checking for best reception. Peak C_1 for maximum signal on receiving. Gain and directivity of the long wire will depend on length and slope.

C_1 —11-pf. per section butterfly variable (Johnson 160-211 or 11MB11).

C_2 —Fixed ceramic capacitor, 39 to 68 pf. Check with variable temporarily, if possible.

L_1 —18 turns No. 24, $\frac{1}{2}$ inch diameter, 32 t.p.i. Tap at 5

turns from each end and $1\frac{1}{2}$ turns from one end (B&W No. 3004).

L_2 —2 turns insulated hookup wire around center of L_1 .

J_1, J_2, J_3 —Tip jack.

J_4 —BNC cable fitting. Connect J_4 and rotor of C_1 with copper strip.

with an absorption wavemeter. Connect a low-range milliammeter in the power lead to L_6 , and couple the wavemeter to the coil. A slight flicker will be seen when the wavemeter tunes through the oscillator frequency. Multiply this by two, subtract or add 1600 kc., and you have the signal frequency. Either beat will work, if you set the slug in the right place. We preferred the lower side, though it's not important.

There may be a slight tendency toward acoustic feedback between the speaker and the oscillator circuit components, but this is not troublesome if the audio volume is set a bit down from the maximum position. With the little receiver's Class B audio system you'll save on battery drain if you run the audio at the lowest usable level. Most receivers draw 8 to 10 ma. with the audio turned down to a whisper. Room-filling audio takes up to 40 ma. on audio peaks. Levels sufficient for use within 3 feet or so of the speaker require very little current swing, and peak receiver drain, including that of the converter, will be about 15 ma. under such conditions. That will give a good many hours of listening, even on a small 9-volt battery.

Transmitter adjustment is simple. You merely tune first for maximum output from the oscillator and amplifier. Current drain of the amplifier increases with drive, so it is a good indication of oscillator peaking. The better the transistors the easier the tuning operation is. Fiddling with coupling may be needed with some transistors, both as to number of turns and position of the coupling windings, particularly if transistors other than those specified are used. Once you have obtained satisfactory output it is well to listen to the signal with a selective receiver with the b.f.o. on. Tune the oscillator for best stability and freedom from frequency modulation, even if it means a slight reduction in output.

A 2-volt 60-ma. (No 48) pilot lamp makes a good load. A piece of No.18 wire about $\frac{3}{16}$ inch long, soldered to the center terminal of the lamp, plugs into the BNC fitting, J_1 . Another piece of wire soldered to the brass base can be bent to press against the outside of the fitting. With everything working well there is a good glow in

the lamp, and this will brighten markedly on modulation peaks. A rough check on output can be obtained by comparing the light with that obtained when a similar lamp is connected across a single flashlight cell. Measure the voltage and current, which will be about 1.4 volts and 50 ma., or about 70 milliwatts. This is similar to the transmitter output, which will run 50 to 100 milliwatts, depending on the transistors used, the condition of the battery, and care used in adjustment.

Antenna Ideas

Everybody likes whip antennas — until they try to work stations farther away than they can shout. Even with high power we need all the antenna we can manage in v.h.f. work; with this pip-squeak a good antenna is a must, even when operating from your favorite mountaintop. (Remember, 70 milliwatts is 30 db. down from the average 50-Mc. station output!) But it doesn't make much sense to eliminate every

(Continued on page 156)

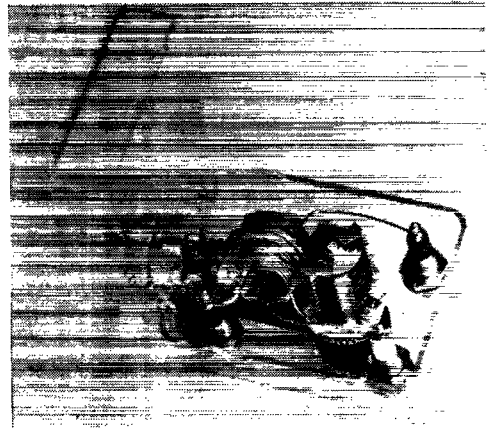


Fig. 7—The miniature antenna coupler is built in a hinged plastic parts box $1\frac{3}{4}$ by $2\frac{1}{4}$ by $1\frac{1}{4}$ inches in size. End-fed long wires or balanced-line antenna systems can be accommodated, through use of the appropriate taps on the tuned circuit.

• Technical Topic —

Transistor Voltage Limitations

EVER wonder why the transistors in your mobile power supply or modulator suddenly disappeared in a cloud of smoke without any warning? Maybe you attributed the failure to bum transistors or perhaps to transistors in general. Of course, it couldn't be a matter of voltage, current, or power ratings because it said right on the transistor box that it was a 12-volt transistor!

Probably the most misunderstood of all the transistor ratings is the maximum voltage that a transistor can stand without being destroyed. Transistor manufacturers establish voltage ratings with reference to a specific combination of transistor electrodes, such as collector-to-base or collector-to-emitter, to indicate the maximum voltage that can be placed across these electrodes before breakdown.

Unfortunately, unlike vacuum tubes, transistors cannot stand, even for a fraction of a second, a voltage that exceeds the breakdown voltage. This can be understood when you stop to compare the physical construction of vacuum tubes with transistors. Transistors have absolutely no physical spacings between their elements as do vacuum tubes. In fact, transistor elements (base, emitter, and collector) are in actual contact with one another. There is only a thin molecular boundary separating the elements. When the critical breakdown voltage is reached, current will accelerate, causing a localized heating which in turn fuses the elements together. A short circuit results and this destroys the transistor.

How can maximum voltage ratings be applied in a practical sense to insure against burned-out transistors? The important voltage rating is the forward voltage between the collector and base, V_{CB} . Sometimes the value for V_{CB} is given for an emitter-open condition, V_{CBO} , or for a specified emitter-to-base voltage condition. In any case, the collector-to-base value must never be exceeded.

The first precaution that might come to mind after determining the maximum collector-to-base voltage would be to limit the power-supply voltage that operates the transistor circuit to a value below the maximum V_{CB} . This is not always sufficient, however, and transistor failure may result even though the operation seemingly is well within ratings.

For instance, suppose you have a push-pull modulator using transistors, such as shown in the simplified circuit diagram in Fig. 1.

The collector-to-base voltage, which is what we are interested in, is the sum of the collector-to-emitter voltage and the emitter-to-base voltage. With no audio signal, this is the sum of the voltages

of BT_1 and BT_2 . But with the amplifier operating, the instantaneous audio voltages add algebraically to the d.c. voltages. Because of the inductive action of the modulation transformer, T_1 , the instantaneous collector-to-emitter voltage on Q_1 and Q_2 may be almost double the d.c. voltage, at maximum audio output. If the modulator were operated in a mobile station using the car's 12-volt battery for BT_1 , the maximum emitter-to-collector voltage could be almost 24 volts. Voltages can reach equally high levels in a transformer-coupled single-ended class A stage, such as might be used in the mobile receiver to drive a loudspeaker. The conclusion is obvious: the d.c. collector-emitter voltage should never exceed one half the V_{CB} rating when transformer coupling is used.

If a transformer-coupled stage is overdriven so that clipping occurs, the sharp cutoff of collector current will generate "spikes" that will go many times higher than the power-supply voltage. In a 12-volt system, voltages can reach 60 or 70 volts, in some cases, especially at the resonant frequency of a speaker connected to an audio output stage. Also, if a transistor audio amplifier or modulator having transformer output is operating without a proper load, or is driven into the collector-current cutoff region, extremely high a.c. voltages may develop across the primary of the output or modulation transformer and may be sufficient to cause transistor failure.

Power supplies using transistors in push-pull switching circuits cause problems, too, with instantaneous collector-to-base voltages largely due to the square-wave nature of the wave form. Sometimes spikes on the leading edges of the waves can become extremely large in amplitude. It is important that a properly designed circuit be used; information on this subject has appeared in *QST*¹ and *The Mobile Manual For Radio Amateurs*².

Transients

Voltage transients (spikes) are another killer of transistors. If the peak voltage of a transient exceeds the maximum collector-to-base voltage, no matter what the duration of the transient, the transistor is sure to be destroyed. There are many sources of transients, some of which are not directly associated with the circuit involved. In the case of the mobile station, transients can come from relays, light switches, turn indicators, and other car electrical equipment.

In addition to transients, the primary voltage may vary over several volts. If the battery is discharged or the voltage regulator is in need of adjustment, the voltage can soar to 16 volts or so.

Damaging voltage transients can be introduced into transistor circuits when making measurements or when trouble-shooting. At the test bench, transients can be coupled from the a.c. line through a v.t.v.m. or other mains-powered test gear into the transistor circuit. Never turn test equipment on or off while it is connected to a transistor circuit. A shielded isolation transformer between the a.c. line and test instruments can give some protection from a.c. line transients.

To sum up, transistors can be used without fear of failure from overvoltage, but only if serious consideration is given to the circuit to be used and to the possibility of voltage transients. The power supply voltage alone is not the sole criterion. — E. L. C.

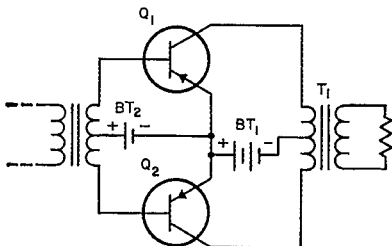


Fig. 1 — Push-pull modulator.

¹ Johnson, "High-Power Transistorized Mobile Power Supply," *QST*, April 1958.

² Third edition, page 184.

Some Fine Points In Message Handling

Part 2: Some Procedural Hints for Both Phone and C.W. Operators

BY GEORGE HART,* WINJIM

The first article of this series was a step-by-step analysis of the parts of a message. This one details some of the other points of message handling by both phone and c.w. In the next one, we hope to put you into a network of traffic handlers, and then the fun really begins.

THE handling of a message is basically to relay a piece of writing from in front of you to the paper on the operating desk in front of the operator at the other end. This may sound simple, but consider the number of transfers that have to take place before the process is complete. The writing in front of you has to be seen by your eyes, interpreted by your brain, expressed through your vocal chords (or c.w. fist), transmitted by your equipment through the so-called air waves, received at the distant point by another piece of equipment, heard by its operator's ears, interpreted by his brain and reduced again to writing by his hand. Each of these processes is subject to error, human, mechanical, electrical and ionospheric. Through such a series of pitfalls, how can we expect a message to come out at the other end exactly as it appeared before the sending operator?

And yet, we do expect this. We expect it because it is done commercially all the time, and taken for granted by the general public. If we do not perform it with at least reasonable accuracy, our service may be considered inadequate. We could be laughed at, ridiculed, downgraded. On the other hand, if we do perform well we are admired, appreciated and utilized. Which do we prefer?

Okay, next question. How does one go about sending message traffic from one point to another without lousing it up? That's what we discussed last month, and we are going to discuss it some more this month and, if space does not permit completion, again next month.

Reading the Message

The first operation is for your eyes to see the message in front of you. They can't do this properly if the light is dim, or reflects blindingly from the paper, or if you aren't wearing your reading glasses. So see that these things are all right before you even sit down.

Now that your eyes are seeing the message, your brain has to interpret what they are seeing. Before you send it, you have to be able to read it.

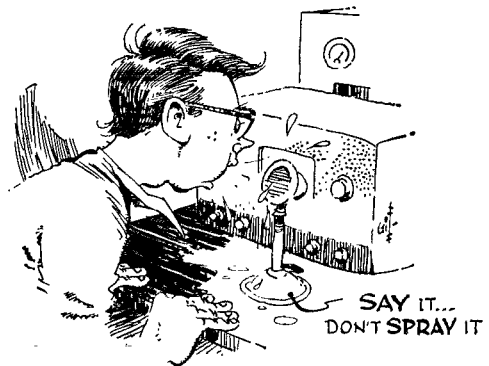
* National Emergency Coordinator, ARRL

The way some people write longhand, this in itself is like trying to decipher Babylonian cuneiform. Most people can decipher their own hencratching, but what happens when someone else has to read it? Best thing to do is have a portable typewriter handy to your operating position, or set up and ready — and use it. It's somewhat harder to make typing illegible, although it can be done.

When the message is legible, the brain should have little trouble interpreting it (assuming the operator can read, of course) and instructing the vocal chords or the fist, as the case may be, how to send it. There are two entirely different processes involved, so let's take them one at a time.

Handling Messages on Phone

On voice transmission, remember you're not a broadcast station announcer trying to project your personality. Forget the sonorous intonations, the skillful inflections, the conversational emphasis. Don't read the message, send it, and do it at writing speed, not understanding speed. The guy at the other end doesn't have to understand it, all he has to do is write it down, just as you have it, one word or group at a time. The best way to do this is to emphasize every syllable of every word, almost in a monotone. If you use a conversational tone, you are emphasizing certain syllables, and this means you are de-emphasizing others. The guy at the other end will undoubtedly get the gist, but it isn't the gist he wants, it's the exact wording and spelling. So send the message to him, don't read it to him. Send one word, give him time to write it down, then send him the next one, and so on. Don't read him a whole phrase or clause at a time. If you do this, he might very easily drop an article, conjunction or other short word here and there. Send one word at a time!



Talk across the microphone, not directly into it. We want to reproduce the sounds made by your vocal chords, not the spray and hot air hitting the microphone grille.

We asoom yew awl no how to spele. On phone, spelling can be a problem, and there is really no alternative to assuming that all operators are capable of spelling simple English words. The alternative is to spell out everything, and this would be a little on the ridiculous side. On the other hand, don't be afraid to show your ignorance, just because you can't spell a simple word such as "cyclical."

Following the sending of the message by voice, the next stage of the process is technical; in other words, your rig. What you put into your rig isn't always the same thing that comes out the receiver at the other end, depending entirely on how well the equipment is adjusted and operating, what happens to the signal as it is projected through the ionosphere, how strong it is when received, and what the receiver does to it before it comes out the speaker or earphones. The transmitting operator is responsible only to the end of his antenna. From there to the receiving antenna, the intelligence being transmitted is at the mercy of the whims of Dame Nature. Then the distant receiver takes over, and the distant operator must reduce the message to written form again.

Station arrangements can make a big difference. On sideband, VOX is a most valuable device because it allows you to send the message one word at a time and gives the receiving operator a chance to break you immediately if he didn't get it. Transmitting at writing speed makes this feasible, provided your VOX is adjusted for quick operation both on make and break. The use of voice-controlled carrier is rare on a.m., but if done on both ends it's just as good a procedure. Otherwise, it is helpful to stand by after each part of a message (preamble, address and text) to get an okay from the receiving operator, or to give him "fills." This also helps to separate the parts of the message.

The exact procedure used in getting (giving) fills varies. The general principle is to be *brief* and *concise*. The receiving operator merely says "word after. . ." or "word before" or "all between," and the transmitting operator transmits *only those words*. Never mind the reason *why* you missed something. Who cares? You missed it and need a fill, so *get* the fill. When you have it all correct, the acknowledgement can be something like "Roger, number umpty-ump, over."

If your count of the words in the text doesn't agree with the "check" as received, get this straightened out before "rogering" the message. This doesn't mean counting the words aloud on the air in an undertone. It shouldn't even mean making the transmitting operator stand by while you count, because if you copied five words to a line (ten if you're using a mill), you can count the words at a glance. *Example:* The check on the message is transmitted as 10, but you count only nine words in the text. You say, simply, "I get

nine." The first thing to do to straighten out the difficulty (assuming he does not re-count and immediately agree) is to check on compound words, numerals and "X-rays" to make sure you are both counting them the same. If this doesn't straighten it out, the transmitting operator should read over the message again, and that ought to do it. The object is to make your copies match, not debate how to count certain words, so don't argue, just get the job done and get along with the traffic handling. Correcting a check should require only a few seconds.

Occasionally we hear operators making remarks about the content of messages they are handling. Regardless of whether you do this before, during or after the transmission of the message, this is the worst kind of lidism and marks you as an unproficient operator of the worst kind. Eschew it like the dickens!

After the signature of the message, *always* say "end of message." This tells the other guy he can stop writing. If this is the last (or only) message you have to send, add "no more." If you have another message to follow, say "more," or "more to follow."

Handling Messages by C. W.

When we say "c.w.," of course we mean International Morse Code; the term is somewhat colloquial, but so ingrained that nearly everybody knows what is meant. Transmission of a message by this mode is quite different. The process is essentially the same, but the brain tells the fist how to transmit rather than the vocal chords, utilizing an acquired skill that not everybody has.

Not that sending c.w. is harder than talking; far from it. Of course anything you can't do is harder than what you *can* do, but when it comes to learning, c.w. is infinitely easier than talking. But everybody learns to talk (after a fashion, that is), while only a relatively few have acquired the skill to transmit intelligence by code.

Given the required skill at both the sending and receiving ends, there are nothing but advantages in using c.w. for message handling. It is simpler, requires a great deal less spectrum space and is therefore more selective, it is more accurate and just as fast or even faster than transmission by voice. The only possible reason that any operator prefers voice to c.w. for transmitting messages is that he lacks proficiency in doing so by code. Let's not kid ourselves about *that*, even if it hurts.

Sending traffic by c.w. does require a lot of skill — not just c.w. skill, but know-how about procedures, prosigns and general operating "savvy" in this specialty. There are more of them than there are in voice operating, because by code it takes longer to send something than by voice and therefore more "short cuts" are advantageous. Proper use of them is an absolute "must" for successful c.w. traffic handling, just as improper or non-use can cause terrific foul-ups.

Many c.w. operators have a tendency to run their words together. When speaking, one is not conscious of distinct stops between words, and so there is no analogy here between speaking and

sending code, and therefore when one has acquired sufficient code proficiency so that sending code is the same as speaking, one is inclined to neglect the stops (spaces). Even good operators are guilty of this, sometimes. If proper spacing is not second nature, then one must make a conscious effort to exaggerate the spacing between words; this is a great deal more readable than omitting it entirely. Proper spacing is just as essential to code transmission as is the formation of each character itself, and just as essential as is proper enunciation in speech.

A really proficient c.w. traffic handler will use "break-in." This does not mean merely to hear the other station without throwing any switches when you stand by; it means the ability to hear him through the spaces in your own sending, so that when he "breaks," your sending can be interrupted even though you are in the middle of a word.

There has been a lot of technical material written on this subject, and much of it is worth reading. A break-in system that realizes all the advantages of a single-antenna for both transmitting and receiving is a technical problem. But in general, if you can put up with some receiver clicks, if you can send properly whether or not you monitor yourself (as any really good operator can), all you really need is a separate antenna for receiving. A small neon bulb across the input (from antenna to ground) of the receiver will bypass most of the r.f. from your own transmitter and prevent any possible damage to your input circuit. Turn *off* your a.v.c. (most receivers have slow recovery time with it on), advance your audio gain to about half way and control signal volume with your r.f. gain. You should adjust your audio gain to the point at which your own signal doesn't hurt ears, the higher the better. You should have perfect break-in. Many c.w. men handle traffic without it, but not the really good ones.

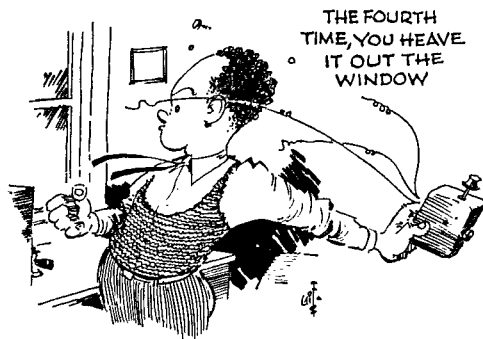
Just *having* break-in doesn't give you the skill to use it properly. Only practice can do that. Let's say you are about to send a message. You get QRV from the other operator, give him QSK, and away you go. You roll through the number, precedence and station of origin at great speed, and on the latter he breaks you, says "NR." This means he wants you to start over again, so he wasn't really QRV at all. Anyway, the number and station of origin should always be repeated (note: the precedence is *not* part of the number), because some operators are slow starters, or they have to get a blank into the mill, or they fumble for a pencil. Or maybe you are just sending too dad-gummed fast. If you are sending faster than he sends, that's your fault; if you are sending at his speed, it's his fault, and don't slow down unless he asks you to.

Anyway, you start over again, and all goes well until you come to the street name, which is a little unusual so you start repeating it; but he breaks you. No, he doesn't send BK, but just touches his key, and this tells you that he got it the first time, so don't repeat. If you don't hear

his di-dit, no harm done. If you do hear it (you will if you have *good* break-in), you send AA and continue.

One of the words in the text is "GLIM-FUBBEN." *Never mind* what it means, there it is, and you have to get it across to the receiving operator; so you sail into it, intending to repeat. Before you get half way through it, he breaks you. This is defeatism. It also indicates he is copying too close to your sending; he should be at least a syllable behind, and in a case such as this, even if he gives up midway in the word he should realize that you will probably repeat it. If you don't, *then* he can break you. Of, if he copied it, a repeat could give him a check on it. *Never* break another operator for a repeat of the word he is sending. Wait until he finishes it, then if you didn't get it and he doesn't repeat, break him and send the first letter. He will then repeat it. Or, if you didn't get the first letter, break and send the last word received; he will send AA and continue without repeating that word.

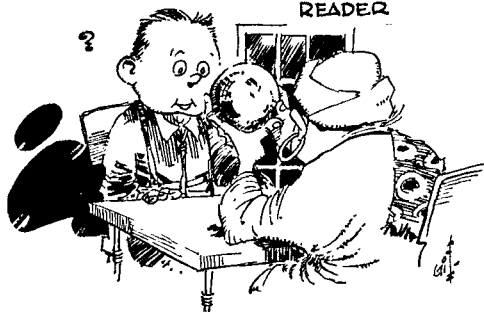
At the end of the message, the procedure can vary. If there is more to follow, most operators



follow the AR (end of message) with a B, and some follow this with a number indicating how many to go. Sometimes you have a "QSG-all" situation, in which the sending station just keeps on going; why not, if you have break-in? Most of them, however, like to get an acknowledgement from the receiving operator after every message to make sure he hasn't fallen in or something. A simple "dit" suffices for this. This isn't the same thing as an "R." The "R" is implicit in his not breaking you. All the "dit" means is "I'm still here, stupid, let's keep going."

Even the best operators make mistakes in sending. It's no crime to send an H for an S, or a Ø for a 9, especially in these days of those blessed electronic keyers (you don't key them, *they* key *you!*), on which you can make the same mistake three times in succession before you finally get it right. (If you make the same mistake the *fourth* time, you are likely to tear the thing out by its chords and heave it right out the window.) The crime is to try to pass it by on the assumption the other guy knows what you are trying to send. This is a very strong temptation. Shucks, anybody should know that TSE was supposed to be

THE OTHER
OPERATOR IS
NOT A MIND
READER



THE, that ANB should have been AND in a plain-language text. But if you start letting these little slips get by, first thing you know you'll be sending NOM when you mean NOT (and it might be copied NOW), and other things that look obvious to you because you're looking at them but won't be so doggoned obvious to the guy at the other end trying to decipher your lousy sending. And it will be lousy, never fear, if you permit such errors.

So, correct *all* mistakes, even minor ones. If you're doing the receiving, don't let the lid get away with making mistakes. Let's not compromise our accuracy by trying to be mind readers. A string of dits signifies an error. A question mark (diddy-dum-dum-diddy) signifies you are going to repeat. If you send a wrong word and desire to repeat it, a string of dits and a question mark are the proper prosigns. If you are simply repeating a difficult or unusual word, just a question mark is called for. Some operators use didit didit as a repeat prosign; this is Navy procedure, not amateur.

If you don't use break-in (shame on you!), it is still possible to handle traffic on c.w. Besides, in heavy QRM or very weak signal conditions, break-in is sometimes not practical. Then it be-

comes necessary to "get fills" whenever you miss anything, and it is usually a good policy for the transmitting station to stand by after every message to get a "roger," otherwise he might discover he has been sending to himself.

Of course it's a little discouraging after having painstakingly sent a message, repeating difficult words twice and correcting all mistakes, to have the other guy say "AA CK," so use break-in if you possibly can. Otherwise it becomes necessary to use such prosigns as AA (all after), AB (all before), WA (word after) and WB (word before). When such fills are asked for, the transmitting operator sends only the parts missed, without repeating the words already received. Don't waste time. The receiving operator often does not know how many words he missed, in which case he might want to have the transmitting station fill in an empty space, so he uses BN (between) thusly; "BN (last word received) ? (next word received)." Or he can just leave out the BN in this case. It is usually better to do it this way than to use WA or WB, because when you miss something there is nearly always a chance that more than one word was missed.

Sometimes you think you got a word right, but you aren't quite sure. Many operators will have a tendency to assume it's okay because it sounds so, but *good* operators will make sure and "confirm." The way to do this is to send CFM followed by the doubtful word. If it is correct, the other operator says C (correct) or CFM (confirmed). If it is not correct, he says N (No, you ninny!) and sends the correct word. Don't use the question mark to ask if something is correct.

Mostly small matters, these. Note that we have been talking about handling the message for two installments and there are still undoubtedly some quirks we have left out. We haven't even begun to talk about the various procedures which can be used to make network operation more fun and more efficient; but we'll get into such matters in future installments, as time goes on. **QST**



Texas — The annual Terry County ARC swapfest will be held on November 1, 1964 at the National Guard Armory in Brownfield. No registration fee. Free coffee. For further info contact E. C. Pool, W5NFO, 1003 East Buckley St., Brownfield.

Strays

A sack of U.S. mail, enroute from New York City to Newington and surrounding towns, was accidentally dropped from a railroad mail car on the evening of Saturday, September 26. Passing trains shredded an estimated 4500 letters to bits before dawn. The post office is attempting to identify the scraps, but if any of you are lacking an answer to League correspondence, this accident may be the reason.

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appeared on page 35, August QST. Let's hear from you.

During September the following additional amateurs were nominated in recognition of their extra skills and courtesies:

- W2KFA W6OED
- K2MGE W6RT
- W3PZW WA6TGH
- W3YAM K7POZ
- K4CRU K8VUB
- WA4MWM W9DOG
- W4OYE WA9GGU
- WA5CRU WA9RFS
- WA6JIC VE3EGG
- VE3FAK



Flagpole Without a Flag

Inexpensive Vertical for 40, 80 and 160 Meters

BY N. H. DAVIDSON,* K5JVF

A standard telescoping TV mast makes a low-cost vertical antenna measuring a full quarter wavelength on 80 meters, and one quite practical to install.

THE low-angle radiating characteristics of vertical antennas of one-half wavelength or less are well known. Equivalently low angles can be approached with a horizontal antenna only if the wire is elevated a wavelength or more above ground. At the lower frequencies, elevations of this order are obviously impractical for most amateurs. Even at such heights, only a small portion of the total power from a horizontal antenna is radiated at low angles; most of the power is distributed among several higher-angle lobes.

A full quarter-wave vertical antenna for 80 meters is mechanically feasible, and can be installed quite inexpensively, since the structure does not have to be as sturdy as it would if it were to serve as a support for one end of a horizontal antenna. With all components purchased new, the total cost of the installation to be described would be about \$45, but the actual cash outlay will vary inversely as the size of your junk box.

Antenna Foundation

The foundation for the antenna consists of a concrete building block, two pieces of scrap lumber and a king-size pop bottle. Cut the two boards to approximately the same size as a solid face of the block, as shown in Fig. 1. Cut a hole in the center of the top board that will make a tight fit with the bottom of the bottle, and nail the two pieces together. Dig a small hole that will permit burial of the block so as to leave about 8 inches of the pop bottle showing above ground level. No detectable sinking or side slippage has been encountered using this simple arrangement.

Ground System

As the length of a vertical antenna is reduced below a half wavelength, a good ground connection becomes increasingly important. With a nominal radiation resistance of 38 ohms for a quarter-wave antenna, the ground-connection resistance must be a small fraction of this value if appreciable power loss in the ground connection is to be avoided. I used eight 8-foot rods driven in the configuration of Fig. 2. Drive the rods down until the tops are about 4 inches under

ground, and interconnect as shown. Now make a ring about 6 inches in diameter of the heaviest bare wire you can lay hands on, or use several turns of No. 12 or 14 twisted together. Drop the ring around the pop bottle and you're ready to start putting the radials in.

For radial wire, I highly recommend galvanized clothesline wire¹ available in 100-foot lengths from most hardware stores for less than a cent per foot. The radial length should be at least a quarter wave for the lowest operating frequency, and there should be at least four of them, evenly spaced. I used 16 wires, from 30 to 100 feet

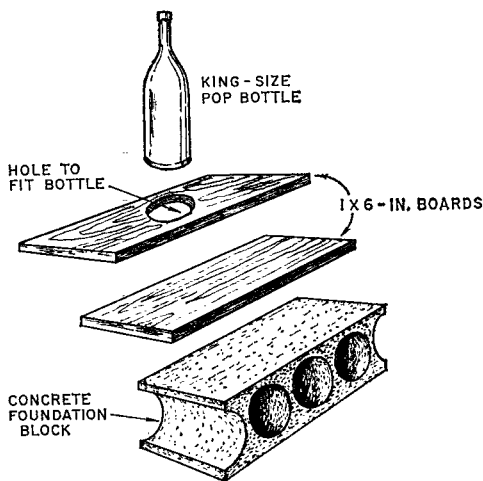


Fig. 1—Components used in making the antenna foundation.

long, evenly spaced radially. This made a total of over 1300 feet of buried wire. The tip on one wire connects to the power company's ground rod at the meter. As each radial wire is installed, connect a free end to the center ring and solder to any other wires in the system as you cross them. An alcohol torch or small blowtorch will be found quite convenient here.

The slits for putting down the radials were made by sinking a spade down, pushing it forward and removing it without bringing up any dirt. This will make a narrow slit about 8 inches deep that the radial wires may be pushed into

¹ Galvanized steel wire is not immune to corrosion. Copper is better, and aluminum better yet. However, if the latter is used, joints will have to be made mechanically, since satisfactory soldered connections are difficult. Corrosion of steel wire can be retarded by driving 1-foot magnesium rods into the ground at intervals along the buried wire, preferably, but not necessarily, in contact with the wire. — Editor.

* 4747 South Santa Fe, Tulsa 7, Oklahoma.

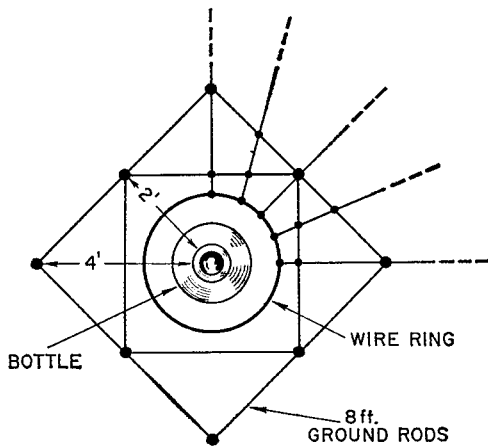


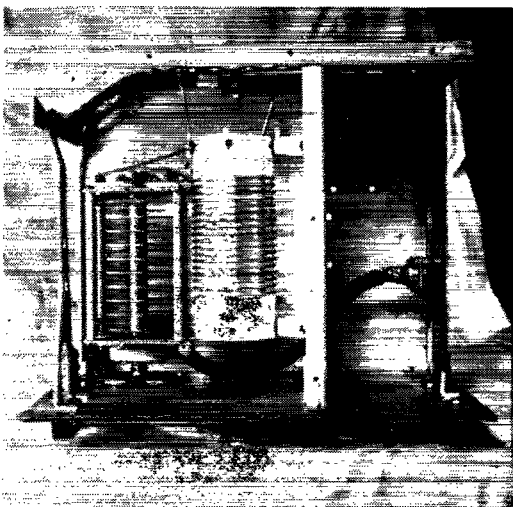
Fig. 2—Ground-system pattern. Heavy dots indicate location of ground rods; smaller dots indicate soldered connections. Radial wires should be spaced evenly throughout 360 degrees, and installed as described in the text.

with a long screwdriver or other tool. A bit of brisk footwork will close the slit, and a gentle rain will erase all signs. It is only necessary to get the wires under the grass roots so they won't "work up."

Before you put the shovel up, bury a run of 50-ohm coax from the shack to the antenna. Select a jacket that is suitable for burial. I used RG-17A/U buried about 2 feet deep. A run of 3-conductor No. 12 (barnyard burial type) was put down along with the coax for possible expansion to remote relays, reversible motors, or other use.

Raising the Antenna

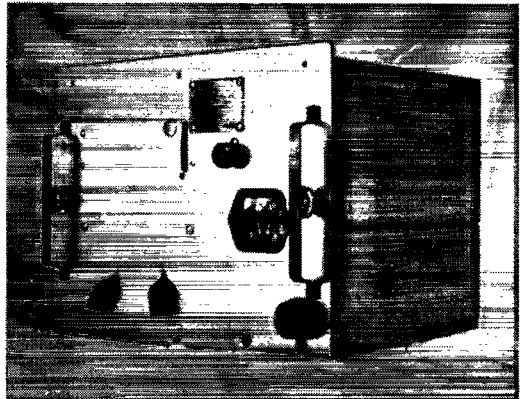
The vertical element consists of a 50-foot telescoping TV mast and two standard 10-foot



Interior view of the 40-meter matching unit. The recessed connector at the right is for the antenna connection.

sections of 1 1/4-inch TV mast. The telescoping mast is made by several manufacturers. The two short sections should be put together first, with a short strap or sleeve over the joint to assure a good noise-free electrical contact. This assembly is then fitted to the top section of the telescoping mast, using another strap or sleeve. Guy rings are an integral part of this mast, and large set screws are provided to insure positive electrical connection between sections. Two sets of 3 guys, at the 30- and 50-foot levels, have proved to be quite adequate. Each wire should be broken with strain insulators at intervals of not more than 20 feet.

Getting the vertical element into the air proved to be an easier job than expected. Locate two 10-foot stepladders and seven helpers. Set the ladders up beside the bottle and "horse" the collapsed mast with the added sections onto the bottle. With one man lifting the sections up and another setting the pins and tightening the set screws while the six others payed out the guy



Front view of the 160-meter matching unit.

wire, the elapsed raising time was about 20 minutes. It is probably needless to say that a calm day should be awaited for the job. The complete 70-foot mast was put up with no one getting more than 10 feet off the ground.

Connection to the bottom end of the antenna is made with a foot or so of copper braid fitted with a PL-259 coax connector at one end. The braid may be stripped from a length of RG-8/U coax line.

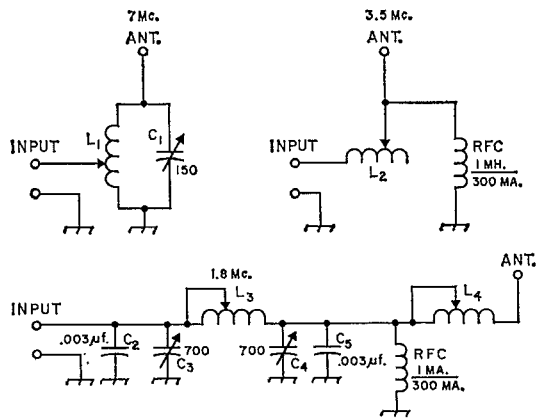
Matching Networks

A preliminary estimate of the range of impedances to be expected at the base of the antenna in covering 40, 80 and 160 meters ruled out a universal matching unit, and resort was made to a plug-in system. The weatherproof box shown in one of the photographs was originally a surplus storage box for GP-7 tuning units, and the plug-in assemblies are made from these tuning units.² The coax feed line and the a.c. line terminate in banana plugs set in an insulating panel in the bottom of the box, while

² Obtained from Fair Radio Sales Co., Box 1105, Lima, Ohio.

Fig. 3—Matching circuits used on the three bands.

- C₁—Air variable, plate spacing approximately the same as used in final stage of transmitter. (Capacitor from GP-7 tuning unit used.)
- C₂, C₅—Disk ceramic or mica.
- C₃, C₄—Dual broadcast-replacement-type variable, sections in parallel.
- L₁—20 turns No. 12, 2½-inch diameter, 4 inches long. (Coil from GP-7 tuning unit used.)
- L₂—Rotary, or fixed coil with adjustable tap; see text. (Coil from GP-7 tuning unit used.)
- L₃, L₄—Approx. 25 μh.—Rotary, or fixed coil with adjustable tap. (Coil from GP-7 tuning unit or antenna coil from ARC-5 transmitter suitable.)



the antenna pigtail plugs into a receptacle recessed in one side. The plug-in units are fitted with banana jacks that mate with the plugs. Coax and earth ground connections are made to the box and another banana plug carries this connection to the tuning units. The earth connection should be in the form of heavy braid or copper strap from the ground ring around the bottle to the box.

The matching circuits shown in Fig. 3 were the most successful of several tried. Adjustment requires a grid-dip oscillator and an s.w.r. bridge. Since capacitor plate spacing and coil-conductor size will vary with the power and mode involved, exact components are not specified.

Adjustment

One of the nicest features of this type antenna is that it can be tuned up at ground level. (Beam hangers take note!) The 40-meter unit is tuned by resonating the LC circuit to 7 Mc. plus, and locating the tap for lowest s.w.r. The latter should occur at a point about 10 per cent from the ground end.

The 80-meter unit is tuned by adjusting the

inductance for the lowest s.w.r. reading. With a 2 ½-inch inductor, lowest reading was obtained at 3.8 Mc. with a half turn, and at 3.5 Mc. with three turns. The tuning is quite broad on this band.

The 160-meter unit is tuned by shorting the r.f. choke temporarily and adjusting L₄ to obtain a dip on the g.d.o. at the desired frequency with the antenna connected. Now adjust each leg of the pi network for minimum s.w.r. The adjustments are quite critical. Considering the present power limits on this band, inductances from ARC-5 transmitters are quite satisfactory for L₃ and L₄. The capacitors C₂ and C₅ are 0.003-μf. disks. These are shunted by C₃ and C₄ which are 700-pf. variables of the broadcast-replacement variety.

The r.f. chokes shown in the 80- and 160-meter tuners are of the 300-ma. transmitting type; the bigger the better. Their purpose is to provide a d.c. path to ground for atmospheric charges that often build up on tall structures under certain weather conditions not directly associated with an electrical storm. Without the ground connection, sufficient voltage may accumulate on the antenna to arc across capacitors or other insul-



The author points to the insulated jack panel on the bottom of one of the plug-in matching-network units. The 80-meter tuning unit is to the left.

ation in the transmitter or receiver and cause noise. Although such charges may not constitute an actual hazard, they can be at least disconcerting to one coming in contact with the antenna or circuitry connected to it. Additional protection against lightning is recommended. This may consist of a gap between pointed electrodes connected between the base of the antenna and the ground system. The gap should be adjusted to the minimum spacing that will avoid breakdown by the transmitter when working at 7 Mc. where the highest r.f. voltage is developed.

With typical adjustment of the networks, I measured standing-wave ratios of 2 to 1 or less over the range of 3.5 to 3.8 Mc., and of 1.5 to 1 or less over the range of 7.0 to 7.2 Mc.

This antenna has given a good account of itself on all three bands. It is the only antenna I've had with which I've been able to raise Europe on 80 meters, and work coast-to-coast on 160. I like it!

Variations

If your favorite bands are 160 and 80, some top loading can be added by tying the first 20 feet of each top guy directly to the vertical element. This will raise the base impedance. The matching units shown will have to be juggled a bit, of course.

Obviously, this antenna can be scaled down for the higher bands. The *LC* values in the tuners

will change, but the matching techniques will remain the same. A 33-foot model was used successfully on 40 and 20 for some time.

Generous thanks go to W5BZI for his advice during planning and tune up, and to my brother-in-law, Ken, for help during construction. **QST**



Matching units for the various bands plug into a weather-proof housing at the base of the antenna.

Strays

FROM the FCC office in Los Angeles, we have this heartwarming story about Stephen Bauer, WB6FZU:

A mother called from Santa Barbara to ask about a General Class license for her ten-year-old son whose Novice license was about to expire. We explained that General Classes were given here each Wednesday. She said this was fine, but there was a problem — her son was blind. We told her in that



Engineer Don Curry administering General Class amateur examination to Stephen Bauer, blind since the age of three. Stephen is "almost" 11 years old now, he says.

case her son was undoubtedly eligible for a Conditional Class license. In fact, he was doubly eligible because Santa Barbara was more than 75 miles from Los Angeles. "Yes, he knows that, but he doesn't want a Conditional", she said, "he wants to earn his license, not have someone give it to him."

We expressed our admiration for his attitude and courage but pointed out that although we would extend every consideration and would be pulling for him in every legitimate way we could, there was always a possibility that he might fail. "Yes, he knows that. He thinks he is ready, but if he fails, he is prepared to study harder and try again," she told us.

On the appointed day, our office force held its collective breath and tip-toed around while Steve was taking the exam, but we could just as well have relaxed. He made it with flying colors.

Steve banged out solid copy on his Braille writer and although normally right-handed, he passed his sending test with his *left* hand. (It seems his dad, who is not a ham, unknowingly set up Steve's Novice station with the key placed on the wrong side.) Big words in the technical section didn't faze him either.

Stephen was an exceptionally cheerful and well-mannered young man, but just to let him know that we don't stand for any nonsense around here (from fellows his size) we assigned an examiner that outweighed him about three times to keep him in line.

A Tuner and Dual I.F. System for an Amateur-Band Receiver

Selective Channels for C.W. and S.S.B.

BY DORRANCE W. BAKER,* W2MUH

The two i.f. strips described here will provide maximum practical selectivity for c.w. and s.s.b. Cost has been held to a minimum through the use of readily-available surplus and replacement-type components.

AFTER struggling along for years in an attempt to produce a stable tunable front end at reasonable cost, the designers of advanced amateur receivers, both manufactured and homebrew, have settled largely on a basic arrangement of crystal-controlled front end, a tunable first i.f. circuit, a second i.f. with fixed tuning, and a detector and audio section. The adjacent-signal selectivity is determined almost entirely by the characteristics of the second i.f. amplifier to which this article is primarily devoted.

Neither of the two i.f. strips discussed is complicated, and both may be built at reasonable cost. Yet each is capable of providing just about the maximum usable selectivity in the mode for which it is designed.

* 1 Spaulding Court, Saugerties, N. Y.

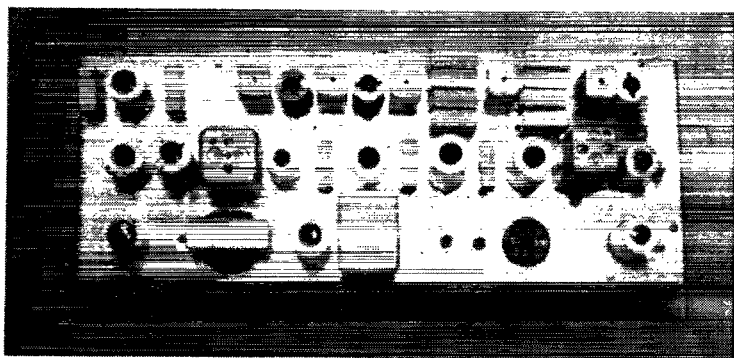
¹ Gottfried, "An Inexpensive Crystal-Filter I.F. Amplifier," *QST*, Feb. 1958.

The C.W. Amplifier

The circuit of the sharp amplifier used for c.w. reception is shown in Fig. 1. As the diagram shows, it is a simple arrangement of cascaded crystals similar to one described earlier by W6YBR.¹ Crystals in the 460-kc. region are used, in preference to the 1690-kc. crystals used by W6YBR, because they are available at low cost in steps of a few hundred cycles.

A number of Channel 48 crystals were purchased and, by selecting crystals and adjusting C_1 , C_2 and C_3 for the best shape factor, it was possible to make this amplifier too selective for practical use. After using this strip in a receiver for several days to get the feel, I adjusted the three trimmers so that an average signal would be just audible about 200 cycles either side of maximum. This adjustment is easy to make. It is done by tuning to the high side of a strong signal and adjusting C_1 and C_3 for a minimum signal, then tuning to the low side and adjusting C_2 for minimum signal strength. By rocking the receiver tuning and readjusting the trimmers, the desired response curve can be obtained within a few minutes. The pass band, as I have it adjusted, is 100 cycles at 6 db., 200 cycles at 20 db., and 500 cycles at 40 db. down.

This amplifier is laid out in strip configuration. The physical layout is critical; leads must be



The case from a BC-375 tuning unit serves as the chassis for the tuner and dual i.f. amplifier. The opposite side of the box is fitted with a 7-inch rack panel. In the top row of components, from left to right, are the b.f.o. tube and sideband crystals (not described), and components of the broad i.f. channel as follows: T_6 and T_5 with their associated $6BA6s$, T_4 , crystals Y_6 through Y_8 , T_3 , crystals Y_1 through Y_4 , T_1 , and the $6AK5$ i.f. amplifier. In the center row, left to right, are the $6AK5$ mixer, $12AX7A$ follower tube, T_7 , the three $12AX7As$ of the sharp i.f. strip and their associated crystals, T_2 , and product-detector tube (not described). The $6BA6$ in the 2.6-Mc. input amplifier is in the lower left-hand corner followed to the right by components of the audio section (not described). The 2.6-Mc. r.f. coils, and components of the high-frequency oscillator (the latter in a separate box) are inside the chassis.

SHARP I.F. AMP. (460 KC.)

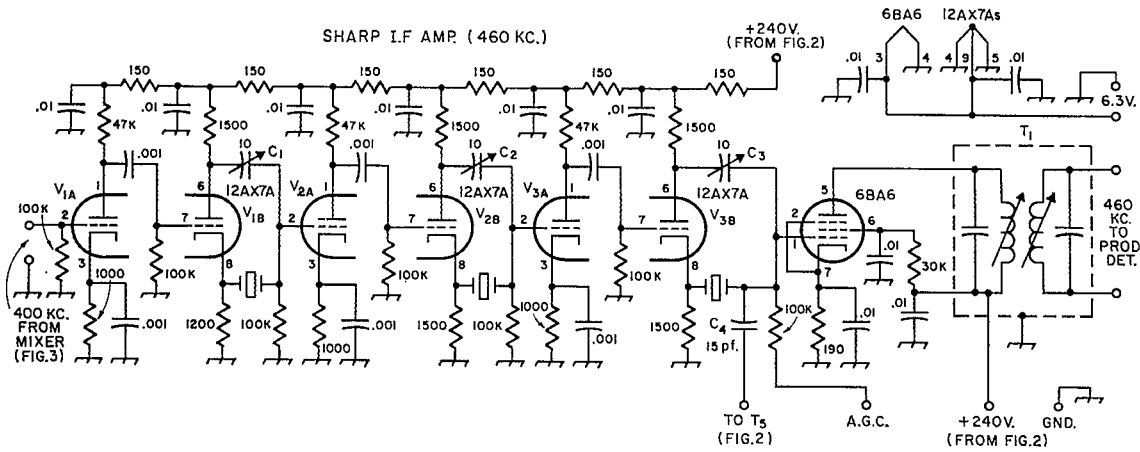


Fig. 1 — Circuit of the sharp i.f. amplifier. Fixed capacitors are disk ceramic, except C₄ which is silver mica or NPO ceramic; if not indicated, values are in μ f. Resistances are in ohms (K=1000), and resistors are $\frac{1}{2}$ -watt composition. Crystals are 459.259 kc. (surplus Channel 48). C₁, C₂ and C₃ are 1-10-pf. ceramic trimmers (Centralab 829-10, or equivalent). T₁ is a 455-kc. replacement-type i.f. transformer, readjusted to 460 kc.

short and the components must be positioned to keep coupling around crystal stages to a minimum. Construction is quite simple otherwise, and the photos supply detail to the extent necessary.

The Broad I.F. Strip

In his article, W6YBR stated that staggered crystals could be used in his cascade amplifier to broaden the response for phone use. This was tried, but I was unable to avoid excessive peaking with the lower-frequency crystals, and the results were not at all satisfactory. For this reason, I turned to the dual lattice filter shown in Fig. 2. The circuit is straightforward. However, the adjustment is more difficult than that of the sharp amplifier unless a sweep generator is available. Not having one of these, I connected a vacuum-tube voltmeter to the output. All crystals were removed, and a jumper was substituted for each of the Channel 331 crystals while all transformers were peaked on a 460-kc. input signal. The crystals were then reinstalled, and the transformers were carefully adjusted very slightly back and forth while rocking the receiver tuning. After experiencing the effect of

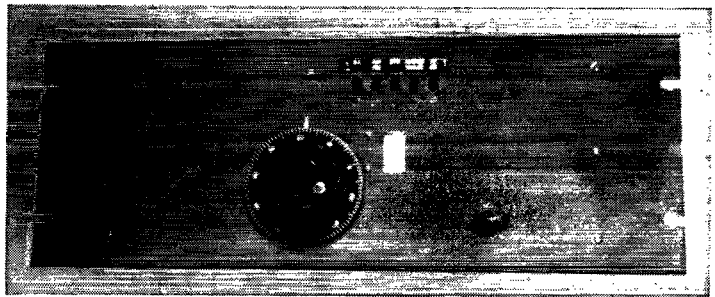
these adjustments, it becomes possible to set up a reasonably flat response curve with sharp skirts. Peak response points will be found until the transformers are properly adjusted. The passband that I finally arrived at is 1.8 kc. at 6 db. down, 2.5 kc. at 20 db., and 3.5 kc. at 40 db. This is a little sharp for a.m., but is excellent for s.s.b.

The i.f. transformers used in this channel are bargain-counter broadcast-replacement types costing less than \$1.00. High-quality transformers are unnecessary.

I.F. and Detector Switching System

The input circuits of the two amplifier strips are connected in parallel to a common 460-kc. source (the second converter in my receiver). The output circuits are also connected in parallel to a pair of 6BA6 amplifiers. One of these amplifiers (shown in Fig. 1) feeds a product detector. The other (shown in Fig. 2) feeds a diode detector. Switching from one i.f. channel to the other is a simple matter of switching plus B from one to the other by S₂. Switching from one detector to the other is done in a similar manner by switching the plus B from one 6BA6

Panel view of the tuner and i.f. amplifier. The calibrated drum dial is read through the rectangular opening to the right of the tuning dial, Mode and power switches are above.



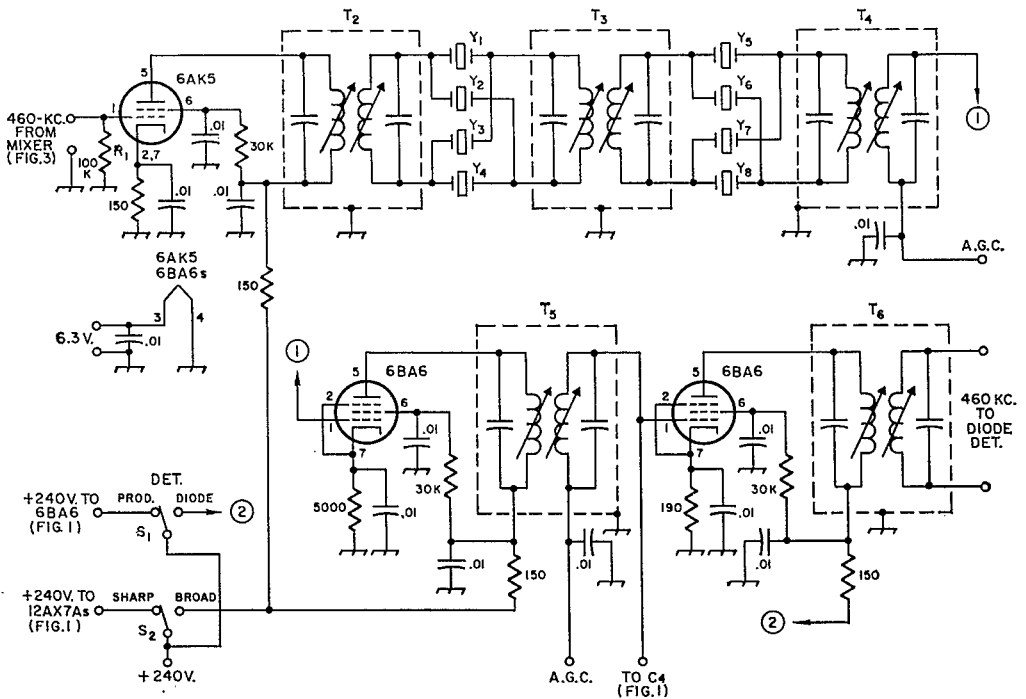


Fig. 2 — Circuit of the broad i.f. amplifier. Capacitances are in $\mu\text{f.}$, and capacitors are disk ceramic. Resistances are in ohms ($K=1000$), and resistors are $\frac{1}{2}$ -watt composition. T_2, T_3, T_4, T_5 and T_6 are the same as T_1 , Fig. 1. Y_1, Y_4, Y_1 and Y_8 are 459.722 kc. (surplus Channel 331); Y_2, Y_3, Y_6 and Y_7 are 461.111 kc. (surplus Channel 332). S_1 and S_2 are s.p.d.t. toggle switches. R_1 should be omitted if both broad and narrow amplifiers are used in parallel as described.

amplifier to the other by S_1 . This system was checked out thoroughly against independent operation of the amplifiers, and performance was essentially unchanged. The first 6BA6 stage in the broad amplifier (Fig. 2) is used to equalize the gain of the two amplifiers. This is done by selecting a value of cathode resistor that will reduce the gain to match that of the sharp amplifier.

Tunable I.F. Stage

The amplifier channels described will, of course, work with any stable conversion system producing output at 460 kc. In my own receiver, a bandswitching crystal-controlled converter translates signals in the amateur bands to a first i.f. tunable over the 100-ke. range of 2.6 to 2.7 Mc. Although some may consider this range too restricted, I have found it convenient for tuning, especially when using the sharp i.f. amplifier, and not a great inconvenience otherwise. For those who may be interested, the circuit is shown in Fig. 3. The high-frequency oscillator feeds a pair of isolating cathode followers in parallel (a single 12AX7A). One of these followers feeds a signal out to terminal A for future use in a transceiver arrangement. The other feeds the receiver mixer, a 6AK5.

The h.f.o. is built into a reinforced 4 \times 5 \times 6-inch utility box as an independent physical unit.

The 50-to-1 worm-gear drive from a BC-375 tuning unit was modified to drive the tuning capacitor. This is an excellent mechanism having no significant backlash. The original small indicator dial was removed and an extension shaft added. A $\frac{3}{4} \times 5$ -inch drum was mounted on this shaft. A calibration strip was cemented to the rim of the drum. This strip is visible through a $\frac{5}{8} \times 1\frac{1}{4}$ -inch slot in the panel. The slot is fitted with a Plexiglas insert across which a hairline is scribed.

The original thumb knob was removed and an extension fitted to this shaft also. The extension was brought through a panel bearing to the front of the panel and fitted with a large knob marked with a 360-degree 100-division scale.

The tuned circuit consisting of L_1, C_5, C_6 and C_7 was set up so that 20 turns of the tuning knob controlling C_5 covers 100 kc. A little arithmetic will show that each division on the tuning knob represents 50 cycles. This is real bandspread. The tuning capacitor provides a variation of about 80 pf. Since this capacitor is shunted by 1100 pf. of fixed capacitance, the tuning is essentially linear.

Considerable time was spent in determining the value of the temperature-compensating capacitor C_7 . A value was selected at random, and L_1 was adjusted to tune approximately to the desired lowest frequency with C_5 set at maxi-

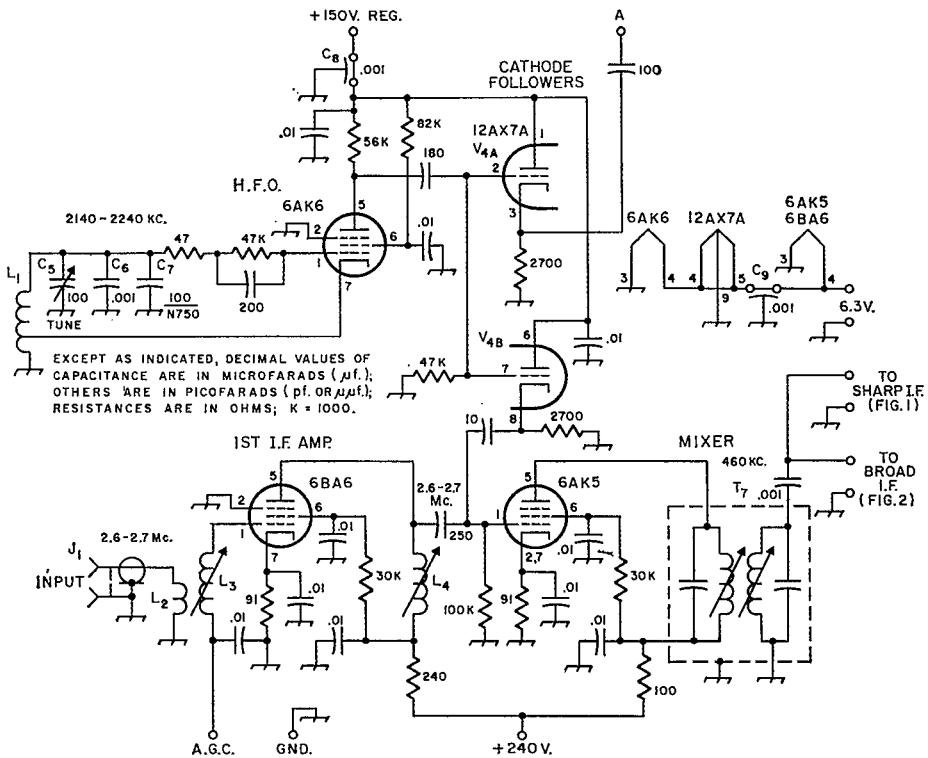


Fig. 3—The second-converter circuit of the W2MUH communications receiver. This section translates the 2.6-Mc. output of a crystal-controlled amateur-band converter to a second i.f. at 460 kc. The high-frequency oscillator, which is the tuning element in the receiver, feeds two cathode followers in parallel. Output from one of these may be taken from terminal A for transceiver operation with an external transmitter. Fixed capacitors of decimal value are disk ceramic; others not listed below are silver mica or NPO ceramic. Resistors are 1/2-watt composition.

C₅—Air variable.

C₆—Silver mica.

C₇—Negative-temperature coefficient (see text).

C₈, C₉—Feedthrough.

J₁—Chassis-mounting coaxial receptacle.

L₁—19 turns No. 20, 16 turns per inch, 1 1/4-inch diameter

(B & W 3019 Miniductor, Illumitronics 1016T Air Dux). See text.

L₂—8 turns No. 28 wound over ground end of L₃.

L₃, L₄—68-30-μh. iron-slug inductor (Miller 4409).

T₇—Same as T₁ (Fig. 1).

mum. C₅ was set at about mid range. Then blasts of hot and cool air were alternately blown across the unit. After plotting the frequency change for a few different values, it became a simple matter to arrive at the correct value. The completed unit drifts less than 100 cycles from a cold start. Any necessary final correction of the tuning range can be made by careful adjustment of L₁ after temperature compensation has been achieved.

The dial was calibrated by beating harmonics of the oscillator against the harmonics of a 100-kc. crystal calibrator at as many points as possible, and intermediate points were marked off at 2-kc. intervals by interpolation, using the 100-division scale of the tuning knob. A final check against a borrowed BC-221 frequency meter showed the accuracy to be within a half kilocycle.

The input amplifier is broad-banded. The input and output circuits should be tuned for

maximum response to a 2650-kc. input signal. Tuning will not be sharp.

The converter used with this tuning section is crystal-controlled, and it covers the 160-, 80- and 40-meter bands in 100-kc. segments. An additional converter is planned for the higher-frequency bands. This converter will also be crystal-controlled and broad-banded to cover segments 500-kc. wide. The output will be in the 3.5- to 4-Mc. range so that the present h.f. converter can be used to cover the higher-frequency bands in 100-kc. segments.

The final results have been very gratifying. If QRM develops when working c.w. with the broad i.f., and there is a detectable difference in beat notes, the interfering signal can be eliminated by shifting to the sharp i.f. amplifier. To demonstrate the effectiveness of this amplifier, I have tuned in an average-strength signal with the broad i.f., then adjusted the v.f.o. of my

(Continued on page 154)

Do It and Rue It

The Case Against Building

BY ROBERT WEINSTEIN, * K4KXR

The judges for the monthly article contest have selected winning entries on the basis of their originality and general value to the amateur fraternity. Some of the winners—for examples, the proposal of a reduction in power limits (July, 1964, QST, p. 21) and this month's winner—will have served their purpose if they stimulate useful discussion in amateur circles, even though they do not necessarily reflect ARRL policy.

I WAS reading the mail the other day and I heard a ham plaintively say, "I put a lot of time, money, and effort into that home-brew receiver project, but it didn't work out right, and I am junking the whole deal."

It is all very nice for the experts to sit back and advise the other guy to build his own gear, but upon close examination, we find that there are many, many reasons why you should not build. In my opinion, these reasons far outweigh any reasons you can find for rolling your own.

Consider the economic aspect. This is an age of specialists. The so-called handyman, who can do a bit of everything, is at the bottom of the economic ladder. He walks around in patched overalls doing the odd chores and small repairs of his well-heeled employers, who stick to their own field of endeavor.

If everybody "did it himself" there would be no doctors, no lawyers, no teachers, no plumbers, no electricians, no barbers, and so forth. The fact of the matter is that we would still be an agrarian society, if we could survive at all, if everybody tended to his own needs and desires. There would be very little radio, too.

Even if he sticks to electronics, the average ham cannot cope with modern electronic problems. Lives there a ham who has not butchered his own TV set in an inept attempt to keep the one-eyed monster percolating? Sure, we can change a tube, and do other simple jobs, but to

service TV sets requires specialized tools, plus specialized study and experience that takes years to acquire.

That's just to make repairs. It takes a lot of equipment, experience and knowledge to build even the simplest radio rig, too. A simple chassis that can be punched out by the thousand at the rate of hundreds a minute, and at a cost of pennies per unit, will take hours of sweaty, dangerous work by a ham, and the end result is usually laughable. Not very funny are the deep cuts and jagged holes that a runaway piece of work on a drill press can cut into you.

Every factory has an investment in special tools, machines, jigs, fixtures, dies, etc., as well as a fund of engineering experience. The average ham cannot make such investments, and even if he could, what would be the point? He would use special tools just once and then watch them rust.

Judging from the hams we have talked to and the closets full of junk we have seen, there must be an annual waste of millions of dollars for radio gear and tools, all for projects that did not work out. Look at your own junk box, and see for yourself.

The question of time is important, too. Commercial interests must invest a lot of time in order to stay competitive. Can a ham put in the hundreds or even thousands of man-hours necessary to experiment to obtain good results?

Since you are being urged on many sides to "build something," let us assume you start a project. This leads to procurement of parts. You clutch your list of twenty different parts in your hand, and give it to the counterman at the local electronics store. Millions and millions of different electronic parts are now being made, and what is popular today is obsolete tomorrow. So the stores have simplified their purchasing and inventory problems. They stock one each of all popular tubes, a few resistors, some .001 condensers, and everything else is "on order."

The counterman who took your order disappears for fifteen minutes into the caverns of shelves in the back, and returns with a couple of the items on your list. They aren't the values you specified, and they are imported from Japan, but it is the best he can do. He does not have the remaining sixteen parts you need, and he holds

* 1805 Purdy Ave., Miami Beach 39, Fla.

out no hope of ever getting them. As a matter of fact, that night he tells his XYL about an "idiot who wanted something called a choke."

You shop around town and settle for a couple of items that are close to what you want. You haunt the surplus stores, you plead on the air, and you send away to the catalog people. Much, much later you accumulate what you need. The enthusiasm for the project has long since evaporated, but you go ahead anyway, since you've already made the investment. Another long period of soul-searching passes, and your gizmo finally falls together. But it doesn't work right, which you knew in your heart all along, because too many of the parts are substitutes.

Suppose you got lucky, and managed to get parts exactly as specified. Also, assume that you have exceptional skills, so that you do a 100% expert, exact job. It is still more than possible that when you flip the switch, unlovely black smoke will billow forth, and the pungent odor of white hot resistors will fill the air. How can this be? Because circuits (even in good old *QST* - see Feedback, a regular feature enjoyed by the thousands who did *not* build) may be wrong. Not only wrong, but several months may elapse before any correction is noted.

Many circuits depend upon a "gimmick," which means that the author didn't know what to do, but he hit upon a lucky combination that worked, just that once. These "gimmicks" are not easy to understand - you can't buy them, and they are not easily duplicated. Or you may need precise measurements that your little \$6.95 handy-dandy VOM cannot give you; or scope readings (ha!); or s.w.r. bridges, or hundreds of gadgets the author just happened to have on hand.

Let us travel further into fantasyland and assume that you have built something, and it works, even if it is only a simple field-strength meter. There is some satisfaction in this, particularly to the unknowledgeable, to whom it is an electronic marvel. But if the circuit is right, and the parts are right, and your work is right, why shouldn't the field strength meter work? It would be a miracle if it didn't.

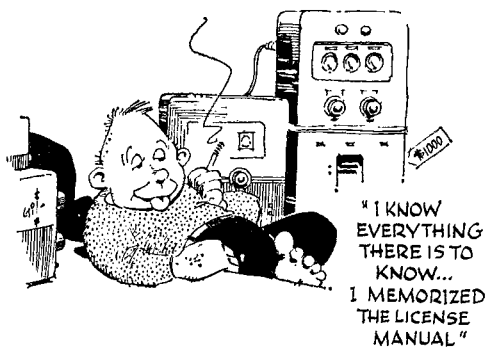
If it is satisfaction you want—and many contend that this is the reason for building—you can get a great deal more by picking the winner of a horse race, or a ball game. Millions of fans back their local teams for just this sort of satisfaction.

Now we come to the question of putting kits together. This is simply a dodge to get around shopping for parts, and is generally a good idea. Also, the circuit has been tested and found true. But when you assemble a kit, what precisely are you doing? You solder one end of part 17 to terminal B of part 14. You can learn nothing from this, except patience. Spend one-tenth the time it would take you to build something on a study of circuits, or on a specialized text book, and you will be ahead in your knowledge of ham radio. The *how* is important to those who make their living from electronics, but the *why* is what

is important to hams.

In all the hoopla on incentive licensing, nothing has been said about building or demonstrating manual dexterity before the F.C.C. Instead, we are asked to study and improve our understanding. So the bookworm gets the Advanced Ticket, but the builder loses his privileges.

Consider, too, the value of home-brew stuff versus commercial gear. The resale value of home-brew stuff, is practically nil. Commercial gear, however, has a definite market. Sometimes you can get up to 90% of cost, even after years of service. Especially if you have the original carton.



Remember that all gear advertised in *QST* carries a manufacturer's guarantee, but there is no guarantee on home-brew stuff. Who can help you if you run into trouble on a home-brew project? You are lost in the woods, all alone, abandoned, discouraged and unaided. But with commercial gear, there are literature, circuits, help from other hams who have the same equipment, a chance to look before you buy, articles in magazines, and help from the manufacturer.

Most hams go into amateur radio (note the term "amateur" and consider its meaning) because they want to enjoy themselves. They want to work other stations, to socialize, and to get relief from their particular kind of work. Why should we expect people who work all day with their hands, such as typists, surgeons, TV servicemen, etc., to spend their evenings and holidays sweating over a hot soldering iron?

Many of us lead hectic lives. We need success, encouragement, pleasure, and forgetfulness from ham radio. We do not want to court frustration and defeat; our competitive system already gives the average American enough of this. You do court destruction of your morale if your time, money and best efforts go down the drain.

Radio is a tool for communication of ideas. Let us leave the development and building of such tools to the professionals. Let each person contribute to society what he can, in his own chosen field. Contributions to the science of electronics come from the theorists, the thinkers, the laboratories, not from the assembly line.

QST

Cleaner Break-In

With the 32S-3

Hash Suppression and Better Keying

BY DAVID P. SHAFER,* W4AX

BREAK-IN for c.w. is provided by Collins in the 32S-3 transmitter, but it necessitates continual operation of the VOX relay. This is objectionable, because the leading edge of the first pulse activating the relay is clipped. It is quite noticeable when sending at 20 w.p.m. and becomes annoying at higher speeds of transmission since the first dot may drop out. In addition, the clacking of the relay may be undesirable to some. If the VOX time-constant potentiometer is adjusted to delay the release of the relay for an appreciable interval, so as to avoid "crowding" the operator, instantaneous break-in is not realized.

For these reasons a break-in system has been preferred that makes use of a small secondary antenna multiplied on the receiver input terminal. The transmitter p.t.t. circuit is closed (VOX relay operated) by means of an auxiliary toggle switch on the key. However, this arrangement is not completely satisfactory, especially in conjunction with a t.r. switch. With the VOX relay operated, the v.f.o. feeds a weak signal through the transmitter to the r.f. output jack. White noise (hash) from the amplifier tubes also is present when using a t.r. switch. The combination makes it virtually impossible to read a weak station on frequency or, because of hash, on a nearby frequency.

Elimination of Backwave

The power supply (516F2) bias potentiometer cannot be adjusted to bias the p.a. tubes beyond cutoff, but resistors R_8 , R_{10} and the potentiometer R_9 were changed to accomplish this, while retaining the ability to maintain normal bias for s.s.b. operation. (A similar method was described in the December 1963 issue of *QST*.¹) This method was discarded, however, because the

* Ex-3AC, K2GU, RFD 4, Box 71, Glen Allen, Va.

¹ Hildreth, "Instantaneous Break-In with the Collins S-Line," *QST*, Dec., 1963.

bias potential required to suppress hash and backwave reduced the closed-key plate current excessively.

A more effective method (Fig. 1B) was devised. The writer is indebted to W2CA for suggesting a means of suppressing the backwave from the free-running v.f.o. Through several QSOs and exchanges of correspondence we arrived at the best choice of component values.

In detail, the changes are as follows:

- 1) Remove and discard R_{12} (220), which is behind S_8 (emission).
- 2) Remove ground end of R_{24} (100K), which is under V_4 (1st mixer).
- 3) Locate new R_{12} (1000) at R_{24} .
- 4) Tie together lifted leads from R_{12} and R_{24} and connect to common connection R_{33} - R_{37} (grid-block bias circuit) going to the VOX relay contacts and R_{123} , and on to J_{14} (key).
- 5) Insert 0.01- μ f. disk capacitor, near V_4 , between FL_1 (mechanical filter) and C_{18} .
- 6) Insert 0.01- μ f. disk capacitor, near V_4 , between R_{12} and S_8 .

Note 1: The several modifications issued by Collins in their Addendum 1 (October 15, 1962) are comprehended.

Note 2: This modification applies grid-blocking bias to both halves of V_4 (1st mixer tube). The added 0.01- μ f. capacitors prevent this d.c. voltage from reaching L_{25} or FL_1 .

Elimination of Hash

The foregoing modification does not eliminate hash, so further effort was necessary. The method described below eliminates white noise and permits instantaneous break-in operation with a t.r. switch on the weakest signals that can be heard,

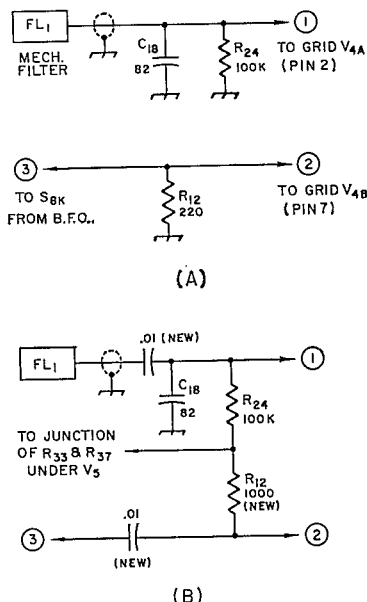


Fig. 1—Modification for suppressing backwave in the Collins 32S-3. A shows the original connections, and component designations, while B shows the revised wiring.

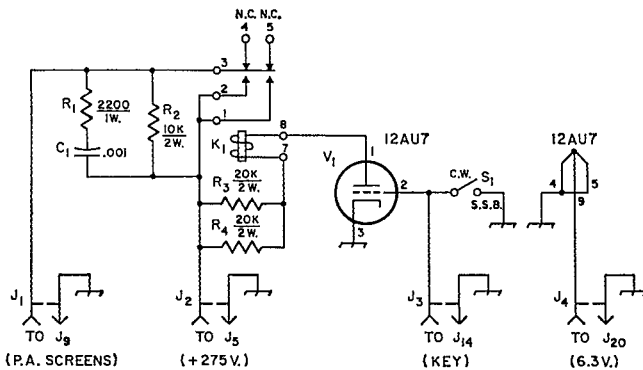


Fig. 2—The relay K_1 is actuated by the keying circuit of the 32S-3 to suppress diode hash by removing final-amplifier screen voltage with key open. Component labels not found below are for text-reference purposes. Designations below jacks indicate points on the 32S-3 chassis where shielded cables from the jacks should be connected.

J_1 - J_4 inc.—Phono jack.

K_1 —S.p.d.t. relay with mercury-wetted contacts, 4000-ohm coil (C. P. Clare type HG-1002, JMT type 119-11, or similar).

R_3, R_4 —Single 10,000-ohm 4- or 5-watt resistor may be substituted.

S_1 —S.p.s.t. toggle switch.

V_1 —One triode section; other section not used.

whether the VOX relay is operated or not. The key-mounted toggle switch for holding the relay operated during a QSO was retained for convenience.

Elimination of hash requires no modification in either the power supply or the transmitter. Simply cut the strap (one end is sufficient) between J_5 and J_9 . The principle involved is that hash is suppressed when the screen-grid supply (+275 volts) on the p.a. tubes (V_8 and V_9) is removed while the VOX relay is operated. This is accomplished by opening the circuit through the strap between the p.a. disable jacks, J_5 and J_9 . An added external relay (K_1) for opening and closing this loop is controlled by a triode which, in turn, is controlled by the application of the key-line potential to its grid, as indicated in Fig. 2. All components are housed in a suitable metal box. (The author used a Bud miniature utility cabinet C-1794, which measures 3 by 4 by 5 inches, with internal mounting shelf.)

As will be seen, a +275 voltage is applied through the contacts of K_1 (when closed) to the p.a. screen grids. This potential also provides the relay operating current (12 ma.) whenever V_1 is conducting. When the key is open, V_1 is blocked by -72 volts on the key line (J_{14}). When the key is closed, V_1 conducts and operates K_1 . Switch S_1 remains open for c.w. operation and is closed (to maintain steady screen-grid potential under the control of the VOX relay) in s.s.b. operation.

R_1 and C_1 form a protective spark-killer bypass across the mercury-wetted relay contacts. R_2 shunts the contacts to reduce the current in the screen-grid circuit from 40 ma. to 10 ma. Thus, the relay handles only a 30-ma. change of current. (If any hash should feed through, it may be completely eliminated by omitting R_2 .) A 10,000-ohm 4-watt resistor may, of course, be substituted for R_3 and R_4 .

Verification of Results

Careful checks at the author's station and by

other stations verify that no backwave or hash is present, whether operation is with a coax relay or a t.r. switch. A t.r. switch is now used because the objections referred to have been overcome. Special search was made for clicks which might be caused by relay control of the screen-grid supply current. None are present because the normal timed-sequence blocked-grid keying characteristics are not affected. Similarly, grid drive, plate current and on-the-air dot weight remain virtually unchanged since mark-space and space-mark transitions are altered very little, if any, by the modification of the first-mixer input network.

In short, instantaneous break-in operation, without backwave or hash, is provided. Satisfactory t.r. switch operation on weak signals is realized and all adjustments of the 32S-3 remain normal.

QST

Back Copies and Photographs

Back copies of *QST* referred to in this issue are currently available, unless otherwise indicated, from our Circulation Department. Please send cash or check — 50c for each copy — with your order; we cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (only) can be furnished at \$1.50 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order — we do not bill nor ship c.o.d.

Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless specifically mentioned in the article.

Introduction to . . .

the Principles and Practices of . . .

Hamsmanship

BY JOHN G. TROSTER,* W6ISQ

YEAH. I definitely decided I'm gonna run my moderate-power kilowatt rig this Sweepstakes."

"Now look, Charlie. I know you're still mad 'cause you didn't win an 'AA Citation' last year. But if you use a kw. you'll lose your good 1.25 multiplier."

"Who's gonna lose a multiplier for runnin' a moderate-power kw.? Everybody else does. Besides, I only got seventh place in SCV last year."

"Charlie, you can't do that. Much too crude and boorish. Besides that's *outright* cheating. All you really need is to develop a little more skill and finesse."

"Yeah? Well, if you got any ideas how I can schnuckle up a few places. . ."

"Well now, I just might have a tested trick or three which I've found helpful in some tight spots. But I must insist on your strict adherence to SS contest Rules and Regulations. Blatant cheating is a thing to be scorned. There are more refined, amusing and productive methods as you shall learn."

"Huh? ? ? . . . oh . . . yeah . . . so I promise not to run over the legal 500 watts for my 1.25 multiplier . . . ahhhh . . . guess that was closer to 150 watts—thereabouts."

"Another thing, Charlie, you must swear to maintain absolute secrecy on both the strategic and tactical application of any and all operational methods, devices, maneuvers, offenses, defenses or ploys which I might divulge to you now or in the future."

"Whheecww . . . ok, ok. I'll swear at anything . . . even them ploys. Third place, maybe?"

"These methods are not for everybody. They've been developed and refined by a few dedicated experts over the years to produce results for the . . . how shall I say . . . interested and appreciative. . . and desirous operators. . ."

"Yeah . . . I'm desirable. Second place?"

"All right, pay attention and I'll outline one small maneuver . . . somewhat primitive you understand, but nonetheless quite effective and satisfactory in producing small rewards for tyros of the game . . . errr, service."

"Is that me?"

"Let's suppose it's Sunday night of Sweepstakes. Everybody's got about 68—maybe 69 sections, and they're all looking for the last tough ones. All of a sudden, you hear this VE8 calling 'CQSS'. If you work him, you have a chance to

win the contest— at least SCV and an 'AA'. Right?"

"Right. First place. I'm gonna win!"

"But if the rest of the boys hear him, there's a pile-up and you lose. Right?"

"Right . . . I lose . . . as usual."

"Charlie, please . . . a little patience. Now zero beat the VE8, flip on your final and tune *your* rig . . . and keep on tuning it. Rotate your beam east so's you completely QRM the VE8 for the rest of W/VE-land. Nobody else will hear him."

"Don't sound like any kind of operatin' I ever heard of. Somebody'll rammy-cackle me good with a Wouff Hong for one of your tricks like that."

"Look, Charlie, I'm giving you the *new*, way-out concept . . . *proved* principles and practices and procedures that'll produce results. Besides, if you do your job right, nobody'll hear the VE8 anyway . . . so none's the wiser. Now, let's get back to winning, eh?"

"Yeah, yeah. I wanna win."

"Now every few seconds, you cut your carrier. As soon as you don't hear him 'CQSSing', you know he's signed . . . so you call him. OK?"

"Do I work him?"

"Sure you work him. Nobody else even heard him."

"So now how do I keep them other lids . . . err . . . the other fellas who always beat me from working the VE8?"

"Simple—just use your *plys*."

"Sounds technical. Do they come store-made or in a kit?"

"Let's go back to your QSO with the VE8. Now, first off, you only give him a report of say—R-2 and S . . . ohhh—3. Make him repeat something a few times so's he'll believe your bad signal report."

"Yeah, make him think he's too weak to waste his time any more in SS."

"Then if you're afraid he might not be convinced, you tell him you'll be glad to take time out of the contest and listen while he knocks the ice cycles off his antenna and checks his rig. But somehow his sigs never get much better. Right?"

"Is the Wouff Hong sharp?"

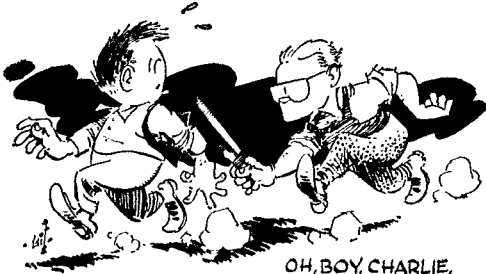
"Now as an added refinement, you give him your *time* so's that it only leaves about 15 minutes before the end of the contest. Then say, 'sorry the contest is almost over' . . . and, 'sorry it's so cold up there that your watch froze stuck

* 45 Laurel Ave., Atherton, Calif.

... and hope to see you next year with better conditions.' "

"Suppose he says his time is OK?"

"You can't hear him—remember he's 2 by 3. But suppose he says, 'never mind, I'm gonna work SS anyhow?' Well, you still want to be friendly and helpful. Right? So you say, 'maybe in the few minutes that are left in SS you'd do better to QSY that very weak sig of yours to the Novice end of the band and get away from all the 1.25-multiplier kws.' Naturally there's as much QRM up there as anywhere, but it gets your VES away from your main competition."



OH, BOY, CHARLIE,
YOU'RE GONNA GET IT

"How do they hold a Wouff Hong?"

"And if he says: thanks anyway', but he's still gonna try for a few QSOs, you say something

like, 'do VE Regulations say anything about a minimum quality for amateur sigs?' And when he says, 'sure—why?', you say. . . 'Ohhh—well then I hope they don't listen up there on Sunday nights 'cause they'll be dogsleddin' after you up the Yukon if they hear how you're ionizing the aurora borealis.'"

"And you say this ain't cheatin' to tell him all that?"

"Charlie... read the fine print in the SS Rules. There's absolutely nothing in there that says you must give *correct* Signal Reports or Times or Numbers or anything. Right? So, if you conveniently . . . how shall I put this . . . juggle and stretch a little here and a little there . . . it's not cheating. Right?"

"Ahhhh . . . dunno. What you been tellin' me sounds more like an open invite to a Wouff Hong by some irate contest fella."

"Quite the contrary, Charlie. All I've been telling you is How to Work the Rare Ones Without Really Trying. Understand?"

"Dunno . . . that Wouff Hong . . ."

"All right then, put it this way. I've just told you How to Win the Contest Without *Actually* Cheating. Right?"

"Well if that little technical ploy ain't really cheatin' . . . or somethin' . . . just what *do* you and your expert fellas call it?"

"Charlie . . . we call it *Hamsmanship*." **QST**



November 1939

... QST's editorial this month continued to caution amateurs to maintain the strictest neutrality by, as the editor put it, "refraining from discussing on the air any manifestation of the war and any subject that might have military interest for an interceptor". Rumors were also flying about on the bands that amateurs were being appointed (in secret) "radio detectives", sort of spy chasing vigilantes. These stories were squelched, however, in the editorial and the amateurs' neutrality code again emphasized.

... Technical articles discussed cathode modulation, a simple freqmeter-monitor, some pointers on the design and adjustment of grid-modulated amplifiers, and one of the first treatments of vertical colinear antennas ("Stacking Coaxial Antennas"). Since coaxial cable was practically unheard-of in 1939, at least in amateur circles, an article by J. M. Burke, W5EME describes how to couple r.f. from open-wire line to a three-element beam with continuous rotation in either direction! The secret was the use of inductive coupling. The article also told how to construct an easy-to-build direction indicator. . . . A contribution to the Hints & Kinks column by Robert L. Ebel, W8RSC, gave details on how to build a calorimeter for making accurate radio-frequency power output measurements. The gadget was made from a pint fruit jar, coil and condenser, thermometer, and a stirrer rod. . . . The first U.I.I.F. Relay and Field-Day, the forerunner of today's V.H.F. Contests, was reported as a big success with 56 Mc. stations (u.h.f. in those days) appearing on mountain tops to bridge the gaps in activity and maintain radio relayed messages. The distance record was a message that started in Dumont, New Jersey and ended up at Glenview, Ill. It took exactly ten stations to make the relay hop! . . . Operating activities included the ever popular Sweepstakes which was in its tenth year in 1939. **QST**

Strays



W9IOP has produced another "computer," known as the Q Dial. You dial whichever Q signal you are interested in, and the meaning appears in a window on the face of the Q Dial. Also provided are the meanings for a number of amateur c.w. abbreviations, and time conversion. On the back side of the Q Dial is provision for keeping a record in three modes of WAS QSOs, and info on radio services provided by the National Bureau of Standards. This Q Dial makes a fine companion piece for W9IOP's Second Qp, which has a whole slew of material on country prefixes, postal rates, etc. Each of these operating aids is available for \$1, either from the Electro-Voice factory Buchanan, Mich., or from any Electro-Voice dealer.

AMONG the many articles that have been written on s.w.r. measurements with a directional coupler or reflectometer, a few have considered the limitations of this type of instrument. For example, the effect of directivity as a possible source of error was discussed some time ago.¹ A few additional sources of possible error are presented for consideration in the present article.

Let us review the meaning of standing-wave ratio or s.w.r. for a moment. By definition,

$$S.W.R. = \frac{E_{\max}}{E_{\min}}$$

where E is measured at a voltage maximum or a voltage minimum along the transmission line. The maximum and minimum points will occur a quarter wavelength apart along the line. The

of E_1 and E_2 because we are only making a *ratio* measurement. Thus, any arbitrary values in "meter units" will suffice for voltage calibration.

Common procedure for s.w.r. measurements is to "normalize" the instrument on the forward or incident voltage by adjusting the meter for full-scale deflection, using a variable resistance in series with the meter movement or by other means. Let us assign this full-scale reading a value of unity. The reflected voltage is then measured as a fraction of the forward voltage, or as a percentage of full-scale meter deflection.

By adjusting the meter to full-scale reading and assigning a value of unity to the forward or incident voltage, we may now represent E_1 in the above formula by the value 1. If we substitute M for E_2 in the formula, where M is the propor-

Accuracy of S.W.R. Measurements

Some Sources of Error in Using a Directional Coupler

BY JERRY HALL,* KIPLP

formula given above might be used directly if a person were to trot up and down an open-wire transmission line while measuring the voltage between the conductors with an r.f. voltmeter. But such a method is hardly practical, and is impossible with a coaxial-type transmission line unless a special slotted line is used.

E_{\max} and E_{\min} are derived by algebraically adding E_1 and E_2 , where E_1 and E_2 represent incident and reflected voltages, respectively. At the point along the line where E_{\max} occurs, E_1 and E_2 will be in phase and may be added directly. At the point where E_{\min} occurs, E_1 and E_2 will be 180 degrees out of phase, so E_{\min} may be derived by subtracting E_2 from E_1 . Therefore, we can modify our original formula for s.w.r. and state

$$S.W.R. = \frac{E_{\max}}{E_{\min}} = \frac{E_1 + E_2}{E_1 - E_2}$$

It is not the purpose of this article to investigate the theory or operation of directional-coupler circuits used in reflectometers; this information is generally available in previously-published articles. Let it suffice to consider the type of directional coupler in use by the average amateur as an r.f. voltmeter with provisions for reading *either* incident or reflected voltage, regardless of where the meter is inserted in the line. Thus, we have provisions for measuring E_1 and E_2 individually, without the necessity for trotting up and down the transmission line. We are not particularly interested in the absolute values

tional meter reading obtained when the reflected voltage is being measured, the above formula becomes

$$S.W.R. = \frac{1 + M}{1 - M}$$

For an example in the use of this formula, assume that a half-scale reading is obtained for M during an s.w.r. measurement, or $M = 0.5$; the s.w.r. then equals

$$\frac{1 + 0.5}{1 - 0.5} = \frac{1.5}{0.5} = 3.0$$

An s.w.r. curve based on this formula is given in Fig. 1, labeled "Linear Detector." This is the same curve that appears in the chapter on measurements in the ARRL *Handbook*.

R.F. Voltmeter Linearity

The directional couplers in use by most amateurs utilize a crystal diode to rectify a small amount of r.f. energy induced into a pickup wire placed near the center conductor of a coaxial line section. The voltmeter more correctly indicates a value of direct current determined by the amount of r.f. pickup, the front-to-back ratio of the diode, and the total resistance in the metering circuit.

It is an accepted fact that the resistance of a crystal diode will change with a change in applied voltage, the resistance increasing with decreasing applied voltage. If the voltmeter is linear, the d.c. meter reading is directly proportional to the r.f. voltage applied to the circuit. Reducing the r.f. voltage to one-half will result in a meter read-

* Hopkins St., Wilmington, Mass.

¹ Breetz, "Possible Errors in V.S.W.R. Measurement," *QST*, Nov., 1959.

ing of half the previous value. However, with an ordinary crystal-diode rectifier, halving the applied r.f. voltage will result in a d.c. meter reading of less than half the former value, because of increased resistance in the diode detector. If a metering-circuit resistance of 5 to 10 or more times the ohms-per-volt sensitivity of the d.c. meter movement is employed with ordinary crystal diodes, the meter may be considered as essentially linear, since the high resistance swamps out the nonlinearity of the diode. Typical values yielding near-linearity are 10,000 ohms with a 0-1 milliampere meter, 50,000 to 100,000 ohms with a 0-100 microampere meter, and so on.

However, if a much lower value of resistance is used in the metering circuit, in the order of a few hundred ohms or so, the metering combination may approach being a "square-law" detector, where the d.c. meter reading is proportional to the square of the applied r.f. voltage. (In a square-law detector, the meter reading is directly proportional to the power in the circuit, rather than the voltage.) Reducing the r.f. voltage to one-half a previous value will result in one-fourth the previous d.c. meter reading.

If the "r.f. voltmeter" used in the directional coupler acts as a square-law detector, we should modify the s.w.r. formula accordingly, to obtain the actual s.w.r. E_1 still has a value of unity, whether the detector be linear or square-law, because the meter is adjusted to full scale on the forward voltage. However, in the example above, where the linear detector read 0.5 on reflected voltage, the reading from the square-law detector would be 0.25, which is the square of the previous reading. Thus, we must extract the square root of our reflected voltage reading with a square-law detector to obtain our reflected r.f. voltage in linear meter units, and the s.w.r. formula becomes

$$S.W.R. = \frac{1 + \sqrt{M}}{1 - \sqrt{M}}$$

With a square-law detector indicating a value

of 0.5 for M during an s.w.r. measurement, the s.w.r. could then be computed:

$$\frac{1 + \sqrt{0.5}}{1 - \sqrt{0.5}} = \frac{1 + 0.707}{1 - 0.707} = \frac{1.707}{0.293} = 5.8$$

An s.w.r. curve based on this formula is also shown in Fig. 1, labeled "Square-Law Detector," for comparison with the linear-detection curve.

Practical Diode Characteristics

Both of the above s.w.r. formulas, and the resulting curves of Fig. 1, are based on ideal diodes in ideal circuit situations, which probably would be difficult to attain inexpensively. In actual cases employing ordinary crystal diodes, the detector/meter combination will act somewhere between true linear and true square-law detection when low over-all circuit resistances are used. This is substantiated in Fig. 2, which shows the result of tests made on an r.f. voltmeter consisting of a 1N69 diode with a 10,000-ohm resistance in series with a 20-microampere meter movement. This would correspond approximately to a 200-ohm resistance in series with a 1-milliampere meter, or a 2000-ohm resistance in series with a 100-microampere meter, a situation quite likely to exist in a directional coupler with medium- or low-power operation in the lower-frequency bands.

For comparison, the theoretical linear and square-law detection curves are shown in Fig. 2, along with the actual curve obtained by test. The calibration curve was obtained at 10 Mc. by varying the output of a calibrated signal generator and noting the meter deflection of the test circuit. Checks at 3 and 30 Mc. indicated that changes in frequency had a negligible effect on the curve. The test curve of Fig. 2 is seen to be somewhat closer to linear than to being a square-law detector.

In a linear detector, the voltmeter reading is proportional to the first power of the applied voltage. In a square-law detector, the voltmeter

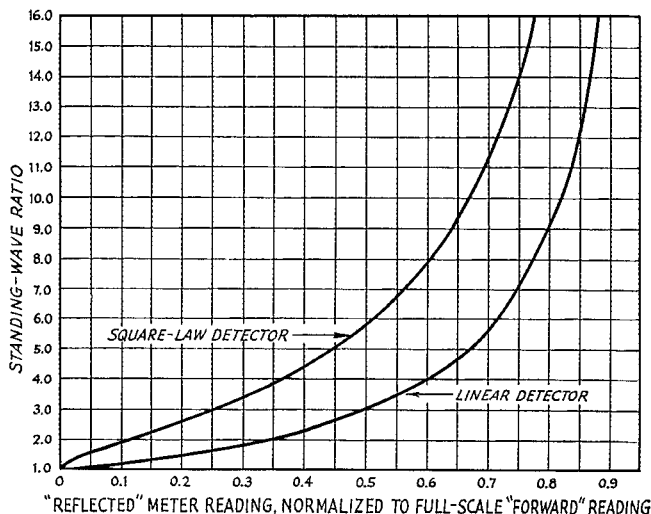


Fig. 1—Standing-wave ratio as indicated by ideal reflectometer with linear and square-law detectors (rectifier and d.c. meter).

reading is proportional to the square or second power of the applied r.f. voltage. A detector acting midway between the two might be said to be proportional to the 1.5 or 3/2 power of the applied r.f. voltage. Correspondingly, it is conceivable that a series of detector curves could exist which are proportional to various powers between 1 and 2, depending on the total circuit resistance.

The power of proportionality for the test curve of Fig. 2 was calculated for several points on the curve, and an average of 1.31 was obtained. This means that, disregarding minor variations in the smoothness of the curve, the d.c. voltmeter reading is proportional to the 1.31 power of the applied r.f. voltage. The actual curve and a "1.31-power-law" detector curve are so nearly alike that the difference could hardly be read on a 3-inch meter. So for practical purposes, we can say the test circuit is in fact a 1.31-power-law detector.

If we were to use this particular detector/meter combination in a directional coupler, the previous formulas for s.w.r. could be modified accordingly for calculation of s.w.r., and the resulting formula would give fairly accurate s.w.r. information providing other errors were not introduced. The formula would be

$$S.W.R. = \frac{1 + 1.31\sqrt{M}}{1 - 1.31\sqrt{M}}$$

A curve based on this formula is shown in Fig. 3. Direct calculation with the formula is difficult

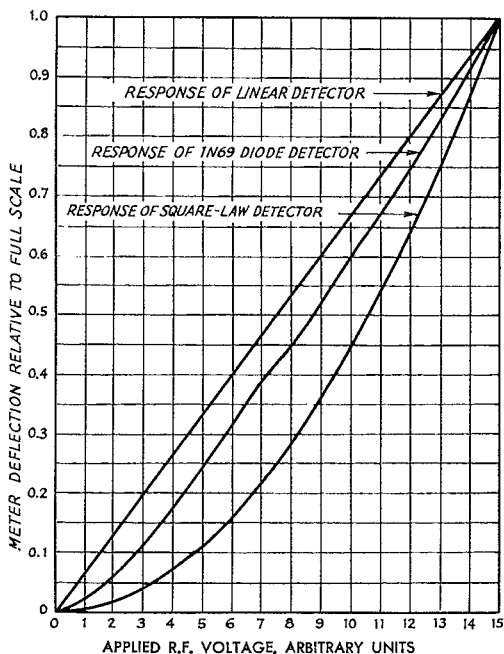


Fig. 2—D.c. meter deflection for detectors following various response laws.

without resorting to a table of logarithms or to a slide rule.

The curve of Fig. 3, for practical purposes, should prove adequate for most home-built reflectometers that have been constructed with care. The curve compares favorably with the calibration curve supplied with the Johnson directional coupler, catalog No. 250-37, which utilizes type 1N294 diodes. At mid-scale reflected values, the Johnson curve indicates a slightly higher s.w.r. than the curve of Fig. 3, but at high s.w.r. values the Johnson curve indicates lower values. The two curves differ only slightly for indicated s.w.r. values below 2.5 or 2 to 1.

Null Impedance

An important factor in reflectometer accuracy is the null impedance, or the impedance at which the bridge shows a matched condition in the line. In fact, the whole purpose of the instrument's use is either for matching or for measuring any mismatch relative to one specific impedance. If the null impedance and the desired operating impedance are not identical, or nearly so, the bridge cannot be satisfactorily used for its intended purpose.

Many factors can affect the null impedance in bridge operation, among them being the pickup wire size, pickup wire spacing from the main conductor, location of the pickup diode along the wire, and the value of terminating resistance used with the pickup wire. If these factors are not properly established relative to one another, a null will occur at some impedance other than that desired.

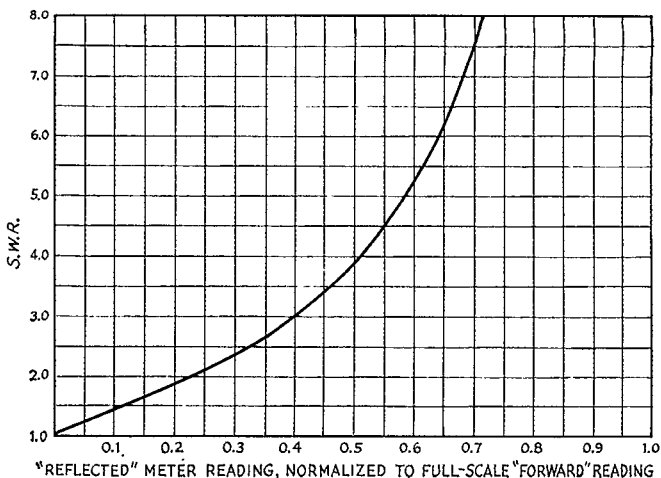
Most reflectometers are constructed for use with either 52- or 75-ohm coaxial lines. The impedance for which a reflectometer is designed to operate is commonly called the "bridge impedance." Thus, a true 52-ohm instrument will show a null in the reflected voltage position when a purely resistive 52-ohm load is connected to its output or load terminals. No other load impedance should yield a null! Even if the overall impedance is 52 ohms but there is reactance present, a complete null should not be indicated. This may be verified by referring to a Smith Transmission Line Chart,² where an s.w.r. of 1.0-to-1 is represented only by the center point on the chart—in most cases, a purely resistive termination equal to the characteristic impedance of the line in use.

A purely-resistive dummy load of the same resistance as the bridge impedance, if such is available, will afford a direct check of null impedance accuracy, by inserting the instrument between a transmitter and the load. Such a load must be capable of dissipating the power output of the transmitter exciting the bridge. A carefully constructed Monimatch, Mark II,³ was subjected to such a test. It was found that slightly different near-null readings were obtained by reversing the input and output ends of the in-

² Cholewski, "Some Amateur Applications of the Smith Chart," *QST*, Jan., 1960.

³ McCoy, "Monimatch, Mark II," *QST*, Feb., 1957.

Fig. 3—Standing-wave ratio as indicated by a practical "r.f. voltmeter" following the 1.31-power response law.



strument when operating into a 50-ohm resistive load, with indicated s.w.r. values in the order of 1.05-to-1 and 1.02-to-1.

Further checks against a General Radio Model 1606-A r.f. impedance bridge revealed that the Monimatch indicated a null when terminated in 44 ohms resistance with a capacitive reactance component of a few ohms. This was ascertained by adjusting the terminating impedance through a transmatch, with 50 watts applied as excitation. Once a null was reached, as indicated on the Monimatch, the impedance bridge was used to measure the actual impedance. The resistive component of the null impedance remained near 44 ohms in both directions, with the greatest change being in the capacitive-reactance component. Frequency excursions and limited power excursions indicated that changes in the null impedance were negligible.

Actually, this amount of error in an s.w.r. instrument is of small consequence in amateur applications. A modern transmitter with a pi-network output circuit should operate just as efficiently into a 44-ohm load as it would into a 50- or 52-ohm load. Even a few ohms reactance in a transmitter load can be compensated for in the proper adjustment of a pi-network output circuit.

A factor often forgotten by many amateurs when considering matched lines is the significance of the words "nominal impedance." RG-8/U

coaxial line, for example, is listed in transmission-line data tables with a *nominal* characteristic impedance of 52 ohms. Actually, the impedance of a particular piece of line can vary by several ohms from the nominal value, depending on frequency, age, and condition of the line. Impedance values over the 3- to 300-Mc. range for new RG-8/U sometimes range from below 40 to above 60 ohms. Different manufacturers' lines exhibit different impedance characteristics for the same nominal type of line. A 52-ohm instrument certainly will not yield errorless indications when operating with a 57-ohm line, for example.

Considerable emphasis has been placed by many amateurs on obtaining a 1-to-1 s.w.r. in transmission lines. The time and effort involved in such attempts may be quite needlessly spent, especially when attempting to reduce the s.w.r. below 1.2 or 1.3 to 1, because of possible errors in the instrument used. Furthermore, in most cases the difference in efficiency between a line operating with an s.w.r. of 1.5-to-1 or one operating at 1-to-1 is only very slight, with no detectable difference at a receiving location.

The moral of this tale is that the next time you hear an amateur assert with indisputable certainty that his transmission line is perfectly matched with a 1.000-to-1 s.w.r., try to borrow his several-hundred-dollar impedance bridge and make some checks of your own! QST

Strays

The Southeast Amateur Radio Club of Cleveland will launch a radio-equipped balloon at noon, Eastern Standard Time, on November 7. It is hoped that the balloon will stay aloft for about a week. The transmitter will operate on 50.05 Mc. at a power input of 90 milliwatts and will be keyed with the call letters KSEMY. The most distant station hear-

ing the signal will be awarded a trophy. Submit reports to Ralph P. Trefney, W8TGX, 1701 Doering Court, Cleveland 9, Ohio. Include date, exact time the signal was heard, direction, signal strength, the length of time you were able to hear the signal, and the tone of the c.w. signal.

• Recent Equipment —

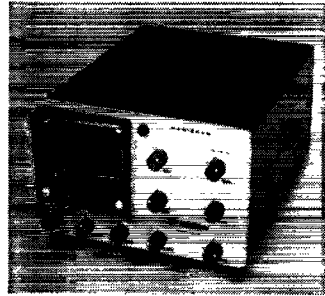
The Heathkit Ham-Scan Panoramic Adapter, Model HO-13

PANORAMIC reception has been with us for a generation or more, but its status has remained that of a desirable but not necessary adjunct to amateur communication. Since it has been a fairly expensive and complex accessory as well, a device for visual presentation of received signals has found its way into only a small percentage of hamshacks. The Heath Ham-Scan, being both easy to build and relatively inexpensive, is likely to change all that.

The Ham-Scan is essentially an electronically-tuned receiver that covers a portion of the i.f. passband of the communications receiver, displaying the signals therein visually instead of audibly. The frequency spread it "looks at" is adjustable from 30 to 100 kc. At the 30-kc end of this range, it is useful for monitoring individual signals. After some experience (if you're new to panoramic techniques), you'll be able to get a fair idea of a number of signal characteristics that you might not notice readily in aural reception only. The 100-kc. sweep is useful for spotting clear spots in a busy band, or occupied ones in a quiet band.

Signals appear as pips rising above a baseline. The height of the pip is an indication of amplitude and the width is the bandwidth of the signal. The pips move along the baseline as the receiver is tuned, becoming audible in the receiver when they pass through the center of the screen. Spurious products are thus readily observed, and the presentation is helpful in nulling the carrier or checking the unwanted sideband in an s.s.b. rig. The Ham-Scan's uses in spotting holes that may be free of QRM, or activity on a sparsely-occupied band, are obvious.

The likeness to the conventional superheterodyne receiver is apparent from the block diagram, Fig. 1. Voltage from the receiver's i.f. system (usually from the mixer plate) is fed into an am-



plifier stage, V_1 , a 6EW6. Parts are supplied with the kit to permit wiring this amplifier for 455 kc. or any of several other intermediate frequencies. Information on the i.f. to use for most communications receivers is furnished.

The 6EAS mixer-oscillator, V_2 , is very similar to the usual receiver technique, except that the oscillator frequency is swept across the desired frequency range electronically, instead of being tuned by hand. This is accomplished with a sawtooth voltage from the horizontal sweep-generator and amplifier, V_6 , a triple-triode 6C10, applied to a voltage-variable capacitor connected across the tuned circuit of V_2B .

Mixer output at 350 kc. passes through two selective i.f. amplifier stages, V_3 and V_4 , using high- Q interstage filters, F_1 and F_2 . The signals are demodulated by a 6AT6 detector-amplifier, V_5 , and passed on to the cathode-ray tube, V_7 . High voltage for the c.r.t. is supplied by the power transformer and a 1V2 rectifier, V_8 . A low-voltage winding on the transformer feeds diode rectifiers to furnish operating voltages for the other stages.

Putting the Ham-Scan into service involves taking some signal out of the receiver. Before

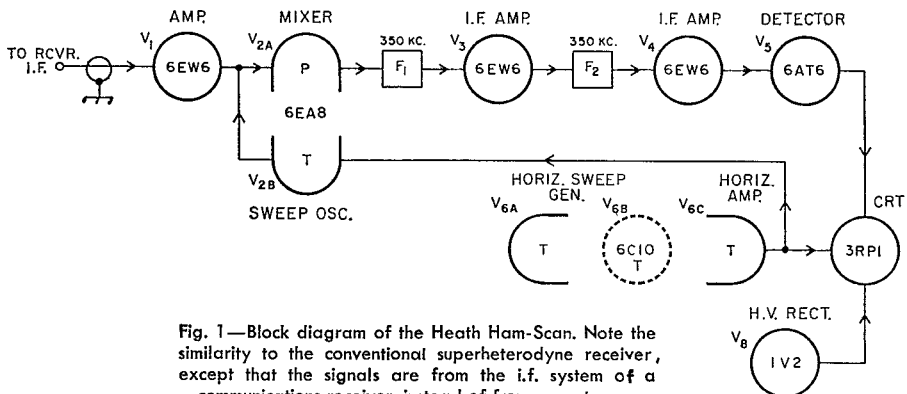
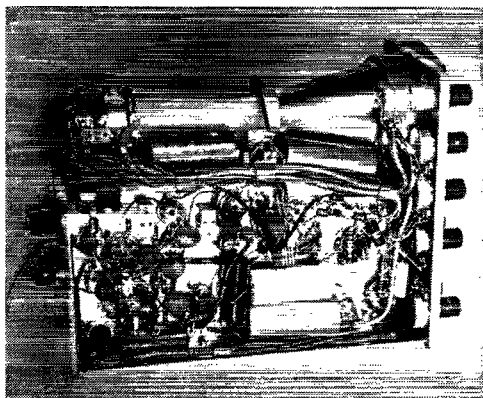


Fig. 1—Block diagram of the Heath Ham-Scan. Note the similarity to the conventional superheterodyne receiver, except that the signals are from the i.f. system of a communications receiver, instead of from an antenna.

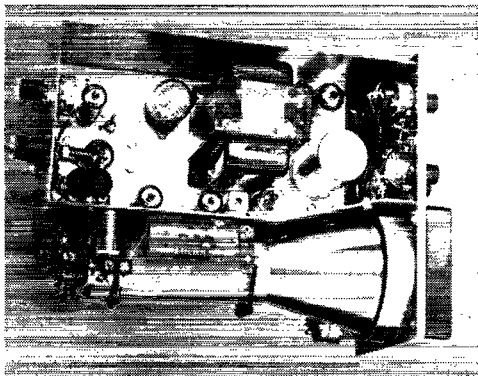
we lose half our audience with this discouraging statement, let it be understood that this is a very simple operation. Quite a few hams have survived the harrowing experience of lifting up the cover of the gleaming monster that represents the better part of one's life savings, and more could. The HO-13 instruction book doesn't say so, but often it is possible to get enough i.f. signal to run the Ham-Scan merely by sticking an unshielded end of wire down inside the mixer tube shield. Even if you do have to remove the receiver from the cabinet and make a connection to the mixer plate, the instruction book practically holds your hand while you do the job.

We installed the Ham-Scan on a 75S-3, which has a spare phono jack on the rear wall just for such uses. It took about 10 minutes all told. Before making the connection, however, we worked the Ham-Scan with this and other receivers having 455-kc. i.f. systems merely by removing the shield braid from about 2 inches of the end of a piece of small coax, and then running the end down inside the proper tube shield in the receiver in question. There's plenty of gain in the Ham-Scan amplifier, and only a tiny signal voltage is needed.



Bottom of the panoramic adaptor reveals the almost professional appearance that results merely from following directions implicitly.

The writer, a veteran of some 40 years of home-building of electronic gear but relatively inexperienced in kit assembling, found this one a breeze. From ripping open the box to looking at the first signals was a matter of some 18 hours, and there were few trouble spots along the way. There is something akin to the thrill of watching a jig-saw puzzle picture take form to be derived from assembling these carefully-organized projects. We resisted the strong temptation to wire from the schematic diagram, instead of following the step-by-step procedure. At times the latter seems childishly simple, but on other occasions we had to do a bit of fore-and-aft reading to be sure we were making the right moves. Sometime we're going to make one of these kit gadgets



Top view of the Ham-Scan. Cathode-ray tube has a cone-shaped Mumetal shield over the flared portion and a cylindrical shield over the neck.

from the schematic, just to see what happens, preferably when there's no hurry about getting the thing done!

Like many another ham too busy or too poor to worry about *looking* at signals, we'd gotten along well enough just listening and talking. Looking at our own signal consistently became a necessity with the advent of Heath sideband at W1HDQ.¹ The monitoring chore is handled by the older brother of the Ham-Scan, the Heath HO-10 Monitor Scope², and we couldn't live on sideband (or a.m. linear) without it. The Ham-Scan seemed nowhere near so vital—a project built for-the-fun-of-it at first. But the other day, when we hooked up another receiver temporarily at the operating position, we found that we missed the waving grass and the jumping pips of the Ham-Scan. In common, we suspect, with many another ham who will make his first move into the panoramic field as a result of the availability of an inexpensive and simple box to turn the trick, it appears that we're hooked on looking as well as listening. Oh well—the Ham-Scan and the Monitor Scope fit one atop the other nicely in the space between the receiver and exciter on our operating position!

— E.P.T.

¹ "Heathkit 50-Mc. S.S.B. Transmitter, Model HX-30," May, 1963, *QST*, Page 51.

² "Heathkit Model HO-10 Monitor Scope," December, 1963, *QST*, Page 58.

Heathkit HO-13 Panoramic Adaptor

Height: 5¼ inches.

Width: 7¾ inches.

Depth: 11 inches.

Weight: 8½ pounds.

Power Requirement: 115 volts a.c., 50-60 cycles, 40 watts.

Price Class: \$80

Manufacturer: Heath Company, Benton Harbor, Mich.

Director Election Results

FCC Proposes 175-Mile Exam Circles

Certification of Test by Volunteers

Minutes of Executive Committee Meeting

ELECTION RESULTS

In the elections for director and vice director currently taking place in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions, two directors and three vice directors were declared elected by the Executive Committee as the only eligible nominees for their respective posts.

In the Central Division, **Philip E. Haller, W9HPG**, who moved up from vice director in 1963 following the resignation of **W9GPI**, has been declared reelected for a new two-year term. In the West Gulf Division, **E. C. Pool, W5FNO** withdrew his name as a candidate for director; accordingly, **Dr. R. O. Best, W5QKF**, the only remaining candidate, was declared to be re-elected to his third term on the Board.

New England had only one nominee for vice director. **Bigelow Green, W1EAE**, will therefore enter his third term on January 1, 1965. The Rocky Mountain Division's vice director of the past six years, **John H. Sampson, jr., W7OCX**, was again the only nominee, and accordingly has been reelected.

Technically, there is a new vice director in the Northwestern Division, a gent 74 years young known as **R. Rex Roberts, W7CPY**. It is hard to use the words "new" and Rex in the same sentence, however, for Rex has been on the Board continuously since 1949 as director of the Northwestern Division, and has served on a number of Board committees, notably the Executive Committee and the Finance Committee. He previously put in eight years as alternate director (actually, the same office as our present vice director) and six as SCM of Montana. **W7CPY** was nominated in separate petitions for both the director and vice director offices, but withdrew from the director race.

The remainder of the offices are contested, and members of those divisions are reminded that ballots must be received at headquarters before noon e.s.t. on November 20 if they are to be counted as valid. The text of the Executive Committee minutes, including these election matters, can be found at the end of this department.

EXAMINATION CIRCLES

In a Notice of Proposed Rulemaking issued October 1, 1964, the FCC proposed that the

amateur rules be changed so that only those persons living more than 175 miles from a place where FCC gives examinations at least twice a year be eligible for Conditional Class licenses. (The docket does not affect those who are already licensed as Conditionals; neither does it affect those who are unable to appear for an in-person exam because of physical disability, military service or temporary residence of a year or more outside the U.S., its territories or possessions.) Presently, applicants for full amateur privileges who live more than 75 miles from a quarterly examination point may take the Conditional Class license.

FCC points out that 20% of present amateur licensees entitled to full privileges have obtained them via mail examination procedures, and suggests that while such a figure in itself is not necessarily alarming, the gradual increase in that percentage in recent years is a trend which should not be continued.

Any person interested in this matter is invited to file comment with FCC, in an original and fourteen copies, setting forth the reasons why he feels the proposal should, or should not, be adopted. Such comments must reach the Commission at its Washington office by November 16, 1964. Full text of the Notice appears below.

Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D. C. 20554

In the matter of Amendment of Sections 97.9(d) (1) and 97.27 (a) of the Commission's Rules governing eligibility for the Conditional Class license in the Amateur Radio Service } DOCKET NO. 15640

NOTICE OF PROPOSED RULE MAKING

By the Commission:

1. The Commission has under consideration the provisions of Sections 97.9(d) (1) and 97.27(a) of the rules governing eligibility for the Conditional Class license in the Amateur Radio Service. These rule sections provide that an individual may apply for the Conditional Class license if his actual residence and proposed station location are more than 75 airline miles distance from any Commission Field Office or quarterly examination point.

2. Review of the present status of the Conditional Class license shows that there are now more than 40,000 holders of this authorization. Over 90% of these licensees established their eligibility on the basis of being more than 75 airline miles distance from a Commission Field Office or quarterly examination point. Almost without exception, these licensees obtained an authorization after passing a code test and written mail examination under the supervision of a volunteer examiner.

3. Conditional Class licensees comprise over 20% of all licensees who are entitled to the higher amateur operating privileges. While this percentage is not alarming, it is the result of a constant increase through the last decade. This the Commission does not regard as desirable since it is our policy that, where feasible, the qualifications of those applicants for the higher classes of amateur licenses be directly verified by Commission personnel.

4. Accordingly, the Commission proposes to amend Section 97.9 (d) (1) and 97.27(a) to provide that only those individuals whose actual residence and proposed station location are more than *one hundred and seventy five airline miles* distance from a Commission Field Office, quarterly or *semi-annual* examination point shall be eligible for the Conditional Class license on a distance basis. It is not anticipated that these increased limitations will impose an undue burden upon applicants. There will be very few locations where potential applicants may have to travel more than 150 miles. Where travel conditions are difficult, such as in mountainous areas, there are almost invariably examination points well within 100 miles of potential applicants.

5. It should be emphasized that this proposed amendment does not in any way affect renewal by present holders of the Conditional Class license. Nor does the proposal affect eligibility for this class license on the basis of protracted disability, service in the armed forces or temporary overseas residence.

6. The specific proposed amended Sections 97.9(d) (1) and 97.27(a) are set forth in full in the Appendix to this Notice. The proposed amendment is issued pursuant to the authority contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

7. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before November 16, 1964, and reply comments on or before December 1, 1964. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this Notice.

8. In accordance with Section 1.419 of the Commission's Rules and Regulations, an original and fourteen copies of all statements or comments shall be furnished the Commission.

Adopted: September 30, 1964

Released: October 1, 1964

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Secretary

APPENDIX

Proposed Amendment of Part 97, Amateur Radio Service Rules.

1. Section 97.9(d) (1) to read as follows: § 97.9 Eligibility for new operator license. (d) * * * (1) Whose actual residence and amateur station location are more than 175 miles airline distance from the nearest location at which examinations are held at intervals of not more than 6 months for General Class amateur operator licenses.
2. Section 97.27(a) to read as follows: § 97.27 Availability of Conditional Class license examinations * * * (a) If the applicant's actual residence and proposed amateur station location are more than 175 miles airline distance from the nearest location at which examinations are conducted by an authorized Commission employee or representative at intervals of not more than 6 months for amateur operator licenses.

CERTIFICATION OF TESTS BY VOLUNTEERS

Volunteer examiners are required to fill out a certification on the back of the answer sheet used by applicants for Novice, Technician or Conditional Class licenses. If the certificate is not completed, the examination will be rejected as if failed; FCC cannot return the application to the examiner for completion of this item. Thus, examiners should exercise the greatest care to see that everything is in order before returning

examination papers to the Commission.

It has been a serious problem — in the first six months under the revised mail procedures, 15,000 examinations have gone out. Over 1,000 were not returned within the required time and they resulted in rejection. An additional 300 which were not received within 60 days required additional follow-ups. Approximately 200 exams did not have the necessary certification.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 300

September 26/28, 1964

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at the Hotel El Dorado in Sacramento, California, at 10:02 a.m., September 26, 1964. Present: President Herbert Hoover, jr., in the chair; First Vice President W. M. Groves; Directors Milton E. Chaffee, Charles G. Compton, Robert W. Denniston, and Noel B. Eaton; and General Manager John Hutton. General Counsel R. M. Booth, jr., was also present.

The Committee discussed various matters informally until 11:00 a.m. at which time it recessed in order to participate in activities of the Pacific Division Convention. The Committee reconvened at the Hilton Inn, San Francisco, California, at 9:20 a.m., September 28, 1964, with all persons hereinbefore mentioned in attendance, plus Vice President F. E. Handy.

The Committee proceeded to examine nominations in the director elections, with careful attention to the application of the eligibility rules concerning membership, license status and freedom from commercial radio connections. The Committee made findings and ordered actions as detailed below, all by unanimous action.

CENTRAL DIVISION

For Director:

Philip E. Haller, W9HPG, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the by-laws, to be duly re-elected as director of the Central Division for the 1965-1966 term without membership balloting.

For Vice Director:

G. Wiley Bergman, W9CA, Everett L. Hannah, W9NWK, Adrian Z. Hodson, W9HOT, Edmond A. Metzger, W9PRN, Sidonius M. Pokorny, W9NRP, and William H. Siebenmorgen, W9IHO/W9GFV were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to full members of the division.

HUDSON DIVISION

For Director:

Guy F. Brenmert, K2EFB, George V. Cooke, jr., W2OBU, and Leon Steinberger, W2EVV, were found lawfully nominated and eligible, but the Committee was in receipt of a communication from each withdrawing his name as a candidate. Harry J. Dannals, W2TUK, and Howard W. Wolfe, W2AGW, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to full members of the division.

(Continued on page 144)



Hints and Kinks

For the Experimenters



PLASTIC SHIELD PROTECTS MICROPHONES FROM WIND NOISE

AN idea recently published in a *NASA Tech Brief*¹ should be of interest to radio amateurs for their possible use in mobile, portable or Field-Day applications. The idea is to protect microphones from wind noise by the use of a shield fabricated from foamed polystyrene, as shown in the sketch in Fig. 1. The shield, made in the shape of a teardrop, consists of two longitudinal sections which are easily slipped on or removed from the microphone. Foamed polystyrene is used as the material for the shield because of its extremely low specific acoustical impedance, low density, and good rigidity.

Tests with the shield showed wind-noise attenuation ranged from 19 db. in a 4-m.p.h. wind to 14 db. in a 20-m.p.h. wind. The attenuation of sound waves ranged from 1 db. at 300 cycles to 12 db. at 9 kc. For further information about this idea, inquiries may be directed to Technology Utilization Officer, Marshall Space Flight Center, Huntsville, Alabama 35812, Reference: B63-10579.

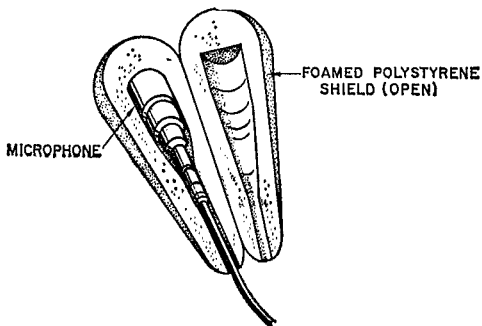


Fig. 1—A foamed polystyrene shield protects microphones from wind noise.

RECEIVER MUTER

FOR those using a J-38 or similar type hand key there is an extremely-simple receiver mute which will turn the receiver off when the transmitter is keyed on. Drill a hole in the J-38 key just below where the gap-adjusting screw touches the key base. Through the hole place a bolt with a tip of coin-silver solder to it. This bolt is insulated from the key base and a lead is run from the bolt to the mute terminals of the receiver.

¹ The *NASA Tech Brief* is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

(The mute circuit of the receiver must be one that mutes the receiver when the terminals are open.) Of course, the key lever must be grounded as it usually is in cathode or grid-block keyed circuits. When the key is up (open), the lever will make contact with the post, turning the receiver on. When the key is pushed down (closed), the mute contacts will open, muting the receiver.

— F. P. Hughes VE2AQJ

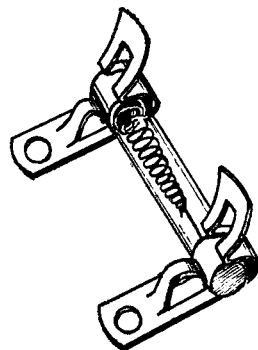


Fig. 2—WB2DUI'S fuse holder.

TEMPORARY FUSE HOLDER

THE sketch in Fig. 2 shows a temporary fuse holder that can be fashioned from two small Fahnstock clips (General Cement No. H592-F). The fuses will remain secure and a good electrical contact is established.

— Don Cook, WB2DUI

IMPROVED FREQUENCY STABILITY FOR THE KWS-1 TRANSMITTER

ONE of the features of the Collins KWS-1 transmitter is that it's a full kilowatt transmitter in a single package. However, because the frequency-controlling section of the transmitter is in close proximity to the heat-producing final-amplifier stage, there is a noticeable frequency drift as the transmitter is used, especially from a cold start.

I found that the addition of a Rotron "Muffin" or "Whisper" fan in the lid of the transmitter practically wipes out any objectionable frequency drift and, in addition, increases component life. The improvement in frequency stability in my particular transmitter is shown in the graph in Fig. 3. Two test conditions were chosen. One is simply the standby condition where only the power amplifier heaters are on. The other

condition is with the emission switch in the c.w. position and power amplifier bias adjusted to give 150 ma. power amplifier plate current, or about 300 watts dissipation in the final-amplifier tubes. This represents about the most severe heat condition likely to be encountered in actual service.

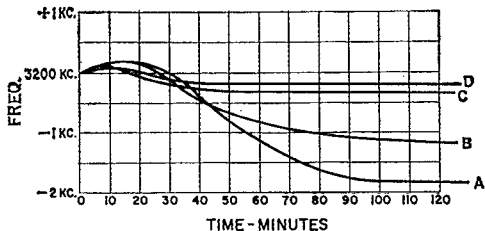


Fig. 3—Curves showing frequency drift with the cooling fan off (A and B) and with the fan on (C and D).

Curve A is the frequency drift of the v.f.o. with the emission switch in the c.w. position and the fan off. The frequency excursion is just over 2 kc. Curve B is the same condition as A, except that the function switch is in standby. Here, the frequency excursion is about 1.3 kc. Curves C and D are repeats of A and B, with the fan turned on. The drift is now 400 cycles and 250 cycles! All of the curves are for a period of two hours after an initial warm-up period of five minutes.

The photograph shows the fan mounted on the top of the KWS-1 transmitter.

— Bruce E. Montgomery, W4BFR

INCREASED GAIN FOR "COMMUNICATORS"

I FOUND that in changing the 6BQ7A r.f. amplifier tube used in the Communicators I, II, and III, to a newly-introduced Amperex 6DJ8 there is an increased gain in the neighborhood of 5 db. and a noticeable decrease in noise. Of course, there is more to it than just changing the tube. The r.f. coils must be touched up for maximum gain. I am now using a 6DJ8 in my Gonset GC105 Communicator and getting excellent results.

Amperex also has a 6922 tube which is identical to the 6DJ8 except that the 6922 is gold-plated and is guaranteed for 10,000 hours!

— Thomas Neuhaus, WB2CLN

STOP POWER-SUPPLY OSCILLATIONS

SEVERAL hams in this area who have used the 6AS7G electronically-regulated bias-supply circuit appearing in *Handbooks* prior to the 1959 edition have had trouble with oscillation in the vicinity of 13 kc. This oscillation has resulted in modulation of the transmitters with which the supply has been used, causing spurious signals to appear at approximately 13 kc. either side of the transmitting frequency. The trouble was avoided very simply by connecting a 0.02- μ f. disk capacitor from grids to cathodes of the 6AS7G/ 60S0.

— Dallas Johnston, W9AAG



Fig. 4—The cooling fan is mounted on the KWS-1 lid above the v.f.o. An air filter and screen are part of the fan assembly.

DIPOLE CENTER INSULATOR

A plastic "barrier strip" makes an excellent center insulator for dipole antennas. The screw terminals are used for making electrical connection between the antenna and feed line and any extra screw terminals can be used for mounting coils, matching networks, etc. The antenna wires are connected to the holes at the end of the strip (these are the holes that are normally used for chassis mounting) to take the strain off the electrical connections at the screw terminals.

After everything is connected, the whole assembly should be dipped in varnish or sprayed with clear plastic spray. Also, it is a good idea to plug the open end of the coax feed line to keep water from running down between the shield and the center conductor. — Joel Rose, W3AFY

24-VOLT D.C. SUPPLY

THERE are many good relay bargains on the surplus market today, but almost universally they require 28 volts d.c. A small, but husky, one-ampere solid-state power supply shown in Fig. 5 can be built up in a matter of minutes.

The unit is constructed on a $3\frac{1}{4} \times \frac{3}{4} \times 2\frac{1}{4}$ -inch Minibox. The diode can be any silicon rectifier with 50 volts p.i.v. or more. The current rating should be at least 1.5 amperes. A test point is included for an easy check of voltage output from the power supply. — W1K1K

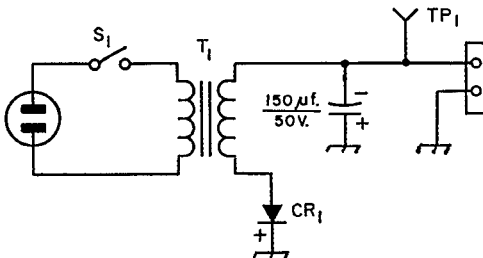


Fig. 5—W1K1K's 24-volt d.c. power supply.

CR₁—See text.

S₁—S.p.s.t. switch.

T₁—Pri. 117 volts, sec. 25.5 volts, 1 amp. (Stancor P6569 TB1 or Allied 61 F 421).

TP₁—Phone tip jack.

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Patience and Fortitude

Remember back to when a YL would go on the c.w. bands for a ragchew and about the first comment from any OM was either that you were the first YL c.w. contact he'd ever had, or at least something to the effect of the rarity of the occasion? Somewhere along the way there has been a gradual change. Who can tell when or how it happened — but, it has happened. The rarity these days is to be anyone's first YL contact, and comments now trend more commonly toward OMs telling about the many YLs they've QSO'd recently. There are YL c.w. operators up and down every band. Their keyers, bugs and straight keys are floating some fine c.w. out over the airwaves.

If YLs were to pinpoint just one reason for their increase in activity on the c.w. bands, chances are their first thanks would go to some very kindly OM (the real Old Timers of amateur radio) who very graciously extended not only words of encouragement but words of wisdom. This fine c.w. ability didn't come easily to any one of them. Everyone learning the code begins with the grand struggle of just trying to remember what dit-dah is, and it's one big continuous struggle right through to dah-dah-dit-dit! Then, as if that isn't bad enough, you find the impossible appearing speed of either 5, or eventually 13 w.p.m., staring at you. At the time of all this studying, if anyone dared to tell you that some day you could easily grow to thoroughly enjoy conversing via c.w., would you have believed them? Yet, it happens.

Ever shy away from answering the CQ of what you might feel is the finest fist on the whole band for fear that either you would make a mistake, or possibly because the speed was just a little bit faster than you felt you could comfortably copy? Don't! Muster up enough courage to answer such CQs and you will gain in experience and proficiency and perhaps pick up some words of wisdom from the OTs, much of which will be helpful. They know a few hard and fast rules that, if followed, are all it takes (plus some fortitude) to increase your on-the-air enjoyment.

They will tell you how important the operating practices you form during your first year of being licensed will be. The harder it was for you to learn code in the first place, the more selfish you should feel when it comes to preserving this knowledge.

*YL Editor, QST. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.

Just when you feel — ah, now I can talk to all these hams and hear what they really sound like, OTs say—Nope! Resist this temptation (or, at least keep it to a minimum) for just the first year, and this is when c.w. will cease to be merely a series of dits and dahs and become a new language. As soon as you sense that you are copying words and not just letters, you are well on your way. At this point, it's wise to try and copy a little faster than you can copy absolutely solid. Sure, you'll miss a word or two — but only rarely does this prevent understanding what was said or meant.



When you are fortunate enough to QSO a YL in G3 land, it may be Joan 'Johnnie' Crossan, G3OJW, from West Wickham, Kent shown with her daughter, Elizabeth. Johnnie is active on 20 mtr. c.w. and s.s.b. where she shares the rig with her OM, G3BWWY. (Courtesy of W1RFQ)

When the time comes that you comment "but I can't write that fast", you have reached another milestone. Now, say the OTs, put down your pencil and copy in your head. Impossible? The impossible just takes a little longer. It helps at first to write down one or two words until this is mastered, and before too long you will find that your QSOs flow along like normal conversation. Copying in your head has its fringe benefits since if you write and send with the same hand, you will find that your hand gets no where near as tired, enabling you to send better code.

These are but a few tried and true ways many OTs suggest to help you thoroughly enjoy c.w.

By the sounds of all the gals who are gracing the air waves with some fine code, the Old Timers' words of wisdom and suggestions have not been taken in vain.

YL Nets

Many of the YLs you have met in last month's YLAP can be found on the YL Nets. Here's a fine way to get to know new YLs and renew old acquaintances. All YLs are welcome.

The following listing may be subject to changes, but was compiled from the latest available information for your convenience.

(GMT) Time	Freq.	Name	NCS or Mgr.
Monday			
1330	3900 kc.	Buckeye Belles	K8MZT
1400	7225 kc.	Floridoras	K4JZX
1400	3920 kc.	Mich. Upper Peninsula	Rotates
1700	7235 kc.	Loaded Clothes Line Net	W0ESD
1800	50.4 Mc.	Indiana Mich. Petticoat Sisters (IMPS)	K9YIC
1930	3737 kc.	Buckeye Belles (c.w.)	K8TFG
2300	3900 kc.	Midnite YL Roundup	W4HLF
2300	3890 kc.	Oregon YL	W7HHH
0230	(every third Mon.)		
	146.502 Mc.	Jersey Tomaters	Rotates
Tuesday			
1330	3940 kc.	Jayhawker	K0HEU
1330	3900 kc.	Blue Ridge	K4YAK
1400	3933 kc.	Floridora SSB	
1430	145.260 Mc.	Buckeye Belles	K8NQK and K8TVX
1430	51.3 Mc.	Buckeye Belles	Rotates
1500	50.33 Mc.	Floridora Southern Net	K4ACF
1800	14.240 Mc.	YL Chapter 4 Net	
1800	7179 kc.	Buckeye Belles (c.w.)	WA8DZL
1800	14.333 kc.	Fla. Internat. Sidebanders (FINS)	K4ICA
1800	50.4 Mc.	IMPS	K9YIC
0230	50.5 Mc.	Colorado YLs	K0WZN
0230	3825 kc.	Gaylars	Rotates
Wednesday			
1330	3900 kc.	WRONE Yankee Lassie	W1YPH
1400	3900 kc.	Mich. YL Welcome Net	W8ATB and K8LHF
1430	50.2 Mc.	Hoosier Amateur Women's Klub (HAWK)	K9MZV
1600	7100 kc.	Loaded Clothes Line (c.w.)	K0EVG
1800	50.4 Mc.	IMPS	K9YIC
1900	50.65 Mc.	WRONE	W1YPH
1900	14.288 Mc.	YL Open House	WA4FJF and K6KCI
0200	50.7 Mc.	Chix on Six (Cleveland)	Rotates
0200	50.3 Mc.	Fla. Suncoast YL Net	K4EAC
0300	146.1 Mc.	Los Angeles Young Ladies Radio Club (Laylrcs)	K6BUS
Thursday			
1400	3860 kc.	Georgia Peaches	K4ZNK
1400	7270 kc.	Friendly Forty	W3UUG
1430	7185 kc.	Floridora Novice Net	WA4FJF
1630	7235 kc.	Tex. YL Roundup Net (Tytrun)	
1800	14.277 Mc.	FINS	KP4CL
1800	50.4 Mc.	IMPS	K9YIC
1800	14.240 kc.	Tangle Net	
1930	(PDST)3885kc.	Baylare YL Net	W6QYL
0400	28.8 Mc.	Ten Mtr. Chirps (6 call area)	Rotates
Friday			
1330	3600 kc.	WRONE (c.w.)	W1YPH
1700	3930 kc.	Minow Net	K7RAM
1730	7250 kc.	40 Mtr. Roundtable (6 call area)	Rotates
1800	50.4 Mc.	IMPS	K9YIC
Saturday			
1430	3910 kc.	HAWK Roost	K9ILK
1800	3845 kc.	Baylare Mermaid Net	WA6LIZ
Sunday			
1400	7225 kc.	Florida Business Girls	K4UIZ
2200	3940 kc.	Jayhawker	W9JUV
Mon. thru Fri.			
2100	50.35 Mc.	Harmonies YL Nets	
PDST			



Traffickers Holiday.

The New York State Net picnic on August 29 was well attended by the following YLs: front row (l. to r.) K2JBX; W2RUF, NYS Net Mgr.; WB2JCE; WA2YTT; back row (l. to r.) WA2VYS, ESS Net Mgr.; and Nancy Lewis, daughter of W2FEB.

YLRL Election Results

With great thanks to all who allowed their names to be placed in nomination for the election of officers, YLYR announces the following results of the election. They will serve for a one year term commencing January 1, 1965. Congratulations and best wishes for a successful year.

President — W6QYL — Martha Edwards, 44203 N. Date Ave., Lancaster, Calif.

Vice President — W0IJJL — Kayla Bloom, 175 S. Jasmine St., Denver 22, Colo.

Secretary — K7MRX — Fran Bailey, Box 3, University Station, Moscow, Idaho.

Treasurer — K5YIB — Barbara Houston, P. O. Box 88, Houston, Tex.

New District Chairmen:

K1OYM — Faith Wedge

WA2GPT — Bea Dietz

W3SLS — Betty Jane Aylor

WA4FEY, Ruth Heitfield

K5PFF — Audrey Beyer

WA6AOE — Maxine Hanberry

K8ITF — Marge Farinet

K9TRP — Diane Price

WA0BBP — Maxine Winterhalder

K5MGI/KH6 — Ruth Jones

KL7CUIY — Kathleen McNulty

VE3EUV — Dorree Butler

New DX Chairman:

K1LCI — Ginny Powell

All YLs are invited to join YLRL. In answer to the many requests asking how you may become a member, applications may be obtained from the Treasurer, K5YIB, or any of YLRL's officers or members.

Coming Events

Gulf Area Young Ladies Radio Klub (Gaylard) will be hostess club to the Texas Young Ladies Round Up Net (Tytrun) members at their annual birthday party, November 6 and 7 at Camp Manison, Friendswood, Texas (just on the outskirts of Houston). A buffet supper will be served on Friday evening, breakfast Saturday morning and a luncheon Saturday noon. Preregistration fee is \$7.00 — after Oct. 15 it is \$7.50. The Gaylarks and Tytrun invite you to join them for a weekend of fun and entertainment.

YLAP contest — the 25th annual contest for all YLs. Phone section Nov. 4-5. See October column for complete details.

(Continued on page 152)

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

STANDARDS FOR EC APPOINTMENTS

THE appointment as emergency coordinator is probably the most important in our entire ARPSC setup, because it is basic, at the ground level, the "do it" level, where contact with the general public is made, where our reputation for public service, good or bad as we make it, is impressed on the man on the street.

At one time our files showed over 1700 ECs. This was an impressive figure, but a little research showed that less than 50% of these were actually *doing* anything, and only about half of this 50% were ever bothering to tell us about it. So we appealed to SCMs to clean out the deadwood, get them replaced with active ECs who would do more than display a piece of wallpaper. Many of the SCMs did. The result? Alas, our EC roster soon dropped to about 1400, which is about the present level.

Your League considers public service No. 1 in its list of objectives, even above incentive licensing. Yet, there seems to be a very definite tendency on the part of amateurs in general, most of whom will readily admit that public service is a good thing, to leave the leadership in such matters to another amateur vaguely referred to as "somebody else." Most of them will admit that they have the ability, but not the time, to take the lead.

Let's analyze this attitude a little. When someone says he doesn't have time to be EC, just exactly what does he mean? Why obviously, (since everybody has time for *something*), that he considers being EC 'way down the line in his own personal precedence list; that he has so many things to do that he considers more important. Such as what? Well, when you start delving into this, you come up with some surprising answers. A good many of them, when lumped together, can be put under a single category — personal pleasure. Would you consider public service more important, for example, than bowling; than playing poker with the boys (or bridge with the girls); than watching television; than going out on dates? Of course you would; or at least you would *say* you would. But such activities are precisely what many of our amateurs are doing in a great deal of the time they claim not to have for EC work.

Mind you, we are not begrudging anyone his recreation. A certain amount of it is a necessity to anyone. Neither are we trying to deny anyone the right to decide for himself what he wants to do with his own time — not that it would do us any good if we were. All we are saying is that

* National Emergency Coordinator, ARRL.

we're wise to you when you say you don't have "time" to be an EC. We know what you are *actually* saying is that being an ARPSC leader isn't important enough to merit use of your valuable time. And from this we conclude that, since you put ARPSC leadership so far down in your list of important things, you probably wouldn't be a very good EC anyway.

A little while ago, we mentioned that only about 50% of our ECs were actually doing anything. Some SCMs and SECs, recognizing this, have put it up to the ECs, to produce results or resign. Wallpaper ECs, naturally, did neither, so section officials summarily cancelled their appointments. The result? A vacancy, all too often not filled. This raises the question: which is the lesser of two evils — to have no EC at all, or to have one who does nothing? Many of our SCMs obviously prefer the former.



The League's booth was part of the display set up by members of the Milwaukee, Wisc. ARRC for the General Motors open house on July 23. The Model 19 RTTY unit printed from a local loop tape giving a brief explanation of amateur radio as a public service. A two-meter link was maintained with W9EKW, Red Cross Hq., and the "Wheel Plan" on the left explained the AREC tie-in with Red Cross. (Photo by K9KJT)

There are several ways of looking at the question, nevertheless. One is that there is little difference between having no EC and one who does nothing, and the existence of a do-nothing EC might discourage other qualified amateurs from applying for the position. Another is that lack of progress may not be the EC's fault; the fault may lie in extreme apathy on the part of the local amateurs, and perhaps if some pressure is applied by the local amateurs, he will come to life. Still another is that even a paper EC, where no one is available otherwise, is at least a statistic

which, while not *much*, is at least *something* — so if no one qualified steps forward to do an active job, why throw out the incumbent?

In any community, a group of amateurs who want to be a part of the amateur's vitally important public service program have to produce a leader. It does no good at all to "have a feeling" that something ought to be done and to pledge support to any leadership offered. All too often, such support is promptly withdrawn when the leadership offered is not up to expectations. If you have an EC, support him or replace him. If you don't have one, get one. If you can't get one because all others, like yourself, prefer to have someone else do it, then give some thought to doing the job yourself. Others may be better qualified, true, but availability and willingness are important factors in AREC leadership, too. — *W1NJM*.

Diary of the AREC

The Alaskan earthquake, again. It has been 6 months since the disaster and we are still receiving reports from amateurs who participated. They are: K1GHT, W4MAF, W6s AUC JSY, WA6JYE, WB6FYH, K7s IWD OQO TNY VNL, W7s RBV THH, K9TZJ.

During the Wichita Falls tornado (p. 52, Sept. 1964 *QST*), K9AEM, the Red Cross station in St. Louis, Mo., was in contact with stations in Wichita Falls and passed traffic.



During a recent hurricane drill in South Carolina, W4RZL SCM, and WA4EHT (both standing) were snapped observing K4QJH, seated at the rig, in operation. Two visitors also watched the goings on.

On April 21, 10 amateurs provided communications for 24 hours during a flood in Muncie, Ind. Those amateurs participating were: W9s BZI CUD FYC OMD NSF FZK CSI, K9PYW, W4As ATT DNB. — *W9FYC, EC Muncie, Ind.*

On May 6, the yacht *Dubloon* was adrift some 400 miles off the coast of South Carolina. She was being towed to shore by a commercial vessel but for some unknown reason would have to be cut loose. The radio operator on the commercial vessel, WA4IYQ, could not make contact with the Coast Guard on regular marine channels so he switched to 15 meters where he was answered by K7NVB. Soon after contact was made and the situation explained, K7NVB was called by W2AMK and advised that WA4MKX, in Tampa, Fla., was a few kcs. lower and could make contact with Coast Guard officials. A Coast Guard cutter was sent to intercept the *Dubloon* and reached her only 40 minutes before the captain of the *Alcoa* had advised that he would

have to leave them. The *Dubloon* was towed into port without further incident. — *W7PBV, SCM Nevada*.

On Aug. 8, a Ukiah, Calif., woman tried to reach her husband in Alaska by telephone but was unable to because he was on board a fishing boat. She called the Red Cross who referred her to WB6GUR who in turn went to W6KVQ's house and attempted to make contact with Alaska. KL7FBA was raised and informed of the situation, and immediately called the Land, Sea and Air Rescue, the Highway Patrol, the Forestry Service and the Coast Guard. The Coast Guard was finally able to contact the fishing vessel, and the man was requested to call his wife via ship to shore telephone. KL7AIR also aided by keeping the frequency clear for the emergency communications — *W6KVQ*.

On Aug. 22, a tornado struck Port Washington, Wis., demolishing 16 homes and damaging 43 more beyond use; a total of 200 homes suffered damage of some degree, 18 local residents were hospitalized, none seriously and no fatalities. Because of the magnitude of the damage, the Port Washington Red Cross office requested aid from the Milwaukee/Waukesha Chapter, K9DBP was called, and he activated the rest of the AREC group. K9UKH and W9SUF operated W9EKW, the Red Cross station in Milwaukee. W9ATK was the first mobile unit to arrive in Port Washington, and local police requested that he go directly to the High school, which was being used as headquarters for the clean-up operation. K9ZEP, the second mobile to arrive, surveyed the disaster areas and reported back to W9ATK who in turn relayed any requests for equipment and supplies to W9EKW. K9CMX stopped at the road block outside of town and helped state police identify and pass Red Cross communications personnel. K9LSC, state area C.D. director, was in contact with the Port Washington operations and was able to provide generators. From the communications standpoint, the over-all operation was very successful, and all participating stations did an excellent job. Those stations participating and not previously mentioned are: W9s AFT HED HFG LUR KGH ROM YYW VZR VZZ ZAD, K9s CAN HJH PSX YZI, W4As EFG DHW. — *K9KJT, EC Milwaukee, Wis.*

During April thru August, the Kansas Weather Net was activated numerous times for storm alerts. Weather conditions were observed, and amateurs were prepared for any emergency situation that might have developed, but luckily, none did. — *K9BXF, SEC Kansas*.

Nineteen AREC members in Southeastern Wis. provided communications for the "On Wisconsin" sports car rally June 6 and 7. Amateurs were stationed at the various check points throughout the course and reported directly to rally officials on any problems, furnishing timing signals and scoring information. Mobiles checked in every half hour and at any time the checkpoint required timing signals or any other information. Prior to opening the base stations, the mobile units relayed information from unit to unit. When communication was impossible at the checkpoint facility, the mobile unit handled its traffic from the nearest favorable radio location. Base stations at Delafield and Colgate relayed information to all other units when direct communication was not possible. These stations relayed scoring information to W9EKW for preparation of RTTY tapes which were sent to rally headquarters in the Lailani Motel. — *K9KJT, EC Milwaukee, Wis.*

On June 13, members of the Oshawa, Ont., AREC participated in a "search for a lost person" drill. Two cars were dispatched to an area of roughly 20 square miles and were told to move in the area wherever they pleased but to remain on traveled roads. They arranged to cover a certain section — one to be considered a "lost person," the other a decoy. VE3s ATI BHQ BIC and QG mobiles were given a quadrant to search, while VE3s CEU and FGL remained at their home stations to keep mobiles in contact with each other in case conditions were poor. The decoy, VE3FOP, was sighted first by VE3BIH and then by VE3ATI and within a couple of hours, VE3QG sighted and stopped the wanted car driven by VE3ADD. The hunt was quite successful, and valuable information was gathered on tracking mobiles and mobile hunting. — *VE3ATI, EC Oshawa, Ont.*



It was supposed to be a New York State Net picnic, but traffic-handling brass from all over the east showed up, and luckily we had our camera. (1) Five NTS leaders: Left to right, W3EML (TCC Director), K1WJD (EAN Manager), WA2VYS (ESS Manager), W2RUF (NYS Manager), WA2GQZ (2RN Manager). (2) He tried to hide behind those cheaters, but we caught former EAN Manager W2EZB sunning himself with his XYL. (3) A lineup of six of the seven net controls that make EAN a model of efficiency: Left to right, W2ZVW, W4DLA, K2RYH, K1WJD, W2MTA, W2ZRC. (4) W3EML, TCC Director, and one of his boys (W4DLA) talk over a problem. (5) WA2VLK, TCC operator *extraordinaire*, packs one of the biggest signals around. (6) W2ZRC imbibes soda (honest!) while E.N.Y. SCM W2EFU makes an observation. Photos by WINJM.

On Aug. 1, KP4JM received an emergency call from LU5DJB who was in search of a very rare drug for a patient who had just been operated on and would die without it. With the aid of KP4LC and PJ3CD, KP4JM located the drug and had it flown to Buenos Aires. The drug arrived in time to save the patient's life.

The Newport County (R.I.) Radio Club was aided at the Newport Folk Festival by the SubSignal Radio Club and operators from Warwick, Providence and Cranston. The Newport Police Department command post, Easton's Beach and the Bellvue Shopping Center were set up on 2 meters as a joint RACES/AREC project. Many incidents and accidents were reported via amateur radio. The operation was under the supervision of W1JFF, EC Newport, and K1VQO, Asst. EC Newport, and lasted from July 23 to 26. On July 2 to 5 the same group had provided communication for the first weekend of the festival, without incident. Fifteen amateurs took part. — W1YNE, SEC R.I.

Communications for a four-day charity round-robin golf tournament, on behalf of the New Rochelle (N.Y.) Hospital, were provided by 20 members of the Westchester County AREC. K2SJV (EC), WA2QEG and WA2OBZ supervised the operation, with WB2FXB and WA2MHY acting as net controls. Mobile units were set up around the course, and the progress of play was reported back to net control, located at the Wykagyl Country Club. The operation lasted from June 9 to 12.

On Aug. 1, the Communications Club of New Rochelle reinstated its 2-meter hidden-transmitter hunt, combining the hunt with a picnic for the members at the home of WA2TEQ, president. More than a dozen members participated in the hunt, which was set up and run by K2YRZ. Kick-off was at 11 A.M. with WB2FXB and WA2OMT placing a portable 2-meter station on the air from a wooded hilltop in upper Westchester County. Units began their hunt from the County Center parking lot in White Plains, and fanned out over most of the county area between the start and the site during the hunt. In the interest of avoiding possible brushes with the law, all police departments in the lower part of the county were notified of the hunt, and scoring was by elapsed mileage only, with no premium for speed.

The first unit to arrive at the transmitter site was K2UTV and his navigator, K2MPK. First place on a mileage basis was won by WA2ZPD and his navigator, WA2USG.

Field communication for the Soap Box Derby held on June 27 in Wausau, Wisc., was provided by a combined RACES/AREC group under the direction of W9VHA. Stations were set up at the start and finish lines, and runoff areas. The successful operation lasted for some 6 hours.

The Calgary, Sask., AREC was requested to provide mobile units to aid officials in controlling the crowd at the July 4 International Air Show. Ten mobiles were at the airport, stationing themselves at strategic spots on the grounds. While the weather was perfect, the crowd was smaller than expected, and no problems were encountered.

On July 11, AREC members in Sauk County, Wisc., provided communications for the Circus Days Parade in Baraboo, the birthplace of the Ringling Brothers and Gollamn Circuses. The operation was mostly of a routine nature, consisting of aiding the formation and reporting the progress of the parade to officials. The only incident that occurred was a short search for a lost child who was quickly found and returned safely to his parents. This was the first year that the group provided communication, and they have been asked to help next year. — K9PKQ, EC Sauk County, Wisc.

AREC members in Ohio and Dearborn Counties, Ind., provided communications for the sesquicentennial celebration and parade in Rising Sun on July 11. Mobile units were stationed at the various staging areas and provided reports on the parade progress enroute through town to the parade master. One rig at the main reviewing stand got into the public address system, providing merriment for the assembled spectators. Lowering the input helped relieve the problem. — K9ZIW, EC Dearborn County, Ind.

On Aug. 8, the same club provided communications for the Citywide Swimming Meet. Units were stationed at the starting and finishing points and at the judges stand.

— K2SJV, EC Westchester County, N.Y.

(Continued on page 146)

ARRL, 1954-1964

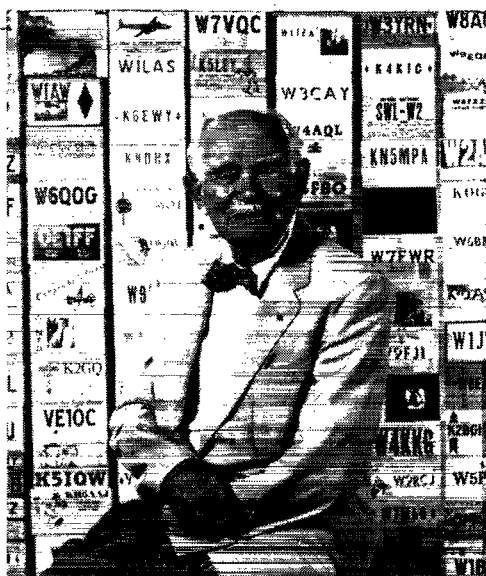
— Growth and Stability

AFTER the regulatory confusion and intermural strife had died down, after NARC and SARA had faded away and the completed Docket 9295 was filed in the archives, amateur radio and the League entered a period of relative calm and tremendous growth. In the years 1954-1959, the U.S. amateur ranks grew 78% from 115,000 to 205,000 and the League's voting membership increased 79%, from 43,000 to 77,000. Part of the growth was a result of the Novice and Technician licenses, part of it was stimulated by League action. For instance, a quarter million copies of *You Can Be There*, a pamphlet capitalizing on the publicity surrounding the *Kon Tiki* expedition, were distributed at fairs, hobby shows, and so on.

A suit against the League and its Executive Committee by three candidates for director and vice director who challenged the Committee's interpretation of the Articles of Association was decided in favor of the League in Connecticut Superior Court. The 40th anniversary of the League was marked by special material in the May 1954 issue of *QST*, by publication of the "Foreward to *QST* Index" by W0CO (in effect a history of *QST*'s first five years), and by an attempt to secure a commemorative stamp honoring amateurs. Five commissioners and several key staff members of FCC paid a visit to ARRL headquarters.

The League Board of Directors held its 1954 meeting at Denver. W0TSN was re-elected as president, and W5NW, W1BDI and W1BYR were elected as vice presidents, the first time the full quota permitted under the 1951 Articles was chosen. Awards for the three best *QST* articles were established: the first, for 1953, went to W2RYI for his January article on harmonic radiation, to W6QYT and W6POH for their meteor scatter story in April, and to VE3BLW for his description of short antennas for mobile operation which appeared in September. A medallion award was established by the Board for those who qualify for Brass Pounders' League on three occasions. With ARRL help W3LOE won a Baltimore County court case involving a 60-foot antenna tower. The judge had harsh words for an excess of community planning and concluded, "The public safety, health, morals or welfare will in no wise be affected by the erection of the tower among the trees in Mr. Cheek's backyard. His home is still his castle within the narrow limits set by law as approved by the courts."

FCC news in 1954 was confined to specialized actions, including authorization for maritime mobile operation on 15 meters, A-8 on 6, Novice and Technician licenses by mail only, phone questions added to the General Class, and — over



Dr. Lee DeForest, famed radio inventor, received greetings from thousands of amateurs on his 85th birthday in 1958.

League reluctance — the Conditional Class exam circle shrank from 125 to 75 miles. The FCC denied segregation of s.s.b. and separate subbands for special interests such as mobile operation; Novices on 6; expansion of 10 and 20 phone, special calls for Extra Class and two-letter calls for the former holders of Certificates of Skill before the days of licensing. License fees were proposed by FCC, but later held in abeyance by request of Congress. Conelrad regulations were approved in principle in 1954; as concerns amateurs, Conelrad compliance became voluntary in 1955 and mandatory in 1957.

Technicians were permitted to operate on six meters after April 1955. Shortly thereafter, the Novice 40-meter band was doubled, both actions having the full support of the League.

In December 1955 *QST* reached the ripe age of 40; the event was celebrated by reprinting *QST*, for December, 1915, and binding it into the regular copy of *QST*, cover and all. This year of 1955 was also the first in which the League grossed more than a million dollars. A new publication, the *Mobile Manual for Radio Amateurs*, was brought out, following by a year the book, *Single Sideband for the Radio Amateur*.

In 1956 the League began its two-year propagation research project, a part of the International Geophysical Year studies, under contract with the Air Force. W1VLI, a well-known young v.h.f. experimenter, headed up the special staff. New rules for amateur RTTY permitted any shift less than 900 c.p.s. Misunderstandings about the use of A-2 code practice in A-3 bands occurred from time to time; at League request a new rule was adopted in 1956 making it clear that this code practice is permitted. The Loran system was expanded; consequently amateurs in the Southeastern states lost their operating privileges on 160-meters.

The next year was one of wide-open bands. Everyone's DX dreams seemed to come true—even those of 6-meter men, when it finally became possible to make WAC on that band. To keep up with its burgeoning membership, the League installed new addressing machinery. *QST* disappeared from the newsstands; instead, it became available (other than by mail) only at radio parts stores, a policy still followed.

Even the sky was not the limit in 1957, for that was the year Sputnik I achieved orbit; amateurs became the local authorities on satellites in hundreds of communities through monitoring the device on 20.005 Mc. Many amateurs and clubs were ready and waiting for the first American satellite as well; initial reports from hams were of great assistance to the scientists in establishing orbits.

As a reflection of 1957 conditions, WAC issuances the following year hit an all time high of 2425. WA prefixes appeared in the second and sixth call areas. Portable/mobile notification rules were simplified, making it necessary to report only annually or when data previously filed was changed. In May, 1958, another expansion of Loran occurred, and U.S. amateurs lost their privileges 1875-1925 kc.

The space-age having arrived, the Government needed to assure itself of ample space for its myriad "little black boxes." Quite a bit of shifting was done in u.h.f. allocations of a number of radio services; amateurs didn't lose any actual space, but notice was served on the amateur that henceforth his bands were shared with the "radiopositioning" service.

QST continued to grow, and its net paid circulation for the year went over the 100-K mark for the first time. The three-millionth *Handbook* rolled off the presses early in 1958.

Over vigorous protests of the League and virtually the whole of hamdom, shared amateur use of the i.s.m. band at eleven meters was terminated in the U.S., and the band made available to the Class D Citizens' Radio Service.

In 1959 negotiations between the military and the civil defense people led to assignment by FCC of frequencies in the 40 and 20 meter bands and



Amateurs held top positions at the Telecommunications Conference, Geneva, 1959—VE3AC (center) presided over the conference; HB9IA (ex-W3GG) was elected conference secretary and later secretary-general of ITU and, at right, LU9DL, was one of two vice-chairmen.

Sidelights 1954-1959

James Lamb, former Technical Editor of *QST*, was made a Fellow of the Institute of Radio Engineers, the citation making mention of his leadership in amateur technical matters . . . October 1954 *QST* reported that W6ZII had been appointed Undersecretary of State by President Eisenhower . . . A story in *Parent's Magazine* by K6ATX did such a good job of explaining amateur radio to the public that the League had it reprinted as a giveaway for public gatherings; about 100,000 copies have been distributed since . . . Denmark permitted the U.S. to issue KG1 licenses to its military amateurs in Greenland . . . KAs, U.S. amateurs in Japan, lost the privilege of handling third-party messages, but have been able to continue operating under the Status of Forces agreements between the U.S. and Japan . . . An insistent inquiry from an individual amateur about the 50-watt peak power limit on 420-450 Mc. led FCC to change the limit to 50 watts input, actually a reduction of permissible power—again underscoring the desirability of raising questions about regulations through the League rather than direct to the Commission . . . A ham station, W3WTE, operated from aboard the Presidential train during the 1956 national election campaign, two-way work being carried out even when the train was standing in an underground terminal . . . Technicians flocked to six meters early in 1957 as the band became available to them; strangely enough, Technician operation on 220 and 420 Mc. also picked up strongly . . . A separate office was opened in Wethersfield, Connecticut for the ARRL/IGY Propagation Research Project . . . National Convention fever seemed to strike the land, with flings at San Francisco in 1956, Chicago in 1957, Washington in 1958 and Galveston in 1959 . . .

additional frequencies in the 80-meter band for long-haul RACES circuits. Technicians were granted privileges in 145-147 Mc.; the League's filing had asked for the full band. FCC published a Notice of Inquiry asking what incentives could be tacked on to the Extra Class license, but ruled out in advance all suggestions which had previously been denied by FCC. Though thousands of comments were filed, no action has ever been taken by FCC following the closing date for comment in this docket.

International

The Administrative Radio Conference held at Geneva in 1959 dominated the international scene during the time under discussion. The decision to hold the conference in 1959 was reached in 1956, when a majority of member-nations of the International Telecommunications Union over-ruled the wishes of the U.S., Canada and a few other countries. Our people felt that no new conference should be held until after completion of a full sunspot cycle under the Atlantic City allocations. Since final switches in assignments had not occurred until 1952 even though the treaty was signed in 1947, the effect would have been to delay the conference until 1962 or 1963. Nevertheless, once the date had been set, the U.S. (and the League!) went right to work preparing for it. FCC inquired into present domestic allocations and future needs in two major

dockets, one covering 25 to 890 Mc., and the other above 890 Mc. The now-customary preparatory committee was established by the Department of State: the League, as always, was the only consistent voice of the amateur on this committee, although others had been invited to participate. It was early established that the U. S. would strive to hold the line below 30 Mc., for *all* services, not just the amateur. After the v.h.f. and u.h.f. studies were completed, the U.S. proposed keeping all amateur bands about the same size, though it proposed shifting two of the u.h.f. bands higher — the 3300-3500 Mc. band to 3500 3700 and the 21,000 Mc. band to 22,000 Mc. — and sharing almost all the bands above 220 Mc. between the amateur service and the government radiopositioning service.

In addition to being a member of the team drawing up U.S. proposals, the League sent representatives to international amateur meetings, notably at Mexico City and two meetings of European members of the International Amateur Radio Union at Stresa, Italy in 1956 and Bad Godesberg, Germany, in 1958. At each, the U.S. and the League positions were carefully explained. Amateur societies were again urged to take part in their own governments, preparations for the Conference, to attempt to insure proposals favorable to amateurs by their administrations, and to get one or more amateurs appointed to the advisory group of the country's delegates to the conference.

Final technical preparations for the 1959 Conference for the majority of nations took place at the Plenary Meeting of the International Radio Consultative Committee at Los Angeles early in the year. Delegates got a good look at amateur radio through the operations of special-events station K6USA: a few temporary arrangements were made legalizing third-party traffic for delegates and the station handled some messages for conferees. The U.S. Government also permitted delegates who were hams to operate the station — an unprecedented goodwill gesture.

The Geneva Radio Conference got under way on August 17, 1959, and lasted until December 21. Canadian Director Alex Reid was a member of the Canadian delegation. President Dosland, General Manager Budlong, General Counsel Segal, and Assistant General Manager Huntoon were all members of the U.S. delegation, Messrs. Budlong and Huntoon spending four and three months respectively, at the conference.

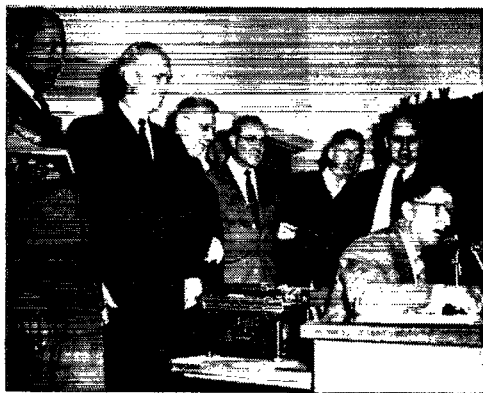
The greatest pressure on the amateur bands came from the international broadcasting service and was lodged chiefly against the 7-Mc. band, already fragmented by the Atlantic City table — 7000-7100 amateur, world wide; 7100-7150 shared, amateur and broadcasting, Regions I & III; 7150-7300 broadcasting, Regions I & III; 7100-7300 amateur, Region II. At least a dozen nations proposed either that the Atlantic City allocation for Region I & III be adapted world wide, or, worse yet, that the world wide allocation be to amateur 7000-7100 and to broadcasting

7100-7300. Finally, after weeks of maneuvering, with the Americas remaining adamant in support of the amateurs on this band, the matter was settled with the full 300 kc., for amateurs in the Western Hemisphere. Amateurs in the rest of the world lost their shared 50 kc., the allocation in Region I & III emerging as 7100-7300 exclusively "propaganda" broadcasting.

There was also a threat that the general sharing arrangement at 80 meters between fixed, mobile and amateur services (which has existed since the first allocations table was adopted at Washington in 1927) might be washed out in favor of some division of the band, one proposal being for 3500-3750 amateur, 3750-4000 fixed and mobile. The Atlantic City allocation was eventually continued with support coming both from those who didn't want *any* exclusive amateur space and those who would prefer no fixed and mobile operation in the band (e.g., the U.S. and Canada).

Another fixed-and-mobile threat appeared at ten meters, where a few countries wanted some low-power stuff in the top half and there was also a troublesome radiosonde threat at the low end. At one point in the conference it seemed certain that at least a half dozen countries would insist on footnote authority, at least, for fixed-and-mobile in the 10-meter band, but the maneuvering and tea-cupping continued, and at the last minute the footnotes were withdrawn. The band stayed exclusively amateur, 28.0-29.7 Mc.

Throughout it all, our representatives were full members of the U.S. team, tackling any problem assigned by the delegation's chairman, whether an amateur matter or not. Similarly, those on the U.S. group representing other services pitched in whole-heartedly on amateur matters when it became necessary. The net effect was to preserve amateur bands *in toto* for the Western Hemisphere, and to hold cuts elsewhere to the barest minimum.



FCC at WIAW in 1954—commissioner W1AE/W3DF at the mike; left to right, ARRL president W0TSN, ARRL president; FCC Chairman Hyde; Commissioners Webster and Bartley; Safety and Special chief White, and Field Engineering chief W3AP.

Operating, the Late 50's

A FEW people thought amateur radio had reached the peak of its growth. The National Traffic System (NTS) was performing well for the whole fraternity. Operationally 2600 had qualified post-war for DXCC. The sunspot cycle had turned upward; DXers were feeling out 21 Mc. hopefully. The January '54 VHF-SS attracted some 600 logs, and 747 took part and reported in the 8th one in '55. The ARRL Field Day and the Sweepstakes were top attractions for June and November even as today, the 22nd annual SS in '55 netting 1880 logs. Other events adding zest to operating were the European DX Contest (WAE), one put on by *Labre* (Brazil) and the annual VK-ZL contest. Traffic was going great guns, this well demonstrated by a growing BPL. "CD" Parties for ARRL appointees were as now, outstanding opportunities for station testing and fraternal contact. A sixth YL-OM contest was held in December. The annual nation-wide test of civil defense communications in which RACES and AREC had workouts showed amateurs willing and able when given a welcoming hand and appropriate local indoctrination. The 10,000 Mc. v.h.f. record had been broken in '54; determined vhf-ers were looking expectantly for new fields to conquer. We regret that space permits giving only some highlights of this whole grand period of amateur operating.

In '56 ten meters was really open for about the first time since 1950. Twenty was a gold mine and fifteen very good. The 22nd annual ARRL DX contest as a consequence made a sixth consecutive increase in participation. Fifteen stations worked over 100 countries in the test. One chap worked 118 countries on 20 c.w. W3DGM/3 with 804 contacts (320 multiplier) made a 771,000 score. Phone records fell too with W2SKE/2 making 842 QSOs, 632,000 points. There were 36 disqualifications. ARRL Observer cooperative notices were running but five or six thousand a year. Hidden Transmitter Hunting was popular with the clubs. Traffickers were examining the need to zero frequency (QNZ) closely with NCS. Newcomers were finding out that without antenna couplers or transmatchers they might get many an FCC notice from harmonic radiations falling outside amateur territory!

Now the rising curve of the sunspot cycle brought new six meter DX. JA6FR (Kyushu) worked LU9MA (Mendoza) and LU2EW and LU3EX, B.A. 11,400 miles. Also in '56 F2-DX was part of the general order of things. Western amateurs were frequently able to work J's and KIP's. DXpeditioners were rapidly coming into the limelight with W3LEZ/VE1, Navassa, FS7RT, PJ2MC, LU2ZY, XE4A and DL1CR/LUX to be worked. New DXCC's went to 513 amateurs in '56 compared to only 326 the previous year.



Brasspounder W6TT made second-high W6 score and won NCDXC and East Bay ARRL DX competition certificates in 1956.

Mae Burke, W3CUL, a top-notch brasspounder, got the Edison Award in '57 for her unmatched morale service (message handling) for GIs. W1BCR and W2KCR got the Navy's Public Service Award for their Antarctic work supporting *Deepfreeze* personnel. More DXpeditions: Aves Id. YV0AB, Seychelles, VQ4GU, Crete SV0WQ, Samoa W6UOU/KS6. Scores in contests now broke all earlier records. They ran 30% or more above '56, a big year in itself. Six meters went hog wild late in the year, QRM as bad as on '75! Daylight bands stayed open in the night. On the serious side some 1200 amateurs, all v.h.f. enthusiasts, cooperated in the ARRL-IGY propagation research project. Amateurs listened and reported on the sputniks. New vistas of operational electronics seemed almost within reach. Following some eight months of tests and preparation, a new world's record was made on 144 Mc. by KH6UK and W6NLZ . . . solid two-way communication July 8th and again Aug. 18th over a distance of 2450 miles.

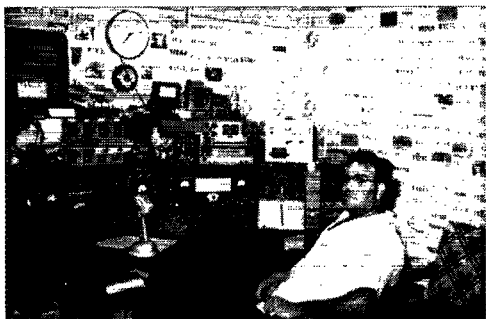
Traffic was hitting its stride. In '58 the reported message handlings rose to a post-war peak. There were again new firsts in v.h.f.-u.h.f. transmission records—1296-Mc. contacts by W6MMU/6 in July, 225 miles with W6DQJ/6, then 270 miles in Sept. with K6AXN/6. As a result of the good conditions both WAS and DXCC issuances were up substantially.

Now "by act of Congress" two new states were created, the first such changes in many years. With statehood for Alaska Jan. 3, '59 and Hawaii August 21, '59 this automatically established new horizons for the League's Worked-All States award. W8GNY and K2YGI worked KL7CEE and KL7CXN on the date of Statehood and were first to get their cards in for a 49-state WAS. W6PJJ, Whittier, California made a 14-Mc. s.s.b. contact with KH6BB Aug. 22nd at 2020 HST, this one then became the first Hawaiian QSL card to be processed for a 50-state WAS. In the period 1955 to 1959 RACES had advanced from having about 300

approved plans to 1400 operational plans throughout the nation. The RACES rules now received some extended earmarkings of h.f. amateur band segments for a possible wartime need; f.s.k. additionally to be permitted in RACES six meter segments. Message traffic volume was stepped up again in 1959 to almost double that of the previous year. Also '59 marked the making of four new records in the v.h.f. field: In June SM6ANR-C3KEQ 650 miles on 420 Mc., also W6DQJ/6-K6AXN/6 400 miles on 1215 Mc. Then in July, W6NLZ-KH6UK 2540 miles on 220 Mc., also W7JIP/7-W7LHL/7 187 miles on 10,000 Mc.

Work with the amateur stations in the Antarctic with the Navy had continued successful with a number of amateurs backing up personal message operations by their consistent skeds. K2KGJ had topped off this kind of service, totalling over 12,000 messages. In '59 this came to public attention through his receiving the Edison Award. This was the year of the Socorro Is. expedition, NE4B . . . also the year will be remembered by some operators as the first in which FCC suspended an operator license for exceeding the one kw. power input rule in a contest. Rag Chewers' Club "matchings" completed by The Old Sock, an index of fraternal activity, topped 6,000 per year in 1959. W9IOP broke earlier records with a 1336 contact 73-section 243,056 score in the Sweepstakes that year. With 10- and 15-bands good most all scores were up; 93 reporters worked all 73 sections. To meet a limited demand for code speed runs above the general program, WINJM acting for the Conn. Wireless Ass'n inaugurated some High Speed runs. Thirty-one amateurs qualified for the CWA certificates. Seven of these made it at 55 w.p.m. and 12 at 60 w.p.m.

In the five years '55 to '60 the total number of different amateurs certified at *some* level of code proficiency in the ARRL Program rose from 25,600 to 37,000. Annual submissions including failures as well as papers submitted for endorsements ran 3849 for '60. The friendly Observer admonitions sent to help fellow hams in this same five-year period went up year by year from



K2EHI, EC Putnam Co. (N. Y.) from this operating position directed the Simulated Emergency Test October 11th.

5300 to 24,000 notices. Interest in the VHF-SS doubled. The number of nets registered for traffic or Public Service steadily climbed, from 414 to 580. Our November '58 "SS" hit a peak of 2383 logs returned, the most recorded in any



Paul Blum, W2KCR discussed work with KC4USA and KC4USV (W2TEB left, K2KID center).

contest up to this time. The Field Organization grew in capabilities through NTS and in the number of Official Station SCM-appointments. Sideband in these years made telling progress toward its full acceptance for operational use by the fraternity in general. In an early '60 *QST*, the League recommended wider voluntary use of Greenwich Time by amateurs. This was a good move, in view of the continued and continuing influx of new operators and because much work was across time zones. A new Op. Aid (No. 10) was issued as a guide to reliable time conversions to and from GMT. The Amateur Radio Emergency Corps through this whole period continued its progress and its annual nationwide Simulated Emergency Tests each October, stressing the necessity for all amateurs to be prepared by registrations in AREC, advance planning, and self-training.

The SET's of this period were made outstanding with Red Cross collection stations, the Office of Civil Defense Mobilization (OCDM) and ARRL working together. The '58 and '59 exercises were outstanding in their ability to develop accuracy, dependability and speed in communications filed during the test . . . also in the many advance contacts and understandings perfected and extended between amateurs and the agencies to be served at all levels, come disaster. Emphasizing the high value in outstanding local leadership, an ARRL Emergency Coordinator Walter Ermer, WSAEU, received the '59 Edison Award "for his work organizing amateurs for emergency communications preparedness in Cleveland." His 300-man voluntary radio communications corps had served his city in various ways on 23 occasions during 1959!

Emergency Communications

THE year 1956 started off with the West Coast recuperating from one of its worst floods in history, the equal of the Diane floods which hit the northeast in August of 1955. Thousands of amateurs up and down the coast participated. As in most modern-day emergency operations, there were very few individual heroes. The amateurs worked together in teams.

The rest of the year was comparatively quiet, with only what we have come to think of as run-of-the-mill emergencies. Not until December did the extensive Southern California fires bring out amateurs in great numbers, mostly in RACES. Shortly afterward a big bomber crash in Northern Maine, about as far away from Southern California as you can get and still be in the same country, provided a contrast both in type of emergency and in temperature. Actually, the bomber crashed in New Brunswick, Canada, just over the border.

Later in January, wide areas of Kentucky and Tennessee experienced flooding and resultant disruption of communications.

The first hurricane of the 1957 season, Audrey, started in the southern Gulf of Mexico and hit the southern Louisiana coast in June, causing extreme damage and much death and destruction in Cameron Parish. W5SKW, EC for Lake Charles, and W5BSR, ARRL director, led amateur communicators into the area and did an excellent job for several days.

In April of 1958 extensive flooding in Central California and the Bay Area again brought out amateurs in great enough numbers to perform significantly in the public service. In October it



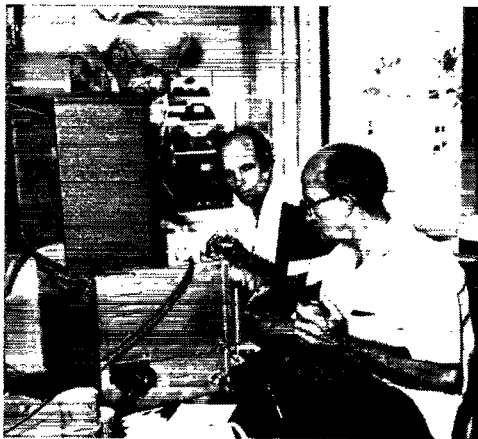
In the Malibu-Topanga Canyon (Calif.) fires in December, '57, Deputy Chief Radio Officer W6QJW, operating under RACES tactical call of CPT19, controlled a net on 3995 kc.

was California again, this time more fires in the tinder-dry southern part of the state. Once again RACES carried the biggest part of the load in this highly-organized civil defense section.

In August of '59 the vicinity of Yellowstone Park in Montana, Idaho and Wyoming was shook by an earthquake causing a mountainside to fall into a canyon, burying a camp ground and killing many people. Amateurs in the three states were active in communications problems which resulted.

Minor emergencies, and some not so minor but not reported in full enough detail to rate "major" in our arbitrary classification system, were reported every month, and the coverage of the emergency page of *QST* grew bigger year by year. For example, in 1956 the emergency page reported 58 emergencies and 21 non-emergency activities. By the end of 1958 the same page was reporting 83 emergencies and 57 non-emergency activities. Quite a number of these were major enough in extent to receive up-front *QST* treatment but not enough details were reported to make this feasible.

The annual Simulated Emergency Tests and civil defense Operations Alert were reported annually in *QST*. By the late 50's, participation in civil defense activities by amateurs had dropped off, while AREC activity started to pick up speed again. Shortly after the turn of the decade, the federal government ceased staging a nationwide c.d. test each year, leaving our own annual Simulated Emergency Test as the sole nationwide test of amateur radio emergency communications facilities — not counting the Field Day, which had long since become a contest with negligible emergency connotation. The SET hit lows in 1955, 1956 and 1957, then started a rapid climb until by 1960 it was approaching pre-



It isn't often that an ARRL director is involved in an emergency operation, but Delta Director Division W5BSR was in the Hurricane Audrey operation right up to his ears. That's Vic standing, while Lake Charles EC W5SKW (wearing earphones) directed the operation and W5KHC operated this rig at Lake Charles City Hall.

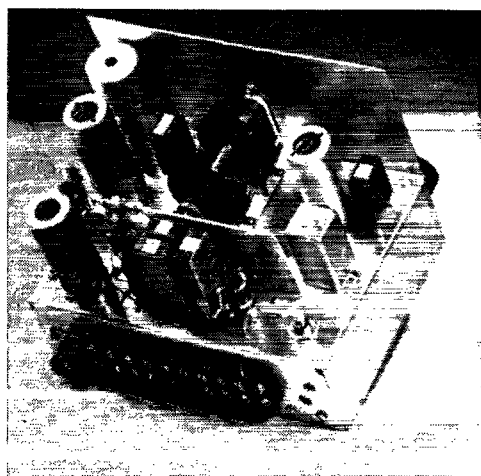
RACES highs and in 1961 surpassed them. Since then, the annual SET has assumed major proportions as an ARRL activity, surpassed only by the "big four" contests.

As our historical records go into the 60's, we start talking more about recent developments

than about historical milestones; but much has happened in the past four years which needs to be reviewed, after which we can take a look into the crystal ball to see what the future holds for that most important of all amateur radio pursuits — public service communication.

Technical Progress

THE amateur-radio year 1956 was ushered in with talk about "Conelrad" and methods for complying (starting in 1957) with the requirement for monitoring a b.c. station during any ham-radio activity. Numerous ingenious devices for sounding the alarm were described in *QST*, ranging from visual indicators to interlocks that



The three-tube 14-Mc. single-sideband transmitter of W4IMP. The variable capacitor "pulls" the crystal frequency and permits a frequency excursion of about 10 kc. The output stage is a 6CL6.

turned off the ham transmitter when the b.c. station left the air.

A significant change in the complexion of amateur radio was spotted in an April, 1956, editorial that, without using the expression, decried the growing "appliance operator" approach to ham radio. Exactly four years later the editorial pages treated the subject of "Those Mail-Order Exams" and the misuses and abuses of the system. The editorials weren't tied together at the time, but in retrospect they should have been. And it could have been pointed out that during this same four-year period more and more *QST* pages were devoted each month to "Recent Equipment" descriptions.

Single Sideband

This is not to suggest that no amateurs were developing the art. In the s.s.b. field, still a controversial area, Tony Vitale, W2EWL, made

many a convert with his "Cheap and Easy S.S.B." (March, 1956), an ingenious phasing-type exciter built in and around a surplus BC-458 transmitter. Murray Crosby, W2CSY, described his "product detector" in May, 1956, and made it impossible for anyone during the following years to peddle a sideband receiver that didn't have *something* labeled a "product detector." In September, 1957, Howard Wright, W1PNB, one of the early sidebanders, described the "Third Method of S.S.B. Generation", a system primarily of academic interest. In 1960 the 7360 beam-deflection balanced-modulator tube was introduced, and in the same year Joe Galeski, W4IMP, described his *three-tube* complete filter-sideband transmitter, which certainly must have set some kind of a record for minimums. By 1960 the pattern of linear-amplifier design was firmly established; tetrodes operating AB₁ for high-sensitivity applications, or grounded-grid Class B triodes when 30 to 100 watts of drive was available.

New hope for a.m. glowed briefly in 1956 when "Ultramodulation" was described, an ingenious circuit that prevented negative-peak overmodulation and splatter.

Communications receivers came in for attention in January, 1957, when a (relatively) high-frequency i.f. amplifier was described using a pair of crystal-lattice filters designed by David Kosowsky. Kosowsky's paper a year later in the *I.R.E. Proceedings* practically started a new industry, and Ben Vester, W3TLN, boiled it down for *QST* readers in a January, 1959, "how-to-do-it" article. High-frequency crystal-lattice filters provided a big step toward getting the selectivity closer to the antenna, and they also made it possible to design a filter sideband transmitter with fewer frequency conversions. In 1957 an i.f.-derived "hang a.g.c." system (fast attack and slow decay) for s.s.b. and c.w. was described, followed later in the year by an audio-derived version of the same principle. And just when it was believed that home receiver construction and plug-in coils were in a class with the dodo bird Ted Crosby, W6TC, described the first of several "HBR-" receivers (July, 1957) and practically started an HBR cult. So popular and successful was the design that a small sporadic paper was published and circulated describing modifications and experiences. Improved reception in mobile operation was reported by Laird Campbell, W1CUT, in "Exit Ignition Noise" (May, 1959),

a description of the successful application of TVI "bottling" techniques to automobile ignition systems.

Antennas

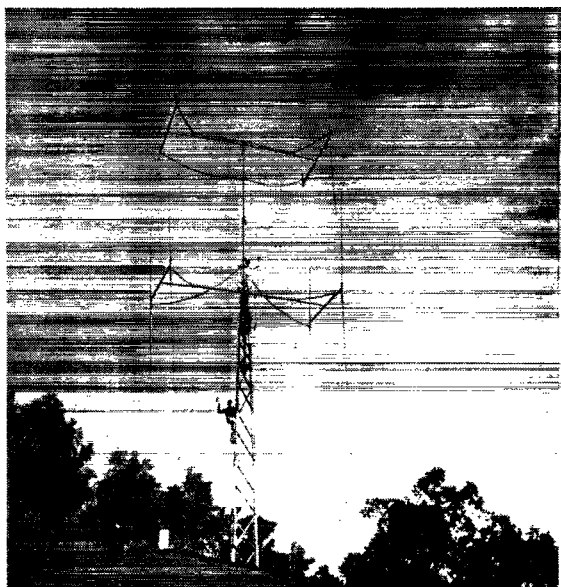
Antenna development inched along the path of refinements to existing designs and of multiband operation with a single "flat" transmission line. An extensive two-part article by Carl Greenblum (August-September, 1956) reported comprehensive measurements on multielement Yagi antennas, single and stacked. A dual "quad" antenna was first described earlier that year, and "trap" multiband wire antennas were described in 1956 and later. The ground-plane antenna went multiband in February, 1958. One of the most impressive of all multiband antennas was the "Driven Beast" (May, 1958), the result of much hard work by A. J. F. Clement, W6KPC. Utilizing all driven elements and a flat transmission line, the three-band unidirectional monster was an 8-element antenna on 20 meters and a 16-element bird trap on 10! In October, 1956, Lew McCoy, W1ICP, described the first of several "Monimatch" designs, a simple and inexpensive directional coupler useful for indicating relative power output and the state of match at the load end of the line.

Semiconductors

As the availability of semiconductor devices increased and their prices decreased, they found their way into more and more amateur gear. Sometimes it would be primarily for novelty value, as in a transistor speech amplifier or "grid-dip meter" or Q multiplier, but in 1958 transistorized power supplies for mobile operation started to supplant vibrator and generator supplies. Transistor modulators for mobile a.m. operation took over almost as quickly. The opportunity for the construction of compact sophisticated automatic keyers was demonstrated by transistorized versions of the "W9TO Keyer" (May, 1959) and the "Transistorized Ultimatic" (September, 1960). The "Magkee" (March, 1960) used transistors and magnetic cores to provide automatic dots and dashes. In the fields made possible only by semiconductors, one of the most useful devices is the "parametric amplifier", and it was explained by Bateman, W4AO, and Bain, W4LYU, in an extensive four-part article (December, 1958, through March, 1959).

Above 30 Mc.

Real progress was being made in the v.h.f. and u.h.f. region. In January, 1956, Kmosko, W2NLY, and Johnson, W6QK1, pooled the results of their individual antenna measurements to describe the tricks required to maintain the gain of 17-element Yagi antennas, single and stacked. A crystal-controlled converter for 432-Mc. reception was described in *QST* for March, 1956. The same issue carried an account of v.h.f. ionospheric scatter propagation by Mark Moynahan, W2ALJ. Meteor shower propagation on 2 meters was described in April, 1957, following the publication



The top of W6KPC's "driven Beast" was 107 feet above the ground.

of a meteor-shower calendar in February. The possibilities for using tropospheric scatter techniques at 144 Mc. and higher were discussed by Dean Morgan, W2NNT, in March. Transequatorial propagation across the geomagnetic equator was described in a comprehensive report by R. G. Cracknell, ZE2JV (December, 1959), based on his work and that of F9BG, G4LX, ZC4IP and ZC4WR. On July 8, 1957, after working together almost a year, John Chambers, W6NLZ, and Ralph Thomas, KH6UK, caught a temperature inversion good enough to sustain a 2540-mile QSO between the two stations on 144 Mc. They repeated the feat on Aug. 18. Looking for new worlds to conquer, they made it on 220 Mc. in June of 1959, and in July, 1960, KH6UK was heard by W6NLZ on 432 Mc.! This would have been a fairly substantial DX record if W1BU, Sam Harris and the Rhododendron Swamp V.H.F. Society and W6HIB, the Eimac Radio Club, hadn't engineered a two-way QSO via moon bounce on 1296 Mc.! This fabulous feat on July 21, 1960, capped several years of effort by Harris and a spectacular crash program by the West-coast group.

Only a few years before, few *QST* readers appreciated that the space age was just around the corner. A May, 1956, article introduced many readers to the new field of radio astronomy, initiated nearly two decades earlier by Grote Reber, W9GFZ. During 1956 there were several articles preparing interested amateurs for tracking the proposed earth satellites to be launched during the International Geophysical Year of 1957. Plans called for tracking on 108 Mc., and when the U.S.S.R. put "Sputnik" into orbit on Oct. 4, 1957, there was much hurried revamping of gear to 20 and 40 Mc. And the space age had begun.

h-y-gain ANTENNA PRODUCTS

WORLD RADIO'S
SELF-SUPPORTING - SPAULDING
Globe Spire

VESTO CO., Inc.
20th and Clay
North Kansas City, Mo.

E. F. Johnson Company
WASECA, MINNESOTA

HI-PAR PRODUCTS COMPANY
FITZBURG, MASS.

Telrex LABS.
TV & COMMUNICATION
ANTENNAS

Mosley Electronics, Inc.

WE BEAM WITH A SPIRIT
HORNET
Antenna Products Co.
P.O. BOX 808 • DUNCAN, OKLA.

General Dubilier Electric Corp.
South Plainfield, N. J.

Cush Craft
621 Hayward Street
Manchester, N. H.

ROHN Manufacturing Company

the antenna
specialists co. 

TRI-EX TOWER CORPORATION
127 EAST INYO ST., TULARE, CALIF.

CUBEX CO. ALTADENA, CALIFORNIA

GOTHAM
1805 PURDY AVE., MIAMI BEACH, FLA.

1209 West 74th Street
Chicago 36, Illinois
MASTER SERVICE GAIN, INC.

E-Z WAY TOWERS Inc.
P. O. Box 5491 • Tampa, Fla.

SKYLANE PRODUCTS
406 Bon Air, Temple Terrace, Tampa 10, Fla.

Communication Products Company
DIVISION OF

Signatures from 1956-1959 ads of beam, tower and rotor manufacturers who are in QST today

Stabilization

DURING the next four years of 1956 through 1959 QST's advertising showed that s.s.b. was fully accepted; use of h.f. transceivers was beginning; transistor applications were develop-

ing; v.h.f. and mobile operating were picking up; small back yards were blossoming with towers and beams; new accessories were coming on the market; TVI was just about licked.

Performance on s.s.b. was stressed in most receiver and transmitter advertising. Hammarlund announced no fewer than eight receivers. Five new ones came from National; five from RME/E-V; four from Hallicrafters; three from Gonset; two each from Heath and Drake; one each from Collins, Morrow, Pierson (later Automation), Knight-kit, Geloso, TMC. S.s.b. receiving converters were brought out by Hammarlund, B&W, D&R, Crosby. International Crystal featured printed circuits.

Many transmitters included s.s.b. or provisions for adding s.s.b. excitation. Transmitters and linear amplifiers included seven units from Johnson; six from Gonset; five from TMC; five from Globe/WRL; four from Hallicrafters; four from Heath; three from Eldico; two from B&W; one each from Knight-kit, Geloso, Millen, P&K, Morrow, Eico, P&H, Lakeshore, Central Electronics, Elenco.

Although s.s.b. transceiver operation in the amateur bands from 3.5 to 29.7 Mc. was not to reach its peak until after 1959, three manufacturers pioneered with equipments. Collins, the company that had gone 100% for sideband, brought out the KWM-1 in May 1957 and followed with the KWM-2 in October 1959. Cosmos Industries announced the Cosmophone 35 in January 1958, the 50 in June of the next year and the 1000 three months later. The Hallicrafters transistorized FPM-200 was advertised in August of 1957. It was not a transceiver but was called a transmitter-receiver with dual v.f.o.s. The Collins 75S-1 and 32S-1, separate units, were designed to be connected for transceive operation. The first ad in *QST* explaining this use was in the March 1958 issue.

Sylvania and CBS-Hytron had advertised transistors for broadcast receivers and audio amplifiers, but Hallicrafters was the first advertiser, in September 1957, to point out that transistors effective up to 30 Mc. were moderately priced. This theme was developed in the May 1958 advertisement. In March of 1958 Digitrols offered a transistorized power supply kit; Universal Transistors announced a mobile power supply in June; Johnson Electronics brought one out in October. In 1959 RCA advertised the 2N307 as a natural for hams; during that year Cornell-Dubilier, Sunair, Kupfrian, Globe Industries, offered transistorized mobile power supplies.

Quite a selection of equipments, components and antennas was available for both v.h.f. and mobile operating, the two types of operations often being the same. The year 1956 saw ads for at least ten receivers or converters and four transmitters, including such well known names as Hallicrafters, International Crystal, E. F. Johnson; and new names like Clegg. In 1957, 1958 and 1959 the number of equipments increased to more than twenty, with a frequency range extending to 432 Mc., and included the Hallicrafters SR-34, a 2 and 6 meter transmitter-receiver; Ameco's 2 and 6 meter converters; International Crystal's

printed circuit 6 meter converter kit; Tecraft's various 6 and 2 meter converters; Johnson's 6 and 2 meter transmitting set-up of the 6N2, the 6N2 VFO, converter, Thunderbolt; Clegg's 250-6C; WRL's 666 VFO; P&H's 600A and L-600-M; Heath's 2 and 6 meter Seneca transmitter and the Cheyenne and Comanche h.f. mobile transmitter and receiver.

V.h.f. and mobile antennas were advertised by most of the 20-odd antenna manufacturers such as Hy-Gain, Mosley, Antenna Specialists, Communication Products, Cushcraft, Master Mobile, Hi Par, Columbia.

In addition to v.h.f. antennas, *QST* carried advertising during 1956 through 1959 of more than twenty companies making h.f. beams, traps, coils.

A variety of accessories came out. The eight in the technical category ranged from the Mach Electronics motor driven gamma match for a beam to the B&W band-switching t.r. switch. Of the eleven operating aids and conveniences which took care of such widely varying needs as a fireproof ashtray (the Spico Dunking Station) and a frequency record (QRG Calibration Log) the time pieces by Pennwood Numechron are still with us. Seven companies advertised jewelry or call sign plates.

WIDBM's book, announced by Nelson Publishing Company in January 1958, supplemented *QST*'s articles and lectures and helped knock TVI down for the count of ten. The result was that TVI was seldom used as a subject in manufacturers' advertising copy.

Testimonial ads using ham calls continued to be popular. Fifteen companies listed a total of forty-nine U. S. calls with the sixth call area having eleven, the fifth call area two, and the remaining thirty six calls divided fairly equally among the other eight call areas.

The RCA campaign showing various manufacturers' equipment using RCA tubes, begun in 1955, continued. Transmitters and amplifiers by B&W, Collins, Gonset, Hallicrafters, Morrow, Johnson, Knight-kit, WRL, were featured. The Walter Ashe ads from September 1957 through January 1958 and those of Adirondack during March through November 1959 (and continuing into 1960) were novel enough to warrant reading now.

More than forty companies ran personnel wanted ads during the four years.

Notice of a satellite was first taken in *QST* advertising in January of 1958 with converters for 108 Mc. offered by Tecraft and Tapetone.

Contests were announced in 1956 by Mallory, in 1957 and 1958 by Hallicrafters, by Tapetone in 1958 and by Astatic in 1959.

For the first time in *QST*'s history circulation went over the 100,000 mark. The net paid was approximately 105,000 at the end of 1959. Rate card No. 15 (No. 14 had applied since March 1956) went into effect with the March 1959 issue. It gave the cost of a one page ad as \$432. QST

The World Above 50 Mc.

1215-1300

2300-2450

3300-3500

5650-5925

10,000-10,500

21,000-22,000

30,000-31

CONDUCTED BY SAM HARRIS,* W1FZJ

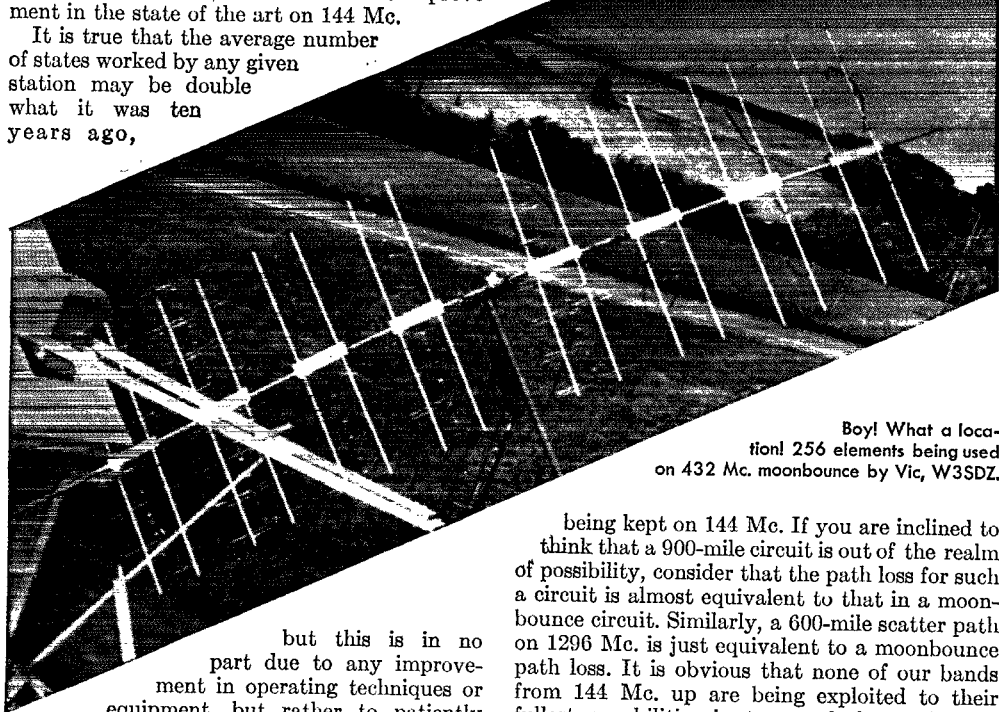
ABOUT ten years ago, a low-frequency friend of mine asked me what average range one could expect from a well equipped 144-Mc. station. Naturally I regaled him with the usual information about being able to work a radius of 200 to 250 miles on phone and 400 to 500 miles on c.w. with great regularity, and, thanks to the efforts of W2UK and W4HHK, 800 to 1200 miles on meteor scatter, knowing the proper time of the meteor showers.

Just the other day, a low-frequency friend of mine asked me the same question, and after I had answered him with exactly the same figures that I had used ten years ago, I began to wonder if the state of the art on 144 Mc. has progressed at all. After careful consideration of the last ten years' events, I am forced to admit that with the exception of KH6UK/W6NLZ extended tropo experiments proving that tropospheric openings can be made over at least a 2500-mile path, and with the exception of the OH1NL/W6DNG 144-Mc. moonbounce contact, there has been no improvement in the state of the art on 144 Mc.

It is true that the average number of states worked by any given station may be double what it was ten years ago,

equipment over the past ten years. As a matter of fact, the equipment available for use by amateurs has improved sufficiently to have doubled the reliable c.w. range as of ten years ago. Considerable improvement in front end sensitivity plus major advances in weak signal detection (for instance the article in September 1964 *QST* on an i.f. tracking filter for weak signal reception and others) have added at least twenty to thirty db. to the minimum detectable signal capability of the serious minded v.h.f.er.

If you could work 450 miles on a regular nightly basis ten years ago, you should now be able to work 900 miles as the 2 X increase in distance would add only 24 db. to the circuit loss. Ten years ago, regular 450-mile schedules were



Boy! What a location! 256 elements being used on 432 Mc. moonbounce by Vic, W3SDZ.

but this is in no part due to any improvement in operating techniques or equipment, but rather to patiently taking advantage of knowledge already demonstrated as of ten years ago. This is not to imply that there have been no improvements in

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

being kept on 144 Mc. If you are inclined to think that a 900-mile circuit is out of the realm of possibility, consider that the path loss for such a circuit is almost equivalent to that in a moonbounce circuit. Similarly, a 600-mile scatter path on 1296 Mc. is just equivalent to a moonbounce path loss. It is obvious that none of our hands from 144 Mc. up are being exploited to their fullest capabilities in terms of the equipment available today. How about it? Is anybody ready to try a 900-mile, 144-Mc. scatter circuit? Or do we have to wait for Tommy to come back to the mainland?

Switzerland to Massachusetts on 1296 Mc.

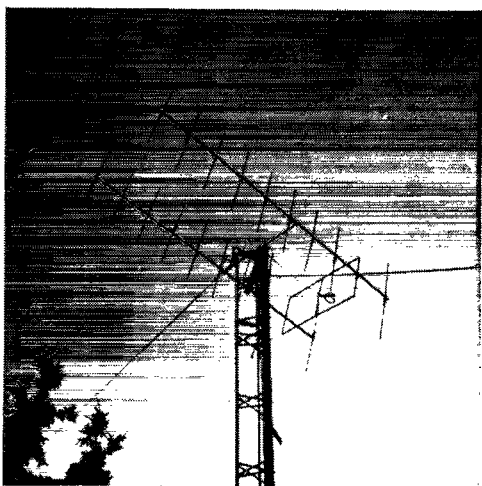
HB9RG and W1BU exchanged S3 reports on 1296 Mc. via Moonbounce September 27 at 0800 GMT. The Swiss moonbounce crew (HB9RG, HB9RF, DJ4AU, DL9GW and DJ3EN) culminated three years of preparatory efforts with their first 2-way contact on 1296 Mc. Using an 18 foot homemade parabolic reflector and a 400-watt output homemade transmitter (RCA7650), their signals were 20 to 25 db, over the noise in a 100 c.p.s. filter at W1BU. (Photo of antenna and transmitter on page 97 September QST). Equipment at W1BU consisted of a 28 foot waveguide fed parabolic reflector using the old standby Eimac 2500 LK Klystron amplifier. Paramp and converter were assembled two days before schedule time by W1EHF. Transmitter and feed system were assembled by W1HIV, W1FZJ, W1TQZ and K1IIE. Time left no margin for error. W1BU was operated by W1HIV and W1FZJ.

50 Mc.

Up in Winnipeg VE4GI reports that the 2's and 5's were heard very weak and for a very short period during the first week of August. He heard W5FW S2 for about five minutes with numerous bursts to 5-8/9. Bill sez that he talked to Pete, VE8BY, who reported the 50-Mc. band open about ten days during August and as Bill sez, "It's too bad that no one in 2,3,8,7,9, and 8 lands wants to work into VE8 land." Remember fellows, it isn't necessary to have a visual aurora to make aurora contact. Many, many times aurora contacts are made when the aurora cannot be seen visually. Remember Pete, VE8BY, and Bill, VE4GI, and turn your beams in their directions frequently. It's to our advantage to keep these boys happy with the VHF bands, but how can they be if they never have contacts on the VHF bands? Bill also tells us that tropo scatter is getting better and that recently he was part of a five-way QSO with VE4JX, W0PHD, W0IZM and W0EUQ. VE4JX has recently worked W8RSP for state 3 on two meters.

Out in Appleton, Wisconsin, W9FBC tells us that July and August were very good (ground wave) when distant stations not ordinarily heard were coming through almost every night. Maury was copying stations in Indiana, Illinois, Michigan and Wisconsin that he rarely hears other than during good ground wave periods. At Cicero, Illinois, WA9FHH observed skip on seven different days during the month of August. This is much more than most areas of the country noted. Certainly the conditions were not the best ever noted by Jim, but he did manage to copy 9 states in 7 call areas. Ground wave was notably good for him on August 4 and 5. WA9IML has nothing of his own (skipwise) to report but did let us know that Mel, KL7EBB/9 did hear Delaware coming through and while rushing to the rig managed to break his big toe. Mel did not get Delaware but the doc said he did a good job of setting the toe. Congratulations, Mel! Out in Michigan W8MIBH tells us of a SSB QSO on August 22 which included K8KEA (Michigan), W8DUII (Mich.), WA9FHA (Indiana), K8IZA (Mich.), W8UKG (Ohio), WA2UCE/2 (New York), WA2ISB/2 (N.Y.) and K8NEY (Ohio). I tell you — these SSBer's —!

As usual, the report received from K7ICW is well worth quoting directly. "Odd, all sorts of weird propagation! August, as evidenced by my log, had better openings than the same period last year. E2 mode observed only once on the 21st to WA4GKR on c.w. Meteor type openings repeated themselves around the Perseids shower with signals on August 9 being outstanding, with W5MJW in El Paso coming through with M/S supported signals while an E opening from Las Vegas to E. Texas was in progress. A very rare trop opening occurred between here and the extreme N. California area on August 29 where activity is sparse as Nevada, but picked up W6YKS RST 4/4/9 building up to 5/9/9 plus at 0820 PDT and W6GRX RST 5/5/9 for about fifteen minutes with signals deteriorating into the QRN. Normal path to these fellows is E, occasionally, or ionospheric scatter with signals usually quite marginal. Distance is roughly 475-575 miles." Thanks Al, you really do keep and compare your old logs. A quick note received from K1IGY/5 in Houston tells us that he is on every morning at 0700 GMT, 50.101 USB and c.w. looking for scatter contacts. Dick sez he has been hearing W8PFP and K9IBT on six-meter scatter and on August 17 heard W1DDF/2. W4UAR writes that six-meter activity is good in spite of the fact that there are fewer band openings. (Glad to hear it.) On two different occasions during August, Jerry did hear



Ready for Oscar III anyone? Pete, VE8BY has this array "ready to go."

openings into 1, 2, 3 and 8 lands. From Knoxville, K1KYL observed openings on four days during August with four states and the Bahamas coming through. WB2IGQ was pleasantly surprised when he managed to nab WA5F1U in Arkansas on August 17. Jeff sez that most of the stations he heard were in Tennessee, and he was surprised at the Arkansas contact as he is running 10 watts to a three-element beam. (in the attic). That's one of the fun things about six meters. You just never can tell what's going to happen, or if it will happen to you. In New York City WA2TQT observes that there were fewer openings in August than July and that those observed were weaker in signal strength and of shorter duration. However, Norm did catch openings on three different days when he heard 4's and 5's. WB2IPX at Locke, New York, goes along with Norm's report except to add that VE3BGA was putting in a good ground wave signal on August 16. The evening of September 7 and morning of the 8th proved to be good to WA2ZPD, who worked three new states on "an excellent band opening". Think this "opening" was really the good ground wave experienced throughout much of the country, Ray. Between 11:59 P.M. and 2:05 A.M. Ray managed to work K1IED/4 in Virginia; K3WRD in Pennsylvania; WA3ASX/3 in Maryland WA2KAP in New Jersey; WA3BAO in Delaware and K3YJL in Pennsylvania. K1VPJ writes to tell us that on August 7 at 2:43 A.M. an atmospheric explosion brought in 6 land on the high end of the band (53 Mc.) for about 2 1/2 minutes. Bruce also reports good ground wave on the nights of August 4, 7, 13, 14, 19, 26 and 28 when stations were worked in northern New York, Long Island, New Jersey and Pennsylvania.

144 Mc. and Up

From north of the border, VE2LI tells us that he may have been a little too anxious in erecting his new beam for 432 Mc. George sez that by the time all adjustments had been checked and double-checked, it was nearly dark outside, but he went ahead and put up the additional 32 elements, making a grand total of 96 elements on 432. Then came the small problem. After keeping skeds successfully with a number of W stations week after week, the new beam produced no signals whatever. A number of letters and phone calls later, George discovered that for some reason or another not even one of his schedulers had kept his sked for several days, and after a small reminder, skeds were resumed with improved signals being received from VE2LI. George sez: "Before changing to 96 elements, on September 10 I worked W2MDE, W1HDQ and W1RVW. Was glad to make it with George as we had several near contacts, but this was the first good solid signal. Was also the first contact with Ed whom I had never heard before that night. W1QWJ does a nice job up here most nights, and I've worked W1OOP a couple of times." Nice going George; now, when does the next 32 go up?

(Continued on page 136)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

XTHIGU ORWDO GHTAH TAHW̄X
—ESROM

Thanksgiving month in W/K regions. . . Somehow, to thoughtful DXers of the old school, it may seem a little more than mere custom this year. Our League has hearkened back to earlier times with the enthralling *QST* series, "Fifty Years of ARRL." The history recounts gay radio days of yore. It accounts for some grim ones, too.

When Europe marched off to war a quarter century ago our h.f. DX was suddenly decimated. Almost half the Countries List went QRT. Within another year our long-haul work excluded foreign QSOs entirely. That was *it*. Ten and twenty meters, so jammed with international fellowship one short year before, held only ghostly echoes of DX joys that had been. There was something sorely missed at many a ham's turkey dinner in '39.

But DX hounds of that day quickly rallied to other phases of the Game. Calls noted only for their bruising participation in 14-Mc. pile-ups began to pop up in 80-meter nets and BPL. (Some are still there.) Preparedness was the theme for American amateurs of the period. DXperts who had jogged along at 20 w.p.m. for years began to work at their put-it-down code speeds. WIAW's bulletin and practice transmissions were devoured as never before.

This code business was, as it still is, a worthy challenge. Many strictly-phone fellows, admittedly rusty, dug in and did themselves proud. Some self-styled c.w.-forever men, however, capable of sending fast tapelike stuff, were in for a jolt. Having sat back comfortably and copied in their heads for years, they were hard pressed to transcribe a minute's solid 16. And such scrawls!

Many hotshots who could easily type WIAW's 35-per were in for an even stiffer shock. When hostilities finally included Uncle Sam, plain text c.w. (and phone) went right out the window so far as most military record communication was concerned. Code groups! Ever sit down and copy a few pages of PPXZK XQRJS EPQWM JLGJ? We saw 40-w.p.m. press vets badly shaken by their first serious encounters with 18-w.p.m. cipher intercept. They had to *unlearn* their proud knack of leisurely copying behind. And cipher in our alphabet was comparative child's play to those who went on to master Japanese and Russian versions. Oh, for a few crisp clear baseball scores from KPH!

Competent c.w. men thrive on weak signals. Makes things interesting. Rough conditions may slow 'em down, but they know how they're doing,

even in cipher. They're personally responsible for their copy; they "sine" it and stand by it. A product of enthusiasm, talent and practiced skill, the manual c.w. operator seems perpetually destined to probe the QSB-QRM-QRN fringe limits of wireless communication where sophisticated substitute devices — often frantically nursed along by equally sophisticated personnel — trip, wilt and fail.¹

We like to think that c.w.-inclined ham DXers, habitually digging weird call signs out of layers of interference, have a natural head start in military-style copy. Possibly so. But how are you at a full helping of WIAW's tube-tables practice text? And how's your endurance on a plain old straight key if that's all you should have handy in the menacing jungles of Petruvia? Be thankful, OM, for that fancy bug or keyer and the privilege of cruising along in the clear.

What:

The chilly season looms ahead for W/K/VEs. Got your skyhooks well dug in and plenty of logsheets on hand? We'll have those deliciously quiet DX nights on 40, 80 and 160, and those cozy indoor DX week ends on 20, 15 and 10. Here's how the "How's" gang puts 1964's warm DX days behind us. . . . "What happened to all the DXpeditionary



fever this summer?" — *K5JVF*. . . . "So far 1964 has shown a dearth of DX on the bands compared to the gala Gus days of '63." — *W8IBX*. . . . "Twenty's very good at times but there's no telling when it will drop out." — *W4SABG*. . . . "The kw. killers grab all the goodies when 14 Mc. opens up for low-power men." — *W3HNK*. . . . "One thing about my dipole; I can sneak in a few quick ones when everybody else has their beams on a rare one." — *W49CQ*. . . . "There's good DX to be found on 21 Mc. if you get on at the right time from the right place." — *K3SLP*

¹"The Importance of C.W.," p. 9, August 1964 *QST*.

*7862-B West Lawrence Ave., Chicago, Ill. 60656.



UWØFK, whose 40 watts and ground-plane are very frisky on 14 Mc., is earning a reputation for prompt QSLs. (Photo via WB6GFZ)

4BQ* 4EB 20, ØQA 21, HL9s KH TE TU US, HM1AX (270) 17, HP1s EV* JF (345) 22, ME MN (110), HRs ICM 2, ISO (140) 0, 2SY 4DH* 9EB*, HZ2AMS, IS1s CSA CWA CWN VAZ 23, JAs 1AEA 15, 1BN 1BRK 1CG 1UT 3BAU 5ADR 5HT 6CZD (278) 12, 6NP, KØDID/VP9 0, KAs 2BW 2HQ 13, 5MC, KB6s CB CP/-KS6 EBQ EPN (290) 9, KCs 4AAA/mm 4USK (340) 0, 6BK, KGs 1AA 1BO 1BX (330) 2, 1CX 1FR 4AA 4AM 4AN (105) 20, 4CG4CH (345) 22, 4CI (330) 11, 6AAY (280) 5, 6AKR 6FAE (346) 6, 6IC (322) 6, 6IF (322) 6, 6IJ 6SB, Kure's KH6EDY 5, KJ6CC (240) 8, KM6s BI (310) 3-7, CE (300), KR6s BD EF 12, MD RN USA, KV4CR (320) 0, KW6CV (285) 8, KX6s BQ (290) 5, DC (330) 2, KZ5s AA AG MC* VL, LA9PI/p, LU2XL/9K3, LXs 1DE 1LF 3QT 21, MP4s BBO BBW BBL 3, BCC BDP BEM (281) 16, BEQ (113), TBA, OAs 3NT 23, 6AD 6Q* 4, 7AF (331) 20, 7Z, OD5s AX DF* (108) 18, OE5 2EGL 23, 8KI (112) 22, ØH2AA (118) 5, ØK1ADT 22, ØX3s JV ØM, ØYs 7M1 8KR 22, P1H1JG* of Holland, PJs 2AA 3AJ 3CD 3CF (100) 22, PX1JQ* (155) 17, PZ1s AG (160) 21, AX BW 21, CA, SMs 1AP 2BJL, SVs 1AN* 1BS* ØWGG ØWF (250) 19, ØWL 10, TF2WHL, TGs 8CW 9GZ 9KJ 9JR (109) 14-22, 9SC (105) 22, 9SG 9SM, TIs 3AA (105) 13, 5KW* TL8AC (100), UAs 9FB 9KCE 9TE 7, 9VB ØEK ØKAP ØKWA (101) 2, UB5s RZ* WE WI, UC2CU (130) 4, UD6s BR KAR 20, UØ6FZ, UG6AW (101) 20, UH8s AI BO 3-8, UI8AG*, UL7s FA FE (140) 4, SB (262) 17, UM8KAA (280) 8-12, UN1BK, UØ5s IP WS, UP2KCA 21, UØ2KAR*, UWs 3FN* 9AF 20, 9CC, VEs 1AJR/SU 22, 8AH 10, 8MC (280) 3, 8MD 8ML (150) 1, 8NN 8RG 6, 8SK*, VKs 1ATR 6GU 9MD (136) 4, 9NT 7, 9RH* 9XI (303) 8, ØFB* ØGS, VPs 2DL* 23, 2GAC 2KD (110) 22, 2KJ (270) 23, 2KL (125) 22, 2KM (124) 21, 4TI 4VP (125) 21, 5LV 12-13, 6WR 7BW 7CC* 23-0, 7CD 7BD 7NY (275) 20, 9BY 9CP 9DC 9FD* 9FE 9FJ 9FK 13, 9WB, VØs 1GDW 2AB 2AP*, VRs 1B 2BJ 20, 2CC* 2EQ* (190) 4, 4EE (310) 13, VSs 1LP 1ME (125) 16, 5MH (112) 13, 6AS (245) 12, 9AAA* 9AE* 9MB 19, 9MG 9MH (112) 12, VU2s CK NR (120) 16, Ws 4BXC/V-VO1 4SLW/KG6 (346) 6, 8BZB/HC2 (104) 22, WAØ-EHW/KG6 (300), WØB6ZS/KJ6 (261) 7, XEs 2DB* 21, 2I 3AQ 3L 3PY, XW8s AV (297), AX, YNs 1BN (345) 15, 1LB (100) 21-22, 4WD*, YO3s CV* GK, YSs 1EM 2 IGO* 1IGM 1JP 1RR (130) 22, ISRD 2SA 3PL*, YU7s LAE* LAJ* LAS*, YV 1I 1LA* 2FM 3CB 3PJ* 2, 8AJ* 22, 8AS 2, YA1AN, ZBs 1A 10, 2B, ZCSAM (112) 19, ZEs 1AC 2JE 2KL 4JE 7JA*, ZK1BW* 4, ZPs 3CJ 5, 5CT 22, 5IT 5JE (331) 21, 5OG 9AY, ZMs 3AT 3HT (275) 17-18, 3HX (260) 17, 7R, 3A2s BY* CP (281) 16, 4U1SU (105) 18, 4W1Ds D (110) 5-9, E, 4X4s BL (100) 4, DK FQ HK IO 7, LC LY PQ RH 6, 5A1s TG TT 8, TZ, 5B4s AK* (270) 19, CZ GT MO* TJ*, 5H3s JJ JR, 5N2s CKH (180) 10, JEB JWC (281), 5T5AD, 5X5s FS IU 21, 5Z4s AQ ERR GT JU, 6Ø6BW (110) 17, 6Y5s EM* MJ (250) 2, UC 2, 7Q7s OL PBD (265) 19-20, 7Xs 2BX 22, 2CT 2MD* 19, 2VP* 2VX (305) 18, 3CT 18, 7Z1AA (275) 19, 9G1s BF 20, CC DV DY EC*, 9K2s AD AM AN (270) 17, AU 18, 9L1s HX JR (120) 19, NH, 9M2LO 16, 9N1AM* (275) 15, 9Q5s AB 6, DO HF (245) 20, KB 22, 9U5BB, 9X5s GG and MH, the asterisks indicating non-s.s.b. specimens.

... "Twenty seems much improved, some DX pouring through like locals, but where was Africa this summer?" — W4CZM. . . . "Twenty's really hoppin'; so is QRM." — W4EFF. . . . "My new 14-Mc. quad surely makes things easier after disgusting results with a vertical." — W4JDV. . . . "Not much DX activity here lately thanks to a new harmonic, and quit listing me as K7VRO." — W7VRO. . . . "Quit listing K7VMO as W7VMO." — Jeeves. . . . "Not much time for DX now in my fresh-man year at the U. of Arizona." — K7VMO. . . . "Jeeves is pretty fresh, too." — WØRD. . . . "DX signals are really hitting strong peaks on 14 Mc." — KØHIL. . . . "Except for brief Asia and Oceania openings around 0200 and 1230 GMT, twenty has been generally poor." — KSRDE. . . . "With its good nights and poor nights, 20 has been generally fair." — K7CAD. . . . "Those summer doldrums aren't slack for DX if a fellow really tries, even with such simple antennas as mine." — W8TRN. . . . "I'm back on the DX trail after schooling, getting married and other distractions." — WA4SHD. . . . "Ten phone may be coming around somewhat." — WA2WJZ. . . . "All's fairly quiet on 15 sideband." — WA9FZQ. . . . "What rain! Had to run the furnace at times this summer." — W7DJU. . . . "Forty sounds like 20 with my new 2-el. 7-Mc. beam; next comes a 3.5-Mc. Vee on Europe." — WA2KSD. . . . "Looks like another mediocre month." — WA5EID. . . . "Much late-summer QRN on 7 Mc. in my area." — WA2FUL. . . . "Despite heavy short-skip QRM I've passed the 100-mark on 40." — K3GK. . . . "I'm hearing weak African and South American signals on 10, too little s.s.b. on 15, and plenty of DX activity on 80." — DL1IO. . . . "Forty's beginning to pick up, but 20 is sporadic except for good European openings." — K4MYO. . . . "Conditions are not wonderful." — W8YGR. . . . "That about covers the consensus. It's 14-Mc. month aboard your "How's" Bandwagon. The brethren mention plenty of potential DXCC material available for the calling. *Away we go!* . . .

20 phone's election returns keep rolling in. Let's check the ballots of Ws 3LE 6KG 8EQA 8KML 8YGR, Ks 1DFC 1QHP 3GEG 3SLP 7MØ ØHLL, Ws 2EFN 2KSD 4CZM 4JY 4PSA 5ABG 5AER 5GZX 9FZQ 9JDV, WB6-GVV, DL4IO, XE1NE and s.w.l. C. Maher. What a slate of candidates! AP2MI (14,105) 1700 GMT, BV1s USA (310) 14, CEs 1BD 1DD 3JR 2, CN8s AB 23-1, AW AX AZ 12, BL* DM* GB (240) 7, GA 20, MZ*, COs 2CT* 8BO*, CPs 1BJ 5AB 5AD (120) 1, 5EA 5EC 5ED 14, 8AB, Cxs 2AY 2CO 4AW 8BM (100) 21, CRs 4AY* 6BX 6DB 6, 7GF (270) 12-13, CT1s EE* EK* FL* GE* PK* 0, DM3-DT* DJØB/9K3, DUs 1AP (241) 14, 1JC (266) 14, 7SV, EAs 6AR* 6CF* 8CR* (210) 21, 8EC* 9EA* (170) 21-22, E19AE, ELs 1G 1H* 2AI (270) 19, 2AP 2I (271) 9, 2S 2Z (290) 21-22, 3AT 6A 20, EP2s BQ NO 19, ET3s JF* (110) 3, LP (40) 17, MEN 17, RR (260) 9-16, RT, Fs 9RY/FC* 9UC/FC (290) 19, 8AD just France, FB8WV* (103) 13, FG7s XL XT XV, FH8CD (306) 17, FM7s WQ (115) 22, WS, FØ8s AA 3, AQ 4, BJ (110) 6, BL, FY7YF (110) 19, GB2LS (205) of England, GCs 2AAO (240) 19, 3IFB, G4RY, HCs 1FG 2AH 5NW 8FN (105) 3, HH2OP, HIs 4XAB* 0, 8AA 8WSR 8XLL, HKS 2ØQ* 3CW* 21,

20 c.w. is premises for the voting machines of Ws 1ASZ 1DYE 1ECH 2BTQ 3HNK 6KG 7DJU 8DSØ 8EQA 8IBX 3TRN 8YGR ØEM, Ks 1DFC 1QHP 3SLP 3UXY 3ZOL 4HEX 4NYØ 7CAD ØHLL, Ws 2EFN 2KDT 2KSD 2LYP 2WJZ 4CZM 4JY 4PSA 4SHD 5ABG 5AER 8JXM 9FMQ 91QC ØAPN, WBs 2VFD 2JQC 6ESW 6GFZ 6H5Ø and DL1IO who register comfortable pluralities for the tickets of AP3s CP (55) 13, HQ (50) 14, SS (15) 14-15, BY1PK (50) 7-14, CEs 1AV (19) 1, 2ØF, CMs 1AR 1SR 2AV (10) 1, COs 2AV (10) 23, 2BB 2CO 2CT (50) 22, 2ER 2JB (5) 21, 8BO 13, CP5EZ, CRs 6A1 (42) 19, 6CW 6CZ (51) 19, 6JL 7CD 7GF 7IZ 9AH 9, CT1s 1VB (75) 21, 2BE, DJ3GE/VP3, DMs 2BDD (20) 22, 2BDJ 2CDL 2XLO (24) 22, 3LMD 3XVO 3ZOL 4YPL (2) 1, 4ZJJ, DUs 1GF (60) 11, 1ØR (58) 9, 2MY (30) 11, 7SV (18) 12, EAs 9AY (45) 23, 6AA (7) 23, Els 2AN (55) 18, 4B (21) 23, 5F (11) 23, 7AU (9) 22, 9S (55) 23, EL2s AC (35) 0, AE AM (22) 21, AP (21) 22, EP2s AS BO BQ (35) 16, DM EL (57) 14, RC (40) 16-19, ET3s RR USA, F9s UC/FC VN/FC (8) 21, FB8s WW (50) 6-7, XX (40) 7-8, FG7s XF (11) 3, XK (95) 0, XS (55) 0-1, FØ8s AA (40) 1-3, BI, FR7s ZD (52) 10, ZI ZS, FURAG (40) 14, FY7s YE (20) 20, YF (20) 15, YJ (5) 23, GB2SM of Britain, GCs 2FMV 3LFJ (50) 1, GD3RFK (70) 12, HAs 1KSA (22) 0-1, 3KMF 3MJ (13) 21, 4YL 5KFR 7PJ (35) 5, 8CZ ØHC (50) 13, HCs 1LE 8GC2, HIs 3AGS (35) 23, 4ARM 8M1AN (68), 8WSR (40) 23, HKØAI (7) 15-23, HL9s KA (59) 8, TS (55) 12-13, US, HMs 2AL (60) 8, 5BF (49) 12, ØHLL (58) 8, HP1s AC BR (20) 22, IE, HS1s SX, HZ3TYQ (60) 20-21, IS1s CWN DKL NU VEA, JAs 4BJO 5AA 5AV 5IP 6AA (23) 16, 6DCE ØDL (60) 7, JT1s AD AJ KAA (50) 2, KAE (23) 14, Ks 2CRF/KL7 5GVTV/VO1 6ØZL/KP4 ØRAX/KL7, KAs 2CJ (22) 8, 2DF 2KS (14) 8-9, 8VB, KCs 4USK 4USV 6BK, KCs 4AM 6AAY, KM6CE, KP6AZ (33) 5, KR6s FY (19) 8, JZ (60) 8, LJZ NT QW TN USA, KS6BN (24) 1, KV4AA (81) 20, KZ5s AW CU EC EH EV KY, LAs 1LG/p 2ØJ/p (20) 23-0, 31J/p 8FI/p (25) 23, LUs 1ZC (80) 20, 8ZL, LXs 2MB 3AX (40), 3YQ (47)

22, LZs 1CR 1FO 1KPW 1KSV 2AW 2KAA 2KDO, MP4s BEE BEQ (48) 20, BEU BEX MAH TBE, OA6W (20) 21, OD5AX (80) 20, OK6SNP, OHL 4NG 9RF, OR4VN of Antarctica, OX3s AY UD, OY3SL, PJ2s ME (20) 0, MI (21) 0, PYs IMCC 4UG (20) 19, SLs 3AE 5AB of Sweden, SM2s CXU (10) 17, RI, scads of SPs, SU1MI (25) 23, SWs LBK 9WAA (30), 9WB (12) 16, 9WKK (70) 15, 9WPP (45) 18, 9WT (60) 9, TA2s BK BZ, TFs 2WIO 2WIV (58) 0, 1, 3AB (55) 13, 3AS 5TP, TG9AC, many TP2s, TN8AF (60) 19, TT8s AJ AM (25) 18, UA1s KAE/2 KED 10, UA2s AR AW KAK (24) 19-20, KAP (85) 21, KAW (75) 14, UA9s ES (40) 18, EU (50) 8, GC (30) 2, HZ (42) 2, JL (35) 18-19, KQA (5) 10, KYE (43) 6, PI (5) 10, PP (34) 2, YU (45) 1, WS (22) 4, YR (48) 2, UA0s BF GU (55) 8, JF (61) 10, KAL (30) 13, KJA KKB (10) 16, KYA MF (75) 15, ML SH (81) 2, SK (10) 7, TD (4) 1, ZO, UB5s AU PG IV JX (61) 21, KDS (20) 21, LU SL (2) 23, UR (62) 21, UX, UC2s AR (5) 21, KAB WP (30) 23, UD6s AX (8) 19, BW, UZ (82) 19, DW (5) 7, KAK (41) 19, UF0s KAL PF, UC6s EA (9) 19, GL (61) 20, UH8s AD BO (10) 19, BF (64) 7, KAA, UH8s AI (75), CT (96) 2, KNA (28) 14, LB (28) 16, UJ8s AC (45) 8, JI (15) 16, KAA (48) 22, UL7s CH (60) 2, FA FE JE 7, JA KCR (48) 3, KDB KDM (33) 7, KDT (20) 8, KKB (43) 14, NB (75), PJ (46) 6, UM8s AJ (40) 14, AP (45) 18, KAA (60) 1, KAB, UN1s BK (21) 11, BN (23) 22, UO5KBR (23) 18, UP2s AR BF (25) 1, BW 0, KCA NM (62) 21, UQ2s AH (69) 8, DR HT (35), KAR (75) 15, KBC/UL7 (75) 14, KCT (15) 2, UR2s GZ (21) 16, KZN (28) 13, UT5s BL CA EIT 20, HT LN (88) 21, SE SL (71) 21, XK (27) 13, UV3TC, UWs 3CS (55) 6, 9CE (60) 1, 9DP 6, 9CS (15) 6, 9OV 9PL (19) 18, 9TR 9WJ 9AF (50) 6, 9FK 8IJ (40) 4, 9IX (50) 2, 9TT, VEs IAJR/SU (84) 23, 8DL 8RG 8RN 8MY (28) 17-18, VKs 6SM 6WT 7BL (80) 5, 9BW 8, 9DR (48) 13, 9GC (62) 6, 9RB (35) 6, 9FB (50) 12, VP8s ITA 2AV (25) 21, 2DA 2KJ 2KT (2) 0-1, 3YG 4TR 6BW (50) 14, 6LN 6PJ 7BG 7NQ 22, 7NS 8CW 8IJ (53), 8HK 9BO 9BP 9BY 9EU (20) 6, 9FU, VQs 2BC 2IE (60) 14, 8AM (15) 13, 8BT (25) 12, 8BY (24) 14, 9HB, VRs 1B (10) 8, 1G 4, 2AA 2DK 2EG 20, VSs IJW (60) 15, IJY (31) 15-16, IMD (65) 14, ILP (80) 12-13, 6FC (59) 10, 6FE (47) 14-15, 9ACL 9AMD 9OC (64) 12-13, 9PGD, VU2s DR FB GW GG JA LE MM (57) 14, ND NM (33) 18, KXZ (63) 13, XO, W5VWU/KJ6 (30) 7, XEs 2JL (90) 14, 2HN 3BL, XW8AF (30) 12, YAA 3A (4) 21, YNs 1IH 1OC 1SL (30) 3, 1XA, lots of YOs, YS1s JJD TM, YVs III 3FB, ZBs 1J (28) 17, ILS 1RS 2F, ZDs 3A (4) 21, 9BB (20) 14, ZEs IAZ (30) 20, 1BA 8JJ (38) 8, ZPs 5CF (50) 22, IS 0, LS (43) 1, ML (50) 23, ZSs 3EW 6AP/KC4, 4S7s NE WP (44) 1-2, 4UITU (47) 14, 4WID (40) 17, 4X4s BT (25) 21, DA DH 6, FU (21) 23, KK NY (65) 21, OQ PQ RH (51) 12, RW (21) 13, 5A3TX, 5B4s AK (42) 18, JF (45) 13, KB, 5N2JK, TJ (28) 13, TX (95) 19, 5H3s HZ (33) 20, KW, 5N2J10, 5R8s AN AR, 5X5IU (90) 14, 5Z4s FK (77) 21, GT IQ (19) 19, IV (10) 20, 6O6BW (35) 23, 6W8s DN DO, 7G1s EZ (10) 23-0, IX, 7Q7EX, 7X2AP (20) 21, 7Zs 1AA 3AB, 9G1s DV FK, 9LIOT (90) 20, 9Ms 2GJ 4LV, 9Q5s AB (35) 21, BK GR PS (92) 20, 9U5JH and 9X5MH. How about some write-ins for your favorite nominees? * * *

Gotta run the Bandwagon back to the barn for this trip, but next month we'll tour other bands with the help of (15 c.w.) W8YGR, WA2WJL, WB2FVD; (15 phone) W8YGR, K7VMO, WB6HSO, DL4IO; (40 c.w.) Ws 7DJU 9NN, Ks 1DFC 3GEX 4MYO 5JVF, WAs 2FUL 2WJL 4PSA 5EID, WBs 2JWB 6FMJ 6GFZ 6ITM, WNGIWX, DL4IO; (40 phone) Ks 1DFC 3GEX, DL4IO; (80 c.w.) W7DJU, K5JVF, WNGs IWX LDV; and (75 phone) DL4IO. We even expect to have news of 10- and 160-meter doings, so roll your pack and make ready to swing aboard.

Where:

ASIA—HM1AP/HM9AP QSL manager K6QPG's recent biking accident will keep her horizontally polarized for some months to come. Mary needs someone to take over for Cho. K6QPG, who may recall, ran her own DX mill on Wake some years back. "4X4DH has been very busy but reports a large batch of cards on the way," writes Bruno's Stateside rep, W5VSO. "All self-addressed stamped envelopes are on file for stuffing. Further details are being

worked out for faster QSL dispatch." . . . Be not of faint heart in this QSL biz. W1ECH just received confirmation of his 1957 QSO with YI2RAL (G3KEV, now 5B4DX), and W8IBX's eyebrows soared at a fresh TA2BK pasteboard via DJPJ. . . . WB0G.VV assumes HM1-AX QSL duties, requiring the usual s.a.s.e. from W/Ks, International Reply Coupons from foreign applicants, or cards will be answered via bureaus. . . . You'll have to get used to another new prefix, just as (ex-VS1s) 9M4s LS LV MD and ML are doing.

AFRICA—Ex-5A2TJ reports, "Just finished making out some 2000 QSLs and have sent them to the 5A bureau for mailing. Thus everyone I worked from Libya should have received his card within the next few months. After a reasonable wait, anybody I missed is welcome to reapply to my WA5GIT address." . . . Ex-6O1WF writes, "As soon as all my logs and cards catch up with me from Mogadiscio I'll take care of the many chaps who still need QSLs from me. I feel certain that considerable mail was lost in transit to and from Somalia. Cards from 53 countries reached me while home this summer, and they're still coming in." Woodrow, who also enjoyed a DX session as EL8D, is available at the address in the roster to follow. . . . Operation by 5X5s AA AD AI AZ CW GT IM RU RV TK and ZA is unfortunately spurious, according to VERON's D Xpress. This Dutch society also understands that ex-TU2AU is still reachable through his old Abidjan QTH. . . . LIDXA affirms that HB9TL has arranged with 5R8BC to handle confirmation of s.s.b. QSOs by FB8s WW XX and ZZ.

OCEANIA—ZL1QW remarks, "Ex-VR4AB, now ZL1-BBK after a spell as ZL2BCH, QSL'd very quickly when he was at Vella Lavella, answering my prepared card and s.a.s.e. I offered to act as his QSL manager but at that time he said he was active so little that it wasn't worth having cards printed." . . . VS4RS, now signing G3IHP on a six-month holiday, invites, "Anyone still needing my QSL can send details plus IRCs to my English address for fast reply." . . . W4YHD iterates that he's not KC6-BO's QSL agent. "I operated that station from August 27 to September 9, 1963, and have logs only for QSOs made during that period." . . . DL4IO (ex-EL4A), active in Germany since early summer, hopes his paltry 10-percent QSLs return improves pronto. After the pump is primed they'll probably pour. Perhaps our running Ken's QTH this month will help.

EUROPE—M1FT (DL7FT) expected to have his QSLs from the printer and in the mails by last month. "I answer cards 100 per cent," assures Frank. DL7FT, once active as 3A2CU, is eager for an early DXpeditionary shot at ZA-land. . . . WA9AXX, QSL charge for OI12s BQ/OH0 and QV/OIH0, states, "I'll eventually QSL 100 per cent via bureaus. Meanwhile, s.a.s.e., or s.a.e. with IRCs, will surely speed cards on their way." OI12s BH BQ BS and QV collected about 4500 QSOs in that July Alands junket. . . . W4RLS recommends mint Yugoslavian postage with your QSLs to YU7LAJ. W2SAW remains a prime source.

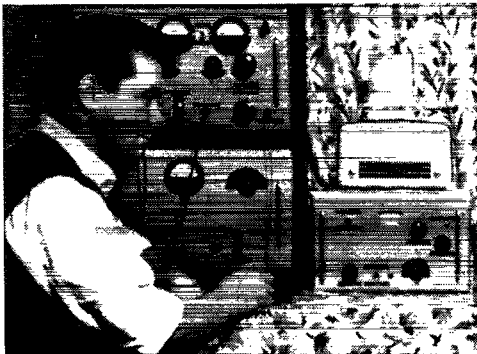
SOUTH AMERICA—"I'm QSL manager for HK0QA," S confirms K9ECE, reporting arrival of logs beginning in late August. S.a.s.e., to be sure. . . . YV5BIG writes, "K3SLP is now my QSL manager starting August 18, 1964." The customary s.a.s.e. courtesy to K3SLP, of course. . . . "You never list W/K amateurs in 'QSLers of the Month,'" complains YV5BPG. "This gives false understanding that all are excellent QSLers." Well, many gripes appear in these pages concerning poor returns from the U.S.A. Commendation of good QSL work by some DX stations should not be construed as disparagement of others. . . . A prepared QSL shipped to KZ5AZ along with IRCs or appropriate U.S. postage will net you our OA4EU/OA9 confirmation, according to DXCPR's D Xer.

HEREBABOUTS—"I was active as guest operator at PJ3CC, August 12-18, 1964," declares W9TKV. "The call is that of the Coral Cliff Hotel, and the station is available to licensed guests. I worked mostly 7- and 11-Mc. c.w., giving many Europeans their first PJ QSOs."

EA4GZ turned in the top Spanish phone score in this year's ARRL DX Contest, listing 924 contacts. (Photo via W1YYM)



QSLs for all PJ3CC contacts should go to the address in the list to follow, not to guest operators. . . . ARRL's W1ECH says, "W9SZR will be operating H18WSR for the next six months or so. Fred will QSL via bureaus except for cards arriving before the end of each month which will be answered in the manner received." . . . Ex-KL7DRM checks in, "Anybody who worked me in Alaska and still needs confirmation can QSL me at W9GXR." . . . WA2EFN notes that W0NWX does not handle VP2VA pasteboards. . . . "HR2SY says that K9BTU is his QSL manager," advises W1UED of League Hq. "Bureaus will be used for W/K/VEs, direct mail for others." . . . "I QSL 100 per cent," assures KP4BOD, "and right now I possess enough cards to answer all requests without delay." Francisco's new QTH follows. . . . Apt editorial comment in DXCPR's *DXer*: "Running a QSL bureau is no child's play. There are hundreds of cards to be sorted, dated, filed and mailed, with much responsibility involved. The job gets more complicated every day with our increasing ham population. One of the worst problems is the accumulation of unclaimed QSL cards. It is the duty of everyone to help relieve our bureaus of this burden." True; even if you don't consider yourself a DX man *per se*, keep s.a.s.e. on file with your ARRL QSL Bureau branch manager as listed in *QST*. . . . "Four fellows answered my 'How's' plea for assistance in running down a Somalia QSL," testifies K9VQK, whose resultant confirmation from 606BW was his No. 100. WA6SLU had good response, too; "Thanks to readers of



YU3NR, a regular on 20 c.w., is obviously a master of homebrew styling. Vinko runs 30 watts to a vertical dipole. (Photo via WA4CZM)

your column I now have my 7G1G QSL!" A few more hollers for help: W1ECH for FF8s AC AP of 1958 vintage; W5VSG for LAs 5F1P 9MI/p, '63; W9GXR for the FA8RJ he worked from KL7DRM in '60; W0IEM for T10RC; VP1 1FTR 2N1Z JLO, XWSAJ, XZ2VW, ZD7SA; K2UTC for HLRKT '58 on Dick (W8 QSL mgr.); TA3JH on 15 phone in '61; WA4CZM for EA8DM, VP1 2DA 8HD, 6W8s AB AC DD; ZL1QW for C9AZ '51, HZ1CK '50, and op Bob of YP2AM of '51. . . . W3HINK, K1DFC and WA4PSA offer QSL managerial assistance to any DX stations in need of such services. . . . Our "QSLers of the Month" this month are DJ7s - CV RW, DL3LV, F8TZ, H18XLJ, HK9RO, IT1PAL, Ks 2US 6OZL/KP1, KB6-EPQ, KG4CH, KH4FBT, KL7BZO, OA4s PD PJ ON4GU, SM1CJV, TG9SM, T12QKX, VP9BP, VR4EE, WB6BFE, nm, XE1, NE PNE, YN3KAL, 5B4JF and 7G1L, plus QSL aides W2CTN, K5s HVW and SGJ. All are commended for outstanding confirmational efficiency by "How's" correspondents W5VSG, K3s SLP ZOL, WAs JJY 4PSA, 5ABG 6TQK 8BR8 8JXM, WB2s DBW and FVD. Any prompt pasteboard producers you'd like to see saluted here? . . . Now here comes our mailbag shakeout of individual specifications, keeping in mind that each recommendation is necessarily neither "official" nor accurate:

CE5EF, E. Pleisen, Box 16, Ereilla, Chile
 CO7AM, Box 35, Ciego de Avila, Cuba
 CP5AQ, R. Lehmann, Box 883, Cochabamba, Bolivia
 CR7AS, E. Ferreira da Cruz, Ribaua, Mozambique
 CR7BT, M. de Oliveira, CFM, Monapo, Mozambique
 CR7DR, F. Correia Dinis, Espungabera, Mossurize, Mozambique
 CR7DW, F. A. de A. de Carvalho, P.O. Box 812, Lourenco Marques, Mozambique
 CR7CY, J. da Silva, SPAM 1714, Mozambique
 CR7CZ, A. F. Lopes, Malvernina, Lourenco Marques, Mozambique
 CR8AD, A. do S. Barreira, Defesamaritima, Dili Timor
 DJ4EK/TA (via DL3RK)
 DL4IO, K. Balc, 71 Heilbronn/Bockingen, Haagstr. 18, W. Germany

EA110, Box 249, Santander, Spain
 EA6AA (via URE)
 EL2AM, P.O. Box 98, Monrovia, Liberia
 ex-EL4I (to DL4IO)
 EP2NO, N. Olguin, c/o QSL Mgr., U.S. Embassy, APO 205, New York, N.Y.
 HC2AH, P.O. Box X, Guayaquil, Ecuador
 HI3JR, J. Riggio, Box 95, Santiago, D.R.
 HI8WSR, W. Santiago, P.O. Box 1297, Santo Domingo, D.R.
 HK9QA (via K9ECE)
 HM1AX (via WB6GVV)
 HR2SY (via K9BTU)
 HS1X, C. Anderson, c/o U.S. Embassy, Bangkok, Thailand
 JT1KAA, Box 639, Ulan Bator, M.P.R.
 KC6BO, Page Comm. Engrs. Radio Club, Koror, Palau, W.C.I., 96940
 KG4AA, NAS, Box 46F, Navy 115, FPO, New York, N.Y.
 KG6SZ (to WA6ZLQ)
 ex-KL7DRM (to W9GXR)
 KP4BOD, F. Bou, 108 Baldorioty St., Aibonito, P.R., 00609
 OA1U, P.O. Box 128, Chalcayo, Lambayeque, Peru
 OA4CG, R. Correa, P.O. Box 2205, Lima, Peru
 OA4EU/OA9 (via KZ5AZ)
 OH5TW (via W2CTN)
 PJ3CC, Coral Cliff Hotel, Curacao, Netherlands Antilles
 PJ3CF, Piscadera Bay Club, Curacao, Netherlands Antilles
 PY7ABY, J. Albuquerque Veiga, Box 842, Olinda, Brazil
 SP4JF (via WA2EFN)
 TA2BK (via DJ2PJ)
 TI2CMF (via W2CTN)
 TI2PCF, Box 2240, San Jose, C.R.
 TJ8AC, Box 26, Garoua, Cameroon
 UA9DT, V. Kozlov, P.O. Box 66, Sverdlovsk, U.S.S.R.
 UW9CC (via UA9DT)
 VE1AJR/SU, F. Richards, CAPO 5049, Bellville, Ont., Canada
 VP2KT (via W2CTN)
 VP8IU (via RSGB)
 VP9BP, B. Paynter, Wellington, St. George's, Bermuda
 ex-VR4AB (to ZL1BBK)
 ex-VS4RS, R. Skelton, G3IHP, 7E Mayplace Rd., E., Bexleyheath, Kent, England
 VS9PGM, D. Bushe, DWS/FO, Aden/Perin, P.O. Box 5153, Maala, Aden
 YU7LAJ, K. Dvinger, Korcula, Yugoslavia
 YV5BIG (via K3SLP)
 ZL1BBK, Dr. G. Holt, 24 Courtville Flats, Parliament St. Auckland C1, N.Z.
 4W1E (to HB9ZN)
 4X4DH (via W5VSG)
 ex-5A2TJ (to WA5GIT)
 5B4JF, J. Farrar, P.O. Box 210, Famagusta, Cyprus
 5N2RSB, R. Briggs, 5 Gough Rd., Catterick Camp, Yorkshire, England
 5X8IU, R. Roberts, P.O. Box 61, Mbale, Uganda
 ex-6OIND, N. Duxbury (W1WIQ), U.S. Embassy, Bolzmannsgasse 16, Vienna 9, Austria
 ex-6O1WF-EL8D, W. Franklin, 307 N. 7th, Sterling, Kansas
 ex-6O2GM (to VS9PGM)
 7G1G (to K3TVS)
 7G1L, GPO Box 7388, New York, N.Y., or c/o PAA, P.O. Box 610, Conakry, Guinea
 ex-9L1NH, N. Henwood, 45 Westwood Ln., Leeds 16, England
 9Q5EA, Box 522, Elisabethville, R.C.

Many thanks for this array to Ws 1UED 3LE 4RLS 4YHD 7UVR 8EQA 8IBX 9NN 9OD 9TKV, Ks 3SLP 3ZOL 5JVF 6GIL 7VMO 9VQK, WAs 2LYP 2WIJ 4CZM 5EID 6SLU 6TQK 8BR8 9AXX 9ICQ 9UDY, CR7CQ, DL7FT, ZL1QW, DARC's DX-1B (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Florida DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N8, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2FGD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* (W1BPW, K1NOL), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PAGs FX LOU V1V WWP) and West Gulf DX Club *DX Bulletin* (W5IGJ). Much obliged, team!

Whence:

HEREABOUTS—Many younger-generation DXers think the old boys have been coasting along on ancient laurels lately. Is this true? Well, an upcoming promotion by Long Island DX Association certainly ought to separate the DX has-beens from the still-heres. Better steer clear of it if you're over the DX hill, OM. LIDXA invites amateurs throughout the world to participate in its First Annual DXCC Contest, a year-long DX marathon commencing at the stroke of midnight, December 31, 1964. The DXer who confirms QSOs with the most countries in 1965 will qualify for the LIDXA Trophy, a similar shack ornament will go to each continental leader, and certificates of distinguished

merit will be issued to country leaders and top scorers in each W/K-VE-VK call area. ARRL's DXCC Rules and Countries List will apply. Use any modes and bands in accordance with the conditions of your license; the country's the thing, not the emission. The deadline for filing your list of confirmed countries — no QSLs until called for — is February 15, 1966, addressed to LIDXA Contest, P.O. Box 599, Lynbrook, N.Y., where a committee consisting of W2s FGD MES, K2MGE and WA2QNW will rule supreme. Will the winners be wily, grizzled veterans of old DX wars or brash and talented newcomers just waiting for such a chance to put the OTs in their place? . . . Writing papers like "Properties of Polynomials Associated with Expansions of Certain Finite Difference Operators" is understandably enough to keep former "How's" reporter K4CQA too QRL for much DXing at the halls of W. V. U. Furthermore, the ham next door lights a 40-watt bulb to full brilliance in the K4CQA/8 feedline. Is such coexistence possible? . . . K9VQK finally filed his first DXCC hundred for W1WPO's scrutiny. Not bad for 75 watts from Nineland and scarce sunspots. . . . W1ECH just issued another Novice WAC sheepskin, this one to WN1XPX. More proof that 21 Mc. is far from faded. Perhaps we should give the Novice gang a slice of 10 to show the Generals how 28-Mc. DX is worked. . . . WB2FVD/1 enjoyed giving New Hampshire to 20-meter sideband DX stations while at summer camp. . . . Gripes of the month are submitted by WA5ABG concerning excessive CQ-DXing on bands already crowded with available DX signals, and by W7VCB (DL4HO) regarding rare single-sidebanders who encourage zero-beat bedlam by not ignoring on-frequency calls. . . . More local dispatches by the clubs tour: W5s ASG FNA GEL KC and KUC, of the twelve DX men who were members of West Gulf DX Club back in '51, are still on the membership list today. WGDXC's famed *DX Bulletin*, W5IGJ editing, now goes to more than 500 members in 26 countries. . . . Condolences to all the Fourland fellows who lost radiators to unladylike Cleo and Dora in late summer. . . . Ws 4HKJ 5BJD, Ks 6UHI 8VDV 9CCJ, VE3BKL and DL1YA are recent winners of DX Club of Puerto Rico's 8X8X8 award. . . . Remember K4SA of pre-WV-II P.R. fame? Dick is K6HK now, 20 and 40 s.s.b. . . . KP4OO is due to terminate his DXtensive Puerto Rico stay next month. . . . Better circle the 23rd and 24th of January on your '65 calendar if you'll be out west at that time, OM. That's when the Northern and Southern California DX Clubs hold their joint annual meeting at the Town and Country Motel, Fresno. Preliminary information is available through W6CBE. . . . "Novices should be alert for something other than the usual WN KN and VE calls in their 40-meter segment," stresses W8IBX. "YV5AP appears to be a regular there (7166 kc. at 0400 GMT) and so is XE1ZP."

EUROPE — DL4HO (W7VCB, ex-EL4A) presents the DX picture out his way: "Just worked my 100th sideband country since June with an SB-10, DX-10, 2B, two verticals and dipoles for 40 and 80. I'm lucky to have a lull-top QTH not far from Stuttgart's famous TV tower. I note 7 Mc. really filling up on week ends. GW3AX emits lively roundtables on 7045 kc., for example, despite heavy commercial QRM. Amateurs aboard U.S. Navy ships seemed especially active this summer, and I've worked about a dozen including atom-powered W7WFFJ/mm. Reciprocal licensing is catching on big over here, too, with lots of hams working portable in each other's countries. How about a campaign to get more activity rolling on 21 and 28 Mc.? I hear local QSOs that could just as well be on 15 or 10. Managed only 15 QSOs in the All-Asia test as I was away most of that week end." Ken could use some ideas on how to battle 500-kv. RTTY on 40 and 80 with his 75-watter. . . . W8NRB/UA hooked some nice DX on USIA assignment in Leningrad, Kiev and Moscow this summer. . . . W3LE finds ex-JT1s AA and YL still going strong with a Viceroy outfit on s.s.b. as OK1s KX and KW. . . . RSCB's 7-Mc. DX Contest phone week end will be almost under way as you read this, and the c.w. session is scheduled for the 21st-22nd of this month. Details appeared in October's column. On the first week end of next month RSCB will throw its annual 21/28 Mc. Telephony Contest, participation particulars next QST. . . . WIWY, WA2WBH, Ws 3GOQ and 7BTH turned in top U.S.A. scores in that order in the 1963 Scandinavian Activity Contest sponsored by SRAL (Finland). K9ECE submitted the only Yank phone entry. Best c.w. single-op scores in each of the Scandinavian countries were logged by SM5BAU, OH1TN, OZ4FT and LA5HB; phone leaders were OH5SM, SM5OV, LA5HE and OZ7FH. . . . Continental comments via our club colleagues: URE (Spain) held a DX test for Spanish-speaking countries last month on notice much too late for announcement here. . . . IS1s CXF MM and ZUI make Sardinia a c.w. cinch but most s.s.b. output is left to IS1VAZ and other commuters. . . . ZB1BX and others are set to depart the island, so newly independent Malta will join the ranks of the rarer.

ASIA — 5B4DX, formerly YI2RM, YI2DX and EI2AE, is back at it on 40 through 15 meters, according to W1ECH. He's G3KEV when back home. . . . Far and Near East items from the clubs press: W4LCY (HS1P)

states that a legally registered Radio Amateur Society of Thailand is petitioning for ham radio's official recognition in that country. Meanwhile, though HS1A S X and others are active, Thailand remains on the ITU/FCC Ban List. . . . VU2NR may undertake his VU5 assignment this month. . . . 9M14U gives 7-Mc. men some new Singapore scenery on the low edge around 1200 GMT. . . . UA1CC continues to roam UJ8 and other rarish Russian regions, s.s.b.ing as he goes. UJ8s AD AU and KAA are sampling the mode. . . . 9N1MM fired up again in late summer and found a new 1X generation lurking for Nepal.

AFRICA — ET3RR (WA1HW) reports ET3s IIO and JF closing down for Stateside. ET3s BG and GC help ET3RR keep the 14-Mc. sideband set happy with their TR-3s. . . . "In two years of operation as 5A2TJ I made over 5000 contacts," calculates WA5GIT. "I expect to be on s.s.b. from California soon. After DXing from Libya I know that things can never be the same again." . . . CR7GQ is having much DX fun with a 10-watt rig assembled by CR7AB. . . . 6O1WV leaves government work for a U.S. college teaching tour after eleven years in Africa. "It will be come time before my rig returns from Somalia and I get back on the air from Kansas." . . . Aforementioned clubs and groups produce Africa addenda: FB8WW's Marcel, fast and gavy, gave the 20-meter c.w. mob a breathless run right on into autumn. . . . If all goes well K1QHP will radiate from French Somaliland at any time now with voice and key. . . . PA8BB (HB9SI) may take another turn as 4U1SU soon. Neighbor VE1AJR/SU is usually tied up with Canadian traffic work. . . . ZS2MI of Marion isle hangs out near 14,285 kc. on week ends, 14,120 kc. week days, 0600 GMT, with a rhombic focused on Pretoria. . . . VQ8AM sets the middle of this month as target time for his Rodriguez rendezvous as VQ8AMR. France hopes to have an SB-10 to go with his DX-100 and 2B on 10, 15 and 20 meters. . . . 7G1L's NCX-3 is widely hailed, and 7G1UX may try s.s.b. soon.

OSCEANIA — VS4RS aims to visit this country early in '65. "Would like to meet some of the many friends made during my past three years in Sarawak. TH be active from G3IHF with a new s.s.b./c.w. transmitter." . . . Further Pacific notes courtesy club newshawks: ZL1s ABZ and 4JF (ZL4L) will have completed their Kermadec and Campbell's contracts this month. ZL2GX says two hams will replace ZL4LY but ZL1ABZ may be the last of his species for some time. ZL2AWJ is still involved in Chatham's chatter. . . . G3NR1 expects to have a sideband set with him on visits to VR5 FU8 and FK8 in that order starting early this month. . . . WA6ZIQ/KH6's Kure flurry and Saipan sideband (KG6S2) ruffled 14-Mc. circles in September. . . . VR2s AP BJ and ES like s.s.b. on the high 14-Mc. end at 0700-0900 GMT. . . . W3ZA, lately heard from DU1-GF, anticipates an early Monaco move. . . . VK4TE isn't saying much yet from Willis. VK8PK pops up with Macquarie on 7020-kc. c.w. at 0730 GMT sometimes, and VK9XI, 14,110 kc. around 1600, remains a fine Christmas present for the ham who wants everything.

SOUTH AMERICA — CX2AM announces the welcome arrival of VP8HY at South Georgia on 14 and 21 Mc., while VP8HU joins the fun from Deception on 40 c.w., 0500 GMT or so. . . . PY1CK tells W8KML there's not much likelihood of a St. Peter and St. Paul's Rocks DX position in view of insufficient anchorage. Any hams in the Brazilian Navy? Sounds like a fine prospective week-end stunt for chopper maneuvers.



OH2BQ/OHØ joined OH2s BH BS and QV in a 4500-QSO DXpedition to the Aland islands in July. All are active from club station OH2AM. (Photo via WA9AXX)



Correspondence From Members -

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

CONTESTS vs. PUBLIC SERVICE

☐ This letter is in reference to the League's recent policy change on contests. With the advent of the shortening of the SS and rumors about changes in the DX contest and CD parties, it would seem that the League is pursuing a policy of reducing contests to nothingness. At the same time, the League is pushing (and to my way of thinking, rightfully so), public service. There seems to be some contradiction here.

While it is true that a contest in itself is not a public service, it is a great way to increase proficiency in the public service vein. I know that personally, I have improved my operating ability many-fold. I feel that each time I sit down at the rig to enter a contest when I finish I will be a better operator than when I started. Is it not true that some of the best traffic men that NTS has are also good contest men? Are these individuals good contest men because they are good traffic men, or are they good traffic men because they are good contest men? I am sure the answer is that they are mutually beneficial. There can be no denying that contests teach people the advantages of break-in, snappy operating, good zero beating techniques and everything else that the League tells us makes good operators. It also teaches us that our 20-meter antenna leaves something to be desired but our 80-meter job really works. It points out deficiencies in equipment and station layout as nothing else can.

Now why is the League policy changing? You cite that W3GRF suggested reducing the SS to one weekend. Is this the real reason? Since when does League policy change at the request of one dues-paying member? I feel the real reason lies elsewhere. There has been growing sentiment against the contest by the type of operator you are trying to discourage! The rag-chewer whose frequency is 3523.4 and "would rather fight than switch". This guy and hundreds of dues paying lids like him are changing League policy. We are not assigned a frequency as KDKA is . . . we are assigned bands. With a little flexibility in our station and in our minds, we can do anything we want to, including carrying on a QSO with the guy down the block, while using our kw . . . even during the SS on an unused frequency.

This letter is to ask you to reconsider. Let's build operating procedure rather than destroy it. Let's put SS back on a two-weekend footing with an option of hours . . . in time for this year's contest. Let's leave FD, the DX contest and the CD parties alone. — *K2KTK*.

☐ In my opinion, the ARRL staff has dealt us a low blow in modifying the Sweepstakes operating schedule. C.w. and phone have been limited to one weekend each under the reasoning that "section leaders almost always take their lead in the first week and with relative positions unchanged at the finish".

Ye gods man, do you think most of us enter the SS with visions of winning or leading our section?

The SS with all its frustrations, excitement and experiences has become a traditional part of amateur radio. Perhaps I have been wrong in feeling that the SS was originally designed to enable amateurs to gain valuable operating experience and savvy which would benefit one and all. Are we to find out at this late date that the ARRL looks upon the SS as merely another scoring battle among the top guns in each section?

Will other popular ARRL-sponsored activities be curtailed in the same manner? Just whose idea was this? — *K8QIIJ*

AND THEN WHAT?

☐ Every few years over the past several decades, correspondence has appeared in *QST* proclaiming there is "Joy in Low Power."

I had hoped that the replies to these articles had sufficiently exposed the contradictions and half-truths presented by these proponents which engage in an emotional tirade against high power but minimize the advantage for reliable long distance communication.

The amateur fraternity does not need a rediscovery of the fact that high power is not necessary. There is a greater need for the progressive amateur interested in improving the state of the art to the best of his ability, rather than one who revives long-buried controversial subjects.

Should we ever be restricted to 250 watts input, we will spawn a new minority who will advocate a reduction of power to 50 watts, using the same arguments presented against a kilowatt. — *W9FHS*

ANYONE LISTENING?

☐ I do not want to sound like I am cutting down anyone, but after being stationed in London, England, for six months, putting in about twenty to thirty minutes a day listening to the bands, I have found that there are a lot of U.S. hams that seem to want to work DX.

They make just one mistake, they seem to call CQ all the time. It seems to me that it would be very simple to work all the DX they want if all they would do is to use their receivers and keep their transmitters off from the start.

Listen, listen, just listen, before you hit the kw.

At times it's so bad on some bands that I think I have a bee in my transducer (loudspeaker). — *K9ZMF*

FOR NO REASON

☐ Recently on 20 mtr. c.w. I have heard Novice stations between 14,080 and 14,100 kc. There is no possible reason why some Novice operators can't control their transmitters. I believe rather than a malfunction of the transmitter, it is the wrong position for the bandswitch. I believe Novices and other operators should remember to check this before transmitting and then the FCC won't have to remind them of it. — *W14TIB*

(Continued on page 148)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr.

ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide

Down the Hudson on Two. "The '64 Albany to NYC Outboard Marathon provided a good AREC training exercise in early summer. Boat Club officials were pleased with the way traffic was handled up and down the Hudson. Our hats are off to our friends in Poughkeepsie and N.Y.C. who did such a fine job. A 7-station net along the 133 mile route to Edgewater N.J. gave race officials amateur radio communications in this event. . . . Our second and fourth Sundays starting Sept. 28 will be RACES training sessions, with regular AREC activities all other Sundays." —*Schenectady Amateur Radio Ass'n News, K2IOW-EC*.

All news of such amateur successes advances a desired good image of the practical operating performance of organized amateur radio. The operations are highly enjoyable; all those served sing our praises. Let us this month look at further ways to extend our performance capabilities.

Needed, More VHF Nets and More Frequent VHF Net Operation. May we also add that we are referring to v.h.f. nets devoted to *traffic and public service!* More complete coverage of counties and communities for disaster needs, civil defense purposes and traffic-communications is called for. Seasonally, v.h.f. can surmount the skip troubles that plague h.f. nets, but the need goes beyond that. SCMs and SECs receiving our October bulletin have been asked to find, appoint, support and extend all v.h.f. net operations. VHF-PAMs to manage and advance such operations are sought, and recommendations for such leader personnel (Techs. or Generals) where posts are unfilled, will be in order.

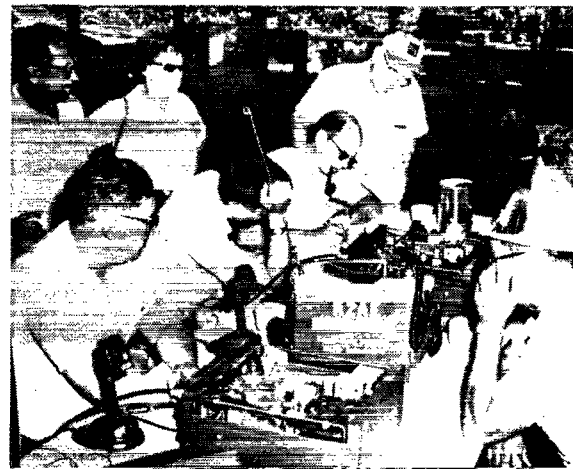
Let us stress the two broad objectives. V.h.f. nets that meet, say, only at weekly intervals are to be asked to step up what they can do to include traffic relaying (if not a present object) and to make their times of meeting three times a week, or even daily. A second important way to make each v.h.f. net more important and potentially useful is to find *at least one* net member operator (and alternate) who can connect up by radio schedule (for each period of your net operation) with the h.f. section net for assured state-wide and national message handling system (NTS) connections.

If you work the v.h.f.'s and can get on a v.h.f. net now or presently to be organized in your ARRL section even once or twice a week (*other* locals can represent your community other days) your SCM will be glad to know about it. He will even give you recognition through ARRL's VHF (Official Experimental Station) Appointment, when you report your netting to him right along. We have successful examples of both east and west coast 6-meter nets going daily, and hope to see many more, and on two as well as six, getting into the traffic and emergency picture.

Case for VHF voiced by North Carolina. For some years there has been a trend to increasing registrations of worthwhile v.h.f. nets. This is borne out by our new Net Directory. But we want especially to invite Technician and General Class, indeed *all* active v.h.f. operators to engage in the fun, fraternalism and challenge of net operating this year for all it has to offer. Net leaders are constantly finding fields for public service participation in demonstrating favorably what such nets can do, too. This is something every amateur can be proud of and share, but only by having a radio part. This develops the skills that make for speed and accuracy and enhances the reputation of the operators who belong, too. North Carolina's successful 'Operation Election' was reported in September *QST*. It was a commendable demonstration of public service, five nets handling 450 election reports. One net on v.h.f. was expressly for the May-June occasion. Wayne Ashworth, K4CDZ, made a newsworthy comment of interest in a late *NON Bulletin*:

"Such an operation on even a larger scale will be held in November. There will probably be worse conditions, long skip, etc. Let us work out v.h.f. back-ups to make sure this job is done well. We should constantly improve our set up . . . In practical terms we can expect mounting emphasis on use of v.h.f.'s not only for this operation, but for public service work in general."

Boat race crew: Schenectady AREC operators; W2EWY foreground, WB2ICP and W2MEK operating the Castleton station (one of seven) handling 2-meter reports in last June's Hudson River boat race. That's K2EJL in the right foreground.



Attention EC's and RO's. We're so sure NCN's Manager is right. Scant need to invite your attention to the need for formation of nets, and their interconnection with other nets for extended coverage as well as training. Can we ask Radio Officers (OCD-DOD) as well as Emergency Coordinators (ARRL) to recognize that just *occasional* roll-calls or radio tests, good as these are, fall short of the training-operating radio work that alone develops each truly capable communications group. It's a good idea to have one or more of your actives reporting on nets beyond your specific local net for the extra connections and knowledge relative to emergency situations as these arise. All v.h.f. equipment set up for AREC/RACES or as a proper side-line in every traffic operator's station — to tie in with 2-meter and 6-meter local nets needs some timely use to keep it ready for local disaster needs, too.

Field Day Review. We couldn't take the space here to mention all that's said about the FD. But we do want to ask all licensed amateurs who went on Field Day if they are signed up in the Amateur Radio Emergency Corps. Each and every locality needs an emergency group, an active one. Each group and individual, we believe, should have a check list, be part of an emergency plan, an amateur radio plan. Being prepared means being signed up; it means more or should mean more than just having an exercise once a year with the club. Concrete, specific plans and arrangements looking to a possible disaster are a responsibility of every ARRL Emergency Coordinator (AREC) and of every Radio Officer (RACES).

If out on this Field Day you no doubt observed a lot of things . . . the operators who clicked off the QSOs expertly, and those that did so slowly or less expertly. Possibly some of your club's operators could *only* assist in the voice operated part of the operations because the FD chairman didn't consider their code adequate.

(1) If you lack identity with a disaster preparedness group, for gosh sakes, drop a line to your EC, SEC or SCM to register with the AREC. If there's no EC, recommend one to your EC. If there is an EC but during most of the year few exercises, ask what is being done not only for some quiet drills in the community plan, but for participation in parade monitoring, work with public service drives (non-amateur groups) and any and all efforts that prove what amateur radio can do and develop skill in meeting very special communicating requirements successfully.

(2) Lack equipment? Plan carefully to have some truly emergency capable items that will best fit in the future. In the meantime get with other prepared amateurs if possible and help in the group effort as you can fit in.

(3) Upgrade your own operating, wherever you find it on the scale of capabilities. Ways to do this? Join in the ARRL section c.w. or phone net. Start some supplementary code copying (W1AW-W6OWP etc.) for a certificate or endorsements. In programming for the club have a

good local man or ARRL official who knows the score invited to give a talk on message form and procedure, to fill gaps in the background of any old or new amateurs in the club.

The Thirty-First "SS". The Sweepstakes, always the League's top activity, continues the invitation to a barrel of operating fun. It is at the same time a test of how well one can operate, and how one's station or new antenna is getting out. The contacts move along at a good clip so everybody likes it. All U.S. and Canadian operators can take part and submit scores.

This year the phone and c.w. sections are held on two separate weekends, 2400 Greenwich Saturday to 2400 Greenwich Sunday, November 15 (phone) and 22 (c.w.). See the full detailed announcement elsewhere in these pages. Let us know how you find it. Best luck and we'll see some of you in the SS!

— F.E.H.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for August Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	281	1915	1697	260	4153
K6BPL	85	1865	1764	101	3815
W6BDR	47	923	911	6	1887
W1PEX	38	779	716	44	1577
WA2RUE	73	748	675	39	1535
WA9CPP	29	776	684	39	1528
W0LGG	75	731	643	51	1500
WA9BWY	15	702	631	36	1384
W3V3	11	573	554	19	1157
K9DHN	120	499	456	9	1084
WA9ECX	208	420	370	7	1005
W8EML	38	546	390	21	995
WB2HLM	56	466	427	17	966
W7BA	6	458	419	36	919
W8UPH	1	373	328	42	753
W2OE	147	276	307	16	746
W2RUE	18	344	244	63	669
K9KZB	20	315	307	8	650
WB2ALF	19	316	307	6	648
W9HAS	23	311	295	11	640
K9VVG	14	324	283	9	640
WA2GPT	66	285	266	15	635
K4PNY	107	261	58	203	629
W6RSY	23	297	204	86	610
W3VR	31	279	242	12	586
K8HLR	26	266	237	37	576
K8NJW	27	268	235	4	564
K9PFC	52	262	234	7	555
WA4BMC	135	184	165	47	531
K4VFX	201	162	150	12	525
W6OHM	8	253	233	30	524
W2CVH	17	239	255	6	517
W8HX	0	256	256	0	512
WA5HNN	76	219	192	18	505
K7TNW	11	248	225	17	501

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W6IAB	510	1540	1254	286	3620
W4PFC	15	378	370	8	771
K2BR	542	0	0	0	542

Late Report:

W4PFC (July)	13	282	280	2	577
--------------	----	-----	-----	---	-----

BPL for 100 or more originations—plus-deliveries

W4RHA 219	WA2QUJ 139	K8JJC 106
W3EW 217	WA2TQT 138	WB2NNA 105
W7APS 178	K3PYS 132	K4COO 102
WA2PJJ 175	WA8GYT 129	W6DTR 102
WA4EYA-4 173	K6GZ 123	Late Reports:
WA4IMC 166	WA9IZR 113	WA2TQT (Ju'y) 248
WA8KUW 152	K9INR 109	WA4EYA/4 (June) 113
W8DAE 145	VE2BEZ 108	WA4IMC (June) 111
	WA8FIC 106	

More-Than-One-Operator Stations

VE3CNE 341	K2US 117
------------	----------

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W1ZLX, W4NML, W4PQP, W4GJR, W4OUK, W4GTAW, W6JCH.

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



DX CENTURY CLUB AWARDS



Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent submissions credited through August 31, 1964.

WIFX 311/337	W8MPW 310/328	W4TM 308/330	W2OKM 306/324	W8PUD 304/321
CX2CO 311/332	W8FB 310/331	W9AIW 308/331	W2FXN 306/320	K2OEA 304/320
W9RBI 311/336	W2LV 310/329	W6BGC 308/328	W2ZWZ 305/328	DJ2BV 304/321
W6CUO 311/336	W9YEV 310/334	W8LKH 308/328	W9SYK 305/323	W5ASG 303/327
W8BRA 311/334	W1ME 310/333	W4AIT 308/331	W1ZW 305/322	W2SAW 303/320
W8JIN 311/336	W2LPE 310/331	W4MLT 308/328	K6ENX 305/322	W5UX 303/318
W4GD 311/332	W1BII 309/333	K2DCA 308/325	W4LYV 305/325	W9KOK 303/327
G4CP 311/335	G2PL 309/332	V57ZM 308/332	K4LNM 305/319	W8IRN 303/321
G3AAM 311/335	W9LNM 309/332	LU6DJX 308/332	W3ECR 305/322	PA0FX 303/323
W2AGW 311/335	W9QVZ 309/330	W6GPB 308/329	5Z4AQ 305/323	W9CIN 302/319
W4DOH 311/335	G3FKM 309/326	W5KCC 308/331	W2LAX 305/322	W3GWH 303/318
W8UAS 311/332	W3JNN 309/333	W1CLX 307/330	W2TVR 305/323	W2FZY 303/316
W8PQO 311/328	DJ1BJ 309/327	HB9J 307/331	W2A YJ 305/324	G3FXB 303/321
W2TQC 311/330	W4OCW 309/326	W6AM 307/332	W4GXB 305/326	W4PLL 303/318
4X4DK 311/329	W9HUI 309/329	W5ABY 307/332	W2GUM 305/322	HB9MQ 303/320
W7GUV 311/334	W8EWS 309/333	W2ZGB 307/323	K2GFO 304/328	W9WVE 303/320
W3GHD 311/335	W5MMK 309/330	W0BFB 307/325	W5ADZ 304/326	K4RID 302/317
KV4AA 310/334	K3UPG 309/333	OE1ER 307/329	W6CYV 304/322	W0PFI 302/316
W1GCK 310/335	W8JBI 309/328	K2BZT 307/324	W4MR 304/324	W8NGO 302/319
P2ZCK 310/333	DL3LI 309/325	W0ELA 307/330	W9AMU 304/321	W4OM 302/324
W9NDA 310/334	W0DU 309/331	W2TUC 307/324	W3GUM 304/326	W5OLG 302/323
W2JIT 310/329	CE3AG 309/333	W3JTC 307/330	W7AG 304/328	W9CIN 302/319
W8KIA 310/334	W3KT 309/333	W0ODF 307/324	W4OPM 304/319	W8RNO 302/320
W3LMA 310/332	W2BOK 309/326	W2UVE 307/325	W0NTA 304/324	W0QI 302/318
W2BXA 310/334	W2ZX 309/328	W8HWG 306/331	W1HZ 304/322	K4AIM 302/316
W2BEC 310/326	W8KML 308/329	G8KS 306/324	G3FY 304/326	K2LWR 302/315
W8DMD 310/332	W7YH 308/331	W7RNV 306/330	W2AFM 304/329	W6WQO 302/319
W7PHO 310/328	W6LY 308/328	W5CKY 306/325	W2HMJ 304/324	W2QHH 302/323
	W7GBW 308/332	W8DAW 306/329	K6EVR 304/321	

Radiotelephone

CX2CO 311/332	W7PHO 310/328	W4DOH 309/331	W3JNN 307/328	W8HWG 302/324
W9RBI 311/334	4X4DK 310/328	W8PQO 308/325	W2JIT 307/324	W4OCW 302/315
P2ZCK 310/333	W8FB 310/331	W8KML 308/329	W2BXA 305/327	I1AMU 302/315
W3RIS 310/335	W1FH 309/330	5Z4ERR 308/330	W9JFF 305/322	W6AM 302/326
W8GZ 310/333	W2ZX 309/328	PY4TK 307/324	W9AIW 304/325	T2HP 301/323
		W6YY 307/327		

New Members

From August 1, through August 31, 1964, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

KP4BEA 247	DL8DX 117	UA1FJ 110	DJ5EO 104	W1QUS 101	K1LDK 100
DJ0IK 244	W5RY 115	WA6TQK 110	D3BV 104	K2VAG 101	W1MRQ 100
DJ3VC 131	SM6AMD 115	V7CX 108	UA3HO 104	W9DOV 101	I1AQB 100
EP2RC 128	SM7ASN 114	Y1BKL 108	W1CSP 103	VE1KS 101	W1R 100
ON4ZY 128	I1DFD 113	SL6AL 105	OH3V 103	F9HM 101	W4GTS 100
W5BZC 124	W9KYK 112	Y3DZ 106	DJ1ZH 102	FO8AA 101	W1YOK 100
VQ2IC 124	Z6BJI 111	WA2RHD 104	IS1SZU 102	SM6ARQ 101	W8AENO 100
OE1KW 118	SV0WAA 110	K4SSV 104	W1TZ 101	YU2BH 101	DJ6FO 100
					G3PJW 100

Radiotelephone

YV5BQF 213	DJ0IK 166	I1DFD 106	DJ2VZ 103	K1IMP 102	WA5EFL 100
DL5AO 166	I1LX 120	K2YLM 103	DL3DX 103	V7CXC 101	J49CQ 100
	K3EIB 114	K4CAH 103	F2JT 103	K3HHY 101	

Endorsements

W9PNQ 313	DL7AP 265	VETPU 220	K8JWC 188	W4OBL 162	K7UCH 140
W3GT 311	DL1AD 261	K2INP 214	IIRC 185	W1BPY 161	K9KGF 139
W2HO 311	K4HYL 260	W8YPT 214	ZL2PM 185	W6BCKS 161	G3JBR 136
W2TP 310	W2GDV 254	CR6AI 214	K1YFQ 183	VE2BCT 161	WA6LBF 131
W9HCR 310	K1BHV 213	K1BVL 213	K0JPL 183	VQ8AI 161	K5AUE 130
W2FUW 309	W2REH 213	W2REH 213	W1LMT 182	W2TOT 160	W3JRE 130
G6XL 303	W1FNQ 250	K1IGO 211	K0JLR 182	W5HP 160	W6YDZ 130
W2BBS 301	SP9RF 250	W6VVR 211	W4ZMC 181	K8AJK 160	VE3DD 130
W6NGA 301	I1KDB 246	W9RDI 210	G3ZY 181	K8BCK 160	OH2NQ 130
W8SSU 300	SP8CK 245	DJ5GG 210	JA1BN 181	K8EHD 160	YO6XI 129
K6VVA 300	DJ5VQ 243	W8GPE 205	W92FMK 180	W1YPH 155	W8AYY 123
C2BQZ 293	K4TKM 241	K8PQC 177	K8PQC 177	L8LGL 154	HK7ZT 122
W2JAE 290	K5FKD 236	K0UKN 202	W5LJT 176	SP9DT 153	W9QON 122
DL3BK 290	K8VDV 230	MP4BBE 201	W1YNP 175	K2LAF 150	W4NTE 120
YV5AB 289	W1CUX 227	K1IMP 200	VQ8AD 175	5A3CJ 150	SM4AWC 113
W1BGW 288	K1DIR 227	W6BNE 200	DJ1WT 173	K4GLA 149	PY2BBO 113
SM5CO 288	W1JG 226	W6GMI 200	WA6NIWG 171	K3ETB 147	W1GAG 111
W4ANF 285	PY1ADA 226	HB9NL 200	V7CFC 170	W4GJ 146	W1JD 111
W8SNL 281	DJ1VS 224	G2AJB 195	W2HUC 169	VK6B 146	W92BAL 110
W2KJZ 277	VE3ADV 222	SP9ADU 194	W3HNL 169	DL7BB 145	W4NTE 110
W9DEI 274	W3DJZ 221	G8FW 191	SP8SZ 166	W4VMS 142	K8WVF 110
I1NK 271	W5CK 220	PY4AP 190	W5MUG 164	W5CYE 141	CE5EF 110
K2JGG 265	W5LEF 220	SP5HR 190	G3OZU 163	KP4BJU 141	XE2OK 110

Radiotelephone

W6QVM 311	W8BRA 251	IT1TAI 215	W3EVW 180	W0YYS 160	LA8LG 131
W9QVZ 310	K8NZD 250	W2YTH 211	VE2MR 180	VE2BCT 157	Y5EFP 131
DL3LR 310	DL3DV 247	W2CT 204	W1RO 176	CX2AY 152	VE6AAV 130
W8JIN 301	I1KIB 246	W2BT 203	V7CFC 170	DL1PM 152	GW3NWX 130
OE1IME 301	K2JGG 243	DL1BK 202	K1DFI 173	VE2AFC 152	W5LEP 121
W8EAP 300	W6QO 243	K9UKN 201	W2GKZ 172	DL3VZ 150	VE6ABP 121
K8RTW 299	K6VVA 240	W2ODO 200	SP8CK 172	OA4KY 150	K2RAP 118
W4SKO 294	W8CUO 230	W2JLH 195	W5BTTI 171	W8SUT 149	K4UAS 116
W3WGH 290	V7GMO 230	W1BR 194	K2OEA 170	DJ5VQ 146	EP2AU 115
W1EFC 289	5Z4AQ 223	W1EFC 192	K2UTC 170	W8BDP 142	9G1AB 114
YV5AB 286	W3DJZ 218	C3BHB 191	W3EYV 170	W1MZZ 140	EB9BR 111
K6LGF 270	I1RB 216	IIRC 192	PY7EC 170	W1MZZ 140	K3DP 110
W1GKK 261	SP9FR 216			W6NGA 132	WA4JOS 110

A.R.R.L. ACTIVITIES CALENDAR

Dates shown are in GMT

Nov. 6: CP Qualifying Run — W6OWP
Nov. 15, 22: Sweepstakes Contest
Nov. 20: CP Qualifying Run — W1AW
Dec. 3: CP Qualifying Run — W6OWP
Dec. 19: CP Qualifying Run — W1AW
Jan. 8: CP Qualifying Run — W6OWP
Jan. 9-10: V.H.F. Sweepstakes
Jan. 16-17: CD Party (c.w.)
Jan. 19: CP Qualifying Run — W1AW
Jan. 23-24: CD Party (phone)
Feb. 4: CP Qualifying Run — W6OWP
Feb. 6-21: Novice Roundup
Feb. 12: Frequency Measuring Test
Feb. 13-14: DX Competition (phone)
Feb. 17: CP Qualifying Run — W1AW
Feb. 27-28: DX Competition (c.w.)
Mar. 13-14: DX Competition (phone)
Mar. 27-28: DX Competition (c.w.)
June 12-13: V.H.F. QSO Party
June 26-27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Oct. 31-Nov. 1, Nov. 21-22: 7-Mc. DX Contest, RSGB (p. 94, last month.)
Nov. 1-5: YLRL Anniversary Party, YLRL (p. 97, last month).
Dec. 5-6: New England QSO Party, Connecticut Wireless Assn. (next month).
Dec. 5-6: 21/28 Mc. Telephony Contest, RSGB (p. 79, this issue).
Dec. 12-14: Virginia QSO Party, Roanoke Valley Amateur Radio Club (p. 88, this issue).
Dec. 13: Tenth Annual Wisconsin QSO Party, Milwaukee Radio Amateurs' Club (p. 94, this issue).

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 Nov. 20 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on 3555, 7080 and 14,100 kc. The next qualifying run from W6OWP only will be transmitted Nov. 6 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 Nov. 20 becomes 2130 EST Nov. 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.

Daily tape-sent code practice transmissions are available

on an expanded basis this season. These start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0230-0320; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0230-0320, 10, 13 and 15 w.p.m. daily from 0030-0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0230-0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230-0320 GMT practice on those dates:

Date Subject of Practice Text from Sept. *QST*

Nov. 2: *It Seems to Us*, p. 9
Nov. 12: *An I.F. Tracking Filter . . .*, p. 11
Nov. 17: *Increasing Power in the V.H.F. Station*, p. 27
Nov. 19: *Organizing Your Local Emergency Corps*, p. 35

Date Subject of Practice Text from *Understanding Amateur Radio, First Edition*

Nov. 25: *Qs of Components*, p. 24
Nov. 27: *Tuned-Circuit Q*, p. 25

W1AW SCHEDULES

Operating Hours

Daily: 2330 to 0530 GMT.

While the reconstruction program is in progress, there is no provision made for visiting of the station. Visitors to the ARRL headquarters building, located on the same premises, are of course welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EST Mon. through Fri. The station will be closed Nov. 26, Thanksgiving Day.

Operating Frequencies

C.w.: 3555 7080 14,100 Voice: 3945 7255 14,280

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

C.W.: Mon. through Sat., 0100; Tues. through Sun. 0500.
Voice: Mon. through Sat., 0200; Tues. through Sun., 0430.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090 21,090 kc.
WIDE-BAND F.M. 52,525, 146.94 Mc.

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, Hawaiian -10, Central Alaska -10.

W1AW NOTE

The ARRL Headquarters Station, W1AW, is still undergoing extensive reconstruction. Operation during this period (2330 to 0530 GMT daily) will be conducted from temporary positions in the basement of the building on a curtailed schedule on 80, 40 and 20 meters only. Full W1AW services will be continued for the transmission of voice and c.w. bulletins, as well as both periods of tape-sent code practice, as noted elsewhere on this page. During most of this period, with the building in disarray as construction progresses, it will not be feasible to invite visitors.

We hope you will bear with us in these slight but necessary inconveniences with the expectation of renewed and extended complete schedules when the changes are completed, from a rebuilt and better W1AW.

THE NEW National HRO-500 synthesized solid state receiver (shortly to be delivered to our dealers) offers its owner a number of unique advantages which will probably not appear for months or years in competitive amateur equipment.

THOSE of our customers who have operated the HRO-500 at hamfests and conventions have some appreciation of its ham-band performance—one kilocycle dial calibration with a 10 Kc per turn tuning rate on each band . . . superb steep-skirted selectivity for SSB, CW and AM, with *Passband Tuning* in the 500 cps and 2.5 Kc bandwidths . . . “Instant-On” stability without tube-type warm-up drift . . . a 50 db *Rejection Tuning* filter that really cuts a hole in a heterodyne . . . and a product detector and AGC system, which, combined with solid state audio, results in the cleanest SSB reception ever available on amateur receiving equipment.

IN RECENT YEARS the only way an amateur might even approach the degree of ham-band performance offered by the HRO-500 was to buy a top-notch ham-band-only receiver. Practical design limitations dictated restricted frequency coverage in order to improve stability and dial calibration. As a result, where formerly a general coverage receiver was the rule, now it is the exception. Many old-timers have forgotten, and most new hams have never experienced, the sheer enjoyment that springs from the ability to receive more than just a few megacycles of the spectrum.

So although the HRO-500 provides dramatically superior ham-band performance as compared to existing ham-band-only equipment, it incorporates a phase-locked crystal frequency synthesizer to provide the same performance from five kilocycles to 30 Mc in sixty electronically bandswitched 500 Kc bands. The spectrum capability enjoyed by the owner of an HRO-500 is almost unbelievable. Not just the HF spectrum from 500 Kc to 30 Mc, but the whole LF and VLF world from 500 Kc down to audio frequencies! The optional LF-10 preselector may be desirable for laboratory VLF work, but a long piece of wire will bring in ship-to-ship CW chatter . . . radio beacons and to-the-minute aviation weather reports . . . high reliability military CW and RTTY communications . . . time and frequency signals from around the world . . . famous NAA . . .

AND in the HF spectrum the HRO-500 owner tunes foreign broadcast stations in the 19 meter band, for example, as easily as standard broadcast stations—at 10 Kc per knob revolution! MARS, press wireless, satellite and Cap-Com signals . . . all with the same one Kc calibration, stability, and over-all performance as on the amateur bands.

THE VHF enthusiast and the experimenter should find the HRO-500 the answer to a prayer—As a tunable IF for VHF converters, or as a “spectrum analyzer” for checking mixer products, birds, harmonics, etc.

THERE really isn't room to remind you of the other features of the HRO-500 that add up to make it years ahead of other equipment—The fact that 5.0 Kc and 8.0 Kc bandwidths are built in as well as the 500 cps and 2.5 Kc bandwidths, or that the entire receiver is solid state and may be operated directly from 12 V.D.C. battery or 115/230 V.A.C. . . . or that sensitivity and noise figure is even better than previous HRO receivers . . . or that an AGC Threshold Control is incorporated to knock out background QRM without destroying AGC action . . . or that one KC calibration marks are $\frac{1}{4}$ " apart . . . or that calibration accuracy is one Kc over the entire tuning range of the receiver . . . or that



National Radio Company, Inc.

• 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 ACMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. The DEPN meets Sat. on 3005 kc. at 1830 local time. The DSMN meets Tue. on 50.4 Mc. at 2100 local time. Renewals: W3EEB as RM; W3RDZ as OO; K3KAJ as ORS. The Delaware State Hamfest at Harrington was very successful and all First State amateurs owe a vote of thanks to the committee for doing an excellent job. At the hamfest the Delaware Field Day Trophy was presented to the 1964 winning club, the Delaware ARC. W3FEG stirred the boys up by putting his K7UGA QSL on the QSL board and had quite a few followers looking for Barry. Prizes at the hamfest went to W3EET, K3PZL, W3UNV and W3GGR. It is with deep regret that I report W3VTG as a Silent Key. We have lost several old-timers lately. Traffic: K3YZF 93, K3OWS 6, W3EEB 4.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ SEC: W3ELL. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SGI, W3SAO. The EPA C.W. Net had QNI 343 with QTC of 291. The PTTN hit a new high in this slow season with QNI of 165 and QTC of 85. K3KBN/3 has been operating from Pine Forest Camp and clearing his camp traffic via K3MYS. W3CUL noted that the Democratic Convention boosted traffic up a bit. Even though the shack was warm, K3RZE had quite a large traffic month. Training net regulars have been W3AZR, K3RZE, W3CBI, K3MHD and W3VAP. A visitor to Coal Crackin' country was W3AXA, who made an official station inspection of this SCM. K3HNP operated from Texas with some very startling results. W3JKX has given up 6 meters for 80, 40 and 10. K3SRQ and K3KNL are completing their final year in radio and TV at the Stevens Trade School. K3RIV is active from the Shavertown area with an Eico 720 and an HQ-170. K3SKZ, now General Class, can be found on 6 meters. The 76ers operate on 50.76 Mc. Tue. at 9 p.m. with K3WEP as NCS. K3JHT is attending the U.S. Naval Training Center in San Diego, Calif. We regret to hear of the passing of K3FSJ, the father of K3NLW. The mobile of W3WJY was redesigned by an YL who didn't know forward from reverse, resulting in bad front-end damage. Some of our appointees we met at the National Convention were W3OY, W3EML, W3BUR and W3FEY. K3SFP added a new dipole for 160 meters and W3AHZ rebuilt his 10-meter vertical. K3LSV has returned from vacation while W3NOH is leaving for his. The new shack of W3EU will be heated with raw a.c. A new club, the Maine Line VFH Assn., W3BKO, reports new officers as W3AES, pres.; K3CEE vice-pres.; K3EJZ, secy.-treas. W3HFY, W3NIP and K3AWC are all sporting new TR-3 sideband units. K3HTZ has started his junior year at Muhlenberg College. The SET will be past history when this report is received. Let's have all ECs comment on their participation as soon as possible. If you held no SET in your area, let's hear from you anyway as to why not. Your new SEC will gladly help if needed. Traffic: W3CUL 4153, W3IVS 1157, W3EML 995, W3VR 586, K3MVO 328, K3MYS 212, K3BHU 155, W3AZR 146, K3MQE 139, K3RUA 84, K3JHF 77, K3KTH 74, W3ZRQ 69, K3HHY 54, W3RV 54, W3ELI 50, K3RZE 45, K3YVG 44, W3VAP 40, K3SFP 37, W3AXA 32, W3OY 26, K3HKW 22, K3HNP 22, W3JKX 20, W3QDW 17, K3HTZ 7, W3BUR 6, K3MNT 3 6, K3KNL 4, W3LXN 4, K3MTF 4, W3BFF 2, K3TYL 2.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, K3JYZ, W3ZNV, W3MCG, PAM: W3RKK.

VIRGINIA QSO PARTY

December 12-14, 1964

All amateurs are invited to participate in the Virginia QSO Party, sponsored by the Roanoke Valley Amateur Radio Club, Inc. Virginia stations are urged to work as many out-of-state stations as possible to permit others to earn credit for the Old Dominion County Award, the Virginia Civil War Centennial Award, and USA-CA.

Rules: (1) Contacts will be made during the 32-hour period from 1800 GMT Saturday, December 12, to 0200 GMT Monday, December 14, (2) No power or minimum time limits. (3) The same station may be worked and counted on different bands and modes. (4) The general call is "CQ Virginia". Virginia stations are requested to identify themselves by signing "DE VA" on CW and "This is Virginia" on phone. (5) Virginia amateurs residing in cities will use their discretion in determining the county they will use in contest exchanges and may use only that county throughout the entire contest period. (6) CW and phone will be considered separate contests and separate logs must be submitted. No distinction will be made between SSB and AM.

Exchanges: Virginia stations will send QSO number, RS/RST report, and county (such as "NR 23 579 ROANOKE"). Out-of-state stations will transmit QSO number, RS/RST report, and state, province, or country.

Scoring: Virginia stations will count one point for each completed contact, including those with other Virginia stations. Multiply this total by the number of states, provinces, countries, and Virginia counties worked to obtain the final score. Out-of-state stations multiply the number of QSO-points by the number of different Virginia counties worked.

Prizes: Highest scoring station in each state, province, and country will receive a certificate. Virginia stations will compete for First-, Second-, Third-, Fourth-, and Fifth-place certificates.

Suggested frequencies are 3575, 3830, 3930, 7030, 7205, 7235, 14,070, 14,250, and 14,340 kcs. Logs, showing dates, times, stations contacted, bands, modes, locations, and final scores, must be received not later than January 15, 1965. Send logs to: Roanoke Valley Amateur Radio Club, Box 2002, Roanoke, Virginia.

The MDD Net meets daily on 3649 kc. at 0000Z; the MDDS daily on 28.1 Mc. at 0130Z; the MEPN M-W-F at 2200Z and Sat. and Sun. at 1700Z on 3820 kc. WN3AF8 is attending Rensselaer Polytechnic Institute and will be active from W2SZ. W3AHQ has been retired from the railroad after 49 years of service. Russ keeps busy on the v.h.f. bands. W3ATQ has been busy this summer but hopes to be back on the MDD this fall. W3CDQ met many old-timers while attending the ARRL National Convention. W3EOW had a wonderful trip through eastern Canada traveling over 3700 miles. W3LDD is EC for Harford County and has things well in hand in case of emergency. K3LLR is giving up operating v.h.f., except mobile, to operate on the lower frequencies and handle traffic. W3MCG had a grand time in the WAE Contest. Karl makes his own typewriter repairs. K3NCQ has a 432-Mc. transceiver. K3NCM reports good activity on the MEPN. The following officers have been elected to run the MEPN: Directors: K3TKJ, W3CQG, K3ZOE and W3LDD as alternate; W3PSP, treas.; W3TFW, secy.; K3NCM, net manager. W3HWZ is trustee to FAR and W3JQN is alternate. W3OHI is moving to Vera Beach, Fla., after living for 53 years in the Washington, D.C., area. K3OSX has a new DX-100. W3PQ has a half-wave antenna up for 160 meters so that he can QSY when the skip is long on the 80-meter band. (Anyone else have an antenna up for 160 for traffic work?). W3QCW has moved to a new location and likes it fine. Thanks, Hugh, for

(Continued on page 92)

#3 IN THE HEATHKIT® SSB SERIES

**SB-200
LINEAR
AMPLIFIER
AT ONLY
\$200⁰⁰**



• 1200 watts PEP SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—antenna relay solid-state power supply • Automatic Load Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit • Circuit breaker protection—no fuses • 120/240 volt operation

Handsomely styled to match the Heathkit SB-300 Receiver and SB-400 Transmitter, the new SB-200 is a completely self-contained desk-top KW Linear that provides globe-circling SSB power at tremendous savings!

Many Advanced-Design Features! Incorporated in the SB-200 is a pre-tuned cathode input circuit for maximum efficiency and low distortion . . . ALC output for automatic exciter control . . . a rugged, well-rated solid-state power supply, protected by circuit-breakers (No fuses to replace or worry about) . . . two heavy duty 572B/T-160-L final amplifiers, fan-cooled for maximum life . . . complete shielding for maximum TVI protection and stability . . . plus a built-in SWR meter and antenna relay for full operating convenience. Antenna is automatically transferred to the exciter when the Linear is switched "off".

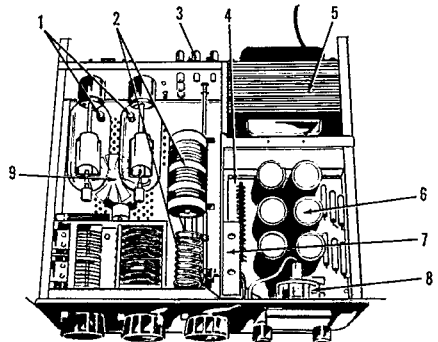
Quality Built Throughout! A heavy-gauge one-piece aluminum chassis, partitioned for extra strength and isolation of circuits . . . use of high quality well-rated components . . . and clean circuit layout all contribute to assure extra years of dependable, trouble-free performance.

Complete Operating Versatility! Compact and lightweight the SB-200 is an ideal companion for the SB-400 Transmitter, the soon to be released SB-100 Transceiver and nearly all other popular SSB & CW exciters in use today! Power supply operates on either 120 or 240 volt power sources for use anywhere. When you go "high power" choose the SB-200 for extra value, performance and dependability!

Kit SB-200, 38 lbs., \$20 dn., \$17 mo. \$200.00

SB-200 SPECIFICATIONS—Band coverage: 80, 40, 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 70 to 100 watts, depending upon frequency. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572-B/T-160-L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.) **Cabinet size:** 14 1/4" W x 6 3/4" H x 13 3/4" D. **Net weight:** 35 lbs.

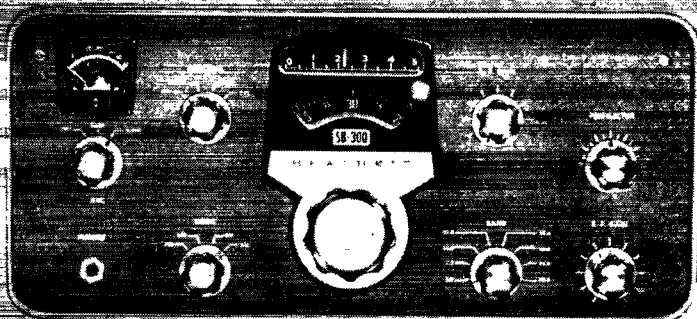
1. Two heavy-duty 572B/T-160-L tubes in parallel 2. Separate pi-network output coils for 80-20 meters & 15-10 meters. 3. Pretuned cathode input circuits 4. Long-life silicon high-voltage rectifiers 5. Conservatively rated 120/240 volt power transformer 6. High capacity (125 mfd ea.) voltage-doubler filter capacitors 7. Two manual-reset circuit breakers for power supply protection 8. Switched panel meter measures SWR, Rel. Pwr., plate current, grid current, & hi-voltage 9. Fan-cooled final amplifier compartment for long tube life.



THIS IS #1 IN THE SERIES

HEATHKIT®
SB-300
SSB-RECEIVER

\$265⁰⁰



- Everything you could ask for in a deluxe receiver and more!
- Complete coverage of 80 through 10 meter amateur bands with all crystals furnished, plus provision for VHF converters
- Crystal-controlled front-end for maximum stability on all bands
- 1 kc dial calibrations—100 kc per dial revolution provides bandspread equal to 10 feet per megacycle—tuning knob to dial ratio approximately 4 to 1
- Provision for transceive operation with matching SB-400 Transmitter
- Pre-built Linear Master Oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly
- Professional styling and features at 60% savings

Good news travels fast! . . . especially on the amateur airwaves! Since its introduction, the Heathkit SB-300 has set the amateur world on its ear as one of the finest values in the industry! Deluxe styling and features now bring you a new dimension in quality, performance and dependability never before thought possible in kit form! . . . and by doing the easy assembly yourself you'll save 60% the cost of comparable units!

Experienced amateurs will quickly recognize the high standards to which this receiver was designed. Its many superb features include a crystal-controlled front-end for optimum stability on all bands, a pre-built Linear Master Oscillator (LMO) for linear tuning with 1 kc dial calibrations, a built-in crystal calibrator, hermetically-sealed 2.1 kc crystal band-pass filter, smooth non-backlash vernier dial mechanism . . . and many, many more! Order yours today!

Kit SB-300, less speaker
 22 lbs., \$27 dn., \$22 mo. \$265.00

SBA-300-1 Optional AM crystal filter
 (3.75 kc) 1 lb. \$19.95

SBA-300-2 Optional CW crystal filter
 (400 cps) 1 lb. \$19.95

Export model available for 115/230 volts AC, 50-60 cps; write for prices.

SB-300 SPECIFICATIONS—Frequency range (megacycles): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3,395 megacycles. **Frequency stability:** Less than 100 cps per hour after 20 min. warmup under normal ambient conditions. Less than 100 cps for $\pm 10\%$ line voltage variation. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** No more than 50 cps. **Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **Modes of operation:** Switch selected; LSB, USB, CW, AM. **Selectivity:** SSB: 2.1 kc at 6 db down, 5.0 kc at 60 db down (crystal filter supplied). AM: 3.75 kc at 6 db down, 10 kc at 60 db down (crystal filter available as accessory). CW: 400 cps at 6 db down, 2.5 kc at 60 db down (crystal filter available as accessory). **Spurious response:** image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Audio response:** SSB: 350 to 2450 cps nominal at 6 db. AM: 200 to 3500 cps nominal at 6 db. CW: 800 to 1200 cps nominal at 6 db. **Audio output impedance:** Unbalanced nominal 8 ohm speaker and high impedance headphone. **Audio output power:** 1 watt with less than 8% distortion. **Antenna input impedance:** 50 ohms nominal. **Muting:** Open external ground at Mute socket. **Crystal calibrator:** 100 kc crystal. **Front panel controls:** Main tuning dial; function switch; mode switch; AGC switch; band switch; AF gain control; RF gain control; preselector; phone jack. **Rear apron connections:** Accessory power plug; HF antenna; VHF #1 antenna; VHF #2 antenna; mute; spare; anti-trip; 500 ohm; 8 ohm speaker; line cord socket; heterodyne oscillator output; LMO output; BFO output; VHF converter switch. **Tube complement:** (1) 6BZ6 RF amplifier; (1) 6AU6 Heterodyne mixer; (1) 6AB4 Heterodyne oscillator; (1) 6AU6 LM osc.; (1) 6AU6 LMO mixer; (2) 6BA6 IF amplifier; (1) 6AU6 Crystal calibrator; (1) 6HF8 1st audio, audio output; (1) 6AS11 Product Detector, BFO, BFO Amplifier. **Power supply:** Transformer operated with silicon diode rectifiers. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{1}{2}$ " D. **Net weight:** 17 lbs.



FREE CATALOG

See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications . . . Send for Free copy!

THIS IS #2 IN THE SERIES



HEATHKIT®
SB-400
SSB
TRANSMITTER
\$325⁰⁰

- Built-in power supply • Complete transceive capability with SB-300 Receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation • Operates SSB (upper or lower sideband) & CW • VOX & PTT control in SSB operation, VOX operated CW break-in using CW sidetone • CW "shift" transceive operation to eliminate transceiver chasing • Crystal controlled heterodyne oscillators • 1 kc dial calibration—100 kc per dial revolution • Dial bandsread equal to 10 feet per megacycle • 500 kc coverage per bandswitch position • Switched 120 V AC for external amplifier antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "low-boy" styling

Here it is . . . the new Heathkit SB-400 Transmitter . . . second in the exciting new Heathkit series of Deluxe SSB Amateur gear! Following the same high standards set by the Heathkit SB-300 Receiver, the new SB-400 Transmitter now offers a matching counterpart that permits complete transceive operation with a host of advanced engineering design features for unmatched performance, versatility and operating convenience!

Unique mechanical design . . . prebuilt Linear Master Oscillator (LMO) . . . built-in heavy-duty power supply . . . sturdy chassis construction . . . beautiful modern styling . . . and power-packed performance are just a few of the many features that make the SB-400 your best buy in an SSB Transmitter! Order yours today for "Deluxe" communications at tremendous do-it-yourself savings! *Kit SB-400 . . . 33 lbs. . . Write for credit details. \$325.00 Export model available for 115/230 volts AC, 50-60 cps; write for prices.*

SB-400 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohm—less than 2:1 SWR. **Frequency range:** (mc) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. **Frequency stability:** Less than 100 cps per hr. after 20 min. warmup under normal ambient conditions. Less than 100 cps for $\pm 10\%$ line voltage variation. **Carrier suppression:** 55 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kc. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **CW sidetone:** 1000 cps. **ALC characteristics:** 10 db or greater @ 0.2 ma final grid current. **Noise level:** 40 db below rated carrier. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** Less than 50 cps. **Oscillator feed-through/mixer products:** 55 db below rated output (except 3910 kc crossover which is 45 db). **Harmonic radiation:** 35 db below rated output. **Audio input:** High impedance microphone or phone patch. **Audio frequency response:** 350 to 2450 cps ± 3 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14 $\frac{1}{2}$ " W x 6 $\frac{1}{2}$ " H x 13 $\frac{3}{4}$ " D.

WATCH FOR THE NEW SB-100 ALL-BAND SSB TRANSCIVEIVER SOON TO BE RELEASED!



- Enclosed is \$265.00 plus postage. Please send SB-300 Receiver.
- Enclosed is \$325.00 plus postage. Please send SB-400 Transmitter.
- Enclosed is \$200.00 plus postage. Please send SB-200 Linear Amplifier.

Heath Company, Dept. 9-11-1
 Benton Harbor, Michigan 49023

Please send Free Heathkit catalog.

Name _____
 (Please Print)

Address _____

City _____ State _____ Zip _____

Prices and specifications subject to change without notice.

AM-147R

an excellent emergency plan for MDD. K3QDD is operating 75-meter s.s.b. mobile. K3RKF received the VITRO LAB Award for his science fair project. K3TJE checked into the MDD Net when he was attending the ARRL National Convention and World's Fair. K3UFV also attended the convention. K3YKC is handling quite a bit of traffic on the 6-meter band. W3ZNV has a new Hornet TB-750 beam ready to go up on his tower. This should increase the activity on the MDD (slow) Net on 28.1 Mc. Traffic: (Aug.) K3QDD 206, K3UFV 163, W3PQ 158, K3GZK 95, K3TJE 48, W3QGW 37, W3AHQ 32, K3YKC 21, W3ATQ 17, K3OSX 15, W3MCG 14, K3LLR 11, W3EOV 9, W3ZNV 2, W3AFS 1, K3NCM 1. (July) K3UFV 176, K3LLV 61, K3KMO 81.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: W2BVLV and W2VAT. NJN Net certificates have been issued to WB2GUK and W2GLW. Southern Counties ARC did an outstanding job handling traffic at the Democratic National Convention in Atlantic City. W2OZQ, Atlantic County EC, reports a total of 542 messages originated, with six operators taking part. W2WLN now has a 500-watt linear. W2XKIP, Trenton, has a new inverted "V" antenna for 80 meters. K2RXB, Margate, again is active on the traffic nets. W2ZI, Trenton, reports a fine turnout at the N.J. Phone Net Picnic at Washington's Crossing State Park. The Net's annual dinner is scheduled for Oct. 24. W2BZJ, Pennington, reports the need for operators at the N.J. State Hq., Wilburthia. If you can help, contact W2BZJ. Gloucester County ARC held its hamfest at Lake Lenape in September. The SJRA's Hamfest will be held at Molia Farms, Malaga. Rancocas Valley ARA's 5th annual radio theory classes started Oct. 4. Classes are held at Willingboro. Contact K2YBN or WB2CRT for information. The Burlington County Radio Club is making plans for the coming fall and winter season. The club meets the 2nd Mon. in Moorestown. We solicit reports from counties not reporting, especially Salem, Cumberland and Cape May Counties. WB2PHV, (ex-W2EUL), Northfield, hopes to form a club at the Experimental Center (NAFEC). Membership is limited to those employed at the Center. Contact WB2PHV for information. Traffic: K2BR 542, W2RG 207, W2WLN 166, W2ZVW 104, W2XKIP 101, K2RXB 53, W2MMD 46, W2ZI 26, W2BZJ 12, K2SHE 8.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PZL. NYS C.W. meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 1800; NYS C.D. on 3510.5 kc. and 3993-kc. s.s.b. at 0900 Sun. and 3510.5 kc. at 1930 Wed.; TCPN 2nd call area on 3970 kc. at 1900; IPN on 3980 kc. at 1600; 2RN on 3990 kc. at 0045 and 2345 GMT. The NYSPTEN held its picnic in St. Lawrence State Park. NYS C.W. held its in Van Etten at the QTH of K2RYH. W2RUF reports over 70 present, including WINJM, W2EFU and many other notables in traffic circles. The picnic lasted three days, a regular hamfest—hi. NYSUN now has 42 counties with 60 members. Glad to report that W2FEB has recovered from a stroke. Sixty 2-meter f.m. commercial rigs were acquired in Erie County area at a real low price through the auspices of W2EUP and K2HUK. Tune 146.94 in that area for almost constant activity. WB2KQI and K2MQN were appointed OPSs and RACES are readying for Hurricane Dora, another fine example of the service many hams perform unselfishly through organized net activities. Are you registered with your local group? K2MDS reports that ATY is gaining in Genesee County with three rigs operating. WB2KNJ will be operating W2TAB at college. WA2BFE is 6-meter s.s.b. with a 10B and Heterodyne unit. WB2FSA has a new 54-ft. tower. WA2NAC is at Alfred Tech. W2MTA is moving back to our area. W2VLE will attend UB. The Southern Cayuga County ARC has formed the SCC V.H.F. Drag Net, which meets Tue. at 2100 on 50.160 Mc. WB2IPX is net director, using the club call WB2NOD/2. The RAGS had its usual station in operation at the New York State Fair in Syracuse using the call W2AE/2. WA2SNV, WB2CIP, W2YRL and K2KJZ donated equipment and arrangements were made by W2A2QG. *Club editors attention:* Please include calls of members if you want news items lifted for this column. Congratulations to BPLers W2OIE, W2RUE, WB2NA and W2GVT. Traffic: (Aug.) W2OE 746, W2RUF 669, W2GYH 517, WA2KQC 300, WB2CAL 220, W2HYM 128, WB2NNA 105, K2JBX 58, W2FEB 43, K2OFV 42, W2FCG 40, W2TVI 40, K2MLI 32, WB2HSK 31, WB2DPR 22, WB2FPG 22, K2RYH 20, WB2FKY 16, W2RQF 16, WB2DGV 15, W2DVI 12, K2HOH 10, WB2JCE 10, K2BWK 9, W2PNW 8, W2EMW 5, WB2JIF 4. (July) W2FEB 119, WB2NNA 23.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3LIV. PAM: W3TOC. RMs: W3KUN, K3OOU, W3NUG. The WPA Traffic Net meets Mon. through Fri. at 0000 GMT on 3585 kc. The

Keystone Slow Speed Net, under the able guidance of K3OOU, operates Mon. through Fri. at 2330 GMT on 3585. We need Emergency Coordinators in many counties throughout our section and a card or letter to SEC W3LIV or your SCM will bring further information. A big vote of thanks to Tony for a good job done while he was SCM of Western Pennsylvania. K3PYS had a remarkable 170 consecutive QNTs into the WPA Traffic Net before vacation came along to break his string. He also made the BPL in Aug. K3PYJ is enjoying s.s.b. operation with a new Drake transmitter. W3KPI plans a new 80-ft. tower and beam. Congrats to the Foothills Radio Club, Inc., on ARRL affiliation. A new tower and beam also are in the works at K3DWW's QTH. Kudos to the Radio Assn. of Erie on its code and theory classes. K3BOZ is home on leave from the service. K3ZMH has gone to s.s.b. with an HX-50 and product detector in his 75A-1. W3OJZ plans 2-meter activity with an SCR-522. Work on 432-Mc. equipment continues at W3ZZO. K3ELL is acting EC because of the absence of K3IML. W3QCN married his YL to the son of W3IMF. W3TAW is NCS for the Horseshoe Radio Club AREC Net. W3TFU is conducting Spanish lessons on 29 Mc. W3RSB enjoyed a visit to the new ARRL Headquarters and was impressed with what he saw. The shack of the Nittany Amateur Radio club is nearing completion. W3WPF departed W3-Land for Kansas. K3AKR and K3CFA are ready to track the new Oscar Satellite when it is finally launched. K3BDI and K3BWI passed out cigars for new sons. K3OFB operates from a hospital bed on 29 Mc. with an HE-50A after his accident. K3YPI says he will have to give up his shack as his YXL is studying code. W3LOD has a new SB-300 receiver. The Fort Venango Mike and Key Club took part in Oil City's All-American City Week festivities. K3FFJ is a new OO. K3YPI received the Keystone Award. W3RTB has gone s.s.b. with a homebrew exciter and W3CRA has followed suit. Does your license expire soon? Renew. The Western Pennsylvania Mobiles Fall Round-Up will be held Oct. 23 in the Thad Stevens Fire Hall on Robinson Blvd. and Frankstown Rd. Traffic: K3PYS 298, W3KUN 190, K3OOU 133, K3PIE 59, W3UHN 34, W3LOD 30, W3YI 17, K3ZMH 17, K3SMB 15, W3GJY 12, W3KWO 10, K3VAR 9, W3LOS 7, W3SMV 6.

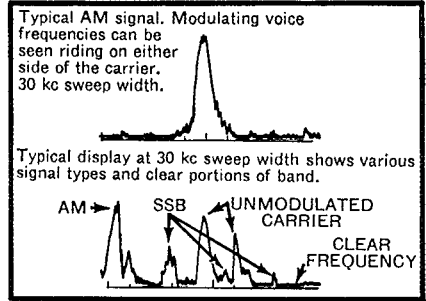
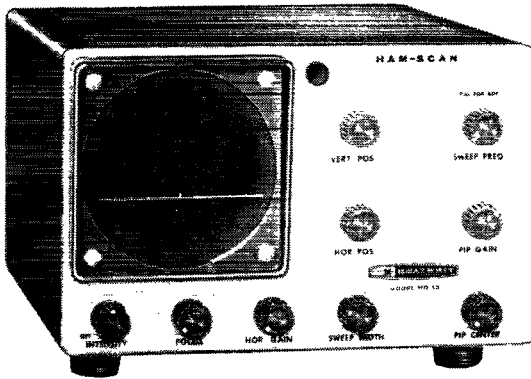
CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9USR. PAM: W9VWJ. Cook County EC: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. K9DRS has a new Cheyenne and is bringing in DX. The new EC of Henry County is K9PXC; he succeeds W9IDA who held this appointment for many years and now has retired from this post. W9EYT has gone RTTY. W9AFO has finished a home-brew kilowatt linear on 2 and 6 meters. W9BOD, K9BDJ, K9ZOO and K9KLL have built new transistorized 6-meter equipment. K9POX and his YXL had their second harmonic on Aug. 31. W9AKV's new QTH is Palo Alto, Calif. This column has received numerous advance notices in regard to the various clubs in this section sponsoring code and theory classes in the coming months. For those interested in such courses, it is advisable that the local radio clubs be contacted for this information. The 9RN had a traffic count of 528 messages. K9UIY was appointed as a new OBS. New s.s.b. stations on 2 meters with Gonset Side Winders are W9ADMU, K9QXK and W9AYP. W9DQY, K9RVG, K9PRB, W9OEQ and W9ADOT hold nightly s.s.b. 145.05 sessions. K9RVG has left for a vacation in Ireland. K9QGR became a great-grandmother, and was the first queen crowned at the Breakfast Club Picnic this year. K8KPS was crowned king at this same event sponsored by the Quad County Radio Club. W9ALHW, K9HRC, K9QGR and W9VHD are new officers of the DeWitt County Amateur Radio Club. W9NMOG is a new Novice call. W9JPU's new QTH is Chicago. The Peoria Area Hamfest was well attended and an FB time was had by all present. Many from 9-Land were seen at the National ARRL Convention held by the Hudson Amateur Radio Club in New York City. A capacity crowd attended the final night's banquet. ARRL President Herbert Hoover, Jr., and Barry Goldwater were featured speakers. All-in-all the three-day event was one successful session after another. K9BTE reports that the North Central Phone Net handled a traffic count of 1352. Traffic reports were sparse this month because of many vacation schedules but W9ACCP, K9KZB and W9HAS managed to receive the BPL award. Traffic: W9ACCP 1528, K9KZB 650, W9HAS 645, K9FBB 378, K9BTE 96, W9AKV 89, K9CYZ 65, W9AJF 21, W9JXV 20, W9PRN 6, W9QQG 6, W9IIP 2, W9LNQ 2, K9RAS 2.

INDIANA—SCM, Ernest L. Nichols, W9YXX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. PAMs: K9CRS, K9GLL, K9IVG. RMs: W9TT, W9DGA. Net skeds in GMT: IFN, 1330 daily and 2300 M-F on 3910

(Continued on page 94)

WATCH IT!... WITH THE



NEW HEATHKIT® "HAM-SCAN" SPECTRUM MONITOR

What many hams have been asking for to supplement their Heathkit HO-10 Monitor Scopes!

Another Heathkit First! The new Heathkit "Ham-Scan" is the first *low-cost* spectrum monitor in kit form and an extremely useful accessory that will greatly increase the versatility and enjoyment of amateur radio operation.

Monitors band activity! With the Heathkit "Ham-Scan" you can visually monitor up to 100 kc of frequency spectrum centered on the frequency to which you are tuned, eliminating "hunting" or unnecessary tuning across the dial to monitor band activity. All signals appearing up to 50 kc on either side of the frequency to which you are tuned are displayed on the screen of the cathode-ray tube as vertical pips. As the receiver is tuned, the display moves horizontally along the baseline with the signal you hear always appearing in the center of the screen.

Identifies signal types. SSB, AM & CW signals are clearly identified with the "Ham-Scan" even though they may be up to 50 kc away and clear portions of the band are easily identified without continuous tuning. It will also prove useful in spotting both phone and CW DX stations operating off your frequency and is invaluable during VHF band openings. Also checks carrier and sideband suppression

of SSB transmitters and aids in identifying "splatter-ig" received signals.

Operates with all receivers. The Heathkit "Ham-Scan" may be used with virtually all receivers in amateur service today. Parts and instructions are included to match your receiver's I.F. frequency (see specifications). Retaining these few extra parts means your Heathkit "Ham-Scan" will not be obsoleted should you purchase a new receiver.

Order now! Be one of the first to enjoy the many advantages of this most-requested "Ham" accessory! Place your order now with the handy coupon below.

Kit HO-13... 11 lbs..... \$79.00

SPECIFICATIONS—Receiver IF: 455, 1600, 1650, 1681, 2075, 2215, 2445, 3000, 3055, 3395 kc. **RF Amplifier—Response:** ± 0.5 db at ± 50 kc from receiver IF. **IF—350 kc.** **Sensitivity:** Approx. 100 uv input for 1" vertical deflection at full gain setting. **Horizontal deflection—Sweep generator:** Linear sawtooth, recurrent-type (internal). **Frequency:** 10 to 50 cps, variable. **Sweep width:** 30 kc or less, to 100 kc $\pm 20\%$. Continuously variable. (Approx. 15 kc to 100 kc for 455 kc IF). **Resolution:** 1.5 kc (frequency difference between two 1" pips whose adjacent 3 db points coincide. Measured at slowest sweep speed and at 30 kc sweep width). **Power supply:** Transformer operated, fused at $\frac{1}{2}$ ampere. **Low voltage:** Full wave voltage-doubler circuit provides 250 volts @ 20 ma, & 580 volts @ 6 ma. **High voltage:** Half wave circuit provides —1600 volts @ 1 ma for CRT. **Power requirements:** 120 volts AC, 50/60 cps, 40 watts. **Tube complement:** 3RP1 CRT (medium persistence green trace), 1V2 HV rectifier, 6AT6 detector, 6EW6 RF amplifier, 6C10 sweep generator/horizontal amplifier, (2) 6EW6 IF amplifier, 6EA8 Oscillator/mixer, (4) 500 ma silicon diode low voltage rectifiers, crystal diode, IN954 voltage-variable capacitor. **Controls:** On-off/intensity, gain, horizontal gain, sweep width, pip center, horizontal position, pip gain, vertical position, sweep frequency/AGC, astigmatism. **Dimensions:** $5\frac{1}{2}$ " H x $7\frac{3}{4}$ " W x 11" D.



FREE 1965 CATALOG
See these and over 250 other exciting Heathkits available in easy-to-build kit form. Save 50% or more by doing the easy assembly yourself! Send for your free catalog today!

HEATH COMPANY, Dept. 9-11-2
Benton Harbor, Michigan 49023

Enclosed is \$ _____, plus postage.

Please send model(s) _____

Please send Free 1965 Heathkit Catalog.

Name _____

(Please Print)

Address _____

City _____ State _____ Zip _____

Prices & specifications subject to change without notice.

AM-139

kc. ISSN, 0030 daily on 3920 kc. QIN, daily at 0000 and RFN at 1200 Sun, on 3656 kc. New appointments: K9BSL as EC of Laporte Co., W9FYC as OBS, WA9IZR as ORS. BPL winners: WA9BWW, K9DHN, WA9ECX, K9IVG and WA9IZR. QIN honor roll: K9VHY, K9HYV, K9DHN, WA9IZR, W9TT and W9ZYK. Good luck to K9DHN, who is going to Purdue. W9TT is now RM of QIN as well as RFN. K9BSL is now heard from Laporte. W9FVR hopes to operate from Germany. WA9BWW and WA9IZR received 9RN certificates. WA9BGI enjoyed a 6-meter rig on vacation in Minnesota. The old-timers booth was popular at the Delaware ARA Hamfest. The Tri-State ARS Hamfest featured a left-foot sending contest. The Elkhart ARC meets the first Wed. of each month at the Red Cross Building. The Bloomington ARC meets the first Fri. of each month at the Civil Defense Building. W9AB has added 2 meters to its OBS schedule. *Amateur Radio exists because of the service it renders.* August net traffic: ISN 443, IFN morn. 689, IFN eve. 125, QIN 147, RFN 50, Hoosier V.H.F. 41 and 9RN 528, with Ind. represented 100%. Traffic: (Aug.) WA9BWW 1384, K9DHN 1084, WA9ECX 1005, K9IVG 640, W9AIM 291, WA9IZR 285, WA9DFQ 195, W9TT 152, W9QLW 126, W9ZYK 115, WA9CVG 77, WA9CJR 61, W9CC 59, W9YXX 54, W9BQ 44, K9CRS 37, W9RZ 33, K9RWQ 30, K9MAF 25, W9DGA 24, K9VHY 24, K9QVT 19, W9FZW 18, W9RTH 16, K9FHQ 14, W9FWH 12, K9LKL 10, W9YEW 10, WA9AXF 8, W9DZC 8, W9BDP 6, WA9BGI 6, W9DOK 5, K9UEO 4, K9KTL 3, WA9DXY 2, W9JSV 2. (July) WA9ECX 99, W9VAY 67.

WISCONSIN—SCM, Kenneth A. Ebner, K9GSC—SEC: W9BCC. RM: W9IQW. PAMs: W9NGT, W9NRP and K9IMR. Nets: WIN, on 3535 kc. daily at 0045Z; BEN, on 3950 kc. daily at 2400Z, W9BN, on 3985 kc. daily at 2315Z and SWRN, on 50.4 Mc. Mon. through Sat. at 0300Z. New appointments: WA9FMQ as OBS, W9PYM as EC for Ozaukee County, WA9AVS as OBS. Renewed appointments: W9EWC, W9QIX, W9SZL and W9AJU as ECs; K9IMR as PAM; W9CXY, K9GIDF and K9GSC as ORSs. Net certificates were issued to WA9CUY for BEN, K9QKN and WA9IVH for W9BN, WA9AKE for CAN and K9WIE for 9RN. A BPL certificate for Aug. traffic went to K9IMR. WA9FMQ received his WAC award. K9YBC and K9WIE received their DXCC awards. New officers of the BARS (W9YT) are WA9BZY, pres.; K9ZMS, vice-pres.; K9GMP, secy.-treas.; and K9AEP, chief engineer. W9CCO is off to Iowa and K9ELT to California for further studies. W9UJF celebrated his 25th Jubilee as an ordained priest. K9ERZ has a new Heath 75-meter transceiver. W9NKG, W9NWLJ and W9NMMK held a late field day of their own. Net reports: BEN, 116 offered, 64 cleared in 22:24 by 742 check-ins; WIN, 64 offered, 41 cleared in 9:02 by 178 check-ins; W9BN, 585 offered 484 cleared in 25:25 by 1196 check-ins. Traffic: (Aug.) W9CXY 404, K9IMR 381, W9DYG 282, W9IQW 43, K9GDF 34, W9CBE 33, K9HJS 31, K9GSC 27, K9DYG 25, W9HWQ 22, WA9NIN 13, W9OTL 12, W9VAJ 12, WA9EDZ 9, W9ONI 9, W9FNT 7, K9DBR 3, W9UEB 3, K9FPM 2. (July) W9YT 17, K9HJS 14, K9FPM 4.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Meidrich, W9OPX—Asst. SCM: Herman R. Kopschke, Jr., W9TCK; SEC: W9CBZG. RMs: WA9EPX, K9JFJ. PAMs: K9FLT, K9VPI, M9SSB. PAM: W9HEN. Appointments issued: WA9IAW and WA9FCJ as ORSs; WA9CQG as 6-meter PAM. Endorsed: K9LJU and W9RA as ORSs; W9HEN as PAM; W9YHR as OPS. The Rochester ARC provided communications for the Explorer Canoe Derby with 13 members participating. K9PSH is building an emergency mobile unit in a panel truck. Several members of the Rochester ARC are grinding lenses for home-brewer telescopes. W9OPX and family were hosts to W9THY and K9RSJ, who camped for two days and visitors W9OJK, K9ERQ and W9OJG. New St. Paul Novice W9OJTT will operate 40 meters. EC K9MEQ is active in the Pico Net. W9OPX and W9RIQ enjoyed the St. Cloud and the Duluth Picnics, also a visit with OPS W9AIO and family. Congrats to newly-married K9ISV and XYL Sharon. K9JTA is enrolled in Aviation Electronic School in Memphis, Tenn., is operating Navy MARS and would like 40-meter contacts with old friends using W4ODR as his call. College-graduate ex-EC K9MAH will teach German and English at Mountain Iron High School. ORS and MSN NCS W9ISJ is now with E. F. Johnson Co. ORS WA9FCJ is NCS on M/JN and MSN and was acting RM for M/JN while RM WA9EPX vacationed. OPS WA9EDN has a new MSPN net certificate. OBS/ORS W9KJZ has renewed interest in TEN and CAN liaison and was visited by Fr. Mark, K9ERZ and W9HXR, who wants 6-meter contacts with the Twin Cities. V.H.F. PAM/OBS WA9CQG and W9IRO are

WISCONSIN QSO PARTY

December 13, 1964

All Wisconsin amateurs are invited to take part in a QSO party, sponsored by the Milwaukee Radio Amateurs' Club in order to promote friendship and operating ability within the section.

Rules: (1) The tenth annual party will begin at 1600 GMT and end at 2259 GMT Sunday, December 13. To facilitate log checking, the use of GMT is requested of all contestants. (2) The general call will be "CQ WIS". (3) Exchange will consist of a "QO number" (starting with number 1), RS or RST report, county and operators name. You are *not* required to give time over the air. (4) Logs must show time of contact, station worked, signal reports sent and received, band, type of emission, power input, QSO numbers sent and received and name of operator and name of county worked. You may use log sheets from the ARRL log book or request special log forms from the contest chairman who will mail them to you on receipt of a S.A.S.E. (5) You may operate on either CW or Phone, but not both, unless you submit separate logs. CW to PHONE contacts will *not* be permitted and crossband contacts are *not* allowed. To encourage the use of bands other than 3.5 to 4 mcs. and to enable you to increase your score, you may work the same station once per band. (6) Scoring: Each message sent and acknowledged will count one point and each message received will count one point, for a maximum of two points per contact. Each Wisconsin county counts as a multiplier and to obtain your final score, multiply your total contact points by the total number of band counties worked. Only QSOs with other Wis. hams count, and the log entries must be complete. Any violation of the contest rules or F.C.C. regulations may result in disqualification. (7) Send logs, postmarked not later than Dec 26, 1964, to Russell E. Burss, W9RKP, 6285 S. Baas Dr., New Berlin, Wis. The decision of the Contest Committee will be final in judging of logs received. Suitable awards will be given to the 1st, 2nd and 3rd place winners for CW only. Phone only, Mobile and Novice entries. Mark your calendar now for December 13. Get on the air during the contest period and see how many Wisconsin stations you can work. Meet the gang and have fun with "CQ WIS".

working hard to establish a 6-meter silent net. They urge your participation on 50.25 Mc. Traffic Keys: W9TYP, of Baudette, and W9DFN, of Dexter. Traffic: (Aug.) W9RA 172, WA9IAW 76, W9KJZ 71, WA9DSH 59, WA9FCJ 58, W9HEN 54, K9VPI 37, K9FLT 33, WA9ACI 28, K9YJ 26, K9KZK 26, W9ATO 22, W9LIG 22, W9OPX 20, WA9EDN 19, WA9DXX 18, WA9AAM 15, K9IKU 15, WA9HMV 12, W9MXX 12, K9LJU 11, K9ISV 11, K9LWK 11, W9RIQ 11, K9UBA 11, K9ZRD 11, W9OMX 10, WA9BZG 9, K9MIA 9, WA9CAE 7, WA9DFT 4, W9KYG 4. (July) W9ATO 24.

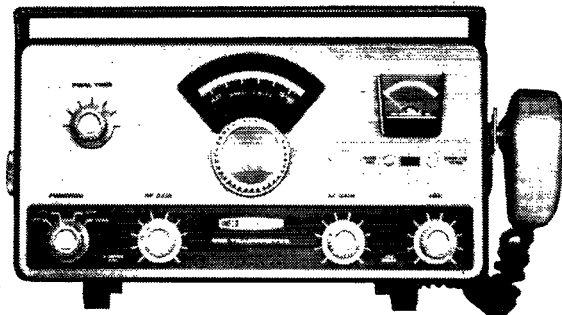
NORTH DAKOTA—SCM, Harold A. Wengel, W9HVA—SEC: W9CAQ. PAM: K9TTY. Net report for the month of Aug.: The North Dakota 75-Meter Fone Net held 22 sessions with a total of 253 check-ins, a maximum of 21, minimum of 8, and handled 9 formal and 17 informal pieces of traffic with 2 relays. As always there is nothing to report from the North Dakota Section. My thinking is that the amateurs in this state don't do very much or they don't want it known. Traffic: (Aug.) K9ITP 52, K9GGL 5. (July) K9ITP 35.

SOUTH DAKOTA—SCM, J. W. Sikorski, W9RRN—Asst. SCM: Jene H. Melton, WA9DEM. SEC: W9SCT. RM: K9GSY. WA9KZQ, formerly of Savanna, Ill., now is WA9JUM at Mohrville, where he works for Milwaukee R.R. He operates a DX-100 and an HQ-100. His daughter is W9JXH. Sixty-four amateurs registered at the Mitchell ARC's successful picnic Aug. 30. WA9CWW and WA9CWX have a new jr. operator—it's a boy. W9CUC, K9WPC and W9IQI have returned to Sioux Falls from summer's work with the Raven Industries balloon-launching crew at Fort Churchill, Manitoba. Traffic: K9GSY 117, W9SCT 93, K9NRR 82, K9VY 45, WA9AOY 24, WA9FPR 23, K9ZBJ 13, W9DII 10, WA9FUZ 7, K9ZFW 7, W9CVZ 6, K9CXL 4, K9TXW 3, K9KOY 2, W9GG 1.

(Continued on page 100)

Big in Power and Popularity

Little in Size and Cost



Heathkit Single Band SSB Transceivers... \$119.95

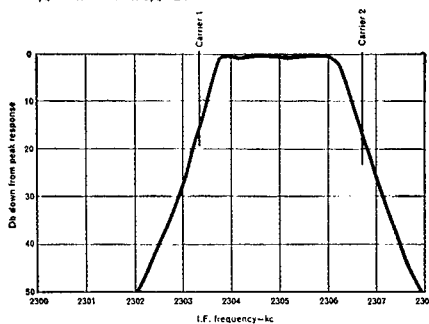
It's easy to see why the new Heathkit SSB Single Band Transceivers are heard so often on the air today—in both fixed and mobile operation! They are compact (less than 1/2 cubic foot), lightweight (only 12 lbs.), loaded with versatile features and pack more input power-per-ounce than any other comparable unit (200 watts PEP). And best of all you save two thirds the cost of three band units by buying only the band you need. Assembly is a marvel of simplicity (only 15 hours) with over 90% of the components mounted on a heavy-duty circuit board. The rugged one-piece steel chassis is welded and braced to withstand plenty of abuse . . . dependable operation with maximum stability. Choose 80, 40, or 20 meter models, or all three, now and enjoy versatile, power-packed performance at lowest cost!

Check These Features!

- True Transceiver for one-band, one sideband operation
- 200 watts PEP RF input
- Crystal filter type SSB generation
- Automatic level control
- PTT and VOX circuits built-in
- Low frequency VFO (1.5-1.7 mv) for greater stability
- 2 kc dial calibration
- 6" of band-spread
- Vernier tuning
- Provision for operation with Linear Amplifier
- Fast, easy, circuit board assembly
- Complete with one-piece steel cabinet and "gimbal" mounting bracket.

- Kit HW-12, 80-meter (LSB) . . . 15 lbs. \$119.95
- Kit HW-22, 40-meter (LSB) . . . 15 lbs. \$119.95
- Kit HW-32, 20-meter (USB) . . . 15 lbs. \$119.95
- Kit HW-42 (all 3 models) 45 lbs. . . Save \$39.85. . . \$320.00
- Kit HP-13, DC power supply. . . 7 lbs. \$59.95
- Kit HP-23, AC power supply. . . 18 lbs. \$39.95
- GH-12: Push-to-talk microphone. . . 2 lbs. \$6.95
- Kit HR-10A: Plug-in 100 kc crystal calibrator. 1 lb. \$8.95

SPECIFICATIONS—RF input: 200 watts PEP. **Sideband generation:** Crystal lattice bandpass filter method. **Stability:** 200 cps per hour after warm-up. **Carrier & unwanted sideband suppression:** 45 db. **Frequency coverage:** HW-12, 3.8-4.0 mc; HW-22, 7.2-7.3 mc; HW-32, 14.2-24.35 mc. **Receiver sensitivity:** 1 uv for 15 db S + N/N ratio. **Receiver selectivity:** 2.7 kc @ 6 db, 6.0 kc @ 50 db. **Output:** 50 ohm fixed (unbalanced). **Operation:** HW-12 & HW-22, LSB; HW-32, USB. **Audio output:** 1 watt @ 8 ohms. **Mike input:** Hi-Z. **Panel controls:** Frequency, final tune, function (OFF-PTT-VOX-TUNE), RF gain, AF gain, (pull for crystal calibrator), VOX gain, meter. Front panel screwdriver adjust for S-meter and VOX delay. **Rear panel controls:** Mike gain, tune level, final bias. **Tube complement:** Fourteen tube heterodyne circuit; (3) 6EA8's mic. amp., VOX relay amp., IF amp., RF amp., Rcvr. mixer; (5) 6AU6's, VFO, VOX amp., IF amp., Xmt. mixer; (1) 6BE6, VFO isolator (HW-12), Het., Osc. and mixer (HW-22 & HW-32); (1) 12BY7, Driver; (1) 12AU7, Xtal osc. product det.; (1) 6EB8, Audio amp. and output; (2) 6GE5 RF output. **Power requirements:** 800 VDC @ 250 MA peak, 250 VDC @ 100 MA, -125 VDC @ 5 MA, 12 VAC or VDC @ 3.75 amperes. **Cabinet dimensions:** 6 1/2" H x 12" W x 9 1/2" D.



A "pre-designed" full lattice crystal filter provides selectivity and unwanted sideband suppression comparable to the most expensive transceivers. Note the narrow bandpass (2.7 kc at 6 db), steep skirts (6.0 kc at 50 db), and low passband ripple (less than 1 db).



HEATH COMPANY, Dept. 9-11-3, Benton Harbor, Mich. 49023
In Canada: Daystrom, Ltd., Cooksville, Ont.

- Enclosed is \$ _____ plus postage.
- Please send model(s) _____
- Please send Free Heathkit Catalog.

Name _____
Address _____ Please Print
City _____ State _____ Zip _____

Prices & specifications subject to change without notice.

AM-145

HEATHKIT 1965



FREE CATALOG

Fully describes over 250 different Heathkit products at savings of 50% or more! See the complete line of "Mobile" and "Fixed Station" amateur gear plus many others. Send for your free copy today!

4 NEW THUNDERBIRD 4 TRIBANDERS FOR 10, 15, 20 M

Famous Hy-Gain Thunderbird Tribanders have been improved...to give you even greater total performance. Each new Thunderbird is equipped with separate new Hy-Q Traps for each band—to give you peak performance on each band whether working phone or CW. New advanced design Beta Match insures optimum transfer of all available energy—allows precision broadband matching and a high degree of electrical and mechanical reliability...comes to you completely factory pre-tuned. Mechanically, new Hy-Gain Thunderbirds are rugged...large diameter, heavy gauge aluminum boom...taper swaged seamless aluminum elements...heavy gauge, machine formed boom to mast and element to boom brackets...non-corrosive full circumference compression clamps at tubing joints. They're available in four models...

1 ALL NEW 6-ELEMENT THUNDERBIRD DX MODEL TH6DX

Superb DX performance. Features wide spaced elements on a 24 ft. boom. New Hy-Q Traps provide true full-sized performance. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 1.5:1 on all bands. Longest element, 32 ft.—weight, 47 lbs. Model TH6DX, \$139.95 Net.

2 NEW, IMPROVED 3-ELEMENT THUNDERBIRD MODEL TH3Mk2

Outstanding performance on 10, 15 and 20 meters. Separate and matched new Hy-Q Traps for each band. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 2:1 on all bands. Boom length, 14 ft. Longest element, 26 ft. Weight, 36 lbs. Rotates with heavy duty TV rotator. Model TH3Mk2, \$99.75 Net.

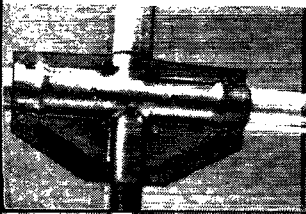
3 NEW, IMPROVED 2-ELEMENT THUNDERBIRD MODEL TH2Mk2

Compact...installs almost anywhere...delivers excellent performance. Features new Hy-Q Traps. Feeds with 52 ohm coax—Beta Matched for maximum gain. Rugged lightweight construction compatible to rotating with standard TV rotator. Boom length, 6 ft. Longest element, 26 ft. Weight, 21 lbs. Model TH2Mk2, \$69.95 Net.

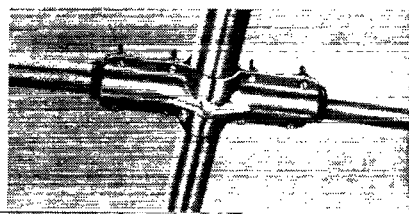
4 IMPROVED 3-ELEMENT THUNDERBIRD JUNIOR MODEL TH3JR

A compact 3-element beam that delivers outstanding performance. Up to 25db f/b ratio. SWR less than 2:1 at resonance. Hy-Q Traps—Beta Match—seamless heavy gauge aluminum construction. Rotates with standard TV rotator. 12 ft. boom. Longest element, 27'6". Turning radius, 15'11". Model TH3JR, \$69.95 Net.

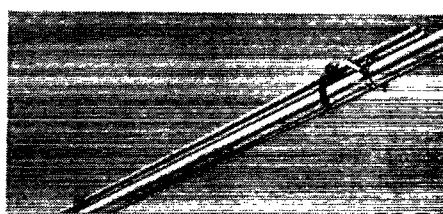
THUNDERBIRD
Boom to Mast Bracket



THUNDERBIRD
Driven Element to Boom Bracket



THUNDERBIRD
Beta Match



2 NEW MULTI-BAND TRAP VERTICALS from Hy-Gain

- New Hy-Q Traps
- New 12" Double-Grip Mast Bracket
- Taper Swaged Seamless Aluminum Construction

HY-GAIN'S MODEL 14AVS, the world's most popular Ham antenna, has a new, improved successor...the Model 14AVQ. Three separate new Hy-Q Traps...completely factory pre-tuned...provide peaked performance on 10 through 40 meters. Outstanding low angle radiation pattern for DX. New 12" double-grip mast bracket insures maximum rigidity whether roof-top or ground mounted. New total performance construction... heavy gauge taper swaged seamless aluminum radiator—full circumference compression clamps at tubing joints non-conductive to corrosion or wear. Unsurpassed for portability ...outstanding for permanent installations. Overall height, 18 ft. Weight, 10 lbs. Adapts to 80 meter operation using Hy-Gain's Model LC80 loading coil. Model 14AVQ, \$29.95 Net.

Loading Coil for 80 Meter operation—Model LC80.....\$ 7.95 Net
 Roof Mounting Kit—Model 14RMK.....\$11.95 Net
 Decoupling Stub adds 6 Meter operation—Model 6MK.....\$ 4.95 Net

For 10, 15 and 20 Meters...Hy-Gain's New Model 12AVQ. Companion to the new Model 14AVQ, the Model 12AVQ, for 10-20 meters, incorporates new Hy-Q Traps—a new 12" double-grip mast bracket—taper swaged seamless aluminum construction. It delivers outstanding low angle radiation. SWR is 2:1 or less on all bands. Overall height is 13'6". Weight, 9 lbs. Model 12AVQ, \$21.95 Net.

Roof Mounting Kit—Model 12RMK.....\$11.95 Net
 Decoupling Stub adds 6 Meter operation—Model 6MK.....\$ 4.95 Net

NEW HY-GAIN DOUBLET...TAKE MAXIMUM LEGAL POWER



Model 5BDQ for 10 thru 80 Meters



Model 4DBQ for 10 thru 40 Meters



Model 3BDQ for 10 thru 20 Meters



Model 2BDQ for 40 and 80 Meters



Model 248BDQ for 20, 40 & 80 Meters

Model 4BDQ 10 thru 40 M \$24.50 Net

Model 248BDQ 20, 40 & 80 M \$22.50 Net

Model 2TQ Matched Trap Kit for building 40 & 80 Meter Doublet \$12.95 Net

Model 2BDP Trapless Fan Doublet for 15, 40 & 80 Meters \$19.95 Net

- New Hy-Q Traps
- Super-Strength Aluminum Clad Steel Wire
- Install Horizontally or as Inverted V
- Weatherproof Center and End Insulators

Installed horizontally or as an Inverted V, new Hy-Gain Doublets with Hy-Q Traps deliver true half wavelength performance on all bands. Completely factory pre-tuned ...SWR less than 1.5:1 on every band. Super-strength aluminum clad single strand steel wire defies deterioration from salt water and smoke ...will not stretch...withstands hurricane-like winds. Easily installed with famous Hy-Gain molded high impact cycolac plastic center and end insulators.

Model 5BDQ 10 thru 80 M... \$34.95 Net

Model 3BDQ 10 thru 20 M... \$17.50 Net

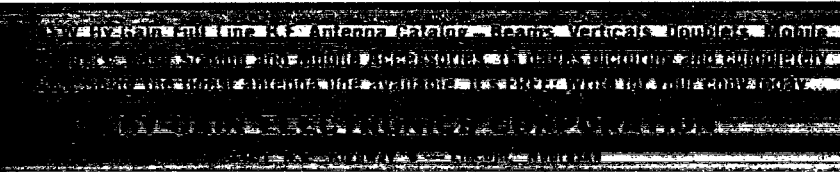
Model 2BDQ 40 and 80 M ... \$19.95 Net

Model 248BDQ 20, 40 & 80 M ... \$22.50 Net

Model 2TQ Matched Trap Kit for building 40 & 80 Meter Doublet \$12.95 Net

Model 2BDP Trapless Fan Doublet for 15, 40 & 80 Meters \$19.95 Net

AVAILABLE NOW FROM YOUR HY-GAIN DISTRIBUTOR



3 more instant-heating tetrodes add power design flexibility to the Amperex family of mobile communications tubes



Now, to accommodate the broadest possible range of transistorized vehicular and portable communications design requirements, AMPEREX adds three new Harp Cathode, push-pull tetrodes—the 8408, 8118, and 8348—to its family of instant-heating types. Like their predecessors, the 8042 and 8300, they provide *full talk-power* in well under half a second, are self-neutralizing, feature low cathode inductance, low operating voltage and extreme ruggedness. The entire family of AMPEREX instant-heating tubes is available NOW. One special note: Even within this outstanding family, the type 8408 is truly a “tube among tubes.” For by combining rugged, high gain, frame grid construction with harp cathode construction it can provide 6 watts at 500 mc with a warm-up time of less than 0.5 seconds.

How Harp Cathode construction makes the difference



Described simply, the Harp Cathode is a flat rectangle, strung harp-fashion with many superfine wires. Its unique advantages are largely a function of this physical arrangement. Thus, the minute wire size provides a high surface-to-volume ratio, resulting in instantaneous availability of thermal energy at the emissive surface. The quantity of electrically parallel, directly heated wires assures low cathode inductance. The low filament voltage affords the closest approach to the “unipotential” cathode. Moreover, in actual intermittent operation tests, tubes incorporating the Harp Cathode have given many times longer useful life than tubes with conventional cathodes.

	8348	8408	8118
Frequency—Mc	175	450	450
Drive Power—Watts	1.0	1.5	5
Power Output—Watts	16.0	6.0	21

For detailed data covering all instant heating harp cathode tubes plus descriptions of associated circuitry reducing warm-up times to as low as 80 milliseconds, write: Amperelex Electronic Corp., Tube Division, Hicksville, Long Island, New York.

Amperelex[®]

IN CANADA: PHILIPS ELECTRON DEVICES LTD., TORONTO 17, ONT.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NM: WA5AVO. The Arkansas Emergency Phone Net has changed its name to the Arkansas Phone Net. K5JPS has resigned as PAM-a.m., but still is net manager of the APN. W5NPM is attending a PME school in Colorado. Anyone in Arkansas is welcome to check into any of the nets listed below. Coverage is needed into El Dorado, Hot Springs and Clarksville. ECs still are needed in several key counties in the state. If you are interested or if you know someone interested in this important service, send a card or radiogram to your SCM (address page 6). Net reports (Aug.):

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave. Tfc.
QZK	3790	0100Z	Daily	31	169	264	5.5
QAN	3695	0400Z	Daily	30	91	187	3.0
APN	3385	1200Z	Mon.-Sat.	26	48	958	1.8
ASBN	3815	0030Z	Daily	30	75	300	2.5

Our RN5 representation fell to 98.4% this month. W5NPM and I had a very nice trip to the Ft. Smith ARC and the Northwest Arkansas ARC. AREC RACES activities are now being coordinated closely in Arkansas. Traffic: WA5HNN 505, W5DTR 232, WA5CBL 212, WA5AVO 206, W5NPM 130, WA5BBS 82, K5TYW 52, K5TCK 37, WA5GPO 36, WA5FGT 18, K5ALU 10, K5ABEZ.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BWK. PAM: W5TAV. RM: W5CEZ. W5MXQ requested that he be relieved of SEC duties because of illness. W5CEW relinquished the PAM post because of personal business. The Third Catahoula Amateur Radio Club Hamfest was a huge success with an attendance of over 300 K5QXK has a new NCX-3 transceiver and is a new OPS. WA5EID has been busy handling traffic. WA5HRD now has emergency power set up. K5OVR has been busy with the Gulf Coast Hurricane Net. The following have been elected by the Conla Radio Club: K5YWG, pres.; WA5CRF, vice-pres.; Jane O'Neil, secy. WA5FNE has tendered his resignation as EC for S.W. La. W5ZBC is back on c.w. with a TO-keyer, a present from the XYL. W5GHP is very active with LAN. WA5BLO has been very active handling traffic. W5EA is making smoke on both c.w. and phone using an ART-13. W5FMO reports a strange feeling this month at not having to get out a section report as he has so ably done the past ten years. W5JFB spent 46 hours in a liferaft when the tug "Michael" sank off the Georgia Coast Aug. 11. WA5FNB had a nice traffic total for August. WA5ITW is a new OPS. W5IQH is busy with LAN and RN5. W5CEZ reports that traffic is on the upswing. I would like to thank you fellows for the congratulations and hope I can do the job as well as Tom did. Please keep the reports coming in and the address is Covington not East Covington. You will find me on 3900 every morning at 1230Z if you need a quick contact. Traffic: W5CEZ 419, WA5FNB 173, W5IQH 107, WA5BLO 91, W5EA 22, WA5HRD 21, W5GHP 17, WA5ITW 12, W5FAIO 4, K5OVR 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. K5GEI reports that the Gulf Coast Hurricane Net Conference was a big success. Two transmitters were operated to send messages from the conference to the homes of participants. W5VOO, W5BW, K5SYG, W5IZS and K5GEI were the chief operators. Helping in this operation were members of the "Miss" C.W. Net and many others. Had a nice visit with W5ZAR, in Brookhaven, recently and was glad to hear from K5ACW, in Pascagoula, that he is really interested and experienced in v.h.f. Contact him. Welcome to the new Tupelo Novice. W5JSH. K5FNY has rig troubles but is back working W5YD at Miss. State handling Starkville traffic. Sorry to lose W8VDA/5, a mainstay with the "Miss" Net. W5JHS, W5SHX, W5CQJ, W5IHQ, W5ESC and many others keep 3925 kc. open daily. Traffic: W5JDF 167, W8VDA/5 86, WA5MIU 33, W5WZ 32, W5BW 26, W5GEI 25, W5EAIM 12, W5UOO 10, K5SYG 8.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. RM: W4MXF. PAMs: W4RMJ, W4AAS, K4WWQ.

Net	Freq.	Time	Days	Sess.	QTC	QNI
TN	3635	1900C	M-Sat.	27	88	217
FTPN	3930	0640C	M-F	21	52	365
TSSN	3980	1830	M-Sat	26	75	866
TPN	3930	0645C	M-Sat	31	174	778
		0800	Sun.			

W4OQG reports the Shelby Red Cross received a 75A4-KWS-1 combo. W4VJ and W4UVL have returned to the

nets. Welcome back. The RATS is planning a Tenn. QSO Party for Feb. Details later. Tenn. Net Roster should be out to all net members when you read this. TN maintained Hurricane Net liaison during the recent Atlantic storms. Six-meter operators should contact SEC W4RRV in regard to a statewide net. W4ZJY recently married. Congrats to you, Dave. K4RIN carried on OO duties 7/4 from N.C. during the summer. Traffic: W4PQP 139, WA4IUM 133, W4HRG 100, W4MXF 82, WA4IBZ 69, WA4OXL 56, W4ZJY 50, WA4GQM 32, K4WVQ 30, WA4NUJ 29, K4EWI 25, W4UVP 24, W4WBK 24, WA4MCC 22, W4TYV 22, W4VTS 21, WA4AWG 18, WA4HJQ 14, K4UMW 14, W4YNU 14, K4SND 12, W4VJ 11, WA4KOG 7, WA4BXH 6, WA4EWW 6, K4NRZ 5, WA4PS 2, WA4GLS 4, WA4LAX 4, WA4NLY 2, WA4RRP 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URN. PAMs: W4BEJ, W4S2B, K4DMU. V.H.F. PAM: WA4IUV. RM: WA4LCH. New appointments: WA4IUV as V.H.F. PAM; WA4MEX as OPS. Aug. net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC
EMKPN	3960	0630E	M-F	21	301	88
MKPN	3960	0530E	Daily	31	539	50
KYN	3600	0900&1900E	Daily	62	490	337
KPN	3960	1930E	M-F	21	532	46

WA4MEX has received his WAS certificate. I think we can all sit up and take notice of the new Novice Net on 21.150 Mc. In August with 13 sessions the net had a QNI of 39 and handled 33 QTC. It is called the LATN (Louisville Area Traffic Net), K4QIO and K4GWA had Z86VX from Johannesburg, South Africa, as a week-end guest recently. Kentucky was represented 90.3% in 9RN with K4DZM and WA4LCH high QNI. Currently the Kentucky AREC Net meets on 3960 kc. Thurs. night after the KPN session. Listen and learn about AREC and who your EC is. If you have constructive criticism, let it fly. Don't forget the Nov. 14 meeting in Louisville. A meeting of ARRL appointees in Kentucky for that afternoon is certain to be beneficial to all of us. WA4MEX has a new Galaxie transceiver. He is NCS on KPN Mon. nights. WA4YH is college bound. How about a college net? Traffic: (Aug.) WA4LCH 281, W4BAZ 162, K4YZU 150, K4DZM 146, WA4BSC 144, WA4DYL 122, WA4YH 82, K4DMU 50, K4QIO 35, WA4MEX 30, K4NVO 25, K4VDO 24, K4TQZ 21, W4NRV 20, W4CDA 19, W4KJP 18, W4YH 16, W4NALK 14, W4PLN 13, W4BTA 10, K4LOA 10, WA4HLW 6, K4WJ 6, W4JRA 4, K9ALP/4 1. (July) K4YZU 50, K4WJ/4 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EJL, K8QLL, W8FWQ, K8KMJ. PAMs: W8CQU, K8LQ, K8JED. V.H.F. PAM: W8PT. Appointments: W8OCC as OPS and OPS: W8AXF and W8LME as ECs; W8ADNW, W8WNX and K8WYO as OEs. Another ham family is that of W8CUL; YF is W8ISE and son is W8ISF. W8SWF now has an NCX-3, an NCL-2000 and a 60-ft. tower with a CD Ham-in rotor. Kent RC won the Field Day plaque 3 times, Muskegon RC twice, so Kent keeps it. New officers of the Brass Pounders ARC of Port Huron are K8KJL, pres.; K8OYS, vice-pres.; K8UPE, secy.-treas.; W8RNX, activities. W8FLK has a five-element beam. Each leg is 280 ft. long, 30 ft. high. New Generals: W8MILJ and W8PFT. W8N8ON won the QLF Contest at the Dallas, Tex., Hamfest. K8PBA picked up a 5-kw. for Huron Valley ARA emergency work. K8JJC has a completely rebuilt station and antenna system. W8DVB says the Eye Bank Net on 3970-3963 has daily coverage. K8JED just finished an HX-10 Maulader. W8JQK made General. W8FEB is heard on 80 c.w. and s.-h.; he was spark 8APT. W8FWQ gave a good talk for the Metropolitan Racehewers Club at the Metropolitan Rehabilitation Institute, with a 2 meter demonstration. K8HLR likes the 51J-4 receiver he "borrowed." K8LNE is out of the hospital after a kidney infection. K8HLR, K8NJW and K8JJC all made the BPL. W8HKT now has a new 300-H.P. Mercury. The QMN gang wants to thank W8NOH/6 for his fine articles. W8ZHB needs a small gasoline engine to finish the emergency power supply. W8AAM finds the inverted "V" only fair on 75. W8DPE (ex-800) has returned from the Virginia A.P.C.O. conference. W8IWF now has a 75-40 "Cliff Dweller" antenna. W8JHH bought a Vanguard 300-C converter for 50 Mc. K8MFO/8 has an NC-300 and a Ranger 2 at college. ECs are wanted. Contact K8GOU if there isn't one in your county. Traffic: (Aug.) K8HLR 576, K8NJW 564, K8KMJ 354, K8WQV 247, K8LNE 225, K8GOU 170, K8JJC 161, W8BEJ 113, K8JED 88, K8PKU 62, W8SH 56, W8ELW 51, W8FWQ 51, W8ADZP 43, W8KXO 39, W8RNT 39, W8HKT 38, W8EUT 36, W8FX 32, K8BYX 20, W8EJR 20, K8EXE 20, W8EENO 17,

(Continued on page 102)

MOBILE SERVICE is the most demanding form of voice communications you use. Power and size limitations are extreme, putting an unusual premium on efficiency. The environment is tough, putting an accent on reliability. In the final analysis you will benefit fully from your mobile equipment only by paying strict attention to every detail of installation and operation.

Mobile service performance starts with the microphone—the first active element in the system—and there's no better way to start than with the new E-V Model 600E dynamic microphone. It is a little more costly than many microphones you can buy that "just work", and rightly so. For the E-V 600E is a lifetime investment in top-notch performance.

Look closely. The dynamic element of the 600E is the direct descendant of a long line of military microphones built to perform faithfully under battle conditions. This element was chosen for high intelligibility and its ability to withstand any environmental conditions. The proved ruggedness of the E-V Acoustalloy® diaphragm easily with-

stands ear-shattering sound pressures with no change in characteristics. But there is more to the 600E than ruggedness. Its sound quality has no equal. Here's why.

The frequency response of the 600E is ideally suited to SSB and critical AM transmission. You get highest intelligibility with any ALC circuit or frequency-shaping network in common use. That's been proved with on-the-air tests with every commercial SSB mobile transmitter and transceiver on the market today. Further, the high output level of the 600E will fully modulate even the "Scotch" input circuits sometimes found in mobile rigs. The 600E is available in 150-ohm or Hi-Z models.

Now pick up the 600E. It is shaped for comfort, with an easy-acting switch that gives you positive control, even when you are wearing heavy gloves. The case is molded of Cyclocac®, a space-age plastic that absorbs a fantastic amount of abuse. The 600E never feels hot or cold to the touch, regardless of the climate. The shielded coiled cord has passed flexing tests that far ex-

There Is Nothing Tougher Than Mobile Service...Except Our New Model 600E!



Model 600E
\$23.40
Amateur Net

ceed normal life, while the switch has test-cycled on and off over a half-million times without a sign of failure. Even so, both cord and switch are designed for easy field service, if necessary.

The E-V 600E is built to outlast every other piece of mobile equipment you may use, while outperforming every other microphone on the market. It will probably be transferred from rig to rig as the one most useful communications tool you own. Actually, the 600E, like all E-V microphones, is guaranteed forever against defects in workmanship or materials. It must perform as stated, or your money back.

The one best way to find out what the E-V 600E can contribute to your mobile installation is to try it. We guarantee you have nothing to lose. Ask your Electro-Voice distributor to help you put the new E-V 600E dynamic microphone to work in your rig, today!

ELECTRO-VOICE, INC.

Dept. 1142Q, Buchanan, Michigan

Electro-Voice®
SETTING NEW STANDARDS IN SOUND

The
Christmas Gift
 that
Lasts All Year
QST

He won't turn up his coat collar
 to hide it.

He won't have to exchange it
 for one with longer sleeves.

He won't read it once and
 shove it out of sight.

It won't shrink.

And he'll like it whether he
 smokes or not.

**QST is the one present that's always
 suitable, always welcome—a
 monthly reminder that you think
 enough of him to give him something
 he really wants.**



QST and ARRL Membership \$5
 \$5.25 in Canada, \$6 elsewhere

**THE AMERICAN RADIO
 RELAY LEAGUE, INC.**

Newington, Connecticut 06111

K8QLL 16, K8VDA 15, W8EGI 14, W8AUD 13, WA8HGE 13, W8ILP 12, W8DSE 11, W8ZHB 11, K8DX 10, W8AHV 8, K8ZXB 7, WA8CXF 2, K8GJD 2. (July) K8GOU 129, K8JJC 74, W8EU 73, K8JED 36, K8MFO 20, K8BYX 13, WA8HGE 13.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8INP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZK, K8BAP and K8UBK. This report was written by W8DAE. MARC news: Massillon announces results of its August election as W8VYO, pres.; W8EKG, vice-pres.; W8OYL, secy.-treas. K8WVZ reports that K8HMO soon will be back on the air with a TR-3 which he won at Dayton two years ago. He has been in the hospital ever since, but now will be in one where he can get on the air. Gool Luck, Paul. We received CLEARC's *Spatter*, the first issue from the Clermont City Radio Club. Thanks. QCWA Chapter from Canton reports a new member, W8PS, from Canfield who is a real OT (chem. rectx., etc.). The Case Institute of Technology ARC (W8EDU) reports officers for 1964-5 as WA2USG, pres.; K8TIE, vice-pres.; K8SEA, treas.; WA8MED, secy. The club has a new HQ-170A and Globe Hi-Bander. Thanks for the Amateur Extra by K8VGF. The Warren *Q-Match* reports successful club operation at the Trumbull Co. Fair. Nice going, men! *Shack Gossip*, of Toledo, reports as a Silent Key Marie Helminski, W8MBL, former editor, also W8RRU. There is a nice article on TVI and public relations in the *Listening Post* of the Queen City Emergency Net, Inc. W8HQK has a good article on transceivers, their operation and limitations. In the *High Banders Log* for July-August, K8TFL tells vividly of the FD operations at K8WSH's near Prospect, Ohio. The participants had a 50-ft. tower and a rotator. A storm then hit with high winds. Hi. We hope the tower stood up, Betty! W8AL still is in the hospital at this writing (9/8) in Cleveland. We hope that he will be home soon. W8DNC, of North Canton, has been invaluable in keeping me in touch with Ruth, Weck's wife. W8QCU lost a 4-250A and a 4-400. Hope no more troubles. Don, W8BOV states that the *OPN News Bulletin* resumed publication with the August issue. K8PBE has a fine message total and says he has a daily sked with K9NBH of Great Lakes, Ill., for Ohio traffic. W8WUO reports with Florida hurricane traffic. W8YGR took 3 messages of 55-65 words each from the USS *Lawrence* in East Atlantic 8 days out of Norfolk, returning from Cyprus. He has an HT-44 and an SX-117 combo running "transceive" on c.w. and s.s.b. K8BAP sends totals for some of the OPN members for August, all of which are in the traffic listing. K8UBK reports totals for the Ohio S.S.B. Net as sessions 57, traffic 826, average 14.5. Thanks. OM. K8DIU reports for BN, sessions 30, traffic 273, average 9.1. W8MYT submits traffic totals for the Ohio S.S.B. Net, which are included in the traffic listing. Thanks, Bob, W8UPIH, W8HXR, WA8GYT and W8DAE made the BPL in August. Traffic: (Aug.) W8UPIH 758, W8HXR 512, WA8GYT 426, W8DAE 410, K8BPE 378, W8HVR 234, K8YDR 196, W8CIIT 185, WA8CXY 181, W8BXN 160, W8TV 124, K8DAE 123, W8BZR 115, K8DIU 109, W8BZX 106, K8UBK 98, W8MGA 91, W8BAB 86, K8LGA 85, K8BYR 84, WA8LQI/8 55, K8RDX 48, WA8AJZ 47, W8BZE 37, W8QCU 35, K8DDG 29, W8ETP 28, WA8AWH 26, W8CXM 18, WA8JXT 18, W8FRD 16, W8BOV 12, W8ADB 10, K8LGB 10, W8DHH 8, K8YWF 8, W8LZE 7, W8IEP 6, W8YGR 6, K8BAP 5, W8IPN 5, WA8JXM 4, W8RO 4, W8WUO 4, K8PJH 2, K8BNL 2. (July) K8DIU 169, WA8GYX 81, W8TV 47, W8IEP 40, W8BXN 30, W8BOV 18, W8FTK 9, WA8JXT 8, K8VGL 7, WA8ADB 3, W8DHH 3, K8FRU 1.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2VYS. PAM: W2JG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0130 GMT. August was picnic month for members of the Schenectady and Albany clubs. The NYS Net Picnic was held at Van Etten, N.Y., with over 50 members, guests and NTS officials present. Massena was the location for the NYSPTEN Picnic, also with a large attendance. W2TVR received a WAZ certificate for s.s.b. among his many DX accomplishments. W82FYF received General Class, as reported by his dad, W2URP. His many friends will miss W2KLM, who has moved to Clearwater, Fla. Sorry to report that W2DKW is a Silent Key. W82FYD reports 82 DX contacts during August. The Communications Club of New Rochelle held a transmitter hunt and handled a city swim meet with its mobile units during the month of August. WA2RAU, K2EBX, K2SJM, WA2QEG and W82FXB received ARRL Public Service Awards for traffic work during the Ala-ka earthquake. Our congratulations. NYS member WA2HGB is attending Cornell this year. Traffic: WA2VYS

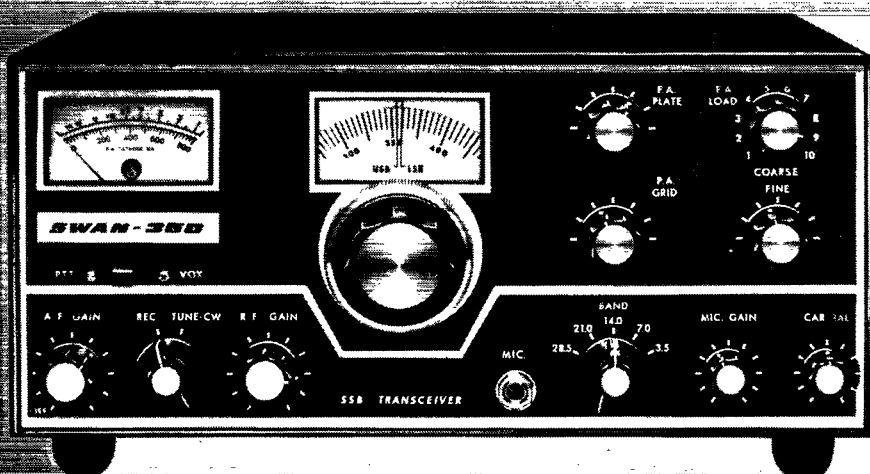
(Continued on page 104)

ONCE AGAIN SWAN LEADS THE FIELD BY INTRODUCING THE MOST TREMENDOUS TRANSCEIVER VALUE EVER OFFERED TO THE RADIO AMATEUR!



If you want the finest voice quality with maximum talk power at the most reasonable price . . . then you must see . . .

THE NEW **SWAN-350** TRANSCEIVER



5 BANDS — 400 WATTS — \$395 HOME STATION — MOBILE — PORTABLE

- 3.5 - 4.0 mc, 7.0 - 7.5 mc, 13.85 - 14.35 mc, 21.0 - 21.5 mc, 28.5 - 29.0 mc (10 meter full coverage kit available.)
- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.
- 400 watts SSB input
320 watts CW input
125 watts AM input
- Sideband suppression: 40 db
Carrier suppression: 50 db
Third order distortion: 30 db
- Lower sideband on 80M and 40M.
Upper sideband on 20M, 15M, and 10M.
(Opposite sideband kit available.)

SWAN SPEAKS YOUR LANGUAGE and continues to set the pace with unequalled performance, proven reliability and superior craftsmanship.

ASK THE HAM WHO OWNS ONE!

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C.....\$ 85
- 12 Volt DC Power supply. Model 412.....\$130
- Plug-in VOX. Model VX-1.....\$ 35
- Accessory kits to be announced.

**SEE THE NEW SWAN-350
and THE DELUXE SWAN-400
AT YOUR DEALERS NOW!**



ELECTRONICS CORP.
Oceanside, California

Communications, mobile radio...

A First Class FCC License

...or Your Money Back!



Your key to future success in electronics is a First-Class FCC License. It will permit you to operate and maintain transmitting equipment used in aviation, broadcasting, marine, microwave, mobile communications, or Citizens-Band. Cleveland Institute home study is the ideal way to get your FCC License. Here's why:

Our training programs will quickly prepare you for a First-Class Commercial Radio Telephone License with a Radar Endorsement. Should you fail to pass the FCC examination after completing your course, you will get a full refund of all tuition payments. You get an FCC License . . . or your money back!

You owe it to yourself, your family, your future to get the complete details on our "proven effective" Cleveland Institute home study. Just send the coupon below TODAY. There's no obligation.

Mail Coupon Today For FREE Catalog

Cleveland Institute of Electronics

1776 E. 17th St., Dept. QT-36
Cleveland, Ohio 44114

Please send FREE Career Information prepared to help me get ahead in Electronics, without further obligation.

CHECK AREA OF MOST INTEREST—

- | | |
|---|--|
| <input type="checkbox"/> Electronics Technology | <input type="checkbox"/> First Class FCC License |
| <input type="checkbox"/> Industrial Electronics | <input type="checkbox"/> Electronic Communications |
| <input type="checkbox"/> Broadcast Engineering | <input type="checkbox"/> Advanced Engineering |

Your present occupation _____

Name _____ (please print) Age _____

Address _____

City _____ State _____ Zip _____

Accredited Member National Home Study Council

How to Succeed in Electronics



341, WA2UZK 270, K2SIN 107, WB2CPU 100, W2OGH 91, WA2VYT 69, WA2JWL 54, K2TXP 50, W2EFU 45, W2-ANV 41, WA2HGB 36, W2PKY 34, K2DEM 32, WB2-FVD 30, WB2FXB 30, WA2ZFD 5, WB2HYA 1.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB SEC: K2OVN. Section nets:

NLI	3630 kc.	2315Z	Nightly	WA2EXP	— RM
VHF Net	145.8 Mc.	0000Z	TWTh	W2EW	— PAM
VHF Net	156.25 Mc.	2300Z	FSSuM	W2EW	— PAM
NYCLIPN	3932 kc.	2000Z	Ex. Sun.	WA2QJU	— PAM
NLS*	3630 kc.	2245Z	Nightly	WA2RUE	— RM

* Slow speed training net operating at 10-15 w.p.m. for the purpose of introducing newcomers to traffic-handling procedures. Learn with actual traffic! Why not give it a try? BPL certificates were awarded to these fine stations: WA2RUE, WB2HLM, WA2GPT, WA2PJJ, W2EW, WA2QJU, WA2TQT and K2US. WB2HWB is a Gold-Star charter member of the NYS Net. Appointments: WA2RUE as RM; WA2PJJ as OPS; K2US as ORS, OPS and OES. It is with deep regret that we report WA2MAQ as a Silent Key. Artie was a mainstay of the Massapequa AREC/RACES group. The Mike Farad Emergency and Traffic Net is on 3610 kc. daily at 0500Z. Its phone section is on 3925 kc. Mon. through Sat. at 1800Z. WA2GPT is now an A-1 Operator and has a Public Service Award for service in the Alaskan Disaster. WA2PJJ, WA2YLL and WB2IQG have Oscar III skeds with the West Coast. WB2HWB has a new Viking v.f.o. as well as a new 80/40 dipole. WB2IQG needs a K16 for W.A.S. You listening, Hawaii? Well, WB2AWX got on phone with a new roof-to-roof antenna! Another fellow who's gone v.f.o. is WB2LUK. WA2PMW has a new Clegg Interceptor. W4TRU/2 vacationed mobile in Ontario this summer. WA2OOL is custodian of the Rockaway ARC Award. WA2VKK also received a Public Service Award for Alaskan service! W2PF reports that over 140 QCWA members signed in at the ARRL National Convention last Aug. WB2FXN has a new five-element Telrex, a new AR-22 rotor and a new shack to boot! An Alaskan Public Service Award was received by WB2CSS, too. WB2BKS moved to a new QTH with a new Elmac AF68A, a new HQ-110A and a new 144VQ Hy-Gain up about 100 feet. WB2UAL is back on the bands after completing the building of his new boat. WB2EX1 is going into PAIT work with a new LM frequency meter. The W2IGHs have a new YL! Any ham scuba divers wanting to start a weekly net are asked to contact WA2UXK. The Brooklyn 6-Meter TVI Committee has been formed with WB2EMO as chairman and WB2FXN as co-chairman. WA2TQT also is K3FNG and CHC No. 1327. WA2LKY and WA2AJ worked 10 and 6 from the Redding, Conn., fire lookout tower with great results. WA2KSP's son, WA2SAR, is now with the Tactical Air Command back in the states. W2EW, W2WFL and WA2EXP are working on an RTTY link between NLI and the V.H.F. Net. New officers of the City College ARS are WA2DCS, pres.; WA2IMH, vice-pres. The club has a kw. s.s.b. on all bands. W2SEU spends Sun. afternoons on 146.51 Mc. looking for RTTY (a.f.s.k.) contacts. W2DBQ is now v.f.o.-controlled on 2 meters. WB2HLM is going to the New York Institute of Technology. WA2ICV is in college in Connecticut. A new member of the VHF Net is WB2MLN. Traffic: (Aug.) WA2RUE 1535, WB2HLM 966, WA2GPT 635, WA2PJJ 420, W2EW 362, WA2QJU 344, WA2UWA 312, WB2EUI 233, WA2TQT 164, WB2HWB 147, WB2IQG 128, K2US 121, WB2AWX 84, WB2LUK 79, W2GKZ 78, WA2EXP 65, W2DBQ 54, WA2RMP 46, WA2VLK 46, WA2PMW 40, W4TRU/2 37, WB2BDW 34, WA2UYQ 23, W2EC 14, WA2OOL 11, WA2VKK 8, W2PF 6, WA2RAQ 2, WB2-FXN 1. (July) WA2TQT 293, WB2HMS 64.

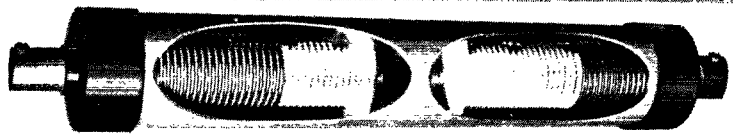
NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW--Asst. SCM: Louis J. Amoroso, W2-LQP. NNJ ARFSC nets:

NJN	3605 kc.	7:00 P.M.	Daily	W2TFM-RAI
NJ Phone	3900 kc.	6:00 P.M.	Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZL-PAM
NJ 6&2	51,150 kc.	11:00 P.M.	M-W-Sat.	K2VNL-PAM
NJ 6&2	146,700 kc.	10:00 P.M.	Tu-Sat.	K2VNL-PAM
NJNN*	3725 kc.	7:20 P.M.	Tue-Th.	WA2SRK-RM
16N	1804 kc.	7:30 P.M.	Tue.	WA2UO-RM

* Novice & Slow Speed. All times local. AREC net sked information is available from K2ZFL SEC. New appointments: WA2UOO as RM; WA2HGL as OO; WN2-LVW as OES; WA2WHZ as ORS; WA2VID as OBS. M-W-F 5:55 P.M. 3900-kc. s.s.b. WB2ALF has a new 40-meter Vee antenna. WB2FLH has installed full break-in. WB2JWB handled hurricane traffic on the TCRN and was NCS for 8½ hours. WA2KRC, WA2SRK and WA2QPN are off to college. WA2MYB won the N.J. award in the Conn. QSO Party. WB2GFY says he

(Continued on page 108)

HERE'S THE ORIGINAL!



None Better HAS EVER BEEN Made!

Choose
from the
complete
line of
multi-band
antennas...



proved best
by every test!

DON'T BE FOOLED BY IMITATION!
BE MISLED BY ADVERTISING
CLAIMS!

The original all metal encased trap was first produced in 1957 by Mosley for use with the World Famous TA-33. The Mosley trap design has been imitated by many manufacturers of amateur antennas. This is both a compliment and proof of the outstanding engineering built into every Mosley Multi-Band Antenna.

Consider the facts
Mosley

MULTI-BAND ANTENNAS have been

- ▶ Used by HAMS all over the world!
- ▶ Specified by the U. S. Government!
- ▶ Produced for Military Installations!
- ▶ Chosen by "Vanguard" and "NASA"!

Mosley



When your communications need a dependable antenna... Get The Finest... Get A Mosley!

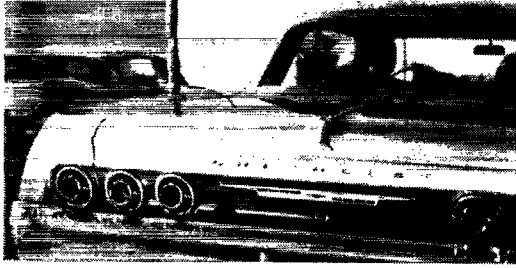
Electronics Inc.

4610 NORTH LINDBERGH BLVD.
BRIDGETON, MISSOURI, 63044

Export Division: 64-14 Woodside Avenue, Woodside 77, New York.

Webster band-spanner.

14 year winner



BAND-SPANNER multi-band mobile antenna...

improved continually over the years to take full advantage of space-age materials and methods...yet the basic, thoroughly-proved design remains unchanged...still the finest...a fourteen year winner!

6-band coverage, 80-40-20-15-11-10 meters (plus MARS) ...beautifully streamlined, sturdy, mechanically without equal...handsome and unobtrusive on any car... handles substantial power...enduring, rustproof and corrosion resistant...all fiberglass column.

Allows exact antenna resonance anywhere within phone or CW portions of 80-40-20-15-10 meter bands (and all 27mc C-B channels). Tunes simply by moving stainless steel top whip, in or out, plunger fashion. The inductor is wound directly on the fiberglass column which is slotted to allow a portion or each coil turn to be exposed internally. Positive!

Attractive dark blue fiberglass column with lighter blue epoxy protective coating on loading inductor. Chrome plated brass hardware, stainless steel whip.

THREE BANDSPANNER MODELS	Regular: A-61, 63" telescoped, 117" overall 27.50
	Short: A-62, 60" telescoped, (illustrated) 93" overall 27.50
	Commercial: A-69, Covers 2-18 mcs. 117" overall 28.80

Webster band-spanner.

317 ROEBLING ROAD, SO. SAN FRANCISCO, CALIF.

Export: AD AURIEMA, INC. 85 Broad St. New York 4, N.Y.

learned a lot at the National Convention. W2BYE has a Model 28 on RTTY. WA2HWZ has a walkie-talkie for 10 meters. WB2ICH discovered the enjoyable activity of handling traffic. WB2COZ has receiving equipment for 144 and 220 Mc. W2OXL is on a rebuilding spree. K2-UKQ continues DXing on 40 meters. WA2ZOW is building a nuvistor converter. EC W2B3CN reports 4 ARRL nets having operated weekly for a full year without a miss. K2AGJ is a member of the YL Sidebanders, 14331 kc. W2ZJ reports a fine N.J. Phone Net Picnic. K2ZJW is on 14-Mc. c.w. with a Globe Scout and an HQ 110. W2KOG has a three-band vertical and a G-76. K2AAM is on 80-meter c.w. with a 4-400A final and an HRO receiver. W2NLY received 2nd place N.J. certificate in the Tennessee QSO Party. W2FKZ and W2NQ have moved to Pennsylvania. Congrats to W2VYB on receiving his college degree. WA2MINU has gone s.s.b. on 6 and 2 meters. WA2UDT reports the Space Communications Forum at the National Convention as an outstanding event. K2YFE has been operating various MARS stations while on military duty, namely W3USA and K5-WAB. K2UQC received the warm praises of a family whose son was located in YV-Land by means of ham radio. WN2KTO claims the highest N.J. Novice score in the CQ V.H.F. Contest. WA2ZOW is running comparative tests on various types of 2-meter antennas. WB2DDB has been re-designing and constructing a new amateur TV station. Dave reports that WB2BCS, K2-BCR and WA2CAQ are interested in TV. WA2FGK is looking for meteor skeds on 144 Mc. up to 1400 miles, and regular skeds up to 600 miles. K2LNS is the operator. WA2VKU is going off to school in HB-Land and invites schedules with 4UHTT. Write to Rob at his N.J. address. Mail will be forwarded. Traffic: (Aug.) WB2ALF 648, K2YNL 402, WB2ALF 203, WB211LH 157, WA2YD 134, WB2JWB 119, WA2SRK 114, WA2KRC 107, WA2UO 100, WA2MYB 97, K2UCY 94, WA2GQZ 80, WA2MTI 58, W2CVW 54, W2ZAL 51, W2PEV 50, W2GFY 39, K2ZFI 30, WA2WAJ 29, W2TFM 18, WA2TBS 16, W2BYE 13, WA2QPX 13, WA2WHZ 13, W2NAK 12, K2EQP 10, WA2CCF 9, WB2HJW 9, WB2ICH 8, WB2IYO 7, WB2COZ 6, W2ANG 5, W2EWZ 4, WA2PWI 4, W2OXL 3, WB2KQJ 2, K2UKQ 2, K2VYL 2, WA2ZOW 1. (July) WA2WHZ 50, W2OXL 7, WA2PWI 2.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke. W0NTB—Asst. SCM: Ronald M. Schweppe. K0EXN. SEC: KOVBI. RM: W0LGG. W0USL. PAMs: KOBBL. W0LSF. At the time of this report (Sept. 7) I have quite a number of unfinished applications on my desk for ARRL appointments. Before you have a chance to read this I hope to have these all finished and everybody made happy. Thank you, one and all, for the fine interest which has developed this summer. I note that a number of our fine old-timers who were unhappy with ARRL are with us again and are continuing to use their experience and "know how" for the betterment of amateur radio. Thanks, fellows, we need you. Your support in the years immediately ahead will be most welcome. Interstate SSB Net: QNI 894, QTC 422, sessions 26. 160-Meter Net: QNI 457. QTC 0, sessions 29. 75-Meter Phone Net: QNI 1131, QTC 101, sessions 26. Hamilton County Net: QNI 134, QTC 4, sessions 26. Congratulations to W0LGG on making his 100th consecutive BPL. Traffic: W0BDR 1837, W0LGG 1500, W0NTB 121, W0USL 102, K0QKD 40, K0KAQ 37, W0GQ 16, W0DYV 12, K0POI 10, W0QVZ 10, K0TPT 10, W0FMZ 7, K0TDO 6, W0DYV 5, K0EXN 2. (July) W0QVZ 6.

KANSAS—SCM, C. Leland Cheney, W0ALA -SEC: K0BNF. Asst. SEC: K0EMB. RM: W0SAF. PAM: K0EFL. V.H.F. PAMs: K0VHP. W0HAJ EC's effective Sept. 1 are: In Zone 2: W0FRC; Z-3: K0LHF; Z-4: W0REU; Z-5: W0ZGK; Z-6: K0GOZ; Z-7: K0GLW; Z-8: K0VQC; Z-9: W0BAMW; Z-10: W0TWJ; Z-11: K0JDD; Z-12: W0CJI; Z-13: K0LPE; Z-14: W0HIJ; Z-15: W0ZUX. W0CCW will act as NCS Coordinator of the SEC Net. EC for Zone 1 has not yet been appointed. Interested operators should contact K0BNF. Counties assigned to zones are as follows: (1) Brown, Doniphan, Jackson, Nemaha. (2) Marshall, Clay, Riley, Geary, Morris, Pottawatomia. (3) Linn, Miami, Wabunsee, Osage, Lyon, Shawnee, Coffey, Franklin, Anderson. (4) Leavenworth, Douglas, Jefferson, Atchinson. (5) Wyandotte, (6) Johnson. (7) Woodson, Allen, Wilson, Bourbon, Neosho, Crawford, Montgomery, Labette, Cherokee, Chautauqua. (8) Marion, Chase, Butler, Greenwood, Elks, Cowley. (9) Sedgwick. (10) Rice, McPherson, Reno, Harvey, Kingman, Barber, Harper, Sumner. (11) Ford, Gray, Hodgeman, Meade, Clark, Edwards, Kiowa, Comanche, Pawnee, Stafford, Pratt. (12) Hamilton, Grant, Morton, Stevens, Seward, Kearney, Finney, Stanton, Haskell. (13) Norton, Graham, Phillips, Rooks, Smith, Osborne, Jewell, Mitchell, Republic, Cloud, Washington. (14) Saline, Lin-

(Continued on page 108)

Clegg



22'er TWO METER TRANSCEIVER

There is just no better way of getting started in VHF than with the newest of the new in the Clegg line — the 22'er two meter transceiver. This ready-to-go station combines many of the fine features that have made the Clegg name famous in VHF ham circles for years plus refinements to make 2 meter AM phone operation more interesting and challenging. It is realistically priced — your distributor will have complete information.

NOW AVAILABLE
AMATEUR NET **\$239.50**

Features

RECEIVER

1. Special triple conversion design with two crystal controlled injection oscillators
2. Selectivity about 10 KC at 6 db and less than 16 KC at 50 db
3. Freedom from spurious responses, IF leak through and images
4. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up
5. Full 143.8 MC to 148.2 MC coverage with tuning dial calibrated 144 to 148 MC
6. Adjustable Squelch
7. Excellent AGC performance
8. NUUVISTOR RF stage and low noise first mixer provide .25 μ V sensitivity (6 db S + N to N)
9. 2 watts audio output available with self contained high efficiency speaker for operation in high ambient noise associated with mobile operation
10. Effective Automatic NOISE LIMITER

TRANSMITTER

1. Broadband exciter stages to simplify rapid QSY
2. High efficiency straight through final amplifier with crystal controlled 18 WATT input
3. High level plate and screen modulation for typical Clegg "HIGH TALK POWER" performance
4. PUSH TO TALK with provisions to switch external LINEAR and VFO
5. TRANSMITTER frequency SPOTTING SWITCH
6. Self contained universal solid state power supply for 115 volts AC and 12 volts DC
7. Tube line-up

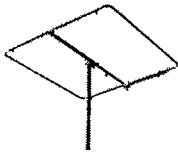
6CW4	RF Amplifier	12AX7	AF Amplifier
6KE8	Tripler/1st Mixer	6AQ5	Rec. Audio/ Modulator
6EJ7	2nd Mixer		
6BA6	10.7 MC IF Amplifier	6AQ5	Modulator
6BE6	3rd Mixer	6KE8	VFO/Buffer
6BA6	456 KC Amplifier	6KE8	OSC/Tripler
6AL5	Diode Detector/ Noise Limiter	12BY7	72 MC Amplifier
		12BY7	Debugger
		2E26	Power Amplifier

Squires - Sanders, Inc.

MARTINSVILLE ROAD / LIBERTY CORNER • MILLINGTON, N.J. 07946

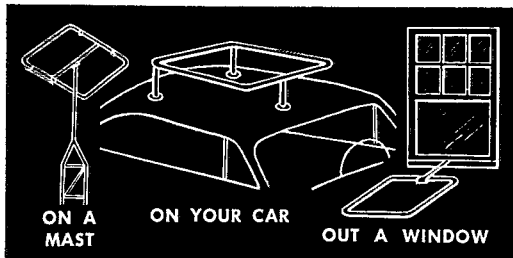
SQUALO

ANOTHER
CUSHCRAFT
FIRST!



SQUALO is a full half wave, horizontally polarized, omni-directional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. The square shape allows full electrical length in compact dimensions. Direct 52 ohm Reddi Match feed provides ease of tuning and broad band coverage.

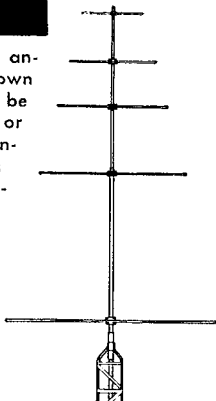
The 6 meter Squalos are completely universal for mounting anywhere. They are packaged with rubber suction cups for car top mounting and a horizontal center support for mast or tower mounting. The 10-15-20 and 40 meter Squalos are designed for mast or tower mounting. Squalo is ideal for net control, monitoring, or general coverage.



MODEL NUMBER	DESCRIPTION	NET PRICE
ASQ-6	6 Meter 30" square	\$12.50
ASQ-10	10 Meter 50" square	19.50
CSQ-11	11 Meter 50" square	19.50
ASQ-15	15 Meter 65" square	23.50
ASQ-20	20 Meter 100" square	29.50
ASQ-40	40 Meter 192" square	66.50

SQUALO TREE

Design a complete multi band antenna system to meet your own requirements. Squalos can be mounted one above the other or above existing beams on a single mast. The Squalo tree is a horizontally polarized, omnidirectional system in any combination of the 6 through 40 meter amateur bands. The Squalo tree takes a minimum amount of space, and does not require extra radials, ground wires, or rotators common to most multi band systems.



BUY FROM YOUR DISTRIBUTOR
OR WRITE FOR FREE CATALOG

Cushcraft

621 HAYWARD ST. MANCHESTER N. H.

#65

coln, Dickenson, Ellis, Ottawa, Ellsworth, Barton, Rush, Russell, (15) Cheyenne, Scott, Trego, Rawlins, Sherman, Thomas, Wallace, Logan, Greeley, Wichita, Deatur, Sheridan, Gove, Lane. Traffic Nets report:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave.
KPN	3920	1245Z	M-W-F	18	51	356	19.3
KPN	3920	1400Z	Sun.				
NCSs:	KOGLI	and	KOEFLL				
QKS	3610	0030Z	Daily				

All operators should know who their Emergency Coordinator is. Contact him and offer your services for emergency communications. Traffic: WOOHM 524, KOGLI 171, WAQAGF 79, WOLA 20, KOLHF 20, KOEFLL 15, KOYTA 14, KOYGR 10, WAQCCW 9, KOYQC 4, WOBVY 2.

MISSOURI—SCM, Alfred E. Schwaneke, WOTPK—SEC: WOBUL. RMs: KOONK, WOOD. PAMs: WOBUL, WOBVL, WOOMM. Appointments renewed: WOBUL, WOBVL, KOBWE, WOHVJ, WOOMM, KOTGU, KOVIQ, KOYIP as OPS. KOYIP as ORS, WOOMM and WOBVL as PAMs, WOANT and WQAKM as ECs. The St. Louis ARC's Second Annual St. Louis Amateur of the Year presentation will be held at Brentwood City Hall Oct. 30 at 8 P.M. All interested are invited to attend. WOBUL is organizing a state-wide EC net to assist ECs in local and section problems. Contact WOBUL for details. Two v.h.f. traffic nets are being organized in the K.C. area, the K.C. Communications Net (KCN) on 50.4 Mc. at 7 P.M. CST Tue., Thurs. and Sat. by WAQEMX, and Podunk's Happy Dinkers (PHD) Net on 50.4 Mc. at 0645 CST Wed. by WAQFLL. PHD has an interesting net certificate. Over 100 hams registered at the Springfield Picnic Aug. 30. KOJPL received a new SR-160 added to his vacation enjoyment. WAQHMN has a new HT-37. WAQJSA is new 2-meter station in Raytown. Add KORAJ as NCS for MoSSB to the list in the June report. Mo. PON NCSs are KOBWE, WADGT, WOHVJ, KOONK and KOAEM. KOAEM has 51-SB on s.s.b. KOPFC is TCC week ends. Net reports for Aug.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mar.
MEN	3885	2345Z	M-W-F	13	250	51	WOBUL
MON	3580	0100Z	Tu.-Sun.	26	159	147	WOBUL
MNN	3580	1900Z	M-Sat.	26	103	63	WOBUL
SMN	3580	2200Z	Sun.	5	23	14	WOBUL
MSN	3715	0300Z	Daily	31	17	5	KOONK
MoSSB	3963	2400Z	M-Sat.	26	546	180	KOHA
PON	3810	2100Z	M-F	20	210	157	KOBWE
PON	(July)	—	—	23	171	170	KOBWE

Traffic: (Aug.) KOPFC 555, KOAEM 175, WOOD 154, WAQEMX 110, WAOCWV 100, KOEQY 89, WOTPK 33, KOBWE 30, KOLQH 28, WOHVJ 24, WOKIK 17, WOBUL 16, WORTO 8, WADGDT 6, WAQJG 5, WQGBJ 5, WQQR 5, WOBVL 2, KOLR 2, WORTW 2, KOVIQ 1. (July) WOHVJ 42, WORTW 11.

NEBRASKA—SCM, Frank Allen, WQGGP—SEC: KOJXX. Appointments: WONIK as PAM; WAQGHZ as RM. Net reports for Aug.: Nebr. Morning Phone Net, 3982.5 kc, 1330Z M-S, QNI 488, QTC 49. West Nebr. Net, 3850 kc, 1400Z M-S, QNI 603, QTC 24. Nebr. AREC C.W. Net (NACN), 3782.5 kc, 0000Z Sat., QNI 19, QTC 1. Nebr. Emergency Phone Net (NEPN), 3982.5 kc, 1830Z M-S, QNI 1143, QTC 62. Nebr. C.W. Net (NEB) 3325 kc., 0100Z and 0400Z, daily, 1st sessions, QNI 187, QTC 14; 2nd sessions, QNI 141, QTC 8. Nebr. Storm Net (NSN), 3982.5 kc, 2330Z and 0030Z daily, QNI 1073, QTC 21. Nebr. AREC Net (NAN), 3982.5 kc, 1430Z Sun., QNI 178. The Tue. Nite Central Nebr. AREC 10-Meter Net has held drills with stations from Kearney, North Platte, Ainsworth and Fullerton. WOFQB was awarded a certificate as the highest scoring station in the state during the recent 160-Meter C.W. Contest, so he promptly deserted the band by going s.s.b. with a new Galaxy III. KOYDS, RM for Nebraska, has put away his key while attending college in Lincoln. WAQGHZ was appointed RM to take over the Nebr. C.W. Net. The West Nebr. Net now is handling weather traffic from Western Nebraska and Wyoming for use by radio stations and SWLs. Traffic: WOLOD 185, KOYDS 87, KODGW 43, KOKJP 31, WOFIG 22, WAQBYK 20, KOJFN 20, WOVEA 16, KOUWK 14, WONOW 13, WQEGK 10, WONIK 9, WAQCEZ 8, KOHNT 8, KOJPT 8, WQAES 6, WAQOK 6, WOLJO 6, WQGGP 5, WOHOP 5, KOBYK/O 3, WAQFDO 3, KOFUR 3, WORJA 3, WQYFR 3, WQDDT 2, WOFQB 2, WQPP 1.

NEW ENGLAND DIVISION

EASTERN MASSACHUSETTS—SCM, Frank L. Baker Jr., WIALP - WIAOG, our SEC, received reports from ECs WISTX, K1s DZG, PNB and ICJ. WIPEX (Continued on page 110)

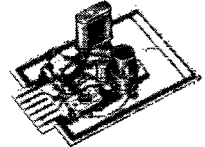
NOW DIRECT CRYSTAL CONTROL TO 160 mc With AOC Plug-In Transistor Oscillators

- Portable Signal Standards • Signal Generators For Receiver Alignment • Band Edge Markers
- Frequency Markers For Oscilloscopes • Quick-Change Plug-In Oscillators • Accessory Cases

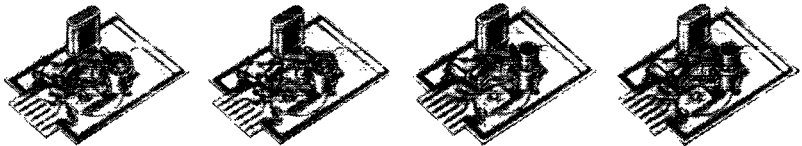
HIGH FREQUENCY (20 mc – 160 mc)

Five transistor oscillators covering 20 mc - 160 mc. Standard 77°F calibration tolerance $\pm .0025\%$. The frequency tolerance is $\pm .0035\%$. Oscillator output is .2 volts (min) across 51 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. -40°F to 150°F	OSCILLATOR (LESS CRYSTAL) PRICE	CRYSTAL FREQUENCY	CRYSTAL PRICE
OT-24	20-40 mc	CY-7T	$\pm .0035\%$	\$ 9.10	20-60 mc	\$ 6.90
OT-46	40-60 mc	CY-7T	$\pm .0035\%$	9.10	60-100 mc	12.00
OT-61	60-100 mc	CY-7T	$\pm .0035\%$	15.00	101-140 mc	15.00
OT-140	100-140 mc	CY-7T	$\pm .0035\%$	15.00	141-160 mc	18.00
OT-160	110-160 mc	CY-7T	$\pm .0035\%$	15.00		



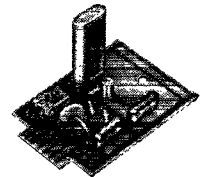
Order direct from
International
Crystal Mfg. Co.



LOW FREQUENCY (70 kc – 20,000 kc)

Four transistor oscillators covering 70 kc - 20,000 kc. Trimmer capacitor for zeroing crystal. When oscillator is ordered with crystal the standard will be $\pm .0025\%$. Oscillator output is 1 volt (min) across 470 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. -40°F TO + 150°F	OSCILLATOR (LESS CRYSTAL) PRICE	CRYSTAL FREQUENCY	CRYSTAL PRICE
OT-1	70-200 kc	CY-13T	$\pm .015\%$	\$7.00	70-99 kc	\$22.50
OT-2	200-5,000 kc	CY-6T	200-600kc $\pm .01\%$ 600-5,000kc $\pm .0035\%$	7.00	100-200 kc	15.00
					200-499 kc	12.50
					500-849 kc	22.50
					850-999 kc	15.00
OT-3	2,000-12,000 kc	CY-6T	$\pm .0035\%$	7.00	1,000-1,499 kc	9.80
OT-4	10,000-20,000 kc	CY-6T	$\pm .0035\%$	7.00	1,500-2,999 kc	6.90
					3,000-10,999 kc	4.90
					11,000-20,000 kc	6.90

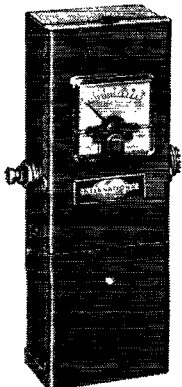


18 NORTH LEE OKLAHOMA CITY, OKLA.



AOC OSCILLATOR CASES

Small portable cases for use with the OT series of plug-in oscillators. Prices do not include oscillators. (When oscillator and crystal are ordered with FOT-10 case a 77°F tolerance of $\pm .001\%$ may be obtained at \$2.00 extra per oscillator/crystal unit. When oscillator/crystal units are ordered with FOT-20 case, a single unit can be supplied with temperature calibration over a range of 40°F to 120°F. Correction to $\pm .0005\%$. Add \$25.00 to the price of FOT-20 and oscillator/crystal unit.)



FOT-20



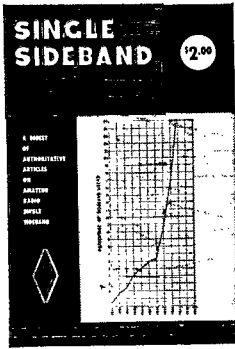
FOT-10



FOT-20 For high accuracy calibration requirements. Includes battery and output jack, output meter circuit and battery check, as well as thermistor temperature measuring circuit. **\$87.50**

FOT-10 Basic case with battery and output jack for general wider tolerance applications. **\$14.50**

MT-1 Oscillator board mounting kit. **\$4.95**



3RD EDITION

The Third Edition of "Single Sideband for the Radio Amateur" is an up-to-date collection of the best SSB articles that have appeared in *QST*, grouped to present a handy and useful reference book. The active sidebander, as well as the amateur planning to adopt this very effective transmission mode, will find the 3rd Edition indispensable. Starting with an introduction to sideband, the text is carefully organized to cover modulators, filter and phasing systems, linear amplifiers, accessories and includes not only theory discussions but plenty of practical construction and operating information. The entire area of single sideband is covered, both transmission and reception. Keep up to date. Get a copy of the bigger than ever 3rd Edition now.

\$2.00 Postpaid

U. S. A. Proper • \$2.25 Elsewhere

The American Radio Relay League

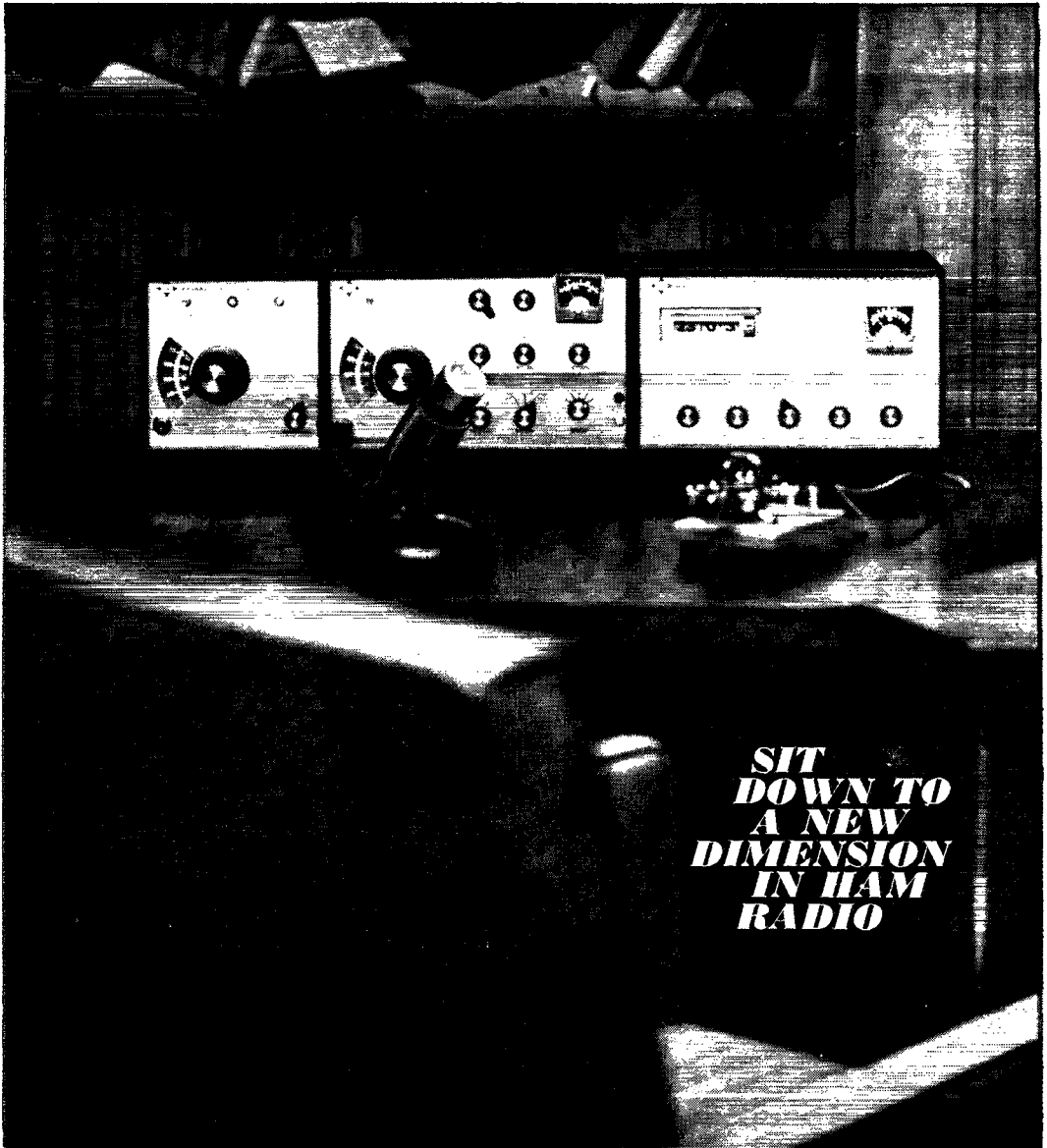
Newington, Connecticut 06111

made the BPL and is on a trip to Japan. The Central N.E. Net reports 26 sessions, 611 QNIs, 2 traffic. EM1-OMN had 4 sessions, 30 QNIs. WA1ALM is on Cape Cod. K1KTC is on 75 meters from Mass. State. W1LXR has s.s.b. WIAMO has a new beam. Wis HKG, KCO, VRK and K1LDC went to the N.Y. Hamfest. W1QQV has a new Drake 2B. W1ZQQ and his XYL went to the N.Y. Fair. W1THT took his first light plane ride with W1LXK. W1NF has a 2-meter Gonsel in the new car. W1NICON has a Drake 2B and transmitter on the way. One Boston paper had a nice write-up about K1FYV who talks with his son in Peru who is a priest. W1S AVT and AIS have net certificates for the EMNN on 3733 kc. Wis RRP and QPT have a sked on 6. K1EKM has a new tower and beams for 2 and 6. K1WYS writes from Lowery AFB in Denver, where he is stationed. K1BIF is on several nets. K1VGM is on 80-meter c.w. W1BIO is on a trip to California. K1ICJ, our Sharon EC, says he has 21 members in his net. W0PAN is on his way to K1H6-Land. The Massachusetts Club gave him a D-104 mike for all his help to the club. The club held a family-day picnic at No. Easton. W1AWC won the hidden transmitter hunt. K1AWP, Wis ECK and WLZ were mobile in the Bridgewater F.D. Parade. Kis HNP, AWP, Wis ECK, GRN, ULJ and WLZ also will be mobile for the marathon race in E. Bridgewater. W1ULJ has a new QTH in Whitman. Wis RSE, WC and ZZZ are back on 10. W1AQH has a new Valiant and K1DMU has an HE-50 mobile. W1WLZ has a new tri-bander, a three-element vertical beam for 80 and is going after DXCC on 80. W1NJL went to the N.Y. Convention and won 2nd place in the high-speed c.w. contest. He won an s.w.r. bridge and power meter and saw K2US. K1-HBJ is in his 3rd year at Tufts. K1MEM has a tri-band beam on an 80-ft. tower. W1BIP has an S-120 and a 1X-20. W1YH has a kw. K1RFO has a tower. New appointments: W1QMN as EC for Acton, W1ABGD as OES. Appointments endorsed: W1AR Belmont, K1ICJ Sharon as ECs; Wis AOG, PEX, AR and NJL as OPSs; comers at the West Medford Radio Club and as OBS. K1BGG as PAM for 6; W1AQV as OBS; W1NJL as ORS. W1AQV is busy helping newcomers at the West Medford Radio Club and as OBS. W1AR is in N.H. K1Z1H is working on his antennas. W1CRK is WA2UFI and is going to M.I.T. K1YKT has a TA93-jr. and is on 20 some. W1ZSS is getting ready to retire. K1WJD met with his EAN Net controls. W1NJM and W3EML at the NYS Net Picnic. K1VOK has a Viking 2. K1PNB says that there will be code practice on 37-33 kc. More on this later; listen in for it. The 6-Meter Crossband Net had 21 sessions, 302 QNIs, 59 traffic. W1CTR is in our 2-meter net now. EM2MN had 21 sessions, 170 QNIs, 135 traffic. W1TZ said he had to pitch in and try to keep a frequency clear for the amateurs in Florida during Hurricane Cleo. K4-CRU was heading this up. W1DXS is now in the Marines. Traffic: (Aug.) W1PEX 1577, W1EMG 257, K1-ZHS 192, W1AXB 176, W1LES 163, K1ESG 104, W1DOM 81, W1CRK 75, W1OPK 65, W1YKT 59, W1ZSS 45, W1-BJE 42, K1VJF 37, W1AOG 37, W1CTR 24, K1GKA 23, K1LCQ 15, K1CMS 12, W1NAVT 6, K1VOK 5, K1WJD 5, (July) K1YKT 192, W1ZSS 34. (June) K1YKT 29. (May) K1YKT 44.

MAINE—SCM, Arthur J. Brymer, W1AHM—SEC: K1DYG. PAM: K1ADY. RM: K1MZB. Traffic Nets: Phone Seagull Net 3940 kc. 1700-1800 EDT and 2000-2100 daily except Sun. Maine State C.D. Net meets Sun. at 1100 EDT on 3993 kc. and Wed. on 3530 kc. at 1900 EDT with W1BYK as NCS. The AREC Net meets Sun. at 0900 EDT with K1DYG as NCS. C.W.—Pine Tree Net meets at 1900 daily Mon. through Fri. on 3596 kc. First Regional Net meets at 1815-1930 daily on 3605 kc. The PTN needs more c.w. operators to check in to help swell its check-ins and pass more traffic. The response for the certificates for endorsement was very good. There are a lot of new hams in the state, too many to list, but congratulations to all of them. I have resigned as SCM as I am moving to Florida and K1DYG has been appointed as Acting SCM. Please give K1DYG your whole-hearted support as SCM until an election has been held. I would recommend him for election as SCM for two years. Thanks to all for your help. Traffic: (Aug.) K1DYG 40, K1ERI 40, K1GUP 26, K1LTO 26, K1TEV 16, W1VF 4. (July) K1TEV 26.

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—The Granite State Phone Net meets on 3842 kc. (alt. freq. 3845 kc.) Mon. through Fri. at 2330Z and Sun. at 1430Z. K1MPN, SCM Vermont, reports the formation of the VTNNH which will operate Mon. through Fri. at 7 p.m. on 3520 kc. W1WFZ requests active participation in this net by N.H. traffic men. Your SCM welcomes this combined net with Vermont. The election of your new SCM will have been completed by the time of this article's appearance. Congratulations to the newly-elected SCM. Endorsements: K1CIG as OES and OBS; K1BCS as OPS and ORS. Cancelled: W1YHE as EC; W1QHS as OO Class I. K1UHE as ORS; K1BGI

(Continued on page 112)



**SIT
DOWN TO
A NEW
DIMENSION
IN HAM
RADIO**

New powerful compact Galaxy Transceivers designed with a touch of elegance and hard core engineering. Never before has so much quality been offered to the amateur for so little cost. For the 80-40-20 meter Fan it's the Galaxy III and only \$349.95 amateur net. Want all Bands? "Cover all five, 80-40-20-15-10 meters, with the sensational Galaxy V — only \$469.95." No matter which Galaxy you choose, a full line of Galaxy accessories are interchangeable with either transceiver. Add up the features: **POWERFUL** — 300 watts • **COMPACT** — only 6" x 10¼" x 11¼" (less than one cubic foot in size) • **FILTER** — the only 6-crystal filter available • **RECEIVER** — it's the "HOTTEST" with full coverage on all bands. **LOOK** at the new VFO side view dial — perfect for mobiling — plus many other outstanding features too numerous to list. Why wait? The Galaxy Transceivers were built for your pleasure . . . ask the man who owns one!

SEE THEM AT YOUR FAVORITE DISTRIBUTOR NOW!!



**GALAXY
ELECTRONICS**

10 South 34th Street
Council Bluffs, Iowa 51504

Send for complete detailed brochure!

Name _____ Call _____

Address _____

City _____ State _____

ROHN

sets the standard

for CRANK-UP TOWERS

Why settle for less than the best?



K7ASK

TWO CATEGORIES TO CHOOSE FROM

Standard Duty Guyed in Heights of 37 - 54 - 88 - 105 and 122 feet

Heavy Duty Self Supporting and Guyed in Heights of 37 - 54 feet (SS) 71 - 88 feet (guyed)

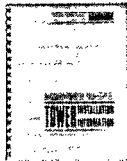
ROHN has these 6 IMPORTANT POINTS:

Ease of Operation—roller guides between sections assure easy, safe, friction-free raising and lowering. **Strength**—welded tubular steel sections overlap 3 feet at maximum height for extra sturdiness and strength. **Unique ROHN raising procedure raises all sections together**—uniformly with an equal section overlap at all heights! **Versatility**—designed to support the largest antennae with complete safety and assurance at any height desired! **Simple Installation**—install it yourself—use either flat base or special tilting base (illustrated above) depending on your needs. **Rated and Tested**—entire line engineered so you can get exactly the right size and properly rated tower for your antenna. The ROHN line of towers is complete. **Zinc Galvanized**—hot dipped galvanizing a standard—not an extra—with all ROHN towers! Prices start at less than \$100.

SEND FOR ROHN TOWER HANDBOOK

—\$1.25 Value

—ONLY \$100 postpaid (special to readers of this magazine). Nearest source of supply sent on request. Representatives world-wide to serve you. Write today to:



ROHN Manufacturing Co.

P. O. Box 2000

Peoria, Illinois

"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers, and installers of complete communication tower systems."

as OPS. Appointments: K1DWK as EC for Merrimack County. It is a pleasure to appoint Otis to this position. He has been very active in the past as Asst. EC and in running the Merrimack Valley Emergency Net. All reports received indicate that activity has been slow. The change in season should show an increase in activity.

RHODE ISLAND—SCM, John E. Johnson, K1AAV —SEC: W1YNE, RM: W1BTY, PAM: W1TXL, V.H.F. PAM: K1TPK. New appointments: W1VWR/W1CVY as OO and ORS. Endorsements: W1YNE as SEC and OBS; W1BTY as RM and OO. RISP report: 31 sessions, 671 QNI, 96 traffic. RIN report: 20 sessions, 73 QNI, 28 traffic. A spaghetti and meatball Dinner was held at the home of W1BTY for the RIN and RI League Officials. Present were W1s BTY, YNE, TXL, YKQ, K1s EWL, BRJ, TPK, Y1I, UXS, NJT, FGK and AAV. The dinner was prepared by W1BTY's XYL and K1FGK. After the dinner meeting a business meeting was held and K1YI was appointed RIN Manager. W1ZPG and his XYL, W1CEW, went to Ireland this past summer and visited E19J in County Cavan. Patty wants to be remembered to all his R.I. ham friends. E19J uses a long wire that runs up a hill pointing toward the west. The W1AQ Club of Rumford issued W1RI certificates: No. 52 and No. 53 to WA1BSJ and W1DWA, respectively. K1-LDK, of the club, received his DXCC certificate. New Techs. receiving tickets are WA1s CRW, GSN, CSO, GNL, BYE, BYL, BYI. Traffic: W1BTY 176, K1TPK 119, W1TXL 91, K1NJT 70, K1YEV 70, W1YNE 57, K1-VYC 41, W1VWR 32, W1QR 27, WA1BSJ 22, W1YKQ 18, K1YOA 6, K1EWL 2.

VERMONT—SCM, E. Reginald Murray, K1MPN—RM: W1WPFZ. The Green Mt. Net meets on 3855 kc. daily at 2230Z; the Vermont Fone Net on 3855 kc. Sun. at 1400Z; the VTNI Net on 3520 kc. Mon. through Fri. at 2400Z; the Vt. C.D. RACES Net on 3993 kc. (a.m.) Sun. at 1500Z. All above times are applicable after Oct. 24. Note that the combined Vt.-N.H. C.W. Net is now operating throughout the week. Welcome to new Novice W1NCMP, of Shaftsbury, and congrats to new Conditionals K1WND, of Taftsville, and WA1CNX, Morrisville. The Green Mt. frequency of 3855 kc. is monitored daily by W1AD/K1BQB. The Green Mt. Net had 581 check-ins with 76 traffic count; VTN had 29 check-ins with 10 traffic count. We still are looking for ECs throughout the state. Please get in touch with your SCM for details. Traffic: (Aug.) K1BQB 144, W1WPFZ 40, K1UZG 24, W1U1S 12, K1MPN 11, K1LLJ 4, W1K1G 1. (July) K1BQB 152, K1UZG 25.

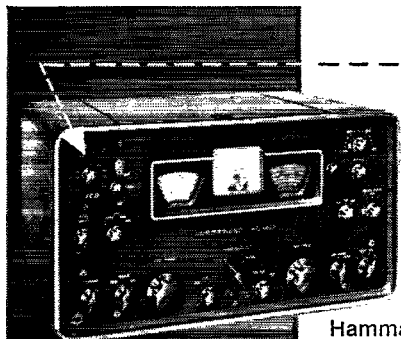
WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR, C.W. RM: K1-IDV; 75-Meter PAM: K1RVT, Hampden County 10-Meter Traffic Net Manager: K1PKZ. The West. Mass. C.W. Net has been quite active all summer but not with its usual number of check-in stations. K1PKZ, manager of the 10-Meter Net, reports that 57 different stations reported into the net during August, but very few messages were handled. Some originations from the members would help. K1RVT has a new Collins S/Line 75S-3B receiver, 3283 exciter and 30S1 linear. New officers of the Berkshire County ARA are K1GFT, pres.; W1-DQX, vice-pres.; W1WF, secy.; K1ZJH, treas.; W1-HRC, K1TRZ, K1HFI and K1PYX, board members; WA1BCU, publicity; K1JGW and K1DOW, membership comm.; W1BKG, editor of *Random Scatter*; and W1-UDT, W1FVT and W1UUK, reporters. W1DPY is now a professor of chemistry at the University of Tennessee. His QTH is Seward Drive, Johnson City, Tenn. New officers of the Pittsfield Radio Club are W1BKG, pres.; W1JDB, vice-pres.; W1WF, secy.; K1SGK, treas. New officers of the Hampden County Radio Association are K1JU, pres.; K1RPF, vice-pres.; K1PAM, secy.; W1-LRE, treas.; W1UFP, K1FUA, W1ALL and K1EFH, new board members. A new active season is upon us. Let's make it the best yet here in Western Massachusetts. Traffic: (Aug.) W1BVR 109, K1YMS 42, K1LBB 31, K1VFN 12, WA1AEV 9, W1D1V 9, (July) K1YMS 29.

NORTHWESTERN DIVISION

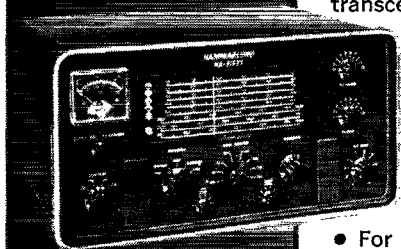
MONTANA—SCM/SEC, Walter R. Marten, W7KUH —Asst. SCM: Dr. Marvin Hash, W7YHS, H.F. PAM: W7YHS, V.H.F. PAM: W7TYN, RM: W7FIS. Endorsements: W7NVP as OO, OBS and OES; W7EGN as OES; W7YHS as H.F. PAM; W7COH as ORS. OO reports were received from K7SVR and W7FIS. W7LBB's daughter is making a tour of the state with the Montana Centennial Band. K7UPI is putting up a new TH-4 and Ham-M-rotor. W7BJT moved from Bozeman to Illinois. W7OOY and W7NVP vacationed in Nebraska. During the National Intercollegiate Flying Association Meet W7NPM operated from Check Point One near Harrison, Mon. W7W1W moved from Bozeman to Cam-

(Continued on page 114)

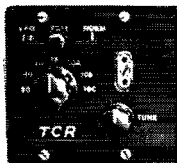
Another First from
HAMMARLUND
TCR



HQ-180A with TCR



HX-50



**A New Dimension in
 TRANSCEIVER Operation**

Hammarlund's new TCR* Transceiver Adapter for the HQ-180A/HX-50 or HQ-170A/HX-50 transmitter-receiver combinations, combines the ultimate transceiver operation with maximum station flexibility.

Enjoy this unique transceiver function without inherent transceiver limitations

PLUS

- For SSB—transmitter and receiver frequencies are *synchronized* ($\pm 3\text{KC}$ receiver frequency vernier—does not affect transmitter frequency.)
- For DX—Just flip the switch, you're on independent receiver frequency control (For those stations below 14,200 etc.)
- For Nets and Traffic—Front panel crystal socket for optional crystal controlled receive frequency.
- And—for the first time, a general coverage receiver, with high stability in the amateur bands, utilizing the TCR, HQ-180A/HX-50.

Protect your investment in amateur radio. Obtain transceiver operation and retain independent transmitter/receiver flexibility. Write today for details!

Hammarlund TCR kits are available for adaption of all HQ-170 and HQ-180 receivers

*Transmitter Controlled Receiver



HAMMARLUND MANUFACTURING COMPANY

A GIANNINI SCIENTIFIC COMPANY

73-88 Hammarlund Drive, Mars Hill, North Carolina 28754

Other Hammarlund Firsts

- | | |
|---|---|
| —variable selectivity crystal filter | —calibrated amateur bandspread |
| —front panel antenna trimmer | —continuously variable selectivity in an amateur receiver |
| —first noise limiter in an amateur receiver | |

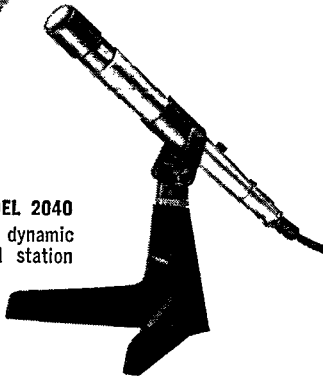
**INTRODUCING
THE WORLD'S
NEWEST HAM & CB
MICROPHONES...
GUARANTEED
FOR FIVE YEARS!**

UNIVERSITY



Extreme-intelligibility, press-to-talk dynamic for hand-held mobile use.

MODEL 9000



MODEL 2040

Extreme-intelligibility dynamic microphone for fixed station operation.

Want to make more contacts with less effort? Want more DX despite competition from the kilowatt crowd? Choose these new University dynamics and you'll "barrel through" even under adverse atmospheric conditions! They're better in every way—articulation, response, ruggedness. They had to be better—that's why we can offer them with a five-year warranty! (If you want to "live dangerously," buy some other brand. You may get a two-year warranty.) For complete specifications, write: Desk Q11.

FREE

**AMATEUR RADIO STATION
WA5HSK**

Walnut plaque with your own call letters! For details, see your local University dealer. CB plaques also available!

**LTV
UNIVERSITY**

A DIVISION OF LING-TEMCO-VOUGHT, INC.
9500 West Reno, Oklahoma City, Okla.

bridge, Mass. K7VVE is looking for an electronics job in Montana. For further information, contact him or your SCM. K7DES returned home from ROTC camp and now is working for the Forest Service. W7KUH spent two weeks at electronics school in Kansas City. Traffic: K7EWZ 179, K7UPH 15, K7SVR 10.

WASHINGTON—SCM, Robert B. Thurston, W7PGY —Asst. SCM/SEC: Everett E. Young, W7HMJ, RM: W7AIB, PAM: W7LFA. Washington Nets are WARTS 3970 kc., WSN 3535 kc., CBN 3960 kc., NSN 3700 kc., Noon Time Net (NTN) 3970 kc. The first two are NTS affiliated. A late report for July states WSN had 31 sessions, 248 QNIs and 87 QTCs for an average of 8 QNIs each session and 2.8 QTCs. The August report shows a considerable increase in QNIs and QTCs with a total of 297 and 234 with 31 sessions. W7BTB says his quad is down while he renews poles but he still maintains his skeds with KL7BJD in Spenard. W7JC reports he is QRT for vacation. W7AMC is recuperating from surgery. New officers and directors of the Washington Amateur Radio Traffic System (WARTS) are K7MGA, Yakima, net mgr.; W7DSB, Seattle, asst. net mgr.; W5YFS/7, Tacoma, secy.-treas.; W7EKT, Spokane, northeast dir.; K7VAS, Yakima, southeast; K7CZF, Tacoma, southwest; K7JAJ, Seattle, northwest; K7AJT, Aberdeen, director-at-large. The *Parasite*, the official organ of the WARTS Net, has a new look, very, very good. W7PXA has a new neat little package in the form of an SBE SB33. The total attendance at the Concouilly Hamfest was listed as 178 with 123 registrations of which 87 were amateurs. W7UVR reports that he is turning his antennas by the Armstrong method at present while awaiting rotators built to his specs. The NSN had 31 sessions, 363 QNIs and 104 QTCs for Aug. K7AZG will major in radio and TV at W.S.U. K7HZN is business administrator at Central College. K7HSX is going for his General Class. The Noon Time Net reports 904 QNIs and 329 QTCs for Aug. K7SRI says he will have the quad on 20 meters up and working soon. W7NWK walked his two daughters down the aisle for a double wedding. W7BA installed a new five-element Telrex beam on top his 100-ft. tower overlooking Lake Washington. W7NFA and family made a trip along the Oregon beaches for their vacation. W7AIB and his XYL spent a vacation in Reno. W7JPH has a new YL. About one hundred were in attendance at the Skagit Bar-B-Que held at Bowmans Lake, on Whibey Island. All appointees are reminded to check expiration dates on certificates and renew same when due. If the SCM does not hear from you in thirty days he will cancel your appointment. Traffic: W7BA 919, K7JIA 405, K7CTP 296, W7APS 220, K7SRI 132, W7BTB 54, K7YDZ 33, W7AIB 27, W7AMC 8.

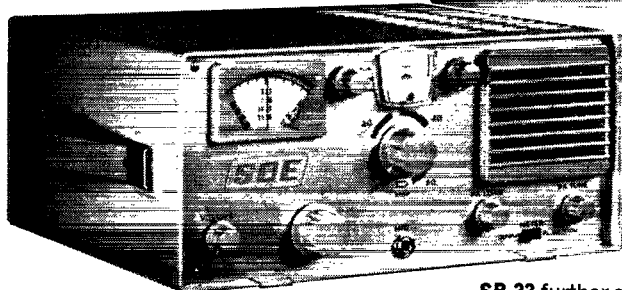
PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—Sec: WA6OLF, ECs: W6KTF, WA6WRIH, WA6FFF, WA6GRO, K6MHD, OESs: W6NDR, WA6MXI, K6QXY, WA6NCD, K6SPP, WA6VAT, OPS: K6TFT, ORSs: WA6ECF, WA6MIE, WB6ETY, WA6WNG/WB6CRC, OOs: W6OJW, K6GK, W6CBF, WA6EKN, WA6CVB, K6LRN, WA6KLL, W6TYM, RM: W6NBX. If your call is not on this list, check the expiration date on your certificate. If you would like to be added to this list and can meet the qualifications drop me a card. As you can see we are low on active ORSs, OPSs and ECs. Of these, EC is the most important and like any other job, in or out of ham radio, it can be as hard or as easy as you want it to be. If you have a large area to cover your assistants. That is why the ARRL has Assistant EC certificates. Make use of them. WA6CVB is now equipped with an S/Line. W6OJW made another visit to Alpine County. WB6ETY has rebuilt his rig but still has a few bugs. WB6FMB worked LU4HC on 15. WB6CRC; WA6WNG turned in a nice total for the first month of traffic work. WB6CRC has WACC 40/40. WA6WNG has WAS 48/47. K6GK is fighting high noise on 40. WB6LH has a new SB-300 and is getting an SB-400. WA6UAV worked KL7 with 11 watts but was QRT with rig trouble and the removal of wildcat teeth. WA6VAT is a new OES and WA6WNG/WB6CRC is a new ORS. WA6JVH has his leg in a cast as the result of a car accident. W3AMJ 6 is stationed at Alameda and living in San Leandro. The SACEN-6 frequency will be 51.3 for the rest of the year. The SACEN-6 is one of the most active groups in the Bay area and can cover all Alameda County in a matter of minutes to provide emergency communications. The members keep in practice by having many drills and constant monitoring. For instance, K6ERM has reported numerous accidents and obstructions on the Nimitz Freeway through W6UB, WA6ANE and his XYL have a new jr. operator, Paul, born Aug. 30. The North Bay ARA is in the middle of incorporation proceedings. Meetings are held the 2nd Wed. of the month at 1900 at the Red Cross in Vallejo. WA6JCS

(Continued on page 116)

SB 33 SET FOR 15

lively, year-round DX band



VALUE CHECK LIST

Compare **everybody's** transceiver data and prices. Read all the small print.

X Y Z SB-33

Four bands: 80-40-20-15				✓
Built-in AC power supply				✓
Built-in speaker				✓
Panel-switchable sidebands				✓
Price . . complete as above				✓

389.50

SB-33 further supports its claim to being the **greatest SSB transceiver value available** by offering an exciting **fourth band, 15 meters**. Sun spot minimums notwithstanding, 15 meters is frequently open for coast-to-coast and DX operation, proved this well during the recent phone DX contest by providing "pipe line" channels to South and Central America . . . to Europe from the East Coast . . . to JA, HL, VS1, VK and ZL from the West Coast. This band is ideal for SSB transceiver operation; the major activity being in the 21.25-21.45 mc U.S. phone band thereby allowing **all stations—DX and otherwise—to be "zeroed"**.

Fixed or mobile, **SB-33** plays this band like a hot smash off the distant fences! The all-solid-state receiver performs in a manner that must be heard to be believed. Reminder: **SB-33** is **all-solid-state throughout** except for the RF driver and the husky, double PL-500's in the amplifier.

For those who want the **big** signal at modest cost, the **SB1-LA Linear Amplifier**. Delivers 1 KW P.E.P. on 80-40-20, 750 watts P.E.P. on 15.

SBE

**SIDE BAND
ENGINEERS**

317 Roebing Rd.
So. San Francisco,
Calif.

Please send full information on SB1-LA Linear and SB-33 Transceiver.

NAME _____

NUMBER STREET _____

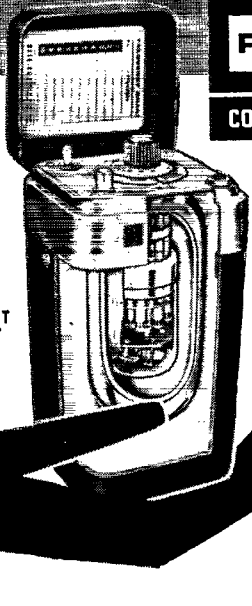
CITY _____

ZONE STATE _____

Export sales: Raytheon Company, International Sales & Services, Lexington 73, Massachusetts, U.S.A.

RAYTHEON

PORTABLE FREQUENCY STANDARD



RBM

CONTROLS

MEASURES BUT
7 3/4" x 4" x 4 1/2"

WEIGHS ONLY
2.6 POUNDS

- SIMPLIFIED OPERATION • PORTABLE, VERSATILE, PUTS "LAB ACCURACY" IN FIELD SERVICING • SPOT OR FIXED FREQUENCY MEASUREMENTS TO AN ACCURACY EXCEEDING PRESENT OR ANNOUNCED FCC REQUIREMENTS
- RUGGED CONSTRUCTION • LOWER POWER CONSUMPTION • DIRECT READINGS . . . NO TEMPERATURE COMPENSATION OR CHARTS REQUIRED • LOWER COST.

The specially designed RBM CONTROLS "Portable Frequency Standard" is a miniaturized, battery powered, low cost, frequency standard for alignment of two-way radio networks including transmitters, relay stations or transceivers.

This light-weight battery-powered instrument has been specifically developed for the accurate, reliable adjustment of transmitting and receiving equipment so located or installed that the use of heavy, laboratory type, line-powered equipment of sufficient accuracy becomes impracticable, if not impossible, due to transportation and powering difficulties.

FOR COMPLETE DETAILS WRITE FOR
RBM BULLETIN SC-101

Serving Major Markets Since 1921

RBM CONTROLS
Division Essex Wire Corporation
Logansport, Indiana

116

finally got her 20-meter beam fixed. Look out, DX! Thanks to the 5 clubs and 12 individuals who took the time to send me a report or a paper. Where are the other 650 ARRL members in the section and 500 non-members? What are you doing? Traffic: WB6CRC 93, K6GK 70, WA6FBS 38, WB6ETY 20, K6LRN 19, WB6ILH 6, WA6UAV 3.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kuriansky, KH6CCCL RM; KH6KWD. PAM: K3DIO/KH6NAA. V.I.F.F. PAM: KH6ECT. EC: KH6FJL. ORS: KH6EWD, KH6FJL. OOs: KH6KS, KH6BZF. OPS: KH6ATS. OBSs: KH6EWD, KH6ATS, KH6DXB, KH6AU, KH6DIT. OESs: KH6BAS, KH6UK, K6QKL/KH6. QSL Mgr.: KH6DQ. This is a complete list of your Hawaii section ARRL field appointees who serve you and your hobby. It is my pleasure to announce the appointment of KH6CCL as SEC. Ernie's devotion to KH6DIJ, MARS and the community will aid the office he'll hold down. We are indeed honored to have KH6UK as an OES appointee. Needless to say Ralph needs no introductions. We're all aware of Ralph's v.l.f. activities. KH6LX, locally with Page Communications Engineers, is awaiting his new Swan 400. KH6CRV has just returned from KJ6-Land where he was on business. KH6FHQ has been using her father's rig, KH6SN, since she landed her General Class ticket. W6HGU/KH6 left to work for the U.S. Navy near Subic Bay, PI. KH6CUP has returned from WESCON '64 where he had an enjoyable time eyeballing the reps. in the L.A. Sports Arena. RM KH6EWD is working up plans for a Novice net. If interested contact Trav Wood, Kaneohe, phone 248-984. KH6FJL is going with an SB-175. At a recent AFCEA chapter meeting KH6AX joined up. KH6AKE is on s.s.b. KH6AN and KH6AS are trying their TR-3s. KH6CCL has just returned from VE7-Land. KH6EJN, a faithful 50th state phone net control station, tells us that the Hilo gang has its AFMARS station, A16/KH6EX, on s.s.b. KH6CUP has gone to JA-Land on business/pleasure. KH6CCL is sporting his Swan 240 locally. Bruce Housner, an ex-KH6er, was here on a brief vacation from down under. KH6SN, up Hanapepe way, has been volunteer examiner of late. KH6AFS, down Hilo way, is about to graduate some 20 code/theory men. KH6EPW is engineering his latest tower/quad construction to keep skeds with K6TTQ, W6RAL/MM, aboard the *Lurline* 700 miles out of Hono, QSOed W6ADT and KH6FKU with very nice signals from all. KH6BQQ is mainlanding it for a while. KH6BEV, Hilo, reports there's quite a gang of hams at the Hawaiian Telephone Company's Hilo office. Besides KH6BEV there are KH6AKX, KH6IN and KH6DHG. KH6BAS has some new gear and arrays to back up his OES work. Traffic: (Aug.) KH6BGS 207, KH6ATS 16, KH6FJL 1 (July) KH6ATS 18, K6QKL/KH6. 1. (June) K3DIO/KH6. 6.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU. Nevada C.W. Net certificates were issued to W4CJD/7, K7OIR, W7NTW, K7SFN, W7SHY, W7JU and W7YK. NARA members should feel real proud of themselves for having such a nice Centennial Hamfest and Dinner. Most of Nevada and many western states were represented. W7NTW is now in KX6-Land. W7CTK and his XYL spent two weeks in Yellowstone. W7FBL is the new Churchill County EC. LYRAC's new board of directors consists of W7ANW, K7YXX, K7VTH and K7WWMG. K7RKH has a new rig with 75 watts output. W7ZT has his plans for retirement; instead of hamming night and day, it will be day and night from the same QTH, with preference given to RTTY. Over 300 Nevada Centennial Certificates have been issued to date, according to the XYL of W7TQE. The following were omitted from the list of those handling Alaskan traffic: W7RBV 47, K7TNY 4 and W7THH, one of the operators at K7FER. Traffic: W7FBL 16, W4CJD/7 13, W7JU 11, W7PBV 4.

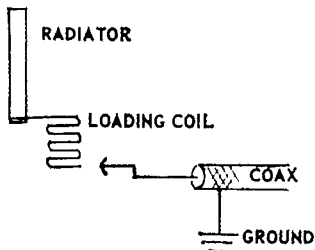
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6HYU. The Yolo Amateur Radio Club's newly-elected officers are WA6NAU, pres.; WA6YR, vice-pres.; WA6KNY, secy.; WB6EAG, treas.; K6GDS, sgt. at arms; WB6CVQ, boots and "Murphy" (a newly created office to assist the sgt. at arms and collect fines). WA6MIO, retiring after two and one-half years as prexy, proudly reports that the YARC has 100% AREC membership. WA6DKI is renewing acquaintances on 0 and 2 meters after a lengthy absence. WN6KOH and his Pawnee on 2 are FB. K6YVY is adjusting to civilian life in his new QTH and equally new shack. WB6CVQ is conducting code classes for Boy Scout Troop #282, for which he is radio counsellor. With assistance from WA6MIO, WB6GGH recently hoisted an inverted "V" that is working fine with his new T-150 on 40 and 75 meters. The YARC meets the 2nd Fri. monthly at the old County Building, Third and "C" Streets, Broder-

(Continued on page 118)

HISTORY - AND THE BIG SECRET

It is an historical fact that the Gotham 23' base-loaded, all-band vertical antennas have been consecutively advertised in QST for a longer time than any other antenna, and perhaps consecutively longer than any ham product.

When a product is popular and long-lived we sometimes lose sight of those newcomers who are not familiar with the 'secret' of its design. Here is the basic circuit:



A single 50 ohm coaxial feedline (either RG8/U or RG58/U) connects to the resonant point of the loading coil for operation on 80 or 40 meters, at SWRs of close to 1:1.

On 20, 15, 10 and 6 meters, the loading coil is bypassed and loading is accomplished by the transmitter pi-network output or antenna tuner output.

Note that the antenna is not grounded, and that radials are not used.

We are often asked if a Gotham vertical antenna will operate on MARS, C.D., C.B., MARINE, or other non-ham frequencies. Here is a simple method of tuning to any desired frequency within the range of the antenna: The inner conductor of one end of the coax is moved up the loading coil a turn at a time while the other end is coupled to a grid dipper tuned to the desired frequency. At one point, there will be a decided dip, and this is where permanent connection is made. With an SWR indicator, this point will indicate minimum SWR. With a field strength meter, maximum radiation will be achieved. Using a transmitter, this point will permit proper loading.

GOTHAM VERTICALS DELIVER THE CONTACTS

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more," W. A., Alaska.

CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a W.A.C. of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111

"The V160 did a beautiful job on a VEI for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

FREE CATALOG

AN ANTENNA THAT SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED.

WHY

THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA

- 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.

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..... \$14.95

THE V40 IS ALSO MADE FOR CITIZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS DESIGNATE CB-1 ANTENNA. PRICE SAME AS THE V40

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.....

73
GOTHAM

A Word from Ward . . .



SOME LIKE 'EM NEW . . . SOME LIKE 'EM USED!

While on a tour of Rome, Mark Twain, the daddy of Huckleberry Finn, found himself intrigued by the painting of a landscape done long ago by an old Italian master. A dealer hurried over. He gushed about the picture, the colors, the frame—and told the Mississippi Pilot he could have the whole shebang for only fifty thousand dollars.

"Wrap her up," said Twain.
"Now?" squeaked the dealer.

"Absolutely. But first, I want you to give me a guarantee that this picture is brand new. Only a leather-head would pay that kind of money for anything second hand."

There is no record that this particular transaction ever went through. But it does go to prove that some things have a mighty high value—even if they are a little used. So be it with ham equipment.

From time to time, I've told you about the new equipment we sell—and sure enjoy doing it. But I'd like my friends to remember that we also stock one of the cleanest inventories in the country of good, used gear—Collins 75A-4, 75A-3, 75S-1, 32V-3, Hammarlund HQ-110, HQ-140, HQ-129X, Johnson Valiants, Adventurers, etc. plus many other fine used receivers and transmitters—and plus hundreds of amplifiers, power supplies and what have you.

Why not tell us what used equipment you're interested in? Unlike what happened to Mark Twain—you won't be asked to pay fifty thousand dollars for it, either.

Sincerely yours,

Ward J. Hinkle W2JFK

Before you buy or trade, wire, write, call

or drop in to see WARD, W2FEU

Be Sure to Write for Our Latest Used List

ADIRONDACK RADIO SUPPLY

185-191 W. Main St., Amsterdam, N. Y.

Phone: (518)842-8350

Ward J. Hinkle, Owner

ick. The club's Two-Meter Net convenes each Mon. at 2000 on 145.8 Mc. The "Calypso touch" and clever artistry of the *Cookie Sheet*, monthly bulletin of the El Dorado County Amateur Radio Club edited and illustrated by WA6RMG, is missing from the SVS mail. The EDCARC's newsletter is now known as *The Heterodyne* and is edited by W6LSW, EC. Bill says for local contacts please look for The "Heterodynes" on 145.5 Mc. They are attempting to work out a closer coordination with AREC groups by tying in with the new Sacto AREC Net meeting Tue. at 9:30 p.m. (PT) on 146.25 Mc. The Sacramento Amateur Radio Club reports its best FD ever, at the Willow School Location and made 1620 points. K6IKV notes that there were 5 additional contacts to the aforementioned: "5 stations, 4 light bulbs and a dead short!" A 2-meter repeater for the Sacto Area is taking form. W6MIW and K6QIF are establishing this to be used for c.d. work, and to promote v.h.f. mobile activity and extend the range of the many low-power base stations using this band. WB6LIK, ex-historian of the SARC, has received his Tech. Class license and is now in Texas to undergo AF Basic Training. WA6TVA, active on the SJV Net, 1830 PDT 3915 kc., and the Sacto. Co. Emergency Net, 0430Z 146.25 Mc. Tue. has his Twoer and ten-element beam on the air along with a T-150, 80-, 40- and 20-meter inverted "V" and a V-40 vertical. K6DMI has returned to his Richmond QTH in the East Bay after spending several months, trailer-bound, portable 6 at Orangevale. WB6-BHJ is "orienting" at Cal Poly Tech, San Louis Obispo. Many Californians took advantage of the warm hospitality of the Reno Amateur Radio Association's "first" hamfest at Reno, including your ASCM/SEC, WA6HYU. Its station, K7FER, on 7220 kc. eight hours daily, issuing bulletins hourly, is an excellent example of public ARPSC Net in Sacto convening under K6IKV Tue. service by hams. Ten AREC members have formed an 146.25 Mc. and cordially invite you to join them. Gentlemen: Won't you please take a few minutes out of your very busy lives to jot down your news and activities and mail them to your SCM or ASCM (Mary Ann, 2830 Santa Paula Court, Sacramento 95821) by the second of each month. Traffic: WA6TVA 29, W6LNZ 17.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—ECs: W6ARE, K6CZN, ORSs: WA6DAU, K6OZL, WA6VPN, W6ADB. OBSs: WB6FYH, K6GZN, W6CUA. OOs: W6DVI, K6ACO. The Delta Amateur Radio Club meets every 3rd Fri. at the Junior Museum. Its local net is on 50.4 Mc. Code also is taught every Mon. and Thurs. at 8 p.m. at the Junior Museum. K6GZN and WA6FBL are the instructors. WN6JIN is the proud owner of an HRO-60. W6ONK has a Galaxy III. A new organization known as the Central California Sideband Association has been formed in Visalia. The new officers are WA6EDQ, chairman; WA6TQL, secy.-treas.; W6BYY, WB6AGN, WB6GIT, WA6YXJ, WA6RLW, and WA6OQE, directors. Anyone interested should contact WA6RLW. If you want to check into its net, it is held Thurs. at 2000 and Sun. at 1000. K6LKJ is mobiling in Canada. New officers of the Tulare County Amateur Radio Club are W6ILL, pres.; W6UHN, vice-pres.; K6VWV, secy.; and WA6TQL, chairman. W6GEG was a recent visitor in Fresno and is now transferred to Winston-Salem. K6FEJ is heard on 2-meters f.m. Fellows, if you don't blow your horn I won't hear it, so drop me a line regarding your activities. Also, hope everyone will have a nice Thanksgiving, because if you look around you will find a lot to be thankful for. Traffic: W6ADB 198, WA6VPN 150.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. V.H.F. PAM: WA6RXB. The Santa Clara Valley Section Net is picking up activity and looking for new check-ins. The net meets Mon. through Fri. at 8 p.m. on 146.7 Mc. Any interested amateurs are invited to check in. The South Bay 6-Meter Net reports 20 check-ins and traffic of 13. The net meets on 50.4 Mc. We welcome back W6QMO as RM. Jeri, a former manager of the NCN, is planning a new recruiting campaign for NCN members and ORS. The Santa Clara Valley Section meeting was held Aug. 23 at Blackberry Farm in Cupertino. There were 33 appointees and family members at the meeting where more S.C.V. ECs were present than at any other meeting. WA6HVN, our SEC, conducted the major part of the meeting which involved emergency planning for the section and the Simulated Emergency Test. K6DYX has been working on a small transmitter for biological experimentation involving the tracking of small animals. W6PLS received a Public Service Certificate for the Alaska earthquake. W6DEF is active on NCN. W6ZRJ vacationed at Trinity Lake and on the South Coast and worked mobile c.w. and phone. W6HC vacationed in Capitola. WA6CYL is working on Oscar communications. W6AUC is active as an OO. K6-YKG is working NCN whenever possible. WA6YDF is

(Continued on page 120)

DO YOU NEED AN EXTREMELY RUGGED SSB TRANSCEIVER AT A REASONABLE COMMERCIAL PRICE?



We do not suggest that you use a hammer
—However, the RF COMMUNICATIONS MODEL SB-6M,
MOBILE/MARINE SSB TRANSCEIVER is being used
for basic communications in some of the most remote
areas of the world.

Two years ago one of our customers needed DC powered SSB Transceivers to use in cars and trucks in one of the hottest, sandiest, most rugged desert regions of the world. He tested the RF COMMUNICATIONS MODEL SB-6M SSB TRANSCEIVER along with equipment from three other well known U. S. manufacturers.

And—after a year of evaluation he selected the SB-6M as the best transceiver available (at a reasonable price) for this very difficult application.

The SB-6M provides 125 watts p.e.p. power output for highly dependable single sideband communications over distances up to 1000 miles. It provides six crystal controlled channels over the frequency range of 1.6 to 16 Mc.

The SB-6M weighs only 35 pounds and is complete in one cabinet including power supply. Models are

available for 12 volt or 24 volt operation. The unit measures 18½" W x 14" D x 9" H.

All components in this transceiver are of the highest commercial quality. The unit is ruggedly constructed and entirely suitable for use in extremes of temperature and humidity. The transceiver is ideal for all Marine and Mobile applications.

Modern SSB circuitry is used throughout the SB-6M. Separate mechanical filters are used in receive and transmit. Compatible AM is standard. ALC, APC and AGC are provided.

A complete line of accessories is available including remote control, shock mount, antenna couplers, antenna kits and others.

The SB-6M is priced hundreds of dollars below other equipment of comparable quality.

RF COMMUNICATIONS is A LEADER in SSB COMMUNICATIONS.



R F COMMUNICATIONS, INC.

1680 University Ave. • Rochester 10, New York
AREA CODE 716, CH 4-5830 • CABLE: RFCOM • ROCHESTER, N. Y.

Overseas Distributor Inquiries Invited



THIS recent addition to the ARRL family of publications is written for the beginner and explains in simple language the elementary principles of electronic and radio circuits, tells how transmitters, receivers and antennas work, and includes complete how-to-build-it information on low-cost gear—receivers, phone and code transmitters up to 150 watts, v.h.f., measurements, and easy-to-build antenna systems.

PROFUSELY illustrated with hundreds of clear-cut photos, charts, diagrams and tables, the 320 pages of this helpful new manual contain a great amount of down-to-earth information unavailable to the beginning radio amateur in any other single publication. It's a "must" guide for every newcomer in setting up and operating his amateur station.

\$2.00 *Postpaid*

U. S. A. Proper • \$2.25 Elsewhere

AMERICAN RADIO Newington
RELAY LEAGUE, INC. Conn. 06111

busy as manager of the South Bay Six-Meter Net, and is working on the '65 National Convention Committee. WA6OLQ was active on NCN during the summer vacation away from Claremont Men's College. K6LFZ, EC for Hollister, reports that the Hollister Emergency Net provided communications for a control burn to clear 1300 acres of brush in the area. Those who participated in the successful activity were K6LFZ, W6RAG, WA6RLM, WA6UWL and WA6UPL. WA6YSY has been active in RACES in the Redwood City area. K6EQE is active on MTN. K6MTX is working on RTTY for Red Cross station W6UW. W6IBW is working with Palo Alto to set up better RACES coordination. The Baycoms, a group of v.h.f. amateurs interested in f.m. v.h.f. repeaters, is active in the development of new repeater equipment. The repeater the group operates is located on Mt. Umunhum near San Jose, and takes in signals on 146.85 Mc. and repeats them at 147.71 Mc. Officers are K6GSJ, W6THD and K6DMW. The Palo Alto Radio Club proposes to purchase an emergency communications trailer to house the club station and for station activity. K6HEP is active on 1200 Mc. as well as the lower v.h.f. bands. Traffic: (Aug.) W6RSY 610, W6YBV 210, K6DYX 208, K6GZ 140, W6JXK 107, W6PLS 52, W6AIT 46, W6DEF 37, W6ZRJ 24, W6HC 28, W6CYL 26, W6ZLO 22, W6AUC 14, K6YKG 14, WA6OLQ 13, WA6YDF 13, K6LFZ 5, WA6YSY 3, K6EQE 2, K6MTX 2. (July) W6DEF 124.

ROANOKE DIVISION

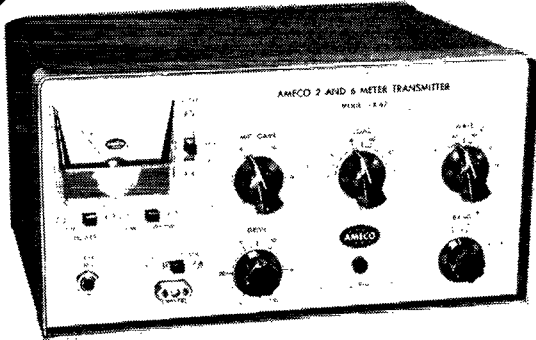
NORTH CAROLINA—SCM, Barnett S. Dodd. W4BNU—Asst. SCM; Robert B. Corns, W4FDV. SEC: W4MFK. RM: W44FJM. PAM: W4AJT. V.H.F. PAM: K4MHS. WA4PDS has increased power to 200 watts with her homebrew final and is keeping TCC skeds now. W4COJ says Gil-Rand is a new 6-meter net in Guilford-Randolph Counties. WA4EYA has a new SX-100 and Viking II but is going to have to divorce them for classes at U.N.C. W4EVN vacationed in sunny California. WA4ANH and K4QDO are new EC appointees. K4MPE is off to the Army for a tour of duty. WA4EIS is sporting a new SX-101A. PAM W4AJT wishes to advertise 3938 kc. as the N.C. calling and monitoring frequency. W4VSJ reports a new HC-10 and a 51J-3 Collins added to his shack. W4BZL, a new EC/OO appointee, reports an AREC net on 145.260 Mc. for Orange and Durham Counties jointly. WA4ICU says that since he got his new Drake 2-B he is hearing Q-5 signals that he didn't even know were on the bands. K4QIF reports a new state worked (W5RCL) on 144 Mc. Meteor Scatter. Net traffic: NCN (E), 266; NCN (L), 208; CCECN, 180; THEN, 88. Traffic: (Aug.) W4PDS 362, WA4KAC 299, WA4EYA/4 232, W4LWZ 195, W4EVN 192, K4CDZ 86, W4BAW 64, W4BNU 52, WA4ANH 46, W44FJM 46, K4MPE 35, K4EO 28, W4BDU 22, K4YYJ 22, WA4EIS 21, W4AJT 18, W4COJ 14, K4IEX 12, K4QDO 11, W4PYT 8, W4RWL 4, W4VSJ 3, W4ACY 2. (July) WA4EYA/4 150, W4IRE 104, W4COJ 10.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: K4HJK. RM: K4LND. PAM: K4OCU. Nets: C.w., 3795 kc. at 0000Z and 0300Z; a.m., 3820 kc. at 0030Z; s.s.b. 3915 kc. at 0100Z. V.h.f. activity is building up in several parts of the state. WA4UXV reports he is active on 6 and 2 from Myrtle Beach. There are centers of activity on 6 around Aiken, Columbia and Greenville also, with some linking of these. More OESs are needed in these areas. All nets were on the alert for possible action during the time that Hurricane Cleo threatened the S.C. coast. The S.S.B. Net operated one thirty-hour session during which there were 906 check-ins and 23 formal messages handled. All stations, particularly the net controls and relay stations, are to be commended on the excellent operation. Members of the s.s.b. and a.m. nets are asked to submit individual traffic reports each month WA4EMY, WA4PFQ and K4ZLW were issued section net certificates for the a.m. net. Set traffic: S.s.b., 136. A.m., 34. C.w., 63. Traffic: WA4EMY 121, K4ZHV 112, WA4PFQ 82, W4PED 66, K4LND 47, W4AKC 44, K4OCU 38, WA4ILO 12, W4NTO 11, W4JA 6.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SHJ. RMs: W4ZM, WA4EUL, W4SEH, W4QDY. PAMs: W4JMA (s.s.b.), W4DKP (a.m.). The new Va. Section AM Net is doing real well. WA4PFS is the new net manager. WA4FCS is installing an Eldico 100F and 1000F s.s.b. plus a couple of new antennas. K4AET has been working 20-40-80 mobile with a new SB-33. W4ZM saw "Barry" at the ARRL Convention in N.Y.C. Some of the fellows going away to school are K4RNI, K4YZT, W44FSC, K4WVT and WA4IVM. K4GRZ is busy as NCS and working with the AREC group. W4DLA attended the NYS picnic in N.Y. state and met lots of traffic brass including WINJM, W1BGD, W3EML and all the EAN
(Continued on page 122)

AMECO*Leader in Compact, Quality Ham Gear*

NEW 2 and 6 Meter TRANSMITTER



• HAS BUILT-IN MODULATOR AND POWER SUPPLY • 75 WATTS PHONE AND CW • ATTRACTIVE LIGHT GRAY PANEL AND DARK GRAY CABINET • COMPACT SIZE 11½" WIDE, 9½" DEEP, 6" HIGH.

The NEW **AMECO** TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.

Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final, 12AX7 and 6GK6 modulator. Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.

Meter reads final cathode current, final grid current and RF output.

Solid state power supply.

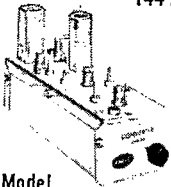
Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.

Potentiometer type drive control. Audio gain control.

Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only \$149.95

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95

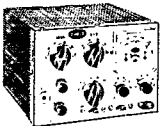
ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, \$24.95
MODEL PCLP with built-in power-supply, wired, \$32.95

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" x 7" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 Kit \$89.95 — Wired Model TX-86W \$119.95. Model PS-3 Wired \$44.95. Model Model W612A Mobile Supply wired \$54.95.



CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. \$19.95
CB-6W — wired & tested \$27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix. 6J6 osc. \$23.95
CB-2W — wired and tested, \$33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. PS-1K — Kit ... \$10.50
PS-1W — Wired \$11.50

EASY TO UNDERSTAND AMECO BOOKS



Amateur Radio Theory Course \$3.95
Amateur License Guide50
Radio Operators' Lic. Guide, EL 1-275
EL 3 1.75 EL 4 1.25
Amateur Log Book50
Radio Electronics Made Simple 1.95

CODE PRACTICE MATERIAL



Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 35, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear.

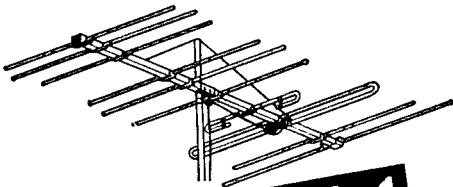
Dept. Q-11 Ameco equipment at all leading ham distributors.

AMECO EQUIPMENT CORP.

178 HERRICKS RD., MINEOLA, L. I., N. Y.

Affiliated with American Electronics Co. and Ameco Publishing Corp.

FINCO 6 & 2 Meter Combination Beam Antennas



2 ANTENNAS in 1

MODEL A-62 · 300 OHM

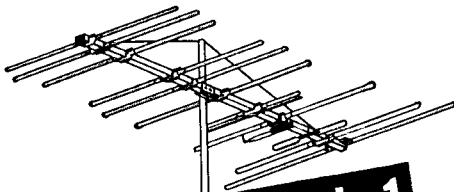
On 2 Meters:

- 18 Elements
- 1-Folded Dipole Plus Special Phasing Stub
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- Full 4 Elements
- 1-Folded Dipole
- 1-Reflector
- 2-Directors

Amateur Net . . . \$33.00
Stacking Kit . . . \$2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:

- Equivalent to 18 Elements
- 1-Gamma-Matched Dipole
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- 4 Elements
- 1-Gamma-Matched Dipole
- 1-Reflector
- 2-Directors

Amateur Net . . . \$34.50
Stacking Kit . . . \$18.00

MODEL AB-62 GMC

On 2 Meters:

Equivalent to 30 Elements

On 6 Meters:

Equivalent to 6 Elements

Amateur Net . . . \$52.50

Also:

- 5 New 6 Meter Beams
- 3 New 2 Meter Beams
- 1 New 1 1/4 Meter Beams

Gold Corodized for Protection Against Corrosion

See Your Finco Distributor or write for Catalog 20-226

The FINNEY Company - Bedford, Ohio

NCS including Mgr. K1WJD. W4PTR put up a new tower. W4JUJ was away for 10 days but got into the Illinois and WVA QSO Parties, besides snagging a few more counties. K4PXY says that he is going to let up somewhat on traffic and give more time to RCC and DX. W4NLCC will help as much as possible as an unscheduled 4RN rep. W4KFC reports: "Took part in WAE and All Asia DX Contests. Attended ARRL National Convention in N.Y.C. Building a new antenna coupler." W4ATDW, Fairfax Co., 4-H Club station was operated from the Floris, Va., 4-H Fair by W4IVP, W44RDN, W44PRF, W44QGG, W44RHX, W44RHT and W44QVS and originated 19 messages. W4MXU made "eyeballs" with W4ZM and W44SHD at the National Convention. W4PFC has many traffic outlets. W4DVT is going away until Nov. K4ASU, the new Norfolk EC, held a bang-up AREC drill during Aug. Traffic: (Aug.) W4PFC 771, K4PNY 629, W4RHA 462, W4DLA 403, W4DVT 229, W4MXU 207, W44FCS 148, W44EUL 110, W4ZM 86, W4NLCC 83, W5VZO/4 73, W4OWE 72, K4ASU 52, K4ISM 52, W4TE 40, W4DKP 35, K4GRZ 34, W4OKN 33, W4KFC 26, W44JRY 18, W4ZAU 13, K4LMB 11, W4QDY 10, K4RNH 10, W44FSC 9, W4NIK 9, K4EZL 8, W4JUJ 8, W4LK 7, K4NOV 6, K4BAV 5, K4IIP 5, W44IVM 3, W4PTR 1, W4WO 1, K4YZT 1. (July) W4PFC 577, W4WO 5.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA, PAM: K8CHW, RM: K8HID, S.S.B. Net Mgr: K8EEO, C.W. Net Mgr: W8LMF. State nets meet on 3570, 3890, 3903 and 3905 kc. W8KUW made the BPL again and is now ORS. W8CKX's work schedules interfere with traffic nets. It is with regret I report the passing of Richard Smith, K8MWN, of Dunbar, WVA. PON comes up with another fine traffic report, 233 messages. W8ACF, W8DUV and W8DUW are active on 144 Mc. in the Huntington area. W8LMF made a fine score in the West Va. QSO Party. W8GIO is moving to Baltimore. K8EEO reports for the S.S.B. Net, 12 sessions, 142 stations and 9 messages. K8CHW reports for WVN Phone, 13 sessions, 230 stations and 60 messages. Congratulations to the Black Diamond ARC on a fine hamfest held in Bluefield Aug. 30. W8QWE is moving to Columbus and K8HTS to Pikeville, Ky. W8QR and W8CCN have new hilltop homes near Fairmont. K8HUX operates 144 Mc. from the Grafton Club station, W8EP, the memorial call of the late "Smoke" Schwerer, a pioneer in v.h.f. work in W. Va. The WVN C.W. Net held 13 sessions with 58 stations and handled 78 messages. Traffic: W8FIC 215, W8KUW 192, K8TPF 178, W8LMF 93, W8CKX 49, W8HZA 20, K8ELH 15, W8BSE 6, W8EEO 4, W8JM 4, W8HKEF 3, W8IMY 3, K8ZDV 3, K8ZDY 3, K8CHW 2, K8EEJ 2, W8EXD 2, K8WNZ 2, W8CRW 1, W8ACUZ 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—SEC: WØSIN, WØGDC—PM, KØFDH—PM. Everyone likes to see his name in print, it seems like. Here in Colorado, we have a new ham paper called the *Sleepyhead Radio World*, dedicated to letting hams blow or brag if they so desire and to let them know about special ham doings over the state. Each month at least one ham is honored with his picture on the front page plus a write-up. It is printed in Alamosa, Colo., and it seems like the boys and girls around sure do like it. Of course, for a buck and a half a year you can afford to like almost anything. WØSIN has been putting in a lot of time with his SEC duties and it looks like it may be paying off. We have a new ham in Alamosa now, KØSLB. He is from Denver and is in the insurance business. KØDXF, of Poncha Springs, a dyed-in-the-wool a.m.er, is now the proud owner of a new s.s.b. transceiver, so it looks like the wool has faded. Also back in Colorado is KØJTZ at Sterling. Welcome back home. Net traffic: High Noon Net: 149. Amateurs of the Division mourn the passing of Andrew Bahlay, KØOOA . . . a great loss, as a personal friend to many; also one with high regard for the general welfare of the Amateur Service in conduct of FCC duties. Traffic: KØZSQ 90, KØDCW 83, WØCBI 14, KØTTB 5.

NEW MEXICO—SCM, Newell F. Greene, K51QL—Asst. SCM, Kenneth D. Mills, W5WZK. SEC: K5QIN. RM: W5ZHN. The Breakfast Club meets daily at 0700 on 3838 kc. NMEPN meets Sun. at 0730 on the same frequency. No word has been received from the TWN boys. K5TQP again is OES. Fred now has 18 states worked on 144 Mc. He puts a fine signal into this area. W5BWY is Asst. EC for Northern Eddy County. K5HTT, the new EC for Los Alamos, is busy recruiting more members. The atomic city is one place where they really take c.d. seriously. W5ZU has been keeping his camper busy since retirement. Now he is off on another trip. (Why not go in for DX-peditions, Mert?) About

(Continued on page 124)



GONSET SIDEWINDER
TRANSCEIVER Model 900A

SOLID STATE "SCOOP" FROM GONSET!

FIRST AND ONLY TRANSISTORIZED 2 METER SSB-AM-CW TRANSCEIVER FOR MOBILE, PORTABLE AND FIXED COMMUNICATIONS

The totally new Gonset Model 900A Sidewinder is the first and only transistorized SSB-AM-CW transceiver (except mixer, driver, final stages in transmitter) to provide complete coverage of the 2 meter amateur band in 4 segments 1 MC wide. Yet it's so compact it fits quickly under the dash of the newest cars! Transistor design makes possible a primary power requirement in the receiver of less than 1/2 amp! Separate power supply accessories snap-fasten to back of transceiver, or may be used for remote installation. Here's the trouble free, solid state transceiver with power to spare for any fixed, portable or mobile application!

For complete information, visit your Gonset Distributor, or write Dept. QS-11.

CHECK THESE HIGH-PERFORMANCE SPECIFICATIONS:

TRANSMITTER: Transistorized (except for mixer, driver, final stages)
• Frequency Range: 144-148 MC • Power Input: 20 watts PEP SSB, 6 watts AM, 20 watts CW • Spurious Suppression: -50 db • Carrier Suppression: -50 db on SSB • Unwanted Sideband Suppression: -40 db • Features include VFO low frequency 1st conversion, with crystal controlled high frequency 2nd conversion for stability, filter type side-band generation and broadband circuits for easy operation.

RECEIVER: All-transistorized • Frequency Stability: Highly stable; utilizes same VFO as transmitter • Sensitivity: 1/2 microvolt or better for 10 db $\frac{S+N}{N}$ • Selectivity: 3.5 kc filter for both receiver and transmitter • Audio Output: 3.0 watts • Spurious Suppression: -50 db or better • Image Rejection: -50db (receiver and transmitter utilize double conversion) • Full RF amplifier with three tuned circuits for low noise figure, good selectivity. Separate RF and AF gain controls.

TRANSCIEVER: Both the receiver and transmitter are dual conversion, using 15 MC and 9 MC frequencies with a hermetically sealed crystal lattice filter. Dimensions: 8 3/4" W., 4 3/8" H., 7 3/8" D. • Wt.: 10 lbs.-8 oz. POWER SUPPLY: Dimensions: (AC or DC) 8 3/4" W., 4 3/8" H., 5 1/8" D. • Wt.: 13 lbs.-8 oz.

PRICE: TRANSCIEVER: \$399.50 Amateur Net; POWER SUPPLY: AC-\$67.75 Amateur Net • DC-\$79.50 Amateur Net



ALTEC LANSING CORPORATION

GONSET, INC.

ALTEC LANSING CORPORATION
LTV A Subsidiary of Ling-Temco-Vought, Inc.

1515 S. MANCHESTER AVENUE, ANAHEIM, CALIFORNIA

QST

ADVERTISERS

Advertising is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's advertising rate card.

Amateurs and Electronic Engineers: Practically everything you need can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff

the time you read this, your SCM should be at the Oklahoma Convention, Lake Texoma. Traffic: W5UBW 34, W3LUX 17, K5HTT 4.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD.—SEC: W7WKF. The Utah Council of Amateur Radio Clubs held its Annual Hamfest in Millcreek Canyon. About 75 adults attended. W7QAG has been operating a 2-meter repeater at the old KFOR-TV site with very excellent coverage over the Ogden-Provo-Salt Lake area. K7SDF is a new OPS. W7LQE and W7VTJ stopped in for an eyeball QSO with W7ZC and W7IFJ during a recent trip to Southern Utah. BUN activities have been almost nil because poor band conditions have made it difficult for any two stations to hear each other. Please send reports to my QTH listed on page 6. Traffic: W7LQE 88, W7OCX 75, W7VTJ 21, W7MWR 3.

WYOMING—SCM, Wayne M. Moore, W7CQL.—SEC: W7YWE. RM and ORS: K7QYG. P.A.M.s and OBSs: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830; YO, Mon., Wed., Fri. at 1830 on 3610 kc.; Jackalope, Mon. through Sat. at 1230 on 3920 kc. Our plan for inter-state net activity is working very well. If you are not now checking into an adjacent state net, plan on doing so. This helps to eliminate Wyoming as a stumbling black traffic-wise. The State Hamfest in August was a great success and the Cheyenne group can be justly proud of the fine job. W7DW has moved back to Casper. Two new ECs are K7POX and W7VB. In August W7HH stayed continuously at the fire-fighters camp to furnish communications during the large Laramie Peak forest fire. Your SCM has finally gone s.s.b. Traffic: K7IAY 21, K7SLM 11, K7AHO 7, K7SDK 4, K7VTM 4, K7WNF 4, K7QGV 3, W7AEC 2, W7TZK 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD.—SEC: W4NML. RM: W44EXA. P.A.M.s: K4NSU and K4WIV. Several Alabama hams have received Public Service Awards for Alaskan work. K4WVP received an A-1 operator certificate. Glad to have W44FJF in Alabama while OM W44FLJ is in Viet Nam. W44VAR is a new Novice in Birmingham. Several Huntsville hams are going on 129 Mc. New equipment: K4WVP a TA-33 jr.; K4ZBX, a TR-3; K4LCI, a TR-3. W44HGN, a K4M-2; W44HFE, a Swan 400; W4WGI, a TA-36; K4IKR, a 50-ft. tower; K4IQU, a 6-meter beam; W44THX, a 20-meter beam. Aug. net reports (times GMT):

Net	Freq.	Time	Days	Sess.	Ave. T/c.	Av. QNT
AENB	3575	0100	Daily	31	3	7
AEND	3725	2200	Mon.-Sat.	22	.46	4.45
AENM	3965	0030	Daily	31	2.4	48.3
AENO	50.55	0115	T/T/Sat.	13	2.4	23.4
AENP	3955	1230	Mon.-Sat.	27	1.6	15
AENP	3955	2400	Daily	35	1.5	22.5
AENR	50.55	0115	Wed./Fri.	8	.5	19
AENT	3970	2230	Daily	35	1.31	7.1

W44EBS is the new NM for AENR. W44HGN is now on 6 meters. Traffic: (Aug.) K4WOP 95, W44EXA 79, W4NML 71, K4WHW 51, K4BSK 46, W4YNG 46, K4AOZ 44, W44JWS 37, K4ANB 32, K4WVP 27, W5DGH 24, W44FLJ/4 15, W44FJF/4 15, K4NSU 14, K4KJD 13, K4NUW 11, W44EXB 10, K4GXS 9, K4BTO 6, W44HFE 6, K4RIL 6, W4YRM 4, K4FZQ 3, W44HGN 2, K4JDA 2, W4CIU 1. (July) K4NUW 127, W44MGI 6.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD.—SEC: KZ5OC. The following report was written by KZ5OC. The CZRA held its monthly meeting Aug. 6. KZ5 Amateur Radio Week was held from 0000 EST Aug. 8 until 2400 EST Aug. 16 in observance of the Fiftieth Anniversary of the opening of the Panama Canal Company. It was a grand success. Over 9500 special 50th Anniversary Canal Zone QSL cards were printed and 1000 certificates. Certificates were awarded for five KZ5 contacts during the Anniversary Week. If you have not received your CZ certificate and have made five KZ5 contacts send a copy of your log to the Canal Zone Amateur Radio Association, P.O. Box 407, Canal Zone. On Sept. 10 the final sorting and packaging of all QSL cards and certificates was accomplished at the CZ Administrative Building, Balboa Heights, Canal Zone. KZ5OC finally got on the air during the CZ 50th Anniversary week. He is running a Swan-400 into a vertical and is having amazing results. KZ5BI is now No 3727 in YLISSB.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI.—SEC: W4IYT. A.M. P.A.M: W4SDR. S.S.B. P.A.M: W4OGX. C.W. RM: K4KDN. RTTY RM: W4RWM. V.H.F. P.A.M: W4BMC. At this writing this section has come into contact with a couple of pretty rough girls by

(Continued on page 120)

YOU WRITE THE R_2 ... IF IT'S FOR AMATEUR, CB OR COMMERCIAL TWO-WAY ANTENNAS, HORNET CAN FILL IT!

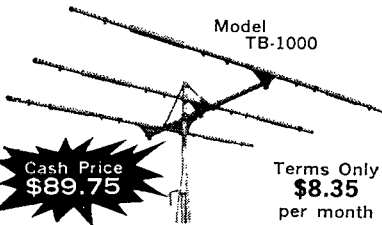
Model
TB-1000-4

**Cash Price
\$112.50**

**Terms Only
\$10.50**
per month

You will be proud to own this beautiful four element beam for 10-15-20 meters. It is unexcelled in performance and features commercial quality construction throughout. The only tri-bander with four working elements on 15 and 20 meters. This gives you that extra four element punch—plus better F/B ratio. The TB-1000-4 is rated at 1000 watts 100% amplitude modulated. It weighs only 64 pounds and has a turning radius of 17' 6". Install the TB-1000-4 at your station now!

Note: Special extended terms on this model available if purchased before January 1, 1965.



Model
TB-1000

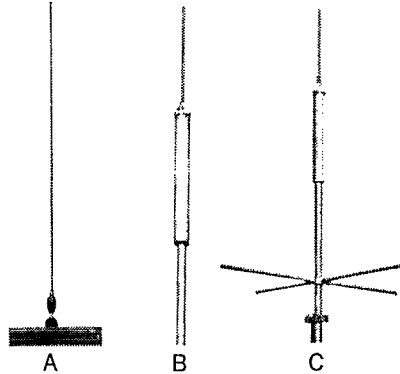
**Cash Price
\$89.75**

**Terms Only
\$8.35**
per month

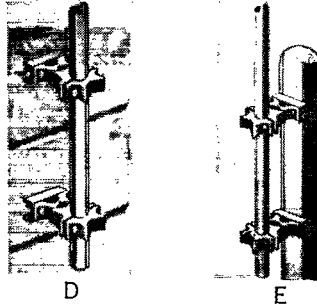
The TB-1000 features the same quality construction as the four element antenna above. Three working elements on 10-15-20 meters gives you performance unsurpassed by any other three element triband beam. It weighs only 44 pounds, and has a turning radius of only 16 feet. It is rated at 1000 watts, 100% amplitude modulated. Dollar for Dollar you can't equal the TB-1000. Buy it today!

Brochures are being prepared on our extensive new line of Monoband Antennas for Amateur and CB. Write for quotation and delivery date on your specific requirement.

We invite inquiries from Commercial Two-Way Radio and Citizen Band dealers. When writing for prices and information, please use your business stationery.



We have many different types of antennas available for Amateur, CB and Commercial Two-Way Radio. Example,—Fig. 'A' for 2 meters, CB and 150 Mc. Business Radio. Fig. 'B' and 'C' available for all services in frequencies ranging from 25 to 500 Mc. Write for complete information stating frequency required.



If you need Special Purpose Antenna Mounting Hardware, you can depend on Hornet to supply it. Fig. 'D' and 'E' above illustrate two of the many types available. Fig. 'D' will easily mount to masonry walls. Fig. 'E' solves the usually difficult problem of erecting an antenna on a power pole. Brochure available on other types.

MAIL YOUR ORDER TODAY

HORNET ANTENNA PRODUCTS COMPANY, Inc.
19 North 8th St., P. O. Box 880
Duncan, Oklahoma 73533

Phone: 405-AL 5-7520

Please rush the Hornet antenna indicated below for a 10 day trial. If not satisfied, I agree to return the antenna prepaid within 10 days without obligation. All prices f.o.b. factory.

- Payment in full is enclosed.
- I wish to use your time-payment plan. One monthly payment is enclosed.
- I prefer shipment to be c.o.d. 25% is enclosed.
- Send literature only on items listed below.

Note: If you wish to use our time-payment plan, please list two credit references.

Model	Description

NAME _____ CALL LETTERS _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____

The Model TB-750 is still available at \$67.50. Only \$6.30 per month.

LOW-LOSS, RUGGED, FLEXIBLE

NITROGEN-FOAM
50 OHM RG-8/U
COAXIAL CABLE



Frequency	Loss Per 100 Ft.	Frequency	Loss Per 100 Ft.
5 Mc.	.37 Db.	30 Mc.	.83 Db.
10 Mc.	.45 Db.	50 Mc.	1.22 Db.
20 Mc.	.65 Db.	150 Mc.	2.02 Db.

Heavy non-contaminating vinyl outer jacket protects the pure, bright copper braid, low-loss nitrogen foam dielectric and heavy copper center conductors. Excellent flexibility even under sub-freezing environmental conditions. ONLY .83 Db loss Per 100 Ft. at 30 Mc.

No. of Feet	Price
50	\$ 10.00
75	15.00
100	19.00
125	23.75
150	27.00
200	36.00
300	51.00
400	68.00
500	80.00
1000 (2-500 Ft. Reels)	150.00

ORDER TODAY

Enclose check or money order—shipping and insurance charges prepaid by us.

COMMUNICATIONS EQPT. CO.

518 State St. La Crosse, Wis.

Please send me _____ Ft. of Low-Loss Nitrogen Foam, RG-8/U Coaxial Cable at \$ _____.

I have enclosed check money order

NAME _____

ADDRESS _____

CITY _____ STATE _____

the names of "Cleo" and "Dora" and at this time it looks very much like another named "Ethel" wants to make a call. It is too soon to make any concrete evaluation of the action but it is clear that, regardless of a fault discovered here and there, the operation was conducted in a commendably orderly fashion. As far as the civil defense function is concerned Colonel Tarkington, State Director, conducted control of "Cleo" from the EOC, Palm Beach County, and was amazed that he had unbroken contact throughout the state for all state area, district and even county command and he was high in his praise of the Florida Sidebanders Emergency Net. We hope that some of the amateurs in other states who helped us may read this for we want them to know that we are grateful for the instant and highly competent aid that they gave us. The ESBN ran into skip both of the nights and capable operators in Houston, Chicago, Boston and Washington took over net control and kept Florida traffic going without a hitch. Many thanks from the operators in this section. We have an interesting note from the past SCM, W4QVJ, who states that he was in Miami on business when "Cleo" hit so operated at the Red Cross station, returned to his home in Jacksonville and found himself working the same storm again from his home station. Unique? It will be some time before this appears in print and no doubt our "Ethel" and perhaps even "Florence" will have come and gone. So it is a case of "que sera sera" and in the meantime may your tubes run cool!! Traffic: W4BMC 531, W4TUB 486, K4COO 207, K4BY 156, W4TRS 134, W4VHK 130, W4URX 123, WA4NBE 102, WA4RSQ 90, W4SDR 81, W4OGX 79, W4LUV 73, WA4NEV 58, W4IYT 58, K4SJI 58, K4IWT 56, W4AKB 52, WA4IJK 50, W44FYV 48, K4ODS 44, W4GJI 42, K4DAX 41, W4IE 40, WA1AFP 38, W4AYD 38, K4OAP 37, W4RQR 37, K4KDN 34, WA4RBM 29, WA4TBM 28, W4IET 25, WA4RXH 22, W4EHW 20, K4ENW 18, W4GWF 15, W4BAV 12, W4BKC 12, WA4IYG 12, W4FP 10, K4ILB 10, W4OVJ 9, K4QAY 8, WA4EVQ 7, W4RHL 7, WA4TGU 7, K4MTP 6, WA4UXZ 4, WA4FVD 3, WA4JYB 3, WA4IXI 2, WA4STJ 2, W4DFU 1.

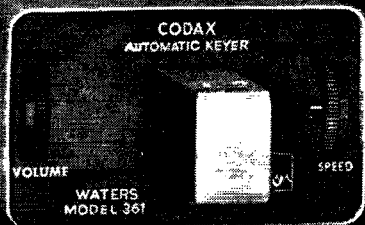
GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: K4MDC, RM: W4DDY, PAMs: W4FYH, K4PKK, W4EHT. Those attending the ARRL Convention in New York were W4HOS, W4FRO and WA4LBJ. After the convention they visited Headquarters at Newington. The new net manager for the Georgia Teenage Net is WA4HSN. The net meets Sat. at 1600 GMT. The Northeast Georgia Emergency Net meets Fri. at 0200 GMT on 50.25 Mc. Net Manager and NCS is K4FLR. The net coverage is excellent and other stations are urged to participate. K4UYD has joined the 2-meter gang. WA4MPD has a sixer and is building a paneled ham shack. WA4CJN joined with GSN in following Hurricane Cleo. WN4SRH participates in MARS activity on 2, WA4GPA is working on a tracking system for Oscar III. WA4BVD made WAC in addition to monitoring "Cleo's" activity. K4MCL has a new TR-3. K4BAI finds time for a little hamming along with military duties. WA4CZM made DXCC and will be QRT as a pre-med student at the University of Georgia. WA4PSA picked up 11 new countries during August. Most reports indicate extended groundwave on v.h.f. but no openings. One hundred stations with 1 message each are better than 1 station with 100 messages. Please report your activity. Traffic: K4MCL 220, W4DDY 216, W4NSO 111, W4RZL 109, WA4MPD 75, WA4CJN 48, K4FLR 44, W4PIM 38, K4AUM 25, WA4BVD 22, K4DKJ 22, WA4PSA 13, WA4HSN 9, WA4LLI 7, K4BAI 5, WA4PGA 3.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NMZ, RM: W4BYE. Tallahassee: K4OHR is back on s.s.b. with a Swan 400. Panama City: The transfer of W4FIJ and XYL WA4FJF leaves a big gap in section activities. Ellen is in Marion, Ala., while Dick is overseas. K4VYF, WA4IMC, WA4NRP and K4PAM were active on the nets during Hurricane Cleo. BRAVO. Crestview: W4TFL/4 now has antennas up for 80-15 meters. Fort Walton: WA4NRJ and W4ZGS provided a 2-meter link between local phone and c.w. net stations during Hurricane Cleo. I.I.f. stations on were W4MTD and W4RKH on s.s.b.; W4BYE and WA4ABP on c.w. K4YMZ and WA4HES have joined the local 2-meter gang. Milton: K4NMZ keeps nightly skeds on 145.2 Mc. with Pensacola at 0400Z. Pensacola 2-meter stations include K4FTI, WA4ILM, K4QVY, WN4TR, W4UUF and K4VND. K4HOX is working on a new shack. Pensacola: W4SRM and WA4ECY were active on traffic nets during Hurricane Cleo, using 29,560 kc. for a link between stations. WA4IZM is building a Heath S.S.B. rig. W4DAO is back on with a Drake TR-3, ready for another 30 years of hamming! Traffic: (Aug.) K4VYF 525, WA4IMC 298, W4MLE 175, W4BYE 120, K4NMZ 99, K4BDF 38, W4RKH 23, WA4NRP 26, W4FIJ 24, W4TFL 12, WA4JIM 10. (July) K4VYF 253, K4NMZ 57, K4BDF 32. (June) WA4IMC 225.

(Continued on page 128)

A Christmas CQ . . .

to the XYL whose OM wks CW.



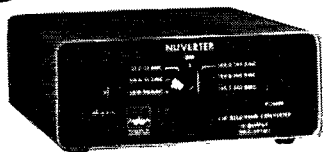
NEW
Waters **CODAX**™

AUTOMATIC KEYS

For the happiest ham on frequency come Christmas Day, surprise that OM with the smooth-performing new Waters CODAX, Keyer. Never anything like it!

Each paddle of the built-in double paddle keyer adjusts individually to his touch for gap and tension with spacing and timing from 5 to 50 WPM fully automatic. Plugged into the mike jack CODAX works CW on **either** upper or lower sideband . . . AM too, of course! With the receiver's phone-output plugged into CODAX he can monitor his own signal as well as the station he's working. CODAX employs solid state digital circuitry, has an hermetically sealed "Reed" relay and is self-powered. Interconnects with any rig in a jiffy without drilling or modification. Won't even need gift-wrapping it's that attractive. So if you'd be wearing mink on your birthday, give the OM a CODAX Keyer for Christmas. \$92.50

New too!



NUVERTER®
2 and 6 Meter Converter

Now the NUVERTER! Adds sharp 2 and 6 coverage to any superheterodyne that tunes 10 meters. And it installs without modifying requires no external relays or switches. A single function switch selects wanted band and matching antenna uses receiver's AVC and also has manual gain control on the panel. Circuitry includes Nuvector converters, high-stability crystal oscillators and integral power supply. Broad-banded to cover 1.8 megacycles in three 600 KC segments on both 2 and 6 meters. \$175.



WATERS
MANUFACTURING INC.
WAYLAND, MASSACHUSETTS

BARRY ELECTRONICS

FXR-AMPHENOL 3 KV @ 100 Ma. maximum. Adjustable lab power supply. Standard 12 1/2" x 19" relay rack panel. Deluxe with 4" Simpson Meters. \$85.00.

HADLEY KW PLATE TRANSFORMER. Herm. sld. Pri: 115 VAC @ 60 CPS with taps. 6200 VCT. Incorrectly rated @ 81 Ma., Guaranteed 1 KW. \$29.50.

G. E. NE-42 NEON GLOW LAMP. 115 VAC or DC. Reg. net \$2.65. Special only 50¢. Sale on SUPERIOR ELECTRIC and GENERAL ELECTRIC VARIABLE TRANSFORMERS: Superior Model 136U (20 Amps./2.8 KVA) @ \$22.50. Model 30MCI36-3 (triple motor-controlled unit) Uses three #136U for single-phase, parallel connection, or three ph. "Y", or three electrically separate units. With motor \$150.00; Model 130M116U (0 to 140 VAC @ 7.5 Amps.) with motor. \$50.00; Model 30MB126U-2 (two 126U units motor-driven, 12.5 amps. per unit, 0 to 140 VAC) with motor @ \$90.00; General Electric Model 9H85AA10X (0 to 120/140 VAC @ 30 Amps.) \$39.95; Model 9H85BA10X (0-240/280 VAC @ 14 Amps.) \$39.95; Model 9H60A10X (240 Input, 50/60 CPS, 1 Phase Output; 0 to 240 VAC @ 5.5 Amps.) \$18.50.

MILLEN FREQUENCY METERS #90605 or 90607 or 90608 @ \$7.50 each (specify 4)

MOBILE TX-86 AMECO 90 WATT XMTR. 6 to 80 Meters. Sale price. \$79.95. (wired)

AMECO MODEL PS-3 AC PWR SUPPLY for TX-86. \$35.00.

HAMMARLUND HK1B KEYS. Like new. \$27.00.

HALLICRAFTERS HT-32 SSB XMTR. Like new. \$298.00.

HAMMARLUND HQ-180. Like new. \$295.00.

VIKING RANGER II. Factory Wired. New. \$275.00.

NATIONAL NGX-3. New with factory warranty. With AC and DC Converter supplies all new factory warranted. Cash deal \$479.16 for all three!

RME VHF 152A. 2, 6, and 10 Meter Converter. Used. \$27.50.

New with factory warranty HAMMARLUND HX50 SSB XMTR. \$375.00.

NEW HAMMARLUND HXL-1 1500 WATT P. E. P. Linear Amplifier. Factory warranty. \$335.75.

HQ110-AC RECEIVER. New with factory warranty. \$207.20.

COLLINS 51J-3 (R-388/URR) RECEIVER. \$525.00.

COLLINS 51J-4 with 3 KC and 6 KC Mechanical filters. \$721.00.

CLEGG ZEUS 2 and 6 Meter Xmtr. Direct from factory with factory warranty. \$575.00.

MATCHING CLEGG 2 and 6 Meter VHF INTERCEPTOR RECEIVER. From factory with factory warranty. \$35.00.

GD AR-23.00.

CD HAM "M" ANTENNA ROTOR. \$110.00.

NATIONAL NC 400 DELUXE RECEIVER. Factory sealed carton. \$695.00.

STANDARD DIAL DESK TELEPHONE — high quality made by P.T.R. Can be used to make complete private systems. Includes Handset, Dial and Bell. Ready to connect. Recently used. Excellent appearance. Modern cradle type. \$6.95.

VHF SWITCHED TUNED OSCILLATOR. Part of AN/ARK26. 16 different frequencies. Switched by Ledex switch, operating @ 12 V. Reg. approx. 150 V. Perfect for the 2 meter transmitter. \$6.95.

MILLEN 3" MUMETAL SHIELD for 3" C.R. tubes. \$2.75.

UTC PLATE XFMR. 115 or 230, 50/60 CPS. Sec: 5800 VCT @ 1 Amp. New. \$110.00.

THERMADOR CHOKE. 5 Hy. @ 1.7 Amps. DC. 21 Ohms. \$24.50.

DELUXE MULTI-METER AN/PSM4C. Brand new. \$135.00 value at only \$65.00 with book and access.

AMECO PGL 6 thru 160 METER NUVISITOR PRE-AMP. \$4.95.

SILICON RECTIFIERS: All rated 750 Ma. 400 PIV @ 30¢ 600 PIV @ 36¢, 800 PIV @ 56¢.

ARRL HANDBOOK \$3.50.

World's Fair Visitors, please visit us when in NYC. We are open — MONDAY to FRIDAY 9 AM to 5:30 PM. SATURDAYS: 10 AM to 2 PM.

IT'S BARRY FOR TUBES... — TUBE HEADQUARTERS OF THE WORLD! — Direct Factory Distributor for Eimac, Westinghouse, etc. REAL SAVING. Write for latest list or call for quotations. We can ship immediately by air. Separate export dept for overseas and Canadian orders. Best, biggest, Most Diversified Tube Stock there is. Try us and see. Tubes for Hamms, Industry and Radio Stations our specialty. Let's hear from you.

Write for #14 Green Sheet Catalog if you do not already have your copy.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Coylar, W7FKK—SEC: K7NLY. PAM: W7CAF. RM: K7TNW. K7RUR participated in the recent FMT with very good results. K7NJO is the new NCS for the 2-meter net which meets Mon. nights at 0300 GMT on 143.35 Mc. K7OFL has a new home-brew 6-meter three-element beam. W7QHC is on the air with a new HW-32 transceiver. W7PEW just completed a 9000-mile vacation trip to Alaska. He was able to keep schedules with home by means of his TR-3 transceiver. The Arizona Amateur Radio Club station, W7IO, is sporting a new Swan-400 S.S.B. transceiver. K7UGA was nominated for the Presidency. W7AYL has a new home-brew k.w. linear. The Scottsdale Amateur Radio Club meets the 3rd Mon. of each month at 0230 GMT in the Western Savings Building in Scottsdale. Please check the expiration date on your ARRL appointment and mail your certificate to your SCM for endorsement. Make application to the SCM for an ARRL appointment. Traffic: K7TNW 501, W7CAF 292, K7N11 113, W7FKK 31, K7RUR 1.

SAN DIEGO—SCM, Don Stanifer, W6LRU—The American Radio Club of El Cajon received a call change to WA6BGS, that of the late Eddy Quinn who helped organize the club. K6LKD, ORS in Escondido, has received an A-1 Operator certificate. WA6ROF went back to college in September, but enjoyed attending the convention prior to hitting the books. W6MYC gave a chalkboard talk for the Newport Club in September on how wireless ticks. The Annual Anaheim Amateur Radio Association Dinner will be held on Nov. 7. Those in the area wishing to attend who are not club members should contact WA6ENZ for further information. WN6JCC received his San Diego 1/2-Century Club certificate for 20 meters. The Palomar Radio Club held an enjoyable picnic at Live Oak Park in Fallbrook. A newly ARRL affiliated club is the Orange County DX Club. Another new club is the Vista Radio Club. DXer K6ENX is moving from Escondido to Vista where he is building a new home on a high hill. WA6SBO has moved to a high hill overlooking La Mesa. The SOBARS held its 7th anniversary meeting in Sept. Vice-Director W6GTE brought the Orange County Club up to date on ARRL activities in August. The September meeting of the San Diego DX Club was held at the home of its president, W6ID. Phone DXer W6RCD is raising his antennas to 80 feet. Appointees in the section are again reminded that to keep a valid appointment you must report regularly to the SCM, and not allow your membership in ARRL to lapse. The new call of the Anaheim club is K6SYU. Traffic: (Aug.) K6BPI 3815, W6IAB 3620, WA6JUH 309, W6EOT 291, WA6ROF 96, WA6BRG 86, K6IME 36, WA6CDD 19, WA6ZWR 15, K6LKD 5, WA6RUS 5, WN6JCC 2, W6WRJ 2. (July) WA4BRG 78.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—RM: W7WST/6. As the new SCM I would like to ask for your assistance in making this section more active. Many appointments are open and if you are interested, please contact me. I especially would like to hear from the northern portion of the section. How about some activity reports, fellows? W7WST/6, of Oxnard, continues to be the traffic king. K6LVB should be on 2 soon. WB6DPV spent July with the XEIs in Mexico. W6YK is waiting for the next 144-Mc. activity from KP4BPZ. WB6DRY has TDY on Johnson Island and will look for the gang on 20. K6BUD has purchased a new printer and plans to give teletype a whirl. WA6JBE purchased a de luxe HZN Tri-Ex tower but cannot put it up because of the indefinite plans at Ft. Mugu. K6VBC had a vacation in Washington with an SBE-33. K6AAK, the retiring SCM, plans a vacation up north also. Traffic: W7WST/6 261, WB6DPV 14.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. PAM: W5BOO. RM: W5LR. The Annual Labor Day Hamfest, sponsored by the Waco ARC, was held in the air-conditioned mall of the Lake Air Shopping Center Sept. 6. The registered attendance was 138, with about 20 attending without registering. W5QKF, West Gulf Division Director, made a report on the National Convention and W5BNG, with the able assistance of W5BOO, PAM, gave a talk on ARPSC and traffic-handling in general. W5YUO won the transmitter hunt. WA5DQP has been appointed as net manager for the TEX C.W. Net, replacing W5DTA. BZ needs help to get rid of the traffic coming into this area. What has happened to the c.w. operators? Amateur radio exists as a hobby because it qualifies as a service. What better way can you qualify than by handling traffic? W5GMC reports the Wichita Falls RACES group now has a station in the Court House (Continued on page 130)

BARRY ELECTRONICS DEPT. Q-11
512 BROADWAY, NEW YORK, N. Y. 10012
WALKER 5-7000 (AREA CODE 212)

Enclosed is money order or check and my order. Prices FOB, NYC. Shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overage will be refunded. Fragile tubes shipped via Railway Express. 50¢ service charge for orders under \$5.00.

Send for New 64 page greensheet catalogue No. 14
 Send information
 I have available for trade-in the following.....

Name.....Title
Company.....
Address.....
City.....State.....

NEWS

B & W OFFERS AMAZING Model 6100 TRANSMITTER FACTORY DIRECT!

OR THROUGH
YOUR LOCAL
DISTRIBUTOR



**NOW
ONLY**
\$495⁰⁰
NO TRADES
FOB FACTORY

**Here's why B & W's Model 6100 has been called
the "Most Amazing Transmitter of Our Time"!**

- The Barker & Williamson Model 6100 Transmitter has been engineered and built to give the discriminating operator the ultimate in SSB, CW and AM communications.
- The 6100 uses the B & W crystal controlled frequency synthesizer, producing an order of stability which up to this time has been available only in costly military and commercial communication systems.
- The crystal lattice filter method of sideband generation is employed. Superior sideband suppression results.
- Solid state rectifiers are used.
- Dual automatic level control (ALC) with adjustable threshold prevents overdrive of output stages.
- Digital Dial System offers a high degree of dial accuracy.

WIRE, WRITE OR PHONE - FACTORY DIRECT - DEPT. C

BARKER & WILLIAMSON, Inc.

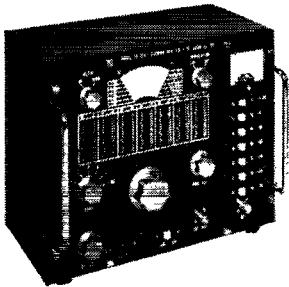
A SUBSIDIARY OF RENWELL INDUSTRIES, INC.

Complete Radio Communication Systems and Equipment

Beaver Dam Road, Bristol, Pa., • 215 788-5581



ALL TRANSISTOR STANDARD SIGNAL GENERATOR NEW! MODEL SG-83A



LATEST
MODEL
!

MADE
IN U.S.A.

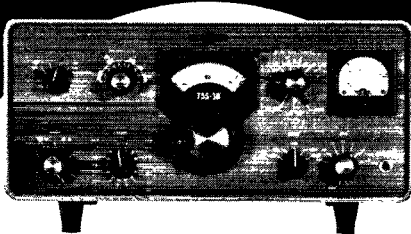
- ✓ 50 Kc. to 54 Mc.; 1% accuracy; plus 1 Mc. crystal
- ✓ Calibrated output 0.6 to 160,000 microvolts
- ✓ Operates from 115 volts or internal battery
- ✓ Modulation 0-50%, read on meter. No FM!
- ✓ Write for technical bulletin

If not in stock at your dealer's, order direct. \$275.00 net
We pay shipping anywhere in U.S.A.



CLEMENS MANUFACTURING COMPANY
630 South Berry Road
St. Louis, Missouri 63122

RADIO, INC... YOUR COMPLETE ELECTRONIC DISTRIBUTOR



75S-3B
RECEIVER

TIME PAYMENTS
TRADE-INS

CALL OR WRITE
RONNIE W5ATB
BERT W5FU

Radio, Inc.

1000 S. MAIN • LUTHER 7-9124 • TULSA, OKLA.

with capabilities of operation on 28,560 and 3.9875 Mc. It is regrettable that it takes a major disaster of some kind to wake up the powers-that-be to the capabilities of amateur radio. WA5CMC is the proud owner of a new Swan 400. The Arlington ARC operated a booth at the Community Fair and received much favorable comment from the many people who attended the Fair. W5DYW has had trouble working some of the northwest and north-central states so he goes mobile into these states so that he will be sure to get some of them. Traffic: (Aug.) WA5DQP 238, W5LR 10. (July) K5FLD 211.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Aast. SCM: Cecil P. Andrews, W5MPX. SEC: K5DLP. The members of the Edison High School Radio Club are back on the air again after a year's lay-off because of an expired license. Their call is WA5JZR. Let's listen for them and give them a boost. W5TKC has a new son, which means a new grandson for W5EHC, W5FFW is now back home after an operation. WA5FLV has been appointed OBS for 75 meters and will transmit the Bulletin at 8 or 9 P.M. Mon., Wed. and Fri. on 3850 kc. and on their local 2-Meter Net on 145.35 Mc. W5MPX has a new 48-ft. tower with a 20-meter and 2-meter beams on it. He can now be heard all over the state. K5CAY and W5PPE now have the 2-Meter Net operating each Mon. at 8 P.M. on 146 Mc. The state can be completely covered by this net. K5CAY has a new TR-3 and a 2-meter rig with 500 watts output. Lightning hit WA5FVJ's transmitter and receiver and he is now using Dan's HT-32 and is back on the air. WA5GQZ is now on the air in Cleveland with a TR-3. K5ASW, the friendly undertaker in Marlow, is on the air with a new Swan 240. K5TCG, brother of K5OCX, moved from Texas to Bartlesville. W5HXT is soft-pedaling amateur radio while he loud-pedals his new Alfa-Romeo. K5YYI is on temporary duty in Lebanon. K5YEE has become a convert to s.s.b. Traffic: K5TEY 137, K5KTW 34, W5DRZ 25, K5CAY 16, WA5BNG 14, K4DLP 13, W5PML 10, W5MPX 6, W4SKI/5 3, K5OCX 3.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM. SEC: W5AIR, PAM, W5ZPD, W5s AQK, BKG, HQR, YCV, TVK, DIV, EYV, and NYL vacationed by driving to Presidio, and taking the slow train through Mexico to the West Coast. This is through the mountains and from what I can hear this was a wonderful trip and was enjoyed by all. K5QVH and family have been vacationing in California; W5KOK and family in Arizona. The members of the Corpus Christi Amateur Radio Club furnished communications for the Sports Car RACES in Corpus Christi. W5AQK was control station at the start and finish line, with a mobile at each of the corners of the track. W5HZR vacationed in Illinois. Anyone attending Texas A&M University who is interested in obtaining Amateur Radio Instructions, should contact the A&M Amateur Radio Club. WA5DQP is the new net manager of TEX Traffic Net. W5QEM has a new NCL-2000. Well, the time has rolled around again to elect our Director for the next two years. Be sure when you receive a ballot to mark it and send it back. Anyone who is a member of the League, and doesn't vote, is like the one who doesn't belong and I don't believe has any right to criticize. Personally, I think W5QKF has done an FB job as Director. Traffic: K5-ANS 128, K5HZR 122.

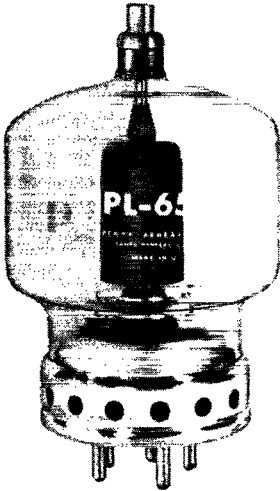
CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM; VE6PV, RM; VE6AEN, ECs: VE6SA, VE6SS, VE6ABS, VE6AJY, VE6AFJ, OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA, OOs: VE6HIM, VE6NX, OBSs: VE6HM, VE6AKV, ORS: VE6BR, OESs: VE6DB, VE6AKV, VE6AJY, VE6MC. At this time VE6PV would like to thank all who pitched in for the last couple of months in taking over net control for APN. Our SEC reports that it looks very good for AREC this winter. By all reports Calgary and Red Deer have lots of activities for this coming winter. No reports were received from Edmonton, Medicine Hat, Vulcan and Lethbridge. VE6SS reports that things will perk up after harvest. I attended a meeting in Red Deer of the ARLA and it is worthy of your support so, fellows, support it in any way that you can as we sure need some unity in this province. Check the nets: CREN-0230Z-Wed.; SAEN-1630Z-Sun.; CAEN-1600Z-Sun. APN-0430Z-Mon., Wed., Fri.; APN-3770 kc.; CREN, SAEN, CAEN-3740 kc. Traffic: VE6FK 15, VE6SA 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FR—The BCARA Annual Picnic was well attended. VE7-AHV skeds VE7NG at Alert on 20. ITV has QRT VE7AOE at Kitimat. The Terrace ARC is forming a 2-meter net. Has anybody seen an RM last heard head-

(Continued on page 132)

**WHY USE MAKESHIFT
TUBES FOR GROUNDED-
GRID OPERATION?
THESE RUGGED POWER
TRIODES ARE DESIGNED
FOR IT!**



No need to fiddle with makeshifts. These Penta power triodes were designed specifically for the job. And only Penta makes them. Either tube will boost a 100-watt class transmitter up to a kilowatt. Either tube can be used for both SSB, CW service. There's no neutralization!

PL-6569 — 250-watts plate dissipation, μ (45). With a power gain of 10 or more, this tube gives you more than 800 watts output with only 75 watts drive. Low plate-to-filament capacitance (0.10 uuf) gives you high stability.

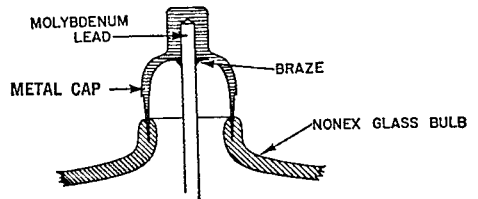
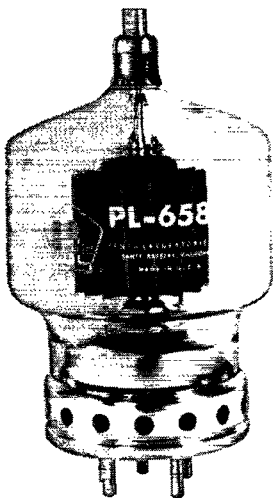
PL-6580 — 400-watt plate dissipation, μ (45). More conservative than the PL-6569. Useful in linear amplification of AM signals where carrier efficiency is low, and extra plate dissipation is needed.

Write today for your free copies of the PL-6569 and PL-6580 data sheets, which give ratings, operating conditions, and suggested circuits.



THE PENTA LABORATORIES, INC.

312 No. Nopal St. Santa Barbara, Calif.
A SUBSIDIARY OF RAYTHEON COMPANY



EXTRA-RUGGED PLATE CAP — Penta has designed both these tubes with a one-piece low-loss plate and cap seal. It can't break off. And there are no set screws or separate pieces to come loose

TRADE MARK REG. U. S. PAT. OFF.

RADIO HANDBOOKS

● **BEAM ANTENNA HANDBOOK** by William Orr, W6SAI. New edition. Theory, design, construction and the installation of rotary beam antennas! SWR data! Multiband beams, 40 meter beams, 20 meter DX beams! How to make your beam work! 200 pages. \$3.75

● **VHF HANDBOOK** by Orr, W6SAI and Johnson, W6QKI. First complete Handbook covering the VHF spectrum! Many VHF construction projects! Design and construction of VHF transmitters, receivers and antennas! Make your VHF station work! \$2.95

● **ELECTRONIC CONSTRUCTION HANDBOOK** by Robert Lewis, W8MQU. All about design—construction—layout and testing of electronic equipment. Non-technical guide for kit-builders and your best key to better performance of your equipment! \$2.95

● **ALL ABOUT CUBICAL QUAD ANTENNAS** by W6SAI. Construction and tuning data. Multi-band Quads. Charts, drawings and photos for your Quad. Full complete data on home-made Quad antennas. The new X-Q Quad. \$2.85

● **5-9 SIGNALS** by William Orr, W6SAI. Inexpensive DX antennas for your station! Multiband ground plane, 45 beam antenna, 2 and 6 meter beams, Demi-Quad beam, and others! \$1.00

● **NOVICE & TECHNICIAN HANDBOOK** by W6SAI and W6TNS. All about amateur radio in nontechnical language! How to learn the code. How to assemble your ham station. Transmitters! Receivers! DX! How to Get QSL cards. \$2.95

● **BETTER SHORTWAVE RECEPTION**, by Wm. Orr, W6SAI. Your introduction to shortwave radio. How to hear DX. How to buy a receiver. Amateur radio. How to align your receiver. Antennas! QSLs. Getting your ham license. \$2.85

● **RADIO HANDBOOK** by W6SAI. New 16th edition. The advanced handbook for engineers and radio amateurs. Hardbound, 812 pages, 34 chapters. (Editors & Engineers). \$9.50

● **SINGLE SIDEBAND PRINCIPLES AND CIRCUITS** by Pappenfus, Bruene and Schoenike. Complete and up to date review of SSB by Collins engineers. Hardbound, 382 pages, 22 chapters (McGraw-Hill). \$14.75

● **ELECTRONIC AND RADIO ENGINEERING** by F. E. Terman. The famous authoritative text on HF-VHF communication. Latest edition. Hardbound, 1078 pages, 26 chapters. \$16.00

● **RADIO ENGINEERS HANDBOOK** by F. E. Terman. Popular and up to date reference on circuits and components. Hardbound, 1019 pages, 13 sections. (McGraw-Hill) \$15.00

● **RADIO TRANSMITTERS** by Gray & Graham of ITT. The definitive handbook on HF/VHF transmitter design. Hardbound, 460 pages, 14 chapters. (McGraw-Hill) \$12.50

● **RADIO ENGINEERING HANDBOOK** by Henney. Communications Handbook covering all aspects of electronics. Hardbound, 1035 pages, 28 chapters (McGraw-Hill). \$25.00

● **RADIO OPERATING—QUESTIONS AND ANSWERS** by Hornung McKenzie. The famous review text for commercial radio examinations. Hardbound, 600 pages. (McGraw-Hill). \$8.25

At your radio dealer now!

Add 15¢ per order to the publisher:

RADIO PUBLICATIONS, Inc., Wilton, Conn.

ing for Smithers? VE7QQ sure is looking for help on the BCEN on 3650. Vancouver and Victoria, where are you? More and more are sporting NCX-3. VE7ANL and VE7AHJ are doing great. VE7JW is moving to Edmonton Airport. VE7AQT is VE6JW and operating on 20 at present. VE7AUF is back after being off for months and is very slowly recovering from her operations. It is time again to get your name to VE7AKY if you wish your call on your license plate. A new EC is VE7BOZ for the Trail Area. VE7JQ is now signing VE6HJ in Edmonton. Ten meter is becoming very active after 8 P.M. with locals throughout B.C. VE7BJV, heard on s.s.b., received his BPL medalion. Sure hope this is not the end of his c.w. operations. VE7ALU is heard often. Wonder what DX he has. VE7PNE, the Pacific National Exhibition station set up by the Vancouver ARC and manned by the amateurs of the lower mainland, again has done a good job of showing the public what amateur radio service is. Thanks to VE7-AQW and all his helpers. Traffic: VE7BHH 115, VE7-QQ 60, VE7BBB 48, VE7AC 14, VE7BHW 10.

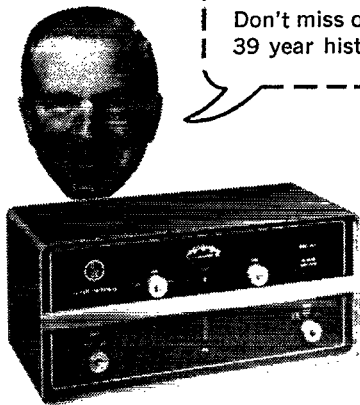
MANITOBA—SCM, William H. Horner, VE4HW.—The first Mid-Continent Hamfest, held in Winnipeg Sept. 5 and 6, was a great success with 348 people from the U.S.A., sister provinces and Manitoba registered. VE3-EED, from Pt. Arthur, won both 6-meter transmitter hunts. VE4OL was first in the Saturday 75-meter hunt and VE4GC won the Sunday 75-meter hunt. W3ZUJ, from Houston, Tex., stopped over to pick up the first prize for best mobile and VE4KR finished on top in the best homebrew competition. Canadian Vice-Director Colin Dumbrell gave an interesting talk at the wind-up banquet. Hamfest Chairman VE4SD and his strong committee did a wonderful organization job. The MAARC meeting held in conjunction with the hamfest discussed plans for setting up a strong provincial-wide organization and location of future hamfests. VE4AE and VE4LP have moved to Calgary. VE4BJ with his RTTY display and VE4CX's demonstration of TV were features at the hamfest. VE4EF and VE4EG are putting Margaret on the DX map with their quads. Our SEC VE4OL is on side band with a Pacemaker. VE4SK and VE4MP have new beams up. We still are looking for two Official Observers and one OBS. Traffic: VE4JT 19, VE4QJ 11, VE4QD 10, VE4EF 8, VE4HW 6, VE4JY 3, VE4AN 2, VE4JA 2, VE4LQ 2, VE4OL 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. Congratulations to the Islanders on the staging of another highly successful convention! It is believed to be the largest ever held in Canada with well over 400 in attendance. Highlights included the awarding of the Dr. Leo Doucette Memorial Plaque to VE1PW, the Brown-Holder DX Trophy to VE1OC and the GR Memorial Trophy to VE1ACL. A cake was presented to VE1LG on the occasion of his 89th birthday! VE1LV was the winner in the hidden transmitter hunt. Newly-elected officers of the NSARA include VE1ZH, pres.; VE1PX and VE1AL, vice-pres.; VE1ALQ, secy.-treas.; VE1UB, License Plate Registrar. Deepest sympathy is extended to the relatives of VE1AX who has joined the ranks of Silent Keys. Congratulations to VE1AGH, who recently won the Worked All Bermuda Contest. Bertus is not only the first VE1 but also the first Canadian to win this popular contest. Congratulations to ex-VE1AHR (VE3?) and his XYL on the arrival of a new YL. VE1PW is going on sea duty with HMCS *Ottawa* while VE1LP will be aboard the HMCS *Bonaventure*. Halifax Natal Day Parade communications were conducted by VE1s WG, UB, AFZ, HL. Traffic: VE1OM 21.

ONTARIO—SCM, Richard W. Roberts, VE3NG.—The OQN and the ECN held a camp-out at Luke Mazinaw in August. Over sixty hams were required to operate station VE3CNE for the three weeks the Canadian National Exhibition was open. My thanks to all of you. VE3BTY is a new ORS. VE3BWM is the new North Bay EC. To VE3DXG, who resigned, many thanks for a job well done. VE3ATB broke his ankle while on vacation. VE3CUC is now VE3GAF. The Ottawa Valley MRC held an FB corn roast and is holding hidden transmitter hunts during the fall. 4X4PQ is returning from Tel-Aviv to Ottawa and will sign his former call. VE3ECN. VE3BPT returned from Florida. VE3FWA is in the body shop. Get well quick. Syd. VE3DYM was in the Maritimes mobile. Our OOs report many signals with chirps these days. VE3BDX skeds with VE3BMC every second evening on 144 Mc. VE3BGA has a new beam on 2. By the time you read this column the Ontario ARRL Convention in London will be past but not forgotten. VE3EAT is on 432 Mc. in London. The London ARC picnic was enjoyed by a fine turnout. The boys at Cornwall held a hamfest which was very well attended. VE3DJK and VE3CIX visited the ARRL National Convention and the World's Fair at
(Continued on page 134)

Can your rig tune to 10 meters?

THEN YOU CAN JOIN THE WORLD OF FUN ON 6 METERS FOR LESS THAN HALF THE REGULAR PRICE!



Don't miss out on the most fabulous "buy" in the 39 year history of "Ham Headquarters, USA"®!

SSB, AM, CW, etc. — whatever mode you are using, just plug a sensational, new . . .

hallicrafters VHF TRANSVERTER

into your antenna circuit, and meet your friends on VHF. (Stop QRMing the DX—switch to 6 for those local QSO's, rag chews!) Work some exciting new VHF DX!

Selling everywhere for \$349.50 amateur net, a Harrison tremendous quantity purchase enables us to bring you the famous Hallicrafters' Model HA-6 for only \$198.

These brand new, fully guaranteed, superbly engineered transverters do a perfect job of putting your received and transmitted signals into the VHF band. Broadband design—you QSY with your regular receiver/transmitter tuning controls. Nuvistor front end gives excellent sensitivity and low noise figure. RF output indicator facilitates easy tune-up for maximum power — up to 120 watts input!

SPECIAL!

World Reference Map for Hams

Big 43" x 33" size shows all data important to hams. This Great Circle Map centered on N.E. United States, listed at \$2, is now yours for only \$1. post paid. (Add 50¢ if you want it rolled.) This is a limited time offer... mail coupon now!

FREE!

While our quantity lasts, we will include the \$99.50 Hallicrafters' P-26 AC power supply, free, with your order for the HA-6. Imagine... that's \$449. worth of brand new equipment . . .

ALL FOR \$198... YOU SAVE MORE THAN HALF!

HARRISON

"HAM HEADQUARTERS, USA"®

225 Greenwich St. • New York, N. Y. 10007
(212) BA 7-7922

Long Islanders! Visit our new Jamaica Store on
Hillside Avenue at 139th Street — RE 9-4101

OK, Bill

Q

Here's my \$_____ or, charge my Acct. No. _____
Rush me your great bargain — a brand new Hallicrafters' HA-6 Transverter and matching P-26 AC power supply — ALL FOR ONLY \$198.

For the enclosed remittance, please mail me _____
Radio Operator's World Reference Maps:

Rolled, in mailing tube @ \$1.50 ea.

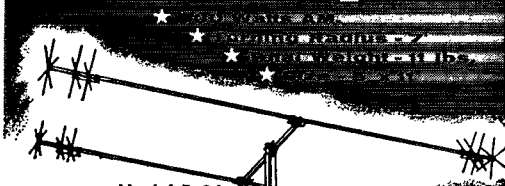
Folded @ \$1.00 ea.

NAME: _____ CALL: _____

ADDRESS: _____

Want High Efficiency and Small Size?

6 10 15 20 METERS
MINIATURIZED-4-BANDS



Model B-24

Mini-Products' time-proved B-24 4-band antenna combines maximum efficiency and miniaturization to provide hams with an excellent antenna where space must be considered.

Like all Mini-Products antennas, the B-24 employs "Multiple Hat" loading for maximum efficiency. TV rotor adequate; Feed line, 50 ohm coax; SWR 1.5:1.

Amateur Net
\$59.95

Write for data on the B-24 and other compact antennas:

- Model B-4010—40 and 10 M. two 18' elements, 10' boom Net \$79.50
- Model C-4—Coax Vertical (no radials) 6, 10, 15, 20 M. Net \$34.95
- Model M-4 Mobile 6, 10, 15, 20 M. Net \$16.95

Patents pending

Mini-Products, Inc.

FREE
GIANT NEW 1965 CATALOG

B-A
 SINCE 1927

TUBES, PARTS ETC. AT LOWEST PRICES

100'S OF BARGAINS NOT IN ANY OTHER CATALOG

EVERYTHING IN HI-FI AND STEREO

SAVE UP TO 50% ON CHOICE KITS

TOP VALUES IN POWER & HAND TOOLS

100'S OF BIG PAGES CRAMMED WITH SAVINGS

BURSTEIN-APPLEBEE CO.

Dept. 65, 1012 McGee St., Kansas City 6, Mo.

Rush me FREE 1965 B-A Catalog

Name

Address

City..... State.....

SEND FOR IT TODAY

FREE

New York, VE3CKP, from Sarnia, is off to the U.K. and will become a "G" soon. Glad to hear VE3DXC back on the air. Sorry to report a Silent Key, VE3ATZ, of St. Thomas. Bert was president of the club and will be missed by his many friends on the air. The Ontario S.S.B. Annual Dinner will be held in November in Toronto. Write VE3GH for information. Traffic: (Aug.) VE3CNE 339, VE3BUR 133, VE3NG 99, VE3EHL 85, VE3EAM 72, VE3ETM 62, VE3DPO 60, VE3GI 59, VE3BZB 52, VE3AKQ 45, VE3CFR 36, VE3BLZ 34, VE3WE 34, VE3BTV 28, VE3EZY 22, VE3EBC 19, VE3DU 13, VE3DH 11, VE3FEH 6, VE3OT 2. (July) VE3CYR 72, VE3AWE 38.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. RAQI a eu beaucoup de succès lors de leur convention à St. Gabriel de Brandon. Environ 700 personnes venant de tous les coins de la province s'y sont rendues avec 250 mobiles. Points saillants: Danse du vice-prés., élections défilés de mobiles, raliement des membres d'AREC par SEC VE2AUU, parade de modes pour YLs et XYLs, chasses aux émetteurs, remise de clefs de la ville par le maire de St. Gabriel, danso du prés. suivi d'un Bar-B-Que et clôture par la remise des prix. Résultats des élections de RAQI: VE2AAH, prés.; VE2AOS, vice-prés.; VE2-LG, secy.-trés.; VE2EC, aum.; VE2KS, av. légal; VE2AJ, propagandiste; VE2s PS, PX, ND, AID, AAH, TJ, ADA, ANB, AIV, VU, TK, AN, AOS, BNS, AWE, BAE, directeurs régionaux. Aussi, à ne pas oublier, les responsables de ce grand succès, VE2PS, VE2PX et VE2AID. Unfortunately, your SCM was unable to attend this year's RAQI Convention but our Asst. SCM tendered the above very complete report. Communication facilities were provided with great success by the AREC for a national car rally between La Tuque and Laval-West. The following stations took part: VE2s AUU, HV, BEZ, BQO, ANB, BLR, FY, BQW, BQV, AZF and ABT. VE2BLT is active on 20 meters contacting S.A. hams. VE2AUH is back on the air with an up-to-date c.w.-a.m.-s.s.b. transmitter. Glad to hear VE2BMI back. Look for the new 2-meter net on 144.180 Sun. between 8 and 8:30 local time. VE2BMG is Net Control. Congrats to the Asst. SCM who made BPL this month. Sorry to report another Silent Key, VE2ZG. Traffic: (Aug.) VE2BEZ 197, VE2DR 144, VE2-AGQ 92, VE2JH 40, VE2ALH 33, VE2BRT 32, VE2OJ 32, VE2EC 24, VE2BOC 19, VE2BRD 18, VE2BCB 16, VE2BG 15, VE2ABT 13, VE2AUU 13, VE2SH 3. (July) VE2ABT 53, VE2ALH 46.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—The AREC, under SEC VE5CU, is now well into phase two of the organization with actual on-the-air exercises. Phase one was completed with the appointment of VE5BO as EC for the North (which includes North Battleford). Write to Box 801, for information on a membership form. All amateurs are eligible. Don't forget to check after the net for information on exercises and general ARRL information from the Official Bulletin stations. Don't forget the QSO Contest for the best idea for a b.f.o. for mobile converters. Beef of the month: Lack of care in zero beating the station you're QSOing. Wastes the band, chaps. Watch for the SARL QSO Party. Traffic: VE5HP 95, VE5LM 46, VE5CM 21, VE5IG 6, VE5HQ 3, VE5KZ 2, VE5YR 2.

SS Rules

(Continued from page 17)

constitute a club entry. Segregate club entries into phone and c.w. totals. Both single- and multiple-operator scores may be counted, but only the score of a bona fide club member, operating a station, (his or another club members'), in local club territory, may be included in club entries.

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

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

SWITCH
TO SAFETY



VU-LIGHTER
CHROME
POCKET
MODEL

Black center
band

Panel in rich
black and white

Only \$5.98

Reverse Side
YOUR
CALL LETTERS
Printed the width
of the lighter.



**GREAT GIFT
ITEMS...
FOR THE HAM
WHO HAS
EVERYTHING**



KEY CHAIN
Only
\$2.48



BRACELET
Only
\$2.75

KEY CHAIN
OR
BRACELET
IN A RICH
BRONZE
FINISH!



... YOUR OWN
CALL LETTERS
HERE...



(Reverse side
of fob)

All Items American Made

IMPORTANT: All orders must be in by NOVEMBER 17th. Please allow for 3 weeks delivery. The lighters are assembled by the factory of the Scripto Mfg. Co. on the East Coast. The key chains and bracelets will require the same amount of time. Thank You.



CUSTOM MONOGRAM CO.
P.O. Box 46186, Cole Branch
Hollywood, California 90046

Please send me the items checked below. I am enclosing a check in the amount of \$ _____

Name in full (please print) _____

Address _____ City _____ State _____ Zip Code _____

Bracelet: Call _____ @ \$2.75 ea. — Key Chain: Call _____ \$2.48 ea.

CHROME POCKET VU-LIGHTER

Call _____ \$5.98 ea.

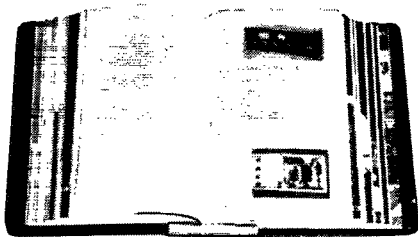
ALL POSTAGE AND HANDLING CHARGES INCLUDED IN PRICES—Sorry No C.O.D.
California purchases add 4% sales tax.

ALL FOREIGN PURCHASES REMIT IN U.S. CURRENCY.

ALL FOREIGN PURCHASES ADD \$1. TO COVER COST OF POSTAGE & HANDLING.

No. 11

QST PROTECTOR!



for those valuable
50TH ANNIVERSARY
ISSUES!

Are your valuable 1964 Anniversary Issues of QST scattered sloppily around your shack? If so, get a QST Binder and file them away neatly for future reference. While you're at it, start the New Year right by obtaining another Binder in which to preserve those interesting 1965 issues coming along soon.

- Holds 12 issues of QST
- Opens to any page and lies flat
- Protects and preserves your copies
- QSTs always available for reference

QST BINDERS (POSTPAID)
Each—\$3.00

Available only in the United States
and Possessions

AMERICAN RADIO RELAY
LEAGUE

Newington, Conn. 06111

The World Above 50 Mc.

(Continued from page 76)

W1HDQ reports working W3GGR in Maryland on 432 on September 8 and his first Canadian contact on that band on the 10th (VE2LD). Ed reports that on the 8th signals were also stronger than normal, and he hopes that this wasn't "it" for this season. In Virginia, W1FJ tells us that his 20-element J beam for 432 is up, the converter is in operation, has a 500-watt final (not excited yet), and is awaiting the arrival of 60 feet of foam flex to replace the old feedline. Ted also reports that K4EUS has moved to Delaware. Virginia's loss is Delaware's gain! Rex, W5RCI in Mississippi sez, "we had one of the best tropo openings in years on September 2 and 3. Worked K9UIF and W9PT on 432 for states number 13 and 14, bringing total for that band up to 14 states, 4 call areas and 725 miles. 432 Mc. transmitter has a 4X250B in the final cavity running 300 watts input. Antenna has 64 collinear elements fed with gas-filled coax." It was a good night on 144, too, according to Rex. He worked stations in Kansas, Missouri, Illinois, Wisconsin, Indiana, Michigan, Ohio, Pennsylvania, North Carolina and Ontario, but nary a new state on two meters.

At Houston, Texas, K1GY/5 sez: "On 432 there are several stations, and W5AJG in Dallas is heard almost every morning. I still have the APX-6 and am working several locals on 1215 with a four-foot dish." WA0GAG observes that his new twin 9-element, 432-Mc. beam works like a bomb with contacts at 200 miles being Q5 S9 and receiving similar reports running 10 watts. Bob also sez that WGTZJ was worked on 1230 Mc. (175 miles) with APX-6 and homebrew horn. W6CMQ at 200 miles was also worked on 1230 Mc.

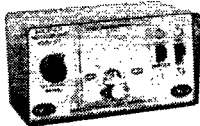
In Watervliet, Michigan, W8PT picks September 1 and 2 as two of the best days for working tropo. Jack worked K2LQJ, K4QIF, W5RCI and W5JWL on 144 Mc. and W5RCI on 432 Mc. for state #9 on those dates. He also tells us that the Persids M/S were normal. Skeds kept during that time with W0EYE on 220 Mc. and K7NII on 144 Mc. produced pings and short bursts, but no contacts. Good signals were heard from K5TQP and W0ENC on 144. Activity seems to be picking up on 1215 Mc. WA9JVL and WA9GLL are converting APX6's for the band. Phil (WA9GLL) has his in working order but is receiving only TV channel 50 (?). Bill (WA9JVL) is working on the power supply and modulator of his rig, and would appreciate any information on antennas and feedlines. Several others in that area (Evansville, Indiana) are talking about the band with some equipment available. W0IDY in Cedar Rapids noted the good tropo conditions of September 1 on 432 and 144 Mc. Bill snagged Indiana for State #6 on 432 and extended his distance worked by working W8YIO in Manchester, Michigan. WA9FHH sez: "Finally got the 220-Mc. 832A rig fixed up. No smoke, but no grid drive either! Will have to do some rebuilding." ATV seems to be the main interest with WB2DDDB these days. Dave tells us that his experiments are mostly with new designs and construction of a TV station, and at present he's working with a two-meter transmitter and receiver for possible use as audio link in TV QSO's; 60-watt TV transmitter in design stage. Dave sez that others interested in ATV are: WB2BCS who is looking for parts; WA2JUP who has built the camera, with antenna and transmitter under construction. K2BCR who has a camera under construction; WA2CAQ who is converting a surplus iconoscope camera to vidicon. Looks like ATV might be here to stay. Keep it up fellows and good luck. Out in California WNGKXN/WB6EMP would like to correspond with any amateurs having experience with amateur television. You boys from 2 land can write to Michael Hirsch, 1432 Pandora Avenue, Los Angeles, California, 90024.

Not much news concerning 220 Mc., but W2SEU does tell us that he is on 220 almost every night from 0200 to 0300 and looks in all directions. He tunes the first 400 kc. of the band and his frequency is 220.030 Mc. Fred is looking for skeds with anyone in Maine, Vermont or Virginia, on 220. Two-meter RTTY is another of the activities at the W2SEU QTH. Look for him every Sunday afternoon on 146.510. He's there and looking for contacts. WB2COZ writes to tell us that he has a TRCS receiver for 220 Mc. At Monroe, Connecticut K1WHS and K1WHIT tried some-

(Continued on page 138)

BULLS EYE BUYS AT ARROW

HAND-PICKED FOR HAMS BY HAMS



AMECO MODEL BIU BRIDGE INDICATOR UNIT

Model BIU, when used with the Ameco SWB or other make of bridge, will accurately read SWR, percentage power and percentage voltage (3 scales). Contains a sensitive 100 microampere $2\frac{1}{2}$ " D'Arsonval meter. Unique switching circuit provides for reading either one of 2 bridges. Charcoal grey cabinet with satin copper panel, $2\frac{3}{4}$ " x $5\frac{1}{2}$ " x $3\frac{1}{2}$ ". Wired and tested. \$15.95

AMECO MODEL SWB STANDING WAVE BRIDGE



High quality bridge accurately reads SWR's from 1.8 to 225 mc. (including ham, CB and commercial bands). Can handle up to 1 KW.

Uses inductive coupling and can be left in the line continuously without insertion loss. Contains two SO-239 VHF connectors. Satin copper case, $1\frac{1}{2}$ " x $2\frac{1}{4}$ " x $4\frac{1}{2}$ ". Wired and tested. \$9.95

DIRECT/5:1 REVERSE VERNIER DRIVE

The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one $\frac{3}{8}$ " hole. High torque, low-back lash, smooth and permanent movement, coaxial spindles, $\frac{1}{4}$ " shaft dia.

Model 4111/RV
Amateur Net \$1.95



actual size

PRECISION PLANETARY-VERNIER for exceptionally fine tuning

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, $\frac{1}{4}$ " dia. Shaft $1\frac{1}{8}$ " long: 6:1 ratio. Vy FB for fine tuning. Easily adaptable to any shaft. Comparable value \$5.95 Model 4511/DAF.

\$1.50 ea. 10 for \$13.50

Shown approximately
actual size

SUPEREX HAM HEADPHONES

Full comfort even after many enjoyable hours of continuous use. Superb comfort even for eye-glass wearers. Crisp, distortionless reproduction and high sensitivity allows you to single out that weak signal and hard to reach station. 600 ohms impedance, completely adjustable head harness.

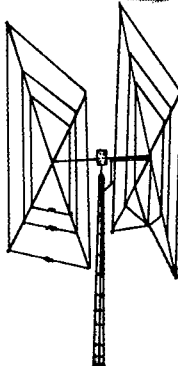
24.95



W2AU SUPER 2 ELEMENT QUAD FOR OUTSTANDING PERFORMANCE ON 10-15-20 METERS

pre-tuned • rated 2KW
PEP • low Q • low
angle radiation • high
gain • broad band •
low wind load • sim-
plified assembly •
rugged construction •
single line or 3 line
feed • ship. wt.-40 lbs.

\$44.95



PRECISION BALL DRIVE DIAL

Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard $\frac{1}{4}$ " shaft for that velvet touch.. Amateur net \$3.95



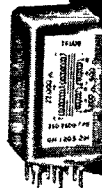
VERSATILE MINIATURE TRANSFORMER

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 $\frac{3}{4}$ " w. x $\frac{3}{4}$ " d. New and fully shielded.

Amateur net \$1.39.

3 for \$3.49.

10 for \$10.75.



MAIL ORDERS
PROMPTLY PROCESSED.

Arrow's Export Dept. Ships To All Parts Of The World!

Prices Subject To Change Without Notice.

TO SAVE C.O.D. CHARGES, PLEASE INCLUDE
SUFFICIENT POSTAGE WITH YOUR ORDER.
ANY EXTRA MONEY WILL BE RETURNED.

ARROW ELECTRONICS, INC.

900 Broad Hollow Rd., Farmingdale, N. Y.

516 — MYrtle 4-6822

65 Cortlandt St., N.Y. 7, N.Y. • 525 Jericho Tpke., Mineola, N.Y. • 225 Main St., Norwalk, Conn.

212 — Digby 9-4730

516 — Pioneer 2-2290

203 — Victor 7-5889

THE LEAGUE EMBLEM



With both gold border and lettering, and with black enamel background, is available in either pin (with safety clasp) or screw-back button type. In addition, there are special colors, available in the pin style emblem only, for Communications Dept. appointees.

- ▶ Red enameled background for the SCM.
- ▶ Green enameled background for the RM, PAM or EC.
- ▶ Blue enameled background for the ORS or OPS.

THE EMBLEM CUT: A mounted printing electrotype, $\frac{5}{8}$ " high, for use by members on amateur printed matter, letterheads, cards, etc.

Pin, Button or Cut: \$1.00 Each, Postpaid

AMERICAN RADIO RELAY LEAGUE

Newington, Connecticut 06111



DUMMY LOAD

52 ohm, non-reactive film oxide R.F. unit. All band, all power to 1 KW. SWR 1.2 to 1.
Kit \$7.95 postpaid.
Wired, add \$2
HAM KITS
Box 175, Cranford, N. J.



100 KC CRYSTAL BARGAIN!

U.S. Navy Surplus. Hermetically sealed standard octal base. Check or money order. No COD's or export orders please. Add 25c for postage and handling.

295

ELECTRONICRAFT, INC.

Box 13, Binghamton, N. Y. 13902



THE Q-TRAN BALUN BALANCE YOUR ANTENNA SYSTEM!

Use the new Q-Tran to balance and increase the efficiency of your dipole, folded dipole, trapped dipole, parallel dipoles, inverted vee, or any beam requiring a balanced feed. Now warranted for 1 year. The Model 101 Q-TRAN is for use with 50 or 75 ohm unbalanced feed (co-ax) to 50 or 75 ohm balanced antennas. Broad band 3 to 30 Mc. with conservative ratings of 1 KW AM and 3 KW peak SSB. Other impedance models available.

Now in use by various governmental agencies.

MODEL 101 Q-TRAN.....\$18.95 CHECK or PPD M.O.

New price effective June 1st

ALLINGER manufacturing

1 Linden Street

Norwalk, Conn.

thing different in working on the 220-Mc. transmitter when they used a 4X150A as a power tripler. "Running at a little over 200 volts on the plate in a test hookup, it ran 10 watts input and we obtained 5 watts of 220-Mc. rf. output. The completed tripler in its final form will be running about 25 watts input to drive the p.p. 4X150A finals. Dave and Arn agree that two meters has been quite good lately and that August 27 was a date to remember. On that date K1WHS worked W4JFU and between them the boys heard K1ZIT, K1OEX, W2QLS/1, K3OBU, K3ARN, W1JSM, W7JCU/3 and VE3BPR. On the 28th, VE1ER was among those heard at Monroe, Connecticut; the 29th brought forth VE2SH and on the 30th, VE2BLZ was among those heard. The boys (K1WHS and K1WHT) are now running 700 watts PEP to a pair of 4X150A's to a 16-element beam; receiver is a 417A into an R-383. They are looking for skeds with North Carolina and Ohio or points further on 145.0065 Mc. Early morning skeds are favored in Connecticut, preferably between 0530 and 0700 EST. At Easton, Connecticut, W1MEH sez "I've been at it agin, two meter M/S that is, and worked four new states during July and August." Georgia, Missouri, Wisconsin and Illinois are the states added and bring Ken's total to 24 states worked on 144 Mc. Skeds kept with W5UKQ turned out negative for Ken, with only pings and very short bursts being heard. Activity on 144 Mc. is high in the Easton area, with a number of stations being on SSB every evening at 144.100. Incidentally, Ken expects to be ready with his SSB in time for the next meteor shower skeds. W1ASW is wondering if he comes close to any kind of a record. On the nights of September 7, 8, 10 and 11, Larry worked fifteen stations in seven states on 144 Mc. using a Pawnee transceiver (about 8 watts output) and a 19" whip inside the shack. Don't know whether it's a record Larry, but I'll bet it was a lot of fun. WN2KLD, K2LNS, WA2UDT and WA2VYN, all of New Jersey report that two meters has been quite good during August, particularly toward the end of the month. Tom, WN2KLD, sez that Virginia came in regularly during the time that Cleo was active. K2LNS reports that WA2FGK was able to work W8KAY with 100 watts and 32 elements on August 21, 22 and 23, and that he copied W4WNI in Kentucky every night of that week. On September 1 W9BRN in Indiana and W9ZIH in Illinois were heard, and on the 3rd South Carolina and Georgia were coming through on 144 Mc. WA2FGK and K2LNs are open for meteor skeds up to 1400 miles and any nightly skeds up to 600 miles. All letters for skeds should go to WA2FGK. From New York WA2PZE writes: "The Perseids were so good that between skeds just a tune across the two meter band yielded many pings and bursts, one of which was W4MNT, who was 10 db. over 9. We worked George last Oronids, but never heard him so strong. During the Perseids I worked K4SJE in Georgia, W9OII in Wisconsin and after a year of trying, finally worked W5UKQ in Louisiana. In the Aquarids a week earlier, I worked W0LFE in Missouri. Grand total on 144 Mc. is now 23 states, 7 call areas and 1200 miles." K2RTH worked W9OII and W0LFE during the Perseids, and K2RCH worked W9OII, K9AAJ, K9UIF and WA4BYW. W7PUA/2 also took advantage of the Perseids by working W9OII and K4SJE, bringing his states worked on 144 Mc. to 22. Steve, WA2PZE, makes one more comment (?), complaint (?), gripe (?), with which we go along. "One problem that I find is that many guys won't sked any station in a state which they have already worked on 144 Mc. This leaves many unworked states with nobody willing to sked." Another Perseids report was received from K3OBU in Delaware who worked two new states, Iowa and Wisconsin, for a total of 23 states on 144 Mc. Skeds made with W9IFA and W9AAG had negative results, although pings and bursts were heard. Joe (K3OBU) has the following comments and would like answering comments on his suggestions: "I think it would be a good idea to try to get some type of 'Gentlemen's Agreement' started in regard to Oscar III. I have a suspicious feeling that the passband will be overloaded and monopolized by a few high power stations ruining the translator for serious CW sked DX work. I think a good agreement would be: 1.) No more than 100 watts input for stations using Oscar III in consideration for all users. 2.) A certain c.w. sked segment be voluntarily reserved. (About 10 kc. at low end.) These two points would go a long way toward making Oscar III very useful for all. Possibly certain passes of Oscar over the mid-west could be set aside for sked work only. [QST]

"Call us for reliable, PERSONAL SERVICE"



Bob Henry
WØARA
Butler, Mo.

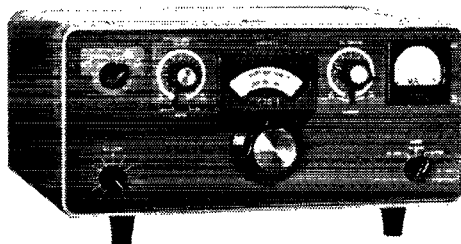


Ted Henry
W6UOU
Los Angeles, Calif.



Walt Henry
W6NRV
Anaheim, Calif.

**CALL US ABOUT THE
62S-1 VHF CONVERTER**



• World's Best Terms:

- 6% finance charge
- 10% down or trade-in down
- No finance charge if paid in 90 days
- Less red tape because we finance

62S-1 VHF Adapter	\$ 895.00
75S-3B Receiver	620.00
30L-1 Linear Amplifier	520.00
KWM-2 Transceiver	1,150.00
32S-3 Transmitter	750.00
516F-2 AC Power Supply	115.00
MP1 12V DC Power Supply	198.00
PM-2 Power Supply	150.00
30S-1 Linear Amplifier	1,795.00

**A-1 Reconditioned
Apparatus**

Nearly all makes and models. Big savings! 15 day trial—90 day warranty. 90 day full trade back on new apparatus. Write for bulletin.

Write, phone or visit either store today!

Inquiries and orders from military men and others outside USA wanted.

Henry Radio Stores

**BIG
TRADE-INS**

Butler 1, Missouri. ORchard 9-3127
11240 West Olympic, Los Angeles, Calif. GRanite 7-6701
931 North Euclid, Anaheim, Calif. PRospect 2-9200

"World's Largest Distributors of Short Wave Receivers"

10-15-20M QUADS

*Pre-Cut *Pre-Tuned *Triband
 Bamboo Fiberglass
 Two Element → \$59.95 \$99.95
 Three Element → 99.95 **New** \$149.95



- * ROTATE WITH TV ROTOR
- * HIGH F/B RATIO
- * VERY LOW SWR
- * LOW Q BROADLY TUNED
- * HIGH GAIN
- * EASY TO MATCH
- * LOW WIND RESISTANCE
- * ONE FEED LINE FROM XMTR FOR ALL 3 BANDS NO SWITCHING

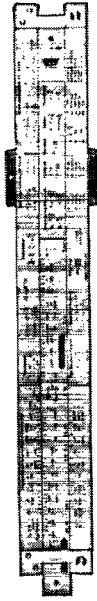
WRITE DEPT. A
 406 Bon Air Dr.
 Temple Terrace, Florida
 Phone 988-4213

Skylane PRODUCTS

GREAT NEW CHRISTMAS GIFT

Solve Electronics Problems Fast With Special New Slide Rule

Professional, high quality instrument . . . specifically designed for electronic engineers and technicians . . . made to our rigid specs by Pickett & Eckel. Has special scales for solving reactance and resonance frequency problems. Accurately and quickly locates decimal points. Carries widely used formulas and conversion factors not found on any other slide rule. Comes complete with top-grain leather carrying case, illustrated instruction manual, 90 day consultation service — all for just \$14.95. Carries lifetime guarantee against defects in material and workmanship.



SEND COUPON TODAY

TO: CLEVELAND INSTITUTE OF ELECTRONICS

1776 E. 17th St., Dept. QT-102, Cleveland, Ohio 44114

Please send me your electronics slide rule.

I am enclosing \$14.95. (If not fully satisfied after 10 day trial, CIE will refund payment.)

Please send additional descriptive literature.

Name _____ (Please Print)

Address _____

City _____ State _____ Zip _____

2-Meter Standings

W1RHZ	32	8	1300	W5NDE	11	5	920
W1AZK	28	8	1205	W5WAX	10	3	735
W1KGS	24	7	1150	W5VY	10	3	1200
W1AJR	24	7	1130	W5BED	9	3	1000
W1MEH	24	6	1000	W5EDZ	8	5	1375
W1MNN	22	8	1200	W5YYO	7	4	1330
W1JSM	22	7	1330	W5UNH	6	3	1200
W1HDD	22	6	1020				
W1ZY	22	7	1050	W6WSQ	15	5	1390
W1FY	19	6	920	W6NLZ	12	5	2540
K1CRQ	19	6	800	W6DNG	9	5	1010
K1AFR	17	6	675	K6HMS	8	4	1010
				W6AJF	6	3	800
W2NLY	37	8	1390	W6ZL	5	3	1400
W2CNY	37	8	1360	K6CTG	4	2	800
W2ORL	37	8	1320	W6AMU	3	2	950
W2BLY	36	8	1020				
K2LMG	32	8	1200	K7HKD	20	7	1330
K2GQI	35	8	1365	W7LHL	10	4	1170
W2AZL	29	8	1050	W7CJM	5	2	670
K2EJ	28	8	1060	W7EJ	4	2	900
K2CEJ	25	8	1200	W7JU	4	2	235
W2AMJ	25	6	960				
W2ALR	24	8	1100	W8PT	40	9	1260
W2RXG	28	8	1200	W8KAY	39	9	1210
W2PZE	23	7	1200	W8SDJ	37	8	1200
W2SMX	23	7	1090	W8FEN	35	8	950
W2LWY	23	7	1050	K8ANU	34	8	1275
K2HOD	23	7	950	W8SFG	34	8	1040
W2DWJ	23	6	860	W8MVE	33	9	1155
W2PAU	23	6	750	W9LOF	32	8	1060
W7PTA	22	7	1150	W8GGH	32	8	1180
W2ESX	21	6	750	W8GJ	32	8	1060
K2KIB	21	5	700	W8RMH	32	6	910
W2UTH	20	7	880	W8NOH	31	8	1090
W2WZR	19	7	1040	W8EHW	31	8	860
W2RGV	19	8	720	W8SVI	30	8	1080
W2EMA	19	6	1010	W8EHW	30	8	860
W2PZE	18	6	750	W8LPD	29	8	850
W2RLE	18	6	980	K1CRQ/8	28	8	690
W2YXS	17	6	720	W8WRN	28	8	680
K2OEI	16	6	1010	W8DX	26	8	720
W2BCCO	16	6	780	W8ILC	25	8	800
K2JWT	16	6	550	W8JWY	25	8	940
				W8WMI	23	8	900
W3RUE	33	8	1100	W8GFN	23	8	540
W3SCA	31	8	1070	W8LCY	22	7	680
W3GKP	31	7	1180	W8BLN	21	7	610
W3TDF	30	8	1125	W8GTR	17	7	550
W3KCA	28	8	1110	W8NRM	17	7	550
W3BYT	28	8	1070				
W3FPH	22	8	1100	W9WOK	42	9	1170
W3LST	22	6	800	W9KLR	41	9	1160
W3LNA	21	7	720	W9UIF	41	9	1150
W3NKM	20	7	730	K9AAJ	35	9	1070
W3LZD	20	7	650	W9AAC	35	9	1050
W3MFT	19	6	600	W9CAB	34	9	1075
K3OBU	17	7	930	W9REM	31	8	850
W3HCC	16	6	500	K9SGD	30	8	1100
K3CFA	16	6	600	W9ZIH	30	8	830
K3HDW	12	6	1015	W9PBE	28	8	820
				W9JWJ	27	9	910
W4HJQ	39	8	1150	W9JFT	27	9	910
W4HHK	37	9	1280	W9IFA	26	6	1000
W4WNH	35	9	1350	W9ZHL	25	8	700
W4LTU	34	8	1160	W9BPV	25	7	1030
W4ZXL	34	8	950	W9CUX	24	7	1000
W4MKJ	34	8	1149	K9AQF	24	7	900
W4AO	30	8	1120	W9WDD	23	7	900
K4IXC	27	8	1255	W9LFL	22	7	825
W4LVA	26	8	1000	W9KPS	22	7	690
K4EUS	26	7	1130	W9ALU	18	7	800
W4EQM	25	8	1040				
W4RFP	24	8	820	W0BFB	42	9	1350
W4MNT	24	8	1170	W0LFE	32	9	1040
K4QLF	24	8	1000	W0HHD	31	8	1030
W4TLV	23	7	1000	W0SMJ	29	9	1075
W4JCC	23	6	725	W0QDH	27	9	1300
W4RMU	21	7	1080	W0ENC	25	6	1225
W4OLK	20	6	720	W0DQY	24	7	1000
K4YYJ	20	6	720	W0RUF	23	7	900
W4LNG	19	7	1080	W0MOX	23	6	1150
K4MHS	20	5	800	W0FC	22	7	1360
K4YUX	18	8	830	W0PDZ	21	7	1170
K4VWH	18	6	570	W0TGC	21	7	870
K4VWH	18	6	590	K0ITF	21	6	940
W4MDA	17	6	775	W0INI	21	6	830
				W0RYG	20	8	925
W5RCI	39	9	1280	W0JAS	19	7	1130
W5AJG	33	9	1360	W0AZT	18	7	1100
W5FYZ	33	9	1275	K0AQJ	18	6	1120
W5WJY	29	7	1150	W0LFS	16	6	1100
W5DFU	29	9	1300				
W5PZ	28	8	1300	VEICL	8	5	800
W5LPG	25	7	1000	VE3DR	37	9	1300
W5KTD	23	8	1200	VE3ATP	29	8	1340
W5SWY	20	8	960	VE3EP	24	7	950
W5KQP	18	8	1150	VE3BQN	23	7	1180
K8TQP	18	7	1250	VE3AQC	18	8	1300
W5ML	16	6	700	VE3DER	17	8	1340
W5KFC	15	5	1360	VE3HW	17	7	1350
W5UGO	13	4	635	VE3HO	1	1	915
W5FC	12	5	1390	W5VY	2	1	365
W5HEZ	12	5	1250	KH6UK	2	2	2540
W5CVW	11	5	1180				

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

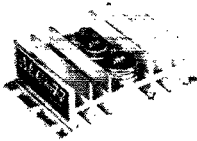
by hams...
for hams...
Harvey is reliability

Harvey

VALUES OF THE MONTH



TRANSISTOR IGNITION BY AUTOMOTIVE ELECTRONICS —



Complete, factory wired, AEC 77 system for installation in all 6- or 12-volt vehicles with negative ground.

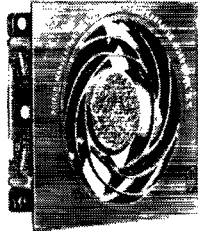
Increases power up to 10% . . . assures fast starts at low end . . . full power at high rpm . . . up to 20% more mpg . . . increases spark plug life 3 to 5 times over normal . . . insures 75,000 mile point life . . . gives instant starting in sub-zero weather . . . eliminates frequent tune-ups . . . simple 20 minute installation by anyone . . . cures ignition problems . . . MOBILE RADIO IGNITION INTERFERENCE REDUCED.

In conventional ignition systems, high voltage at the spark plugs falls off over 50% as engine speeds increase. The result is a weak spark causing incomplete combustion, loss of power, fouled plugs and poor gas mileage. The rugged AEC 77 electronic ignition increases and maintains maximum high voltage output at the spark plugs with no high voltage fall-off at any speed. Says World Champion Racing Driver Phil Hill, "Rarely does a device come along that improves power, performance, and economy, at the same time. My congratulations to AEC 77".

Every AEC unit uses high quality components such as Delco high voltage 15 ampere transistors and Motorola 50 watt zener diodes. Every AEC Ignition coil is wound with Formvar insulated wire, oil impregnated and hermetically sealed for maximum insulation and cooling.

Complete AEC 77, factory wired, with 400:1 coil ratio, 6/12 volts \$39.95

Please add 75¢ for postage and handling.
25% deposit on COD's.



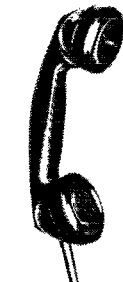
ROTRON WHISPER FAN

The fan that moves 60 cu. ft. of air per minute . . . while running so silently you have to look to see if it's running! Removes heat to save your rig, yet uses only 7 watts. Measures 4½" square by 1½" deep. Has run for years in computers and other commercial equipment without attention — lifetime lubricated. Operates on 110-120V. A.C. Amateur Net \$14.85



EXTRA-SENSITIVE HEAD PHONES BY SUPERX

600 ohm impedance; extra-high sensitivity for weak signals and hard-to-read stations . . . reproduction is crisp, free of distortion . . . unequalled wearing comfort over long use. Amateur Headphone Model AP-S. Amateur Net \$24.95



BRAND NEW SOUND-POWERED HANDSETS WITH WESTERN ELECTRIC UNITS —

Operation up to 5 miles over a simple, two-wire line. No batteries or other external power required. Just the thing for tuning up that beam. Use anywhere a telephone or any other two-way communication set-up is needed. It's portable and flexible. Per pair less wire \$24.95

WE SPEAK YOUR LANGUAGE — and have for 37 years. It means orders from every corner of the world are handled personally and your instructions, in any language, are followed. It means we speak the universal language of all radio amateurs. And that gives you such ham-to-ham extras as consultation on your problems, meeting specific requirements, and — at your request, with no charge — opening sealed cartons for complete equipment check-out.

Send check or money order including shipping charges. We return any excess.

Harvey

OUR **37th** YEAR

RADIO CO., INC.

103 West 43 St., New York 36, N. Y. (212) JUdson 2-1500

40 FT. CRANK-UP TOWER

At

68 MPH

*At 40 Feet

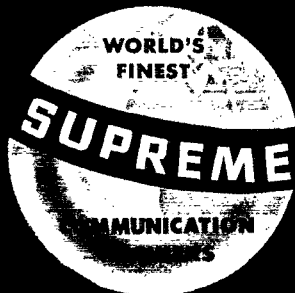
USING A TRI-BAND
10-15-20 METER BEAM

Assembled Weight—20 lbs.
Wind Surface Area—4.9 sq. ft.
Wind Load—86 lbs.
Maximum Element Length—26'8"
Boom Length—12'
Turning Radius—14.9'

OR

148 MPH

with your Tri-Bander at 25'



*Certified by Reg. Prof. Eng.

\$129.50

Model 40-1

F. O. B.

WITH HEAD MOUNT

PLANT

BRACKET MTG. KIT \$9.50

Tilts over on a heavy base plate for access to motor and array.
Horizontal bracing throughout.

Available direct from manufacturer.

SUPREME ELECTRONICS
INC.
FRONT & MAIN STS.
UPLAND, PENNA.

Happenings

(Continued from page 57)

For Vice Director:

Robert J. Link, W2VKF, was found lawfully nominated but ineligible due to lack of the required membership continuity. Mark C. Stern, W2TCL, was found lawfully nominated but the Committee was in receipt of a communication from Mr. Stern withdrawing his name as a candidate. Graham G. Berry, Sr., K2SJN, and Stan Zak, K2SJO, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

NEW ENGLAND DIVISION

For Director:

Dana W. Atchley, W1HKK, and Fred P. Collins, W1FRR, were found lawfully nominated but ineligible due to lack of the required membership continuity. Milton E. Chaffee, W1EFW, and Robert Y. Chapman, W1QV, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

For Vice Director:

Bigelow Green, W1EAE, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the by-laws, to be duly re-elected as Vice Director of the New England Division for the 1965-1966 term without membership balloting.

NORTHWESTERN DIVISION

For Director:

R. Rex Roberts, W7CPY, was found lawfully nominated and eligible but the Committee was in receipt of a communication from Mr. Roberts withdrawing his name as a candidate. Herman F. Helgesen, W7AIB, and Robert B. Thurston, W7PGY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

For Vice Director:

R. Rex Roberts, W7CPY, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the by-laws, to be duly elected as Vice Director of the Northwestern Division for the 1965-1966 term without membership balloting.

ROANOKE DIVISION

For Director:

P. Lanier Anderson, jr., W4MWH, and Bannie L. Stewart, W4CE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

For Vice Director:

Joseph F. Abernethy, W4AKC, and L. Phil Wicker, W4ACY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to the full members of the division.

(Continued on page 144)

VARACTOR

432 mc DOUBLER/TRIPLER

Unbeatable performance at an unbeatable price. Only \$54.95 ppd. Model 1432 triples from 2 mtrs. Model 2132 doubles from 220 mc. 20 watts IN at 144 produces 12 watts PEP out (nominal) at 432. Use with existing AM, FM, & CW transmitters. No power supply required.

VHF ASSOCIATES P.O. Box 22135 Denver, Colorado 80222

TREMENDOUS SAVINGS ON LIKE-NEW EQUIPMENT

for the SWL, Newcomer, or Extra-Class Amateur

- Two-Week Trial • 90-Day Guarantee
- Trades Accepted • Plenty of Free Parking



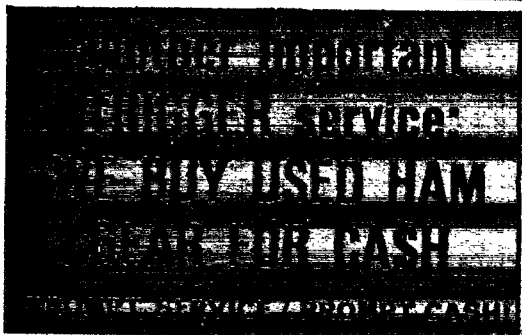
Whether you are a shortwave listener, a potential ham, a UHF enthusiast, or possess one of those rare two-letter calls, Trigger Electronics is where you will get the cleanest, most dependable, like-new equipment at sensational savings for such gear. And it performs as brilliantly as it looks!

SEND FOR FREE PRICE LIST

Whether you want to buy a key, a code practice set, or a top-quality receiver or transmitter, Trigger has the gear and is ready to get you started out right. Send stamped self-addressed envelope for free price list.

5174.....\$895		HQ170C.....\$219
75A4.....495		NC88.....67
75A3.....239		NC155.....119
75S1.....339		NC183D.....179
75S3.....469		NC198.....77
32S1.....449		NC270.....159
32S3.....569		NC300.....189
30L1.....379		G76 DC SUPPLY... 69
KWM2.....795		GSB100.....249
DC SUPPLY.....79		GONSET III 6MTR. 149
32V3.....239		GONSET III 2MTR. 179
DRAKE 2A.....169		SUPER 12 CONV... 39
DRAKE 2B.....207		G66B RECEIVER... 67
DRAKE TR3.....469		RME 4350A.....119
MS3 AC SUPPLY... 67		KE93&AC SUPPLY.. 117
DC3 DC SUPPLY... 99		REGENCY ATCL... 39
SK43.....79		CLEGG INTERCEPTR 319
SK52A.....279		POLYCOM PC6.....239
SK99.....84		POLYCOM 62B.....279
SK100.....179		DX35.....39
SK110.....99		DX40.....44
SK111.....167		DX60.....64
SK117.....269		DX100.....99
SI08.....69		TX1 APACHE.....159
SI20.....44		SB10.....77
SR34.....139		GR91.....34
SR150.....469		HR10.....69
SR150 AC SUPPLY. 75		HT1 XMTR.....47
SR150 DC SUPPLY. 77		HQ10 VFO.....34
FPM200.....975		HW20.....179
HT32.....299		HM10A GPO&COILS. 34
HT32B.....389		GER.....39
HT37.....299		CENT. B. SLICER. 79
HT40.....49		LAFAYETTE HE35.. 37
VALIANT.....209		HE45A & VFO.....99
VALIANT II.....269		KNIGHT R55.....39
RANGER.....137		KNIGHT T50.....29
RANGER II.....219		KNIGHT TC.....39
ADVENTURER.....29		KNIGHT TX50A.....89
500.....395		AMECO T86W.....47
THUNDERBOLDT... 279		EICO 723.....34
HQ10C.....109		EICO 730 & COVER 47
HQ100A.....129		BC221D& AC SUPPLY 99
HQ110C.....127		WATERMAN11a.....47
HQ129X.....89		HICKOK 533AP.... 79
HQ150.....159		

NEW DRAKE EQUIPMENT
We stock the complete line of brand-new DRAKE equipment. Used, clean gear accepted in trade. Write TRIGGER for unsurpassed trade-in allowance.



TRIGGER Attn: W9IVJ (ABC1234)
7361 North Avenue
River Forest, Illinois
(suburban Chicago)

Amount Enclosed

RUSH THE FOLLOWING:

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ORDER BLANK TO: (1) send for free price list, (2) trade ur present gear, (3) order equipment, (4) sell ur gear for cash.



FOREIGN INQUIRIES INVITED

(A small deposit will hold the unit of your choice on Lay-Away)

STORE HOURS

Weekdays 1:00-8:00 P.M.
Saturdays 9:00-3:00 P.M.
Or by Appointment After Hours

TELEPHONES

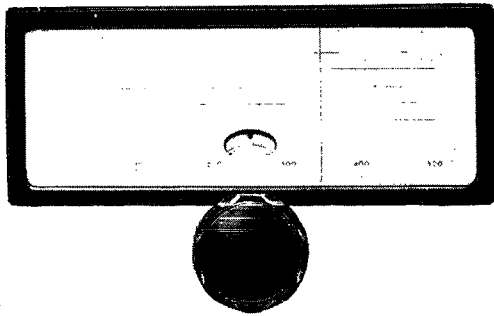
From Outside Chicago PR 1-8616
Chicago Area Only TU 9-6429
Business phones with QTH Extensions



Electronics

7361 NORTH AVENUE • RIVER FOREST, ILLINOIS

EDDYSTONE



GEARED SLOW MOTION DRIVE For Amateur Radio & Communications RECEIVERS & TRANSMITTERS

A high grade assembly, flywheel loaded, manufactured to fine tolerances, provides a smooth positive drive with a reduction ratio of 110:1. The vernier with its 100 divisions rotates 5 times for one pointer traverse, giving 500 divisions with positive reset readings. A cam adjustment on the vernier assures correct zero setting. A spring loaded jockey arm maintains tension of the pointer drive. Overall dimensions $9\frac{1}{16}'' \times 5\frac{3}{4}''$.

Manufactured by
Stratton & Co., Ltd. (Eddystone) PRICE \$21.50 NET
Birmingham, England Postpaid

Distributed by
BRITISH RADIO ELECTRONICS, LTD.

1742 Wisconsin Ave., N.W.
WASHINGTON 7, D. C.

CONVERTER SALE

New model series 300 with 3 VHF transistors, crystal, and more than 30 high quality parts. Carefully assembled and tested. Measures only $3'' \times 2\frac{3}{4}'' \times 2''$. Low noise and better than 1 microvolt sensitivity. Made in USA and guaranteed. Available in the following models for 12 volts DC:

Model	Input mc.	Output mc.	Price
300-A	26,965-27,255	1.0-1.29	\$10.95 ppd.
300-B	50-51	.6-1.6	\$10.95 ppd.
300-C	50-54	14-18	\$10.95 ppd.
300-D	144-148	50-54	\$12.95 ppd.
300-E	144-145	.6-1.6	\$12.95 ppd.
300-F	144-146	28-30	\$12.95 ppd.
300-G	14.0-14.35	1.0-1.35	\$10.95 ppd.
300-H	5.0 (VVV)	1.0	\$10.95 ppd.
300-X	Choice of 1 input freq. and 1 output freq. between .6 mc and 160 mc.		\$14.95 ppd.

Note: All above converters have a tuned R.F. stage.

Order now while prices are still low.

Average time between receipt of order and shipment is two weeks —for faster service send postal money order.

All above converters are supplied with Motorola type connectors. For two SO-239 connectors instead, add 75c. N.Y.C. residents add 4% sales tax.

VANGUARD ELECTRONIC LABS
190-48—99th Ave.

Dept. S-11
Hollis 23, N. Y.

ROCKY MOUNTAIN DIVISION

For Director:

Robert B. Miller, W7QPP, and Carl L. Smith, W0BWW, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

For Vice Director:

John H. Sampson, jr., W7OCK, was found lawfully nominated and eligible. Being the only eligible nominee he was thereupon declared, pursuant to the by-laws, to be duly elected as Vice Director of the Rocky Mountain Division for the 1965-1966 term without membership balloting.

SOUTHWESTERN DIVISION

For Director:

The Committee found petitions naming John F. Martin, W6ECP, and Virgil Talbott, W6GTE, but as each petition was signed by the same identical members, the Committee was obliged to declare the petitions invalid. Ray E. Meyers, W6MLZ, and Howard F. Shepherd, jr., W6QJW, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

For Vice Director:

Leonard E. Babin, WA6CQF, was found lawfully nominated and eligible, but the Committee was in receipt of a communication from Mr. Babin withdrawing his name as a candidate. John F. Martin, W6ECP, and Virgil Talbott, W6GTE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to full members of the division.

WEST GULF DIVISION

For Director:

E. C. Pool, W5NFO, was found lawfully nominated and eligible, but the Committee was in receipt of a communication from Mr. Pool withdrawing his name as a candidate. Roemer O. Best, W5QKF, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the by-laws, to be duly re-elected as Director of the West Gulf Division for the 1965-1966 term without membership balloting.

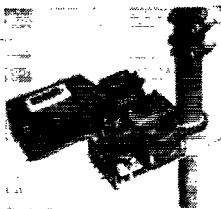
For Vice Director:

Favian M. Adair, W5FKE, and Ray K. Bryan, W5UYQ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to the full members of the division.

After extended discussion, the chair announced the appointment of a committee consisting of Charles G. Compton, W. M. Groves and Carl L. Smith, to make a general study of ARRL election procedures and report to the Board of Directors at its 1965 meeting. On motion of Mr. Eaton, unanimously VOTED that the General Manager is authorized to pay the expenses of the operation of such a committee up to the amount of \$500.

On motion of Mr. Chaffee, unanimously VOTED

(Continued on page 158)



TELEX ROTATOR-INDICATOR SYSTEM MODEL TS250-RIS

**Most Feeds Thru Rotator
For Safe, Easier, Installation**

- 1300 IN./LBS ROTATION TORQUE
- SELF LOCKING BY STURDY WORM GEARS
- SELSYN AZIMUTH INDICATION
- ACCOMMODATES 2" O.D. MASTING
- MALLEABLE CAST MASTING CLAMP SUPPLIED
- OUTPUT SPEED APPROX. 1 RPM
- WILL FIT INTO OR ONTO A 6" SIDED TOWER

Write for FREE PL65 Describing Rotators and Antennas

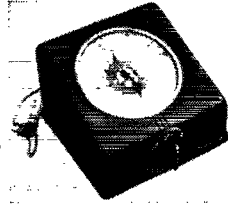
A Really Sturdy
**ROTATOR-INDICATOR
SYSTEM**—
NOT a Modified
TV Rotator!
Designed To
Out-Perform, Outlast!

\$25000
F.O.B.

ALSO:

TS325-RIS \$325.00
TS435-RIS \$435.00
TS535-RIS \$535.00
TS585-RIS \$585.00

TELEX LABS.
ASBURY PARK, N.J.



CLIP AND MAIL CLIP AND MAIL

WRL SELLS TO YOU DIRECT! NO ONE CAN MATCH THESE PRICES! (Fill in coupon and check items wanted—send to WRL)


Name _____ Call _____
Address _____
City _____ State _____

Cash Charge COD (25% cash with order).
If new customer, send credit information with your charge order.

RUSH ME

WRL'S NEW UNIVERSAL PSA-63A "MULTI-PAK" AC SUPPLY. Will power most any AM-SSB-CW XCVR-XMTR
Silicon rectifiers. Dual HV 600V/300V @ 300 MA, 210W. Max. bias 95 VAC. Wt. 15 lbs.


- * Wired \$39.95
- * (2-week trial)



Kit \$24.95

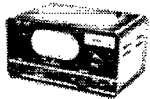
RUSH ME

WRL'S WVG-II "BEST BUY" ALL BAND VERTICAL ANTENNA 10 THRU 80 METERS
Simple to mount—completely self supporting. Rated: Full KW-AM or CW-2KW PEP. Massive base clamp. 3-30 Mc Continuous Coverage.
FIXED • PORTABLE
(2-week trial)
\$15.95 POSTPAID



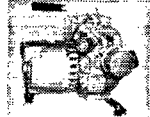
RUSH ME

WRL'S TC6A COMPACT LOW COST 5 WATT 6 METER TRANSCEIVER
Fixed—Mobile. Size 5" H, 9 1/4" W, 6" D, 5 W input with 8 Mc XTALS, PTT. Rec. 1/2 UV, tunes 49-54 Mc, AVC, ANL, Stable, selective, speaker inc. Wt. 9lbs. (less P.S.)
Kit \$39.95
Matching AC Supply
Separate Kit \$15.95



RUSH ME

WRL'S NEW! IMPROVED PORTABLE 12R GENERATOR
Shielded ignition. Alternator type commutator. Inherently regulated. 3 point mount. Carrying handle. 1250 Watts peak, 115 VAC, 60 cy.
\$149.95
(FOB Milwaukee Wisconsin)




RUSH ME

WRL'S SS-3 "Q" MULTIPLIER SELF POWERED. NO-RECEIVER MODIFICATIONS
Improve your receiver performance. New and improved design of SS-3 Circuits with ultra high "Q" coils. Selects the signals you want and rejects the undesired ones. Complete with 115 VAC "built-in" power supply. Use with any superhet having 455KC I.F.
Kit \$15.95



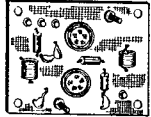
RUSH ME

WRL'S MM-100 ANTENNA TUNER
Specifically designed to match end-fed long wire which is 1/2 wave, or multiples thereof, to 50 ohm transmitters. Panel lamp indicator. For inputs up to 150 watts SSB, 100 watts CW, 75 watts AM. 4x5x4 steel case. Reduces TVI.
Kit \$10.95

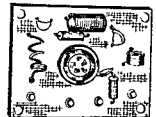


RUSH ME

WRL NUVISTOR PREAMP PRINTED CIRCUITS
PA50—2 Stage preamplifier for 6 meters. Use 2 RCA 6CW4 nuvistors. Highest grade glass epoxy board. Assembled and pre-aligned for 50 ohm input-output. Requires 60—120 VDC @ 10 MA & 6.3 VAC. (Less 6CW4 tubes) Size 2 3/4" x 2 1/4"
PA50-2 Wired \$6.37 (2-week trial)
PA—144 Same as above except only 1 6CW4 nuvistor & for 2 meters.
PA-144 Wired \$4.98 (2-week trial)



PA50-2



PA-144

FREE!

NOW! THE MOST EXCLUSIVE HAM/CB CATALOG EVER COMPILED. SEND FOR IT TODAY—100's OF BARGAINS—CHARG-A-PLAN APPLICATION. BEST PRICES ANYWHERE.



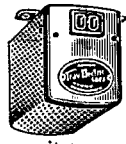
Rush Me "Blue Book" Listing of Reconditioned equipment.
 Rush me my new 1965 Catalog.

WRL WORLD RADIO LABORATORIES
3415 West Broadway
Council Bluffs, Iowa 51504

CLIP AND MAIL CLIP AND MAIL

**USE YOUR 110 VOLT
A.C. RIG ...
IN YOUR CAR!!!**

WITH A **TERADO POWER INVERTER!**
Plenty of A.C. Power for your A.C. Transmitter and Receiver is available from your car, boat or plane battery. Just add a Terado inverter to change the 12 volt direct current to 110 volt, 60 cycle alternating current, stable within 1/2 cycle, in spite of changing input or load. Also operates tape recorders, signal generators, grid dippers, tube testers, etc. Models from 15 to 600 watts, both vibrator and transistor types.



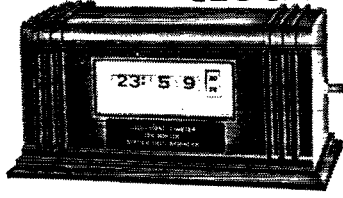
See your electronic parts jobber, or write:

terado CORPORATION
1061 Raymond Avenue, St. Paul, Minn. 55108
In Canada, Atlas Radio Corp., Ltd., Toronto, Ont.

**CALL-IDENT
TYMETER®**
10-MINUTE STATION
CALL REMINDER

**24
HOUR
CLOCK**

#124
22.50
Plus applicable taxes



10-minute repeating timer buzzes warning to sign your call letters. Walnut or ebony plastic case. H4", W7 3/4", D4". Wt. 3 lbs. 110V, 60 cy. 1 year guarantee.

At Your Dealer, or WRITE TO
TYMETER ELECTRONICS
PENWOOD NUMECHRON CO.
7249 FRANKSTOWN AVE., PITTSBURGH 8, PA.

ARPS

(Continued from page 64)

Thirty eight SEC reports were received for July representing 17,953 AREC members. This is the same number of reports as received for last July but represents a drop of about 150 members. Those sections heard from this time are- E. Mass., Colo., Minn., Wash., N.C., B.C., Nev., Ind., Ala., Alta., Ohio, Maine, Okla., Va., Ark., N.Y.C.-L.I., S. Dak., N.N.J., Mich., Ont., W. Pa., Utah, R.I., E. Fla., Ariz., Mo., S. Tex., Ga., Iowa, N. Mex., E. Bay, Los A., Miss., E. Pa., Nebr., W. Va., W. Fla., Sask.

RACES News

Some of the Texas RACES organization was alerted when tropical storm Abby threatened the Gulf Coast in early August. State RO K5TRY informs us that Florida, Miss., Ala. and Texas already had stations on the air when Abby was reported. Nets activated included the West Gulf Emergency Net, the Gulf Coast Hurricane Net, and 18 units of Matagorda County RACES. No emergency communications developed, and the State Emergency Operating Center was secured at 0130 GMT on Aug. 8. — K5TRY, Texas State RO.

National Traffic System

Several of the NTS managers have been complaining that traffic is being short-circuited around the regular NTS channels. TCC receiving stations D, F and K only have the option to QNI either the destination Area or Region nets, or put the traffic directly into the destination section net. If other short-circuiting continues, it can do nothing but hurt NTS. Let's follow channels, fellows and gals.

August Reports:

Net	Ses-sions	Traffic	Rate	Aver-age	Represen-tation (%)
1RN	60	520	.379	8.6	88.3
2RN	62	694	.633	11.2	98.7
3RN	62	740	.441	11.9	94.6
4RN	49	522	.379	10.7	93.3
RN5	62	901	.337	14.5	95.3
RN6	62	878	.621	14.2	98.2
RN7	31	444	.381	14.3	90.3 ¹
8RN	61	415	.271	6.8	72.1
9RN	31	528	.666	17.3	94.4 ¹
TEN	62	556	.475	9.0	64.1
ECN	27	119	.248	4.4	74.1 ¹
TWN	27	147	.350	5.4	57.4 ¹
EAN	31	1499	.966	48.4	100
CAN	31	1176	.845	37.9	99.4
PAN	31	1186	.841	38.3	98.9
Sections ²	1062	6575			
TCC Eastern ³	97	575			
TCC Central ³	86	891			
TCC Pacific ³	93	1598			
Totals	1751	19,954	EAN	9.7	EAN
Record	1973	25,618	1.440	14.8	100

¹ Region Net representation based on one session or less per day.

² Section nets reporting (40): MDD MDDS (Md.-Del.-D.C.); TN TSSBN TPN ETPN (Tenn.); BUN (Utah); WSBN (Wisc.); BN Ohio SSB; QMIN (Mich.); SCCW SCEN (S.C.); QIN (Ind.); NCNL NCCW (N.C.); PPN PPTN (Pa.); SCN (Calif.); OSN (Ore.); GBN (Que.); RISP (R.I.); OQN (Ont.-Que.); AENB AEND AENH AENM AENO AENP (noon) AENP (eve) AENR (Ala.); WFPN (Fla.); NJN NJPN NJNN (N.J.); VTN (Vt.); NPTN (Tex.); MSPN (noon) MSPN (eve) MJN (Minn.).

³ TCC functions reported, not counted as net sessions.
(Continued on page 148)

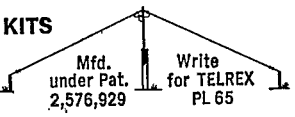


telrex "BALUN" FED INVERTED "V" ANTENNA KITS

SIMPLE-TO-INSTALL, HI-PERFORMANCE ANTENNA SYSTEMS:

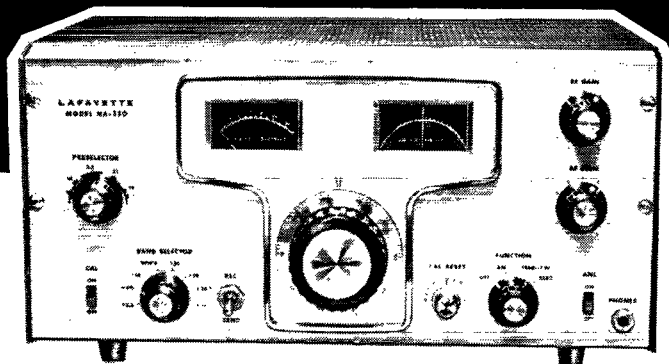
- 1 KW P.E.P. Mono-Band Kit...1KMB1V/81K...\$16.95*
- 2 KW P.E.P. Mono-Band Kit...2KMB1V/81K...\$21.00*

*Kit comprises, encapsulated, "Balun," copperweld, insulators, plus installation and adjustment instructions for any Mono-band 80 thru 10 Meters. Also available 2, 3, 4, 5 Band Models.



TELREX LABORATORIES
ASBURY PARK, NEW JERSEY

NEW! LAFAYETTE



10-80 METER DUAL CONVERSION AMATEUR RECEIVER

MODEL
HA-350

99-2524WX

189⁵⁰

Uses Mechanical Filter For Exceptional Selectivity—Offers 2KC Bandwidth!

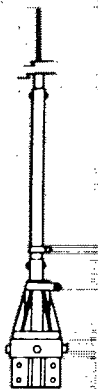
Lafayette's newest! A dual conversion superheterodyne communications receiver covering the 10 through 80 meter amateur bands and offering a high order of electrical and mechanical stability for superior AM, CW and SSB operation. Check some of the exceptional features!

- Sensitivity 1 μ V or Better
- 7 Band-Switching Positions—3.5, 7, 14, 21, 28, 28.5 and 29.1 MC, plus WWV on 15 MC
- Tuning Dial Covers 600 KC for Each Band
- 12 Tubes
- Crystal-controlled 1st Oscillator
- Transmitter-type VFO for 2nd Oscillator
- Preselector Tuning
- Crystal-controlled BFO (Dual frequencies)
- All Heterodyning crystals supplied
- Selectable upper and lower Sidebands
- Geared Tuning Mechanism
- 100 KC Calibrator Circuit (crystal optional extra)
- Separate Diode AM Detector and CW/SSB product Detector
- Coax Antenna Input
- 8 and 500 ohm outputs
- Imported

LAFAYETTE 10-80 METER BAND TUNEABLE VERTICAL ANTENNA

40-0104WX

14⁹⁵

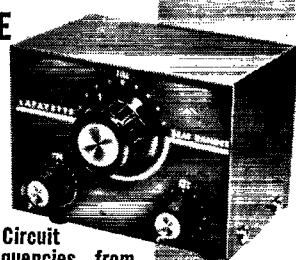


- Single adjustment for tuning antenna
- Omni-directional—overall height 18 ft.
- Rugged, wind-resistant—Irridite-treated
- For Ground, Roof or Tower Installation
- 52 ohms impedance—1000 watts power rating

NEW! LAFAYETTE "BEAT-BANDER" EXTERNAL BFO

99-2502

11⁹⁵



- Stable, Transistorized Circuit
- Provides "beat" frequencies from 3.5-32MC
- Connects to Receiver's Antenna Input
- Ideal for receivers without BFO, or those using a combined Q-Multiplier/BFO
- Complete with coax cable and 9-volt battery
- Imported

FREE!

Lafayette 516—Pg. 1965 Catalog No. 650. Write:

Lafayette Radio Electronics Corp., Dept. VK-4, P.O. Box 10, Syosset, L. I., N. Y. 11791

XMAS GIFT SUGGESTIONS

For that budding new amateur:
See page 120.

For the sideband newcomer or
oldtimer: See page 110

For the QST reader who "files"
his copies all over the house:
See page 136

For every amateur: See page
171

Don't delay. Place your
order now to allow
plenty of time for arrival
before Christmas

K3MVO reports that traffic on 3RN has increased a little, but the attendance has decreased a bit. W4SHJ has issued 4RN certificates to W4s IEI IRE JMA MXU NLC and TUB. K5IBZ is contemplating using 160 as an alternate frequency for RN5 sessions this winter; RN5 certificates went to WA5DQP and W8VDA/5. WB6BBO sez that the second alternate PAN station sked is working out quite well especially when traffic is extra heavy. W9QLW has issued 9RN certificates to W49s BWY IZR and K9WIE. TEN is doing well despite some section net problems, and W0LGG has issued a certificate to K0YDS. VE3BZB reports that ECN had a picnic with 6 members attending, and the outing proved quite successful. W9DYG says that CAN had its best month since April, but traffic is still a bit slack. WB6JUH has issued PAN certificates to W7JHA and K7EWZ.

This is the last of the summer months. Traffic is down from last year, but there haven't been as many fairs and the like this year either.

Transcontinental Corps. W3EML everything is going smoothly but still has openings for station D (that's the late one). W4ZJY has returned from his honeymoon and is back on the air. Thanks to W5PPE for taking over in the interim. W7DZX sez that station skeds are a bit rough because 40 is playing tricks but hopes that these skeds can be shifted to 80 soon. Other than that, things are going pretty well.

August reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	79.2	1634	575
Central	93	92.5	1451	891
Pacific	124	75.0	799	1598
Totals	341	80.9	3884	3064

The TCC roster: Eastern Area (W3EML, Dir.) — W1s BGD EMG NJML, K1s WKK ZHS, W2s GVH, ZVV W12s BLV KQG WLN, W3s EML NEM, K3s FHR FKJ MVO, W4s DLA DVT, WA4PDS, W8s CHT ELW, K8NJW, WA8CPH, W9PTZ/2. Central Area (W4ZJY, Dir.) — W4ZJY, W5PPE, W9s AKV CXY DYG HAS QLW JOZ VAY ZYK, K9DHN, WA9s AUM BWY, W0BDR, K0FPC.

August Net Reports:

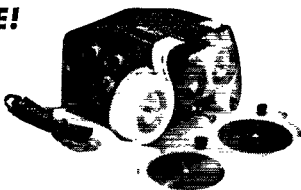
Net	Sessions	Check-ins	Traffic
North American SSB	26	454	410
HBN	31	492	806
7290	41	854	448
Interstate SSB	31	894	422
Northeast Area Barnyard	26	788	8

QST

LEARN CODE!

SPEED UP Your
RECEIVING
with G-C
Automatic Sender

Type S
\$32.00 Postpaid in
U. S. A.



Housed in Aluminum Case. Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycles A.C.

Adjustable speed control, maintains constant speed at any setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

GARDINER & COMPANY

STRATFORD

NEW JERSEY



NEW!

THE IMPROVED NIKEY

Now with ball bearing pivots. The only key especially designed for use with all types of Electronic Keyers. Independent Dot-and-Dash Levers make your fist sound "Truly Automatic." Standard Model \$17.95, Deluxe Model \$19.95. Check or Money Order.

THE PRODUCTIVE TOOL & MFG. CO., INC.

9 Market Street

Stamford, Conn.

Correspondence

(Continued from page 82)

TUBES vs. TRANSISTORS

I think QST should have more transistor and semiconductor articles and less vacuum tube articles. These vacuum tube circuits have not changed in 20 years. Although the vacuum tube is even better than it has ever been, it has been outdone on almost every front by the transistor.

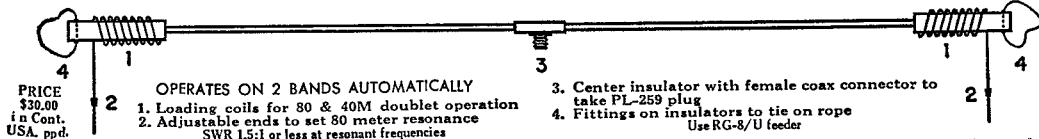
I notice that manufacturers are pushing tube rigs more than ever now. Of course, they are pushing tube rigs! They know that the ham will realize his

(Continued on page 150)

LRL-70 ANTENNA

70' LONG, 80 & 40 M

Power rating 2 Kw. P.E.P. or over



PRICE
\$30.00
in Cont.
USA. ppd.

OPERATES ON 2 BANDS AUTOMATICALLY

1. Loading coils for 80 & 40M doublet operation
2. Adjustable ends to set 80 meter resonance
SWR 1.5:1 or less at resonant frequencies

3. Center insulator with female coax connector to take PL-259 plug
4. Fittings on insulators to tie on rope
Use RG-8/U feeder

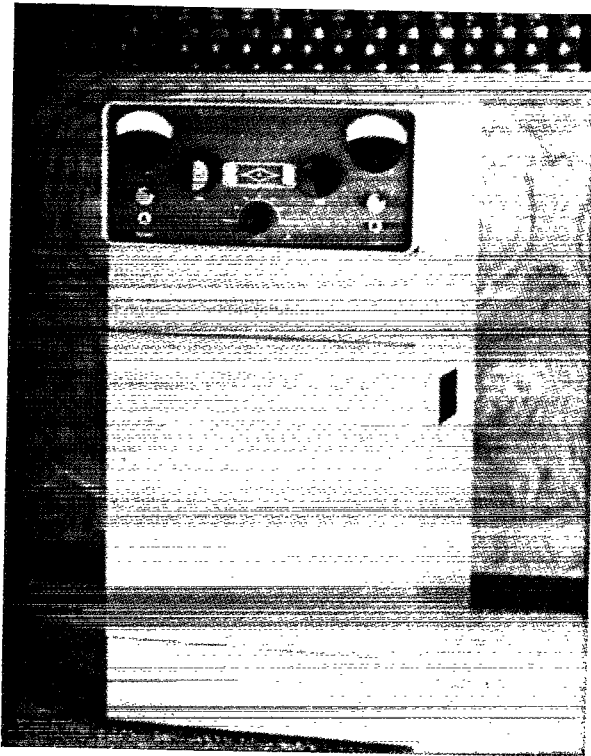
LATTIN RADIO LABORATORIES

Box 44

Owensboro, Kentucky

JOIN THE

BOOH-2K O



An exciting new amateur radio group is just celebrating its first anniversary. You may have heard their meeting on the air. An especially enthusiastic group of them meets on 14282 KC just about every morning.

It's called the Benevolent Order Of Happy 2-K Owners. It's an unusual group since all the members are proud and happy they belong and all amateurs everywhere are glad along with them. Never before have so many sharp, clean, beautiful signals been heard on the air.

Even more exciting--- membership is not restricted. Anyone can belong. We hesitate to tell you that the 2-K is the finest linear amplifier your money can buy; you might think we were blowing our own horn. Why don't you just ask a 2-K owner, or better yet write us for our beautiful full color brochure. Don't consider a 2-K unless you want the loudest, cleanest, sharpest, best sounding signal on the air.

• 2-K Console or 2-KD Desk Model \$675.00 •

HENRY RADIO STORES

"World's Largest Distributors of Amateur Radio Equipment"

Butler 1, Missouri
816-679-3127

11240 West Olympic Blvd.
Los Angeles 64, California
213-477-6701

931 N. Euclid Ave.
Anaheim, California
714-772-9200

431 E. Green Street
Pasadena, California
213-684-0861

Solid Porcelain Low Loss
***Strain Axial Antenna Connector**

Will handle 1 Kw DC Input and 2000 Watts
of P. E. P. (Will actually handle 5 Kw.)

Epoxy Cement Supplied for Coax Seal



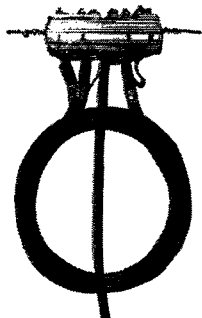
Your Answer to
Coax Feed - Open Wire
Line - Loading Coils
and Balun Assembly

Ordinary Coax



Loading Coils

Size 5"x1 3/4" Wt. 12 oz.



Pix Shows Balun
Assembly

*Patent Pending

**FREE!!
BALUN**

Instructions with Every
Purchase of a Strain
Axial Connector.

For 80 and 40 Meters

**COST \$3.00
POSTPAID**

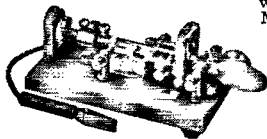
See Your Supplier or
Write

**YATTER
LABORATORIES**

BRADLEY BEACH, N. J.
SAM W2ENM

ENJOY EASY, RESTFUL KEYING

With **VIBROPLEX**



Sending becomes fun instead of
work with the SEMI-AUTO-
MATIC Vibroplex. It actually
does all the arm-tiring nerve
wrecking work for you. Ad-
justable to any desired
speed. Standard models have
polished Chromium top parts
and gray base. DeLuxe mod-
els also include Chromium
Base and red finger and

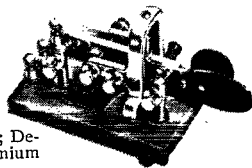
thumb pieces. Five models to choose from, priced at \$17.95
to the 24K Gold Plated Base "Presentation" at \$33.95.

VIBRO-KEYER

Works perfectly with any
Electronic Transmitting Unit.
Weights 2 1/4 lbs., with a base
3 1/2" by 4 1/2". Has Vibroplex's
finely polished parts, red
knob and finger, and thumb
pieces. Standard model \$17.95; De-
Luxe model includes Chromium
Plated Base at only \$22.45.

Order today at your dealers or direct

THE VIBROPLEX CO., INC.
833 Broadway New York 3, N. Y.



FREE
Folder

rig is obsolete sooner if it has tubes in it. The ham
will buy the second new rig much sooner and the
manufacturer will relieve the ham of a little more
green in the long run.

I agree with and support the ARRL on all its non-
technical views. Let's not live in a vacuum. Let's
be sure our technical foundation is solid. — W4VHS

THE WRONG SOURCE

¶ I am writing you as a potential problem appears
to exist with a local broadcast station.

Last evening I had an occasion to call this station
on the telephone to report I was having difficulty
receiving them. I told the girl who answered the
telephone that "... I was having trouble receiving
their station." No sooner did I get these words out
of my mouth than the girl replied that my difficulty
was either: "a ham radio operator or something
wrong with my receiver."

When I assured her that it was neither, I per-
suaded her to let me talk with the engineer at the
transmitter. I soon found that my difficulties in
reception were due to a power reduction at the
station.

How can I best influence this BC station to change
their policy and not blame the amateur for the
difficulties their listeners seem to have? Granted, we
probably do cause a good number of cases of BCI
and TVI. But to be *blindly* accused as the chief
cause of reception difficulties is more than we should
accept from any standard broadcast station.
— K8LOS

MAY I CUT IN? SURE!

¶ Years ago a person wishing to transmit would
simply send dit di-dit, and then listen. If the person
who heard it was listening to another station and the
sender of ... gave him interference he would simply
send di-dah-di-di-dit (wait) and when he was clear
for the break, he would send dah-dah-dit di-dah
(GA-go ahead).

If the sender of dit di-dit did not hear a di-dah-
di-di-dit or dah-dah-dit di-dah he went right ahead
and called CQ or any station he wished. The time it
takes to send a "Q" signal such as "QRL?" or any
other "Q" signal would be considered interference,
while ... is non-interfering. Traffic nets now use a
single dit for break in many cases. — W3QV.

WORLD TRAVEL

¶ It has occurred to the writer that since various
organizations are able to charter aircraft, and sell
space to bona fide members of their organizations,
thus permitting many persons to enjoy trips abroad
at approximately one half normal economy fare,
that it is highly conceivable that enough hams
throughout this country and Canada would avail
themselves of this opportunity, that ARRL could
easily sponsor at least two west coast to the Orient
trips, and two east coast to Europe trips per year.

It is hoped that you may be able to print this
letter, so that we may determine national amateur
interest in this subject. — W2LW

▶▶▶▶▶ **THE DXERS CHOICE • 20-15-10 METER QUAD** ◀◀◀◀◀

PRETUNED FOR SINGLE OR 3 LINE FEED • NO BAND SWITCHING NECESSARY
BREAK THROUGH THE DX BARRIER WITH THE HIGH GAIN, LOW ANGLE RADIATION W2AU 2-EL QUAD
COMPLETE QUAD OF ALL HIGH QUALITY PARTS. See AUG. QST Pg. 152 SEPT. Pg. 168 for details

Available now at Arrow, Harrison, Lafayette in NYC
area; Adirondack in Amsterdam; Electronic Dist. in Whea-
ton, Md.; Genesee, Buffalo; Priest, Norfolk; Soundco,
Springfield, Mass.

Complete Quad \$44.95
Basic Hdwe kit complete, except wire
and bamboo spreaders \$32.95
Cast aluminum spider fits 2" diam.
boom for do-it-yourselfers \$ 6.95 each

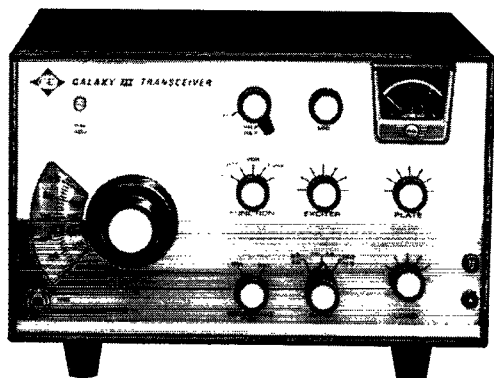
UNADILLA RADIATION PRODUCTS • RFD 1, UNADILLA, NEW YORK

BRYAN EDWARDS, JR.

W5 KFT

"The Kid from Texas"

RECOMMENDS



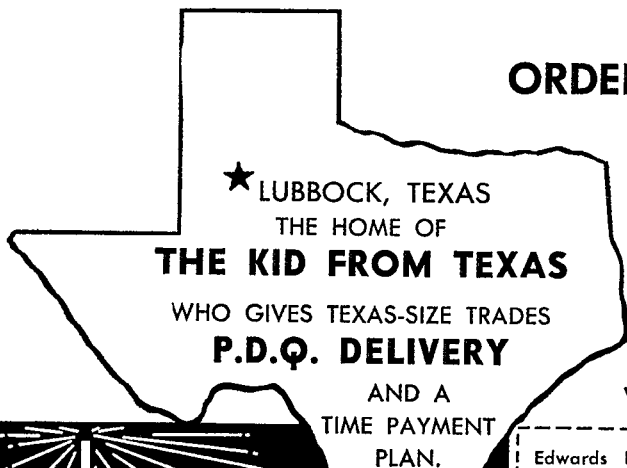
GALAXY III \$349.95
80-40-20 METERS (Illustrated)

GALAXY V \$469.95
80-20-15-10 METERS

IMPORTANT FEATURES OF THE GALAXY III AND GALAXY V . . .

- ✓ 300 Watts SSB/CW Input conservatively rated.
- ✓ "Hottest Receiver" because of advanced design.

- ✓ Best Filter Available: 2.1 kc bandwidth with exceptional 1.8: 1 shape factor. The only 6-crystal filter used in amateur equipment.
- ✓ Most Compact 300-Watt Transceivers: 6" high, 10 1/4" wide, 11 1/4" deep; weight —only 13 lbs.



ORDER TODAY!

PERSONAL INDIVIDUAL SERVICE GUARANTEED

WE WANT YOUR BUSINESS!

Edwards Electronics

TELEPHONE POrter 2-8759
1320 19TH ST. / LUBBOCK, TEXAS 79401

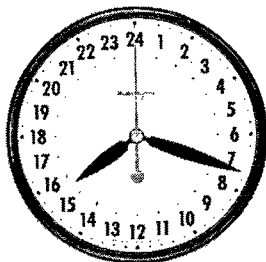
Edwards Electronics Okay, Kid From Texas
1320 19th Street I'm interested!
Lubbock, Texas 79401

Enter order for equipment listed on attached sheet.
 Send Galaxy III and V literature.
 Send quotations for trade in allowances on equipment listed on attached sheet.

Name _____ Call _____
Address _____
City _____ State _____

NEW!

24 HOUR CLOCK



Dependable, Accurate, Made in U.S.A.

Wonderful addition to any "Ham" Shack—provides accurate time reading without confusion. Dependable, self-starting U.L. Approved electric movement. 13 1/2" black case, 12" white dial, black hands and numerals with red sweep second hand. Operates on 115 volts AC, 60 cycles.

ORDER TODAY Only \$14.95

Enclose check or money order—we prepay shipping and insurance charges!

COMMUNICATIONS EQPT. CO.

518 State St., La Crosse, Wis., 54601

Please send me _____ 24-Hour Clock(s) for which

I have enclosed \$ _____

by: Check; Money Order.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

TV CAMERA

We have the lowest prices and complete stock of all components for making your own Ham TV or closed circuit TV camera plus exclusive VANGUARD printed circuits and incredibly low prices on F1.9 lens with focusing mounts. Complete ready-to-operate cameras also available at the lowest prices you'll ever find. For more information, price list, and photos, send 10c coin or stamps.

VANGUARD ELECTRONIC LABS
190-48—99th Ave.

Dept. S-11
Hollis, N. Y. 11423

A GREAT CIRCLE MAP CENTERED ON YOUR QTH?



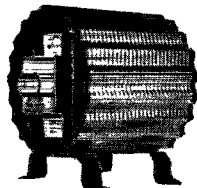
Better than that, the DX COMPASS gives exact great circle bearings and distances from any to any lat° long°. Not a compilation of bearings from a few cities, but a true computer of 6" plastic. Tell the other station what his bearing to you should be. Useful anywhere, land or sea, fixed or mobile, directional antenna or not.

\$4.50 ppd

\$5.00 foreign

SERRATRONICS 543 E. Lesterwest Way Glendora, Calif. 91740

DUMMY ANTENNA



Gentec Dummy Antennas have been engineered to produce compact, stable, RF loads.

FUNCTION

Gentec Dummy Antennas permit transmitter adjustments under electrical conditions duplicating actual antenna conditions but convert and dissipate all the electrical power as heat. This function prevents radiation and thus eliminates TVI, QRM and associated problems. Transmitters can readily be peaked for top DX operation.

\$11.95

Terms: C.O.D. plus postage, or ppd. in U.S.A. when check included with order.

Write For Free Literature

Impedance 50 ohms
VSWR Less than
1.1/1.0
(DC to over
250 MC)

Power Rating:

125 Watts—Steady State
250 Watts—ICAS

GENTEC INCORPORATED, P.O. Box 233, Raritan, New Jersey

YL News

(Continued from page 61)

Field Day

YLS miss a Field Day? Not if it can be helped! It's traditionally known as too much fun to ever miss. The Floridors were out in full force for this event as their report shows.

In Orlando, the YL members of the club were placed in charge of the club's Field Day operation on 10, 6 and 2 meters.

The Floridora Club station, using the call of WA4RXP, operated from the QTH of their President, K4RHL. Using emergency power from Ellie's generator and after convincing many OMs in the Fort Lauderdale area to add some antennas to the occasion, they qualified for Class A operation. Gayle, WA4NRO, and her OM joined in this station's operation, and altogether they had a very successful weekend with 398 contacts.

Ellen, WA4FJF, operated with the Panama City Club. One hope she had was to work the Floridora club station and was disappointed that she hadn't done so until in checking over the logs at about 4 A.M., she found right there in the log, in her own handwriting, the call WA4RXP.

Sue, K4BDF, operated with the Pensacola Club and Evelyn, W4WYR, with the Dade Club.

The state of Florida was well covered by many YLS with lots of that true ham spirit.

Sophie Heintz — W6SH

In keeping with this celebrated 50th anniversary year of the League when much fine reminiscing is being done in connection with amateur radio's history, Sophie Heintz, W6SH, kindly complied with a request to tell the YLS about some of her amateur radio experiences. Sophie has had her amateur radio license since 1926 and has had some wonderful moments as you will see from reading her following comments.

"From the time Ralph (W6RH) and I were married in 1919, I heard about 'wireless' from all sides. Finally, in 1926 I decided 'if you can't beat 'em, join 'em. So I studied theory for months and drew circuit diagrams for days and days. Fortunately, the code gave little trouble, having joined a war-time code class at the U. of Calif., my Alma Mater.

In 1927 I took my examination, and much to my relief, passed it. The call W6GI (Green Ink) was mine. Ralph had promised me a crystal-controlled transmitter (a rarity in those days) if I passed the examination, and there it was, waiting for me!

One of the first contacts was 1HR in the Philippines. From that first QSO, I worked 1HR on sked nearly every morning and took a string of traffic, mostly for military personnel, during each contact.

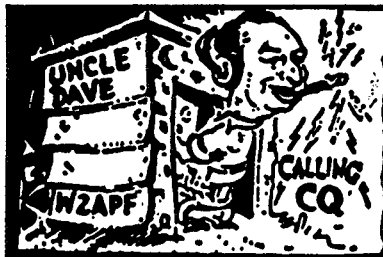
I still recall the tragic flight of the 'Spirit of Dallas', the first plane to carry short wave equipment. Bill Erwin was the pilot and Ben Eichwaldt was the radio operator. I copied the signals, as did thousands of hams all over the world, until the plane went into a tail-spin and then into a second tail-spin from which it did not recover.

A happier flight was that in 1928 of the 'Southern Cross', the first from the U.S. to Australia. Sir Charles Kingsford-Smith was the pilot, Charles Ulm the co-pilot, Harry Lyon the navigator, and Jim Warner the radio operator. I worked Jim (who is the only survivor) many times during the flight, a really thrilling experience.

I also worked Sir Hubert Wilkens on his polar expedition in 1927. The usual DX stations in many countries were rather easily worked, largely because of the favorable sun-spot cycle and its effect on the ionosphere. I also had regular skeds with the 1929-1930 Byrd Antarctic Expedition (the first KC). My OM's company built the ground and plane equipment, so I got to know the 'Ops' real well. I remember Howard Mason, Malcolm Hanson and Lloyd Berkner particularly. The skeds started at 4 A.M. Pacific Time and they also came on every day. By the time the traffic was copied and filed, it was time to wake Ralph and cook breakfast. Never a dull moment!

1930 I suspended operations because of the press of many things. To Col. Clyde deVinna, chief location camera man with MGM, went my little jewel, my transmitter. Clyde, an old friend of the family, made good use of the rig,

(Continued on page 164)



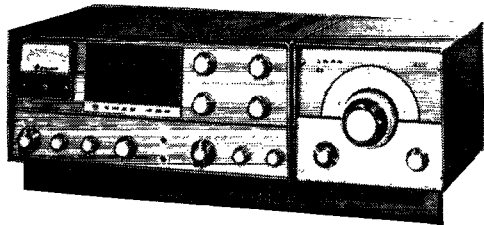
FORT ORANGE

Radio Distributing Co., Inc.

904 BROADWAY ALBANY 7 N. Y. U. S. A.
AMATEUR HEADQUARTERS

Cable Address "Uncledave" CALL ALBANY 518-436-8411 NITES 518-477-5891

YEP, FELLAS, WE HAVE IT! THE SENSATIONAL NEW 400 WATT
SWAN-400 • SSB TRANSCEIVER • 5 BANDS



FEATURES:

SWAN-400

- Transmitter power: 400 watts P.E.P. input, 10 through 80 meters. Fixed or mobile. Dist. prod. down 30 db. 320 watts CW input, 125 watts AM input. P.A. efficiency: 60 per cent.
- Transmitter ALC with audio compression
- And we're proud of overall audio bandpass: essentially flat from 300 to 3300 cycles transmitting and receiving
- Single Conversion Design. Spurious emission and image response down more than 80 db.
- Receiver Sensitivity better than .5 uv for 10 db signal-plus-noise to noise ratio
- 100 Kc Crystal Calibrator

Amateur Net \$395

SWAN-420 Full Coverage Frequency Control Unit: ↑

- Full frequency coverage of 10, 15, 20, 40 and 80 meter amateur bands in 20 ranges of 200 kc each, including WWV range
- Direct reading dial scale calibrated in 2 kc increments. Dual tuning knobs provide choice of fast 6:1 ratio or slow 36:1 vernier tuning.
- Transistorized VFO circuit with Zener regulated p/s
- Excellent temperature, voltage and mechanical stability

Amateur Net \$120

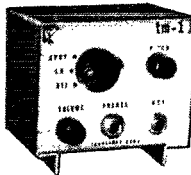
ACCESSORIES

SWAN-406 Miniaturized Control Unit. Compact size allows installation on car dashboard within easy reach and visibility of operator. Mounting brackets, hardware: 3" h, 4 1/4" w x 5" d. 3 lbs.

- AC power supply, Mod. 117B. \$85
- 500 watt mobile power supply, Mod. 512 \$145
- Plug-in VOX unit, Mod. VX-1 \$35

CW OPS! HEAR WHAT YOU SEND:

—AUTOMATIC—



TM-1/G CW Monitor
Model B

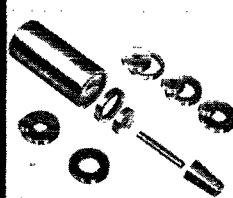
TM-1 squelches receiver output and injects adjustable side-tone into phones for perfect monitoring of keying. Use TM-1 for code-practice and AM reception. Completely transistorized. Handles up to 300 V. at key terminals. A must for the shack; perfect for field day. Not a kit. Battery and complete instructions included. Order TM-1 for cathode-keyed rigs; TM-1G for black-grid keying. Our new Model B Monitors are better than ever. Side-tone generator now has full frequency range; battery drain has been reduced greatly; and the new Model B provides better impedance matching between the Monitor and your phones.

\$19.50 PPD

TRANS-PRO LABS

263 Bouchard Ave., Dracut, Mass.

NEW 6-IN-1 CHASSIS PUNCH!



Now... Punch 6 popular hole sizes with one punch . . . octals, 9-7 pin, phone jacks, pilot lights, etc. Easy to use —no turning, twisting or vise required. Sizes 1 1/2" — 1" — 3/4" — 3/8" — 1/2" — 1/4". Has hardened dies and punches for long life. Plated to resist rust and corrosion. 14 pcs., packaged in handy storage tube.

Wgt., 2 1/2 lbs. Amateur Net \$4.98 U.S.A.

FROM YOUR WHOLESALE, OR BY MAIL (include postage for your zone).
PUNCHES DIVISION OF ROWE INDUSTRIES
P.O. BOX 415 TOLEDO, OHIO 43601

NOW

EXCLUSIVE 66 FOOT **MOR-GAIN** 75 THRU 10 METER DIPOLE
NO TRAPS — NO COILS — NO STUBS — NO CAPACITORS

Fully Air Tested — Thousands Already in Use



40% Copper Clad wire—Under three lbs. Air Weight—Rated for full legal power—AM/CW or SB—Coaxial or Balanced 50-75 ohm feed—VSWR under 1.5 to 1 at most heights—Rust resistant hardware—Drop-proof insulators. Completely assembled, ready to put up. Model 75/40 Amateur Net \$23.80. Terrific Performance—No coils or traps to break down or change under weather conditions—Fully Guaranteed. MODEL 75/40HD (HEAVY DUTY DIPOLE) \$28.00—RATED 3KW PEP—69'.

NEW SUPER GAIN MOBILE COIL AND TIP ROD FOR NEWTRONICS MO-1 OR MO-2 MAST; WITH 1-1 MOR-GAIN-MATIC MATCH. NH40 \$17.00; NH20 \$15.00—FULLY TESTED AND GUARANTEED.

MODEL 40/20 \$17.00 • 36 FEET LONG
MODEL 80/40CW \$23.80 • 69 FEET LONG
MODEL 75-10 \$40.00 • 66 FEET LONG

ORDER DIRECT OR WRITE FOR FULL INFORMATION

MOR-GAIN

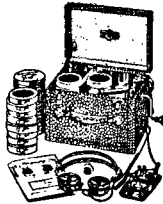
P.O. Box 6006
Alexandria, Virginia 22306

OR THRU YOUR FAVORITE DISTRIBUTOR

Phone: 703-780-2171

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher**. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready. No QRM. Beats having someone send to you.



ENDORSED BY THOUSANDS!

The **Instructograph Code Teacher** literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System**. Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS
4700 S. Crenshaw Blvd., Los Angeles 43, Calif.

YOUR CALL AND HANDLE IN GOLD



on a colorful vinyl overlay, mounted on an attractive wood grained hardboard background, with border and contemporary Coat-of-Arms in golden yellow, 7 1/4 x 5 1/4 in.

● Make wonderful gifts. ● \$2.95 PPD in USA

BE SURE TO PRINT CALL AND HANDLE PLAINLY

VANCO Box 1615, Costa Mesa, Cal.

URGENT, NEED IMMEDIATELY

Very high prices paid. Freight prepaid. AN/GRC; PRC; APR; APN; ARC; ALT; URM; UPM; TS- We also buy all military and commercial test, radar, and communication equipment.

Call collect. It costs you nothing to hear our high offer.

SPACE ELECTRONICS 4178 Park Ave., Bronx, N.Y.
(212) CY 9-0300



It's rare to find two 2-letter calls in one family! Shown demonstrating the rig at KR6MD to S. Sgt. Robert Richardson during a recent trip to Camp Hauge, Okinawa are (at right) Ralph, W6RH, and (at the rig) Sophie, W6SH.

especially when he photographed "White Shadows in the South Seas," a classic in its day. George "Bram" Bambridge of Papeete was one of our QSO friends of long standing, so while Clyde was in Tahiti, we worked him and Bam many times. Curiously, we now work FO8AQ, Raymond Natra, who is Bam's nephew.

In 1959 I decided to get back on the air, so again began studying long forgotten theory and brushing up on the code. The examination over with, I was issued my new call, W6SH, my old call having been reissued. I manage to get on the air, mostly on 14 Mc., several times a week. My skeds with KR6, KH6 and KL7 lands keep me busy and still leave time for world-wide DX which I still enjoy.

Ralph and I have one son, Ralph, Jr., a research fellow at Stanford Research Institute.

Like many other hams, we have old and dear friends all over the world. Many we have seen and visited in their homes. Radio is a rewarding part of our lives, for which we are ever grateful."

Little can be added to Sophie's account of her warm radio memories. We can take this opportunity, however, to wish her many more happy moments in amateur radio. QST

Tuner and I.F. System

(Continued from page 48)

transmitter to put a signal into the pass band to block out the incoming signal completely. Then the sharp i.f. is switched in and the incoming signal is in the clear.

I should add one word of caution. When a detector and audio system are added, the sections described constitute a highly-sensitive receiver covering 2.6 to 2.7 Mc. All sections must be thoroughly shielded, and the supply lines entering the shielding enclosure must be carefully filtered to avoid direct pickup of signals in this segment. QST

CLIP AND MAIL

FREE!

EXCLUSIVE HAM CATALOG

Now! the most complete amateur catalog ever compiled.



HAM/CB

- 100's of Bargains for the Ham, CB'er & experimenter.
- Exclusive WRL "Charge-A-Plan" Application.
- The best prices available anywhere!

WORLD RADIO LABORATORIES

3415 West Broadway, Council Bluffs, Iowa

Rush my Free WRL 1965 Catalog

NAME _____

ADDRESS _____

CITY _____

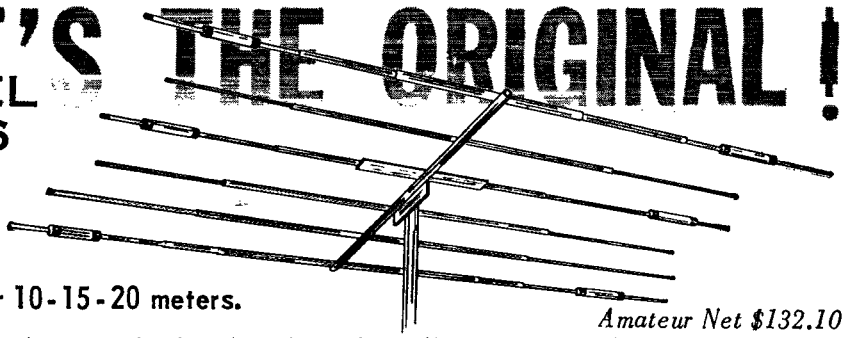
STATE _____

SEND FOR IT TODAY FREE

CLIP AND MAIL

HERE'S THE ORIGINAL!

MODEL TA-36



TRAP
MASTER

for 10-15-20 meters.

Amateur Net \$132.10

The new Clean-line TA-36 . . . the three band beam that will give your signal that DX punch! This wide spaced, six element configuration employs 4 operating elements on 10 meters, 3 operating elements on 15 meters and 3 operating elements on 20 meters.

Automatic bandswitching is accomplished by means of exclusive design high impedance, parallel resonant "Trap Circuits". Built for operation at maximum legal amateur power.

Traps are weather and dirt proof offering frequency stability under all weather conditions. Just one coaxial feed line is needed. 52 ohm, RG-8/U is recommended.

Antenna comes complete with illustrated booklet and color coded elements for ease of assembly.

SPECIFICATIONS & PERFORMANCE DATA: ■ Fwd. gain, 10 meters-9 db., 15 meters-8.5 db., 20 meters-8 db. ■ Front-to-back, 20 db. or better. ■ SWR, 1.5/1 or better at resonance. ■ Transmission line-52 ohm coaxial. ■ Maximum element length, 29 ft. ■ Boom length, 24 ft. ■ Turning radius is 19' 3". ■ Assembled weight-69 lbs. ■ Wind load (EIA Standard), 210.1 lbs. ■ Wind surface area, 10.7 sq ft.

Mosley Electronics Inc., 4610 N. Lindbergh Blvd., Bridgeton, Mo., 63044.
Export Division: 64-14 Woodside avenue, Woodside 77, New York.

CODE SOUND LANGUAGE "the specialized language of sound"

Complete study of the International Morse Code. Selected training aids recorded. "Complete In Every Detail!" Enthusiastic Approval! Consensus of Opinion, "CSL is The Best!" "Easy To Learn!" By Proper Study "You Can Soon Copy 35 WPM!" Master The Code, Now! Magnetic tape, 7" reel, dual track, 2 hours. Immediate Delivery. \$6.95 PP. Send check or money order.
Sound History Recording, Box 16015, Washington, D. C. 20023



DUMMY LOAD

52 ohm, non-reactive film oxide R.F. unit. All band, all power to 1 KW. SWR 1.2 to 1.
Kit \$7.95 postpaid.
Wired, add \$2
HAM KITS
Box 175, Cranford, N. J.

SSB-AM-CW

75% of Your Pwr is wasted

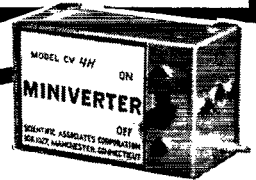
ATTENTION: Special Consideration to Overseas, Rural, and Small Town Amateurs

- TRANSMITTERS—RCVRS
- AMPLIFIERS
- TRANSCIEVERS
- BEAMS & ROTATORS
- TOWERS
- E-Z WAY
- TRI-EX
- SPAULDING
- Major Brands
- Fastest Service

Overseas Amateurs and Newcomers—our recommendations can save you costly mistakes . . . For personal attention write to W9ADN—at

ORGANS & ELECTRONICS Box 117
Lockport Ill.

NOW . . . any radio can be a Sensitive Shortwave Receiver



With the Miniverter, you can listen in your home or auto to conversations on any of the shortwave frequencies: Fire, Police, International, Amateur, Citizens Band, Civil Air Patrol, Coastguard. It's fun and also a valuable tool for Volunteer Firemen, Auxiliary Policemen, boatowners, and many other listeners. Crystal-controlled and transis-

torized, these easily installed powerful units are available in a range from 2 to 60 megacycles. All have a tuned RF stage and are shipped postpaid ready for installation.

BAND*	Price
International, CHU, WWV.....	\$18.95
Fire, Police.....	\$27.95
Amateur, Citizens Band.....	\$18.95 to \$24.95
Marine.....	\$18.95

*Specify desired frequency when ordering!

Write Dept. Q-11 to place your order or for a descriptive brochure.

SCIENTIFIC ASSOCIATES CORPORATION
BOX 1027, MANCHESTER, CONNECTICUT

IMPROVE OPERATION

with

Power-Packed 3.7 DB Gain

**Base Station
with
 $\frac{3}{4}$ WAVE
Ground Plane**

Insure maximum signal transfer and minimum SWR from antenna to receiver without loss of conventional matching transformer. Adjust band width frequencies from 50 to 54 mc.

Model AM-106

\$34.95

See Your Dealer or Send For Complete
"ANTENNA BUYER'S GUIDE"

Master Mobile Mounts INC.

4125 W. Jefferson Blvd. Dept.
Area 213, 731-2251 — Los Angeles, Calif.



Compare Advantages

Up to 20 db Signal to Noise Improvement • Fully weather-sealed • Lower radiation angle
Double radiated power • Built-in lightning protector • SO-239 connector

Max. Power Input — 250W. AM

VSWR less than 1.2:1

Normal Input Imp. — 50 ohms

Accepts Mast of $1\frac{1}{4}$ "

Overall Height — $\frac{3}{4}$ Wave

Wind Surface Area — 1.12 sq. ft.

Wind load at 100 mph — 48 lbs.

Featherweight Portable for 50 Mc.

(Continued from page 30)

possible ounce of weight in the station, if you have to tote along even the lightest conventional beam antenna on all of your portable ventures.

This problem has bedeviled the writer for years. We've built dozens of knock-down beams for various bands, our best for 50 Mc. being a featherweight job weighing only about 5 pounds, including a 15-foot support and the canvas golf bag used to carry the thing.² This is about as good as any 3-element beam can be, and it is still our favorite portable skyhook, but it is terribly bulky compared with the rest of this station. There are times when we want something pocket-size.

On a mountain hike of a couple of miles or more, anything that is bulky, even if light, becomes a major nuisance. Seeing some plastic-insulated stranded wire that was little heavier or stiffer than grocery string gave us an idea: why not try a long wire? Long wires work. They have gain and directivity. They respond to various polarizations. Most important of all, they can be *light!* Their big failing is that they tend to respond to everything, as we found on our first try. With a random wire plugged into the receiver we became acutely aware of this, as we tuned through TV buzz, f.m. splash, paging services, Citizen's Banders — you name it — looking in vain for 50-Mc. hams.

A long wire tames easily, however. The antenna coupler of Figs. 7 and 8 did the trick. We made both capacitors variable at first, but found that about 39 pf. would tune the coupling loop well enough. We checked out the coupler using the exciter of the home rig, so as to have a few watts to show on the s.w.r. bridge when adjusting for zero reflected power. Various wire lengths and configurations can be accommodated with the three taps on L_1 (Fig. 8) brought out to tip jacks. A balanced line to a beam or dipole can be connected to J_1 and J_2 . So can the two wires of a V, or even a rhombic, if you like to work with really big antennas and there's room for them on your mountaintop.

There is no need to be too fancy about the use of long-wire antennas. Almost anything will work; the longer the better. Just tune in a signal on the receiver, peak C_1 for maximum signal, and then repeat the process with another tip jack. Any length of wire will tune in one of them, and it will work out. We've used a half wavelength, a 30-foot wire and a 100-footer with excellent results. The 30-foot wire is usable in almost any location.

The coupler can be connected directly to the BNC fitting on the transmitter, J_1 in Fig. 3, or a convenient length of coax can be used. (A coax-fed antenna or beam can be connected directly to the transmitter, of course.) The support for the far end of the long wire can be a fire tower, tree, building or whatever. On our first test of the system we hitched the wire to the top of the sectional support we normally use for our por-
²Tilton, "A Featherweight Array for 50-Mc. Portable Work," *QST*, August, 1960, p. 38.

ARE YOU WORRIED ABOUT RM-499 PROPOSAL TO F.C.C.? F.C.C. GENERAL EXAM?

- * 297 Questions and Answers
- * All answers complete with discussion
- * IBM type answer sheets
- * High quality printing

A MUST For General Class Check & Study. Nothing Like It Ever Published! **\$2.98 Postpaid**

POST-CHECK

P.O. Box 3564, Urbandale Sta., Des Moines, Iowa 50322

20 M QUAD

\$45.50 Bamboo Spreaders

\$87.50 Fiberglass

- | | | |
|-------------------------|----------------------------|-----------------------|
| WRITE FOR FULL DETAILS: | • Convertible to Tribander | • Easy to match |
| | • High Gain | • Rugged Construction |
| | • High F/B Ratio | • Inexpensive |

VERO INDUSTRIES

51-31 69th St.
Woodside, N.Y. 11377

HERE'S THE BEST DEAL IN THE USA

The best gear and the best terms

		Down Payment	12 monthly Payments
HT-44	395.00	35.00	30.00
HT-45	365.00	17.00	29.00
SX-117	379.95	19.95	30.00
NCX-5	585.00	9.00	48.00
NCL-2000	585.00	9.00	48.00
TR-3	550.00	34.00	43.00
Swan-400	395.00	35.00	30.00

- No finance chgs. No shipping chgs.
- No trade-ins. Cont. USA only.

WILLARD S. WILSON, INC.

405 Del. Avenue, Wilmington, Delaware 19801
Est. 1920 Willard-W3DQ Tel. 302-654-5344



THOUSANDS OF DIFFERENT ANTENNA COMBINATIONS

(all rotated by the one and only HAM-M)

At latest count, there were more than 10,000 HAM-M rotors in use throughout the world, rotating almost as many different antenna combinations. That's product acceptance...that's industry leadership! The reason: proved performance!

The HAM-M performs, consistently, in temperatures that range from -35° F to $+140^{\circ}$ F, under heavy antenna loading, through ice storms and hurricane-force winds. The HAM-M is safe—there is no voltage in excess of 24 volts in the rotor or control cable, and the control box is both fused and overload-protected.

CDE unconditionally guarantees every unit for 90 days and carries a complete stock of parts for field

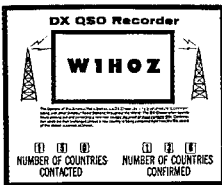
service. Factory rebuilding service is available for only \$17.50 at any time.

At \$119.50 amateur net, the HAM-M is the greatest rotor value around! For technical information, contact Bill Ashby K2TKN. Your local CDE Radiart Distributor has the HAM-M in stock.



CDE makes a complete line of the world's finest rotors: Ham, heavy-duty automatic, heavy-duty manual, standard-duty automatic, standard-duty manual...and the industry's only wireless remote control rotor system!

CORNELL-DUBILIER ELECTRONICS, DIV. OF FEDERAL PACIFIC ELECTRIC CO., 118 E. JONES ST, FUQUAY SPRINGS, N. C.



DX CHASERS

Heavy 8 x 10 DX QSO Recorder is best DX Award for wall. Simply turning spinners always shows exact number of countries QSOed and QSLed. Also, explains DX Chasing to visitors at a glance.

\$2.50 PPD.



ALL HAMS: Ur call and name gold-embossed on handsome pen and pencil set. Ideal gift for the Chief Op. Specify Red, Blue, White or Black. Request special price on quantities with duplicate lettering for group events. Print name and call clearly.
Pen or Pencil Only, \$2.75 PPD. Pair, \$4.50 PPD.

VIKING PRODUCTS Dept. A-11 196 So. Main St. • Orange, Mass.

LAMPKIN METERS + 2nd Commercial License = YOUR OWN PROFITABLE BUSINESS!

YOU ALREADY HAVE EARNED ONE FCC LICENSE... YOUR HAM TICKET. IT HAS GIVEN YOU LOTS OF FUN. WITH A LITTLE EXTRA STUDY YOU CAN EARN ANOTHER — A 2ND-CLASS RADIO TELEPHONE. THIS TICKET CAN LEAD TO LOTS OF MONEY — IN A BUSINESS THAT'S A NATURAL FOR A HAM!

THERE IS AN URGENT NEED FOR TECHNICIANS WITH 2ND-CLASS COMMERCIAL LICENSE, TO MAINTAIN TWO-WAY COMMERCIAL RADIO. CLOSE TO 3,000,000 NON-HAM MOBILE RIGS MUST BE KEPT OPERATING. CITIZENS BAND RADIO IS EXPLODING. FREQUENCY ADJUSTMENTS ON ALL THESE OUTFITS CAN ONLY BE MADE BY PROPERLY LICENSED AND EQUIPPED TECHNICIANS. TO LEARN MORE...



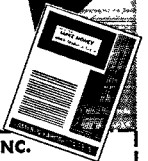
**LAMPKIN 105-B
FREQUENCY METER**
RANGE 0.1 TO 175 MC AND UP.
PRICE \$260.00 NET.



**LAMPKIN 205-A FM
MODULATION METER**
RANGE 25 TO 500 MC.
PRICE \$270.00 NET.

LAMPKIN METERS ARE PREFERRED TEST EQUIPMENT... BY THOUSANDS OF MOBILE-RADIO ENGINEERS!

Send for **FREE BOOKLET**
"How to Make Money in Mobile-Radio Maintenance!"



LAMPKIN LABORATORIES, INC.
MFG Division, Bradenton, Fla.
At no obligation to me, please send me free booklet "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE"—and data on Lampkin meters.

NAME _____
ADDRESS _____
CITY _____ STATE _____

LAMPKIN LABORATORIES, INC. BRADENTON FLORIDA

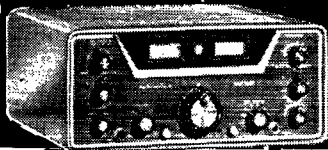
N. Y. MIDTOWN HEADQUARTERS
for world famous *hallicrafters*

SR • 150 Amateur Band Fixed/Mobile Transceiver . . . provides, with unvarying dependability, a range of operating features never available at this price . . .

P-150 AC Power Supply
\$99.50

P-150 DC Power Supply
\$109.50

\$650.00



Enjoy the ultimate in proven engineering reliability. HALLICRAFTERS' (maximum flexibility) SR-150 is the most advanced, most outstanding example of HALLICRAFTERS' ability to build the world's best value in professional quality sound equipment.

ALL HALLICRAFTERS in stock for immediate delivery. Complete audio demo dept. Depend on us.

EVERYONE eventually goes to

1 Door East of Lexington Ave.



Hrs.: 8:30 to 6 Sat. Incl

124 East 44th Street, N.Y.C. • MU 2-3869

WANTED • WANTED • WANTED

AIRCRAFT RADIO SETS: Collins: 51R - 51X - 51Y - 51V - 51Z Bendix: T-21; R-21; DFA-70; RA-18C; MK-7; GSA-1

TEST SETS: ARC, Boonton, Collins, Hewlett-Packard, Bird, Textronics LIGHT WEIGHT RADIOS: Lear - Narco - Bendix - Motorola - ARC (including parts & accessories) • Headsets, Microphones, Antennas J. LEE, Box 105, New Haven, Conn. Phone: 865-0164

WANTED • WANTED • WANTED

ANTENNA AND TOWER INSTALLATIONS
SPECIALIZING IN TRI-EX TOWERS
a complete sales installation and repair service for the California area
HAM RADIO ENTERPRISES

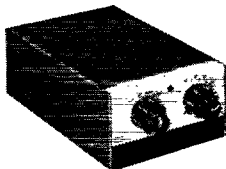
14840 Broadmoor St., Van Nuys, Calif.

TED GILLET **W6HX**
INQUIRIES INVITED

CW OPS:

QRQ with less effort try the "Ultimatic" Keyer

- DUAL LEVER OPERATION
- PERFECT DOTS, DASHES, SPACES • MEMORY PREVENTS LOST DOTS • CALIBRATED SPEED CONTROL • MONITOR
- TRANSISTORIZED.



MODEL 200, for blocked-grid keying \$ 98.75
MODEL 200R, SPDT reed keying relay 110.75
"NIKEY", dual lever 17.95

WRITE FOR BULLETIN 200.1

ALKAN
products

P.O. BOX 5494 LAKE ST. STATION
MINNEAPOLIS, MINN. 55408

table beam. When we described our movements about this central support to WA2SVG/2, the first station worked with it, Vince promptly dubbed the antenna "The Maypole," which is about as descriptive of the aiming system as any paragraph we could write. As he and others worked with the Maypole can testify, a sloping wire does have marked directivity—and gain, too.

If we want the cooling breeze we take the rig up to an upper landing of a fire tower (if the tower watchman is not on duty), tie a small stone to the end of the wire, and heave it into a nearby tree. This unconventional approach (station at the top of the antenna) works very well. We've had many fine contacts over distances of up to 125 miles with variations of this haywire approach, always with reports far better than would be possible with a small whip.

We still like that 3-element beam for use in high spots where the hike is not too arduous, but up to 100 feet of fine insulated stranded wire winds up to pocket size and gives more decibels per ounce than anything we've tried in the way of portable antenna systems. When you've been at this fascinating game as long as the writer, ounces may become more important than decibels if you take your mountain-topping on foot!

QST

Happenings

(Continued from page 144)

that Noel B. Eaton, W. M. Groves and Charles G. Compton, with F. E. Handy and David H. Houghton as alternates, are appointed a Committee of Tellers to count the ballots in the current elections.

The Committee was in recess for luncheon from 1:50 p.m. to 2:05 p.m.

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

- | | |
|------------------------------------|---------------------|
| Eastern Conn. A.R.A. | Danielson, Conn. |
| Edison A.R.C. | Los Angeles, Calif. |
| Sherbrooke A.R.C. | Sherbrooke, P.Q., |
| Steele County A.R.C. | Owatonna, Minn. |
| Triangle A.R.C. of N. C. | Chapel Hill, N. C. |
| Tri-State A.R.C., Inc. | Luverne, Minn. |
| Venango Christian High School R.C. | Oil City, Pa. |
| Wake County A.R.A., Inc. | Raleigh, N. C. |

On motion of Mr. Groves, unanimously VOTED to approve the holding of a Michigan State Convention in Muskegon on February 20, 1965, a Delta Division Convention in Memphis, Tennessee, March 27-28, 1965, and a West Gulf Division Convention in Oklahoma City, Oklahoma, July 9-11, 1965.

On motion of Mr. Chaffee, after discussion, unanimously VOTED that the General Manager is directed to seek from the Federal Communications Commission a change in the amateur rules so as to restrict the lower 100 kc. of the 144-148 Megacycle amateur band to c.w. emission only, in lieu of the present top 100 kc. limitation.

There being no further business, the Committee adjourned, at 3:15 p.m.

(During the course of its meeting, the Committee informally discussed a number of subjects including the Building Fund, the commemorative stamp, the cover plaque award, IARU and international conference matters in considerable detail, and amateur tower cases.)

JOHN HUNTOON
Secretary

**One Control
tunes this rig . . .
from VFO thru final**



Special gang-tuned circuits in Li'l Lulu let you QSY instantly — there's no buffer tuning and final dipping needed when the frequency is changed. And the rig is really TVI proof! By keeping the VFO grid circuit in the 25 mc range, TVI is eliminated. Price: \$225 thru your dealer.

Check these features:

- 117 vac, 12 vdc integral power supply
- Class A high level modulation
- Carbon, dynamic, or crystal mic input
- Push-to-talk, or use panel switch
- Built-in cw keying filter
- VFO spotting switch
- VFO control
- 12DQ7 final.

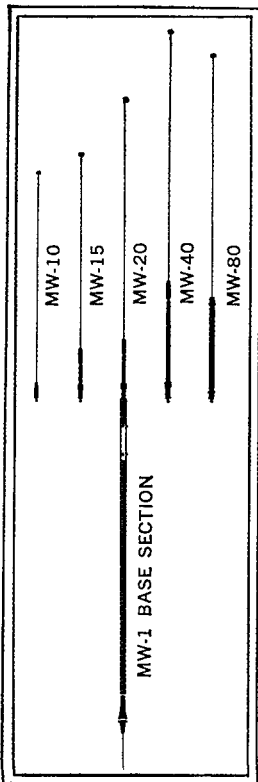
WHIPPANY LABORATORIES, INC.
1275 Bloomfield Ave., West Caldwell, N. J.

Lil' Lulu

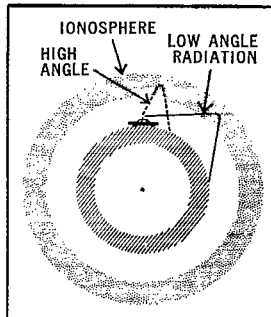
COMPLETE

50 MC

TRANSMITTER



**Monowhip SLEEVE MONOPOLE
MOBILE ANTENNAS** *for amateur radio
with interchangeable top sections for 10 thru 80 meters*



Low-angle radiation induces longer hop-skip for more dependable DX

MW Series consists of single base section and choice of separate, easily-inserted top whips for 10, 15, 20, 40 and 80 meters.

See your **B&K/MARK** Distributor or Write for Catalog HW21-Q

Unique design provides highly-efficient, versatile, single-band or multi-band operation—makes it easy to “add-a-band.” Feedpoint elevated above ground plane of vehicle lowers angle of radiation, increases effective range of both skip and ground wave communications. Omnidirectional radiation characteristic helps overcome usual pattern distortion caused by vehicle. 52-ohm impedance match across extremely wide bandwidth provides exceptionally low VSWR—and utmost radiation efficiency. Rated to handle 500 watts PEP input on all bands, conservatively. Extra rugged to withstand severe environmental conditions.

B & K/MARK

DIVISION OF **DYNASCAN** CORPORATION
1801 W. BELLE PLAINE AVE. • CHICAGO, ILL. 60613

Canada: Atlas Radio Corp., 50 Wingold, Toronto 19, Ont.
Export: Empire Exporters, 123 Grand St., New York 13, U.S.A.

TRADE... OR NO TRADE

You'll get a better deal here on your new transmitter or receiver

Find out what a "surprise" Walter Ashe deal can save you... tell us what you want and what you have to trade. You'll get our deal by return mail.

NEW 1965 CATALOG FREE

The ham's complete catalog... all the newest equipment, components, parts and supplies. Make Walter Ashe your "one-stop" supply source.



WALTER ASHE RADIO CO.

Dept. Q-11-64, 1123 Pine Street
St. Louis 1, Missouri

CQ de W2KUW

We will pay for every good
304TL • 4-400 \$10.00

Sent to us before December 31, 1964

Other large transmitting tubes & equipment also needed.
ARC-GRC-PRC-MN-TS-UR. 51J-V-X-Y-388-390, 17L.

TED DAMES CC. • 308 Hickory St., Arlington, N.J.



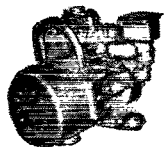
DUMMY LOAD

52 ohm, non-reactive film oxide R.F. unit. All band, all power to 1 KW. SWR 1.2 to 1.

Kit \$7.95 postpaid.
Wired, add \$2
HAM KITS

Box 175, Cranford, N. J.

EVERLITE* World's THRIFFIEST Light Plants



"OUR LEADER" 1200 watts, 115 volts AC for only \$139.95

Unbelievable but true — World's finest design in an alternator light plant at this unprecedented price. This plant puts out a steady 1200 watts of 115 volt AC power. Alternator design eliminates commutator and brushes and service problems. Practically free from "Hash". Perfect for standby power, hamfests, field day and civil defense operation. Also excellent as a standby power unit to operate your oil burner, appliances, power tools, or anything that restarts gas engine with 1 year factory warranty. Complete with carry handle and shock mounts. Why fool with short life 2 cycle plants when you can buy this rugged machine at our factory price. Item #1265 wt. 65 lbs. **\$139.95**

All sizes available — Write for catalog.
Approved for Civil Defense."

MASTER MECHANIC MFG. CO., Dept. 1-1164 Burlington, Wis.

Southern Customers write Dept. 1-1164, Box 65, Sarasota, Florida

Silent Keys

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

W1BYL, Ed Butler, Newburyport, Mass.
W1GRZ, Yalmar T. Hill, Fitchburg, Mass.
K1NSY, Andre Rancourt, Pawtucket, R. I.
W2ASD, Donald Buck, Collingswood, N.J.
K2BT, Wesley D. Mock, Jr., Wayne, N.J.
W2BQT, John T. Finn, Newark, N.J.
W2DKW, Arthur Whineglass, Albany, N.Y.
W2GFS, Vernon Chipman, Jamestown, N.Y.
WA2MAQ, Arthur Banigan, Massapequa, L.I., N.Y.

K2OAH, Ben Adams, New York, N.Y.
WA2WKG, Robert D. Vosbury, Binghamton, N.Y.
W3KGP, Albert Haladay, Kingston, Pa.
W3VTG, Ray Johns, Hockessin, Del.
W4GUN, Harry L. Garrett, Canton, Ga.
WA4RIU, Ben Case, Miami, Fla.
W4WPF, Marvin Kaniss, St. Petersburg, Fla.
W5AAR, L.L. Zeigler, Sweetwater, Texas
W5EWE, Daniel Ray Patterson, McComb, Miss.
W6DCK, Harold David Gordon, North Hollywood, Calif.

W6IZO, Arthur G. Randall, Garden Grove, Calif.
WA6KPY, Victor F. McCann, Bloomington, Calif.
WA6MWB, Max Ballinger, Lancaster, Calif.
W6QIW, William B. Farwell, Oakview, Calif.
W6RJH, Frederick H. Brock, Whittier, Calif.
W8YYU, Dr. Gordon Braendle, Millbrae, Calif.
W7KCT, W.C. Miller, Provo, Utah
K7NMD, Warren D. Hoyt, Cactus, Ariz.
K8HNW, Al Ruskka, Lennon, Mich.

WN8KNT, Edwin S. Freed, Minerva, Ohio
K8MWN, Richard C. Smith, Dunbar, West Va.
K8NMR, Elbert L. Benfer, Youngstown, Ohio
K8TIX, John R. Ferris, Manistee, Mich.
K9OHR, Harold Richmond, Rockford, Ill.
W9OMQ, Paul Norris, Sandborn, Ind.
K9PFJ, Edward P. Breese, Jr., Canton, Ill.
W9UBW, Steven L. Gabil, Pontiac, Ill.
K9WSV, James Ray Gifford, Sr., Indianapolis, Ind.
W9YEY, A.J. Grabowski, Chicago, Ill.
W0DAE, Jack W. Stone, Shawnee Mission, Kans.
W0DFN, Mary Ellen Lieninger, Dexter, Minn.
K00OA, Andrew Bahlay, Denver, Colo.
HR3MW, Max Whitaker, Atlantida, Honduras
VE1AIX, G.M. Sanborn, Halifax, Nova Scotia, Canada

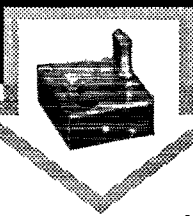
VE1AJ, Joseph Holmes, Sydney, Nova Scotia, Canada
VE3ATZ, Charles A. Ruppel, St. Thomas, Ont., Canada
VE7APG, Les Storey, Vancouver, B.C., Canada
VE7YB, Marvin Briggs, Esquimalt, Canada
VR4CU, George Vianello, Solomon Islands
VP4TK, Paul Alonzo, Belmont, Port-of-Spain, Trinidad, B.W.I.

Strays

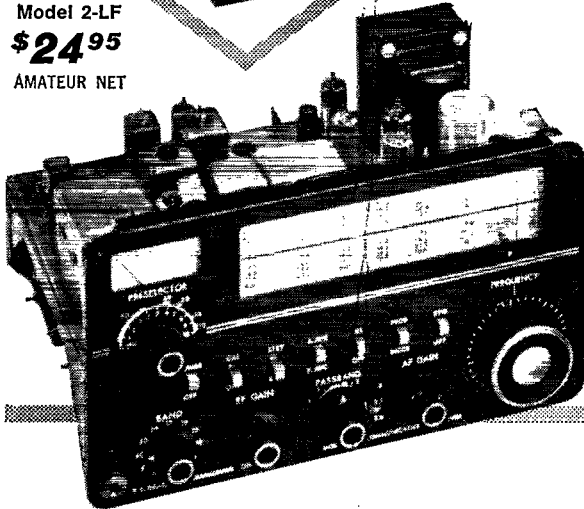
"A Complete Two-Band Station for the V.H.F. Beginner" — a reprint of four articles that appeared in July, August, September, and October, 1961 QSTs — is still available for 50¢ (no stamps, please) from the ARRL, 225 Main Street, Newington Connecticut 06111.

All lovers of coincidences — attention! WA4RRO parked his car in the yard of an electronics store in Norfolk, Va., and discovered that he was right alongside the car of W4RRO. In addition, both are Navy men!

NEW... Low Frequency Converter for Drake 2-B Receiver



Model 2-LF
\$24.95
AMATEUR NET



The new Model 2-LF Low Frequency Converter plugs into the Calibrator Socket of the Drake 2-B Receiver. It converts low frequencies into 10 Meter ranges. Extends the range of the 2-B to include Broadcast, 160 Meters, Marine, Mars, etc. **Covers .1 to 3.5 Mc** in two ranges. Crystal for .1 to 1.8 Mc is furnished. Accessory crystal is available for 1.8 to 3.5 Mc.

FEATURES:

- All solid-state circuitry
- Diode ring mixer
- Transistor crystal oscillator
- Sensitivity less than 2 micro-volts for 10 db S/N
- I.F. rejection better than 50 db
- Conversion oscillator attenuation 40 db
- RF input impedance 50-500 ohms, unbalanced

R. L. DRAKE COMPANY
MIAMISBURG, OHIO

RADIO TELETYPE EQUIPMENT

Teletype Models 14, 15, 19, 20, FRXD, 28, Kleinschmidt printers. Boehme CW keyers R-390, R-391. Radio Receivers Collins 51J-3, 51J-4, R-390A. Hammarlund SP-600JX. Telewriter Model L Frequency Shift Converter.

ALLTRONICS HOWARD CO.

Box 19, Boston, Mass. 02101 Tel. 617-742-0048

CALL-SIGN STAMP

\$1.50 PPD.
POCKET RUBBER STAMP. Stamp and inking device fit together, form compact unit. Less than 1 oz. Print 3 lines desired. Max. width is shown. No "g" available.

Order from... **Rodger Nordlund - K9KVQ**
7635 West Irving Park Road
Chicago, Illinois - 60634

SAMPLE IMPRINT OF STAMP Shown Actual Size

Faster CW-
BETTER READABILITY

Sole license under Patent No. 3,098,898

Preferred by better operators TRY IT! 10-day money back guarantee. \$19.95

AUTRONIC — the finest. For any keyer. Improve your fist. For right- or left-handers. Velvet touch. Micrometer screw adjustments. No contact bounce. Big silver alloy contacts. Many exclusive features. Small, modern, attractive. Proper weight distribution. Thousands used by commercial, military, and ham operators. Also try the companion AUTRONIC KEYER — \$69.50. Best for reliability, performance, results. Free brochure.

ELECTROPHYSICS CORP. Since 1929
3017 West Coast Highway, Newport Beach, Calif.

Horizontally Polarized
or
use it vertically POLARIZED if you wish

← THIS IS THE SKELETON SLOT ELEMENT... heart of the "J BEAM"

Priced low as \$13.95. Single Boom Beams—Low as \$9.75

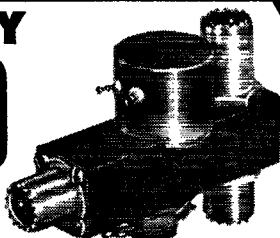
G2HCG WORKS KP4BPZ MOONBOUNCE ON 144 mc with STOCK "J BEAM"

The new SKYBEAM 144 will be ready soon for general distribution. This is the same antenna exactly that was used on June 14, 1964, on 144.010 MC for two continent contact using "moonbounce." No other commercial 144 MC antenna offers fingertip choice of horizontal, vertical, helical polarization. Get details about the 144 Skybeam and other Skybeams also available on 220 & 432 MC.

Write for Spec Sheets and Price List

GAIN, INC. 27 East 112th Place
Chicago 28, Illinois
Tel: (Area code 312) 586-1973

DOW-KEY DK60 SERIES COAXIAL RELAYS



Size
2 3/4 x 3 3/4 x 1 1/2
Less than 9 oz.
DK60-C2C

4 Standard Models, AC or DC,
UHF, N, BNC, TNC or C Conn.

Outstanding favorite for amateurs . . . Versatile combinations for industrials! Low VSWR less than 1.15:1 from 0 to 500 mc. LOW LOSSES . . . High Contact Pressures. LOW CROSS-TALK through use of patented "isolated connector" arrangement. HIGH POWER RATING. All coils encapsulated in epoxy resin for quieter operation and resistance to moisture.

- ★ UNCONDITIONAL GUARANTEE for one year. (We will repair if faulty within 1 year.)
- ★ See one of our 700 dealers and distributors in U. S. and Canada for catalog sheets or write:
- ★ All Relays available in weather-proof boxes for exterior installation
- ★ Ganged, multiple position switch arrangement available for remote control selection of antennas.

STANDARD RELAYS: DK60, DK60-G, DK60-2C and DK60-G2C —

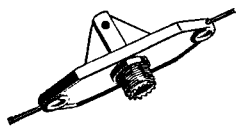
PRICED FROM . . . \$12.45

DOW-KEY CO., Thief River Falls, Minn.



Can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Big trades, easy terms. Used bargains
VAN SICKLE RADIO SUPPLY CO.
Gene Van Sickle, W9KJF, Owner
4131 N. Keystone Ave.
On the northeast side of Indianapolis 5, Indiana

HYE-QUE ANTENNA-FEEDLINE CONNECTOR



New 3-in-1 molded plastic-and-metal fitting provides: coax feeder connection, heavy copper leads to elements, antenna center support. Hye-Que 1 connector fits standard PL259. Reinforced, weather protected, ultra-efficient. At your ham store, or \$2.95 ppd. Companion insulators, 2 for 99¢ ppd. Includes complete instructions.

BUDWIG MFG. CO. P.O. Box 97, Ramona, Calif. 92065

TRANSTENNA 102A

A PRESELECTION SECOND TO NONE AND A T-R SWITCH BEYOND COMPARISON

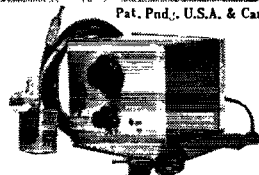
Pat. Pnd., U.S.A. & Canada

MODEL 102A

\$69.45 (Add \$7 for Sidetone)
15 DAY TRIAL

Return For Full Refund If You Burn It Out Or Are Not FULLY PLEASSED

- Std. coax coupler (xmit to feedline)
- No TVI or Suck out
- 30 DB Min. Gain (10-30 mtrs)
- No Effect on Transmission
- Monitored switching
- Full Legal Input
- Burnout Proof
- CW Sidetone (optional)



IMPROVEMENTS

Muting circuit breaks between dots and dashes. Through operating positions for unity gain on all frequencies.

102B \$59.00 (excludes rcvr muting)

FICHTER ELECTRONICS

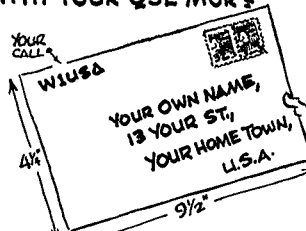
Write for Free Literature
33 Myrtle Avenue, Cedar Grove, N. J.
Tel. Center 9-6412

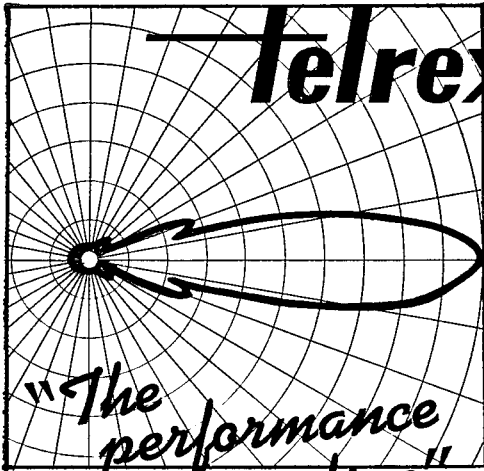
The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
- W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
- W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
- W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320.
- W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
- W6, K6, WA6, WB6 — San Diego DX Club, Box 6029 San Diego, Calif. 92106.
- W7, K7, WA7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
- W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland, Ohio 44110.
- W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
- W0, K0, WA0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn. 55921.
- VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
- VE2 — John Ravenscroft, VE2NV, 135 Thorn Crest Ave., Dorval, Quebec.
- VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
- VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
- VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
- VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
- VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
- VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
- KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P. R.
- KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
- KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
- KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

(Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)

IS YOURS ON FILE WITH YOUR QSL MGR?





"The performance with a line"

**MATERIAL DIFFERENCE
—IN USE IN 135 LANDS!**

"BEAMED-POWER" ANTENNAS and ANTENNA SYSTEMS

The Choice of the Discriminating
Communication Engineer . . . the
Man who Never Settles for Any-
thing Less than THE-VERY-BEST!

You too—can enjoy world renowned TELREX performance and value! Send for PL65 condensed data and pricing catalog, describing the lowest priced antennas on the market, in relation to materials and performance! Expanded data sheets—including your favorite band, are also available.

ANTENNAS

SINCE
1921

COMMUNICATION SYSTEMS
telrex LABORATORIES

ASBURY PARK 40, NEW JERSEY, U.S.A.

★ **New! Call-Letter Flag** ★ Ideal for transmit
★ hunts and clubs. CB ★
★ **WA6DUW** ★ too. Xint gift. Slip on
★ ★ ★ ★ ★
★ blue background (specify). Your own call im-
★ printed black, both sides. Now, only \$1.95!
★ WA6DUW • 808 S. Los Robles • Pasadena • Cal.

VHF • UHF

CONVERTERS & PREAMPS

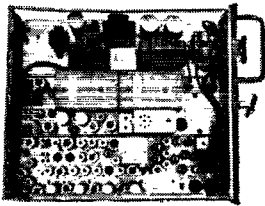
50 thru 432 Mc.

Write for Literature

PARKS ELECTRONICS

RFD 2

Beaverton, Ore.



432 MC-FM CRYSTAL CONTROLLED MOBILE

Motorola T44A-6 6/12
DC Power Supply, 18 W
Transmitter, 2C39 Tri-
pler, 2C39 Final. Receiver
is triple-superhet with
0.8 μ v sensitivity

Simple mechanical changes necessary to convert these
450-470 MC units to 432 MC. All Units Complete with
2C39s Crystal Info., and Schematics

T44A-6 \$52.50
T44A-6A Later, Improved Version 64.50
Cases for above 2.50

150 MC CRYSTAL CONTROLLED MOBILES



Motorola 41V 10W RF • 2E26 Final, 12VDC. Schematic
Included
FMTRU — 41V 12VDC \$34.95
Cases for above 4.00
SEND FOR LATEST FLYER • SALES LIMITED TO
AMATEURS • NO CONTROL HEADS OR CABLES AVAIL-
ABLE

FM SALES CO.

1100 Tremont St. Roxbury 20, Mass. 617-427-3513

"Your Friendly Supplier"

A
SPECIAL

OFFERS



PL-259
STOCK NO. 25



SO-239
STOCK NO. 23

ONLY **32¢** EACH
IN LOTS OF 10 OR MORE



NEW! RG-8U Coaxial Cable
9¢ per foot

Minimum order 100 feet Stock No. 7328

For Prepaid Shipment Continental U. S.
Order by above Stock Numbers

ALSO—we can handle your antenna require-
ments! We stock ANTENNA SPECIALISTS, CUSH-
CRAFT, HY-GAIN, MOSLEY, NEW-TRONICS, &
WEBSTER—both fixed station & mobile, plus
accessories.

"Write for Latest Used Equipment List"

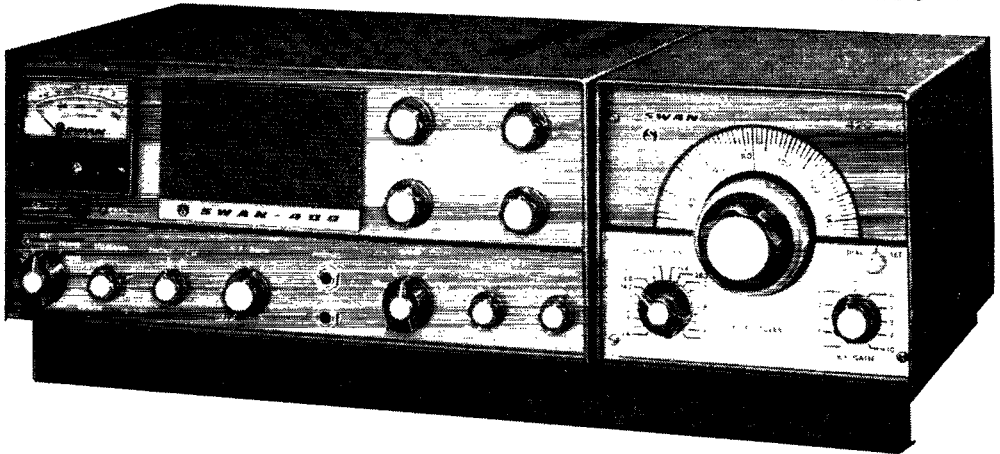
Evans RADIO

P.O. BOX 312

PHONE
603-225-3358

CONCORD, N. H.

SEE THE SWAN 400 AND SWAN 420 NOW!



SWAN-400

- Transmitter power: 400 watts P.E.P. input, 10 through 80 meters. Fixed or mobile. Dist. prod. down 30 db, 320 watts CW input, 125 watts AM input. P.A. efficiency: 60 per cent.
 - Transmitter ALC with audio compression
 - And we're proud of overall audio bandpass: essentially flat from 300 to 3300 cycles transmitting and receiving
- Amateur Net \$395

SWAN-420 Full Coverage Frequency Control Unit:

- Full frequency coverage of 10, 15, 20, 40 and 80 meter amateur bands in 20 ranges of 200 kc each, including WWV range
 - Direct reading dial scale calibrated in 2 kc increments.
- Amateur Net \$120

WRITE HERB KLINE, K1IMP, FOR FURTHER INFORMATION AND PRICES

Send Inquiries to

DeMambro RADIO SUPPLY, INC.

ELECTRONIC DISTRIBUTORS

OPEN DAILY 8:30-5:30

SATURDAYS 8:30-12:30

Phone: 617-254-9000

1095 Commonwealth Ave. Boston, Massachusetts 02215

LEARN RADIO CODE



THE EASY WAY!

- No Books To Read
- No Visual Gimmicks To Distract You
- Just Listen And Learn

\$9.95

Album contains three 12" LP's 2 1/2 hr. instruction

Based on modern psychological techniques—This course will take you beyond 13 w.p.m. in LESS THAN HALF THE TIME!

Also available on magnetic tape. See your dealer now!

EPSILON [E] RECORDS

841 Woodside Road, Redwood City, California

VACUUM CLEAN YOUR RIG

thoroughly with new device. Works in narrow places easily with any vacuum cleaner. Guarantee your rig a longer life.

Attachment with two tips: \$1 postpaid

VERO INDUSTRIES

51-31 69th St. Woodside, N.Y. 11377

572B NOW ONLY \$9.95!

ALSO M.O. 2000 ZERO BIAS TRIODE EQUAL TO FOUR 572B's, \$29.95.

BOTH TUBES NOW BEING MANUFACTURED BY THE DESIGNER.

O'MALLEY TUBES

525 Lehigh Avenue

Phone 201-687-5550

Union, N.J.

TELCO'S MODEL BLA-2000*

*Designed by
Dr. Robert P. Rafuse - W1RUD

BROADBAND CLASS AB2 LINEAR AMPLIFIER

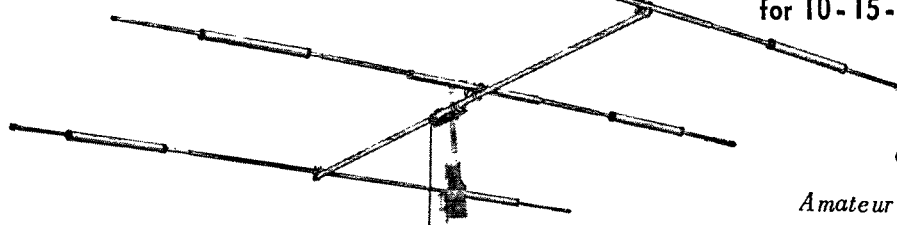
- Instantaneous bandwidth: 3-30 Mc/s.
- Power input: > 2 KW pep (1 KW average on normal voice).
- No tuning, matching, or bandswitching required for a 50Ω load impedance.
- Drive power requirement: 100 W pep nominal.
- Integral power supply for 115/230 V 50-60 ~.
- Quick frequency changing, spread-spectrum communication, swept-frequency operation jamming and counter-measures.

TAPETONE ELECTRONICS LABORATORIES INC.

99 ELM STREET, WEST NEWTON
65, MASS. PHONE 617-332-1123

HERE'S THE ORIGINAL!

MODEL TA-33
for 10-15-20
meters.



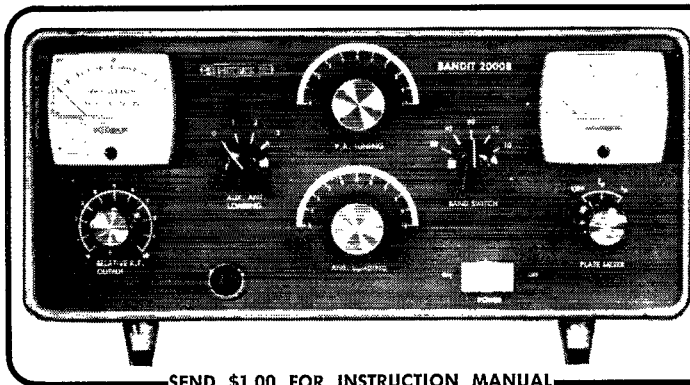
**TRAP
MASTER**

Amateur Net \$104.75

Three element beam provides outstanding performance on 10, 15 and 20 meters. Exceptionally broadband for excellent results over full Ham bandwidth. Exclusive MOSLEY trap design provides resonant frequency stability under all weather conditions. Easily handles full KW, amplitude modulated. Traps enclosed in aluminum are weather and dirt proof. Element center sections of double thickness aluminum, minimizing sag. Boom requires no bracing. Heavy duty universal mounting plate fits masts up to 1½ inch O.D. Feed with one coax line. RG-8/U is recommended. See your nearest amateur equipment dealer or write for literature describing the TA-33, only one of the famous TrapMaster family of fine amateur antennas.

SPECIFICATIONS AND PERFORMANCE DATA: ■ Fwd. gain up to 8 db. ■ Front-to-back is 25 db. ■ SWR, 1.5 or less, at resonant frequencies. ■ Maximum element length is 28 feet. ■ Boom length is 14 ft. ■ Turning radius is 15.5 ft. ■ Assembled weight is 40 pounds. ■ Wind surface area is 5.7 square ft. ■ Wind load is 114 pounds. ■ Shipping weight is 53 pounds.

Mosley Electronics Inc., 4610 N. Lindbergh Blvd., Bridgeton, Mo., 63044.
Export Division: 64-14 Woodside avenue, Woodside 77, New York.



HUNTER

NEW **BANDIT** NEW
2000B

COMPACT LINEAR AMPLIFIER ■ GROUND
GRID 2000 WATTS P.E.P. ■ FOUR NEW
UE572B ZERO BIAS TRIODES ■ SELF-CON-
TAINED SOLID STATE POWER SUPPLY, CON-
SERVATIVELY RATED TO 2400 V. AT 1 AMP.
■ REQUIRED DRIVE: APPROX. 100 WATTS.
■ WRITE FOR MORE INFORMATION.

*Hunter Manufacturing
Company, Inc.*

SEND \$1.00 FOR INSTRUCTION MANUAL

IOWA CITY, IOWA



Pre-tuned / pre-packaged IF strip

Model 8902 pre-tuned 455 KC IF strip provides excellent gain (55 db) and selectivity (6 db bandwidth: 8 KC), No alignment is required. Included among the 21 components on the PC board are a mechanical filter, 2 transistor amplifiers and a diode detector capable of driving earphones. Overall dimensions: ½" x ½" x 1½".

Model 8901 input IF transformer adapts the IF strip for use with a converter in capacity detectors, AM and CB receivers. Both units are included for \$5.75 net.

J. W. MILLER COMPANY

5917 SO. MAIN STREET • LOS ANGELES, CALIFORNIA 90003

NOW ON DISTRIBUTOR SHELVES

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checkings-copies can be supplied.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6UH, 1010 Monte St., Santa Barbara, Calif.

MOTOKOLA used FM communications equipment bought and sold. W2BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimacs, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDS: Uncased 88 Mhz, like new. Dollar each. Five/\$4.00. P. O. DaPaul, 309 South Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned, Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel KEllogg 8-0500.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. WAAA, 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 NOrmandy 8-8262.

WANTED: All types of aircraft or ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames. W2KUW, 308 Hickory, Arlington, N.J.

SELL, swap or buy ancient radio sets and parts, magazines. Lavery, 118 N. Wycombe, Landsdowne, Penna.

COLLINS Equipment bought, sold & repaired. Paul A. Reveal, 129 Midland Ave., Glen Ridge, N.J.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

ENTERING College this Fall. Must sell entire rig to pay for college. No reasonable offer will be turned down, but on first-come first served basis: SR-150 with AC power supply, HA-1 keyer with key, Knight SWR Bridge, AR-22 Toro, Bud low-pass HA-33J & W antenna switch. WA8ASV, 1121 Milbourne, Flint, Michigan.

TRANSISTOR Characteristic Curve Plotter, manufactured by Dunn Engineering, Mod 311 w/schematic and manual, 26 tubes. VC sweep acc. 0.50v. I in steps 1 microamp/steps to 1 ma/step. Original cost, \$800. F.O.B. \$200. In perf. condx. Peter von Rats. 1145 Jerico Tpke., Woodbury, L.I., N.Y. MY 2-5090.

FOR Sale cheap: QST or CQ, any quantity. Send your list for quotation. Cash for call books before 1942. Want early rad. gear and publications. Ery Rasmussen, Box 612, Redwood City, Calif.

FOR Rent: January thru April 1965. Hamshack, tower, TH-4 beam ant, attached to 2 bedroom 2-bath home, beautifully furnished. Completely equipped in quiet neighborhood. Convenient shopping, golf, beach. 1212 Park Road, Hollywood, Fla.

WANT: R-391/URR receivers, parts, assemblies. Nick Thompson, 99 Water, Millinocket, Me.

APACHE \$165; HQ-110, \$130. Local sale. WA2HYT, 1340 Raleigh Rd., Mamaroneck, N.Y.

CRYSTAL Bargains. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

QSL'S? WPES? SWLS? Personalized made-to-order fast service! Largest variety samples, 25¢. DeLux samples 35¢ (refunded). (Religious QSL samples, 25¢). Sakkers, W8DED, Box 218, Holland, Michigan. 49424.

C. FRITZ, bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

FINE QSL'S Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

ATTRACTIVE QSL'S: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSL'S. Twenty exclusive designs in 3 colors. Rush \$3.00 for 100 or \$5.00 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Blandensburg, Md.

QSL'S. Distinctive. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSL'S. Samples 20¢. QSL Press, Box 281, Oak Park, Illinois. 60303.

QSL'S "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSL'S-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

DELUXE QLS. Petty, W2HAZ, Box 27, Trenton, N.J. Samples, 10¢.

CREATIVE QSL Cards. Free, new catalog and samples. Personal attention given. Wilkins Creative Printing, P.O. Box 787-1, Atascadero, Calif. 93422.

QSL'S. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXX, 1996 N. M-18, Gladwin, Mich.

QSL'S, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, tatabulous. DX-attracting, prototypal, snazy, unparagoned cards (Wow!), Rogers, K0AAB, 961 Arcade St., St. Paul 6, Minn.

QSL'S-SWLS 3-colors, 100 \$2.00. Samples dime. Bob Garra, 414 Mahoning St., Lehighton, Penna.

QSL'S, Many designs, \$1.50 per 100 up. Samples 10¢. K. Kidd, Rd. 1, Box 254, Telford, Penna.

QSL'S. Large selection including photos, rainbows, cuts, etc. Fast service. Samples dime. Ray, K7HLR, Box 1176, Twin Falls, Idaho.

HUNDRED QSL'S, \$1.00. Samples, dime. Meininger, Jesup, Iowa.

NOTICE! Finest QSL's for less, believe us! "How To Catalog" only 20¢. Liberty Press, 4339 Prospect, Indianapolis, Ind.

QSL'S. Samples, dime. Printer, Corwith, Iowa.

QSL'S, 100 for \$3.00, 28 new drawings. Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSL'S "Friar" Harvard St., Schenectady Large "Clip and Design" Catalog with samples, 25¢.

QSL'S, Samples 10¢. Wildcat Press (W6CMN, Bill), 6707 Beck Ave., North Hollywood, Calif. 91606.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSL'S. Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSL'S until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL'S, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

ZIP Code rubber stamp, call, name, address with ink pad, \$1.00, K4ISA, E. Perry, Box 8080, Allendale, Fla.

QSL'S, SWLS, Gorgeous Rainbows, etc. Top quality, fast service! Low prices. Samples 10¢ (refundable). Joe Harms, WA4FJE, (ex/WIGET, W2JME), 905 Fernald, Edgewater, Fla. 32032.

SUPERIOR QSL'S, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSL'S, Samples 25¢. Rubber stamps: name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSL'S 300 for \$4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Inglewood, Ill. 60041.

QSL'S 3-color glossy, 100, \$4.50. Rutgers Vari-Typing Service Free samples Thomas St., Riegel Ridge, Milford, N.J.

QSL'S, Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Sample 15¢. Agents for Call-D-Cal decals. K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSL'S \$2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

1 1/2" Call QSL'S \$2.40/100, \$2.90 (2 sides). Samples. Garlery, 2624 Kromer, Ft. Wayne, Ind.

GREET Ham Friends with 3-D Personalized Christmas cards. Newest holiday idea. Brilliant, sparkling designs. Samples 10¢. 3-D QSL Co., Monson 2, Mass.

QSL'S—100 3-color glossy, \$3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

QSL'S, \$1.75/100. Samples 5¢. Nu-Print, 322 Page Blvd. Springfield, Mass.

ELEGANTE QST. "A luxury to Send; an Honor to Receive". Sample, 25¢. Crafted by Samco, Box 203-T, Wynantskill N.Y. 12198.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to YARSCO, Box 307, Yorktown Heights 1, N.Y.

QSL'S, Gorgeous Rainbows! Top quality! Fast service! Low prices! Samples, 10¢, refundable. Joe Harms, WA4FJE, 905 Fernald, Edgewater, Fla.

W6OHE Press quality QSL'S. Samples 10¢. P.O. Box 2411, San Bernardino, Calif.

QSL'S. Free samples. New designs. Dave's Printing Service, Box 578, Broadus Branch, Phillippi, W.Va. 26417.

CUSTOMIZED QSLs with your autographed photo, Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER Stamps, 3-line. \$1.00. Andrew Travis, 2002 West 8th, Austin, Texas, 78703.

RUBBER Stamps \$1.00. Call and address. Clint's Radio W2-UDQ, 32 Cumberland Ave., Verona, N.J.

1965 Desk Calendars, your name, call, address, 3-\$1.00. H. Morgan Printery, 443 Euclid, Akron, Ohio.

QSLs. Stamp and Call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs. Samples free. Blanton's, Box 7064, Akron, Ohio 44306.

QSLs. Christmas Designs, Catalogue. Samples 10¢. Longbrook, Box 93-W, Quakertown, N.J.

PICTURE QSL Cards of your shack, etc. Made from your photograph, 1000, \$14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Phila., Penna. 19140.

CANADIANS: Central Electronics 100V and Central Electronics 600L Linear. In perf. condx, \$900. VE3BUG, 99 Arjay Crescent, Toronto, Can.

CANADIAN: Drake 2-A for sale or trade for gud general coverage receiver. Write A. Lafontaine, VE2AKF, 570 105th Ave., Drummondville, Que. P., Canada.

CANADIANS: Hallcrafters SR-160 xcvr, P-150 DP p/s, mounting kit with cables; complete Newtronics "Hustler" antenna system; Turner ceramic mike; tunable field strength meter. In perf. condx. Returning to university. Need the cash. Goes to best reasonable offer. Ron Goforth, 5507-105TH St., Edmonton, Alberta.

WANTED: HA-1 keyer. State condx and please be reasonable in price. C. Gutman, 7526 Mountbatten Rd., Montreal 29, Quebec, Canada.

MUST Dispose: 82 copies Proceedings of the IRE, 3 vols. complete, 1926 to 1952. Real bargain for lot. Write for list. Mrs. Miriam Y. Knap, W171M, 191 Beechwood Road, West Hartford-7, Conn. Tel: 521-2055.

TUBES. Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

ACT NOW!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WALKER-5-7000.

RTTY Gear for sale. Write for list, 88 or 44 Mhy Toroids five for \$1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

304TL tubes wanted. Also other xmtrs and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL-5-2615.

ELECTRONIC Tubes: Top brands sold at substantial savings! (Minimum order \$15.00). Authorized G-E Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only—Commercial Quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016 212-MU 6-2834.

FIGHT Foot rack containing DX-100, NC-300/cal. spkr., \$22R rcvr. In exclnt condx. Best offer. K2QBV, Joel H. Kornreich, 1340 E. 86th, Brooklyn, N.Y. Tel: No. CH-14262. 200V SSB, \$545; HT-32, \$225; AN/FRR-21 rcvr, 14-600 Kc., \$175; SP-600JX-17, \$425; Collins R-390, R-390A, R-391, R-388, 511-3, 51J-4 general coverage receivers. Altronics-Howard Co., P.O. Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

APACHE TX-1, A-1 plus cond. RME-4350-A, A-1. Offer for TX-1 or both. Offers?? K1MTM.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANTED: For personal collection: QST May 1916 WICUT, 18 Mohawk Dr., Unionville, Conn.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. Garfield Area code 201-471-2020.

"HOUSE OF Happy Hams!" Get your new or used gear for less with cash and no trade. Make us an offer or ask for ours. H & H Electronic Supply, 506-510 Kishwaukee St., Rockford, Illinois.

FOR Sale: W6BWK estate: Clegg Zeus 331, \$495.00; Clegg Interceptor and power supply, \$250.00; Latine 262 and U.F.O. supply, \$150.00; RMI converter 56-220Mc, \$175.00; Hallcrafters SX-101A, \$300.00; Collins 75A2, \$225; Johnson Kilowatt desk, Ranger exciter, kilowatt Matchbox with SWR, condx as new, \$1000. Many other items. Ted Brix, 5573 No. Van Ness Blvd., Fresno 5, Calif.

FOR Sale: 75A4, serial 5111 .5, 3.1 filters vernier knob. Like new, \$500.00; 75A4serial 448, .5, 3.1 filters, vernier knob. In mint condx, \$425.00. These two receivers are identical in appearance and performance. Will ship F.o.b. Elgin, Illinois. L. E. Krafft, K9ZWF, 1.0 Gromer Rd., Elgin, Ill.

WANTED: Hallcrafters S-20 (not S-20RD), S-22, and most early models. Howard Hoagland Junior, 639 North Sierra Bonita, Los Angeles, Calif. 90036.

SELL: Collins 51J-3 (R-388/URR), excellent condx, w/vernier knob, manual, \$550.00; Hallcrafters SX-28, w/manual, fair, \$70.00; Telerec Beams: 10mtr, wide-spaced 3 cl, excellent, \$45.00; 15mtr wide-spaced 3 cl., good, \$55.00; 20mtr Super-mini, 2 cl., excellent, \$45.00; Telrex R-100 medium-duty rotor, fair, \$20.00; Proppich rotor, w/transformer, reversing relay, good, \$25.00; Gonset 10mtr converter, \$10.00; PF-103 motor/generator, excellent \$25.00; 50 foot tower, excellent, 5 ten foot sections, triangular, 6.5 inches, complete w/top-plate 3 galvanized screw guy-anchors, turnbuckles, guywire clamps, \$75.00; All F.O.B., Jackson, N.H., Mack Beal. W1PNR.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, \$7.00 postpaid. Wenlgarc, W4V0F, 1517 Rose St., Key West, Fla.

COMPLETE station plus for best offer over \$600; Marauder, NC-300, with calibrator, DX-40, VE-1 Vibrotex key, AR-2 rotor, Rohm 32 ft. tower, 100 ft. RG/8-U, 100 feet RG-58/U Mosley TA-33 Jr., T-R relay, plus extra tubes, manuals and 4 years of QST. Deliver to within 150 miles rad. W5ITQ, 5720 Meadowdale, Metairie, La. 70003.

FOR Sale: Plate Transformers 3600-0-3600 VAC @ 1000 Ma. CCS, with 110 V and 220 V primaries, \$35.00. One Year Guarantee. Peter W. Dahl Co. 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel. 922-7618.

WANTED For personal collection: Benwood Bakelite Rotary Gap; antique gear dating back to 1915 or earlier. Spot cash! W0ZB, 4 Williamsburg, St. Louis 41, Mo.

FOR Sale: Collins KWS-1 transmitter S/N 969 new final tubes 7580 up dated at factory 3 years ago: \$550.00, 75A-4 receiver S/N 3673 3.1 filter reduction knob, \$350.00. HT-37 transmitter like new condx, \$225.00. TA-33 Jr beam with 100 ft. RG-8-U foam cable, \$50.00. All of the above equipment is very clean and in good working condition. W9FAA, John J. Dilworth, Cassville, Wisconsin 53806. Phone 7255407.

COLLINS AM wired kit, \$5.00. State model. KWM-2 2 Kc. independent receive control: \$15.00. Kit Kraft, Box 763, Harlan, Ky.

HAMMARLUND HX50 excit, 8 mo. old, \$300; Drake 2A, all xtls, call, excl., 2BQ speaker, \$210. W1FZY, 90 West Myrtle, Orange, Mass.

SELLING Out: Collins 310B-1 xmtr/excrt, TVI suppressed manual, in perf. condx, crated, \$75.00; Also complete KW final, AM/SSB/CW featuring 4-400A, vacuum variable capacitor and rotary coil tuning, pi-network matches any antenna, all bands 10-80, separate bias and screen supplies; 750 modulator; KW power supply components; scopes, and many other top ham units. Write for free list. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck, N.Y. 11362.

BOOST Reception: 3.5-30 mcgacycle SK-20 Preselector kit, \$18.98. Boost modulation, AAA-1 clipper-filter kit, \$10.99. Reduce noise, NJ-7 Noiselector, IF, wired, \$4.49. Postpaid! Literature-free. Holstrom Associates, Box 8640-T, Sacramento, California 95822.

ATTENTION RTTY'ers: Typewriter ribbon re-inking device, \$3.00 per roll. W7ARS, Walter E. Nettles & Companies, 8355 Tanque Verde Rd., Rte 2, Box 694R, Tucson, Ariz.

WASHINGTON Amateur Radio News. Free copy. Foundation for Amateur Radio, 2509-32nd St. S.E., Washington, D.C. 20020.

CASH For Callbooks. For private collection, U.S. Government Callbooks before 1927, Radio Amateur Callbook Magazine 1942 wanted. W8EF, 801 Lake Shore Road, Grosse Pointe 36, Mich.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

DXER Beware! A real bomb, York 5000 transmitter. 1 kw. using 4-1000A, bridge power supply, vacuum tuning condenser. \$30.00. \$3" wide, 24" deep, 6 ft. high. Further details. Bill Brown, W0SYK, 28 Marine Lane, Hazelwood, Mo. Tel: HEMPstead 2-6840.

HALLCRAFTERS Equipment in mint condx. SX-101A, \$220 and HT-37, \$275. Or both pieces \$425 Bob Bevington, K5BFO, Blytheville, Arkansas.

WANTED: Collins Parts, BC-610, GRC-27. Autodyne, Bethpage, L.I., N.Y.

HUNTER Bandit 2000A linear amplifier, Ser. #439. Only eight months old and unused last 90 days. Has Hauber bias modification installed. Mint condx \$425.00. K4ZJF, Milt de Reyna, K4ZJF, 4030 Hallmark Dr., Pensacola, Fla. Tel: 433-6552.

NOW You can vacuum clean your rig even in between miniature tubes and circuits with a new device that gives your rig longer life. Non-magnetic. Use with any vacuum cleaner. Attachment with two tips, \$1.00 postpaid. Vero Industries, 51-31 69th St., Woodside, N.Y. 11377.

RANGER II, F/W, in mint condx, full factory warranty card, \$250.00. Collins 75-S with 3.1 Kc. mechanical filters in A.M. position. In mint condx: \$475.00. Prefer local pick-up deal. No trades. Guy! P. G. Balko, Hillcrest Rd., New Canaan, Conn. W1KHW.

MOD. Xfrmr: UTC-CVM5 600W. Hardly used, \$65.00. K1IGO. TRANSCEIVER Clegg 99er 16 xtls. E-V mike, perf. condx, \$100. WA4SBD, 2414 Springhill Rd., Huntsville, Ala.

COLLINS 32S1 and 51F2, \$450; KWM-2 including PM-2 with Collins suitcase and vertical trap antenna: \$925. David Talley, W2FB, 49 East 9th St., NY.

COMPLETE Station in exclnt condx, \$420; Valiant factory-built with filter, \$250; HQ-150 with spkr, \$150; Heath SWR Bridge, \$10; Shure 707A mike and stand, \$7; Ant. relay, \$10; two ants, extra 6146s, etc. included if sold complete. Robert Kobelia, WA2YSI, Verona, N.Y. FN 3-6769.

ANTIQUE Radio collectors: S. Gernsbach's (the first radio encyclopedia ever published). Out of print since 1927. Complete story of radio and wireless from 1927 back to the beginning. 549 photographs, drawings and circuit diagrams, 1930 definitions, etc. Only \$5.00 postpaid. Also lot of early radios, catalogues, horns, loops, earphones, crystal detectors, honeycomb coils, switch points, etc. Send large SASE for list. Phil Wintgarten, 67-61 Alderton St., Forest Hills 74, L.I., N.Y.

SELL: Hammarlund HQ-160 with speaker, \$189; Sonar VFX-60, \$150.00; Kreco 12-volt dynamotor p/s, \$20; Tri-Ec crank-up tower, 37 ft., \$75. All cash and carry. W2PLB, Charles Moskowitz, 720 East 32nd St., Brooklyn, N.Y.

SELL: SX-110 and Globe Chief 90 with SM-90 modulator and manuals for all three. \$120. Might sell them separately. WA8-HCS, 403 Lincoln. Chesandis, Mich.

SELL: Poly PC-6 AC/DC latest, four xtls, B&W 423 filter, Telrex 3-element beam, mint condx, Hy-Gain HH-6B Halo, HMB mast, mobile mount, all new: \$250.00. Al Taylor, WB2-KTA, 3092 Avex, Brooklyn 35, N.Y.

WANTED: SX-88 42 36-A 37, A-1 condition. Leon Etheridge, 50512 Figueroa, Folsom, Calif.

PERFECT SX-99 plus xtal calibrator, \$115; matching R-46B 1/2 speaker, \$10. Heathkit QF-1 Q-mult. DX-40. Dow coax relay, all cheap. Certainly will bargain. Write to Mark Edelman, 3524 Hull Ave., New York City 10467.

SWAN SW-240 with SW-117 AC pwr. supp./spkr, \$285; Topaz 12v. mobile pwr. supp., \$55; Hustler mobile ant., bumper mount and 75-40-20 resonators, \$25.00. Will sell separate or first \$345.00 takes all. Will ship. Ed Brooks, K3JTW, 2416 Tremont, Allentown, Penna.

SELL Or swap, like new Winco AC generator, B&S eng. no. 1500 Watt; Poloroird camera and case; new Browning Sweet 16 vented rib automatic shotgun with case (trade); also stamp album, 7500 issues. Need CE-600L linear or similar 5B amplifier, DX100B, 50 to 68 ft. tower. Constable, WA4MIV, 212 Stonecreek Rd., Smyrna, Ga.

SELL: Super 12, \$40; Master Mobile 80 thru 10 meter whip with bumper mount, \$15. Motorola deluxe line transmitter model FMTU 70DCL (F) less p/s, \$25, surplus modulator unit BC456E, \$5.00. 75 ft. crank-up tower, less base, with guy wires, etc. \$250 or best offer, \$300 takes all. Also have miscellaneous issues of QST and CQ. Send card for list. All inquiries will be answered. Can not pay shipping. Steve Huyett, RFD 1, Berryton, Kansas 66409.

SELL: Collins 75A4 with spinner knob and speaker, \$400; LM-2, \$25.00. Paul Rockwell, W3AFM, 5800 Hillburne, Chevy Chase, Md.

S.O.S. At least one section Rhin fold-over tower model #30 F.K. 301 wanted by A. L. King, WIJN, 8 Hugh Terrace, West Peabody, Mass.

SELL: F/W 20-A, in exclnt condx, \$110.00. Drake 2A, exclnt condx, \$160. Contact Dudley Spears, Box 213, Blytheville, Ark. Phone: P-3-3404.

NEED Replacement parts for BC-610 and model 28 printer. Furnish list and prices. W0BVA, 800 East Quincy, Pittsburg, Kans.

SELL All, perfect, HT41, \$250; Hornet beam and CDR TR4, \$55; HA and paddle, \$60; Johnson LP filter, \$7.00; B&W switches \$14.00. Bill, Box 3332, Lafayette, La.

WANTED: Cootey Key in gud condx and reasonable cost. Write Thomas Chittim, W8LSN, 3375 Byron Rd., Howell, Mich.

APACHE, \$210; SX-100, \$260; TA-33, Jr., AR-22 rotor, \$60. All are in excellent condx. Deliver within 50 miles radius NYC. P. Narine, 3122 Edwy Street, Ithaca, N.Y.

TRADE SB-33 transceiver with six hours air-time for photographic equipment. Sell \$290. Dan Harrington, 12407 Lena Ave., Cleveland, Ohio 44126.

COLLINS 75S1, Telex Twinstet, \$350; 32S1, AC power supply, \$500; Gonset GSB101, \$180; TA33 Sr., Ham-M rotor, coax, 10' tower, \$125.00; Heath SWR Bridge, \$8.00; 24-hour clock, \$8; D-104 mike, stand, \$15.00. William Madigan, WA4RPA, 200 E. Lucerne Circle, Apt. 5D, Orlando, Fla. 423-7930.

SELLING: Collins 75A3, \$325; Ranger, \$125.00. Excellent condition, manuals included. Write: William Bank, 2250 Fuller, Ann Arbor, Mich.

COLLEGE Bound: HQ-100C/ with xtal controlled BFO, \$25.00; Hallcrafters HA-5 VFO/used, very little, \$70. Bug brand new \$10. Heath xtal calib., \$5; Knight speaker, \$5. Package deal: \$210. K5GWO, Hugh Barnes, 3932 E. 32 Pl., Tulsa, Okla.

WANTED: 250 watt Matchbox or Z-match. With or without SWR indicator. Lynn Faulkner, W8NTV, Grafton, West Virginia.

HT-37, in perf. condx, \$275. Art Johnson, K2POA, 29 Boone St., Bethpage, L.I., N.Y. Tel: 516-WEI-3374.

NCX-3 plus NCX-A 110v. power supply. Used less than five hours on receive position only: \$350. Complete, in original boxes and with all instructions and other papers; tape recorder, Sony 101, brand new in original box, unused, \$80. L. R. Belmont-Smith, 115 8th Ave., Brooklyn, N.Y. 11215.

B&W Model 381 TR switch, \$30. RME DB-23, \$30. Both units for \$50. L. A. Morris, W1V G, 99 Bentwood Rd., West Hartford 06107. Phones: 203-666-1541 daytime, 203-521-0416 evenings.

COLLINS 75A-4, \$419. Perfect Central Electronics 200V, \$525. Like new SB-33, \$295; HW-32, \$119; Collins 515E1 D. C. supply, \$87. W0BDG, 3845 Kipling, Minneapolis 16, Minn.

WANTED: Tubes, parts, components, new and used; Amateur, Industrial, Commercial. Mid-West Electronic Supply, 54 Mia Ave., Dayton 27, Ohio.

SWAP Colt Woodsman automatic pistol, perfect condx, for National 1-10A receiver. W0BBA, Bral Island, Minn.

COLLEGE Bound: Must sell HQ-129X, \$110; Viking II, \$140; 122 VFO, \$15, or will sell complete station for \$250. K7JPB, Guilford W. Gaylord, 2135 Solari Dr., Reno, Nev.

SELL: Apache, \$185.00; H-Q 170C, \$240. Both: \$400. Dave Zweier, 157 Chestnut St., Sunbury, Penna.

CLEANUP! Write for free list of bargains as shack-cleaning begins. RTTY, Surplus, etc. Model 15 printer, perf. condx. 215's and 255's. Craig Johnston, WA9CEQ, 833 So. Shore, Madison, Wis.

NC-188 Receiver for sale. Excellent condx, \$90. Bob Weiss, 8 Tuers Place, Upper Montclair, N.J.

COMPLETE Station, Apache, like new: NC-155, NTS-3, original cartons; manuals, accessories. Everything in perf. condx. Best offer over \$310. WA2MXXR WA2MXXR, 512 Magnolia Ave., Brielle, N.J.

TWO Used Motorola FM, 150 Mc. 2-way radios for sale. Don Voigt, W4HQP, Box 72, Dallas, N.C. 28034.

VIKING Valiant, good condition, \$180. F.o.b. Will deliver within 100 miles. WA8KRR, Hal Miller, 6945 Hubbard Dr., Dayton, Ohio 45424.

NATIONAL 12-tube general coverage receiver recently overhauled \$30 F.o.b. Hood, 5512 N. Donald, Oklahoma City, Okla., 73122.

HALLCRAFTERS HT-37, \$275.00; HT-1, \$250.00. Both for \$500. In exclnt condx! WA4KLT, 101 Griffin Drive, Greenville, So. Carolina.

MUST SELL: SX-117 and Eico 720-K with DK-60-G2C relay. Both one year old and in exclnt condx. Will sell together or separately. Make offer! Paul Gresser, 36 8th Ave. East Dickinson, N.D.

APACHE Transmitter, \$175.00, Mohawk receiver, \$190. Both units like-new condx. Sell both units for \$350.00. Willing to deliver up to within 150 miles radius, W4VGS, Robert K. MacDowell, 301 Cleveland St., Fairfax, Virginia (703) 273-4537.

JOHNSON Invader, almost new, original carton and Drake 2B with xtal calibrator. Both best offer over \$550. Will deliver up to 100 miles. Rev. Leo Brown, St. Stephens Friary, Croghan, N.Y.

75A-4 with 2 filters, best offer over \$400; 100V best offer over \$400; 600L, best over \$200; Gonset G76 W/12v P/S, best over \$400. Used by little. Quitting ham radio. All inquiries answered. Nathan R. DeYoung, W0TOL, 504 N. Third, Manhattan, Kansas.

COLLEGE Bound, Must sell: SX-62A, in exclnt condx, \$250. K7NKD, 1539 W. Virginia, Phoenix, Arizona 5007.

SELL Or trade: 2 vacuum variable capacitors, Jennings UCS X-700 15 kv and UCSF 500 7.5 kv, \$20 ea; 75S-3, \$47; TH-4 Thunderbird beam, \$50; 4-4000 final amplifier, \$75; 1500 volt 55A p/s, \$20. Need: 75A4 filters. W2 GBS, 1417 Stonybrook Ave., Mamaroneck, N.Y.

G-50 must go! Best offer. Richard Axelrod, 5000 Woodbine Ave., Philly, Penna. 19131.

FOR Sale: Collins AN/GRC-19 less antenna, 25 volt. Rcvr 550 Kc.-32 Mc., digital dial. Trans. 1.5-20 Mc digital. All manuals. Also AN/VRC-19 less antenna, 24 volt, 152-174 Mc., manual. Best offer for each in gud condx. James Beatty, 1024 Yale, Massillon, Ohio 44646.

COLLINS For sale: College bound, 75S-3, \$530; 32S-1, \$410; 312B-4, \$135; 516P-2, \$65 plus Ham-M rotator, \$55; Hy-Gain TH-4 beam, \$55; T-4E-55 ft. crank-up tower, \$75. If package deal, deduct \$30. All are in excellent condx. Will ship c.o.d. John Spritzler, WA6POY, 130 N. Gunston Drive, Los Angeles 49, Calif. Tel: GR-22117.

WANTED: Commercial, Military, All types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URN, URM, TS, 618S-1-T, 17L, 51R, V-X, others. Ritco, P.O. Box 156, Annandale, Va.

MOHAWK wid spkr, \$190; DX-60 wid VFO, \$90. Like new condx. F.o.b. Norfolk, Va. J. H. Schlosser, 218 Rodman Road.

SALE: New GPR-90 rcvcr, used less than 10 hours, also new Crown A-30 amplifier. No reasonable offer refused. A. Bruno, 185 Hall St., Brooklyn 5, N.Y.

COLLINS 75S-3, \$460; Gonset GSB-100, \$200. Matching GSB-101 linear, \$175; both two years old. In mint condx. HA-1 keyer. Autronic paddle, \$70. Only 2 months use. Eico 710 grid-pid meter, \$30. new. WA4J AY, 207 Palm Ave., Auburndale, Fla.

FOR Sale: SX-101A, SN-260274 excellent condx, \$195.00. R. H. Mitchell, W5DWT, 6403 Stonewall, Greenville, Texas.

MUST Sell the following, assembled and/or maintained in top condx by Amateur Extra: Collins xtr 32V-2, \$170; Heath receivers HR-20 with a c. p/s, \$119; SB-300 with three filters, \$285; Heath scope O-11 with mumetal shield and electronic switch S-3, \$89; plus no other tubes, \$18; 350 ft. shielded audio scope with CRT, but no other tubes, \$19; 350 ft. shielded audio cable Belden #208, \$12; Simpson 4 1/2" \$4.00. Rare old original "Radio" paperback magazines 9 months in 1935 \$5.00, complete file "G-E Ham News" 1946 to 1963, \$15.00. All prices perf. B. G. Freeland, 6913 Churchland St., Fgh. 6, Penna.

FOR Sale: All in perf. condx: Collins 75A-4, ser. 5394, and KWS-1 ser. 1245 vernier dials on both units: \$1000. Pick-up del. only! Srv. no shppg. Madison L. Courtney, Jr., W2MAT, 388 Howell Ave., Riverhead, L.I., N.Y. Tel: 516-PA7-2771.

DYNAMOTORS PE-10C, input 12V output 600V, 200 Ma. 13 lbs., \$4.95. Bedford Electric Supply, Box 16, Bedford, Mass. 01730.

SELL Plate transformers 3000/2700/1600 at 1000 Ma. CCS, exclnt regulation for Class B, custom-built by UTC. Compact, \$35.00. Also, 3000/2700/1700 CT 500 Ma., \$35.00. Boye Hagerty, Honesdale, Penna.

FOR Sale: Ranger I, \$150.00; Hallcrafters S-40B, \$50; Glob Scout 65B, \$45.00. All in excellent condx. KIAPA Sunny Acres, Brattleboro, Vt.

CLEARING Out shack! SX-28, Super Pro, Viking II with VFO and antenna relay, VHF-52A with 6 and 2 meter, Irving Preverters, ARC-5 VHF receiver. The whole lot, \$300. You pick up (sry, no shipping). Local deal only! Sutter, 11137 Van Buren Ave., Los Angeles 44, Calif.

BARGAINS Hunters: Write for free catalog offering array of low cost surplus electronic components. Electronic Surplus Sales, P.O. Box 11356, Philadelphia, Penna. 19116.

NC-303, xtal cal., \$310; Central Electronics MM2 RF analyzer, receiving adapter, \$50; Apache 1X1, \$165; S-38 spkr, \$15; NC-60 rcvr, \$35.00; D-104 mike, push-to-talk, stand, \$25; Johnson 275 w. Matchbox, directional coupler, \$40.00; 10-1-20m quad, \$25; 10-15-20M Mini-Dipole, window mount, \$10.00; Bud code osc-monitor, \$3.00; 40-80M vet pocket dipole loading coil, \$3.00; home-brew electronic keyer, \$5.00; CQ run, 1958-1963; QST run 1958 1964. Best offer. All equipment first class shape and in wkg. order. Will ship only the smaller items. K9DFG, 330 Dolle Lane, Crystal Lake, Ill.

DX Magazine, March 1963 through February 1964 (29 issues), 15¢ ea. postage. Wimp 623 Callbook, like new, \$2.00. Foreign edition, Spring 1963, like new, \$1.50, 1962, \$1.00. W2JZB, George Clark, 123 Davis Ave., Hackensack, N.J.

WANTED: QSTs before 1925. State condition and price. W6-ISO.

WANTED: August 1920 QST. Will pay market price. K4JU, Box 247, Hernando, Fla.

CASH Only; 351D2 Collins, mobile mount \$95; 516E1 12-volt p/s, \$165; SR-150 transceiver w/P5150/120, AC supply, Used 25 hrs., 1600; TA33 Jr. 3-element Tribander, \$50.00; GSB201 linear, used 10 hrs., \$275. Above with manuals. Will consider offers. Write for price. item prices. Bill Rogers, 711 E. Los Angeles, Vista, Calif.

SELL: Motor-Generator, shaft connected, on cast-iron base. Ecco Mfg. Special, made for radio transmitting power. Generator is double commutator, 100 and 500 DC volts at .5 amp. 1 hp. 3-phase, 220 VAC. Used about 20 hours. Oscar D. Bryant, K4GYV, P.O. Box 33, Mt. Vernon, Ky.

COLLINS 32V-2 complete with instruction manual. All new tubes except final. Better than 100 watts output on 80-15 c.w. and a.m. Can be used on SSB with external generator. Cabinet in excellent condition. Will ship collect. Best reasonable offer. WIBGD, 111 Buena Vista Rd., West Hartford, Conn.

MAKE Reasonable offer: Apache with SB-10, audio filter installed. Also 75A-1; Sixer with 12 VDC supply. W0DCB, Ron Samson, 3301 Mt. Vernon Rd., S.E., Cedar Rapids, Iowa.

MOBILE Or fixed. PMR6 (135V). Palco Bantam, James supply, y clean, little use. Alt. for \$125.00. WA6HFD, Kaplan, 23038 Lanark St., Canoga Park, Calif.

ENTIRE Station: Drake 2B, W9TO keyer, new AR-22. Many accessories. WA2WEU, 49 Wadsworth Terrace, New York 10040.

SELL: HT-32A, \$325.00; RME 6900 with speaker, \$225.00. Both \$500.00 in mint condx. K0FMK, Steve Davis, 1023 Park. Tel: 236-3942. Grinnell, Iowa.

MUST Sell: 80-6 M station. HE-80, Globe Scout Deluxe, relay, mic, xtals and key. In exclnt condx. Best offer over \$200. K1YMA.

NOVICES! Heath HR-10, DX-60, HG-10. Like new. Best offer over \$155. WA3BMD, 213 Peach, Pittsburgh 36, Penna.

HEATH HW-32, 20-meter SSB transceiver, HRA-10-1 calibrator, HP-23 110-volt supply, AK-7 speaker, GH-12 PTT mike. Wired by Air Force electronics technician. Outstanding signal. \$175.00. Syl Polunsky, W5TGT, 2601 Parkview, San Angelo, Texas.

SELL mint SX-110 with manual, \$105.00. You pay shipping. Want mint HR-20 and HP-23. Richard Hallowell, 207 Gray Plaza, Scott AFB, Illinois.

MUST Sell for school. Perfect Apache and SX-101A. Three years old, \$400 or any reasonable offer. K9ZSY, 101 Park Ave., River Forest, Ill.

HEATH HW-32 80-mtr. transceiver. HP-13 DC supply, HP-23 AC supply, GH-12 mike, HRA-10-1 calibrator, Histier ant, with bumper mount, \$225.00 express collect. John Doyle, K4TVL, Box 1017, Mobile Ala.

SELL: Gonset G-43 receiver. Exclnt condx, \$85. WB2IDK, 621 Oradell Ave., Oradell, N.J.

FOR Sale: Lampkin 105-B frequency meter, perfect. Used two times. \$200. Signal generator TS-497B/URR, military equivalent of Measurements model 80, y clean, recent calibration, \$300, shipping charges collect. KLT/BCO, Box 263, Eagle River, Alaska.

FOR Sale: Apache Transmitter, 1 yr. old, \$200; DX-40 with VFO, \$50; SX-111 SSB receiver, \$200; Lettine 45-watt 6-meter transmitter \$45. All items are in exclnt condx. Duke Flanagan, W4JEY, Box 293, Aiken, S.C. Tel: M1-9-2730.

PRINTED Circuit boards, Hams, Experimenters, Catalog, 10¢ P/M Electronics, Box 6288, Seattle, Wash. 98188.

QST Magazines, Solid 1940-1946 run in binders, \$3.00 per year; solid run 1957-1963 in new binders, \$5.00 year, also misc. 1937 through 1957 QSTs and CQs, 25¢ each. Joe Holt, Box 157, Levy Sta., Little Rock, Ark.

W0GFO Offers you hundreds of reconditioned equipment bargains. Write for free catalog. Galaxy 36, \$29.00; Swan 140, \$129.00; AF-67, \$59.00; HT-37, \$299.00; SX-101, \$179.00; Valiant, \$199.00; Viking 500, \$389.00; NC-125, \$79.00; SP-600, \$309.00, and many, many more. Ask for our new 1965 Catalog. Write Leo, Box 919, Council Bluffs, Iowa.

WANTED To trade: Electric guitar, case, mike, special floor stand and lavalier holder 50-watt output amp. with matched speakers, reverb tremolo switch. Will trade for HQ-170A, HQ-180, RME 6900, NC-303, NC-270, NC-400, SX-101A, GX-117 or write me what you have. Will also consider buying for cash. Wallace Schulz, Concordia College, Seward, Neb.

FOR Sale: RME 4350, in gud condx, \$85. Will split freight cost. K5ECE, 5214 Carew, Houston 35, Texas.

SELL: Excellent HE-45B/Saturn-6 halo, \$95. K1HK.

SWAP: August 1920 QST for any earlier issue. W2DTE.

FOR Sale: One Kuhn 2-meter converter with car radio and power supply for running both off a 115-volt AC current. All three for \$40.00. Will trade for 2-meter transceiver. Dick Aufmutz, WN8LYU, 720 Wadsworth Rd., Medina, Ohio 44256.

SENECA (Heath VHF-1) w/PTT, D-104 w/g stand. Both for \$150.00. Otto Hagendorf, 66 Nassau St., Elmont, N.Y. 11603.

COLLINS 75S-1; \$295.00. Mint condx. K5PKK, 2012 Atlantic St., Dallas, Texas.

SINGLE Sideband station, HX-50, \$290; Warrior, \$160.00; 2B, 2BO, 2AC, \$210.00. B. R. Reece, Furman University, Greenville, S.C.

COLLINS for sale, 75S-3, or will trade for 51S1, all-channel receiver. Factory improved. W. R. Randall, 39 Clinton St., Gouverneur, N.Y. 13642.

FOR Sale from W9OZR estate: Hammarlund 110-C, \$130.00; Collins type 310B exciter, \$90.00; composite 700-watt AM, best offer over \$100.00. W9DCU, A. B. Van Alstyne, N75 W15427 Colony Rd., Menomonee Falls, Wis.

HALLICRAFTERS S-76 double conversion 80-10 meter amateur receiver, Viking 11 transmitter with VFO, \$130.00. I. H. Marsh, K2DZR, 16 Dellwood Ct., Colonia, N.J.

TOROID RTTY Kit: Mark-Space/Discriminator and bandpass filters, including 4 mfd electrolytic capacitor, like new to toroids; info sheet, mounting hardware and six toroid capacitors, \$5.00 ppd. Toroids 88mhz less capacitors, \$1.00 each. 5/4\$4.00 ppd. KCM Products, Box 88, Milwaukee, Wis. 53213.

NCX-3 Transceiver used 5 months, then factory-overhauled and modified, with NCX-A and NCX-D power supplies. Also 20-meter Hustler mobile antenna, lavalier mike, cables and instruction books. Selling lot only. Will ship collect in original cartons on receipt of \$400 cash or equivalent. Wm. A. Martin, 56 Riverview Dr., Fair Haven, N.J. 07702.

CENTRAL 100 V in mint condx. First certified check for \$350 gets it. F.O.B. W2WRI, 23 New Street, Katonah, N.Y. 10536.

SALE: Collins 75S3 receiver, 32S-1 transmitter, 516F2 supply all top condition, \$950. Also Hammarlund general-coverage HQ-129X receiver, \$90; Eico 723 CW transmitter, \$40; Fiberglass cubical quad 10-15-20 antenna, \$50.00. John Benson, K9IEL, Winona Lake, Indiana.

COLLINS KW-1, AM transmitter, \$1650.00; 75A-3 receiver, \$300. First certified check for \$1800 takes both. Will ship, Jules Milton, 3 Henry Street, Great Neck, L.I., N.Y.

COLLINS 75S-3, 32S-3, 516F-2, like new, used less than 10 hours. All offers considered. K1KR0, 83 Fairland Dr., Wethersfield, Conn. Tel: 529-9281.

FOR Sale: Collins 75A-4, serial 2348, exclnt condx, not a scratch, vernier dial, matching spkr, 3.1 Mc filter, manual, \$400. Harold Alam, 530 Milky Way, Lompac, Calif.

GONSET GSB-101 perf condx, \$155. Shipped collect. 4-81A's, \$15.00. Fred Madan, 536 Third St., N.E., Hickory, N.C.

HQ-100C. Excellent, \$110.00. Trades considered. Also have other equipment. Belvidere, Box 1103, New Britain, Conn.

HALLICRAFTERS HT-37, \$300; Drake 2B G-multiplier, calibrator, \$200. W2ICW, 212-FL-7-7146.

WANTED: Cash for KWM-2 or S/Line rcvr and xmtr also need Drake 2B. State condx. C. W. Brenner, K7GNC/DLSLD, Co. B, 1st Sig Bn, APO 46, N.Y.C.

CLEGG ZEUS & 2 meter transmitter with power supply and modulator for sale, A-1 condx. \$495.00. Jack West, W9NHF, N. Octavia Ave., Chicago, Ill. 60631.

75A-4, #3993, \$475.00; KWS-1, #1015, \$925.00; both in like-new condx, only one owner, original packing cartons for shipment. New Heathkit SB-300 receiver, professionally built, \$280.00. W2KFZ/4 752 Lakeside Dr., Robins AFB, Ga. (910) 926-2610.

SELL: Swan SW-120 20-meter SSB transceiver with Topaz 12 VDC and WR11 115 VAC power supplies. Also Hallicrafters "Splatter Guard" and Telrex indicator-control unit for rotary beam. Best offers. W2KIT, Box 28, Scarsdale, N.Y.

QST Back issues: 1955 thru 1963, almost complete. Best offer. Charles H. Willard, W2EZB, 110 Winchester Dr., New Hartford, N.Y.

REAL Savings on an NCX-3 at \$350, 110 volt AC power supply, HRO-60, \$250.00; Hammarlund HC-10 converter, \$60; P & H Linear with 162's, \$75. Johnson Matchbox, \$35.00. W8AQA, 132 Guild St., Grand Rapids, Michigan.

THUNDERBOLT, new, \$500, with final amplifier tubes, \$400 without. Organs & Electronics, Box 117, Lockport, Ill. Circuits from Handbook, QST, CQ, etc. constructed. All work guaranteed. Reasonable. Write for free list. WA6IKV, 3240 Machado Ave., Santa Clara, Calif.

QST, 136 issues, 90 from Feb. 1931 to July 1952. Complete issues, Sept. 1952 to Dec. 1963. \$30.00; CQ, 191 issues, 7 from Oct. 1945 to Jan. 1948. Every issue from March 1948 to Dec. 1963. \$40.00. R5GB Bulletin, 64 issues, May 1959 to Aug. 1964. \$10.00. Popular Electronics, complete file, 11 years: Vol. 1, No. 1 to date, \$26.00. Radio, 28 issues, Feb. 1934 to Mar. 1937, \$7.00. No single copies sold. Fine condition. Most like-new condx. Some valuable issues. \$100. Takes all. F.O.B. Cincinnati, Ed Gleason, W8DVY, 3971 Drew Ave., Cincinnati, Ohio 45211. Will deliver if near area.

SELL: SR-150 with AC P/S. Best offer over \$550. J. Reifer, 625 Foster St., Evanston, Ill.

QST Magazines: 1923-1959 inclusive, completely intact, bound. Make offer for individual year or complete run. Also Radio 1934-1939, bound. D. Higgins, 10430 Hoyne, Chicago 43, Illinois.

20A, with VFO and OT1, f/w, in A-1 condx, \$150.00. Delivers it to your door. K3NFL, 4 Stones Throw, Wilmington 3, Delaware.

VIDICON, new 6198 Grade "A" with focus coil, \$40, 15-watt 6-meter transmitter, \$15.00. Wanted: NC-101-X, Charles Copp, 337 Jamaica Blvd., Carle Place, N.Y.

THUNDERBIRD Tribander, \$99.50 model, never assembled, \$59.00. New parts for 1000w. linear, half-price. Send for list. Harold Greene, 377 Oldham St., Pembroke, Mass.

DX-100 for sale, in gud condx, \$120.00. Cole, an, 109 Cedar Street, East Hampton, N.Y. Tel: EA-4-1614.

KWM-1, exclnt condx, \$300. Don Boys, 532 Pammel, Ames, Iowa.

WANTED: A Heath HG-10 VFO in exclnt condx. WN2LDJ, 1117 Logan Ave., Bellmawr, N.J.

SELL: QSTs, January 1937-January 1960, complete, including 13 bound volumes, \$45.00; CQ Dec. 1946-January 1960, complete, including 10 bound volumes, \$30.00. Heath AT-1, \$15.00. Jackson I oscilloscope, \$15.00. Heath IA-1 ionition analyzer, \$45.00. Speech clipper, \$5.00. National HRO with A-E coils, \$50.00; BC454, \$5.00. K3LZD, 413 Bliss, Pittsburgh 36, Penna.

WANTED: 1951 QSTs all with binder, if possible. Binders only 1956 through 1964; Heathkit CO-1 code practice oscillator. Jack Kulish, K7XNY, Stanford, Montana.

TR-3, AC-3 supply, MS-3 speaker, \$460.00. J. Papp, Box 3337, Ventura, Calif.

SELL Or trade R-388/5113 Collins receiver, gud condx, 10 Sigma Polar relays 7J0Q-160T, \$1.75 each postpaid, HRO-50 C coil, \$6.00 postpaid. Wanted: R-390, R-390A or R-391, any condx, and plug-in units for CV-57. W5RXN, 2105 N.W. 30, Oklahoma City, Okla.

GALAXY III Transceiver and A.C. power supply, \$325.00. In mint condx. Will ship. Gregory Drzyzga, Box 4254, Tyndall AFB, Fla.

APACHE TX-1. Exclnt condx, \$175. K2EGI.

OVERBURDENED With college expenses, I must sell, immediately, my Viking Ranger, relay, xtals, other misc. included. \$100. Write, call, Edm. Estlin, WA2NAQ, 33 Holder Hall, Princeton University, Princeton, N.J. 08540.

SELL: NC-300 with speaker, \$185; 2 and 6 meter converters. \$25.00 each; Apache late model, \$165.00. Ranger, \$150.00. Each in gud working order. Will ship, W8TAJ, 1061 Burkwood Rd., Mansfield, Ohio.

SWAP Bendix Skipper 28 ship to shore xmtr-rcvr, with remote control station, 14 marine band xtals, cost new \$500 in A-1 condx for a gud ham receiver. Joseph Egan, WA4IAB, 3550 NE 6th Dr., Boca Raton, Fla.

WANTED: VFO-Matic, P&H Model 8010 for KWS-1. R. K. Palmer, K3MTW, Smethport, Penna.

CHRISTIAN Ham Fellowship (Undenominational missionary fellowship for hams). Write for free details. Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, Mich.

GLOBE HG-303 90-watt c.w. transmitter with matching V-10 VFO, both new with warranty cards, \$35.00 each. F/W Valiant, spdlss, \$225. Loew, 3-04 Linden Lane, Fair Lawn, N.J. 201-SW7963.

CLEANING House! Must sell: QSTs (1954-1957 run); CQ (1956-1964); 73 (1960-1964). All issues 40¢ each. Darlene Sharon, 318 Garfield, Hastings, Nebr.

FOR Sale: Heath HX-20, \$200. Going transceiver. Logan Lawson, W4MHV, 8809 Ferndale, Fern Creek, Ky.

SALE: Exclnt Apache, SX-111. Speaker, dipoles, coax, etc. Best offer. All offers considered and answered. Inquire November 4, 1964, and after to: Art Bernstein, WA2YJN, 2411 East 3rd St., Brooklyn, N.Y. 11223.

4-1000A Eimac, new, \$35.00; new 304TLs, \$15.00; 120 mfd. 3000V oil-filled capacitors, \$25.00 and \$3.00 crating. Mclntyre, W8WOM, 3137 Mayfield Rd., Cuyahoga Falls, Ohio.

HT-37, exclnt condx, \$265.00; 1/2 Kw. linear per Handbook, ready for wiring make offer. New ARC-5, 3.5 Mc with dynamotor, \$8.00; cabinet for 14 x 17 chassis, \$8.00. Local deal only, sry. R. A. Bubbe, K6TOK, 1826 Verde Place, Anaheim, Calif. Prospect 6-3939.

SELL: Gonset G-76 transceiver with AC and DC supplies, \$300. Wanted: Collins 75A3 slow-speed dial. Bill Ruzgics, K8MTI, Box 9004, Duke Station, Durham, N.C.

COMPLETE 5-Band SSB, HX-20, HC-20, AK-6 HP-10, \$350.00. Terms K6UPU, 142 La Vista Grande, Santa Barbara, Calif.

WANTED: Riders Manuals (Radio), Vols. I, II, III. Will accept singles. WØGX, Everett Hollstadt, 3957 Minnehaha Ave., Minneapolis, Minn. 55406.

APACHE: Perf. condx. Asking \$180. Will ship. WA2FNY/9, 1129 Spy Run, Ft. Wayne, Ind.

SELLING Out: Complete station 10-80 mtr. phone/c.w. Includes Sonar SRT 120P xmtr, Knight VFO, Knight SWR-pwr meter, Bud LF601 low-pass filter, Handbook antenna coupler with antenna relay, 11 tube Coast Guard receiver, RME HF-10-20 converter, operating table, speaker, Heathkit DX-20 spare xmtr. All are in working condx. The whole lot for \$150.00. Also available: Hallicrafters S-40 receiver, BC453B, "Q-Ser" with p/s, ARC-5, 40-mtr xmtr with p/s. Make an offer on these items. Peter Hctor, 38 Lee St., Cambridge 39, Mass. Phone (days): 864-6900. Ext. 4829.

FOR Sale: Heath Warrior HA-10 linear, factory-wired, 2 Eimac 4-1000A, Eimac socket, Chicago File, Trans B&W 850A pi-net coil. Redmond blower. New C.E. MM2 'scope. Send for list of other parts, also QST and CQ magazines. A. Martinka, 3723 Magnolia Ave., Chicago 13, Ill.

PAIR Heathkit Twovers with DC supplies, \$90.00. K6HAG, 27 Kensington Ct., Berkeley Calif.

SELL: Heath Apache, Mohawk, SB-10, \$370. Or sell individually for reasonable offer. Also SX-42 with spkr, \$110. All equipment in exclnt optg. condx w/manuals. Leonard Neumann, Concordia Seminary, St. Louis, Mo.

FOR That bandswitching KW amplifier: I Jennings Type UCS variable vacuum capacitor, 10 KV, ready to mount; 1 large ceramic rotary switch, 3 deck, 3 pole, 3 position, KW spacing. Both for \$100. N. B. Crandall, WA4VDN, 409 Court St., Blenton, No. Carolina.

KWM2 new condition, 1 year old: \$795.00. Also 7551 clean, \$295. WA2REQ, 212-RN 3-8726. Sal, 2274 National Dr., Brooklyn 34, N.Y.

SELL: Eico 720 90-watt xmtr with Eico 722 VFO. In like new condx: \$100. W3BTP/4, 5225 Vienna Dr., Mobile, Ala.

GERONIMO! Buy, Sell, Trade, Ham Directory, 12 issues, \$1.00. WA2NHH, 1225 Hillside, North Bergen, N.J.

SELL: Invader 200, \$325; SX-101A, \$200; Heath monitor 'scope, \$50; A33 J with TR4 rotor, \$75; SWR Bridge, Johnson low-pass, R48 spkr. All interconnecting cables included, \$525.00 total. Exclnt condx throughout. Richard Hockman, K3LIX, 828 Highland St., DuBois, Penna.

BEAUTIFUL KWM-2 Late model, \$729; mobile mount \$79; noise blander, \$79; 30L-1, \$329. Samuels, 1725 Broadway, Brooklyn 7, N.Y. Tel: GL-5-2222.

SELL: Johnson Viking II with model 122 VFO. In exclnt condx, factory modification for time sequence keying. Full coverage for MARS frequencies. Best offer over \$115 f.o.b. R. W. Woodward, W1VV, 41 Middlefield Dr., West Hartford, Conn.

"HOSS TRADER" Ed Moory "plays Santa Claus": New Equipment with factory warranty on a cash no trade deal: Swan 400 and VFO \$369.00; Galaxie III Transceiver, \$39.00; NCL-1000, \$475.00; Hunter Bandit 2000-B, \$429.00; Drake 2-B, \$219; NCX-5, \$499.00; Hy-Gain TH-4 Beam and Ham-M rotor, \$168.00; SB-33 \$309.00; SR-160, \$249.00; SR-150, \$459.00. Reconditioned Used Gear: HQ-170-VHF, \$279.00; factory-reconditioned KWS-1 and 75A-4; \$1095.00; KWM-2, \$695.00; 75S-1, \$289.00; NC-300, \$125.00; HT-37, \$289.00; HT-37, \$309.00; 10-B, \$69.00; Gonset CSB-101 Linear, \$19.00; Heath Warrior, \$69.00; DX-100, \$15.00; TB-3, \$49.00. Terms Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Tel: WHitney 6-2820.

NOISE Blanker for 75A-4, new, with instructions; Model 136C-1, \$59; VFO for KWM-1, 100 kc, 70K-1, new, \$39; VFO for KWS-1, 70E-23, new, \$39; KWM-1 DX adapter, new, \$19; Hunter Bandit 2000A, factory checked, \$325.00; 51S-1, still in warranty, \$1150. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

SELLING Out: 75S-3, like new condx; first certified for \$450; Heath KL-1 Chippewa Linear, 2 KW with KS-1 matching power supply, used only 100 hours, first certified check for \$350.00; HT-37, gud condx, first certified check for \$350.00. Plate transformer, 200 volt, 300 mills, no center tap, new surplus, never used; \$15.00. Heath Monitor 'scope HO-10, never used, \$50.00. Will deliver within 100 miles; after that limit, f.o.b. deal. William Dayton, W1MVH, 100 York St., New Haven, Conn.

SELL Or trade: New Funk and Wagnalls deluxe encyclopedia set, in exclnt condx, for Clegg 99'er and inverter or Seneca in exclnt condx. Any offer considered, however. K1FHS, Richard Johnson, 37 Ten Rod Road, North Kingstown, R.I.

SELL: Drake 2-B, \$190; HT-32A, \$355, both for \$530. W3JDY, W. A. Hartman, tel: 201-452-6066.

FOR Sale SB-10 SSB adapter, \$60 (never used); Glegg 99'er, \$85; single sideband linear amplifiers per 1963 Handbook, parallel 813's, 40 meter \$30.00; 20 meter, \$30.00, 1700 volt at 1/2 amp. plate supply, \$35.00. Screen bias and filament supply (metered) for volt 300 mills, \$20. Shipping charges extra. A. L. Godshall, W3DSE, 509 Lansdale Ave., Lansdale, Penna.

SELLING Out: Apache, \$135.00; Mohawk, \$135.00; Marauder (wired by Heath engineer) \$250.00. All great as a pin! Gordon L. Wright, K5EHX/W5IPA, 4515 Glover, Dallas 19, Texas.

FOR Sale: Original cartoned G32's, \$2.75 each; 3E29/829B's, \$4.00 each, also other types. Want to purchase screen or plate modulator for Globe 303. Samkofskey, 201 Eastern Parkway, Brooklyn 38, N.Y.

FOR Sale: KWM-2A, serial No. 10152, PM-2 AC supply, CC-2 carrying case, \$850.00, 516E-1 DC supply, \$100. Gonset Bantam beam with coils for 15 and 20 meters, \$35.00, Maj. James W. Craig, 1646-B Sycamore Dr., Blytheville AFB, Ark. 72317.

BEAM, Forty Meter Hy-Gain Monobander, gud condx. Can't use at present QTH. Sell for \$35.00. Lynn McMoran, 800 Willow St., Greenville, No. Carolina.

SELL: Perfect NCX-3, NCXA, \$350. Taubin, W2GCW, 144-44 41st Ave., Flushing 55, L.I., N.Y.

SX-111; Lafayette HE-50 for sale. Both perf. condx. James Cullen, 109 Thicket Road, Baltimore, Maryland 21212.

SELL: Clegg Zeus, \$500, "Interceptor B", \$300; Heath Monitor 'scope, \$60. All Three: \$800. For details write to K8YQH, 4808 Laurelann Dr., Dayton, Ohio 45429.

AVAILABLE for employment March 1965. Naval Officer, college degree, Age 26. Single. Communications and electronics experience. Resume on request. K2IQI, A. S. Gowan, 170 Cooper, Lake George, N.Y.

SX-101 Mk III, as new unmarked, best offer over \$175.00. W2JLX, 227 Pasadena, Hawthorne, N.J. (201) 427-1190.

FOR Sale or trade for ham gear, one Presto K-8 disc recorder in gud condx. E. R. Arms, W9PBL, Harrisburg, Ill.

WANTED: Collins 353-E plug in adapter with CW, SSB filters for 51J3; Hersh Groves, WASLOF, 3569 Creek Rd., Cincinnati 41, Ohio.

COMPLETE SSB Station, similar to Collins S/line mfd. by R.E.I. Xmtr. rcvr. control unit, power supply. All xtals, cables, manuals. Bargain, W2BAA, 212-FL-9-4009.

NORTH Jersey: Hammarlund HQ-110 with clock and speaker. In exclnt condx, \$130.00 cash and carry deal only. 425 Hillside Place, South Orange, Tel: 763-5287 evenings.

SELL: Heath DX-60, relay, mike, coax. Good condx, \$70. Knight R-100A receiver, exclnt condx, \$70. Both for \$130. KITCO, 11 Sterling Rd., Wellesley, Mass.

HALLICRAFTERS SX-101 Mk III in exclnt condx, \$185.00; Hallicrafters HT-32 in exclnt condx, \$290.00. Both for \$450.00. F.o.b. Niceville, Fla. George Reazer, W8KYH/4, Rte 1, Box 214-A.

WANTED: De Forest receivers, transmitters, Audion with screw base, "H" tube, Oscillon, Fleming Valve, Boonton 160-A, "Q" Meter. W9EVK, 610 Monroe Ave., River Forest, Ill. 60305.

TRADE B&K Television analyst, Dyna-Sweep analyst, exclnt. For Drake or Collins rcvr. Trade Television alignment generator for ham gear. WA5VJI, Tommy Jones, Box 8, Medill, Okla.

WESTON Model 506 and other manufacturers milliammeters and voltmeters excess to my needs. Four for \$5.00 and up, plus postage. List for stamp. Etter, Box 717, Riverhead, N.Y.

CENTRAL Electronics 100V, all factory modifications, vly little use, \$395.00; B&W L1000-A less p/s with spare 813, \$190; B&W 51 SB sideband generator factory installed audio limiter \$100. Write your needs for meters, tubes, parts, etc. D. B. Whittemore, W2CUZ, 36 Masterton Rd., Bronxville, N.Y.

NEW ENGLAND: Selling 300W AM/CW rig, in exclnt condx, extras, terrific appearance, TVI suppressed; \$125.00. Operating at 40 Clarissa Rd., Chelmsford, Mass. Tel: AL-6-5902. K1UOC.

FOR Sale: D-104 and G-stand, \$15.00; Viking Valiant W/T, \$250.00; RME-6900, \$270; B&W low-pass, \$8.00; HK-1B keyer, \$25.00; Vibro Autokey, \$10.00; Heath SWR Bridge, \$5.00; Johnson Signal Sentry, \$15.00; DB-2 3 Preselector, \$35.00. Jim Patten, WA2FII, 89-81 215 Place, Queens Village 27, L.I., N.Y.

HALLICRAFTERS SX-110 in vly gud condx, w/spkr and xtal calibr. \$125.00. P'll pay shipping. Michael Brumberger, 30 Bay 29th St., Brooklyn, N.Y. 11214.

CRYSTALS Airmailed: MARS, Nets, SSB, Kits, CD, etc. Custom finished sets stabilized, FT-243, 01% an kilocycle 3500 to 8600 1/90. (Five or more same or mixed frequencies \$1.70) (Nets—Ten or more same frequency \$1.35) 1700—3499 and 8601—20,000 Kilocycles \$2.50. Overtone supplied above 10,000 Kilocycles. Add 50¢ each for .005% HC-6/v miniatures above 2000 add 75¢ each. For 375 to 525 Kilocycles, FT-243 pins or hermetics, inquire. G. E. Ham Nets kits—inquire. OST Kits, FT-243, "DCS-500", "IMP", \$9.95 set. Airmailing 10¢/crystal, surface 5¢. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

ENTIRE 80-2 meter station with beams, coax, \$50.00. WN9-KAN, 1436 Bonniebrae, River Forest, Ill.

RRR! Wanted: B&W HDVL coils and link; BCL coils; BTEL and 2A coil turrets; 304TL's, GDM, WA9FJG, 627 Rochdale, Lombard, Ill.

MOTOR Ship "Hams At Sea" sailing soon from Florida port to Caribbean Islands. Welcome aboard, skipper licensed navigator, \$150 weekly cruises, one or more weeks. Exclnt cuisine included. For information write Ken Weinberger, 922 So. Toledo, Tulsa, Okla.

BUY Of a lifetime for VHF homebrewers: up to 100 watts output up to 250 Mc. Type 5894 tubes made by Amperex including Johnson recessed ceramic sockets, \$14.95 each, Ruggedized for mobile use. Brand new in original cartons. One year replacement guarantee. Shipped postpaid. Cash or money-order. W0FUW, William Duncombe, Box 463, Troy, Ohio.

200V Central Electronics. Excellent condx: \$495.00. K8LDC, 738 Truesdale Rd., Youngstown, Ohio 44511.

NOVICES! FB T-60 xmtr goes to highest bidder. Starting price, \$25.00. B&W 750 ohm lo-pass filter, \$10. WB6DHU, Bon Laughlin, 2016 Manning Ave., Los Angeles, Calif. 90025.

BARGAIN List, clearing out: transformers, chokes, meters, diodes, relays, cabinets, switches. Collins 32V-1 transmitter, PTT mike, coax relay, manual, spare 4D32, exclnt, \$140; Heath HR-10 receiver, new, \$50; DX-60 transmitter, exclnt \$58; 4D32 tubes guaranteed, \$8; Thordarson 3000V, 720 Ma. CCS plate transformer and matching swing-choke, enclosed, \$45.00; 3 Kc lattice filters, new, \$8.00. W0LWZ, 1030 So. Dudley, Denver, Colorado 80226.

ATI TV camera, \$100 complete; Triplett 3434 Sweet generator, \$75; Model 15 RTTY complete, \$75.00. Wanted: QST binders. K1HOP.

FOR Sale: HQ-170, matching sprkr, in mint condx, \$225.00; DX-100 modified loading, \$115.00; AF-67, PMR-7, M1070 dual supply, relay, cables, mike, Hustler mobile antenna, complete; \$145.00. Manuals included, All F.o.b. Charles Landry, K1HNF, 4 Meadow Lane, Exeter, N.H.

PERFECT SM-10, \$68.50; matching Apache, \$160; 0-12 5-in. Heathkit laboratory oscilloscope, \$50.00; Drake 1-A with calibrator, just realigned, \$125.00. Jonathan Eddy, 45 Franklin St., Annapolis, Md. Tel: 301-268-5335.

FOR Sale: Globe King 500B, TDQ 100 watts A.M. on 2, 70 ft. heav.-duty t tower, Elco 460 'scope. All in gud condx. Bert Stiver, K8PLD, 143 Whittlesey, Norwalk, Ohio.

MOVING: Must sell Ranger I, late factory wired, Hammarlund HQ-105TR, 3-element 10-meter beam, manuals. All in mint condx: \$300, or gud offer. F.o.b. Ivan Fiedler, 5050 Fleetwood Dr. Canton 8, Ohio.

CHICAGOLAND 2-meter Gonset Communicator-4, late model, complete with Nuvistor pre-amp, xtals, portable antenna, mobile brackets (never used), instruction manual and original shipping carton. In mint condx: \$250.00. Eugene R. Northup, 207 Rush St., Roselle, Ill.no.s.

SELL: Complete mobile SSB station: Swan 240 Triband transceiver, Swan SW-12 DC p/s, Newtrcn.cs "Hustler", 80 and 20 mtr. antennas; Webster Bandspanner antenna, Electro-Voice 714SR mike. All ths for \$335.00. Gerald Kolton, K9GBH, 1801 W. Armitage, Chicago 25, Ill. Tel: EV 4-9670.

NEEDED: The donation of a suitable ham receiver to promote a seminary radio club, Mount St. Francis Radio Club, WA9KEP, Mount St. Francis, Ind.

WANTED: HRO-60 coil sets, WB2FIL RD 1, Box 315, Old Bridge, N.J.

SELL: HQ-110A with speaker \$200. Perfect condx. WB2JPV, 12 West St., Westport, N.Y.

HOWARD Radio Fall Specials: Thunderbolt, \$325.00; 75A4, \$480.00; 32V-1, \$135.00; DX-100, \$89.00; HT37, new, \$425.00; SB23, new, \$349.00; NC270, new, \$209.00; Invader 200, as new, \$335.00; KW5-1, 75A-4, perfect, \$1275.00; GSB100, \$225.00; 2B, new, \$259.00. Greo list, Box 1269, Abilene, Texas 79604.

HW-12-22-32 owners inexpensive Triband conversion. Complete plans, \$4.00 postpaid. Plans, Box 17, West Bend, Wis.

FOR Sale HT-37, very clean, original owner, in factory container, \$285.00 F.o.b. Ellington, Conn. Will deliver reasonable distance. K1OXU.

EICO 720, 722, 730 F/W. All like new condx. Little used. \$150.00. K8UFE

"KID From Texas" has moved to a new larger location. Special prices to celebrate our new building. Demonstrator closeouts: SB-3 \$279; NCC-3, \$269; Galaxy III, \$279; slightly freight-damaged NCL-2000, \$399. Send for free catalog. Mobile specials. AF-67, \$49.00; PMR-6, \$15.00; PMR-7, \$45.00; MT-1, \$39.00; MR-1, \$39.00. Free list on reconditioned equipment. Collins 75A-1, \$169.00; 75A-2, \$199.00; Valiant, \$149.00; 2-B, \$179.00; Galaxy 300, \$199. Special transceiver package deals at a reduced price. HQ 29X, \$69.00; SX-140, \$69.00; HT-37, \$249.00; HT-32, \$279; Invader, \$299; GSB-100, \$199; HX-10, \$259.00; HQ-180C, \$259.00. Free equipment listing. Bryan, W5-KFT, 1320-19th St., Lubbock, Texas. Tel: PO-2-8759.

DRAKE 2B, low hours, \$200; Apache, \$160.00; both are in exclnt condx, jointly owned, partner moving. Must sell. W4SDT, Sherrill Parks, Box 32, Statesville, N.C.

SX-42 for sale. Best offer over \$100.00. K9LGY, 6301 West Fairlane Avenue, Milwaukee, Wis.

COMPLETE Mobile: all-band Harvey-Wells transmitter, Gonset Triband converter, 100 ampere Lecce-Neville alternator, complete with ammeter and harness. Carter Gen-E-Motor, mike, antenna. \$185.00 takes everything. George Jones, 25 Willard St., Melrose, Mass.

ELMAC PMR-6A, A54-H, xtal cal. antenna relay, filter, etc. \$110.00. Les Mathews, WB2DQV, 12 E. Howard St., Clayton, N.J.

OSCILLOSCOPE, Dumont 208B, exclnt condx. Swap for gud rotator, W2ETB,



THE LEAGUE IS YOU!

Working together, the members of ARRL have for fifty years provided the base of support from which our great public-service hobby has grown and maintained the precious privileges that many amateurs now take for granted.

Through membership in the League and affiliated clubs, many people pool their knowledge, their skills, their energy, and a small part of their material resources to help one another. The result is top-notch training programs and publications, top-efficiency traffic nets, community communications programs—and an amateur radio service which is useful to our country and deserving of its privileges.

Newcomers gain from the experience of the old timers, and old timers gain from the enthusiasm of the beginners. The more we work together in the League, the greater will be our collective achievements—and our security.

Each and every radio amateur is vital to the League, and the League is vital to each and every radio amateur. Join now with over 100,000 League members so that we can all share more fully in these mutual benefits. League membership is only \$5 in the U.S., \$5.25 in Canada, and \$6.00 elsewhere.

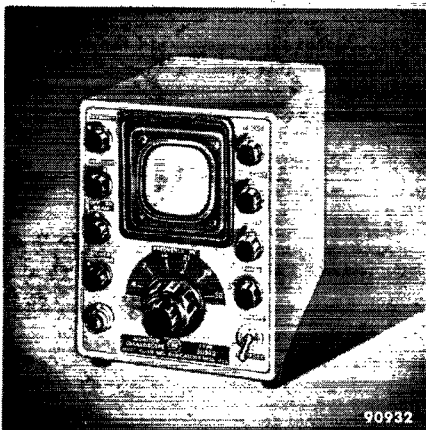
If you are already a member, help strengthen your League by spreading this word to others!

THE AMERICAN RADIO
RELAY LEAGUE, INC.
Newington, Conn. 06111

Designed for



Application



90932

THE NO. 90932 MODULATION MONITOR

The No. 90932 Amateur Band Monitor Oscilloscope is a complete oscilloscope for monitoring the modulated r-f output of a transmitter. Built-in link-coupled tuned circuits cover all amateur bands 3.5 to 54 mc. All circuits and accessories are built in. The monitor will display the r-f envelope and/or the trapezoidal monitoring pattern of single side band transmitters or amplitude modulated transmitters. It shows the linearity or non-linearity of Class-B r-f amplifiers, parasitic oscillation, neutralization, and r-f output.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS



Index of Advertisers

Adirondack Radio Supply	118
Alkan Products	159
Allied Radio	174
Allinger Manufacturing	138
Alltronics-Howard Co.	161
Ameco Equipment Corp.	121
American Radio Relay League	102, 171
QST	124
Advertising Policy	136
Binders	138
Emblems	110
Single Sideband	98, 99
Understanding Amateur Radio	120
Amperex Electronic Corp.	160
Arrow Electronics, Inc.	159
Ashe Radio Co., Walter	129
B & K/Mark Div.	128
Barker & Williamson, Inc.	144
Barry Electronics	134
British Radio Electronics, Ltd. (Eddystone)	130
Budwig Manufacturing Co.	104, 140
Burstein-Appleebe Co.	172
Clemens Mfg. Co.	173
Cleveland Institute of Electronics	126, 152
Collins Radio Co.	157
Communication Products Co.	108
Communications Equipment Co.	135
Cornell-Dubilier Electronics Div.	160
Cush Craft	164
Custom Monogram Co.	163
Dames Co., Theodora E.	162
DeMambo Radio Supply Co., Inc.	164
Dow-Key Co., Inc., The	161
Drake Co., R. L.	151
Edwards Electronics	4
Eitel-McCullough, Inc.	101
Electro-Voice, Inc.	138
Electroncraft, Inc.	161
Electrophysics Corp.	161
Epsilon Records	164
Evans Radio	163
Fichter Electronics	162
Finley Co., The	122
FM Sales Co.	163
Fort Orange Radio Distributing Co., Inc.	153
Gain, Inc.	161
Galaxy Electronics	111
Gardner & Co.	148
Gentec, Inc.	152
Gonsel, Inc.	162
Gotham	117
Grand Central Radio, Inc.	158
Hallcrafters Co., The	1, 1a, 1b
Ham Kits	139, 155, 160
Ham Radio Enterprises	158
Hammarlund Mfg. Co., Inc.	113
Harrison Radio	133
Harvey Radio Co., Inc.	141
Heath Co., The	89, 90, 91, 93, 95
Henry Radio Stores	138, 149
Horton Electronic Co.	125
Hunter Mfg. Co., Inc.	165
Hy-Gain Antenna Products Corp.	96, 97
Instructograph Co., Inc.	151
International Crystal Mfg. Co., Inc.	109
Johnson Co., E. F.	5
Lafayette	147
Lampkin Labs., Inc.	157
Lattin Radio Labs.	148
Lee, J.	158
LTV University	111
Master Electronic Mfg. Co.	160
Master Mobile Mounins, Inc.	156
Millen Mfg. Co., Inc. James	172
Miller Co., J. W.	165
Mini-Products, Inc.	134
Mor-Gain	153
Mosley Electronics, Inc.	105, 155, 165
National Radio Co., Inc.	87, Cov. 111
Nordlund, K9KVQ	164
O'Malley Tube Co.	155
Organs & Electronics	163
Parks Electronics Lab.	146
Pennwood Nucletron Co.	131
Penta Labs., Inc.	156
Post-Check	148
Productive Tool & Mfg. Co., Inc., The	153
Punches Div.	130
Radio, Inc.	132
Radio Publications, Inc.	116
RBM Controls	119
RCA Electronic Components & Devices	Cov. IV
RF Communications Associates, Inc.	112
Rohn Mfg. Co.	155
Scientific Associates Corp.	162
Seratron	115
Sideband Engineers, Inc.	140
Skyline Products	155
Sound History Recording	154
Space Electronics	107
Squires-Sanders, Inc.	142
Supreme Electronics	103
Swan Electronics Corp.	161
Tapetone Electronic Labs., Inc.	7
Technical Materiel Corp.	144, 146, 163
Telrex Labs.	146
Terado Corp.	153
Trans-Pro Labs	143
Trigger Electronics	150
Unadilla Radiation Products	Cov. II
United Transformer Corp.	162
Van Sickle Radio Supply Co.	154
Vanco Sales	144
Vanguard Electronic Labs.	152, 144
Vero Industries	156, 161
VHF Associates	142
Vibroplex Co., Inc. The	150
Viking Products	157
WA6DUW	163
Waters Mfg. Co.	127
Webster Mfg. Co.	106
Whippany Labs., Inc.	159
Wilson, Inc., Willard S.	156
World Radio Labs.	145, 154
Yatter Labs.	150

RESERVE YOUR FREE COPY, NOW!

The new
**C-P Communication
Systems Handbook**

Catalog includes

- BASE STATION ANTENNAS
- VEHICULAR ANTENNAS
- DUPLEXERS
- COAXIAL CABLE SYSTEMS
- ACCESSORIES
- TECHNICAL DATA SECTION

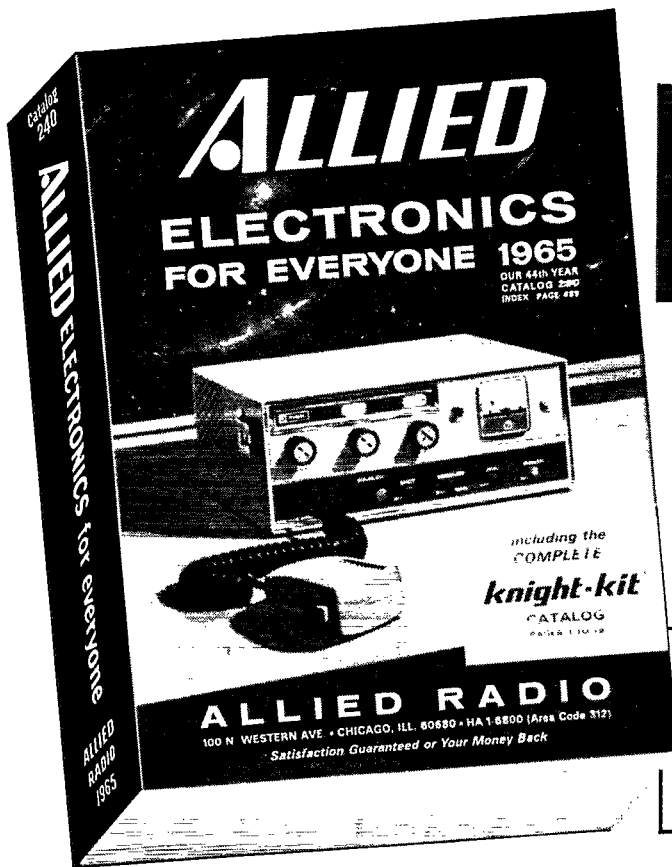
**Contains Complete Specifications and Data
on C-P "Certified Performance" Components**

The new C-P Catalog No. 664 will be of interest to everyone concerned with two-way communication systems . . . describes every type C-P antenna from vehicular whips to radome-protected base station models, coaxial cable systems, duplexers, mounting hardware and accessories. Write for your copy today; please make requests on company letterhead.

Communication Products Company
DIVISION OF
PHELPS DODGE ELECTRONIC PRODUCTS
CORPORATION



MARLBORO, N. J.
Tel. 201-462-1880
LOS ANGELES, CAL.
Tel. 213-245-1143



FREE

send today for
your 490-page

ALLIED
1965 CATALOG

world's largest
electronics catalog

BIGGEST SELECTION
BIGGEST SAVINGS

EVERYTHING IN ELECTRONICS FOR THE AMATEUR

*get every Ham
buying advantage*

LARGEST SELECTION

ALLIED stocks the station gear you need—at lowest, money-saving prices. Get same day shipment from the world's largest stocks.

HAM-TO-HAM HELP

Our staff of more than 60 licensed hams goes all-out to give you the personal help you want. Whether you write, call, or visit our Ham Shack, you'll like the friendly interest and attention you always get at ALLIED.

EASY TERMS

Make full use of the convenient ALLIED Credit Fund Plan—have over 24 months to pay.

ALLIED RADIO

servicing the Amateur for 44 years

- Ham Receivers, Transmitters, Transceivers
- World's Largest Stocks of Station Supplies
- Great Build-Your-Own Ham Knight-Kits®
- Citizens Band 2-Way Radio
- New Automotive Electronics
- Electron Tubes and Semiconductors
- Test Instruments and Meters
- Everything in Stereo Hi-Fi
- Tape Recorders and Tape
- Everything in Electronic Parts, Tools & Technical Books

SEND FOR YOUR COPY TODAY



ALLIED RADIO, Dept. 13-L
100 N. Western Ave., Chicago, Ill. 60680

Send FREE 1965 ALLIED Catalog

Name _____
PLEASE PRINT

Address _____

City _____ Zone _____ State _____

NEW NCX-5 ALL-BAND TRANSCEIVER FROM NATIONAL — \$585

. . . The Finest Money Can Buy At Half The Cost of Closest Comparable Equipment

The new NCX-5 transceiver is dramatically superior in features and performance to the finest equipment previously available, yet, at only \$585, sells for the price of ordinary transceivers.

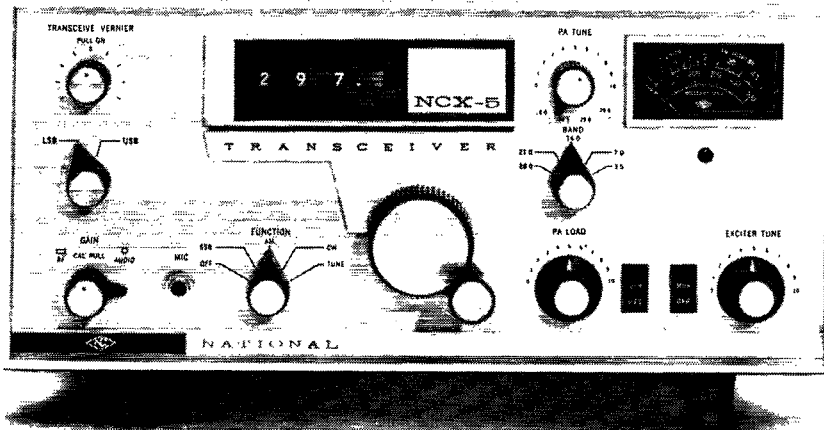
The NCX-5 was designed as a total amateur station for the 80, 40, 20, 15, and 10 meter bands, without compromise for either mobile or fixed station operation. Accordingly, the NCX-5 incorporates a linear solid state VFO with essentially no warmup drift — NCX-5 stability from turn-on is equal to the best tube type oscillators after "warm-up", and is unaffected by large excursions in temperature or voltage input. Dial calibration is by means of a technique previously found in only the most expensive military equipment — a digital counter read-out accurate to one kilocycle on each band with additional counter calibration to 100 cycles.

To make comparison with existing equipment even more difficult, NCX-5 transmit and receive selectivity is by means of National's new 8-pole crystal lattice filter; superior to filters of any type ever manufactured for amateur use. Filter bandwidth is 2.8 Kc. at 6 db with a 6-60 db shape factor of 1.7:1.

Selectable upper or lower sideband is included, together with a new Transceiver Vernier control to provide up to ± 5 Kc. separation of receiver frequency from the transmitter.

Other important features are VFO input for optional VFO console VFO console incorporates split-frequency crystal channels as well as tunable VFO functions, with sharp selectivity and sidetone oscillator for CW operation Built-in ALC (10 db) with ALC input for NCL-2000 2 KW amplifier Two R. F. stages in receiver New separate AM detector as well as product detector Front panel choice of built-in VOX, PTT or new MOX operation Easy access hinged cover 200 watt input on SSB or CW, 100 watts AM Break-in grid block CW Fast-attack slow decay AGC S-meter/plate meter May be operated from NCX-A or NCX-D power supplies Optional XCU-27 100 Kc. calibrator Mobile mount included National's One Year Warranty.

Delivery of National's new NCX-5 transceiver will be in September. Call or write your authorized National dealer today for trade-in information on your present rig, and make certain you're first in line for delivery!



ADDITIONAL NCX-5 SPECIFICATIONS — Frequency Range: With crystals supplied 3,500 to 4,000 Kc., 7,000 to 7,300 Kc., 14,000 to 14,500 Kc., 21,000 to 21,500 Kc., 28,500 to 29,000 Kc. (Three additional crystals required if coverage of entire 28,000-30,000 Kc. band is desired). Types of Emission: SSB (selectable upper or lower sideband), AM, CW. Output Impedance Range: 40-60 ohms, Pi network. Frequency Determination: Double conversion with crystal-controlled high frequency oscillators and tunable second oscillator. Dial Accuracy: One kilocycle over entire 500 Kc. tuning range on all bands. Dial Calibration: 100 cycles on all bands. Tuning Ratio: Identical on all bands; 10 Kc. per 360° rotation of main tuning control. Frequency Stability: Not more than 100 cycles variation in any ten-minute period from turn-on including variation in input voltage of $\pm 10\%$. Suppression: Carrier -50db, unwanted sideband -50db, 3rd order distortion products -30db at full output. Receiver Sensitivity: 0.5 uv for 10 db S/N in SSB mode. Audio Output: Better than 2 watts; 3.2 ohms. Microphone Input: High Impedance. Tube and Semi-Conductor Complement: 20 tubes, 15 semi-conductors, 41 functions; Parallel 6GJ5's in P.A. Dimensions: 6-5/16" H, 13-5/8" W, 11-5/8" D. Shipping Weight: 26 pounds. Power Requirements: 700 V.D.C. @ 300 Ma., 280 V.D.C. @ 160 Ma., -80 V.D.C. @ 10 Ma., 12.6 V. @ 5 A.



NATIONAL RADIO COMPANY, INC.  37 WASHINGTON STREET, MELROSE, MASS. 02176

World Wide Export Sales: Ad Auriema Inc., 85 Broad St., N.Y.C.; Canada: Tri-Tel Associates, 81 Sheppard Ave. W., Willowdale, Ontario



RCA High-Perveance Beam Power Tubes

For the mobile man who wants a hefty signal from a compact rig, RCA High-Perveance Beam Power Tubes are the answer.

High-Perveance design enables you to get the power you want at lower plate voltages—making it easier to work with practical values of pi-network components, use more compact tank circuits and lower voltage-rated filter capacitors, simplify rf and dc insulation problems.

Another feature of RCA Beam Power Tubes for mobile service is their special heaters—designed to withstand the strain of repeated on-off operation and to operate efficiently over the wide range of voltages encountered in car electrical systems.

At “cruising” speed or engine “idle”, RCA Beam Power Tubes have the ruggedness and performance capability it takes for mobile service. Check the Power Chart for the types you need.

Available through your RCA Industrial Tube Distributor.

Select your Power and Tube Number

Plate Input Watts			RCA Tube Type
CW	AM	Conditions	
9.9	—	CCS Max.	8077/7054
17	15	CCS Max.	6417
24	17.5	ICAS Max.	7551
40	27	ICAS Max.	6893
85	55	ICAS Max.	6850*
120	85	ICAS Max.	6883B/8032A/ 8552
210	175	Typical	8072

*Twin Type (total for both sections)

For more technical data on any of these RCA Beam Power Tubes, write: Commercial Engineering, Sect. K-37-M, RCA Electronic Components and Devices, Harrison, New Jersey.



The Most Trusted Name in Electronics

Announcing—

HALLICRAFTERS'

5th annual, all amateur

"New Ideas" contest!

Biggest and best ham contest ever—the kind of contest that means something!

Amateur radio needs your ideas for improving technique ... increasing

efficiency ... serving the public ... promoting good will ... fostering

international understanding. Give us your idea and win a valuable

award to boot!



EASY TO ENTER... EASY TO WIN!

HERE'S ALL YOU DO:

1. Pick up an official entry blank from your favorite amateur distributor listed here. Contest ends December 31, 1964.
2. Complete this sentence in 50 words or fewer: "My ideas for contributing to amateur radio are: . . ."
3. Return Official Entry Form to the distributor. That's all there is to it. No purchase required.

CONTEST EXTRA—HAM CLUB PRIZES!

Ham clubs may win valuable awards just for entering the contest! Use awards for club station ... door prizes ... raffle prizes!

- Any club with 20 individual entrants receives an HA-8 Splatter Guard. Any club with 50 entrants receives an HA-1 electronic T.O. Keyer!

1a ● Individual entries must show club affiliation.

ENTER TODAY

ARIZONA

Phoenix: Henry Radio Co.

ARKANSAS

DeWitt: Moory's Wholesale Radio & Appliance Co.

CALIFORNIA

Anaheim: Henry Radio Co.
Burbank: Electronic City, Inc.
Los Angeles: Henry Radio Co.
North Hollywood:

C. Q. Radio Supply

Pasadena:

Electronic Components of Pasadena

Henry Radio Co.

Riverside: Mission Ham Supplies

Sacramento: Selectronics

San Francisco: Amrad Supply Co.

San Jose: Quement

Industrial Electronics

COLORADO

Denver: Burstein-Applebee Co.

DISTRICT OF COLUMBIA

Washington:

Electronic Wholesalers

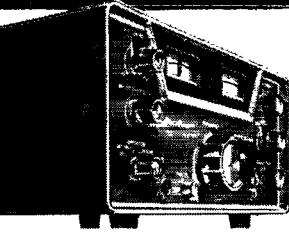
GEORGIA

Hopeville: Southeastern Radio Parts

OVER \$10,000 IN AWARDS!

**5-BAND
NATIONAL
AWARD!**

Complete deluxe amateur radio station consisting of Hallicrafters
 Model 44-2000 5-Band National Award Computer with inter-dig-
 ital band changes for transceive operation . . . HA-9 Linear Amplifier
 HA-7A Power Supply . . . HA-50 AC Power Supply with built-in
 breaker . . . HA-10 Low Freq. Tuner . . . and an HA-1 Electronic
 Unit Worth over \$1,000!



**FIVE
REGIONAL
AWARDS!**

Fabulous SR-160 Transceivers featuring R.I.T. (Receiver Incremental Tuning) . . . AALC (Amplified Automatic Level Control) . . . greatest talk-power in a highly compact mobile unit.

OVER 100 LOCAL AWARDS!



An award from each participating distributor to the winner among his customers—a high performance, beautifully-styled HA-8 "Splatter Guard"!



hallicrafters

ONLY AT THESE OUTSTANDING HALLICRAFTERS DISTRIBUTORS!

ILLINOIS

Chicago: Allied Radio Corp.
 Amateur Electronic Supply
 St. Francisville: Buzz Electronics

INDIANA

Anderson: Elect. Supply of Anderson
 Fort Wayne: Fort Wayne Elect. Supply
 Indianapolis: Graham Electronics Supply
 Van Sickle Radio Supply
 Lafayette: Lafayette Radio Supply
 Muncie: Elect. Supply

IOWA

Council Bluffs: World Radio Laboratories

KENTUCKY

Louisville: Mobile Communications

LOUISIANA

New Orleans: New Crescent Electronics Supply

MARYLAND

Wheaton: Electronic Distributors

MICHIGAN

Detroit: Reno Radio Corp.
 Ferndale: Midway Electronics Supply
 Flint: Shand Electronics, Inc.
 Grand Rapids: Radio Parts, Inc.
 Kalamazoo: Warren Radio Co.
 Lansing: Main Electronics

MISSOURI

Butler: Henry Radio Co.
 Kansas City: Associated Radio Communications
 Kansas City: Burstein-Applebee Co.
 St. Louis: Walter Ashe Radio
 Springfield: Reed Radio & Supply Co.

NEW HAMPSHIRE

Concord: Evans Radio, Inc.

NEW JERSEY

Paramus: Lafayette Radio Corp.
 Springfield: Federated Purchaser

NEW YORK

Farmingdale: Arrow Electronics
 Jamaica: Harrison Radio Corp.
 Mineola: Arrow Electronics
 New York: Arrow Electronics
 Grand Central Radio
 Harrison Radio Corp.
 Terminal Hudson Electronics
 Rochester: Rochester Radio Supply Co.
 Westbury, Long Island: Adelphi Electronics

OHIO

Cincinnati: Coston's
 Cleveland: Pioneer Electronics
 Columbus: Universal Service
 Steubenville: The D & R Radio Supply Co.
 Toledo: Hillebrand Electronics
 Warren Radio Co.

OREGON

Portland: Portland Radio Supply

PENNSYLVANIA

Chester: Bell Radio
 Philadelphia: Radio Electric Service Co.
 Pittsburgh: Cameradio Co.
 Tydings
 Wyncote: Ham Buerger

SOUTH DAKOTA

Watertown: Burghardt Radio

TEXAS

Abilene: Howard Radio
 Dallas: Crabtree's Wholesale Electronics
 Fort Worth: Ed Guge Electronics
 Houston: Busacker Electronics
 Lubbock: R & R Electronics
 San Antonio: Radio & TV Parts
 Waco: Hargis Co.

VIRGINIA

Norfolk: Priest Electronics

WISCONSIN

Madison: Satterfield Electronics
 Milwaukee: Allied Radio Corp.
 Amateur Electronic Supply