

# QST

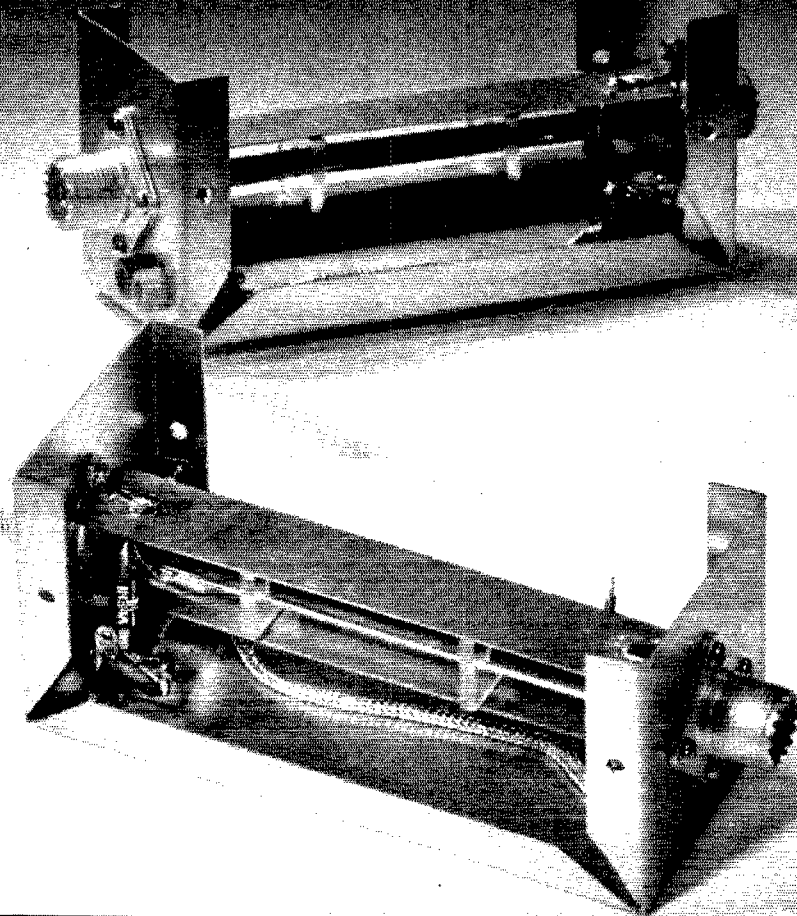
February 1957

50 Cents

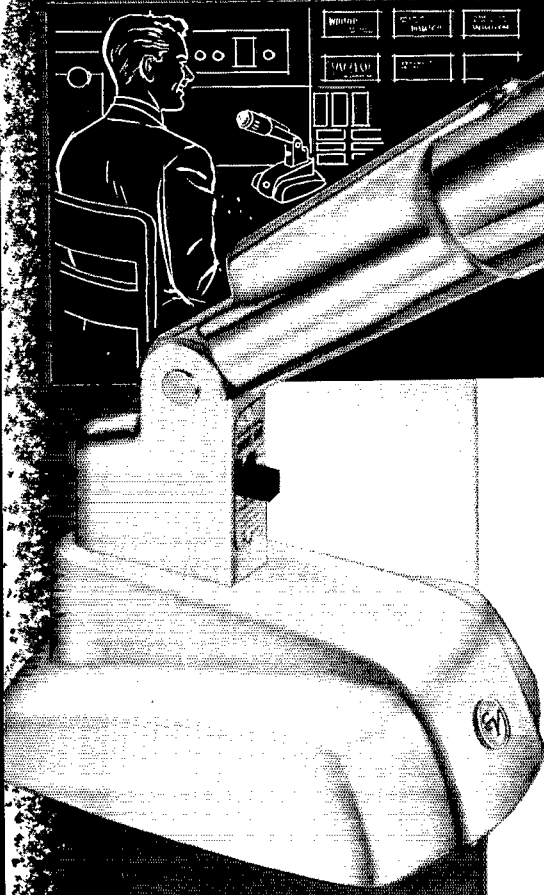
55c in Canada

devoted entirely to

# amateur radio



If you operate phone YOU WON'T BE SATISFIED UNTIL YOU OWN



the completely new  
**664** VARIABLE D\*  
**CARDIOID**  
 DYNAMIC MICROPHONE

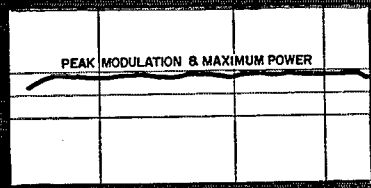
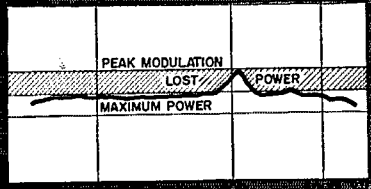
The 664 will equal a useful power increase of four times over commonly-used peaked microphones, and could well be the best investment, dollar-wise, in your shack

Here is a totally new concept in microphones for amateur phone communication.

The cardioid (high directivity at all frequencies) pickup pattern enables you to have a *real* "arm chair QSO." The forward gain of 5 db\*\* allows you to speak at nearly twice the distance you have been working to a conventional microphone. Unwanted sounds in the shack are rejected nearly twice as effectively as by ordinarily-used non-directional microphones.

The response curve is tailored to put the highest degree of intelligibility on your carrier. Your 100% modulation is all speech . . . in full character . . . with bite and punch. This curve, compared to ordinary microphones, will give you up to 12 db more usable audio—without splatter or hash.

We invite you to prove to yourself that the 664 will outperform your present mike by a direct comparison. If it doesn't out-hurdle QRM, your distributor will refund the purchase price without qualification.



New Variable D\* Dynamic Microphone operates on the principle of multiple sound paths to the diaphragm. Spaced apertures to the rear of the diaphragm are phased to provide cancellation of rear sounds and give full response to sound from the front.

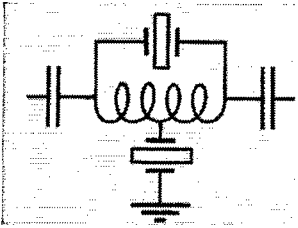
This new principle enables the curve to be free from peaks or dips. Insures freedom of blasting and boominess from close talking. Eliminates effect from mechanical shock. High level -55 db. Acoustalloy diaphragm. Switch easily changed to relay control, if desired. Absolutely unaffected by moisture, humidity, or temperature.

- Model 664. Without Stand . . . . . Net Price: \$49.50
- Model 419. Desk Stand . . . . . Net: 6.00
- Model 419S. Desk Stand. (Switch on Base) . . . . . Net: 9.00

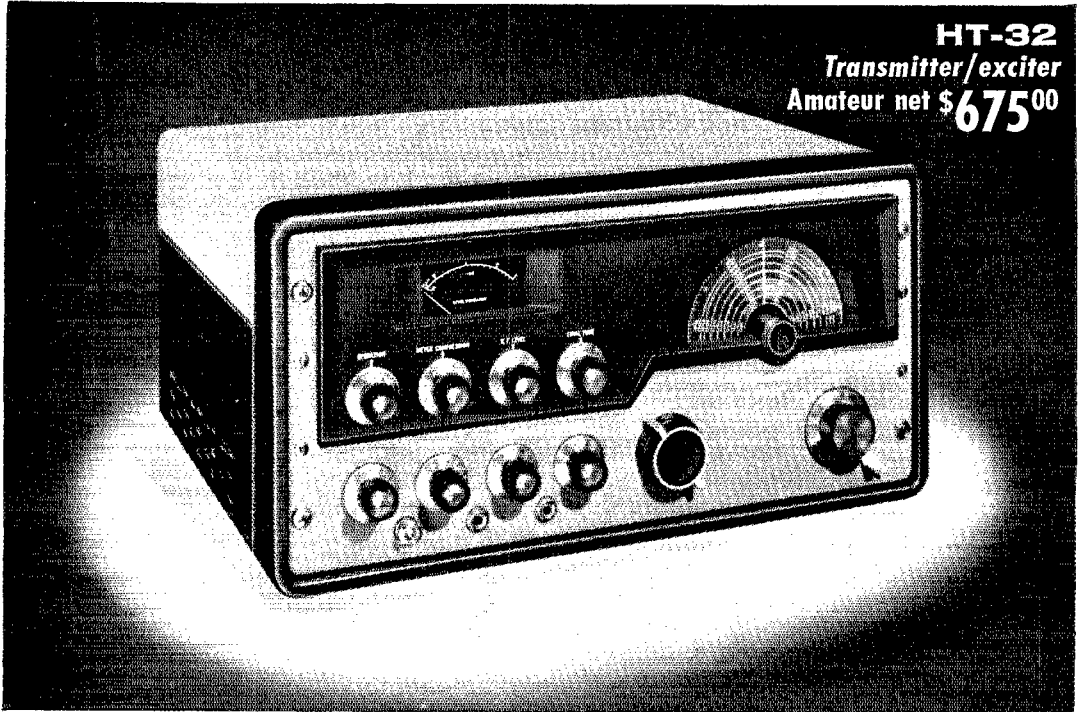
\*\*Forward gain is that compared to a pressure mike; actual front-to-back hemisphere pick-up ratio is 20 db.

\*Patent Pending

**Electro-Voice®**  
 ELECTRO-VOICE, INC. • BUCHANAN, MICH. • Export: 13 E. 40th St., N. Y.



*From this exclusive HIGH  
FREQUENCY filter originates  
the cleanest signal on the air!*



**Hallicrafters new HT-32 transmitter features  
5.0 mc. quartz crystal filter... new bridged-tee  
modulator... high stability... gear-driven V.F.O.**

• Forget your old ideas about SSB signal clarity! The HT-32 establishes *entirely new standards* with two major achievements of the world famous Hallicrafters laboratories—yours exclusively in the HT-32:

1. **5.0 mc. quartz crystal filter.** Result of a 3-year research program, the crystal filter system now is commercially practical at *high frequencies*. System cuts unwanted sideband 50 db. or more!
2. **New bridged-tee modulator.** Temperature stabilized and compensated network provides carrier suppression *in excess of* 50-db. Patented diode application develops

sideband energy from audio voltage. World's most stable modulator. These and many other features make your decision *clear*—compare the HT-32 with any other transmitter available. Your supplier has all the details. Stop by and see him today.

**ADDITIONAL FACTS ABOUT THE HT-32**

- SSB, AM or CW output on 80, 40, 20, 15, 11-10 meter bands.
- High-stability, gear-driven V.F.O.
- 144 watts peak power input.
- Distortion products down 30 db or more.
- Complete band switching.
- C.T.O. direct reading in kilocycles.
- T.V.I. suppressed.

**NEW**  
FROM  
**hallicrafters**  
CHICAGO, ILL. U.S.A.

*WHERE THE BEST IDEAS IN  
COMMUNICATIONS ARE BORN*

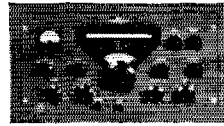
**EXPORT SALES: Phillips Export Company  
100 East 42nd St., New York 17, N. Y.**



75A-1 . . . 1948



75A-2 . . . 1950



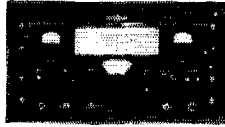
75A-3 . . . 1953



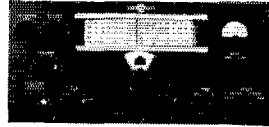
32V-1 . . . 1948



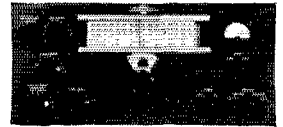
32V-2 . . . 1949



32V-3 . . . 1953

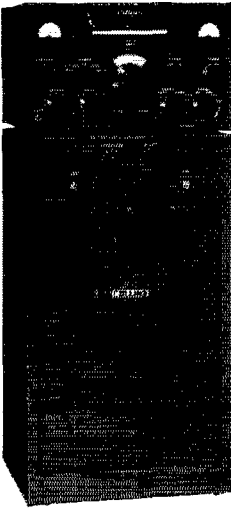


310B-1 . . . 1948



310B-3 . . . 1948

# All these years **YOU** could have owned **Collins**



75A-4

KWS-1

. . . because it costs only a few cents a day to own the world's finest. Considering performance you can't buy or build equipment that costs as little per day to own. The reason is Collins high resale value. Check the chart below. See why Collins Amateur equipment is not only the standard for performance, but the best investment, too. So why miss out any longer on the kind of performance that puts your signal out sharp and clear and pulls in the good ones. Invest today in Collins Amateur equipment. Get the performance you've always wanted.

*Collins*

CREATIVE LEADER IN COMMUNICATION



## COST PER DAY TO OWN COLLINS EQUIPMENT

MODEL	PRODUCTION YEAR	COST NEW	FALL OF 1955		FALL OF 1956	
			AVERAGE MARKET RESALE PRICE	COST PER DAY TO OWN	AVERAGE MARKET RESALE PRICE	COST PER DAY TO OWN
75A-1	1948	\$ 375	\$ 300	2 1/2c	\$ 260	3c
75A-2	1950	440	350	4	350	3
75A-3	1953	530	425	10	400	9
32V-1	1948	475	300	6	300	5
32V-2	1949	575	350	10	425	5
32V-3	1953	775	500	27	550	15
310B-1	1948	190	150	1	150	1
310B-3	1948	215	175	1	200	1/2
KW-1	1952	3,850	2,850	66	3,000	59

# QST

FEBRUARY 1957

VOLUME XLI • NUMBER 2

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

## STAFF

A. L. BUDLONG, WIBUD  
*Editor*

RICHARD L. BALDWIN, WIKE  
*Managing Editor*

GEORGE GRAMMER, WIDF  
*Technical Editor*

DONALD H. MIX, WITS  
BYRON GOODMAN, WIDX  
*Assistant Technical Editors*

EDWARD P. TILTON, WIHQ  
*V.H.F. Editor*

C. VERNON CHAMBERS, WIJEQ  
LEWIS G. MCCOY, WIICP  
E. LAIRD CAMPBELL, WICUT  
*Technical Assistants*

ROD NEWKIRK, W9BRD  
*Contributing Editor, DX*

ELEANOR WILSON, WIQON  
*Contributing Editor, YLs*

ANN B. FURR, WIZB  
*Production Assistant*

LORENTZ A. MORROW, W1VG  
*Advertising Manager*

EDGAR D. COLLINS  
*Advertising Assistant*

Chris Dunkle & Associates  
3257 West 6th Street  
Los Angeles 5  
*California Representative*

DAVID H. HOUGHTON  
*Circulation Manager*

J. A. MOSKEY, W1MY  
*Assistant Circulation Manager*

## OFFICES

38 La Salle Road  
West Hartford 7, Connecticut  
TEL.: ADams 3-6268 TWX: HF 88  
Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.25 in the Dominion of Canada, \$5.00 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. Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 23, 1925.  
Copyright 1957 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  
INDUSTRIAL ARTS INDEX  
Library of Congress Catalog  
Card No.: 21-9421

## —CONTENTS—

### TECHNICAL —

The Snoop-Loop.....	Claude M. Maer, Jr., W0IC	11
A 7- to 30-Mc. Preselector...	E. Laird Campbell, WICUT	16
Recent Equipment:		
The Regency ATC-1 Converter.....		19
The RME 4301 Side-Band Selector.....		20
The Model SM-90 Screen Modulator.....		21
Transistor Operating Characteristics		
	H. F. Priebe, Jr., W2TGP	27
Using the 4X250B on 144, 220, and 432 Mc.	Mason P. Southworth, W1VLH	31
Monimatch, Mark II.....	Lewis G. McCoy, WIICP	38
An "All-Band" BC-458-A Heterodyne V.F.O. for S.S.B.	Ben Russ, W2QZ	40
Technical Topics:		
S.S.B. Balanced Modulators.....		42
Special S.S.B. Issue of I.R.E. Proceedings.....		42
Technical Correspondence.....		43
Meteor Shower Calendar for V.H.F. Men.....		44
Combined Keyer and Control Circuit	S. B. Leslie, W5DQV	45

### BEGINNER —

A Novice Three-Band Antenna System	Lewis G. McCoy, WIICP	25
------------------------------------	-----------------------	----

### MOBILE —

Ten Watts Mobile for Twenty Bucks	Paul L. Whitlock, K4ANU	22
-----------------------------------	-------------------------	----

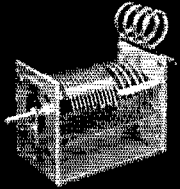
### OPERATING —

23rd Annual ARRL DX Competition.....	(Reminder)	10
National Traffic System.....	George Hart, WINJM	50
1957 Novice Roundup.....	(Reminder)	57
High Claimed Scores — 1956 SS.....		73

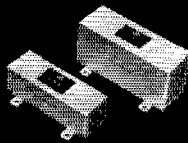
### GENERAL —

How They Planned the First Expedition	Julian N. Jablin, W2QPQ	14
F.C.C.'s Amateur Service Group	Richard L. Baldwin, WIKE	54

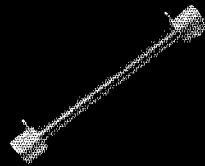
"It Seems to Us —".....	9	Silent Keys.....	60
Hamfest Calendar.....	10	Feedback.....	60
ARRL 1957 National Convention.....	10	How's DX?.....	61
Coming ARRL Conventions....	10	YL News and Views.....	66
Correspondence from Members.	49	World Above 50 Mc.....	69
Our Cover.....	57	Operating News.....	74
In QST 25 Years Ago.....	57	With the AREC.....	76
Quist Quiz.....	57	Station Activities.....	82
Hints & Kinks.....	58	ARRL QSL Bureau.....	154



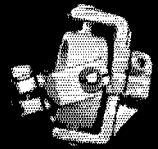
medium powered  
pi-network inductor



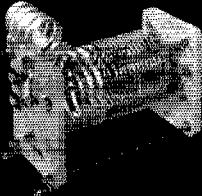
filament choke



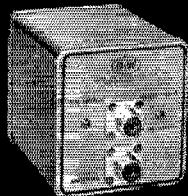
r-f plate choke—  
transmitting type



insulated flexible  
universal shaft coupling



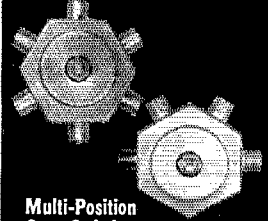
1-Kw Pi-Network Assembly



T-R Switch



Grid Dip Meter



Multi-Position  
Coax Switches

# 8 new quality products from B&W

## MODEL 851 Medium Powered Bandswitched Pi-Network Inductor Assembly

An ultra-compact, highly efficient, integrally bandswitched pi-network inductor assembly for single or parallel tube operation 80 through 10 meters. Rated for 2000 VDC at 250 ma input SSB-CW... 1250 VDC at 200 ma input for AM. Minimum measured "Q" of 300.

NET PRICE ..... \$16.50

## R-F Plate Choke—Transmitting Type

Ideal for parallel or series fed circuits. High quality grooved steatite form. Operates 80 through 10 meters. Rated for 2500 VDC at 500 ma.

NET PRICE ..... \$ 3.75

## Microphone Adapter Unit

Provides all necessary circuitry for switching a single microphone and push-to-talk features on transmitter-SSB generator combinations.

Use Model 51MCA with B&W 5100-5/51SB-B

Use Model 51MCA-B with B&W 5100/51SB

Use Model 51MCA-C with Collins 32V/B&W 51SB

NET PRICE ..... \$15.00

## Tuning Knobs

Satin-etched, machined aluminum knobs dress up any piece of equipment... give it a professional appearance. Four sizes available, one plain, three skirted. Models 900-903.

NET PRICE 900	.....	\$ 3.00
901	.....	\$ 1.50
902	.....	\$ 0.60
903	.....	\$ 0.45

## 1-KW Pi-Network Assembly

A high-power, integral bandswitched tank coil for 80 to 10 meter operation. Ideal for class C or linear operation using triodes or tetrodes in conventional or grounded grid circuits. Minimum "Q" of 300. Model 850.

NET PRICE .....\$35.00

## T-R Switch

Fully automatic electronic antenna switching from transmitter to receiver and vice-versa. For power applications up to the legal limit. Ideal for fast break-in operation on SSB, AM, or CW. Receiver gain 6 db at 3.5 mc. Broad-banded... no tuning required. Model 380B.

NET PRICE .....\$23.70

## Grid Dip Meter

A highly accurate, sensitive instrument. May be used as a grid-dip oscillator, signal generator, or absorption wavemeter. Five color-coded plug-in coils cover 1.75 to 260 mc. Color-coded dial easily read. Operates from 110 VAC. Easy to use in hard-to-get-at places. Model 600.

NET PRICE .....\$39.75

## Multi-Position Coax Switches

For 75 or 52 ohm line. Instantly switches coax lines... no screwing or unscrewing coax connectors. Handles up to 1 KW modulated power. Max. cross-talk—45db at 30 mc. Model 550A 5-position switch. Model 551A 2-pole, 2-position switch.

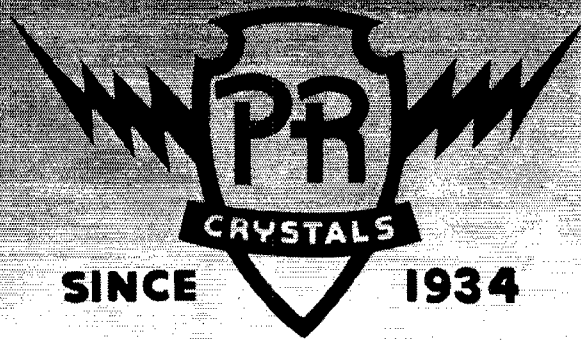
NET PRICE 550A	.....	\$8.25
551A	.....	\$7.95

Prices subject to change without notice.

# B & W

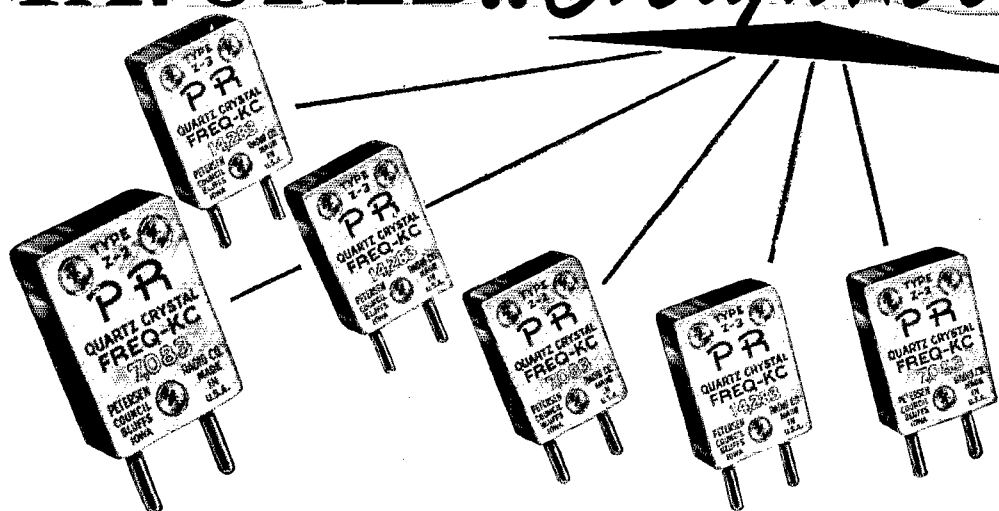
## BARKER & WILLIAMSON, INC.

Bristol, Pennsylvania



SINCE 1934

FAVORED.. *Everywhere*



20 METERS, Type Z-3, \$3.95 • 40, 80 AND 160 METERS, Type Z-2, \$2.95

**PR** *Crystals*



USE **PR** AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.  
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

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

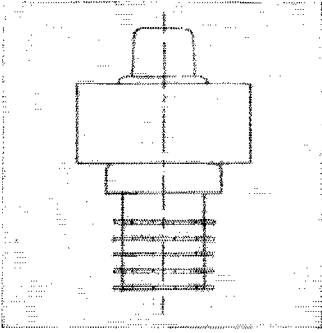
## Section Communications Managers of the ARRL Communications Department

**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. *All amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

ATLANTIC DIVISION			
Eastern Pennsylvania	W3PYF	Clarence Snyder 117 Porter St.	Easton
Maryland-Delaware-D. C.	W3PRL	J. W. Gore 3707 Woodbine Ave.	Baltimore 7, Md.
Southern New Jersey	K2BG	Herbert C. Brooks 800 Lincoln Ave.	Palmyra
Western New York	K2HUK	Charles T. Hansen 211 Rosemount Drive	Buffalo 21
Western Pennsylvania	W3NCD	R. M. Heck RFD 1	Sharpsville
CENTRAL DIVISION			
Illinois	W9VIX	George Schreiber 239 S. Scoville Ave.	Oak Park
Indiana	W9NTA	Seith L. Baker 276 West Sumner Ave.	Martinsville
Wisconsin	W9RQM	Reno W. Goetsch 929 S. 7th Ave.	Wausau
DAKOTA DIVISION			
North Dakota	W0KTP	Elmer J. Gabel Custer State Park	Hankinson
South Dakota	W0FLP	Les Price P. O. Box 425	Hermosa
Minnesota	W0KLG	Robert Nelson	Dassel
DELTA DIVISION			
Arkansas	W5ZZY	Ulmon M. Goings P.O. Box 207	Oscola
Louisiana	W5FMO	Thomas J. Morgavi 3409 Beaulieu St.	Metairie
Mississippi	W5WZY	Julian G. Blakely 525 So. Main St.	Greenville
Tennessee	W4SCF	Harry C. Simpson 1863 So. Wellington St.	Memphis
GREAT LAKES DIVISION			
Kentucky	W4KKW	Albert M. Barnes 830 Third Ave.	Dayton
Michigan	W8RAE	Thomas G. Mitchell 409 Liberty	Buchanan
Ohio	W8AL	Wilson E. Weckel 2118 Tuscarawas St., W.	Canton 8
HUDSON DIVISION			
Eastern New York	W2EFU	George W. Tracy 1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	W2TUK	Harry J. Dannals 139 East Zorane Drive	Farmingdale, L. I.
Northern New Jersey	W2YQR	Lloyd H. Manamon 709 Seventh Ave.	Asbury Park
MIDWEST DIVISION			
Iowa	W0BDR	Russell B. Marquis 807 North Fifth Ave.	Marshalltown
Kansas	W0ICV	Earl N. Johnston 1100 Crest Drive	Topeka
Missouri	W0GPI	James W. Hoover 15 Sandringham Lane	Ferguson 21
Nebraska	W9CBH	Floyd B. Campbell 203 W. 8th St.	North Platte
NEW ENGLAND DIVISION			
Connecticut	W1ERW	Milton E. Chaffee 53 Homesdale Ave.	Southington
Maine	W1BPT/VVA	Alan D. Duntley 830 Third Ave.	Casco
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr. 91 Atlantic St.	North Quincy 71
Western Massachusetts	W1HRV	Osborne R. McKeraghan 22 Mutter St.	Easthampton
New Hampshire	W1AII	John Arthur Knapp 15 North State St.	Concord
Rhode Island	W1VXC	Mrs. June R. Burkett 24 Roger Williams Ave.	Rumford 16
Vermont	W1OAK	Mrs. Ann L. Chandler RFD 2	Barre
NORTHWESTERN DIVISION			
Alaska	K17AGU	Dave A. Fulton Box 193	Anchorage
Idaho	W7RRI	Rev. Francis A. Peterson Box 60	Preston
Montana	W7NPV/WXI	Vernon L. Phillips Box 971	Harlowton
Oregon	W7ESI	Edward F. Conyngham 11901 Powell Blvd.	Portland
Washington	W7FIX	Victor S. Gish 511 East 71st St.	Seattle 5
PACIFIC DIVISION			
Hawaii	KH6AED	Samuel H. Lewbel P.O. Box 3564	Honolulu
Nevada	W7LTV	Albert R. Chin P.O. Box 14	Reno
Santa Clara Valley	W6VHM	G. Donald Eberlein P.O. Box 372	Los Gatos
East Bay	W6FDJ	Roger L. Wixson 3018 Berlin Way	Oakland 2
San Francisco	W6GGC	Walter A. Buckley 901 Grafton Ave.	San Francisco 12
Sacramento Valley	W6JDN	Harold L. Lucero 1113 Elinore Ave.	Dunsmuir
San Joaquin Valley	W6JPU	Ralph Sarovan 3639 Mono St.	Fresno
ROANOKE DIVISION			
North Carolina	W4RRH	B. Riley Fowler Box 143	Morgantown
South Carolina	W4HMG	Bryson L. McGraw 227 Kalmia Road	Columbia
Virginia	W4KN	John Carl Morgan c/o Radio Station WFVA, Box 269	Fredricksburg
West Virginia	W8PQQ	Albert H. Hix 1013 Belmont St.	Forest Hills, Charleston 4
ROCKY MOUNTAIN DIVISION			
Colorado*	K8CEN	William R. Haskin 1632 W. Cuhanas	Colorado Springs
Utah	W7LOE	James L. Dixon 911 Childs Ave., P.O. Box 1045	Ogden
Wyoming	W7PSO	James A. Masterson 851 Bon Ave.	Casper
SOUTHEASTERN DIVISION			
Alabama	W4MI	Joe A. Shannon 41 Lenape Drive	Cottontdale
Eastern Florida*	W4LYT	Andy B. Clark 1004 E. Blount St.	Miami Springs
Western Florida	W4MS	Edward J. Collins 459 Fairway Hill Drive, S.E.	Pensacola
Georgia	W4CFJ	William F. Kennedy 563 Ramon Llovret	Atlanta
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	Urb. Truman, Rio Piedras, P. R. Gambou
Canal Zone	KZ5WA	P. A. White Box 82	
SOUTHWESTERN DIVISION			
Los Angeles	W6CMN	William J. Schuch 6707 Beck Ave.	North Hollywood
Arizona	W7OIF	Cameron A. Allen Maryland Ave.	Phoenix
San Diego	W6LRH	Don Stansifer 4427 Pescadero	San Diego 7
Santa Barbara	W6QIW	William B. Farwell 90 Grapevine Road	Oak View
WEST GULF DIVISION			
Northern Texas	W5TFP	Ray A. Thacker 4700 West Hanover	Dallas
Oklahoma	W5GIO	Ewing Canaday 919 Stanley	Stillwater
Southern Texas	W5QEM	Roy K. Eggleston 1229 Dinn Lane	Corpus Christi
New Mexico	W5FPB	Einar H. Morterud 2717 Quincy St., N.E.	Bel Air Albuquerque
CANADIAN DIVISION			
Maritime	VE1WB	D. E. Weeks R. R. 3	St. Stephen, N. B.
Ontario	VE3NG	Richard W. Roberts 170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2GL	Gordon A. Lynn R.R. No. 1	Ste. Genevieve de Pierrefonds, P. Q.
Alberta	VE6MJ	Sydney T. Jones 10707-57th Ave.	Edmonton, Alta.
British Columbia	VE7JT	Peter M. McIntyre 981 West 26th Ave.	Vancouver, B. C.
Yukon	VE4HL	John Polmark 109-13th, N.W.	Portage la Prairie, Man.
Manitoba	VE4HL	John Polmark 1044 King St.	Saskatoon
Saskatchewan	VE5HR	Harold R. Horn	

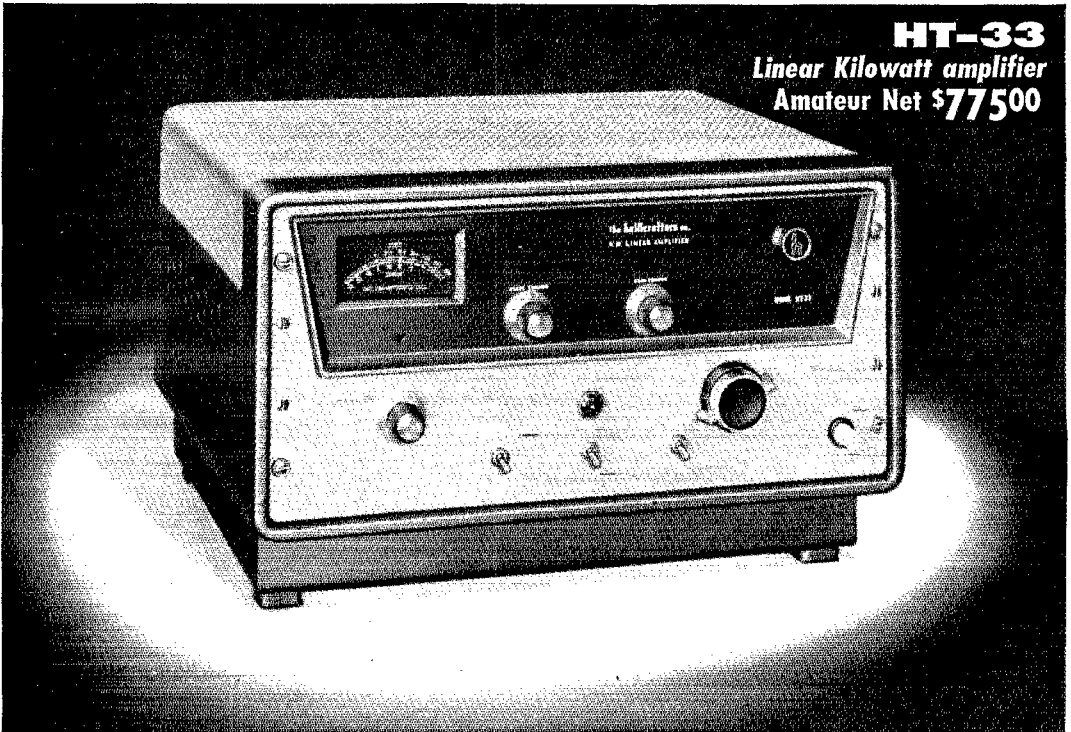
\* Official appointed to act temporarily in the absence of a regular official.





## *New ceramic tubes assure longer life—greater dependability*

Ultra-compact new HT-33 kilowatt amplifier first to employ extra-safe, extra-long-life ceramic power tube



Performance and dependability were key words in the Hallicrafters laboratories when the HT-33 was on the drawing boards. That's why our engineers insisted on new, costlier ceramic power tubes. Result: another Hallicrafters first that means consistently higher performance over a longer life.

Here's what ceramic tubes mean to you: 100 watts greater plate dissipation. Greater overload safety. Unbelievable ruggedness (they'll withstand repeated 11 milli-second shocks of 50g) and reliability. *Advanced design, too.* Notice the clean lines, the compactness of the HT-33—just 12 $\frac{3}{8}$

inches high, for trim table-top application. See it, and compare these and other features, at your supplier's today.

### MORE FACTS ABOUT THE HT-33

- Six amateur bands: 80, 40, 20, 15, 11-10 meters
- Simplified tuning: greater power transfer and higher harmonic attenuation.
- Low drive requirement: 8 watts P.E.P. will drive to full KW
- New type Neon Indicator light for fuse overload.
- Quieter operation: higher performance allows low speed blower.

EXPORT SALES: Phillips Export Co., 100 E. 42nd St., New York 17, New York

**NEW**  
FROM  
**hallicrafters**  
CHICAGO 24, ILLINOIS

*WHERE THE BEST IDEAS IN  
COMMUNICATIONS ARE BORN*

# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



## Past Presidents

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

## Officers

**President** . . . . . GOODWIN L. DOSLAND, W0TSN  
Moorhead, Minnesota

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

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

**Vice-President** . . . . . PERCY C. NOBLE, W1BVR  
37 Broad St., Westfield, Massachusetts

**Secretary** . . . . . A. L. BUDLONG, W1BUD  
38 La Salle Road, West Hartford, Connecticut

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

. . . . .

**General Manager** . . . . . A. L. BUDLONG, W1BUD

**Communications Manager** . . . . . FRANCIS E. HANDY, W1BDI

**Technical Director** . . . . . GEORGE GRAMMER, W1DF

**Assistant General Manager** . . . . . JOHN HUNTOON, W1LVQ

**Assistant Secretaries** . . . . . LEE AURICK, W1RDV  
PERRY F. WILLIAMS, W1UED  
38 La Salle Road, West Hartford, Connecticut

. . . . .

**General Counsel** . . . . . PAUL M. SEGAL  
816 Connecticut Ave., Washington 6, D. C.

## DIRECTORS

### Canada

ALEX REID . . . . . VE2BE  
240 Logan Ave., St. Lambert, P. Q.  
**Vice-Director:** William R. Savage . . . . . VE6EO  
833 10th St. N., Lethbridge, Alta.

### Atlantic Division

GILBERT L. CROSSLEY . . . . . W3YA  
Dept. of E. E. Penna. State University  
State College, Pa.  
**Vice-Director:** Charles O. Badgett . . . . . W3LVF  
725 Garden Road, Glenside, Pa.

### Central Division

JOHN G. DOYLE . . . . . W9GPI  
4331 N. Wildwood Ave., Milwaukee 11, Wis.  
**Vice-Director:** George E. Keith . . . . . W9QLZ  
RFD 2, Box 22-A, Utica, Ill.

### Dakota Division

ALFRED M. GOWAN . . . . . W0PHR  
1012 South Willow Ave., Sioux Falls, S. D.  
**Vice-Director:** Forrest Bryant . . . . . W0FDS  
6840 Harriet Ave., Minneapolis, Minn.

### Delta Division

VICTOR CANFIELD . . . . . W5BSR  
Box 965, Lake Charles, La.  
**Vice-Director:** Milton W. Kirkpatrick . . . . . W5KYC  
4914 Ploynell Dr., Baton Rouge, La.

### Great Lakes Division

JOHN H. BRABB . . . . . W8SPF  
708 Ford Bldg., Detroit 26, Mich.  
**Vice-Director:** Robert L. Davis . . . . . W8EYE  
247 Highland Ave., Salem, Ohio

### Hudson Division

GEORGE V. COOKE, JR. . . . . W2OBU  
88-31 239 St. Bellerose 26, N. Y.  
**Vice-Director:** Lloyd H. Manamon . . . . . W2VQR  
709 Seventh Ave., Asbury Park, N. J.

### Midwest Division

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

### New England Division

MILTON E. CHAFFEE . . . . . W1EFW  
53 Hometown Ave., Southington, Conn.  
**Vice-Director:** Frank L. Baker, Jr. . . . . W1ALP  
91 Atlantic St., N. Quincy 71, Mass.

### Northwestern Division

R. REX ROBERTS . . . . . W7CPY  
837 Park Hill Drive, Billings, Mont.  
**Vice-Director:** Howard S. Pyle . . . . . W7OE  
3434 74th Ave., S.E., Mercer Island, Wash.

### Pacific Division

HARRY M. ENGWICHT . . . . . W6HC  
770 Chapman, San Jose 26, Calif.  
**Vice-Director:** Harold L. Lucero . . . . . W6JDN  
1113 Ellmore Ave., Dunsmuir, Calif.

### Roanoke Division

P. LANIER ANDERSON, JR. . . . . W4MWH  
428 Maple Lane, Danville, Va.  
**Vice-Director:** Thomas H. Wood . . . . . W4ANK  
1702 N. Rhett Ave., North Charleston, S. C.

### Rocky Mountain Division

CLAUDE M. MAER, JR. . . . . W0IC  
740 Lafayette St., Denver, Colo.  
**Vice-Director:** Carl L. Smith . . . . . W0BWW  
1070 Locust St., Denver 20, Colo.

### Southeastern Division

JAMES P. BORN, JR. . . . . W4ZD  
25 First Ave., N.E., Atlanta, Ga.  
**Vice-Director:** Thomas M. Moss . . . . . W4HYW  
P.O. Box 644, Municipal Airport Branch,  
Atlanta, Ga.

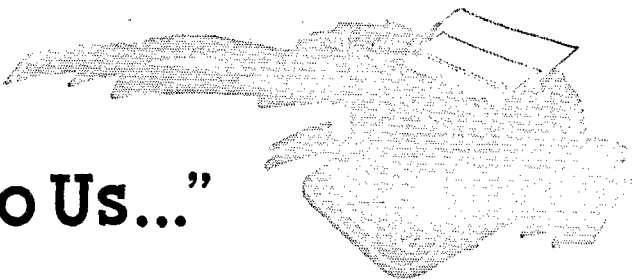
### Southwestern Division

WALTER R. JOOS . . . . . W6EKM  
1315 N. Overhill Drive, Inglewood 3, Calif.  
**Vice-Director:** Virgil Talbott . . . . . W6GTE  
9226 Alexander Ave., South Gate, Calif.

### West Gulf Division

GRADY A. PAYNE . . . . . W5ETA  
5103 Linden St., Bellaire, Texas  
**Vice-Director:** Carl C. Drumeller . . . . . W5EHC  
8824 N.W. 58th St., Oklahoma City 12, Okla.

# "It Seems to Us..."



**DX . . .**

In a few days now the XYL will tear the January page off the hardware store calendar on the kitchen door and be startled to find two big red eyes staring at her. She'll wonder a moment if you're suddenly this year taking an interest in Washington's birthday . . . and then, as she shudders, the truth will dawn — the OM is going to be in another DX contest sponsored by that darned *QST* magazine. Unmistakably important, those brilliant wax-crayon circles, with their March counterparts, will dominate family life in the coming weeks. Plan to pack the kids off to Grandma's, check the supply of coffee, get a couple extra cartons of cigarettes. Here we go again . . .

Fortunately, not many of us need to go quite that far in forgetting the Amateur's Code, paragraph five — "the amateur is balanced." Because for even the casual operator, the DX contest is a lot of good fun. This year will be an unusually good opportunity. DX should be rolling in and, particularly on 15, 11 and 10 meters, not too much of a competitive chore to work. Admittedly, connecting with the really rare ones will still require plenty of operating time and skill along with a substantial signal. But the combination of long skip on the higher-frequency bands and the quota system (especially the second weekend) will give even the newcomer with low power and no beam a chance to knock off a sizeable total of countries. So get out your January *QST*, page 62, for the details and then mark *your* wall calendar with a red crayon so the family will know that those weekends Pop won't be taking 'em to the movies, or skiing or skating.

**. . . AND QSLs**

Burgeoning DX activity will result in a similar increase in QSL card traffic, and so we'd like to add a word about the QSL Bureau system, designed to facilitate the delivery of foreign cards to amateurs in the U. S. and Canada. Foreign amateurs send cards to their national amateur society. There they are sorted by country, and cards for VE/VO, W/K and possessions are forwarded in bulk to ARRL (or, if broken down by individual districts, to the manager of the QSL Bureau for that call area.) This system does not provide the fastest delivery, but does enable the

foreign amateur, with perhaps hundreds of cards to send, to get his QSL to you at the greatest saving.

What do you have to do to get your cards by way of this system? We've answered this question regularly in *QST*, but here it is again: send a business-size letter envelope (about 4½ by 9½ inches), stamped and self-addressed, and with your call letters prominently in the upper, lefthand corner, to the manager of your call area as shown regularly in *QST* (e.g., Page 154, this issue). If and when cards arrive at the bureau for you, your manager will insert them in the envelope and mail them to you. Immediately, furnish him with another self-addressed, stamped envelope for his file. (Some of the more active amateurs send two or three envelopes at a time.)

The idea is to handle only incoming cards, and not to act as a mailing house for cards from W and VE amateurs. Cards from you to the DX amateur (if you don't QSL direct) may be sent to the proper bureau as shown in the IARU listings each June and December *QST*. Frequently a foreign amateur will say "QSL via ARRL." He is *not* suggesting that you send your card to Hq. or to your QSL Manager, but rather that you send a card to his bureau, as listed every six months in *QST*, and that he will be sending *his* through ARRL and the QSL Manager for your call area. So be sure you have an envelope on file; your cards will reach you regularly, and you'll cut down on the backlog of uncalled-for cards which plague the hardworking bureau managers.

## **NOVICE HARMONICS — AGAIN!**

In the Spring of last year, in conference with the crew of FCC's Field Engineering & Monitoring Division, we were asked to help in what was becoming a rather acute problem to the Commission — an upsurge of harmonics from Novice amateurs operating in their 80-meter segment, and interfering with operations of other services in the 7400-7500 kc. portion of the spectrum. A principal result was an article in July 1956 *QST*, describing the harmonic problem and giving details on construction of a simple low-pass filter.

Recently, on the occasion of another visit to Washington, we learn from FCC that Novice harmonics are again causing a good

deal of trouble. The Commission is even enclosing with each new Novice license a warning that the licensee should take particular steps to comply with the rules regarding spurious emissions. For our part, we'd like to suggest to all Novices, as well as to those about to embark on the Novice path, that you get out that July 1956 issue and turn to page 32 — and then put its information to use so that you won't be getting a "QSL" from FCC.

## 23rd Annual ARRL DX Contest

Phone: Feb. 8th-10th, Mar. 8th-10th;  
C.W.: Feb. 22nd-24th, Mar. 22nd-24th

Time for the ARRL DX Test again! Wherever you are, you're urged to participate on phone or c.w. or both. Each of the four 48-hour periods gets underway on Friday at 7 P.M. EST and ends on Sunday at 7 P.M. EST on the dates shown above.

Certificate awards will be given to the highest-scoring c.w. and phone operator in each country and in each continental U. S. A. and Canadian ARRL section. And then there will be the special certificates for club leaders and multiple-operator competitors and a gavel to the top club.

Those outside the U. S. and Canada will try to trade contest information with as many W (K) and VE/VO stations as possible. U. S. and Canadian amateurs will transmit RS or RST reports plus states or provinces. The DX will be sending us 5- or 6-digit numbers indicating signal reports and powers input.

Free contest report forms, though not required by the rules, are now available from ARRL on request. When asking for them, please advise us whether you expect to enter the c.w. section, the phone section, or both.

Look over the contest rules in last month's *QST*, then stand by for four week ends jam-packed with operating fun!

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

March 8-9 — Michigan State, Grand Rapids

June 7-8-9 — Dakota Division, St. Paul, Minn.

July 27-28 — West Gulf Division, San Antonio, Texas

August 30-31-Sept. 1 — ARRL National Convention, Chicago, Illinois

## ARRL NATIONAL CONVENTION

Save the 1957 Labor Day weekend, August 30th to September 1st, for the League's National Convention to be held in the Windy City, under the able sponsorship of the Chicago Area Radio Club Council. All events will take place in the air-conditioned Palmer House, in the heart of Chicago's famous Loop. Watch *QST* for additional details as plans develop. Or write Convention Chairman Jordan Kaplan, W9QKE, 5536 W. Jackson Blvd., Chicago 44, Ill.

## HAMFEST CALENDAR

Ohio — All Cleveland radio amateurs and their friends are invited to the second annual Break-Break Pow Wow dinner to be sponsored by the Indian Hills Radio Club. The dinner will be on Saturday, February 23; 7:30 P.M. at the Alliance Club Hall, 6968 Broadway. Reservations must be in by February 16; donation \$3.50. Bring the XYL! There will be dancing, refreshments, and a program of interest to all. For further information, call Lloyd, K8AAD, EV. 2-3105, or Dick, W8SZF, EV. 2-1133.

## Strays

The annual *Boys' Life* Radio Listening Contest, February 1 through February 28, will have this year, for the first time, a section for amateurs and former amateurs in addition to the sections for SWLs. The contest is open to anyone who has not reached his 19th birthday by March 1, 1957. The complete rules appear in *Boys' Life* for November, or can be obtained from Dept. C, Boy Scouts of America, New Brunswick, N. J. for ten cents.

Pictured at the left and located smack in the middle of a big thorny briar patch in the heavily thicketed area south of Burleson, Texas, is Bob Branson, W5BSX. With all the ingenuity he could muster Bob located his hidden transmitter in the center of the patch so that the hunters would have at least 100 feet of briars to fight no matter from which direction they approached. The antenna was located 150 feet away in the top of a practically inaccessible tree. It will be noted that Bob is definitely "mobile" with the use of his son's red coaster wagon.

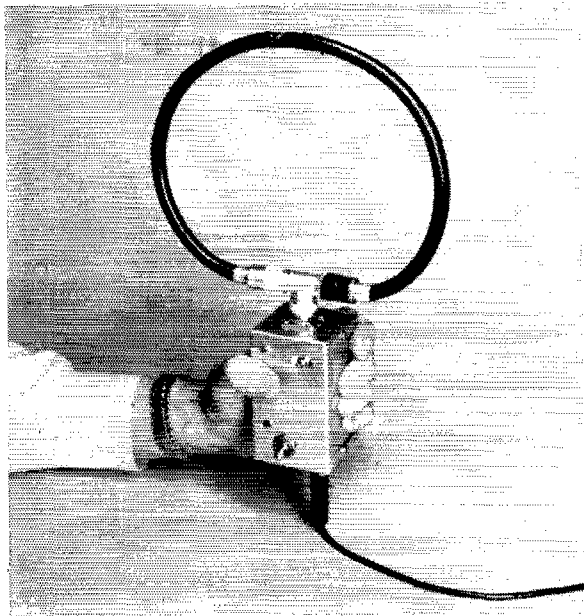
This hunt was staged on unfamiliar territory (Johnson County) for the benefit of all members of the Fort Worth Ten Meter Net on the afternoon of Sunday, October 28th. Still picking prickly pear spines out of their feet were the lucky (?) mobileers who located the transmitter before the one-hour deadline. W5RHW with QFN as co-pilot arrived first, with YUO, BMR and THI following in that order.

**QST for**



The box containing the detector and amplifier is also the "handle" for WØIC's "Snoop-Loop." The loop mounting, using a coax tee as a support, is a convenience but is not an essential part of the loop assembly.

The loop tuning capacitor is screwdriver adjusted. An on-off switch and headphone jack (on the bottom in this view) are the operating controls.



## The Snoop-Loop

*Everything Else Is Transistorized — Why Not A Portable  
D.F. Loop?*

BY CLAUDE M. MAER, JR.,\* WØIC

**H**AVE YOU EVER been up a creek without a paddle? To get to the point, have you ever been hidden-transmitter hunting on a night as dark as the inside of a potted power transformer? If you have, brush the far out of your eyes and nose and continue reading.

Picture yourself, after taking off at the start of the hunt, heading in the right direction, signal getting stronger and stronger, excitement increasing with each additional S unit on the meter. You're following your loop closely — it's working just as good as a ten-element beam on 20 fed by a water-cooled kilowatt — and now you're getting out of town into the countryside. The roads are unfamiliar, and the null is beginning to swing rather rapidly, showing that you are getting in close. Whoops — it shifts to give a direction at right angles to the car. You look carefully across the deep ditch beside the road into the dark field where you know your cagey buddy is hiding. No roads into the field as far as you can see in either direction. You dare not waste miles driving up and down the road looking for an entrance, for each tenth of a mile counts.

You park beside the road, grab your flashlight, and plunge into the veldt in the direction your loop null clearly indicates. But after taking a

few steps you're up to your armpits in brush and can't see ten feet forward or backward. You stumble on in hopes of running into the hidden transmitter — you're probably not more than 500 feet from it — but away from your car with its sensitive receiver and amazingly sharp loop it really becomes a hunt for the needle in the haystack. Now do you see what I mean about the lack of a paddle?

After this happened to me a few times, I decided that something had to be done. I had an old loop left over from the early days of transmitter hunting, and it was a simple trick to wire in a germanium diode, capacitor and headphone jack. I was all set — I could leave my car on the nearest main travelled road, walk in to the hidden transmitter, find out how he managed to get in there with his car and — if a helicopter was not necessary — drive right in in jig time.

Well, I tried it at the very next transmitter hunt after bragging quite a bit about my new secret weapon. I reached a very close spot in the car (at least, I thought it was close) and started out on foot. Alas, no signal in my phones. I knew it was tuned to frequency because I had checked it earlier in the evening on a nearby mobile. My "weapon" was a dud. Later checking showed that it was good for only about 25 to 35 feet. Not good enough. What to do?

\* Rocky Mountain Division Director, ARRL, 740 Lafayette St., Denver, Colo.

### The Solution?

All sorts of thoughts came to mind, but the one that kept recurring was the use of a transistor, one of those supposedly magic devices which will some day replace the trusty old UV-201-A and require only a fraction of the power and voltage. But the trouble was that I didn't know anything about transistors. Also, what do transistors cost? Probably several bucks, which was more than I wanted to put into a device used once or twice a month at most. I was very pleasantly surprised to find at my next visit to the radio store that modern production-run transistors cost only about one buck, instead of several. So in I jumped, picked up two of the little devils and headed for the *Handbook*.<sup>1</sup>

Without going into the details, I found that transistors are not at all difficult to understand if you can keep the names of the connections straight in your mind. I also found that the one-buck transistors were only good for audio and i.f. service, and that the most gain could be realized from the so-called common- or grounded-emitter connection. Although some experts frown on comparing transistors with vacuum tubes, it was very easy for me to visualize the grounded-emitter circuit as being the same as the customary grounded-cathode circuit of the vacuum tube. (My goodness, it wasn't too long ago that, as far as I knew, the grounded-cathode circuit was the only way to connect up a tube.) It seems that the base acts like a grid, and the collector acts like the plate. In order to obtain any appreciable plate — oops, collector — current flow, the base has to be biased with a very small voltage of the same polarity as that applied to the collector. Generally speaking, the audio sensitivity and gain of a transistor stage is dependent upon the amount of base bias — within limits, the greater the base bias, the greater the audio sensitivity of the stage. So far so good.

<sup>1</sup> *The Radio Amateur's Handbook*, 33rd edition, 1956, pages 77-81.

### How About the Little Gem?

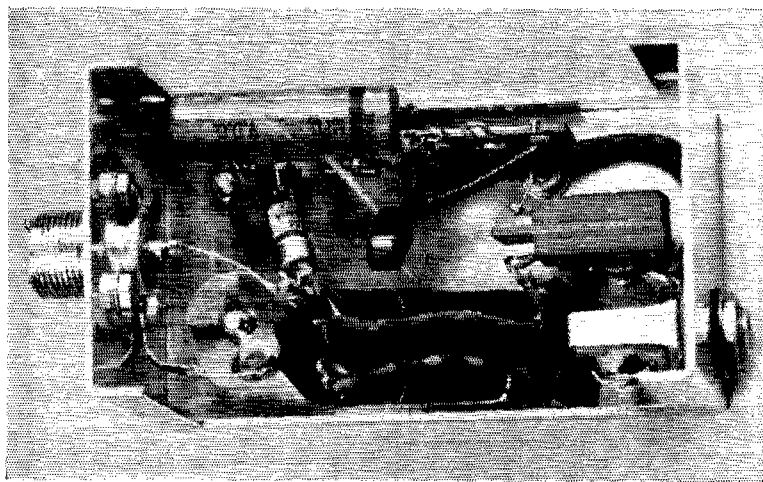
About this stage in my mental gyrations, I recalled an article in *QST* about the use of a transistor in a field-strength meter.<sup>2</sup> This struck a familiar note — wasn't a field-strength meter just what I wanted for tracking down these wily boys hiding in the bulrushes? I hurriedly located the Little Gem in the measurements chapter of the *Handbook*,<sup>3</sup> and looked at the diagram. It took me a while to catch on to the meter balancing circuit, but I really got baffled when I looked at the base circuit. Look, Ma, no bias. How come?

This puzzle took a few days of sneaking in a thought now and then during lulls at the office, and then a cryptic note in the *Handbook* description began to sink in: "The transistor is used in the common-emitter arrangement connected so that the rectified d.c. from the crystal flows in the base-emitter circuit." I got a hot flash — that's where the bias comes from. A little more thought showed me that this was the correct connection for the transistor if the meter were to read relative signal strength, because when a fixed bias is applied to the base circuit the average collector current remains more or less constant for all signal levels. Of course, the instantaneous current will vary with a.c. input so that an audio signal will come through and be amplified.

Right there I had to make a decision. Did I want to use a meter or headphones? For a number of reasons I chose the headphones. In the first place, the trouble I was trying to overcome was lack of sensitivity in my portable loop. I reasoned that the time you need the most sensitivity is when the signal is weak, and with the Little Gem circuit there is less bias on the base with weak signals (remember the Little Gem gets its bias from rectifying the incoming signal) and thus the least sensitivity at that

<sup>2</sup> Campbell, "The Transistorized 'Little Gem,'" *QST*, Aug., 1955.

<sup>3</sup> *The Radio Amateur's Handbook*, 33rd edition, 1956, p. 503.



Interior construction is very simple, a lug strip providing wiring terminals for most of the parts. The two penlite cells are wrapped with tape and supported by leads soldered to the terminals.

time. Thus, it seemed to me that the signal-biased circuit was not what I was looking for. In addition, the use of a meter requires a light on the meter face when it is being read, and three hands are needed to hold the loop, a separate meter case and the light. At the same time you want to keep a sharp lookout where you are walking and, most important, for the hidden transmitter itself. Even if a battery-operated pilot light were to be installed, meters have to have a balancing circuit and tend to jiggle when carried. Also, they will go off scale when getting in close, and I hated to think of my nice surplus 100-microampere meter winding its needle around the peg. As it turned out, the headphones have been very satisfactory for the transmitter hunts here in Denver because there is modulation on the signal at all times and the modulated signal comes through fine.

After doing the thinking for a week or so, it took about a half hour to connect in my transistor audio stage, and I had a real secret weapon, the "Snoop-Loop." It works, too. On the ten-meter band I can read signals up to one mile under good transmitting conditions, but even in the thick woods a quarter of a mile is duck soup. I believe that a half mile can be said to be the working range of the device.

It's a good idea to check out these distances carefully, before you make the mistake I made one night. When first testing it out on a hunt, I stepped out of the car to see if I could hear the hidden transmitter. Sure enough, there was a weak signal in the phones. I had become used to using the loop with only the diode detector, and in the excitement of getting in close forgot about the greatly increased sensitivity I had built in. I rushed off down the road on foot, following my Snoop-Loop, and about one mile later at the top of a high hill I stumbled onto the hidden site. Boy, I still have scars from the blisters on my feet! As it turned out, we could have driven on the main road to within 500 or 600 feet of the site and then my little loop would have led us into the location, which could not be seen from the road. In that case a meter might have been helpful, but you can learn the relation of audio strength to distance fairly accurately with a little practice.

In localities where the signal from the hidden transmitter is unmodulated the meter circuit will have to be used. The Little Gem should work quite well, but some means should be included for reducing sensitivity to keep that meter pointer straight. Sometimes, detuning the input circuit will do the trick, but if the only tuning is in the loop circuit itself, detuning may cause some strange directional effects.

### Construction

Fig. 1 shows how simple the unit really is. Almost any size box can be used, but I happen to be one who doesn't like to burn his fingers trying to solder connections in small places, so I chose a medium-sized aluminum case, 4 by 2 $\frac{1}{4}$  by 2 $\frac{1}{4}$  inches (ICA No. 29338). Any equivalent box

will suffice and leave plenty of soldering room.

The loop is constructed of RG-8/U coax. Since a coax "tee" connector is used for convenience and ease of mounting, one end of the coax loop is connected to a male plug in the conventional way but the center conductor of the other end is shorted to the shield so that the male connector at that end has no connection to

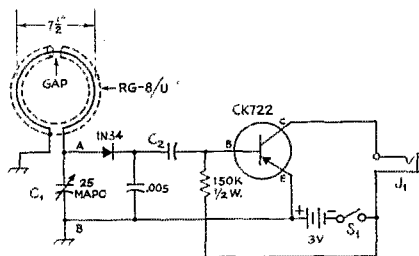


Fig. 1 — "Snoop-Loop" circuit for 28-Mc. operation. The loop is a single turn of RG-8/U inner conductor, the outer conductor being used as a shield. Note the gap in the shielding; about a 1-inch section of the outer conductor should be cut out.

C<sub>1</sub> — 25- $\mu$ f. midget air padder.

C<sub>2</sub> — 0.1  $\mu$ f. or more (paper).

J<sub>1</sub> — Open-circuit phone jack.

S<sub>1</sub> — S.p.s.t. toggle.

"A" and "B" (chassis ground) refer to alternative input circuits shown in Fig. 2.

the center prong. This results in an unbalanced circuit, but seems to give good bidirectional null readings as well as an easily-detectable maximum reading when the grounded end of the loop is pointed in the direction of the transmitter. Careful tuning will improve this maximum reading as described in an earlier article.<sup>4</sup>

Placement of parts can be seen in the photographs. Be sure to insulate the headphone jack from the case because both connections are above ground three volts worth (no danger of any serious shock!). Also, don't forget to remove one inch of shielding from the top of the loop. You won't get much signal unless you do.

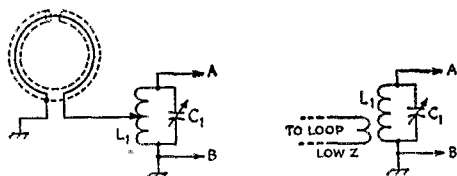


Fig. 2 — Input circuits for lower-frequency bands. L<sub>1</sub>C<sub>1</sub> should cover the desired amateur band, but the L/C ratio is not critical. In the circuit at the left, adjust the position of the tap on L<sub>1</sub> for maximum signal strength. The circuit at the right is for use with a length of low-impedance line between the loop and tuned circuit L<sub>1</sub>C<sub>1</sub>. As an alternative to the inductive coupling shown, the line could be tapped on L<sub>1</sub>.

"A" and "B" connect to correspondingly-designated points in the circuit in Fig. 1, substituting for the loop and C<sub>1</sub> in that circuit.

<sup>4</sup> Amphar, "Unidirectional Loops for Transmitter Hunting," *QST*, March, 1955.

The Snoop-Loop is not limited to the ten-meter band or to a built-in loop. Fig. 2 shows alternative circuits for other bands and for plugging in a separate loop connected by a low-impedance transmission line.<sup>5</sup> Select coil and capacitor combinations that will tune to the desired frequencies. Plug-in coils could be used. It is a good idea to have the r.f. end of the unit fairly well shielded, to eliminate signal pickup except through the loop. Incidentally, sensitive high-impedance phones really improve the performance of the Snoop-Loop. I use a single hearing-aid button type with 8000 ohms impedance and 2000 ohms d.c. resistance.

Fig. 3 shows the Little Gem connection for using a meter in place of the headphones.

I don't know if this little loop will be as

<sup>5</sup> Duncan, "Transmitter Hunting — Seattle Style," *QST*, March, 1955.

Norberg, "Transmitter Hunting with the D. F. Loop," *QST*, April, 1954.

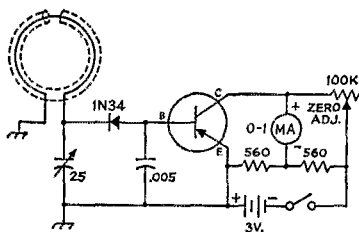


Fig. 3 — The "Little Gem" metering circuit, for use with unmodulated signals. Other components same as Fig. 1.

helpful to you as the paddle we originally talked about, but it sure helps on a dark night in the country. (Tip to the hidden-transmitter operator — If you want to foul up some of your pals using these loops, just hide near the transmitting antenna of a 50,000-watt broadcasting station. But that's another story!)

## How They Planned the First DXpedition

BY JULIAN N. JABLIN\*, W2QPQ

*The scene is laid in a little shack on the outskirts of Cadiz, Spain, where the Sociedad Radiotelegrafía Jamón de Cadiz meets weekly. As the curtain rises, Cristóbal is aimlessly tuning the receiver. José, the club president, enters.*

JOSÉ: Buenos días, amigo. How's DX?

CRISTÓBAL: The band's deader than Isabella's grandfather. What's new?

JOSÉ: I worked a G last night who told me about a funny thing that happened to him. Seems that he had the beam pointed west, even though he knows that nothing's out there, of course, when he heard . . .

ROBERTO (*bursts in*): Hola! I just worked my cousin in Seville on 75. Bad news for us. That Seville Latón Pounders' Club!

CRISTÓBAL: Qué?

ROBERTO: They've just made their 87th country toward DXCC, and you know what that means. There aren't any more than 87 countries. So they are tied with us.

JOSÉ: We're tied with them!

ROBERTO: We're both tied. And there's no chance of making any more countries. Those Sevillaño lids!

CRISTÓBAL (*at the rig*): . . . aquí es EA1OU, el estación de la Sociedad Radiotele . . . Qué???

What did you guys say?

ROBERTO: The Seville gang made their 87th country. So we're now tied.

JOSÉ: And there aren't any more countries.

ROBERTO: So how can we get our lead back?

JOSÉ: We can't invent a country.

CRISTÓBAL: Maybe we can find one.

JOSÉ: Where — under Ferdinand's bed?

CRISTÓBAL: Don't be estúpido. Now look. I've never agreed with you guys that the world is flat — that it just drops off way out west. José, what did that G tell you last night?

JOSÉ: He just said that he had the beam pointed west by accident and he was calling CQ and when he signed he heard someone smack on his frequency but it was so weak he couldn't read him so he never made the QSO but he was sure there was a station there.

CRISTÓBAL: He talks like a phone man, too.

ROBERTO: So he heard a signal. So what? Did he ever measure the front-to-back ratio of his beam? Did he ever hear of sunspots? Those Gs could learn a lot about radio. Everybody knows that there aren't any countries out west. Just space.

CRISTÓBAL: Everybody knows everything. But nobody's ever been there. I'd like to get a boat and sail west, just to see for myself. I'll bet there are countries there. Or something.

JOSÉ: Why not?

ROBERTO: But everybody knows . . .

JOSÉ: Claro. Still, supposing that Cristóbal is right. We could take the lead from those Sevillaños again. And if Cris should be very lucky, there might be several countries.

\* 147-17 Charter Road, Jamaica 35, N. Y.



Thirteen, maybe. And that would give us DXCC, all at once.

CRISTÓBAL: Let's not go overboard, now.

JOSÉ: You could do it, Cristóbal. We could find several . . .

ROBERTO (*getting the fever*): You'd need a good ship — something big enough to be safe from sea serpents. Maybe a couple of brass cannon, too.

CRISTÓBAL: Look, fellows, I only said that I thought . . .



JOSÉ: I have an uncle whose wife's sister's boy friend works in a shipyard. He could get us a line on what kinds of ships are available. He could even give us the dope on the equipment you'd need.

CRISTÓBAL: Equipment — that would be tough. Where would we get the dough for the equipment? Or even for the boat? Let's forget it, fellows.

JOSÉ: Ferdinand and Isabella have all the money in the world. Now if we could get to them . . .

ROBERTO: One of the king's ministers of state is a ham. Maybe we could get him interested. He could go to the king for us.

CRISTÓBAL: I'm not getting mixed up with any politicians.

JOSÉ: *Aquietarse* — I'm thinking. Once we get the boat, we can go to manufacturers and ask them to contribute. You could write a book later, Cris, and mention the names of the people whose products you've used. It's done all the time.

CRISTÓBAL: Take it slow, José. We haven't even . . .

ROBERTO: What bands would he operate?

CRIS and JOSÉ (*together*): *Qué?*

ROBERTO: He'll have to take gear with him to operate. We can't count on the natives there being hams. He can get a maritime-mobile call. Like EA1SRJ/MM. For Sociedad Radiotelegrafía Jamón, of course.

CRISTÓBAL: If I go, it'll be EA1CC — for Cristóbal Colón. But nobody said I'm going.

JOSÉ: You're going, if we have to shoot you out of a cannon. Look, Roberto, let's get Diego, as club secretary, to write a lot of letters to radio manufacturers to lend us gear. It will be a big boat anyway, so he can use rigs on 10, 20, 40, 80 and 160. Tell them it's an expedition to find new DX — a scientific expedition. A . . . a . . . a DXpedition!

ROBERTO: A DXpedition. What a word. José, you're a genio!

CRISTÓBAL (*coldly*): One-sixty, hey. Has anyone here figured out where I'm going to string 250 feet of wire for an antenna while I'm sailing along?

*José and Roberto are silent for a moment as they think this one over, then Roberto brightens.*

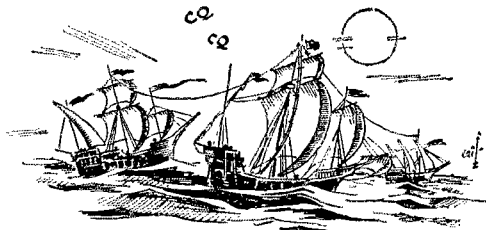
ROBERTO: Maybe we could get two boats. Then you could string the antenna between them.

CRISTÓBAL (*even colder*): And ground the center when it sags into the water, or use the two halves on 80 when it snaps.

JOSÉ: Three ships! That's the answer. Three ships . . . then you can use the third one to support the antenna in the center. And you could orient the antenna by changing the position of the boats. And even make a V-beam on 80 . . .

CRISTÓBAL: Of all the cracked-up, crazy ideas, this is el ultimo. Look, I'm not using three boats — or one. I'm not going to work 160, or 80. Or 40, 20 or 10. I'm not going! *Punto final.*

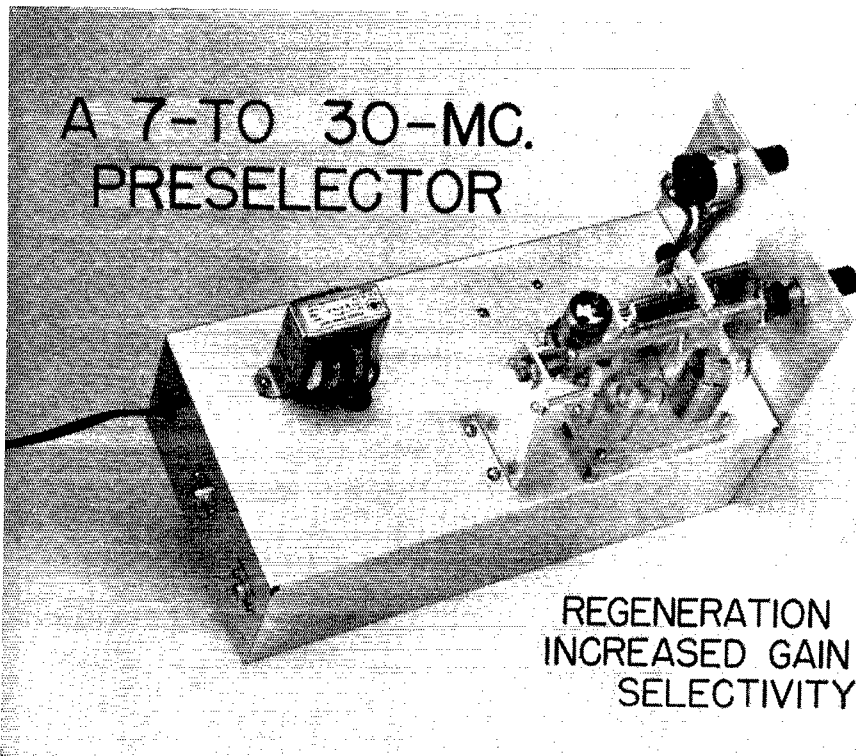
JOSÉ: Pay no attention to him, Roberto. Now look, Roberto, I'll get hold of my uncle's wife's sister's boy friend about the boats — three good boats. You and I will get together with Diego about an approach to the minister of state. Maybe we'll talk to Henriques . . . he has an in with the tax collector's office. We'll get Manuêlo to make up some special QSL cards . . . maybe one for each band . . . if we can get the boys to send a few doubloons in return for the cards, we can get back some of the dough that this will cost. (Be quiet, Cristóbal!) Let's work up a list of gear that



he'll need and figure out who manufactures the best of what. Then Diego can write the letters to them. Cristóbal will probably need some sort of special operating permit . . . We can discuss that with the minister, too. (You are so going, Cris!) Now we can have Juan work out an operating schedule for each band. About the crew — perhaps we can get volunteers on an expense-sharing plan. The operators would be set up like on Field Day. . . .

*The curtain goes down as José and Roberto are happily dreaming of the DXpedition and a luminous DXCC glows in the background.*

# A 7-TO 30-MC. PRESELECTOR



REGENERATION FOR  
INCREASED GAIN AND  
SELECTIVITY

BY E. LAIRD CAMPBELL,\* WICUT

• Many receivers fall off in performance at the higher frequencies, beginning to lose sensitivity and image rejection. The regenerative preselector described here will do a lot to "hop up" your receiver performance if it isn't currently up to par. We were sorely tempted to call the regeneration "Signal Multiplication" but we were afraid we couldn't get it past some of the old timers. The fact remains, however, that regeneration is about the closest you can come these days to getting something for practically nothing.

WITH CONDITIONS improving on the higher frequencies, amateurs are doing more and more operating on 20, 15 and 10 meters. However, some receivers do not perform well at these frequencies, for a variety of reasons. Even some of the so-called modern receivers with an r.f. stage seem to fall off in vitality at these higher frequencies. How can one improve his reception and continue using his present receiver? The answer is a "preselector," which is another name for an outboard r.f. amplifier.

Most receivers without an r.f. amplifier seem to perform reasonably well in the 80- and 40-meter bands. At higher frequencies the need for

an r.f. amplifier becomes apparent. Therefore, for 14 Mc. and higher, an r.f. stage is imperative for serious operating.

The preselector described here not only will add gain but will reduce the image response. By making it regenerative, more gain and selectivity are achieved than with a normal r.f. amplifier. When the preselector is used with a no-r.f.-stage receiver, the resultant image rejection and sensitivity will compare with that obtained from more expensive receivers. If you pride yourself in owning a brand-new receiver but feel you're not getting what you should on 10 and 15 meters, the preselector will perk these bands right up.

### The Circuit

The schematic diagram of the preselector is shown in Fig. 1. The pentode section of a 6AN8 is used as the regenerative r.f. stage, and the triode section ( $V_{1B}$ ) serves as a cathode follower to couple to the receiver input. There is no d.c. return path from cathode to ground in the output circuit except through the antenna coil of the receiver, so if the receiver in use has no d.c. return through its antenna circuit, a low-resistance r.f. choke should be placed across antenna terminals.

A three-position switch,  $S_1$ , provides straight-through operation from antenna to receiver (for low-frequency work), 7- to 14-Mc. operation, and 21- to 30-Mc. reception. Two bands can be covered in each range through the use of a large

\*Technical Assistant, QST.

(140- $\mu\text{f.}$ ) tuning capacitor,  $C_1$ . Variable antenna coupling is provided, and cathode control of bias ( $R_1$ , the gain control) is included for those rare times when it may be required. Only one tuned circuit is necessary because the regeneration gives effective selectivity that is sufficient for good image rejection up to 30 Mc. with receivers using intermediate frequencies as low as 455 kc.

Regeneration control is obtained through the use of the familiar capacitive-bridge neutralizing circuit. However, instead of using it to neutralize the stage, the circuit is used to control feedback up to the oscillation point. Because the circuit is frequency-sensitive in this application, it is necessary to add capacitance ( $C_3$ ) at lower frequencies. This is done automatically through  $S_{1C}$ .

The power supply uses a TV booster transformer and a selenium rectifier. The plate voltage is removed in the straight-through position of  $S_1$ , and the 115-volt line is opened by  $S_2$ , mounted on the gain control.

### Layout and Construction

The preselector is built on a  $5 \times 10 \times 3$ -inch chassis (Bud AC-404). Panel controls are mounted on the  $5 \times 6\frac{1}{2}$ -inch aluminum panel. The two bottom controls ( $C_2$  and  $S_1$ ) are mounted through the chassis and front panel, to secure the panel to the chassis. On the panel, the tuning control is in the center, coupling and gain control on top, and regeneration and band switch on the bottom.

The input tuning assembly is composed of two main parts, the coil platform and link adjustment arm. The coil platform is made from a thin piece of plastic measuring  $3 \times 1\frac{1}{4}$  inches. The

platform in the photograph was made from the lid of the plastic box in which the 0.01- $\mu\text{f.}$  disk ceramic capacitors came (Sprague 5GA-S1). The capacitors are supplied five to a box, the exact number needed for wiring the unit. One 3-inch length of B & W 3011 Miniductor coil is needed for the links and coils. As seen in one of the photographs, the high-frequency coil,  $L_2$ , is made by unwinding turns but leaving the plastic supporting bars. These plastic bars are secured to the coil platform with cement. The low-frequency coil is mounted in the same manner. The coil platform is mounted on the chassis with screws and spacers and is raised about  $\frac{3}{4}$  inch above the chassis, in order to maintain the high  $Q$  of the coils. A 6-inch lucite or plastic rod is used to support the links. Both ends of the rod are supported by  $\frac{1}{4}$ -inch panel bushings. The rear bushing is held by a bracket cut from a piece of sheet aluminum. Two 1-inch No. 4 machine screws are placed on the bracket so that a projecting 1-inch screw on the rear of the lucite link shaft will be stopped at the end of about 45 degrees of rotation.

To keep the link shaft from moving after it has once been set, a friction lock is made from a grommet, 1-inch machine screw, and a couple of washers. The machine screw is placed about  $1\frac{1}{2}$  inches back on the shaft. A washer, grommet, another washer and the bushing are placed on the shaft in that order from the screw. By applying pressure to the shaft from the rear bushing, the grommet is compressed against the front bushing. The knob is tightened on the shaft and maintains compression on the grommet.

Other components on top of the chassis are the

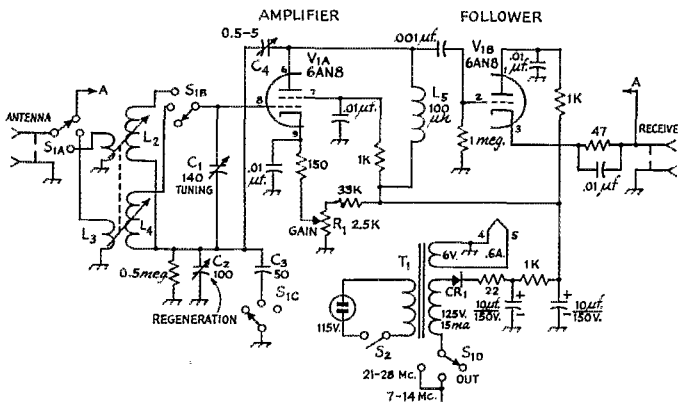
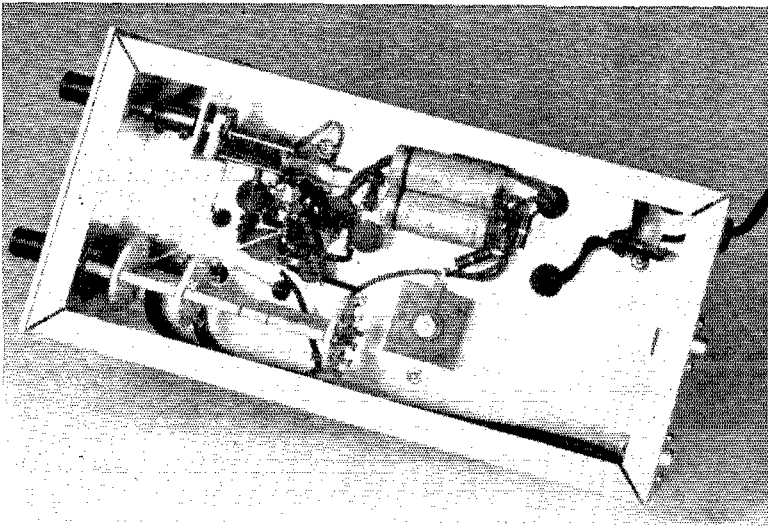


Fig. 1—Schematic diagram of the regenerative preselector. Capacitances are in  $\mu\text{f.}$ , unless specified otherwise. Resistors are  $\frac{1}{2}$  watt. Switch  $S_1$  is shown in the "out" position.

- $C_1$  — 140- $\mu\text{f.}$  variable (Hammarlund HF-140).
- $C_2$  — 100- $\mu\text{f.}$  variable (Hammarlund MAPC-100-B).
- $C_3$  — 50- $\mu\text{f.}$  mica (see text).
- $C_4$  — 0.5-5- $\mu\text{f.}$  tubular trimmer (Erie 532-08-OR5).
- $CR_1$  — 50-ma. selenium rectifier (International Rectifier RS050).
- $L_1$  —  $L_4$  — No. 20,  $\frac{3}{4}$ -inch diam., 16 turns per inch (B & W 3011 Miniductor).
- $L_1$  — 2 turns.
- $L_2$  — 5 turns.

- $L_3$  — 7 turns.
- $L_4$  — 19 turns.
- $L_5$  — 100- $\mu\text{h.}$  r.f. choke (National R-33 100  $\mu\text{h.}$ ).
- $R_1$  — 2500-ohm potentiometer (Mallory U7) with  $S_2$  (Mallory US-26).
- $S_1$  — Switch built on 1-inch shaft (Centralab PA-301) (see text).
- $S_{1A}$ ,  $S_{1B}$  — 1-pole 12-position (3 positions used) wafer switch section (Centralab PA-1).
- $S_{1C-D}$  — 2-pole 6-position (3 positions used) wafer switch section (Centralab PA-3).
- $S_2$  — See  $R_1$ .
- $T_1$  — 125 volts at 15 ma., 6.3 volts at 0.6 amp. (Stancor PS-8415).



◆

The band switch and the panel bushing for the regeneration control shaft hold the panel to the chassis. One terminal of the neutralizing capacitor,  $C_4$ , is soldered to the stator terminal of the regeneration control.  $C_2$ .

◆

tuning capacitor  $C_1$ , power transformer  $T_1$ , and the 6AN8 tube. The r.f. gain control  $R_1$  and power switch  $S_2$  are mounted on the panel. Five holes are drilled in the top of the chassis to allow the passage of leads from the rotor and stator of  $C_1$  and from the coils. It is good practice to use rubber grommets in these holes to prevent the leads from shorting to the chassis. Since the tuning capacitor  $C_1$  is above ground, an insulated extension shaft (Allied Radio No. 60 H 355) is required. The capacitor is secured to the front panel by screws and spacers.

Regeneration control  $C_2$ , switch  $S_1$ , and the power supply components are mounted under the chassis. The regeneration control  $C_2$  is placed back from the panel to reduce lead length to its associated circuit. It is mounted on a bracket bent from sheet aluminum and supported by screws from the side of the chassis. A shaft coupling (Allied Radio No. 60 H 360) spans the distance between the panel bearing assembly and the capacitor shaft.

Switch  $S_1$  is made from Centralab miniature steatite sections and shaft.  $S_{1A}$  and  $S_{1B}$  are single-pole types, separate sections being used to minimize input-to-output coupling. The first section  $S_{1A}$ , switches the links and should be spaced about  $\frac{3}{4}$  inch from the panel.  $S_{1B}$ , which selects the tuned circuits, is next, spaced an inch from  $S_{1A}$ . Lastly, section  $S_{1C-D}$ , which switches the compensating capacitor  $C_3$  and controls the plate voltage, is placed  $2\frac{1}{2}$  inches back from  $S_{1B}$ .

Power supply components, resistors and capacitors are supported by lugs and terminal strips. The selenium rectifier  $CR_1$  is held by the same screw that secures the link supporting bracket. Input and output jacks are phono jacks.

When the wiring has been checked, connect an antenna to the preselector input. Also, run a shielded lead from the preselector output to the receiver antenna post. Turn on the power with  $S_2$  and allow the tube to warm up. Turn on

the receiver b.f.o. and tune to 28 Mc. with  $S_1$  in the "out" position. Now turn  $S_1$  to the 21-28-Mc. position, set  $R_1$  to minimum bias (arm grounded) and the antenna coupling to maximum (coils close together). Adjust  $C_1$  and listen for beats or oscillation which would indicate the preselector is oscillating. If nothing is heard, rotate  $C_2$  toward minimum capacitance until the unit goes into oscillation. If neither of these methods works, it may be necessary to adjust the neutralizing capacitor,  $C_4$ . Once oscillation starts, set the regeneration control at minimum capacitance. Slowly adjust the neutralizing capacitor  $C_4$  until the unit oscillates only when the regeneration control is at minimum capacitance. Now switch the preselector and receiver to 14 Mc. and tune. The unit should start to oscillate at about the same setting of  $C_2$ . If the point of oscillation is not the same, the value of  $C_3$  will have to be changed until oscillation occurs at 14 Mc. with  $C_2$  at or near minimum capacitance.

It will be found that the preselector can go into oscillation either when the regeneration control is advanced (toward minimum capacitance) or when the antenna coupling is reduced (coils moved apart). This is perfectly normal, and the usual operating procedure will be to leave the antenna coupling fixed at around tightest coupling and handle the regeneration with  $C_2$ . Normally  $R_1$  will be set at maximum gain (arm grounded), but when a strong local opens up you may want to back off on this and the antenna coupling. Depending upon the degree of regeneration,  $C_1$  will tune "sharp" or "broad."

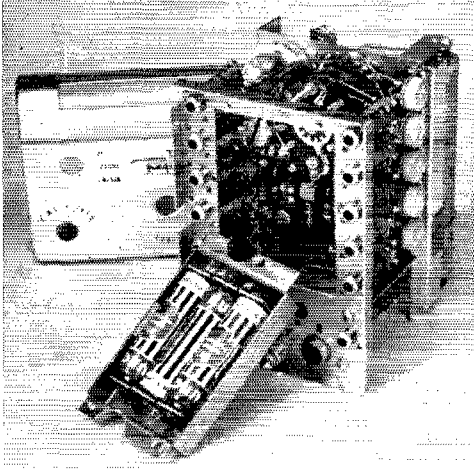
The improvement in performance when the preselector is used will depend almost entirely on how poor the receiver is with which the preselector is used. Considerable improvement in sensitivity can be expected with receivers having no r.f. stage or with older receivers using antiquated tubes. The preselector will help reduce r.f. image response with any receiver.

# • Recent Equipment —

## Regency ATC-1 Converter

THE ATC-1 converter, covering the amateur bands from 3.5 to 30 Mc., is the first piece of practical receiving gear offered the amateur in which the functions normally performed by tubes have been taken over completely by semi-

inches wide, 3½ inches high, and about 4½ inches deep over all. This compactness is not a primary result of using transistors, since it would have been possible to use miniature tubes without increasing the cabinet size significantly; most of the space actually is occupied by the tuned circuits required for the various frequencies covered. The real advantage of the transistors lies in the freedom from reliance on external power sources, and in the frequency stability that becomes possible when sources of heat are eliminated and operating voltages are obtained from batteries.



Removed from its case, the assembly is seen to consist mostly of tuned circuits and switch sections. The two transistors and crystal diode mount on a small bakelite panel behind the cutout. The penlite-cell power supply is contained in the demountable compartment in the foreground. This view is of the rear of the converter chassis.

The slide-rule type dial is a lucite cylinder rotated by the band switch so the proper calibration comes up. Each band is spread over the entire dial length.

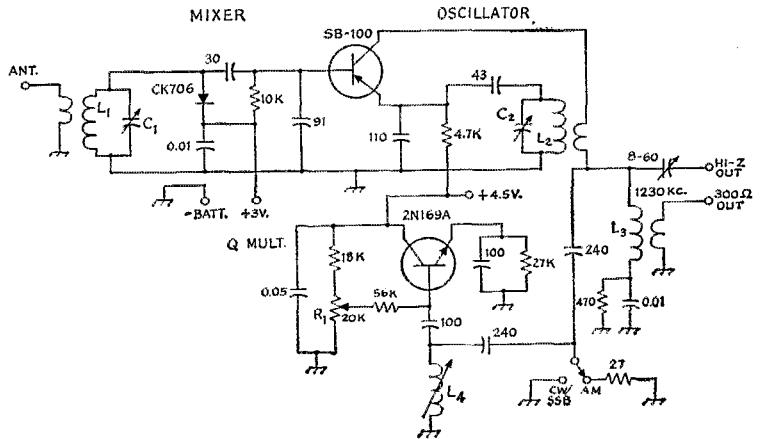
conductor devices. It is self-powered — three penlite cells! — and thus may be used with any receiver, home or mobile, without regard for the type of power supply available.

The converter is quite compact, measuring 5

### Transistor Circuit

The circuit, shown in Fig. 1 without switching and similar details, no doubt will interest those who have experimented with transistors. The converter (mixer-oscillator) is a type SB-100 surface-barrier transistor. The incoming signal is applied, through  $L_1C_1$ , between base and emitter. The oscillator is a tickler feed-back arrangement with the tuned circuit  $L_2C_2$  between emitter and ground and with the tickler coil in the collector circuit. In series with the feed-back coil is the converter output circuit coil  $L_3$ . The output circuit, tuned by a 240- $\mu\mu\text{f}$ . fixed capacitor can be coupled to the antenna terminals of a receiver covering the broadcast band, through a small variable capacitor or, alternatively, through a coupling coil designed for a receiver having 300-ohm input. The output frequency is 1230 kc., this frequency being chosen so that harmonics of the broadcast-receiver oscillator will not fall in any of the amateur bands.

The oscillator fundamental frequency is used for the 80-, 40- and 20-meter bands, with the oscillator on the high side of the signal frequency. The second harmonic is used for 15 and 10 meters, the harmonic being on the low side of the signal on these two bands. The use of harmonic injection is said to improve the stability on the two higher bands. There is also the point that obtain-



Circuit diagram of the Regency amateur-band converter using transistors. Capacitances below 0.001  $\mu\text{f}$ . are in  $\mu\mu\text{f}$ .

ing reliable oscillation becomes increasingly difficult as the frequency is raised.

The CK706 across the converter signal circuit is used to protect the SB-100 transistor from excessively strong signals. It is back-biased so that incoming signals above a 3-volt level are clipped by the diode.

#### Q Multiplier

An interesting feature of the unit is the  $Q$  multiplier using a 2N169A transistor. This circuit also doubles as a b.f.o. for c.w. reception when operated in the oscillating condition.  $L_4$  with the 240- $\mu\text{m}f.$  capacitor resonates at 1230 kc., regeneration in the circuit being controlled by the variable resistor  $R_1$ . In the "A.M." switch position

the oscillator and i.f. output circuit are coupled through the 27-ohm resistor, and for maximum gain and selectivity  $R_1$  is adjusted so the  $Q$  multiplier is highly regenerative, but not oscillating. For c.w. or s.s.b. reception the switch eliminates the coupling resistor and the resulting increased  $Q$  of the tuned circuit causes the transistor to go into oscillation. Stray coupling provides enough b.f.o. injection in this case.

A novel touch in the dial construction is a push-in tuning knob that closes a switch to light the dial lamp. On releasing the knob the switch opens. This is done to save battery drain, since the dial lamp takes much more current than the transistors!

— G. G.

## The RME 4301 Side-Band Selector

**O**UTRIGGER side-band selectors fall into two classes: those using a phasing-type of selector and those using a low-frequency filter and a converter. The RME 4301 uses the phasing-type of side-band selection and, although it is obviously designed as a matching adjunct for the RME 4300 receiver, it can be used with any receiver having an i.f. in the vicinity of 455 kc. It has a built-in power supply. To use it with any receiver (including the 4300) it is only necessary to make three connections; one to the last i.f. and two in the audio circuits. The 4300 already has these connections brought out to jacks; other receivers might require some slight alteration.

For those who are not quite sure what a side-band selector of this type will do for them, a brief review might be in order. By virtue of the circuitry in the selector, it is possible to receive both side bands of an a.m. signal, as in normal reception, or only one side band, all at the flick

of a switch. Many times there will be QRM on one side band and not on the other, so a selectable-side-band device of this kind gives you a better chance at interference-free reception. A side-band selector of this type also gives an improvement in the reception of s.s.b. signals, since it helps to make a better s.s.b. signal out of an existing one by increasing the side-band suppression, and this in turn makes the signal a little easier to tune in. For c.w. reception, the side-band selector gives superb single-signal c.w. reception by eliminating the "other side" of zero beat.

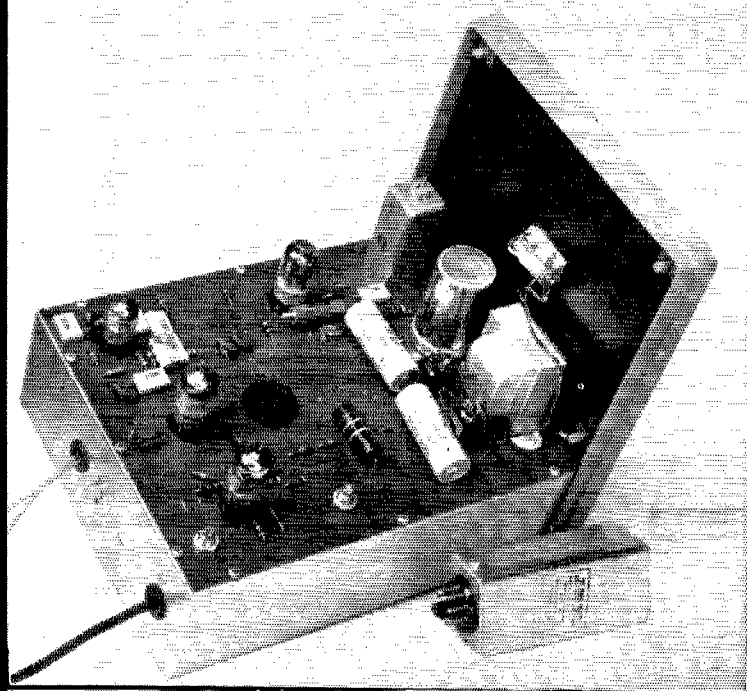
These facts are all well known to the s.s.b. gang, and the 4301 is practically identical electrically to some other units that have been described or that are available in the stores. It uses one triode of a 12AT7 as the b.f.o., a 6AL5 as the detector, a 12AT7 phase-shift coupling tube, a 12AT7 side-band combiner tube, and the remaining 12AT7 triode as an audio output tube.

Mechanically there are some good lessons for the serious amateur in the 4301.

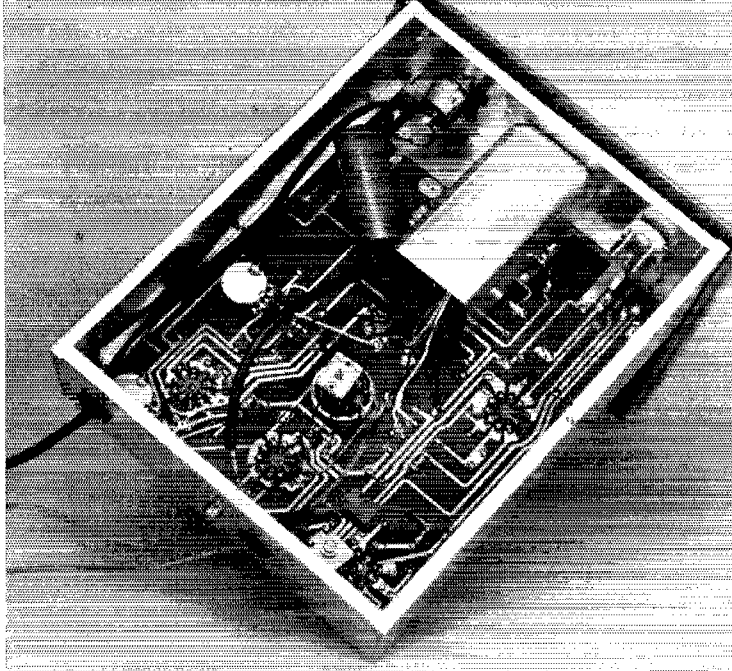
It is the first example we have seen in the ham field of a unit built almost entirely around etched circuitry. Referring to the photographs on these pages, you will see that almost all of the components are mounted above

◆  
The RME 4301 Side-Band Selector is intended for use with any receiver that has an i.f. in the vicinity of 455 kc. Electrically it is similar to other phasing-type selectors, but mechanically it is considerably different. The heavy die-cast panel can be seen here, and you will notice that many of the components are mounted above the deck. The deck is of phenolite and etched circuitry is used, as the other photograph shows. The shield can houses the audio phase-shift network; normally it mounts in the octal socket in the center of the deck.

**QST** for



The underside of the 4301 is singularly uncluttered as a result of the use of etched circuits. The shield can houses the function switch; the other panel controls are the h.f.o. pitch and the a.c. switch.



the chassis, and the view under the chassis reveals little more than the etched leads and the soldered connections to the components mounted above the deck. Since kits are available to amateurs for etched circuit work,<sup>1</sup> it isn't hard to visualize applying the technique to a unit like this side-band selector, and we must admit it makes for a very clean arrangement. Perhaps the dyed-in-the-wool experimenter

isn't ready for etched circuits if he is going to try a number of different component values, but any established design might certainly benefit through the use of the new approach to equipment wiring.

— B. G.

<sup>1</sup> Middleton and Marshall, "Etched Circuitry for the Ham — Now!", *QST*, August, 1954.

## The Model SM-90 Screen Modulator

A RECENT addition to the WRL line of amateur equipment is the Model SM-90 screen modulator. This unit is designed for use with the Globe Chief<sup>1</sup> transmitter but with suitable modifications is adaptable to any screen-grid amplifier that is run at inputs up to 100 watts. The modulator is available either in kit or wired

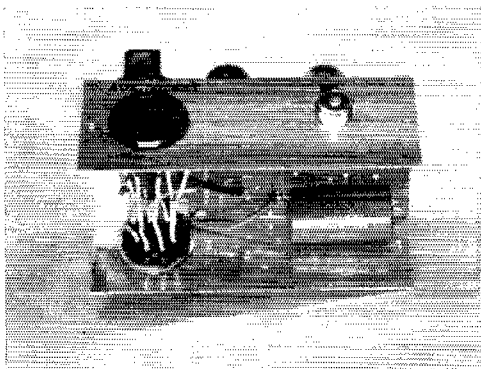
form. A complete step-by-step wiring manual is furnished with the unit and, in addition, details are given for connecting the modulator to most of the current "Novice" transmitters.

The SM-90 is built on a  $5\frac{1}{4} \times 2\frac{3}{8} \times 2\frac{1}{8}$ -inch chassis. An octal plug mounted on the lip of the chassis permits the unit to be plugged into the auxiliary socket on the back of the Globe Chief. Construction is simplified by the use of an etched circuit board which holds most of the circuit components. The design is such that an individual hole is provided in the board for each component lead, thus minimizing the possibility of wiring errors. Power for the unit is obtained from the transmitter.

Either a crystal or high-impedance dynamic microphone can be used with the SM-90. The speech-amplifier portion of the circuit uses a 12AX7 as a two-stage resistance-coupled amplifier followed by one triode of a 12AU7. Output from the latter is transformer coupled to the second half of the tube, which operates as a Class A modulator when connected in series with the screen grid of the r.f. stage to be modulated. The unit is capable of 80 per cent modulation of the small r.f. tetrodes for which it was designed—about par for this type of modulation.

The SM-90 is manufactured by World Radio Labs Inc., Council Bluffs, Iowa.

— L. G. M.



The SM-90 screen modulator is designed to be plugged into the auxiliary socket on the back of the Globe Chief. An octal socket on the chassis wall provides connections for switching an antenna relay and for a push-to-talk system.

# Ten Watts Mobile for Twenty Bucks

## A Simple 3-Tube Rig for 75 Meters

BY PAUL L. WHITLOCK,\* K4ANU

**I**N THESE DAYS when the average mobile power on the low-frequency bands is 50 watts or more, it may seem foolish to suggest anything as little as 10 watts. But don't underestimate the capabilities of the little rig shown in the photographs. I have worked hams in Montgomery with Q5 reports, and Montgomery is 100 miles away. Granted that this may be the exception rather than the rule, there is still a great deal of fun to be had working over much shorter distances. There are many hams whose opportunity for mobile work is so occasional that an expensive, bulky installation would hardly be warranted. And remember, power economy in the transmitter is carried down the line, through the power supply, to the demand on the car battery.

### Circuit

The circuit, shown in Fig. 1, could hardly be less complicated. A 6C4 Pierce oscillator is capacitively coupled to a 6AQ5 final. The final is plate-screen modulated by another 6AQ5.

$T_1$  is a rather unique item made by Triad. The primary is in the form of an autotransformer with an impedance ratio of 5000 to 6750 ohms, and rated at a total of 100 ma. d.c. It matches the required load of 5000 ohms for the Class A 6AQ5 modulator and a Class C load of 6750 ohms (about 40 ma. at 250 volts for 10 watts input). The secondary is designed to feed a 4-ohm

\*4117 33rd Ave. North, Birmingham 7, Ala.

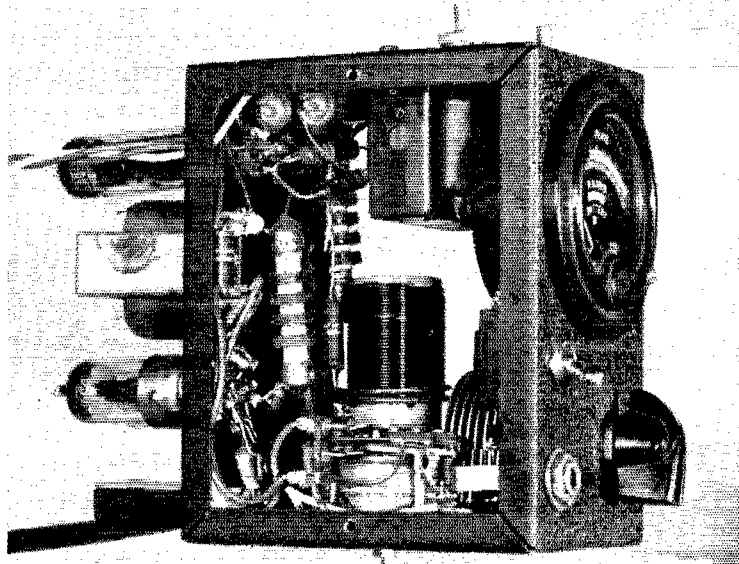
• Here is a simple little 80-meter mobile rig that has given a good account of itself. The complete unit, including modulator, operates from a 260-volt, 100-ma. supply.

speaker voice coil so that the modulator can be used for p.a. work should the occasion arise. This could be a handy arrangement in an emergency.

Microphone voltage is obtained from the drop across a portion of the modulator cathode resistor. The Triad A-5X microphone transformer was chosen not only for its small dimensions, but also because its frequency response is limited chiefly to the most useful speech frequencies—300 to 3000 cycles.

### Construction

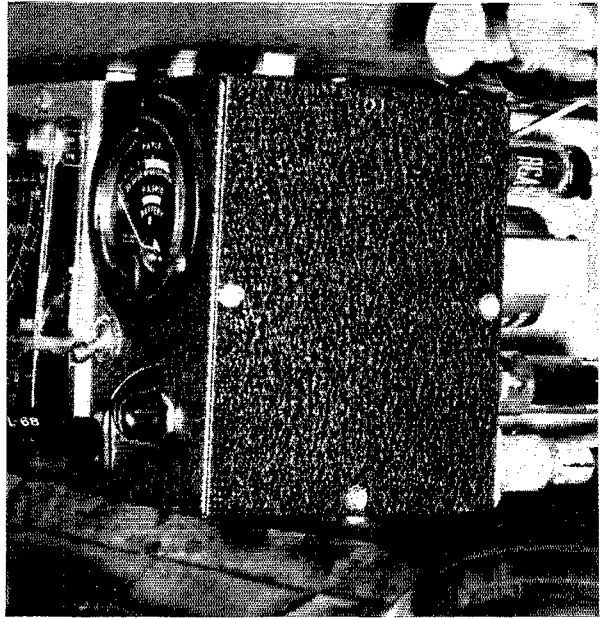
Most of the constructional details will be clear from the photographs. The unit uses a  $3 \times 4 \times 5$ -inch utility box as a foundation. The  $2\frac{1}{2}$ -inch milliammeter, amplifier plate tank tuning capacitor, filament switch, and microphone jack occupy the front panel. The three tubes, crystal socket, coax output connector, and modulator transformer are mounted off the back of the box. The output tank coil is wound on a Millen 1-inch plug-in coil form. The 4-prong socket for the coil is a ring-mounting type tube socket which has



◆  
This view shows the change-over relay mounted alongside the output tank coil and capacitor. The resistors and capacitors at the upper left are  $R_5$ ,  $R_6$ ,  $C_6$  and  $C_7$  in the modulator circuit.  $RFC_1$  is wired between an insulated tie point and the 6C4 socket. The resistor to the left of the choke is  $R_2$ .  
◆



The 10-watt 75-meter mobile transmitter is fastened under the instrument panel by means of bolts through holes drilled in the top of the transmitter box.



been mounted with a machine screw through a hole drilled at its center. A spacer elevates the socket to clear the terminals. The socket is placed immediately to the rear of the tank tuning capacitor. The socket isn't really necessary; a similar coil form without pins could be mounted directly on a spacer, of course.

A double-pole antenna/power change-over

relay,  $K_1$ , is mounted in the space left alongside the tank coil and capacitor. One pole switches the coax line to the antenna, while the other one may be used to switch power between transmitter and receiver or to turn a transmitter supply on and off. The relay used here is a standard 6-volt a.c. relay with a 20-ohm coil. It is actuated by the push-to-talk switch on the T-17 microphone.

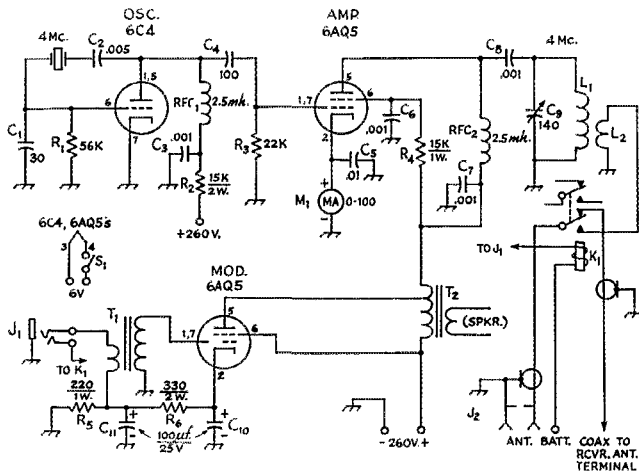


Fig. 1 — Circuit diagram of the 10-watt 75-meter mobile transmitter. All resistors are  $\frac{1}{2}$  watt unless otherwise specified. All capacitances less than 0.001  $\mu\text{f}$ . are in  $\mu\text{f}$ . Polarized capacitors are electrolytic; other fixed capacitors may be ceramic or mica.

$C_1 - C_8$  — Ceramic or mica.

$C_9$  — 140- $\mu\text{f}$ . midget variable (Hammarlund MC-140-S or similar).

$C_{10}, C_{11}$  — Electrolytic.

$J_1$  — Open-circuit jack.

$J_2$  — Coaxial receptacle (SO-239).

$K_1$  — See text.

$L_1$  — 32 turns No. 20 enam., 1-inch diam., close-wound.

$L_2$  — 2 turns insulated hook-up wire over ground end of

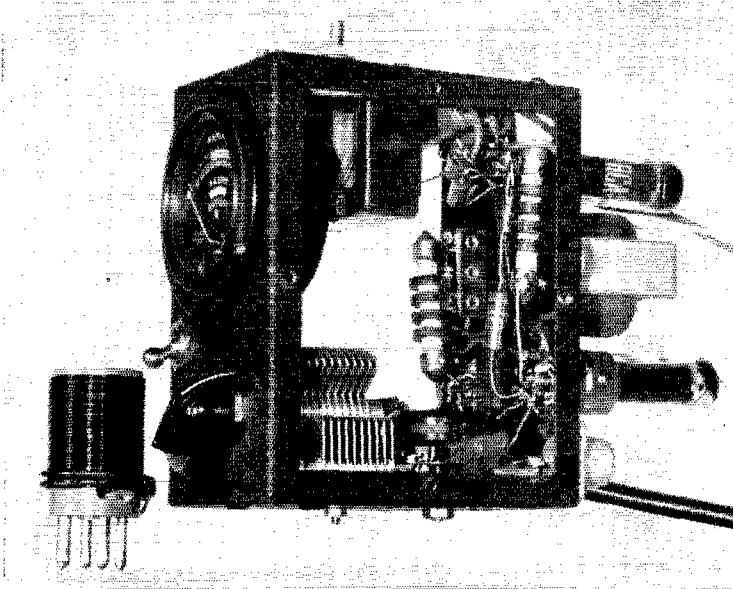
$L_1$ .

$R_1 - R_6$  — See above.

$S_1$  — S.p.s.t. toggle.

$T_1$  — Microphone transformer, single-button carbon (Triad A-5X).

$T_2$  — Combination modulation and speaker output transformer — see text (Triad M-4Z).



◆

The amplifier tank coil has been removed in this view to obtain an unobstructed view of the components on the rear wall of the box.  $RFC_2$  is mounted on a small cone insulator at the upper right. The two resistors immediately below the choke are  $R_4$  to the left and  $R_3$  against the rear wall. The two mica capacitors near the coil socket are  $C_6$  below and  $C_5$  above. Suspended from the top wall of the box is the microphone transformer. The mounting tabs may have to be trimmed with tin shears, so that the transformer will fit inside the box.

◆

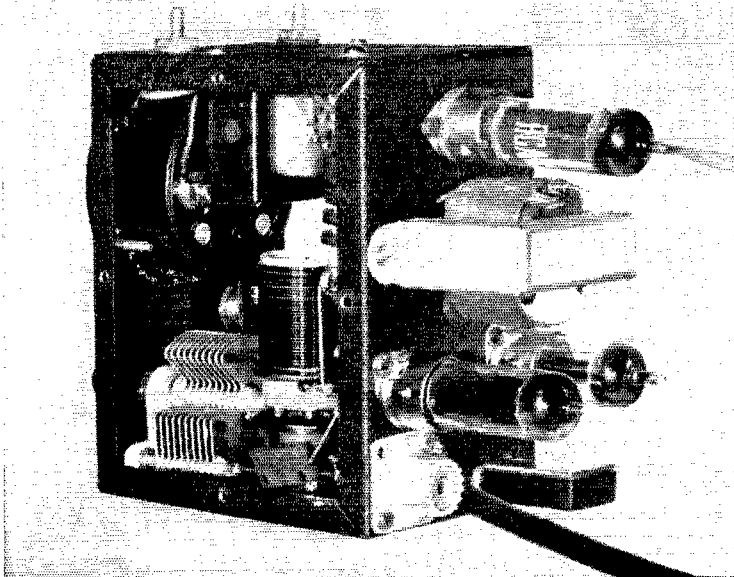
The microphone transformer is suspended from the top of the box. Small components are grouped around the tube sockets with which they are associated.

#### Power Supply and Adjustment

For an input of 10 watts to the final, a power supply delivering 260 volts at 100 ma. will supply both r.f. and audio sections. The most-common types of vibrator supplies will meet these requirements. The power unit of the ordinary car radio will furnish enough power for an input of about 4 watts to the final. If the car radio has a push-pull output stage, its supply ought to have enough output to run the final at almost the full

10-watt input. In either event, the receiver supply must be switched, of course, since the receiver power units will not handle both receiver and transmitter simultaneously.

So far as the adjustment of the transmitter is concerned, there is only one control—the one resonating the amplifier tank for plate-current dip. Adjustment of the antenna is discussed in the *ARRL Handbook*. The coupling should be adjusted so that the final draws about 40 ma. at 260 volts for 10 watts input. With the final fully loaded, grid current should run about 3 ma. A high-resistance voltmeter with an r.f. choke in its negative lead should read 60 volts or more across the 22K amplifier grid leak.



◆

Rear view showing the mounting of the components at the rear of the box. The tube above the modulation transformer is the 6AQ5 modulator. Below are the 6AQ5 r.f. amplifier to the left, and the 6C1 oscillator to the right. This view also shows the studs for fastening the unit to the instrument panel.

◆

# A Novice Three-Band Antenna System

Paralleled Dipoles for 80, 40 and 15

BY LEWIS G. McCOY,\* W1ICP

THE PARALLELED-DIPOLES antenna system<sup>†</sup> has several features that makes it of particular interest to the Novice. First, and probably most important to the beginner, it is a very simple antenna to build and no adjustments of the system are necessary to make it work. Another advantage of the system is the use of coax feed line. When coax line is used there is no problem of insulating the feed line from walls or gutter pipes. Practically all commercial and kit transmitters these days are designed to work into coaxial line. Last, and certainly quite important, the antenna will produce contacts.

The antenna system is shown in Fig. 1 at A. It consists of two half-wave dipoles, one for 80

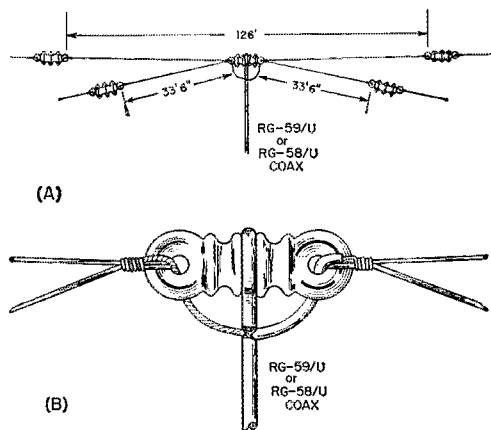


Fig. 1—(A) A sketch of the antenna system. (B) The method for connecting the coax to the center of the antenna. The coax should be wound over the insulator and taped. This will take the strain off the feed line. The leads from the skinned-back portion should be long enough to provide drip loops.

meters and the other for 40, both fed at the center with coax cable. When used on 15, the 40-meter antenna becomes a  $1\frac{1}{2}$ -wave-length center-fed antenna. The impedance of the antenna on the three bands is close to 70 ohms. This value will vary for different heights but will still be close enough so that either 50- or 75-ohm coax can be used for a feed line.

If the builder is not interested in 80-meter operation, the 80-meter antenna can be eliminated and the system can be used on 40 and 15.

Apparently many amateurs have little or no knowledge about the directivity characteristics of an antenna. If one is going to put up an antenna he naturally will want to orient it in such a

• Here is an antenna for the Novice that has many desirable features. It is easy to build and install, the feed line can be any length you want to make it, and the one antenna will serve on three Novice bands.

manner that it will do the most good for him. To give the reader just a taste of this fascinating facet of amateur radio we are showing the horizontal patterns of a half-wave antenna and of one that is  $1\frac{1}{2}$  wave lengths long. This is what you can expect when using the 40-meter dipole on 40 and 15.

Fig. 2 shows the radiation patterns for half-wave and  $1\frac{1}{2}$  wave length antennas for several vertical angles of radiation. Since the antenna described here is an active half wave length at 3.7 and 7.1 Mc., and a  $1\frac{1}{2}$  wave length antenna at 21 Mc., Fig. 2A will apply on the two lower bands and Fig. 2B will be representative on 15 meters. On the lower bands, the antenna coverage will be close to that indicated by the 30-degree pattern of Fig. 2A, while on 15 meters the 15-degree pattern of Fig. 2B, or even the 9-degree pattern, shows what can be expected. While a thorough explanation of these patterns is beyond the scope of this article, the patterns indicate that major radiation from the antenna is at right angles to the wire on the 3.7- and 7.1-Mc. bands and more nearly a fancy "X" on 21 Mc. Because the patterns are different on different bands, it will pay to do a little planning ahead of time if one has a choice of several antenna locations. For a more complete explanation, the reader is referred to the ARRL *Antenna Book*.

## Construction

The antenna can be constructed from any copper or copper-clad wire that is strong enough to support itself. Either No. 12 or 14 copper wire will be adequate. Another wire that is readily available is electric fence wire. This is a copper-clad steel wire that is very strong yet relatively inexpensive. As can be seen in Fig. 1 at A the over-all length of the 80-meter antenna is 126 feet. The 40-meter antenna is 67 feet. The method of connecting the coax at the center insulator to the two antennas is shown at B. The coax is looped around the insulator and taped to provide sufficient strength to support the feed line.

Probably the most important thing about the antenna is that it should be placed as high as possible. Sixty feet above ground is an ideal height for the antenna if it can be managed. Unfortunately, many of us are in no position to

\* Technical Assistant, QST.

† Berg, "Multiband Operation with Paralleled Dipoles," QST, July, 1956.

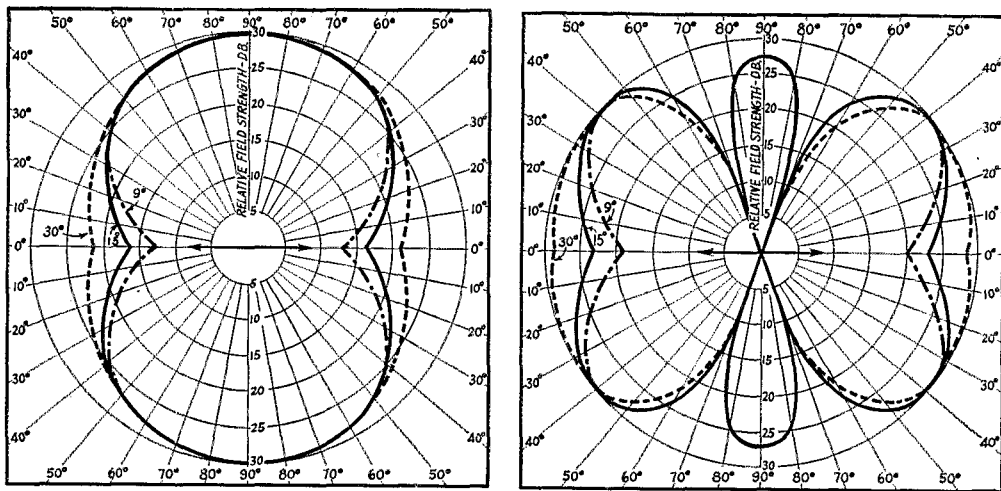


Fig. 2 — (A) Radiation pattern of a half-wave antenna at several vertical angles. The arrows at the center indicate the direction of the antenna wire. (B) The pattern of a  $1\frac{1}{2}$ -wavelength antenna.

put up 60-foot towers or use trees of that height. However, it should be possible to get the antenna up 40 feet with the use of A frames or guyed poles. Details on constructing supporting structures are given in the *Antenna Book* and the *Radio Amateur's Handbook*.

The two antennas are shown separated in the drawing at Fig. 1A, with the 40-meter antenna slightly lower at the ends than the 80-meter job. The spacing between the two antennas is not critical as long as they don't touch each other. In fact, if the builder desires, the two antennas can be run parallel if insulating spreaders are used between them.

### Connecting to the Transmitter

Fig. 3 shows the arrangement for connecting the antenna system to the transmitter and receiver. Either a coax relay or a switch should be

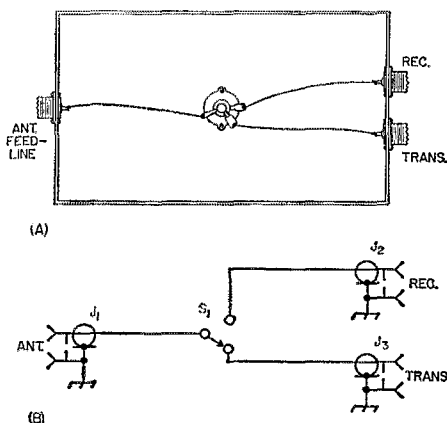


Fig. 3 — (A) Sketch of the antenna switching unit. (B) The circuit diagram of the antenna switch. J1, J2, J3 — Coax chassis receptacle (SO-239, or RCA type phono jack). S1 — One-pole 6-position (only 2 positions used) ceramic wafer switch (Centralab 2501).

used to switch the antenna to the transmitter or receiver. It isn't very smart to put up a good transmitting antenna and then not use it for receiving. As pointed out earlier, different antennas have different patterns. The amateur who uses separate antennas for receiving and transmitting often handicaps himself.

Coax relays are expensive, but a very effective switch can be made for coax by using a 1-pole, 2-position ceramic wafer switch. Fig. 3 shows the circuit and a drawing of the switch mounted in a metal box. As one can see from the circuit, the system is very simple. The antenna feed line plugs into the fitting on the side of the box, using either coax fittings or RCA type phono jacks and plugs for connectors. The inner conductor is connected to the arm or pole of  $S_1$  with a short piece of hook-up wire. One contact of the switch is connected to the receiver fitting and the other contact is connected to the transmitter fitting. Short lengths of coax cable are used to connect the switch box to the receiver and transmitter.

If desired, a multiple-pole switch can be used at  $S_1$  to also turn the transmitter on and switch the receiver to stand-by.

It should be pointed out that with this antenna or, for that matter, with *any* multiband antenna, precautions should be taken to prevent harmonic radiation. This is particularly true of Novice operation in the 80-meter band. A goodly number of hams have found that their second harmonics from 80-meter operation have caused interference to commercial services outside the high end of the 40-meter band. The author wrote an article<sup>2</sup> on this subject and described the construction of an inexpensive filter that will cure the trouble. It is recommended that the 80-meter operator follow the procedures outlined in the article to prevent harmonic radiation, unless he likes to collect FCC Forms 793.

<sup>2</sup> McCoy, "Eliminating 80-Meter Novice Harmonics," *QST*, July 1956.

# Transistor Operating Characteristics

## General Circuit Considerations

BY H. F. PRIEBE, JR.,\* W2TGP

NOW THAT THE PRICE of many types of transistors is within the reach of most radio enthusiasts, more and more electronic equipment will make use of this mighty midget. The mere construction of equipment utilizing transistors requires very little knowledge of the transistor, but certainly a general understanding of just what to expect is more than helpful. The following material, then, is directed to just this end—to discuss in general terms some of the properties of the grown-junction germanium

• Some facts about transistor operation in relation to circuit design.

high and is usually greater than 0.4 megohm. The common-base current-multiplication ratio  $\alpha$  is usually between 0.95 and 0.995.

### Variations in Characteristics

For equivalent circuits to be valid they must be representative of all the units likely to be encountered. Most of the transistor's equivalent circuits meet this requirement reasonably well, but typical parameter values are usually specified rather than exact values because of variations. The four main causes for such variations are operating point, temperature, frequency, and manufacture. The most troublesome variations in the past have been those that occur from one unit to another during normal production.

The effect of parameter variations on the circuit performance can be estimated from the equations listed in Table I, where the approximate equations for some of the more important transistor circuit characteristics are given. The list includes equations for the three basic circuit connections: common base, common emitter, and common collector. A greater portion of present-day circuits employ the transistor in the common-emitter connection, and of the parameters considered the variations in  $\alpha$  will have the greatest effect.<sup>1</sup> For example, in the common-

<sup>1</sup> See *The Radio Amateur's Handbook*, 1956 edition, Chapter 4, for definitions of transistor constants. — Ed.

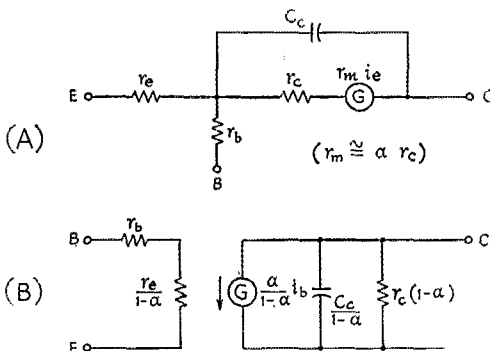


Fig. 1—A—Common-base low-frequency equivalent circuit. B—Common-emitter current-generator equivalent circuit.

transistor. With this background one will have a better appreciation of transistorized equipment, and also will be better equipped to delve into more exact design formulas.

An often-used form of the transistor's several equivalent circuits is the one shown in Fig. 1A. It is the common-base (sometimes referred to as "grounded-base") low-frequency equivalent circuit, and is used quite frequently in relating the transistor's parameters or characteristics. Typical values for the parameters, at 25° centigrade, for most grown-junction germanium transistors are as follows:

The emitter resistance,  $r_e$ , is approximately 25 ohms with 1 milliamperes emitter current. The emitter resistance varies with the emitter current and is approximately equal to  $25/I$  where  $I$  is the emitter current in milliamperes. The base resistance,  $r_b$ , might be anywhere between 25 and 1000 ohms; the ideal is, of course, minimum resistance. The collector resistance,  $r_c$ , is rather

Characteristic	Common Base	Common Emitter	Common Collector
Short Circuit Current Transmission	$\alpha$	$\frac{-\alpha}{1-\alpha}$	$\frac{1}{1-\alpha}$
Frequency Cutoff	$f_{\alpha 0}$	$(1-\alpha_0)f_{\alpha 0}$	$(1-\alpha_0)/\alpha_0$
Phase	In phase	Reversal	In phase
Input Impedance	$r_e + r_b(1-\alpha)$	$r_b + \frac{r_e}{1-\alpha}$	$r_b + \frac{R_L + r_e}{1-\alpha}$
Output Impedance	$Z_c$	$Z_c(1-\alpha)$	$R_G(1-\alpha)$

$\alpha_0 = \alpha$  at low frequencies.  
 $f_{\alpha 0}$  = Frequency at which  $\alpha$  is reduced by 3 db.  
 $R_L$  = Load resistance.  
 $R_G$  = Source resistance.  
 $Z_c$  = Collector impedance.

\* 192 Mills St., Morristown, N. J.

emitter connection an  $\alpha$  of 0.95 gives a short-circuit current transmission ratio of 19 and an  $\alpha$  of 0.99 gives a ratio of 99.

Most manufacturers of transistors are presently classifying transistors into groups so that units of a given designation are more nearly similar in characteristics. This has been a welcomed step and has been most helpful to the circuit designer. The variations from the other three sources still plague the circuit designer; probably the most troublesome is the variation of collector current with the emitter circuit open (commonly designated  $I_{co}$ ), which may be as great as 1000 per cent when going from one temperature extreme to the other. This property is treated in a typical example a few paragraphs later on.

### Effect of Driving and Load Impedances

In the following discussion and examples a typical transistor is assumed and its characteristics are listed in Table II.

**TABLE II**  
Typical Transistor

$r_e = 25$  ohms  
 $r_b = 200$  ohms  
 $r_c = 1$  megohm  
 $\alpha = 0.98$ ;  $(1 - \alpha) = 0.02$   
 $f\alpha_c = 1$  Mc.  
 $I_{co} = 5\mu a.$  at 25° centigrade

A noticeable characteristic of the transistor is its bilaterality — that is, its ability to amplify in both directions. Stemming from this characteristic is the fact that the input driving impedance has an effect on the output impedance and, conversely, the output load impedance has an effect on the input impedance. The limits of these impedance variations, for the typical transistor listed in Table II, are shown in Table III for the three basic connections. With the common-base connection, varying the output load from zero to infinity causes the input impedance to go from 29 to 226 ohms. With the common-collector connection the same  $R_L$  variation causes the input impedance to go from 1450 ohms to one megohm. For these two connections increasing the output load impedance also increases the input impedance. Using the common-emitter connection, the input impedance goes from 1450 ohms to 226 ohms when the output impedance is varied from zero to infinity.

Variation of the input driving impedance has a similar effect on the output impedance. With the common-collector and common-base circuits, an increase in driving impedance shows an increase in output impedance. The opposite is true for the common emitter; as the driving impedance increases the output impedance decreases.

### Operating Values

To show the nature of the input and output impedances of the transistor, fixed values of  $R_G$  and  $R_L$  of 1000 ohms and 20,000 ohms, respectively, are often used. These are practical and typical impedance values obtained from available interstage transformers. Fig. 2 shows the relative performance of the typical transistor in the three basic connections. Current gain, input resistance, and output resistance are shown.

The current gains for the common emitter and common collector are about the same. The current gain of the common base is approximately equal to  $\alpha$ ; since this is less than 1, one might ask, "How is amplification achieved?" This is brought about by the large difference between the input and output impedances. In an extreme case this difference might be as great as a million to one; for the example shown, the impedance ratio is several thousand to one. The circuit characteristics of the three connections show the common emitter to be the most desirable because the input and output resistances are easily realizable and the phase reversal is helpful in many applications. The common-emitter connection is the most widely used; consequently, most of the following discussion will be on the transistor so connected. The common-emitter current-generator equivalent circuit is shown in Fig. 1B.

### Gain vs. Emitter Current

Variations in operating point have much to do with the over-all performance. One of the most important factors is the emitter current,  $I_e$ . For a given set of conditions the gain of a

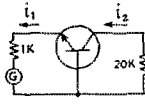
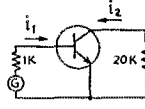
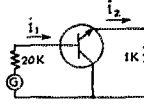
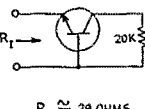
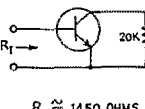
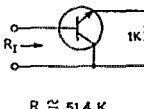
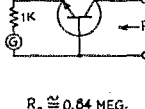
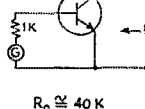
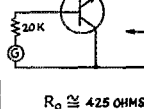
COMMON BASE	COMMON EMITTER	COMMON COLLECTOR
 <p><math>\frac{i_2}{i_1} \approx .96</math></p>	 <p><math>\frac{i_2}{i_1} \approx 24.5</math></p>	 <p><math>\frac{i_2}{i_1} \approx 25</math></p>
 <p><math>R_T \approx 29</math> OHMS</p>	 <p><math>R_T \approx 1450</math> OHMS</p>	 <p><math>R_T \approx 51.4</math> K</p>
 <p><math>R_o \approx 0.64</math> MEG.</p>	 <p><math>R_o \approx 40</math> K</p>	 <p><math>R_o \approx 425</math> OHMS</p>

Fig. 2 — The three circuits and a comparison of typical transistor characteristics in them, using representative values for driving-source resistance and load resistance.

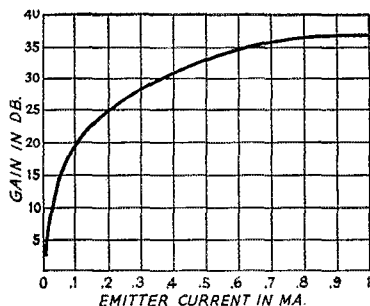
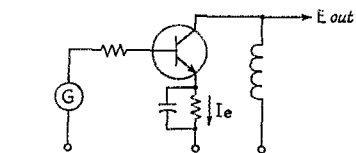


Fig. 3—Power gain of a common-emitter stage as a function of emitter current.

single common-emitter stage is plotted against emitter current in Fig. 3. It shows that for values of emitter current below 0.3 to 0.5 milliamperes the gain is reduced appreciably. The circuit designer then must weigh the power saving against the loss in gain. For most applications the emitter current will be greater than 0.33 milliamperes.

#### Effect of $I_{co}$

The collector current with emitter open ( $I_{co}$ ) is another of the more important characteristics of the transistor. It might be said that the current-amplification ratio,  $\alpha$ , makes the transistor and the presence and nature of  $I_{co}$  tend to destroy the transistor. The effect of  $I_{co}$  is twofold. One, it flows through the collector load where it is not

only a useless but sometimes a troublesome addition to the collector current. Two, if there exists sufficient d.c. resistance in the base circuit, as with some of the common-emitter and common-collector stages,  $I_{co}$  flows through the base-emitter path in the transistor and is amplified in the same way as normal base current. The collector current contributed by  $I_{co}$  is then  $I_{co}$  (or some part of  $I_{co}$ ) times the current amplification of the stage, which is in the order of  $1/(1-\alpha)$ .

A simple example will show how troublesome  $I_{co}$  can become in a stage not designed to withstand any variation in  $I_{co}$ . Consider the circuit shown in Fig. 4. Only the d.c. operating paths

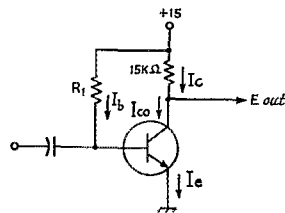


Fig. 4—Transistor amplifier with fixed bias, no stabilization.

$$I_c = \frac{I_{co}}{1-\alpha} + \frac{\alpha}{1-\alpha} I_b$$

are considered. It is desired to have  $E_{out}$  swing the full supply voltage of 15 volts. Using the parameters listed for the typical transistor (Table II) we select  $R_1$  so that  $E_{out}$  (with no signal in) is 7.5 volts. Thus

$$I_c = \frac{7.5}{15K} = 0.5 \text{ ma.}$$

and

$$I_b = \frac{I_c(1-\alpha) - I_{co}}{\alpha} = 5.1 \mu\text{a.}$$

$$R_1 = \frac{15}{5.1} = 2.94 \text{ megohms.}$$

If the temperature were to increase approximately  $10^\circ$  centigrade, thus increasing  $I_{co}$  by a factor of 2, we have the following:

$$I_c = \frac{I_{co}}{1-\alpha} + \frac{\alpha}{1-\alpha} I_b$$

$$I_c = \frac{10}{.02} + (49 \times 5.1) = 749.9 \mu\text{a.}$$

and  $E_{out} = 15 - (I_c \times 15K)$   
 $E_{out} = 3.75 \text{ volts.}$

The available output voltage has been reduced to one half that of the desired value. From this example it is obvious that this method of biasing a transistor is not very practical.

Fig. 5 shows a stage connected to perform the same operation as in the previous example. Here the collector current with emitter open,  $I_{co}$ , flows through the low-resistance d.c. path provided by the coupling transformer. The collector current remains nearly constant with changes in  $I_{co}$ , for it is now  $\alpha I_e + I_{co}$  and  $I_{co}$  is the only variable. For large values of  $I_{co}$ , when  $I_{co}$  is greater than  $I_b$ , the net current entering the base of the transistor is negative; that is,

TABLE III Input Impedance			
	Circuit	$R_L = 0$	$R_L = \infty$
$R_{in}$	Common Base	29 ohms	226 ohms
	Common Emitter	1450 ohms	226 ohms
	Common Collector	1450 ohms	1 megohm
Output Impedance			
	Circuit	$R_G = 0$	$R_G = \infty$
$R_{out}$	Common Base	0.89 megohm	1 megohm
	Common Emitter	0.12 megohm	0.02 megohm
	Common Collector	29 ohms	0.02 megohm

instead of the voltage source  $V_b$ , supplying current, it must accept current. The stabilization of the collector current then is dependent on the ratio of resistance in the emitter circuit to the resistance in the base circuit. The greater the ratio the better the collector current stability.

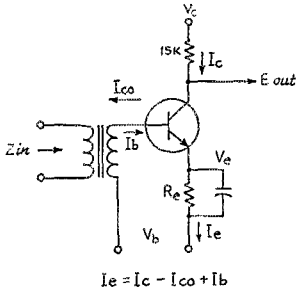


Fig. 5—Transistor amplifier with bias stabilization.

The power expended in the emitter resistance  $R_e$  decreases the over-all efficiency of the stage. The circuit designer must weigh the additional power requirements against the improved temperature performance.

#### Effect of Frequency

The frequency at which a transistor is operated has much to do with its relative performance. The transistor is, in its present form, a relatively low-frequency device. Most presently available transistors are useful only in the audio-frequency range. Some of the available units will work at frequencies through the standard a.m. broadcast range. The gain of a common-emitter stage is plotted vs. frequency in Fig. 6, using the typical transistor of Table II. Notice

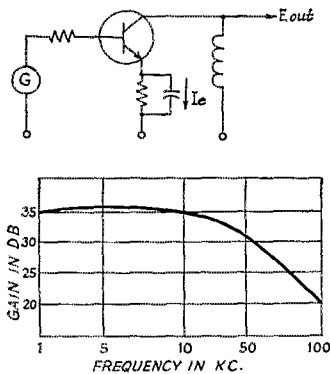


Fig. 6—Gain of a common-emitter stage vs. frequency, for the junction transistor listed in Table II.

the relatively low frequency at which the gain starts to drop. The collector capacitance, base resistance and the nature of  $\alpha$  are the main contributing factors to this poor high-frequency operation.

#### Noise Figure

Transistor noise has been a limiting factor in low-level, low-frequency applications of the

transistor. The smallest signal that can be amplified usefully is determined by the noise generated by the transistor. The noise figure is the ratio of total noise to that portion of the noise arising in the signal-source resistance. The noise figure of present junction transistors averages 15 to 20 db.; this is continually being improved, and a few low-noise types (about 6 db.) are available.

Transistor noise at low frequencies varies approximately inversely with frequency, thus limiting low-frequency and d.c. applications. Transistor noise increases with increasing collector voltage as well as with increasing emitter current; it is at its lowest in the region of 1 to 2 collector volts and less than 1 ma. emitter current.

#### Summary

Summarizing the material presented, we can say the following about transistor circuits:

The circuit must accommodate a wide variation in transistors; the four factors contributing to this are temperature, operating point, frequency, and manufacture.

The transistor is very temperature sensitive; consequently, the temperature range that germanium transistors can operate over is not nearly as great as might be desired, and the circuit configuration is greatly affected by the temperature requirements.

The use of transformers for interstage coupling is desirable for current stabilization and impedance matching.

The gain of a transistor stage varies considerably with emitter current in the region below 0.5 ma., and a minimum value, without sacrificing too much gain, is 0.3 ma.

The transistor at present is a relatively low-frequency device. The nature of  $\alpha$ , collector capacitance and base resistance are mainly responsible for this.

Transistor noise is not as low as desired, but the selection of low-noise units will provide for the few low-noise applications.

## Strays

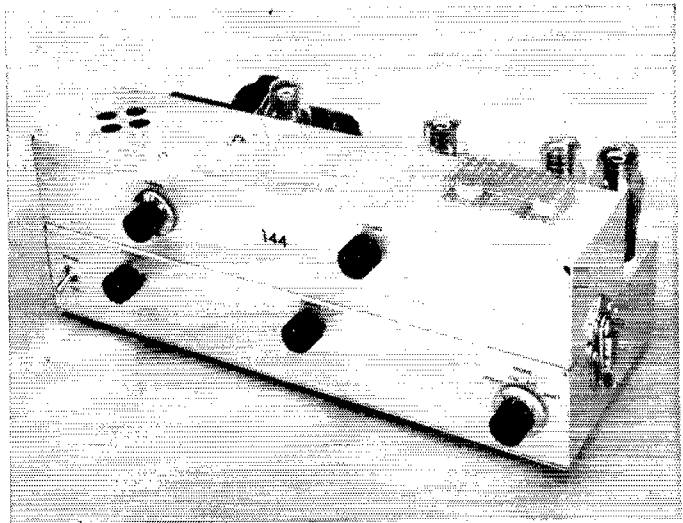
W3FIQ recently had an antenna-raising party and used the hydraulic bed of a dump truck to furnish the lifting power for the complete tower and antenna assembly. This enabled W3TMK, W3FAS, WN3LBY, WN3HLM, W3ALD and others to devote their entire time to supervision!

W2RG recently worked ZS6TR on 7002 without prearrangement, thus making it apparently the first bona fide trans-Atlantic QSO using transistors and without first using a high-power rig to establish contact. With a miles-per-watt figure of about 37,000, this seems to be a new record for 7 Mc.

GL 7373 is the phone number for W7BA. He says the GL stands for "good luck."



◆  
 The 4X250B v.h.f. amplifier. Removable coaxial-line tank circuits allow efficient operation on 144, 220 or 432 Mc.  
 ◆



## Using the 4X250B on 144, 220, and 432 Mc.

*A Two-Band Grid Circuit and Plug-In Plate Tanks — V.H.F. Style*

BY MASON P. SOUTHWORTH,\* W1VLH

◆ Here is a description of the amplifier that attracted so much attention when it appeared on the cover of November *QST*. It takes 500 watts input on c.w. or 300 watts phone on 144 and 220 Mc., with efficiency that you'd expect on 3.5 Mc. Operated as a frequency multiplier, it delivers a potent signal on 432 Mc. as well. If you have a small phone rig for 144 or 220 Mc., use it ahead of this 4X250B job running as a Class AB<sub>1</sub> linear amplifier, and get a 100-watt carrier with no driving power!

NO UP-AND-COMING v.h.f. enthusiast would deny that the tube designers and manufacturers have contributed a great deal to his enjoyment of ham radio in recent years. A good example of this is the new 4X250B coaxial tetrode. Here is a tube which provides the high efficiency and low drive requirements that 2-meter-and-down transmitter constructors have been after for years. It is somewhat high priced, to be sure, but in the final analysis, when watts output for dollars input are considered, the overall transmitter cost is much more favorable than it at first appears.

The transmitter described in this article makes the most of the 4X250B's capabilities, pretty well compensating for its one disadvantage — price. This is accomplished by making the rig

\* ARRL-IGY Project Coordinator.

work on all three of the popular amateur bands above 100 Mc. Thus the design should appeal to many fellows who would hesitate to make the investment for one band only.

Little or nothing is sacrificed to obtain this wide frequency coverage. The two-band grid circuit covers the 144- and 220-Mc. ranges simultaneously, with coupling efficiencies about equal to conventional tanks. The plate circuits are plug-in affairs, with separate coaxial lines for 144, 220 and 432 Mc. which fasten easily in place. Operation on 432 Mc. involves tripling from 144 Mc. or doubling from 216 Mc., the latter arrangement being somewhat more efficient.

The amplifier takes 500 watts input on c.w. or 300 watts with plate-modulated telephony on either 144 or 220 Mc., with an efficiency of 70 to 80 per cent. It delivers as much power to the antenna as many conventional v.h.f. finals running nearly a full kilowatt. Operating as a frequency multiplier, and within the 50-watt maximum input rule, about 20 watts is delivered to the transmission line on 432 Mc., quite a respectable signal on this band.

Last, but by no means least, on the list of possibilities for this transmitter is operation as a Class AB<sub>1</sub> linear amplifier, as described in December *QST*, page 28. Although linear amplifiers for a.m. service have their disadvantages, as pointed out by W1DF,<sup>1</sup> this one has much to recommend it, particularly for the fellow who already has a small phone rig for 144 or

<sup>1</sup> Grammer, "Linear Amplifiers for A.M.," *QST*, February, 1956.

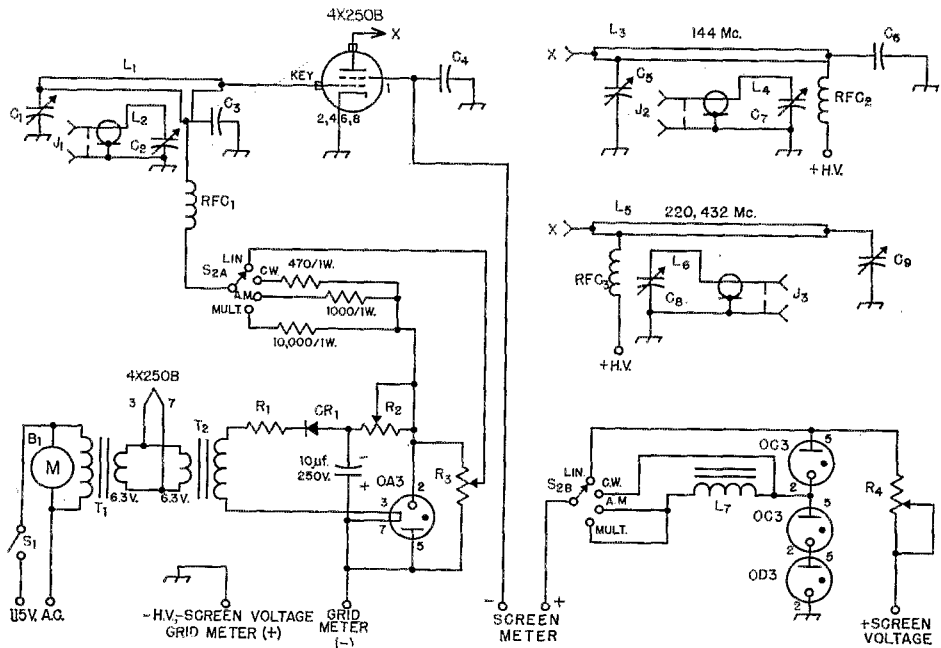


Fig. 1 — Schematic diagram of the 4X250B amplifier.

- C<sub>1</sub> — 15- $\mu$ f. variable (Hammarlund HF-15).
- C<sub>2</sub>, C<sub>7</sub> — 35- $\mu$ f. variable (Hammarlund HF-35).
- C<sub>3</sub> — 500- $\mu$ f. button bypass.
- C<sub>4</sub> — By-pass capacitor built into Eimac 4X150A/410 socket.
- C<sub>5</sub>, C<sub>6</sub> — Disk-type capacitor (Millen 15011). See text for modification.
- C<sub>6</sub> — Teflon dielectric flat-plate by-pass capacitor. See text.
- C<sub>8</sub> — 220 Mc.: 35- $\mu$ f. variable (Hammarlund HF-35). 432 Mc.: 20- $\mu$ f. miniature variable (Hammarlund MAC-20).
- CR<sub>1</sub> — 65-ma. selenium rectifier (Federal 1002A).
- J<sub>1</sub>, J<sub>2</sub>, J<sub>3</sub> — Coaxial chassis connector (Amphenol 83-1R).
- L<sub>1</sub> — See text and Fig. 2.
- L<sub>2</sub>, L<sub>4</sub>, L<sub>5</sub> — Coupling link made with No. 18 tinned wire. See text.
- L<sub>3</sub>, L<sub>5</sub> —  $\frac{5}{8}$ -inch o.d. copper tubing plate line. See text.

- L<sub>7</sub> — Audio choke, 5-10 henrys, 50 ma. (Thoradson 20C59 used).
- M — Blower unit, about 10 c.f.m. (Ripley, Inc., Middletown, Conn., Model 8438).
- R<sub>1</sub> — 100-ohm, 1 watt.
- R<sub>2</sub> — 2500-ohm, 10-watt adjustable.
- R<sub>3</sub> — 25,000-ohm, 4-watt wire-wound potentiometer.
- R<sub>4</sub> — 5000-ohm, 25-watt adjustable.
- RFC<sub>1</sub> — 10 turns No. 18 enam.,  $\frac{3}{8}$ -inch diam., close-wound.
- RFC<sub>2</sub> — 1.8- $\mu$ h. v.h.f. solenoid choke (Ohmite Z-144).
- RFC<sub>3</sub> — 220 Mc.: 20 turns No. 18 enam.,  $\frac{3}{8}$ -inch diam., close-wound.
- 432 Mc.: Same as for 220 Mc., but 12 turns.
- S<sub>1</sub> — S.p.s.t. toggle.
- S<sub>2</sub> — 2-pole, 4-position rotary (Centralab 1405).
- T<sub>1</sub> — Filament transformer, 6.3 volts, 3 amp.
- T<sub>2</sub> — Filament transformer, 6.3 volts, 1 amp.

220. The 3 to 4 watts available from a Gonset Communicator or similar unit is far *too much* drive for this amplifier. You have to use an attenuator between the driver and the final! You don't get something for nothing, of course; the efficiency under carrier conditions is limited to about 35 per cent. This is still a 100-watt carrier, however, which is not to be sneezed at, especially when only negligible drive and audio power are required. And if you decide to go s.s.b., all you need is a receiving-tube heterodyning exciter and you'll be in business.

### Some Unusual Tank Circuits

Since it is mainly the tank circuits which make this amplifier different, most of our space is devoted to them. From the schematic diagram and Fig. 2, it may seem that the grid circuit

is unlike any you've encountered before. You have to break it down into parts to see the principles involved. First, think about the long strip of flashing copper which runs from the 4X250B grid connection to the stator terminal of the grid tuning capacitor. This is a half-wave tuned line for 220 Mc.

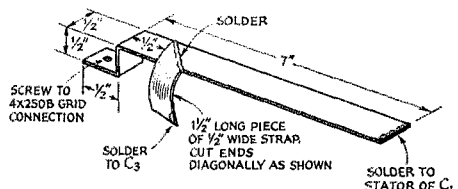


Fig. 2 — Details of the two-band grid circuit.

A half-wave plate line has a point of low r.f. voltage at its electrical midpoint. We can connect anything we please at this point without affecting the operation of the circuit. In this case we have connected a short strip of flashing copper to the low-voltage point, grounding the other end of the strip through a button by-pass capacitor,  $C_3$ . This forms a coil or loop of sorts, and it must have a new resonant frequency determined by the setting of  $C_1$ . This frequency is in the 144-Mc. range with the dimensions shown here.

Thus our grid circuit tunes two frequency ranges simultaneously, hitting both 144 and 220 Mc. at very nearly the same setting of the tuning capacitor. This could mean trouble if the bands were harmonically related, but since they are not it is very convenient. The grid return for the stage can be made to the by-passed point for either mode of operation. Coupling is by means of a hairpin loop with a series capacitor to tune out its reactance.

The plate circuits are coaxial lines built inside standard  $3 \times 4 \times 17$ -inch chassis, so that the chassis form the outer conductors of the line. This arrangement takes up a bit more space than absolutely necessary, but it saves a great deal of metal work. A quarter-wave line is used for 144 Mc., and half-wave lines for 220 and 432 Mc. Guide pins align them accurately, and "draw-bars"<sup>2</sup> hold them in place. Connections to the plate cap of the 4X250B are made with standard fuse clips. These can be adjusted to fit quite satisfactorily.

### Changing Operating Conditions

Since we have an amplifier that can be run Class C for c.w. or plate-modulated phone, Class AB<sub>1</sub> linear, and as a frequency multiplier, we need a way of conveniently switching the operating parameters of the tube to satisfy these various conditions. This is done with a mode switch and a built-in bias supply with variable output voltage.

The bias pack used requires only a small filament transformer wired back-to-back with the one supplying the 4X250B heater, a selenium rectifier, a VR tube, a potentiometer, and a couple of resistors and capacitors. The potenti-

ometer is used to set the bias to the proper value for linear amplifier operation. The mode switch selects either this value of fixed bias or the full output of the pack, plus the value of grid resistor to provide proper bias for Class C c.w., a.m., or frequency-multiplier operation.

The voltage applied to the screen must also be altered in changing modes. Here 250 volts is required for Class C amplifier conditions and for frequency multiplying. The required screen voltage for Class AB<sub>1</sub> service is 350. This must be well regulated for s.s.b., so VR tubes were used. With the VR tubes in the order shown, we switch from 250 to 350 volts with the mode switch. It is also possible to switch in an audio choke in the screen lead for plate modulation. Using VR tubes provides another convenience, even if you don't plan to use the rig as a linear. By adjusting  $R_4$ , the screen can be fed from any power supply available that delivers 400 to 500 volts. This supply need be rated at only 50 ma. so it could be built into the base of the rig if you so desire.

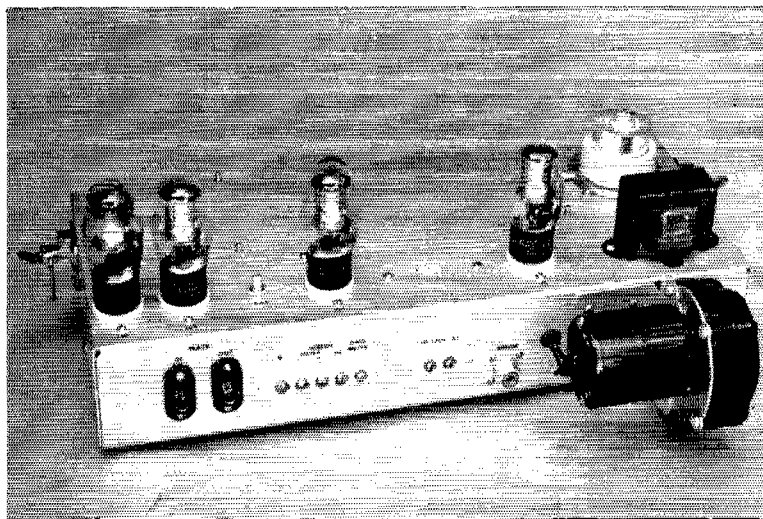
### The Base Unit

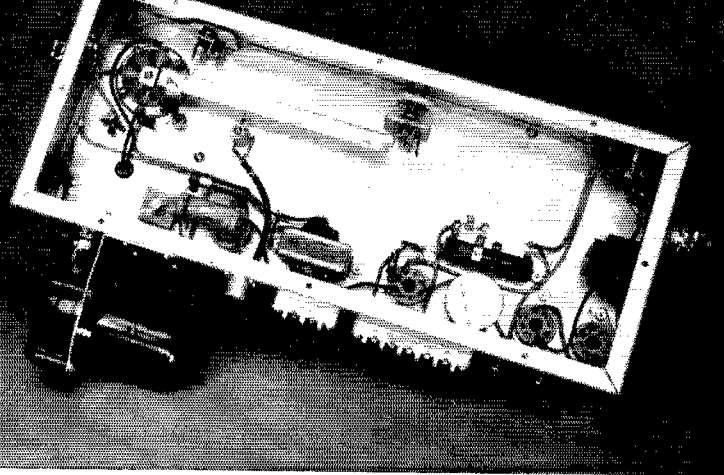
The base unit holds the 4X250B, its grid circuit, the bias supply components, and the blower for cooling the tube. With the tube mounted vertically as shown, the blower could be turned off with the plate voltage, according to the tube manufacturer, but it was allowed to run in this model. The chassis is 7 by 17 by 3 inches. It must be equipped with a bottom plate for proper operation of the blower system.

The controls on the front of the chassis are, left to right: the a.c. switch,  $S_1$ , for the filament transformer, bias supply, and blower; the input circuit reactance tuner-outer,  $C_2$ ; the grid tuning capacitor,  $C_1$ ; and the mode switch,  $S_2$ . This has positions for linear, c.w., a.m., and multiplier operation. The two capacitors are  $3\frac{1}{2}$  and  $9\frac{3}{8}$  inches from the left end of the chassis, respectively. Along the back are two high voltage terminals, strips for the various metering and supply leads, a coaxial connector for the r.f. input from the driver, and the blower. The latter is mounted on an aluminum right-angle bracket the size and shape of which will depend on the blower that you use. The one specified comes without any flange around the air outlet. We discovered that

<sup>2</sup> This is the term used by luggage store people to describe the snap catches used to hold the line assemblies in place.

Rear view of the amplifier, with the plate line assembly removed. VR tubes are for regulation of the bias and screen supplies. Note luggage catch at the left end. Two of these clamp the plate line in place.





Bottom view of the amplifier base unit, with cover removed. Two-band grid circuit is in the upper left of the picture.

it fits nicely over the shield base from a standard nine-pin miniature socket. This type flange doesn't provide mechanical support, but it does serve to make the air stream go where you want it.

On top of the chassis we see the 4X250B mounted 2 inches from the front edge and from one end, in the Eimac air-system socket designed for it. (The socket is a worthwhile investment; you might be able to make something that would work as well, but it wouldn't be easy.) On each end of the chassis are the drawbars which clamp the plate lines in place. These are standard luggage store items, and should be readily obtainable. Three of the four guide pins that position the plate line may be seen projecting through the chassis. These are 8-32 machine screws threaded into the main chassis from the bottom, so that they mate with matching holes drilled in the plate line chassis flanges.

Lined up along the rear edge of the chassis are the four VR tubes and the 4X250B filament transformer. Between the second and third VR tubes from the left in the rear view is the shaft of the potentiometer used for setting the Class AB<sub>1</sub> bias. The bias supply layout really doesn't matter much, but the VR tubes from left to right are the OD3, the two OC3s, and the OA3 bias regulator. They are spaced for access to the high-voltage and r.f. output terminals on all of the plate lines. These were located with short leads in mind rather than symmetry. Two high-voltage connectors on the rear of the main chassis avoid having to disturb one's power supply cabling when changing tank circuits. They are merely connected in parallel, with one serving as a permanent connection for the cable from the power supply. The other connects to a short patch cord which runs to a similar terminal on the plate line in use.

In the bottom view the tube socket is at the upper left. One version of this socket, the 4X150A/4010, has the cathode pins grounded, while the other, the 4X150A/4000, has not. If you use the 4000 as we did, terminals 2, 4, 6, and 8 must be connected with short leads to the socket shell. This was accomplished in our case by drilling and tapping the shell immediately

inside each pin, and fastening the pin to the shell with a 4-10 machine screw. If you do this, put a thin spacer between the pin and the shell, and don't drill the mounting flange by mistake, for this contains the screen bypass. A better method of grounding the cathode pins would be to get the 4010 socket in the first place.

The long strap which forms the half-wave line portion of the grid circuit is made from flashing copper,  $\frac{1}{2}$  by 8 inches. This is drilled  $\frac{1}{4}$  inch from the tube end for the screw which fastens it to the grid terminal. One-half inch from this same end the strap is bent up, and  $\frac{1}{2}$  inch further on it is bent flat again. It then runs over to the tuning capacitor where it is soldered to the nearest stator terminal. Note that this capacitor had to be mounted back slightly from the front of the chassis so as to meet the copper strap. This makes the use of a coupling and short extension shaft necessary. Even with the shallowest shaft coupling available, it was necessary to cut off some of the threaded portion of the bearing used where the shaft goes through the chassis.

The short strip of flashing copper is again  $\frac{1}{2}$  inch wide, but only 1 inch long. Its ends are cut off at an angle so that it contacts the other strap nearer the grid pin and the by-pass farther away from the socket. The point of connection to the first strap is about  $\frac{1}{2}$  inch from the second bend in it. The r.f. choke going to the bias supply is connected at the by-pass end of the short strap.

The link,  $L_2$ , is made from a piece of No. 18 wire about 5 inches long. The three-sided pickup portion located near the grid circuit is about  $1\frac{3}{4}$  inches long and  $\frac{3}{4}$  inch high. The remaining length is used for leads to  $C_2$  and to the ceramic insulator that serves as a tie point for the link and the coax going over to  $J_1$ . This link cannot be seen too well in the photograph, as it is mostly underneath the grid line.

Bias supply components are along the rear portion of the chassis. From left to right in the bottom view we see the selenium rectifier, the variable resistor,  $R_2$ , and the electrolytic capacitor (over the OA3 socket), the bias supply transformer, another VR tube socket with  $R_1$  near it, the potentiometer and  $R_4$ , and the remaining VR tube sockets. Mounted on the right end wall is

the screen choke,  $L_7$ . The switch and the three grid resistors are in the upper right-hand corner. Except for the grid circuit, the parts placement and wiring below the chassis are not at all critical. Shielded wire was used for the power wiring, following standard TVI reduction procedure.

### The Plate Line Assemblies

The plate circuits plug onto the front edge of the base chassis and are held in place by the luggage drawbars mounted on their ends. Each assembly has two controls on its front side — the plate tuning capacitor and the capacitor in series with the output coupling link. The placement of these varies with the assembly involved. On the back of each unit are connectors for high voltage and for the r.f. output. The assembly shown in place in the front view is the 144-Mc. one. In the bottom view of the three plate lines, the assemblies are for 432, 220 and 144 Mc., from left to right. The four  $\frac{5}{8}$ -inch holes above the 4X250B in each assembly are for the cooling air stream.

The inner conductor of the 144-Mc. line is a  $9\frac{1}{4}$ -inch piece of  $\frac{5}{8}$ -inch o.d. copper tubing. This material was available at a local hardware store, cut to length if desired. Plumbing supply houses are another source. The inner conductor is supported at three points. At the tube end it is bolted to a copper strap that runs to the ceramic insulators which support the plate clip. At the other end it is strapped to the plate bypass, which will be described later. The main support is a 1-inch ceramic insulator near the tuning capacitor. This insulator is between the copper tubing and the top of the plate line chassis.

Holes to pass small machine screws must be drilled  $\frac{1}{4}$  inch from each end of the copper tube at right angles to each other. The hole for the tuning capacitor is  $1\frac{3}{8}$  inches from the plate end of the tubing, while that for the supporting insulator is 3 inches. The line should be mounted so that the end nearest the 4X250B is 3 inches from the end of the chassis. Note also that the tubing does not run down the center of the chassis. It is mounted  $1\frac{3}{4}$  inches from the rear wall, to give the tuning capacitor more range.

At the tube end of the assembly, the plate clip is supported by two "stacked" ceramic cone

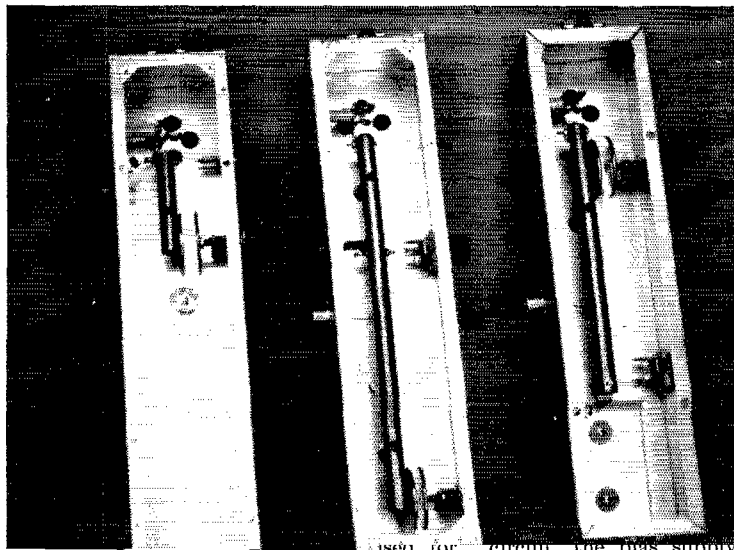
insulators fastened to the rear wall of the chassis. Use one  $\frac{5}{8}$ -inch cone and one  $\frac{3}{4}$ -inch, held together with a beheaded machine screw. The plate clip is a standard  $\frac{1}{2}$ -inch copper fuse clip, available at electrical supply stores. Its mounting position is somewhat critical for proper clipping-on action, but if the hole for mounting the cone is made a bit oversized, some adjustment will be possible. The assembly mounts 2 inches from the chassis end and about 1 inch down from the top. A small piece of copper connects the clip to the end of the copper tubing. This has to be shaped so as not to touch the tube cooling fins. It should be at least  $\frac{1}{2}$  inch wide.

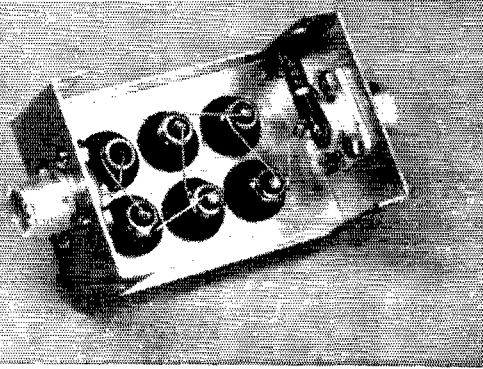
The plate tuning capacitor is a rotary disk affair made from a neutralizing capacitor. The fixed plate is removed from the original assembly, and screwed to the copper inner conductor. The rotor plate is used with the bearing and tension mount from the original capacitor. This assembly is removed from its insulator, and screwed to a ceramic pillar one inch high. This insulator is mounted about  $\frac{5}{8}$  inch from the chassis edge and should be shorted out with a  $\frac{1}{2}$ -inch wide copper strap to ground the rotor. A shaft bearing should be used where the threaded shaft goes through the panel. Most of the threaded portion of this bearing will have to be cut off so that it will fit in the space available. The end of the neutralizing capacitor shaft will have to be cut off, to fit into a  $\frac{1}{4}$ -inch hole in the knob.

Also on the front of the chassis, we see the link-tuning capacitor, mounted  $5\frac{1}{2}$  inches from the bottom end. The coaxial connector is on the back, 8 inches from the end. The output link is supported between the connector and the stator of  $C_7$ . The portion adjacent to the inner conductor is about 3 inches long and  $\frac{1}{2}$  inch high.

The plate by-pass assembly is partly visible near the bottom end of the chassis. The plates of this capacitor are the chassis itself and a piece of sheet aluminum measuring  $2\frac{3}{4}$  by 4 $\frac{3}{4}$  inches. A  $\frac{1}{2}$ -inch lip is bent along the end of this piece, for fastening to the copper strap which connects to the copper inner conductor. The capacitor dielectric is a sheet of  $\frac{1}{32}$ -inch Teflon cut slightly larger in size than the aluminum sheet. The Teflon was obtained locally from a store listed under plastics in the classified ad

◆  
The coaxial-line plate circuits for 432, 220 and 144 Mc., in that order, left to right.  
◆





section of our telephone directory. This dielectric is sandwiched between the chassis and the aluminum sheet, and held in place by two  $\frac{1}{2}$ -inch ceramic feed-through bushings. No connection is made to the center screws of these bushings, and no d.c. voltage is present on them under normal conditions. As a safety precaution, a shield was made from perforated aluminum sheet to cover the tops of the bushings. This is held in place by the feed-throughs themselves.

The dimensions not specified exactly are either not critical, or are best determined individually during the assembly process. A certain amount of partial assembly and taking apart is just about essential in the construction of the tank circuits. While building the original unit this approach was found to be much less critical than trying to lay out all the holes, drill them, and assemble in one step. One point requiring adjustment is the position of the 4X250B plate clip. This should be set so that it seats firmly on the tube, but is not tight enough to lift the tube out of its socket when the plate line assembly is removed.

The assemblies for 220 Mc. and 432 Mc. require no Teflon-dielectric by-passes, because the line sections involved are half-wave rather than quarter-wave in design. The high voltage must be fed in at the point of low r.f. voltage at the electrical centers of these lines. This point is somewhat critical, and checking for it requires access to the inner conductor while the plate line is mounted on the base assembly. This is provided in the 220-Mc. line by punching a  $\frac{5}{8}$ -inch hole in the chassis top near the r.f. voltage null, about 7 inches from the tube end of the chassis. The ventilation holes serve this purpose in the 432-Mc. line.

The inner conductor of the 220-Mc. line is  $12\frac{1}{2}$  inches long, supported by two 1-inch cone insulators, about  $1\frac{1}{2}$  inches from each end of the copper tube. As in the 144-Mc. case the tube end of the inner conductor is 3 inches from the end of the chassis, and the copper tubing runs down the chassis  $\frac{1}{4}$  inch off-center toward the rear.

The plate tuning capacitor is identical to the one for 144 Mc. It is located about  $1\frac{3}{4}$  inches from the end of the chassis. The series link capacitor and the coaxial connector are 10 and 8 inches from this end of the chassis, respectively. The coupling portion of the link is about  $2\frac{1}{4}$  inches long and  $\frac{1}{2}$  inch high.

The power absorber for insertion in the line to the amplifier grid circuit, when a Communicator or similar low-power transmitter is used as a driver.

Finding the point of low r.f. voltage on the line is done as follows: First, mount all the components of the plate line and make all connections except for the r.f. choke which runs between the high voltage connector and the unknown point on the inner conductor. Install the assembly on the base unit with the 4X250B in place. Make up a length of coax with a male connector on one end and a one-turn loop on the other. Connect the coax to the antenna socket, and couple the link to a grid-dip meter tuned to 220 Mc.

Tune the plate capacitor until the grid-dip meter indicates resonance. Now take a pencil or screwdriver and run it along the inner conductor through the hole punched in the chassis top for this purpose. A point will be found where the grid-dip meter reading does not change as the pencil touches the copper tubing. The assembly may now be taken apart and the copper tubing drilled at this point to fasten the r.f. choke in place. Note that this system permits the r.f. voltage null to be located without applying plate voltage to the rig.

The 432-Mc. plate line is an abbreviated version of the 220-Mc. one. The inner conductor is only 3 inches long. It is supported by a single 1-inch cone insulator near the capacitor end of the copper tube. The tuning capacitor and the link capacitor are about  $5\frac{3}{4}$  and  $3\frac{1}{2}$  inches from the end of the chassis, respectively. The antenna and high-voltage connectors are 4 inches from the chassis end, and one over the other. The pick-up link measures about 1 by  $\frac{1}{2}$  inches.

In this unit the r.f. low-voltage point will probably fall somewhere along the copper strap which connects the tube plate clip with the tube end of the inner conductor. In the original version it was located about  $\frac{1}{2}$  inch from the latter. Because most of us don't have 432-Mc. grid-dip oscillators, the low voltage point will have to be located by cut and try in this case. Assemble the unit with  $RFC_3$  connected to the copper strap about  $\frac{1}{2}$  inch from the end of the inner conductor. Next apply drive and plate and screen voltages as described in the following section, with a load connected to  $J_3$ . Insert a wooden pencil or insulated screwdriver through the nearest of the ventilating holes over the 4X250B, and search along the strap for a point where touching it with the pencil lead does not affect the plate current or the output of the stage. Connect the r.f. choke at this point.

#### Operation

The first step in getting the rig working is to adjust the dropping resistors  $R_2$  and  $R_4$ .  $R_2$  should be set at the highest value at which the OA3 will light every time the power is turned on. The resistance needed at  $R_4$  can be calculated roughly by assuming a VR tube current of 40

ma. and finding the value of resistance required to drop the input voltage to about 350.  $R_4$  can then be set at this value with an ohmmeter, and modified if necessary later on.

When working with a tetrode amplifier using a fixed screen supply, never apply screen voltage without also turning on the plate supply. Also, be certain that the tube is not run without a load of some sort connected to the antenna terminals. Screen current will be excessive if either of these things is done.

When the bias supply has been checked out, apply r.f. drive through coaxial connector  $J_1$ . Under Class C conditions an exciter having about 10 to 15 watts output is required to drive the amplifier to its full output on either 144 or 220 Mc. The drive required on 220 tends toward the top of this range, with somewhat less being needed on 144. Considerably lower driver output is still quite usable. The amplifier is capable of delivering 125 to 150 watts output for c.w. operation with as little as 4 watts of drive.

Operated as a Class  $AB_1$  linear amplifier, with a modulated stage as a driver, the 4X250B requires no driving power at all; only driving voltage. This explains the use of an attenuator in the line between the two units when a Communicator or similar low-power phone rig is used as a driver. The attenuator is described later.

When the stage is operating as a frequency multiplier to 432 Mc. it is possible to use any amount of drive from around 3 to about 25 watts — more output being obtained with increased excitation, of course. Efficiency is better when operating as a doubler than as a tripler, so this mode is to be preferred. Nearly 20 watts may be put into the transmission line, however, even with the stage tripling.

When the driver question has been settled, connect whatever you have decided to use to  $J_1$ . Tune  $C_1$  and  $C_2$  for maximum grid current if Class C operation is planned. There will be some interaction between  $C_1$  and  $C_2$ , especially on 220 Mc., where the link is somewhat large. Work back and forth between them for maximum grid current. The optimum settings for these capacitors may be found by inserting a standing-wave bridge in the line between the driver and the amplifier, and adjusting  $C_1$  and  $C_2$  for minimum reflected power. Grid current for c.w. operation should be about 30 ma., while for plate modulation it should be about 20 ma. As has been pointed out above, values less than these are quite usable.

Now apply plate and screen voltages. It is well to start with less than full plate voltage to prevent harm to the tube if trouble develops. Something between 500 and 1000 volts should be satisfactory. With no drive applied, the fixed bias supply should cut off the plate and screen currents when the mode switch is set for c.w., a.m., or multiplier service.

Something in the way of a load is now required. Suitable dummy loads for high-power v.h.f. use are not readily come by, so perhaps

the best solution is a gamma-matched dipole, fed with coax and erected near the test position. This can be adjusted for minimum s.w.r. readily, and thus provides the desired nonreactive load. Testing should be done with some discretion, however, as you'll be radiating a potent signal locally, at least. Two or three 100-watt lamps in parallel, equipped with a variable series capacitor for tuning out their reactance, is a usable substitute for initial checks.

Adjustment for Class C operation is similar to that followed with any tetrode amplifier. Apply drive and plate and screen voltages, quickly adjusting the plate tuning capacitor for a dip in plate current or for maximum output. The output indication is preferred, as maximum output and minimum plate current may not coincide perfectly. The series capacitor in the link circuit should also be adjusted for the degree of loading desired. The tuning capacitor should be readjusted after changing the link capacitor, as there may be some interaction. The plate current at resonance should not be more than 250 ma. for c.w. operation, and 200 ma. for plate modulated work. Screen current will run between 25 and 45 ma., depending on the plate voltage; higher current being obtained with lower plate voltage.

Any plate voltage between 500 and 1500 is satisfactory for either c.w. or phone operation with the maximum plate currents mentioned above. It may be increased to 2000 volts for c.w. service. Efficiency will be on the order of 75

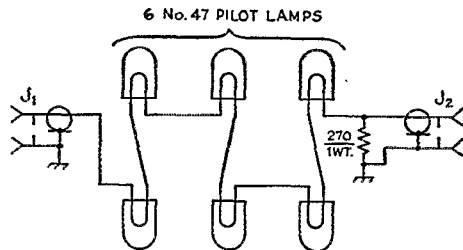


Fig. 3 — Schematic diagram of the power absorber used between the driver and amplifier when the latter is operated as a Class  $AB_1$  linear. Lamps are 6.3-volt blue-head pilot lamps (No. 47) mounted in rubber grommets. Resistor is 270 ohms 1 watt.

per cent or so on either 144 or 220 Mc., if full rated grid drive is employed. It will be somewhat less if only a few watts are available. No trouble with instability was encountered with the original amplifier. If neutralization for either band were required in some other version, it could probably be accomplished by negative feedback from the grid line up through the chassis into the plate compartment.

For operation as a frequency multiplier to 432 Mc., the plate voltage should be cut down to 300 to prevent exceeding the 50-watt maximum input rule. Admittedly, this is not making very good use of the 4X250B's capabilities, but

(Continued on page 150)

# Monimatch, Mark II

An Improved Version of a Popular S.W.R. Monitor

BY LEWIS G. MCCOY,\* WIICP

• Combine simple construction and low cost with a real need and you have a sure-fire formula for popularity. So it was with the Monimatch described in October *QST*. Here's a still better version — smaller and even easier to make. It uses the same indicator as the first model.

**M**ONIMATCH MARK II, the result of questions and suggestions from many builders of the original unit, has several features that represent improvements over the original design.<sup>1</sup> For one thing, the size has been reduced to less than half. This is accomplished by using two short linear inductors, placed on opposite sides of the center conductor of the line section, instead of a single long one. The box for housing the Mark II is only 5 inches long, so the unit can more easily be fitted into a transmitter or antenna coupler.

Another feature is the simplification of the construction work. In the original unit a U-shaped trough was used for the outer conductor of the line section. This required a metal-bending job. In experimenting to determine the necessity for using such a trough it was found that two

flat strips of metal properly spaced from the inner conductor did an excellent job. In the Mark II, separation between the inner conductor and these strips is maintained at the proper value by two spacers made from insulating material. These spacers also serve the purpose of supporting the two bridge wires.

The indicator circuit of the revised bridge remains the same as in the original version. The description below is therefore confined to the bridge itself.

## Construction

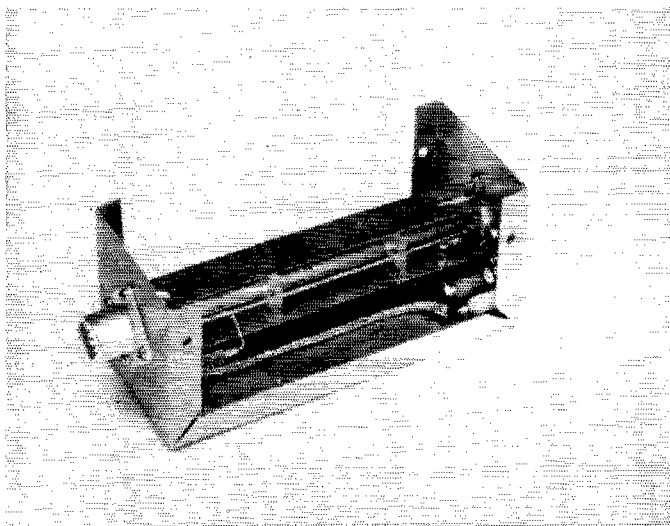
The Mark II is mounted in a  $2\frac{1}{4} \times 2\frac{1}{2} \times 5$ -inch aluminum box (ICA Flexi-Mount). The 5-inch dimension is the only critical one. Any available insulating material of reasonably low loss, such as polystyrene or bakelite, is suitable for the spacers. The dimensions of these pieces are given in Fig. 2.

When the spacers are completed they can be slipped over the inner conductor rod, which is a piece of  $\frac{1}{4}$ -inch o.d. copper tubing,  $4\frac{3}{8}$  inches long. One of the coax chassis fittings should be mounted on one end of the box, positioned as shown in the photograph. The inner conductor pin of the fitting should be tinned with solder and one end of the copper tubing slipped over it and soldered in place. Then the other fitting can likewise be tinned, mounted on the opposite end of the box, and the connection soldered.

Next, the two strips used as the outer conductor can be installed. These are  $\frac{5}{8}$  inch wide and  $4\frac{7}{8}$  inches long, and can be made from

\* Technical Assistant, *QST*.

<sup>1</sup> McCoy, "The Monimatch," *QST*, October, 1956. A description of the original Monimatch is included in the 1957 edition of *The Radio Amateur's Handbook* and in the *ARRL Antenna Book*, 8th edition.

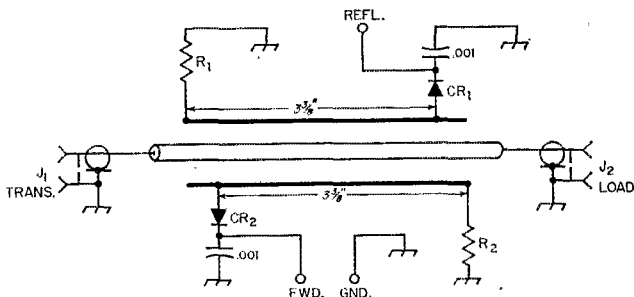


◆  
The smaller size of the Mark II makes the unit suitable for mounting inside a transmitter or antenna coupler. As mentioned in the text, the outer conductor strips are held in place by soldering lugs mounted under the nuts of the coax fittings.  
◆



Fig. 1 — Coupling circuit of the Monimatch Mark II. Strip conductors forming the outer conductor of the line sections are not shown.

CR<sub>1</sub>, CR<sub>2</sub> — 1N34A diodes.  
 J<sub>1</sub>, J<sub>2</sub> — Coax chassis receptacles (Amphenol 83-1R).  
 R<sub>1</sub>, R<sub>2</sub> — See text.



copper, brass, or even tin from a tin can. The method of mounting them in place is simple. Solder a soldering lug to each end, allowing the end of the lug having the screw hole to project beyond the edge. Bend this part of the lug at right angles to the strip. The top and bottom screws and nuts of the coax fittings are used to hold the strips in place. This, along with the insulating spacers, insures correct alignment of the strips with the inner conductor.

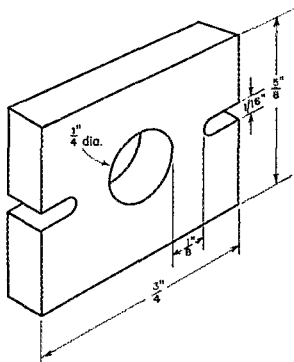


Fig. 2 — Dimensions of the insulating spacers used to hold bridge wires and outer conductor strips in place.

The bridge pick-up wires are 4 inches long and are made from No. 14 tinned wire. For a 50-ohm bridge, 150-ohm  $\frac{1}{2}$ -watt resistors are used for R<sub>1</sub> and R<sub>2</sub>. For 75 ohms, 100-ohm  $\frac{1}{2}$ -watt resistors will do. *Most important*, the resistors should be carbon or composition, not wire-wound. Many builders of the original unit were unable to get a null because they failed to use carbon resistors.

Standard one-terminal tie points are used at each end of the box to hold the 1N34A diodes and the 0.001- $\mu$ f. disk-ceramic capacitors. These and the pin jacks for the indicator leads can be mounted in place after completing the bridge assembly as described above. Next, solder a resistor to one end of each bridge pick-up wire, keeping the resistor lead as short as possible. The wires can then be placed in the slots in the spacers, after which the other resistor leads should be soldered to lugs secured under mounting nuts at the adjacent coax fittings. The diodes are connected approximately  $\frac{5}{8}$  inch from the opposite ends of the wires. This dimension is not critical.

### Testing and Adjusting

The setup for testing the Mark II is the same as described in the October article. Actually, adjustment is very simple. Connect a nonreactive dummy load, having a resistance equal to the characteristic impedance of the line with which the bridge is to be used, to J<sub>2</sub> and apply power to J<sub>1</sub>. Set the switch in the indicator unit to the "forward" position and adjust the r.f. input, along with the variable resistor in the indicator unit, for a full-scale meter reading. Then switch to the "reflected" position and move the pick-up wire (the one connected to R<sub>1</sub> and CR<sub>1</sub>) in the spacer slots until the position giving a good null is found. This position probably will be about  $\frac{1}{8}$  inch from the line center conductor. Once the proper setting is found a drop of cement can be used to hold the wire permanently in place.

Finally, reverse the input and output connections so that the "load" side of the bridge, J<sub>2</sub>, is connected to the transmitter. Connect the dummy load to J<sub>1</sub> and adjust the other bridge wire to give a null with the indicator meter switch in the "forward" position. When this wire is cemented in place the bridge is completed. Restore the original input-output connections and it is ready for use.

Table I in the October article gives typical values of rectified current with the indicator switched for forward reading. The figures for the Mark II will be approximately the same.

The writer will be happy to hear from builders of this unit (as well as the original) who may have further suggestions for improvements. Who knows? — maybe we can have a Mark III!

## Stays

Sometimes our Technical Information Service is called upon to answer some weird ones. Here's a question (but not typical!) that came in recently. "I used to have an old receiver that tuned the 40- and 80-meter bands. Many times I would hear hams calling CQ 75. Then I got a new receiver. I have been tuning around for three months and haven't heard a CQ 75 yet. Would you please tell me what frequency 75 meters is on. The reason I can't tell from the old receiver is because the dial was on one frequency and the station was on another." And that, friends, came from a licensed amateur.

# An "All-Band" BC-458-A Heterodyne V.F.O. for S.S.B.

Ten to 160 with a 9-Mc. S.S.B. Generator

BY BEN RUSS, \*W2QZ

THIS ARTICLE ASSUMES the constructor has a basic knowledge of tracking methods and owns the BC-458-A—or its equivalent T-21/ARC-5—with its coils and air-spaced capacitors intact.

The author's unit is operated with 24 volts d.c. for the filament supply. This makes it possible to use the 1629 (electron eye) tube as part of the original series-parallel filament circuit. The filament of the 1626 master oscillator is in series with the 1629 and its wire-wound 126-ohm current equalizing resistor. B voltage is obtained from the exciter. A VR75/OA3 regulator is used in the former crystal socket. All other connections and relays not necessary for the v.f.o.'s operation are removed.

## The Basic Changes

The tube involved is the 1625 on the left with the front of the unit facing you. This is the "second 1625" in Fig. 1. It is this tube and its associated circuitry that will deliver fundamental and multiples of the output frequency of the first 1625.

Remove the oscillator can with its attached slug. File away the edges of the rim on the threaded portion of the oscillator slug so it may now be screwed down and the rim will no longer serve as a limit stop.

Loosen the oscillator air-padder set screws that this can encloses. Align and drill a hole in the side of the can to admit a screwdriver for setting and locking this padder, then replace the can.

These changes are made so the original oscillator frequency limits of 5.3 to 7 Mc. can be altered to extend from 5 to approximately 6.7 Mc.

\*75-19 195th St., Flushing 66, New York.

• A practically painless operation on the widely-used BC-458 converts it into a generator of beating frequencies that will transfer a 9-Mc. single-side-band signal to any amateur band below 30 Mc. Only about a half dozen inexpensive components are required.

## Buffer Stage

The first 1625 operates on the same frequency as the master oscillator. Count down to the 4th turn from the top of the plate coil and carefully solder a 200- $\mu$ f. mica capacitor to it, making sure that the solder doesn't short out adjacent turns. This capacitor is soldered to the side of the coil facing the oscillator shield can. Drill a hole between the two 1625's to pass an insulated wire from the other terminal of the capacitor to the grid of the second 1625. Connect a 24,000-ohm half-watt resistor from the grid to the cathode terminal of the socket. The capacitor feeds the r.f. drive to the second 1625 and the resistor returns the grid circuit to ground. Ground the cathodes of both 1625's.

Ground both ends of the original antenna coupling coil. This coil then acts as a shorted-turn device for fine trimming of the first-1625 amplifier tank inductance.

## Output Stage

Ground the base lugs of the pressure springs that hold the roller contact against the antenna inductor. They can be connected to the adjacent machine screws that hold the composition strip to the chassis. This roller coil becomes the output

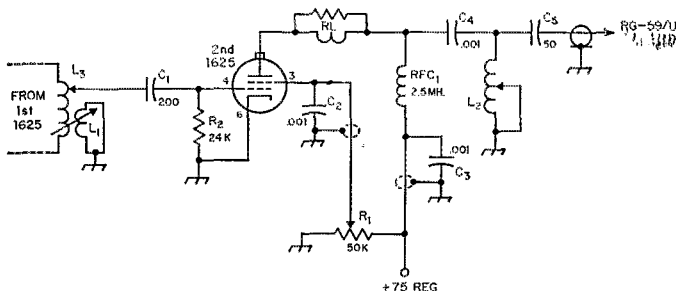


Fig. 1—Basic changes in the BC-458.

- C<sub>1</sub>—200- $\mu$ f. mica, receiving type.
- C<sub>2</sub>, C<sub>3</sub>—0.001- $\mu$ f. disk ceramic.
- C<sub>4</sub>—0.001- $\mu$ f. mica.
- C<sub>5</sub>—50- $\mu$ f. mica.
- L<sub>1</sub>—Original antenna coupling coil.
- L<sub>2</sub>—Original antenna inductance (roller coil).

- L<sub>3</sub>—Original amplifier coil.
- R<sub>1</sub>—50,000-ohm potentiometer.
- R<sub>2</sub>—24,000 ohms, 1/2 watt carbon.
- RFC<sub>1</sub>—2.5 mh. r.f. choke.
- RL—Parasitic suppressor (see text).

tank inductance and tunes from 5 to 39 Mc. with the second 1625.

Connect the end of the roller coil (right side facing the front of the unit) to ground by soldering a conductor from the last turn on the outside of the form to the closest leg of the spider inside the coil form. Make sure there is sufficient clearance for this lead between the edge of the form and the composition thumb gear knob.

Remove the antenna binding post. Mount a 50,000-ohm potentiometer in its place. The arm feeds the screen of the second 1625. The outside terminals are connected to ground and plus 75 volts d.c., respectively. This is the output control for the injection frequencies.

Mount a 2.5-mh. choke near the second 1625's plate. Feed plus 75 volts d.c. to it through a hole drilled in the chassis nearby. Bypass the cold end of the choke to ground. Disconnect and reuse the parasitic choke part for the second 1625, or make a new one (100-ohm, 1-watt carbon resistor wound with 8 turns of No. 20 wire). The plate blocking capacitor is a 0.001- $\mu$ f. mica. The output capacitor is a 50- $\mu$ f. mica. All capacitors are the receiving type.

There is a heavy lead that holds a flat spiral spring on the left side of the antenna inductance assembly. Remove the spring, and to this lead solder the plate blocking and output coupling capacitors. This heavy lead is the "hot" end of the roller coil. Keep all leads to it and the plate of the second 1625 short. The output coax cable should have its shield grounded as close to the output coupling capacitor as possible. Ground the coax cable to chassis where it leaves the rear of the v.f.o. A five-foot length of RG-59/U is used.

That just about does it.

#### Alignment

A grid-dip meter and calibrated receiver should be used for initial checking of the new dial and roller-coil settings. This need be done but once.

Adjust the oscillator slug to tune 5 Mc. at the low end of the dial. Turn the dial to check that 6.225 Mc. is in the range. If 5 Mc. cannot be reached, adjust the air padder. Adjust both slugs and both air padders with the antenna coupling coil set halfway. (After finishing the initial tracking adjustments this control can be varied, if need be, to resonate this stage as evidenced by maximum brilliance of the VR tube.) Trim up the oscillator and the first 1625 slugs and their respective air padders for tracking between 5 Mc., which is the lowest frequency used, and 6.225 Mc., which is the highest used in these circuits. A target to aim for is to get 5 Mc. at the low end of the dial and 6.7 Mc. at the high end. Adjust the slugs for the low end and the air padders for the high side. In some units it may be necessary to bend the end plates of the oscillator and first-1625 tuning capacitors to reach 5 Mc.

Turn the screen voltage control potentiometer to full output. It should be possible to tune the second 1625 stage to all frequencies in Table I.

Table I

Frequency of Oscillator and 1st 1625	Frequency of 2nd 1625 (Roller Coil)	Frequency Multiplication	Resultant Freq. Plus/or minus 9 Mc.
5.5 Mc.	11 Mc.	2 ×	2 Mc.
5 Mc.	5 Mc.	None	4 Mc.
5.333 Mc.	16 Mc.	3 ×	7 Mc.
5 Mc.	5 Mc.	None	14 Mc.
6 Mc.	12 Mc.	2 ×	21 Mc.
5.143 Mc.	36 Mc.	7 ×	27 Mc.
5.43 Mc.	38 Mc.	7 ×	29 Mc.

Once sure of the dial and roller-coil settings for the various bands, be certain you make some identifying marks thereon.

If the VR tube extinguishes when the output screen voltage control is up full, try changing 1625's or reduce the value of the VR tube's dropping resistor slightly.

#### Conclusion

Once calibrated, there should be no problem hopping from band to band. Exact resonance of the second-1625 plate circuit can readily be obtained by watching the S meter of your receiver with the exciter set for the band to be used, and on the calibrate position. The position of the roller contact on the antenna inductance for 5 Mc. is at the right end; for 39 Mc. it is at the third turn from the left end.

Frequency stability is no problem if your line voltage is stable. This is mentioned because cathode temperature fluctuations cause a slight change in the oscillator frequency.

The changes and alignment mentioned in this article should take no more than one or two evenings' work. Let's operate 10 through 160 meters and enjoy more of our bands.

## Strays

KN2SWY offers a new certificate for DX-men. WAN — Worked All Night.

WØELC sends along a newspaper ad offering a  $\frac{1}{2}$ -kw. amateur radio transmitter with a holo-craftic 5 x 28 receiver. How about that, Mr. Halligan!

QST author Prof. O. G. Villard, jr., W6QYT, has been awarded the Liebmann Prize by the IRE for his contributions in the field of meteor astronomy and ionosphere physics. His work led to the solution of a number of outstanding problems in radio propagation. The Liebmann prize is one of the highest honors in electronics.

"I like  $\Omega$  - made  $\pi$ ." — W4PVA

## ● Technical Topics—

### Transformerless Single-Side-Band Balanced Modulator

IN A RECENT advertisement of Airborne Instrument Laboratories mention was made of a balanced-modulator circuit that should be of interest to s.s.b. men. With the permission of Murray G. Crosby, W2CSY, the inventor of the circuit, here is a description of the basic idea.

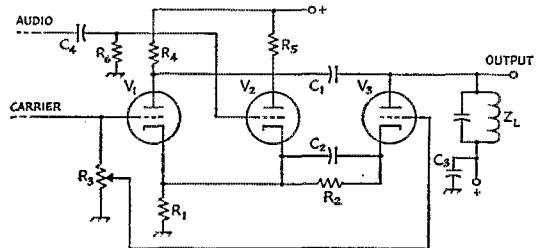
The circuit in Fig. 1 will be recognized as quite

*Fig. 1*— This triple-triode balanced modulator circuit should find application in filter-type s.s.b. excitors. The carrier is balanced out by proper adjustment of  $R_3$  and  $C_1$ .

- $C_1$  — 0.25  $\mu$ f.
- $C_2, C_3$  — By-pass at carrier frequency.
- $C_4$  — 0.01  $\mu$ f.
- $R_1$  — 1000 ohms.
- $R_2$  — 2700 ohms.
- $R_3$  — 10,000-ohm potentiometer.
- $R_4, R_5$  — 470 ohms.
- $R_6$  — 0.1 megohm.
- $V_1, V_2, V_3$  — 6C4 or 12AU7.
- $Z_L$  — Resonant at carrier frequency.

similar to the product detector described recently.<sup>1</sup> Triodes  $V_1$  and  $V_2$  serve as cathode followers to drive the cathode circuit of  $V_3$ , by virtue of the common cathode resistor  $R_1$ . By the proper choice of bias and the signal-level limits, triodes  $V_1$  and  $V_2$  are adjusted for linear operation. Mixer operation takes place in  $V_3$  through the switching action exerted by  $V_1$ . With the grid of  $V_3$  at ground potential, side bands and carrier will appear in the output if  $Z_L$  is tuned on or near the carrier frequency. A positive-going signal at the grid of  $V_1$  results in a positive-going signal at the cathode of  $V_3$ , which has the same effect on  $V_3$  plate current as a negative signal on the  $V_3$  grid. Consequently, if the proper amplitude of voltage from the  $V_1$  grid is applied to the  $V_3$  grid, the net effect on the

voltage across  $Z_L$  is zero. This can be done conveniently by the proper setting of the arm of  $R_3$ . For complete carrier elimination, the carrier is cancelled in the output by the proper setting of  $R_3$ , together with the correct setting of  $C_1$ , a neutralizing capacitor that compensates for capacitive feedthrough between  $V_1$  and  $V_3$ . A



<sup>1</sup> Crosby, "Reception with Product Detectors," *QST*, May, 1956.

carrier reduction of approximately 50 db. may be maintained with stability.

Suggested values for the components are given in the caption.  $C_2$  and  $C_3$  are by-pass capacitors for the carrier frequency. In some applications it might be convenient to replace the tuned circuit,  $Z_L$ , with an r.f. choke or a 47,000-ohm resistor. When a resistor load is used, the audio voltage will appear across it, a consideration in some applications.

Mr. Crosby reports that this triple-triode modulator has been used together with the corresponding triple-triode product detector in s.s.b. transmitter and receiver combinations that have produced an over-all distortion of transmitter and receiver of less than 0.5 per cent. In amateur work, it may find its primary application in filter-type s.s.b. generators.

— B. G.

## Special S.S.B. Issue of I.R.E. Proceedings

The amateur fraternity is well represented among the authors of papers in the December 1956 issue of the *Proceedings of the Institute of Radio Engineers*. All of the papers in this issue are on single side band — a subject on which a considerable segment of the amateur population feels itself quite at home, since there are undoubtedly more s.s.b. stations in operation in the amateur service than in any other.

Contributors to the I.R.E. single-side-band issue who have likewise been represented in *QST* at various times include D. E. Norgaard, W2KUJ (soon to be a W6, incidentally), Warren B. Bruene, W0TTK, E. W. Pappenfus, W0SYF,

D. K. Weaver, Jr., W6VQL, John W. Smith, W0UCM, and your technical editor, W1DF. Others holding ham calls are John P. Costas, W2CRR, P. J. Icenbice, Jr., W0NKZ, and Emil L. Martin, W0NCS. We've probably missed identifying a few, since it isn't the custom in the *Proceedings* to give the author's call, when he has one — although it wouldn't be a bad idea, come to think of it.

The papers, thirty-two in all, cover the s.s.b. field from many angles. The ones that have special interest for amateurs will be reviewed in subsequent issues of *QST*.

— G. G.

## ● Technical Correspondence —

### LATITUDE AND SATELLITE-TRACKING ACCURACY

U.S. Naval Research Laboratory  
Washington 25, D. C.

Technical Editor, *QST*:

A large number of persons have written us concerning the utility of obtaining tracking data from the satellite orbits with receiving stations north of the latitudes over which the satellite will pass.

There are two questions to be answered (1) Can accurate measurements be made on the satellite from, say, the 45th parallel when the satellite is at, say, the 35th parallel? (2) Would such measurements aid in computation of orbit parameters? We now feel that the answer to both questions is affirmative.

At the 45° latitude the satellite at 35° will subtend the elevation angles shown in Table I.

Table I

Alt. of Satellite at 35° N. (Stat. Miles)	Elev. Angle at 45° North	Range (Stat. Miles)
200 Miles	11	730
400	24	830
600	34	950
800	41	1100
1000	47	1260
1200	52	1440
1400	55	1620

If the satellite's transit altitude is more than about 400 miles the elevation angle should be large enough for good observations. We can reasonably expect that a large percentage of the transits will satisfy this altitude condition.

If we assume only that the ionosphere and atmosphere are horizontally stratified then if all we attempt to measure is the time the satellite intersects the plane perpendicular to a horizontal baseline this measurement will be unaffected by the ionosphere and the atmosphere.

The only dilution in accuracy a northern observer will encounter, under these conditions, is that due to his increased range to the satellite and, at least for large satellite altitudes, this dilution will be small.

The method of increasing the accuracy of observation is of course to increase the baseline length and to have a good method for calibrating the system. We now feel that radio stars may provide the means for calibration and we are checking open wire line for transmission line so a long, reasonably priced baseline can be built. — Roger L. Easton

### ANOTHER LOOK AT S.W.R.

Hughes Aircraft Company  
Culver City, California

Technical Editor, *QST*:

Beginning several years ago, amateurs were exposed to a variety of commercial couplers, as typified by the Johnson Matchbox. These match the output of low-power transmitters to a wide range of antenna input impedances. Usually, these antenna couplers are connected to the transmitter with coaxial line, with the manufacturer's suggestion that an s.w.r. meter be used to insure that the standing-wave ratio is not excessive.

K6RXU experienced high circulating r.f. currents in the Johnson Matchbox when a means of measuring the s.w.r. in the coax between the transmitter and the Matchbox was not available. However, when a Jones Micromatch type 261, specifically designed for 52-ohm line, was inserted between the transmitter and the coax to the Matchbox, it was possible to tune the coupler properly and reduce the s.w.r. on this coax to 1:1 on nearly every frequency.

Many amateurs have followed the same procedure and accomplished a similar reduction in s.w.r. in this coax section. This has led some to the fallacious conclusion that the Matchbox is therefore able to reduce s.w.r. between the

transmitter and the antenna because there is little or no measurable reflected power through the Micromatch. To determine experimentally what happens in this situation, K6RXU obtained a second Micromatch and inserted it at the Matchbox output in the coax to the antenna, as at B.

It thus became possible to measure the s.w.r. simultaneously in both the connecting coax at A and the transmission line at B. These tests prove conclusively:

1) It is possible to have a low or 1:1 s.w.r. in the coax connecting the Matchbox and the transmitter at A and have a high s.w.r. in the transmission line at B.

2) Power reflected down the transmission line into the Matchbox at B may circulate as r.f. current there and need not be further reflected into the transmitter at A.

3) The tuning and matching controls on the Matchbox (or any matching circuit — Ed.) can reduce the s.w.r. on the coax between Matchbox and transmitter at A, but cannot reduce the s.w.r. on the transmission-line coax at B.

4) Transmission-line s.w.r. is a consequence of mismatch at the antenna and cannot be reduced at the Matchbox regardless of Micromatch readings on the coax between Matchbox and transmitter at A.

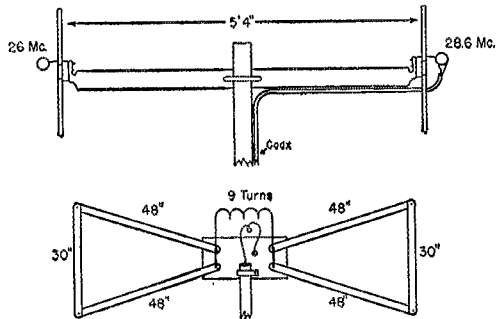
Amateurs contemplating the design of an antenna coupler might seriously consider building in two Micromatch-type bridges. One would indicate the correct capacitor dial settings to reduce power reflection from coupler to final (low s.w.r.) at A. The second would indicate the power into the antenna and the actual s.w.r. in the transmission line at B at the operating frequency. — Leonard C. Silvern

### "WONDER BAR" BEAM

P.O. Box L  
Talco, Texas

Technical Editor, *QST*:

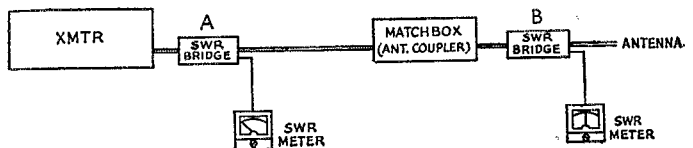
The article in November *QST* by E. T. Bishop, on the "Wonder Bar" antenna was of unusual interest to me. After reading the article in detail, I decided to build it and put a reflector on it. It worked!



The two elements are made almost exactly like the K6OFM antenna, the only difference being that the original plastic blocks used for insulators in the TV antenna were retained and the coils were wound self-supporting out of No. 12 wire wound around a 6F6 metal tube used as a form. The link on the driven element is made of the same size wire as the coil and is wound on the same form. Nine turns are wound on each coil and the link is two turns. The link is taped to the approximate center turns of the coil with Scotch electrical tape. The driven coil is 3 1/4 inches long and the reflector coil is 2 1/4 inches long. The boom is made by welding two of the original TV antenna booms together after one of the flattened ends had been sawed off each boom. The spacing between elements is five feet four inches. The link is fed from my 40-watt transmitter with 52-ohm coax. The driven element is resonated at 28,600 kc. by adjusting the coil and checking with a grid-dip meter and a calibrated receiver. The reflector element was resonated at 26,000 kc. by compressing the turns of the coil.

(Continued on page 134)

Fig. 1 — Arrangement of units showing s.w.r. measurements at two locations.



# Meteor Shower Calendar for V.H.F. Men

FOR SEVERAL YEARS now the Perseid meteor shower, an annual celestial show in August, has been used by 2-meter men as a time for concentrating on schedules with distant stations. Such scheduled work has produced mighty interesting results, as well as choice "new states" worked, for some of our more avid 144-Mc. DX enthusiasts. See "The World Above 50 Mc." in October *QST* and this issue for examples of the sort of thing that can happen.

If the Perseids, only one of a dozen or so major meteor showers each year, can make such 2-meter DX possible and enhance 6-meter scatter to so great an extent, how about the others? What is the best time to bear down? How far can you expect to work? These are some of the questions we've been receiving in recent mail.

For those new to the game, meteors are cosmic particles, often no larger than grains of sand (but occasionally much larger) that bombard the earth at the rate of 100,000,000 or more per day. Traveling at velocities of up to 50 miles per second, they quickly burn up upon entering the outer reaches of our atmosphere, often producing the familiar "shooting star" effect in the night sky. Few of them ever reach the earth itself in other than ash form, though the larger ones do manage to do so, as huge meteor craters scattered over the earth's surface testify.

The intense heat generated by friction with the upper air causes the meteor to leave an ionized trail behind it as it burns some 30 to 100 miles above the earth's surface. It is this ionized trail that concerns us as v.h.f. DX enthusiasts. Reflection of radio waves from meteor trails has been recognized for quite a few years, but it remained for W4HHK and W2UK to demonstrate that the ionization was intense enough to reflect 144-Mc. signals. A new addition to the v.h.f. man's bag of tricks resulted from their two-year program of investigation of the possibilities of meteor scatter for 144-Mc. communication. This all-out effort won them the 1955 ARRL Merit Award for outstanding contributions to the advancement of the art.

The "ping" of meteor-reflected signals can be heard at almost any time if you arrange a schedule with a high-powered station at a distance of 800 to 1200 miles or so. You have to know his frequency accurately, and both you and he should have good-sized antennas, aimed at a common point, but not necessarily at each other. The W2UK-W4HHK tests showed that off-path aiming of as much as 25 degrees had little effect, so long as both aimed off path by the same amount and meteor reflection have been observed at much sharper angles on 50 Mc. The meteor-reflection pings are of little communications value unless they occur frequently enough, or are of sufficient duration to permit the transmission of some information.

Below is a table of the principal meteor showers. The names are those of the constellations from which the meteors appear to come. (The relation is, of course, an optical illusion; the meteors seen are less than 100 miles above the earth, the constellations millions of miles distant.)

Jan. 1-4	Quadrantids	Aug. 10-14	Perseids *
April 19-23	Lyrids	Oct. 9	Giacobinids
May 1-6	Aquarids	Oct. 18-23	Orionids
July 26-31	Aquarids	Nov. 14-18	Leonids
		Dec. 10-13	Geminids

\* Perseids begin around July 20th, reaching a peak in mid-August. Their effects are noticeable to a considerable degree from late July on.

The dates given are approximate, and the intensity of the various showers varies from year to year. Some are associated with comets, as for example, the Giacobinids of October. These may put on big shows only during certain years, the Giacobinids having last done this in 1946. The October 9th shower of 1946 was perhaps the first in which the effects of meteor showers were observed by v.h.f. men. See December, 1946, *QST*, page 43, for details. Its previous large display was in 1933. (Circle October, 1959, on your calendar!)

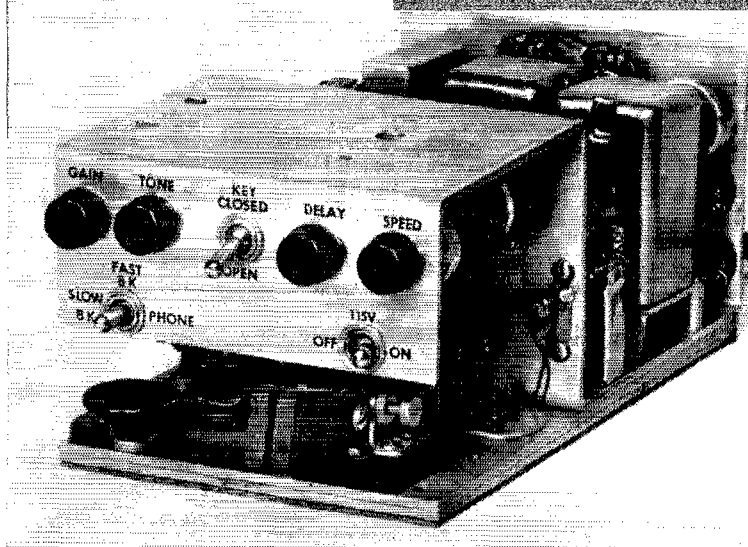
About 20 other showers that are considered less reliable than those in the above table have been observed. These may return in future years, and still others may develop, so meteor-scatter DX on 144 Mc. is no one-shot affair. Of the lesser showers, one comes in January, one in February, one in March, two in May, two in June, three in July, three in August, two in September, three in October and one at the end of November, running into December. The last, the Andromedids, was once an important meteor stream, but has been lost for many years. It could reappear, as others have done.

In general, more showers and higher burst counts occur in the second half of the year. As with visual observation, best results are obtained late at night or in the early morning hours. During the Perseids shower of 1956, meteor enhancement of 50-Mc. signals was observed at high level through the midmorning hours daily from the latter part of July until about Aug. 15th. DX of the meteor-scatter variety was worked on 144 Mc. from July 29th through Aug. 13th.

The Perseids are perhaps the most reliable year after year, but the possibilities of other showers should not be overlooked. The Geminids of 1955 and 1956 produced marked effects on 50- and 144-Mc. propagation during the late evening and early morning hours, and periodic showers,

(Continued on page 146)

This unit is an electronic bug key, combined with a straight key, a station control unit, and a sidetone generator. The two cans at the right rear house keying and control relays.



## Combined Keyer and Control Circuit

*A Complete Unit for Controlling the Station*

BY S. B. LESLIE,\* W5DQV

• The usual practice in *QST* is for the staff to write this box, but in this case excerpts from the author's letter of submittal tell the story better than any editor's clichés. W5DQV writes, "This gadget has certainly increased the operating pleasure at this station. It presents nothing new, but several different functions are combined in one convenient package. This is the only control unit a c.w. or phone station needs once the transmitter is properly set up for operation."

"Nuff said. Read on and find out how it's done.

**D**ESPITE the obvious advantages of break-in c.w., a look across any of the c.w. bands will show that very few stations are using it. Unless you are now using full, smooth break-in, you are not enjoying your c.w. contacts as much as possible. Having to flip even one switch is a nuisance, and if you have to turn down the receiver gain and turn on the rig each time you go on the air, and then turn off the rig and turn up the receiver again to listen, the situation becomes

\* 122 East Third St., Okmulgee, Okla.

almost hopeless and might even drive a good c.w. man to take up phone.

The unit to be described was designed to alleviate the above ailments. This little gadget will, with the first closure of the key, silence the receiver, key the transmitter, supply a monitoring sidetone to the headphones or loud-speaker and, if you wish, also close the antenna relay as well as the relays in your power supply. Stop sending and you are back listening again. If you have a T-R switch around the shack, you can run full break-in with the fastest of them, as the receiver will come on between characters. If you do not have a T-R switch you can either buy one or build one as per several excellent articles appearing in the recent amateur literature.<sup>1</sup> In case of a flat pocketbook or a junk box empty of T-R switch parts, an antenna relay can be used, as this unit will close any number of relays with the first closure of the key and will hold these relays closed until a pause in sending occurs. This recovery pause can be varied to

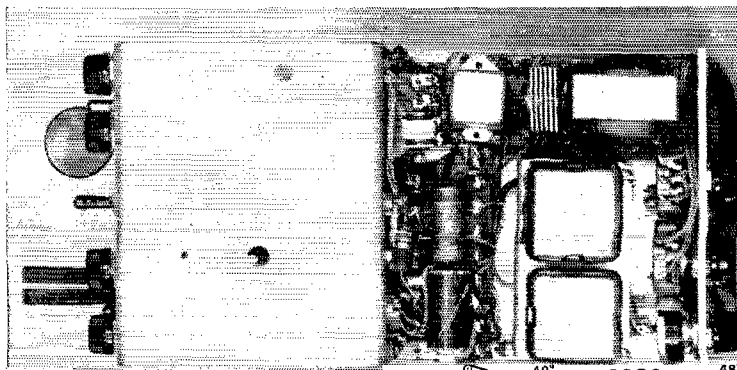
<sup>1</sup> Puckett, "A C.W. Man's Control Unit," *QST*, Feb., 1955.

Puckett, "Break-In with One Antenna," *QST*, Mar., 1954.

Crawfis, "Simplified Break In with One Antenna," *QST*, Nov., 1954.

Heisinger, "A Practical T-R Switch," *CQ*, Oct., 1955.

A top view of the keyer and control unit. The power supply is mounted along the right edge, with the filter capacitors underneath the subchassis.



suit your fancy from a fraction of a second to several seconds.

An electronic keyer complete with keying lever is built in and, for those of you who might want to slow down, or for use when QRM gets rough on DX contacts, a straight hand key is included. Whenever visiting dignitaries are around and you wish to make an impression by running phone, you can go on the air merely by pressing the key or a push-to-talk switch on the mike. The whole unit, including keying lever and hand key, is only 4 inches high, 5 inches wide, and 10 1/2 inches long. This height was chosen so that the unit could slip under the receiver which is mounted on support brackets 4 1/4 inches above the operating desk. This brings the keying levers and frequently-used controls flush with the receiver panel and also raises the receiver controls and dials to a more comfortable operating level.

years of trouble-free service here. Briefly, the circuit functions as follows:  $V_{1A}$  is a saw-tooth generator, the frequency being controlled by  $R_2$  (speed control) while  $R_1$  (ratio control) varies the ratio of dot plate voltage to dash plate voltage. The saw-tooth output of  $V_{1A}$  is fed to the grid of  $V_{2A}$  which acts as an electronic switch to turn the current on or off to the keying relay,  $K_1$ . The grid of  $V_{2A}$  is so biased that when the saw-tooth input voltage exceeds a certain value the tube will conduct, closing  $K_1$ ; when the input voltage falls below this certain value the tube ceases to conduct and  $K_1$  opens. The bias on the grid of  $V_{2A}$  is readily adjusted by varying  $R_3$  (weight control), which controls  $V_{2B}$  current through the common cathode resistor. Those interested in a more complete discussion of circuit operation are referred to Montgomery's excellent article. Almost any plate-circuit relay

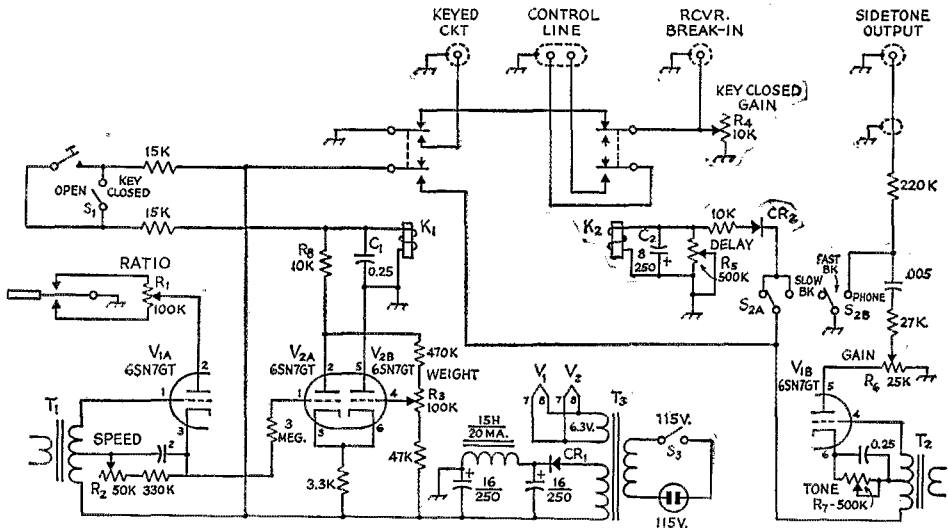


Fig. 1 — Schematic diagram of the combined electronic key and station control unit. All capacitances are given in  $\mu\text{f}$ ; all resistors are 1/2-watt unless specified otherwise.

CR1 — 65-ma. selenium rectifier.

CR2 — 20-ma. selenium rectifier.

$K_1, K_2$  — Plate circuit relays. See text.

$R_1, R_2, R_3, R_4, R_5, R_6, R_7$  — Linear-taper volume controls.

$S_1$  — S.p.s.t. toggle.

$S_2$  — D.p.d.t. center-off toggle.

$T_1, T_2$  — Midget push-pull output transformer, secondary not used.

$T_3$  — Small power transformer, 135-v. secondary.

Incidentally, it also gives you some extra desk space to fill up with log books, ash trays, and QSL cards. No claim is made for originality as only time-tested, straightforward, trouble-free circuits are used, and all components are readily available or easily made in your shack. No difficulties should be experienced in constructing and adjusting this unit.

### Circuit

Examination of the circuit diagram in Fig. 1 will show that the unit consists of four distinct parts: keyer, side-tone generator, delay circuit, and power supply. The keyer is a copy of one developed by Montgomery<sup>2</sup> and has given

with the required number of contacts and capable of fairly fast positive action can be used. Those used by the author are war-surplus Sigma 80110 relays with 16,000-ohm coils,<sup>3</sup> but Potter and Brumfield d.p.d.t. type LM-11 relays have been used, as well as several old relays of unknown vintage from the junk box. With a little juggling of  $R_3$  and  $C_1$ , all of these relays gave good results. No critical adjustment of the relays was required. Note that the + side of the power supply is grounded, permitting the keying lever to be grounded.

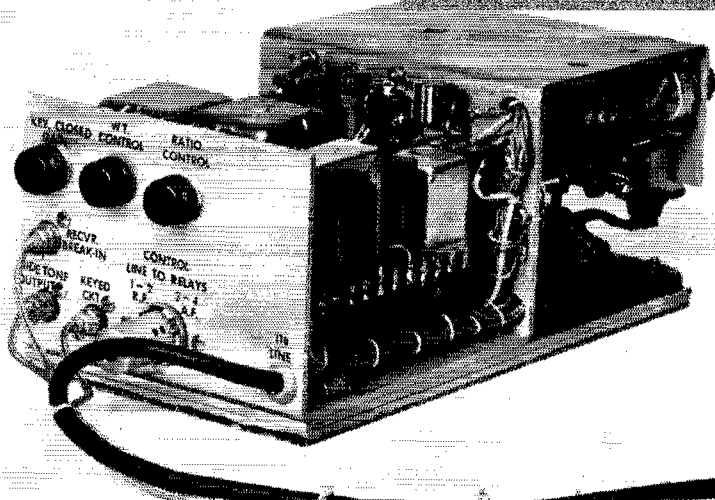
The two 15,000-ohm resistors in the leads to the hand key were included to reduce the voltage to the proper level for  $K_1$  and also to keep

<sup>2</sup> Montgomery, "The Very Electronic Key," *CQ*, Mar., 1952.

<sup>3</sup> Available at time of writing from Avionic Supply, 1223 Venice Blvd., Los Angeles 6, Calif.



Rear view of the keyer, with the several cables in place that run to transmitter and receiver.



the operator from getting "bit" every time he touches an exposed part of the key.  $S_1$  closes the key for transmitter tune up, or it can be used as a "talk-listen" switch when you are set up for phone operation.

The side-tone generator is an audio oscillator supplied with keyed voltage through extra contacts on keying relay  $K_1$ . It can easily be seen that when  $K_1$  closes to silence the receiver and key the transmitter, the side-tone oscillator is also keyed. The audio output is fed through a decoupling network to the grid of the last audio stage in the receiver.

The delayed-recovery portion of the circuit is included for those with delicate ears and no T-R switch. Trying to key an antenna relay will result in a terrific racket and, unless you have a good noise limiter in your receiver, you will probably get loud clicks and pops in the receiver output as it is keyed along with the transmitter. This delay circuit is fed keyed voltage along with the side-tone generator through  $CR_2$ . As soon as the keying relay closes,  $K_2$  also closes and a charge builds up on  $C_2$ , holding  $K_2$  closed after  $K_1$  opens.  $K_2$  remains closed until the charge drains off  $C_2$  while  $R_5$  merely serves to vary the discharge time of  $C_2$ , thus varying the length of time  $K_2$  holds in.  $CR_2$  was found necessary to prevent  $C_2$  discharging through the side-tone generator and making the side-tone characters have long tails.

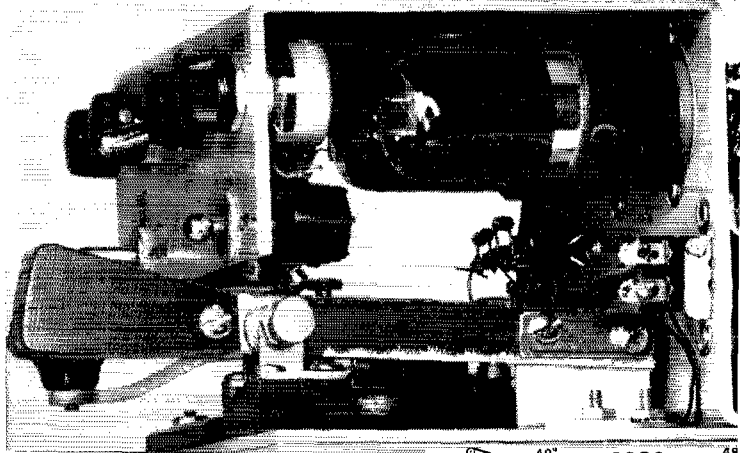
$S_2$  is the function switch, a d.p.d.t. toggle with a "center-off" position. Switched to either of the

"on" positions the delay circuit is activated. In the "phone" position the side-tone output is grounded. In the center "off" position the transmitter is keyed and the receiver is silenced solely by  $K_1$ . Of course, full break-in demands that the final be protected against excessive key-up plate current. If you use a T-R switch you will have to have your final biased to cut off, as any key-up plate current will cause the final to act as a noise generator and this noise will be fed directly into your receiver, masking the weaker signals.

### Construction

Any type of construction that pleases you can be used, as lead length and placement of parts are not critical. Most of the details of the type of construction used here can be seen in the photographs. This open-chassis construction allows lots of equipment to be put into a small space without undue crowding. Note that several subassemblies are used. The power supply is a complete assembly built on a terminal board, wired and tested before being fastened in place. The two output transformers and small capacitors and resistors associated with the saw-tooth and side-tone generators are mounted on a terminal board to form another assembly, and this is fastened to the chassis just below the sockets for the two type 6SN7GT tubes. The components associated with the delay circuit are fastened to the vertical wall beside these tube sockets. The ratio and weight controls, receiver

A close-up view of the key lever also reveals the hiding place of the two dual-triode tubes used for control, sidetone generation and the electronic bug key.



key-down gain control and the various output connections are all mounted on the rear wall. Phono jacks were used for all output connections except the control line, where a small shielded Amphenol connector was employed. The two plug-in type relays are mounted on a little sub-chassis of their own.

### Key Construction

The lever for the electronic keyer is a very simple affair yet it works beautifully and has the desired "bug" feel to it. It is made of several pieces of old hack-saw blades, two contact points from an old relay or vibrator, two stationary adjustable contacts from an old s.p.d.t. relay, a husky right-angle bracket, several screws and nuts and two pieces of bakelite for a handle. Fig. 2 shows the details of construction. The

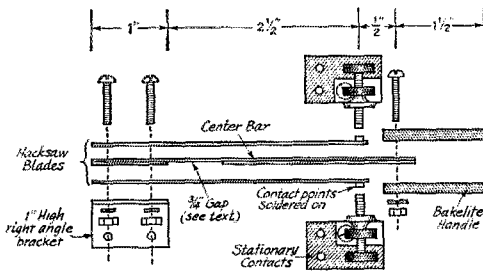


Fig. 2 — Details of the key lever. The stationary contacts are adjustable contacts removed from an old relay and mounted on small blocks of bakelite. The whole key lever is mounted directly on the base plate of the unit.

two side pieces of hack-saw blade with the contacts soldered to them should be gently sprung out until, at rest, they barely touch the center bar. The center bar consists of two pieces of blade soldered together, making the bar two blades thick, except for a gap of about  $\frac{3}{4}$  inch near the mounting bracket where it is only one blade thick. This makes the bar stiff yet allows it to swing from side to side easily.

### Chassis

The heavy-gauge aluminum used for the chassis was obtained by removing the crackle finish from an old panel with paint remover and then scouring well with SOS pads. This gives the aluminum a fine, semigloss finish. It is best, if possible, to have the local tinsmith cut and bend the chassis for you, as the aluminum is rather hard to handle. However, it can be done at home with a little patience and much elbow grease. Two thicknesses of aluminum are used for the base, to provide additional weight and to allow for countersinking the screws that go through the base, to avoid scratching the surface of the operating desk. A piece of thin gasket cork is glued with gasket cement to the bottom of the unit to provide a nonscratch antiskid surface. The cork and cement can be obtained at any auto-supply house.

### Adjustments

After you have finished the wiring, go back over the whole thing again and check each connection. You will be surprised how easy it is to leave one or two connections unsoldered or to connect a wire to the wrong place. After re-checking and satisfying yourself that everything is OK, plug in the line cord, flip on the line switch and see if the heaters light up. Then with the voltmeter check the output of the power supply. It should run from 115 to 130 volts. Connect the side-tone output to the grid of the last audio stage in the receiver and the stand-by line to the stand-by terminal on the receiver. Some receivers have a phono input that feeds directly into the audio, and if yours is so equipped all you need do is plug the sidetone into the phono jack. If your receiver opens the ground end of the r.f. gain control for stand-by, you are again in business and all that is necessary is to connect the stand-by line from the control unit to your receiver stand-by terminal. If your receiver uses some other method of stand-by, it will be necessary to disconnect the ground end

(Continued on page 138)

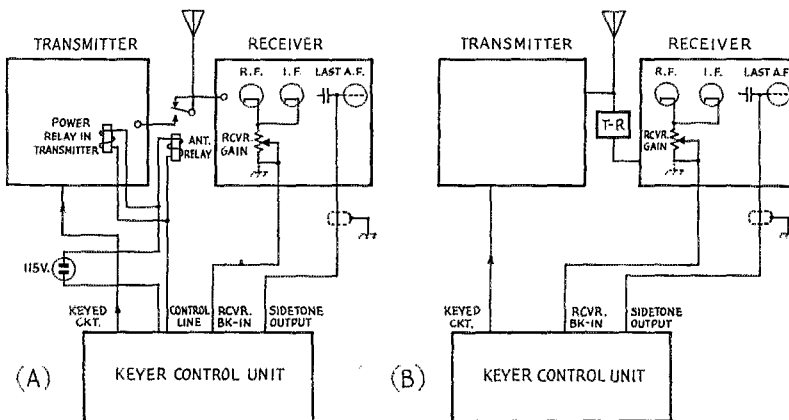


Fig. 3 — Suggested station interconnections for (A) phone or delayed-recovery break-in, and (B) full break-in.



# Correspondence From Members -

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

## AMATEURS?

8291 Lincoln Avenue  
Anaheim, California

Editor, *QST*:

It used to be that our non-commercial status as amateurs was a jealously-guarded and vigorously-defended virtue. I say "used to be" because in recent times, our definition of the word "amateur" seems to have been altered, even perverted in our vocabulary. Today, we find the spectacle of "dollar-per-QLS" nearly unchallenged by our ranks, the commercial endorsements by expeditious amateurs agreeably received, and we blandly accept the fact that recognition and achievement awards most commonly go to those who can afford the most luxurious equipment.

In the sport of hunting, analogous to amateur radio, the hunter who buys a deer or the hunter who sells one is ostracized if his deed is known. The man who kills more than his limit wins not acclaim but scorn from his fellows, as does he who uses unfair or illegal methods. The fisherman who uses hand grenades is not revered or respected by his society, nor is the one who sells the trout in his catch.

Yet in our present concept, the amateur radio counterparts of these things are accepted and indeed prescriptive. We have drawn an unholy distinction between the word "legality" and the word "morality," where there ought be no distinction. And the process is regenerative, as our ranks are swelled by newcomers who look to us for guidance and find none.

To what depths of degredation is our once cherished hobby to sink before we revise our distorted sense of values and end this prostitution of amateur radio?

— R. W. Johnson, *W6MUR*

## ULTIMATE

23 John Street  
Carteret, N. J.

Editor, *QST*:

I have been using an electronic keyer for about one year now (one of the more primitive types) and have recently had the pleasure of using the "Ultimate" keyer. The vast difference and ease of operation of the "Ultimate" as compared to my keyer without self-completing dashes is astounding. I've finally decided to build this keyer and would like an enlarged schematic diagram as advertised in April 1955 *QST*.

— Bob Panek, *K2DSW*

[Editor's Note: Hq. continues to make the enlarged schematics available for 50¢.]

## HARMONIC ANTENNAS

Elizabeth St.  
Fremont, Ohio

Editor, *QST*:

I cannot restrain myself any longer. A situation has become so alarmingly commonplace in recent years that I am really surprised that there has been relatively little said or done about it.

Today practically every new ham who goes on the air puts up some sort of all-band antenna, such as a Windom, trap coil doublet or what have you. These are all great harmonic radiators. Now they even come along with deluxe all-band beams capable of radiating a fat, juicy harmonic around the world.

I can listen on 20 meters any day during busy hours and hear never less than a dozen harmonic signals. They are mostly, but not all, from Novice stations. But this is not the fault of the Novice.

The newcomer sees practically nothing printed these days regarding single band antennas. Always it is a new

version of an all-band antenna. The all-band feature gives them powerful appeal especially to a newcomer.

A good dipole or folded dipole is still the best 80- or 40-meter antenna and will not radiate harmonics on other amateur frequencies.

What about some concentrated efforts in this regard? A few strongly-worded editorials on the subject would do some good. And how about an article in *QST* showing several types of easily constructed harmonic-proof antennas. Let's have no more printed about these "Grand Island Specials" which are now the popular vogue. Also, how about taking the Wouff Hong from its place of rest at Headquarters and threatening to use it on anyone who advocates these antennas in the future?

— Raymond G. Grob, Jr., *W8YFJ*

## OO REPORTS

601 West Spring St.  
Fayette, Missouri

Editor, *QST*:

The other morning, I heard an amateur discussing a harmonic notice he'd received, courtesy of an ARRL Official Observer. He was a little critical of the OO system as a whole and I noticed he attempted to pass the whole thing off with the remark, "After all, ham radio is just a hobby. . . ."

He is right; ham radio is just a hobby. However, when a ham signal strays from the assigned bands, it can be serious interference to a number of important radio services, aero or maritime mobile, public safety, the military, and others.

I'm sure that he would much prefer to receive an innocent post card notice in the mail as a result of being heard by an observer than to receive that franked envelope from the FCC as a result of a complaint from some other radio service. The OO card is worded "Cooperative Reporting." It means just that. Some ham is spending time trying to help him, when he might well be on the air himself. I'm quite sure that if on his job he had to sit by for long periods of time on a long haul 7.8-Mc. point-to-point circuit, with work piling up all around him that he couldn't move because of a 75 phone harmonic planted right on his working channel, he would see the notices in a different light.

— Davis A. Helton, *W0PME*

## THE McCOY

4219 Cedar St.  
New Boston, Ohio

Editor, *QST*:

I have built the Monimatch described in the October issue of *QST*, and I must say it's the real McCoy.

It does everything the book says it can do.

Let's have more of these excellent projects by McCoy.

— Clyde Meadows, *W8NSV*

[OK, see p. 38, this issue—Ed.]

## SIGNAL REPORTS

1108 High Street  
Covington, Ky.

Editor, *QST*:

After spending the past few months on 20, 15 and 10 meter c.w., chasing DX, I have come to the conclusion that we just might as well do away with signal reports.

The "straw that broke the camel's back" was observed a few nights ago on the high end of 20 c.w. An H18 was on with a rough, chirpy signal. He was working Ws and Ks as fast as he could dig them out of the pile-up. The worst signal report he got was a T8. One W5 even went so far as to give him 599 FB! This W5 said that it was his first H18. I guess that was the reason right there. Nobody wanted to take a chance on insulting the H18 and miss getting his QSL.

(Continued on page 138)

# Handling Traffic By System

## Basic Organization, Principles of Implementation, and Requirements for Operation of the ARRL National Traffic System

BY GEORGE HART,\* WINJM

• The first question usually asked about the ARRL National Traffic System is: "Suppose I want to take part, how do I go about it?" The answer is simple: participate in your section traffic net. This will take only a small amount of your operating time and will make you part of a nationwide traffic organization of which we can all be proud.

THE ARRL NATIONAL TRAFFIC SYSTEM now consists of 85 nets. Of these, 72 are at "section" level, representing 51 sections of the ARRL Field Organization (see p. 6). Some of them operate on c.w., some on phone. All of them are tied together by eleven "regional" and three "area" nets, and by the Transcontinental Corps, to form a nationwide traffic system, proper implementation of which means that traffic can be handled from point of origin to point of destination in the shortest possible time, every time.

That phrase "proper implementation" is the catch. It cannot be accomplished without you. Your section traffic net or nets, if it has any, are listed in the ARRL Net Directory (free on request) complete with frequency, time, days of operation and other data. If you don't find your section listed, ask your section Route Manager, Phone Activities Manager or Section Communications Manager. If you find that no net exists, or it is not a part of NTS, you can do something about that too, if you want to; and we want you to, because you are missing out on much of the joy of being an amateur if you don't get in on traffic work. So, start out by reporting in to your section net.

The main purpose of this article is to give you a rundown on how the National Traffic System works. Let's get down to business:

### General Principles

The National Traffic System is not something that grew like Topsy. It was carefully thought out and planned in advance by your ARRL staff on the basis of objectives, opinions and suggestions gleaned from the field of amateur traffic handlers. The big question floating before its organizers in those early pre-NTS days was: "How can we best set up a nationwide structure for systematic handling of message traffic within the amateur bands?" The answers to this question brought into being the following general principles forming the basis of the National Traffic System:

\* National Emergency Coordinator, ARRL.

(1) A maximum number of operators are provided for. This means that the system is open to any or all modes of transmission on any or all amateur bands. Additionally, it is set up so that no operator is required to spend great amounts of time in any net. A couple of hours once a week is enough to be helpful in making the system a success if enough individual amateurs will devote this much time.

(2) All possible measures are taken to promote maximum network efficiency. This means that nets are kept large enough to do their jobs, small enough to prevent unwieldiness; that each net sticks to its own job and concentrates on doing it well; that all nets use a standard operating procedure; and that net managers are selected with the greatest care for best leadership and net know-how qualities.

(3) Coordinated liaison between nets of the National Traffic System is what makes it a system, rather than a scattering of nets loosely

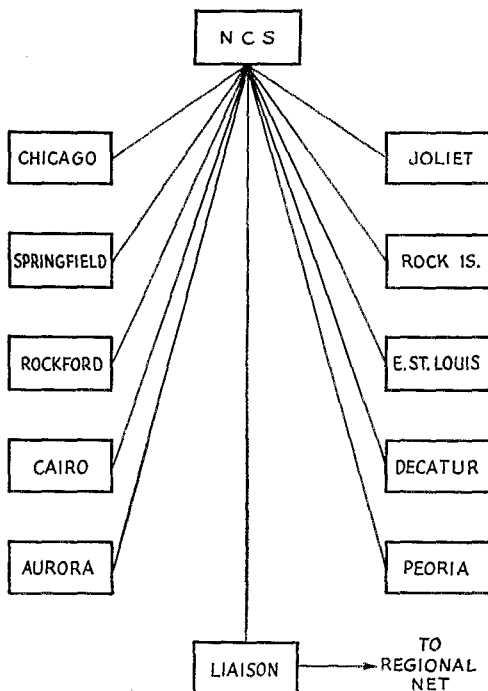


Fig. 1. Typical section net setup (III). All possible points within the section are represented, the more the better. The liaison station takes traffic for all points outside the section to the regional net which meets at 1945. This net first meets at 1900, again if possible at 2200 local standard time.

connected together by individual stations. NTS achieves this by setting up net "levels" based on cumulative coverage for rapid transfer of traffic from point of origination to point of destination. This is done on a nationwide systematic basis that provides smooth traffic flow but requires all nets to operate within certain time limits. Certain stations are designated in advance to perform certain functions so that the liaison will be smooth, efficient and effective.

(4) Each NTS net has its regular outlets for traffic to certain points, but all nets are open to all incoming traffic for their coverage areas. Stations reporting in with traffic should be sure, however, that they know that particular net's coverage area and are familiar with the operating procedure, so that they won't jam the net by requiring the NCS to take valuable time in explanation.

### How NTS Works

The basic plan is absurdly simple. There are three net levels, which we call section, regional and area, each having a specific coverage area. The section net handles all traffic for all points within the ARRL section (see page 6) or sections it covers, and is the origination point of most traffic and the delivery point of nearly *all* traffic. The regional net covers a certain number of sections (usually all those within a call area), and the *area net* covers a certain number of regions (usually all those within time zone boundaries). Then there is the Transcontinental Corps, which has the function of transferring traffic from one area (i.e., NTS area) to another where this is required. The method of handling of each message by these nets depends on whether the message is going to a point within the same section, within the same region, within the same area, or to another area.

At this point, you'll have questions. Let's ask a few of them and give the answers.

(1) Why can't a station with a message simply put it directly into the section net of destination? It can, but if everybody did this there probably wouldn't be any section nets because there would be nobody to staff them.

(2) Doesn't all this relaying slow down the traffic so it takes a long time to reach its destination? No, not if all nets operate according to schedule. Given proper operation of all NTS nets and the TCC, a message from the east coast to the west coast can be delivered the same evening, because the three-hour time difference is in its favor; a message from west coast to east coast is usually subject to a 24-hour delay.

(3) Since traffic is cumulative at regional and area levels, doesn't this greatly overload nets at these levels? Sometimes it does; but don't forget that not all of the traffic at section level reaches region, and not all at region reaches area. Also, there are fewer stations with more traffic at regional and area levels, and operator ability is higher at these levels so that traffic is usually handled more quickly.

(4) Suppose some of the nets find it more

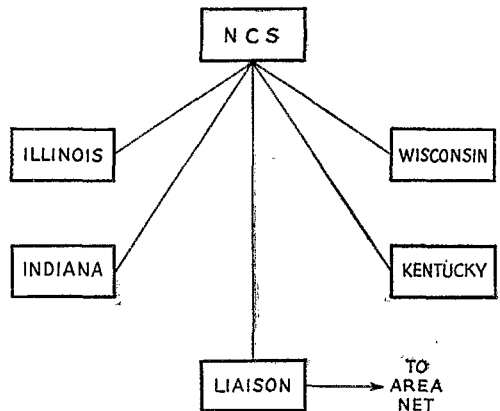


Fig. 2. Typical regional net setup (Ninth Region). The liaison station in Fig. 1 becomes the Illinois representative above, with other stations similarly representing other sections in the same region. The liaison station in this net takes all traffic for points outside the region to the Area Net which meets at 2030. Regional nets first meet at 1945, again at 2130 local standard time.

convenient to hold their sessions at times other than those specified in the NTS plan? Well, this is a big problem. If the nets don't meet in proper sequence, the traffic flow pattern is disrupted and the system will not work as planned. Some of the nets *do* meet at times other than those specified, but it makes for a *bad situation* and the object should be to find the stations that *can* participate at the specified time rather than change the time to suit the individuals' preference.

Any other questions? Let's have them. We'll be glad to answer any and all.

### The Section Net

The foundation of the NTS is the section net. There are 73 sections in the ARRL Field Organization (see page 6), and most of them have section traffic nets, or combined traffic and emergency nets. Quite a few have more than one net — for example, a phone net, a c.w. net, a slow speed or novice net — and some have section nets with more than one session each night, in order to accommodate operators who find one time better than another, as who doesn't? The NTS plan does not put a limit on how many nets each section shall have or what mode shall be used. It does call for close liaison between *all* traffic-handling nets within the section so that all traffic coming into the section can be sent as near as possible to its destination before being actually delivered to the addressee. It also specifies the *times* of section net meetings, so that their operation will fit into the nationwide traffic flow pattern envisaged by the system; but in the case of section nets, there is some leeway even here. For reasons that shall become apparent later, section nets should have at least two meetings, one completing its operation before 1945 (the "early" session), and another commencing operation not earlier than 2200 (the "late" session), both local standard time. NTS

doesn't care whether the nets are conducted on phone, c.w., s.s.b., RTTY, facsimile, television or all of these. It doesn't matter if the early session is by one mode, the late session by another, or if each mode has two or more sessions. Similarly, any frequency in any amateur band may be used.

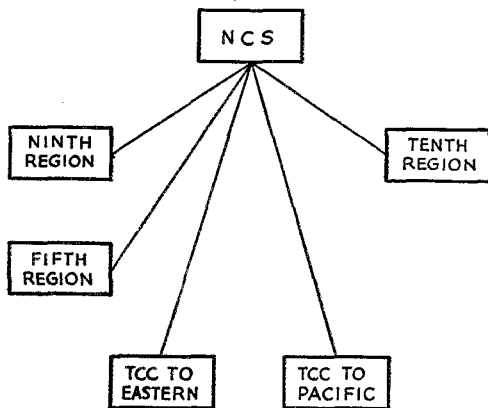


Fig. 3. The Central Area Net layout. The liaison station in Fig. 2 becomes Ninth Region above, with other stations similarly representing the other regions in the CST zone. Traffic for other areas goes to either the TCC-Eastern or TCC-Pacific station, who transfer it to those areas by reporting directly into other area nets or by special schedule with a relay station. The area net meets only once each day, at 2030 standard time.

The objective is coverage of all points within the section before 1945 and after 2200, and complete liaison between all nets to make such coverage possible. Generally speaking, the object of the early session is to collect traffic, of the late session to distribute it.

Each net session must have a net control station, to direct the flow of traffic, and a liaison station or stations to take traffic for points outside the section and to bring traffic back to the late sessions of section nets.

The Section Net welcomes beginners. If there are enough novices interested, it is worth while establishing a novice net; otherwise, perhaps slow-speed and high-speed nets can be operated separately to good advantage (but don't forget liaison!). Some sections operate special training nets (usually on week ends) for the benefit of amateurs who wish to get some network training before they plunge into full-scale net operation.

### Regional Nets

Obviously, traffic for points outside the section must be transmitted or relayed to those points outside the section net. The NTS plan calls for each section to send one or more representatives to its regional net (roughly covering a call area) in which traffic can be centralized, coordinated and distributed to the proper section representative or, if the message in question goes to another region, to the station designated to take such traffic to area. Regional nets start their first session at 1945 local standard time, which is the time by which section nets should be all cleared of their early session. Then, after the

area net has met, regional nets convene again at 2130 to take care of traffic coming back from area and place it in the hands of section net representatives to be carried back to the proper section net for delivery. Note that the station that takes the traffic to area and the one that brings it back from area need not be the same station, although both must be present in the area net.

### The Area Net

At 2030 local standard time, regional net representatives from each time zone (with Mountain and Pacific time zones being considered as one) get together to coordinate inter-regional and inter-area traffic. The procedure is the same as at regional level, except that representatives represent regions instead of sections. The area nets are usually pretty busy and they operate with clock-like precision and no nonsense.

Any traffic not cleared takes alternate or overflow routings, or the station left holding some goes directly to the destination region net.

### The Transcontinental Corps

Each area net has two TCC members reporting in to take traffic for each of the other two areas. This traffic is either put into the destination area net direct, or relayed to another station in that area by special schedule, that station then putting it into his area net or direct into destination nets, whichever is more convenient or feasible. Much depends on the time factor. For example, the TCC station in the Eastern Area Net designated to transfer traffic to the Central Area has no time for a special schedule because Central Area Net starts operating as soon as Eastern Area Net vacates the frequency (at 2130 EST/2030 CST), so he usually reports his traffic directly into CAN. On the other hand, the TCC station in EAN designated to transfer traffic to the Pacific Area has two hours in which to make the transfer before PAN meets at 2330 EST/2030 PST, so this can be accomplished by a special schedule on 40 or 20 meters. A knotty problem has been to find qualified stations in the Eastern Area to keep a late schedule with the TCC station in PAN who collects traffic for Eastern Area, since the latter will not have this traffic until 2130 PST/0030 EST. If you are a night owl and can wiggle a key, we can use you, OM.

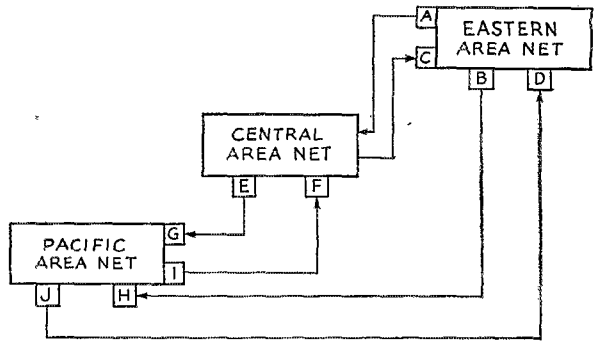
### Administration

Naturally, an organization as extensive in scope as NTS presents a multitude of administrative problems. All information regarding the system's operation must be centrally coordinated, and each cog in the machinery must have some idea what the rest of the machinery is doing, how it works, and what its problems are. Every net must have its net manager, its NCSs, and its liaison stations.

Section nets are managed either by a regular section appointee (RM for c.w., PAM for phone, SEC or EC for emergency nets tied into the system), or by some amateur designated by one of these or by the SCM himself. This decen-

◆

**Fig. 4.** How the Transcontinental Corps works. The letters represent stations, and arrows show the direction of traffic flow in each case. Note that stations A and C report directly into the Central Area Net (necessary because the two nets meet on consecutive hours), while other TCC stations work each other on special schedules to exchange inter-area traffic.



◆

tralizes a large chunk of the NTS appointive function from your headquarters and puts it into the hands of the elected official who knows his local people best — the SCM. The net manager then has the responsibility for designating net control stations, liaisons, and for reporting net activities each month to the SCM and to headquarters for the record.

At regional and area NTS levels, the Articles of Association provide for appointment by the ARRL Communications Manager. This involves the appointment of eleven regional net managers, three area net managers and three TCC Directors, each of whom is "cleared" with his resident SCM before the appointment is made. Regional and area net managers have the same functions as section net managers — designation of NCSs, liaison stations, issuance of certificate, and monthly status reporting to headquarters. TCC Directors (one for each area) have the not-easy job of finding stations to perform each TCC function assigned to their areas, keeping track of the consistency and success with which these functions are performed, and also of reporting each month to headquarters.

#### Certification

Yes, there are NTS certificates — separate ones for section, regional and area nets. They are issued by the SCM (on recommendation of the net manager concerned) for section nets, by the regional and area net managers for those nets. But they are not issued at random or on request

to net members; certain qualifications have to be met. NTS certificates are not easy to get. Regional and Area Net managers get special hand-lettered certificates.

#### Proposed Changes

NTS does not always operate in strict accordance with the structure outlined above. As in all systems or organizations, there are continuing difficulties which require action.

One of the biggest problems has been implementation of the late (2200) section net. A current proposal to adopt an extra regional net session some time before the first section net session is aimed at making the second section net meeting unnecessary and adding other advantages. Other current proposals have to do with changing the coverage areas of regional and area nets; changing the rigid time schedule or abolishing it altogether in favor of a simple statement of sequential operation; and incorporation of some of the so-called "independent" nets as an integral part of the system.

Each such proposal is given careful consideration and discussion before being implemented or discarded. There is nothing sacred or inviolate about the existing NTS structure, and some of the changes proposed above may be put into effect before this article appears in print. Interested amateurs should follow comments in the National Traffic System heading under "Traffic Topics" which appears in the *Operating News* section of each issue of *QST*.

(Continued on page 140)

◆

**Fig. 5.** The NTS Time Schedule. The connection between area nets is provided by the Transcontinental Corps (TCC). Normally, there is no direct liaison between nets of different areas; all inter-area traffic goes through the area net and the TCC. The Mountain Standard Time zone is part of the Pacific Area.

GMT	PST	Pacific Area	CST	Central Area	EST	Eastern Area
0000	1600		1800		1900	Section Nets
0045	1645		1845		1945	Regional Nets
0100	1700		1900	Section Nets	2000	Regional Nets
0130	1730		1930	Section Nets	2030	Area Net
0145	1745		1945	Regional Nets	2045	Area Net
0230	1830		2030	Area Net	2130	Regional Nets
0300	1900	Section Nets	2100	Area Net	2200	Section Nets
0330	1930	Section Nets	2130	Regional Nets	2230	
0345	1945	Regional Nets	2145	Regional Nets	2245	
0400	2000	Regional Nets	2200	Section Nets	2300	
0430	2030	Area Net	2230		2330	
0530	2130	Regional Nets	2330		0030	
0600	2200	Section Nets	0000		0100	

# F.C.C.'s Amateur Service Group

## How Amateur Licenses Are Processed

BY RICHARD L. BALDWIN,\* WIIKE.

AS A RADIO AMATEUR you enjoy a unique position. You are a member of one of the hobbies in the United States which require a federal license. That little piece of paper identifies you as one of the 150,000 U. S. citizens authorized to have your own private radio station. Every month FCC is issuing several thousand of these licenses to new amateurs, for renewals of existing licenses, and to take care of changes of address and upgrading to higher grades of license.

You probably used the ARRL's *License Manual* to prepare for the amateur exam, and quite possibly you copied the League's Hq. station for code practice. And you remember, perhaps, how a bead of perspiration trickled down your forehead as the FCC engineer watched over your shoulder while the tape machine was punching out the required w.p.m. for your code test. But, after you knew you had passed, what about those weeks while you patiently, or impatiently, waited for the Commission to send along that magic piece of paper? Did you ever wonder what was going on down there in Washington while your application was being processed? Let's go on a trip to the Washington offices of the Commission and get to see some of the behind-the-scenes action.

### The Amateur Service Group

If you visit the New Post Office Building in Washington, at the corner of 12th and Pennsylvania Ave., and go up to the sixth floor, there in the maze of FCC offices you'll find three rooms occupied by the Amateur Service Group. This group, under the Public Safety and Amateur Division of the Commission, has the responsibility for processing the many thousands of amateur license applications and issuing the licenses accordingly. In addition, this group issues licenses in the Radio Amateur Civil Emergency Service and the Disaster Communications Service. Considering this load, the Amateur Service Group functions as well as it does because

\* Managing Editor, QST.

it has a system, and because the system has some good people operating it. Mr. Frank Gentile is Chief of the group, and under his direction some eight or ten people are engaged in processing amateur licenses. So let's see how these folks operate, and what the system is.

Every day hundreds of amateur license applications are received at the Commission offices, and just to show you how fast they pile up we took a photograph of some of them, which you can see on p. 55. As these applications come in they are counted and sorted by call area and according to whether new, modification or renewal—this part of the job being done by Mrs. Jane Carroll. Mrs. Carroll, incidentally, has been with the Commission for 15 years, and although she is not a licensed amateur, she most certainly does have the interests of amateurs at heart. She is particularly upset when incorrect applications have to be sent back, thus delaying the whole licensing process—but more about that later.

After the incoming applications have had this initial processing, they are stacked in order of receipt to be put through the mill by the various clerks in the office.

### New Licenses

Let's say that one of the clerks has just been handed a pile of license applications consisting only of Novices. (All applications involving examinations, including failures, are forwarded to Washington by the field offices!) The clerk thereupon goes through the applications one by one, checking each one for accuracy and completeness. Is the complete name and address there? How about the place and date of birth? (A common mistake is to list the current year as the date of birth—for example, Dec. 1, 1956!) Have all the queries been answered either "yes" or "no"? The clerk must carefully check all items to be sure that the application is correct in every detail. Small typographical errors can be corrected by the clerks, but if any applica-



◆  
This is Mr. Frank Gentile, Chief of the Amateur Service Group.  
◆

QST for



◆

Mr. Paul Kiefaber and Mrs. Jane Carroll finish sorting and filing a group of applications which have been separated by license class and by call area.

◆



tion is found to be defective in some major aspect, then a suitable form letter is prepared and passed either to Mr. Gentile or his assistant, Mr. Paul Kiefaber, for review and mailing.

If the application is okay, the next step is to assign call letters. In the photo on p. 56 you will see a large mechanized file cabinet, of which there are several in these offices. One of them contains assignable call signs, set up in advance and double-checked to eliminate duplications and such combinations as SOS, Q signals, or other "unassignable" calls. The  $3 \times 5$  cards on which each call is listed are stacked in alphabetical order; the assignment of call letters is made by clerks who have little or no knowledge of amateur radio as such, strictly in alphabetical sequence of the assignable calls. As each call letter combination is used up, that  $3 \times 5$  card is removed from the file, so that duplicate calls will not be assigned. The policy so far, incidentally, has been to go through the W alphabet once, then back through it to pick up expired calls, and then start in on Ks. This means that although once upon a time you could tell pretty well the seniority of an amateur just by looking at his call sign, that is no longer possible, in the case of 3-letter calls — another reason why the two-letter call is regarded in such high esteem!

But to continue — our hypothetical license application has been checked for accuracy and call letters have been assigned, and it is now ready for typing. The Commission staff works on this stuff in batches, in the interest of economy and over-all speed. We have been talking about a single license, but the clerks, of course, handle the applications in groups of 50 or 75, as do the typists who prepare the actual licenses.

The license blanks consist of an original and five carbon copies, made up ahead of time in book form for convenience. One of the copies is for the name file, another copy is for the geographic file, another is for the call letter file, the next is for the expiration file, and the last copy is for the field office of the FCC district in which the applicant resides.

The term of the license, by the way, (one year for Novices and five years for other classes of license) begins the day it is typed.

After being typed, the license and the original application are checked once more before mailing. The mailing operation consists of separating the various copies and filing them, provided no error is found, and dropping the original license in the mail. Every effort is made to file the various copies immediately (except that the expiration file copy is first sent to the publisher of the *Call Book*, who extracts the necessary information for his records and then returns that expiration copy to the Commission). Actually, the filing of the copies is quite a job, and sometimes falls behind because of the press of other duties. For example, the copy that goes into the expiration file, in the case of the *renewals*, must replace a previous expiration copy. And similarly for the other copies, so that in 20% of the applications handled each week a *double filing* job is involved.

### *Renewals*

In the case of renewals, the procedure is much the same as that for new application, except that the renewal application is customarily made on Form 405A instead of the Form 610. Although the amateur applicant does all the typing or hand printing on this job, it still requires a fair amount of time to process it at the Commission's offices. The form has to be checked against the Commission records to make sure that the information put down by the amateur on the application is the same as that already on file. Again, minor errors, such as typing or spelling mistakes, can be corrected by the FCC clerks, but if, for example, the address given by the amateur does not jibe with the information in the Commission's records (as happens), then the application on the Form 405A is returned to the amateur together with a Form 610 and a request that the amateur file a suitable modification for change of address.

If the Form 405A is found to be all in order, it is stamped with the new expiration date

(which will be five years from the date of processing) and then the original copy is returned to the amateur, a second copy goes first to the *Call Book* and then to the Field Office of the district in which the amateur lives, and a third copy remains in the Washington files.

### Modifications

Modifications for change of address are handled routinely, provided the application is properly filled out. But that "routinely" still means quite a bit of work on the part of the license clerks. Again, careful checking is the watchword. Examples? Does the new address involve a change of call sign? (When we visited the Commission getting the background info for this article they showed us a pile of correspondence in connection with one amateur who had moved to a new geographical address and also had a different mail address, both of which were in a call area other than that in which his existing license was issued, but he wanted to retain the same call letters and call area!) Is the amateur applying for change of address only, or is there also a change in grade of license? This point is important, because if there is an upgrading of the license, the term is extended for five years, while a change-of-address-only does not extend the term of the license.

### How Long Does It Take?

If this all seems like a fairly easy process, you're beginning to wonder why it takes a month or more to get that modification or renewal, and perhaps even longer for that new license. Let's take a look at some of the problems the folks at the Washington office face in their processing of applications from amateurs.

One difficulty is that of personnel. The number of amateur licenses issued monthly has increased markedly the past few years, yet budgetary considerations have made it impossible for the number of Commission personnel to increase correspondingly.

If all the applications were correct, it would still represent a considerable load to handle some seven thousand items per month, and

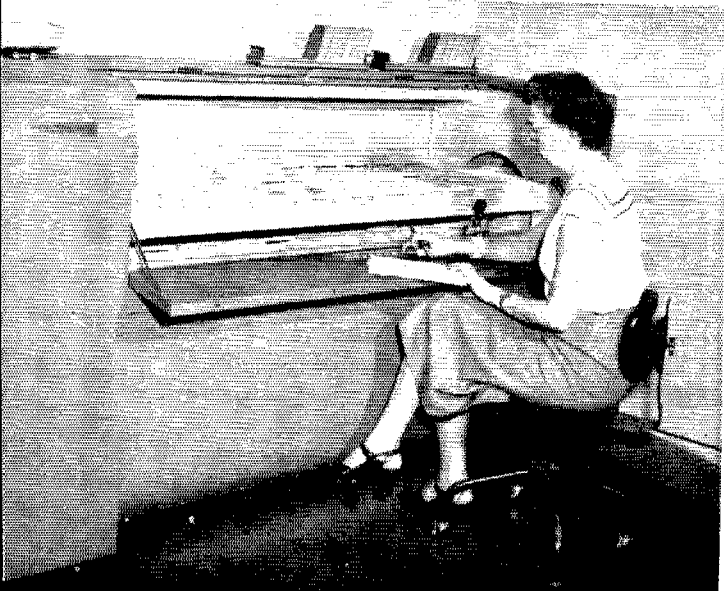
there are a number of routine, detailed operations on each item, but something between five and ten per cent of the license applications are defective and must be returned to the applicants. This requires time and slows down the entire process. Applications for new licenses include, in addition to those mentioned earlier, such defects as not having all of the blanks properly filled out, not being signed or notarized, or in the case of mail exams, being returned directly to Washington instead of to the field office from which the examination was originally obtained. Modification requests are defective in that the applicant may claim operator privileges which do not agree with the Commission records, or an application for advancement to a higher grade of license also shows a change of address which is not properly requested in the application; or, again, some of the blanks are not completely filled out.

Renewals seem to cause the most difficulty, not only to the individual amateur but also to the Commission. Remember that if filing an application for renewal on the so-called short form 405A (and that is the only form to use when yours is a straight renewal request with no modification for change of address or change of license grade involved) you mail to the Commission *only* that short form. Do *not* include with it your original amateur license. When the signed form is received back from the Commission, it must be attached to your original license. That means that once having renewed, you must have two pieces of paper in your shack — your original amateur license and the Commission: okayed Form 405A.

### Commission Correspondence

Another great time waster at the Commission is the volume of individual correspondence received, much of it unnecessary. One example of the latter are requests for special call signs. In this matter even rank hath no privilege; not so very long ago a top-ranking military officer asked for a special call sign sequence and was turned down — the rules didn't provide for such

(Continued on page 146)



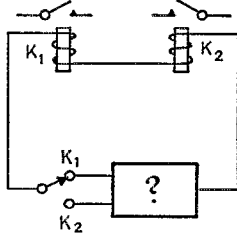
A license clerk pushes a button on one of the mechanized file cabinets, bringing one of the large filing trays into position.

**QST** for

# Quist Quiz

Lynn Wilson, W4JXD of Alexandria, Va., sends in a problem that is worthy of your attention because the solution may prove useful in your ham shack some day.

Two conventional d.c. relays are connected as shown, and the problem is to decide (1) what to put in the box, and (2) what to do to the relays, if anything, so that the switch position controls which relay will close. (No rectifiers, please.)



The answer to last month's Quist Quiz, just in case you didn't get it, is 1 ohm. If you redraw the circuit, you will see that the three resistors are in parallel and that the circuit isn't really very complicated.

This was an excellent example of how not to draw a diagram. Such illogical diagrams can foul up even an expert in the game. If you're interested, there was an article on circuit diagrams on page 42 of the January, 1954, issue of *QST*.

## OUR COVER

This month's cover shot shows by means of a mirror both the front and rear of W1ICP's latest version of the Monimatch. This gadget is catching on all over the country and according to Mac's correspondence is being built by an amazing number of the gang. You'll find further details on this model at page 38 of this issue.



W5SZB and W5TVL conducted an interclub meeting of the Edinburg and McAllen (Texas) Kiwanis Clubs via amateur radio. This shows the Edinburg setup, with W5SZB at the extreme right. He reports that this is the first meeting of its kind in the records of Kiwanis International. Others shown above are Dr. Henry Forcher, Mr. Al Ramirez, and Mr. Harry Quin.

## CALLING ALL NOVICES CQ N-R!

The Novice Round-up makes its sixth annual appearance this year. February 2nd through 17th. Old-timers are invited to join in the fun and give the newcomers contacts.

Full details appeared in January *QST*, but as a reminder, don't forget that the Round-up starts on Saturday, February 2nd, at 6:00 P.M., local time, and ends on Sunday, February 17th, 9:00 P.M. local time. A time limit of forty hours is available. This can be used any way you prefer in operation on 80, 40, 15 and 2 meters.

You've still time to get extra scoring credits by qualifying in the Code Proficiency Run from W1AW on January 17th, or from W6OWP on January 3rd. In the meantime, send to ARRL Headquarters for your free map of the United States, a contest log, and reporting forms for the Novice Round-up. The fine outline map can be posted in your shack to keep a visual check on your worked-all-states progress.

Remember to read January *QST* again for full details on rules.



## February 1932

... The big news twenty-five years ago was the moving and expansion of the 80-meter phone band, now to be 3900 to 4000 kc. It had previously been at the low end of the band.

... The Department of Commerce reported that the number of amateurs had increased 20% during the past year, now standing at 22,739.

... Ross Hull described what he called an unorthodox receiver, using two r.f. stages, a regenerative detector, and one stage of audio. He said that this was no set for a beginner to build, that only an advanced amateur should tackle it. How times have changed, for look at the stuff that a Novice puts together today!

... Dellenbaugh and Quinby discussed the importance of the first choke in a power supply filter, while Grammer wrote of the merits of various tubes used as crystal oscillators.

... This February, 1932, issue also had an epistle from The Old Man, entitled "Rotten Young Squirts," in which he pointed out the dreadful vengeance that might be wreaked on those who had rotten fists, or who ventured outside the amateur bands, or who sent any kind of a false signal. He voiced particular alarm over the possible fate of those who sent a multitude of CQs without signing their calls.

... And say! The M&H Sporting Goods Co. of Philadelphia advertised a bunch of Navy surplus, including receiving types at a dime each and some 5-watters for only six bits, while silicon bronze aerial wire went for \$1.25 for 600 feet.



# Hints and Kinks

## For the Experimenter



### SERVICE NOTES ON SOME HAMMARLUND RECEIVERS

WHEN Hammarlund receivers type SP-100, SP-200, SP-400 and the surplus versions (BC-779, etc.) are operating properly, the maximum high-frequency oscillator drift is usually about 50 kc., and most of this takes place during the initial warm-up. The oscillator drift characteristics of these receivers can be materially improved by making a simple modification suggested by Jack Scheider of Hammarlund's Engineering Department.

First, obtain a 3.3- $\mu$ f. temperature compensating capacitor having the highest negative temperature coefficient available. Three 10- $\mu$ f. capacitors may be connected in series if the 3.3- $\mu$ f. job is not obtainable. Lift the top shield from the main tuning capacitor gang after removing the mounting screws from the top plate of the shield. Connect the 3.3- $\mu$ f. capacitor between the stator terminal of the oscillator tuning capacitor (the first section away from the panel) and ground.

Realignment of the oscillator trimmers is the next operation. Turn the receiver upside down, panel facing toward you, and remove the bottom cover. Using a signal generator or the standard frequencies from WWV, adjust the trimmers for on-the-noise calibration of the test signals. The trimmer control shafts are accessible through the line of holes running from left to right across the shielded coil compartment. The line of holes directly to the rear of the panel are over the oscillator trimmers. Do not touch any of the other trimmers. All of the more popular receivers in the group referred to above have the high-frequency band trimmer at the left end of the line. Move on one step to the right each time the range of the receiver is decreased to the next lowest band.

Since the shunt capacitance which has been added to the circuit is only 3.3  $\mu$ f., it is obvious that each oscillator trimmer will require only slight adjustment. Only a fraction of a turn of each adjustment screw should be necessary.

Everyone who has made this modification to his receiver reports complete satisfaction. One report stated that the drift had been reduced to less than 200 cycles, and another claimed that the modified set was excellent for s.s.b. reception.

### Audio-Limiter Alterations

The following is a step-by-step procedure for improving the action of the noise limiter for the aforementioned receivers. If you have the bottom plate off the receiver because of the oscillator modification, now is a good time to go to work on the limiter.

### Audio-Circuit Changes

Operations 1 through 5 involve the first-audio tube socket.

- 1) Remove .02- $\mu$ f. coupling capacitor feeding grid of first-audio tube. Replace capacitor with a jumper.
- 2) Remove grid-leak resistor from grid pin.
- 3) Remove ground connection from Pin 8.
- 4) Remove lead from 3-volt bias to Pin 6.
- 5) Connect a 100-ohm  $\frac{1}{2}$ -watt resistor between Pin 8 and ground.

### Second Detector-Limiter Modifications

1) Disconnect all wiring to the second detector socket (6H6) except that terminated at Pins 1, 2 and 7.

2) Remove all components and wiring from the terminal strip adjacent to the 6H6 socket except heater leads on the last lug.

3) Remove all wiring from the 6N7 socket.

Note: Steps 4 through 8 to follow pertain to wiring of the 6H6 socket. Fig. 1 is a sketch of the socket and the new wiring.

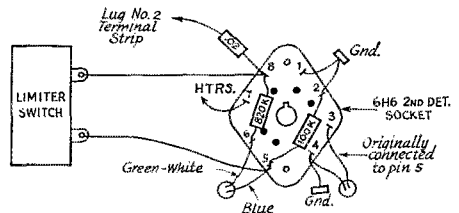


Fig. 1 — Sketch of the layout for the second-detector socket (Hammarlund SP series receivers) after modification.

- 4) Connect the lead that originally went to Pin 5 to Pin 3.
- 5) Ground Pins 1, 2 and 4.
- 6) Connect the following to Pin 5: a lead to the limiter switch; a 100K  $\frac{1}{2}$ -watt resistor to ground; the blue lead from the i.f. transformer.
- 7) Connect an 820K  $\frac{1}{2}$ -watt resistor between Pins 6 and 8, and connect the green-white lead that originally went to the 6N7 grids to Pin 6.
- 8) Connect the .02- $\mu$ f. coupling capacitor (see Step 1 of audio-circuit changes) from Pin 8 to Lug No. 2 of the terminal strip. Wire a lead between Pin 8 and the remaining terminal on the limiter switch.
- 9) Solder the audio input lead to Lug No. 2 on the terminal strip.

Do not attempt these modifications unless you feel that you are thoroughly capable of diving into a superheterodyne receiver. If you have any hesitancy about operating on your set, either forget the whole idea or pass the job along to someone who is familiar with what makes a superhet tick.

— Frank Lester, W2AMJ

## ADDITIONAL KEYING HINTS FOR THE DX-100

IN THE AUGUST ISSUE of *QST*, W8MWZ presented a circuit for modifying the DX-100 against key clicks. The circuit has the further advantage of buffer-grid keying instead of oscillator keying. However, this circuit will not work properly with all DX-100s, the problem being that of self-oscillation during the key-up period (after the key is closed the first time).

The circuit shown herewith as Fig. 2 will work equally well with the transmitter switched for

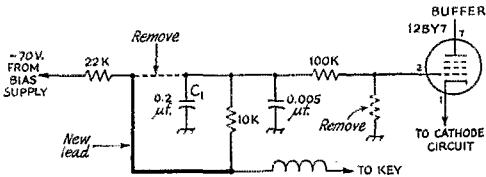


Fig. 2—Circuit of DX-100 keying arrangement used at W9PNL. Arrows point to original components and wiring. Resistors are  $\frac{1}{2}$  watt.

either crystal or v.f.o. operation, and is essentially the same as the W8MWZ arrangement with respect to the shape of the envelope.

In the event the original circuit (August *QST*) has been installed, this latest modification is extremely simple. Disconnect the 22K isolation resistor from Pin 7 of the 5V4 rectifier socket. Solder a 10-inch lead to the free end of the resistor; this connection can remain "airborne" as the resistor is secured at the other end. The other end of the 10-inch lead is then soldered to the top terminal of the new three-lug terminal strip at the "key end" of the 10K resistor. The dashed line in Fig. 2 shows the connection that will be broken when the 22K resistor is lifted from the rectifier socket, and the heavy black line shows the correct terminations for the new 10-inch lead. The final operation is the removal of the 100K resistor connected between Pin 2 of the 12BY7 socket and ground.

If the transmitter has not been previously modified, this circuit can be easily installed by following most of the instructions offered by W8MWZ. One additional suggestion is that  $C_1$  be mounted in the 12BY7 compartment to save the need of running two wires from the 5V4 socket.

—Irving M. Hoff, W9PNL

After modification as per August *QST*, the 12BY7 buffer stage in the DX-100 would not cut

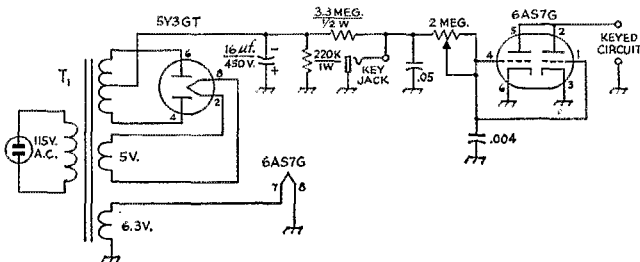


Fig. 4—A simple vacuum-tube keyer for the DX-100 or any similar type transmitter.  $T_1$  is a small broadcast replacement type power transformer.

off under key-up conditions. This difficulty was remedied, without affecting the desirable keying features that had otherwise been obtained, by substituting a 2.5-mh. r.f. choke for the 100K isolation resistor connected in series with the lead to Pin 2 of the 12BY7 buffer tube.

—Bob Findlay, W4BTU

The DX-100 is considered by many to be one of the best transmitter buys available. However, like any transmitter in which the v.f.o. cathode is keyed alone or with a first buffer, the rig does radiate clicks. Fortunately, with the DX-100, the solution is easy as outlined below.

1) Remove the transmitter from the cabinet and set the transmitter so that it rests on its rear apron.

2) Take out the crystals and put them back in the junk box. With that swell v.f.o. you don't need them, anyway.

3) Turn the crystal v.f.o. switch to any crystal position and leave it there permanently.

4) Remove the 6AU6 v.f.o. tube and, using your volt-ohm meter or other continuity tester, determine which blue lead coming to the crystal-v.f.o. switch is connected to Terminal 7 of the v.f.o. tube.

5) Solder an insulated wire from this crystal-v.f.o. switch terminal to Terminal 1 of the plate switch. This is the terminal that connects directly to the phone-c.w. switch (with another lead going to the remote socket). The wire can be dressed along the preformed cable.

6) Replace the v.f.o. tube and shield, and put the transmitter back in its cabinet.

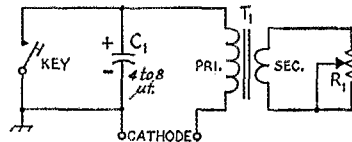


Fig. 3—Circuit of a simple key-thump filter for the DX-100. The electrolytic capacitor,  $C_1$ , must have a voltage rating greater than the key-up cathode voltage of the keyed stage.  $R_1$  is a 300-ohm potentiometer used to adjust the inductance (primary of  $T_1$ ) in the circuit.  $T_1$  is a standard filament transformer having a 6.3-volt secondary.

Now, when the plate switch (or remote) is thrown to "on," the v.f.o. is turned on and the first buffer only is keyed. The wave can now be shaped as desired by either an LC key thump filter (see Fig. 3) or a v.t. keyer inserted between

(Continued on page 148)

# Strays

Nationwide TVI could happen! W2ND, Network Film Engineer for ABC in New York, was astonished recently when a picture tube in his control room started to flicker on and off, spelling CQ. The tube was monitoring the output of a standby film projector. Had it been necessary to use that machine for the show then in progress, K2IAD, located across the street, would have had his c.w. signals seen, blinker fashion, over the entire network. A video circuit in the projection equipment was accidentally resonant in the 7 Mc. band.

-----

Back in 1952 W4URF worked W7OVA for his first Oregon QSO. By 1956 W4URF had become K8CSG and again needed Oregon for WAS. Whom did he work for his first Oregon QSO? W7OVA, of course!

-----

W1RDV reports an unusual contact on Nov. 24th involving ZS1SW, ZS1B, ZS1HN, and several scores of W stations. ZS1SW was operating on 10 meters and was remotely controlled by ZS1B, thirty miles away, on 6 meters. ZS1HN was also on six and was rebroadcast by ZS1B. A receiver at ZS1B tuned to ten, and a 6-meter link between him and ZS1SW completed the arrangement. W1RDV says that his own signals were strong enough to operate the VOX relay at ZS1SW and for him to contact W8YIN and W4TFB via the African stations.

-----

The FCC reports that through the efforts of one of its field offices and a local TVI committee, a Massachusetts amateur — an invalid — was finally able to get on the air. Before he started operating, neighbors imagined that his installation was ruining their TV reception. This made him so nervous that he sought FCC help. Inspection proved that his gear was okay, and he went on the air without incident. The amateur has found that his new hobby has brought him

## Silent Keys

IT IS WITH DEEP REGRET that we record the passing of these amateurs:

- W1AAF, Charles F. Pendergrast, Boston, Mass.
- W1DYT, Henry A. Clafin, Millbury, Mass.
- W2FEV, Henry H. Hauck, Metuchen, N. J.
- W2LXL, Claus D. Eckhoff, Franklin Square, N. Y.
- W2SRK, Roderick A. Beach, Nichols, N. Y.
- W2WVB, Charles B. Remer, Rochelle Park, N. J.
- W3BYC, Carl J. Seydel, Philadelphia, Penna.
- W3UF, William B. Allen, Eastport, Md.
- K4HCB, Maurice W. Mueller, Ferndale, Fla.
- W5MZO, Claiborne B. Cook, Ft. Worth, Texas
- K6MMP, Ferrell H. Weedon, Oakland, Calif.
- W6OEV, Francis E. Kellog, Tracy, Calif.
- W7AXZ, Eugene North, Seattle, Wash.
- W7FVY, Clyde J. Criswell, Tacoma, Wash.
- W7HPJ, Allen H. Walsh, Olympia, Wash.
- W8CNG, Clarence D. Knepper, Dayton, Ohio
- W8HDE, Russell A. Shields, jr., Highland Park, Mich.
- W8ORU, Russell H. Johnson, Avon, Ohio
- W8ULL, Roy S. Sawdey, jr., Solon, Ohio
- W8USO, Heber H. Legg, Oak Hill, West Va.
- W9HEM, James B. Simpson, Colorado Springs, Colo.
- VE3BFM, Max I. Martin, Kenora, Ontario, Can.
- VE7ATJ, T. J. Corley, Nanoose Bay, B. C., Can.

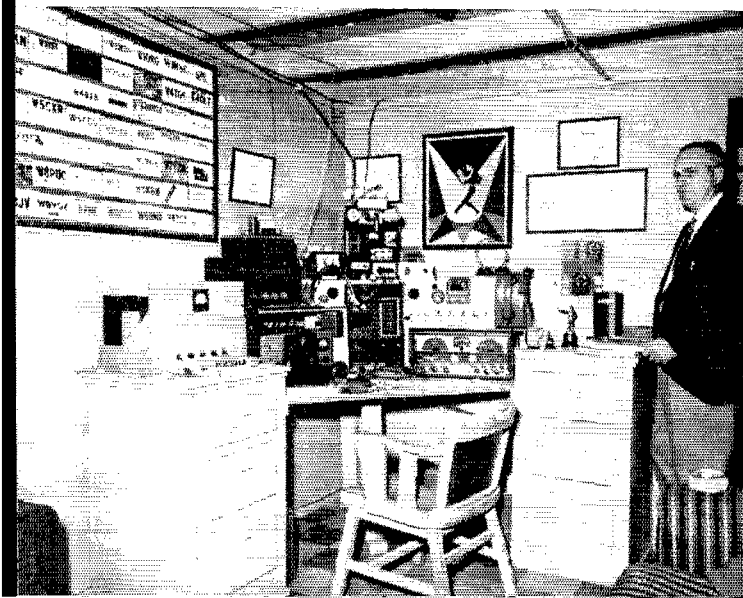
relaxation, relief from boredom, and the ability to endure an affliction which has beset him for more than 10 years.

-----

The Commission further reports that it discovered and closed down nearly 150 illegal radio stations during 1956.

## FEEDBACK

Perhaps it should have been pointed out in the December issue that in the circuit of WØMIQ's grounded-grid 4X150A linear amplifier, link coupling from the exciter is necessary to supply the required d.c. cathode return. If a pi network is used in the output of the exciter, or if a series capacitor is used in the link line, a 1-mh. 300-ma. r.f. choke should be connected in parallel with  $R_1$ .



Here's how W5KSE built his console. He used a 4' x 4' x 1/2" piece of plywood for the center section, and a couple of 3-drawer chests for the end sections. He thus has plenty of operating space in a small area.

QST for



CONDUCTED BY ROD NEWKIRK,\* W9BRD

**What?**

Last month in tongue-in-cheek fun we touched on the so-called glamorizing of DX. We say so-called because the proposition amounts to lily-gilding. Shucks, there is no more real need to glamorize DX than there is need to glorify any other miraculous manifestation.

You get your ham license. You build or buy an r.f. generator (transmitter) and an r.f. detector (receiver). You devise or purchase an r.f. radiator-interceptor (antenna). Then you manipulate your key or speak into your mike to converse amiably with kindred souls thousands of miles away. Look, ma, no wires! Nothing to it—so superficially simple that you quickly become ensnared in secondary considerations like countries totals, traffic routes, contest results, or rag chews on such minutiae as the weather, the QRM, and Aunt Agatha's asthma, all but entirely losing your awareness of the grand magical mystery itself.

Then Oswald, the neighbor's snooty kid, spots the new beam on your roof and drops over to pepper you with questions. Most of them are easy: "Who ya talkin' to?" ("A guy in Port-au-Prince.") "What's the blue lights?" ("Rectifiers.") "What's all them squeals?" ("Six other guys on top of the guy in Port-au-Prince.") And so on. A half hour later treacherant Oswald's maddening persistence finally pins you to the crux: "But what *is* an electromagnetic field?" (Silence. Then, "Oswald, I think I hear your mother calling.")

No, you're not necessarily stupid. They don't ask that qualitative question in FCC exams. What you could have told nosy Ozzie is: "That, you little monster, is beyond the scope of this discussion." This is a perfectly legitimate answer and practical textbooks use it often, albeit without the aspersion. Oh, sure, it would be convenient to assume that a familiarity with advanced mathematics would permit the answer to "What *is* an electromagnetic field?" to be rendered clear. But how advanced, and how clear? In their reputable *Transmission Lines, Antennas and Wave Guides*, Doctors King, Mimno and Wing state that

... If the electromagnetic field is given only mathematical significance, the entire picture of a propagation through space is part of the convenient but physically meaningless mathematical mechanism for calculating results that agree with experiment.

\* 4822 West Berteau Avenue, Chicago 41, Ill.

<sup>1</sup> Sooner or later all amateurs should study the Wave Propagation chapter in the ARRL *Radio Amateur's Handbook*, as well as the chapter on Electrical Laws and Circuits. Also consult your League *Antenna Book*. Therein this curious business is discussed from a practical ham's-eye view.

Well, a physically meaningless answer never would have placated little Oswald. Moreover, KM&W concur that

If the field is assigned a physical reality, the difficulty of propagating something physically real through complete emptiness is overcome by inventing an electromagnetic ether to fill all space. The existence of such a medium has never been confirmed experimentally, and some of its properties would have to be physically absurd.

Oswald is physically absurd, you muse. But he won't buy physically absurd answers. So we dangle between something physically meaningless and something physically absurd. KM&W do go forward to throw more light on the thing, and skirmishes with Maxwell, Kirchoff, Coulomb, retarded fields, near zone, far zone, etc., incline one to agree with Henney's *Radio Engineering Handbook* that

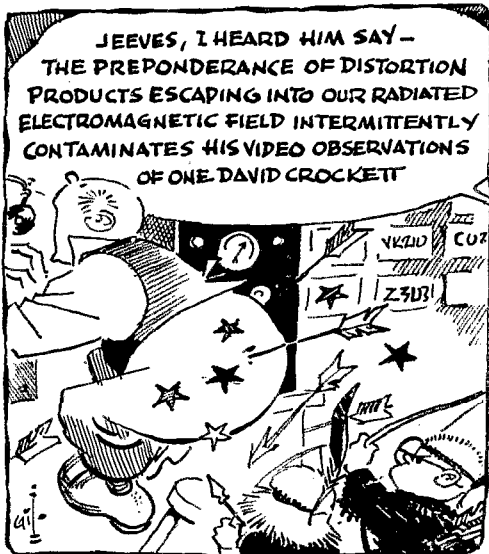
... Any attempt to give a simple yet accurate picture of the phenomenon of radiation must be fruitless, though such pictures may aid in an understanding of the subject. . . .<sup>1</sup>

What's *your* definition of a miracle—something physically absurd? That must be one of the self-glamorizing functions of DX. It's so darned physically absurd.

**What:**

Moving now from the absurd to the sublime, this is zero-month for the 23rd ARRL International DX Competition. Seismologists man your seismographs, and bird-watchers take over from ionospheric fall-out wherever you may be! See the fully-detailed announcement in last month's *QST* (also see the following text for a sample of the stuff W/K/VE/VO amateurs will be gunning for. . . .

**160** c.w. earns position as first stop for the "How's" Bandwagon this trip. Surplus sunspots notwithstanding, WIBB reports this season's Transatlantic Tests in high gear after a flying start. Gs 3ERN 5JU and GM-



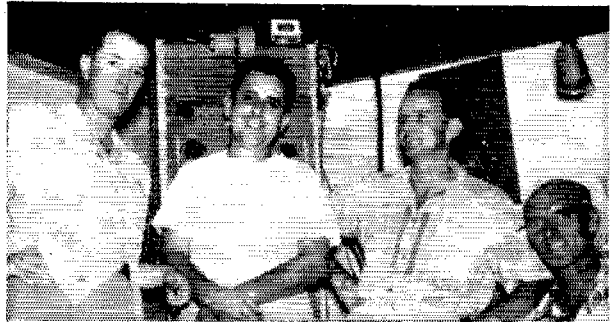
2BUD were worked and/or heard by 1.8-Mc. specialists Ws 1BB 1AWO 2BWR 2EQS 2MYR 2UWD 4UWA/4 SHFI 8VWQ, K9HEM and VE2AWA beginning in early December between 5 and 8 GMT. . . . Besides such North Atlantic Path doings, W1BB demonstrated that north-south 160-meter propagation is in the air by nailing a neat "first" with CP5EQ. Stew also is reported heard by PY2AJK around 5 GMT in early October. . . . Other items gleaned by your 1.8-Mc. Boswell (W1BB): PY2AJK listens regularly but has no transmitting authorization for 160. . . . HB9CM (see HB1CM/HE photo last month) is keen for the low-band hunt once again and hopes to repeat his 1956 Liechtenstein triumphs. . . . BSWL-4588, an avid 160-meter tuner, asserts that 1.8-Mc. DX should be possible between 22 and 2 GMT inasmuch as Yank BC stations peak during those hours at good strength. . . . K9HEM and W9CWZ are putting the finishing touches on a 160-meter rhombic (that's what we said!) at W9CWZ's farm near St. Louis—half-mile-long less! . . . One-sixty DX comes hard out west but W5s KPB and SOT are in there gamely trying. . . . Passing up one or two multipliers in the ARRL DX Test could cost you Section supremacy in the final reckoning. You contest men got your bi-i-ig coils and your lo-o-ong skywires ready?

**20** c.w.'s researchers of the recherché had their DX-uberance tempered somewhat by a touch of winter doldrums. Cranky by night and short-skippish by day conditions nevertheless were good enough for successful sorties by W1BPH: HK3JC 13 GMT, U6DGD 3, W1DBA: CRs 6FC (14,040) 20, 7DB (55) 20, FE8AE (60) 20, HA5KDM (45) 3, KTITW (15) 1, OESKI, PJ2ME (40) 22, SPs 2CJ 310G 9KAO, T2EAE, UA3KAF, UB5KBE (60) 5, VP3AD (50) 3, ZB2I (95) 20, ZSs in number, 9S4s CH (55) 21, CM (55) 23, W1PFA: UA9DT (24) who says QSL direct (see "Where?"). W2DGH: GP1CJ, U1POL6 near the North Pole, W4EMF/KSA, W2HAMJ: UA9DN (28) 3-4 UA9s KAD (88) 1-2, KJA (79) 0-1, U18KAA (80) 1, U17s GL (10) 4 and T5, KBA (79) 3, UR2AO (22) 3, spent much time on forty, also hooked VP8s AO and BO of Antarctica, notes that VP8AO was So. Shetlands licensee in 1949. W2HSZ: QRL making a buck but managed AP2RH, DU7SV, K6CGG, YK9AU, VQ2RG, VSs 1GZ 1HC 6AE 6CG 6DE, VU2KL, 4S7s MR WP, plus Russians UA9s DH KYB YB, UA9s KQB OE, U18KBA, UR2AR. W2QH: EA6AW, FG7XD who received 807 from Howy for QRO, SV0WN of Crete, UA9CM, YO2KAB, ZS2MI of Marion Island, K2MGR: HC1LE, OA4BP, YO3ZR, 4X4GV, CP EA6 KS4, Dutch

St. Martin, K2PHC: CX1BZ, KV4AA (80) 2242, 3V8BI, W3MOT: CRs 6A1 (57), 7C1 (54), EA6AZ (80), FB8s BE (82), BR (39), SV0WT (63), UA1s AB KFA, UA9s CC DX KSA, UB5s KBC UA, UR2AK (59), VQ4EF (43), VS1HA (54), ZE6JL (52), UL7; still stalks KR6AP (65), UG6AN (70), W3WGH: sweating out DXCC diploma at 130/105, BV1US, FK8AO, HP1BR, KW6CA, OO5CP, OY7ML, VQ3FN, ZK1BS, SV0 VSI V56, W4EJF: CR6CZ heard. K4HMS: CN8JD, HC1KD, LU4ZD, Sint Maarten, K4HNA: SL3AG of the Swedish militia UA1s 1KBB 6KVB, UB5KMA, UF6AM, UJ8KAA, W6-ITM: O63FS, UA1KAL, YU1PV, ZB1BF, W6YY: learns of activity by CE0AC (58) 4-5, CR10AA, HSIWR, VQs 5GJ 8AD 8AP, one VU4AB "Laccadives", ZB2Y, ZC5JM, W7DJU: CE3CZ, SM1BJA, YU2QT, YV4AU, W8EY: UH8KAA, UF6KAF, Iwo's KA0IJ, pursues VK9AJ of Cocos-Keeling, ZC3AC, W8IBX: FY7YE (29) 1, GD3FBS, YV6BF, KS4 VP3, W8KJL: VP8BC (see "Whence?"). W8NOF: YU4HA, UA1s 1AU 3KAA, KV4, W9NAX: JA1CJ for sixth and last continent, KV4BO, YV5HL, HC, 61 countries on 65 watts, W9PNE: UA1s 3AF 9KDL (82) 7, UA9, KZ7B UZ: 89/30 up north, LA9LFP of Jan. 7, Maysen, VS6DN, VU2RM, 4X4FK, U18 U17 487, C8SJA: FB8s BD (6) 18, ZG (33) 18 of Amsterdam Isle, ST2NG (49) 19, SUIIM (67) 4, U06AI (7) 21, VU2EJ (63) 0-1, W81PQ: VP2LU (10) 1 of Windwards for No. 187, anticipates UA9KTT of Tannu Tuva but has misgivings about UA1KTO/FJ's authenticity.

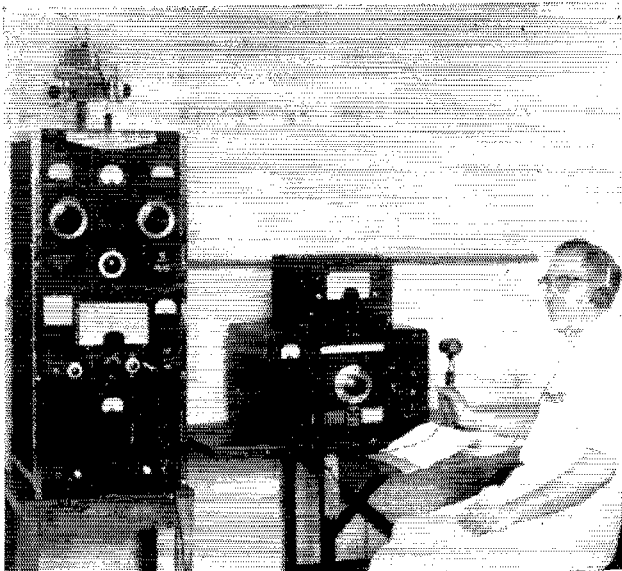
**20** phone's diminished following will suddenly swell again around the 8th, as any fool with a 14-Mc. receiver will perceive. Meanwhile, W6IMM warms up on CN8GT, EL5A, KR6AF, OO5FH, VS2DW and ZE6JY. Formosa's BV1US (162) was brought to bay by W1PNR. . . . K4KJY caught CN8JD, HR1HN, VP1s IML 5AK, YVs 4BW and 6BC with his Globe King and/or Ranger and 3-el. spinner. . . . HR1E2 (162) 1 and XW8AC (157) 0 caught CN8JX's fancy. . . . W6Y comments on 20-meter vociferousness of EL2F (187), VQ2S 5FS 8AR and ZC3AC. . . . NCLXC, WGDXC and WVDXC organs spill the beans on AP2s U (110) 12, Z (95) 3-4, CRs 5SP (280), 6CX (187) 5, 7AH (118) 5, 7CO (180) 4, CT2AH (145) 2, DU7SV (187) 14, EA8s AI (165) 2, BB (161) 2, ETs 2UB (183) 0, 3RL (175), FB8s BC (145) 4, ZZ (115) 17, FK8AS (140) 10, KA2MR, KR6SO (143) 14, LX1DA (100) 7, SP8CK (160) 4, SUIAS (107) 6, SV0s WA (132) 22, WL (180) 6, WT (150) 19, TFs 2WBG (148) 3, 3EA (130) 4, UA1s AB (120) 6, KBB (141) 7-8, UB5KBE (132) 8, UC2KAB (138) 6, UQ2AN

Over 1000 confirmed countries, free-style plus phone-only, are represented by the two friendly gentlemen at right. They're DXdom's finest, PY2CK and W1FH, caught here parrying trade secrets in Charlie's Boston hamshack, July '52, September '52, June '53, and August '53 "How's" pages feature other photos of these world-beating DXers and their respective arsenals. . . . At top left K2MAE/MM, KH16A, ex-VR3D and G3FYW rendezvous happily in mid-Pacific. Ex-VR3D, who expects to help the KM6AX gang dash out Midway contacts during much of 1957, also has signed the calls ZLAFH, ZL3AE, ZL1BI, VR2CD and VE7ASL in times past. G3FYW now is based at Christmas Island but heavy official duties keep him QRT. . . . At lower left is a row of European DX talent sufficient to prematurely grey the hair of W1FH and PY2CK. From left to right are SM5KP, Gs 4ZU 2MI 3HLS and 2PL, all 200-country DXCC men, and all 200-country phone-DXCC members except G2MI. Art certainly can be excused for having "only" 150-odd countries confirmed on voice, for G2MI's time-consuming RSGB organizational activities are as widely hailed as his feats of mike and key.





In the field of voice ionospheric endeavors no DX station is more regularly and enthusiastically pursued than CR5SP of Sao Thome Island. This installation runs 500 watts to an 813 final modulated by 811s, feeds a long-wire radiator on 11, 21 and 28 Mc., and twenty meters is preferred. (Photo via CR6AI)



(132) 5, VK9AJ (143) 14, VP8s BP (156) 12, BQ (197) 23, VS2DW (138) 10, VU2s CW (108) 12-13, ES (103) 13, XZ2OM (147) 13, YO3RF (103) 4, ZD6DT (110) 15, ZSs 2MI (150) 16, 3E (305) 21, 8L (105) 15-16, 3V8BL (155) 5, 4S7s WP (105) 12-13, YL (110) 12, 4X4s BO (111) 5, DK (133) 14, 5As ITB (170) 6-7 and 21F.

**15 phone**, played by a wider field, made K2OZY happy with CR5SP, EL8A, FA3JY, HZIAB, KT1WX, OQ5AU, TF2WBG, 5A2TZ and a KS4. A DX-100 and 3-el. rotary did the trick for Joel. . . . . BV1US, that *big* sig from EI7AI, HH4IV, KG1GB, several KL7s, OA5H, VK3QP, VP4LB and ZL4CC clicked with W6ZZ. ON8MM's QSL gives Miles five YL continents, only Asia to go. "Have been trying 27-Mc. phone on Saturdays and Sundays to avoid the very bad week-end QRM now on 21 Mc. and there really is quite a bit of activity there. Even raised my states total by a couple so now have 40 toward my 27-Mc. WAS. Also QSO'd a KH6 there—if you can call that DX there should be more later!" W6ZZ sports a new NZART (New Zealand) OAP certification . . . . . CE3TH, HP3FL, K44BB, OAs 4AE 8B and South Africa rounded out K4CHK's month . . . . . A Ranger, NC-300 and modest 40-meter folded dipole collected HC1ES, HH4RM, KG1AW, KM6AX, KW6CH, TI2DLM, VO5FS, XEs 2FL 3BA and YN4CB for K3CER. Bill notes that the favorite antenna of DX stations appears to be the long-wire, by far. . . . . GC6FQ (414) 17, IT1AI and Z33G worked CN8JX. . . . . W3WGH snapped up ET2FM, LX1DC and an HZ1, while W1PNR tossed off VP3YG (192) and nifty ZS9G (137). . . . . K4HMS, K4HNA and W8NOH chime in with TI3CL, KZ5CP and an HZ1, respectively.

**15 c.w.** contributed HZ1HZ, ST2NG, SV0WT, VO4s CC 1P, VU2s EJ HF, ZE1JA, 4X4s CK and DR to that eminent confidant of Kount U.R. Kuntries, W2HSZ. . . . . W2QHH reached the 21-Mc. 128-country mark courtesy folk like JA1AF, KW6CA, OY7ML, UA9s CC DN, UB5KBA and VO2CQ. . . . . At his new QTH away from the Madison W9LNM, W9MQK and W9RBI competition, W9NLJ9 scored with CR7AD, CX2FD, OE6BN, SL5AX, a UB5 and UQ2AS. It's Sheboygan. . . . . W8EVC did okay on DM2AEK and YU8EK, while K2LMQ managed OY1R and SP9DT. . . . . Here and there on 15 c.w., at W1CTW: SM1CBC to complete W8M requirement, VP2LU, K2RUR, VO3TL, W3CMN; KZ5PH, K4CHE; CX2FD, KA2KS, ZS. K4HMS; FA8JO, YU2DU, Zss. K4HNA; GE3RE, VO3FN, ZE3JL, W6ZZ; KL7BZA, four SMs, TF3KG, VO3, W7DJU; JA1ACB, W8IBX; Euros in number. K6CER; GE3RC, FA8CR, OK1s SP XC, ZS.

**15 Novice** prefix-pursuers passed through the winter dip without faltering. KN9CAZ, for instance, brought his tally to 60/47 thanks to GN8JX, CR4AD, CR6CS, DU7SV, FA8CR, KG1AW, KV4RK, OA5H, OD5LX, OQ5QS, FT5TP, TI2EA, VK7LZ, VP5s 5RR 6HT, VO2QG, VS1DU, YUs 1KA 1KK 3ER, ZP9AY, 4S7GE, 4X4s BX CK and IX. Bill nailed some of these with an AT-1 and 2-el. homebrew rotary, others with a

DX-100 and 88-ft.-high cubical quad. . . . . While casing the band for his last-needed continent, Africa, KN2SYC digressed for UA3BN, UC2KAB, WH6BVM, WP4AEM, XE1PJ and a 4X4. . . . . KN9COF has no trouble with Asians—JA1ACB 1-2 and KR6GT 2 carry him to the 22-country rung. . . . . Around the land, reports by W1N1QT: G5UR, other Euros, VP6, 12 countries and 30 states. K2SRA: CE3RE, OH2TI, VP6. KN5EZY: finalized WAC requirement via one DU7, SP3PI, ZE1JV. K9ODCF: DU7SV (110) 23. K9ODQI: 21 countries including DU EA and VQ2. . . . . Rig trouble caused KN4JFE to lose valuable DXing time in troubleshooting, but that's part of the game. Anyway, Rod romped off with SP1KAA and a ZE for Nos. 45 and 46. . . . . We're still getting those inquiries ament the most countries ever confirmed by a Novice licensee, Come, now, *who* is the WN1FH of our Novice DX world?

**40 c.w.** appears to be marking time for the February-March Big Brawl. Nobody reports a heavy single bag but there are DX samplings to be inspected. At W1ECH: EA EI PA0, VP3VN, hears VP2AH, awaits new DX-100 on order. W2DGV: HI2SB, PJ2ME, YO5PK, 984, W2GXV: Gs SM, PY2AFF, fat sig from SL5CX (5) 7, all heard. W2HMJ: EA 11, W5TOP/KS4, reports son KN2ROR nearing WAS on 40. W2JBL: had personal visit from HP1JF, worked HH2JB (13) 10, I1MQ, KH6BLI (22) who seeks Vt. and S. Dak., northerner VE80W whose QSLs may take months to emerge from the wilderness. K2LMQ: Europeans galore, TI2PZ, PYs 7AFK 7CY 8BS, uses Globe Scout, W3EVC: EA4ED, K6OIZ: provides the West Coast slant with JA3s RG (7) 14 s.s.b.-to-c.w., TT (6), VE (2), elusive UA0KJA (12) 15, W7DJU: VK5XK, W8CSK: VP2AH, W2IG/KH6, W8IBX: HH3DL

. . . . . Regular QST Hint & Kinker W2OLU captured PY7AEW, YU3s APR EU OV and shipboard SM8YF. . . . . **Forty phone** will feed many a multiplier to the A3 gang during the upcoming ARRL Test. W3DUQ reports transatlantic conditions encouraging enough to support DL4UW (107) supersessions with dozens of Yanks in call areas as far west as W0. The trick, of course, is to get the U. S. boys to tune down around 7100 kc.!

**80 c.w.** intends to carry some weight in the Competition at hand but, contrary to performances in past years, multipliers may come hard. W2QHH kept an ear on the band, digging up PJ2ME (2) and VP2LU (4) 1. That Sint Maarten trophy is Howy's 3.6-Mc. country No. 117. . . . . W1ECH hears Europeans at good strengths and relays word of W1FEA's luck with VK6BJ and ZLs. . . . . OK2s 1BE KBA, OZ3RU, GM GW and Dutch St. Martin interested W2DGW. . . . . Novice-wise, KN6SRZ lost much sleep nabbing KL7NIU, W17BYA and VE8AT in the Yukon, A Globe Scout, S-38D and long-wire assisted.

**10 c.w.** should see a workout it hasn't had for years when February 22nd rolls around. In the meantime we find W1ECH chatting with FA8RJ, KH6J, UA3BF, YV5BJ, 4X4FS and W8QOH/MM near CR4-land. . . . . K4EEK collected CX2FD, UA1KBB, UC2KAB, ZE2JV

and scads of European friends . . . . . Euros, FA8JO, UA3KAN, UB5KAB, UC2 and VK customers traded 73s with K4HNA . . . . . K2PHC selected GE3CU, CX1FB, KW6CA, PJ2AN, YO4RF, ZP6CR, VKs ZLs and ZSs . . . . . North Dakota QSOs went to OKs 1KTW 1VB 2KBE and SP5AR through the good offices of W0EUQ . . . . . W2QHH amassed GRs 6DA, 7BS, EA8CC, JA7AD, LZ1SR, VK9DB, VS6CT, ZD3A, ZK1BS, 3V8FA, 4X4BX, 9S4s AX and BW . . . . . Hither and you, at K2ENO: received WGSA No. 412, hooked Euros, 4X4, K2PS: OX3AY, K4HMS: YV8 4AU 5DE.

**10** phone brings us to the end of the Bandwagon's journey this month, and we find K2MMF there to greet us with CR5AC, FA8s BF CF, ET2FAL, FA3JR, GD3GMH, HI6EC, KA2s AD DS KS LZ MA MR, KA5MC, KT1AG, KR6GT, JA8 1BFJ 4AH, LX1AI, OK1MB, ST2DB, YO8GM, YU3JN, ZD4BL, 5A5TH and a smattering of VKs. Neat, eh? . . . . . W3AZD did equally well on CN8MM, CR6BH, GR7AH, EA8AI, EL2D, GC3KAV, GD2FRV, HC1BS, HH7W, HISWL, HK3PS, HR2HA, KB6BC, KM6AX, OK1KAE, PJ2AF, SP5SS, VP8 1MC 2JC 3YG 4KL 5MJ, 6JC 7NF, VQ2FJ, YN4CB, YS2AG, YU1BE, ZD4BR, ZP6JE, 5A2TO and CR5 to reach 69 . . . . . HC1ES, HH2JK, KG4AC, KL7BCS, YU and a Turks VP5 raised K2PSV . . . . . At W6ILM it's Europeans, KA2NA, KR6AF, UA1AB and VS6CY . . . . . CT2AH and OE1FF gave c.w.-man W2QHH his 99th and 100th A3 countries . . . . . W1EKU's 10-meter observations confirm a December slump for all DX directions except Europe. Yet Vern accounts for JA4AH, KA2EB, KG6NAC, KG6IG in the Bonin Isles, W0BLV/KG6, OQ6HP, TF3KA, VO4GF, one ZM1BL "Box 1595, Wellington, N. Z." ZSs and KR6. ZD3BFC eludes W1EKU at every turn, however . . . . . And now that we've ascertained what's What, let's find out who's

**Where:**

Our world-wide QSL DXchange receives its annual big push from the ARRL DX classic this month and next. Under pressure of soaring backlogs certain confirmation short-cuts will be attempted, some with tragic results when batches of cards come through which do not bear data sufficient for DXCC accrediting. Call signs of the confirmer and confirnee, geographical location of the confirmer if not conclusively indicated by the call, and the date of QSO usually represent the bare minimum so far as DXCC is concerned. See page 57, October 1954 QST, for more chatter on the matter . . . . . Russian QSLs continue to turn up in odd assortments, quantities and places. W2-WFC's recent QSP of an unexpected and unsolicited UP2AS batch is typical. As for DX points, RSEA (East Africa) reports, "A large batch of Russian cards arrived for Kenya amateurs and among them are quite a lot of phone-to-phone, a much higher proportion than in former years." Quite a few of the rarer U.S.S.R. variety now are showing up at W1WPO's ARRL DXCC Desk, boosting many a 200-country man's tally . . . . . On behalf of a half dozen fellow CN8s, CN8JX (W7GGG) writes, "Follows over here try to QSL 100 per cent and appreciate receiving cards from the countries they work and also from the states. It is rather disheartening to send QSLs to amateurs who promise prompt returns, often a state or country you'd like to have for WAS or DXCC, and then once they've received your cards apparently forget they worked you. I mail my QSLs to the bureaus for local distribution as the printing cost plus postage for approximately 100 cards per month, if sent individually, would be excessive. . . . Out of 312 cards received here only two (VF3s) had IRCs attached, and yet the majority wanted QSLs direct." . . . . . W9B7W was mystified to find the DX grapevine chanting "QSL TF2WBG via W9BVW" for Earl, mainly active on 75-meter a.s.b., made no such contract. Never-



Ceylon is about as far away from W/K-land as any DX can be, and 4S7EG makes the long haul consistently over either pole. Ted's rig is a v.f.o. five-stager ending in an 807 with 807s modulating, and the receiver is an HRO. (Photo via W6ZZ and W4ZMC)

theless he was gracious enough to forward all cards received, and there were plenty! TF2WBG's Call Book QTH appears adequate. . . . . KL7PI advises W1WPO that his 1956 activity terminated as of September 20th. Hence an influx of QSLs for October KL7PI QSOs must be attributed to some mentally disturbed unfortunate . . . . . ISWL finds ZA1UB pasteboards bouncing back with "unlicensed station" surcharges . . . . . According to W1WPR of W1AW, GBANK (V89AS) continues efforts to locate the previous V89AS (G2BAMU) . . . . . From VP2LU (W1TBS): "Ordered 500 QSLs from the states and expect them any day now. Will send all W/K QSLs through the bureaus and expect to be active in both sections of the coming ARRL DX Test." . . . . . In QSO with OX3UD, he says that no QSLs will be forthcoming until July, 1957, due to heavy ice and snow on the east side of Greenland." This frigid note via W8VCF . . . . . Announcing distribution of a new batch of QSLs, ZD6RM calls attention to the fact that enveloped cards sent from Nyaaaland by air require seven IRCs each (average transit 10 days) while a single coupon covers surface-mail reply (six weeks). "The number of cards I go through!" . . . . . Bx-ZK1RL explains, "I expected to return to New Zealand much earlier than I did and consequently my logs, cards, etc., were packed away and I was unable to get at them. Have just arrived back now (no ZL call as yet) and have started on the backlog." Neil's N.Z. QTH follows, and he adds, "I wish to thank the W/K boys for their cooperation in helping me work a little DX!" . . . . . As must be stipulated periodically, we caution you that the addresses to follow are necessarily neither accurate nor official. But they may assist you to some quick QSLs. W1s CTW PFA UED WED WPO, W2HMJ, K2s ENO MME, W6s ITH YY, W8s EV IBX NOH, W0s EUQ QGI, VE1FP, International Short Wave League; Newark News Radio Club; Ohio Valley Amateur Radio Association; Northern California, Southern California Willamette Valley and West Gulf DX Clubs contribute:

- CN8FT, S. Galloway, MARS Stn., 49th Comm. Sqdn., APO 117, New York, N. Y.
- CN8JG, W. Rosecrans (via CN8FT)
- CN8JP, E. Schroeder (via CN8FT)
- CN8JO, J. Andette (via CN8FT)
- CN8JV, Box 60, Navy 214, FPO, New York, N. Y.
- CN8JX, Glenn Luse (via CN8FT)
- GR4AH, N. Pinheiro, SAL Airport, Cape Verde Islands ex-DL4BY (to KZ5DX)
- EA8CF, P. O. Box 8, Laguna, Tenerife, Canary Islands
- ET3RL, Box 399, Addis Ababa, Ethiopia
- ET3RN (via ET3RL)
- F7DR, 298th Sig. Co., APO 11, New York, N. Y.
- FA9IB (via FA3GZ)
- F8SBD, Box 1310, Tananarive, Madagascar
- F8SBT, Box 971, Dakar, French West Africa
- FK8AS, P. O. Box 151, Noumea, New Caledonia
- HC1WP, P. O. Box 446, Quito, Ecuador
- 15AAW, C. Bortolini, Box 85, Mogadiscio, Italian Somaliland
- JA1JG (via JARL)
- KA2MR, Marcia Rast, Box 111, APO 323, San Francisco, Calif.

**CAUTION**

Under this country's treaty obligations and on formal notice received from other nations, FCC-licensed amateurs are warned to engage in no communications with stations in the countries listed below. This is in accordance with the FCC Public Notice of December 21, 1950 (p. 23, Feb., 1951 QST), and as since revised.

Cambodia (FIS, XU), Indonesia (PK, YB-YH), Iran (EP-EQ), Korea (HL-HM), and Viet Nam (FTS, XT, 3W).

For those whose QST files do not go back to 1950 we will gladly supply, upon request, literature describing the circumstances of this prohibition.

KA2PS, Phillip F. Sears (via FEARL)  
 KA3GG, APO 47, San Francisco, Calif.  
 KJ6BT, H. L. Guerrero, APO 105, San Francisco, Calif.  
 KL7BUZ, Hq. Sqdn., 10th Air Dvn., Det. No. 1, APO  
 942, Seattle, Wash.  
 KR6RY (to W7LQN)  
 KS4AS, Swan Island, via Tampa, Fla.  
 KS4AX (W40A2/KS4) Swan Island, via Tampa, Fla.  
 KZ5DX, Ray E. Spence, Box 754, Curundu, Panama  
 Canal Zone  
 LZ1KPZ, Box 22, Pozardjik, Bulgaria  
 LZ1KSI, R. G. Radev, 13 Kresna St., Pozardjik, Bulgaria  
 LZ1UR, Konstantin Ivanov, Box 336, Sofia, Bulgaria (or  
 via W6BIL)  
 OA5H, P. O. Box 1229, Lima, Peru  
 OQ5BG, P. O. Box 888, Leopoldville, Belgian Congo  
 OQ5CS (via OQ5GI)  
 PY2AJK, R. G. Rolim, Rua Bela Cinta 2265, Sao Paulo,  
 Brazil  
 SM1CBC, E. Dundborg, Radio Stn., Tingstaede, Gotland,  
 Sweden  
 SP3CL, Box 400, Poznan 1, Poland  
 SP5AR, Box 222, Warsaw 10, Poland  
 SP5EG, C. Stamezynski, P. O. Box 92, Warsaw 32, Poland  
 SV0WL, Box 134, Salonika, Greece  
 SV0WO, J. W. McMinn, USCGC Courier (WAGR-40),  
 FPO, New York, N. Y.  
 UA9DT, Box 9, Sverdlovsk, U.S.S.R.  
 UB5KCA, Box 52, Odessa, Ukraine, U.S.S.R.  
 UPOL6 (via CRC, Box N-88, Moscow, U.S.S.R.)  
 VK1RA (via VK2AEA)  
 VP2LU, Fred Perkins (W1TBS), PAA/RCA, St. Lucia  
 AFB, via Patrick AFB, Fla.  
 ex-VP7BG (to VP2LU)  
 VP8AO (via ISWL, 86 Barringer Rd., London N. 10,  
 England)  
 VP8BO (via RSGB)  
 VQ4KRL (via RSGB)  
 VR2CS, Box 334, Suva, Fiji Islands  
 XZ2OM, F/Lt. Aung Myint, BAF/1064, Burma Air  
 Force, War Office, Rangoon, Burma  
 YU1DQ, C. Mladen, Post Box 48, Belgrade, Yugoslavia  
 ZB1BF, No. 8, Bemelli St., Hamrun, Malta  
 ZC5JM, Pat, % RAF, Labuan, British North Borneo  
 ZD1AO, Box 430, Freetown, Sierra Leone  
 ZD4CE, Box 268, Takoradi, Gold Coast  
 ZE1JO, B. H. Cooper, 5 Peter House, Monmouth Rd.,  
 Avondale, Salisbury, So. Rhodesia  
 ZE1JT, F. C. Parsons, P. O. Box 384, Salisbury, So.  
 Rhodesia  
 ex-ZK1BL, Neil Marks, Radio Section, Post Office,  
 Wellington East, N. Z.  
 5A5TH, Box 372, APO 231, New York, N. Y.

### Whence:

Asia — KA2FC, scheduled to return Stateside next month, deserves plaudits for bringing FEARL's DX awards department to even keel. Swifty tells W7DJU that the applications backlog now is nil and he trusts it will remain thus. KA2FC looks forward to springtime visits with W7s BA DAD DJU and PHO, W7DAD being responsible for Swifty's first ham QSO back in '52. — JAJG will represent Japan's Prince Harald Land antarctic IGY base on 15 through 40 meters. Neighboring New Zealand IGY antarctic bases may sign ZL5 calls, according to W6YY's

advice. — UAIKAU tells W7DJU that UA0KSI is available from Wrangel Island, one of the few ARRL DXCC Countries List entities so far confirmed by no one. There's a real first for some lucky DXer. [Probably will be a ten-country 21-Mc. Novice who pulls it off. Boss. — Jeeves.] — Much to the chagrin of KNGCOF and other Novices, somebody is foisting fake JAIALN QSOs on 15 meters. JAIALX, who prefers 7-Mc. s.s.b., states that the call has not been used since 1954. — W6YY comments on the weird aspect of great-circle maps centered on VS2. South America covers the entire 300 degrees at an average distance of some 11,000 miles.

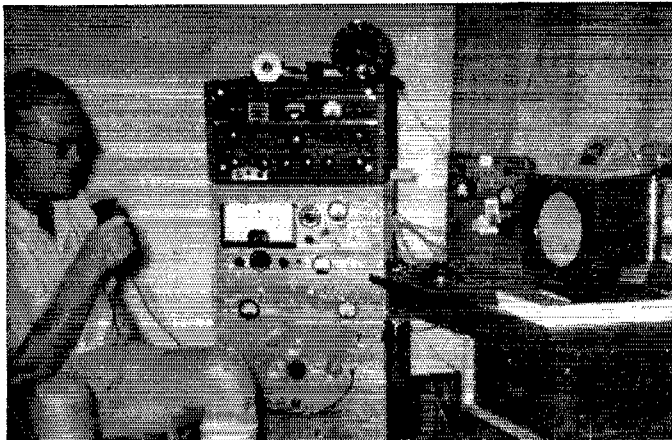
Africa — Liberia's "FCC" terminated the maritime-mobile tickets of EL9A (W4DQW), EL9B (W8QOH), and EL9C (W2JNA) in line with its new policy of restricting such assignments to ships flying Liberian flags. "Foreign maritime mobile stations coming to the shores of Liberia, upon application, may be granted permission to operate only within the territorial waters of Liberia; and, for the duration of that period, may be governed by such Liberian rules and regulations as may be established."

"Being a transmitting amateur or short-wave listener in a territory the size of East Africa carries with it a responsibility to one's fellow men far in excess to that of our brother amateurs in smaller and more populous areas," comments the Radio Society of East Africa's *Circular Letter*. VQ4EV urges more profitable utilization of RSEA's farflung membership for emergency communications purposes, stating that "Our American friends have set us a good example that we could well follow." — W6C3Q has been QRL in Mediterranean DX areas, listening in occasionally but not jamming. Wally heads back to Kilofornia next month for another crack at boosting his 150-confirmed DX tally. — W7GCO, banging away on the DX end as GN8JX, last had his picture in *QST* back in 1953 as KR6LL. In his first four months of Moroccan operation Glenn reached 118/56 with a 32V-1, 75A-1 and 14-Mc. ground-plane. — Next month, you know, Gold Coast becomes independent Ghana. Saarland's 9S4 label is scheduled for replacement this year, too.

Europe — Linc from YO3RD to W1BDI comment interestingly on the business of signal reports. Recognizing the necessary limitations of our customary RST system, Livi suggests the employment of R5SSST. "The first 'S' is merely the usual signal strength of the station received. The second 'S' is for the approximate mean signal strength of other stations from the same country heard within not more than 10 minutes before contact has been established. The third 'S' is for stations from neighboring countries within the same time zone received not more than 10 minutes before contact has been made. The fourth 'S' applies to stations from the remainder of the continent in the same time limit of 10 minutes." Gosh, think of the terrific flattery-for-QSL potential of an R5SSST 591119X report, fellows! — Ex-DL4BY, who shut down his Frankfurt sender last summer, now radiates as KZ5DX. Ray is W8NVT when back home. — "DXpeditions to Liechtenstein seem remote in the immediate future due to gas shortage. It is forbidden to use cars on Sundays in Switzerland since last November." This jarring note from Swiss SWL HE9RDX. — This year the Liverpool (England) City Charter will have been granted for 750 years. In conjunction with this observance the Liverpool & District Amateur Radio Club announces world-wide availability of a new DX certification based on confirmed QSOs with ten Liverpool hams. Contacts must date after January 1, 1956, and G3BIT will supply further data. — W6YY has it that UP2AS and UAIKAI contemplate

(Continued on page 144)

VQ5EK, active in Kam-pala since September, 1953, has assembled a 170/147 DX record with this v.f.o.-807-813 arrangement modulated by 807s. A three-element rotary helps breach 14-Mc. QRM.



# YL News and Views

CONDUCTED BY ELEANOR WILSON,\* W1QON

## Results: YLRL Anniversary Party

**Statistics:** Approximately 400 YLs participated in the phone section, with 140 logs submitted. One hundred forty YLs participated in the c.w. portion, with 56 logs submitted. In last year's party there were 196 phone entrants and 89 c.w. entrants. The conclusions can be readily calculated.

Some 40 DX YLs participated, making the non-W YL turnout the greatest ever in the seventeen years of YLRL contesting.

**From YLRL Vice President W9YBC:** "This year the new 'club entry' was one of the highlights of the contest. Many entered just to give their club a boost and found to their delight that they were trapped by contest fever. All suggestions received from participants will be sent to the new Vice President W3YTM (who assumed office Jan. 1, 1957). One suggestion — to work out a club multiplier which is based on the percentage of the club's membership — will definitely have to be followed up if club entries are accepted again next year."

## Comments: From the phone operators

W6GGX — "The club (Los Angeles YLRC) does feel that some fairer way of competing on a club basis should be arrived at if possible due to the great difference in membership."

W1FTT — "My first A.P. and what a ball it was! Amazing to talk to girls in 39 states in a two-day period."

K4APF — "Next year I won't use the OM's 900-watt rig at all. Sure could have used that multiplier."

W4SGD — "The contest rules were very well stated, and I'm sure the solution of dividing California into sections made the YLs out West happy, and it also gave us more multipliers."

W5HWK — "Please don't shorten the contest; if anything, lengthen it. Do think that recognition should be given to all ARRL sections, not just California."

KL7BJD — "How about a double multiplier for DX stations. We are anxious to work the girls —

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

## CLUB ENTRIES

Los Angeles Young Ladies Radio League . . .	52,803
(Winning club entry)	
Texas YL Round-Up Net . . . . .	33,347
Ladies Amateur Radio Klub . . . . .	24,232
Washington Area Young Ladies Amateur	
Radio Club . . . . .	13,871
Penn-Jersey Young Ladies Radio Club . . . .	12,280
San Diego Young Ladies' Radio League . . . .	5,568

## TOP SCORERS

### C.W.

First —	W4RLG . . . . .	1822
Second —	W4HLF . . . . .	1500
Third —	W3YTM/3 . . . . .	1380

### PHONE

First —	W3OQF/MAX . . . . .	10,587
Second —	W3URU . . . . .	10,125
Third —	K4CXJ . . . . .	8,905

this might make them look for us. We are willing to burn the midnight oil.

## And from the c.w. gals

K4BKT — "It was my first A.P., but I'll guarantee it won't be my last."

K4EQB — "Wish all YLs would sign 'YL' after their calls so we could identify them."

W4HLF — "Was so disappointed at the number of girls *not* in the c.w. contest."

W6WSV — "What I'd like to know is — where do all these gals that I hear during the A.P. on 20 c.w. go all of the rest of the year?"

WN7DIF — "Had fun and hope to make general class for the YL-OM contest."

**And the Winners:** Placing first in the phone section for the third consecutive time Barbara Houston, W3OQF, operating her OM's rig W3MAX, received a gold cup. Top c.w. scorer Frances Shannon, W4RLG, has won YLRL gold cups before for her c.w. contest operating skill. Frances feels she could have had a considerably higher score had there been more girls on c.w., incidentally. Arlic Hager, W4HLF, took second place c.w. honors this year as she did last year. Mildred Wright, W3YTM, the new YLRL Vice President, placed third c.w. Sarah Hengen, W3URU, was second place phone scorer, and Lois Jennings, K4CXJ, placed third phone. Second and third place winners in both categories will receive certificates.

For the first time in a YLRL Anniversary Party, under the revised rules, clubs were eligible to compete. Six clubs participated and submitted logs, and the largest, the Los Angeles YLRC, led with a grand score of 52,803 points. A gavel will be awarded.

Here are the scores. Congratulations to the winners and "nice going" to all who participated.

## —SCORES—

Certificates will be awarded to the highest scorer in either category in each district, U. S. possession, VE district, and country where at least three entries were received.

Figures following each call indicate number of contacts, ARRL sections worked, and score (for example; W1YNI



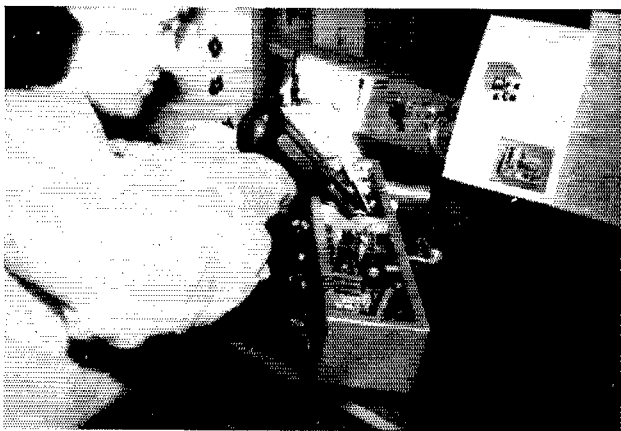
November 1951 and one year later received her Advanced Class ticket. Starting out on 40 c.w., she switched to ten phone for DX chasing. When skip conditions declined, the Gertmans rebuilt their transmitter and moved to 75-meter phone, where Donna has operated almost continuously since, except for an occasional jaunt to 20 or 40.

Phone Activities Manager for Oregon, she is a regular NCS of both the Oregon Emergency Net and the Northwest Traffic Net. She holds a Grand Masters Certificate of the Brotherhood of Radio Amateurs Trafficers and is a coordinator for the communications group of the Mountain Rescue and Safety Council of Oregon. For her assistance in state forest fires in 1954 she received a Public Service award.

Donna has a son nine and a daughter seven. Her other hobbies include sewing, textile painting, and fishing.

The photo at the right really doesn't do W1WED justice, but it does tell a story. Ruth built the little ten thru eighty rig that she's shown working on, from layout to testing. When asked for some information about the transmitter which brought her a top prize in the Home-built Contest at the ARRL New England Division Convention in Rhode Island in September, Ruth volunteered the following remarks:

"The transmitter was originally designed as an r.f. assembly for mobile work (1955 ARRL Handbook, page 436) to be built into a square cabinet. I liked the tube lineup and band tuning arrangement and the 10 — 80 meters coverage, so I laid it out on a 3 × 4 × 17 inch chassis for rack mounting. For power supply and modulator I use the same ones which power and modulate our 829B, 832A, and ARC 4. The rig should give me 90 watts c.w. and 65 watts phone; however, since I do not run the tubes at their maximum voltages, I normally run about 55 watts c.w. and 40 phone. The tube lineup is a 5763 oscillator, 5763 driver, and a



W1WED

6146 amplifier. About the only deviation from the original circuit is the addition of a crystal v.f.o. switch. It took three weeks of work evenings from the first hole drilled to the final decals for the panel. Only about fifteen dollars worth of parts were purchased, the remaining coming from surplus gear which we had around the shack. I did all of the work myself, with an occasional conference on what to do with the OM, Ken, W1WTR.

I use this transmitter on the R. I. YL C.W. Net. It's the fourth rig I've built, the first one was a Novice 6AG7 described in QST when Novice licenses first became available. The results have been well worth the time and money spent. The rig is very stable either crystal or v.f.o., phone or c.w., and it tunes up easily on any band. The present antenna is 136' longwire end fed with open 300 ohm on all bands except 10 meters, where I use a horizontal folded dipole of 300 ohm Twin-Lead in the attic.

I have also put two Heathkits together (the three-inch scope and the v.f.o.), and I would recommend kit building as an excellent starting point in the art of building for any YL."

### Keeping Up With the Girls

#### Clubs:

*Rhode Island YLRC:* New officers are Pres. W1CFW; Vice Pres. KN1AAK; Secy. W1WED; Treas. WN1JJU. KN1AAK, Helen, was appointed NCS for the C.W. net Wed. at 3743 kc., 1330 EST.

*Los Angeles YLRC:* Forty members attended the annual Christmas party held at the home of K6ANG, Bille, in Fullerton.

*Texas YL Round-Up Net* — Thirty-two YLs from Oklahoma, Louisiana and all parts of Texas celebrated the second anniversary of the net with a luncheon at Pier 21 in Houston. Speakers were W5SYL, 1956 YLRL Fifth District Chairman; W5HCE, Net Vice President; K5BNQ, Alternate Net Control; W5LGY, Net Secretary; W5EGD, Net Presi-

(Continued on page 142)



VK3YL and Friend, or as Mrs. Austine Henry herself labeled the picture, "Two Dinkum Aussies". For twenty-six years Australia's most active YL (she was the third licensed VK YL; there are now some twenty women amateurs in her country) Austine is known the world over for her DX activities. She recently became the first YL to Work All Continents YL. Pre World War II she was active on 80, 40, and 20 c.w. and 5-meter phone. Post-war she has used 20 c.w. to make DXCC (185 countries worked, 171 confirmed), BERTA, WBE, WAC, and DUF4. She was the first YL to become a member of the Royal Australian Wireless Reserve, and she has served as instructor in code at the Wireless Institute of Australia. At her home in Murrumbidgee, where she lives with her husband who is "not licensed, but interested," Austine runs 30 watts to a 61.6 and copies with a home-built superheterodyne receiver.



# The World Above 50 Mc.

CONDUCTED BY EDWARD P. TILTON,\* WIHDQ

**E**XCEPT for the pioneering work of W4HHK and W2UK, most of the 144-Mc. DX attempts involving meteor scatter have been made during the Perseids shower in August. For several seasons now the Perseids have been used as an aid to long-haul 2-meter contacts, but the other showers, well scattered through the calendar, have received little attention.

## RECORDS

### Two-Way Work

- 50 Mc.: LU3EX — JA6FR  
12,000 Miles — March 24, 1956
- 144 Mc.: W6ZL — W5QNL  
1400 Miles — June 10, 1951
- 220 Mc.: W8BFQ — W5RCI  
700 Miles — October 9, 1954
- 420 Mc.: W1RFU — W1VVE  
410 Miles — June 12, 1954
- 1215 Mc.: W6IHK/6 — W6VIX/6  
190 Miles — June 9, 1956
- 2300 Mc.: W6IFE/6 — W6ET/6  
150 Miles — October 5, 1947
- 3300 Mc.: W6IFE/6 — W6VIX/6  
190 Miles — June 9, 1956
- 5250 Mc.: W2LGF/2 — W7FQF/2  
31 Miles — December 2, 1945
- 10,000 Mc.: W7JIP/7 — W7OKV/7  
109 Miles — August 8, 1954
- 21,000 Mc.: W1NVL/2 — W9SAD/2  
800 Feet — May 18, 1946

W4LTU, Orlando, Fla., has been demonstrating the possibilities of the lesser showers in fine style of late. Results achieved during the Orionids, Taurids and Leonids were detailed last month. A surprise contact, presumably on the Andromedids shower in late November, was made between W4LTU and W9KLR, Rensselaer, Ind., the first 2-meter work between Indiana and Florida.

The Geminids, with a peak the second week of

December, produced several more "firsts." W4LTU had a continuous succession of schedules morning and night with a long string of northern 2-meter stations, lining up for their first Florida contacts. Using a 30-seconds-each-way system, W4LTU and W1REZ, Fairfield, Conn., kept schedules from 0500 to 0600 daily from Dec. 9th to 12th. On the 9th, bursts were loud but short, and only parts of letters were read. On the 10th there were bursts long enough for exchange of calls and some information. The mornings of the 11th and 12th, exchanges of calls and signal reports were made, with complete confirmation each way, for the first Connecticut to Florida work on 144 Mc.

A Rhode Island first was made, also, on the 13th, with W1KCS, between 0630 and 0730 EST. Florida to Wisconsin was made with W9GAB, Beloit, with frequent and strong bursts. This was in an evening schedule, the 11th. W4LTU reported that he heard more than 80 individual bursts, averaging nearly 3 per minute, and of good strength. W3TDF, Langhorne, Pa., made it on the 14th, at 0534, a complete exchange being accomplished on a single long burst.

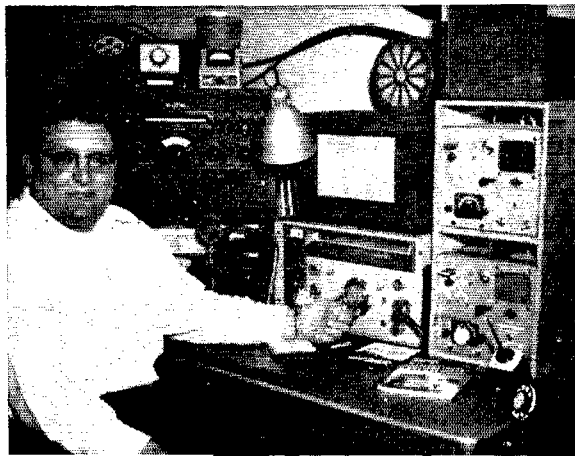
The Geminids work was not all on north-south paths. W1REZ and W0IFS, Minneapolis, ran schedules at 2300 to 2330 EST, beginning on the 10th, and signals were heard each way on every try. Calls were identified the first night. On the 11th, calls and some signal information were exchanged. At 2318 on the 12th, calls, signal reports and confirmations were swapped and the first 2-meter contact between Connecticut and Minnesota was history. Other firsts, for which we have no complete information, were made with W8ILC, Dayton (Ohio) and VE3DIR, Toronto (Canada).

Operators on 50 Mc. also benefited from the fall showers. K2ITP, Riverton, N. J., and W4KK, Rome, Ga., noted louder-than-normal bursts on their 6-meter scatter skeds during the Taurids, but these seemed of short duration,

◆

First 50-Mc. operator in the Northwest to make WAS is Walt Manning, W7ERA, Milwaukie, Oregon, who turned the trick Dec. 1st. 6-meter rig has a pair of VT-127A's as Class B linear amplifier, driven by a communicator. An NC-300 is used with crystal-controlled converters for 50, 144 and 132 Mc.

◆



mostly. Bursts of signal were frequent on 50 Mc. during the evening hours around the 12th, even being observed in the course of casual tuning of the band. There is little doubt that what most 6-meter men are passing up an interesting bet by not making greater use of meteor showers for scheduled work over paths up to 1300 miles or so.

Admittedly, it takes a special kind of avid ham interest to get one started in meteor-burst work. If your aim in life is casual rag-chewing, you'll never take to meteors as a means of communication between friends. But if you are attracted by the challenge of something new and different—a means of communication that demands skill and patient perseverance in a cat-and-mouse style of operating, trying to com-

municate by means of meteor bursts may turn out to be one of the most fascinating things you've ever tried. Ask the man who has picked up a few new states that way!

### 50-Mc. DX Highlights and Prospects

F2 DX held up on December better than expected. Cross-band contacts were made almost daily with European stations up to the middle of the month, and some transcontinental work was done through at least the 27th, that we know of. Prospects for midwinter are less attractive, but there should be a considerable spurt again beginning in February. Predictions for February and March show little prospect of east-west work over great-circle paths involving latitudes higher than about 45 degrees, but north-south openings should be more frequent and of longer duration than in any previous experience.

East-west paths across the Pacific in the lower latitudes should exhibit very high m.u.f., and long transequatorial prospects should be good. Japan to South America, though practically halfway around the world, should be possible again, and the chances for the first United States to Africa contact look better than ever before. If the predictions can be believed transcontinental work within the United States is over until fall, but no part of the country should be without South American openings. Northern parts of the country should watch for high peaks of m.u.f., particularly on mornings following large-scale ionospheric disturbances.

In that connection, we call attention to the new disturbance warnings now being transmitted by W1AW. During the nightly bulletins on all bands from 1.8 to 144 Mc. (see W1AW schedule published regularly in QST) warning of imminent disturbances is given. These warnings are now received by wire from the IGY World Warning Service, and are much more accurate than the 3-weeks-in-advance information formerly used.

To record to detail the 50-Mc. DX that burst like a flood on the 6-meter scene at the end of 1956 would require a whole issue of QST, but here are a few highlights:

When endless calls on both 6 and 10 meters in October and November failed to turn up anyone in Europe who could listen on 50 and transmit on 28 Mc., we got out a few letters to veterans of the transatlantic work of the late '40s. Some of these appeals brought results. G6DH, who worked with your conductor daily for several weeks prior to the first crossband 10-6 QSO, November 24, 1946, got out his ham gear and put it back to work again for the first time in years. Now at his Clacton home only week ends, Denis still managed to be the first to make a cross-band contact in this cycle, Dec. 1st, at 0820 EST, again with your conductor at the U. S. end.

This was none too soon, for about two hours later, E12W, Dublin, Ireland, was also working crossband, with W1FOS, W1HOY, W1L1DQ, W2UTH and W8CMS, in that order, between 1037 and 1127 EST. The following day, G6CJ, who had been trying for two week ends to raise 50-Mc. W's by calling them on 28-Mc. e.w., began attracting attention, and in the course of Sunday morning worked numerous stations crossband. PA0FB also was in there Dec. 2nd. He reports hearing stations for several days beginning Nov. 30th. On Dec. 2nd, he heard W1's HDQ FOS HOY LBI CLS, W2's MEU YYI, W4's LNB TDW LAW GJO, W5AXO and K5GGM.

Beginning on Dec. 2nd, and continuing to the end of December, at least, G5BD, G4D3GMH, G3COJ, G3IUD, G5JU, G3FXB and possibly others, were working W's and VE's frequently via the crossband route. Though eastern stations frequently found the band open to Europe and the West Coast simultaneously, we have no record of reception of W6, 7, or 8 stations in Europe.

Several prospects for 2-way transatlantic v.h.f. work loomed. British amateurs now have a band between 70.2 and 70.4 Mc. On the basis of recent observations, this frequency is a bit high for F2 propagation, but one can never tell for sure. Signals up to 54 Mc. or so were heard from Europe on numerous occasions, and on more than one day the BBC Channel 3 sound, 53.25 Mc., furnished near broadcast-quality reception for several hours at a time. A good converter for 70 Mc., and a Channel 4 TV antenna just *might* come in handy. France and some other European countries have a band around 72 Mc.

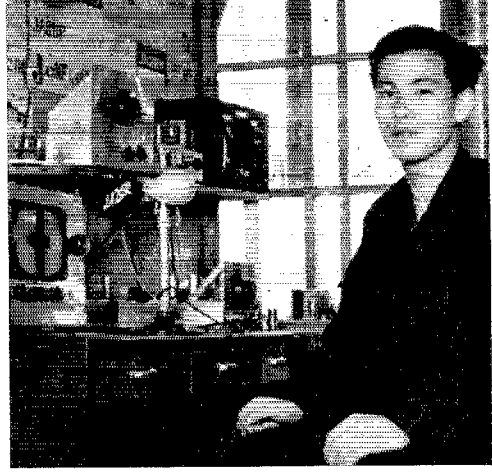
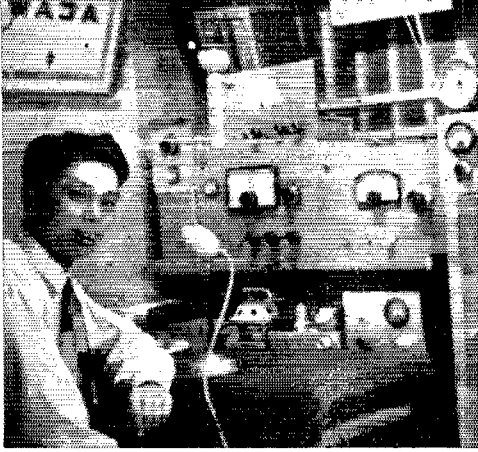
Russia has one at 38 to 40 Mc., and UB5WF has been on 28-Mc. e.w., asking W's to listen for him there. He has



W0ZJB	48	W4CPZ	45	W8UZ	45
W0BJV	48	W4QN	44	W8RFW	45
W0CJS	48	W4UCH	44	W8SQU	45
W8AJG	48	W4FLW	43	W8LPD	44
W9ZHL	48	W40CJ	41	W8HLE	43
W9OCA	48	W4UMF	41	W8YLS	41
W6OB	48	K4DJO	41	W8PCK	38
W0INI	48	W4MS	40	W9BRN	48
W1HDO	48	W1AZC	40	W9ZIL	48
W5MJD	48	W4IKK	40	W9QTV	48
W1DZ	48	W4FNR	39	W9VZE	47
W1LLI	48	W4IJJ	38	W9RQM	47
W0DZM	48	W4AKX	36	W9ALU	47
W0HVV	48	W4AYV	36	W9QKM	47
W0WKB	48	W4CJO	35	W9HIA	45
W6SMJ	48	W4ZBQ	34	W9UNS	45
W0GCV	48	W5VY	48	W9MHP	43
W7ERA	48	W5SFW	47	W9MPH	42
W1VNH	47	W5LFO	47	W9JPF	42
W1CLS	47	W5GNO	46	W9GCT	41
W1GCV	46	W5ONS	45	W0ORE	48
W1LSN	46	W5TJI	45	W0QIN	47
W1AEP	46	W5ML	44	W0NFM	47
W1RFU	44	W5PSC	44	W0TKX	47
W1KHL	42	W5JLY	44	W0KYE	47
W1FOS	41	W5JME	43	W0MYG	47
W1DJ	41	W5VY	42	W0JOL	46
W1ELE	39	W5FAL	41	W0TJF	44
W1SPX	36	W5HEZ	41	W0TRQ	44
W1UHE	34	W5BXA	41	W0HRQ	44
W1S0Z	34	W5FLD	40	W0JHS	43
W1WAS	31	W5FXN	40	W0RPT	43
W2MEU	47	W5EXZ	38	W0CNM	42
W2AMJ	46	W5HFF	33	W0FKY	42
W2BYM	46	W5NSJ	32	W0PKD	41
W2RLV	45	W5ZVF	31	W0ZFW	41
W2RNV	45	W6VNN	48	W0USC	40
W2RGV	44	W6UXN	48	W0ZTW	36
K2JNS	42	W6TMI	46	W0VTK	35
K2AXO	42	W6FXM	46	K0BPM	35
W2GYV	40	K6EDX	46	W0WNU	34
W2SIV	39	W6ANN	45	VE8AET	45
W2QVH	38	K6GTG	44	VE8AIB	35
K2HPN	38	W6NDF	43	VE1EF	35
W2ORA	38	W6TWS	41	VE1QZ	34
K2HRB	37	W6CAN	40	VE1QY	32
W2ZUW	37	W6ABN	39	VE3DER	31
K2HTQ	36	K6HRG	38	NE1CF	27
K2ITP	36	W6GCG	35	VE1EQ	27
W30JU	47	W60JF	31	VE1WL	21
W3TIF	47	W7BEA	47	CO6WW	21
W3NKM	47	W7BQC	47	VE4HS	20
W3MQU	41	W7DQX	47	CO2ZX	16
W3MXW	41	W7PBJ	46	LUNLA	16
W30TC	40	W7DYD	47	P3IAE	15
W3PFH	40	W7ACD	45	JZLAUH	5
W3RUE	40	W7JRG	44		
W3KMY	39	W7BQC	42		
W3LFC	39	W7IPA	42		
W3TDF	35	W7RIV	41		
W3AMO	34	W7CAM	40		
W3UQJ	28	W7UFB	27		
W4FBH	46	W8CMS	47		
W4EQM	46	W8QJN	46		
		W8NQD	45		

Calls in bold face are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.





Four Japanese 50-Mc. operators who have worked frequently into Western U.S.A. Upper, JA7GB and JA1ALZ; lower, JA2IF and JA2QR. (Three photos courtesy of W7MKW.)

said that he will be able to listen on 50 Mc. shortly. A cross-band 50-40 QSO should have been possible in November or early December.

Transcontinental 50-Mc. DX reached a peak on Dec. 1st. The band was open for four hours and the m.u.f. went well over 52 Mc. Signals were of the meter-piuning variety, even with low power. Concentration of the loud ones cost quite a few operators a chance at hard-to-get states at somewhat shorter distances (see OES notes), and much more DX might have been worked if there had been activity in other parts of the world at the right time. This was notably true of Alaska. RTTY signals from Alaska were heard S9-plus in the east many afternoons after the W6's and 7's faded out, sometimes remaining in as late as 1645 EST. As this was only 27 minutes earlier than Japanese amateurs report having worked West Coast stations, we held some hope that JA's might break through to Eastern U. S. A. and Canada. Certainly the path to KH6 must have been open more often, and to much more of Mainland U. S. A. than the few West Coast contacts made by KH6's indicate.

Japan was worked many days by W6's and 7's, with the m.u.f. running well over 51 Mc. JA1AN, V.H.F. Manager for JARL, reports about 900 stations active on 50 Mc. in Japan, and the W7's say the band sounded like it on the better days! JA's were worked from Utah, Idaho, Colorado and Wyoming, as well as the coastal states, and were reported heard in the Denver area by K6GKR, as late as 1650 MST Nov. 25th.

KX6BQ in the Marshall Islands gave the West Coast gang a thrill (and a new country on 6) when he fired up a 2E24, feeding a 48-inch whip. With the aid of an old Hallcrafters receiver, he worked several W6's and W7's, and was heard in Japan. The story is told that he put the rig on the air simply to see if the 2E24 would work on 50 Mc.,

and was amazed when he heard his first signal, K6RNRQ, Oakland, Cal.

Japanese SWL JA2-1031 sent copies of his logs to several West Coast stations. Some idea of the extent of the trans-pacific DX can be gained from his list of 16 W6's, 18 W7's, 1 VF7 and KX6BQ, heard Nov. 25th alone. W6KEV, Acampo, Cal., who sent us a copy of this log, worked 12 JA's that day. KA2DS, Tschikawa, Japan (W7JCU), perhaps the only American presently on 6 in Japan, has worked numerous W6's and 7's, as well as KH6NS, KH6BRJ and KH6PP. The band has opened to W7 as early as 0712 JCT, which is 1712 EST. Dale says that the low end of the band is crammed with stations, both JA's and W's, whenever it is open.

JA1AN writes that two special 50-Mc. awards are open to American 6-meter enthusiasts. The AJD is given to anyone who can show proof of contact with all Japanese call areas. A tougher one is the WAJA, which requires proof of contact with the 46 separate prefectures. Ten International Reply Coupons should accompany the QSL's.

### Here and There on the V.H.F. Bands

It has been a long wait for several West Coast 50-Mc. men. Since about 1950, W7ERA, Milwaukie, Ore., has been looking for a Vermont contact to complete his Grand Slam on 6. Double-hop contacts between the northern parts of the country don't happen every day, and sometimes not every season. And Vermont contacts are rarer yet, or they were until the F2 DX broke loose this past fall. But, as so often happens with the hard ones, W7ERA had two Vermont contacts when he got his first one, Dec. 1st, with W1FMK, Brattleboro, and W1TFE, Barre, Vt.

The 48 QSLs to clinch the deal for W7ERA arrived at Headquarters Dec. 18th, so to Walter Manning goes 50-







# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator  
PHIL SIMMONS, W1ZDP, Asst. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, W1ZJE, Administrative Aide  
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., Phone

In ARRL's 23rd DX Competition, short calls well timed and generously flavored with listening periods should insure best chances of success, both from the scoring standpoint and that of getting QSOs with some new ones. Be sure to use the abbreviation for your state or province given on page 62 of January '57 QST with the announcement. Many overseas amateurs will be looking for states to advance their WAS standing, and this will give you the best chance of getting that information through without a repeat being necessary. In addition to advance publicity in QST, notices were mailed earlier to all overseas societies and QSL bureaus and to selected amateurs in rare spots.

The dates: February 8th-10th (phone) and February 22nd-24th (c.w.) and the corresponding March week ends (same dates) for completing logs in the respective contests. We're operating right in that favorable portion of the sunspot cycle. The competitive urge brings out desirable DX and this should help us add to our country totals. The contest offers plenty of operating enjoyment whether you are a regular follower of DX, or just plan to have some fun with DX in the time available from family or business commitments. We hope that in this contest the DX gang will help to minimize pile-ups by specifying *up five, down ten* (kc.) or as appropriate, thus indicating where they will listen. Good hunting!

**YLs of Traffic Distinction.** Irene Craft, W0KQD, holds a top post as a TCC manager in NTS; besides her organizing successes she always manages to turn up with a good total. Clara, W2RUF, RM WNY very often led that section in traffic before her recent unfortunate auto accident. Thelma, W9JYO on the Indiana Phone Net was recently congratulated in *Midwest Clix* for the outstanding job in that area. Mae, W3CUL, has consistent BPL totals! W1OAK is Vermont SCM and a mainstay in 1RN. W7QKU, Donna Gettman, Oak Grove, Oregon is a BPL winner, and very active. Nellie Hart, W7NH, was RN7 and PAN manager for a long period and is a staunch supporter of NTS. Marge, W2NAI, manages the Inter-State and Second Regional Phone Nets. Then there's W1UKR, WIYYM, W3NHL, W4AKP, W4ZDA and many others . . . the girls really keep traffic and public service to the fore. Lydia, W0KJZ, is Regional Net Manager for TEN — and NCS herself on Tuesdays. W0OUD is RM and NCS of the Missouri Net . . . just to name a few.

**Which Band for DX.** The order of popularity of different bands for making an accumulation of country credits is a good subject for discussion.

While CRPL predictions can give a general idea of a maximum usable frequency or calculated drop-out time for the use of bands between particular points, the actual operating observations may vary considerably from such average expectation. In routine operating the hours that amateurs can operate in particular countries (their morning and evening times when free from conventional tasks) must be taken into consideration when looking for DX. In a contest an amateur's operating periods of course will be more extensive.

What do statistics show as the average DX-QSO producing ability of the various bands? We looked at the posted results of 15 members of one active club who were interested in DX and reduced their total accumulation of countries (for the 15) to percentages. It looked like this:

14 Mc. c.w. 33%, 21 Mc. c.w. 13.9%, 7 Mc. c.w. 12%, 28 Mc. c.w. 11.5%, 14 Mc. phone 8.3%, 21 Mc. phone 6%, 28 Mc. phone 5.6%, 3.5 Mc. c.w. 4.5%, 27 Mc. c.w. 1.8%, 27 Mc. phone 1.1%, 7 Mc. phone 1%, 4 Mc. phone .7%, 50 Mc. and above .3%, 1.8 Mc. c.w. .2%, 1.8 Mc. phone .1%

Our thanks to the Ohio Valley Amateur Radio Association and its bulletin for the tabulation of members' standings which invited this brief analysis. Of course the personal preference for one mode or band or another, propagation conditions that favor residents of north or south latitudes for use of certain bands and the incentive factors that determine individual choice of a band must always be taken into account. But we thought you might share our interest in a fascinating subject. Perhaps those newer in the ham game may here find some clues for future plans. We want to caution that such figures should not be followed too literally. In any contest the band choice is a matter for personal judgment. The station and country you are after, the season of the year and the conditions of the moment often must govern your personal operation to get most from the available time. (It seems so often that the rarest DX is heard from while we have to be at the office or daily grind).

**Period of License Suspension Reduced.** The following amends an initial FCC Order of 10 Oct. '55 which was reported on page 114, Dec. '55 QST.

With reference to the request for a hearing on the order suspending the Advanced Class amateur operator license, and providing that during the period of suspension, license must not permit W6DZJ to be operated by any person, FCC on Jan. 16, '56 designated the matter for review at a hearing, this to be Nov. 6, '56. On this docket no appearance was entered but FCC on its own motion reviewed its earlier de-

cision. From the findings and conclusions: (1) FCC reaffirmed it as conclusive from communications transcribed by the monitoring stations that on three specific '54 and '55 dates, in the operation of his station, communications were transmitted containing obscene, indecent or profane words, language or meaning (in violation of Sec. 12.157) with nothing in the record to justify or excuse the dereliction. (2) It appeared disciplinary action was essential but a reduction in suspension not unreasonable.

Accordingly FCC ordered (6 Dec. '56) that the earlier amateur operator license suspension of Mr. Harold M. Boring, Los Angeles, Calif. be reduced from one year to two months commencing Feb. 1, 1957.

**Re Key Clicks.** Your best friend sometimes won't tell you, but common courtesy to fellow hams requires a signal clean of clicks. *QST* has received the suggestion that there be introduced a departmental listing of "prehistoric signals." The several weeks publication lag in putting out a monthly magazine of course makes that impractical. The condition might well not exist by the time the publicity appeared . . . if observer warnings and FCC notices have done their job! W9BXX and a group of local amateurs urge some personal and detrimental publicity to shame the poor-signal gang into action. Many amateurs share the feeling that too much importance can hardly be ascribed to the deplorable situation of clicks and thumps noted on many signals in the bands today.

The average operator, we feel, *ought* to be just as ashamed of a poorly filtered signal or one with a disgraceful click or thump that annoys his fellow hams far and near as the present day businessman would be of going to his work in a model T Ford! The *Handbook* as well as current *QST* articles treat of "what to do." Additionally, at least one of the manufacturers of amateur equipment has come forward with an excellent kit applicable to the production line models.

Purpose of this item is to suggest a larger control measure. If *every single operating amateur* or reader of these columns will be frank to tell the operators of different amateur stations as they are worked when their signals are in any way deficient, the deficiencies will soon be remedied. When using RST reports *always* add a C or K for chirp or click respectively.

### WIAW OPERATING NOTE

The complete schedule of current WIAW operations appeared on page 77 of last month's *QST*. See that issue for full information on when and where to look for the ARRL Headquarters station.

### CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WIAW will be made on February 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7080, 14,100, 21,010, 50,900 and 145,600 kc. The next qualifying run from *W6OWP* only will be transmitted on February 6th at 2100 PST on 3590 and 7128 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from WIAW each evening at 2130 EST. Approximately 10 minutes' practice is given at each speed. References to texts used on several

of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text sometimes is reversed. To improve your fist, hook up your own key and buzzer and attempt to send in unison with WIAW.

*Date* Subject of Practice Text from December *QST*  
 Feb. 4th: *Polarization Effects in V.H.F. Mobile*, p. 11  
 Feb. 7th: *Automatic Antenna Tuning . . .*, p. 15  
 Feb. 11th: *Losses in Feed Lines*, p. 18  
 Feb. 14th: *Phased Array for 40 Meters*, p. 20  
 Feb. 19th: *A Simple Crystal Switcher*, p. 25  
 Feb. 21st: *Modernizing the C. W. Clipper-Filter*, p. 36  
 Feb. 27th: *Fifty-Six Field Day*, p. 60

### MEET THE SCMs

Thomas G. Mitchell, presently SCM for Michigan, has held the call W8RAE continuously since he was first licensed in 1937.

As well as holding the SCM post, he is EC for the Michigan Third Area and participates in ARRL Sweepstakes, Field Day, DX Contest, LO and CD Party activities. He



is a member of the A-1 Operator's Club, the Michigan CD Radio Club and the Niles Amateur Radio Club, being a past-treasurer of the latter society.

W8RAE's shack is a separate room on the ground floor with access to antennas, etc., and contains a Collins 310-B driving p.p. 807s, a BC-696 and a BC-459 with a common power supply portable and an Eldico 2-meter mobile transceiver rigged for fixed use. Other receiving equipment includes an NC-127, a DB-23, an HF 10-20 and a VHF-152. Antennas are a 136-ft. flat-top center-fed with tuned feeders for all bands and a four-element Yagi for 2 meters.

Amateur radio is Tom's one and only hobby, but his favorite sports are football and fishing. His working hours are spent as production superintendent for Electro-Voice, Inc., Buchanan, Mich.

### A.R.R.L. ACTIVITIES CALENDAR

Feb. 2nd-17th: Novice Round-up  
 Feb. 6th: CP Qualifying Run — W6OWP  
 Feb. 8th-10th: DX Competition (phone)  
 Feb. 12th: Frequency Measuring Test  
 Feb. 15th: CP Qualifying Run — WIAW  
 Feb. 22nd-24th: DX Competition (c.w.)  
 Mar. 7th: CP Qualifying Run — W6OWP  
 Mar. 8th-10th: DX Competition (phone)  
 Mar. 18th: CP Qualifying Run — WIAW  
 Mar. 22nd-24th: DX Competition (c.w.)  
 Apr. 3rd: CP Qualifying Run — W6OWP  
 Apr. 13th-14th: CD QSO Party (c.w.)  
 Apr. 16th: CP Qualifying Run — WIAW  
 Apr. 20th-21st: CD QSO Party (phone)  
 May 2nd: CP Qualifying Run — W6OWP  
 May 15th: CP Qualifying Run — WIAW  
 June 5th: CP Qualifying Run — W6OWP  
 June 8th-9th: V.H.F. QSO Party  
 June 20th: CP Qualifying Run — WIAW  
 June 22nd-23rd: ARRL Field Day



This column is for doings of, and comments about, the organization and operation of our Amateur Radio Emergency Corps. RACES doings are covered under a separate subheading. However, it is not always possible to separate them, because RACES and the AREC have much, if not everything, in common. They are both emergency communications facilities, they are both amateur services, and in many places their leaders and personnel are identical, not to mention their equipment, their organization and their aims. There is one difference: AREC is our own emergency communications service, sponsored by your amateur society, organized by amateurs and consisting exclusively of amateurs, its leaders appointed by elected amateur officials; RACES is a government service sponsored by a government agency, organized by government-appointed officials who are usually but not necessarily amateurs, its leaders appointed by officials, elected or appointed, who are generally not amateurs.

It is difficult and often impractical to generalize when circumstances, requirements, aims and attitudes differ so widely among the thousands of AREC and RACES groups throughout the nation. One thing can be said for sure: emergency communications consciousness among amateurs has shown an overall decided increase as a result of promulgation of RACES by our FCDA and FCC — this regardless of any other considerations. The ideologies of the two groups are not in conflict; the basic aims are the same. We find them in conflict only where local circumstances or personalities make them so. In all cases of such conflict, we have found a personality or group of personalities at the bottom of it — a regrettable but often insoluble circumstance.

Civil defense officials, like amateurs, are people, and like all people are prone to personal partialities and prejudices which are apt to affect their official thinking. Judging the whole by experience with a small segment is a very common human failing to which none of us is immune. Specifically, civil defense communication officials who are not amateurs (and even some who are) are sometimes anti-amateur simply because of one or two experiences with amateurs who are not representative of the best of our qualities. If they are small-minded, it is utterly impossible to convince them that amateurs are or can be efficient communicators. If they are high-minded, it is simply difficult to do so. Except in those relatively few cases where such a pre-prejudice exists, the impression made on non-amateur officials is wholly up to the amateurs themselves.

In a few cases where anti-amateur sentiment has existed we have been asked to intercede, and in a few cases we have tried to do so. Mostly, these attempts have not been received favorably. If, you may ask, neither FCDA nor ARRL Headquarters can do anything in such cases, then on what basis can amateur emergency communication be developed, and for what purpose? The AREC is your answer. Nobody can force your local officials to utilize amateurs if they do not want to; but a well-organized, efficient, functioning AREC speaks for itself. Personnel and political circumstances change. Your job is to maintain a high

standard in the AREC, if or whether or not civil defense officials will utilize your services, and to "leave the door open" to a change of circumstances which might make them receptive to the facilities you can offer. Most civil defense officials are tickled to death to utilize the services of amateurs. Those who are not may suddenly become so at any time. You should be prepared to serve them, whether the change in attitude is simply that or results in a change in personnel or a political shakeup. Our rule-of-thumb advice: if you cannot serve under RACES, serve under AREC, thus maintaining the reputation of our own amateur organization as well as of amateur radio itself to be ready to serve any or all agencies requiring help in an emergency.

Additional information on participation by amateurs in Hurricane Flossie comes to us through the medium of the bulletin of the Pensacola Amateur Radio Club. At 0825 on September 24th, W4DAO/4 set up at the American Red Cross headquarters and started getting a group together on 29,560 kc. Within a very short time W4s YBS/m UCY SPP/m CCY LJK HIZ/m PQW/m JPD, K4s DKG/4 BZN EGD/m DDD/m and WINRZ reported in to offer their services. After a call for more mobiles, W4JK and K4BZN also went mobile, making eight mobile units available. At 1300, power failed at Red Cross and K4BZN/4 assumed temporary control while emergency power was being installed. Later, W4CCY took over as NCS. Mobile stations were dispatched to various sections of town to provide reports of conditions and to provide standby communications for evacuation centers. Communications were maintained with RC headquarters concerning evacuation procedures, provisions and bedding. One center was completely surrounded by water and itself had to be evacuated, communications supplied by amateur radio. In performing their duties, mobiles discovered various fallen high voltage lines, washed out roads and streets; these were reported to the NCS and the mobiles remained at the scene until road crews arrived. K4DKG/4 furnished weather reports by phone patch from the Aerology Department of NAS Pensacola.

On October 20th VE3KM was engaged in a local QSO with VE3JL from downtown Hamilton, Ont., when he heard a crash and a scream about 100 feet away. Three people were badly hurt when a car crashed one of the light standards in a nearby parking area. He immediately asked VE3JL to dispatch an ambulance. Within minutes one was on hand as a result of this prompt call.

On Nov. 8 at 1245 an aeroplane collided with the 810-foot tower of WOR-TV. At 2000 hours on the same date, when the tower seemed to be in danger of falling, the Mayor of North Bergen declared a state of Civil Defense Emergency. County RACES RO K2DUZ was notified of conditions by W2KDA, Hudson County Communications Director, and within 15 minutes had RACES mobile units at the scene of the disaster. The RACES units remained on the scene handling emergency traffic for civil defense officials for a total of 65 hours without interruption. The following stations participated in the operation: K2s DUZ QHZ KOX JOG LIL PXX CMB W2s FBZ NEM KDA COT WRC, KN2s UXW QMS and UYE. The RACES frequency of 144.320 Mc. was used for the entire operation. Assistance was offered in the form of additional equipment by K2CMB and W2NEM. W2s COT FBZ and KDA, along with K2LIL, were very helpful in keeping the frequency clear for emergency operation. — W2VQR, SCM Northern New Jersey.

At the request of W3NRU, Radio Officer for the Western Pennsylvania Area, FCC at 2025 on November 23rd officially requested the voluntary cooperation of amateurs in

Here are recipients of very handsome "Certificates of Achievement" awarded by the Radio Amateur Mobile Society, Inc., of Sacramento, Calif. for their work during the floods of 1955. Left to right are W6LSK, W6KKI, K6EWH, W6NQIH and club president K6CFF. K6EIHU, not present, also received an award.

# RAMS



QST for



Thirty-three amateurs and their mobile units are affiliated with the Sheriff's Office of Harris County, Texas, all carrying deputy's commissions. The group is very active in c.d. work and various emergencies. The trailer shown has three receivers, three transmitters and a 3000-watt power plant. Standing in front of the trailer are (l. to r.) W5RMLX, W5FDZ, W5CC and W5ETA (ARRL Director).

clearing the frequency segment 3950-3960 kc. for the handling of emergency traffic dealing with stranded motorists and others in the snowbound northwestern Pennsylvania area. The net secured the emergency at 2045 Nov. 23rd. W3KLD, EC for Erie County, Pa., reports that amateurs in his area provided emergency communication from 2000 Nov. 22nd until 0800 November 26th.

For amateurs interested in the care and feeding of tropical hurricanes and tornadoes (and many of us have reason to be), K9CKP recommends two kits put out by the U.S. Weather Bureau on the subject, available from Superintendent of Documents. One kit is designated HURK-56 (75 cents per kit) and contains 14 publications on hurricanes; the other is designated TORK-56 (\$1 per kit) and contains 14 publications on tornadoes. If you'd like to read up on these subjects so you'll know what's happening next time you find yourself in the middle of a hurricane or tornado, here's your chance to do so.

Did you fellows see the FB spread the Weather Bureau put on the back of some of their recent daily weather maps concerning "The Cooperation of Radio Amateurs in Weather Emergencies"? It's a most worthwhile piece of publicity, complete with pictures of some of the installations and a map showing the Weather Amateur Reporting Network covering the state of Florida. This is just one of the many services being rendered by SEC Andy Clark, W4IYT and his active AREC organization in the Eastern Florida section. A letter from Mr. D. M. Little, Deputy Chief of the U.S. Weather Bureau in Washington, says, in part: "Although splendid cooperation exists throughout the United States and its possessions, the arrangement in Florida provides an interesting and complete story . . . In this manner, we are bringing to the Nation's attention the commendable public service which the radio amateurs are rendering."

Finding that the ARRL Form has some shortcomings in its application to AREC organization in Cuyahoga County (Cleveland) Ohio, EC W8AEU has instituted a punch card system which makes filing quicker, easier and more complete. The card is 3 1/4 by 7 1/2 inches and has space for 100 punch holes around its edge. The card is simply

The Southern Wisconsin and Northern Illinois Amateur Radio Club put on a simulated disaster for the Woodstock (Ill.) Lions Club in November. Mobiles were dispatched to strategic points by a control station set up at the meeting place. Shown in the picture are (l. to r.) W9NZ, KN9CCO, W9TPA, W9YUN, W9KXH, W9OBY and Lion's President Dr. Paul Schwabe. Seated is W9LET. Frequency was 29.1 Mc.

filled in by the registrant, the EC then punching it in accordance with the information provided by the registrant and filing it. Come an emergency, the EC can then tell by glancing at the locations of the punch holes which of the registered amateurs are available at any particular time for any particular duty, thus saving him time and trouble in studying each individual Form 7 for this information. Walt says the cards cost only 1 1/2 cents each. Each registrant or prospective registrant gets a complete explanation of how to fill out the card, along with other information concerning the purpose and principles of AREC organization.

On Sept. 8th AREC members of the Metropolitan Toronto, Ont., area provided communications for the Governor-General's Cup Air Race. The race started and finished at the Toronto Island Airport and had five turning points in southwestern Ontario. Each plane had to be recognized at each turn. This information was relayed by amateur radio to the finish line. One of the contestants developed engine trouble and had to make a forced landing. The farmer on whose field he landed drove him to the nearest check point where the amateur mobile stationed there made arrangements for inspection and removal of the downed plane, and later the pilot was transported to the finish line in the amateur mobile. Although two fixed stations stood by to assist if necessary, all communication was mobile to mobile over distances ranging from 30 to 50 miles. Seven mobiles took part, and the operation was under the direction of VE3DSM, Metropolitan Toronto EC for 75 meters.

Amateurs from the Shenandoah Valley Amateur Radio Club in Winchester, Va., assisted the Lions Club in a sale of brooms on Oct. 1-2, proceeds of which went to help the blind. A mobile unit stood by at broom sale headquarters while the local broadcast station made periodic announcements concerning the sale. As listeners called in, mobiles were dispatched from various points in the city to deliver brooms. The project proved to be very valuable both from publicity and experience in mobile emergency work. Five mobile units were utilized, with W4HXB as control station. — W4ACC.

On October 13th W0TUS, EC for Cass Co., Minn., put on a demonstration to show how Minnesota amateurs could supply fast and efficient communication in the event of extensive forest fires. The drill got under way at 1000 when W0LST contacted the chief of Minnesota Forest Service Fire Control in St. Paul and put him in direct contact with ten stations located throughout the demonstration area of about 10,000 square miles in northwestern Minnesota. Reports of fire danger, weather conditions, and actual or simulated fire conditions were obtained through contact of each amateur with his ranger tower. The demonstration was eminently successful and all fire officials were highly pleased at this evidence of the potential of amateur emergency communication.

Eighteen SWCs reported on behalf of 5848 AREC members in October. Corresponding figures for October of last year are 18 and 4217, so we've gained in AREC members, but not in number of reports. Sections reporting: E. Fla., Ga., W. N. Y., Ala., San Joaquin Valley, Tenn., Colo., NYC-LI, Minn., Santa Clara Valley, N. C., E. Pa., Ont., Ore., Wis., Md.-Del.-D. C., Iowa, Nebr. The addition of Iowa places our total sections heard from this year at 34. This is slightly less than half of all sections.



## NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.

## NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc.                      7140 kc.

### RACES News

We have just received from FCDA a few samples of some RACES transfers which are being made available nationally through their regional offices to state civil defense offices.



They are just like the insignia to the left hereof, with the background of the circle in blue, the letters CD in red on white background, the word "radio" inside the lightning flash in blue, and the letters RACES in white at the bottom. In addition, inscribed around the outside of the circle in red are the words "This is a Unit of Your Civil Defense."

They are right handsome and will make an impressive decoration on any car. Local radio officers wishing a supply for distribution among RACES personnel may obtain them by applying through their state radio officer.

A certain city authorized for RACES (which wishes to be nameless in this case) has provided for purchase of certain well-known 2-meter station equipment for use by regular members of its c.d. communications (RACES) group in the following manner: (1) The individual puts up a deposit of \$100. (2) The city adds \$50 to complete payment of 1/2 the cost of the unit. (3) Matching funds in the amount of \$150 are obtained through FCDA to cover the rest of the cost. The \$100 deposit put up by the amateur is considered evidence of good faith on his part. He can keep the equipment at his home or elsewhere, use it in regular amateur work as long as he is an active member of the RACES group. The actual ownership remains with the city, and the equipment must be available for immediate use in emergencies. In the event the amateur's membership in the RACES group is terminated, he returns the equipment to the city and gets his \$100 back.

A good "gimmick?" Sounds like one to us. The amateur gets the use of the gear for a third of its purchase price, the city gets the use of it for a sixth of its purchase price, plus the operator's availability and maintenance service of the gear which would otherwise sit gathering dust in the periods between the relatively few uses it would otherwise get. No reason why similar agreements cannot be extended to apply to other FCDA-approved equipments as well, costing more or less than \$300. If the idea sounds good to you, try playing it on your local civil defense purse strings.

The first New Jersey State RACES Symposium was held at Asbury Park, on Oct. 28th. Each of the 21 Counties in the state was represented by the County RO and his assistant. Technical discussions and organizational problems were the topics of the day. The meeting was presided over by W2VQR, State Radio Officer, and other speakers from the c.d. state level were included in the program. Permanent executive, technical and frequency allocations committees were appointed under W2FMQ, K2DO and K2BJP respectively. Each committee is made up of seven county radio officers, each having one vote. The findings of each committee will be submitted to the State RO for inclusion in

official proceedings of the state RACES organization. Thus, RACES will be governed by amateurs with a direct voice in the administration of their c.d. program. The meeting was a huge success, and it is planned to hold these meetings at least once a year.

From the "Bergen Defender," official publication of Bergen County (N. J.) Civil Defense, we glean that RACES organization, expansion and interest continue to grow and improve. At a meeting of county RACES officers in October, 30 of the 37 municipalities in the county were represented. During the month of October, 41 station licenses were issued in 13 municipalities. W2GNQ is county radio officer.

Missouri RACES operates in ten districts, each with its NCS. The statewide net is managed by State Radio Officer K0CTG, who opens the net and gives general information, then turns it over to the various district NCSs in turn. C. D. tactical call signs are used, which adds some interest to the drills.

## FREQUENCY MEASURING TEST, FEBRUARY 12TH

ARRL invites all amateurs to try their hand at frequency measuring. W1AW will transmit signals for the purpose of frequency measurement starting at 9:30 P.M. EST (6:30 P.M. PST), Tuesday, February 12th. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3626, 7025 and 14,116 kc. About 4 1/2 minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 9:36 P.M. It is suggested that frequencies be measured in the order listed. Transmissions will be found within 5 or 10 kc. of the suggested frequencies.

At 12:30 A.M. EST, February 13th (9:30 P.M. PST, February 12th), W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3507, 7105 and 14,025 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite application for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for QST listing of top results; at least two readings should be submitted to warrant QST mention. Listing will be based on over-all average accuracy, as compared with readings made by a professional frequency-measuring lab.

## TRAFFIC TOPICS

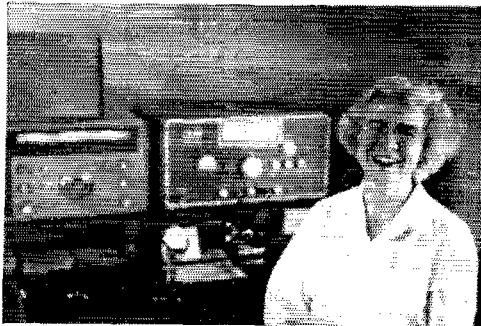
There is a common saying (especially among c.w. men) that "anyone who knows how to talk can operate phone." This is an over-simplification based on an optimistic definition of what constitutes talking. The sad fact is that very few of us, relatively speaking, do know how to talk. One of the dictionary definitions of "talk" is "to make sounds suggesting speech." Some of our phone mouthings fit this definition very well; but to convey intelligence through the spoken word is something that too few of us accomplish too seldom.

The reason for this is not so much lack of training in speech, nor lack of education, nor lack of basic intelligence. It is slovenliness, pure and simple — the tumbling from the mouth of half-formed syllables intended to convey ideas but not quite succeeding in doing so for the simple reason



that slurring sometimes makes words having quite different meanings sound alike, if indeed they can be understood at all. This is bad enough in face-to-face conversation, but its difficulties are increased manifold under conditions we commonly meet on the phone bands.

In phone traffic handling particularly the importance of clarity and distinct articulation and enunciation are paramount. How many times have you required fills in a phone



After months of intensive effort, we finally succeeded in getting a snapshot of Irene, W0KQD, at her operating position. Irene is Pacific Area Director of the Transcontinental Corps of the ARRL National Traffic System, and has done an outstanding job in that capacity since her appointment in late 1955.

message not because of QRM, fading or weak signals but simply because the transmitting operator failed to make his articulation clear? Not all of us have voices well suited for reproductive qualities, and not all of us have vocabularies and speech training that enable us to put our thoughts into easily-understood words. What nearly all of us do have is the ability to make full use of our lips, our tongues, our teeth and our palates in making our speech sounds clear and distinct. If we fail to do so, we are just adding our own carelessness to the other difficulties of speech transmission which, goodness knows, are numerous enough.

Some of you regular traffic men may have noticed the absence of W2RUF from the air (and the BPL column) of recent months. Clara is the victim of an unfortunate auto accident while traveling in Mexico last summer, and sustained some injuries that have put the kibosh on her operating activities. We are glad to say that she is convalescing at home at this writing, and by the time you read this may be back on the traffic lanes doing the usual. I think we can speak for all traffic men in saying that we're sorry about the accident and will be very happy to welcome her back to the fold.

Miscellaneous reports: Transcontinental Phone Net reports a traffic total of 3410 for November, including 1390 in the First Class Area, 1465 in the Second Call Area and 555 in the combined Fourth, Ninth and Tenth Call Areas. North Texas-Oklahoma Net reports thirty sessions, 958 check-ins and a traffic total of 240.

National Traffic System. We were surprised and somewhat dismayed to note that on the CD-85 net registration card, many section nets who send representatives to their NTS regional nets considered themselves as not being a part of the National Traffic System. Further inquiry revealed that some of them actually did not realize that section nets could be a part of NTS, thought that NTS was just the regional and area nets and the Transcontinental Corps.

This is very far from being the case. On the contrary, the section traffic net is the very basis of the National Traffic System. The rest of the system is just a means for tying them together on a chronological and systematic basis.

The question then arises: when is a section net a part of NTS and when isn't it? The only requirement is that the net be represented in its regional net, either by direct liaison or through another section net. For example, Connecticut Phone Net is part of NTS even though it doesn't send a representative to IRN, because it does conduct regular liaison with the Connecticut (c.w.) Net and thereby adds

to Connecticut coverage for traffic coming through the system. All of its traffic doesn't go to NTS (some goes to TCPN and other phone nets), but this doesn't matter as long as its facilities are available on a regular and deliberate basis to outside traffic coming through region. On the other hand, a net which does not have any connection with its NTS regional net is not a part of NTS, whether or not it is sponsored by the section organization.

The responsibility of regional net representation lies with the section net manager. It is his job, not that of the regional net manager, to see that his net has an NTS connection. In passing this along, we should add that as far as the regional net is concerned representation must be for the whole section, not just for a single section net, because regional nets are geared to handle traffic for sections, not for specific destinations within sections. It is therefore a very good idea for all traffic nets within a section (if more than one) to coordinate their liaison so that traffic they get through region can be distributed through the net having coverage in any particular message's destination. To use the Connecticut example again, a message coming through IRN (designated simply as "Conn." there) will be sent to the Conn. representative, whether he be from CN or CPN or other Conn. net. The liaison between the nets in Connecticut must then function to see that this message reaches the net which can cover its particular destination.

We would like to urge all section nets to put some sort of NTS liaison into effect. Of course we would like to have you put your traffic into the system too, because a traffic system

### BRASS POUNDERS LEAGUE

Winners of BPL Certificates for November traffic:

Call	Org.	Recd.	Rel.	Del.	Total
W0BDR	.....	81	799	741	2 1623
W3CUL	.....	137	741	633	99 1610
W08CA	.....	6	687	681	0 1374
W3PZW	.....	35	664	588	76 1365
W3W1Q	.....	65	498	620	85 1283
W7BA	.....	23	610	590	17 1240
K2WAO	.....	112	54	26	15 1207
W0PZO	.....	13	556	534	12 1115
W7BGY	.....	31	494	431	63 1019
W3NZZ	.....	307	353	0	351 1011
W0CPL	.....	6	432	399	33 870
W9CXY	.....	11	397	387	10 805
W3ZXS	.....	275	269	181	50 775
W1LDE	.....	16	388	340	10 754
W5DDE	.....	2	369	369	0 740
W5ELW	.....	30	367	343	9 739
W5DTA/5	.....	24	336	340	22 722
W0GYH	.....	610	49	49	1 709
W9DO	.....	17	330	323	24 694
W7APE	.....	8	322	292	30 652
W0KQD	.....	21	312	269	0 602
W4C0J	.....	38	291	246	12 587
W7FRU	.....	4	288	268	8 568
W7VAZ	.....	1	277	231	46 555
W3WVG	.....	3	271	275	1 550
W0LGG	.....	43	256	231	5 535
W1YBF	.....	26	276	134	91 527
W0GAR	.....	2	259	259	1 520
W2YRW	.....	3	255	198	59 515
Late Reports:					
W3WG (Oct.)	.....	5	478	462	5 950
W1NJM (Oct.)	.....	4	274	15	271 564

### More-Than-One-Operator Stations

Call	Org.	Recd.	Rel.	Del.	Total
K5FPB	.....	184	250	474	12 920
KH6AJF	.....	145	206	153	110 614
K7FAE	.....	14	250	244	6 514
K3WCS (Oct.)	.....	251	241	201	65 758

BPL for 100 or more originations-plus-deliveries:

KH6BQS	194	KP6AK	122	W6CMN	108
W0N1Y	151	W0YVM	117	K6WAY	108
W1DLS	142	W9DGA	116	W0KJZ	108
W0ZWL	142	W7AHV	111	W9TT	104
K7FAE	140				

### More-Than-One-Operator Stations

K3WBJ	237	W4HTP	154	W3YDX	108
K7FBN	155	W1AW	112	KH6QU	103
		W9AB	110		

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W1YWM, W3PZW, W3ZSX.

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

without traffic cannot live long. However, if you prefer to route your outgoing traffic by non-NTS means, this alone does not rule you out as a part of NTS, provided your facilities are available to NTS daily through regular liaison with your regional net. Then, report your NTS activities monthly on a form CD-125 direct to headquarters (as well as to your SCM) and they will be included in both the summary below and in the SCM's monthly *QST* column.

Remember, your participation in your section net makes you a part of NTS if your net in turn is represented in the regional net. Section nets are basic. Don't neglect them.

November reports:

Net	Sessions	Traffic	Rate	Average	Representation
EAN.....	26	761	0.97	29.0	32%
CAN.....	27	836	1.26	30.9	100%
1RN.....	26	324	0.45	12.5	92.9% <sup>1</sup>
2RN.....	31	225	0.45	7.8	98.9% <sup>1</sup>
3RN.....	42	249	0.44	5.9	64.3%
4RN.....	25	100	0.33	4.0	.....
RN5.....	48	755	0.84	15.7	74.8%
RN7.....	50	286	.....	5.7	25.1%
9RN.....	56	614	0.56	11.0	83.5%
TEN.....	90	1641	.....	18.2	67.8%
ECN.....	22	55	0.62	2.5	69.7% <sup>1</sup>
Sections <sup>2</sup> .....	621	4650	.....	7.3	.....
TCC (Eastern)	31 <sup>3</sup>	376	.....	.....	.....
TCC (Central)	.....	1718	.....	.....	.....
TCC (Pacific)	95 <sup>3</sup>	583	.....	.....	.....
Totals... ..	1064	13173	CAN	9.9	CAN
Record.....	1064	13173	1.47	12.6	100%

Late reports:

4RN (Oct. ...)	24	53	.....	2.2	57.7% <sup>1</sup>
----------------	----	----	-------	-----	--------------------

<sup>1</sup> Regional net representation based on one session per night. Others are based on two or more sessions per night.

<sup>2</sup> Section nets reporting: CN & CPN (Conn.); OSN (Ont.); ILN (Ill.); SCN (Calif.); Iowa 75 Phone; GSN (Ga.); S. Dak. 75 Meter; TLON (Iowa); AENB, AENP & AENT (Ala.); QKN, QKS & QKS SS (Kans.); KYN (Ky.); WVN (W. Va.); E. Tenn. Phone, Tenn. 160 CW & Tenn. 80 CW; Sooner Traffic Net, OLS & SSS (Okla.); HNN (Colo.); WSN (Wash.); MSN (Minn.).

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

Lateness is something we should perhaps speak about. It is getting to be a bad. On nets, the NCS is late taking control of a net whose members straggle in anywhere from a half hour to an hour late themselves. He then reports the net session to the manager (late, of course), who collects all other late reports and sends them in late to this office. We then prepare our copy for *QST* and submit it late to the managing editor, who puts it in the magazine—which comes out late. When you receive your copy of *QST* late, did it ever occur to you that it might be because you and a lot of guys like you neglected sending in a net report until the last minute, hoping it would still be in time? Well, it's not that bad, but it's a contributing factor. How about making a concerted effort to run our NTS on time, gang?

The First Regional Net has started a session at 2130 in accordance with the NTS structure, K2KIR and K2LWK have received well-deserved 2RN certificates; 2RN is now also operating two sessions, at 1845 and 1945. Both Pennsylvania sections are lagging on 3RN, although some improvement has been noted. W4BVE says that 4RN practically runs itself. RN5 manager W4COU submits figures showing that RN5 had a November traffic efficiency of 98%. VE7ASR resigned as RN7 Manager on Dec. 1; W7WAI is acting manager until a permanent manager is appointed. W4KKW has produced a very fine 9RN Bulletin summarizing activities for September and October. TEN now operates three net sessions seven days per week; W0s GXQ ZEL MHS, K0s CNC AZF and DNMM have earned their Tenth Regional Net certificates. ECN is getting more representation from Ontario Phone Net and from Maritimes through VE1DB and VE1OM. A recent EAN bulletin put out by W8SCW shows that 2RN has not missed a single EAN session during the first ten months of 1956; 1RN has missed only one. The bulletin gives some excellent rules for area net procedure to speed up traffic and in general increase efficiency. W9DO continues to wax enthusiastic about the efficiency of his Central Area organization in particular and NTS in general—and with good reason. CAN certificates have been awarded to K5AOV, W9MAK and W9KQB.

*Transcontinental Corps.* The fortunes of Eastern Area TCC are looking up under the direction of W3WG, who is

tackling the filling of vacancies in the roster with both fists. He has issued a TCC letter to all Eastern Area TCC stations indicating that TCC assignments will be for three months at a time. New stations on the roster include W8QLJ, W8ELW, W9DO and W9CXY—the latter two conducting a large part of the interchange between EAN and CAN, while W8ELW serves as a relay from PAN to EAN.

W0BDR, W0SCA, W9DO and W9CXY are handling the bulk of Central Area TCC. Doc says all his stations are reliable, loyal and dependable.

Pacific Area TCC traffic was handled during November by 18 different stations on 95 regular TCC skeds and 26 auxiliary skeds arranged to take care of overload or to take care of traffic when regular stations were late or had already left PAN for their TCC schedule. Reporting of assignments completed is close to 100%.

The TCC roster as of Dec. 1: Eastern Area—W1EMG W1BDI W1NJAI W2ZRC K2KIR W3COK W3WG W8QLJ W8ELW W9DO W9CXY W1AW; Central Area—W9CXY W9DO W0BDR W0DGL W0KJZ W0LGG W0SCA; Pacific Area—W6ADB W6BPT W6EOT W6GJP W6HC W6IPW W6REF W6EPW W6VZT W6YHM K6DYX K6GZ K6ORT W7APF W7FRU W7GMC W7UJL W0KQD.



Radio amateurs throughout New York State combined forces on election night, Nov. 6, to turn in a remarkable demonstration of their ability to gather detailed information from a large area and forward it swiftly and accurately to its destination. This is the 2-meter RITTY printer at New York City's Municipal Broadcasting Station (WNYC) at which returns were terminated after having been transmitted from C.D. Headquarters, collector of statewide returns on 80 and 75 meters. At left is W2EBZ, who set up and maintained the equipment, and at right is W2VKF, N. Y. C. RACES Supervisor and EC for Richmond Boro.

## ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]  
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the .....  
..... ARRL Section of the .....  
Division, hereby nominate .....  
as candidate for Section Communications Manager for this  
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager  
Present

Section	Closing Date	SCM	Term Ends
Yukon *	Feb. 11, 1957	W. R. Williamson	Mar. 17, 1949
Hawaii	Feb. 11, 1957	Samuel H. Lewbel	Feb. 3, 1957
Michigan	Feb. 11, 1957	Thomas G. Mitchell	Feb. 17, 1957
Santa Barbara	Feb. 11, 1957	William B. Farwell	Apr. 12, 1957
Nebraska	Feb. 11, 1957	Floyd B. Campbell	Apr. 15, 1957
Saskatchewan *	Feb. 11, 1957	Harold R. Horn	Apr. 15, 1957
Colorado	Feb. 11, 1957	James B. Simpson	Deceased
New Mexico	Mar. 11, 1957	Finar H. Morterud	May 4, 1957
Wisconsin	Mar. 11, 1957	Reno W. Goetsch	May 12, 1957
Maine	Mar. 11, 1957	Allan D. Duntley	May 16, 1957
Eastern Penna.	Apr. 10, 1957	Clarence Snyder	June 15, 1957
North Dakota	Apr. 10, 1957	Elmer J. Gabel	June 15, 1957
San Joaquin Valley	Apr. 10, 1957	Ralph Saroyan	June 15, 1957

Iowa	Apr. 10, 1957	Russell B. Marquis	June 16, 1957
South Dakota	May 10, 1957	Les Price	July 2, 1957
New York City & Long Island	May 10, 1957	Harry J. Dannels	July 11, 1957

\* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 169 Logan Ave., St. Lambert, Quebec, To be valid, petitions must be filed with him on or before closing dates named.

### ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Wyoming	James A. Masterson, W7P50	Dec. 10, 1956
Southern Texas	Ray K. Eggleston, W5QEM	Dec. 10, 1956
Minnesota	Robert M. Nelson, W0KLG	Feb. 17, 1957

### DXCC NOTES

We wish to call attention of workers for the DXCC to Rule 11 of conditions for that award. This rule was written to assure high ethical standards for all DXCC-certified amateurs. Unfortunately there have been some, each year, who would submit manufactured or altered confirmations to attain the award. Any confirmations submitted for DXCC credit should be reviewed with Rule 11 in mind. ARRL has to base disqualifications directly on any confirmation as submitted. Necessarily the rule cannot be concerned with who may have made a patent alteration, so before you submit cards or other evidences, scan them most carefully. If any have reached you with mark-overs or are wrong in other respects, avoid disqualification by going after a new card at the source. Complete rules are in every Handbook and on page 73 of March 1956 QST. A line to Headquarters will bring a copy of the DXCC rules.

### DX CENTURY CLUB AWARDS

#### HONOR ROLL

W1FH.....269	W8NBNK.....262	W2AGW.....259
W6AM.....269	PY2CK.....262	W6MEK.....259
W8HGW.....268	W3BFS.....260	W3JTC.....259
W6ENV.....267	W5ASG.....260	W7AMX.....259
W6MX.....264	W6IDZZ.....260	G2PL.....258
W6SYG.....263	W6T.....260	W8SN.....258
W9NDA.....262	ZL2GX.....260	W6CQU.....258
W3GHD.....262	W6VFR.....259	W3KT.....257
	W8BRA.....259	

#### Radiotelephone

PY2CK.....256	W8HGW.....237	CN8MM.....232
V04FRR.....251	W9RBI.....237	W6AM.....232
W1FH.....247	W8GZ.....236	W1NWO.....231
ZS6BW.....244	W3JNN.....233	W9NDA.....230

From November 15, to December 15, 1956 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

#### NEW MEMBERS

W3HIX.....130	W2AWF.....102	W6LVA.....101
W8HJA.....130	W4ZMC.....102	W6WLY/Ø.....101
W8JFC.....115	K6AAJ.....103	F8SW.....101
487GE.....109	W6MFP.....102	T69AZ.....101
W4BTU.....107	W9HYM.....102	W38JK.....100
W0BFI.....107	ØN4TX.....102	W35GH.....100
W1YQC.....106	SL7BT.....102	W5RDL.....100
W4FYI.....105	SM7AAZ.....102	W8LFJ.....100
W8QZB.....105	VESQE.....102	W9CXC.....100
ØH7OD.....104	K2PIC.....101	F2ABT.....100
J8AAA.....103	K9BVR.....101	ØA2BI.....100

#### Radiotelephone

5A1TA.....119	1TUDJ.....104	W1BFT.....101
W0SYK.....109	W5DQK.....103	W15FK.....101
1TBU.....105	W4PEN.....102	W4TFB.....100
F8BHC.....104	W0AGO.....102	ZS3AB.....100

#### ENDORSEMENTS

W1ME.....253	W6LDD.....223	W6TNT.....203
W6ADP.....251	W6YY.....223	W4EPA.....203
W9LNM.....240	W9FJB.....222	W0QVZ.....201
W6NNV.....239	W3OP.....220	W7KFN.....200
W1JYH.....232	W1KFT.....214	W2GVZ.....200
W3DRD.....230	W6CTL.....210	W0DXE.....199
W6LW.....227	KP4KD.....210	W8EV.....195
W2TQC.....226	W2CYS.....205	W3VKD.....194
W6BPD.....224	ØH2RY.....204	W1TX.....192

W8CLR.....192	W8EMI.....161	EA7CP.....135
K2BU.....190	W9GDI.....161	ØH3NY.....133
W5UX.....190	W1BGW.....160	W1AW.....130
W7AJ8.....190	W4HYW.....160	W7BGH.....130
W7PHO.....190	W4UXI.....160	K2AAA.....129
H99ET.....190	W5OG8.....160	D1JZN.....129
W2ZB.....184	W6LUB.....160	W0CKC.....127
W6ID.....183	G3CBN.....160	W0PGL.....122
W8TJM.....183	G6M6D.....160	W9WIO.....121
W8GLK.....182	W0QJ1.....160	K2H8M.....120
W6VDG.....181	W4NYN.....154	K2EQD.....120
W1DGH.....180	D147C.....153	W2CJO.....120
W6ATO.....180	F3FA.....151	W4EHH.....120
W2LSX.....176	W2FBS.....150	K6DNH.....120
W7FB.....175	W2MIUM.....150	W6OUN.....120
C86A1.....173	W6CGQ.....150	W6YMH.....120
W7EJD.....172	W8SQP.....150	SØ9WT.....120
W6HDS.....172	C8KS.....150	TØ9AD.....118
W2AZS.....170	W1GDY.....142	W0LVG.....114
W3WDC.....170	W4JBQ.....141	PY68N.....114
KH6LG.....170	W6ULS.....141	W7JYZ.....111
W1LHZ.....165	W2LAX.....140	W2JVZ.....110
W2FXE.....164	W4PHJ.....139	W9Y8X.....110
W8CQ.....162	W4AUL.....137	ØZ8Z.....110
J66AD.....162	W7CSW.....136	SM5CCE.....110
	W9CDP.....135	

#### Radiotelephone

W8BF.....225	W2KXE.....150	EA2CB.....121
W8BKP.....201	W4JGO.....150	W0EHF.....120
W3DHM.....195	W2JIL.....142	EA3GI.....120
W6YV.....194	EA9BC.....133	D18SD.....120
PY4CB.....190	ØN4AR.....131	G3AIZ.....120
W6AZD.....180	W5AHH.....130	K4BYQ.....114
YV5AB.....180	W8MRC.....130	CX2CN.....112
W0NCG.....170	11RC.....130	LUSDC.....112
W8CLR.....164	K2AAA.....129	W1UWB.....110
11CAR.....162	W5LJA.....128	W9ABA.....110
W68YQ.....160	CX5AF.....124	TØ9AD.....116
H99ET.....154		VE3KT.....110

#### W/VE/VO Call Area and Continental Leaders

W4TM.....249	VE3QD.....210	VFR4W.....181
W0YXO.....250	VE4XO.....118	W0BEP.....190
VE1HG.....164	VE5QZ.....140	ZS6BW.....240
VE2WW.....189	VE6VK.....152	4X4RE.....222
	VE7GI.....212	

#### Radiotelephone

W2BXA.....207	W6AIV.....213	VE7ZM.....171
W4HA.....204	W1ICR.....120	ZL2GX.....220
W5BGP.....222	VE2CQ.....118	ØD5AB.....184
W7HLA.....187	VE3KF.....163	EA2CQ.....210

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

## ATLANTIC DIVISION

**EASTERN PENNSYLVANIA**—SCM, Clarence Snyder, W3PYF—SEC: NNT. RM: YAZ, PAM; TEJ. EPA nets: 3850, 3610 kc. Reports from Emergency Co-ordinators in the section have continued to increase and NNT has requested that ECs who have not been reporting regularly begin to make it a policy to send him a report form on the 30th of the month. BBS is now on 2 meters with a Gonset. BNR and AMC are now on s.s.b. with a Band W 51SB following the B&W 5100. ZXZ has joined CUL in BPL this month. CUL reports that she has 8 individual skeds daily and Sun. BES reports that GXP, GYP and EBG are now General Class. EBG received his Wyoming card, making WAS a Novice. EU has been inactive while getting everything tied down for the winter on the farm. BBX has a new 20-meter beam, and is installing new mobile in the car. LJA is leading a noon-day code class at YDX. GOT and GMIN, a pop-sop team, have dropped the "N" from their calls. GOT is ready to go mobile on 10 meters. The Philmont ARC now has a self-powered truck, and is equipping it with gear to be used for emergency operation. ZLX is building a phasing s.s.b. exciter. During a bad fire in the Lancaster Area on Sept. 22nd and 23rd three amateur mobile units helped in the control of traffic. This was reported in the *Pennsylvania Fire Policeman*, a publication of the Pennsylvania Fire Police Assn. ZRQ again makes an appeal for operators for the AN Net on 3610 kc. at 1900 weekdays. BNR has issued a new list of PPN members. If you so desire, write to him for a copy. TEJ has clung his mind about the new QTH and still is at the old QTH. DHJ has been busy travelling and showing the Philmont movie "Every Single Minute." The Short Skip Radio Club of Philadelphia is now affiliated with ARRL. Again I request that the affiliated clubs in this section please ask their secretaries to drop me a line on the 1st of the month with items about their members and what they are doing. QUA reports that the York Road Radio club is sponsoring a YL in her attempt to get her amateur license. The YL, a police victim since the age of 2½, has been supplied with a code oscillator, key, *License Manual*, receiver, etc., by members of the club. Traffic: (Nov.) W3CUL 1610, ZXZ 775, OK 318, YDX 253, BFF 190, EMD 145, ZRQ 121, YAZ 102, BNR 98, FLP 98, CSP 63, NF 59, PYF 48, DQG 24, ZLC 23, BHX 17, CNO 15, QBT 10, QLZ 10, AMH 8, DJL 8, NQB 8, ADE 5, ABD 4, PVY 4, BES 2, CMN 2, DUL 1.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA**—SCM, John W. Gore, W3PRL. MCH has demonstrated once again the value and the extent to which mobile amateur service can serve in the public interest. On Dec. 4th at approximately 11 p.m. he was returning home from Washington on the Washington-Baltimore Freeway when he noticed a car running off the road into the side embankment which turned over on its side. He immediately QSYed on his mobile rig to 29.640 kc., breaking squelch on NKY's monitoring receiver on that frequency, and asked Paul that he notify State Police so that assistance could be rendered as soon as possible. MCH then proceeded to assist the driver, who was not seriously injured, from the damaged car. The State Police and trouble crews arrived in short order and took charge of the situation. MCH then arranged for a patch so that the driver could advise his family of the delay in arriving at his destination. This service as outlined above was observed and commented upon by the State Police and the assembled group of those who had stopped to look at the car. KTR, Commander U.S.N., has been

assigned by the Navy to head a new project to operate in England and the Continent with Headquarters in London for a tour of duty of possibly two to three years. This duty is in connection with Navy research and development in all fields. WRC, at its October meeting, featured a talk on "Earth Satellite and Radio Tracking" by Mr. Votaw of NRL and also a film by G.E., "And A Voice Shall Be Heard". At its November meeting Gil Crossley, Atlantic Division Director, gave an interesting talk on "Ham Radio, Past and Present" and also discussed current League affairs. WN3HHF, equipped with a Ranger and a 140-X, is now gunning for his General Class licence. EQK now has TPA-101 and CCC from Radio Club Argentina and BERTA from England and has collected 119 verifications on DXCC. BUD now has a 210-meter beam. WG has been appointed Eastern Area Director of TCC, succeeding 8UPB. The MDD is cruising along in its usual fine style with the exception that it still needs Delaware stations to complete the coverage. Delaware stations are requested to check in or to contact WV, PZW or UE. The ARA had 3 fixed, 1 portable and 6 mobile stations in operation to assist in the formation direction of the Alsatia Mummies Parade held in Hagerstown Oct. 31st. Those participating were A1X/M with EPX assisting, CSX/M, EHA/3, FBR/M, GXJ/M, NHR/M with OYX assisting, 8WZD/M with N-GRH assisting, YRK and JVZ. NHR has a new jr. operator. Spec Leffler, who assisted EHA/3, is awaiting his Novice Class ticket. The ARA has initiated a Big Brother plan whereby a Novice requesting assistance is referred to one particular General Class operator who will give of his time and knowledge to help the newcomer. HZW, the Kent Co. Amateur Radio Club, recently affiliated with the ARRL, has been progressing quite well since its formation. At a meeting held Nov. 12th at C.D. Headquarters, Dover, Mr. Harry Helm, C.D. Director for Kent Co., discussed the new c.d. headquarters which is now under construction in the New Court House Annex. Another feature of the meeting was a code test. This group also publishes a very attractive bulletin with ZNF as managing editor. ZNF made WAS with an AT-1. KLA reports hearing three 220-Mc. stations in the Baltimore Area, including YQD and WOD. PZW has taken over the Young Radio Central during the resting-up period of his father, WV, who has done well as teacher, trainer and counselor in the handling of the large volume of traffic at that QTH. Traffic: (Nov.) W3PZW 1363, WG 550, UE 402, K3WBJ 312, W3UCR 84, PEC 69, COK 63, PRL 44, BUD 38, WV 35, ZCN 35, ZSR 26, PQ 24, OYX 8. (Oct.) W3WG 950, K3WCS 758, W3WZL 297, PKC 74, TN 62, OYX 14. (Sept.) W3WZL 210.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG—SEC: YRW, PAM; ZI. Appointments of the month: K2ARY, Carneys Point, as EC for Salem County and K2PDR, Moorestown, as OES. Net certificates have been issued to the following members of the N. J. Emergency Phone Net: K2CDH, K2HPV, K2HWX, K2JKA, K2SRO, RHX and SHL. VDE, asst. manager of NJTFN, has issued a very fine net bulletin. Again this month K2WAO and YRW have earned their BPL certificates. LS, Pleasantville, continues to report many discrepancies chargeable to Novice out-of-band operation. K2ITP, Riverton, reports many interesting items as a result of his OES work. ZI reports 45 Jersey Phone Net members and their families attended the annual picnic held at DVRA headquarters, ZQ. K2EFA, using an indoor antenna, maintains his N/J sked while attending Rutgers. K2HPV, Penns Grove, is heard five nights weekly on 3890 kc. transmitting Official Bulletins. RG, Merchantville (transistor DXer), has worked ZS6TR on 7 Mc. running 216 milliwatts. The DVRA held a Christmas Party. The c.d. alert was a big success with all but six counties participating. SJRA officers for 1957 are 'TBD, pres.; K2HHO, vice-pres.; LBX, treas.; K2PTJ, corr. secy.; and OGZ, rec. secy. EH, BLV, K2HOD, K2DCF and K2JCK attended the Washington Mobile Radio Club Hamfest. PAU continues his Tue. night skeds with 3GKP and 4A0. K2HHO is remodeling his shack. SDB has raised his countries worked list to 124. BUI has a new rig and upped his list to 145. K2TKP is now asst. manager of the Delaware Valley 2-Meter Net. K2HDX has received his WAS certificate. All are urged to apply for AREC membership through your EC or SEC. Help us to plan our emergency traffic

(Continued on page 90)

# THIS THING CALLED "Q"

**T**HE QUALITY factor "Q" is a consideration of great importance in all radio circuits capable of resonance although it is only of recent years that it has been so recognized. Early text books completely failed to mention it and many amateurs still seem to regard it as something rather mysterious. Let's try to dispel some of that mystery.

**S**IMPLY STATED,  $Q$  is the ratio of the reactance of a circuit or component to the r.f. resistance of that same circuit or component. For example: if you have a coil which presents a reactance of 1000 ohms and a resistance of 10 ohms its  $Q$  is 100. When a coil and capacitor are used in a tuned circuit their respective reactances become equal and opposite at resonance and  $Q$  is then the ratio of either one to the total circuit resistance.

**T**HE  $Q$  of a circuit determines its band width. Assume that the circuit described above with a  $Q$  of 100 is tuned to resonance at 7200 kilocycles. If a variable frequency oscillator is tuned through this frequency it will be found that the distance between the points on either side of resonance where the r.f. voltage across the circuit drops to half its maximum value (-6 db.) is 72 kilocycles — the resonant frequency divided by the  $Q$  of the circuit. In a receiver we obviously need a much higher  $Q$  for practical operation and this is usually achieved by the use of a number of tuned circuits plus electrical or mechanical filters.

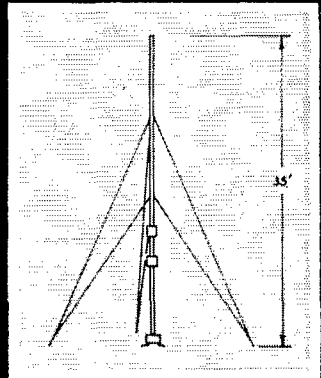
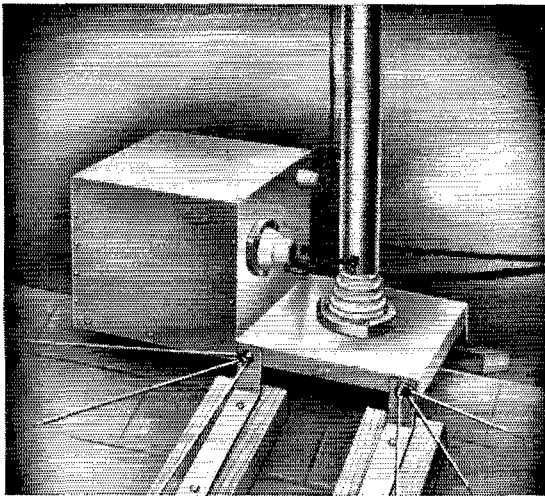
**M**ANY FACTORS affect the  $Q$  of a coil: the ratio of length to diameter, the size and spacing of the wire, nearness to shielding or other adjacent objects, and above all the core material. A powdered iron core will greatly increase the inductive reactance without adding to the resistance and the  $Q$  goes up accordingly. When used at frequencies below 30 megacycles most good tuning capacitors have a very high  $Q$  — above that frequency, however, losses in the dielectric begin to show up as additional r.f. resistance and the  $Q$  goes down.

**T**HIS SUBJECT is far too big to cover in one page and we can only touch on a few of the high spots here.  $Q$  is just as important in transmitter design, which we have not even mentioned, and for those who are interested we recommend the ARRL *Handbook*, pages 45-47, 93, 104 and 148-153; also Terman's *Radio Engineering*, pages 37-41. One thing we can promise — if you gain a basic understanding of  $Q$  a good many other aspects of theory which may have seemed confusing will be automatically cleared up.

73

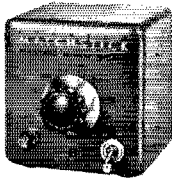
CY READ, W9AA

Beelbellyin Jr. W. J. Hoelgan W9AC for **hallicrafters**



## Viking "Match-Stick" Vertical Antenna

### Fully automatic! Bandswitching 80 through 10 meters!



Remotely motor driven from operating position

Here's the antenna system every amateur has been looking for. The "Match-Stick" is a completely pre-tuned, multi-band antenna system automatically controlled and remotely motor driven from your transmitter location. Installation is simple . . . easily mounts on roof top or in limited space location. Low SWR (less than 2 to 1) on all bands—impedance: 52 ohms. Low vertical radiation angle for DX. Antenna tuning network is enclosed in a weatherproof aluminum cabinet located at the base of the antenna . . . effective antenna length and network selected by weather-proof relays mounted directly on the mast.

**SPECIFICATIONS**—Vertical mast is 35' in length—made of 2" diameter, hard-temper aluminum tubing—mast sections separated by steatite insulators. Six nylon guy ropes furnished—will not affect radiation pattern. Fused isolation transformer. Complete "Match-Stick" assembly includes: Vertical mast, base, tuning network and relays; control box for remote operation; and six nylon guy ropes. Detailed installation and operating instructions also included.

(NOTE: Due to individual station requirements, the "Match-Stick" assembly is furnished less transmission line, 6 conductor control cable and ground radial wire.) **Cat. No. 137-102. . . Amateur Net \$129.50**

### station accessories



**"SIGNAL SENTRY"**—Monitors CW or phone signals up to 50 mc. Powered by receiver. With tubes.  
**Cat. No. 250-25 Wired . . . \$18.95 Net**



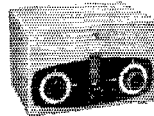
**CRYSTAL CALIBRATOR**—Provides accurate 100 kc check points to 55 mc. Requires 6.3 volts at .15 amps and 150-300 volts at 2 ma. With tube.  
**Cat. No. 250-28 Wired . . . \$17.25 Net**



**SWR BRIDGE**—Provides accurate measurement of SWR for effective use of a low pass filter and all antenna couplers.  
**Cat. No. 250-24 . . . \$9.75 Net**



**LOW PASS FILTER**—Handles more than 1000 watts RF—provides 75 db or more attenuation above 54 mc. Wired and pre-tuned.  
**Cat. No. 250-20 52 Ohms . \$13.50 Net**  
**Cat. No. 250-35 72 Ohms . \$13.50 Net**



**VIKING "MATCHBOXES"**—Self-contained—bandswitching 80 through 10 meters. Provide integrated antenna matching and switching. Tunes out large amounts of reactance—no load-tapping or plug-in coils necessary.  
**Cat. No. Amateur Net**  
**250-23 275 Watt . . . \$ 49.85**  
**250-30 Kilowatt . . . \$124.50**

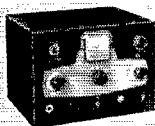
See your distributor  
Most authorized Johnson  
distributors offer liberal terms.  
Often as little as 10% down, plus you  
on the air, and your used equipment  
(especially if it's Johnson) is always  
worth top dollar in trade.



**E. F. Johnson Company**

2804 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

**Punch your  
signal home  
...with one of  
these 4 VIKING  
full power\*  
amateur rigs!**

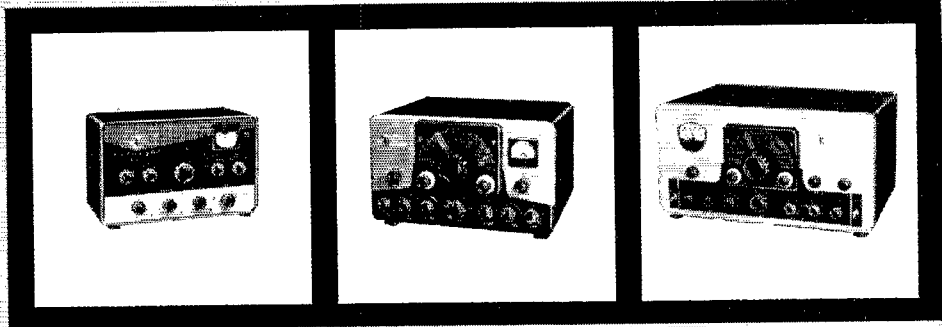


"ADVENTURER"

\*Top performance isn't simply a matter of watts. Only carefully integrated equipment design can be counted on to develop effective power that punches your signal home, every time. That's what we call "communication power" . . . and your Viking transmitter delivers it in full measure! Viking transmitters are engineered for outstanding flexibility and performance. Integrated in design from their rugged, highly stable VFO through high efficiency output circuits, Viking transmitters deliver full communication power!

**VIKING "ADVENTURER"**—Used to earn the first Novice WACI (Worked all continents.) Self-contained, effectively TVI suppressed, rated at 50 watts CW. Instant band-switching 80 thru 10 meters—operates by crystal or external VFO. Break-in keying is clean and crisp. Wide range pi-network output handles virtually any antenna without a separate antenna tuner. Designed for easy assembly. With tubes, less crystals and key.

Cat. No. 240-181-1 Kit . . . . . Amateur Net \$54.95



**VIKING "6N2"**—Instant band-switching on 6 and 2 meters, this compact YHF transmitter is rated at 150 watts CW and 100 watts phone. Effectively shielded and TVI suppressed—may be used with the Viking "Ranger", Viking I, Viking II or similar power supply/modulator combinations capable of at least 6.3 VAC at 3.5 amp., 300 VDC at 70 ma., 300 to 750 VDC at 200 ma. and 30 or more watts audio. May be operated by built-in crystal control or external VFO with 8-9 mc. output. With tubes, less crystals, key and microphone.

Cat. No.	Amateur Net
240-201-1 Kit . . . . .	\$119.50*
240-201-2 Wired . . . . .	\$159.50*

\*Price subject to revision.

**VIKING "RANGER"**—This outstanding 75 watt CW or 65 watt phone transmitter also serves as an RF and audio exciter for high power equipment. As an exciter, it will drive any of the popular kilowatt level tubes—no internal changes necessary to switch from transmitter to exciter operation. Self-contained, instant band-switching 160 through 10 meters—operates by extremely stable, built-in VFO or crystal control—effectively TVI suppressed. Easily assembled—with tubes, less crystals, key and microphone.

Cat. No.	Amateur Net
240-161-1 Kit . . . . .	\$214.50
240-161-2 Wired . . . . .	\$293.00

**VIKING "VALIANT"**—Designed for outstanding flexibility and performance. 275 watts input on CW and SSB (P.E.P. with auxiliary SSB exciter) 200 watts AM. Instant band-switching 160 through 10 meters—operates by built-in VFO or crystal control. Pi-network tank circuit matches antenna loads from 50 to 600 ohms—final tank coil is silver-plated. TVI suppressed—timed sequence keying—high gain push-to-talk audio system—low level audio clipping—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals, key and microphone.

Cat. No.	Amateur Net
240-104-1 Kit . . . . .	\$349.50
240-104-2 Wired . . . . .	\$439.50

See your distributor  
Most authorized Johnson  
distributors offer liberal terms.  
Often as little as 10% down puts you  
on the air, and your used equipment  
(especially if it's Johnson) is always  
worth top dollar in trade.



**E. F. Johnson Company**

2805 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

# BLILEY NOVICE BAND CRYSTALS



BAND	MULTIPLIER	CRYSTAL FREQ. RANGE	TYPE	PRICE
80 Meters	1	3700.0 to 3750.0 kc's	AX2	\$2.95
40 Meters	2	3587.5 to 3600.0 kc's	AX2	2.95
40 Meters	1	7175.0 to 7200.0 kc's	AX2	2.95
15 Meters	1	21,100 to 21,250.0 kc's	SR10	8.50
15 Meters	3	7033.33 to 7083.33 kc's	AX2	2.95
15 Meters	6	3516.66 to 3541.66 kc's	AX2	2.95
2 Meters	6	24,166.66 to 24,500.0 kc's	SR10	8.50



AX2



SR10

## BLILEY CRYSTALS FOR SPOT FREQUENCIES IN NET OPERATIONS



TYPE	APPLICATION	TOLERANCE	PRICE
MC9	3 mc-12 mc experimental frequencies	± .03%	\$6.50
SR10	12 mc-27.5 mc experimental frequencies	± .03%	8.50

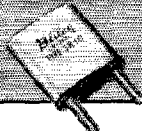
MC9



SR10



## BLILEY CRYSTALS FOR AMATEUR · EXPERIMENTAL CITIZEN'S BAND · SINGLE SIGNAL FILTERS



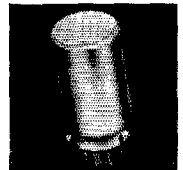
	KV3	SR10	CF6	AX2	MC9	
TYPE	APPLICATION				TOLERANCE	PRICE
KV3	Reference Frequency 100 kc				± .005%	\$8.50
MC9	Marker Frequency 1000 kc				± .05%	8.00
MC9	13,627.5 mc (Multiplier to 27.255 mc) CITIZEN'S RADIO SERVICE (CLASS "C")				± .04%	5.50
SR10	27.255 mc (3rd Overtone Crystal) CITIZEN'S RADIO SERVICE (CLASS "C")				± .04%	5.50
CF6	455 kc — 456 kc — 465 kc Single Signal Filters				± 5 kc	4.50
AX2	1800-1825 kc; 1875-1900 kc; 1900-1925 kc; 1975-2000 kc				See Note A	3.75
AX2	3500-4000 kc; 7000-7425 kc; 8000-9000 kc				See Note A	2.95
AX2	14-14.5 mc				± 10 kc	3.95

Note A: We will supply to integral spot frequencies (no fractions) as ordered; calibration ± 500 cycles in factory test oscillator.

## NEW HIGH STABILITY PACKAGE WITH 100 kc AND 1000 kc CRYSTALS

This compact temperature controlled package provides a high stability reference source at both 100 kc and 1000 kc. Precision reference for general amateur use.

TYPE	DESCRIPTION	STABILITY	PRICE
TCO-2L	6.3V Oven	75°C ± 5°C	\$ 9.00
BH6A Crystal	1000 kc	± .0002%	12.50
BH9A Crystal	100 kc	± .0005%	11.00



TCO-2L

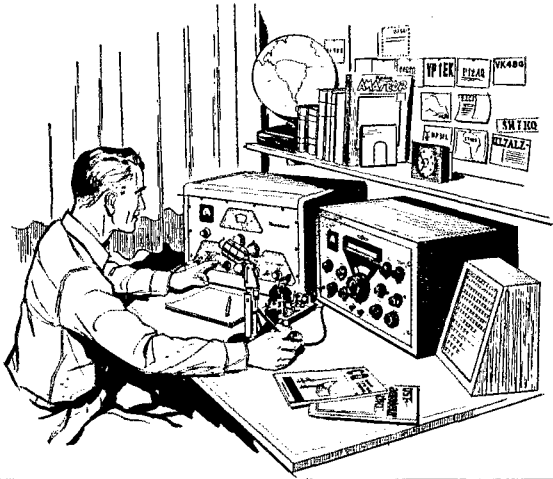
Crystal units described are calibrated in recommended oscillator circuit—adjustable to zero beat (at 75°C) in this circuit.

## BLILEY ELECTRIC CO. UNION STATION BUILDING ERIE, PA.

Major producers of crystal units, crystal ovens, oscillator assemblies and solid ultrasonic delay lines for commercial and military equipment.



# HEATHKITS<sup>®</sup>



*Top quality  
ham equipment  
in kit form . . .  
designed especially to  
meet your requirements!*

Heath amateur radio gear is designed by hams—for hams, to insure maximum "on the air" enjoyment. Good design and top-quality components guarantee reliability. Heathkits are easy to build and are easy on your budget! You save by dealing direct, and you may use the Heath Time Payment Plan on orders totaling \$90.00 or more. Write for complete details.

## HEATHKIT

### DX-100

## TRANSMITTER KIT

PHONE  
AND CW

- ▶ Phone or CW—160 through 10 meters.
- ▶ 100 watts RF on phone—120 watts CW—parallel 6146 final.
- ▶ Built-in VFO— $\pi$  network output circuit.
- ▶ Easy to build—TVI suppressed



MODEL DX-100

**\$189<sup>50</sup>**

\$18.95 dwn., \$15.92 mo.  
Shpg. Wt. 107 lbs.

Shipped motor freight unless  
otherwise specified.  
\$50.00 deposit required  
on c.o.d. orders.

The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses  $\pi$  network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.



**HEATH COMPANY BENTON HARBOR 9, MICHIGAN**

*A Subsidiary of Daystrom, Inc.*

# HEATHKIT **DX-35** TRANSMITTER KIT

PHONE AND CW



MODEL DX-35

**\$56<sup>95</sup>**

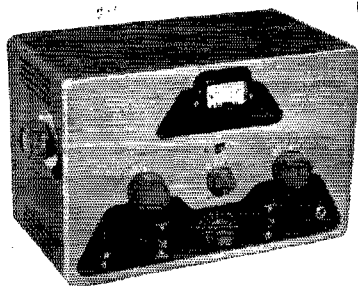
Shpg. Wt.  
24 lbs.

\* \$5.70 dwn., \$4.78 mo.

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulator and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulator. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.

- ▶ Phone or CW—80 through 10 meters.
- ▶ 65 watts CW—50 watts peak on phone—6146 final amplifier.
- ▶ Pi network output to match various antenna impedances.
- ▶ Tremendous dollar value—easy to build.

BRAND NEW



MODEL DX-20

**\$35<sup>95</sup>**

\$3.60 dwn., \$3.02 mo.  
Shpg. Wt. 18 lbs.

# HEATHKIT **DX-20** CW TRANSMITTER KIT

- ▶ Designed exclusively for CW work.
- ▶ 50 watts plate power input—80 through 10 meters.
- ▶ Pi network output circuit to match various antenna impedances.
- ▶ Attractive and functional styling—easy to build.

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including "potted" transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!

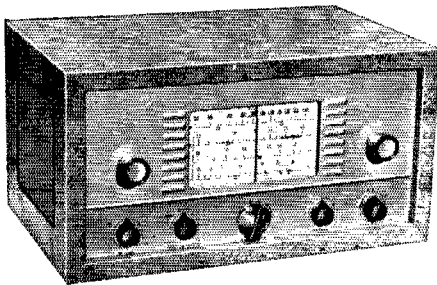
**HEATH COMPANY BENTON HARBOR 9, MICHIGAN**

*A Subsidiary of Daystrom, Inc.*

# HEATHKIT

## COMMUNICATIONS-TYPE, ALL BAND

### RECEIVER KIT



This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception.

MODEL AR-3  
**\$29<sup>95</sup>**

incl. excise tax  
(less cabinet)  
\$3.00 dwn., \$2.52 mo.

Shpg. Wt. 12 Lbs.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A. Shipping Wt. 5 Lbs. \$.50 dwn., \$.42 mo. \$4.95

#### A HEATHKIT VFO KIT MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. \$1.95 dwn., \$1.64 mo. **\$19.50**

#### B HEATHKIT GRID DIP METER KIT MODEL GD-1B

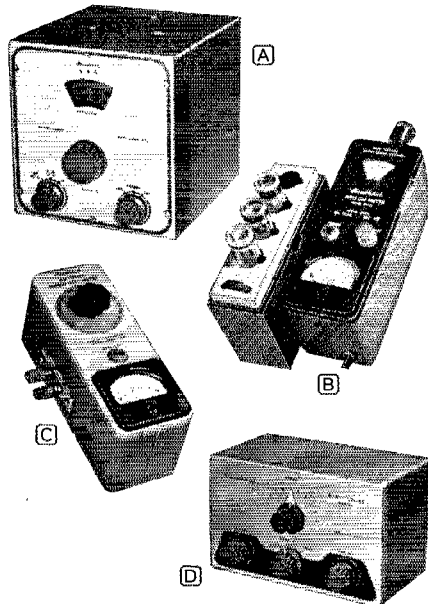
Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. \$2.00 dwn., \$1.68 mo. **\$19.95**

#### C HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. \$1.45 dwn., \$1.22 mo. **\$14.50**

#### D HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. \$1.00 dwn., \$.84 mo. **\$9.95**



#### HOW TO ORDER...

It's simple—just identify the kit you desire by its model number and send your order to the address listed below. Or, if you would rather budget your purchase, send for details of the Heath Time Payment Plan for orders totaling \$90.00 or more.



**HEATH COMPANY BENTON HARBOR 9, MICHIGAN**

*A Subsidiary of Daystrom, Inc.*

# ALL-BAND VERTICAL ANTENNAS

GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna is complete, can be assembled in less than two minutes, and requires no special tools or electronic equipment. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V40 multi-band verticals. No guy wires needed; rugged, occupies little space, proven and tested. Send for your vertical multi-band antenna today!



## QUESTIONS MOST FREQUENTLY ASKED:

- Q. Are radials required?  
 A. No. Any ground connection can be used, and the more efficient your ground, the better your vertical will operate.
- Q. Must a vertical antenna be mounted at any special height?  
 A. No. Any convenient height will do.
- Q. Can bandswitching be done from the shack?  
 A. Only if you use a complicated switching system. Usual method is to switch by hand—takes only a few seconds as coil is base-mounted.
- Q. How do you mount a vertical antenna?  
 A. At any convenient place with TV fittings, or clamps, or bolts, or antenna-base fittings, or any handy method.
- Q. Do I have to do any machining or finishing?  
 A. No, everything is furnished ready for use.
- Q. Can I use a full KW with a vertical?  
 A. Yes.
- Q. Do I need a separate loading coil for each band?  
 A. No. For instance, the V80 will operate on 80, 40, 20, 15, 10, and 6 meters.
- Q. Where can I get a Gotham vertical antenna?  
 A. From any reputable electronics distributor (about 300 handle Gotham products) or directly from us.

## Literature Available

- V40 vertical for 40, 20, 15, 10, 6 meters.....\$14.95  
 V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters.....\$16.95  
 V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters.....\$18.95



## WORK THE WORLD



**How to order**  
 Send check or money order directly to Gotham or visit your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

# GOTHAM

1805 PURDY AVENUE  
 MIAMI BEACH 39, FLA.

(Continued from page 82)

systems. Appointments are available in the section for those who can qualify and desire to take part in League activities. Traffic: K2WAO 1207, W2YRW 515, RG 173, HDW 139, K2PTJ 103, EWR 65, KN2THX 54, K2DSL 53, W2Z1 42, BZJ 24, K2CWX 4, EFA 4.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: UTE/FRL. RMs: RUF and ZRC. PAMs: TEP and NAL. NYS C.W. Net meets on 3615 kc. at 1900; ESS meets daily on 3590 kc. at 1800; NYS Phone on 3925 kc. at 1800; NYS C.D. on 3509.5 and 3993 kc. at 0900 Sun.; TCPN 2nd Call Area on 3970 kc. at 1900; SRPN on 3980 kc. at 1100; ISN on 3970 kc. at 1600. QHH got his seven-band WAS. He also got his 240 sticker on DXCC and applied for YLCC/600. EMW reports VR3B and ZDIFG for new ones to bring him up to 213 worked, with a QSL from I5RAM to make 204 confirmed. K2GWN has a Viking Ranger to excite his pair of 4-85As. K2CUQ and K2DBB are rebuilding their shack. K2PVN erected his twelve-element Long John on a 30-ft. mast but it blew down. He will put on a tower now and try out his pair of 4E27s on 2 meters. The gang in Endicott, N. Y., has established a local 6-meter net, including JHS, SHV, EWM, YLM, UOX, K2OYX, K2QBX and K2CWD. RAGS reports that the Deepfreeze message total is in excess of 2100 messages. K2QXI received her General Class ticket. DXY has moved to the Syracuse Area and is mobile with a 6V8 rig. K2PDP has finished his DX-100 and is working out very well on all bands with a home-brew trap antenna. PUI will go s.s.b. shortly. HNH built a Monimatch and is using it to tune up his 2-meter beam. TKO also built a Monimatch and reports it's a very worthwhile gadget. The A.A.R.A. held a DX Nite with a report by SAW on the ARRL Convention held in San Francisco. The Squaw Island RC held an Auction in November as did RAW-NY, KBT and SARC. IEP is back on 75-meter phone and has a trap antenna. OYV is on s.s.b. JYZ has 107 countries confirmed. The Otsego ARC is one year old and growing steadily. K2QBL dropped the "N." and has ordered a DX-100. SHZ has put up a new Quad antenna and has snared three new ones. His total is 201, with 178 confirmed. K2DLB and K2R2N are experimenting on 420 Mc. PVI has taken over as net manager of the Erie County Emergency Net. PPY reports Erie County RACES is getting 40 Gonset 2-meter Communicators to add to the 50 CD-2s and 10 100-watt 2-meter rigs. A KWS-1 and a 75A-4 also have been ordered. TAX is on with a home-brew s.s.b. rig using a mechanical filter. Niagara and Erie County have a 2-meter autostart RTTY Net. All stations are invited to report to the SCM monthly, or whenever you have an item of general interest. Traffic: (Nov.) K2KIR 215, IYP 210, W2ZRC 154, OE 56, K2GWN 27, CUQ 24, W2PEB 16, QHH 15, K2DG 9, PJU 3. (Oct.) K2KIR 273, GWN 24, DG 16, W2EMW 15, CUQ 11.

**WESTERN PENNSYLVANIA**—SCM, R. M. Heck, W3NCD—Asst. SCM: Anthony J. Mroczka, 3UHN. SEC: GPG. RMs: NRE and NUG. PAM: AER. The Traffic Net meets each night at 7 p.m. on 3585 kc. The members of the Cumberland Valley ARC recently staged a simulated manhunt. Horseshoe Radio Club news: WN3GAS has an S-40B receiver and ARC-5 transmitter. RBH worked DL1, YU3, KH6 and others for DX and BZN worked YU6, LUB, KH6, F8, DJ2 and others, both on 40 meters. KQD is building an 813, YOZ has the 813 almost done. EGV is collecting parts for one. WN3INS is a new Novice with an SX-71 and a Globe Scout. DPH is building a pair of 807s. Steel City ARC: ZDW has a new WRL tribander, RUZ is going hunting. UHM is getting close to being mobile, ZPZ is mobile on 10 meters, AAN is going on 6 meters soon. The Allegheny Kiski ARA attended the Etna ARC's sponsored lecture on antennas. New AKARA officers are WGH, pres.; GVI, vice-pres.; RER, secy.; SWV, treas. and KOZ, RSR and LPQ, board of directors. Breeze Shooters Net: BCL and LVU are the latest NCSSs, NKM, SPZ and OJW have Valiants, WFR and RSB have KWS-1s. KHL has 10- and 15-meters beams, STB has a new beam, ABW has WAS and WAC, 8WUX asked BSN to help locate stolen gear, WHA and NYD received good publicity cooperating with local police on Halloween. The new mobile net frequency is 29,360 kc. Wed. at 2000 EST. UHN reports better activity in the WPA Net. UTR/4 is calling in from Virginia, where she is going to school. LXQ is working on the C.D. Net Sun. at 9 a.m. on 3502.5 kc. BSO is having fine results with his DZZ beam. New officers of the ATA of Pittsburgh are QJJ, pres.; SIR, vice-pres.; UGV, secy.; and UL, treas. The WPA Bellowsers and Chirpers Society finished 13th in the 1956 Field Day. UVD still is running the Weather Net on 3585 kc. the 1st Sun. of each month. Anyone interested in the Upper Ohio Valley River Net, contact Walt. SIJ is having trouble with the

(Continued on page 92)

HI JIM, HEARD YOU WORKING THAT DX STATION. HOW DO YOU DO IT ON THE LOW POWER YOU RUN?



EASY, BILL. I'VE GOT A GOTHAM BEAM. I'M WORKING STATIONS I NEVER HEARD BEFORE. DX IS A CINCH NOW.



THAT SETTLES IT, JIM. I'M GOING TO GET A GOTHAM BEAM TOO. ARE THEY EASY TO INSTALL AND OPERATE?



VERY EASY, BILL AND THEY'RE FOOL-PROOF AND TROUBLE-FREE. LICKS YOUR NOISE AND QRM PROBLEM TOO. MY GOTHAM BEAM IS THE BEST INVESTMENT I EVER MADE.



Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

**TYPE OF BEAM.** All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

#### MORE DX CONTACTS

**GAIN.** Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

#### THE DESIGN IS PROVEN

**FRONT-TO-BACK RATIO.** We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams; 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

#### THOUSANDS IN DAILY USE

**MATCHING.** Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

#### ALCOA QUALITY ALUMINUM

**ASSEMBLY AND INSTALLATION.** No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

#### CONSISTENT PERFORMANCE

**MAST.** Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between  $\frac{3}{4}$ " and  $1\frac{1}{8}$ ".

#### QUICK INSURED DELIVERY

**STANDING WAVE RATIO.** A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

#### YOU WILL WORK THE WORLD

**STANDARD AND DELUXE BEAMS.** Standard beams in the 6, 10 and 15 meter bands use  $\frac{3}{8}$ " and  $\frac{3}{4}$ " tubing elements; the deluxe models for these bands use  $\frac{1}{2}$ " and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

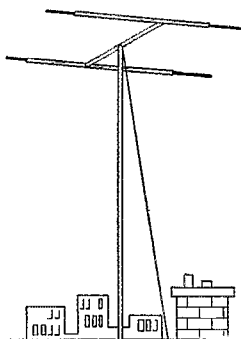
#### AND THE PRICE IS RIGHT!

### HOW TO ORDER FROM GOTHAM

Send check or money order to GOTHAM — we ship immediately by Railway Express, charges collect.

### HOW TO ORDER FROM A DISTRIBUTOR

ANY electronic distributor can order a Gotham antenna for you. Here are some of the leading distributors who sell Gotham beams: Atronic Corp., Alltronics, Amateur Radio Supply, Lew Bonn Co., Burghardt Radio, Capitol, Curle, Crabtree's, Dixie, Duffy, Evans, Electronic Distributors, Emco Electronics, Electronic Supply, Miami, Emrich, W. H. Edwards, Fargo, Ft. Wayne Electronics, Graham Electronics, Henry of Missouri and Calif., Harris, Johannessen, Kinkade, Mytronic, Melrose Sales, Nidisco, Offenbach & Reimus, Purchase, Rome Electronics, Radio Electric Service, Radio Equipment Co., Radio Parts Co., Radio Supply Co., E. A. Ross, Sacramento Amateur Radio, Specialty Distributing, Swan Distributing, Srepcu Inc., Selectronic Supplies, Thurow Distributors, Tel-rad, Thrifty TV Supply, Universal World Radio.



**This Full Size Gotham Cost Only \$21.95 And Brought In 87 Foreign Countries, All Continents And 30 Zones On 35 Watts!**

Airmail Order Today — We Ship Tomorrow

**GOTHAM** Dept. QST  
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

- |  |        |  |
|--|--------|--|
| <b>2 METER BEAMS</b>                             |        |  |
| <input type="checkbox"/> Deluxe 6-Element        | \$9.95 | <input type="checkbox"/> 12-El \$16.95 |
| <b>6 METER BEAMS</b>                             |        |  |
| <input type="checkbox"/> Std. 3-El Gamma match   | 12.95  | <input type="checkbox"/> T match 14.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 21.95  | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Std. 4-El Gamma match   | 16.95  | <input type="checkbox"/> T match 19.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 25.95  | <input type="checkbox"/> T match 28.95 |
| <b>10 METER BEAMS</b>                            |        |  |
| <input type="checkbox"/> Std. 2-El Gamma match   | 11.95  | <input type="checkbox"/> T match 14.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 18.95  | <input type="checkbox"/> T match 21.95 |
| <input type="checkbox"/> Std. 3-El Gamma match   | 16.95  | <input type="checkbox"/> T match 18.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 22.95  | <input type="checkbox"/> T match 25.95 |
| <input type="checkbox"/> Std. 4-El Gamma match   | 21.95  | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Deluxe 4-El Gamma match | 27.95  | <input type="checkbox"/> T match 30.95 |
| <b>15 METER BEAMS</b>                            |        |  |
| <input type="checkbox"/> Std. 2-El Gamma match   | 19.95  | <input type="checkbox"/> T match 22.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 29.95  | <input type="checkbox"/> T match 32.95 |
| <input type="checkbox"/> Std. 3-El Gamma match   | 26.95  | <input type="checkbox"/> T match 29.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 36.95  | <input type="checkbox"/> T match 39.95 |
| <b>20 METER BEAMS</b>                            |        |  |
| <input type="checkbox"/> Std. 2-El Gamma match   | 21.95  | <input type="checkbox"/> T match 24.95 |
| <input type="checkbox"/> Deluxe 2-El Gamma match | 31.95  | <input type="checkbox"/> T match 34.95 |
| <input type="checkbox"/> Std. 3-El Gamma match   | 34.95  | <input type="checkbox"/> T match 37.95 |
| <input type="checkbox"/> Deluxe 3-El Gamma match | 46.95  | <input type="checkbox"/> T match 49.95 |

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

#### NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- |   |         |
|---|---------|
| <input type="checkbox"/> Beam #R6 (6 Meters, 4-El).....   | \$38.95 |
| <input type="checkbox"/> Beam #R10 (10 Meters, 4-El)..... | 40.95   |
| <input type="checkbox"/> Beam #R15 (15 Meters, 3-El)..... | 49.95   |

Name .....

Address .....

City.....Zone.....State.....



rig. SXH has a new Valiant. RTF and NUG are reported home from the hospital. Pennsylvania Novice Net: UJP gave a talk on "School and Ham Radio," ERJ, ERK, EXB and HFP are graduating to General Class. New members are WN3s JLZ, JLL and HZR and KN8s C11 and AZE. Washington County ARC has drawn up a new constitution. Radio Association of Erie: YKE left for temporary quarters at Ft. Meade. BBO is in the Air Force working on electronic equipment. XLO puts out code practice at 6:30 p.m. nightly on 7.15 Mc. STK's code class is holding up well. WN3IAF is newly licensed. The Mercer County Radio Association, which meets regularly twice monthly, has quite a number of Novice members because of the club's code and theory classes. A general discussion net has been formed in Mercer County which meets Sun. at 9:30 A.M. on 29.52 Mc. The Nittany Amateur Radio Club, of State College, recently affiliated with ARRL, reports current officers are SAY, pres.; RBC, vice-pres.; WLE, secy.-treas.; and POP, act. mgr. The NARC invited the 3YA Penn. State University Club, Bellefont Radio Club and all interested area hams to its latest meeting. Both clubs were well represented as well as the Keystone VHF Club, WARC, North Penn ARC and McKean RC. The McKean County c.d. plan is in for approval. LOD is County Radio Officer and ZMF is the key station. Traffic: WBWQ 1268, YUL 80, UEN 43, BZR/3 21, LSS 12, KUN 7, LOD 1.

### CENTRAL DIVISION

**ILLINOIS**—SCM, George T. Schreiber, W9YIX—Section Nets: ILN, c.w., 3515 Mon. through Fri.; IEN, phone, 3940. SEC: HOA. RMs: STZ and MAK. EC Cook County: HPG, BUK, RM for seven years, has resigned because of other activity and AA, assistant, has resigned because of business reasons. The new appointees are old-time traffic men and your cooperation with them will be appreciated. We apologize to BHL for the mistake in the November column which branded him as "the mother of," etc. We don't know who sent this item in but we don't consider it a joke and neither does Larry, who has been subjected to much unnecessary ribbing. We are sorry, Larry. K9AGU and his dad, JGL, have been giving 420 Mc. a whirl and got hold of a small TV transmitter which they are putting in shape for a little ham TV. GRF has a radio family; his YXL is KFC and his son KFD. DRN built a new rig for 144 Mc. and reports it works fine. YNV is now 7GMI and is working for an airline. JMG writes that he hopes for an outdoor antenna and intends to be heard on ILN. A recent call in the section is K9CIL. PHE has been busy rebuilding and a note from LL says he spent 8 weeks in Mexico, but no radio. New equipment: K9AMC, a Gomet 20-meter beam; K9BWQ a DX-100 and K9BHT a Viking Valiant. QVY now is in the Army stationed at Ft. Devens, Mass., and signing /1. GDI has upped his power to a cool kw. and claims he is heating the clouds. K9BLY runs 270 watts on c.w. and 200 watts on phone with three 1625s in parallel. New officers of the Chicagoland Mobile Club are ILS, YLB and QCR. CSW writes that the North Central Phone Net handled 187 messages in November while IJN handled 244. No report was received from IEN. Won't someone supply? BQC would like to hear from v.h.f. men in the section who would be interested in reading

a v.h.f. bulletin with news of the doings here. Congrats to the Y Rad Club of Sterling and the Kliz, Chip and Splatter Society of Rockford on their recent affiliation with ARRL. OEV has bought a new house and won't have his 2-meter beam up until spring. K9BHG got his General Class ticket. The Kiswaukee Radio club elected the following officers: KCM, ARN, BHG, and WTF. MGP, DeKalb high school teacher, has nine students in his radio course. BYB has gone to Florida for the winter taking his rig with him. The JARS dedicated its new club house, complete with a power house, on the club property on the outskirts of Joliet Dec. 16th, a huge crowd of club members and well wishers were present to inspect the facilities. Congrats to TV, whose daughter Barbara was selected a queen of Clark College. Why are there so many messages with incorrect addresses coming off the MARS circuits into the section nets? Traffic: (Nov.) W9DO 604, MAK 441, OR 203, OYL 186, YYG 108, YLX 33, K9USN 82, W9YH 71, CTZ 70, K9AXT 66, W9OCB 54, BUK 28, EDH 24, YFO 22, PCQ 16, STZ 16, FAW 15, SXL 11, K9AMD 10, W9MHC 8, QQG 7. (Oct.) K9AXL 23.

**INDIANA**—SCM, Seth Lew Baker, W9NTA—Asst. SCM: George H. Grane, 9BKJ. SEC: QYQ. RMs: DGA, TCQ and TT. PAMs: CMT, KOY, SWD and UXK. New appointments: TT as RM for RFN, EHY as OPS and ORS. New officers of the Fayette Co. RC are JZU, pres.; YSB, vice-pres.; UNH, secy.-treas.; VPJ and KNS, dir.; JWH, comm. officer; and HNV, asst. comm. officer. JDM made WAS and also worked both Polar stations on 20 meters. KTX received the A-1 Operator Club certificate. URQ has a new SX-99. EHU moved to Georgia. DGA is building a new selective receiver. The Shellyville High School ARC is newly organized with the following officers, all KN9s: CWK, pres.; ELJ, vice-pres.; ELY, secy.; GCU, treas. The club has a DX-35, KN9GBB, Meg, is new in Evansville with a Ranger and an SX-99. K5BIG is now K9GGW. WTY has resigned as manager of AB and K9AUI has taken over. OZJ has a new Quad-Yagi five-element beam for 2 meters and a three-element 10-meter beam. KN9DZL, Judy, is very busy on 2 meters. HNV has a new 15-meter beam up. 9IOP is now 2IOP in Scarsdale, N. Y. RIT and his Dad, K9BEY, are wiring a DX-100. The Martinsville ARC has a DX-35. YZO has a Globe King. GUX has moved to Michigan. Get your nominations for the Hoosier Courtesy Award in to WTY, QYQ, CTF and K9BEH on 6 meters and WHL has a ten-foot on 6 meters. CNL is 10-meter mobile. New officers of the Delaware ARS are NQB, pres.; K9BMW, vice-pres.; JJJ, secy.; TKO, treas.; and BSL, act. mgr. YRM has a new Valiant. PAS is communications chief for Hammond. BKJ reports IFN evening traffic as 317, morning 164, total 481. TQC reports QIN as 287. TT gives 93 for RFN. CAEN had 75, as reported by EHZ. KOY reports Interstate S.S.B. Net traffic as 257. Six-meter activity in Terre Haute: K9AHC, with 50 watts to a five-element beam, K9EFO the same, K9BCP 75 watts to a piece of wire, FNQ a converted Link mobile l.m. rig, KT a BC-457 into a TU 69 tuning unit (3 815s). UB has a 90-ft. tower for a 2-meter beam, 147.3 Mc. should be good near South Bend, SQH has a kw. on s.s.b. A new Indianapolis Club, the Double Circle RC, made up of WISH personnel has been organized. Officers are CKD, pres. and trustee; DSC, vice-pres.; and Charles Little, secy.-treas. It's nice to hear PZW back on 75 meters. EGV has a new Gotham 10-meter beam up. NTA is getting lots of helpful (?) advice on how to wire his DX-100. Traffic (Nov.) W9NZZ 1011, EHZ 360, SVL 343, JQC 340, TT 238, EQO 236, JYO 236, K9BBO 193, W9TQC 153, AB 150, DGA 138, ZYK 126, KTX 114, BKJ 101, TFS 81, NTA 68, WUH 56, VNV 48, VPJ 38, BUQ 36, CLY 35, DOK 33, CC 28, QYQ 26, TG 26, RTH 25, SVZ 23, UXK 22, WTY 21, YAA 18, IMU 17, CMT 16, PQZ 16, EJW 15, DZC 13, BDP 11, SWD 11, AMW 10, ZSW 10, QR 7, URQ 5, WAU 5, HUF 4, LDB 2, LGD 2, FJI 1, FSG 1, WBA 1, YVS 1. (Oct.) W9CTY 24, VPJ 23, APO 13, MHP 11, AZF 6.

**WISCONSIN**—SCM, Reno W. Goetsch, W9RQM—SEC: OVO. PAMs: NRP and AJU. RMs: KJJ and KQB. Nets: WIN 3535 kc. 7:15 p.m. daily; BEN 3950 kc. 6 p.m. daily; WPN 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29.620 kc. FZC is WIN NCS Sun. OMT has added an SX-24 and RAIE 10-20 converter to the equipment in his shack. MIN is enjoying his 32V-1 with active net operation. The Fond Du Lac Amateur Radio Club's call is K9DJB and the club has an active c.d. net on 28 Mc. HJJ received his Old Timers Club certificate. KQB added a UQ2 to his string of DX. YRO has 110 countries worked and 95 confirmed. CXY racks up another BPL with his highest traffic total to date. ORS appointments were issued to FZC, GIL and K9AEQ while KQB received an RM appointment. Congrats to GPI, newly elected as the Central Division Director. Net certificates (WIN) were

(Continued on page 94)

### 1957 ILLINOIS QSO PARTY

February 15th—24th

All amateurs are invited to take part in an Illinois QSO Party sponsored by the Chicago Area Radio Club Council. The contest will be held from 12:01 A.M. CST Feb. 15th to 11:59 P.M. CST Feb. 24th.

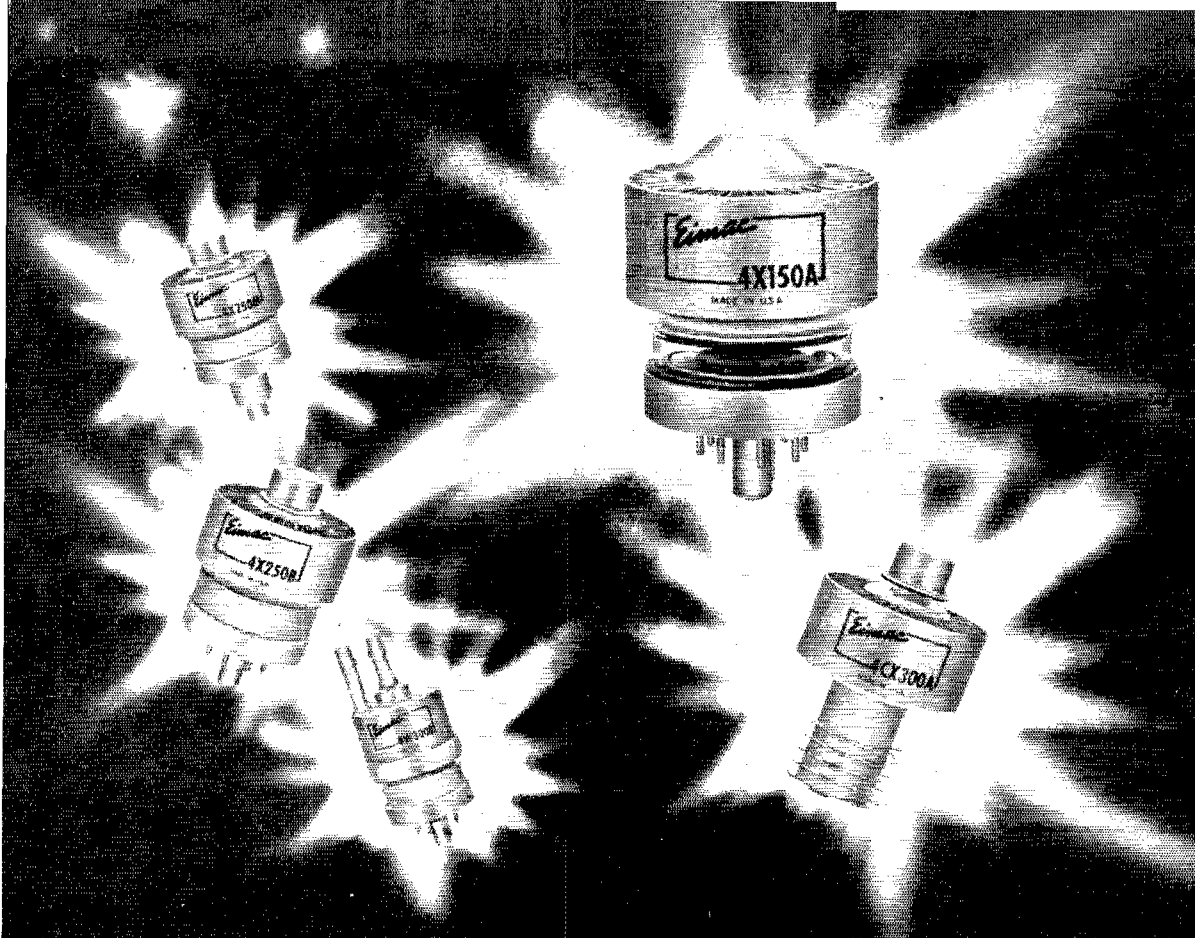
**Rules:** (1) Object is to work as many Illinois stations in as many of the 102 Illinois counties as possible.

(2) Any and all bands may be used. Land or marine mobile contacts count as one station worked. Scores of aeronautical mobiles cannot be counted.

(3) Each contact counts one point. Multiply the number of stations worked by the number of different counties worked. An additional multiplier of two is allowed for contacts on 144 Mc. or above.

(4) Send copies of your log, postmarked not later than March 10th, to James V. Wilson, W9HUK, Chairman (CARCC, 1417 Lee Street, Evanston, Illinois).

(5) Suitable certificates will be awarded to the winners by the Council.



## Evolution at Eimac

Back in 1946 Eimac developed and produced the 4X150A—a new concept in power tetrodes. Its immediate acceptance by the industry then, has led to even more popularity now.

But today at Eimac the glass 4X150A is virtually obsolete.

Since 1946 Eimac has constantly improved the 4X150A to the point where it has evolved into a family of superior quality 250w and 300w tubes for operation to 500Mc. Small, compact structure has been retained. In fact, the 4X250 series is interchangeable with 4X150

tubes. Ceramic envelopes make possible greater mechanical strength, better production techniques, and higher temperature processing.

Because "good enough" has never been accepted at Eimac, however, this family of air cooled or water cooled, co-axial or conventional socketed tubes (2.5v, 6v, and 26.5v) is again accelerating the pace in quality, design, and performance, exactly as the 4X150A did a decade ago.

For further information, contact Amateur Service Bureau

**EITEL-McCULLOUGH, INC.**  
 SAN BRUNO · CALIFORNIA  
 The World's Largest Manufacturer of Transmitting Tubes



### 4X150A

4X150 Series  
 4X150A-1946  
 4X150G-1949  
 4X150D-1952

4W300 Series  
 4W300B-1953

4X250 Series  
 4X250B-1955  
 4X250F-1955  
 4X250M-1955  
 4CX250K-1956

4CX300 Series  
 4CX300A-1956

issued to FZC and K9AEQ. GAB and HGE report European reception on 50 Mc. GAB has been experimenting with a "slot" antenna on 50 Mc. GFL is using a 100-watt rig on 50 and 144 Mc. to a ten-element beam 90 ft. high fed with 7/8" gas-filled line. The LaCrosse Club elected the following new officers: K9BVM, pres.; MWQ, vice-pres.; OGT, secy.; MLJ, treas. KXK gave a talk on ham radio at both the Amherst and Weyauwega Lions Club meetings. OVO has a Viking Ranger as exciter as well as a portable rig. GDX is with the Air Force on Guam, and can be heard from KG6NAC on 15 or 20 a.m. or s.s.b. The Wisconsin QSO Party brought forth many of the Wisconsin boys, with 86 worked by LGR and 88 by RQAI. KQN spoke on Conelrad at a WVRA meeting. NUC is the proud owner of a Gouset Communicator. HSQ is giving his DX-100 a workout. LFI is mobile on 10 and 75 meters. LFJ put a drop-pitch motor on his 20-meter beam. Traffic: W9CXY 305, KJJ 187, KQB 103, SAA 85, LGR 71, AZN 20, FZC 20, MCK 10, OMT 10, K9AEQ 7, W9OVO 6, K9ASH 3, W9MIN 2, NHE 2, RTP 2.

## DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Elmer J. Gabel, W0KZT—Officers of the new radio club, STC Livewires, at Valley City, are K0CCB, pres.; L. Bietz, vice-pres.; K. Scheibl, secy.-treas., and J. Dexter, pub. mgr. Meetings are held every Thurs. night under the direction of YEQ, with code classes each Tue. afternoon for the nine members working for their Novice Class licenses. Several of the boys have worked SWB from his winter QTH in Arizona. K0GGH/6 has graduated from the mobile and is now on the air with a new Valiant, usually near 21.3 Mc. at 1800 our time. The ND Phone Net held 25 sessions with 676 check-ins handling 106 pieces of traffic. Traffic: K0CNC 108, W0FVG 43, K0HLL 20, W0HHM 18, K0ADI 15, W0NPR 13, HVA 10, K0CND 8, W0MQA 7, K0ATK 6, W0QOD 4, KLP 1.

**SOUTH DAKOTA**—SCM, Les Price, W0FLP—Asst. SCM: Gerald F. Lee, 0YKY. SCM assistants: HOH, FKE, APL, GQH, NEO, TI, MZJ and GDE. PAM: ULV. RM: SMV. SECs: YOB and GDE. The SDCW Net had 13 sessions. QNI 82, high 8, low 3, average 6.3; QTC 44, high 10, low 1, average 3.4. The S.D. Evening Phone Net had 28 sessions, GDE 11, CVL 12, SCT 5, QNI 1049, high 48, low 11, average 37.46; traffic 81, high 12, low 0 (3 times), average 2.89; informals 168, high 43, low 1 (4 times) average 6. GKU is operating PKL in Lennox. Craig Kepner, ex-0QCC, now is 7FQY at the U. of Arizona. NNX still is without the final for his Viking KW and is just using the Ranger. VMM is having difficulties with the new Viking Valiant. On Nov. 26th, BC SDK worked YU3JN, Yugoslavia, on 10 meters, getting a "5 by 8 to 9 through many QRAM on you" signal report from there. TNAI is spending the winter in Lead. EQV and DVB have a Globe Spanner beam on a windmill tower. QCK is attending U. of Minn. NWK, with the Navy in California, can be heard from K6CST after 6 p.m. PST. K0ACJ and family moved to Colorado. SCT installed push to talk. OZC moved to Ceresco, Nebr. K0BQR purchased QZC's 812 transmitter. OOI, who spent the summer in Finland on an exchange program, now is using a "trap" antenna on 75 meters with good reports. GWS has an 813 rig going. 7BTA left for Denver. OQJ is in the hospital with an ear infection. BQH is rebuilding. Yankton lost two good hams, HJV to Proctorville, Ohio, and HFN to Findlay, Ohio. The Lead Club is holding classes. KN0DTL is about ready for his General Class exam. The PDARC made \$25 on the annual November auction. A meeting was held in Centerville at LXD's folks. SMV, of Sioux Falls, was guest auctioneer. K0ARE has been checking into Minnesota and Nebraska c.w. nets in addition to the SD phone and c.w. nets. The Brookings ARC is in the process of being reactivated and has arranged to meet at the Armory. The club has a BC-669. The old officers, MZJ, pres., and FFP, acting secy.-treas., are in charge. Code Class for beginners are held and there are several Technician Class licensees in town attending college. 9VCO has taken Brookings traffic on the phone net in the absence of another station. Grace says the SD YL ragchew is a big success (Tue. 1 p.m. CST). Participants are K0BMS, W0VVA, DVB, ZWL, K0CDO, K0ARF and W0MZI. Traffic: W0ZWL 426, SCT 305, ARF 171, DVB 69, NEO 66, BQS 36, TAS 26, SMV 21, SIR 19, FLP 15, OJI 14, JKU 11, QDU 7, QEK 6, DKJ 5, OFP 5, EXX 4, NNX 4, YBF 2, FJZ 1.

**MINNESOTA**—SCM, Charles M. Bove, W0MXC—SEC: GTX. The election at the St. Cloud Radio Club was as follows: DFP, pres.; GLV, secy.; and SV, treas. The Minneapolis Radio Club, Inc., elected VLZ, pres.; BSI, vice-pres.; QXA and QXF, secy.; TBX, treas. The Montevideo Radio Club elected LJM, pres.; GBF, vice-pres.; and HKK, secy.-treas. BUC took the Extra Class exam and passed with flying colors and is now known as an Extra Class Super Duper operator.

EYW's XYL now has her license with the call K0OAH. ITQ is on vacation in Texas and Mexico. LXR now has a 32V-3 and a center-fed doublet. K6EA, who has his winter home in Bemidji, is back with us from California and is handling traffic from W6-Land on 15 and 10 meters. IRM has been appointed Official Observer. IRAM gave a talk on beams and on s.s.b. at the Minnetonka Radio Club at Mound, Minn. We hear that he is quite an authority on s.s.b. as he has indoctrinated most of the club members. Even K0BFS soon will be on s.s.b. The Minneapolis Radio Club's annual Christmas banquet was a big success. K0BPS received the Rubed Dario award from Nicaragua which is a toughie to get. We hear that REA may become a part of the Ramsey County Sheriff's office similar to the part played at PZT in Hennepin County. WMA now has worked 80 different countries. JIB has been reappointed PAM for the evening 75-Meter Phone Net. Alternate controls are EMZ, QKA, QVR, WVO and TBX. WKO entered the September Frequency Measuring Tests and with two measurements had an average of only 22.3 parts per million. DSX is a new ham at Onamia. SWB now is 7SWB in Tucson, Ariz. URQ is building a new 12-volt mobile rig. ALW has put up a 75- and 20-meter doublet. TRH is now serving aboard the USS *McGowan* and his home port is Newport, R. I. Bob Benson is receiving a commission to operate from KC4USA, USB, USN, USW, USK, USH and USV at the South Pole and will be on all bands on s.s.b. He will be anxious to contact Minnesota stations for handling traffic. Traffic: W0KJZ 437, KLC 187, DNM 172, DQL 149, ALW 70, RLQ 57, WMA 55, IRJ 53, KFN 45, UMX 45, BUD 26, BUO 24, TBX 24, TUS 24, LUX 22, K6EA 19, W0QVR 19, ADI 17, TCK 13, KNR 12, TQQ 12, VEZ 11, IYP 10, QDL 10, CTX 9, EMZ 9, GDZ 9, NTV 8, KXW 7, CVD 6, DIA 4, LIG 4, MXC 4.

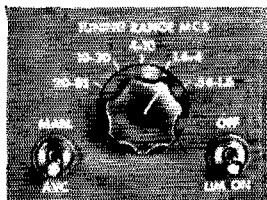
## DELTA DIVISION

**ARKANSAS**—SCM, Ulmon M. Goings, W5ZZY—We appreciate the opportunity of serving as SCM for Arkansas. Our pledge is "We'll do our best." Our thanks to former SCM FME for a job well done. VKE has started a net on 3885 kc. each Tue. for the ECs at 6600. He invites all who are interested in emergency communications to join the net. EMT is DXing on 6 meters and looking for skeds. DAG sends code practice each Mon., Wed. and Sat. on 3790 kc. at 2030. K3HOL is a new ham in Osceola with a General Class ticket. We are happy to announce that K5IGX and K5GOU have dropped the "N" from their calls. DAE has finished his WAS. DUV is erecting a new tower and is topping it off with a three-element 20-meter beam. FPA has built a new three-element beam for 10 meters and is proud owner of a new HQ-150. KRO has a new 20-A for sideband. The Osceola Amateur Radio Club has a new club call, K5ING. At the last meeting a TVI committee was appointed. The club is meeting in its new club house, which is located 3 miles south of Osceola. New ECs are DAG and HDN. YIC has a complete emergency station set up for Warren, Ark. Traffic: W5DAG 25, GUE 4, FPA 3, KRO 2.

**LOUISIANA**—SCM, Thomas J. Morgavi, W5FMO—BMD has a 20A, a slicer and a Q Multiplier on 75 meters. K5CHV received his General Class license on his birthday. A bolt of lightning put K5CCZ out of business. AQY has a new receiver. CWC needs one state for WAS on 75 meters. 5PEL, ex-K2CXB, now is in New Orleans. MXQ traded his equipment for an SX-100 and a Viking Valiant. EA, Route Manager, is anxious to start a c.w. net in Louisiana. All interested persons, please contact him for full particulars. WYN runs an 813 final and an NC-125 meeting nets and ragchewing. VAR, when not phone-patching, is working on the new 813 final he is going to drive with a Ranger. K5DGI, now on s.s.b., worked SV8WT, PJ2ME, SV0WE, FT2RH, DUTSV, FQ8AF and FB8ZZ and has 93 toward DXCC. CWC is Alt. NC for the Delta Net. TCQ and EIH are now Class I Official Observers. Their scores in the last Frequency Measuring Test were 33.0 and 14.2, respectively. K5DGI and UXE have been appointed Official Observers. Class IV. SPZ, formerly of New Orleans, now in Ft. Worth, slowly is getting settled. From the Caravan Club news we learn that SUA won the hidden transmitter hunt. Mobiles participating were SUA, JTR, KQS, NXM, WXA and KAT. Two to five riders in each unit made a total of 25 participating. A 6-meter net, operating on 50.52 Mc. at 2000 CST, Wed. and Thurs., includes JGV, VIL, VUH, JTO, WCJ, K5, CHC, CRF and HVB. K5CHC has his Globe Scout on 6 meters. FMO has replaced the 20-meter beam that "Flossie" destroyed last September. The new boom is an aluminum ladder. Check expiration dates on all appointments. Please send reports in on time. Traffic: (Nov.) W5NDY 279, MXQ

(Continued on page 96)

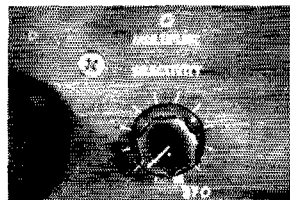




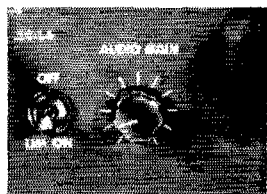
Tuning range 540 KCS to 30 MCS.



Electrical bandsread tuning with direct calibration.



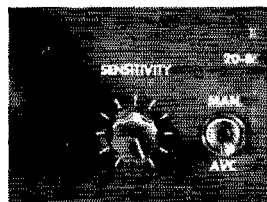
Q-Multiplier for variable selectivity.



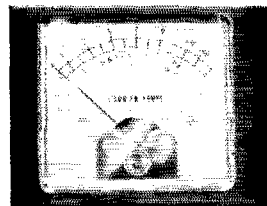
Auto-Response automatically adjusts audio bandwidth for best results.



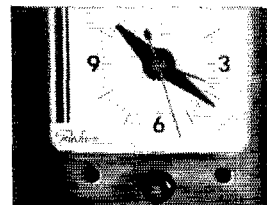
Antenna trimmer for optimum antenna matching.



Variable sensitivity control permits adjusting RF gain.



"S" Meter provides visual tuning indication as well as signal strength.



Clock-Timer (optional) turns on set automatically at pre-set time.



# The FEATURE-FULL HQ-100

Just spend a few minutes trying out the HQ-100 and we're sure you'll agree with us that it is the most amazing communications buy ever offered. Test its sensitivity, its selectivity, the convenience of its controls, the amazing Auto-Response, and then look at the price tag.

And that's only part of the story. The chassis is the cleanest, most straightforward design you've ever seen. In fact, the outstanding engineering and design that went into the HQ-100 is what made the low price possible. Hammarlund engineers designed the HQ-100 around standard components, minimizing the special 'frills' which run up the cost of the usual receiver.

Inspect the HQ-100 at your nearest Hammarlund dealer. We know you'll be pleasantly surprised . . .

**\$169<sup>00</sup>**

(Clock, optional, \$10 extra)

Send For Descriptive Bulletin No. Q-257

## HAMMARLUND

HAMMARLUND MANUFACTURING COMPANY, INC.

460 West 34th Street, New York 1, N. Y.

Export: 13 East 40th St., New York 16, N. Y.

In Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Canada.



Established 1910

66, EA 15, UXE 15, WYN 15, VAR 7, CWC 2. (Oct.)  
W5MXQ 255, EA 17.

**MISSISSIPPI**—SCM, Julian G. Blakely, W5WZY—The Keesler Amateur Radio Club has elected 4ZST/5, as its new pres.; FBW as vice-pres.; with 0TDE/5, custodian, 4ZGR/5, 5VTI, JBS and K5FGJ all have new auxiliary power units for emergency work. KH6-BFM/5 was heard with a new DX-35. A recent visitor to the KARC was JA6BP, Tomoyuki Sudo, who gave an interesting talk at the club meeting. BEK is operating on 15 meters with a new Ranger and has worked "Stay-Put" Carlson twice recently. K5IGV is mobile in Greenville. K5BKK is going up to 6 meters. IGW may be heard mobile (river marine) as he is chief engineer on a newly-commissioned river boat. Hams with 221 frequency meters or equivalent should investigate the Class I OO appointment for precise frequency measurements. It's a challenge to you and a service to your fellow amateur.

**TENNESSEE**—SCM, Harry C. Simpson, W4SCF—Asst. SCM: Richard A. Crowell, 4WQW. SEC: RRV. PAM: PQP. RM: IV. Our sincere thanks go to PFP, who has resigned as PAM after three very successful years. John has done a great job and I am sure the new PAM, PQP, will be able to call on him for any necessary assistance at any time. Two fine members of the Memphis ARC have been nominated for the Edison Award. Both BAQ and DQH have done much for amateur radio throughout the country, and the club is to be congratulated on having such individuals as members. The same club elected 1957 officers, with DCH, pres.; FRB, vice-pres.; K4GXU, treas.; YMB, secy.; and BAO, BAQ, IQX and WTI, directors. Nice letters and bulletins were received from WQW, WQT and BMI and the Memphis and Bays Mountain Clubs. NPS has a new VFO and made a nice SS total. K4GQU is a new General Class licensee. TDZ reports BBC TV audio is being heard daily on 41.5 Mc. The usual fine net reports were received from IV, PFP, DIZ and UIO. PL is basking in the Florida sunshine and says it is warmer in Chattanooga! WQW has a new receiver and will be looking for his long-lost friends on TN. EWC and SCF visited major Tennessee cities, including White's Creek, and spent some time with K4DIZ, K4WBF, PQP, RRV, VQE, GGM, BQG, WQT, GEN, BMI and many others. Traffic: K4DIZ 246, W4PQP 128, TDZ 74, VJ 54, IV 44, SCF 25, PFP 23, UVL 20, K4HJA 12, W4RRV 10, K4LPW 4, W4UIO 2, K4EPP 1, W4GQU 1, NBV 1, NPS 1, TDZ 1, WQW 1.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Albert M. Barnes, W4KKW—SEC: JSH. PAMs: VJV and SUD. RMs: ZDA and ZDB. Congratulations to the newest ARRL affiliated club in Kentucky, the Audubon Amateur Radio Society of Henderson. JSH reports that the Paducah Area is on its way with its RACES plan. BAZ writes that the Fall City Area is going ahead with RACES plans. VJV says it was the best month ever for KPN, with YYI, OOS and NGN holding an informal net week days at 1300 CST on 3660 kc, plus the regular KPN at 1930 CST. ZDB reports excellent activity on KYN with 32 active stations. HOJ is off with transmitter trouble. FR has been QNI with his new call, K8DAY. W9OZQ now is home from the hospital. JUT, a new AREC member, has a 3-kw. standby plant. KZF is a new OPS. LOA is the new call of Colonel Hanks, now secy.-treas. of the Warren County Radio Club, Bowling Green. PHJ keeps a weekly sked with DL4PN, ex-W4PN, and would like to hear from old friends. ALR is QRL work. YP/4 has a new phone patch. CHK is working DX on 15 meters with a Ranger and a beam. BVC, KZF and SZL also are DX'ing. JUI says we are missing a good thing by passing up 6 meters. HEA is rebuilding. MWR was very active in the Kentucky QSO Party, also JCN. HOE is a most active Frankfort station. CDA is all set for Conrad. How about you? KKG keeps a weekly sked with 68EU on 15 meters with no misses! AIS reports the Kentuckiana Radio Club will operate the c.d. station at Bowman Field. HSI has a new push-to-talk foot style. HI! QCD wants to NCS UTL again to raise his total. HI! Traffic: W4KKW 172, QCD 148, ZDB 146, HSI 114, W5GOH/4 96, W4BAZ 91, K4QU 79, K4AIS 77, W4RPF 77, SUD 65, VJV 57, JSH 51, KKG 40, CDA 38, ZDA 35, SBI 22, K4HOE 20, W4MWX 20, NIZ 20, SZB 20, JCN 16, MWR 12, HEA 10, K4DLT 5, W4JUI 5, SZL 5, KZF 2.

**MICHIGAN**—SCM, Thomas G. Mitchell, W8RAF—Asst. SCM (phone): Bob Cooper, 8AQA; Asst. SCM (c.w.): Joe Beljan, 8SCW. SEC: GJH. The meeting with MOCD on Nov. 10th was attended by our SEC and Area ECs representing seven out of ten areas. Attending for the MOCD was Mr. William Powell, who has been assigned the duty of implementing the RACES program. The RACES organization is patterned after the AREC so that all members and ECs will function

interchangeably. This will facilitate administrative measures and reduce the confusion that would be present with separate organizations for each service. On the agenda for the meeting were such matters as reviewing the organizational structure, geographical reallocation of some counties to other areas than now assigned, personnel changes in some EC appointments, and the consideration of a standard form to be supplied to each EC that would assist him in preparing a suitable ComPlan for his unit. ComPlans must be submitted AND APPROVED from each unit before RACES authorization will be granted. Some units are very active, but other units are either inactive or just getting under way. We must fill in the voids and encourage AREC activity to be prepared for any situation that may arise. ECs must strengthen their ties with county and local c.d. and Red Cross agencies and promote drills within their units. No organization will be worthy of its name unless it can OPERATE EFFICIENTLY. If an emergency developed today, would you be ready? Think it over—and ACT! More of this information will be included later and the MOCD will include news in their News Letter. Send recommendations for the Hamvention Radio Amateur Radio Award to DIJ, 4209 N. Hyland Drive, Dayton 4, Ohio. This award is for outstanding service over long periods of time in any public service or humanitarian effort as opposed to a service rendered during a particular incident. Traffic: (Nov.) W8ELW 739, ILP 157, K8NAW 111, W8ZLK 104, NUL 55, RVZ 54, RTN 53, QGO 51, GKT 50, NTC 45, YAN 44, FWQ 43, IV 38, FX 27, SCW 27, NOH 23, OGY 23, AUD 21, PAF 19, TBP 18, HKT 17, DSE 16, RAE 16, OCC 15, PHM 9, HSG 8, FGB 6, QIX 4, WNO 4, EGI 2, SJF 1, SWN 1. (Oct.) W8OCC 69, DAP 52, QGO 49, TIN 43, NOH 28, TBP 21, IKX 12, FGB 3, SWN 3. (Sept.) W8IKX 12.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCMs: J. C. Erickson, 8DAE, and E. F. Bonnet, 8OVG. SEC: UPB. RMs: DAE and FYO. PAMs: HPP and HUX. EQN's son is KN8DEV. Warren ARA officers for 1957 are KJE, pres.; HLX, vice-pres.; and K8BXT, secy.-treas. EQJ has a new all-hand antenna using 3DZZ traps. SMK received a DUF certificate. The AREC, with cooperation from the West Park Radios, handled communications for the huge Cleveland Press Christmas parade on Nov. 25th using mobiles and walkie-talkies. Those who took part were HFE, INW, VFU, DKG, QXW, NLJ, ZXL, LHJ, AEU, QXG and BZG. The Springfield ARC is now meeting in the central fire station. BMC, YAC, OKB and OG are working lots of DX. RWZ has a new 75A-4 and a KW-1. YAC has a two-element 20-meter beam. At the Dayton Hamvention in April an award again will be given to the amateur who, in the opinion of the judges, has contributed the most to some unselfish public service, humanitarian effort, performed some emergency work, such as giving of his time and means, even at great personal sacrifice, to provide communications during a flood, tornado, etc. Let's have individuals and/or clubs in Ohio, West Virginia, Kentucky, Indiana and Michigan show their appreciation by naming an amateur of their choice by sending to D. L. Marquette, W8DHJ, 4209 N. Hyland Dr., Dayton, Ohio. GBJ's XYL presented him with a daughter. Massillon ARC's 1957 officers are NWP, pres.; OYL, vice-pres.; FRB, secy.-treas.; and YHU, act. mgr. The club's code class is being well attended. SWZ is on RTTY. VF has a new KW-1. IXA has a new 20-A exciter. HOX has a new homebrew s.s.b. rig using a Collins mechanical filter. Many thanks to FYI in Warren for reporting into BN twice a week. Now if we could get a Youngstown station to report into Ohio Phone or BN, HZJ has a new 1-kw. Matchbox and built a Monimatch described in QST and says it works fine. 9VBV/8 is working DX on 10 and 20 meters. PAJ reports the Geauga County ARC trailer is in operation on 10-meter phone as K8DJB. YCP has two elements on 15 and 20 meters. Canton ARC's 1957 officers are IKM, pres.; OYV, vice-pres.; AL, secy.-treas. Toledo's ham of the month is JMD, the youngest member of the Ohio State Blind RC. He is one of a group at the school who started as Novices, namely, JIX, JLY, JME, KLC and KLD. They are all General Class now. HUX and HWX have been working DX on 10 meters. BBO is on 2-meter s.s.b. now. The Hocking Valley RC's 1957 officers are VCD, pres.; 3HTN/8, vice-pres.; YRG, secy.-treas., and HPP, editor. FCO has a new SX-100. KN8ASZ bought a new home. KN8CSO built a transmitter. CQT is mobile with an Elmac. PIQ tells us that the Dayton boys have many countries on 6 meters. New appointments are HNY as OO and SDE as OBS. ECs of the following counties are asked to please check the date on their certificates and if lapsed send them to UPB for his endorsement: Allen, Ashland, Ashtabula, Athens, Clermont, Clinton, Columbiana, Crawford, Darke, Delaware, Fayette, Franklin, Geauga, Hancock, Huron,

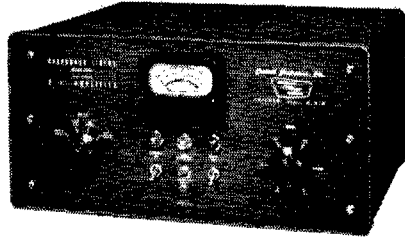
(Continued on page 98)

# YOU CAN'T GO WRONG WITH MULTIPHASE!

CENTRAL ELECTRONICS, a pioneer in the amateur SSB field, is justly proud of the fact that all over the world MULTIPHASE equipment has established an enviable reputation for SUPERIOR DESIGN, WORKMANSHIP and PERFORMANCE. Couple that with REASONABLE PRICES and you have a combination impossible to beat.

## MULTIPHASE 600L

**Broad-Band Linear Amplifier  
For SSB, AM, PM, & CW**



Here's the amplifier that is making History! YEARS AHEAD IN DESIGN - The 600L has NO TUNING CONTROLS OF ANY KIND! New BAND-PASS COUPLERS, an exclusive development of CENTRAL ELECTRONICS, provide linear efficiencies of 60-65%. COMPLETE FREEDOM FROM SELF-LOADING!

- Single 813 in Class AB2. Approx. 8 watts peak drive power for 500 Watts DC input.
- Single knob band switching 10-160 Meters.
- Automatic relay protection.
- Designed for 50-70 Ohm co-ax input and output.
- Built-in HEAVY-DUTY power supply. Bias and screen regulation. 45 Mfd. oil filled output capacitor.

- Extremely low intermodulation distortion.
- Completely shielded - TVI suppressed Parasitic free.
- Exclusive meter features originally developed by CENTRAL ELECTRONICS. Often copied but never equalled.

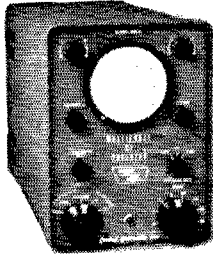
A 600L and a reasonably decent antenna invariably result in an OUTSTANDING SIGNAL. Ask the ham who uses one!  
MULTIPHASE MODEL 600L..... Complete, ready to operate.....\$495.00

## NEW MULTIPHASE MODEL MM-1

### RF ANALYZER

One compact unit provides oscillator and 3" scope for CONTINUOUS MONITORING OF SSB-AM-CW. COMPLETE ALIGNMENT OF SSB EXCITERS and GENERAL MODULATION ANALYSIS.

- NO TUNING required. Broadband response flat 1 MC to 55 MC at power levels of 5 watts to 5 kilowatts.
- Built-in 1 KC audio oscillator has less than 0.5% distortion.
- Automatic blanking protects CRT during standby.
- RF attenuator controls height of pattern, calibrated in 3 db steps.
- For use in "Series" with 50-72 ohm co-ax lines. A short pickup antenna is recommended for other systems.
- The MM-1 provides: SPEECH ENVELOPE patterns without annoying 60 cycle double trace.
- TONE ENVELOPE patterns automatically synchronized with self-contained 1 kc audio generator.
- AF TRAPEZOID patterns for HIGH LEVEL AM systems.
- DOUBLE TRAPEZOID OR BOW TIE patterns for analysis of LOW LEVEL LINEAR AM systems.
- RF TRAPEZOID for determining linear amplifier "LINEARITY" by sampling input and output signals.



Amateur Net  
Kit ... \$99.50  
Wired... 129.50



\*Pat.  
2-659-777

Amateur Net  
Kit ... \$49.50  
Wired... \$59.50

## NEW MULTIPHASE MODEL GC-1

### Gated Compression Amplifier \*

Now - it's no longer necessary to "ride" the gain control in SSB-AM-CW round tables in an effort to copy the "barefoot" rigs along with the KW rock crushers! Merely set the Sensitivity control so that the weakest signal in the round table is Q5 and presto - no more blasting.

The GC-1 is a complete audio output system. With its novel Gated Audio AVC circuit, changes in level of approximately 40 db. produce less than 3 db. variation in output. The unit may be connected between the receiver or Sideband Slicer output and the speaker voice coil - it's that simple.

Thousands of GATED COMPRESSION units are in daily use by Deaf Training schools throughout the world to prevent painful "blasting" and to provide relaxed listening pleasure.

Get your MULTIPHASE GC-1 now! Then sit back - relax - enjoy ham radio and pity those who are still diving for the gain control.

## OTHER MULTIPHASE PRODUCTS

Model 20A- 20 watt Band Switching Exciter.....	\$249.50	Kit.....	\$199.50
Model 10B- 10 watt Multiband Exciter.....	\$179.50	Kit.....	\$129.50
Model B- Slicer and Q Multiplier.....	\$ 99.50	Kit.....	\$ 69.50
Model A- Slicer less Q Multiplier.....	\$ 74.50	Kit.....	\$ 49.50
Model AQ- Q Multiplier for Model A Slicer.....	\$ 29.50	Kit.....	\$ 22.50
Model DQ- Desk Model Q Multiplier.....	\$ 29.50	Kit.....	\$ 22.50
Model 458K- Conversion kit for 160 thru 15 Meters.....			\$ 15.00
Model 458CP- Deluxe Case and Panel for 458 VFO.....			\$ 10.00
Model QT1- Anti-Trip unit for 10B or 20A.....			\$ 12.50
Model RE1- CRT Analyzer-Rejuvenator.....	\$ 59.50	Kit.....	\$ 49.50

WRITE FOR LITERATURE ON THE COMPLETE MULTIPHASE LINE

MULTIPHASE  
EQUIPMENT

*Central Electronics, Inc.*

1247 W. Belmont Ave.

Chicago 13, Illinois

MULTIPHASE  
THE OVERWHELMING  
CHOICE OF HAMS  
EVERYWHERE

Knox, Lawrence, Lorain, Lucas, Mahoning, Marion, Montgomery, Noble, Ottawa, Paulding, Pickaway, Portage, Ross, Sandusky, Summit, Trumbull, Tuscarawas, Warren and Wood. We need you ECs, so please send in your certificate for endorsement. Traffic: W8VTP 303, QJL 252, IIR 110, KN8CTW 91, W8HXB 82, SZU 80, DAE 78, UPH 71, WAV 28, AL 25, ARO 23, LZE 22, SMK 20, HJZ 18, PBX 16, VVX 16, W9VBV/8 15, W8RN 12, RO 12, PLQ 10, QIE 8, BEW 4, CSK 4, EEQ 4, MXO 4, YCP 4, AQ 3, HNP 3, LMB 2.

## HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EPU—SEC: KGC. RM: BXP. PAMS: GDD, IJG and WOC. Section Nets: NYS on 3615 kc. at 1900, NYSPTEN on 3925 kc. at 1800, SRPN on 3980 kc. at 1200, LPN on 3980 kc. at 1600, MHT on 3716 kc. Sat. at 1300. Congratulations are in order to the Rip Van Winkle Amateur Radio Society, of Catskill, on its recent affiliation with the ARRL. ZBY was presented with an Asst. Director's certificate by Hudson Division Director OBU at the November meeting of the Schenectady Club. KGC, our SEC, was a speaker at the Ulster County Mike and Key Club dinner on Nov. 18th. Club auctions certainly are popular since over 230 persons attended the IBM auction in November. Why not inaugurate this as a regular feature of your club? LCB worked England on 6 meters using 50 watts to an indoor beam. The Dutchess County RACES group has expanded to include the Civil Air Patrol. QOM is the new EC for the City of New Rochelle. K2HNW, professor of physics, is the new advisor for the Union College Radio Club, GSB. We are pleased to add K2BDJ to those receiving ARRL Public Service Awards. K2EDH is now using semi-break-in on the NYS with full-break to follow. The State RACES Command Nets on 3509.5 and 3993 kc. handled over a hundred messages Election Night sending county returns to the State Control Center. EFU, JZK, K2HNW and RNL conducted a "CW Nite" at the Schenectady Club on Dec. 3rd. Antique wireless with slides and tape commentary featured the Albany Club meeting on Nov. 23rd. All E.N.Y. extends congratulations to K2HUK, the newly-elected SCM for W.N.Y. How about your Conelrad indicator, is it working properly? Traffic: (Nov.) W2BXP 314, EFU 162, NOC 127, K2HPQ 85, W2PHX 59, K2LKI 41, W2ATA 23, K2EDH 20, W2GTC 8, K2GCH 5, HNW 5.

**NEW YORK CITY AND LONG ISLAND**—SCM, Harry J. Dannels, W2TUK—SEC: ADO, PAM; OBW. RM: WFL. Section Nets: NLI—3630 kc. nightly at 1930 EST and Sat. at 1915 EST. NYC-LIPN—3908 kc. Mon. through Sat. from 1730 to 1830 EST. The NLI Net continues its successful work under WFL with 241 messages handled. However, in addition to the recent request for Brooklyn stations, the net needs a few Queens outlets, too. According to OBW, 109 stations handled 273 messages on NYC-LIPN. The Amityville hams staged a successful c.d. drill with HSP and K2s AMP, GKQ and PLC participating, with Suffolk RO, KNA, assisting. KNA reports 125 RACES operators are manning 87 authorized stations in Suffolk. CTJN is using a 14-Mc. Quad with good results. K2DEM went to 61 countries with an Iceland contact. K2RCX dropped the "N" with her Tech. Class license. BO has been working the West Coast on 40-meter c.w. while mobile! LGK worked his first W6, Iowa and Minnesota stations in 18 years of hamming with 18 watts on 28 Mc. GP is now more active on 144 Mc. The Bonac ARC call is K2VLV. K2EQH missed a few OBS skeds when his modulator blew up, but he's back in business again. Officers of the Bellport HSRC, K2VMG, are K2JZR, pres.; K2QLZ, vice-pres.; KN2SGN, secy.; KN2TSE, treas. The club station uses a DX-100 and an NC-125. K2PSV's DX-100 has contacted 23 countries and he needs only Asia for IWAC. IAG worked his first ZL using 10-meter n.i.m. The Tu-Boro RC, BMW, is on 40-meter c.w. MDM earned his CP-35 sticker. NYN joined the married ranks. AOC, with 100 watts to a 5894 on 220 Mc., has worked 6 states and 3 call areas. Mary reports IQI, LKP, MGQ, WOF and K2BLU/2 are active and he is looking for other contacts. BQM is back in business at his new QTH with the tower and 20-meter Telrex installed. EEN set up gear on 2 and 6 meters for the V.H.F. Contest. A Phasemaster II put OKU on s.s.b. K2DDK built a transistor Conelrad monitor. K2s PHK, RLI, ROH and TJP dropped the "N." K2LQM is off to the Army in February. The Amateur Radio Association of Flatbush now signs K2VSS. KN2TJM added a Q-multiplier. Using only crystal-control, K2UOY has now worked 42 states and 6 countries in a little over two months on the air. K2ITZ put up a biconical for 10 meters. K2BSM added a Viking Valiant as his second rig. KN2SNL has a Gonset on 144 Mc. New stations on 50 Mc. are

K2s JLR, KYV, LDK, QNY, RLW, RYE and VER. K2JDI worked G5BD on 6 to 10 meters cross-band. K2ACD now has 36 states on 50 Mc. K2s AZT, MBY and RKL, operating mobile on 6 meters, assisted in the Newsday Motorcade. K2QEZ added a three-element beam on 14 Mc. QBS/3HRG is off on a trip to Turkey. KN2s TBU and TBW are on 80 and 40 meters with 807 rigs. K2TLG reports the activity of the Rock 'n Roll Net on 50.1 Mc. on Sun. at 0730. Congratulations to K2s HEA and MGE on their 4th harmonic—a girl. K2KTU added Matchbox to his DX-100. The Levittown ARC is running a code practice session. Anyone interested may contact K2LUR for details. KN2PTS returned from W6-Land and added a Globe Scout and NC-98. K2PZB runs 45 watts to a 6146 on 50 Mc. K2s ONX, RUS and SEW are building for 6 meters. K2OZY needs a ZL confirmation for WAC. K2PWH finished a 6-meter converter from the Handbook. New members of the NYC are JIL and K2s CVK and ESD. GG has a new HT-30 s.s.b. exciter. BKX now operates s.s.b. with a Viking Pacemaker. K2EAF moved to Farmingdale. Advanced congratulations go to IVS and K2AAA, respectively, on their section victories in the SS C.W. and Phone Contests. Your SCM enjoyed visits with the East Suffolk, Brooklyn Civic Center, Bell Labs, Nassau and Mid-Island Clubs during November. May I visit your club soon? Traffic: (Nov.) K2AMP 275, DEM 175, KXZ 145, W2WFL 142, AEE 93, K2PEF 84, W2TUK 77, OME 64, K2GHS 59, LUM 50, W2BO 47, K2RJO 45, W2IVS 39, JFU 24, OBW 24, K2KSP 23, Q2S 23, DVT 22, W2UGF 21, HAC 20, LKG 20, PF 18, GP 17, PDU 15, YBT 15, EC 13, K2EQH 12, JZR 11, PSV 10, W2DUS 8, IAG 7, K2GLP 3, AAW 2, W2ITZ 2, JCA 2, MDM 2. (Oct.) K2OPJ 34, DVT 9, ITZ 7.

**NORTHERN NEW JERSEY**—SCM, Lloyd H. Manamon, W2VQR—SEC: IIN. PAM: VDE. RMs: MLV, NKD and CGG. K2DOX was home for the Thanksgiving Holidays. HXU has his receiver repaired, license renewed and is back on the air. NYI schedules 4TY, the former 2TF of Nutley. NYI has received WGSa (Swedish) and WABC (British) certificates. VYB is QRL with college work. ZGB is the new president of the Somerset Hills Radio Club. GZZ recently received DXCC for 40-meter operation exclusively. K2CM has a kw. on s.s.b. after years of QRP. BHM is back on the air after a long absence. K2BZT recently was elected to the 1st-class Operators' Club. JLL, the new QSL Mgr., was the guest speaker at the Somerset Hills Club on Dec. 6th. PY2CK recently visited K2GMO. VDE has a new HQ-100. VCZ worked 66 sections in the recent SS Contest. CVW has just received his Extra Class license. K2SKK is building a new 2/6-meter transmitter. New officers elected by the GSARA are CQB, pres.; NPB, vice-pres.; QFQ, treas.; FZY, chief engr.; K2CTJ, secy.; CTJ, pub. ZYW is hard at work modifying a BC-312. K2MMM is keeping the c.w. bands hot. K2BWQ is doing a real DX job with the s.s.b. rig. VDE has issued the second in a series of NJTPN bulletins. The bulletin is five pages in length, and is full of valuable information on net operation. The Monmouth-Ocean County 6-Meter Traffic Net has added K2VEU and K2HEI to the roster. K2BSG reports the Ocean County Radio Assn. has initiated a 6-meter club project which will result in at least a dozen or more new stations on 6 meters from Ocean County. K2MMF has earned the 20-w.p.m. sticker. In addition he has run the SX-100 and Viking Ranger overtime in running his countries-worked score up to 29. The Maritan Bay Radio Amateur Club elected new officers at its first January meeting. K2EQD is in charge of the club's auction night program. The Irvington Radio Amateur Club is conducting code and theory classes at its club headquarters, 1143 Clinton Ave., Irvington. K2IGH has a new DX-100. K2QIS has a new 32V-2. The IRAC, in keeping with its annual practice, conducted "Operation Holiday" again this year. This is a club activity whereby the members set up a message-handling service for the public so that they may send Christmas greetings to relatives and friends wherever they may be. The Monmouth County RACES Control Station was officially opened by RO K2DHE and his staff on Dec. 17th. NIE, better known as the "Robin Hood" of the s.s.b. gang, again is deep in the forests of South Jersey looking for the first deer of the season. Not only is he equipped with bow and arrow, but he has the Elmac along to keep us informed of his progress. K2IPR is studying hard for his exam at navigation school. The NJN Morning Net report for November is as follows: 26 sessions, 98 stations, traffic 75. NJN Evening Net report: 26 sessions, attendance 459, traffic 359. This is a new record both in attendance and traffic. Again congrats to Net Mgr. MLW, who retired Jan. 1st. Welcome to the new NJN net mgr., BRC. Traffic: K2BHQ 161, EQP 147, W2MLW 122, VDE 118, ZVW 118, BRC 87, FNT 71, RXL 58, K2BWQ 52, W2KFR 19, K2IAZ 16,

(Continued on page 100)

**MALLORY****MALLORY**

# CONELRAD

## ALERT SIGNAL SEQUENCE

Upon notification by the proper authorities, broadcast stations will proceed with the following alarm sequence:

**CURRENT PROGRAMMING DISCONTINUED**  
**5 SECONDS—CARRIER OFF THE AIR**  
**5 SECONDS—UNMODULATED CARRIER**  
**5 SECONDS—CARRIER OFF THE AIR**  
**15 SECONDS—1000-CYCLE-MODULATED CARRIER**  
**1 MINUTE (max.)—CONELRAD MESSAGE**  
**CARRIER OFF AIR FOR DURATION OF ALERT**

*(If so authorized, transmission may be continued on 640 or 1240 kc under CD jurisdiction.)*

UPON SIGNAL OF AN ALERT, ALL AMATEUR TRANSMISSIONS MUST CEASE—excepting those specifically authorized by RACES.

An alarm may be constructed or purchased which will automatically detect the above sequence. In the absence of an alarm system, the broadcast band must be monitored for normal operation before each transmission is begun, and checked at least every ten minutes during a QSO. During a Conelrad alert, broadcasts will be made only on 640 and 1240 kc.

*( Trim the above information on dotted line and mount on desk or transmitter.  
 If you'd like additional free copies printed on card stock, drop a line to  
 the MALLORY HAMSHACK, P. O. Box 1558, Indianapolis 6, Indiana. )*

## *for dependable service . . . MALLORY*

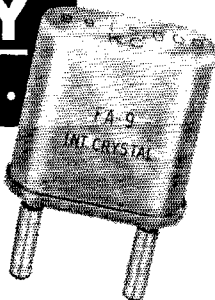
Building a dependable Conelrad alarm or a transmitter—or rebuilding and maintaining present equipment—it pays to use good, reliable components. You can always depend on Mallory for the very best in capacitors, resistors, controls, switches, vibrators and Vibrapacks, mercury and zinc-carbon batteries, and a host of other tested and proven electronic components. See your Mallory Distributor—TODAY.

**P. R. MALLORY & CO. Inc.**  
**MALLORY**

**P. R. MALLORY & CO. Inc.**  
 P. O. Box 1558  
 INDIANAPOLIS 6, INDIANA

# ONE DAY Processing!

## FA-9 CRYSTALS



For AMATEURS—  
EXPERIMENTERS 1500 KC to 50 MC

Wire mounted, plated crystals for use by amateurs and experimenters where tolerances of .01% are permissible and wide range temperatures are not encountered.

**CIRCUIT:** Designed to operate into a load capacitance of 32 mmf on the fundamental between 1500 KC and 15 MC. Designed to operate at anti-resonance on 3rd overtone modes into grid circuit without additional capacitance load. 5th overtone crystals designed to operate at series resonance. (Write for recommended circuits)

### Prices

Pin Diameter .093\*  
Pin Spacing .486

FREQUENCY RANGE	TOLERANCE	PRICE
1500-1799 KC	.01%	\$ 4.50
1800-1999 KC	.01%	4.00
2000-9999 KC	.01%	3.00
10000-15000 KC	.01%	4.00
<b>Overtone Crystals—3rd Overtone Operation</b>		
15 MC-29.99 MC	.01%	\$ 3.00
30 MC-54 MC	.01%	4.00
<b>Overtone Crystals—5th Overtone Operation</b>		
55 MC-75	.01%	4.50
76 MC-90 MC	.01%	6.50

### PRECISION CRYSTALS COMMERCIAL USE

F-6 SERIES  
1500 KC — 50 MC

NOTE: The FA units will not necessarily have the correct correlation for Commercial use.  
For commercial applications, the F-6 type unit should be used. Write for details!

**ONE DAY SERVICE!** Crystals are sold direct, for fastest possible service. When cash accompanies order, International prepays Airmail postage; otherwise, shipment made C. O. D. Specify exact frequency and crystal will be calibrated to .01% or better of this frequency.

## International CRYSTAL MFG. CO.

18 N. LEE PHONE FO 5-1165 OKLAHOMA CITY, OKLA.

W2QXL 11, K2BZT 4, W2DRV 4, NIY 4, VMX 4, K2SKK 3, W2CJX 2.

### MIDWEST DIVISION

**IOWA**—SCM, Russell B. Marquis, W0BDR—When you read this, notations will be in order for SCM for the next two years. K0EVE and CLS are reporting into TLCN now. The Midwest Division Director and Vice-Director are listed in station activity reports this month. AEH is working 6 meters using a 75-meter dipole. Otho is planning a 3-bay beam to improve his signal. K0ADM worked a PZI on 6 meters. PP is back on the air with a Viking. He is mostly on 10 meters but Bill promises to get on 75 meters soon. IKP is now in California. K0AEY has a new Valiant. IHC is now on s.s.b. with a 20-A. ZAM has 5 new countries confirmed on s.s.b. NGS renewed his OPS and PAN and LJW renewed their ORS appointments. K0AAH received an ORS appointment. AIZ qualified for WAS. W0NWX is putting up several Wind-Charger towers for some type of vertical antenna. The Halloween Roundup at Cedar Rapids showed excellent results again this year, with 17 mobiles and 33 operators. CVU had almost a full page write-up in the *CR Gazette*. TLCN is going on a 7-day-a-week schedule. The Waterloo Club members took their XYLs out for a Christmas dinner. Traffic: (Nov.) W0BDR 1623, SCA 1374, PZO 1115, LGG 535, BJP 344, LCN 332, CZ 290, SQE 254, KVI 191, GXQ 139, UTD 73, BLH 70, BTX 68, LJW 42, QVA 40, K0AHZ 32, W0EHH 32, NGS 26, FMZ 21, K0DZX 19, EXN/Ø 17, AAH 14, W0YT 13, ZPM 13, BQJ 12, VWF 12, K0BEC 9, CLS 9, DBW 9, W0GQ 9, EEG 8, FNR 8, DIB 7, PTL 7, TIU 7, MEL 4, UTX 4, K0WAD 4, BRE 3, W0SLC 3, HNE 2, IHC 2, NWX 2, FDM 1. (Oct.) K0CER 25.

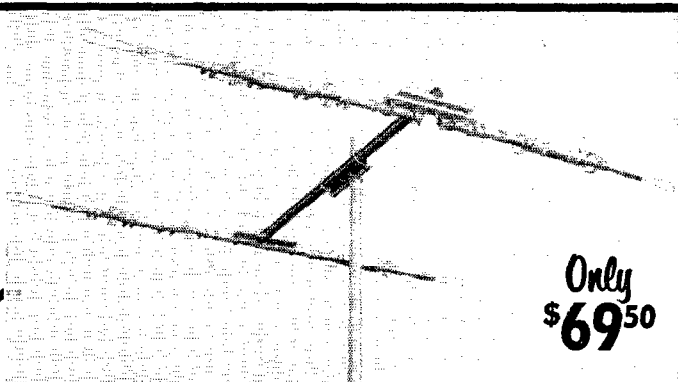
**KANSAS**—SCM, Earl N. Johnston, W0ICV—SEC; PAH, RMJ; QGG, PAM; FNS. Congratulations to the Coffeyville Amateur Radio Society, which recently was affiliated with ARRL. Officers are YLI, pres.; LFL, vice-pres. and act. mgr. The club has 23 members and meets at City Hall. The KVRC, of Topeka, celebrated its 30th year of ARRL affiliation Nov. 1st and meets every other Fri. at Police Hq. The Wheat Belt Radio Club now has 60 members and had its annual Christmas Dinner Dec. 9th at Herndon. It also sponsors two nets, one at 1230 Sat. on 3825 kc. and an emergency net on 3610 kc. at 1230 and 1800 during emergencies. The JARS, of Kansas City, which meets the 3rd Thurs. of each month at KNG Armory, has 3 new Novices on the roll, KNHVG, HBY and HSF. TPB reports lots of 6-meter activity in Kansas City. The JCARC regrettably announced the passing of EIB Nov. 19th. Walt was a member of the recent DX expedition to Corn Island and Socorro YNAB and XEA. From the CKRC club bulletin *Ink* we learn of more v.h.f. activity in that city than any other in Kansas. Point your beams any evening either on 6 or 2 meters and you should rate a contact. JAS reports of hearing reflected scatter every Sun. A.M. on 6 meters hearing 4s, 5s, 6s and 8s. Incidentally, JAS is building a kw. on 6 meters. Traffic: (Nov.) W0BLI 403, K0FEI 349, W0NYI 310, FNS 232, YVM 222, TOL 183, QGG 134, OHJ 132, SAF 111, ABJ 91, MIX 70, FDG 62, IHN 44, QQQ 28, K0EWS 21, W0ONF 21, K0BXF 17, W0ICV 17, QGB 17, K0BLX 14, W0WWR 14, K0AHW 9, W0VZM 9, ECD 8, UOL 6, DEL 5, LIX 4, LQX 3, UAT 2, K0AOQ 1. (Aug.) W0UAT 1.

**MISSOURI**—SCM, James W. Hoover, W0GEP—OUD reports that DE is recuperating from an eye operation and is planning some new gadgets for the station. OMM received a new Viking Valiant for her birthday. WYJ has an ORS appointment and is working TCRN on 40 meters. ECE is now a member of MARS. K0CHZ is the new president of the Missouri School of Mines Radio Club. The club has erected a new 20-meter dipole. OVV has increased power to 75 watts. The St. Louis Amateur Radio Club has a new 10/15-meter beam. 5DKT has moved from Arkansas to Joplin and is finishing a new DX-100. KNGSV is using a 25-watt rig on 40 meters and will get a DX-20 soon. K0BDT has a new 75-A but still has trouble with the transmitter, which was damaged by water during a fire last summer. CXU/GXP is laid up with a heart condition but is active with a 500-watt Globe King. ZXX has taken a position with Boeing Aircraft in Wichita, Kans. Ex-CKS was in St. Louis on business for Federal Telecommunications Laboratories. Ex-SKA, who is with the same company, is in Alaska for a few months. New officers of the Bandhoppers Radio Club are NOA, pres.; FIN, vice-pres.; GEP, secy.-treas. JNK has built ten 6-meter coaxial antennas for Bandhoppers Club members. *Sidebands*, published by the St. Louis Amateur Radio Club, carried an article on a 6-meter transmitter which was designed by QLL. Traffic: (Nov.) W0CPI 870, GAR 520, PME 121, HUI 119, KIK 107, OMM

(Continued on page 102)

FOR THE HAM WHO'S  
LOOKING FOR

*Economy!  
Low-Cost!  
Performance!  
and  
Top Construction!*



Only  
**\$69<sup>50</sup>**

✓ The only factory pre-tuned, pre-matched and pre-adjusted 3 band antennas

✓ One beam, one feed-line, three bands (10, 15 and 20M), and low SWR

✓ Guaranteed for one year against any defects in material or workmanship

✓ Better performing than three stacked arrays because it eliminates interaction and de-tuning effect

✓ Outperforms any beams in their class, bar none

✓ SWR less than 1:5 to 1 on all bands

✓ May be erected in extremely short time; no adjustment necessary; no test equipment needed.

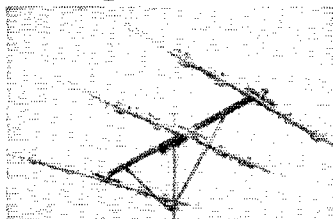
**WRL's**

PAY JUST \$6.95 DOWN; \$6.00 PER MO.

## 2-Element Triple Globe Spanner

For the ham with limited space who wants top quality transmission on 10, 15 & 20M without stacking beams. This Triple Spanner meets the requirements of max. gain in min. space. Spacing .1 reflector on 20M. Single transmission for all bands, 52 ohm RG-8U.

### WRL's 3 ELEMENT TRI-BAND

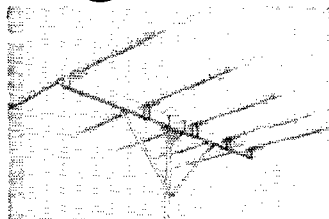


#### THE HAM'S STANDARD BEAM

The performance standard of all tri-band antennas in amateur radio communication. Spacing, .1 reflector on 20M. Single transmission line for all bands, 52 ohm RG-8U.

Only **\$99<sup>75</sup>** \$10.00 Down  
\$8.00 Per Mo.

### WRL's 5 ELEMENT TRI-BAND



#### THE HAM'S CHAMPION BEAM

Here's the absolute best. Heavy duty construction with new type mast/boom clamp and 2x3" rectangular aluminum boom. Spacing, .1 all reflectors and directors. Single transmission line.

Only **\$349<sup>50</sup>** \$34.95 Down  
\$19.50 Per Mo.

*Makes  
Stacking Beams  
Obsolete!*

Additional Director Element for the 3-Element Spanner Allows Increased Gain in F/B Ratio On 10 Meters: **Only \$19<sup>95</sup>**

Amateur Band	Model Number	Description	Gain in DB Over Dipole	F/B Ratio in DB	Horizontal Beam Width	Boom Length	Boom Diameter	Element Diameter	Element Wall	Element Alloy	Max. Mast Diameter	Longest Element	Approx. Net Wt.
10, 15, 20 METER BANDS (Triple Globe Spanners)	152T-2	2 Elem.	5.8 Av.	14 Av.	68°	96"	1 1/2"	1 1/8, 1, 3/8, 3/4"	.058 .049 .035	6061STG Ant. 41	1 1/2"	29'	36#
	152T-3	3 Elem.	8 Av.	20 Av.	59°	216"	1 1/2"	"	"	"	1 1/2"	30.7	58#
	152T-5	5 Elem.	12 Av.	22 Av.	54°	36 ft.	2 x 3 Rect.	1 1/4, 1 1/8, 1 3/8, 3/4"	"	"	2"	30.7	96#

Send for Complete Brochure on the Full Line of Globe Spanners!

## WORLD RADIO LABORATORIES

"The World's Largest Distributor of Amateur Radio Equipment!"

3415 W. BROADWAY

PHONE 2-0277

COUNCIL BLUFFS, IOWA

# Free BROCHURE

## Also Time Payment Plan

Mail this for full information

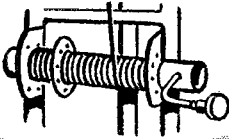
NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

QST-2

### TELESCOPES CRANK DOWN TO ADJUST



#### 3 SIZES — 30 - 40 - 50 FT.

The answer to your prayer—crank it up or down. Used by hundreds of hams—testimonials available. Lower it for storms.

Install it yourself. **SPRING LOADED RACHET WINCH** can be padlocked. Good looking, husky, yet light.  $\frac{3}{4}$  in. aircraft type tubular steel. Hoist cable tested for 920 lbs.

50 ft.—\$96.50 (100 lbs.) **F.O.B.**  
40 ft.—\$73.95 ( 80 lbs.) **St. Petersburg**  
30 ft.—\$59.75 ( 60 lbs.)

Also 40 ft. layover available.  
All packed in strong shipping carton.

**PIPE BASE** eliminates concrete

**EAVE BRACKET** simplifies installation

**HINGED BASE** Easy to service

10 ft. sections build up to 80 ft. Easy to install with simple lock joint. Strong aircraft type tubular steel—light weight.

20 ft. Towers (35 lbs.)—\$34.25  
10 ft. Towers (20 lbs.)—\$16.00

**Tele-Vue TOWERS, inc.**

701-707 49th St. So., • St. Petersburg, Fla.

Prices subject to change without notice

106, BVL 97, MHS 94, VPO 85, RTW 68, UXT 54, CKQ 53, WYJ 39, EBE 37, IIR 24, ECE 22, EEE 22, KA 18, YKC 17, KBACK 11, AWC 9, K5DKT/Ø 7, WØZQV 6, BUL 5, KØDEX 5, WØGEB 5, GEP 4, JHY 4, OIV 4, OVV 2, WAP 2. (Oct.) WØRTW 66, LQC 63, BVL 58, WFF 37, ECE 19.

**NEBRASKA**—SCM, Floyd B. Campbell, WØCBH—SEC: JJJ, PAM: MAO. OUP has a new s.s.b. rig and PNV will have one by the time this is published. FLF is now at the Martin Plant in Denver. VYX has completed his new skating rink and should be back on the air soon. FTR has his windmill tower up, thanks to some of the Lincoln fellows. The morning session of the Nebraska Emergency Phone Net reports: QNIs 474, average 15.8, QTCs 50, average 1.7, time in minutes 502, average 16.7. The Noon Net had: QNIs 694, average 23.1 QTCs 82, average 2.7, time in minutes 740, average 24.7. AEM is back on the net. The NSS had: QNIs 195, average 6.5, QTCs 42, average 1.4, time 1250, average 41.9. KØBMQ is a new NSS member. The Western Nebraska Net reports: QNIs 365, QTCs 19. The Nebraska Emergency Phone Net will continue to operate mornings but will have a different manager from the Noon Net. The North Platte Club is the owner of a 3-kw. Kohler plant. It's d.c. but will make for good lighting. Better check your appointments and get them in for renewal. WTPKX, ex-WØZAI, passed away at Sheridan, Wyo. We remember how Wally could work ZLs and VKs right under our noses and we couldn't even hear them. Traffic: WØDDT 184, MAO 160, ZJF 126, ZOU 61, SPK 54, KØDGW 48, WØEGQ 43, KDW 43, ZWG 36, UJK 34, NIK 31, VGH 27, KØBRS 23, WØDQN 23, KØCDG 16, WØBOQ 15, KØBRQ 12, WØWFF 12, KØDFO 11, ELQ 11, WØBTG 10, PDJ 10, DDP 9, KLB 8, OOX 8, DQP 8, ERM 6, IZW 6, OCU 5, ORW 5, AEM 4, NHT 4, QKR 3, KØFBD 2, WØNHS 2, TFZ 2, URC 2, KXK/Ø 1, ORN 1.

### NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Milton E. Chaffee, W1EFW—SEC: EOR, RM: KYQ, PAM: YBH. Traffic nets: MCN, Mon.-Fri. 0645 to 3640 kc.; CPN, Mon.-Sat. 1800 and Sun. 1000 on 3880 kc. Note the new schedule of CN: Mon.-Sat. 1845 and 2200 on 3640 kc. It is hoped that there will be enough traffic and personnel to maintain the late session of CN, thus fulfilling our NTS requirement. Members of the CN met at AW Dec. 1st, talked over net conditions and agreed to try to encourage more c.w. operators to join CN. 1RN 1930 and 2180 schedules are to be met regularly by CN. The Middlesex ARS is planning on a new club house. The Hamden ARC continues active and plans to add JEQ Conelrad system to several members' stations. WHL has an 829B on 6 meters. EGX is mobile on 10 meters and plans high power at the home location. AOS is very busy and has little time for radio. BYB sent the only OO report and FVV offers the only OES report. EJH laments the fact that plans don't always work out but that there still is good activity in Fairfield County AREC. He resolves to submit EC reports to EOR regularly in 1957. How many other ECs will do the same? DHP reports a regular OBS schedule and that the U. of C. station, LXV, again is active. AJN has been reactivated at Willimantic High School. AVS will be back in swing after a heavy P.O. schedule. BPL for November was made by YBH (the hard way) and AW (originations plus deliveries). BDI succeeded in getting his beam up and continues his TCC schedules. HYF has moved but still is in Ridgefield. The CPN held 30 sessions passing 246 messages, according to YBH, our PAM, and notes high QNI by DHP, VQH (30), TVU (29) and YBH (28). KYQ reports the CN met 20 times, handling 279 for 10.9 per session, and the most consistent CN members were KYQ (23), RFJ (20) and AVS (18). Appointments were issued FOR as OES and EBW as OPS. Renewals: RFJ, TYQ, RRE, JTD and HUM as OPS; RFJ as OES; GVJ as OPS; EJH, PRT, ODW, EGX and ZYT as EC. Thanks for your many fine notes and messages on my election and please let me know how your Director can help. An SCM election announcement is coming up so get set on your choice of candidate. Traffic: (Nov.) W1YBH 527, KYQ 301, AW 231, EFW 203, DHP 90, AVS 88, TYQ 86, NJM 79, CUH 75, HDI 72, ULY 62, LV 47, YNC 41, IUC 39, RRE 33, FHP 30, RGB 30, VY 30, RFJ 20, FYF 19, BYB 17, EBW 16, HYF 16, MDB 4, EJH 2. (Oct.) WINJAI 564.

**MAINE**—SCM, Allan D. Duntley, WIBPI/VYA—SEC: TVB, PAM: FNT, RM: EFR, OOS: WRZ and CHU. It is with regret we note the passing of our good friend BAD. The Sea Gull Net and others contributed toward a beautiful floral piece and UZR and IUV represented the group at the service. Our sincere thanks to IUV for handling so well the details of the flowers and the personal visit to the widow. At times like this the

(Continued on page 104)



# GONSET

originator of "Communicator," the high performance VHF station "package."

introduces a

completely new

Communicator for

Civil Defense

applications on

fixed frequencies

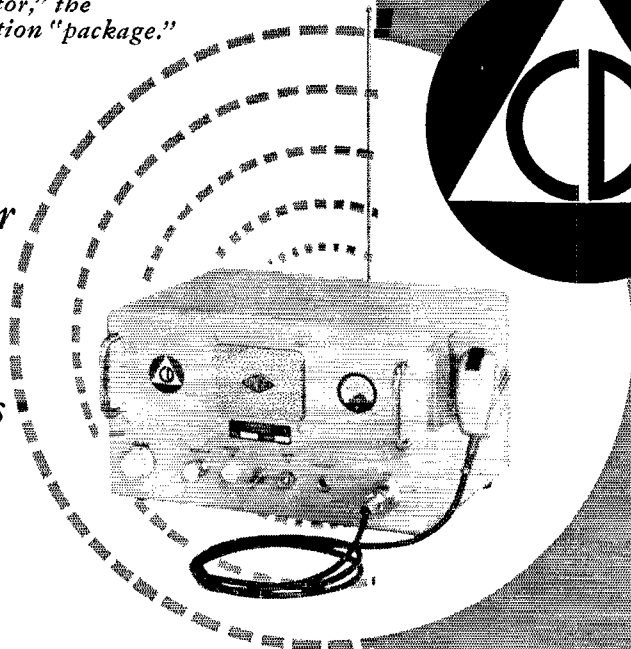
from

25

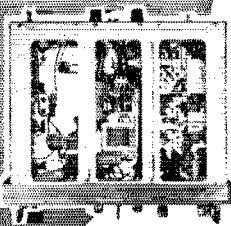
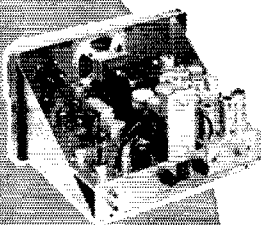
to

250

MEGACYCLES



Built-in power supply  
for 12 volt DC and  
115 volt AC.



Now... wholly outstanding with highest utility, the new GONSET fixed-frequency Communicator. Here the desirable, small size, lightweight, ready-to-operate "package" theme prevails. Standard models... soon available... include those for C-D operation within the amateur 1 1/4, 2 and 6 meter ranges. The manufacturer certifies this equipment will meet applicable F.C.D.A. specifications in fixed and mobile A-M receivers and transmitters above 25 megacycles.

Dimensions: 8" high, 13" wide, 10" deep. Weight: 22 pounds. Finished in bright yellow with C-D symbol in red and dark blue.

Receiver is crystal controlled, utilizes double conversion, provides 100 kc channel spacing above 200 mcs., proportionately less on lower frequencies. Excellent noise figure. Spurious responses down better than 60 db. Has noise limiter, panel-adjustable squelch.

Transmitter is crystal controlled. Final amplifier utilizes Type 6360 tube in push-pull, plate modulated by two 6CM6s. Integral speech clipping prevents modulation in excess of 100%. Power output is from 7 to 10 watts. Press-to-talk operation and 2-way built-in power supply are other desirable features.

**GONSET**

DIVISION OF L.A. YOUNG SPRING & WIRE CORPORATION

Actual Size CF-500

# EIMAC FINGER STOCK

... for sliding contacts and  
electrical weather stripping

Actual Size CF-400

Eimac preformed finger stock is the inexpensive, efficient answer to many circuit and equipment design problems... Used for efficient electrical contact in high-frequency tuning devices, in coaxial tube sockets, for electronic weather stripping around access doors in equipment, and for dozens of other purposes, resilient silver-plated EIMAC finger-stock is outstanding.

EIMAC finger stock is accurately heat-treated to maintain uniform mechanical properties, can be fitted around a 1/2-inch radius, and may be fastened by screws, rivets, clamps or soft soldering.

A size for every need —

Single Edge	Width	Double Edge	Width	Klystron Types
CF-100	1 1/32	CF-200	1 3/16	CF-700
CF-300	3 1/32	CF-400	1 17/32	CF-800
CF-500	1 1/2	CF-600	2 1/4	

For further information  
write our Application  
Engineering Department.

**EITEL-McCULLOUGH, INC.**  
SAN BRUNO CALIFORNIA  
The World's Largest Manufacturer of Transmitting Tubes

hams show their true colors. As erroneously reported a month or so back, WNIIZS has not lost his "N." TWR is the boy issuing the "15 on 15" certificates. Sorry about the error. Wes. EUK has a new rotary beam on 15 meters. HAG, our little gal who met with the accident, still is at home but is recovering satisfactorily. We understand her brother, KN1ABX, age 9, is the youngest ham in Maine. Her 11-year-old sister is waiting for her Novice ticket. Our hats off to UDD for keeping the Burn Yard Net going these many years. The net celebrated its third birthday with appropriate ceremonies Dec. 9th. KVT, the PAWA club station, is heard every Tue. on u.h.f. ZME has a "unique way" of making BPL. Sorry that WNIWGC let her ticket expire. SRW now has "two" crystals on 10 meters. SWG has walked down the center aisle. JTB, "a mile high in the sky," is looking for contacts on 10,000 Mc. We miss TBZ on the Sea Gull Net. Sure be glad when May 10th comes—won't you? Traffic: WILKP 231, CEV 153, FNT 45, DTK 38, FZK 31, UDD 28, BX 22, HZZ 13, JIS 12, FQM 11, BDP 9, GYJ 5, HTD 5, JNM 5, K2KVP/15, WIFLY 4.

**EASTERN MASSACHUSETTS—SCM,** Frank L. Baker, jr., W1ALP—New appointments: FIQ, Bedford, as EC. WJW as OO. Appointments endorsed: IO Danvers, IBE Rockport, SMV Cohasset, MCR Boston, WLU Watertown, as ECs. GDY, IH, BHD and TWG as OBSS. EPE as ORS. BHD as OES. TWG as OO. Heard on 75 meters: HNK, WTY, ZRF, ESI, COX, EFE, CMU, KBS, JNO, OT, JOM, AOZ, HBQ, WHC, DAZ, MWM, NNS, OCR and K4ASV/1. RMF and KNI are on 6 meters. Heard on 2 meters: OOB, DFZ, MDD, ELV, QT, NQQ, LDT, LUW, APV, NVQ, TTY and KNI. ACA and AGH. ALP and DWY attended a meeting at BB's QTH with the Winthrop group. KN1AFD is KZW's boy. 2KH and ex-IBYY attended a meeting in Boston. Canton has its RACES license. FZJ is Radio Officer for Medfield and BEI is his alternate. HSN is R.O. for Stoughton and IPE is alternate. A meeting was held at Sector I-B Headquarters with the following present: SMV, FQA, LOS, WFG, ALP, DXQ, YYZ, ACB, MMQ, SH, UXN, GNK, TBX, NBS, MOI, IPE, LLB, HNS, EPW, GLP, MME, TZ, FWS, ADAI, REP, HSN and NBT. ONV made DXCC. NEM has a new car. SXD has a new TBS. EK is working on his house. MJA is studying. LNU is rebuilding. DWO and TUD are mobile on 10-75 meters. ETH, on all bands, has a new two-element 15-meter beam. CHA/MRQ is on 2 meters at home and at Portland, Me. RP gets on the QCWA Net on 75 meters. BPA made WAS and WASM. New officers of the Framingham Radio Club are QVK, pres.; AJH, vice-pres.; KCC, secy.; ZWJ, treas.; HJP, act. mgr. MEG built a 6-meter c.c.c. JNY is busy with OO duties and DX. GDJ has been on the 80-meter c.w. Novice band, helping those with harmonics on 7400-7500 kc. BPW is DXing. SS spoke on old-time equipment at the Rochester ARA in New York. Area 1 Radio Comm. held a meeting with CQ, KTG, QQL, ZYX, TQP and ALP attending. AYG is on 75-10 s.s.b. and mobile on 10 meters. WNIOSH is new in Hingham. XZG is on 10-meter mobile. VM has an SX-100. NF, one of our OOs, says he hears a lot of key clicks and unfiltered sigs. AQE, DXing on 10-15, is on 2 and 6 meters. UKO has a two-element beam for 15 meters and is working DX. GDY has a Morrow CM1 for Conelrad. IBE is helping out with IGY and the Dept. of Interior for QLT. KCQ got WAS in the SS Contest. EMG is working odd hours for a Boston paper. AAR is on 2, 10 and 75 meters. LMI sends his 73 to the gang. AKN is doing some hunting. TZ, ex-ICLF, has a new Temco GA750 transmitter on 75 meters. ABI has a Viking Ranger. NUP is working at WCC in Chatham. WNIHC is in college in Milwaukee. MEG is mobile on 80 meters. QVK had a daughter. HJP has a new QTH. The Framingham 2-meter Net is active again on 145.35 Mc. SON was WAS on 20-meter c.w. KCC and KSX have a new son. IH has a new tower and beam on 10 and 15 meters. New officers of the Greater Boston ARS are EAE, chairman; TEO, treas.; EPL, secy. WNK is on 80-10 meters. WNIWK was mobile on Mt. Wachusett in the SS. The Braintree Radio Club held an auction. AUBF/1 took part in the P.M.T. JRH, secy. of the Scituate High School ARC, ISS, reports that the club has some new equipment for the station on 80 meters and a Gonset for e.d. work from the town. TWG is waiting for a card from Japan for WAC. The South Shore Club had a meeting and a talk and demonstration by ZQM on RTTY. WNIWIDY is helping AVY with OO work. The T-9 Radio Club held a meeting at CVM's QTH. The El-Ray Club elected LNX, pres.; RND, vice-pres.; WYX, secy.; UJQ, treas.; VIA, act. mgr.; DDF, chief engr. TON moved to California. FZJ has given several talks on "Moon-Bounce." MHC has a new 6-meter rig. The Framingham Club had a Halloween Party at SQY's. Area 1 Radio Comm. held a meeting

(Continued on page 108)

one  
name  
stands  
out

# ELDICO

For Peak Performance

## New SSB-100F

Exciter/Transmitter  
Featuring —

Crystal Lattice Filter

Frequency Range:

80 meter band	3,500 to 4,000Kc
40 meter band	7,000 to 7,500Kc
20 meter band	14,000 to 14,500Kc
15 meter band	21,000 to 21,500Kc
11 meter band	26,900 to 27,400Kc
10 meter band	28,000 to 30,000Kc



### Specifications

**TUBE LINEUP:** 22 tubes, including two rectifiers, one voltage regulator, one oscilloscope and one 5894 power amplifier.

**TYPE OF EMISSION:** CW - AM - LSB - HSB

**POWER RATINGS:** DC average input SSB-100 watts; AM input (two tone test) - 60 watts. Peak envelope power input SSB-144 watts. Peak envelope power output SSB-100 watts.

**AUDIO CHARACTERISTICS:** Response:  $\pm 3$  db from 400 to 3300 cycles. Noise and hum: 50 db or more below PEP level.

**AUDIO INPUT:** .05 volts for rated power output (any high impedance crystal or dynamic microphone).

**HARMONICS AND SPURIOUS RESPONSES:** Spurious mixer products — 40 db or more down. Third order distortion products — 35 db or more down. TV interference suppression — 40 db or more second harmonic, 60 db or more higher harmonics.

**UNWANTED SIDEBAND AND CARRIER SUPPRESSION:** 50 db or more down, THROUGH LOW FREQUENCY CRYSTAL — LATTICE FILTER.

**FREQUENCY STABILITY:** Control Oscillator — (800 to 1300 kc) —  $\pm 100$  cycles after two minute warm up period. Output frequency — within 300 cycles after five minute warm up period. Dial accuracy —  $\pm 2$  kc after calibration.

**CABINET:** Receiver type table model with hinged cover.

**FINISH:** Flat gray.

**SIZE:** 17 1/4" long by 10 3/4" high by 15" deep.  
**WEIGHT:** 58 lbs. **SHIPPING WEIGHT:** 65 lbs.

Write for Free Illustrated Literature on SSB Equipment



DELIVERY AT YOUR LOCAL DISTRIBUTOR IN MARCH

# ELDICO Electronics

A division of Dynamics Corporation of America

72 East Second Street, Mineola, L. I., N. Y., Pioneer 6-5212

New!

New!

# MORROW

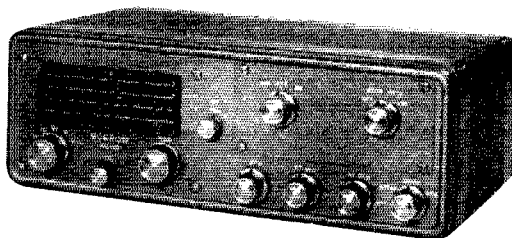
PRESENTS  
THE

## FALCON RECEIVER

FIXED, PORTABLE, MOBILE

Exactly matches our MB-560-A transmitter in size; interchangeable with MBR-5's cables and power supply.

YOU CAN HEAR THEM WITH THE FALCON!



Amateur net \$169.00

Less power supply, speaker and BCT\*

**SELECTIVE BANDPASS:** Narrow 2.8 KC, Broad 9.2 KC at 6DB down.

**SENSITIVITY:** 1 microvolt with 14DB signal to noise ratio on 10 meters.

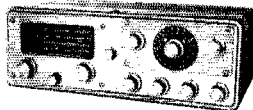
**DUAL CONVERSION** superhetrodyne receiver eliminates images.

Tunes amateur bands 75, 40, 20, 15, 10 meters.

Provision for Broadcast accessory tuner.

Size: 4" high, 11 3/4" long; 7 1/8" deep.

Weight: 6 1/2 lbs.



\*Conelrad Monitor and Broadcast tuner accessory (BCT) has its own dial — no retuning required when switching from an amateur frequency to broadcast and back again. BCT amateur net, \$19.95. FALCON with BCT installed, \$189.00 amateur net (less power supply and speaker).

SEE YOUR JOBBER

Prices Subject to Change Without Notice



# MORROW

radio manufacturing co.  
2794 Market St. Salem, Ore.

with QQL, ZYX, TXZ and ALP present. MEG heard three W7s in Seattle on 50 Mc. ALP has a new beam for 10 meters. AHE has a 6-meter Gonset but will have an 829B later. BHD says Everett has nine 2-meter Gonsets. WNIKCR is going after the Tech. Class license. QGN also was at a meeting at BB's QTH. Glad to hear that both DJ and OIR are better. Art is on 6 meters from a rest home. BB is getting ready for 160-meter DX again. ALP wants to thank all those who helped to elect him as New England Division Vice-Director. KBMI got married. WN1J1 and KN1A1Q are on 2 meters. Traffic: (Nov.) W1EPE 297, 1BE 152, EMG 138, GNX 104, EAE 87, AVY 61, TZ 39, AUQ 33, K2AWA 30, WITY 25, UKO 24, UE 12, BY 11, ATX 7, AAR 5, ABJ 5, AKN 4, CZW 4, GDY 4, RCQ 3, LMI 2, NUP 2. (Oct.) WIBGW 10, WU 10, AQE 9, K2AWA 4, WIBB 4.

**WESTERN MASSACHUSETTS**—SCM, Osborne R. McKeaghan, W1HRV—SEC: RRR, RM; BVR: PAM: MNG. The WMCW Net meets on 3560 kc, Mon, through Sat, at 1900 and 2200 EST. The C.W. Net is going along good with several new members doing a fine job, but how about these phone operators making BPL so often? What can you c.w. men do about that? That is a challenge, men. LDE and DLS made BPL the third month in a row for LDE, who is now due for a HPL medalion. MNG is our new PAM. How about a WM phone net, fellows? Certificates endorsed were OO, OPS, ORS, OES and OBS for MNG; OPS, ORS and OO for JYH. Your SCM enjoyed a visit with the Pequoig Amateur Radio Klub in Athol Nov. 13th. It is a growing club with much interest in c.d. and AREC work. The members have plans for code and theory classes to be held in the Athol High School to start soon. The Montachussets Club in Fitchburg held an auction of radio gear at the November meeting. The HCRA held its annual Christmas party Dec. 7th with a fine turnout and an enjoyable program. SPF has been appointed Radio Officer for the town of Oxford. DZV has worked Nevada and Africa to complete WAS and WAC with 60 watts. PZY has a new 15-meter beam. AGM is testing a new vertical antenna. VNH and RFU are working many FB DX stations on 6 meters during P2 openings. BXB has a sixteen-element beam up and ready to go on 220 Mc. as soon as he gets the rig finished. He also has a new Viking Pacemaker for the lower frequencies. JJO has a new 6-meter beam and a DX-100. WNI's JMG and JQT are now General Class operators. New Novices are AEH in Adams, AJI in Easthampton and ADS in Pittsfield. AZW has received a QSL card from KTTW for his 100th country confirmed. FGV is working 50-Mc. DX with a halo antenna on his mobile rig. We hear that EOB had an SS score way up in six figures. Traffic: WILDE 754, DLS 242, UKR 202, BVR 132, ZUU 79, FAY 35, IIRV 44, DYO 43, DWV 34, KGG 23, PZY 21, MING 18, DZV 16, DGL 8, AGM 4, JYH 3.

**NEW HAMPSHIRE**—SCM, John A. Knapp, W1AJJ—SEC: BXU, RMs: CRW and COC. PAM: CDX. The Nashua Two-Meter Phone Net meets every night at 1900 on 145.26 Mc. All are welcome. The NEEN holds forth Sun, at 1300 on 3850 kc. The Granite State Phone Net is doing a fine job through early evening QRM. Meeting times are Mon. through Fri. at 1800 on 3842 kc. Don't forget the New Hampshire QSO Party dates: Mar. 16th at 1800 to Mar. 17th at 1800. Congrats to new OPS appointees JB, CNX and IIQ; also to KVG, who passed his General Class exam at the Concord Hamfest. The Concord High School Radio Club, NBD (CVB, trustee), operates regularly on Tue. evenings, c.w. and phone. SEC BXU advises that five of the ten counties now are operating from state-controlled RACES stations. BYS, formerly of Keene, has moved to Concord. Edison Award Citation holder COC answered a QRRR from 48KC and expedited aid via the State Police to an accidental gunshot victim on Tamiami Trail, 35 miles west of Miami. A hearty welcome to Novices WN1MOP, NNL, NNML, NNO, KOE, KOL, NYT, NZZ, OAP, OIE and KN1AAT. Traffic: (Nov.) W1CWR 74, WUW 52, EVN 10, FZ 8, WBM 4. (Oct.) W1HOU 165, DYE 31, WBM 28.

**RHODE ISLAND**—SCM, Mrs. June R. Burkett, W1VXC—SEC: TQW, RM; BTY, PAM; YNE. New appointments: TGD, CPC and YKQ as ECs; CMH as ORS; YNE as OPS and OO; and FIG and UHE as OESs. Appointments endorsed: ISE and LUO as ECs; KCS as OES, and CPV and ZXA as ORSS. The BCRA now has a TVI committee consisting of KPAM, IJM, VEM and NCD. KCS is NCS of the Southern New England Net, which meets Wed. at 2000 on 50.7 Mc. with WED, WTR, VWR, UHE, ZPC, FIG and ZOK also in the net representing Rhode Island. FIG is building a 120-watt rig for 6 meters. Results of recent club elections follow. NARRO: LWA, pres.; ICI, vice-pres.; HCG, secy.; and CDV, treas. BVARC: WMW, pres.; YRC, vice-pres.; Ray Giguere, secy.; KDU, treas.; YMW, act.

(Continued on page 108)

**NOW! FOR THE FIRST TIME!**

FAMOUS

**telrex**

**56-SERIES  
COMMERCIAL-  
GRADE ARRAYS**

**-at  
amateur  
prices!**

**HIGHEST  
SIGNAL-TO-NOISE,  
SIGNAL-TO-  
INTERFERENCE  
RATIO EVER!**

- Gusset plate mounting
- Hair-pin resonated
- Wind drag reduced 55%
- Rugged, lightweight aluminum construction
- All stainless steel hardware

**ASK THE AMATEUR  
WHO OWNS ONE!**

Whether you are limited for space or money, or whether money is no problem, Telrex has the best suitable array for you. Every Telrex array is fully integrated mechanically and electrically to provide outstanding performance per element. The unsurpassed superiority of Telrex arrays is why the most outstanding radio amateurs, including the world's champion DX'er, use Telrex.

In service in all 48 states, on every continent and 78 foreign countries! Call or write for new illustrated bulletins



**telrex LABS.  
TV & COMMUNICATION  
ANTENNAS**

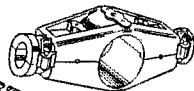
**ORIGINATORS AND MANUFACTURERS OF THE WORLD'S FINEST TV AND COMMUNICATION ANTENNAS**

**EXCLUSIVE  
TELREX TAPER  
SWAGED ELEMENTS**



**MINIMUM WIND DRAG  
AND NOISE**

**SPECIAL MOLDED  
CYCOLAC INSULATORS**



**LUG CONNECTORS AT DIPOLE,  
NO CONNECTOR  
TROUBLES, MUCH HIGHER POWER CAPACITY**

Replete with features never before available! All elements are insulated from the boom by a sturdy molded phenolic element support. Each element is taper-swaged and hair-pin resonated. Every model equipped with the famous Telrex balun match for balanced pattern and minimum TVI. All models are precision tuned and matched, then calibrated for easy assembly and duplication of our laboratory specifications at your site. No experimenting required!

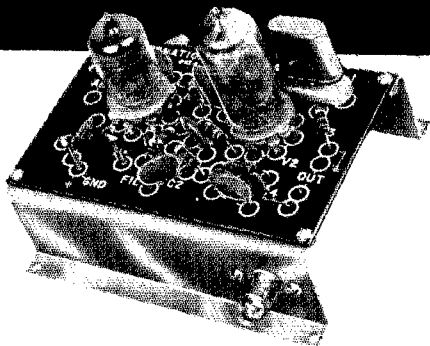
Arrays come fully equipped with an extra heavy-duty gusset-plate mounting for easy attachment to a 2-inch OD support mast. No masting holes are required. The reduced wind drag and gusset-plate mounting make multi-band "christmas tree" installations (best, for outstanding, clean cut patterns on more than one band) much more practical and less costly!

The variety of models available in this series enable the amateur to dominate one or more bands from 3/4 meters through 80 meters. In fact, Telrex "Big Bertha" rotating masts can be equipped with arrays with gains exceeding many commercial service installations.

**ASBURY PARK 44  
NEW JERSEY, U.S.A.**

Telephone: PProspect 5-7252

# PRINTED CIRCUIT 6 METER CONVERTER



## Compact, Broad Band Crystal Controlled

● No alignment necessary . . . Simple to assemble . . . with snap-on connectors for power leads! Output IF frequency can be changed by merely changing the crystal (crystal range of 40 MC to 50 MC).

### Specifications

<b>Freq. Range</b>	50-54 MC (51 MC design center)
<b>Sensitivity</b>	1 microvolt or better
<b>Output IF*</b>	(1) 600 KC to 1500 KC (2) 7 MC to 11 MC
<b>Crystal Freq.</b>	49.4 MC or 43 MC depending on IF desired (Oscillator range 40 MC to 50 MC).
<b>Plate Power</b>	150 volts to 250 volts DC @ 15 ma to 20 ma
<b>Heater Power</b>	6.3 volts @ 600 ma
<b>Tubes</b>	6AK5 RF Amplifier 6J6 Mixer Oscillator
<b>Size</b>	(overall) 4" x 3 1/2" x 3 1/2"
<b>Weight</b>	3 ounces

**KIT** (with crystal less tubes).....\$10.95

**COMPLETE,** wired and tested with tubes and crystal.....\$15.95

\*Specify IF when ordering

### HOW TO ORDER

For fastest possible service, crystals, oscillators and converters are sold direct. When cash accompanies order, International prepays postage. Otherwise, shipment made C.O.D.

## International CRYSTAL Mfg. Co., Inc.

18 N. LEE PHONE FO 5-1165  
OKLAHOMA CITY, OKLA.

mgr., and IBM, corr. secy. The BVARC Net meets Mon. at 1900 on 29 Mc. SBP, TQW and ZXA participated in the SS. The Newport County Emergency Net meets Sun. at 1000 on 29.53 Mc. YNE, manager of the R. I. Novice Net at 1830 on 3743 kc. Mon. to Fri., reports that N1JJW, N1KDS, N1JNT and N1JGG check in regularly. NARRO sponsors code and theory classes every Fri. under the direction of LWA, YLH and IXB. Traffic: W1BTY 82, YKQ 69, YNE 66, VXC 50, QR 34, WN1JJW 25, W1CCN 23, TGD 22, SBP 21, ZXA 14, ZDS 12, HLY 11, FIG 10, JFF 8, DZI 4, YRC 4.

**VERMONT**—SCM, Mrs. Ann L. Chandler, W1OAK—SEO is back on VTPN (Sun. 9 A.M. on 3860 kc.) and reports an average of 17 stations per net session for November. GAIN (Mon.-Sat. 12 noon on 3860 kc.) and VTN (Mon.-Sat. at 6:30 P.M. on 3520 kc.) had splendid activity. New RACES District RO for Newport is ZNM with IT as alternate. New alternates in Bennington and Windsor are Glenn Morrissey and RPK, respectively. The Fourth Annual Great American Mountain Valley Auto Endurance Run traveled the back roads and mountain passes Nov. 23rd with the BARC crew in action on 10 meters, with net control NPW on Mt. Mansfield with NLO as operator. Assisting at check points were WTO, WPK, QNM/M, KJG, BRG/M, HRG, ZWB/M and OJO. Difficulty in contacting net control hence traffic for wreckers to pull sports cars out of 16 inches of snow in Lincoln-Warren Gap was relayed via ØDJD and KØAPS in Iowa. New officers of the Mike and Key Club are BNV, pres.; EIC, vice-pres.; Fred Muller, secy.; George Harvey, treas., and EIB, act. mgr. TLP/MIM is operating aboard a merchant marine ship on 15 meters looking for Vermont contacts. SCE has a new Tri-Bander beam on 28 Mc. RWP built a switching mechanism for the new Vee beam array, 7 Vees radiating from an 80-foot pole, switchable from the operating position. WN1LPP is a radio and radar operator in the air force at Limestone, Maine. WN1NOB is a freshman at Bethany College, W. Va. UFI is busy with duties at St. Monica's Rectory in Barre. ETV has a new 15-meter beam. HFS skeds daily on 40 meters and completed a 150-watt rig. UFI and SDG are regulars on the New England Weather Net. N1O, EOY and SEO reerected a c.d. antenna at the district center in Burlington. EKV smiles over working VP8BP on Antarctic continent. Vern's son, HCG, received his Conditional Class license. SEO sports a new rotator for the 21-Mc. beam. WN1KCI is operating a brand-new Viking Adventurer transmitter. EPT is chief engineer at WDOT. An interesting feature at EIC's is an automobile starter switch used to turn the VFO on without turning on the rig. New General Class licensees are FME and MLL. New Novices are MKG and MOT. Your SCM is starting an all-Vermont amateur (Novices included) scrapbook. Kindly send me news items, newspaper clippings and photos of yourselves. Traffic: W1OAK 62, AVP 45, BNV 23, KRV 20, ELJ 14, ZNM 10, KJG 9.

### NORTHWESTERN DIVISION

**ALASKA**—SCM, Dave A. Fulton, KL7AGU—TI is busy setting up at the new QTH, Yakataga. Jim hopes to have his kw. c.w. rig on soon and will be using a 40-ft. tower with a three-element beam on the top of it and a 50-watt phone rig for 75 meters. In moving TI had to give up the QSL Bureau, among many other odd jobs that he has held for some time around Juneau. The new QSL Manager will be CP. The new address of the KL7 QSL Bureau will be 310 Tenth Ave., Anchorage, Alaska. Pappy asked that those sending in postage send in the three-cent stamp (dog-team variety) and that the envelopes be of the 5X7 type to accommodate the larger type QSL cards. VI, AOS and RUI have all transferred Stateside. BPY and his XYL, BVV, are Stateside going to school. They will return shortly and should be heard on the air from the Fairbanks Area.

**IDAHO**—SCM, Rev. Francis A. Peterson, WTRKI—All Idaho amateurs are gathering forces to get the amateur license plate bill passed. Personal contacts with the legislators in each county are necessary. Contact RKI or OA for information. RKI, your SCM, gave a pep talk at Boise with suggestions and plans for Idaho hams. C.d. drills at Pocatello were very successful. ZLO moved to Moreland. KHM is in the hospital with a heart attack. IY had 86 contacts in the Sweepstakes. OXL moved to Riggins. YBV to Washington. TTZ to Fiji Islands. GMT, PKA and EF report successful new antennas. EMT rewound the plate transformer and is back on the air. IWU is working 10, 15 and 20 meters now. Volunteers are needed as OO, OBS and code practice stations to give better Idaho coverage. YBA has a new baby boy. There are new hams all over, especially in Boise, Pocatello and Lewiston. EYR has a new beam and made W1AC and W1AS. Traffic: W7GMC 175, EMT 28, VQC 28.

**MONTANA**—SCM, Vernon L. Phillips, W7NPV/WXI  
(Continued on page 110)

If it's worth  
engineers'  
time...



Mil. Spec.

**Belden**  
ELECTRONIC  
WIRE

The complete packaged line  
—easy to use. Be sure of  
the right wire engineered  
for the job.

There are 1001 Belden  
wires for every Radio and  
Electronic requirement.

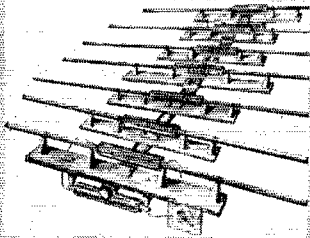
...it's worth  
engineered  
electronic wire

**Belden**  
WIREMAKER FOR INDUSTRY  
SINCE 1902  
CHICAGO

6-8

Magnet Wire • Lead and Fixture Wire • Power Supply Cords, Cord Sets and Portable Cord • Aircraft Wires • Welding Cable • Electrical Household Cords • Electronic Wires • Automotive Wire and Cable

# the MOSLEY "73"



## 3-Band Rotary Beam for 10-15-20

*offers these  
PLUS Features*

- ✦ Single 52 ohm line OR separate feed for Positive Harmonic Suppression!
- ✦ Separate radiator element for each band means better impedance match!
- ✦ Temperature and Weather Stabilized Construction to maintain performance over wide environmental extremes. No loose bolts to detune. Heavy duty, air dielectric condensers!
- ✦ Inductive coupling assures maximum energy transfer at any reasonable SWR over necessary band width!
- ✦ Built for the average Ham Budget. Not an expensive so-called "commercial grade" beam...not a flimsy "bargain" Beam!

Model VPA-73, less mast, rotor and coax line, .....Ham Net.\$151.20

Model VPA-73C, with coupling yoke for single line feed. Ham Net.\$178.38

### Attention MOSLEY Beam Owners:

*If you presently own a Model VPA20-3, VPA1020 or VPA1520 you can convert to the VPA-73! Write for full details and conversion kit prices.*

## Mosley Electronics, Inc.

8622 ST. CHARLES ROCK ROAD  
ST. LOUIS 14, MISSOURI

—SEC: KUH. Hams at Bozeman High School have formed the Key Clicker's Klub. WN7BJT is pres. and WN7GAA is secy. New officers of the Gallatin Amateur Radio Club are QH10, pres.; WYT, vice-pres.; UVK, secy. New officers of the Electric City Radio Club are TSG, pres.; ØOVY, vice-pres.; CAL, secy-treas. Forty hams and XYLs attended the ECRC Dinner Nov. 17th. The ECRC holds hidden transmitter hunts the first Sun. of each month. GCS won a trophy as a three-time winner of hidden transmitter hunts. Clubs newly affiliated with ARRL are the Yellowstone Radio Club and the Flathead Valley Amateur Radio Club. Billings AREC assisted the Red Cross Disaster Committee Nov. 23rd. SMY received an Old-Timer's Club certificate from ARRL. RZY is on RTTY on 80, 40 and 20 meters. DXQ vacationed in Chugwater, Wyo., where he visited his new granddaughter. RDM built Ham-Lim for his speech amplifier. CLD transports new automobiles across the State and is putting a mobile rig in his truck. GFT has RACES control transmitter nearly ready to go. HTB is working out fine with three-element 10-over-20 beams on a 90-foot tower. Traffic: (Nov.) W7TNJ 30, SFK 19, NPV 9, OOG 8, YPN 8, PXR 6, MQI 5, WMT 5, LBK 4, RLN 4, YHS 4, CQC 2, SMY 1. (Oct.) W7MQI 8.

**OREGON**—SCM, Edward F. Conyngham, WTESJ—EUG reports he has a new ATD transmitter on the air. VLL now has a new 2-meter transmitter and receiver on and expects several more in the Medford Area. TSH advised that lots of school work plus building a new portable transmitter has reduced operating to zero. PRA's doctor prescribed lots of rest and suggested that he get on the air and visit a lot more. (Could it be the Doc is working on his Novice ticket?) OMO says he still is looking for the spare time to work over the rig. BLH reports DX on 6 meters, W1, W2, W3, W4, VE1, JA2, JA3, JA8, KH6, CO and TGS. BLH worked 40 and 80 meters during the month in addition to school work, making a traffic total of 13 and checking in to OSN and RN7. TLC again has landed; his new QTH is Box 163, Corvallis. PSJ has his sister in from Cuba so ham activity has been reduced. Traffic: (Nov.) W7APP 652, ENU 166, PRA 41, OMO 34, HDN 23, VIL 10, EUG 7, JCY 2. (Oct.) W7TLC 150, HJU 27, QYS 27.

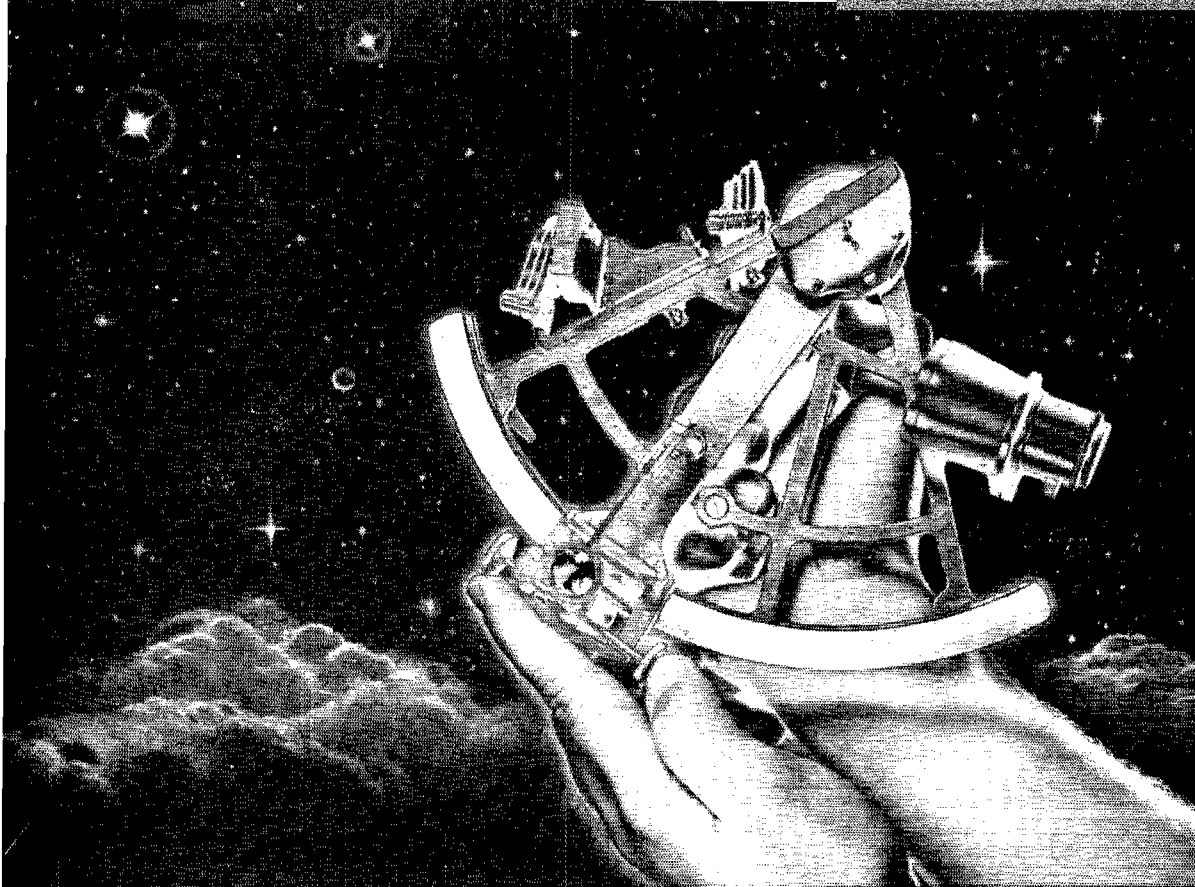
**WASHINGTON**—SCM, Victor S. Gish, W7FIX—News from clubs in the section is in very scant supply. If your area does not have an ACTIVE Emergency Coordinator who is holding an ARRL certificate, please nominate one from your club and notify your SCM so appointment can be made. PGY is monitoring 3920 kc. between 1730 and 1830 daily for traffic. PXA visited RHX and SPA in Salem, Ore., and NLJ in Parkland, Wash. ZCZ is looking for a 40-meter traffic net. ALB is QRL getting started as manager of WSN (3575, 1900 PST Mon.-Fri.). CCY reports WN7s EZP, FLD, PBB, FAV, PAY and FGW are new Novices in Selah. JC is in a new QTH at Edmonds, VAZ was off the air sick, lame and lazy—and the rig was sick too—but he still made BPL. AVM reports Aberdeen C.D. now has four 2-meter Gonsets. WQD is the proud owner of a Model 26 RTTY. AHV makes BPL on originations again. ER is working DX. TH is on temporary duty in Portland. WAH is QRL traffic and trying for WAS. CWN sent in a MARS application. OE is concentrating on "3550" when not on WSN, RCM, SAP and USO are checking ten Gonsets for Clark County C.D. AMC renewed his OPS appointment; he is QRL ham printing. King County C.D. meets each Thurs. and transmits on 145.296, 145.8, 50.4 and 50.36 Mc. and 28,640 and 29,430 kc. BA reports: JNC has five 50-ft. towers for his W3DZZ 10-15-20 beam; JXR has a new four-element 10-meter beam; OZG is going s.s.b. with a kw.; BA changes antennas, transmitters and receivers by flicking a switch. Loyd skids: Ø800 W6IAB and KR6MD, 1715 K17WAH and K17AIR, 1730 KH6AJF, 1800 K17USA, 1830 ØEN, 1900 ØBLR, 1930 UTL. Traffic: (Nov.) W7BA 1240, W7BGY 1019, ERU 568, VAZ 555, K7FEA 514, FBN 478, PÆE 293, WAT 263, W7WAH 207, ØE 119, AHV 114, ER 46, APS 45, ZCZ 37, USO 36, EIH 27, LYB 23, JC 18, JEX 16, CCY 14, WQD 13, BMK 7, FIX 5, CLZ 3, EVW 3. (Oct.) K7WAT 105, W7ER 15.

### PACIFIC DIVISION

**HAWAII**—SCM, Samuel H. Lewbel, KH6AED—Congratulations from all the KH6s are due to the Maui Amateur Radio Club. Under the call KH6RS they beat all other entries in the 1956 Field Day. ØØ station KH6ARL qualified via the Frequency Measurement Test for appointment as a Class I and II Official Observer. This now sets him up to offer help with regard to frequency as well as signal quality. Your SCM asks that you please send in traffic and activity reports regularly. Form the habit of making a monthly report. Traffic: KH6AJF 614, QU 428, BQS 301, KP6AK 124.

(Continued on page 112)





# UNIVAC<sup>®</sup> and your stars

What are you shooting for in the vast universe of opportunity? Remington Rand UNIVAC has a majority of the top men in computer development . . . men who brought into being the basic knowledge in this field . . . who set the standards others follow . . . and who consistently lead in design trends today. These men will share their know-how wisely with you.

## IMMEDIATE OPENINGS FOR:

**FIELD LOCATION ENGINEERS** with a college degree in a scientific or engineering field and experience in electronics. Extensive electronic background may substitute for some college. Many opportunities for rapid advancement.

**FIELD LOCATION TECHNICIANS** with technical school background and preferably some experience in electronics. These positions can lead to full engineering responsibility.



*Send complete resumé to:*

***Remington Rand Univac***

**DIVISION OF SPERRY RAND CORPORATION**

**at any one of these four plant locations**

D. A. BOWDOIN  
Dept. PF-6  
2300 W. Allegheny Ave.  
Philadelphia, Pa.

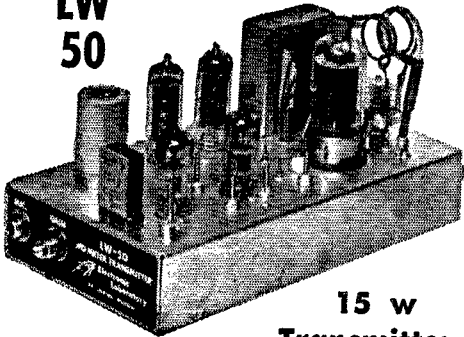
ROBERT MARTIN  
Dept. NF-6  
Wilson Avenue  
South Norwalk, Conn.

J. N. WOODBURY  
Dept. SF-6  
1902 W. Minnehaha Ave.  
St. Paul W4, Minnesota

# V H F

TWO or SIX

LW  
50



15 w  
Transmitter

Crystal controlled  
High gain speech  
Push-pull modulation

**NEW LOW PRICE**

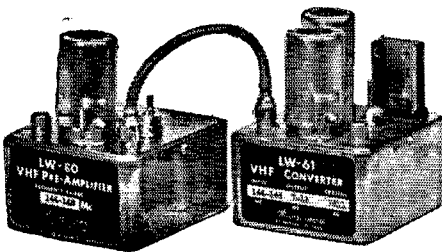
Pre-Assembled Kits **\$29.50**

Complete with tubes and crystal **\$39.50**

Ship. Wgt. 4 lbs.

LW-80

LW-61



Pre-Amp

Converter

**\$12.50**

Wired  
Tested  
Postpaid

**\$18.50**

Send for complete details

**ELECTRONIC  
LABORATORY**

ROUTE 2, JACKSON, MICHIGAN

NEVADA—SCM, Albert R. Chin, W7JLV—Your new SCM wishes to thank all members for their support. I am setting up office and records and hope to see all appointees soon. The Nevada Amateur Radio Assn, meets the second Tue. of each month, in the U. of Nevada E.E. Bldg. at 8 p.m. The hidden transmitter hunt meets at the "Y" north of Reno at 8 p.m. every Fri. Watch for it on 29.072 Mc. QJH, the XYL of CX, has a new YL operator to train, a baby girl, VIU and son YNO are now on the air with a Viking Valiant from Gerlach. ZWZ and FJN were visiting Reno. snow came, and they rushed back to Las Vegas. FJN now is working for the Highway Dept. Radio Section, ZT and the Reno gang handled the Admission Day Parade which worked out PB, MLK is now K6UEU at Livermore working for the U. of California. VJR and JLV have new Elmac AF-67s. PC, Reno EC, monitors 7268 kc. at 2000 and 3995 kc. at 2100 each Mon. Check in and give Don a call, he's doing an FB job and will relay to your SCM.

SANTA CLARA VALLEY—SCM, G. Donald Eberlein, W6YHM—Asst. SCM: Roy E. Pinkham, 6BPT; SEC: NVO. RMs: K6GID and ZRJ. The Monterey Bay Radio Club has started a class in amateur radio regulations and theory. WSH is the instructor. There is a need for more students to enroll. ZRJ reports the following attending the second meeting of the NCTA at Red Coach Inn: ZLO, RFW, YHM, HC, OIA, VZT, WOZ, PLG, OIL, BPT, K6EHT, IYC, EPC, BGM, QCI, GZ, OND, DYX and GID. ZLO has been working liaison between MTN Phone and NTS C.W. Nets. K6QCI has been doing an FB job on CN and expects to have his code speed up soon for work on PAN. K6DYX is building a new electronic bug. KB is on the air with a new DX-100 working 3.8-Mc. phone and 144 Mc. K6JAW moved from Monterey to Salinas and will be heard on 28 and 21 Mc. using a DX-35. WJM, an old reformed traffic station, has been heard working 14-Mc. c.w. chasing DX. ZTX is all set for the next Field Day and promises to be tough competition. The Monterey Bay Radio Club has a good idea for collecting news for its club paper, included with the paper is a return coupon with postage paid. This is to be filled out and returned to UZV with any news or items of interest for the members. MMG sends this information: The NPEC now meets the 2nd Fri. of the month at the QTH of LPS, 2320 Toyon, San Bruno, and reports 6-meter activity in that area is humming. Sorry that this report was delayed. AL The SCCARA elected the following in November: WAL, pres.; KRF, vice-pres.; JTE, treas.; OYV, secy.; WGO, EOA, RNG, APV and HC, board members. Traffic: W6BPT 223, K6DYX 179, W6YHM 88, AIT 82, ZRJ 78, HC 64, YBV 64, ZLO 44, JCG 42, AIT 35, K6QCI 30, W6MMG 10, K6GRUO 9, K6DHO 4.

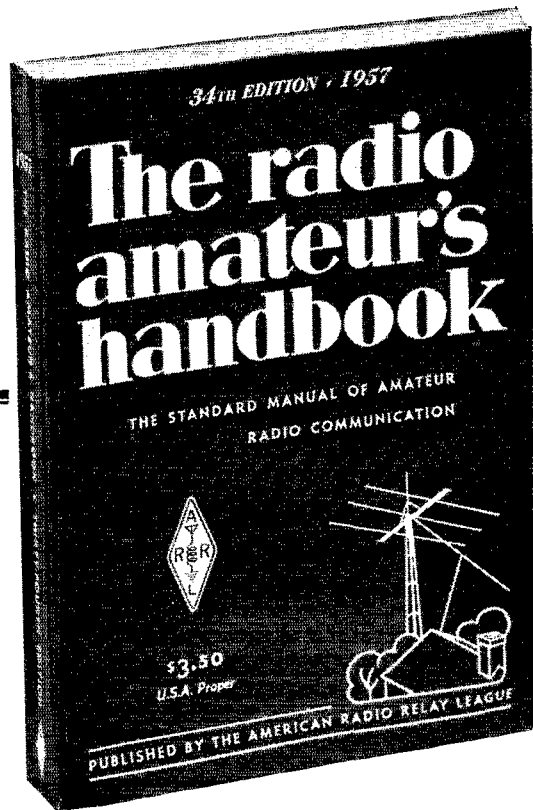
EAST BAY—SCM, Roger L. Wixson, W6FDJ—Asst. SCMs: Harry T. Cameron, 6RVC, and Oliver A. Nelson Jr., 6ALXQ. SEC: CAN, PAM; LL, RMs: EFD, JOH and IPW. The Acacia Club enjoyed a wonderful evening at the Hunters Point Naval Ship Yard. BF (Port) arranged the program which included dinner at the Officers' Club, followed by a talk and movie on Civilian Radiological Defense. The SARO group visited the Voice of America station at Dixon. IOT was in charge of the program which started with a dinner at the famous "Nut Tree" at Vacaville. CBF reports that the VOA station was very impressive. The East Bay Club enjoyed a technical talk on Class C amplifiers by HC, our Pacific Division Director. The Oakland Radio Club celebrated its thirtieth birthday. The first meeting of the month was devoted to nominations of officers and an interesting program presented by ELW, TML had prepared a set of colored slides on the ARL Convention held in San Francisco this summer. The second meeting of the month was devoted to "Old Timers Night." FDJ conducted the program. Some interesting highlights on the program included the reading of a letter by Phil Tait, who was the first secretary. The letter, written by Clifford J. Dow, ZAC, was dated Wailuku, Maui, Jan. 15, 1922. Part of the text read as follows: "To Radio 6XW, 2830-16th Ave, Oakland, Calif. Dear Friend: This is to acknowledge your transmission to me at 10:55 p.m. Hawaii time on Jan 14th. You were using 200 meters c.w. At the time I was listening on one bulb, the detector alone, as my A battery had run too low to use even one step, and the set just barely was oscillating on the detector." This letter along with the station used by XW is in the Oakland Radio Club Museum. CBF attempted to take an old-time flash powder picture at the meeting but the igniter for the powder just wouldn't fire. The Mt. Diablo Club had an election of officers and a "Dutch Auction." At a Dutch Auction the articles to be auctioned are tied to a string through a long pipe. After the bid is closed the winner chooses a string at the opposite end of the pipe from the articles and pulls his prize. A special "well done" to those who get out the

(Continued on page 114)

# 1957 EDITION

NOW  
AVAILABLE

!



*A*N INVALUABLE reference work and text for everyone—hams, engineers, lab men, technicians, experimenters, students, purchasing agents.

Distributors throughout the Nation have the 1957 Edition in stock. Better get your copy of this complete Handbook now. The demand is terrific!

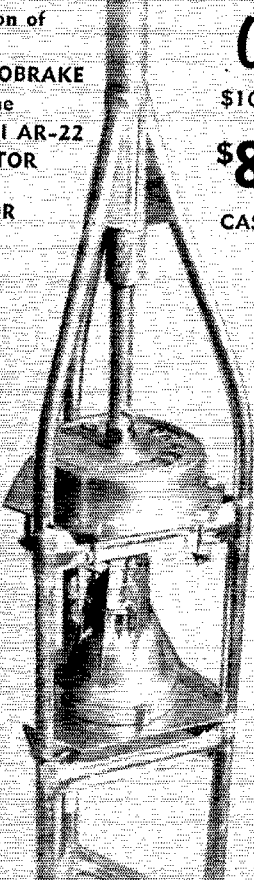
In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, new equipment in all categories. Every field of ham radio is covered: transmitting, both c.w. and 'phone; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; vacuum tubes; miscellaneous data; procedures; station operation, etc.

\$3.50 USA proper    \$4.00 US Possessions and Canada    \$4.50 Elsewhere  
Buckram Bound Edition \$6.00 Everywhere

The **AMERICAN RADIO RELAY LEAGUE, Inc.**  
WEST HARTFORD 7, CONN.

# NOW YOU CAN OWN THE finest Available Ham Antenna Rotating Assembly at the Lowest-Cost Ever!

Combination of  
the  
**WRL ROTOBRAKE**  
and the  
**CDR Model AR-22**  
**TV ROTATOR**  
and  
**INDICATOR**  
**CONTROL**  
**BOX**



**Only**  
**\$10.50 Down**  
and  
**\$835**  
**PER MO.**  
**CASH PRICE:**  
**\$10495**

- ✓ Will support 150 lbs. of antennas against 5000 in.-lbs. of torque (equal to av. Christmas tree array in 100 mph. wind)
- ✓ Prevents damage to beam; provides radial and thrust bearing; prevents coasting and shifting
- ✓ Kits available for adapting to most any type pole and tower mounting.

If you currently own a rotator, add the WRL RotoBrake for only  
**\$7.45 Down; \$5.93 per mo.**  
Cash Price: **\$74.50**

Send for complete brochure to

"The World's Largest Distributor of Amateur Radio Equipment!"

## World Radio Laboratories

34th & Broadway Council Bluffs, Iowa  
Phone 2-0277

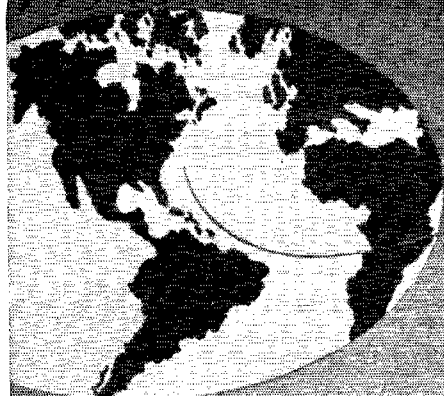
Carrier, the club bulletin. The Napa boys report that their new 6-meter mobile rigs are completed and from the report I just received from K6BYQ the little rigs really work out FB. SUE reports contacts with JA-Land on 6 meters and other DX is coming through. Don't forget to send in information for this column. Traffic: K6WAY 401, GK 166, W6LPW 126, VPC 77, ASJ 28.

**SAN FRANCISCO—SCM.** Walter A. Buckley, W6GGC—K6KGI lost his beam during a recent storm in Eureka and the wind also played havoc with PYL's big Cubical beam. OPL attended the Humboldt Radio Club's November meeting and enjoyed meeting many of the fellows. MGZ and his XYL both enlisted in a unit of the Naval Reserve, she as chief yeoman and he as first-class radioman. The Cathay Club has been busily giving code practice to all interested. K6EOW has been working a lot of DX with his 10-meter three-element beam. K6GJJ, in Sacramento, made his first Bay Area contact with K6RNQ by using his new 6-meter three-element beam and K6KEW 70-watt rig. AVN had a hidden transmitter control station for the 29ers 10-meter hunt for the month. The HAMS spent its monthly meeting trying to repair some gear for e.d. work at the Red Cross. The Marin Amateur Radio Club held its first meeting at a new club location, the American National Red Cross Hq., San Rafael, with 28 members attending. HJU gave a report on badges for the club. K6BU and HJU will check further and report. K6BTH gave a report of activity at NNRC Hq. during Operation Quiver. Special thanks was given to OPL for his assistance in keeping the channel clear during the operation. The Young Ladies Radio Club of San Francisco held a nomination of officers at its November meeting. John Reinartz, Chief of the Amateur Service Bureau of Emac, gave a very interesting talk at the San Francisco Radio Club meeting with over 100 members showing up to hear him speak on Relaxation Oscillators and Increased Audio With No Splutter. K6LRN has his 12X-100 rig ready to roll. K6DBM is doing nicely on 20-meter c.w. K6GKQ had his car broken into recently and equipment taken. K6QIH's XYL is awaiting her Tech. Class ticket. K6SRZ is working 6 meters. JWF again is active at Red Cross station CXO, after his recent trip to the hospital. MRV reports that he is feeling fine again after his recent trip to St. Mary's Hospital. All the fellows in the San Francisco Radio Club were sorry to hear of DEK's serious operation. Best wishes from all. Al. The CCRC meeting was held at GGC's QTH in November. BIP keeps in touch with his XYL via the Mission Trail Net each night. It seems strange to hear HIP on the phone band. This SCM is now the proud owner of a card from JAW, having worked Chuck on c.w. from this new QTH. Hope to hear IBDI one of these nights. Traffic: W6BIP 30, GGC 22, GHI 8.

**SACRAMENTO VALLEY—SCM.** Harold L. Lucero, W6JDN—With the ending of another year and amateur radio in full swing, I wish to thank each of you for your cooperation for the past years. On Nov. 17th the Sacramento Amateur Radio Club's annual party was held with 130 present. Entertainment was put on by TOL and it was the best. On hearing from George Hart, he tells me the certificates for emergency work during the floods of last Christmas will be on the way soon. So many have asked. He also explained the reason it takes some time to get them out. After knowing the reason it can be well understood. TMP is moving to Oregon. Our loss will be Oregon's gain. Thanks, Gerry, for your aid during the past years. K6RPQ is on 3.711-Mc. c.w. and doing fine work. Ed, let's hear more from you. How about an ORS appointment? It looks like MWR will be heard from Red Bluff soon. As long as you remain in W6-Land its OK. Fred, but we can't lose you, too. JDN attended the party in Sacramento, renewed old friendships and made new ones. ACN also was present. As you know he is the one to whom we owe our auto license plates bill passage. The Dunsmuir Amateur Radio Club again is in full swing and several new amateurs are in the offing. Traffic: (Nov.) K6EHT 37, W6JDN 15, K6RPQ 11. (Oct.) K6EHT 65.

**SAN JOAQUIN VALLEY—SCM.** Ralph Saroyan, W6JPU—K6EDX worked J1A1UH on 6 meters for the first U.S.A. to Japan QSO. Officers of the Fresno High Radio Club are K6HFA, pres., and K6HTM, vice-pres., and the club call is S1A. Equipment consists of an 8X-100 and a Viking II. K6HTM has four 837s on 20 meters. YMH has a new tower and has a 3-band beam 50 feet high. Members of the Fresno Amateur Radio Club participated in the CPX Nov. 15th with great success. GCS participated in CPX in Visalia. K6GOX worked J1A1O on 6 meters. ADB was robbed of a few radios. K6BCL has a new Communicator. K6BDL got rid of his TVI. ADB has a new 8X-96 receiver. DIY is on 40 meters. ERE has a new 64-foot tower. NTV is being heard in the Bay Area on 420 Mc. The Tulare County

(Continued on page 116)



Keep  
your **EYES**  
to the **FUTURE!**

### Do YOU Know

... the field of **ELECTRONICS** is the most advanced and fastest growing in the world, offering the largest range of jobs for technicians and engineers in history?

### Do YOU Know

... **PHILCO TechRep** is the world's largest Field Service organization and because of this leadership can offer you —

- unlimited advancement
- opportunity to work any place in the world
- experience in the most advanced fields of electronics and guided missiles
- personal security, real challenge, top salary and compensation for your skills

### Do YOU Know

- Philco electronic experts help prepare you for your TechRep Service career
- Philco's especially written Home Study Course keeps you posted on latest electronic techniques, including radar, guided missiles and transistors
- Philco provides financial assistance to continue your education

### Do YOU Know

... Philco not only will help you select the position in Electronics best suited to you but can and will provide you with periodic reports as to the openings in our world-wide organization for which you may be qualified.

**GET THE FACTS ABOUT YOUR FUTURE WITH PHILCO:**

Send Now to Dept. 10-B

for The Complete Story on What Makes The Philco TechRep Division—

*"First In Employment Opportunities"*

**PHILCO TECHREP DIVISION**

22nd & LEHIGH AVE., PHILADELPHIA 32, PA.



**BEFORE  
YOU BUY  
OR  
TRADE  
ANY HAM  
GEAR  
SEE**

**WARD, W2FEU**

**SKYWIRE  
SPECIALS**

**REYCO Multiband Ant. Coils complete antenna kit including**

1 pair Reyco coils.....	\$12.50
100 ft. 72 ohm twin lead Amphenol or equivalent.....	6.00
125 ft. #18 Copperweld.....	1.00
2 #668 Birnback insul.....	.42
1 #468 Birnback insul.....	.27

Total \$20.19

**OUR PRICE \$19.95**

prepaid  
add 50¢ west of Mississippi

**DO IT YOURSELF  
MULTI BAND ANTENNA KIT**

(See Page 18 — Oct. QST)

Including

100 ft. RG-59U.....	\$ 7.00
125 ft. #18 Copperweld.....	1.00
1 B & W 3905—1 coil.....	1.50
2 Centralab 850SL-100N.....	3.60
10 Burndy-KS-90 servits.....	2.40
4 #668 Birnback insul.....	.84
1 #468 Birnback insul.....	.27

Total \$16.61

**OUR PRICE \$15.95**

prepaid  
add 50¢ west of Mississippi

Ask for Used Bulletin #13 — lots of Bargains

**See WARD—W2FEU**

**ADIRONDACK RADIO SUPPLY**

Telephone Victor 2-8350

185 West Main St. — Amsterdam, New York

Radio Club boasts 25 members and meets the first Wed. of each month in the Municipal Auditorium. ARE is on 75-meter mobile. ASV is radio chief in the civil defense set-up in Visalia. K6KLE is off the sick list and is back at work. ONK has a real antenna farm. K6LRQ has a 50-foot tower. K6GDI worked KH6BRJ on 6 meters. K6KQM has a new mobile rig on 75 meters. FUA is heard on 75-meter phone. VHB is heard on s.s.b. BVT is operating 15 meters mobile. JPS is working out with 2 watts on 6 meters. SUV is working on high power for his mobile. PXP has a 28-volt system in his pickup. Don't forget the reports. Traffic: W6ADB 110, GCS 15, QQE 9, EBL 6.

**ROANOKE DIVISION**

**NORTH CAROLINA**—SCM, B. Riley Fowler, W4RRH—SEC: ZG, PAM; DRC. Much interest is being shown in the RACES program in the State. CVQ, as State C.D. Radio Officer, and ZG, as SEC, are doing a very fine job in getting this much-needed part of amateur radio under way. Your SCM is trying to assist wherever possible in getting this matter going. Mr. Denning, the C.D. Communication Officer, has been most cooperative, as have Henry M. Brown, of National C.D. Headquarters, and Curtis Steed, of Region Three. George Hart, of ARRL, has furnished much-needed information. To each of these gentlemen may I take this means of saying, "Thanks, fellows." Considerable interest is being shown in club activity in the State. New clubs have been organized at Morganton and Kinston. Each of these clubs indicate they are preparing for c.d. activity. Your SCM attended an excellent AREC-RACES meeting in Greensboro Nov. 25th. The EC there, AJT, is doing an excellent job. If your SCM or SEC can be of assistance at any time just let us know. I still get many Form 7 applications from amateurs. Please check this column in December and January QST for the name of your EC in your district. If you will do this it will speed up getting your registration card. No report was received from the c.w. boys. How about it, fellows? Traffic: W4GXR 103, DRC 48, DSO 37, HUL 32, W9QNL 4 32, W4ZWF 26, K4AJR 5.

**SOUTH CAROLINA**—SCM, Bryson L. McGraw, W4HMG—Hearty congrats to ANK on his election as Vice-Director and to MWH on his reelection as Director. ZRH has a new sluck to the chagrin of Dusty, his horse, who remains outside. K4AI1 is mobile with nice signals. FFH, our PAM, reports an average phone net attendance of over 50 per night. AYA has a new kw. EGI has an FB new 500-watt commercial job. K4BBG is on 75 meters. QQE is sporting a new coaxial 6146 final on 2 meters. A bad QTH is no problem for K4HLI, who uses a mobile whip for a fixed antenna. Congrats to K4EAR on the fine speeches to civic and service clubs on amateur radio. DBB/4, now at the U. of S. C., is on with a BC-610E, K4IOH, with a new 15-meter beam, is getting the rare ones. K4AOG is on s.s.b., also mobile via a real midget auto. Congrats to DXW and the Mobile Net on the fine job. EGI and the Palmetto Club of Columbia report a fine raffle with enough profit for a club receiver, etc. JCP has a booming mobile signal here. K4HLL is doing well with a Globe Scout via 15 meters. FFH, using the wrong mike during net drills, caused many guffaws. K4CKB has a new daughter. AKC, our RM, endorses the following as new ORES.: EGI, BVX, CJD, DFR, AVU, CHD, S0F and EKG. TYS is handling much traffic via s.s.b. K4ASA is living it up with a new DX-100 on 20 meters with good DX. Congrats K4GAT on the very clean audio on the 100-watter. The *Rock Hill Bulletin* is growing steadily in circulation. Congrats to QST with fine articles lately and many good comments here. Traffic: K4EGI 53, BVX 27, W4CJD 16, FM 8.

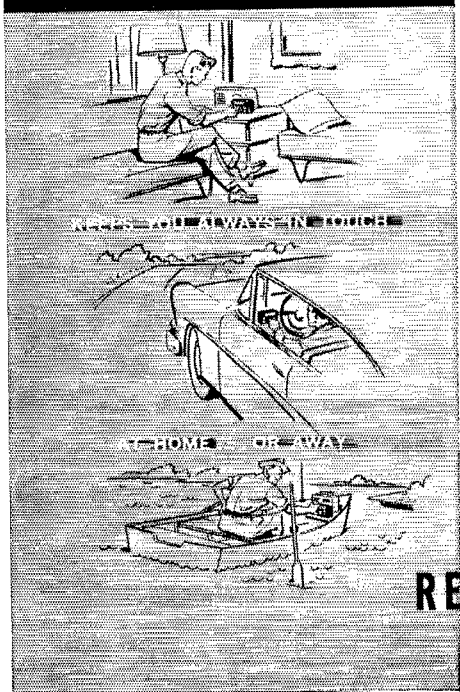
**VIRGINIA**—SCM, John Carl Morgan, W4KX—Most reports on November doings naturally concern SS participation. KFC, IA and TFX reporting the highest totals in the section. K4IYE says "Ran up total of THREE points!" Most interesting was the SS report from IHN, who worked all 73 sections in only 108 contacts. The Shenandoah Valley ARC's "Operation Precinct" was a big success. Mobiles stationed at remote polling places had all their returns in to the press and radio before nearby landline-linked precincts were heard from. Some of former heretofore seldom reported until the day following the election. The South Boston Club, addressed by c.d. representative, now plans a c.d. station. K4BU1 addressed the message, phoned to K4BUG, and sent via radio to AAD, who in turn phoned it to the Newport News Rotary meeting. The whole transaction was copied on a receiver at the South Boston Rotary meeting. Club prexy QCF reports the VPI club station, K4KDJ, now is on the air, and the club is sponsoring Novice exams for about 20 persons. JUJ reports receipt of a QSL from TG-Land after a

(Continued on page 118)

**NOW!**  
 world's first and only  
**TRANSISTORIZED**  
 Amateur Band Converter

**Regency**  
**ATC-1**

a tiny self-powered  
 converter that connects  
**INSTANTLY**  
 to any receiver



4 3/4" x 3 1/4" x 4 1/16" — weighs only 30 ounces

● No other converter like it! REGENCY's new ATC-1 is truly portable. Hooks up in seconds to *any* receiver (including car radios)—only connections are to an antenna and to receiver's antenna input.

The ATC-1 takes no power from the receiver. It is self-powered by three tiny Penlight cells which have a current drain of only 450 to 600 micro-amperes.

**World's Smallest Converter.** Use of transistors instead of bulky vacuum tubes makes this remarkable unit as easy to carry as a candid camera—it's actually less than half the size of this page!

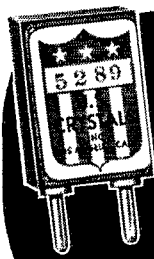
The ATC-1 provides AM, CW and SSB reception on the 80, 40, 20, 15 and 10 meter amateur bands. Sensitivity is 5 to 10 mv for 6 db signal-noise ratio. A modified "Q" multiplier circuit improves sensitivity and selectivity for phone operation. Smartly styled aluminum cabinet is covered in dark grey tweed with satin finished aluminum front.

With features that can't be duplicated at any price, the transistorized REGENCY ATC-1 is available now at just . . . **\$79.50**  
 amateur net

See and hear this miniature marvel at your local distributor.  
 Bulletin giving complete details and specifications yours on request.

**REGENCY** Division • I. D. E. A., Incorporated

Dept. B, 7900 Pendleton Pike, Indianapolis 26, Indiana



**U. S. CRYSTALS** offers the most complete line of crystal frequencies for the novice, amateur, technician and the experimenter, calibrated by Berkeley Electronic Counters to guarantee your exact frequency.

There is no substitute for Crystal Stability

**NOVICE FT-243 type holders**

3700 KC to 3750 KC in steps of 1 KC.....**\$1.29** ea.  
7150 KC to 7200 KC in steps of 1 KC.....**\$1.29** ea.  
5276 KC to 5312 KC in steps of 1 KC .....**\$1.29** ea.

**80 Meters Ft-243 type holders**

3500 KC to 4000 KC in steps of 1 KC on this very popular band, supplied to the nearest KC of your frequency tolerance .1% .....**\$1.49** ea.

**6 Meters 8334 KC to 9000 KC** in steps of 1 KC, what a range! 6 Meters is wide open, order your frequency now .....**\$1.49** ea.  
Example — 6 x Fund. Freq. 8335 KC x 6 = 50,010 KC

**SPECIAL FEATURE  
CRYSTAL STANDARDS**

100 KC RCA or Bliley . . . FT-249 . . . . . **\$4.95**  
1000 KC . . FT-243 . . . . . **\$4.95**  
Crystals ground to spec. frequency from 999. to 9,999

Write for inquiries

**SHIPBAND MARINE.** Any frequency special ground tolerance .005 .....**\$2.99** ea.

Specify type of holder, pin size, pin spacing.

**AIRCRAFT** (Low frequency range only)

Special ground tolerance .005 .....**\$2.99** ea.

Specify type of holder, pin size, pin spacing.

**C. A. P. MARS SP. AMATEUR POLICE NOVICE**

Any frequency from 3000 KC to 10000 KC tolerance .01% Tol. **\$2.99** ea., .005% Tol. **\$2.99** ea.

Specify type of holder, pin size, pin spacing.

**STOCK CRYSTALS AVAILABLE**—FT-243, DC-34, DC-35, FT-171, FT-241 Lattice XTAL freq. from 370 KC to 540 KC . . 59c ea.

10 OR MORE **49** c ea.

500 KC . . . \$1.99    200 KC . . . \$1.99

**40 Meter — 20 Meter — 15 Meter — and**

**10 Meters Ft-243 type holders**

Range of frequency 7000 KC to 7150 KC, 7200 KC to 7424 KC in steps of 1 KC. A terrific new range of frequencies. Tolerance .1%.

40 Meter 7 Meg. Fundamental .....**\$1.49** ea.

20 Meter 7 Meg. Doubling Circuit .....**\$1.49** ea.

Example — 7141 x 2 = 14,282 KC

15 Meter 7 Meg. Tripling Circuit .....**\$1.49** ea.

Example — 7141 x 3 = 21,423 KC

10 Meter 7 Meg. Quadrupling Circuit .....**\$1.49** ea.

Example — 7151 x 4 = 28,604 KC

**2 Meters 8000 KC to 8222 KC** in steps of 1

KC never before offered on this very popular ragchewing band. Be the first with a new set of frequencies away from QRM .....**\$1.49** ea.

Ex. — 18 x 8 Meg. Fund. Freq. 8001 x 18 = 144,018 KC

Calif. add 4% Tax.    Min. order \$2.50.    No COD's

Prices subject to change.    Ind. 2nd choice.

**U. S. CRYSTALS, INC.**

1342 So. La Brea Ave., Los Angeles 19, Calif.

12-year wait! Somebody either is borrowing KX's call or using the wrong foot in signing his own. Three QSLs were received for SS contacts while KX either was not on or was on another band. K4BCT now is K6UYK in Hollywood. SBJ's expectations of shore duty fizzled and he QSYed from a tin-can to a fleet oiler, but he expects to be on the beach permanently shortly. K4DKA has a new break-in monitor which improves net operations. PVA has a new 66-ft. vertical in the works. BLJ says the new rig is TVI-proof all the way down to 10 meters, and that's on the deep-fringe Eastern Shore! CVO is doing most of his hamming via mobile. Traffic: (Nov.) W4A 262, QDY 97, KX 46, K4ASU 38, W4MWH 28, K4AET 26, EZL 20, W4SHJ 20, AAD 18, BZE 18, CVO 16, KFC 15, FLX 14, K4BYS 12, W4UJ 9, BRF 5, K4BUI 4, W4PVA 4, K4EAS 3, IYE 1. (Oct.) W4SZT 46, WYC 43, K4DKA 32, W4ZM 16, PVA 15, K4CZB 4.

**WEST VIRGINIA**—SCM, Albert H. Hix, W8PQQ—SEC: GEP, PAM: FGL, RMs: GBF, DFC and HZA. The Dayton Hamvention will be held April 6th. I mention this quite early so that you can make plans far enough in advance. It is a very successful affair each year and all should attend who can possibly do so. This year the Dayton Club is starting an annual award to the most deserving ham in West Virginia, Kentucky, Ohio and Michigan. It will be for public service, humanitarian effort, etc. All nominations and suggestions should be submitted to D. L. Marquette, DEJ, Awards Chairman, 4209 N. Hyland Dr., Dayton 4. CLX has a new three-element 28-, 21-, and 14-Mc. Telrex beams on a 60-ft. tower doing a fine DX job. Please don't forget to send your contribution to NBG for the expenses incurred in the license plate call letter campaign. His address is Dr. Bill McClung, 16 Park Place, Richwood. ZJS has a new Collins rig and is working good DX on 14 and 28 Mc. Ex-7KTL is now K8DDB in Pt. Pleasant. The QTH of DPF/4 is Charles Watters, Philco Electronic Systems Engr., 701st AC&W Sqn., Ft. Fisher AFB, Kure Beach, N. C., for those who may want to contact him. We are so very glad that KXD is getting along so well after his operation. TGF has a new DX-100. AXU has a 125-watt linear amplifier on s.s.b. NYH has up a new three-element beam. The SNCS will be heard from the c.d. station signing HZA/8 on 3890 kc, more frequently in the future. BTF will man the station. SNP is reporting in regularly on the WVN. Traffic: W8HZA 80, BWK 41, PZT 27, NYH 17, UYR 9, GIU 5, PQQ 3.

**ROCKY MOUNTAIN DIVISION**

**COLORADO**—Acting SCM, William R. Haskin, K0CEN—We are sorry to report the passing of our SCM, James Simpson, W0HEM, after a long illness. We regret that we have received no news from the Colorado section members this month. If you don't send it in we cannot write it up. We have begged, pleaded, asked and I don't know what, but still no response. We need club news, reports of experiments new things that you have tried, and anything your fellow hams would be interested in. We sure appreciate the traffic reports but there must be other things happening. So let's hear from you. Traffic: (Nov.) W0EKQ 602, IA 200, K6DXF 148, W0EKQ 137, TVI 116, K0DCC 111, DMW 46, W0NIT 43, AGU 33, K0WBB 25, W0JHI 22, HOP 10, SGG 7. (Oct.) W0NIT 86, K0DXF 75, W0ENA 41, K0DCC 34, DMW 33, W0YQ 27, JHI 26, DRY 21.

**UTAH**—SCM, James L. Dixon, W7LQE—The Ogden Radio Club is now affiliated with the Ogden City Recreation Department. EIF and CWD received General Class licenses. ZDE received his Technician Class license. LQE received the Extra Class license and finally worked Vermont for the 48th state. VTC and VTD are busy putting up a vertical antenna and modernizing the rig with a cabinet. JJD has a new antenna and a much-improved signal. OGX, LQE, JSS, TEF and JJD are the only active Army MARS in Utah. SAZ talked back to Ogden from Southern Utah with a bailing-wire antenna. ZSW has 35 watts to an ARC-5 screen modulated, a 100-ft. long wire antenna and an SX-25 receiver. LQC, at Utah General Depot, is off the air because of a RC-610 failure. W7NDHM was elected to the State Legislature, and has Sunday skeds with DDT in Idaho. Both are blind hams. Please send in your activity reports before the seventh. Traffic: W7HBN 4.

**WYOMING**—SCM, James A. Masterson, W7PSO—The Pony Express Net meets Sun. at 0830 on 3290 kc. with PSO as NCS. The YO Net meets Mon., Wed. and Fri. at 1830 on 3610 kc., with BHII, DXV and NMW alternating as NCSs. More check-ins are encouraged. New appointments include HYW as OO and UFB as OES. ACG, IDO, CQL and YSF have started the Wyoming MARS Net which meets Tue. and Thurs. at 1900 on 3237 kc. SZZ has a new 60-ft. tower and

(Continued on page 120)



# RIDER BOOKS THE EASY WAY TO MORE ELECTRONIC KNOWLEDGE

## for Career Advancement—More Successful Ham Operation

### READ THESE NEW RIDER BOOKS

#### BASIC POWER ELECTRICITY

by Anthony J. Pansini

The important subject of electricity as used in the power field is made crystal clear in this "picture-text" book. Every thought, every idea is presented in both illustrated and text form. Written for those who see industrial and power electricity and electronics as a career. Examples which explain the text reflect industrial and power electricity numerics. Price to be announced.

#### L-C OSCILLATORS

by Alexander Schure

Wide use of L-C Oscillators in amateur, commercial and industrial makes subject important. Covers elements, energy conversion, frequency range and stability; power considerations, oscillator efficiency, harmonic generation, series and parallel resonance, critical damping. Circuit analysis, typical circuits discussed.

#166-13, soft cover, 72 pp. .... \$1.25

#### BASIC SERIES by Van Valkenburgh, Nooger & Neville, Inc.

The fabulous picture-text books, that teach faster and easier! The theory, principles and practice of electricity, electronics, synchros and servos, are here presented in a manner which permits a rapid grasp of the fundamentals of these vitally important subjects. Over 2,000 specially prepared illustrations present, explain and make every topic discussed picture clear.

#### BASIC ELECTRICITY

#169, soft cover, 5 volumes, 624 pp., \$10.00 per set.  
#169H, cloth bound in single binding..... \$11.50

#### BASIC ELECTRONICS

#170, soft cover, 5 volumes, 550 pp., \$10.00 per set.  
#170H, cloth bound in single binding..... \$11.50

#### BASIC SYNCHROS & SERVOMECHANISMS

#180, soft cover, 2 volumes, 270 pp., \$5.50 per set.  
#180H, cloth bound in a single binding..... \$6.95

#### ELECTRONICS TECHNOLOGY SERIES

edited by Alex. Schure, Ph.D., Ed.D.

An economically priced series of books explaining the basic concepts and principles of individual phases of electronics technology. Each book deals with a specialized subject.

- #166 RC & RL TIME CONSTANT.....Only \$ .90
- #166-2 FM LIMITERS & DETECTORS  
Only \$ .90
- #166-3 FREQUENCY MODULATION.....Only \$ .90
- #166-4 CRYSTAL OSCILLATORS.....Only \$1.25
- #166-5 A-M DETECTORS .....Only \$1.25
- #166-6 LIMITERS & CLIPPERS.....Only \$1.25
- #166-7 MULTIVIBRATORS .....Only \$ .90
- #166-8 R-F TRANSMISSION LINES.....Only \$1.25
- #166-9 AMPLITUDE MODULATION.....Only \$1.25
- #166-10 BLOCKING OSCILLATORS.....Only \$1.25
- #166-11 WAVE PROPAGATION.....Only \$ .90
- #166-12 SUPERHETERODYNE CONVERTERS & I-F AMPLIFIERS .....Only \$ .90
- #166-15 INVERSE FEEDBACK.....Only \$ .90
- #166-16 RESONANT CIRCUITS.....Only \$1.25

### ADVANCE YOUR CAREER WITH THESE BOOKS

**INTRODUCTION TO PRINTED CIRCUITS** by Robert L. Swiggert, #185, soft cover, 112 pp. .... \$2.70

**BASIC VACUUM TUBES & THEIR USES** by Rider & Jacobowitz, #171, soft cover, 208 pp., \$3.00. #171-H, cloth bound. \$4.50

**HOW TO USE METERS** by John F. Rider, #144, soft cover, 144 pp. .... \$2.40

**FUNDAMENTALS OF TRANSISTORS** by Leonard Krugman, #160, soft cover ..... \$2.70

**INTRODUCTION TO COLOR TV** (2nd Edition) by Kaufman & Thomas, #156, soft cover, 160 pp. .... \$2.70

**HOW TO SELECT AND USE YOUR TAPE RECORDER** by David Mark, #179, soft cover, 148 pp. .... \$2.95

**OBTAINING & INTERPRETING TEST SCOPE TRACES** by John F. Rider, #146, soft cover, 190 pp. .... \$2.40

**UHF PRACTICES & PRINCIPLES** by Allen Iytel, #141, cloth bound, 440 pp. .... \$6.60

**TRANSISTOR ENGINEERING REFERENCE HANDBOOK** by H. E. Marrows, #193, cloth bound, 9 x 12", 288 pp. .... \$9.95

**PICTORIAL MICROWAVE DICTIONARY** by Victor J. Young & Merideth W. Jones, #188, soft cover, 116 pp. .... \$2.95

**BASICS OF PHOTOTUBES & PHOTOCELLS** by David Mark, #184, soft cover, 136 pp. .... \$2.90

**BROADCAST OPERATOR'S HANDBOOK** (2nd Edition) by Harold E. Ennes, #138, cloth bound, 448 pp. .... \$5.40

**FM TRANSMISSION & RECEPTION** (2nd Edition) by Rider & Uslan, #102, cloth bound, 460 pp. .... \$4.95

### GET YOUR COMMERCIAL TICKET EASIER WITH ...

#### Kaufman's RADIO OPERATOR'S LICENSE Q AND A MANUAL

The BEST book for FCC License preparation  
Covers elements 1 thru 8



The only book with complete discussion of answers to every technical question in the FCC Study Guide. Makes it very easy to answer multiple choice questions. Used by more than 60 leading schools.

Only \$6.60



### For those who do servicing

Your parts jobber has over 50 Rider titles of interest to you, plus the new Rider S D O, single diagrams on TV receivers for only 50¢ each.



**ORDER TODAY!** These books are sold by electronics parts jobbers and book stores. IF YOUR dealer doesn't have these books, write direct.—Canadian prices 5% higher.

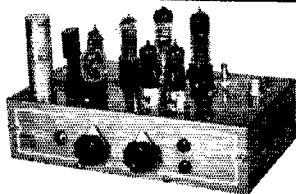
Prices subject to change without notice

W2RID

**JOHN F. RIDER PUBLISHER, INC.** 116 West 14th Street, New York 11, N. Y.

In Canada: Charles W. Pointon, Ltd. 6 Alcina Ave., Toronto, Ontario all prices approximately 5% higher.

# ARROW ... For A Complete Line of Ham Equipment



**Tecraft Transmitters** For 220, 144 or 50 Mc. Hi-Level Plate modulation. Hi-Imped. Mike. Provisions for Metering All Stages. Tuned Antenna Output System to 52/72 Ohm Line. RF Output-Indicator. Power Requirement 6.3 V. AC at 4 amps & 250 V. DC at 250 ma. Tubes: 6AU6 osc., 5763 Buf/Dbler; 6360 Buf/Mult.; 6360 final amp.; 12AX7 speech amp. & driver; 2-6AQ5 modulators. Power Input to Final, 20 Watts.

**Complete** with tubes, crystal & plugs.....**59.95**  
**Matching Power Supply** .....**39.95**



**Tecraft converters** may be had with IF output frequencies to suit the tuning range of your receiver, and provide the ideal system, in terms of **extreme sensitivity, maximum stability, low noise, high gain and selectivity.**

**Low Noise Figure:** Approximately 4 db. 1 microvolt of signal will provide better than 20 db thermal noise quieting.

**Sensitivity:** Approximately 1/10 microvolt input will provide a signal 6 db over noise level.

**Gain:** Better than 30 db.

**Model:** CC5-50, CC5-144, CC5-220 for Collins 75A1, 2, 3..... Specify IF 26-30 Mc. Collins 75A 4..... Specify IF 28-30 Mc. National NC-300..... Specify IF 30-35 Mc.

Complete with crystal and tubes..... **\$42.50**

**Model** CC5-50 & CC5-144. For General Coverage receivers. Choose either 6-10, 7-11, 8-12, 10-14, 12-16, 14-18. Any of above in kit form..... **\$29.75**

CC5-220. For 14-19 Mc. only. Wired only.

**Trade-ins Welcomed**

**ALL PRICES F.O.B. N. Y. C.**

## ARROW ELECTRONICS INC

65 Cortlandt Street, N. Y. 7, N. Y.

Dlgby 9-3790

525 Jericho Tpke. Mineola, L. I., N. Y.

Pioneer 6-8686

three-element beam. 7TJ is now 5TJ. ILL, HYW, VTB and UFB are active on 6 meters. WJTR/7 has moved to Casper. YSF is rebuilding his kw. rig. TZK visited the Casper Club. NVX is running a full gallon on s.s.b. WYX is back in Wyoming. Traffic: W7BHH 48.

### SOUTHEASTERN DIVISION

**ALABAMA**—SCM, Joe A. Shannon, W4MI—SEC; TKL, RM: KIX. PAM: K4AOZ, KN4KID is going strong on 40 and 15 meters with 50 watts working 45 states. WHW reports that LAX and AAN are making progress on the new house. K4AJG is the new Tuscaloosa EC and DGH has been appointed OPS. BAI is a new ORS. COU tells us that Alabama was 100 per cent on RN5 for three months. FEC has a new high-power final on 2 meters passing our schematics to all askers. YRO is singing the blues over the TVI situation which still is not licked. ZSQ's new phone patch is so good he thought others might like a copy of the dope sheet — ditto copies are ready for distribution! AENT now meets daily on 3905 kc., the change made necessary because of long skip and strong signals from Indiana! K4BFF says activity is picking up among the teen group as well as adults. BJL has a new 20A going strong but the a.m. boys still can't understand him! CIU's new 5-band doublet does a good job on 75 meters and he claims good results on the other four. WOG is showing signs of life after a long period of silence! KN4KJD has taken his Conditional Class exam, and K4APF is working 'em on 10 meters. Traffic: (Nov.) W4COU 587, K4AOZ 196, K4BRS 189, W4HTP 189, KIX 111, K4ANB 102, EOH/4 91, W4RLG 76, HON 64, DGH 60, YRO 58, ZSQ 48, K4EOG 47, W4BFX 40, K4BFF 34, BFL 31, W4BJL 27, EJZ 25, WHW 25, K4BTO 21, EEH 19, AJG 15, W4CIU 14, WOG 12, MI 10, ZSH 10, K4AAQ 8, W4RTQ 8, ZUP 7, CRY 6, GUV 6, HHG 6, TKL 5, SXS 4, TOI 4. (Oct.) W4COU 471, K4AJG 50, HAL 43, W4BFX 28, K4EOH/4 15, W4WOG 15, ZSH 7, TXO 5, YFN 3.

**EASTERN FLORIDA**—Acting SCM, Andrew C. Clark, W4IYT—Asst. SCM: John F. Porter, 4KGJ. SEC: IYT, RM: LAP, PAM: KQ. We are very sorry to report the passing of K4HCB on Nov. 27th in Ferndale. W4s BIL, BWR, HRC, GGQ, JCR, GXZ, KOH, UPT, WPD and K4LRZ formed Florida's first all YL/XYL net, which meets each Mon. at 9 A.M. on 7230 kc. All YL and YXLs are invited to participate. There now are opening for ORS, OPS and OO appointments. If interested, get in touch with the SCM. LMG moved from Miami to Winter Haven. Miami: ES has a new rig. GHA, CIU and HQW ran neck in neck in the SS. AHW was elected the new Dade EC. K4AG is a new RACES RO. The ARCAES (Red Cross) reelected IYT, YJE, AHW and SJZ as officers for another term. The DRC, SMIRC, HRC and MSRC enjoyed a showing of "The First 30 Years of Amateur Radio" by Southeastern Division Director ZD; also a nice visit by John Huntoon, ILVQ, of ARRL Hq. AZMI and WSJ are OOs; GHA and AHW are OPSS. All ARRL appointees please check your certificates for endorsement and forward to the SCM. AZMI has a new Yaliant. The Key West RC had a dinner in honor of the new officers with 32 present. Ocala: The Ocala gang formed the Silver Springs Radio Club with quarters provided by the Chamber of Commerce. K4GSO was elected new mgr. of the Tropical Phone Traffic Net, on daily at 5 P.M. on 3945 kc. PJU now has a new 3-bander beam. Fifteen QSOs with Orlando Club members brings a box of citrus. For details contact BKC, president. The Florida Hurricane Net (HN) is going strong Sun. at 7 A.M. on 3695 kc. Give a listen for YJE, the mgr. BJL is now OO 1 Class. BWR made WAC and YLCC. Winter Haven: K4KDN is ex-W9MRQ. KJ is in a new QTH. Traffic: (Nov.) K4KDN 196, W4ZLR 137, K4ABE 104, W4PJU 94, IWM 92, DVR 80, W5E 80, IYT 73, LAP 48, PZT 46, RWM 45, AHZ 42, TRN 38, LMT 36, EHW 34, K4AHV 28, W4KQJ 26, FSS 21, BWR 15, HGO 12, SJZ 8, W4FRP/4 6, K4GON 4, W4BJT 3, K4DRO 2. (Oct.) W4PC 233, K4KDN 136, W4EHW 120, WS 98.

**WESTERN FLORIDA**—SCM, Edward J. Collins, W4MS/RE—SEC: HIZ, RMs: ANP and BYE. It is with deep regret that we record the passing of ART. He had been an active amateur since the late 20s and was one of our u.h.f. pioneers. HIZ has been doing an FB job for the c.d. group. PQW gave a talk on Conrad to the Pensy Radio Club. BGG has modulator trouble. ERR made a trip to the hospital but is home again and doing FB. QK is studying a DX-100. EQR has a new beam up for 6 meters and has a hot opening without a transmitter. HI, GMS is tower-painting. DKG/4 reports WAS in one year with low power and a good antenna; he is being transferred to Maryland. The Panama City Amateur Radio Club is in full swing with 32 members and J.C.R. pres.; K4KDS, treas.; K4CEF, secy., and LBH, publicity. ANP is planning

(Continued on page 122)

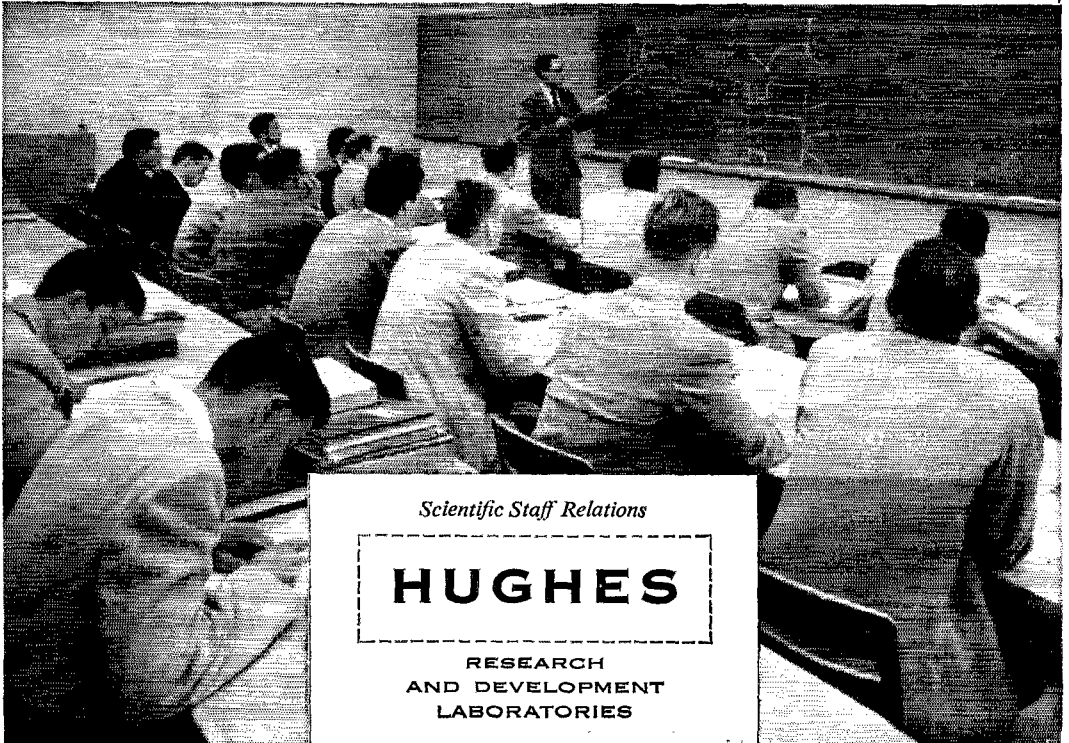
# Apply Your Electronics Experience

ENGINEERS AND  
PHYSICISTS WITH  
ELECTRONICS TRAINING  
ARE NEEDED TO  
CONDUCT CLASSROOM  
AND LABORATORY  
PROGRAMS ON ADVANCED  
SYSTEMS WORK IN THE  
FIELDS OF RADAR  
FIRE CONTROL,  
ELECTRONIC COMPUTERS,  
GUIDED MISSILES.

*The proper functioning of the complex airborne radar and computer equipment produced by Hughes requires well-trained maintenance crews in the field.*

At Hughes Research and Development Laboratories in Southern California engineers assigned to this program are members of the Technical Staff. As training engineers they instruct in equipment maintenance and operation for both military personnel and field engineers.

*Prior to assignment, engineers participate in a technical training program to become familiar with latest Hughes equipment. After-hours graduate courses under Company sponsorship are available at nearby universities.*

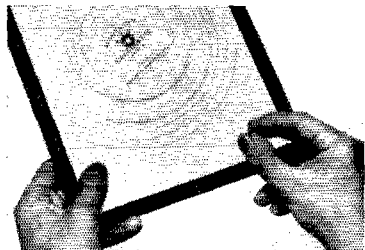


*Scientific Staff Relations*

## HUGHES

RESEARCH  
AND DEVELOPMENT  
LABORATORIES

# Time Savers . . .



**B**ESET with a knotty technical problem? Why not let an ARRL Lightning Calculator provide solution and save hours of operating time, or time you might better spend in constructing that new rig.

**I**F YOU'RE trying to figure out how many turns to wind on a coil for a particular band, you'll find the answer more quickly by using the Type A Calculator, designed especially for problems involving frequency, inductance and capacity. Direct-reading answers to Ohm's Law problems involving resistance, voltage, current and power may be obtained rapidly on the Type B Calculator. Be sure — and be accurate — with one of these dandy time savers.

## ARRL LIGHTNING CALCULATOR

Type A or Type B

\$1.25 postpaid

## THE AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Conn.

on increasing the height of all his antenna masts 20 feet. JPD is enjoying the new beam. ZFL is after bigger DX. HBK still is knocking off DX. DAO/DEF and QK help the beginners. VR uses an invisible antenna on 7 Mc. UCY keeps 10 meters hot. PAA still is calling Charley Queen Dog Xray. K4EHI keeps promising General Class. K4ECP has a 6-meter converter for the car. CCY is after a bigger signal. CDE meets the 75-meter nets with an FB sig. RDC does a big job with low power. The 2-meter net from the local Fair Grounds stimulated a lot of interest in 2 meters. ODO was seen studying the gear. ZPN keeps skeed with his son in Oklahoma. K4AGM is QRL his senior year in high school but still is after new states on 6 meters. MS underwent surgery and spent November in the hospital. Thanks for the good wishes, gang. FHQ would like more time to operate but work won't permit. UYS has returned to Ga. Tech. BFD still works in the wee sma' hours. Let's make 1957 the greatest year yet in Western Florida activity. Traffic: K4DKG/4 148.

**GEORGIA**—SCM, William P. Kennedy, W4CFJ—SEC; K4AUM, PAMs: LXE and ACH. RM; PIM. GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs. 0800 EST on Sun.; ATLCW on 7150 kc. at 2100 EST Sun.; GSN Mon. through Fri. at 1900 EST on 3595 kc. with PIM as NC; 75-Meter Phone Mobile Net each Sun. at 1330 EST on 3995 kc. with UUH as NC; Atlanta Ten-Meter Phone Net each Sun. at 2200 EST on 29.6 Mc. with VHV as NC. The Confederate Signal Corps has elected K4CFN, pres.; JQM, vice-pres.; K4AQX, secy.; UMO, act. mgr.; K4DLE, treas. The Athens Amateur Radio Club elected OTA, pres.; LAJ, vice-pres.; JVI, secy.-treas.; DLJ, act. mgr. ZLS was made EC in South Ga. Sorry to lose BQT. We also are sorry to lose YST as EC for Cobb County, but are glad to get KXT. YB, in Thomasville, and BEQ, in Toccoa, are on s.s.b. YWP is now the proud papa of a baby girl. CAN has a new Johnson Valiant. ZML now is mobile. ILVQ, Asst. General Manager of ARRL, was guest speaker at the Atlanta Radio Club's Christmas Party Dec. 8th. The Confederate Signal Corps had K4AUM as guest speaker at its annual Christmas Party. AD was elected president of the Ole Timers Club at its annual meeting with KL reelected as secy.-treas. Any old-timer with 25 years or more who is interested in joining should contact KL. Woody's call, K4DOD, has been issued to the Flint Radio Club as a memorial station. New Generals are K4KKV, K4KKW and K4JTC. Welcome Gladys. K4LVE. LNG finished some new power supplies for the big rig. PIM still is looking for stations in Columbus, Ga. BXV is NC of GSN on Tue. We are happy to report that we now have two more XYLs who have passed their Novice Class exams, K4INN's XYL and Jeanie. KN4KML. Traffic: WPIM 167, ZLS 94, PBK 47, K4INN 42, W4DDY 40, K4CSL 33, CZQ 29, W4ZD 22, BXV 21, K4HOU 3.

**CANAL ZONE**—SCM, P. A. White, KZ5WA—New appointments: RV as SEC; BE as RM; RM as PAM; and PP as EC Pacific side. A wife in Denver wanted to get in touch with her husband in the Canal Zone so she called the local HC station and told them her problem. They called W6COC and within ten minutes he and KZ5VR had the husband on the line. VR reports delivering a birth announcement to Ft. Bragg, N. C., within 19 minutes after it happened in the hospital here in the Canal Zone. VR is now NCS of the YL's Cross-Country Net and doing a very good job on it. The famous yacht *Yankee* was here for three days recently on its trip around the world. The crew of 23 includes 5 YLs, of which one is an amateur, KN2VMK, also the ship's doctor. She was having trouble with her rig so the KZ5 gang got together and put her back on the air. Those known to have been in on the deal are BG, DG, GD, KA, KJ, RM, RV and VR. Traffic: KZ5VR 188, HA 69, RM 14, BE 10.

## SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, William J. Schuch, W6CMN—Asst. SCM: Albert F. Hill, jr., 6JQB. SEC: LIP. RMs: BHG and GJP. PAMs: MEP and K6BWD. All nets seem to be going great guns. BHG is playing with hi-fi. K6LYL is doing very FB with liaison to other nets. K6MON is very QRL traffic skeed. ORS is doing nicely on u.h.f. K6COP makes WAC and a big traffic count. CK is QRL MARS. HJY is doing an FB job on four nets. K6GUZ is QRL school. KN6PRZ also is busy with traffic. K6UYK is a newcomer to W6-Land from KH6 and KV4. New officers of the 50 Club are LDR, pres.; USV, secy.; EKI, treas. The Riverside group is working hard on a RACES program. K6GCV is s.s.b. now. K6HYD and DLZ now are /6 in Riverside. The 2-meter repeater at K6MYK is working FB for relay. K6PLW is getting a new rig and handling traffic. Operation "Shakedown" really shook the boys down. More experience in RACES is needed by most of the

(Continued on page 124)

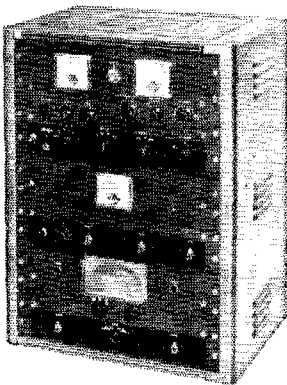
# Three Times the "Audio Punch" in Globe King 500B

NEW COMPRESSION CIRCUIT MAKES THE DIFFERENCE IN QRM PENETRATION!

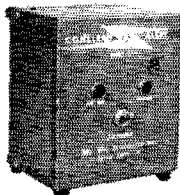
## WRL's 500 Watt COMPLETELY BANDSWITCHING Globe King 500B

Only \$38<sup>10</sup> per mo.

Pay Just \$69.90 Down  
Cash Price: \$699.00



## CONELRAD ALARM



### Modification Kit for the King!

If you own one of the older models of the Globe King (400, 500 or 500A), you can now add this same "communication punch" available in the new 500B. WRL's new King Modification Kit with simplified instructions can be easily installed in your old rig, reducing sideband splatter and keeping modulation at 100% level, allowing a greater penetration of the QRM Barrier. Same principle as used by broadcast stations.

Only \$1095

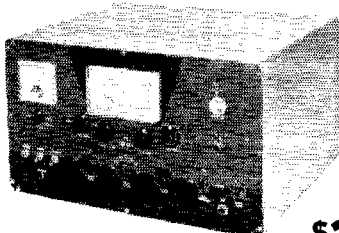
Installation made at the WRL  
Factory, \$20.00 complete.

Bandswitches 160-10M, 540 watts on fone, CW & SSB (P.E.P.)\*. Pi-Net matches most antennas from 52-500 ohms. Electronic Grid-Block Keying for maximum clarity of signal (time sequence operation). New audio compression circuit holds modulation at high level without usual clipping distortion. RF Section enclosed with complete screening for TVI-elimination. Separate power supply for Modulator, allowing better overall voltage regulation. And many other top features, including provisions for push-to-talk and built-in VFO.

\*with external SSB exciter.

Use of the new Fail-Safe WRL Conelrad Alarm permits easy compliance with the FCC Regulations. Operates, completely automatically, from any receiver with AVC; takes Xmttr. off air automatically. Is compact and low cost. Extremely simple to connect; complete instructions. Just two leads to receiver; receives AC plug from Xmttr. Printed Circuit for ease in assembling kit.

Kit, with printed circuit: \$22.50  
Completely wired: \$29.50



## THE World Radio Globe Champion 300

Completely bandswitching, 160-10M. 350 watts on CW, 275 watts on fone, 300 watts SSB (P.E.P.)\* Built-in VFO, push-to-talk, antenna changeover relay. Improved time-sequence Keying. Pi-Net output circuit, 48-700 ohms. Extensively TVI-shielded, filtered and by-passed. High level Class B Modulation with splatter suppression; new audio compression circuit holds modulation at high level without usual clipping distortion. Ready to go on SSB, with any external exciter. Two new Amperex 9909 Final tubes (1000 V on plates) allow 33 1/3% safety factor.

Only \$24<sup>47</sup> per mo.

Cash Price: \$449.00. Pay Just \$44.90 Down  
Kit Form: \$349.00, 10% Down, \$19.02 per mo.

### Get the Story on the

WRL GLOBE SCOUT 65B - WRL'S GLOBE  
CHIEF - WRL GLOBE SPANNER BEAMS

Watch for Announcement of  
THE NEW WRL  
Vertical Antenna  
COMING SOON!

SAVE UP TO

50%

ON  
RECOND.  
EQPT.

Here's a Sample from  
MORE THAN 800 ITEMS!

Hallcrafters 5R10A .....	\$ 25.00
Hallcrafters S77 .....	69.00
Johnson Ranger .....	175.00
Johnson Viking II .....	219.00
Sonar SRT 120 .....	99.00

NEW GUARANTEE!

## Free 1957 Catalog

More than 18,000 items  
GET YOURS TODAY!



Please rush me:  FREE 1957 Catalog, and information  
about the items listed below!

Q-2

WORLD'S MOST PERSONALIZED ELECTRONIC SUPPLY HOUSE

**World Radio**  
LABORATORIES  
PH. 2-0277

3415 W. BROADWAY COUNCIL BLUFFS, IOWA

NAME: \_\_\_\_\_

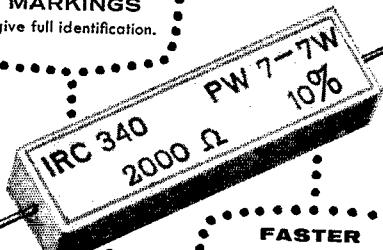
ADDRESS: \_\_\_\_\_

CITY & STATE: \_\_\_\_\_

# POWERFUL REASONS for using **IRC**<sup>®</sup> POWER RESISTORS

**CLEAR  
PERMANENT  
MARKINGS**  
give full identification.

TYPE PW-7 (7 watts)  
TYPE PW-10 (10 watts)



**FASTER  
INSTALLATION**  
axial leads provide  
greater versatility.

**FULL  
POWER**  
conservative rating per-  
mits continuous operation  
at full power.

**COMPLETELY  
INSULATED**  
famous IRC element is  
sealed in compact  
ceramic case for full pro-  
tection and rapid heat  
transfer.

## For all needs

In addition to Types PW-7 and PW-10 shown here, IRC offers axial lead Type PW-4 at 4 watts, and tubular types from 10 to 200 watts in a variety of terminals for both fixed and adjustable requirements.

ORDER FROM YOUR IRC DISTRIBUTOR

**IRC**  
**TENSION-GRIP  
NUT DRIVERS**

Holds nuts or hex screws auto-  
matically... will not drop...  
holds and drives simultaneously.  
Spring action, non-magnetic, 6  
sizes from 1/4" to 1/2".

**IRC**

**INTERNATIONAL  
RESISTANCE CO.**  
Dept. 431, 401 N. Broad St.  
Philadelphia 8, Pa.  
In Canada: International Resistance  
Co., Ltd., Toronto, Licensee

gang. K6CSR has a new Quad Skyhook. K6EIA still is painting the house. HUK is a new member of the Mission Trail Net. Reports show the gang scrambling to get Conelrad gear going. K6BWD has a new beam. INH is QRL business. The AREC members are not reporting as they should be. K6ELX has a new mobile. K6IQF is back after a sick spell. The U. of California Club, Riverside, is building a new station. The Victorville and Barstow Clubs both are getting started in e.d. Nice going. Thanks for all the Christmas cards, gang. It is impossible to QSL all of them. My apologies to one club, whose report I have lost. Traffic: (Nov.) W6LDE 740, GYH 709, EOT 425, CMN 209, BHG 171, K6LVL 154, MON 152, W6ORS 126, K6COP 125, W6CK 117, HJY 105, K6GUZ 88, KN6PRZ 76, K6UYK 44, W6GJP, 40, USY 25, VSH 24, MEP 23, K6PLW 20, CSR 13, HOV 12, EIA 10, W6BUK 7, K6BEQ 6, W6INH 4, K6BWD 2. (Oct.) K6IQF 52, W6VSH 14.

**ARIZONA**—SCM, Cameron A. Allen, W7OIF—SEC: YWF. PAM Arizona Emergency Net, 3865 kc.; ASI. PAM Grand Canyon Net, 7210 kc.; LUJ. W7UC ran up 19,440 points in the SS contest. A potluck picnic was held in Phoenix South Mountain Park with a nice turnout from Central Arizona. ASI also stopped off for a couple of hours on his way to San Francisco. The Phoenix gang holds a picnic or mobile caravan once each month. Listen on 3865 kc. for details. Traffic: W7NPL 100, Q1F 6.

**SAN DIEGO**—SCM, Don Stansifer, W6LRU—The Convair Club's operating contest was won by HME. New officers of the Coronado Club are ZCA, pres.; JVA, vice-pres.; KSI, secy.-treas.; K6SQC, corr. secy. HQL now heads C.D. Communications in Coronado. BZE met and lunched with ex-YUIGM recently. WNN finally got the needed cards for DXCC on phone. The Christmas meeting of the San Diego DX Club was held at the home of OME, ex-TA3AA. Many amateurs in the City Area now are participating in the San Diego City C.D. Communications set-up. K6HAM is the call of a Mr. Burger in San Diego. CAE has been on jury duty. K6HLQ, ex-president of the Silvergate Club, now is on active duty in the Navy. The Aztec Radio Club is very active from the State College with a Viking Ranger. Eight stations in the San Diego Area are now active on 420 Mc.: BLK, MVV, OSA, UPI, YWM, K6BTO, HNK and 2CWG/6. Six others are building but are not yet on the air on 420 Mc. LWT is building a 74-foot steel tower. BZE leads the San Diego DX gang in countries worked with 236. The 10-meter AREC group again furnished communications for the North Park Toyland Parade. The Upper-Ten Club enjoyed an outing in Imperial County at the Salton Sea Races. Club secretaries and individual amateurs, please forward any information for this column to the SCM prior to the 5th of each month. Traffic: W6EOT 425, K6DBG 35, W6LYF 16, KYB 7, IJU 3.

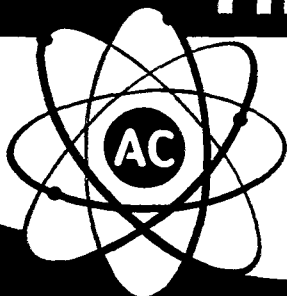
**SANTA BARBARA**—SCM, William B. Farwell, W6QIW—Asst. SCM: Dorothy Wilson, 6REF, SEC: K6CVR. BIY has moved to Hawthorne. BRY gives up the Globe King for a 32V-3. EGC is inactive at present as is POD, who is getting rid of his gear. KN6TIII and KN6THT report they are enjoying QSOs outside of California. KL7BGP, ex-W6TPZ, of Santa Barbara, is due to return Stateside. QDY, who can copy c.w. at 60 per, has been hospitalized with a knee injury. *Ham Radio as a Family Hobby*, a booklet put out by ARRL, was written by ATX, of Santa Barbara. KN6RCL is teaching c.w. to the Army Reserve. BE has received his QSL card direct from KC4USA, Little America. On the mend list after illness are K6EGR, OQX and DYU. QKO has tapped the family budget for an NC-300. K6EEJ has her WAC and WAS certificates. K6JRT QSOed with KL7JWB, Alaska, on 75-meter phone with a 5-9 report using 150 watts. LZ is organizing a code class at Ventura. Traffic: W6QIW 112, ELR 73, REF 56, FYW 4.

## WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, Ray A. Thacker, W5TFP—SEC: PYI. PAMs: YKT and IWQ. RM: KP6. Gentlemen, what has happened to the "old-fashioned" courtesy on the ham bands? GY writes to advise that he is back on the air after being off for thirty years! He has had the call 5GY since 1914. The Temple ARC's new officers are MXT, pres.; BSW, vice-pres., and EOW, secy.-treas. ZTG is going along FB at Texas Tech. DFB is enjoying 15 meters with a new three-element beam. Cof is doing a fine job with his OBS schedule. We would appreciate inquiries regarding official appointments in this section. What are you interested in? We have openings in all appointments. GHU is devoting most of his air time on c.w. A most enjoyable visit was had with the Oil Belt ARC in Albany. This is an area club with members in several towns and all come into Albany where they meet in the county court-

(Continued on page 126)

# FIELD ENGINEERS



the Electronics Division  
GENERAL MOTORS Corp.

PRESENTS

## AMERICA'S CHALLENGE

...YOUR OPPORTUNITY  
IN ELECTRONICS

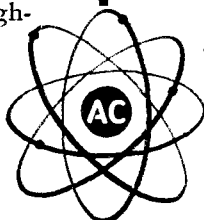
If you are a man with background in Missile Guidance, Airborne Navigational Equipment, Aircraft Fire Control Systems, Radar, Advanced Communications, Single sideband, mechanical filters, etc. (either civilian or military) you will find your niche in life with AC.

Stimulating assignments throughout the United States as well as choice overseas locations.

Attractive salaries, relocation expense, etc. offered all qualified men. General Motors policy of decentralization presents unparalleled opportunity for future growth and development.

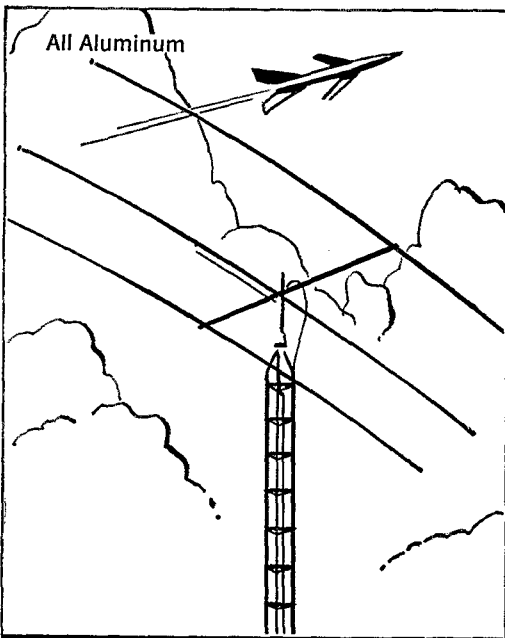
Send resumé to

\*Mr. James Gundry, W9KNP,  
Technical Employment Division.



the Electronics Division  
GENERAL MOTORS Corp.

\*Milwaukee 2, Wis. Flint 2, Michigan



## Space-Raider BEAMS

set the pace in space

Top antenna performance at economy prices!  
Space Raider holds the line with the finest beams available at a price you can afford.

### 20 meter, 3 element beam only \$49.50!

Model A-20-3. 1 1/4" O.D. Center sections, 1" O.D. and 3/4" O.D. adjustable end sections. Boom; 2" O.D. 18' long. 0.1—0.15 wavelength spacing. Forward gain 8 D.B. Front/back ratio 20 D.B. SWR less than 1.5 at band edges—less in the middle of the band.

Space Raider beams also for 6 meters (\$39.50), 10 meters (\$29.50 & \$39.50), 15 meters (\$49.50) All prices amateur net.

Space Raider beams are designed to perform—built to last!

- 100% aluminum. Rugged, weather resistant, non-corrosive.
- Sturdy all aluminum hardware. Heavy duty tubular elements & booms.
- Ceramic insulators, low loss connections.
- Easy to assemble. Low maintenance.
- Minimum TVI.

Order now from your ham distributor  
Free literature available

Full size beams for full size performance.

Mfr. by National Wire & Cable Corp., Antenna Division  
136 San Fernando Rd., Los Angeles, Calif.

house. In the courtroom yet! This club has applied for affiliation. Thanks, fellows, for a nice evening. Speaking of affiliation, there are no disadvantages and many advantages for clubs to apply for League affiliation. Talk it over with your group, fellows; your applications will be welcomed! Well, I hope everyone made it with their Conelrad preparations. We certainly would appreciate hearing from more of you with items of interest, club news, etc., for this column. Thanks. Traffic: K5FFB 920, W5DTA/5 722, KP8 214, K5EAM 113, W5BKH 50, CF 45, YKT 45, K5BKH 44, W5TTP 40, AXX 38, AHC 26, ASA 21, OCV 13, K5AVG 12, W5COF 4, GHU 2.

**OKLAHOMA**—SCM, Ewing Canaday, W5HQ—Asst. SCM; James R. Booker, 3ADC. SEC: LXH, PAM; MFX, RM; JXM. Our congratulations to EHC on his election as West Gulf Division Vice-Director. The newly-organized Chisholm Trail Amateur Radio Club at Duncan has 23 licensed hams and 12 associate members. Officers are AJZ, pres.; YPK, vice-pres.; NCH, secy.-pub. dir.; ERI, treas.; YPJ, act. mgr. A training committee composed of K5DUJ, K5AQA and UGA already have added three Novices to the club. Our new phone net, STN, on 3850 kc. at 1800 daily, and SSZ, the c.w. training net on 3682 ks. at 2200 Mon., Wed., and Fri., are going great with good participation. K5CAY has been serving as NCS on MACAN, 21.4-Mc. phone traffic net. KN5DYL passed his General class exam in Kansas City and should have his ticket by now. YLH has finished a new 500-watt linear for his s.s.b. RMM is building a new house and will be back on the air soon. OOV has prepared for the winter with a new 75A-4 and a heater in his shack. JWV has been off the air because of an appendectomy. Traffic: K5AOV 369, W5DR7 144, MRK 129, JXM 114, K5HZF 112, GAY 108, W5GIQ 63, FEC 54, ADC 40, K5AUX 38, W5PNG 32, GOL 29, K5DUJ 24, W5CCK 21, MFX 21, MQI 21, K5CBA 14, CVU 13, W5SWJ 11, KCG 8, QAC 8, EHC 7, RST 7, PCQ 5.

**SOUTHERN TEXAS**—SCM, Roy K. Eggleston, W5QEM—K5EIN is a new General Class license holder. Welcome to the air, Ida. GQN has been visiting in New York and at W1AW. The Baytown Amateur Radio Club is a new affiliated club. VPE and CFK have new s.s.b. rigs. K5CNX and K5ESO have dropped the "N" from their calls and are working 40-meter phone. KKA is on from Raymondville. Congratulations to ETA, our new West Gulf Division Director, and EHC, our new Vice-Director. URW is the new OBS at Houston. TYI is president of the new Alice Radio Club. Let's hear from any of you fellows who would like ARRL appointments. AQN's new QTH is Rockport. QKF and his XYL visited RPH and his XYL in Little Rock. EYV was a Corpus Christi visitor. FNH, TTW, AUO, NZH and others unknown to the writer, attended the Pre-Convention Planning meeting for the STEN Convention at Wolfe's Inn in San Antonio, Nov. 11th. The Convention will be held in Kerrville on June 14, 15 and 16, 1957. Let's have some news from you guys and gals. Traffic: W5FWR 10, K5GEM 6.

**NEW MEXICO**—SCM, Einar H. Morterud, W5FPB—SEC: DAA, PAM; DVA, RM; RKS. The NMEPM meets on 3838 kc. Tue. and Thur. at 1800 MST, Sun. at 7030; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700. It is still hoped that the C.W. Net can be reactivated. Contact the RM if you are interested. Congratulations to the operators of EKK/5 as Class 1A Field Day winners. ARCCNM took second place in the FD club aggregate score. We're proud of these standings. Your attention is directed to K5DAA as our new SEC. Give him your full support; he will be assisted in his duties by the XYL Ruth, K5DAB. While parked in front of another amateur's home, K5DAO's new Jaguar was struck by another car and was a total loss! WKW assisted in securing the service of an air-ambulance for the victim of an auto accident. 7UPQ now is in Shiprock. BIH has a 65-ft. tower for the 2-meter beam. RFF can paper the shack with WAC, WAS and OTC certificates. WNU lost his modulation transformer. SUY has a code and theory class. Mar. 11th is the deadline for filing nominating petitions for a new SCM. Traffic: W5FPB 14, CIN 6, K5DAA 6, W5DVA 6, BIH 4, WKW 4, RKS 2.

### CANADIAN DIVISION

**MARTIME**—SCM, D. E. Weeks, VE1WB—Asst. SCM: Aaron Solomon, 10C. SEC: FH. The Cross-roads Amateur Club at Gander has been reactivated with VO2CM, pres.; VO2JH, secy.; and VO2F, treas. Newly-elected officers of the Halifax Club are FK, pres.; BO, vice-pres.; YJ, ex-3EA, secy.; GC, treas.; FQ, bulletin editor. Congratulations to this club (FO/1) on the high score in the 1956 Field Day Contest. FD enthusiasts could follow the example of OML, DB and EK, who operated DB/1 for the third successive year in the October CD Party. Their score was 32,370 points. 39 sections, 5 bands. VU has completed an 813 rig. 3BIJ

(Continued on page 128)

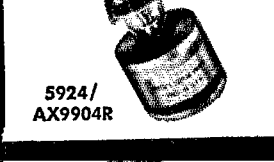
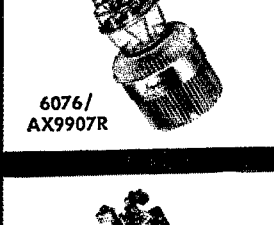
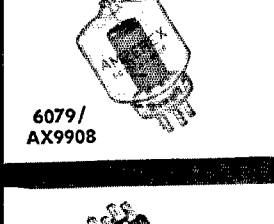
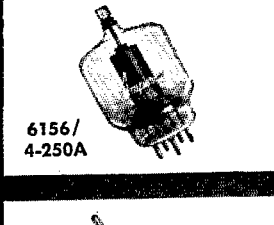
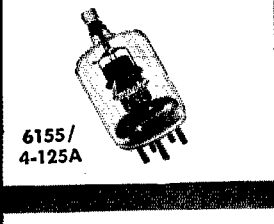
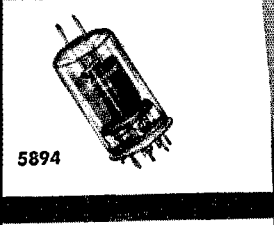
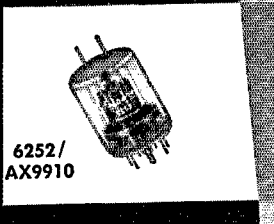
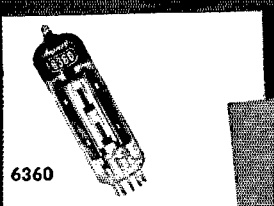


**IMPORTANT MEMO**

TO: *All Transmitter Engineers*  
 Investigate these  
 Amperex tubes and  
 write for SSB  
 ratings and typical  
 operating conditions

FROM: *SJ* CHIEF ENGINEER

AMPEREX TYPE	HEATER VOLTAGE					
6360	6.3					
6252/AX9910	6.3					
5894	6.3					
607						
6083/AX9902						
4X-150A						
6155/4-125A	5.0					
6156/4-250A	5.0	14.1				
5848/AX9902	10.0	9.9	100	B	5000	700
6079/AX9908	10.0	9.9	75	B	4000	
833A	10.0	10.0	30	B	5000	800
6076/AX9907R	6.3	32.5	220	AB, AB-	3000	500
5924/AX9904R	12.6	33	75	B	3000	
					4000	
					6000	



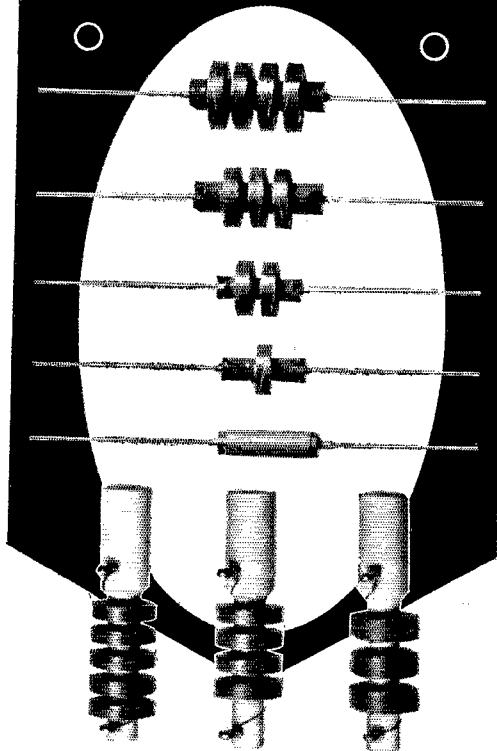
For SSB Ratings and Typical Operating Conditions for each tube write directly to:

**AMPEREX ELECTRONIC CORP.**  
 230 DUFFY AVENUE, HICKSVILLE, LONG ISLAND, N. Y.

In Canada: Rogers Majestic Electronics Ltd.  
 11-19 Brentcliffe Road, Leaside (Toronto 17)



# Small • High Q R-F CHOKES



Here's a new line of chokes providing high Q in small size. Standard constructions include:

**Solenoids on phenolic and powdered-iron forms**

**Pie-wound coils on ferrite cores and powdered-iron or phenolic forms**

**Pie-wound coils on ceramic forms**

Design features are:

**Finish to MIL-V-173A or to meet your specification**

**Inductance ratings from 1.1 $\mu$ h up**

**Current ratings from 50 to 2800 ma.**

Write for free data sheet Number C-157 giving inductance, resistance, current rating, Q vs frequency, self-resonant frequency, distributed capacitance, and core sizes for all these new r-f chokes. Or ask for quotation on special units.

## Waters

MANUFACTURING, inc.

Wayland, Massachusetts



Mail Address:  
Box 368, So. Sudbury, Mass.

APPLICATION ENGINEERING OFFICES in PRINCIPAL CITIES

now is living in Halifax. ZL (ex-VE1EP, VO6EP) is back on 14 Mc. after a long lay-off. WL, PQ and OM are gunning for 50-Mc. DX. OM has accepted an RMI appointment and would like to see a better Maritime representation on ECN, 3535 kc., 2045 ADT. BL, active since 1925, and EE, 1933, have received their Old Timer Club certificates. Traffic: VE1FQ 144, PX 65, AV 22, UT 18, FH 17, ADB 10, DK 7, DB 4, VU 1.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—From old St. Nick KM received a Pacemaker, NG a Valiant, GI a Heath Scope, AJA an Elnac Mobile and BDX a new homebrew rig. AUU reports the OSNet is doing fine. BUR works 10 meters when not busy on the net. DPO is a new ORS. The Grey-Bruce Net is on Mon., Wed. and Fri. at 1830 on 3645 kc. The A.R. Philatelic Society is on Mon. at 2000 on 3645 kc. Stamp collectors, take note. CO advises the Toronto AREC has been reorganized. BVF got his Viking working. VP is back from the DEW Line Deep Freeze. NF was a visitor to Toronto. Zero visibility because of bad fog required CO, NG, NO and TL to monitor the emergency frequency, 3765 kc., to assist stranded mobiles on Ontario highways. Ten were contacted and traffic to their anxious families was passed. We welcome a new club in our midst, the Muskoka ARC. Those in the Muskoka Area should contact BVF on 75 meters for information. TA is now a resident of Oakville. The Toronto AREC will man a booth at the Sportsman Show in March at the Coliseum. Four rigs will be operated. Your SCM and SEC will be present. 6GC is now 3EHI and is on from Belleville. 7AFA is portable  $\frac{1}{3}$  from Ridgeway, CAB is back on 2 meters. The new editor of Nottown's *Bulletin Board* is HE. HF of North Bay, is the new editor *KeyKlix*. The big prize-winner at the North Bay Hamfest was Fred Hammond of Guelph. The Metro Club of Toronto has a few of the fair sex as full members. We have often wondered why the YLs have not started their own club. IB, Ontario's oldest ham, is active with his DX-100. Welcome to a new ham, Ralph Jobson, in Toronto with the call EIU. The Hamilton Radio Club was incorporated in December. Traffic: (Nov.) VE3BUR 80, NG 77, NO 72, GI 70, AUU 64, DQX 63, EAM 36, DEX 34, AJR 24, CDX 21, TX 18, DPO 17, VZ 14. (Oct.) VE3AUU 61, CDX 36, TX 14, APL 10.

**QUEBEC**—SCM, Gordon A. Lynn, VE2GL—ATL skeds ALD daily on 80 meters and assisted at AWK with AAL, ALD, ANR, APC and AGN during the SS Contest. YU is on 10 meters exclusively except for the SS, and keeping almost daily skeds with his father. AIL keeps busy on 20 and 80 meters, YA supplied CO with news from home, football results, etc., via ham radio while CO was in Florida vacationing. FL reports the Muskeg Net is active on 3750 kc. at 7:15 P.M. It is with regret that we receive FL's resignation as EC for his district. He is celebrating 25 years of daily skeds with AEM, except for war suspension, and 20 years as ORS during which time he has reported each month! AJD is working some nice DX on 10 meters. ANK took part in the SS Contest, as did ADD and others. XR has his 6L6 with 20 watts back on. UM was wondering why he wasn't getting out and found one side of his antenna tuning capacitor grounded. He is now working out well on 20 meters. Traffic: VE2ATL 58, DR 55, EC 26, CP 19, FL 4.

**ALBERTA**—SCM, Sydney T. Jones, VE6MJ—WL reports that the Calgary gang is going for 3-band beams in a big way. EH has forsaken square dancing for experimenting with TT. EA has his new ham shack nearly completed. MJ has joined the gang on 146.7 Mc. New officers elected at the last meeting of the Northern Alberta Radio Club, Edmonton, are ZF, pres.; SN, vice-pres.; AU, secy.; YG, treas.; WO and HM, directors. ZA has now moved to a new QTH and expects to be active shortly. ZF is mobile on 75 meters. LS is getting good results on 28 Mc. The following members of the NARC have resumed code practice sessions on the air on 3687 kc. on Mon., Wed. and Fri.: CE, WR, SN and ZF. Listen for them at 1930 MST. DZ, AS, KC, KM and WS are active on 146.7 Mc. mobile with EH and MJ operating from the home QTH. Several of the Calgary gang have been heard operating the U. of A. station, RR. Please, fellows, keep those reports coming. Only one was received this month. Traffic: VE6HM 126, YE 10, TT 9, OD 7, MJ 5, WL 2.

**BRITISH COLUMBIA**—SCM, Peter M. McIntyre, VE7JT—Congrats to KX for the first VE/ZL contact on RTTY on Nov. 22, 1956. Jim keeps regular ORS skeds on RTTY Tue. and Fri. on 7144 kc. During a recent storm in the northern section of British Columbia amateurs kept necessary emergency communications going; also just at the writing of this report heavy rains and winds caused a minor emergency in Victoria and the BCAREC Net was in emergency session with over 50 stations on frequency between 1800 and 2300 hours Dec. 9th. The Chilliwack Club has a new club

(Continued on page 130)

# MAKING THE BIG DECISION?

BRIGHT FUTURE

MONOTONY

NO FUTURE

NEW HORIZONS

OLD SALT MINE

INTERESTING WORK



## FIELD ENGINEERING WITH A FUTURE - AT RAYTHEON

Wondering about your next step? Raytheon field engineering gives you a real chance to up-grade your future. Many Raytheon executives are former field engineers.

Interesting, stimulating work with our Design and Engineering Departments evaluating and testing the latest equipment gives you valuable experience. Assignment to one of these missile, sonar, counter-measures, bombing or fire control radar programs prepares you for a key field position.

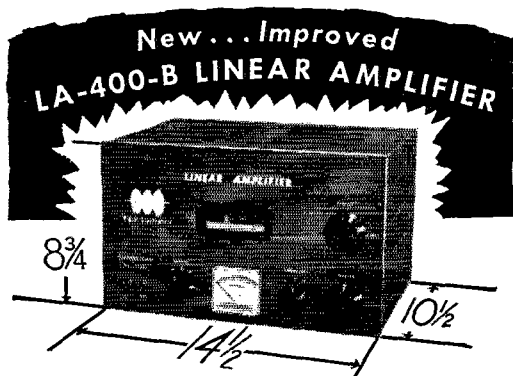
Primarily, we're interested in men with an E.E. degree and field experience, but you get full consideration when you have radar, sonar, missile or similar background. Men with mechanical and hydraulic experience also are needed.

Your Raytheon future includes an attractive salary; assistance in relocating; insurance; educational programs, etc. Interviews in most U.S. cities, Japan, some European countries. Write E. K. Doherr for full details.

*Excellence in Electronics*



**RAYTHEON MANUFACTURING COMPANY**  
Government Service Department  
100 River Street, Waltham 54, Massachusetts



Now gives simplified multiband operation on 75 through 10 meters. Improved TVI suppression... free from parasitics or harmonic radiation. Plus new metering circuit for reading RF voltage input, plate current and RF amperes output. Low impedance, untuned input circuit. 400 watts P.E.P. input with more stability and better linearity with only 20 watts drive. Designed around four Modified 1625 Tetrodes. Especially effective for SSB; also delivers high quality signal on AM, PM and CW. Ideal for portable use.

**SATISFACTION  
GUARANTEED**

**PRICE \$199.95**  
(\$19.95 down; \$16.50 per month)  
**ALSO AVAILABLE**  
Modified 1625 Tetrodes \$3.75 each

### P.S. Sidebanders: Watch for announcement of the V-F-O-MATIC

Makes your 75A-2, 3, or 4 receiver the VFO for your KWS-1, 10A, 20A or Phasemaster II. Automatically keeps your transmitter on the same frequency to which your receiver is tuned. No more calibrating or "talking yourself on" frequency with V-F-O-Matic. *Coming soon! Worth waiting for!*

**P & H ELECTRONICS • 424 Columbia, Lafayette, Ind.**



*Founded in 1909*  
**RADIO TELEPHONY  
RADIO TELEGRAPHY  
RADAR & TELEVISION**

Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$48.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details. New: Advanced TV Engineering Course.

**PORT ARTHUR COLLEGE** PORT ARTHUR TEXAS

Approved for G. I. training

receiver and by now should have its transmitter built. The Vancouver Amateur Radio Club has a good winter program lined up with various special speakers on various subjects. We would like to hear from anyone who has piped TV in his area and is getting more than the usual amount of 15-ke. ITV. Trail has such ITV and it seems to raise havoc. We are glad to hear ALL back on the band after trying to scalp himself with an axe. CQ left for VE3-Land with the best regards of the VE7 gang. Hope you all had a very good Christmas and found the gear you wanted under the tree. The Newton Area is well represented by AMH, AMJ, OM1, JB and YMI, who are all fairly active. ER is reactivating. Ten meters is sure on the up-wing if this happens. AGH finds it easier pushing switches than a semi-trailer but, alas, business before pleasure.

### 4X250B

*(Continued from page 37)*

at least you can't do much harm to the tube at this input. A fairly good load for this frequency can be made by tying a number of blue bead pilot lamps together in parallel with very short leads. Each lamp that is lit to full brilliance indicates about 2 watts output.

Apply drive and plate and screen voltages, and tune  $C_8$  and  $C_9$  for maximum output as before. The plate current should not exceed 166 ma. to comply with the 50-watt rule. Because of the low plate voltage, check the screen current to see that it is not much more than about 30 to 40 ma.

When an antenna is substituted for the dummy load, some sort of output indicator will definitely be needed for tuning up. This could be a field strength indicator with the meter at the operating position. It was found that a Micromatch was usable on 432 Mc. without introducing much of a "bump" in the line, although its sensitivity was reduced.

Speaking of the Micromatch, be extremely careful when using it to measure the output of this transmitter when operating near its full ratings on 144 or 220 Mc., especially the latter. The coupler unit contains an r.f. choke which doesn't take too kindly to three or four hundred watts of v.h.f. power.

### Linear Amplifier Service

Proper operation for Class AB<sub>1</sub> linear service is a fairly involved procedure. It was described in detail in the discussion of v.h.f. linears in QST for December, page 28, and is not repeated here. It may be something of a disappointment to the fellow who has not investigated linear amplifier characteristics thoroughly to learn that the efficiency of this unit is only about 35 per cent in linear service. But when it is considered that 100 watts of output, modulated, can be obtained with only a very low-powered driver stage, the linear application looks more attractive.

No driving power is required for AB<sub>1</sub> service; the amplifier draws no grid current. Almost any modulated stage you're likely to have will overdrive the 4X250B when it is run as a linear amplifier. A Gonset Communicator, for example, must have most of its output swamped out, when it is used as a driver for this amplifier.

*(Continued on page 132)*

# HARVEY - YOUR HEADQUARTERS FOR Single-Sideband Equipment

## HARVEY'S complete line of SSB equipment

includes all available models of reliable make — in stock for immediate delivery. Your questions and problems on SSB will receive the prompt attention of one of HARVEY's famous radio amateur salesmen, each well versed in SSB operation and currently on the air.

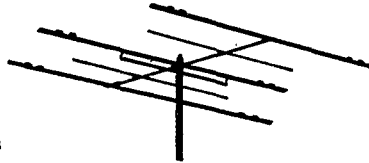
## COLLINS KWS-1 TRANSMITTER



### 1 KW PEAK POWER

Designed for optimum kilowatt performance on AM, CW, or SSB, the KWS-1 is compact but not crowded. Frequency range 10 through 80 meters. Single conversion on 80, dual conversion on higher bands. Output tuning is continuous throughout entire range. Exciter and power amplifier housed in a single "receiver-size" cabinet which may be placed on the operating desk or mounted on top of the power supply cabinet. Permeability tuned, hermetically sealed VFO used to provide stable and accurate signal source. Select upper or lower sideband with two position control. Exciter may be operated by either push-to-talk microphone switch or by the voice-operated relay located within the audio unit. Provision made for voice-operated break-in while using loudspeaker on the receiver. CW operation features excellent wave shaping for smooth keying and the complete elimination of transients. High and low voltage power supplied by the 428-A High Voltage Supply and the 429-A Low Voltage Supply—both contained in a single cabinet. \$2,095.00 Complete with tubes.

- **THREE BANDS** 10, 15 and 20 Meters
- **ONE BEAM**
- **ONE FEED LINE**



**The W3DZZ BEAM**  
Is IN STOCK  
at HARVEY'S  
(exclusive in N.Y. area)

The original Three-Band W3DZZ Beam — Manufactured by the Frederick Tool and Engineering Corp.

No Stacking Required • Wide-Band Balancer — requires no adjustment. Maximum Gain—over 8 db gain on 20 and 15 meters; somewhat higher on 10 meters • High Front to Back Ratio — in most installations the front to back ratio exceeds 30 db on 10 and 20 meters and 25 db on 15 meters • Rugged Design — boom consists of two 12-foot lengths of 2 1/4" dia. tubing with .065" wall. Three-band elements are made of 1 1/2" tubing with .058" wall. All tubing is of 6061-T6 heat-treated aluminum alloy for maximum weather resistance and strength.

Model FT-100 Beam Antenna—a Multi-Band Parasitic Array for 10, 15 & 20 Meters Light weight—only 55 lbs. • Total length of elements less than 28 ft. • Clean design with shortened elements gives low wind resistance • Uses RG8U as feed line • Trap capacitor insulation is of highest quality polystyrene.

Complete.....\$19500

### Model FT-200 Set of Traps for 5-Band W3DZZ Wire Antenna



10, 15, 20, 40 and 75/80 Meters • 75 Ohm Twin-Lead or Coax Feed Line • Concentric Coil and Condenser Completely Potted in Polyester Resin • High-Voltage Polystyrene Insulation on Concentric Capacitor.

Pair.....\$1250

### ANTENNA KIT for FT-200 Traps

150' #12 Copper-Weld Wire • Special Center Insulator • 2 End Insulators • 2 additional Egg-Type Insulators.....\$6.90  
RG 11/U Coax.....\$0.13 per ft.  
RG 59/U Coax......07 per ft.  
72 ohm kilowatt twin lead......06 per ft.

## COLLINS 75A-4 RECEIVER



New Production

### with FINE TUNING KNOB —

Designed for AM, CW and selectable SSB reception. Covers 160, 80, 40, 20, 15, 11 and 10-meter bands. Features include: double conversion . . . permeability tuned, hermetically sealed VFO . . . mechanical

filter . . . separate detectors for SSB and AM . . . band-pass tuning . . . new noise limiter . . . bridged-T rejection notch filter . . . built-in crystal calibrator . . . provision for 3 Collins plug-in mechanical filters. PLUS — new gear reduction tuning knob for fine tuning, 4 to 1 ratio . . . eliminates 'dial drag' . . . has no detectable backlash . . . adds unsurpassed smoothness to SSB, CW or AM tuning.

Complete with new tuning knob (less speaker).....\$64500

New Tuning Knob, separately..... 15.00

Model 270 G speaker for above in matching cabinet..... 22.00

We're Generous on Trade-Ins  
If You Want to Talk SWAPS and DEALS  
write . . . or call **W2DIO**

NOTE: Prices Net, F.O.B., N.Y.C.  
Subject to change without notice.

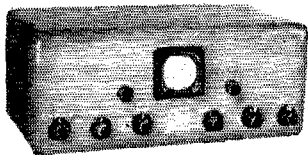


**Harvey** RADIO CO., INC.

103 W. 43rd St., New York 36, N.Y. • JUdson 2-1500

Established 1927

*Amateurs*  
...NOW SEE YOUR SIGNAL!



MONITOR BOTH TRANSMITTED AND RECEIVED  
SIGNALS FOR PERFECT 100% MODULATION

## MONISCOPE

No more guesswork about your signal! Moniscope gives you 100% modulation control because you see and hear the quality of your signal — Transmitting or Receiving. You know you always have a perfect signal and that you comply with FCC Reg. 12.133. Monitors continuously from 3.8 to 30 MC — Just one connection to receiver — Connection to transmitter optional.



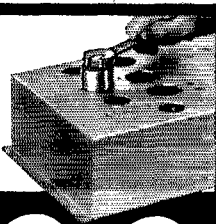
Marie Moore Pres. See your dealer or write direct.  
Special Amateur Net Price \$129.95.



**AMERICAN ELECTRONICS ENTERPRISES**  
3603 East 10th St., Long Beach, California

- ✓ Automatic changeover
- ✓ Sine or trapezoid pattern
- ✓ Automatic brightness control
- ✓ Works on SSB

## CUT CHASSIS HOLES FAST!



ROUND



SQUARE



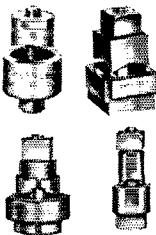
KEY



"D"

Smooth, accurate openings made in 1½ minutes  
or less with Greenlee Radio Chassis Punch

Quickly make smooth, accurate holes in metal, bakelite, or hard rubber with a GREENLEE Chassis Punch. Easy to operate . . . simply turn with an ordinary wrench. Round, square, key, and "D" types . . . wide range of sizes to make openings for sockets, plugs, controls, meters, terminal strips, transformers, panel lights, etc. Assure perfect fit of parts and professional finish to every job. Write for descriptive literature. Greenlee Tool Co., 1862 Columbia Ave., Rockford, Ill.



## The Power Absorber

Ordinarily the last thing a v.h.f. man would want in the line between his driver stage and final amplifier is a means of dissipating power, but such a device is needed with the Communicator.

Shown in the accompanying photograph, and on the November *QST* cover, it is a low-power adaptation of a unit described by WIDE.<sup>3</sup> All that is required besides the box and coaxial connectors are 6 pilot lamps and a resistor. The pilot lamps were employed rather than larger bulbs to make a more compact unit.

The device is built into a 3¼ × 2¼ × 1½-inch Minibox. The input and output connectors are mounted on opposite ends of the box, while the lamps are arranged on the top, and held in place by rubber grommets. As the photograph shows, there isn't much work involved in wiring up the components. Just hook the lamps in series with the coaxial connectors and add a resistor across the output terminal.

In use, the absorber is simply placed in series with the coax connecting the driver and amplifier. The bulbs will light when the driver is turned on, and tuned up properly. If some light brighter than others, it is because of a standing-wave pattern on the line. This can usually be cured by retuning the amplifier grid circuit to match it to the coax.

The absorber, with the constants shown, will reduce the output of a Communicator or similar rig to the level required for the 4X250B operating Class AB<sub>1</sub>. If you should need more or less drive the value of the resistor in the absorber should be increased or decreased to provide it. The change in brilliance of the lamps provides a rough indication of the modulation level applied to the driver.

<sup>3</sup> Grammer, "Reducing Power for S.W.R. Bridge Operation," *QST*, April, 1956.

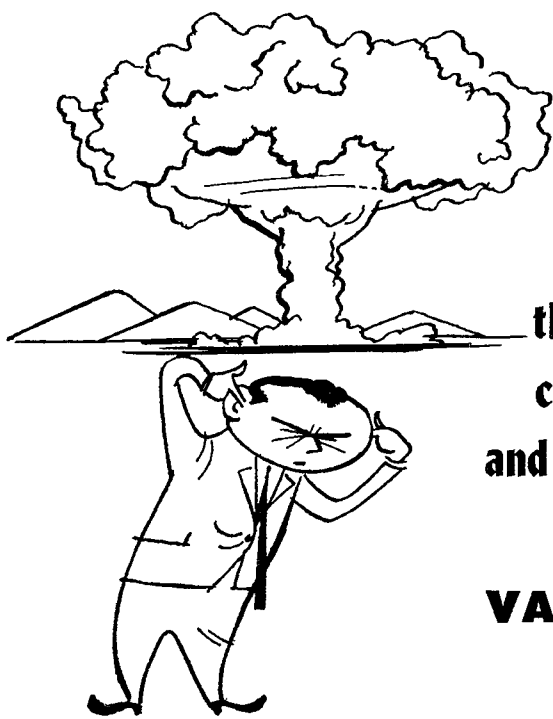
## Keyer-Control Circuit

(Continued from page 48)

of the r.f. gain control and then connect the stand-by line to the terminal that formerly went to ground. This is very easily done and will not affect the trade-in value of your receiver.

Press the key lever to either the dot or dash side. Probably nothing will happen, but while holding the lever over, carefully adjust the weight and ratio controls until the keying relay is activated. Now adjust the speed control to the desired speed and again touch up the weight and ratio controls. The weight control makes the characters lighter or heavier and hence also controls the spaces, while the ratio control varies the dot-to-dash ratio. There is considerable interaction between these two controls but by careful adjustment almost perfect characters can be obtained. The receiver key-down gain need not be used at all unless you want to listen to your own signals, in which case adjust this con-

(Continued on page 134)



$$E = Mc^2$$

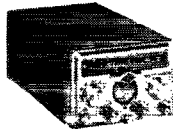
Dr. Albert Einstein had the "final word" on atomic energy.

**In the West,  
the "final word" on high trade-ins,  
convenient credit terms, new  
and certified used ham equipment  
comes from**

**VALLEY** *electronic supply co.*  
*Burbank and Van Nuys, Calif.*



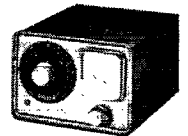
New! **GONSET G-77 MOBILE XMTR.** with matching power supply and installation kit. Amateur net: **\$279.50**



New! **GONSET G-66B MOBILE RCVR.**  
Amateur net: **\$189.50**



New! **MORROW MAH ARM-CHAIR HAMSHACK.**  
Amateur net: **\$595.00**



New! **MORROW CONELRAD MONITOR.**  
Amateur net: **\$39.50**



**VALLEY ELECTRONIC IS THE  
"FINAL WORD" ON BEAMS!**

**Gonset**  
20 meter Bantam, Amateur net: **\$59.50**

**Space Raider Single Beams**  
10 meter, 3 element, Amateur net: **\$29.50**  
20 meter, 3 element, Amateur net: **\$49.50**

**Sky Sweeper**  
2 meter, 5 over 5, Amateur net: **\$13.95**  
6 meter, 5 over 5, Amateur net: **\$35.25**

**WRL 3 element Tri-band**  
10, 15, 20 meters, Amateur net: **\$99.75**

**W3DZZ 3-band Rotary**  
Amateur net: **\$195.00**

**GET THE "FINAL WORD"  
FROM VALLEY ELECTRONIC!**

**Equipment.** New and used receivers, transmitters, accessories, test equipment. National, Johnson, Hallicrafters, Collins, Multi-Elmac, Barker & Williamson, Harvey-Wells, Gonset, Morrow, Triplett, etc.

**Trade-ins and Credit.** Save time and money—Valley's offer is the "final word." Higher trade-ins, longer credit, low down payments.

**Service.** Over 200 years of combined ham experience at your command.

W6OYD W6YPA W6YML K6CRD W6QJI W6VCR W6KSF  
K6PMU W6VBY K6DPH W6LTY KN6UAZ K6BSB W6EBG K6JJM

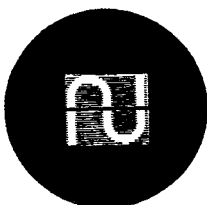
*Some prices slightly higher west of the Rockies*

**VALLEY** *electronic supply company*

*Two Western Locations*

1302 W. Magnolia Blvd., Burbank, Calif.  
Phone Victoria 9-4641

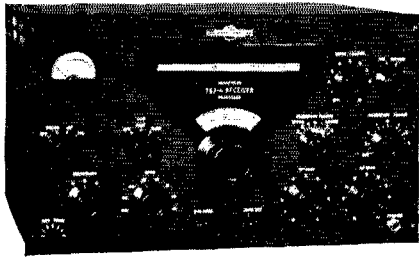
17647 Sherman Way, Van Nuys, Calif.  
Phone Dickens 2-5143



**FREE** Novice Classes at Both Stores • W6LTY & K6DPH Instructors • 455 Novices Licensed Through Our Classes to Date

**PHONE FOR STARTING DATE OF NEXT CLASS!**

## The 75A-4



**Designed Expressly for Amateur  
Operation on the 7 HF bands**

The Collins 75A-4 receiver retains time-proved features of earlier 75A series, plus AVC on SSB and CW, separate detectors for AM and SSB, Pass band tuning, rejection tuning, superior selectivity. Many other outstanding features.

Send for complete details in Bulletin 056-0298-00

### SELECTRONIC SUPPLIES, INC.

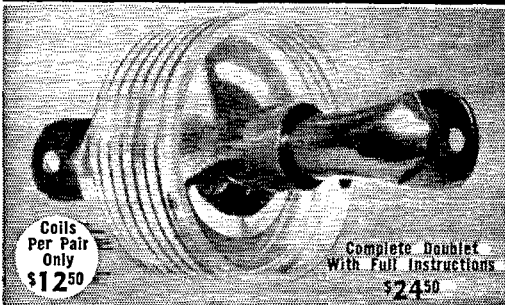
Radio and Electronic Supplies

1320 Madison Ave., Toledo 2, Ohio, W8GDE, Mgr.  
803 South Adams St., Peoria 2, Ill., W9YYM, Mgr.

## The WRL "Wonder Doublet"

Variable 5-Band Doublet for  
10, 15, 20, 40 and 80M

- ★ Only Doublet traps with adjustable, weather-protected condenser sections
- ★ Molded, 1-piece polystyrene construction
- ★ Complete weather-proof coils, imbedded in polystyrene
- ★ Capacity can be varied for resonating trap circuit on any tone or CW frequency (work any spot frequency in any band with maximum efficiency!)



Coils  
Per Pair  
Only  
**\$12.50**

Complete Doublet  
With Full Instructions  
**\$24.50**

WRL's "Wonder Doublet" is self-resonant on the 5 most popular bands. Comes completely pre-assembled, with 88 ft. of kilowatt Amphenol Twin Lead. Doublet proper constructed of No. 14 Copper Clad Steel antenna wire. End insulators are 7 inch porcelain. Coils are very High Q and will withstand 1 KW.

For Complete Information Write To

## WORLD RADIO LABORATORIES

3415 W. Broadway

Council Bluffs, Iowa

trol, with the key down, until your signal comes through the receiver at the desired level. Of course, you would not want the sidetone on at the same time. Once these rear panel controls have been adjusted they need not be touched again. Your sending speed can be controlled by the speed control alone.

With the function switch in either the full or delayed break-in position, adjust the side-tone gain and tone as desired. With this switch in the delayed break-in or phone position the receiver should remain silent for a short time after sending stops. Adjust this silent period by means of the delay control on the front panel. In the phone position the delay period will still be present but there will be no side-tone note. No adjustment to the hand-key circuit is needed.

This completes all adjustments and you are now ready to hook up the transmitter and antenna. For this, follow Fig. 3. You are not quite ready to give the c.w. bands a workout, as a word of advice about electronic keyers is in order. It takes considerable practice to master the technique of sending good code with an electronic keyer and I would suggest you spend many hours practicing with this, or any other keyer, before putting it on the air. This unit functions nicely as a code-practice oscillator. All that is necessary is to turn off the transmitter and start sending. After you master this unit you will be proud of your sending and your number of contacts will go up.

## Tech Correspondence

(Continued from page 45)

The entire time spent on the construction of the beam was one afternoon. I got my QST one day about 11 A.M., and was on ten all day the next day.

With the help of W5AJ, who lives about one quarter mile from me, we determined the front-to-back ratio of the beam to be 15 db. This ratio is confirmed by my own S meter on received signals.

Only one and a half days have elapsed since the construction first started and I have not had time to put up a suitable dipole to determine maximum forward gain. So far the only measurement has been the broadness of my smile when I get reports of 20, 30, and 40 db. over S9. This with the thing stuck up 20 feet in the air on an old TV pole.

The beam seems to be about as broad as the curve drawn in QST for a single element, but this is impossible; it can't be that good! However, it will work the whole band with good results.

I already had an old junk two-stack TV conical antenna, so the cost was exactly nothing.

— G. G. Ryan, W5JMQ

## W8QFH V.F.O. CIRCUIT

10 Thornycroft Close  
Timperley, Cheshire  
England

Technical Editor, QST:

Apparently, W8QFH ("A V.F.O.-Driver Circuit for 7 Mc.," QST, October, 1956) and the writer live under the same lucky star which permits circuits theoretically incorrect to work and work well! For the benefit of chaps who are not so lucky and who perhaps have an interest in Bob Karl's circuit, I should like to point out where trouble may be experienced, particularly if anybody tries to make the oscillator work at a frequency higher than 1.75 Mc.

A triode Clapp oscillator, as any other triode oscillator, be it Hartley, Colpitts or modifications thereof, should have its anode returned to some part of the grid circuit at r.f.:

(Continued on page 136)



# FROM A "CAT'S WHISKER" TO A COLISEUM!

Crystal sets to satellites . . . only decades away from the first primitive experiments looms today's giant 12 billion dollar radio-electronics industry. Now, all 4 floors of New York City's Coliseum are needed to display one year's growth!

The purpose of *The Radio Engineering Show* is to bring new and stimulating ideas in radio-electronics to engineers. To achieve this, more than 200 papers will be presented by 22 professional groups at the Convention's 55 technical sessions. Over 800 new ideas in radio-electronics engineering will also be presented by 834 exhibitors representing more than 80% of the productive capacity of the industry.

Yes, it's big in size, big in scope. Whatever your special interests, attending this Convention can cut weeks off your "keeping informed" time. Plan now to be there.

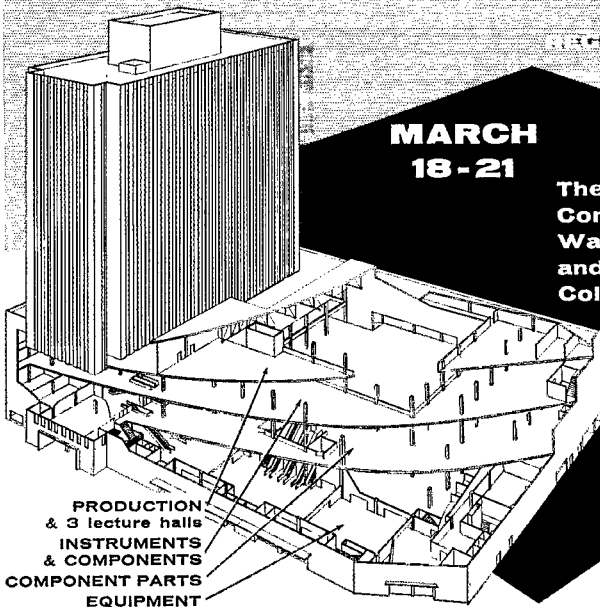
*Save time, a whole year's productive effort seen in days! -See all that's new in radio-electronics products, developments, and engineering--meet the men responsible! -Hear the best technical papers about your specialty! -Meet old friends, make new ones, enjoy association and social events!*

IRE Members \$1.00  
Non-members \$3.00

**MARCH  
18-21**

**The IRE National  
Convention  
Waldorf-Astoria Hotel  
and The Radio Engineering Show  
Coliseum**

**New York City**



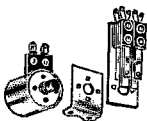
PRODUCTION  
& 3 lecture halls  
INSTRUMENTS  
& COMPONENTS  
COMPONENT PARTS  
EQUIPMENT



The  
Institute of  
Radio  
Engineers

1 East 79th Street, New York 21, N. Y.

## New DOW KEY Relays Multikit Series DKPK



with interchangeable coil and contact assembly, the new series offers a versatile relay of unusually high quality. A.C. types entirely free of hum or chatter.

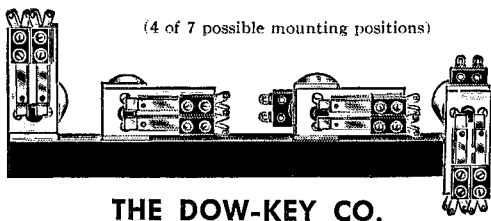
### COILS

6, 12, 24 v. a.c. .... \$1.85	6, 12, 24, 48 v. d.c. ... \$1.85
110 v. a.c. .... 2.20	110 v. d.c. .... 2.75
220 v. a.c. .... 2.85	

### CONTACT ASSEMBLIES

SPDT 10 amp. .... \$1.65	DPDT 15 amp. .... \$2.25
--------------------------	--------------------------

See your distributor. If he has not yet stocked Dow DKPK series relays, order from factory. Send check or money order or will ship C.O.D. Prices net F.O.B. Warren, Minn. Shipping weight 5 oz. Dealers' inquiries invited. Literature on request.



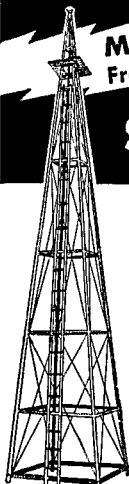
THE DOW-KEY CO.

BOX 57B

WARREN, MINNESOTA

**MORE SIGNALS PER DOLLAR**  
From Money Invested in an Antenna

Self Supporting  
**STEEL TOWERS**  
For Rotary Beams, FM, TV



You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5 1/2 ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower — and saves you money, too!

### ATTRACTIVE — NO GUY WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

Width of Base Equal to 1/5 Height

SMALL DOWN PMT.—EASY TERMS

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 23'-\$104, 28'-\$127, 33'-\$149, 39'-\$182, 44'-\$208, 50'-\$259, 61'-\$339, 77'-\$662, 100'-\$895.

Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change... so order now! Send check or money order... or write for free information. Cable address: "VESTO"

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

**VESTO CO., Inc.**  
20th and Clay  
North Kansas City, Mo.

i.e., in this case through a capacitor from anode to ground. The question then arises as to from where one takes the output if the anode is at ground potential for r.f. For a transmitter oscillator, the answer is that nowhere is really satisfactory except perhaps the cathode whose output voltage is small. For this reason, some chap developed a thing called an e.c.o., using a tetrode or pentode where the grounded screen looks like an oscillator anode and the rest of the tube looks like an amplifier enabling an anode load to be provided across which the output voltage is developed.

Why, then, should Bob Karl's circuit work? I cannot answer this other than perhaps to suggest that at 1.7 Mc. the inductive anode lead, via Miller effect, reflects sufficient capacitance from anode to grid circuit to start the tube oscillating.<sup>1</sup>

A year or so ago, I built a very similar oscillator, using a 6SL7 as Clapp and cathode follower, which worked well on 1.7 Mc. with a circuit almost identical to that shown by W8QFH. When I tried to make it work at 3.6 Mc., it just would not go until a capacitor was connected from anode to ground and then, of course, the output to the cathode-follower grid was negligible.

So, if anyone tries this circuit and it won't work, let them think on this point and change the 12A17 for a triode-pentode if a single tube for v.f.o. and cathode follower is a requirement.

— Gordon S. Bracewell, G8BQK

<sup>1</sup> An r.f. choke showing a series resonance near the operating frequency might also provide coupling to the oscillating circuit, while still maintaining a sufficient reactance to provide a driving voltage to the cathode follower. — Ed.

## World Above 50 Mc

(Continued from page 72)

lining up more. Anyone who has operated on 6 within a range of 600 to 1200 miles from Tennessee during the past few DX seasons cannot have been other than impressed by the number and enthusiasm of the 6-meter stations in that state.

## The World Above 420 Mc.

Note that this month we have revived a feature that used to run regularly in these pages, a summary of the known records for two-way DX work on all bands above 50 Mc. Could be that some of these listings do not represent the best work that has been done. Particularly in regard to 420, we have had second or third-hand reports of several contacts that appear to be beyond the quoted record. There was one across the Mediterranean, from France to Algiers, and W0PME quotes a Radio Budapest broadcast in regard to a contact between Switzerland and Spain on 420. If this issue of *QST* eventually reaches any of the participants in this or other u.h.f. DX work, we'd be happy to have complete details of the communication so that it can be duly recognized.

At least two members of the U.H.F. Club of Jamaica are out to live up to the club name. W2QPPQ and W2OKX have built and are now testing 230-Mc. equipment.

And here's another amateur TV enthusiast: W1ETF, West Haven, Conn., has been doing closed-circuit work and he has his 442-Mc. rig just about ready to go on the air.

### OES Notes

W1AHE, Stow, Mass. — Sunday-morning 2-meter net activity organized by W1QF, Lowell, Mass. First session 0700 to 0730, Dec. 2nd.

W1FIG, Providence, R. I. — F2 DX observed on 50 Mc. almost every day in November and through early part of December. Now have about 40 stations on 50 Mc. in Rhode Island, of which 15 are mobile. Net operates Wed., 2000 EST, with W1KCS as control. Aim for 50.7 as net frequency.

W1HDQ, Canton, Conn. — Crossband checks with G5BD on 28 Mc. made on 50.0, 50.28, 50.57, 51.15 and 51.25 Mc. showed signal getting stronger with each move higher in frequency; even though the highest of these was only 500 kc. away from the center frequency of the BBC video on 51.75 Mc. Reception on British Channel 2 must have been rather badly messed up on the better days! G5BD reports more than 70 contacts with 46 different stations

(Continued on page 138)



*and* **HENRY HAS ALL THE NEW EQUIPMENT** *First*

**TOP TRADE-INS**

We try to top all offers. Your trade-in makes down payment. Write for our offer.

**EASY TERMS**

90 days open account or 10% down—up to 20 months. We finance. Payment within 90 days cancels all interest. Write for details.

**A-1 RECONDITIONED APPARATUS**

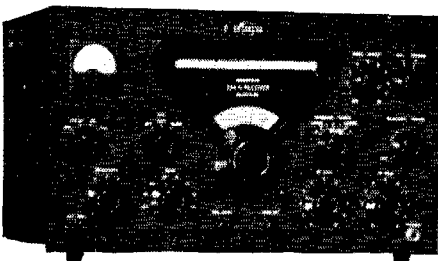
Nearly all makes and models—Big savings—Ten day trial—90-day warranty. 90-day full trade back on new apparatus. Write for bulletin.

**PERSONAL SERVICE — FAST DELIVERY**

Your inquiries and orders handled same day. Write, phone or wire us.

**COMPLETE STOCKS**

Henry has everything in the amateur equipment field, new or used . . . transmitters and receivers.



**COLLINS 75A-4 RECEIVER**

An SSB Receiver that doesn't sacrifice top efficiency on AM, CW and RTTY. . . top features proved in earlier 75A models are retained.

20 monthly payments  
**\$31.00**  
\$64.50 down  
Cash Price **\$645.00**

**A FEW ITEMS IN STOCK FOR IMMEDIATE SHIPMENT**

Collins KWS1 . . . . .	<b>\$2095.00</b>
Hallicrafter SX 101 . . . . .	<b>395.00</b>
Hallicrafter SX 100 . . . . .	<b>295.00</b>
Hallicrafter SX 99 . . . . .	<b>149.95</b>
National NC 300 . . . . .	<b>399.00</b>
Hammarlund HQ 150 . . . . .	<b>295.00</b>
Hammarlund HQ 100 . . . . .	<b>169.00</b>
Hammarlund HQ 140XA . . . . .	<b>249.50</b>
TMC GPR-90 . . . . .	<b>495.00</b>
Gonset G66B . . . . .	<b>189.50</b>
Gonset G-77 . . . . .	<b>279.50</b>
Gonset Communicators . . . . .	<b>229.50</b>
Elmac PMR7 . . . . .	<b>159.00</b>
Elmac AF-67 . . . . .	<b>177.00</b>
Morrow MB-560 . . . . .	<b>214.50</b>
B & W 5100B . . . . .	<b>475.00</b>
B & W 51SB-B . . . . .	<b>265.00</b>
Johnson transmitters, kits and wired	

Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has the new equipment first.

PRICES SUBJECT TO CHANGE

**Write, wire, phone or visit either store today.**

Butler 1, Missouri  
Phone 395



Bob Henry,  
W0ARA  
Butler, Mo.



**Henry Radio Stores**

GRanite 7-6701

11240 West Olympic Blvd. Los Angeles 64



Ted Henry,  
W6UOU  
Los Angeles



**"World's Largest Distributors of Short Wave Receivers."**

# KRECO ANTENNAS

- GROUND PLANES
  - CO-AXIALS
  - STACKED CO-AXIALS
  - FREQUENCIES FROM 14 mc TO 470 mc
- ORDERS SHIPPED IN 48 HRS.



- for
- Police
  - Fire
  - Taxi
  - Industrial
  - Amateur
- MEET FCDA SPECS.
- Catalog 56-Q On Request

Material: Models above 100 mc are 100% BRASS machined to close tolerance. Models below 100 mc are machined of brass with hard

aluminum tubing elements which mount on cadmium plated brass inserts. Base insulator is unbreakable fiberglass reinforced polyester.

Used by Leading Hams and Commercial Industrial Installations everywhere. See Your Distributor or Write

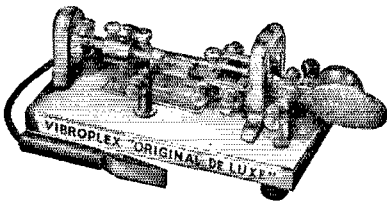
**HERB KRECKMAN Co.** CRESCO PENNA.

## GET INTO ELECTRONICS

Train for best technical positions in a Top-flight school. Specialize in missiles, computers, radar, communications, industrial electronics, color TV, automation. Excellent program in theory, laboratory, mathematics. Major firms select our graduates as Tech. reps., field engineers, specialists. Associate degree granted 21 months' program. High school or equivalent required. Write for catalog.

**VALPARAISO TECHNICAL INSTITUTE**  
Dept. TW Valparaiso, Indiana

## Vibroplex Makes Sending TWICE AS EASY FOR YOU:



You get All these benefits with Vibroplex:

Smoother, easier performance; cleaner signals. Freedom from nervous and muscular tension. Adjustable speed to suit your own hand. Personal touch. Trouble proof, nothing to get out of order. No mere sore, tired muscles, no sending fatigue. Lifetime of easy, enjoyable keying. And many others.

Easier on your arm . . . easier on your nerves . . . easier on you. That's because its semi-automatic action performs for you with an ease beyond comparison. Requires no special skill . . . there's no tiring arm effort . . . no nervous or muscular tension common to other keys. Vibroplex actually does all the arm-tiring work for you. Helps you develop a higher degree of sending skill than is possible with any other type of key. Gives you years of easy, enjoyable keying.

Five smart models standard or deluxe, priced from \$15.95 to \$29.95. Left-hand models, \$2.50 additional. Handsome carrying case, \$6.75. Take the advice of any user and order yours today. At dealers or direct. FREE folder.

**The VIBROPLEX CO., Inc.**  
833 Broadway New York 3, N. Y.

138

in W1, 2, 3, 4, 5, 8 and VE1, up to Dec. 10th. Best DX: W5s SFW and MJD, Amarillo, Texas.

K2HRB, Lancaster, N. Y. — Local 50-Mc. activity at high level. Sunday morning net on 50.55 Mc., W3AMO or W3FGI as NCS.

W3GKP, Spencerville, Md. — Observations during November aurora: A clean signal on c.w. occupies but one frequency, but when reflected from the aurora it occupies a spectrum. That reception is improved by increasing selectivity, up to a point, indicates that spectrum is not flat-topped, though it is narrower than the usual receiver selectivity curve. My observations all show displacement of frequency upward from the direct-path signal, by about 500 cycles, though work at Cornell indicates that displacement can be in either direction. Frequency displacement observed here recently depended upon what part of the aurora the antenna is aimed at, which would appear to indicate that all parts of the aurora do not have the same motion.

W4AZC, Birmingham, Ala. — Making consistent ground-wave contacts on 50 Mc. with K4CFD, Nashville, and K4EGC, Tallahoma, Tenn., around 200 miles.

W5PZ, Ponca City, Okla. — First 432-Mc. work in this area done with W5HTZ/5, near Newkirk, Okla. As signals were good over this path, the next try will be from the home location of W5HTZ, Wewoka, 120 miles. Rig at W5PZ has 5894 tripler and amplifier, at 50 watts input. W5HTZ uses 15E's.

W6SOD, Torrance, Calif. — Would like to swap info on 220 Mc. with stations using the band in other parts of the country.

W7QDJ, Clearfield, Utah — VE1, W1, 2 heard on 50 Mc. Dec. 1st. (Shortest F2 skip on record — EPT.) JASCF worked Dec. 8th. How about more c.w. on 6 during DX sessions? East Coast works West Coast with 89 signals, and the easterners fail to hear the hard-to-get states at shorter distances because of heavy phone QRM.

W8ECZ, Rock Island, Ill. — Increasing activity on Quad City 6-Meter Net, opening at 2030 CST, Fridays, 50.7 Mc. Also have c.w. net at 1930, to help Technician-Class ticket holders prepare for General. V.H.F. club organized for same purpose has ragchew and code-practice meeting last Friday of each month.

W9IBL, Mt. Vernon, Mo. — Only active 6-meter station in Southwest Missouri; work W0VVO, Raytown (south of Kansas City) regularly on sked, 155 miles. Both of us would like skeds with other stations within 200-mile radius, in early morning or after 1700 CST.

## Correspondence

(Continued from page 49)

This kind of stuff goes on day after day. A really rare one can put out any kind of a signal that barely can be copied and almost never get less than 569. I have heard some signals that were so rough they were an insult, and some lid would say "579 pse QSL." During the DX contest, I heard every sort of a rotten signal imaginable get a 579.

Some of the DX stations are just as guilty though because there will be a big screaming, seething mess of a pile-up and Mr. DX station digs a guy right out of it and gives him an R5. Really now, with all those stations right on the same frequency, all calling like mad, this DX station can copy with no difficulty? Is he trying to tell the world how good an operator he is, or is he trying to brag up the other guy's signal? (Then he says "QSL sure." He probably hasn't mailed a QSL out in 15 years. But that's another gripe.)

It does no good to give out a correct signal report as the next umpteen stations that work the guy will give him T9 and make a liar out of you. Several times I have given out with a signal report such as a T7 and evidently it insulted the character because he came back with a T6 or something about as bad.

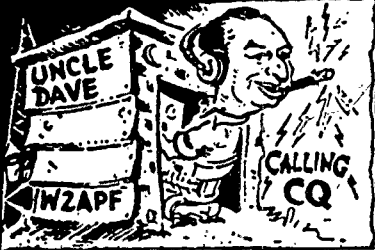
I have heard DX stations with a T4 signal work hard for several minutes just to get a 579 report from some lid. With this valuable piece of information he was happy.

I cannot see the use of exchanging reports if they mean absolutely nothing, but it's the first thing two stations do when they make contact.

It seems to be the general opinion that you have to give a DX station a good signal report or he won't QSL.

I say, Mr. DX station, if you are only passing out QSLs

(Continued on page 140)



# FORT ORANGE

## Radio Distributing Co. INC.

904 BROADWAY, ALBANY 4, N. Y. U S A  
AMATEUR HEADQUARTERS

We carry all popular brands of Electronic merchandise. Write!

Call Albany 5-1594 - Nites 2-7729

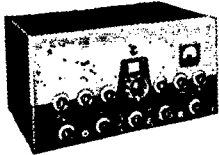
Ask UNCLE DAVE about our easy payment plan that gives you up to 18 months to pay after the down payment. Life insurance included at no extra cost.

### LATE WINTER CLEARANCE

Write Uncledave for your free net control logs and message pads

We want to clear our overstocked shelves for new fresh units for spring. Our loss is your gain. Read them and drool...or maybe you haven't spent that cash you got for Christmas.

#### JOHNSON VIKING II



Our Special Prices

Reg. \$293 kit form... \$225.  
Reg. \$337.50 w/t... 260.

#### BARKER WILLIAMSON 5100S TRANSMITTER



Our Special Price

\$365. ... Reg. price \$475.00



#### SONAR SRT 120

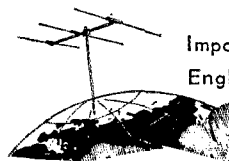
Special Prices  
Reg. 259.50 w/t... \$169.50  
Reg. 289.50 w/t  
with power supply \$199.50

Write For Giant Specials List.

#### WE HAVE ALL THE NEW UNITS AVAILABLE

Johnson Valiant Kits.. \$349.50  
Johnson 6N2 kit ..... 119.50  
Johnson Ranger kit..... 214.50  
Johnson Pacemkr w/t.. 495.00  
Johnson 500 kit ..... 649.50  
Collins 75A4 with mechanical dial ..... 645.00  
TMC - GPR 90 ..... 495.00  
National NC300 ..... 399.00  
Hammarlund HQ100 ..... 169.00  
Hallicrafters SX101..... 395.00  
RME 4300 ..... 194.00  
.....and any equipment a ham could possibly want.

#### THE FAMOUS GAZU GLOBEMASTER PANDA BEAM



Imported from England... \$99.50 net

3 band minibeam 10, 15 and 20 meters—it's the Ham's dream beam...sold ONLY by Fort Orange Radio. One antenna, 1 beam, 1 feed line — it's pre-tuned, fits any 2" pole.

#### SEE US FOR HIGHEST TRADE-IN ALLOWANCES

Harvey Wells R9 ..... \$160.50  
Harvey Wells T90 ..... 179.50  
Morrow MB560 ..... 214.50  
Morrow MBR5 ..... 224.50  
Elmac PMR7 ..... 159.00  
Elmac AF67 ..... 177.00  
Gonset G66 ..... 189.50  
Gonset G77 .... write for prices  
Johnson Mobile Xmtr kit 99.50  
.....and a full line of.....  
Master Mobile Equipment.....  
James Power Supplies.....  
and all the very best gear for your special needs.

#### HERE IS JUST A PARTIAL LIST OF USED EQUIPMENT . . . CHOOSE YOURS

Meissner 150B 150 watt .....	\$ 95.00	Hallicrafters SX-88 .....	\$449.50
Hallicrafters 100 watt HT-19 .....	179.00	Hammarlund HQ 129X .....	139.00
Eldico TR-75 75 watt (Att: Novices)....	35.00	National HRO-7 with 6 coils .....	125.00
Johnson Viking Adventurer 35 watt (like new) CW - all bands .....	50.00	National HRO-50T w/coils, spkr (L.N.) .....	325.00
Johnson Viking II with VFO .....	275.00	National HRO-60 w/6 coils (a Demo)....	450.00
Lysco 600S 35 watt (NEW) CW and Phone VFO .....	150.00	Elmac PMR 6A 12 volt receiver .....	75.00
Sonar SRT-120P 120 watt. All band ....	125.00	Johnson Mobile Xmtr (all band).....	95.00
National 50-3 Selecto-Ject (for NC98)..	30.00	CD144 Deltronic (get on 2 meters cheap) .....	125.00
Hallicrafters SX-25 with PM23 spkr ....	125.00	Sonar SR9 2 mtr receiver-transmitter MB26 110V P.S. in cabinet .....	75.00
Hallicrafters SX-28A—an old standby....	150.00	Stewart Warner No. 73 citizen band (pr) .....	150.00
		Home built rcvr 2/power supply .....	25.00

Write Uncledave W2APF with your needs and problems.

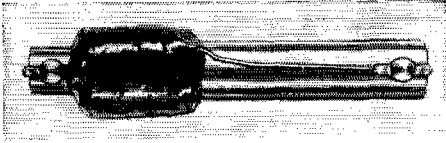
JUST OFF THE PRESS - WRITE FOR OUR GIANT

... USED EQUIPMENT LIST NO. 2 24 HR. SERVICE WE SPECIALIZE IN FOREIGN TRADE on stock items

And lots, lots more!

## FIVE BAND ANTENNA COILS

Tunes 80 - 40 - 20 - 15 - 10 Meters



Change bands with your transmitter in 20 seconds. Coils weigh 7 oz. each, are weatherproof, and tested for 400 lb. tensile strength.

Specify phone or CW.

No. 5BC-F Coils for phone **\$12.50** postpaid  
No. 5BC-C Coils for CW **\$12.50** postpaid

Complete antennas with 88 ft. of KW twinlead, 12 inch insulators, and high strength wire.

No. 5BA-F Antenna for phone **\$27.50** postpaid  
No. 5BA-C Antenna for CW **\$27.50** postpaid

All prices postpaid in U. S. A.

**MONEY BACK GUARANTEE**

If not available at your jobber, write  
Don Larimer, W9IYP

**GENERAL CRYSTAL CO., INC.**

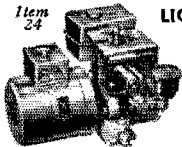
Antenna Division

434 Wilmot Avenue Burlington, Wisconsin

Manufacturers of quartz crystals for all applications



Item 24



### MASTER MECHANIC PORTABLE LIGHT PLANTS, PUSH BUTTON START

AC Plant 700 Watts — 115 v. 60 cyc. Powered by a rugged 2.2 hp. easy starting Briggs gas engine. No wiring necessary; just plug in and operate. Plenty of current for receivers, transmitters, antenna motors, emergency lights, etc. which require up to 700 Watts. Ideal for radio amateurs, Civil Defense, trailers and camps. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries.

Item 24. Wt. 75 lbs. Be prepared if war or storms knock out power lines. **\$143.50**  
800 Watt Plant (Item 44) same as above but with larger engine and greater capacity. **\$169.95**  
1200 Watt Plant (Item 45) same as Item 24 but with larger generator and engine — 50% greater output **\$199.50**

We make all sizes up to 25,000 Watts. Write for information.

Send 10¢ for big 1957 Catalog. Free with order.

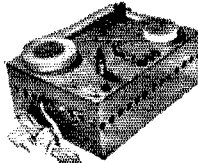
Prices f.o.b. factory. Money back guarantee. Send check or M.O.

Master Mechanic Mfg. Co., Dept. 92-P, Burlington, Wis.

## What Is This Thing Called the "Hump" in CODE?

THE hump (around 8 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the hump. We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dotdash is not A. The SOUND resulting from dotdash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.

**TELEPLEX CO. 415 G. St., MODESTO, CALIFORNIA**



to the guy that can tell the biggest lie about your signal, as far as I'm concerned, just keep your QSL cards right on top of your crummy old rig!

— Gerald Collins, W4ZPX

## UTAH QSLs

473 N. 5th E.  
Provo, Utah

Editor, QST:

For nearly four years I have been partially ignoring my duty as a good amateur. I have felt ashamed about this many times, and now I would like to try to redeem myself. A lot of fellows have sent me QSLs in hopes of getting a Utah card, and some have been disappointed. I would like to publicly apologize to these guys, and assure everyone that I am henceforth QSLing 100%. To those who have sent me QSLs and haven't received one in return, please send me QSO information on a post card, letter, etc., and let me send you a card. Recently I have acquired an XYL, and have changed QTH. So, please use the address at the top.

I ask forgiveness from my fellow amateurs with all sincerity, for I know how frustrating it is to hopefully send someone a card and never get one in return. So check your logs, fellows, and see if I'm that — from Utah your "wouldn't QSL!"

— Ray Johnson, W7QDM

## TWO-HEADED PHONE OPS!

707 Sheridan Road  
Evanston, Illinois

Editor, QST:

During a contact, phone operators apparently grow second heads which disappear later. While the oddity may be a split personality problem common to the non-c.w. op, research fails to find even delusions of royalty. The mysterious double head is left as the only working hypothesis for the pompous use of "we/our" when the man means "I/my." Two-operator stations are too few to consider as a reason. Two-headed phone men must be on the air; beware!

— Temple Nieter, W9YLD

## N.T.S.

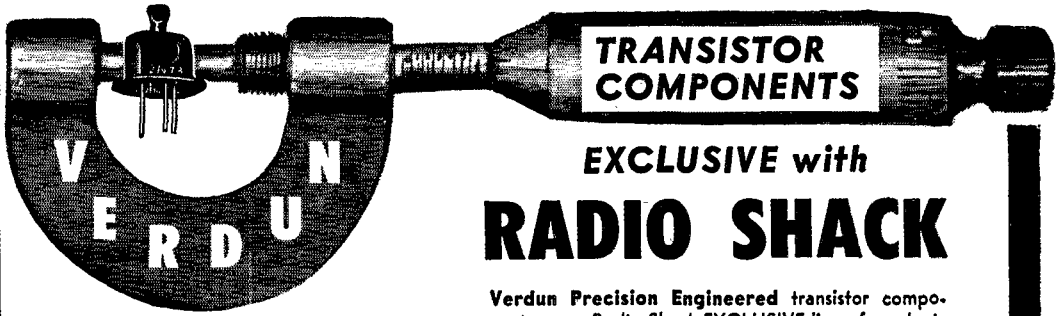
(Continued from page 58)

### Getting Into Your NTS

If you have read this far, you must be interested. If so, write us for a copy of CD-24, which explains the system in much more detail than we have been able to do in the foregoing. The success NTS has enjoyed in the seven years of its operation has been due to teamwork on the part of all participants. Its shortcomings, where they exist, are due to lack of adequate staff to meet the schedule requirements. NTS operates six days per week, 52 weeks per year, and we hope soon to expand it to operate every day, Sundays, holidays and February 29th included. It's an ambitious undertaking, but it can be done if you will help us do it.

### ARE YOU LICENSED ?

• When joining the League or renewing your membership. It is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.



**Precision-Engineered**

**EXCLUSIVE with  
RADIO SHACK**

Verdun Precision Engineered transistor components are a Radio Shack EXCLUSIVE line of products to fill every micro-miniature application.

**Verdun SUBMINIATURE AUDIO  
TRANSISTOR  
TRANSFORMERS**



**\$1.49**

Radio Shack's own tiny importations — all 0.8" W x 0.62" H x 0.64" deep, except Order No. R-9967 which is 0.5" x 0.58" x 0.48". U-type mounting clip, vacuum-impregnated insulation, color-coded leads; the best, the SMALLEST, and the most moderately priced such units presently available.

- V-11 Input interstage — pri. 20K, sec. 1K. Order R-9967Q
- V-13 Input Transformer — 200K/1K Order R-9968Q
- V-21 Driver Transformer — 10K/2K CT Order R-9969Q
- V-31 Output Transformer — 500CT/3.2 Order R-9970Q
- V-33 Output Transformer — 500CT/8; small Order R-9974Q
- V-35 Output Transformer — 500CT/8; large Order R-9958Q

**Verdun Subminiature  
Variable Condensers!**



VERDUN units are smaller in size, superior in quality, and lower in price!

**BROADCAST SUPERHET**

VERDUN V-2GP is the world's smallest, enclosed in plastic case! 2-gang, measures only 1-1/16 x 1-1/16 x 5/8", self-contained trimmers, 180° tuning. 10-208 mmf on antenna section, 10-100 mmf on cut osc. section. Order R-9959Q.....Net \$1.89

**SINGLE-GANG 365 MMF**

VERDUN V-1GP is also plastic-encased, top TRF performance, measures a mere 1-1/16 x 1-1/16 x 5/8", 180° tuning, 10-365 mmf. Order R-9962. Net \$1.19

**Verdun Subminiature Controls**

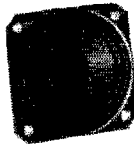


**WORLD'S SMALLEST**

**59c**

VERDUN Controls are the World's Smallest — just 5/8" diameter, with 1/4" knurled and split shafts. All audio taper. Ideal for transistor and other miniature circuits. Order R-9942Q (5000Ω); R-9943Q (10K); R-9944Q (20K).....Net 59c each

**New 1 1/2" PM Speaker!**



1 1/2" dia.

15/16" deep

**\$1.95**



World's smallest genuine PM Speaker. For transistor radios, conduit box for hidden speaker, intercoms, walkie-talkies, personal radios, monitoring, etc. 8-ohm voice coil impedance. Shallow cone with shielded pot construction, magnet totally enclosed. Conventional solder terminals. 6-32 mtg. holes. Imported to save you 50%. Order R-9925Q.

**WITH MATCHING OUTPUT  
TRANSFORMER**

R-9925 1 1/2" speaker with 500 ohms center-tapped to 8 ohms transformer. Order R-9925-58.....Net \$2.90

**FREE** Send for Radio Shack's big, new 1957 catalog featuring a complete TRANSISTOR SECTION

**ORDER BY MAIL**

NAME \_\_\_\_\_

STREET \_\_\_\_\_

TOWN \_\_\_\_\_ STATE \_\_\_\_\_

Add estimated postage.

**Radio Shack**

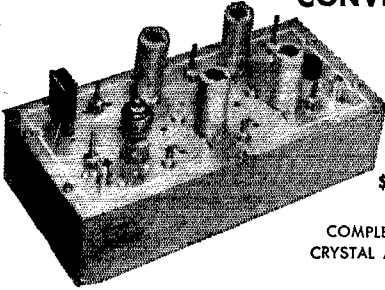
230-234 Crown St., New Haven 10, Conn.

167 Washington Street,  
Boston 8, Massachusetts

## TRACK the EARTH'S SATELLITE!

(See July 1956 QST, page 11)

WITH A *Tecraft* **CC5-108  
CONVERTER**



AMATEUR  
NET

**\$42.50**

COMPLETE WITH  
CRYSTAL AND TUBES

May be had with IF output frequencies to suit the tuning range of your receiver. Provides the ideal system, in terms of **extreme sensitivity, maximum stability, low noise, high gain and selectivity.**

**LOW NOISE FIGURE:** Approximately 4 db. 1 microvolt of signal will provide better than 20 db. thermal noise quieting.

**SENSITIVITY:** Approximately 1/10 microvolt input will provide a signal 6 db. over noise level.

**GAIN:** Better than 30 db.

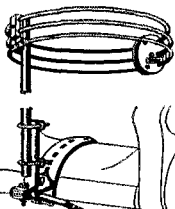
AT YOUR DEALER'S OR WRITE:

*The Equipment Crafters, Inc.*

RIVER EDGE, N. J.

523 WINNE AVE.

COlfax 2-0159



## "SATURN 6" MOBILEER

- ▶ Horizontally polarized
- ▶ Minimizes flutter and noise
- ▶ Adjusts to your frequency in 6 meter band
- ▶ Feeds with 50-ohm cable
- ▶ Fits standard mounts
- ▶ Ruggedly constructed
- ▶ Weighs under 2 lbs.

### MODEL S-1

#### "Saturn 6" Antenna

2-pc. adjustable aluminum mast, bracket, universal bumper hitch. No holes to drill. Co-ax feed line not inc. Net. . . . . \$16.95

HI-PAR PRODUCTS CO.

Fitchburg, Mass.

## 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

## YL News and Views

(Continued from page 68)

dent; and W5ZPD, MC for the occasion. The third anniversary party will be held in Dallas, Texas, in November 1957.

*Young Ladies Radio League* — President W3PVH has appointed W8RIE, Beth, Chairman of the Nominating Committee for 1957.

### Operating:

K6QFY, Irene, is looking for YL contacts on 20 a.s.b. . . . W5HWK has made YLCC and YL/WAC in less than a year, using only two crystals on ten phone. Jessie has also worked 72 countries toward DXCC. . . . By working



A much sought-after contact in the A.P. was KA2MR, Marcia Rast, the only KA-YL operator in Japan. Marcia, ex K6DLL and W1STU, used 20 meters to work 41 stations in 24 sections, although she "had a hard time getting the U. S. girls to tune the DX band." Next year she expects to be stateside herself. (Photo courtesy Marcia's OM KA2TR.)

KA2MR and W0MJK in the YLRL A.P. W6WRT, Ruby, completed both her YL/WAS and YL/WAC. . . . W6UHA has been enjoying almost daily contacts with ZS6GH, Diana; ZS6KK, Marie; ZS2AA, Iris; and OQ5FH, Momy. Maxine, who now has 229 countries confirmed, recently chatted with UQ2AG, Valentine, on twenty c.w.

### Miscellany:

K6OQD has been busy building a Viking Valiant and a 6N2. Jean was recently named Radio Officer of the Glendora CD unit and was elected Secy-Treas. of the local ham club for a third term. . . . K6HVC, Marge, has been appointed Director of Communications for the San Bernardino County National Red Cross. . . . K6HIW, Kay, was reelected Secretary of the San Francisco RC. . . . PA0ULA, Paula, will leave her native land in January '57 for Boston, Mass., where she hopes to settle permanently. . . . W6WSV's new QTH is 1442 Cameo Drive, Santa Ana, Calif. and W5RZJ is back on ten meters from her new location in Santa Fe, New Mexico.

### MEMBERSHIP CHANGES OF ADDRESS

Four week's notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of QST without interruption.



*More Than Just An Antenna*

**THE NEW C & G**

**SEVEN-BAND**

**antenna  
system**

One antenna  
and one feed line . . .  
Designed for  
sparkling performance  
on 80 through 6 meters.

**Model 200 mounted on tower and rotator with 80 and 40 meter radials.**

The new C & G Seven-band antenna System is ideal for those with limited space who want optimum coverage on 80 through 6 meters. All Systems are pre-tuned and color-coded to simplify installation. Assembly is simple and fast. A standard heavy-duty TV rotor operates the beam.

Because of the very low standing wave ratio and single coaxial feed line, the TVI problem is greatly reduced on every band. The specification chart below shows that here is a complete antenna system to give the radio amateur maximum performance at minimum cost.

ELECTRICAL SPECIFICATIONS AND CHARACTERISTICS CHART

	6 Meters	10 Meters	11 Meters	15 Meters	20 Meters	40 Meters	80 Meters
<b>Model 100 Amateur Net...\$ 99.95</b>							
FORWARD GAIN	4.7db	7.6db	6.7db	5.9db	0 db	(c) 1.5db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	26db	21db	17db	(a)	(a)	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.5	1.1-1.6	1.1-1.3	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	2	3	3	2	1	1	(b)
HORIZONTAL BEAM ANGLE	22 deg.	30 deg.	34 deg.	37 deg.	(a)	(a)	(b)
<b>Model 200 Amateur Net...\$ 149.95</b>							
FORWARD GAIN	4.7db	7.6db	6.7db	5.9db	5.6db	(c) 1.5db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	26db	21db	17db	14db	(a)	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.5	1.1-1.6	1.1-1.6	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	2	3	3	2	2	1	(b)
HORIZONTAL BEAM ANGLE	22 deg.	30 deg.	34 deg.	37 deg.	39 deg.	(a)	(b)
<b>Model 300 Amateur Net...\$ 199.95</b>							
FORWARD GAIN	5.2db	8.8db	7.9db	7.8db	7.6db	(c) 2.6db	(c) 1.5db
FRONT TO BACK RATIO	12.6db	29db	26db	23db	21db	9db	(b)
STANDING WAVE RATIO	1.2-2.1	1.1-1.8	1.1-1.7	1.1-1.6	1.1-1.6	1.1-2.1	1.1-2.1
NUMBER OF ELEMENTS	3	4	4	3	3	2	(b)
HORIZONTAL BEAM ANGLE	22 deg.	22 deg.	26 deg.	30 deg.	32 deg.	39 deg.	(b)

Footnotes: (a) Standard figure 8 dipole pattern rotary  
(b) Vertical cone radiator with top loading  
(c) with radial guy wires

**Order direct from C & G or  
your local distributor. Write  
for complete specifications.**

**C & G RADIO SUPPLY CO**

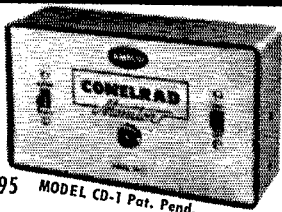
2502 JEFFERSON  
TACOMA 2, WASH.

Phonc  
BR 3181

# Here it is!

## The Sensational, New, AMECO CONELRAD MONITOR

Not just a kit,  
but wired and  
tested, complete,  
ready for \$**13**  
operation.  
Priced at  
a LOW **.95**



Completely enclosed in an attractive black case and brushed copper panel with block lettering, the AMECO Conelrad Monitor converts any receiver having AVC, into an effective conelrad alarm system. When the broadcast station goes off the air, a loud clear tone immediately sounded in the receiver. The AMECO Monitor is a complete electronic audio alarm. There are no buzzers or relays.

### OTHER FEATURES INCLUDE:

- Easily installed. No leads in radio to cut.
- Connectors provided so that monitor can be plugged in or out of receiver.
- Monitor switch allows receiver to function normally or turns on Conelrad Alarm System.
- Excellent as Code Practice Oscillator.
- Receiver completely silent during the monitoring. No transformer clatter.
- Easily modified for mobile use.
- No potentiometers to vary. No relays to adjust.

**AMERICAN ELECTRONICS CO.**  
1203 Bryant Avenue, New York 59, N. Y.

## DXERAMA

SECOND EDITION

**Bigger and Better than Ever!**

Nearly 50 DX Awards. 15 new ones including new revised rules CDM, WACE and others. Nicely printed on good paper, heavy covers, well indexed, 8½" x 11", 72 pages.

**\$1.60** U. S. A. & Possessions      **\$1.85** Foreign

Compiled by W3AXT

Order from your Distributor or direct from

**DXERAMA** 1101 Farmingdale Rd., Lancaster, Pa.

## LMB PRESENTS THE NEW "SAL-MET"

FREE 1957 CATALOG covering the full precision engineered line of original box chassis as manufactured by LMB including new Miniature, new Jiffy, new T.F., new Utility Boxes. Eleven different types, 160 different shapes and sizes. A ready reference for engineers, experimenters or anyone using metal boxes. Send for your FREE CATALOG now!

"SAL-MET" Non-corrosive Flux — solders copper to aluminum, aluminum to aluminum, any metal to any metal using conventional solder and regular soldering methods. Send for both LMB and "SAL-MET" Catalogs.

**LMB**

1011 Venice Boulevard  
Los Angeles 15, California

## How's DX?

(Continued from page 65)

springtime Tannu Tuva DXpeditionary doings under government auspices. . . . The DARC (Germany) WAE DX Contest phone week ends have concluded but the final c.w. session won't be held until April 6th-7th. We'll schedule a reminder for the April column.

**Hereabouts** — VP9BM, DXCC with one to spare, shuts down in favor of KP4 reassignment, and W1YYM, with a fresh DXCC membership of her own, notes that VP5FH is VP7-bound. . . . VP2LU (WITBS, ex-VP7BC) received his ticket last October 29th, string a long-way to the nearest St. Lucia palm tree and rolled up some 67 countries in less than a month. Fred uses a DX-100 plus SX-96 and expects to put in another month or two in the Windwards. . . . W2QHH really must have a way with the women for he's now certified at YLCC/600. Howy echoes an amen to our December DX certificate-award terminations and deplores the irresponsible attitudes displayed by numerous overseas award sponsors. . . .

W1CTW is providing for the answer to heel-tipping, the growing malpractice of jumping on rare ones before they've finished QSOs. SK and K both are clear invitations for the roof to fall in, so we hold out for profuse use of KN. . . . W3MOT, an old traffic hound who had 56 eighty-meter countries bagged prewar as W8MOT, finds a spare set of 304TLs the answer to 14-Mc. QRMI when the going gets too rough for his normal 125-watt input. . . . W6HHI, back from his BV1US adventures, visited pleasantly with W3VKD in early December. One outcome of the event was a favorable write-up plus photography in the Indiana, Penna., *Evening Gazette*. . . . The family touch seems to gain a higher-than-normal QSL returns percentage for W7DJU. Dale uncovers a cozy photo of OM and XYL with each outgoing high-priority card. . . . From W8KML: "VP8BC of the Falklands advises he is QRT as of November, 1956, and going to South Georgia (no radio). He hopes to be back in the Falklands in ten years and his call will not be reassigned." . . . Red Higby, a KC4USA staffman, sent K2K6J a poem which might well be titled "Ode to a Pile-Up." We like the last verse: "My p.a. is shot and my skywire is sagging; the mike cord is loose and the meter is dragging; the fan is dead and the tubes are red — so Queen-Roger-Tare, I'm going to bed!" . . .

Help! W1BTU needs a clew regarding the present whereabouts of one HL1BA worked way back in '48. . . . In *Ether Waves* of the Ohio Valley Amateur Radio Assn. we see that W8JIN maintains his comfortable lead in the membership's total band-countries category with 1155 on 14 bands (phone suballocations counted separately). Runner-up is W4KXX with 602, followed closely by W8s EV SDD JJW and ZJM. W4EPA continues chores as the organ's able DX editor. . . . You have roughly one week, if you're a W/K, to complete preparations for the 23rd ARRL DX Contest. Time is a-wastin'! We suggest you consult the résumé of last year's Test, which appears in the September 1956 *QST*, for info on the guys and gals you're out to beat. In some ARRL Sections (like Utah or Nebraska) you may have easy going; in others — *brother!*

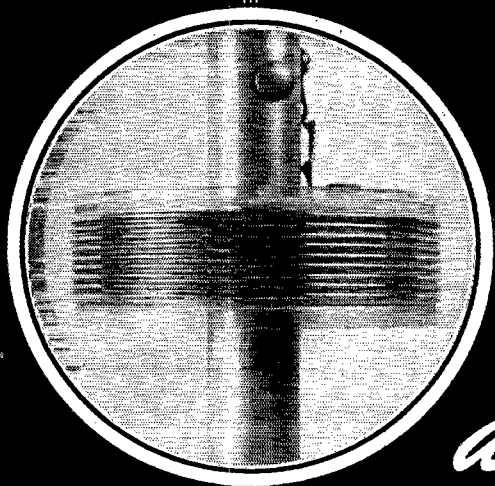
**Ten Years Ago In "How's DX?"** — Conductor W1DX reminds us that ARRL's 13th International DX Competition, the first postwar, kicks off this month. By also refers the gang to the first published Postwar Countries List which appears elsewhere in this February 1947 *QST*. . . . Bandwise, 80 and 75 meters find W/VE clients consulting many Europeans, K6CGK working the U. S. East Coast, and G6BY's terminated rhombic inhaling North American 3.9-Mc. phones as far west as W8. The best on 40 appear to be G5KW/ZC1, PJ9XX and ZD3AF. On 10 phone you can find HP1A, J9s AAO AGT, LX1s AY RB, OX1B, PK1AW, W0MCF/CI, XU1s 1RP and 6GRL; 10 c.w., HE1CE, LX1AX and YR5X. Boss 20 features (phone) Cs 7AA 8YR, EKIND, Js 5AAA 9UUV, KA1s AW CB, W6ONP/KW6; (c.w.) EK1AZ, EPs 1AL 3D, FG3GP, FM8AC, FT4AE, HA4AE, HZ1AB, I7AA/I6, Js 3AAD 4AAC, KA1ZU, KP6AB, Spitzbergen's LA4LA, LX1AS, PZ1XX, NY4CM, OX1Z, PKs 2AA 3TT 4KS, RAEM, Libyan T1NS, UAs 9CF 0KAU 0KTU, UN1AO, UQ2AB, Papuan VK4s NV OS, V06HOS, VR4AA, W2ICT/G7, W8URU/G7, XACP of Sardinia, XAEG of Trieste, YU7LX, ZA2D, ZC6AA, ZP2AC and ZS4P of Hasutoland. . . . Your column is graced by photos of popular CR9AN and VS7ES, while poor Jeeves performs as a human beam-rotator in waist-deep midwinter snows.

# SWITCH TO SAFETY!



# Coming Soon!

THE ANTENNA REQUIRING ONLY 1 SQ. FT. OF REAL ESTATE!



## WRL'S NEW

# VERTICAL

The Secret Is in the "Traps"!

# VERTICAL

## antenna!

✓ **SAVE SPACE** ✓ **SAVE MONEY** ✓ **WORK ALL BANDS**

Automatically tunes 80, 40, 20, 15 and 10M . . . No adjustment necessary . . . one man installation in minutes . . . easily side-mounted on any building, or free standing with three guy wires.

Watch for Exciting Announcement

## NEXT MONTH!

# World Radio Laboratories

"The World's Largest Distributor of Amateur Radio Equipment!"

3415 W. BROADWAY

COUNCIL BLUFFS, IOWA

PHONE 2-0277

## FCC Story

(Continued from page 46)

issuance. Likewise, there is no provision in the rules for receiving a two-letter call unless the applicant has previously held a two-letter call—in other words, an old, old timer. It will do you no good to write and request a two-letter call because a pal of yours once held it, or because it belonged to your father, or anything of the sort. The Commission staff works strictly according to the rule book, and the book provides that a two-letter call is assigned only if the applicant previously held such a two-letter call. Similarly, it does no good for you to write and request your initials in your call sign, or to request a buddy's call for sentimental reasons, or to request FMC because you are president of Ford Motor Co. Correspondence on such matters only adds to the delay.<sup>1</sup>

Many have written to the Commission about one thing or another and have failed to receive a prompt reply. The Commission staff is sincerely apologetic for this, but simply does not have the time nor the facilities to handle much of the extra correspondence that comes in. Insofar as possible, the Commission answers correspondence with form letters, in order to take as little time as possible from the processing of licenses and thus speed up the overall program. (For specific answers to specific problems we still suggest that you write ARRL Hq.)

Don't forget—your license application is being handled by a group of people who have a definite set of rules to follow. If you will follow those same rules, everyone will benefit. Triple check yourself. Have you filled in every blank, correctly? Has it been signed and notarized as required? Is all the information correct and in agreement with whatever information you may have previously filed with the FCC? If so, then the Amateur Service Group in Washington will be able to handle even more licenses per month than it now does.

<sup>1</sup> Rule 12.81 of the Rules Governing the Amateur Service treats of the only cases where special calls may be issued.

# FREED MIL-T-27A POWER & PULSE TRANSFORMERS FOR IMMEDIATE DELIVERY FROM STOCK

### POWER TRANSFORMERS

Cat. No.	Hi Volt	DC Volts	DC Amps	Filament V 1	Filament Amp.	Filament V 2	Filament Amp.	Case Size
MGP1	400/200 ct	185	.070	6.3/5	2	6.3	3	HA
MGP2	650 ct	260	.070	6.3/5	2	6.3	4	JB
MGP3	650 ct	245	.150	6.3	5	5.	3	KB
MGP4	800 ct	318	.175	5.	3	6.3	8	LB
MGP5	900 ct	345	.250	5.	3	6.3	8	MB
MGP6	700 ct	255	.250					KB
MGP7	1100 ct	419	.250					LB
MGP8	1600 ct	640	.250					NB

### PULSE TRANSFORMERS

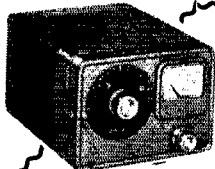
Cat.No.	Block'g. Osc.	Inf. Coup'l'g.	Low. Freq. Out.	Pulse Voltage Kilovolts	Pulse Duration Microseconds	Duty Rate	No. of Wdgs.	Test Volt. KVRMS	Chr. Imp. Ohms
MPT1	✓	✓	✓	0.25-0.25-0.25	0.2-1.0	.004	3	0.7	250
MPT2	✓	✓	✓	0.25-0.25	0.2-1.0	.004	2	0.7	250
MPT3	✓	✓	✓	0.5-0.5-0.5	0.2-1.5	.002	3	1.0	250
MPT4	✓	✓	✓	0.5-0.5	0.2-1.5	.002	2	1.0	250
MPT5	✓	✓	✓	0.5-0.5-0.5	0.5-2.0	.002	3	1.0	500
MPT6	✓	✓	✓	0.5-0.5	0.5-2.0	.002	2	1.0	500
MPT7	✓	✓	✓	0.7-0.7-0.7	0.5-1.5	.002	3	1.5	200
MPT8	✓	✓	✓	0.7-0.7	0.5-1.5	.002	2	1.5	200
MPT9	✓	✓	✓	1.0-1.0-1.0	0.7-3.5	.002	3	2.0	200
MPT10	✓	✓	✓	1.0-1.0	0.7-3.5	.002	2	2.0	200
MPT11	✓	✓	✓	1.0-1.0-1.0	1.0-5.0	.002	3	2.0	500
MPT12	✓	✓	✓	0.15-0.15-0.3-0.3	0.2-1.0	.004	4	0.7	700

ALSO AVAILABLE — Military Standard Filament and Audio Transformers.

Send for NEW 48 page transformer catalog. Also ask for complete laboratory test instrument catalog.

## FREED TRANSFORMER CO., INC.

1703 WEIRFIELD ST., BROOKLYN (RIDGEWOOD) 27, N. Y.



## MORROW CM-1

### CONELRADMONITOR

Meeting all FCC requirements under regulations taking effect Jan. 2, 1957, the CM-1 Conelrad Monitor by Morrow is just the thing for your shack! 5-tube tunable b.c. rcvr with built-in speaker; all Conelrad frequencies easily seen and plainly marked. Meter allows visual monitoring and rear jack provides relay connection to other signal devices. 115 VAC. Amateur Net. . . . . \$39.50

Available Now at **RADIO PRODUCTS SALES**

1237 16th Street DENVER 2, COLORADO

CANADIANS! We have large stocks of nationally advertised Ham parts. Write for Free catalog.

## THE CRAWFORD RADIO

VE3YR 119-121 JOHN ST., N. VE3JU  
"Geo" HAMILTON, ONT. "Bill"

## RADIO COURSES

- FCC LICENSE PREPARATION
- COMMERCIAL • CODE BRUSH-UP
- AMATEUR • THEORY
- TELEVISION AND RADIO SERVICING

Personal Counseling Approved for Veterans

## YMCA TRADE & TECHNICAL SCHOOL OF N. Y.

15 West 63 St. New York 23, N. Y.  
EN 2-8117 Catalog T. Q.



55th  
Year

## Meteor Shower Calendar

(Continued from page 44)

some of which do not appear in the above table, may spring big surprises now and then. Some of these are predictable in advance, and receive considerable notice. The Giacobinni-Zinner shower of October, 1946, was given wide publicity in the newspapers of the country, so it found many hams on deck on 50 Mc. ready to see what could be done. *Sky and Telescope Magazine* publishes advance notice of meteor showers regularly, giving anticipated meteor counts per hour. In the case of night displays, this information is a fair indication of the potential of the shower for v.h.f. DX work. *The New Handbook* (Continued on page 148)

## 3 outstanding Hallicrafters SSB units

# get yours from Burghardt's!

## Convenient Terms – Speedy Delivery

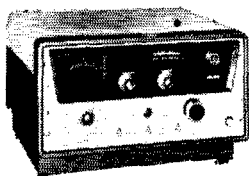


Just \$67.50 down—easy terms.

### New HT-32 Transmitter

A complete table-top, high efficiency amateur band transmitter. SSB, AM or CW on 80, 40, 20, 15, 11 and 10 meters. Two new exclusive SSB features—piezo electric filter cuts unwanted side-band 50 db or more—newly developed bridged-tee modulator. 144 watts plate input (P. E. P. two tone). Built-in voice control. Ideal CW keying and break-in operation.

\$67.50 down—\$28.35 per month for 24 months.

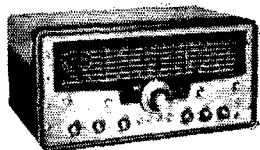


Just \$77.50 down—easy terms.

### New HT-33 Linear Kilowatt Amplifier

Ultra-compact—extra safe, extra long life ceramic power tubes. 1000 watts CW and SSB (P.E.P.) input . . . 775 watts AM. 80, 40, 20, 15, 11, and 10 meters. Pi-network output system for high harmonic suppression. Single knob bandswitching. Built-in power supply. All control leads filtered. Relay rack panel mounting if desired.

\$77.50 down—\$32.55 per month for 24 months.



Just \$39.50 down—easy terms.

### New SX-101

Excellent stability—sensitivity less than 1 microvolt on all bands. Covers 160, 80, 40, 20, 15, 11-10 meters—special 10 mc. position for WWV, plus coverage of major MARS frequencies.

\$39.50 down—\$21.52 per month for 18 months.

### **Other Hallicrafters units on easy terms:**

HT-30—\$35.00 down—\$19.07 per month for 18 months.  
SX-99—\$14.95 down—\$8.17 per month for 18 months.  
SX-100—\$29.50 down—\$16.07 per month for 18 months.

S-85—\$11.95 down—\$9.54 per month for 12 months.  
R-46B—Amateur Net \$17.95  
S-38D—\$4.95 down—\$3.97 per month for 12 months.

- Terrific Trade-Ins
- 10% Down—Easy Terms
- Speedy Delivery—Personal Attention

**TOP TRADE-INS**—We have hundreds of standard brand pieces of equipment in our trade-in department and prices are realistic! Write for current bulletin.  
**NEW CATALOG**—The most up-to-date presentation of amateur equipment available. Chock full of gear and accessories. Write for your free copy today!

Satisfaction Guaranteed  
or your money refunded  
after 10 day trial.



P. O. Box 746, Watertown, So. Dakota • Phone 5749

# Burghardt

RADIO SUPPLY

## for HIGH POWER PI NETWORKS

VACUUM VARIABLES  
TO KV . . . 10-400 MMF

A beautiful, brand new, Jennings Vacuum Variable offered at half price as a result of a fortunate contract cancellation procurement. This is an ELMAR exclusive.

Immediate attention to mail orders for the above or any other nationally advertised electronic parts and equipment. ELMAR can supply, from STOCK, almost anything you may require.



NET 69 50

SEE OUR FULL PAGE AD  
IN THIS ISSUE

**ELMAR**  
ELECTRONICS

ELVIN W6TT  
MARIO W6DUB

140 11th Street, Oakland 7, Calif.

## WHAT'S AVAILABLE?

See P. 113 . . .



### WIENS CONELRAD ALARM

PROFESSIONAL PROTECTION FOR MOBILE AND FIXED STATIONS

THIS UNIT gives VISUAL ALL-CLEAR indication and a simultaneous VISUAL and AUDIO CONELRAD ALARM signal and is fail-safe. Attaches to any b.c. receiver and employs a unique audio muting system to eliminate unwanted radio audio-signals on All-Clear conditions.

Power: 150-300 vdc, 15 ma; 2 volts AVC  
Specify: 6.3 vac, 6.3 vdc or 12.6 vdc  
MEETS ALL F.C.C. REQUIREMENTS

\$39.50 Completely wired and tested

WIENS ELECTRONICS LABORATORIES  
Dept. 12B, 130 Crest Rd., Redwood City, Calif.

• SMALL INVESTMENT • LIFETIME RETURN •

### OPPORTUNITY WITH YOUR OWN RADIO TELEGRAPHY CODE MACHINE BUSINESS



Now operate your own code school. Rent code machines to individuals, military, trade schools, many others. Your investment brings 138 code machines, head phones, hand keys, cords, cases manuals, tape making machine, all basic service supplies. All equipment NEW. Closing out at a sacrifice.

Write or call collect for terms.

ULTRADYNE ENGINEERING LABS  
BOX 3308  
ALBUQUERQUE, N. M.

of the Heavens, published by the McGraw-Hill Book Co., and in abridged form by Mentor Books, is a good source of more information on meteor phenomena.

One thing is certain: we have no more than scratched the surface of the possibilities of meteor showers for interesting work on 50 and 144 Mc. It could be that distances well beyond the existing 1400-mile 2-meter record will some day be covered by this medium, though all two-way work has so far been under 1300 miles. Precisely-kept schedules and detailed observation and reporting of results could add considerably to our knowledge of meteor phenomena generally, and another feather to the cap of amateur radio.

— E. P. T

### Hints & Kinks

(Continued from page 89)

the key and key jack. The author suggests a keyer using one 6AS7G tube as shown in Fig. 4. Use of this tube results in only a 15-volt drop to the plate of the first buffer. With any other type of keyer tube the voltage drop is considerably more.

To set the v.f.o. on frequency, snap on the plate switch or remote control and listen for the note in your receiver. This system doesn't lend itself to break-in operation on your own frequency, but permits perfect keying.

— G. L. Countryman, W3HH

### MORE ABOUT THE "HOW'S MY MODULATION?" INDICATOR

WHILE TRYING to apply W2PFU's hint for checking modulation (QST, October, 1950, p. 67; also *Hints and Kinks for the Radio Amateur*, Volume Five, p. 47), I found myself without a germanium diode. Needing to make the check in a hurry, the demodulation probe for an oscilloscope was put to work. Output from the probe was fed directly to the tape recorder. A short length of wire connected to the tip of the probe provided adequate r.f. pickup.

In some later checks made with both the probe and the plain diode, it was determined that the use of the probe resulted in best reproduction of the modulated signal. This does not mean that you *must* run out and buy a probe if you want to use the W2PFU system, but it certainly means that the probe *should* be put to work in this application if you already have one on hand.

— David Berkley, K2MUN

### A HOMEMADE BUMPER MOUNT

IT IS ASSUMED that every amateur has access to an "Armstrong" milling machine (file, that is), one very worn hack-saw blade, and an electric drill. These tools will suffice to build this bumper mount, aside from the welding and brazing.

Make a cardboard template of the bumper contours at the point where you wish to mount the antenna, taking care that the top line is parallel to the ground — unless you want a real

(Continued on page 150)

# FREE! LAFAYETTE CATALOG

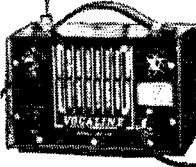


## ELECTRONIC CATALOG PACKED WITH MONEY SAVERS

Packed with the largest selection of Electronic, Radio and T.V. Parts, and equipment, PA, Hi-Fi systems, tubes, antennas, Transistor Kits, parts and components, Test Equipment, new build your own kits, tools, books, Microscope, drafting equipment, Binoculars, Telescopes, All Radio, TV and Ham supplies — ALL AT GREAT SAVINGS — For the economy minded serviceman, dealer, engineer and technician **CHUCK FULL OF BUYS! SEND FOR YOUR FREE COPY TO-DAY.**

### VOCALINE RADIO TRANSCEIVER

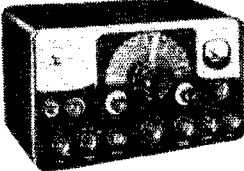
Model  
JRC-400



First really low-priced 2-way radio available. Provides satisfactory communication at a distance of 10 miles or more—depending on location and terrain. Amplitude modulated radio telephone operates on fixed frequency of 465 megacycles (Citizens Radio Band). RF power input is 2 watts; power output is ½ watt. Power supply operates on any 115 volt AC outlet or a 6 volt DC power source. Tubes: 6AV6, 6AF4, 6AS5. Weight: 4 lbs. Dimensions: 9" x 6" x 3". FCC approved.

Single unit, complete with mike... **68.36**  
Pair ..... **136.71**  
Also available for 12 volt DC (plus 115 volt AC) at same price.

NEW!



### JOHNSON VIKING "PACEMAKER" SSB — CW — AM TRANSMITTER

- BRAND NEW!
  - 90 WATTS P.E.P. INPUT SSB
  - SINGLE-KNOB BANDSWITCHING 80, 40, 20, 15 and 10 METERS
  - "FOOLPROOF" VOICE CONTROLLED OPERATION
  - EFFECTIVE TVI SUPPRESSION
  - STABLE, ACCURATELY CALIBRATED VFO
  - OUTPUT CIRCUIT WILL FEED VIRTUALLY ANY ANTENNA SYSTEM — PLENTY OF POWER!
  - COMPLETELY SELF-CONTAINED
- "PACEMAKER" — COMPLETE — WIRED AND TESTED..... **495.00**



### TRANSISTOR CODE PRACTICE OSCILLATOR KIT

For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two penlite cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KT-72 ..... Net. **2.99**  
Cannon EC1—Single Headset ..... Net **1.13**

### HAMMARLUND HQ-100 RECEIVER

Dollar for dollar the most remarkable communications receiver ever produced. Sensitivity and selectivity place it in the really "top" class. Continuously tunable from 540KC to 30MC. Electrical bandspread tuning with unequalled direct dial calibration. Q-multiplier permits continuously variable selectivity for all operating conditions. Sensitivity: 1.75 microvolts produces 10 to 1 signal-to-noise ratio. Voltage regulated and temperature compensated. Auto-Response automatically adjusts audio response to fit receiving conditions. 10-tube circuit with automatic noise limiter. Seven tuned circuits in two stages of IF. BFO variable from zero to ±4kc. With "S" meter. 16¼" L, 9-7/16" H, 9¼" D. Wt., 30 lbs.  
HQ-100—Receiver ..... Net **169.00**  
PL-38888-G1—  
6x9" Matching Speaker. Net **14.95**

### LAFAYETTE—HAM EQUIPMENT HEADQUARTERS

We carry a complete line of all the famous Communications Transmitters, Receivers and Accessories.

ASK FOR W2EG1

### HALLICRAFTERS SX-101 AMATEUR BAND RECEIVER

NEW! 7 Bands: 160, 80, 40, 20, 15, 11-10 Meters

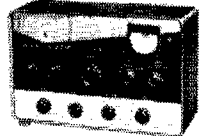


Rugged and extremely stable receiver provides excellent coverage of amateur bands and most M.A.R.S. frequencies. Dual conversion, selectable sideband receiver with 1 microvolt sensitivity. 5 steps of selectivity from 500 to 5000 cycles. Special 10 Mc position for V W V. Other features include crystal controlled 2nd conversion oscillators, tee-notch filter, full gear drive tuning knob with 50:1 ratio, built-in precision 100 kc evacuated marker crystal, illuminated, dual-scale "S" meter. Direct coupled series noise limiter. 14 tubes plus VFO and rectifier. Conforms to PCDA specs. 20" W, 10½" H, 16" D. Wt., 74 lbs.

SX-101 Receiver..... Net **395.00**

### NEW VIKING! JOHNSON 6N2 TRANSMITTER

A compact VHF transmitter with instant bandswitching coverage of 6 and 2 meters. Completely shielded and TVI suppressed. Capable of 6.3V, AC at 2.5 Amps, 300V, DC at 70 Ma, 300 to 750V, DC at 200 Ma, and 30 watts audio. Input 150 watts CW and 100 watts AM phone. Cathode keying. Can be operated by external VFO or built-in crystal control. 8 to 9 Mc crystals used in pentode oscillator. Dual band tank circuit. Flexible output coupling system. Tubes: 2-6U8, 6360, 5894.



6AQ5. Wired and tested. 18½ x 8¾ x 8¾". Shpg. wt., 14 lbs.  
No. 240-201-2—Less crystals, Key and mike ..... Net **129.50**  
No. 240-201—As above  
in kit form..... Net **99.50**

Lafayette  
Radio

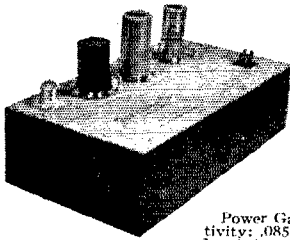
DEPT  
VB

165-08 Liberty Ave.  
JAMAICA, N. Y.

100 SIXTH AVE.  
NEW YORK, N. Y.

BOSTON 10, MASS., 110 Federal St.  
NEWARK 2, N. J., 74 Central Ave.  
PLAINFIELD, N. J., 139 W. Second St.  
BRONX 58, N. Y., 542 E. Fordham Rd.

# Introducing the XC 144 NOISE FIGURE 2.8 db



A truly  
HIGH  
PERFORMANCE  
2-METER  
CONVERTER

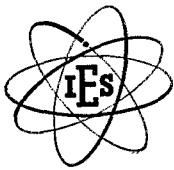
### SPECIFICATIONS:

Power Gain: 2000 (33 db). Sensitivity: .085 microvolts will produce a 2 to 1 signal to noise ratio when used with normal communications receiver bandwidth; .025 microvolts when followed by a crystal filter. Image frequency rejection: 60 db. Rejection of signals at intermediate frequency: 90 db. Other spurious responses: greater than 80 db down. I. F. tuning range: 14 to 18 Mc. Tube complement: 417A/5842, 6BZ7/6BQ7A, 6CB6, 12AT7. **\$79.95**

### SPECIFICATIONS: XC-50 6 Meter Converter

Power (gain: 2000 (33 db). Sensitivity: .1 microvolts will produce a 2 to 1 signal to noise ratio when used with normal communications receiver bandwidth; .03 microvolts when followed by a crystal filter. Image frequency rejection: 60 db. Rejection of signals at intermediate frequency: 80 db. Other spurious responses: greater than 80 db down. I. F. tuning range: 14 to 18 Mc. Tube complement: 6BS8/6BQ7A, 6BS8/6BQ7A, 6CB6, 12AT7. **\$59.95**

**TAPETONE INC.**  
10 ARDLOCK PLACE, WEBSTER, MASS.



## ELECTRONIC TECHNICIANS ARE IN DEMAND!

Trained Men Are Needed Now! In just 18 months, you can complete Electronic Technicians training to enter this ever-growing industry. Day or evening classes. Opportunity for employment in local industry. Approved for Korean Veterans. Terms beginning Jan., April, July, September. Write for Catalog 334 TODAY.

INDIANAPOLIS ELECTRONIC SCHOOL, 312 E. Washington St., Indianapolis 4, Ind.

## AN/APR-4 TUNING UNITS WANTED

TOP PRICE PAID. Also Frequency Meters TS-173, 174, 175, and 323, and other good quality surplus equipment; General Radio, L&N and other standard laboratory equipment and instruments, Weston meters, etc.; technical manuals.

### ENGINEERING ASSOCIATES

434 Patterson Road

Dayton 9, Ohio

## COMMUNICATIONS

### ENGINEERS and TECHNICIANS

- Must be willing to travel when required.
- Graduate Radio Engineers or equivalent and Electronic Technicians with extensive experience in Communications systems transmitters, receivers, terminal equipment, antennas, or a combination of these.
- For assignments on design and installation of communications facilities in U.S.A. and overseas.

Excellent salaries and fringe benefits

### PAGE COMMUNICATIONS ENGINEERS, INCORPORATED

710 Fourteenth Street, N.W.

Washington 5, D. C.

150

rakish job pointing aft! Using the template, refer to Fig. 5 and lay out the pieces. Allow an extra half inch in length for the top piece (A) for the hook which goes over the top of the

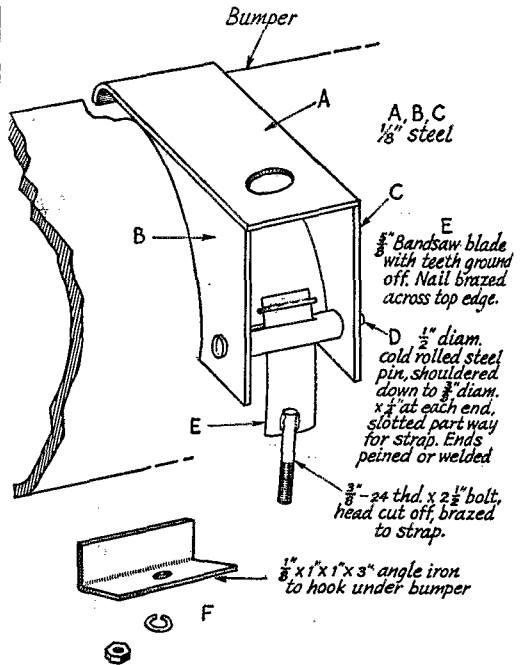


Fig. 5—Sketch of the homemade mount used by W8QMI.

bumper. This hook can be hammered cold with the piece held in a vise. Clamp the two side pieces (B and C) together and drill the holes for the slotted pin (D). Make up the strap-and-bolt piece (E) allowing extra length of strap.

At this point it is well to take all the parts out to the car for a trial assembly. If all is well (three hands would come in handy here), mark the location for the stop on the strap. Braze the stop to the strap, put the strap in the slotted pin, insert the pin in the side pieces and peen (or weld) in place after making certain the slot is directed so there will not be a kink in the strap. Now the top can be welded to the side pieces and the job is ready for paint. I used a 3/4-inch hole in the top plate and made a bushing and two large washers of formica to insulate the antenna.

The mount is locked in place on the bumper by means of the bracket, washer and nut illustrated in section F of Fig. 5.

—E. W. Koch, W8QMI

## TEMPLATE FOR MAKING PERFORATION HOLES

THE PERFORATED HARD-BOARD back cover with which many types of TV receivers are equipped makes an ideal template for those who drill their own perforated aluminum. Not only does the stunt save considerable effort and time, but it lends a professional appearance to the

(Continued on page 162)



Serving the entire Western Region... Alaska... and the Pacific Area...

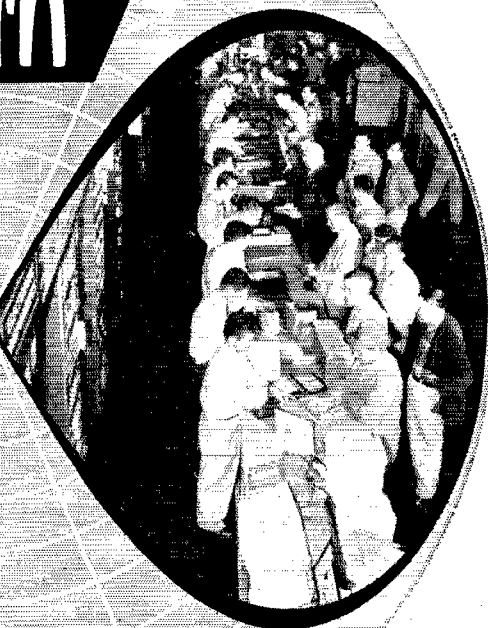
# The Elmar Pattern\*



ELVIN  
WSTT



MARIO  
WGDUB



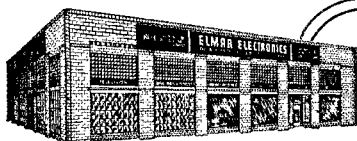
\*

## PLOT YOUR ANTENNA PATTERN

Request brings you convenient  
8 1/2" x 11" polar-type paper,  
Name and address please.  
Free... no charge.

# ELMAR

electronics



You may order with fullest confidence from ELMAR...  
pace setting West Coast suppliers of trans-  
mitters, receivers, antennas, all electronic  
parts... and equipment...

where over 200 nationally advertised brands are  
IN STOCK—always—enabling you to obtain  
*what* you need... *when* you need it...

ELMAR... a reliable firm...  
where immense sales volume attests to customer  
confidence... where rapid turnover means...  
INVARIABLY... up to the minute models...  
FIRSTS... again and again...

be assured—ALWAYS—immediate action on mail  
orders... courteous service on phone and counter...  
large, competent staff to assist with your  
problems—whether simple or complex...

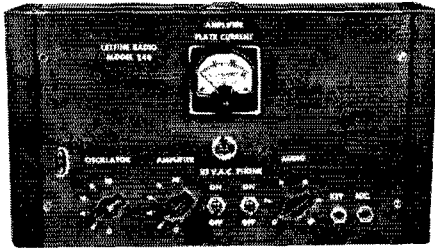
liberal trade-in allowance... excellent time-  
payment plan... are the rule—not the exception.

You may order with fullest confidence from ELMAR.

140 Eleventh Street, Oakland 7, Calif. HIgate 4-7011

# XMTRS FOR 160 TO 2 METERS

or Special Freq. 500 KC. to 160 MC.



## LETTINE MODEL 240 TRANSMITTER WITH MOBILE CONNECTIONS AND A.C. POWER SUPPLY

This outstanding transmitter has been acclaimed a great performer throughout the world. Air wound plug-in coils used for high efficiency. Takes any freq. from 1.6 to 30 mc. Ideal for General Class, Novice, CAP, CD, Industrial. Sold direct from our factory, ready to operate. 40 to 50 watts input. Phone-CW. Complete with 8 x 14 x 8 cabinet, 40 meter coils, xtal, tubes: 6V6 osc., 807 final, 5U4G rect., 6SJ7 xtal mike amp., 6N7 phase inv., 2-6L6's PP mod. Wt. 30 lbs. \$79.95, 80, 20, 10 meter coils \$2.91 per band. 160 meter coils \$3.60.

**MODEL 130 FOR 120 TO 130 WATTS — \$199.50**  
807 osc., 2-807's final, 6N7 xtal mike amp., 807 AF driver, 2-807's mod., 2-860A's rect., 6L6 clamper. Wt. only 47 lbs.

**MODEL 242 FOR 6 METERS OR 2 METERS — 45 WATTS INPUT — 616 FINAL.** Complete with mobile connections, A.C. power supply, tubes, xtal. Xtal mike input. Uses 8 mc. xtals or Lettine VFO. Swinging link matches 52 — 300 ohm antennas. Same cab. as 240. \$89.95.

**VFO — \$49.95 — ANT. TUNER \$20.00 LESS COILS**  
Send full amount or \$25 with order — balance C.O.D.

### LETTINE RADIO MFG. CO.

62 Berkeley St.

Valley Stream, N. Y.

**CODE-SENDING-RECEIVING-SPEED**

Be a Radio Ham or Commercial Operator. Pass FCC code test in few weeks. Fascinating hobby. Good pay, interesting work in Commercial field. Same system used by radiotelegraph specialists. FREE book explains how Amateurs and Operators learn code and develop amazing skill and speed. Candler System Co., Dept. 4-B, Box 928, Denver 1, Colo., U.S.A. and 52b, Abingdon Rd., Kensington High St., London W.8, England



## FREE 172 PAGE 1957 B-A CATALOG

Complete guide to Everything in Radio, TV and Electronics for Dealers, Servicemen, Schools, Amateurs, Broadcasters, Public Utilities, Engineers, Experimenters, Factories and Laboratories.

**BURSTEIN-APPLEBEE CO., 1012 McGEE ST., KANSAS CITY, MO.**

## OBEY THE REGULATIONS!

Effective January 1, 1937, FCC Rule 12.192 (b): "All operators of stations in the Amateur Radio Service will be responsible for the reception of the CONELRAD Radio Alert or indication that such alert is in force..."

### The QRT Conelrad Alarm Kit

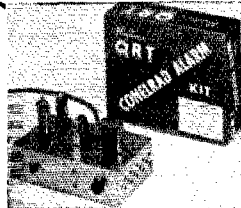
is just the thing for your shack... \$16.50

Shipped prepaid when remittance accompanies order. If on C.O.D. basis, will ship p.p. or express. All such costs added to the price of unit.

### RADIO PRODUCTS SALES CO.

1237 Sixteenth St.

Denver 2, Colo.



finished plate because of the neat and even alignment of holes.

—George S. Carson, W0JV

## ADJUSTMENT OF SEMI-AUTOMATIC KEYS

AMATEURS who use bugs should be interested in learning how to adjust and maintain these keys. The required reading is included in the following instruction which the Bell System furnishes to employees and subscribers who use semiautomatic keys.

### General

Semiautomatic sending keys (so-called because they make dots automatically) are commonly used at telegraph stations. Fig 6 is a schematic diagram of one of these keys.

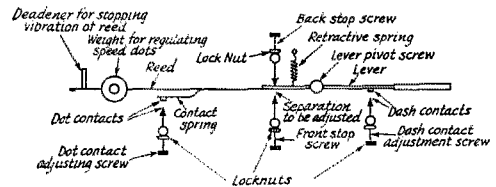


Fig. 6 — Schematic diagram of the semiautomatic key referred to in the Bell System instructions.

The proper maintenance of these keys in accordance with the following instruction is necessary to insure good telegraph service.

### Inspection

When signals are not satisfactory, examine the key for mechanical defects. See that contact points are clean and in alignment, with the faces parallel. The lever pivot screw should be loose enough to permit a free movement of the lever but not so loose as to make signals unsteady. All supporting parts should be rigidly fastened. See that cord and plug are in good condition.

### Adjustment

After inspection has been completed, the key should be adjusted as follows:

- 1) Place the key on a level surface.
- 2) Adjust the back stop screw until the reed lightly touches the "deadener," and tighten the lock nut.
- 3) Adjust the front stop screw until the separation between the end of this screw and the lever is approximately .015 inches and tighten the lock nut. A greater separation is permissible if the operator prefers more lever movement.
- 4) Operate the lever to the right. Hold in this position and stop the vibration of the reed. Adjust dot contacts until they just "make" without flexing the contact spring and tighten the lock nut. As this is a very important adjustment it should be checked after setting up the lock nut to see that it has not changed.
- 5) In case the dots are either too light or too heavy, move the weight which is provided for regulating the speed (and which generally should be kept well toward the outer end of the reed) nearer the outer end.

*Note A:* After key has been adjusted as above, do not change adjustments to correct light or heavy signals except by moving weight toward outer end of reed.

*Note B:* Keys equipped with two weights should always have one weight near the outer end of the reed.

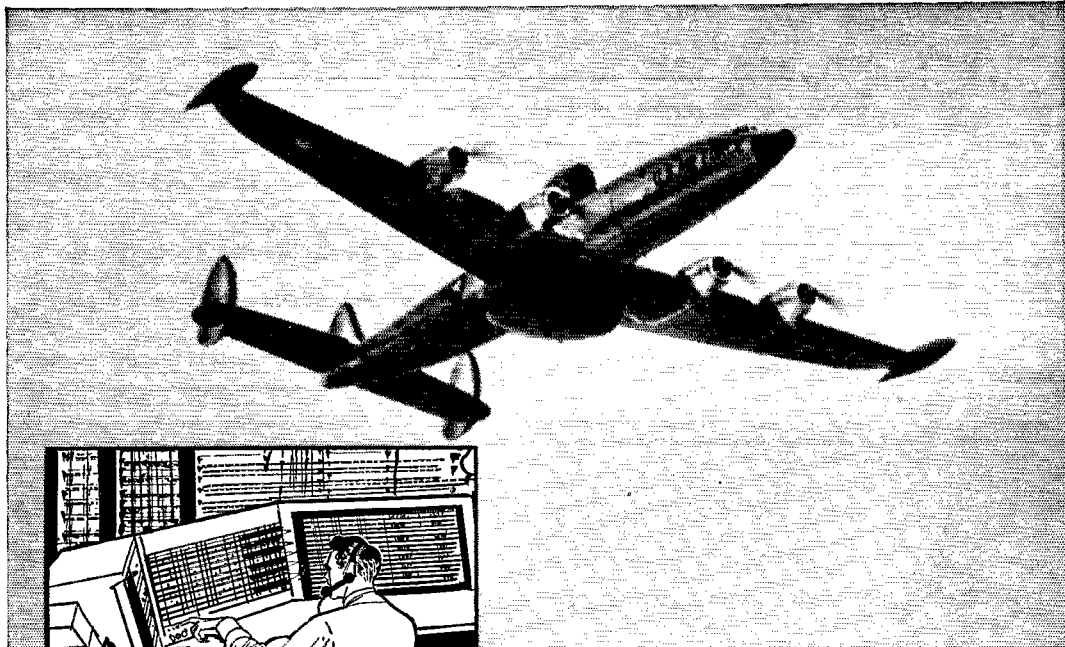
—Virgil E. Thompson, W1SEJ



K4CHK reports that there is a Kentucky town by the name of Eighty-eight, which has a population of 73, but no hams.

# Help test SAGE

— the new Air Defense System



**Sage "Brain".** Giant electronic computers store defense data . . . furnish correct picture to commanders at earliest possible moment.

**Airborne Radar.** Used for early warnings in areas beyond range of fixed radar locations. One of many sources of information being handled by Sage (semi-automatic ground environment).

The Defense Projects Division of Western Electric has opportunities for Engineers, Physicists, Mathematicians and Technicians for field work in testing Sage.

\* \* \*

New digital computer techniques and their application to radar data processing and weapons control have opened a new and expanding field of automation. The extensive classroom and laboratory training

which precedes job assignment affords an excellent opportunity to enter this new and challenging electronics field as part of the Bell System team.

FOR FURTHER INFORMATION CONTACT:  
D. P. Wilkes, W2LNC, Superintendent,  
Systems Testing; Western Electric Company,  
220 Church Street, New York 13,  
New York. Or, if you prefer, telephone  
collect to: WOrth 4-0277.

**Western Electric**



MANUFACTURING AND SUPPLY

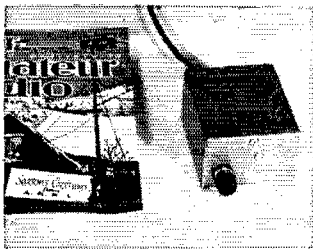
UNIT OF THE BELL SYSTEM

# THE C & G TRIGGER

for

CONELRAD

**ORDER  
YOURS  
TODAY**



Tune to any station for your warning and the C & G Conelrad Trigger does the rest. Provides instant aural alarm when radio station goes off the air. Fits any standard superhet broadcast Amateur **\$10<sup>95</sup>** radio. With complete instructions. Net

OR A COMPLETE PACKAGE:

Traveler Model 46-37 radio with Amateur **\$27<sup>95</sup>** trigger installed. Net

## C & G RADIO SUPPLY CO

2502 JEFFERSON

Phone

TACOMA 2, WASH.

BR 3181

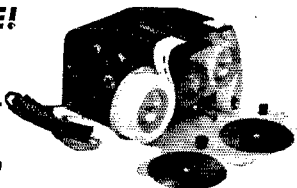
### LEARN CODE!

SPEED UP Your  
RECEIVING  
with G-C

Automatic Sender

Type S

\$28.00 Postpaid in  
U. S. A.



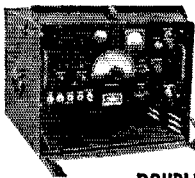
Housed in Aluminum Case Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle A.C.

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



MODEL  
**CD-2**  
**FCDA**

CD-2  
2 Meters  
CD-6  
6 Meters

Accepted

**DOUBLE CONVERSION RECEIVER  
PLATE MODULATED P.P. FINAL**

- Available for 2 Mtrs. or 6 Mtrs.
- Designed for CD, Fixed or Mobile
- Your complete CD station

**SONAR**

A complete resume available  
on request to CD Division  
**RADIO CORP**

3050 WEST 21st ST., B'KLYN, N. Y.

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

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. Its operation is made possible by volunteer managers in each W, K and VE call area. 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 — D. W. Waterman, W1IPQ, 99 Flat Rock Rd., Easton, Conn.

W2, K2 — E. F. Huberman, W2JIL, Box 746, GPO Brooklyn 1, New York.

W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Penna.

W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.

W5, K5 — Robert Stark, W5OLG, P.O. Box 261, Grapevine, Texas.

W6, K6 — Horace R. Greer, W6TI, 414 Fairmont St., Oakland, Calif.

W7, K7 — Joseph P. Vogt, W7ASG, 5399 Karen Ave., Salem, Oreg.

W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.

W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.

W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.

VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.

VE2 — Harry J. Mabson, VE2APH, 122 Regent Ave., Beaconsfield West, Que.

VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.

VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.

VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.

VE6 — W. R. Savage, VE6EO, 883 10th St. N., North Lethbridge, Alta.

VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.

VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.

VO — Ernest Ash, VO1A, P.O. Box 8, St. John's, Newfoundland.

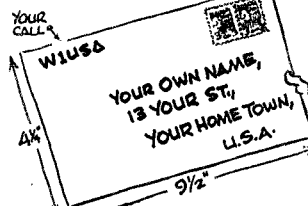
KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.

KH6 — Andy H. Fuchikami, KH6BA, 2543 Namau Dr., Honolulu, T. H.

KL7 — KL7CP, 310—10th Ave., Anchorage, Alaska.

KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa, C. Z.

### IS YOURS ON FILE WITH YOUR QSL MGR?



# FIELD ENGINEERS:

HERE'S THE GOOD WORD—



## Bendix Radio

**IS CONTINUING ITS RAPID EXPANSION AND NEEDS YOU!**

Bendix Radio, the leader in its field, has numerous, excellent opportunities for Field Engineering Personnel for both U.S. and overseas assignments. You will be responsible for the installation, overhaul and maintenance of long-range Bendix radar equipment.

**ACT NOW! YOU'LL OBTAIN THESE IMPORTANT ADVANTAGES:**

- ★ The prestige of representing the leader in its field.
- ★ Opportunity for professional development & advancement.
- ★ Excellent salary.
- ★ Overseas allowance.
- ★ Field allowance.
- ★ Relocation expenses.
- ★ Many other company benefits

It is preferable that you have had a minimum of two years college, plus at least four years engineering experience in radar or communications systems.

Send resume to: MR. O. A. BOWMAN  
Field Engineering  
Dept- Q

## Bendix Radio

DIVISION OF BENDIX AVIATION CORP.  
BALTIMORE 4, MARYLAND

**PREMAX**

### GROUND PLANE ANTENNAS

FULLY ADJUSTABLE 20 to 60 M.C.

Rugged but light in weight, these all aluminum antennas maintain sensitive transmission and reception in all weather and wear. Adjustable arms lock securely. Waterproof housing protects cable connections and seals coax. Standard threaded sleeve mounts on 1/2 inch pipe, set screws included.

STYLE GP-430 adjusts for 20 to 40 M.C.

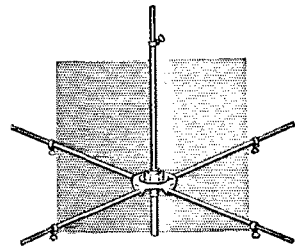
STYLE GP-450 adjusts for 40 to 60 M.C.

PREMAX designs and builds many of the antennas used by U. S. Government. Ask your dealer for Premax, or write:

**PREMAX PRODUCTS**

5730 Highland Avenue

Division  
Chisholm-Ryder Co. Inc.  
Niagara Falls, N. Y.



GP-430

**NOW ONE BALUN FOR 1.5 to 30 MC**

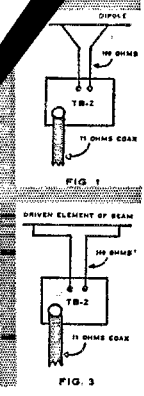
**FOR ONLY \$16.95!**



If your dealer cannot supply you—order direct

**INSTRUCTION SHEET TB-2**

The type TB-2 Balun is a broadband (1.5 mc to 40 mc) impedance matching device used to transfer power in either direction between 75 ohm coaxial cable and 300 ohm balanced transmission line. In amateur service it will handle 1 kw from 1.5 mc to 30 mc and there are no taps or switches to change. It may be used for receiving as well as transmitting over its frequency range. The TB-2 Balun has a universal type of bracket that readily lends itself to a variety of mounting methods either indoors or outdoors. It may be fastened to a wall or surface; suspended by ropes or wires; or fastened to a pipe by the use of ordinary TV hardware. It has proven itself of great value in connecting 75 ohm coaxial lines to single dipoles, folded dipoles, and beam antennas as indicated in figures 1, 2, and 3. Many transmitters are of the single ended type, being designed to feed coaxial cable only. The TB-2 Balun is especially useful in enabling such transmitters to feed a 300 ohm balanced transmission line without the use of any complicated switches or circuitry. Specifications: 3½" Wide, 3" Deep, 4½" Long (less mounting bracket) — 8" long (with bracket). Weight 2½ lb.



**LYNMAR ENGINEERS, INC.**  
1432 N. CARLISLE ST., PHILADELPHIA 21, PA.

**PLAY IT SAFE - THE WALTER ASHE WAY!**

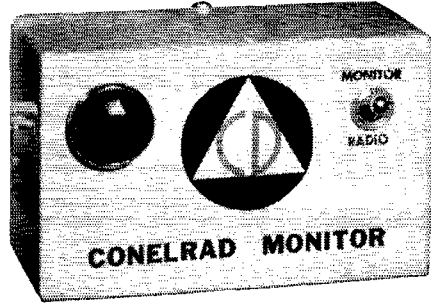
*"Conelarm"*

**CONELRAD ALARM SYSTEM FOR AMATEURS**

**NOT A KIT!**

**MODEL "CA"**  
**\$16.50 NET**

**READY TO USE**



**NOT A KIT!**

**MODEL "CA"**  
**\$16.50 NET**

**READY TO USE**

On and after January 2nd 1957, all amateur radio stations are required by the Federal Communications Commission to have a Conelrad alarm. The Walter Ashe "CONELARM" complies with F.C.C. regulations applying to amateurs. This is not a kit but a completely wired and tested unit, ready to go as soon as it is hooked to the voice coil leads of any standard broadcast receiver. Broadcast receiver does not have to incorporate automatic volume control as the "CONELARM" does not depend on AVC action to

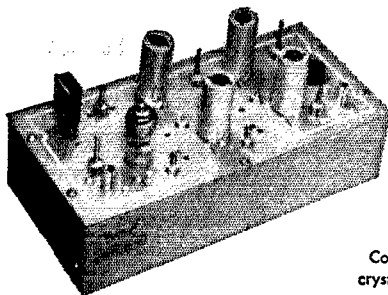
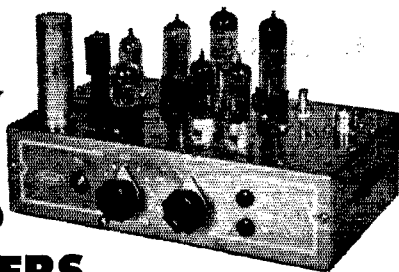
function. Fail-safe circuit immediately indicates receiver failure. Can be used with external gong, buzzer, or other 110 VAC operated signal device. May also be used with external 110 VAC relay to turn off transmitter in case of Conelrad alert. Large red bullseye warning light on front panel. Finished in attractive Conelrad Yellow with Red CD emblem. Size 5¼x3¼x3"D. Complete with instructions, cord and plug. Operates on 110 VAC. Shpg. Wt. 3 lbs. MODEL "CA". F.O.B. St. Louis, Missouri. Net.....\$16.50

**WALTER ASHE RADIO CO.**  
**BOX 4502, PLAZA STATION, ST. LOUIS 1, MO.**

**1<sup>1</sup>/<sub>4</sub>,  
2  
or 6**

**METERS  
with**

*Tecraft*



AMATEUR  
NET  
**\$42.50**

Complete with  
crystal and tubes.

**Tecraft Transmitters** For 220, 144 or 50 Mc.  
Hi-Level Plate Modulation • Hi-Impedance Mike  
Provisions for Metering All Stages • Tuned Antenna  
Output System to 52/72 Ohm Line • RF Output-Indica-  
tor • Power Requirement 6.3 v AC @ 4 amps & 250 v  
DC @ 250 ma. • Tubes: 6AU6 osc.; 5763 Buf/Dbldr;  
6360 Buf/Mult; 6360 final amp.; 12AX7 speech amp.  
& driver; 2-6AQ5 modulators • Power Input to Final,  
20 Watts.

Complete with tubes, crystal and plugs.....**\$59.95**  
Matching Power Supply..... **39.95**



**AT YOUR DEALER,  
OR WRITE**

*The Equipment Crafters, Inc.*

**523 WINNIE AVE. RIVER EDGE, NEW JERSEY COLFAX 2-0159**

**Tecraft converters** may be had with IF output fre-  
quencies to suit the tuning range of your receiver, and  
provide the ideal system, in terms of **extreme sensi-  
tivity, maximum stability, low noise, high gain  
and selectivity.**

**LOW NOISE FIGURE:** Approximately 4 db. 1 micro-  
volt of signal will provide better than 20 db. thermal  
noise quieting.

**SENSITIVITY:** Approximately 1/10 microvolt input will  
provide a signal 6 db. over noise level.

**GAIN:** Better than 30 db.

**MODEL:** CC5-50, CC5-144, CC5-220 for

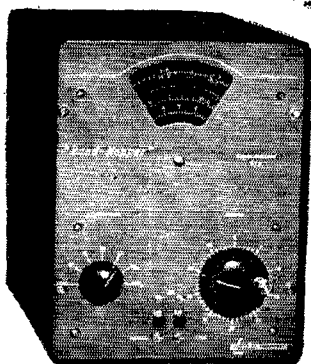
Collins 75A1, 2, 3.....Specify IF 26-30 Mc.

Collins 75A 4.....Specify IF 28-30 Mc.

National NC-300.....Specify IF 30-35 Mc.

**MODEL:** CC5-50 and CC5-144. For  
General Coverage receivers. Choose  
either 6-10, 7-11, 8-12, 10-14, 12-16,  
14-18. Any of above in kit form, **\$29.75.**  
CC5-220. For 14-19 Mc. only. Wired only.

**LOOK .... it's here!**  
**"Band-Hopper"**



**VFO FOR SSB**

*Only*  
**\$139.50**

1. BANDSWITCHING - 160M - 80M - 40M - 20M - 15M - 10M.
2. 100:1 GEAR DIAL DRIVE. FOR SMOOTH ACCURATE TUNING. CALIBRATION OF DIAL SKC.
3. VFO TEMPERATURE COMPENSATED AND EXTREMELY STABLE.
4. BUILT-IN REGULATED POWER SUPPLY.
5. STANDBY SWITCH PROVIDES ROCK STABILITY FOR IMMEDIATE OPERATING.
6. HETERODYNING PRINCIPLE PROVIDES FOR MAXIMUM STABILITY ON HIGH FREQUENCY BANDS.
7. FOR USE WITH ANY 9MC PHASING SSB TRANSMITTER SUCH AS PHASEMASTER JR., DELUXE PHASEMASTER JR., PHASEMASTER II OR 10B-20A.
8. MATCHING CABINET TO PHASEMASTER LINE 7-1/16" x 9-1/16" x 11-1/8".

See Your Dealer or Write Today

**Lakeshore INDUSTRIES**  
MANITOWOC, WISCONSIN  
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

*Sorry . . .*

**No Mermaids  
nor Sea Monsters !**

● Old maps are quaint but ARRL does not compete with Herr Blaeu . . . we leave that market to the antique shops. Our World Map is strictly modern, not 16th century.

No active amateur can afford to be without one of these popular and useful adjuncts to good operating. Here is why the ARRL World Map is such a favorite:

As soon as you hear a DX station you can see exactly where he is—the country prefixes are not just listed in the marginal index; they're printed on the countries, themselves. You can tell his direction from you, and his distance. There's no question about which continent he's in—boundaries of the six continents are plainly marked.

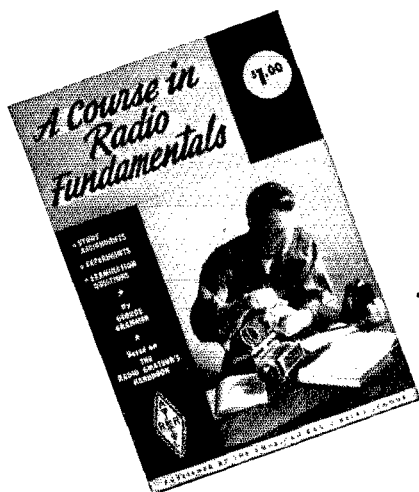
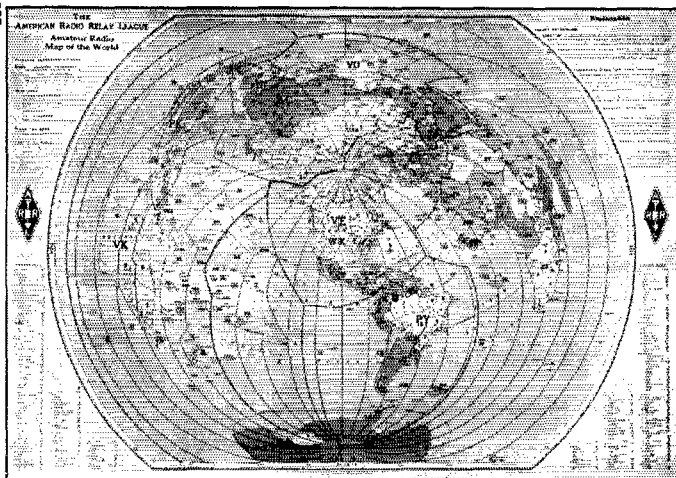
The time zones are plainly marked, too. Call areas of thirteen countries are shown. Principal cities are designated. There's a scale of miles, another of kilometers. Printed on heavy map paper measuring 40" wide x 30" high, in 8 colors that really stand out, this new ARRL World Map is easily read from your operating position.

40" x 30" 8-Color Map, \$2.00, postpaid anywhere in the world

**AMERICAN RADIO RELAY LEAGUE, INC.**

38 LA SALLE ROAD

WEST HARTFORD 7, CONN.



"You get more fun out of radio if you know how and why it works"

**\$1.00 POSTPAID**

U. S. A. Proper

\$1.25 Elsewhere

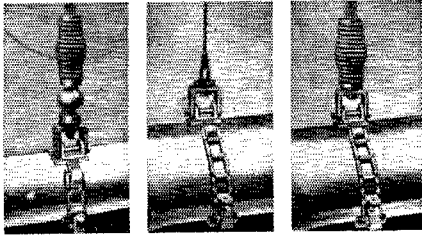
A concise, clearly written text for use with The Radio Amateur's Handbook, A Course in Radio Fundamentals is ideal for the beginner but just as useful for the more advanced amateur who wants to brush up on his radio knowledge. For radio theory classes it is one of the most practical books available.

Complete with study assignments, experiments and exam questions based on The Radio Amateur's Handbook.

**The American Radio Relay League • West Hartford 7, Connecticut**



**BUMPER MOUNTS  
WITH NEW X-HEAVY DUTY CHAINS**



No.444 \$17.80 No.445 \$7.95 No.446 \$13.45

Adjustable to any bumper. No holes to drill, easy to attach. High-polished Chrome Plated 3/4"-24 thread, to fit all antennas. Precision engineered.

**go  
mobile  
with  
Master  
Mobile**

**NEW!... SILVER-PLATED ROLLER WITH  
POSITIVE ACTION, STAY-PUT CONTACT**

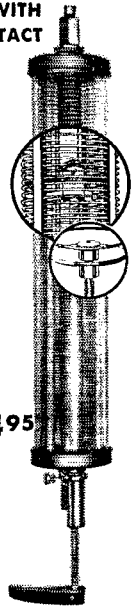


**ANTENNA  
COILS**

**MASTER DELUXE  
ALL-BANDER  
No. 750**

HY "Q" construction with wider spacing of turns for high frequency bands. Use as center or base loaded antenna with 60" whip.

- Covers 10 thru 75 and all intermediate frequencies.
- Silverplated single turn contact, positive spring.
- Eccentric cam contact, easy selection of turn.
- Automatic lock prevents damage to coil.



Amateur net **\$14.95**

**No. 333  
MASTER  
MIGHTY MIDGET**

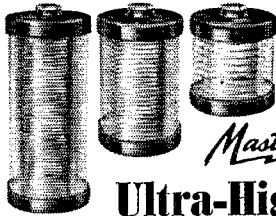
... engineered to provide the highest "Q" consistent with good design. Compact, extremely rugged, yet lightweight, its operation assures precision tuning with the new adjustable silver-plated roller that stays put! Perfect for 40-20-15-11-10 meters. "Get 5 Bands Plus on 1 Coil." **\$9.95**

AT LEADING RADIO JOBBERS EVERYWHERE

Leading Manufacturers of Mobile Equipment

**Master Mobile Mounts, Inc.**

1306 BOND STREET · LOS ANGELES 15, CALIF.



- Ruggedized construction
- Greater efficiency
- Precision made
- 2 3/4" Diameter

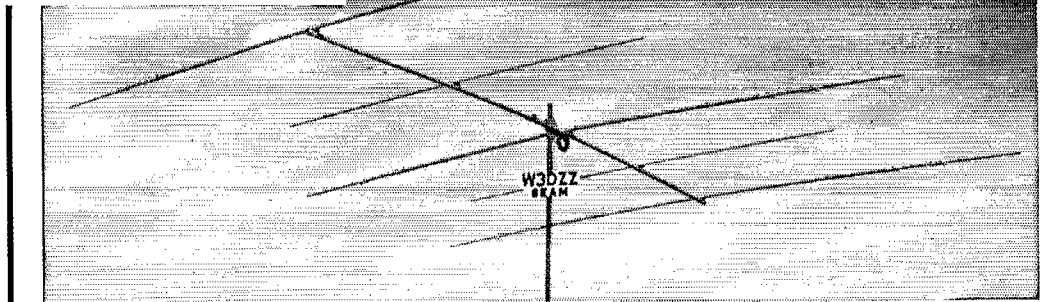
*Master*

**Ultra-High "Q" COILS**

For 80-40-20 & 15 Meters

After many years of experimentation, here is the coil with the highest "Q" ever obtained. Tested and found to have a "Q" of well over 515. **\$5.25 ea.**  
Use with 36" base section, 60" whip.

*The* **ORIGINAL  
THREE-BAND**



- ✓ **NO STACKING REQUIRED**—all elements are at the full height yet wind resistance is held to a minimum.
- ✓ **UNIQUE WINDMILL DESIGN**—permits ready access to all parts of the beam from the tower.
- ✓ **WIDE-BAND BALANCER**—affords perfect pattern symmetry with coaxial feed line. No adjustment required.
- ✓ **MAXIMUM GAIN**—over 8-db. gain on 20 and 15 meters, somewhat higher on 10 meters.
- ✓ **HIGH FRONT TO BACK RATIO**—in most installations the front to back ratio exceeds 30 db. on 10 and 20 meters and 25 db. on 15 meters.
- ✓ **RUGGED DESIGN**—Boom consists of two 12-foot lengths of 2 1/4" dia. tubing with .065" wall. Three-band elements are made of 1 1/2" tubing with .058" wall. All tubing is of 6061-T6 heat-treated aluminum alloy for maximum weather resistance and strength.

**MODEL FT-100 BEAM ANTENNA PARASITIC ARRAY** operating on 10, 15 and 20 meters. Complete with hardware, assembly instructions and prints..... **\$195.00**

**MULTIBAND DESIGN FOR WIRE ANTENNAS**—The W3DZZ design employs a concentric coil and condenser completely potted in Polyester Resin. Polystyrene insulation of concentric capacitor can withstand highest amateur transmitter voltages.

**MODEL FT-200 TRAPS** for 5-band antenna operation on 10/15/20/40 and 80 meters. (75 ohm feed line). Pair, postpaid..... **\$12.50**

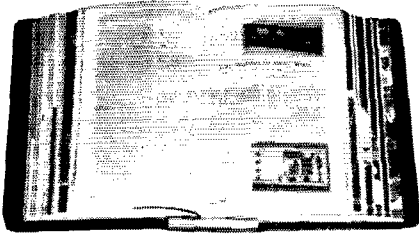


See your local distributor (HARVEY has it in the N. Y. area) or write to:

**FREDERICK TOOL & ENGINEERING CORPORATION**

414 PINE AVENUE, FREDERICK, MARYLAND

# QST BINDERS



Are your 1956 QSTs scattered 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 1957 issues to come.

Price **\$3.00** postpaid

Available only in the United States and Possessions

- Holds 12 issues of QST
- Opens to any page and lies flat
- Protects and preserves your copies
- QSTs always available for reference

## The AMERICAN RADIO RELAY LEAGUE, Inc. WEST HARTFORD 7, CONN.

### ... RADIO TELEGRAPH OPERATORS ... ... MARINE SERVICE TECHNICIANS ...

Qualified Radio Telegraph Operators and Trainees for permanent assignments to various coastal stations USA. Must be touch typists and possess 2d class telegraph license or better. Good 'fist' essential. Also vacancies in various ports USA for Marine Service Technicians—same license requirements.

**MACKAY RADIO & TELEGRAPH CO., INC.**  
P.O. Box 768 Clark, New Jersey

ELECTRONICS • RADIO • 36 Years of Successful  
RADAR • TELEVISION • Training in Electronics

### COMMERCIAL RADIO INSTITUTE

Approved by Maryland Board of Education  
38 West Biddle St. Baltimore 1, Md.  
Write for Free Catalog • Tel. LE 9-3342



*Evans offers you!*

- ▶ Service to hams by hams.
- ▶ Trade-ins and time payments.

**WE SELL GOTHAM BEAMS.**

**WRITE FOR  
ELECTRONICS  
COMPONENTS  
CATALOG**

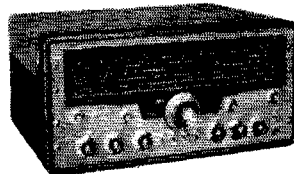
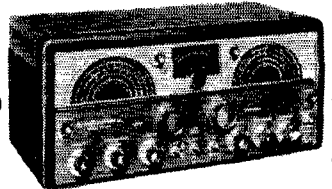


Write W1BFT, P.O. Box 312, Concord, N. H.  
Without obligation please send me the new  
1957 Electronics Components Catalog.

NAME .....  
STREET .....  
CITY ..... STATE .....

## HALLICRAFTERS

**SX-100  
\$295.00**



**SX-101  
\$395.00**

**Evans RADIO**  
P.O. BOX 312 • CONCORD, N. H.

# TREMENDOUS CRYSTAL CLEARANCE SALE!

Save Money—Order in Package Quantities!

All crystals tested and guaranteed to oscillate. Please include 20¢ postage and handling charge for every 10 crystals or less. Minimum order \$2.50. No. C.O.D.'s.

## PACKAGE DEAL No. 1

25 Assorted FT-243 45 Assorted FT-241A  
15 Assorted FT-171B 15 Assorted CR-1A

100 Crystals *Our Choice* \$8.95

Assorted.....Regular value \$66.00

## PACKAGE DEAL No. 2

FT-241A Crystals for Single Sideband  
370 KC—538 KC

35 Crystals *Our Choice* \$3.49

Assorted.....Regular Value \$14.00

## PACKAGE DEAL No. 3

HAM BAND CRYSTALS — FT-243

For operating on 80, 40, 20, 15, 10, 6 and 2 meters—on either fundamentals or harmonics.

25 Crystals *Our Choice* \$6.95

Assorted.....Regular Value \$20.00

FT-243  
RANGE  
3655 KC  
— 8733 KC



FT-241A  
RANGE  
370 KC  
— 538 KC



FT-171B  
RANGE  
2030 K.C.  
— 3995 K.C.



CR-1A  
RANGE  
5910 K.C.  
— 7930 K.C.



INDIVIDUAL CRYSTALS • Indicate 2nd choice—Substitution May Be Necessary  
Low Frequency — FT-241A for SSB, Lattice Filter etc., .093" Pins, .486" SPC, marked in Channel Nos. 0 to 79, 54th Harmonic and 270 to 393, 72nd Harmonic. Listed below by Fundamental Frequencies, fractions omitted.

### 49¢ each—10 for \$4.00

370	393	416	488	511	534	400	462
372	394	418	490	512	536	440	463
374	395	419	491	513	537	441	464
375	396	420	492	514	538	442	465
376	397	422	493	515	540	444	466
377	398	424	494	516		445	469
379	401	425	495	518		446	470
380	403	426	496	519		447	472
381	404	427	497	520		448	473
383	405	431	498	522		450	474
384	406	433	501	523		451	475
385	407	435	502	525		452	476
386	408	436	503	526		453	477
387	409	438	504	527		454	479
388	411	443	506	529		457	480
390	412	484	507	530		458	
391	414	485	508	531		459	
392	415	487	509	533		461	

### 79¢ each—10 for \$6.50

4035	5740	6340	7500	7773
4080	5750	6350	7506	7775
4165	5773	6373	7520	7800
4190	5780	6375	7525	7806
4280	5806	6400	7540	7825
4340	5840	6406	7550	7840
4397	5852	6425	7573	7841
4490	5873	6673	7575	7850
4495	5875	6675	7583	7873
4840	5880	6700	7600	7875
4852	5892	6706	7606	7900
4930	5906	6725	7625	7906
4950	5925	6750	7640	7925
5030	5940	6775	7641	7940
5327	5955	6800	7650	7950
5360	5973	6825	7660	7975
5485	6206	6850	7673	8250
5397	6225	6875	7675	8273
5600	6240	6900	7700	8300
5485	6250	6925	7706	8310
5500	6273	6950	7710	8316
5600	6275	6975	7725	8320
5675	6300	7470	7850	
5700	6306	7473	7750	8690
5706	6325	7475	7766	

### 79¢ each—10 for only \$6.50

CR-1A	FT-171B—BC-610
SCR 522- $\frac{1}{2}$	Banana Plugs,
Pins, $\frac{1}{2}$ " SP	$\frac{3}{8}$ " SPC
5910 7810	2030 2258 2435 3250
6370 7930	2045 2260 2442 3322
6450	2065 2282 2532 3955
6497	2105 2300 2545 3995
6510	2125 2305 2557
7380	2145 2360 3202
7480	2155 2390 3215
7580	2220 2415 3237



514 TENTH ST.  
N.W., Wash., D. C. Dept. Q.

### 79¢ each—10 for \$6.50

3735	6450	6650	8280	8625
6025	6473	7000	8350	8650
6045	6475	7450	8375	8690
6073	6500	7125	8400	8700
6075	6506	7150	8425	8733
6100	6525	7306	8430	
6125	6550	7300	8450	
6140	6573	7425	8475	
6150	6575	7440	8500	
6173	6600	8173	8525	
6175	6606	8175	8550	
6185	6625	8225	8575	
6206	6640	8275	8600	

SPECIAL—200 KC in FT-241A Holder—\$1.25 Without Holder 39¢ ea.—3 for \$1.00

Beams FOR THE Deans OF Hamdom

THOSE WHO KNOW THE DIFFERENCE!  
SEE PAGE 109 NOVEMBER QST  
TENNALAB-QUINCY, ILLINOIS

## RADIO and TELEVISION

Over 30 years N.E. Radio Training Center. Train for all types FCC operators' licenses. Also Radio and Television servicing. FM-AM broadcasting transmitters at school. Send for Catalog Q.

### MASS. RADIO SCHOOL

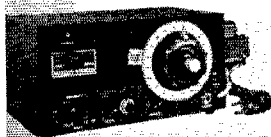
271 Huntington Avenue Boston 15, Massachusetts  
Lic. by Comm. Mass. Dept. Educ.

NEW!

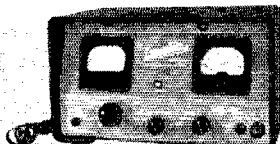
## LAMPKIN EASY PAYMENT PLAN

For the first time ever — LAMPKIN frequency and FM modulation meters can be purchased on

### EASY MONTHLY PAYMENTS!



Type 105-B Frequency Meter.  
Range 0.1 to 175 MC. and up.  
Price \$220.00



Type 205-A Modulation Meter.  
Range 25 to 500 MC.  
Price \$240.00

LAMPKIN meters are the test equipment preferred by thousands of successful mobile-radio maintenance engineers!

To learn how little it costs to start—and how profitable this business can be—use coupon below for time-payment details and free booklet "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE."



LAMPKIN LABORATORIES, INC.  
Mfg. DIVISION, BRADENTON, FLA.

At no obligation to me, please send free booklet and dope on time-payment plan.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

LAMPKIN LABORATORIES, INC. BRADENTON FLORIDA







SELL: 15 tube receiver with xtal filter, S meter, 10" speaker, \$50; new 100TH and TW75 tubes, \$4.25 each. No shipping. R. H. Beers, 33 Sterling Drive, Livingston, N. J.

ENTIRE Station: 32V2 and SX-28A, mike, bug key and straight key, antenna relay, \$450. Paul P. Graves, WIJFF, 34 Grove St., Augusta, Me.

WANT: Receiver for cash. For sale: 32V2 converted to 32V3; \$395, in perfect condx. Ed Flynn, 3118 N. Francisco, Chicago 18, Ill.

FOR Sale: TBSS0D, H-W VFO, AFS-50, A.C. line filter: \$115. W3VPL, Kranias, 104 Johns Ave., Gettysburg, Penna.

BARGAINS! TVI-suppressed Harvey-Wells Bandmaster transmitter complete with VFO, NC88 National receiver with Q-multiplier like new. Vergne, K2KGU, 420 Riverside Dr., N. Y. 25, N. Y. Tel. MO 6-8513.

SELL: Hallicrafters SX100 receiver and speaker, bought recently and in new condx: \$240; converted BC312-M receiver with manual and loudspeaker, very gud condx, \$40. May consider 6 or 2 meter equipment in deal. Stephen Gamret, K2DOC, 335 Skyview Ct., Pittsburgh 7, Pa. Tel. HO 2-5888.

JOHNSON Viking Kilowatt, final amplifier, like new, 5 months old. Works like a dream. Forced to sell. Moving to small apartment. Wonderful buy for quick sale: \$995. Will sell Viking Ranger as driver for above, also for \$200 extra if wanted. H. Webb, K2GKH, 125 Ocean Ave., Jersey City 5, N. J.

CENTRAL "A"-slicer \$49.95, "B"-slicer \$74.95, QT-1 \$6.95; Collins 32V2 \$450.00, 32V3 \$550.00; Eldico TR75 TV \$49.95, VFO2 \$9.95, VFO10/20A \$38.95; Eimac A54 \$99.95, A54H \$110.00, PMR7 \$139.95, PSB6 \$19.95, PSR16 \$19.95, PR612 \$24.95, Gonset Triband \$24.95, Super 6 \$14.95, Commander \$94.95, VFO \$9.95, Communicator II \$179.95, Hallicrafters SX62 \$225.00, S76 \$139.95, S85 \$89.95, SX100 \$239.95; Hammarlund HQ140X \$199.95, SP400X \$229.95; Johnson Ac venturer \$44.95, VFO \$39.95, KW \$1295.00; Lettine 240 \$59.95; Lyseo 600 \$79.95, 600S \$89.95; Millen VHF tubes \$89.95; National HRO-3 \$39.95, HRO50T1 6 coils & speaker \$350.00, NC1831D \$275.00. Many used items available; write for latest list. Evans Radio, Box 312, Concord, N. H.

SELL: Heath AF-1 xmitter, \$21; Heath VF-1, \$16, both for \$35, pp 6L6's, 40 watt modulator, \$20. Lee Owen, R.D. #1, Ravenna, Ohio.

WANTED: Choke, 15 to 25 henries, 600 to 900 Ma., 5000V insulation. Advise price, condition, weight, size. W1BB.

SWAP: 2 air conditioners 3/4 h.p. Philco, in perfect condition for c.w./phone xmitter and rcvr. Will ship. Ted Weiss, K2DWG, 536 E. 4th St., Brooklyn 18, N. Y. Tel. GE 8-0860.

SELL: S-53A receiver in perf. condx, only \$65. Will ship anywhere in U. S. Dennis Woolley, 508 W. Flint St., Davison, Mich.

WANTED: RC-224, BC-348 receivers, ARC-3, BC-788, K5/ARN-7. Cash or trade. Immediate action. Harjo Sales Co., Dept. E, 503 N. Victory, Blvd., Burbank, Calif.

SELL: BC-221 calibration book, in excellent condition, \$50. Eimac 250TH, \$25 pr; RCA 810, \$14 pr.; 10 meter xmitter, 850 watts, \$200. WZETM, St Marlians, 2200 Ocean Ave., Brooklyn, N. Y.

TUBES: 832A's, \$3.50, 100TH, \$4.50; 203A's, \$2; 2C-39, \$6.50 (highhouse), 3C-33, \$3.50; Bendix 1A-12 transmitter, 100 watt, VFO, PAR807 final, unmodified, \$35; signal generator, Measurements Corp. Model 78B, \$15; T-23/ARC-5 2 meter xmitter, \$15; RM-13J telephone control unit, \$12; Aircraft BC-1206C Beacon rcvr \$5; BC-338 xmitter, covering 3000 to 8000 Kc., ideal for Novice, \$15; Navy freq. meter, covers 125-20,000 Kc. A.C. supply; calibration book, \$75. Bill Slep, W4FHV, Ellenton, Fla.

SELL: Lakeshore linear P-400GG \$75 watts SSB 200 watts AM, \$195; Central Electronics Model B slicer, \$69; both items guaranteed in brand new condx. G. F. Guler, Palmetto Trailer Park, Box 205, Merritt Island, Fla.

SELL: 65 watt xtal c.w. xmitter w/p.s. \$50. Chester Wolf, KH6PBZ /2, 128 Willow St., Brooklyn 1, N. Y.

# amateur radio -



— The only interest of the  
League

— The only subject for its  
magazine,

# QST

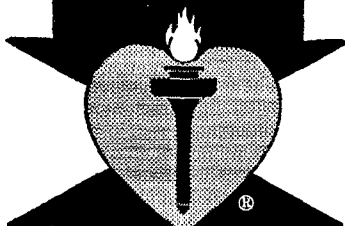
Just  
Ham  
Radio . . .

... AND THE *Best OF THAT!*

QST and ARRL Membership  
\$4 in the USA \$4.25 in Canada  
\$5 elsewhere

The American Radio Relay League, Inc.  
West Hartford 7, Conn.

help your  
HEART FUND

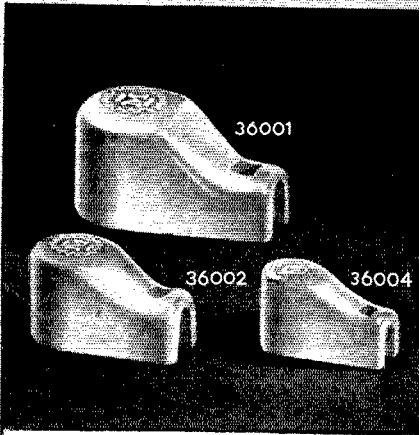


help your  
HEART

# Designed for



# Application



## 36000 SERIES

### Ceramic Plate or Grid Caps

A new addition to this series of exclusive Millen "Designed for Application" products is the 36004 for use on tubes with 1/4" diameter contacts. Efficient, compact, easy to use and neat appearing. Soldering lug and contact one-piece. Lug ears annealed and solder dipped to facilitate easy combination "mechanical plus soldered" connection of cable. No. 36001 for 9/16" tube terminals. No. 36002 for 3/8". No. 36004 for 1/4".

# JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY  
MALDEN  
MASSACHUSETTS



## Index of Advertisers

Adirondack Radio Supply.....	116
Allied Radio Corp.....	168
American Electronics Co.....	144
American Electronics Enterprises.....	132
American Heart Association.....	165
American Radio Relay League, Inc.....	165
<i>Handbook.....</i>	113
<i>World Map.....</i>	158
<i>Course in Radio Fundamentals.....</i>	158
<i>Binders.....</i>	160
<i>QST.....</i>	165
Amperex Electronic Corp.....	127
Arrow Electronics, Inc.....	120
Ashbe Radio Co., Walter.....	156
Barker & Williamson, Inc.....	156
Belden Mfg. Co.....	109
Bendix Radio.....	155
Bliley Electric Co.....	86
Burghardt Radio Supply.....	147
Burstein Applebee Co.....	152
Candler System Co.....	152
Central Electronics, Inc.....	97
C & G Radio Supply Co.....	143, 154
Collins Radio Co.....	2
Commercial Radio Institute.....	160
Crawford Radio.....	146
Dow-Key Co., Inc., The.....	136
Dixerama.....	144
Eitel-McCullough, Inc.....	93, 104
Eldico Corp.....	105
Electro-Voice, Inc.....	Cov. 11
Elmar Electronics.....	148, 151
Engineering Associates.....	150
Equipment Crafters, Inc.....	142, 157
Evans Radio.....	160
Fort Orange Radio Dist. Co., Inc.....	139
Frederick Tool & Engineering Corp.....	159
Freed Transformer Co., Inc.....	146
Gardiner & Co.....	154
General Crystal Co., Inc.....	140
General Motors Corp., Elec. Div.....	125
Gonset Co.....	103
Gotham.....	90, 91
Greenlee Tool Co.....	32
Hallicrafters Co.....	1, 7, 8, 3
Hammarlund Mfg. Co., Inc.....	95
Harvey Radio Co., Inc.....	131
Heath Co.....	87, 88, 89
Henry Radio Stores.....	137
Hi-Par Products Co.....	142
Hughes Research & Development Labs.....	121
Indianapolis Electronic School.....	150
Institute of Radio Engineers.....	135
Instructograph Co., Inc.....	142
International Crystal Mfg. Co., Inc.....	100, 108
International Resistance Co.....	124
Johnson Co., E. F.....	84, 85
Kreckman Co., Herb.....	118
Lafayette Radio.....	149
Lakeshore Industries.....	157
Lampkin Laboratories, Inc.....	161
Lettine Radio Mfg. Co.....	152
L. M. B.....	144
L. W. Electronic Laboratory.....	112
Lytman Engineers, Inc.....	156
Mackay Radio & Telegraph Co., Inc.....	160
Mallory & Co., P. R.....	99
Mass. Radio & Telegraph School.....	161
Master Mechanic Mfg. Co.....	140
Master Mobile Mounts, Inc.....	159
Millen Mfg. Co., Inc., James.....	166
Morrow Radio Mfg. Co.....	106
Mosley Electronics, Inc.....	110
National Co., Inc.....	Cov. 111
National Wire & Cable Co.....	126
Page Communications Engineers, Inc.....	150
Petersen Radio Co., Inc.....	5
P & H Electronics.....	130
Philco TechRep Div.....	115
Port Arthur College.....	130
Premax Products.....	155
Radio Corp. of America.....	Cov. 1V
Radio Products Sales Co. (Denver).....	146, 152
Radio Shack Corp.....	141
Raytheon Mfg. Co.....	129
Regdon Corp.....	122
Regency Div., I.D.E.A., Inc.....	117
Remington Rand, Inc.....	111
Rider Publisher, Inc., John F.....	119
Selectronic Supplies, Inc.....	134
Sonar Radio Corp.....	154
Sun Parts Distributors, Ltd.....	161
Tapstone, Inc.....	150
Technical Materiel Corp.....	167
Tele-Vue Towers, Inc.....	102
Teleplex Co.....	140
Telrex, Inc.....	107
Tennalab.....	161
Ultradyne Engineering Labs.....	148
U. S. Crystals, Inc.....	118
Valley Electronic Supply Co.....	133
Valparaiso Technical Institute.....	138
Vesto Co., Inc.....	136
Vibroplex Co., Inc.....	138
Waters Mfg. Inc.....	128
Western Electric Co.....	153
Wiens Electronics Laboratories.....	148
World Radio Laboratories.....	101, 114, 123, 134, 145
YMCA Trade & Technical School of N. Y.....	146

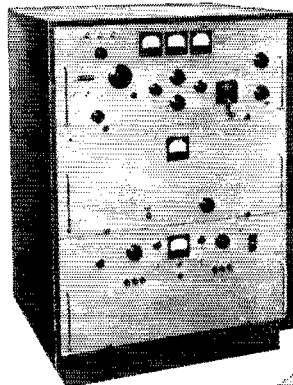


## communications transmitter . . .

This is a DARN GOOD transmitter, but generally accepted to be too expensive for most Hams. It is available for CW, FSK, A-2, AM or SSB with the SBE-1 exciter. Conservatively rated for 1000 watts output CW or FS and 750 watts phone in the 2-32 mc range. Complete details are in . . .

### GPT-750

BULLETIN Q174

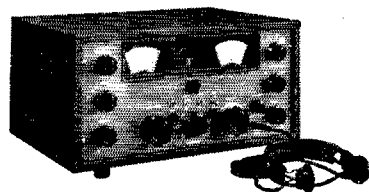


## communications receiver . . .

This is the receiver they are talking about all over the industry. It has caused more excitement in a shorter time than anything to come along in quite a time. The specs you all know — they are in . . .

### GPR-90

BULLETIN Q179



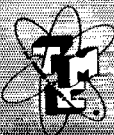
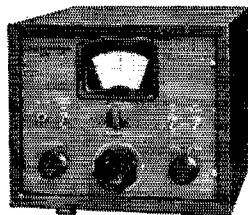
## single sideband adapter . . .

You wanted SSB — here it is, an electrically band-spread, filter type slicer for accurate and simple tuning of SSB signals. Details are in . . .

### GSB-1

BULLETIN Q194

We're working on RF matching transformers, wide band antennas, new SSB transmitter and a lot of other stuff — want a job?



## The TECHNICAL MATERIEL CORPORATION

TMC Canada, Ltd.  
OTTAWA, ONTARIO

MAMARONECK  
NEW YORK

# VHF AMATEURS:

## MAKE ALLIED YOUR SUPPLY HEADQUARTERS

### EVERYTHING IN VHF

You'll find everything you want in VHF at ALLIED. We offer and stock the largest selection of famous-name VHF equipment.

### KING-SIZE TRADES

We're trading highest—just try us. Write today—describe your present equipment—and see what a sweet deal we'll give you on the VHF gear you want.

### FEBRUARY BARGAIN BULLETIN

*Super values in reconditioned and new gear!* More of Allied's famous values. The lowest prices anywhere on top-quality reconditioned gear—with 90-day new-set warranty—plus outstanding buys on new, discontinued units. Quantities limited—be an early bird.

#### Reconditioned

Hallicrafters S-40A.....	\$ 64.95
Hallicrafters SX-43 w/spkr.....	99.50
Hammarlund SP-400X.....	225.00
Central Model A Slicer.....	49.95
National HRO-50T.....	199.00

#### NEW (Discontinued)

Morrow 5BRF Converter.....	\$47.95
Morrow 3BRF Converter.....	44.95
Hallicrafters S-81.....	49.95
Alpar M44 Antenna Kit.....	39.95
Philmore #7501 Portable Radio Kit.....	6.45

**SEND FOR COMPLETE LIST**



### 356-Page ALLIED CATALOG

Send for it—it's the most widely used Electronic Supply Guide. It's packed with the largest selections of station gear, plus Hi-Fi, P.A., test instruments, Knight-Kits, industrial equipment, electron tubes, parts, tools and books. If you haven't a copy, write for it today.

OUR 36<sup>th</sup> YEAR

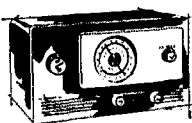


Order from **ALLIED RADIO** 100 N. WESTERN AVE. CHICAGO 80, ILLINOIS

### EASIEST TERMS

You'll find it light on your pocket when you buy on our liberal Easy Pay Terms. You pay only 10% down (your trade-in will more than cover the down payment)—and the rest in easy budget-sparing monthly payments. So make your VHF selection now from famous-make equipment like that listed below.

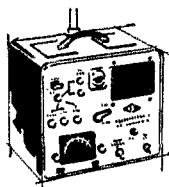
### FAMOUS BRANDS ALWAYS IN STOCK



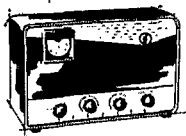
**Hallicrafters S-102 & S-106.** These receivers offer excellent VHF reception at extremely low cost. Model S-102 is for 2 meter band; S-106 is for 6 meter band.



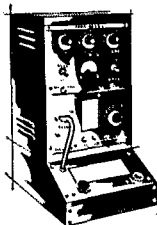
**National NC-300.** Uses plug-in converters for extremely sensitive reception. Designed for the most exacting users. Choice of 3 plug-in converters: for 6 meters, 2 meters or 1½ meters.



**Gonsel Communicators.** Available for 2 or 6 meters. A complete VHF station in a single compact case, ready for AC or battery operation. An amazing little rig that puts out a truly good signal.



**Johnson 6N2.** This low-cost rig makes it easy for you to get on 2 or 6 meters. Use your present low band transmitter for audio and power supply—run up to 100 watts on AM phone. Available in kit form or assembled.

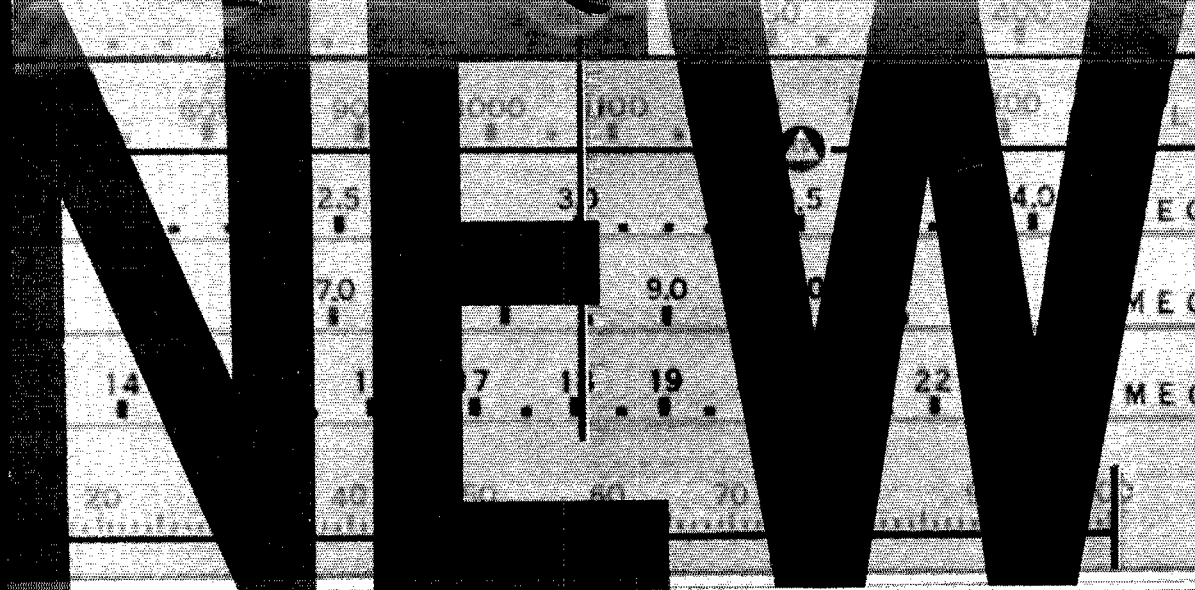


**Harvey-Wells.** Popular "Bandmaster Sr."—very moderately priced transmitter—covers 2 and 6 meters—all other bands from 15 through 80; phone and CW.



**Tecraft Converters.** Available for 2 and 6 meters. Use with any receiver covering 14-18 mc. Broad-band design; crystal controlled.

Also available—a complete selection of quality VHF beam antennas and accessories



# 3 NEW FROM NATIONAL



OFF

OFF

Coming soon, and very soon are 3 new receivers from National.

Price scaled for any ham budget, each offers complete new styling and many new features... so new they will be the most talked about receivers on the air.

You'll want to see them, you'll want to admire them... and you'll want to own at least one. So if you plan to buy a receiver in the \$100 to \$200 price bracket, **WAIT!** Don't buy any until you see the 3 new receivers from National!



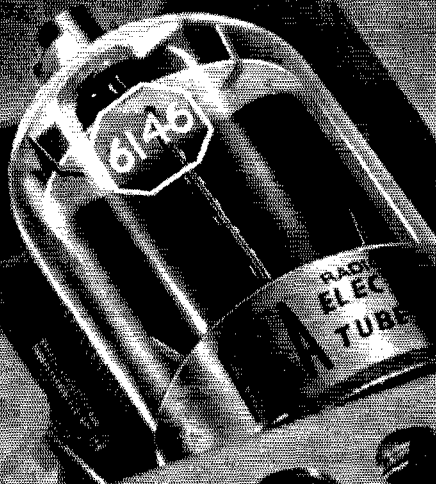
*tuned to tomorrow*



Malden 48, Mass.

8 out of every 10 U. S. Navy ships use National receivers.

Inside view of the Gonset G-77 showing  
the RCA-6146 in the "final".



## Leading Amateur Designs

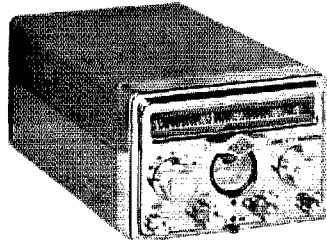
### ...USE RCA TUBES

Next time you QSO a mobile station and you ask him what's behind that solid signal, don't be surprised if you get this answer: "A Gonset G-77—with an RCA-6146 in the final."

Why do more and more amateur and commercial designs specify RCA beam power tubes such as the 6146 pictured here?

Beam power tubes—an original RCA development—offer better results with fewer stages, fewer tubes, fewer controls. RCA beam power tubes make it practicable to get the power you want with lower plate voltage.

There are RCA beam power tubes to meet your power requirements at any frequency up through 450 Mc. Your RCA Tube Distributor handles the entire line. For technical data on any type of RCA beam power tube, write RCA Commercial Engineering, Section B37M, Harrison, N. J.



Gonset G-77 One of amateur radio's outstanding multi-band mobile transmitters.



**TUBES FOR AMATEURS**

RADIO CORPORATION OF AMERICA

Tube Division

Harrison, N. J.