

October, 1948

40 Cents

QST

devoted entirely to

amateur radio

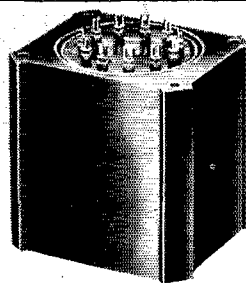


In This Issue — A "10-20" BEAM WITHOUT SWITCHING

Linear Standard Units.

THE ULTIMATE IN QUALITY...

UTC Linear Standard Audio Transformers represent the closest approach to the ideal component from the standpoint of uniform frequency response, low wave form distortion, high efficiency, thorough shielding and utmost dependability. UTC Linear Standard Units offer these features:



- True Hum Balancing Coil Structure . . . maximum neutralization of stray fields.
- Balanced Variable Impedance Line . . . permits highest fidelity on every tap of a universal unit . . . no line reflections or transverse coupling.
- Reversible Mounting . . . permits above chassis or sub-chassis wiring.
- Alloy Shields . . . maximum shielding from inductive pickup.
- Hiperm-Alloy . . . a stable, high permeability nickel-iron core material.
- Semi-Toroidal Multiple Coil Structure . . . minimum distributed capacity and leakage reactance.
- Precision Winding . . . accuracy of winding .1%, perfect balance of inductance and capacity; exact impedance reflection.
- High Fidelity . . . UTC Linear Standard Transformers are the only audio units with a guaranteed uniform response of ± 1 DB from 20-20,000 cycles.

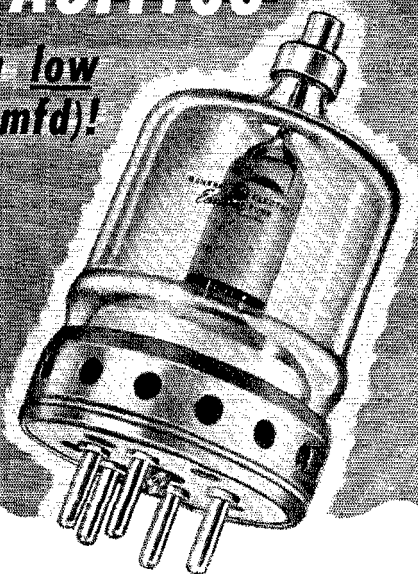
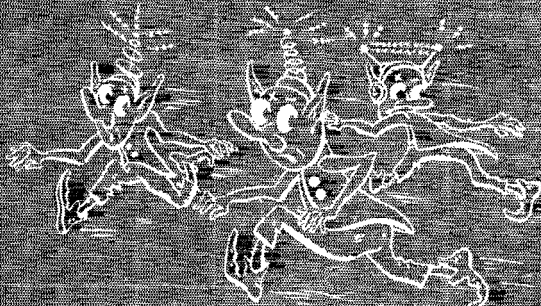
TYPICAL LS LOW LEVEL TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	± 1 db from	Max. Level	Relative hum-pickup reduction	Max. Unbalanced DC in prim'y	List Price
LS-10	Low impedance mike, pickup, or multiple line to grid	50, 125, 200, 250, 333, 500/600 ohms	60,000 ohms in two sections	20-20,000	+15 DB	-74 DB	5 MA	\$25.00
LS-10X	As Above	As above	50,000 ohms	20-20,000	+14 DB	-92 DB	5 MA	32.00
LS-12	Low impedance mike, pickup, or multiple line to push pull grids	50, 125, 200, 250, 333, 500/600 ohms	120,000 ohms overall, in two sections	20-20,000	+15 DB	-74 DB	5 MA	28.00
LS-12X	As above	As above	80,000 ohms overall, in two sections	20-20,000	+14 DB	-92 DB	5 MA	35.00
LS-26	Bridging line to single or push pull grids	5,000 ohms	60,000 ohms in two sections	15-20,000	+20 DB	-74 DB	0 MA	25.00
LS-19	Single plate to push pull grids like 2A3, 6L6, 300A. Split secondary	15,000 ohms	95,000 ohms; 1.25:1 each side	20-20,000	+17 DB	-50 DB	0 MA	24.00
LS-21	Single plate to push pull grids. Split primary and secondary	15,000 ohms	135,000 ohms; turn ratio 3:1 overall	20-20,000	+14 DB	-74 DB	0 MA	24.00
LS-22	Push pull plates to push pull grids. Split primary and secondary	30,000 ohms plate to plate	80,000 ohms; turn ratio 1.6:1 overall	20-20,000	+26 DB	-50 DB	.25 MA	31.00
LS-30	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125, 200, 250, 333, 500/600 ohms	50, 125, 200, 250, 333, 500/600 ohms	20-20,000	+17 DB	-74 DB	5 MA	25.00
LS-30X	As above	As above	As above	20-20,000	+15 DB	-92 DB	3 MA	32.00
LS-27	Single plate to multiple line	15,000 ohms	50, 125, 200, 250, 333, 500/600 ohms cycles	30-12,000	+20 DB	-74 DB	8 MA	24.00
LS-50	Single plate to multiple line	15,000 ohms	50, 125, 200, 250, 333, 500/600 ohms	20-20,000	+17 DB	-74 DB	0 MA	24.00
LS-51	Push pull low level plates to multiple line	30,000 ohms plate to plate	50, 125, 200, 250, 333, 500/600 ohms	20-20,000	+20 DB	-74 DB	1 MA	24.00
LS-141	Three sets of balanced windings for hybrid service, centertapped	500/600 ohms	500/600 ohms	30-12,000	+10 DB	-74 DB	0 MA	28.00

Write for our Catalog PS-408

CHASE AWAY PARASITICS

by choosing this tube with low grid-plate capacitance (.05 mmfd)!



THEY'RE annoying, self-excited oscillations . . . and they invite Grand Island QSL cards! In a screen-grid tube, these gremlins batten on a high grid-plate capacitance; but extremely low g-p capacitance acts like a whiff of DDT powder.

Good circuit layout is your follow-up, if you want to give parasitics a knockout. To a GL-4D21/4-125A tube add correct circuit design, and you've set the stage for a *clean* signal.

In many other ways G.E.'s fine v-h-f tetrode is the right tube for your final, singly or in push-pull. Lots of power—a pair will take 1 kw input CW, or 760 w input phone! Yet drive is economically low. Only 5 w and 6.6 w respectively are needed for the input figures given.

Your circuit design is simplified, since no neutralizing is required at most frequencies. The tube is modern in every feature, including a compact, streamlined contour that bespeaks the structural sturdiness within. This tetrode will stand up!

See the GL-4D21/4-125A at your nearby G-E tube distributor. Price and full performance information also are available there. Or write *Electronics Dept., General Electric Company, Schenectady 5, New York.*

Get *Ham News* regularly! Ask your G-E tube distributor to reserve a copy of each bi-monthly issue for you. This helpful, free magazine is jam-packed with circuit suggestions sure to aid you in your progress. To read G. E.'s *Ham News* is to become a more proficient radio amateur!



GL-4D21/4-125A TETRODE

500 W MAX CW INPUT. 120 MC
FREQUENCY AT MAX RATINGS

ELECTRICAL CHARACTERISTICS

Filament voltage	5 v
current	6.5 amp
Avg interelectrode capacitances:	
grid-plate	.05 mmfd
filament-grid	10.8 mmfd
filament-plate	3.1 mmfd

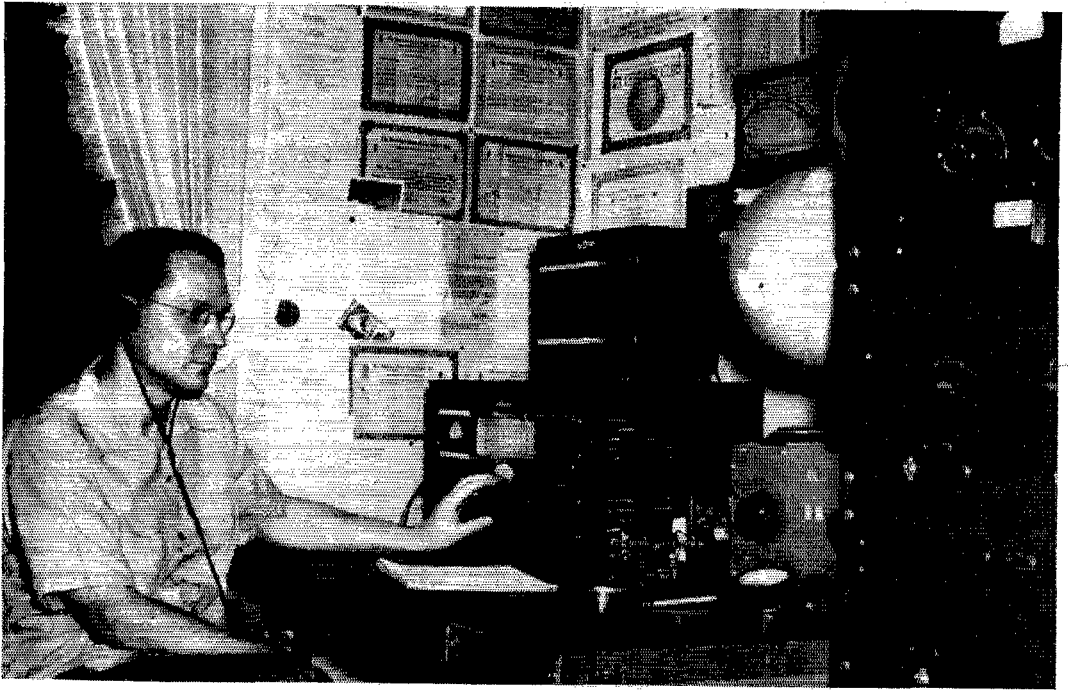
MAXIMUM RATINGS, CLASS C TELEGRAPHY

Plate voltage	3,000 v
Screen voltage	400 v
Plate current	225 ma
dissipation	125 w

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL  ELECTRIC

161-GA10-8880



"...accuracy with a vengeance!!"

W1BFT

W1BFT (Carl B. Evans, above) of Concord, New Hampshire, knows accuracy when he sees it. He is a member of the DXCC, A-1 Operators' Club, RCC and ORS, OPS, ex-SCM of N.H., WAS, WAVE, and has been an active licensed ham since February, 1925, thus automatically qualifying for the Old Timers' Club as well. On July 19 last he wrote us:

"I participated in the last frequency measuring test conducted by the A.R.R.L. over W1AW using a Collins 75A receiver and a 100 kc frequency standard. What I was trying to do was to see if I could qualify as a class II Official Observer with that equipment. Much to my surprise, the results were better than five times as good as required for Class I O.O. I thought you

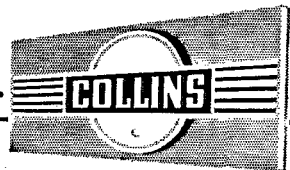
might be interested in the figures, so here they are:

"Number of measurements made were 14; 3 on 3.5, 3 on 7, 4 on 14 and 4 on 28 mc bands. Average error .00133% or 13.3 parts per million; Class I O.O requirements are 71.43 parts per million!! Best measurement was .02 kc low on 28 mc!!!

"That is what I call accuracy with a vengeance!! I knew the receiver was good, but hardly realized it was that good!"

If you want the best that can be had in accuracy and stability, you will find it in the Collins 75A-1. If you don't know your Collins dealer, we will be glad to give you his name and address.

FOR RESULTS IN AMATEUR RADIO, IT'S . . .



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 West 42nd Street, New York 18, New York

458 South Spring Street, Los Angeles 13, California



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

STAFF

Editorial

KENNETH B. WARNER, W1EH
(Managing Secretary, ARRL)
Editor

HAROLD M. McKEAN, W1CEG
Assistant Editor

GEORGE GRAMMER, W1DF
(Technical Director, ARRL)
Technical Editor

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

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

RICHARD M. SMITH, W1FTX
C. VERNON CHAMBERS, W1JEQ
JOHN W. PADDON, VE3QV
Technical Assistants

ROD NEWKIRK, W9BRD
DX Editor

WALTER E. BRADLEY, W1FWH
Technical Information Service

Production

RALPH T. BEAUDIN, W1BAW
Superintendent

NANCY A. PRICE
Assistant

Advertising

F. CHEYNEY BEEKLEY, W1GS
LORENZ A. MORROW, W1VG
EDGARD D. COLLINS

Circulation

DAVID H. HOUGHTON
Circulation Manager

RALPH T. BEAUDIN, W1BAW
Assistant Circulation Manager

OFFICES

38 La Salle Road

West Hartford 7, Connecticut

Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.50 in the Dominion of Canada, \$5.00 in all other countries. Single copies, 40 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 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

Copyright 1948 by the American Radio Relay League, Inc. Title registered at U. S. Patent Office.

-CONTENTS-

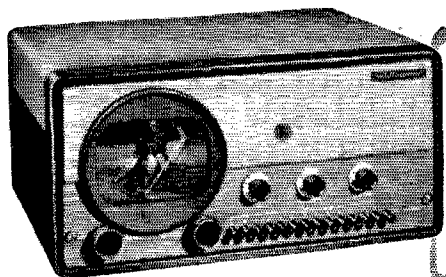
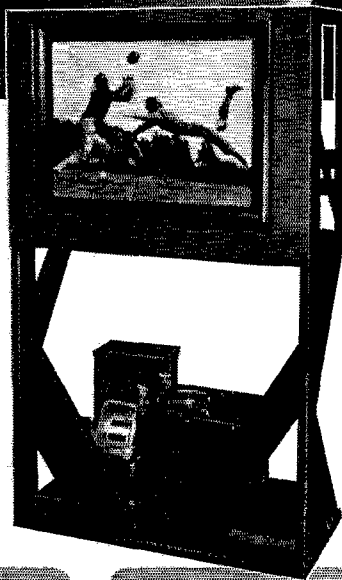
"It Seems to Us . . ."	9
A New Principle in Two-Band Rotary-Beam Design <i>A. M. Pichitino, W3NJE</i>	11
The Story of Amateur Radio Teletype <i>John Evans Williams, W2BFD</i>	16
Happenings of the Month	21
Simple Crystal Control on 144 Mc. <i>E. W. Johnson, W2UXA, and Marvin Bernstein, W2PAT</i>	22
Announcing the 15th ARRL Sweepstakes	24
I.A.R.U. News	26
Further Advances in Electronic-Keyer Design <i>F. A. Bartlett, W6OWP</i>	27
Silent Keys	30
A "Hot" Converter for 220 Mc. <i>Harry Paul, W1PMS, and Calvin Hadlock, W1CTW</i>	31
United States Naval Reserve	34
Navy Day Receiving Competition	35
Midwest Division Convention	35
Hamfest Calendar	35
Completing the Surplus-Parts Bandswitching Transmitter <i>C. Vernon Chambers, W1JEQ</i>	36
How's DX?	41
Technical Topics —	
The Clapp High-Stability Circuit	45
The "Transistor" — an Amplifying Crystal	48
In QST 25 Years Ago This Month	49
ARRL QSL Bureau	49
The Eyes Have It <i>John W. Paddon, VE3QV</i>	50
The World Above 50 Mc.	52
Correspondence from Members	54
Hints and Kinks	55
Operating News	56
Station Activities	64
WWV Schedule	136

Assembly Line . . . for radio chassis or . . . TV ??



It's sometimes hard to tell. In the RF and IF sections there's very little difference.

That's why it was easy for hallicrafters to add television to their line. Long years of high-frequency "know-how" in the Amateur field now bring you precision television at amazingly low prices.



Model T-54 \$169⁵⁰

7-inch direct view; push-button tuning on all 12 channels. 19 tubes plus cathode ray tube and 3 rectifiers. Size 20" x 9 $\frac{1}{2}$ " x 18". Write for folder S-207C

Model T-60 \$595⁰⁰

16" x 12" screen; 12-channel push-button tuning. 22 tubes plus cathode ray tube and 3 rectifiers. Size 44 $\frac{1}{2}$ " x 24" x 14". Write for folder S-208C

The hallicrafters *Co.*

4401 W. FIFTH AVE., CHICAGO 24, ILLINOIS

WORLD'S LEADING MANUFACTURERS OF PRECISION RADIO AND TELEVISION EQUIPMENT!

NBFM *or* CW
VFO *or* CRYSTAL!



\$29800

Slightly Higher
West of Rockies

...the New **HT-19** *transmitter*

• Designed for the modern-minded Ham. Maximum flexibility on 5 Bands — 3.5, 7, 14, 21, and 28 MC. High stability, low FM distortion (measured at less than 5%). Provisions for applying AM from external modulator. 125 watts output.

Oscillator—reactance modulator with speech amplifier—buffer—and final. The 4-65A in output stage is air-cooled by a 3000-rpm fan! 5 Tubes plus 2 Voltage Regulators and 3 Rectifiers.

See it at your Hallicrafters Dealers!

the hallicrafters co.

4401 W. Fifth Ave., Chicago 24, Ill.

World leading manufacturers of precision radio and television equipment

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*. All ARRL Field Organization appointments are now available to League members. These include O.R.S., O.E.S., O.P.S., O.O., and O.B.S. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

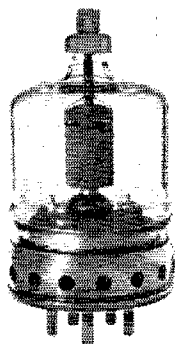
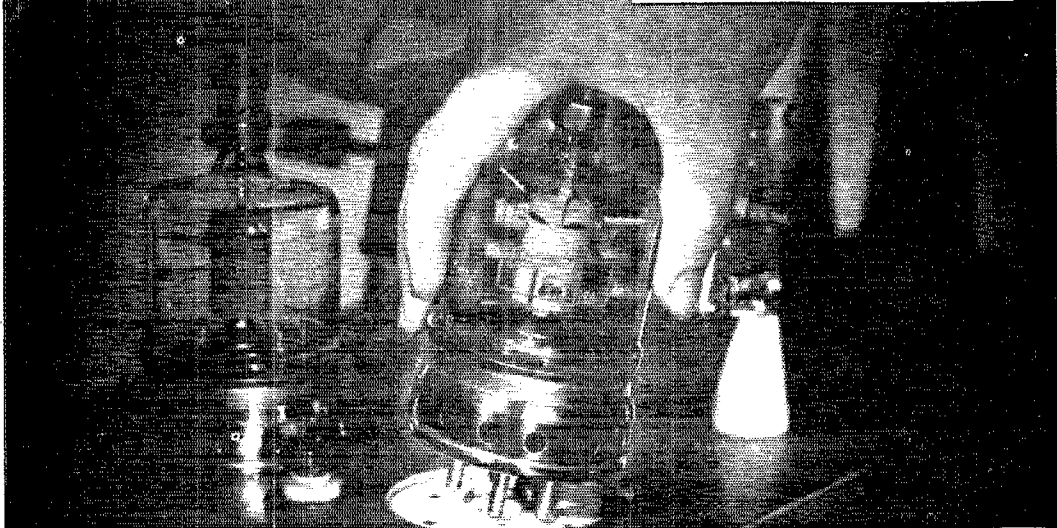
ATLANTIC DIVISION			
Eastern Pennsylvania Maryland-Delaware-D.C. Southern New Jersey Western New York Western Pennsylvania	W3BES W3BWT W2QXX W2PGT W3KWL	Jerry Mathis Eppa W. Darne G. W. (Bill) Tunnell Harding A. Clark Ernest J. Hlinsky	633 Crescent Ave. 137 Tennessee Ave., N.E. 23 Wyoming Ave. 75 Westmoreland Ave. 509 Beechwood Ave.
CENTRAL DIVISION			
Illinois Indiana Wisconsin	W9AND W9FSG W9RQM	Wesley E. Marriner Charles H. Conway Keno W. Goetsch	624 College Ave. 3385 College Ave. 929 S. 7th Ave.
DAKOTA DIVISION			
North Dakota South Dakota Minnesota	W8G7D W8NGM W8CWB	Paul M. Rossoletti J. S. Foasberg Walter G. Hasskamp	204 Polk St. 509 Idaho Ave., S.E. 116 3rd Ave., S.W.
DELTA DIVISION			
Arkansas Louisiana Mississippi Tennessee	W5JIC W5VT W5IGW W4QT	Marshall Riggs W. J. Wilkinson, jr. Harold Dav Ward Bahman	Room 313, Jefferson Hotel Route 2, Box 333 1000 Overlook Ave.
GREAT LAKES DIVISION			
Kentucky Michigan Ohio	W4CDA W8SCW W8PNQ	W. C. Alcock Joseph R. Beljan, jr. William D. Montgomery	153 St. Mildred's Court 13959 Fuller Ave. 1290 Coalidge Ave.
HUDSON DIVISION			
Eastern New York N. Y. C. & Long Island Northern New Jersey	W3HZL W2KDC W2ANW	Ernest E. George Charles Ham, jr. Thomas J. Lydon	7044 Lexington Parkway 200 Harvard St. 199 Mortimer
MIDWEST DIVISION			
Iowa Kansas Missouri Nebraska	W8PPP W8AWP W8ACD W8RQK	William G. Davis Alvin B. Unruh Ben H. Wenden William L. Gemmer	3rd St. 842 N. Terrace Drive 1001 10th St. 1708 West 6th St.
NEW ENGLAND DIVISION			
Connecticut Maine Eastern Massachusetts Western Massachusetts New Hampshire Rhode Island Vermont	W1VBR W1GKI W1ALP W1LZW W1AQQ W1HRC W1NLO	Walter L. Glover E. Norman Davis Frank L. Baker, jr. Brentiss M. Bailey Gilman K. Crowell Clayton L. Gordon Burtis W. Dean	Glover Ave. RFD 1 91 Atlantic St. 62 Dexter St. 15 Academy St. 70 Columbia Ave., Gaspee P. O. Box 81
NORTHWESTERN DIVISION			
Alaska Idaho Montana Oregon Washington	KL7PQ W7IWU W7EGN W7IAQZ W7ACF	August G. Hiebert Alan K. Ross Fred B. Tintinger Ralph A. Blunkes Clifford Cavanaugh	Box 879 2105 Irene St. 328 Central Box 744 Route 1
PACIFIC DIVISION			
Hawaii Nevada Santa Clara Valley East Bay San Francisco Sacramento Valley* Philippines*	KH6EL W7CX W6BPT W6TT W6LW W6ZF KA1CB	John Souza N. Arthur Sowle Roy E. Pinkham Horace R. Greer Samuel C. Saniew Ronald G. Martin Craig B. Kennedy	Box 2025 1061 Fremont St. 414 Fairmount Ave. 215 Knovics Ave. 4820 Second Ave. 25 Roosevelt Road
San Joaquin Valley	W6FKL	Ted R. Souza	3515 Home Ave.
ROANOKE DIVISION			
North Carolina South Carolina Virginia West Virginia	W4CYB W4ROE/ZANG W4KFC W4J8M	W. J. Wortman Victor Ferguson Victor C. Clark Donald B. Morris	67 Duke Power Co. 323 Rosewood Drive Box 2 303 Home St.
ROCKY MOUNTAIN DIVISION			
Colorado Utah-Wyoming	W8OYT W7NPU	Glen Bond Alvin M. Phillips	2530 Kendall RFD 2
SOUTHEASTERN DIVISION			
Alabama Eastern Florida Western Florida Georgia West Indies (Cuba-P.R.-V.I.) Canal Zone	W4GIW W4FWZ W4DAO W4DXI KP4KD	Dr. Arthur W. Woods John W. Hollister Luther M. Holt Clay Griffin Everett Mayer	411 Woodward Bldg. 3809 Springfield Blvd. 233 W. Romana St. 1557 Athens Ave., S.W. P. O. Box 1061
SOUTHWESTERN DIVISION			
Los Angeles Arizona San Diego	W6IOX W7MLL W6GC	Vincent J. Haggerty Gladden C. Elliott Irvin L. Emig	1017 Indio Muerto St. 39 North Melwood 4852 Marlborough Drive
WEST GULF DIVISION			
Northern Texas Oklahoma Southern Texas New Mexico	W5DAS/MNL W5HXL W5HIF W5SMA	N. C. Settle Bert Weidner Ted Chastain Lawrence R. Walsh	5630 McCommas Box 14 3937 So. Staples St. P. O. Box 1063
MARITIME DIVISION			
Maritime (Nfld. & Labr. att.)	VE1DQ	A. M. Crowell	69 Dublin St.
ONTARIO DIVISION			
Ontario	VE3CP	Thomas Hunter, jr.	1774 Westcott Road
QUEBEC DIVISION			
Quebec	VE2GL	Gordon A. Lynn	c/o Radio Division, Montreal Airport
VANALTA DIVISION			
Alberta British Columbia Yukon	VE6MI VE7WS VE8AK	Sidney T. Jones W. W. Stovary W. R. Williamson	P. O. Box 373 3915 W. 32nd Ave. Radio Range Sta., D.O.T.
PRAIRIE DIVISION			
Manitoba Saskatchewan	VE4AM VE3CO	A. W. Morley Norman Thompson	26 Lennox Ave. 1120 7th Ave., N. W.
		Glenside Gardens Washington 2, D. C. Auburn Syracuse 10 Farrell Dixon Indianapolis 5 Wausau Grand Forks Huron Crosby Danville Shreveport Greenville Chattanooga Danville Detroit Cincinnati 30 Schenectady 8 Westbury Rutherford Mitchellville Wichita 6 North Kansas City North Platte Newtown Old Orchard Beach North Quincy 71 Pittsfield Baker Plateau, Providence 5 Burlington Anchorage Boise Whitefish Box 744 Auburn Waikuku, Maui Reno Santa Clara Oakland 11 Los City Sacramento 17 San Francisco Del Monte Quezon City, Rizal Fresno 4 Charlotte 1 Columbia 25 Antandale Fairmont Denver 14 Ogden, Utah Birmingham Jacksonville 8 Pensacola Atlanta San Juan 5, P. R. Santa Barbara Tucson San Diego Dallas Crescent Corpus Christi Los Alamos Halifax, N. S. Windsor, Ont. Montreal, P. Q. Edmonton, Alta. Vancouver Teslin, Y. T. St. Vital Moose Jaw	

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

OUTSTANDING

Follow the Leaders to

Eimac
TUBES
The Power for R-F



The Eimac 4-125A

Look about you . . . check the equipment shows . . . thumb through the trade magazines . . . talk to design engineers . . . yes, the Eimac 4-125A power tetrode is the standout vacuum tube, accepted in all fields of electronic endeavor for its stability, long-life and dependability.

Each tube is backed by the combined engineering resources of Eitel-McCullough plus over a million hours of proven field-service. It's Pyrovac[®] plate is highly resistant to momentary overloads and contributes to the tube's long life. Processed grids control primary and secondary emission, providing a high degree of operational stability. The tube is ruggedly designed to withstand abnormal physical as well as electrical abuse.

Detailed data and application notes are immediately available and statistics for unusual applications will be supplied on request.

EITEL-McCULLOUGH, INC.

204 San Mateo Ave., San Bruno, California

Export Agents: Frazer & Hansen, 310 Clay Street, San Francisco 11, California

*Reg. Trade Mark

Filaments: Thoriated tungsten															
Voltage		5.0 volts													
Current		4.5 amperes													
Grid-Screen Amplification Factor (Average)		2.2													
RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR				HIGH-LEVEL MODULATED RADIO FREQUENCY AMPLIFIER				AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR							
Class-C Telephony or FM Telephony (Key-down conditions, 1 tube)				Class-C Telephony (Carrier conditions unless otherwise specified, 1 tube)				Class AB ¹ (Sinusoidal wave, two tubes unless otherwise specified)				Class AB ² (Sinusoidal wave, two tubes unless otherwise specified)			
Maximum Ratings				Maximum Ratings				MAXIMUM RATINGS				MAXIMUM RATINGS			
D-C PLATE VOLTAGE				3000 MAX. VOLTS				3000 MAX. VOLTS				3000 MAX. VOLTS			
D-C SCREEN VOLTAGE				400 MAX. VOLTS				400 MAX. VOLTS				400 MAX. VOLTS			
D-C GRID VOLTAGE				500 MAX. VOLTS				-94				-45			
D-C PLATE CURRENT				375 MAX. MA.				200 MAX. MA.				50			
PLATE DISSIPATION				125 MAX. WATTS				85 MAX. WATTS				275 MAX. MA.			
SCREEN DISSIPATION				20 MAX. WATTS				20 MAX. WATTS				125 MAX. MA.			
GRID DISSIPATION				5 MAX. WATTS				5 MAX. WATTS				20 MAX. WATTS			
Typical Operation (Frequencies below 120 Mc.)								TYPICAL OPERATION							
D-C Plate Voltage				2500 3500 volts				2000 2500 volts				2000 2500 volts			
D-C Screen Voltage				350 350 volts				350 350 volts				350 350 volts			
D-C Grid Voltage				-150 -150 volts				-220 -210 volts				-94 -94 volts			
D-C Plate Current				290 167 ma.				150 152 ma.				50 50 ma.			
D-C Screen Current				40 30 ma.				33 30 ma.				-0.5 -0.3 ma.			
D-C Grid Current				12 9 ma.				10 7 ma.				0 0 ma.			
Screen Dissipation				14 10.5 watts				11.5 10.4 watts				8.5 8.5 ma.			
Grid Dissipation				2 1.2 watts				1.4 1.4 watts				5 6 ma.			
Peak R-F Grid Input Voltage (approx.)				320 280 volts				375 340 volts				13,400 20,300 ohms			
Driving Power (approx.)				3.8 2.5 watts				1.8 3.3 watts				94 94 volts			
Plate Power Input				500 500 watts				300 380 watts				0 0 watts			
Plate Dissipation				125 175 watts				75 80 watts				105 89 volts			
Plate Power Output				375 375 watts				215 300 watts				1.4 1 watts			
												Max-Signal Plate Dissipation (per tube)			
												125 125 watts			
												Max-Signal Plate Power Output			
												210 320 watts			
												Total Harmonic Distortion			
												5 2.6 per cent.			
												1 0.2 per cent.			

NOW WITH . . . Pyrovac Plates • Processed Grids

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 Secretary at the administrative headquarters at West Hartford, Connecticut.



Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914-1936
EUGENE C. WOODRUFF, W8CMP, 1936-1940

Officers

President GEORGE W. BAILEY, W2KH
Washington, D. C.
Vice-President J. LINCOLN MCCARGAR, W6EY
Oakland, California
Secretary KENNETH B. WARNER, W1EH
West Hartford, Connecticut
Communications Manager FRANCIS E. HANDY, W1BDI
West Hartford, Connecticut
Treasurer DAVID H. HOUGHTON
West Hartford, Connecticut

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

Assistant Secretaries ARTHUR L. BUDLONG, W1BUD
JOHN HUNTOON, W1LVQ, LEROY T. WAGGONER, W1PEK
West Hartford, Connecticut

DIRECTORS

President
GEORGE W. BAILEY, W2KH
1 East 79th St., New York 21, N. Y.

Vice-President
J. LINCOLN MCCARGAR, W6EY
66 Hamilton Place, Oakland 12, Calif.

Canadian General Manager
ALEX REID, VE2BE
240 Logan Ave., St. Lambert, P. Q.
Alternate: Leonard W. Mitchell, VE3AZ
78 Raglan Ave., Toronto, Ont.

Atlantic Division
WALTER BRADLEY MARTIN, W3QV
1633 Arbutha Rd., Abington, Pa.
Alternate: Henry W. Wicketts, Jr., W3KWA
1112 State Ave., Coraopolis, Pa.

Central Division
CLYDE C. RICHFIELD, W9ARE
Marshfield, Wisconsin
Alternate: Harold H. Jansen, W9DJG
3519 California Ave., Alton, Ill.

Dakota Division
GOODWIN L. DOSLAND, W8TSN
Moorhead, Minnesota
Alternate: Robert A. Kimber, W8BLK
Canyon Lake Rd., Rapid City, S. D.

Delta Division
VICTOR CANFIELD, W5BSR
P. O. Box 965, Lake Charles, La.
Alternate: James W. Wicketts, W4FTS
220 N. Howel St., Chattanooga, Tenn.

Great Lakes Division
HAROLD C. BIRD, W8DPE
114 Hickory Dr., Crescent Lake, Pontiac, Mich.
Alternate: John H. Braub, W8SPF
1321 Berkshire Rd., Grosse Pointe Park 30, Mich.

Hudson Division
JOSEPH M. JOHNSTON, W2SOX
Avon-by-the-Sea, N. J.
Alternate: Robert A. Kirkman, W2DSY
1910 Oak Drive, West Belmar, N. J.

Midwest Division
LEONARD COLLETT, W8DEA
Civil Aeronautics Administration
Box 776, Joplin, Mo.
Alternate: Alvin G. Keyes, W8KTQ
1201 Merchants Nat'l Bank Bldg., Cedar Rapids, Ia.

New England Division
PERCY C. NOBLE, W1BVR
37 Broad St., Westfield, Mass.
Alternate:

Northwestern Division
HAROLD W. JOHNSTON, W7DXF
2727 Belvidere Ave., Seattle 6, Wash.
Alternate: R. Rex Roberts, W7CPY
110 W. Brennan St., Glendive, Mont.

Pacific Division
WILLIAM A. LADLEY, W6RBQ
200 Naylor St., San Francisco 12, Calif.
Alternate: Kenneth E. Hughes, W6CFR
810 W. Orange Ave., So. San Francisco, Calif.

Roanoke Division
H. L. CAVENTISS, W4DW
2607 Vanderbilt Ave., Raleigh, N. C.
Alternate: J. Frank Key, W4ZA
Box 707, Buena Vista, Va.

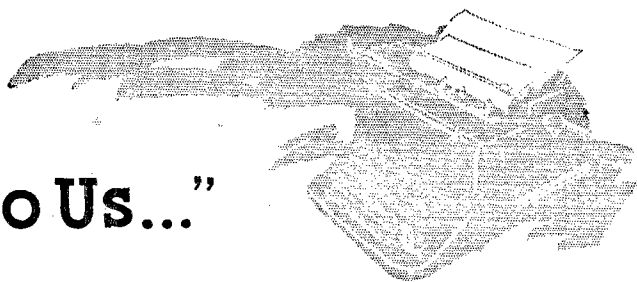
Rocky Mountain Division
FRANKLIN K. MATEJKA, W0DD
P. O. Box 212, Estes Park, Colo.
Alternate: P. Arthur Smoll, W0KVD
529 No. Nevada Ave., Colorado Springs, Colo.

Southeastern Division
WILLIAM C. SHELTON, W4ASR
627 Revillo Blvd., Daytona Beach, Fla.
Alternate: William P. Sides, W4AUP
Fleming Road, Montgomery, Ala.

Southwestern Division
HANS R. JEPSEN, W6KEI
6837 Ethel Ave., No. Hollywood, Calif.
Alternate: Arthur E. Schifferman, sr., W6CGI
1445 Raymond Ave., Glendale 1, Calif.

West Gulf Division
WAYLAND M. GROVES, W5NW
P. O. Box 586, Odessa, Texas
W5NW at Humble Pipe Line Camp, Odessa
Alternate: Jack T. Moore, W5ATA
4531 Fairway Ave., Dallas 4, Texas

"It Seems to Us..."



EMERGENCY PREPAREDNESS

Reading the other day about a weather airplane searching for a rumored hurricane in the West Indies, we were reminded that we would soon be well into the East Coast's hurricane season and close to the time of year when Nature in angry mood can play havoc with the affairs of Man in any part of the country. And that of course brought to mind our rôle in disaster communications and the need to be prepared. We even think of it as a duty, for it is a fact that in these days the rendering of emergency communication is the most important way in which amateur radio "pays off" to the country as a whole for its privileges.

The hundreds of ARRL Emergency Coördinators are busy on organizational work in a large number of communities, helping to plan the most advantageous employment of amateur facilities should disaster strike. The participation of the individual amateur comes about through enrollment in the ARRL Emergency Corps. The apparatus needs are met by the existence, in the thousands of amateur shacks, of equipment that does not rely upon the usual commercial sources for its power. The amateur prepares himself to do his duty in this work by getting together the apparatus for a self-powered station, to deal with the disaster that he hopes will never come but for which he is ready. And generally he builds that apparatus himself.

Supposing that you want to prepare yourself to do your part in the work, you are asking yourself what apparatus you should build. One difficulty is that the many facets of amateur radio provide a puzzling number of choices. Maybe we can help with some suggestions from Headquarters' experience. First off, the isolated or crippled city needs contact with the outside world, and any emergency power supply that permits a fixed home station to remain on the air — on "80" or "40" for choice — is a valuable contribution to the work. Generally, however, it is found necessary to install a station in some sort of a central headquarters, and there the question of portability comes to the fore. The old standard for work of this sort was what we called a

"suitcase portable," complete with cubbyholes for 'phones and precut antenna. It is still a perfectly excellent idea, the ideal way to have a portable station, and the League urges all amateurs who feel up to the job to prepare themselves in that manner. But many amateurs, with no great yen for portable work itself, do not feel that they can make the investment in such extra equipment that would rarely be used. To them the League urges that home stations be constructed in such a manner that the transmitter front end and a low-power stage or two can be quickly removed and safely transported to where they are most needed, and there operate on emergency supply instead of the traditional commercial juice. As to power sources, the gas-engine generator of course is an admirable one if you actually own it. (A borrowed one won't be much good to you if the owner will have priority during an emergency.) Considering their expense, our Communications Department suggests that those of us who don't own one will be best advised to plan our emergency supplies around that practically-omnipresent source of energy, the 6-volt automobile storage battery. That means, of course, that both the front ends of our transmitters and our receivers should contemplate 6-volt filament operation and should be so fitted with terminal strips or plugs and cables that they can be changed over quickly to operate on a vibrator or dynamotor supply fed by 6 or 12 volts. The sense of security that you'll get from equipping yourself with such an auxiliary supply will more than offset its modest cost. But whether with 115-volt generator or 6-volt battery source, the amateur who plans and builds and equips his home station so that its essentials constitute a movable independently-powered station for emergencies may feel that he is taking an important step in preparedness.

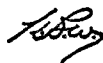
In addition to these fixed stations the relief of an emergency almost always requires portable and mobile stations that can go right into the heart of the affected zone. Often Nature is at her cruelest at such times, and here the suitcase portable again comes into its own, since you can't carry four armfuls of tender

home-station gear out into a blinding sleet-storm and hope to get a station running. Times and fashions change. Time was when the whole load of affected-area operations was borne by such carrying-handle portables, mostly on 80 c.w. Lately mobile installations in cars have been giving a pretty good account of themselves and promise to be exceedingly valuable in certain types of emergencies. Their mobility permits spotting them where they are most needed, they are instantly ready to operate, and they provide shelter for the operator. The recent opening of the lower amateur frequencies to mobile work unquestionably will result in a great increase in the number of automobile installations. We urge you, when planning a station for your car, to give a thought to emergencies and make your installation in such a way that it will be useful in that field of work, too.

The record shows that an increasing percentage of amateur relief work is being conducted by 'phone. The beleaguered community's contacts with the outside world are still best handled via 80-meter telegraphy (or 40 in the South), but for the "tactical" or short-term communications *within* a disaster zone of limited area, voice work frequently offers the great advantage of speed in permitting relief officials to converse directly with each other. And in spite of the opinion of some hard-shelled old-timers, it is possible to handle message traffic speedily and effectively by voice. For such close-in work, the v.h. frequencies have been found preferable, the mobile

work to date of course having been done on 2 and 6 meters and on 10-meter ground wave. Two meters has an excellent record for network operation to tie together the key points in a distressed area, and we recommend its use whenever possible. There are all kinds of emergencies and in some of them 75-meter 'phone doubtless will be found useful, but its general performance record in the average disaster of limited size has not been very good. This is because it is so tender to distant interference that it cannot be operated satisfactorily at night unless protected by an FCC order "clearing channels" for it. While we need all the apparatus and bands we can bring to bear when emergency strikes us, experience to date indicates that 4-Mc. 'phone is not the best way and the League cannot recommend the building of special emergency apparatus for that purpose. For work at greater distances than v.h.f. will cover, or whenever "record communication" is a necessity, there is still no substitute for 80-meter c.w.; and a few such rigs in "suitcases" or mobile in cars are a necessity in any group's planning.

It seems to us that it's the duty of every radio amateur to be prepared to play some part in emergency communications. Whatever you build, whatever your interests, keep that aim in mind, we urge you, and plan your gear so that it will be capable of helping your community if trouble comes.



WITH DEEPEST SORROW I report the death, on September 2nd, of Kenneth B. Warner, for nearly thirty years Secretary and General Manager of the American Radio Relay League. W1EH is silent. We in amateur radio and ARRL have lost a brilliant leader, a close friend, and perhaps the truest and most ardent amateur in our ranks.

QST will pause next month to record the contributions and achievements of the man who, perhaps more than any other single amateur, left his mark in the history of amateur radio. Then we shall go forward, as Ken Warner would have wanted us to, in the finest ARRL traditions toward the brilliant future which is rightfully that of amateur radio.

GEORGE W. BAILEY, W2KH
President, ARRL

A New Principle in Two-Band Rotary-Beam Design

Dual-Band Operation in One Array Without Switching

BY A. M. PICHITINO,* W3NJE

IN recent years the parasitic type of beam antenna array has been widely used in amateur radio communication. The characteristics of this type of array — appreciable gain at low vertical angles of radiation, good azimuthal resolution or discrimination, wide coverage when rotated, compactness — are well known and have proved highly desirable. The usual approach to dual-band operation with this type of antenna has been to utilize separate antennas mounted upon a common rotatable structure. Previous articles^{1, 2, 3} have described the use of relays and linear phasing sections to achieve dual-band operation with common radiating elements. These methods have disadvantages in that adjustments are difficult and tedious and that proper relays are difficult to obtain and maintain.

This paper describes a dual-band parasitic array using common radiating elements without the use of relays or linear phasing sections. Tuning of the system is easier, less time-consuming and more accurate than in the case of a single-band antenna. An improved tuning method for single-band antennas is also described.

* Lieut. Comdr., USNR; P.O. Box 11, Ivyland, Pa.

¹ J. D. Kraus, "The Three-Band Rotary Antenna," *Radio*, February, 1940.

² J. A. McCullough, "A Unique Five-Band Antenna System," *QST*, December, 1946.

³ J. G. Marshall, "Matching the Antenna for Two-Band Operation," *QST*, September, 1945.

• Twenty and ten in the same beam, without switches or relays and with matched lines on both bands? Can't be done? Well, it has been done, and this article tells how. The principles can readily be applied to any type of parasitic array you may fancy.

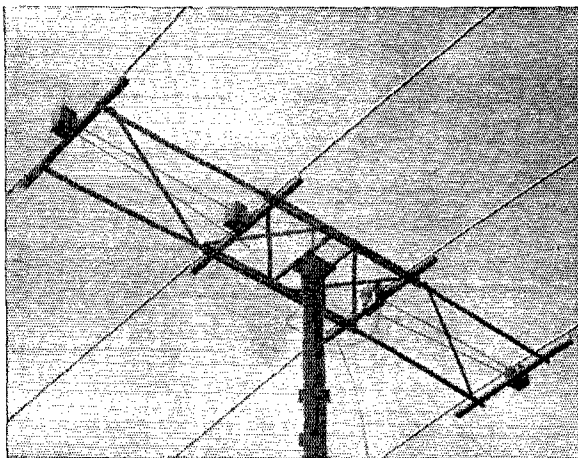
Theory

This system provides dual-band operation at maximum efficiency only when the frequencies are harmonically related at a frequency ratio of one to two (14 Mc. and 28 Mc., 7 Mc. and 14 Mc., etc.).

Basically, the array consists of a parasitic-type four-element antenna — driven element, two directors and a reflector — cut for the lower frequency using 0.1λ spacing between all elements. All elements are insulated and open in the center.

The driven element is energized as a half-wave dipole on the lower frequency and as two half-waves collinear, in phase, on the higher frequency. The parasitic elements must be shorted at the center on the lower frequency and opened at the center on the higher frequency. This is done to provide the usual half-wave parasitic elements on the lower frequency to work in conjunction with the half-wave driven element, and to provide half-wave collinear parasitic elements that

Close-up view of the antenna, showing the weatherproof enclosures for the networks and the extension rod, for tuning the networks associated with the outside elements. The loop of 300-ohm line is also visible in this photograph. This beam is at W3NJE.



are properly phased to work with the higher-frequency collinear driven element.

In other words, the antenna may be described as a conventional four-element close-spaced (0.1λ) beam on the lower frequency and as eight elements wide-spaced (0.2λ) on the higher frequency, each of the collinear half-waves of the driven element being headed by two directors and backed by a reflector.

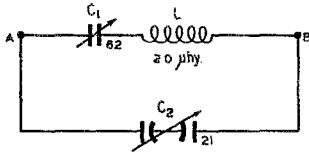


Fig. 1 — Circuit of network used at the center of parasitic elements.

C_1 — 116- μ fd. variable, 3800 volts peak.

C_2 — 50- μ fd. per-section (same as C_1 with center stator plate removed).

(Numbers near C_1 and C_2 indicate calculated values to effect resonance at 14.25 and 28.5 Mc.)

L — 2.0 μ hy; 7 turns No. 8 wire, diam. $3\frac{1}{2}$ inches, length $4\frac{3}{4}$ inches.

In view of the fact that the experimental antenna was designed and put into operation on 14 Mc. and 28 Mc., further discussion will use the terms "14 Mc." and "28 Mc." in place of "lower frequency" and "higher frequency," respectively.

Impedance Matching

The impedance of a center-fed dipole differs greatly from that of two collinear half-waves fed in the center, especially when, as in this case, parasitic elements are used. Experimental measurements indicate that the impedance at 14 Mc. is of the order of 5 ohms and at 28 Mc. is 4500 ohms with parasitic elements. A network was constructed with constants such that a common transmission line would be properly terminated at both frequencies. This network is inserted at the center of the driven element and results in an essentially flat line on both 14 and 28 Mc.

Parasitic Networks

As stated previously, it is necessary to short the parasitic elements electrically on 14 Mc. and to open them electrically on 28 Mc., in the center of the element. In the experimental antenna, which is centered on 14.25 Mc., the directors are 4 per cent shorter and the reflector 5 per cent longer than the driven element, which is $0.95\lambda/2$. A 14-Mc. series-resonant circuit is placed between terminals A and B, Fig. 1. A series-resonant circuit, ideally, has zero impedance across its terminals and thus the element is electrically shorted across A and B as desired. C_1 is made variable to provide electrical adjustment and to facilitate tuning.

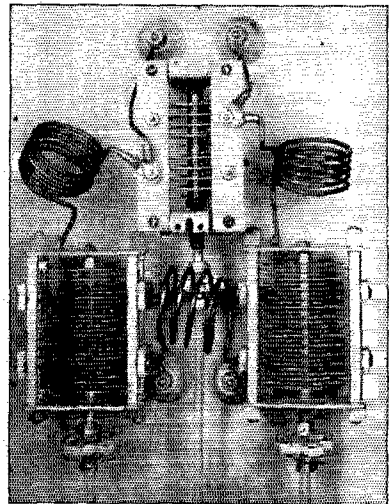
Since there is zero impedance across A and B at 14 Mc., any impedance may be placed across

these terminals with no effect upon the tuning of the parasitic element. Capacitor C_2 (Fig. 1) is placed across A and B and is of such a value that at 28 Mc.,

$$X_L - X_{C_1} = X_{C_2}$$

When this equation is satisfied, it can be seen that C_2 in conjunction with C_1 and L provides a parallel-resonant circuit between A and B at 28 Mc. A parallel-resonant circuit, ideally, presents infinite impedance across the terminals and thus the element is electrically open at the center as desired. (In the practical case, the impedance is not infinite but is determined by the Q of the tuned circuit. With a good coil, having a Q of 200 or more, the impedance is sufficiently high between terminals A and B to insure proper operation of the parasitic elements.) C_2 is also made variable to provide for easy adjustment.

Capacitor C_2 has no effect upon 14-Mc. tuning as it is effectively shorted at this frequency. Capacitor C_1 does affect tuning at 28 Mc. because C_2 must be varied to effect parallel resonance with each change of capacitance of C_1 . Therefore, to avoid interaction in tuning, it is necessary that the antenna system be tuned first at 14 Mc.

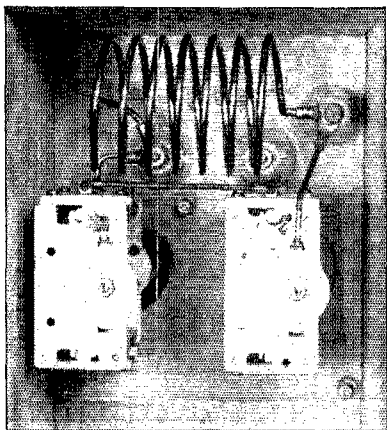


The two-hand matching network. This is an early version, and the coils shown are not the same as those specified under Fig. 2. The latter values should be used.

Supporting Structure

The element-supporting structure is of conventional design and is constructed of wood. This design has been described numerous times, the latest being in November, 1947, *QST*.⁴ The center spacing between all elements is 0.1λ (free-space value) at 14.25 Mc., which is equal to 6 feet 11 inches. It is recommended that at least 4-inch insulators be used throughout because on

⁴ P. L. Van Brunt, "A 4-Element 14-Mc. Beam."



A network of this type is used at the center of each parasitic element. C_1 and C_2 are mounted on a sheet of Lucite fastened to the side of the enclosure by $\frac{1}{2}$ -inch stand-off insulators. C_1 is at the right and C_2 at the left.

28 Mc. the center of each conductor is at a high-voltage point.

Matching-Network Construction

The matching-network schematic is shown in Fig. 2 and the completed network is shown in the photograph. The network is built in a wooden box, 13 by $10\frac{1}{2}$ by 5 inches, which serves as a weatherproof enclosure. The capacitors and inductors are insulated from the box and the input and output terminals of the network are brought out through feed-through insulators.

The coil-winding information is supplied only as a reference; the coils should be checked by means of a Q-meter or some other method that will verify the resultant inductance. The detailed design of this type network is covered in a previous article³ so that those desiring to use different transmission lines and parameters (e.g., 2- or 3-element basic antennas) may do so.

The circuit constants shown are for use with a 300-ohm transmission line. This is done in the author's case to allow the ribbon-type line to loop downward and swing with the rotating structure, thereby eliminating slip rings with attendant maintenance and impedance-discontinuity problems. Higher efficiency would be achieved by using a 4-conductor 300-ohm open-wire line from the transmitter to the top of the supporting mast, with a short length of 300-ohm ribbon for the downward-hanging loop. However, the de luxe type of 300-ohm line has reasonably low attenuation, is unaffected by moisture, and has given excellent results.

Parasitic-Network Construction

The parasitic networks are identical for each parasitic element and are shown schematically in Fig. 1. A completed network is shown in another

photograph. The networks are enclosed in wooden boxes $9\frac{1}{8}$ by $7\frac{5}{8}$ by $5\frac{3}{4}$ inches for weather-proofing as in the case of the matching network. The capacitors and inductor are insulated from the box, with the capacitor shafts extended (by use of flexible insulated couplers and $\frac{1}{2}$ -inch aluminum tubing) so that they can be rotated while standing at the top of the supporting mast.

A hole 2 inches in diameter is drilled in the bottoms of the boxes to provide adequate "breathing." This helps to prevent moisture condensation. Without this "breathing" hole condensation, particularly on the capacitors, caused frequent flash-overs after periods of high humidity. Since incorporating these holes no flash-over or condensation has been observed even after or during heavy rains and fogs.

Two feed-through insulators are used to connect the network to the elements. These insulators are mounted on $2\frac{1}{2}$ -inch centers and are connected to the elements by means of wide aluminum straps as shown in Fig. 3. One of the photographs also illustrates the method of mounting the parasitic network boxes by means of aluminum angle and the method of attaching the extension shafts to the capacitors. It can be seen that the two center-support insulators must be separated sufficiently to provide clearance for the extension shafts.

Capacitors & Inductors

All capacitors except C_4 (in the matching network) are basically the same — single section, 116 $\mu\text{mfd.}$, 3800 volts peak. They are easily obtainable in the surplus market, having been used in the TU-series tuning units. This capacitor has 13 stator plates and is the largest capacitor in the TU-10-B unit. The center stator plate is removed

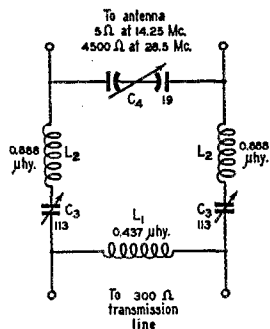


Fig. 2 — Circuit of two-band matching network to couple a 300-ohm line to a 5-ohm load at 14.25 Mc. and to a 4500-ohm load at 28.5 Mc.

C_2 — 116- $\mu\text{mfd.}$ variable, 3800 volts peak.

C_4 — 35- $\mu\text{mfd.}$ -per-section, 4200 volts peak (Cardwell MT-35-GD).

L_1 — 0.437 $\mu\text{hy.}$; 4 turns No. 8 wire, diam. $1\frac{1}{16}$ inches, length $2\frac{1}{2}$ inches.

L_2 — 0.888 $\mu\text{hy.}$; 6 turns No. 8 wire, diam. $1\frac{1}{16}$ inches, length $1\frac{1}{8}$ inches.

(using a jeweler's saw) in the case of the parasitic-network shunt capacitors, C_2 , which provides proper capacity and voltage breakdown (25 μfd . max. and 7600 volts peak) as a split-stator capacitor with rotor floating.

It is recommended that C_4 be similar to the type listed as it has a wide range of maximum to minimum capacity and thus allows a wider range of control.

All inductors are wound of No. 8 solid copper wire and are self-supporting. The parasitic-network inductors can be wound using the specified turns and sizes as they can be pulled apart or pushed together if necessary. However, the matching-network inductors should be accurately measured, because even though the variable capacitors will tune the network through a wide range the standing-wave ratio will not be as favorable if the inductors differ from those specified. The resultant s.w.r. with correct inductors, as measured on the experimental antenna, was 1.08 on 14 Mc. and 1.34 on 28 Mc.

Element Lengths

It is desirable that the parasitic networks perform only the switching function and that they be required to compensate for element length as little as possible. This allows full element lengths and normal current distribution.

The driven element is 32 feet 10 inches long (with a 1-inch gap in the center) which length corresponds to $0.95\lambda/2$ at 14.25 Mc. Each side is 16 feet 5 inches in length with no compensation for the length of connection to the network. This length is in effect part of the network and is taken care of in the network tuning.

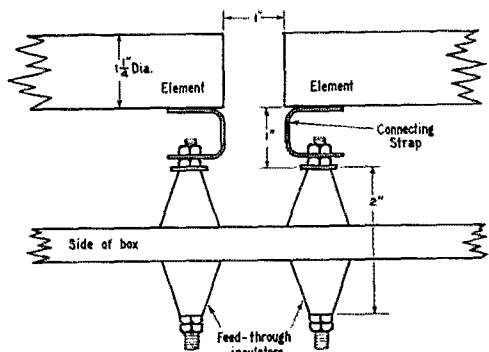


Fig. 3 — Method of connecting networks to elements.

The directors are made 4 per cent shorter than the driven element or 31 feet 6 inches (with a 1-inch gap in the center). Each side is 15 feet 6 inches in length with three inches allowed each side for connection to the actual network as shown in Fig. 3.

The reflector is made 5 per cent longer than the driven element or 34 feet 6 inches (again using a

1-inch gap in the center). Each side is 17 feet in length with three inches allowed for connections as in the case of the directors.

Tuning Procedures

There are two methods by which this antenna system may be tuned. One is the conventional method of supplying power to the antenna and making adjustments in accordance with readings taken by a remotely-located field-intensity meter. The other is to tune the system by observing the S-meter of a receiver while tuning to a remotely-located station or signal. The second method has two important advantages. Fewer men are required. If the transmission line is properly terminated in its characteristic impedance, there will be no standing waves on the line and changes in S-meter readings will be the result of changes in tuning of the antenna system proper with no transmission line pick-up (assuming a balanced line). In making direct field-strength readings it is difficult to tell to what degree the antenna proper or the feedline contribute to the meter readings.⁵ In addition, the readings may be erroneous because of the close proximity of power and telephone lines, or other conductors, to the field-strength measuring apparatus.

In using Method 1 the transmission line is coupled to the transmitter by means of link coupling, with enough power supplied to the antenna to obtain a satisfactory reading on the field-intensity meter. The power coupled to the antenna should be no more than is necessary for adequate meter readings. The antenna is first tuned on 14 Mc. The series-network capacitors, C_1 , should be set to approximately one-half capacity. The matching-network series capacitors, C_3 , should be tuned together for proper loading.⁶ It will be noted that these capacitors are interrelated to the extent that numerous settings

⁵ This is a point that is all too frequently overlooked, but it must be pointed out that the danger of false readings also exists when tuning the beam by receiving measurements. One quick test that can be applied is to disconnect the line at the antenna (but otherwise leaving the line in its final operating position). A truly balanced line will show no response to incoming signals. If the receiver does respond to the test signal under these conditions, the readings when making antenna adjustments will be reliable only to the extent that the signal from the beam is sufficiently stronger than the stray pick-up to swamp out the inaccuracies introduced by the latter. Under reasonably good conditions the error will be least when adjusting for maximum gain, but may be extreme when adjusting for minimum back response. Also, as the author points out, the line must be matched to its characteristic impedance at the receiver. Measurement in this case is difficult, but can be accomplished with the help of a Micro-Match operating at a low-enough power level to avoid overloading the receiver's antenna coil. — *Edit r*

⁶ The term "proper loading" as used here should be interpreted to mean "minimum standing-wave ratio." Depending on the line length, maximum loading on the transmitter tank as determined by the amount of coupling to an untuned link is more likely than not to result in the wrong operating conditions. See "Flat Lines and Loading," January, 1947, *QST*, and "Coupling to Flat Lines," August, 1947, *QST*. — *Editor*

will provide proper loading. However, the correct position is that at which both capacitors are at approximately the same capacity. This maintains proper balance.

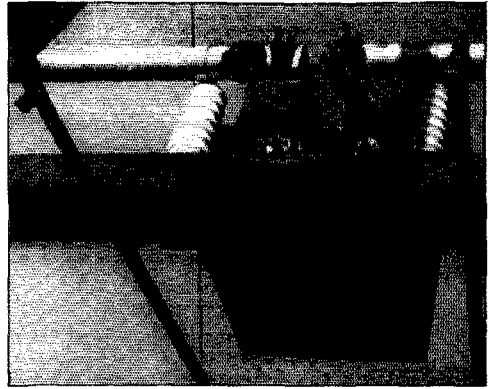
The parasitic elements may now be tuned in the following order: first director, reflector and second director.

The tuning is done in this order because the elements have the greatest effect upon field intensity and antenna impedance in that order. Each time that the various elements are brought into approximate tune, the antenna-matching network series capacitors, C_3 , should be retuned a number of times, because of the normal interaction between elements, to find the point where maximum field intensity or maximum front-to-back ratio is achieved as is normally done with the conventional parasitic-type array. The power input to the transmitter must be maintained constant and checked after each adjustment.

The second method of tuning the array requires running two conductors from the S-meter in the receiver to the top of the antenna mast, where a second S-meter is located so that the man tuning the system can observe it while making adjustments. This line should be run to the base of the mast and vertically up the mast, and should be by-passed at each end with a 1000- μ fd. mica capacitor to eliminate as much as possible any detrimental r.f. effects. A signal located at least five miles away should be used to tune on. A man should be located at the receiver to keep the signal tuned continuously, in case of receiver drift. The man tuning the system at the top of the mast tunes capacitors C_3 for maximum S-meter reading and also capacitors C_1 in the order previously specified. Again the various capacitors should be tuned a number of times to overcome the effects of interaction and to achieve best peaking.

When tuning the system on 28 Mc. the same procedure is followed in the two methods with the exception that capacitors C_1 and C_3 are not tuned. If they are tuned or displaced while tuning on 28 Mc. it will be necessary to retune on 14 Mc. before proceeding with 28-Mc. tuning. Capacitor C_4 of the antenna-matching network is tuned to provide maximum loading or maximum S-meter indication on 28 Mc. and capacitors C_2 are tuned for maximum field intensity, S-meter reading or front-to-back ratio.

It will be noted that the tuning of the first director (or directors) on both frequencies is quite sharp. The reflector is moderately sharp and the second director is comparatively broad. The parasitic-network series capacitors should be at approximately one-half capacity when the antenna is peaked on 14 Mc. If this is not the case, when the antenna is peaked the inductor L should be compressed or extended to change the resultant inductance and shift the amount of capacity required. If capacitors C_1 are not at ap-



This photograph shows the method of mounting the network enclosure, in this case for the first director. Note the aluminum angle, at the bottom, holding the box to the crossarm. The shafts at the extreme left and right are the extensions of the tuning controls from the second-director network.

proximately one-half capacity it will be found that capacitor C_2 will not have sufficient range to tune to 28 Mc.

Single-Band Tuning

It is obvious that the series-resonant method of tuning may be applied to single-band antennas. It is necessary only to provide a series-resonant circuit to tune to the operating frequency. Wide-spaced midget capacitors will provide adequate voltage breakdown (3000 volts peak) for modulated inputs up to 1000 watts. Actual field-intensity measurements show that there is no measurable difference between a solid parasitic conductor and an element using a series-resonant network. Although it appears that the I^2R losses should be greater with series-resonant tuning it does not show up in field-intensity measurements. This type of tuning makes it much simpler to tune a single-band antenna regardless of spacing or height above effective ground.

Results

Two of these antenna systems have been constructed to date. Both have been in operation approximately one year. The one located at W8KML is 45 feet in height, with power lines and normal residential buildings close by. The antenna at W3NJE is 29 feet in height and is completely surrounded by trees and higher buildings. In spite of what appear to be average locations, both antennas worked over 100 countries on 'phone within six months of being erected. The antenna system is sufficiently low- Q so that it adequately covers the entire 14-Mc. band, and with the wide spacing on 28 Mc. covers not only the 28-Mc. band but also the 27-Mc. or 11-meter band. The same coupling link of 5 turns is used on all three bands.

(Continued on page 96)

The Story of Amateur Radio Teletype

An Insight into a Fascinating New Branch of Ham Radio

BY JOHN EVANS WILLIAMS,* W2BFD

FOR several years prior to the war we were very much interested in carrier current¹ or "wired wireless" over distances longer than the in-the-building circuits that amateurs had used in the past. The idea was to use carrier current for voice feed and remote control of the W2BFD half-kilowatt 20-meter 'phone rig which was located about six-tenths of a mile from home. Voice relay was 100 per cent solid but transmitter control would suffer occasionally when a heavy power leak would turn on the transmitter — a most undesirable state of affairs. Positive control was finally achieved by the use of an intricate coding system which required the dialing of four digits prior to the dialing of the code for turning on the transmitter. However, this system was regarded as too complicated and so many simpler schemes were being mulled over in our mind when World War II came along.

As was the experience of many amateurs, war work brought us into intimate contact with many projects of "hush-hush" nature. Gained was an inkling of the workings of a "magic" new transmitting system, f.s.k.,² which was tolerant of noise and fading to a remarkable degree. Here at last, it was thought, was the ticket to simplified

*% The Electronic Device Co., 38-06 61 Street, Woodside, L. I., N. Y.

¹J. E. Williams, "'Wired Wireless' for Remote Control," February, 1940, *QST*.

²Grammer, "Frequency-Shift Keying," Technical Topics, June, 1946, *QST*.

• The mail has been heavy at W2BFD ever since March *QST* made casual mention, in conjunction with his converter article, of Mr. Williams' interest in amateur teletype. To rescue W2BFD from the throes of writer's cramp and at the same time record an interesting bit of amateur radio history, here is the background on TT as recounted by the man who should know.

remote control. By 1944 a subcarrier f.s.k. unit — differing from true f.s.k. in that a frequency-shifted a.f. oscillator modulates a fixed-frequency r.f. carrier — was in two-way operation at W2BFD on the power-line carrier apparatus, making transmitter control in every sense the equal of a wire circuit.

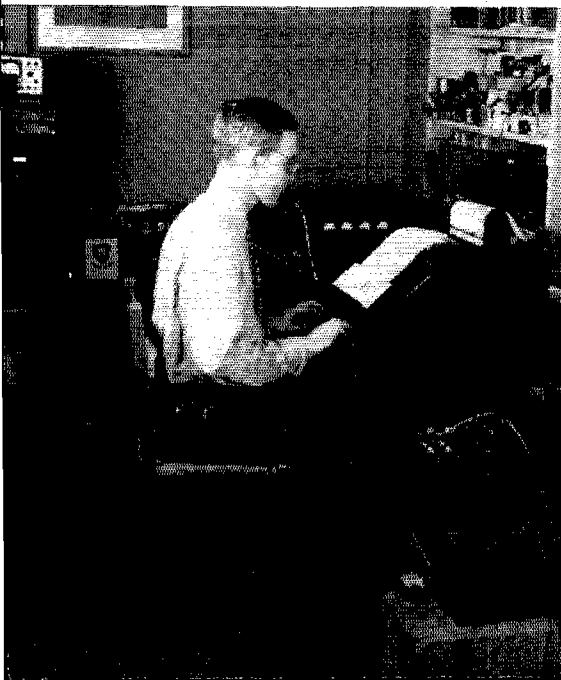
In the early summer of 1945 Al Waring, W2CFT, dropped into the shack and surprised us in the act of connecting our f.s.k. receiving equipment to the output of a communications receiver. Commercial f.s.k. signals were tuned in and the loudspeaker turned off. Al, a CAA technician with an extensive knowledge of landline teletype, exclaimed, "John, the clicking of that polarized relay sounds exactly like the rhythm of the relays over at CAA. I'll bet that stuff would type if you had a printer here!" In such a simple manner amateur teletype was born. To W2CFT must go the credit for starting us off. He is the "Patron Saint" of ham teletype!

◆

Home from Yale for the week end, Renville H. McMann, jr., W2PCD, New York City, drops in on the V.H.F. Teletype Society Net for a rag-chew. When classes permit, Ren is one of those active in building equipment for a proposed extension of the Net into Connecticut, using automatic-relay stations. The projected link would tie into the New York end at W2MXJ, Bayside, L. I., cross Long Island Sound to W1OHH, New Haven, and continue through intermediate stations to W1AW, Newington.

◆

QST for



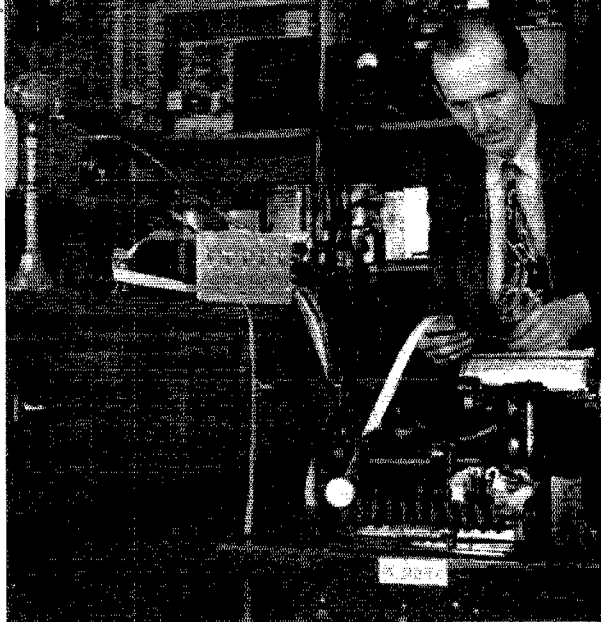
◆

The author runs a test on the W2BFD teletype, using a high-speed-printer tape "transmitter" for signal source. [An experimenter-type ham, W2BFD was using single-side-band 'phone back in the Thirties when most of us were putting in Class B.—Ed.]

◆

Always ready to help, W2CFT put us in contact with a CAA teletype repairman who had heard talk about a batch of printers that had belonged to the old Postal Telegraph Co. and which had been taken over by Western Union. The report had it that they were heaped in a warehouse in Brooklyn, unused. At that time Gus Rinninsland came into the picture. Although not an amateur, he had been interested in various phases of radio for over twenty years. When he saw what was being accomplished in f.s.k. and what was needed for amateur teletype, he threw himself wholeheartedly into our project. At times taking time off from his regular work, Gus followed leads all over New York and New Jersey in an effort to secure teletypes for us. Heartbreak followed the breaking-off of negotiations with WU when that company decided they would need the old Postal Telegraph machines in other fields. Similar negotiations to procure a second batch located in Jersey City failed too. But Gus would not let us drop the matter. His enthusiasm and continual friendly "heckling" resulted in our locating, through connections developed as an old-time wire telegrapher, two companies that would dispose of their machines for much less than had been anticipated, provided it could be guaranteed in writing that the machines would remain in amateur hands (more about this later). Needless to say, Gus has mastered the code and is now ready to go up for his ham ticket.

In May of 1946 the first two machines were received and within three hours of the time they were unpacked one was connected to the f.s.k. panel and a commercial radioteletype station tuned in. It was a dramatic moment when, after a few false starts, the printer burst into a rhythmical 65-w.p.m. pounding-out of a perfectly-typed message saying . . . ah, sorry, OM, but the secrecy provisions of the Communications Act prevent us from telling you, so that is one part of amateur radio teletype history you will never know! . . . The fascination of seeing this "iron horse" clip out the words with never a moment's hesitation from the tape-operated commercial teletype stations all over the world will never wear off. The machines are positively uncanny!



That settled it. If commercial high-speed stuff could be copied solid, then it would be a cinch to record amateur transmissions. A one-way circuit on 2 meters was arranged between W2BFD and the homes of several friends, including W2BDA, W2AUF and ex-F8JM (now an American citizen and awaiting his W call). A blight fell on our little group when our CAA friend, W2CFT, was transferred to Paris to supervise radio-teletype installations at Orly Field. However, Al is back with us again and located at MacArthur Field here on Long Island.

The circuits worked right from the start, so a crude and not very effective automatic starter unit (a.s.u.) was schemed up to keep the printer motors off until a signal was received. A rather humorous sidelight developed when the printer installed in a closet in the home of one of the gang started up at 3 o'clock one morning with a loud clatter. He swears to this day that it was done deliberately but of course we wouldn't believe that, would we?

The first two-way amateur radio teletype QSO of record took place between Dave Winters, W2AUF, Brooklyn, and W2BFD, Woodside, L.I. It was not witnessed by any other amateurs but it will be a long time before either of us gets a bigger thrill out of ham radio. At that time Dave had pressed into service an Abbot TR-4 to do the transmitting job and outside of the drifting, which required retuning of the W2BFD receiver every few minutes, the Abbot made a good showing for itself. An unexpected dividend of using subcarrier f.s.k. on a modulated-oscillator transmitter was realized then. The dynamic instability which always accompanies varying voice modulation is totally absent with this system, although the center-frequency drift is still there. With a.f.s.k. the modulation is always close to 100 per cent and only the pitch changes, so the in-

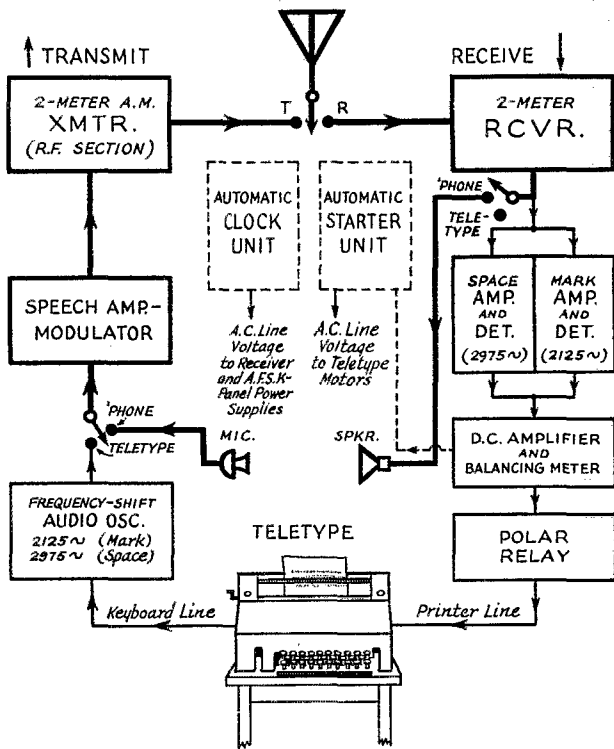


Fig. 1—Audio f.s.k. teletype system used by members of the V.H.F. Teletype Society of N. Y. Net. Bold lines represent a typical 2-meter 'phone-station installation (usually a 522 with crystal-controlled receiver and transmitter), while the medium lines show how the various a.f.s.k. units and the teletype machine fit into the over-all station pattern. The automatic clock and starter units (light dashed lines) are optional and required only when unattended message receiving is desired. Coupling between the frequency-shift audio oscillator and the space and mark amplifiers actuates the receiving-printing circuits and thereby makes it possible to monitor visually all keyboard operation.

Since a.f.s.k. is relatively uncritical as to carrier or receiver drift, it is especially adapted to v.h.f. applications. For true f.s.k., wherein the r.f. carrier is shift-keyed, the receiving set-up shown above need not be changed except for the addition of a receiver b.f.o.

stability is not manifested on a type of modulation where the amplitude never varies.

Shortly after this first two-way contact Bill Fisher, W2MXJ, Bayside, L.I., came on with teletype, contributing many hours of pioneering work to our new activity. Incidentally, Bill is one of the most active v.h.f. teletype stations on the air today, and is still trying to convince the rest of us that TT should go horizontal on antenna polarization.

During these early days of teletype on the ham bands, we made it a practice to close each QSO by switching to voice modulation and giving the station call and a description of what was being done. This helped to dispel the fear amateurs were expressing that one of the Press Wireless stations,

not too affectionately known as "Jingle Bells," had invaded the band. This vocal explanation or "advertisement" brought astonishing results because in a short time amateurs from all over the metropolitan New York area were calling and writing to find out how they could get into this fascinating new angle of their hobby.

As might be expected, there also was some lack of understanding by a number of amateurs who felt that 'phone operation on the 2-meter band was being threatened. It was not unusual to overhear an amateur saying that TT was "as broad as a barn" and that we were trying to make two meters an exclusively-teletype band. Nothing could be farther from the truth. Frequency-wise, the approximately 6-kc. (not Mc.) bandwidth (carrier ± 2975 -cycle space frequency) of teletype is not as broad as the majority of 'phone stations. The impression of teletype's extraordinary loudness is gained because a.f.s.k. permits a higher average level of carrier modulation (for the same reason progressive 'phone operators use speech filters and clippers). As for TT giving 'phone any serious competition: What amateur would want to type out his rag-chews by the hour when he could have his say more naturally and quickly on voice? And to set the c.w. man at ease, we might add that teletype circuits are purely electro-mechanical in nature; the teletype printer machine has no reasoning faculties which in times of hard going can substitute for the intuition and gray matter of a trained c.w. operator. Amateur teletype is primarily a means of printed-record com-

munication, with the highly-desirable extra feature of allowing a message to be delivered at any time on an unattended printer at the station of destination.

Teletype is an enthralling field for the technically-minded amateur. Such was the case with Renville McMann, W2PCD, a Yale student, who learned of TT during a rag-chew. It was not long before Ren joined our group, followed in short order by his close friends, Alexander ("Sandy") Proudfit and Lee Nettleton. W2PCD came on the air with teleprinter within a few days of the time he received his machine and has since done extensive work with RC filters and Navy-type FRA f.s.k. converters. Sandy has pitched into the battle of licking our numerous technical problems,

drawing on his wide engineering experience to help in the perfection of our present sure-fire automatic starter unit. Lee, also at Yale, will uphold the Cheshire, Conn., leg of a proposed automatic-relay TT net into Connecticut.

October of last year saw the first reliable automatic relaying operation accomplished on TT. Although over a short distance, it enabled two stations (one a transceiver) to communicate with one another when they were unable to hear each other direct. This circuit was from W2AUF to W2BFD to W2PCD and return. It was followed by many longer and more complex relays, and though our stations are highly concentrated, transmission paths up to 200 miles have been covered. Net members are now anxiously awaiting completion of amateur-teletype outlets in Connecticut (W1OHH, W1AW, W1INF), Pennsylvania (W3POW), and the District of Columbia (W3OGQ) for enlargement of operations. Also in prospect is the fascinating idea of long-range two-way teletype communication with W6BE, Moraga, Calif. and F8FW (operated by the father of ex-F8JM, and F8FW), St. Mihiel, France, using true f.s.k. on 11 meters.

And so we come up to date in our story of the growth of ham teletype. A nearer-complete roster of active TT network stations in this area should also include W2s HGN, BTP, VGT, ER, TWJ, WHT, PAG, RHN, LRI, SHE, PDX, HUJ, MIB, EIE, OBE, KGP, IRM, IXT, CFT, WIA, NKG, VDM, DXK and HBA. We now have a sufficient number of stations in operation so that the Brooklyn AEC Net is considering arrangements for adding our facilities to that smooth-working organization. Also in the offing is the establishment of a regular traffic-handling net, to be run without the benefit of schedules thanks to our newly-perfected automatic starter unit!

A.F.S.K. Teletype-Station Operation

Fig. 1 shows in block form a typical v.h.f. teletype station. Despite the presence of the mechanical printer, it will be apparent that the system is mainly radio as we know it. Most of our net stations use the now-famous surplus SCR-522 for transmitter, audio and receiver, without major modification except for the addition of power supplies. Suitable crystals for holding the transmitter and receiver to the network calling fre-

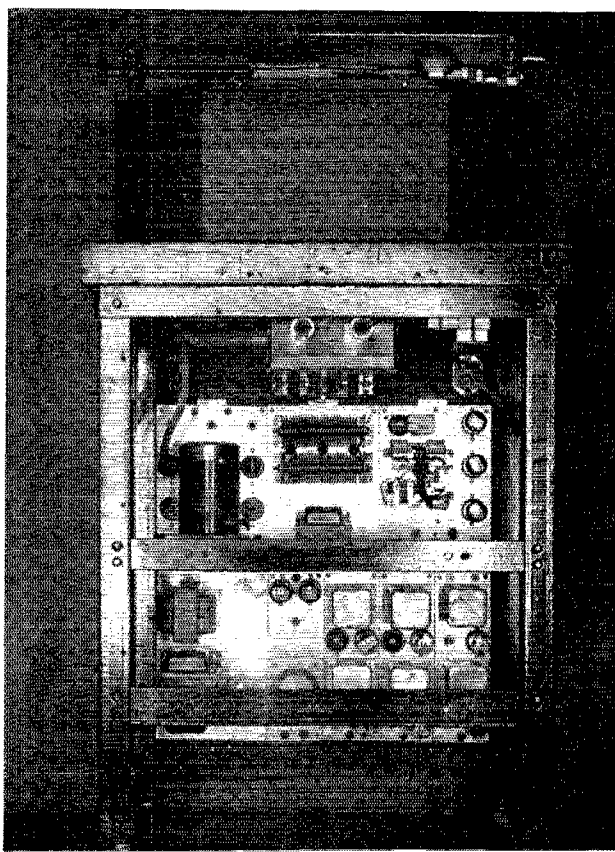
quency of 147.96 Mc. are used. The stability afforded by this low-cost crystal-controlled rig helps to eliminate many of the troubles which might be introduced by frequency drift.

To transmit, the frequency-shift audio oscillator is teleprinter-code-keyed by the teletype keyboard mechanism, in turn feeding the various combinations of mark and space tones into the speech-equipment front end and then, as usual, the final and antenna come into play. For receiving, the audio output of the station receiver — teleprinter-coded a.f.s.k. — is fed in common to the space amplifier and detector and the mark amplifier and detector, where it is amplified, passed by either of two LC selective filters, rectified, and the outputs fed, in opposition, to the d.c. amplifier for amplification of the voltage for controlling the action and direction of the polar relay. This latter device, which is furnished with the teleprinter, energizes the machine's printing mechanism.

The automatic clock unit and the automatic starter unit, while optional, are ingenious devices which make possible the reception of a message on an unattended teletype, thereby increasing station efficiency. The a.c.u. is an inexpensive electric-clock motor fitted with a pair of contacts which turn on the station receiver and the a.f.s.k. panel for the first minute of each hour. If no "start" signal is received by the a.s.u. during this period, the receiver and a.f.s.k. panel are shut off again automatically. However, if a starting signal is received from a calling station, the printer

◆

A peek behind the W2BFD teletype discloses that the a.f.s.k. panel isn't as complicated as the system diagram of Fig. 1 would have it. *Top row, l. to r.:* polar-relay (comes with printer) chassis, selenium-rectifier power supply (for printer magnet voltage), automatic-starter-unit chassis. *Bottom row:* 300-volt plate and heater-voltage supply, d.c. amplifier and balancing meter, mark amplifier and detector, space amplifier and detector, frequency-shift audio oscillator. The leg spacing of the machine allows the use of a standard 19-inch panel.



motors start up automatically and the a.c.u. loses control until the calling station transmits a "stop" signal. These devices are, of course, amply protected by overload and safety devices.

In the interests of standardization, net members have worked out agreement on a number of points. Besides deciding on a common calling and working frequency of 147.96 Mc., we have adopted standard mark and space frequencies of 2125 and 2975 cycles, respectively. This permits the tuning-in of most commercial circuits for test, as well as for diversion. We are also agreed on the use of similar a.s.u. "start" and "stop" signals, on standard printer-table connections so that units can be changed conveniently during emergency, and on rudimentary Q-code abbreviations which are gradually being tailored to our needs.

Several blueprints, the generously-contributed handiwork of Andre Thieblemont, ex-F8JM, are available to interested amateurs for the cost of reproduction. They include: wiring schematic of the table *after* it has been altered for radio, 25 cents; schematic diagram of the a.f.s.k. panel, 40 cents; and physical layout of the a.s.u. subpanel, 25 cents.

Procurement of Teletypewriters

The Model 12 machines that we have been obtaining for V.H.F. Teletype Society members, which are also available *at cost* to other interested amateurs who meet certain conditions, including the signing of a waiver, are used but in good working order. By our contract with the two telegraph companies mentioned earlier, we agree to take all machines that become available providing they are working on telegraph wires at the time of purchase. The machines have many new parts, and practically all of them are equipped with brand-new 115-volt 60-cycle GE or Westinghouse syn-

chronous motors. The machines are ready to use as received after a bit of cleaning (telegraph companies take marvelously good care of the moving parts, etc., but do not worry too much about oil, grease and dust accumulation).

The teletypewriters consist of:

- a) Steel teletype table wired for keyboard and printing units to plug in.
- b) Keyboard unit containing sending and receiving distributors.
- c) Printing unit which types on standard 8½-inch-wide roll paper.
- d) Polarized relay with jack base into which it plugs.
- e) Cover, which may be one of two types: (1) newspaper-office style, which is really a dust cover and which is easiest to remove, or (2) totally-enclosed "silent" type with sound-absorbing padding, which has a glass window for observation and a slot through which the paper issues.

Until further notice, the machines described above can be procured for amateur use by copying and signing the waiver reproduced below (one for each machine) and mailing to J. E. Williams, % Electronic Device Co., 38-06 61 St., Woodside, L. I., N. Y., together with a check or money order (payable to J. E. Williams³) for fifty-five dollars and instructions as to whether the machine should be crated and shipped (with these charges C.O.D.) or whether it will be picked up here in New York. Purchasers should also specify type of cover desired. Delivery of machines is subject to from one to three weeks' delay, and as there are usually more orders than machines available, total delay may be as great as five weeks.

Waiver

Date.....

The teletypewriter which I am purchasing from John Evans Williams is to be utilized at amateur radio station.....

It will be utilized only for amateur communications or amateur experimental work. It is agreed that it will not be used for the gainful interception of commercial traffic or news handling.

It is likewise agreed that this machine will not be resold to other than an amateur radio station operator and then only under the identical proviso such as governs the present sale.

By.....
Licensee of Amateur
Station.....

³ Amateurs may purchase teletypes *at cost* only through Mr. Williams. For certain permitted types of commercial operation, these same machines are available from the Electronic Device Co. at the full price.



W2WCR, Maspeth, L. I., station of the Amateur V.H.F. Institute of New York (ARRL affiliate), which is equipped both for 'phone and teletype operation. Prexy Charley Brown, W2ER, is at the TT keyboard.



Happenings of the Month



TVI

TVI isn't just an amateur headache; it plagues most of the other radio services as well, and it also plagues the Federal Communications Commission, which is often the recipient of listener (or "looker") letters demanding that something be done, or of appeals to field offices to come on over and explain why the pictures don't come through.

Recently the Commission's staff drafted an information release and a letter to television-receiver owners, to be sent to the public in instances such as those cited above. The information release gives some general information on allocation problems and reception limits and touches on the general problem of interference; the letter then explains that in the opinion of the Commission's field-engineering force the particular difficulty in the case at hand is due to one or more of several checked reasons. We've looked over both documents and it strikes us the Commission has done a pretty fine job. Set-owners are told the facts of life, what they can and can't expect, both as regards television reception and receiver performance. The touchy interference question is given forthright but fair treatment. In fact, FCC comes right out at the start of its letter and explains that unsatisfactory reception is usually due either to attempted reception beyond the normal service range of a TV station or to deficiencies in receiver design.

It puts the blame for most interference on the deficiencies in receiver design, whether the interference is from f.m. broadcast stations, short-wave broadcast stations, point-to-point telegraph stations, police, aviation or utility stations, or such things as medical diathermy and industrial heating devices, flashers, heating pads, etc. Not only that, but all these various services are given explanatory treatment by the Commission's letter. We think you'll be interested in what it says of us amateurs, as an example:

The reception of AMATEUR STATIONS on a television receiver may be due to harmonics of nearby amateur stations operating in the 27 or 28 megacycle band; or it may be due to receiver adjacent channel response to amateur stations operating in the 50 to 54 megacycle amateur band. Adjacent channel interference may occur to television channel No. 2 from amateur stations in the 50 to 54 megacycle band. The fact that you may hear an amateur station on your television receiver is not necessarily an indication that it is operating "off frequency," or in any other illegal manner, but may be an indication that the amateur station's signal may be many times stronger than the desired television signal, and your receiver is not designed to operate and afford adequate rejection of unwanted signals under those unfavorable conditions. The condition is the result of an

engineering design compromise inherent in most present-day television receivers. By adding "preselection" or appropriate "filters" to your television receiver, interference may be eliminated or greatly reduced. The amateur's assistance should be solicited and adjustments made on a cooperative basis. This is especially true in the case of harmonics which cannot be eliminated by "traps" on the receiver without removing the desired picture.

CANADIAN MOBILE REGS

As briefly mentioned last month, Canadian amateurs now also enjoy portable and mobile rights on all amateur bands. A circular announcing the new regulations is being distributed from the district radio offices. Notice of such operation is not required unless it is to extend beyond a period of 48 hours. If it is, notice must be sent the nearest RI in the home district and, if operation is to occur in another call district, to that RI also, the notice to state the call, home address, dates and places of proposed operation and/or mobile itinerary. When working outside the home district, telegraph stations follow the call by an oblique stroke and the district number, 'phone stations by the word "Portable" and the district number. Portable operation is authorized for only one month at a stretch without obtaining additional authority, and in no case for more than four months per fiscal year. The license conditions pertaining to portable privileges continue to apply.

WASHINGTON NOTES

FCC has advised the League that the several requests of the Board of Directors for amendments to the amateur rules are requiring considerable study but that it is expected that the Commission will be able to take definitive action in this matter before the end of October. . . . The recommendations of the Office of Civil Defense Planning were completed on schedule August 1st and are now under study in the Department of National Defense, with announcements to be expected by early November, it is said. Meanwhile the recommendations remain confidential. . . . A subcommittee of the Senate Interstate & Foreign Commerce Committee has begun a detailed two-year study of communications, with a view to seeing what recommendations ought to be made for changes in the Communications Act. Chief emphasis is on the international carriers, with small prospect of matters of concern to amateurs, but the League is keeping in touch. . . . On August 10th FCC held an informal engineering conference on harmonic

(Continued on page 96)

Simple Crystal Control on 144 Mc.

10 Watts Output with 2 Tubes and 100-Ma. Total Drain

BY E. W. JOHNSON,* W2UXA, and MARVIN BERNSTEIN,* W2PAT

OUR increased utilization of the r.f. spectrum above 100 Mc. has placed considerable emphasis on the necessity for simplifying equipment for operation therein. Moreover, crystal control has become virtually mandatory in both commercial and amateur applications, as a result of the greatly-increased occupancy of the 144-Mc. band and adjacent commercial assignments. In densely-populated areas, the chap with the modulated oscillator and superregenerative receiver is getting to be anything but popular with his brethren! Increased use of mobile rigs has placed a premium on stability, and also upon the problem of keeping the power drain required for a given output down to a minimum.

The problems outlined above are equally applicable to certain military uses in the same part of the spectrum, and engineers at the Signal Corps Engineering Laboratories have been taking steps to effect simplification and reduce power drain wherever possible. One of the most promising lines of attack is in the extension of the usable range of direct crystal control, from the previous limits of around 14 to 30 Mc., to as high a frequency as possible. The results of this work, done by the laboratories and by organizations under contract to them, have borne fruit in the form of usable crystals at frequencies as high as 100 Mc. Naturally, amateur applications also came into the picture, albeit incidentally, and the rig described below was designed, assembled and shown as part of the Signal Corps Engineering Laboratories exhibit at the Hudson Division convention at Asbury Park in September, 1947.

Long strings of frequency multipliers were out, along with their relatively high power drains and numerous adjustments. In their place was used a single 6J6 miniature, one section of which operates as a crystal oscillator on 48 or 72 Mc., while the second section either doubles or triples to drive an 832 on 144 Mc. Sufficient drive is obtained to per-

• Simplification of the exciter stages and reduction of the over-all current load are important requirements, not only to the amateur v.h.f. worker who is interested in portable and mobile applications, but to the military services as well. The two-tube 144-Mc. transmitter described herein was a result of a program conducted by the Signal Corps Laboratories, aiming toward the above objectives. With a total drain well within the capabilities of the smaller vibrator supplies, it supplies an output of about 10 watts at 144 Mc.

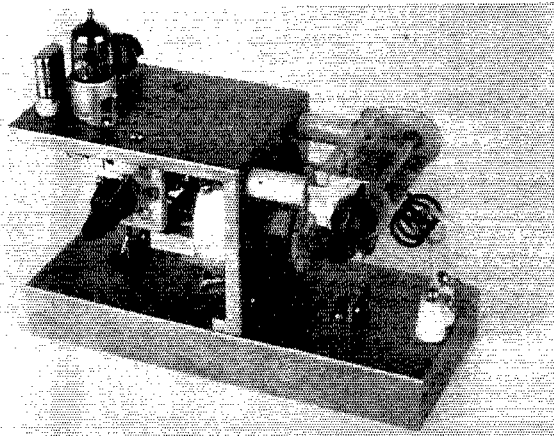
mit amplitude modulation when running 15 watts input to the 832 operating as a straight amplifier. The over-all drain on the B supply is about 100 ma. at 250 volts, about 15 ma. going to each section of the 6J6, with the remainder being taken by the plate and screen of the 832. The output is close to 10 watts. Compare this with a drain of about 150 ma. at the same voltage taken by the usual oscillator-multiplier-multiplier line-up that starts out with an 8-Mc. crystal and delivers some 3 or 4 watts of r.f. on the output frequency.

Circuit Details

The crystal oscillator (see Fig. 1) is the chief item of interest, the multiplier and output stages being reasonably conventional in character. It utilizes the principle of controlled regeneration to facilitate oscillation of the crystal, and by proper choice of constants can be made so that it will not oscillate except at the desired crystal frequency. A reasonable amount of capacity should be used in conjunction with L_1 (15-25 $\mu\text{mf.}$); this with the low value of grid leak (R_1) apparently acts to inhibit any tendency of the oscillator to take off on its own, even with a relatively large amount of feed-back. L_1 can be a tapped coil, with the portion tuned by C_1 resonating at the crystal frequency. The fewer the number of turns in that portion of the coil connected to the crystal as compared with that connected to the plate of the oscillator section, the less the amount



Front view of the 2-meter transmitter.



QST for

*Squier Signal Laboratory, Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

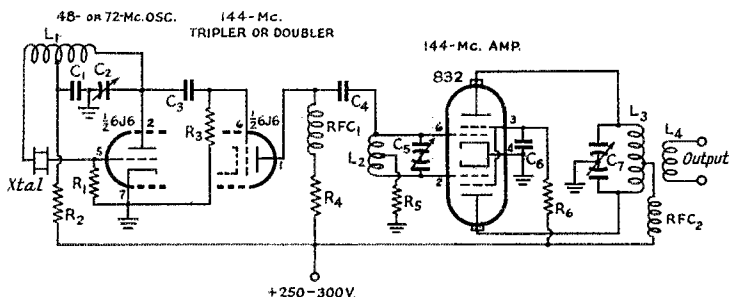


Fig. 1—Schematic diagram of the 144-Mc. transmitter.

- C₁—470- μ fd. mica.
- C₂—15- μ fd. midget variable.
- C₃—39- μ fd. mica.
- C₄—100- μ fd. mica.
- C₅—15- μ fd. per-section split stator.
- C₆—47- μ fd. mica.
- C₇—15- μ fd. split-stator variable.
- R₁—3300 ohms.
- R₂—4700 ohms, 1 watt.
- R₃—82,000 ohms.
- R₄—1000 ohms.
- R₅—22,000 ohms.

- R₆—20,000 ohms, 10 watts.
- Resistors $\frac{1}{2}$ watt unless otherwise indicated.
- L₁—48-Mc. crystals—10 turns No. 18 enamel, $\frac{1}{2}$ -inch diam., tapped at 3rd turn, 1 inch long.
- 72-Mc. crystals—6 turns No. 18 enamel, $\frac{1}{2}$ -inch diam., tapped at 2nd turn, 1 inch long.
- L₂—3 turns No. 12 enamel, $\frac{1}{2}$ -inch diam., 1 inch long.
- L₃—4 turns No. 12 enamel, $\frac{1}{2}$ -inch diam., $1\frac{1}{8}$ inch long.
- L₄—Output link, 2 turns push-back at middle of L₃.
- RFC₁, RFC₂—1-watt 1-megohm insulated resistor wound solid with No. 32 d.s.c.

of feed-back. The same effect can be obtained by making two separate coils and varying the separation between them. A ratio of about 2 to 1 (tap one-third in from crystal end) is a good starting point and from experience seems to be about optimum.

The apparently unbalanced feed to the 832 grids may cause some lifted eyebrows, but in the actual transmitter the drive divides evenly enough between the two grids. Purists can add the small amount of additional capacitance to ground required to effect a perfect balance if they so desire. C₅ is made by taking an ordinary wide-spaced 30- μ fd. double-ended midget air padder and severing, by means of a jeweler's saw, the front half of the stator plates from one of their supports and the back half from the opposite support, resulting in a very compact split-stator condenser. The 832 socket is of the type with built-in by-pass condensers, and is highly recommended for use with 832s and 829s at these frequencies.

Following are typical values of grid and plate currents obtained with crystals of 48 and 72 Mc. Plate-supply voltage is 250.

	48-Mc. Crystal	72-Mc. Crystal
Oscillator grid current.....	6 ma.	1.8 ma.
Multiplier grid current.....	1.1 ma.	0.9 ma.
Multiplier plate current.....	15 ma.	14 ma.
Final grid current.....	1.4 ma.	1.6 ma.
Final plate current.....	55 ma.	52 ma.
Measured power output....	9.4 watts	9.3 watts

It will be noted that the 6J6 is run somewhat in excess of maximum ratings. It seems to stand up well, however, and has been operated up to 18 hours continuously with no immediately serious effect. For amateur operation 6J6s should give satisfactory service; moreover, they are cheap and widely available on the surplus market.

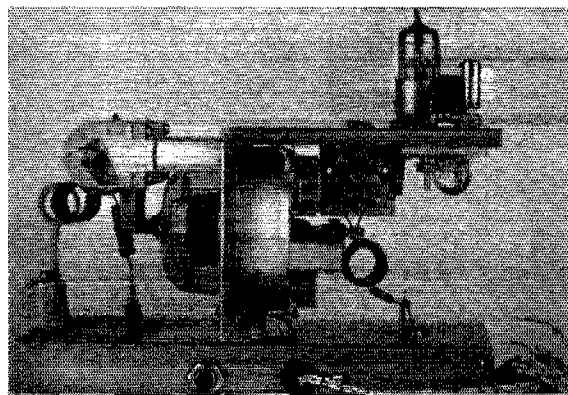
Other Combinations

A high percentage of run-of-the-mill crystals on about 8 Mc. show a decided willingness to operate on their third overtone¹ when used in the oscillator circuit shown in Fig. 1. This led to a combination of two 6J6s, the first section of the first tube operating as an oscillator at 24 Mc., the second section doubling to 48, with the second 6J6 operating as a push-pull tripler.

(Continued on page 100)

¹"Overtone" is used in this sense merely as a means of indicating that the crystal actually vibrates at an odd multiple of the normal-thickness shear frequency that would be expected of it. The multiple is not an exact integral figure, but is close enough to be considered so for design purposes; the difference is but a fraction of a per cent. They are also sometimes known as "harmonic" crystals but we prefer to use the word "harmonic" only in conjunction with electrical harmonics of a frequency. They are always exact integral multiples of the original frequency and may be either odd or even numbers.

Rear view, showing arrangement of components in the exciter portion of the 144-Mc. rig.



Announcing the 15th ARRL Sweepstakes

Medallions Will Be Awarded to C.W. and 'Phone Winners in Each Section, Certificates to Top Scorers in Club Groups

CONTEST PERIODS

Time	Start	End
	Nov. 13th & 20th	Nov. 14th & 21st
EST	6:00 P.M.	3:01 A.M.
CST	5:00 P.M.	2:01 A.M.
MST	4:00 P.M.	1:01 A.M.
PST	3:00 P.M.	12:01 A.M.

IT'S TIME to get your station in readiness for the 15th Annual ARRL Sweepstakes, to be held this coming November. This popular contest affords you an opportunity to pit your operating skill against the best men in your ARRL section, or to fill in some of those states that are lacking for WAS.

As usual, the contest will run over two consecutive week-ends, with a maximum allowable total operating time of 40 hours out of the possible 66 for each entry ('phone or c.w.). The rules are practically identical to those of last year. You can operate both 'phone and c.w., but separate logs must be filed for each entry.

Entries by multiple-operator stations are encouraged and will be listed, but only single-operator stations will be eligible for the specially-designed bronze medallions offered to the top 'phone scorer and the top c.w. scorer in each section. Multiple-operator scores can be grouped with single-operator scores in club competition, however, and a handsome gavel is offered to the club with the highest aggregate score. Within a club, single-operator entries can compete for the "club-certificate" awards given to the top c.w. and 'phone scorers.

The Sweepstakes, like Field Day, is a contest that puts a premium on operating skill rather than on sheer power, since the 1.25 score multiplier applied to stations operating with 100 watts or less during the contest practically insures that most of the operation will be in this power class. The 807s and 6L6s really go to town in the SS!

If you're new to the SS, it won't take you long to catch on. During the contest period, call "CQ SS" or answer such a call, exchange preambles in the form shown elsewhere on this page, and keep your log properly. ARRL will gladly send you contest forms upon request, or you can draft your entry in accordance with the sample. Tune up your gear now, warn the folks that you'll be unavailable the week-ends of Nov. 13th and 20th, read the rules to acquaint yourself with the pattern, and then get set for an operating spree that is real fun.

Rules

- 1) **Eligibility:** The contest is open to all radio amateurs in the sections listed on page 6 of this issue of QST.
- 2) **Time:** All contacts must be made during the contest periods indicated elsewhere in this announcement. Time may be divided between week-ends as desired, but a total of 40 hours must not be exceeded for each entry. Time spent in listening counts as operating time.
- 3) **QSOs:** Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. C.w. stations work only c.w. stations and 'phone stations only other 'phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a proper preamble.



This medallion will be presented to c.w. and 'phone winners in the 15th ARRL Sweepstakes. It provides dignified and lasting proof of individual accomplishment in one of the most popular of operating contests.

- 4) **Scoring:** Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see p. 6) worked during the contest is the "sections multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either point (s) or multiplier. Apply a "power multi-

HOW TO SCORE

Each preamble sent and acknowledged counts one point.

Each preamble received counts one point.

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

For final score: Multiply totaled points by the number of *different* ARRL sections worked, that is, the number in which at least one bona fide SS point has been made.

Multiply this by 1.25 if you used 100-watts-or-less transmitter input at *all times* during the contest.

EXPLANATION OF "SS" CONTEST EXCHANGES

<i>Send Like a Standard Msg. Preamble, the . . .</i>						
	NR	Call	CK	Place	Time	Date
<i>Exchanges</i>	Contest info. numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (RST report of station wkd.)	Your ARRL Section	Send time of transmitting this NR	Send date of QSO
<i>Sample</i>	NR 1	WIAW	589	CONN	6R12 PM	NOV 13

plier" of 1.25 if the input power to the transmitter output stage is 100 watts or less at all times during contest operation.

The final score equals the total "points" multiplied by the "sections multiplier" multiplied by the "power multiplier."

5) *Reporting:* Contest work must be reported as shown in the sample form. Mimeographed contest forms will be sent gratis upon receipt of radiogram or postcard request. Indicate starting and ending times for each period on the air.

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

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. Contest reports must be postmarked no later than December 10, 1948, to be eligible for QST listing and awards.

6) *Awards:* Two medallion awards will be given in each section, one for the highest c.w. score and one for the highest phone score. Only single-operator stations are eligible for medallion awards. Multiple-operator scores will receive separate QST listing in the final results.

A gavel will be awarded to the highest club entry. The
(Continued on page 104)

STATION W. . . — SUMMARY OF EXCHANGES, FIFTEENTH A.R.R.L. ALL-SECTION SWEEPSTAKES

Freq. Band (Mc.)	Time On or Off Air	Sent (1 point)				Time	Date (Nov.)	Received (1 point)				Time	Date (Nov.)	Number of Each Different New Section as Worked	Points
		NR	Stn.	CK-RST	Section			NR	Stn.	CK-RST	Section				
3.5	On 6:10 P.M.	1	WIAW	589	Conn.	6:12 P.M.	13	7	W8JIN	589	Ohio	6:14 P.M.	13	1	2
"	"	2	"	589	"	6:15 "	"	6	W1BFT	599	N.H.	6:17 "	"	2	2
"	"	3	"	579	"	6:20 "	"	6	W1BJP	579	Vt.	6:21 "	"	3	2
7	"	"	"	"	"	"	"	24	W5KIP	479	Ark.	8:05 "	"	4	1
"	"	4	"	479	"	9:15 "	"	38	W5HJF	579	N. Mex.	7:15 "	"	5	2
"	"	5	"	579	"	9:28 "	"	45	W7KEV	479	Nev.	6:20 "	"	6	2
"	"	6	"	589	"	9:33 "	"	59	W8RSP	589	Ohio	9:34 "	"	..	2
"	Off 9:35 P.M. Time 3 hrs. 25 min.														
"	On 6:45 P.M.														
14	"	7	"	569	"	7:15 P.M.	14	94	KL7AD	569	Alaska	2:18 P.M.	14	7	2
"	"	8	"	569	"	7:25 "	"	127	W7ZN	569	Idaho	5:28 "	"	8	2
"	"	9	"	469	"	7:35 "	"	114	W7HRM	569	Utah-Wyo.	5:30 "	"	9	2
3.5	"	10	"	579	"	9:10 "	"	130	W0LHS	579	N.D.	8:05 "	"	10	2
"	"	11	"	589	"	9:12 "	"		W5KIP		Ark.			..	1
"	Off 9:15 P.M. Time 2 hrs. 30 min.														

Total Operating Time: 5 hrs. 55 min.

3.5, 7 and 14 Mc. used.

10 Sec., 22 Pts.
85 Watts Input Power

Assisting person(s): name(s) or call(s) etc.:

(Claimed score: 22 points × 10 sections = 220 × 1.25 (85 watts input) = 275

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

Signature:

Address:

Tube Line-Up:

Number Different Stations Worked:

I.A.R.U. News

QSL BUREAUS

For best service on delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country, as listed below. *Do not send foreign cards to A.R.R.L. Headquarters except those for which no bureau is here listed.*

For service on *incoming* cards, see list of domestic QSL bureaus in alternate issues of *QST* under the heading, "ARRL QSL Bureau" (page 49 of this issue).

Alaska: J. W. McKinley, Box 1533, Juneau
Algeria: Via France
Argentina: R.C.A., Av. Alvear 2750, Buenos Aires
Australia: W.I.A., Box 2611, W. C.P.O., Melbourne
Austria: O.V.S.V., Kierlingerstrasse 10, Klosterneuberg
Azores: Via Portugal
Belgian Congo: P. O. Box 271, Leopoldville
Belgium: U.B.A., Postbox 634, Brussels
Bermuda: VP9D, James A. Mann, The Cut, St. Georges
Bolivia: R.C.B., Casilla 15, Cochabamba
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Honduras: D. Hunter, Box 178, Belize
Burma: B.A.R.S., P. O. Box 611, Rangoon
Canal Zone: Canal Zone Amateur Radio Association, Box 407, Balboa
Canton Island: Kenneth G. Neifert, KB6AD, % CAA, Canton Island, South Pacific



The winning station in the 1948 National Field Day in Switzerland was HB1U, pictured here being operated by HB9U and HB9CE, with HB9CA, traffic manager of U.S.K.A., looking on.

Chile: Radio Club de Chile, Box 761, Santiago
China: K. L. Koo, P. O. Box 409, Shanghai
Colombia: L.C.R.A., P. O. Box 534, Bogotá
Cook Islands: Ray Holloway, P. O. Box 65, Rarotonga
Costa Rica: F. Gonzalez, Box 365, San José
Cuba: James D. Bourne, Lealtad 680, Habana
Czechoslovakia: C.A.V., P. O. Box 68, Prague I
Denmark: E.D.R., Box 79, Copenhagen K
Dominica: VP2DC, Roseau
Ecuador: Victoriano Salvador, P. O. Box 2536, Quito
Egypt: Box 360, Cairo
Eire: R. Mooney, "Eyrefield," Killiney Co., Dublin
Ethiopia: ET3AF, P. O. Box 858, Addis Ababa
Fiji: S. H. Mayne, VR2AS, Victoria Parade, Suva
Finland: P. O. Box 308, Helsinki
France: Service QSL, R.E.F., 6 rue du Pont de Lodi, Paris 6
Germany: (D2 calls only) Capt. J. S. Howe, Entries and Exits Branch, 100 Hq. CCG (BE), Bad Salzuflen, B.A.O.R.
Germany: (D4 calls only) M/S A. R. Varney, OPM, EUCOM, APO 757, % Postmaster, New York, N. Y.
Germany: (D5 calls only) via France
Great Britain (and British Empire): A. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent
Greece: C. Tavaniotis, 17-A Bucharest St., Athens
Greenland: 1385th AAF Base Unit, APO 858, % Postmaster, New York, N. Y.
Grenada: VP2GE, St. Georges
Guam: G.R.A.L., APO 234, % Postmaster, San Francisco, Calif.
Guatemala: Manuel Gomez de Leon, P. O. Box 12, Guatemala City
Haiti: Roger Lanois, % RCA, P. O. Box A-153, Port-au-Prince
Hawaii: A. H. Fuchikami, 2543 Namaau Dr., Honolulu
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P. O. Box 541, Hong Kong
Hungary: H.S.R.L., Postbox 185, Budapest 4
Iceland: Islenzkir Radio Amatorar, P. O. Box 1080, Reykjavik
India: J. Nicholson, Nadair Estate, % Munnar P. O., Travancore
Israel: See *Pa'estine*
Italy: A.R.L., Via San Paolo 10, Milano
Jamaica: Thomas Meyers, 122 Tower St., Kingston
Japan: F.E.A.R.L., APO 503, % Postmaster, San Francisco, Calif.
Luxembourg: W. Berger, 20 Louvigny St., Luxembourg
Malta: Via Great Britain
Mauritius: V. de Robillard, Box 155, Port Louis
Mexico: L.M.R.E., Apartado Postal 907, Mexico, D.F.
Montserrat: VP2MY, Plymouth
Morocco: C. Crangier, Box 50, Casablanca
Morocco: *Tangier International Zone only:* EK1MD, Box 57, British Postoffice, Tangier
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands East Indies: Hr. C. Loze, PK1LZ, Burg. Kuhlweg, 47 Bandoeng, Java
Newfoundland: N.A.R.A., Box 660, St. Johns
New Zealand: N.Z.A.R.T., P. O. Box 439, Wellington C. 1
Nicaragua: L. B. Satres, Bolivar Ave., 106 Managua
Northern Rhodesia: VQ2DH, Box 93, Livingstone
Norway: N.R.R.L., P. O. Box 898, Oslo
Pakistan: Via India
Palestine: P. O. Box 4099, Tel-Aviv
Panama, Republic of: L.P.R.A., P. O. Box 1616, Panama
(Continued on page 100)

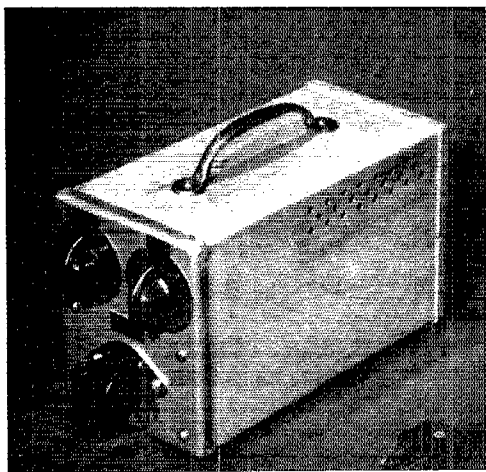
Further Advances in Electronic-Keyer Design

Some New Ideas in Automatic Keys

BY F. A. BARTLETT,* W6OWP

A CASUAL LISTEN on any c.w. band leaves no doubt that the fully-automatic sending key — and particularly the so-called “electronic bug” — has come into its own. And with it, the readability “quotient” of amateur sending has started a steady improvement. Heretofore, with one or two exceptions, the most important consideration in electronic-keyer design has been automatic dots and dashes. Several circuits effectively achieve this result. But as more and more operators try their fists with keyers of this type, the need for features other than the basic automatic dot-dash principle has become increasingly evident.

A common difficulty is the intraletter timing where a change from dashes to dots is made. Un-



The completed electronic keyer occupies little more table space than a conventional bug.

less the last dash is timed correctly, clipping results and our machine-like fist does a disappearing act. On dots, there is a fifty-fifty chance of hitting timing correctly, but on dashes the chance for error is multiplied by the increased mark-to-space ratio. This critical timing is eliminated when dots and dashes are self-completing, and the key lever serves only to start each dot or dash.¹

In this same category can be included a dif-

* 2237 Howard Ave., San Carlos, Calif.

¹ Beecher, “A Better Electronic Keyer,” *QST*, Aug., 1945.

• Self-completing dots and dashes, single-control speed adjustment and a simple keying lever — all without undue circuit complication — add up to an electronic-key design easier to master. For the c.w. man who is looking toward perfection, this automatic key looks like one of the closest approaches we've yet had.

fefully with which we all are familiar. This is a tendency to develop one or two speeds at which the operator's sense of timing is highly developed and he puts out code of a quality above reproach. But when asked to QRS or to speed up, he finds himself in trouble. Often he will blame his bug or “late hours the night before.” By eliminating critical timing, the self-completing feature tends to break up this “self-resonance” in code sending. An operator using a keyer with self-completing action finds that he has a maximum speed which is perhaps influenced by “state of mind,” but for sending below his maximum, one speed is as good as another, and changing pace on a moment's notice causes no difficulty.

Another frequent complaint — especially among amateurs who build their own gear — is the complicated adjustment of dots, dashes and spaces each time a change in speed is made. The dot-dash-space relationship is fixed regardless of sending speed. Thus the need for individual adjustment of each is superfluous. Simplification here to permit instant variation in sending speed is in order.

Although perhaps not as basic as the above considerations but deserving of mention is need for a less complicated key lever. The principle of dots on one side, dashes on the other, seems to dictate single-pole double-throw. The familiar “feel” of the traditional bug would thus be retained and adjustment difficulties reduced to a minimum.

In the following paragraphs, the writer describes a new automatic-keyer circuit in which the above desirable features are inherent in the design.

Circuit Operation

Essentially, this keyer circuit, shown in its basic form in Fig. 1, consists of a stable, mechan-

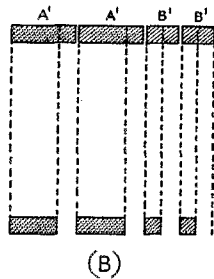
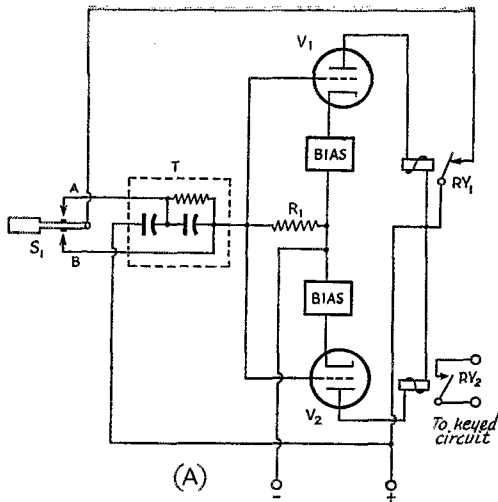


Fig. 1—A—Basic keyer circuit. B—Graphic illustration shows operation of basic pulsing circuit and shaping-keying circuit in terms of operational cycle of respective plate-circuit relays. Full explanation is contained in the text.

ically-triggered pulse generator working into a clipping circuit which shapes the operating cycle of the keying relay in conformity with standard concepts of the telegraph code. The manner in which the circuit functions is quite simple. Referring to Fig. 1, two tubes and associated plate-circuit relays are connected with their grids in parallel, but with independent bias supplies which hold the idling grid voltage beyond plate-current cut-off. To the grid circuit is connected timing network *T* which provides one of two time constants as selected by key lever *S*₁. The opposite side of this network connects to the positive B supply. *S*₁, through the back contacts of *R*_{Y1}, is likewise connected to B+ with the circuit idling.

Now, consider only *V*₁ for a moment. If *S*₁ is moved to position A, three things take place simultaneously: (1) the effective capacitance of *T* is discharged; (2) positive potential is placed on the grid of *V*₁; and (3) plate current begins to flow through *R*_{Y1}. This closes the relay armature, opening the back contact connected from B+ to *S*₁. The short-circuit across *T* thus is removed and the network begins to charge through resistor *R*₁ reducing the positive potential on the grid of *V*₁ until the applied bias takes over, plate current ceases and *R*_{Y1} opens. If *S*₁ is held to position A, a continuous pulsation of *R*_{Y1} occurs. The duty cycle of these pulsations is shown graphically as A' in Fig. 1. If *S*₁ is held to position B a different time constant becomes effective and the pulsations are shorter, as at B' in the illustration.

The over-all speed of operation is dependent upon the value of *R*₁ which controls the rate-of-charge of the timing network. Opening *S*₁ or moving the lever to the opposite contact at any time during the progress of a cycle has no effect upon completion of that cycle, since *S*₁ will not be

connected into the circuit until *R*_{Y1} opens. *S*₁ thus is seen to serve only to initiate the start of each pulse, at either of two rates as selected at A or B. For all speeds used in manual telegraph work, this basic pulsing circuit can be made very stable and capable of an almost unlimited number of operational cycles.

It will be recalled that in standard telegraph practice, a dot is considered of unit length, a dash three unit lengths and the character space, i.e., space between consecutive dots or dashes within a letter, one unit length. Referring again to Fig. 1, the pulsation of *R*_{Y1} can be considered the equal of the mark-to-space keying characteristic of this relay, were it connected into a keyed circuit. It is at once apparent that spacing between pulses is almost totally lacking. Insertion of the character space then is the function of *V*₂, and *R*_{Y2} becomes the keying relay for operating an external transmitter or other telegraph instrument.

The manner in which this is accomplished is as follows: Constants for the timing network *T* are chosen such that A' is four units in length and B' is two units.² Now the grid of *V*₂ is subject to the same input voltage during pulsing cycles as is the grid of *V*₁. Accordingly, similar plate current variations would be expected to pass through relay *R*_{Y2}. However, by means of the independent bias supply, the grid of *V*₂ is biased to a value higher than the grid of *V*₁. This results in the cutting off of plate current to *V*₂ during pulsing cycles a fixed interval ahead of cut-off in *V*₁. The additional bias voltage for *V*₂ is selected to cause *R*_{Y2} to open one unit length ahead of *R*_{Y1}. The action, in terms of the operating cycle of *R*_{Y2} compared to *R*_{Y1}, is shown graphically in Fig. 1.

With *S*₁ in position A, dashes of three units

² For purposes of explanation, round numbers are used and the slight spacing between pulses at *R*_{Y1} is neglected.

length, each followed by a space characteristic of one unit length, will be produced. In position *B* dots of unit length with unit character space are formed. Note that Ry_2 always starts simultaneously with Ry_1 .

Since the rate of all operations is a function of the timing network *T*, then variation of *R* will change the speed of all characteristics in proper relationship. A variable bias voltage for V_2 , provided by R_{10} (Fig. 2), can act as control for the weight of the keying.

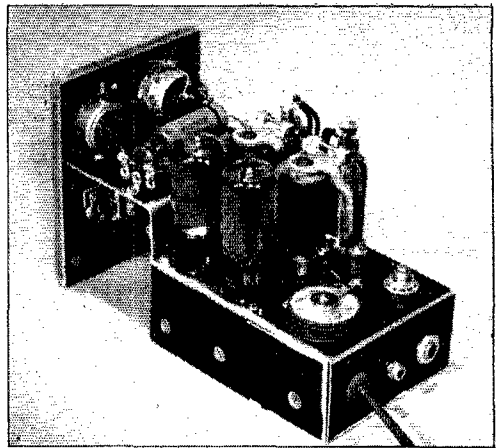
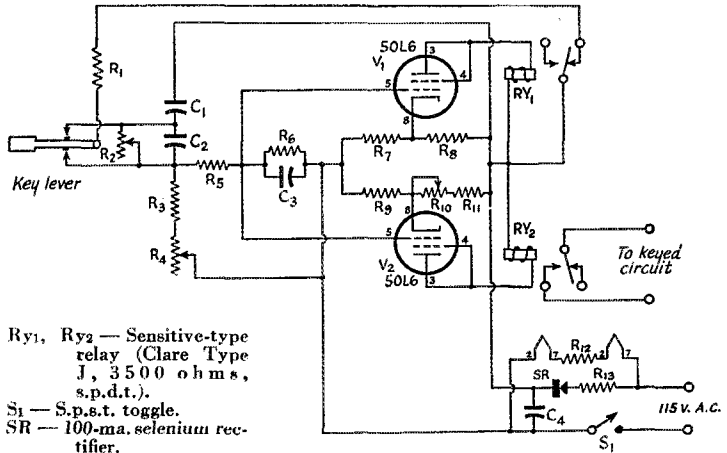
Practical Keyer Circuit

The foregoing material has dealt in general terms with the basic principle of operation. To equip the circuit for practical usage, suitable means of obtaining bias and insuring stability of the grid-input circuit must be introduced. In Fig. 2 is shown a complete circuit diagram of a keyer built around the principles just discussed and using standard parts. Exact circuit values are given to enable duplication.

Operating grid bias is obtained by means of the two divider networks made up of R_7R_8 and $R_9R_{10}R_{11}$. R_3 and R_5 prevent excessive change in grid-input impedance with variation of the speed-control resistor, R_4 . C_3 and R_6 furnish necessary grid-input stabilization. R_3 also serves to fix the maximum operating speed by limiting the current flow through R_4 . Maximum resistance of the latter sets minimum speed. Values shown provide a range of approximately 12 to 50 words per minute. R_1 in series with the movable contact of the key lever limits the instantaneous discharge current of the timing network. This minimizes sparking both at the key lever and pulsing-relay contacts. R_{10} is used to vary the bias on V_2 by controlling the bleeder-current flow through R_9 . This allows the weight of the keying to be varied to suit the operator's wishes. In addition, it is of advantage in compensating for differing characteristics when tube replacements are made.

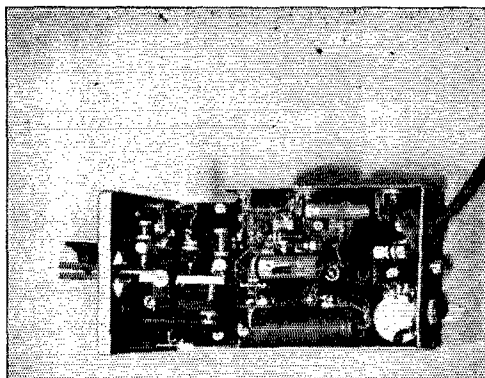
Fig. 2 — Practical keyer circuit.

- C_1 — 0.15- μ fd. 600-volt paper.
- C_2, C_3 — 0.05- μ fd. 600-volt paper.
- C_4 — 40- μ fd. 150-volt electrolytic.
- R_1 — 470 ohms, $\frac{1}{2}$ watt.
- R_2 — 0.5-megohm variable (dot-dash ratio control).
- R_3, R_5 — 0.22 megohm, 1 watt.
- R_4 — 2-megohm variable (speed control).
- R_6 — 2.7 megohms, $\frac{1}{2}$ watt.
- R_7, R_8 — 2200 ohms, 1 watt.
- R_9 — 6800 ohms, 1 watt.
- R_{10} — 5000-ohm variable (shaping control).
- R_{11} — 10,000 ohms, 2 watts.
- R_{12} — 150 ohms, 5 watts.
- R_{13} — 39 ohms, 1 watt.



Interior view showing the mounting of tubes, relays and other major parts.

High-quality condensers should be used at C_1 , C_2 and C_3 . Standard-make 600-volt tubulars were used in the keyer illustrated. C_1 consists of 0.05- and 0.1- μ fd. units in parallel to give the required 0.15- μ fd. capacitance. No particular comment need be made on the power supply which uses a standard 100-ma. selenium rectifier. The 150-ohm resistor in the filament circuit drops the voltage to a safe operating value for the 50L6s. The two relays constitute the most-critical components in this circuit. These should be identical and of fixed-adjustment wiping-contact design. Coil resistance, of course, must be suitable for vacuum-tube operation. So-called "sensitive plate-circuit" relays of the type having numerous adjustments should be avoided. In the experimental keyer shown in the photographs, the author used 3500-ohm Clare relays. However, any good telephone-type relay with proper contact and coil specifications should be satisfactory.



This bottom view of the electronic keyer shows a compact but orderly arrangement of the minor components.

If duplication of the circuit of Fig. 2 is planned, it is important that relay-contact spacing be set at 0.010 inch, as measured between the movable contact and the "make" contact. To set this spacing, use a feeler gauge and carefully bend the "make" contact arm. The overtravel of the armature should be sufficient to give moderate wiping action on both the forward and back contacts.

Timing-Circuit Adjustment

The setting of R_2 in the timing circuit for the correct dot-dash ratio must be made by monitoring a circuit keyed by Ry_2 . First, set R_2 at minimum resistance and with the key lever held to the dash position, set the speed control R_4 at about one-quarter scale beyond the point where the keying relay picks up. The speed control should be set at about two-thirds scale. Now, advance R_2 and at the same time swing the key lever alternately from the dot position to the dash position. To the average operator's ear, the point where the dot-dash ratio is about right is readily determined. Once set, the timing circuit needs no further attention. The dot-dash ratio will remain true at all sending speeds.

Mechanical Layout

The photographs show an electronic keyer using the circuit of Fig. 2 and built to occupy a minimum of space at the operating position. The construction is compact but not overcrowded. A semiautomatic-key assembly was altered to serve as the control lever. Aside from the portability angle, the author favors a design wherein the keyer is built as a unit separate from the key lever. This makes for a more orderly operating position — since one advantage of a keyer of this type is the simple lever required. Lead length is not critical and the keyer unit can be incorporated right in the exciter unit or transmitter proper. A semiautomatic key can be converted to single-pole double-throw action in a

matter of minutes. The shorting connection between the stationary dot and dash contacts is removed and the vibrating arm is locked by strapping it to its backstop with a rubber band. Contacts are then adjusted to give the desired s.p.d.t. action.

Sending Technique

"Go slow" is the best advice the writer can give to the operator learning to use this new type of keyer. Each letter involves a different operational sequence and these sequences will have to become mechanical — that is, done without conscious mental assistance — before high-speed work should be attempted. A little study will show that each letter can easily be transmitted with mechanical perfection if full advantage is taken of the timing margin afforded by the keyer's self-completing action. Strive for this perfection. Once the sending rhythm of each letter is mastered, pay close attention to spacing between letters and words. This is the road to manual sending that compares favorably with the precision and accuracy of tape transmission.

In closing, the writer wishes to acknowledge valuable suggestions contributed by A. R. Burns of Highland Park, Calif., in the development of certain portions of the circuit described.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1NFF, Fred A. Latimer, Lenox, Mass.
 W2AFU, Elmer Theibault, Lakewood, N. J.
 W2GHIQ, Joseph T. Bell, Short Hills, N. J.
 W2IGY, Arthur D. Gonyea, Hudson Falls, N. Y.

W2QGT, Mrs. Katherine L. Wood, Syracuse, N. Y.

W2SAK (ex-W2ABS), Peter S. Case, Somerville, N. J.

W2SXR, Albert L. Wahl, Mt. Vision, N. Y.

W5JMK, S/Sgt. Nunzio DiPaola, USAF, Winnsboro, La.

W6MGC, SCM John R. Kinney, Sacramento Valley Section, Sacramento, Calif.

W8AHU, John T. Stillwell, Grafton, W. Va.

Alvina G. Zachary (second op at W8DEN), Detroit, Mich.

W8HDW, Frank Rogowin, Lorain, Ohio

W9COI, Charles J. Lemieux, Fort Wayne, Ind.

VE3MT, Art Potts, Toronto

GM5UT, Eldrick Fowler, Aboyne, Aberdeenshire

HB9CD, Enzo Sala, Zurich
 PK6XA, Lt. Bert Krygsman

A "Hot" Converter for 220 Mc.

Push-Pull Stages Provide High Gain and Improved Signal-to-Noise Ratio

BY HARRY PAUL,* WIPMS, AND CALVIN HADLOCK,* WICTW

AFTER the initial thrill of engaging in actual communication palls, the experimentally-inclined amateur usually begins to cast around for other fields to conquer, and many find that the designing and construction of gear provides fully as much pleasure as does routine operating. For them the u.h.f. bands offer a fruitful field.

While sitting in at one end of the WICTW-WIDAH 235-Mc. circuit, a 45-mile hop between Arlington, Mass., and North Scituate, R. I., WIPMS was impressed by the strength and reliability of the signals and was immediately intrigued with the possibilities which this band and its 220-Mc. successor afforded for interesting work. The converter described herewith is the result of a series of projects aimed at improving receiver performance at these frequencies.

It is well known that the signal-to-noise ratio of a receiver varies inversely with the bandwidth; that is, the sharper the selectivity the better the signal-to-noise ratio. Since all of the stations known to be operating on $1\frac{1}{4}$ meters in eastern New England were using crystal control, it was entirely practical to build a converter and feed it into the NC-183 receiver already available in the shack. This would mean by-passing the various stages of broadband and semibroadband receivers used by earlier workers, and starting in with communications-receiver selectivity, right at the outset. It also permitted con-

*% The National Company, Malden, Mass.



• The idea of a push-pull r.f. section, with its inherently balanced circuits, has long appealed to v.h.f. experimenters. In this $1\frac{1}{4}$ -meter converter, push-pull circuits are combined with other novel ideas, including the use of a neutralized-triode r.f. stage and special tank circuits, adding up to outstanding performance on 220 Mc.

centration on the r.f. circuits, which are normally regarded as the most interesting phase of such a project.

R.F.-Amplifier Considerations

The two chief electrical factors determining the gain of a tube as an r.f. amplifier at these frequencies are its mutual conductance and input conductance. The latter is relatively unimportant at low frequencies but must be taken into consideration at v.h.f. This input conductance (or its reciprocal, the input resistance) is shunted directly across the input (antenna) tank and loads it down to a lower Q , thereby reducing the voltage developed across it, which is impressed on the grid of the tube. This lower input resistance at v.h.f. is caused by the appreciable transit time of the electron stream in the tube and also by the appreciable inductance of the lead between the cathode and the r.f.-tank ground. Of the two above factors, the cathode inductance normally has a considerably greater effect on lowering the input resistance than the transit time at 220 Mc. It is, therefore, important to keep this inductance to a minimum.

Noise in the r.f.-amplifier output circuit is the sum of the noise that is generated in the tube itself by the passage of the electron stream from cathode to plate, the tuned-circuit thermal noise, and the antenna noise. The fewer elements disturbing the electron stream during its passage from cathode to plate, the less tube noise generated. Thus a triode is a quieter tube than a

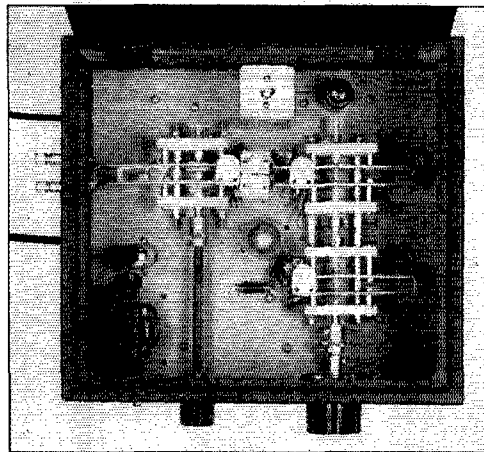
◆
The 220-Mc. converter described by WIPMS.

pentode and is to be preferred. For good signal-to-noise ratio the tube noise must be no more than a small fraction of the antenna and tuned-circuit noise.

One drawback in the use of the triode as an r.f. amplifier is that the grid-plate capacitance couples the output circuit back to the input circuit, causing oscillation to take place. The grounded-grid amplifier circuit is one way of eliminating this feed-back. This circuit isolates the input and output circuits effectively and has been used extensively in the past few years. It is, however, highly degenerative, spoiling the selectivity of the associated tuned circuits and preventing the tube from giving the full gain of which it would be capable if this degeneration were not present.

If the tube could be operated as a conventional grounded-cathode triode amplifier and the grid-plate capacitance eliminated or nullified, it should then give the highest possible gain while still taking advantage of the low tube noise of triode operation. This can be accomplished merely by cross-neutralizing in the conventional manner, and since the converter will cover a very narrow frequency range, cross-neutralization is practical and easy.

For the same reasons as above, a triode was also decided upon for the mixer stage. Several factors led to the use of push-pull circuits for these two stages. First, we intended to use a balanced feeder system. Second, push-pull circuits allow the use of higher LC ratios and the circuits are balanced with respect to ground. This is particularly helpful when cross-neutralization is used at these frequencies. Third, a tube which is cheap and at the same time particularly adapted for this circuit is readily available — our old friend, the 6J6. This tube is particularly suitable because of its common cathode, which is made of a rectangular piece of tubing coated on all sides. The only lead having inductance and connected with the cathode circuit ties the cathode to the tube pin. When the 6J6 is used in push-pull, the common-cathode-to-ground con-



Top view of the 220-Mc. converter, showing the arrangement of the r.f., mixer and oscillator tank components. Tubes for these stages are mounted upside down, with their sockets directly under their respective tank circuits. The oscillator and mixer are tuned by the vernier dial, and the r.f. stage is peaked with a separate control.

nection is out of the active circuit completely; therefore, the effects of cathode-lead inductance, which represent a major portion of the total input resistance in the usual circuit, are nil. Fourth, while feeding the signal into the mixer grids in push-pull, the oscillator voltage is injected to the two grids in parallel by means of two equal capacitances whose junction is at a voltage null with respect to the push-pull input tank, giving a great reduction in "pulling" of the oscillator. Of course, the plates of the mixer must be connected in push-pull as shown in the circuit diagram.

Construction

The 6J6 r.f. and mixer tubes are mounted upside down on the chassis, directly under the r.f. grid and plate tanks, providing short direct connections to the grids and plates. The grids of the 6J6 r.f. tube connect directly on to the grid tank. The plate leads are crossed so that the neutralizing condensers can be mounted between adjacent ends of the tanks. The neutralizing condensers are 3-30 μfd . mica trimmers, whose fixed plates have been cut back to reduce the minimum capacitance. The grid tank is grounded at the center, while the rotor of the plate tuning condenser is grounded. Grounding of the rotor of the plate tuning condenser gave a better balance to ground, which aided in neutralizing. The r.f. plate tank is capacity coupled to the mixer grids. The oscillator voltage is parallel-fed to the grids through two

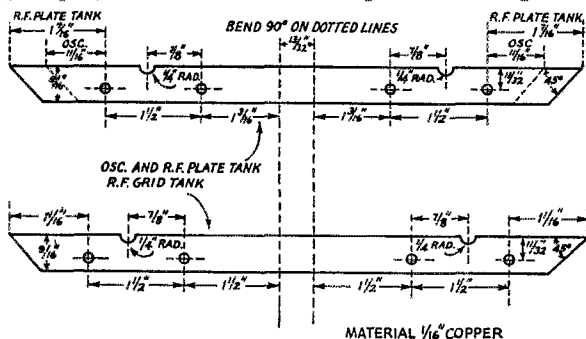


Fig. 1 — Detail drawing of the tank inductors used in the WIPMS converter. The upper sketch shows dimensions for the r.f. plate and oscillator circuits, while the lower is used in the r.f.-stage grid circuit. The material is $\frac{1}{16}$ -inch-thick copper strip.

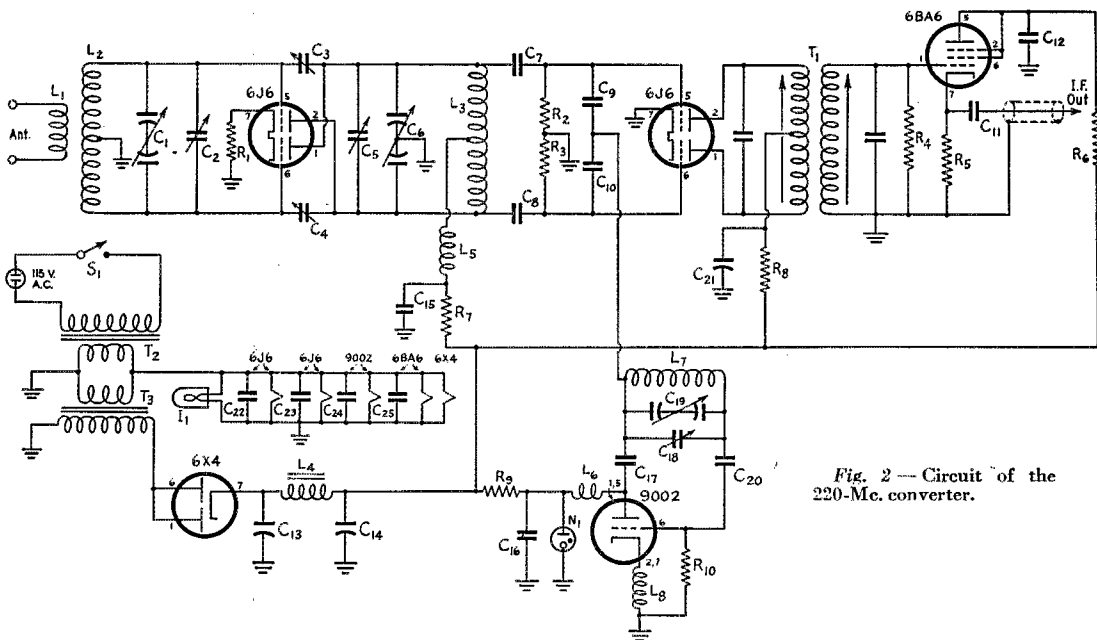


Fig. 2 — Circuit of the 220-Mc. converter.

- C₁ — Special split-stator variable having a tuning range of approximately 1 μ fd. (National VHF-1D, or VHF-225TR, complete with tank inductor).
 C₂, C₅ — 2.5- to 6- μ fd. ceramic trimmer.
 C₃, C₄ — 3-30- μ fd. mica trimmer with fixed plates cut back to reduce minimum capacitance.
 C₆, C₁₀ — Similar to C₁, but dual model. (National VHF-2D, or VHF-225TC, complete with tank inductor).
 C₇, C₈ — 50- μ fd. ceramic.
 C₉, C₁₀ — 2- μ fd. ceramic.
 C₁₁, C₁₂, C₁₆, C₁₇, C₂₂, C₂₃, C₂₄, C₂₅ — 0.001- μ fd. ceramic.
 C₁₃, C₁₄ — 40 μ d.
 C₁₅ — 270- μ fd. mica.
 C₁₈ — 5-20- μ fd. ceramic.
 C₂₀ — 100- μ fd. ceramic.
 C₂₁ — 0.1 μ d.
 R₁ — 47 ohms, $\frac{1}{2}$ watt.

- R₂, R₃ — 0.22 megohm, $\frac{1}{2}$ watt.
 R₄ — 33,000 ohms, $\frac{1}{2}$ watt.
 R₅ — 330 ohms, $\frac{1}{2}$ watt.
 R₆, R₇ — 1000 ohms, $\frac{1}{2}$ watt.
 R₈ — 0.1 megohm, $\frac{1}{2}$ watt.
 R₉ — 4700 ohms, $\frac{1}{2}$ watt.
 R₁₀ — 47,000 ohms, $\frac{1}{2}$ watt.
 L₁ — $1\frac{1}{2}$ turns No. 14 wire, 7/16-inch inside diameter, lead lengths $1\frac{1}{4}$ inches.
 L₂, L₃, L₇ — Special inductors — see Fig. 1, text and photograph.
 L₄ — 8-henry 30-ma. choke.
 L₅, L₈ — 2- μ h. choke; 40 turns No. 28 enamel on $3\frac{1}{2}$ -inch form.
 L₆ — 7 turns No. 14 enamel on $\frac{1}{4}$ -inch form.
 N₁ — Neon bulb, 1-watt G.E. NE-32.
 T₁ — 10.7-Mc. i.f. transformer (National type IFN, modified).
 T₂, T₃ — Filament transformers (UTC-FT-4).

separate 2- μ fd. ceramic condensers.

The 10.7-Mc. i.f. transformer is a modified National type IFN. A center-tap was added to the primary winding to provide push-pull output from the mixer. One half of the primary winding was unwound and a twist put in the wire to provide a tap and the turns wound back on. A flat piece of copper of the same size as the other terminals was inserted in one of the extra slots in the polystyrene base. This tab should be a little too thick for the slot, and should be pressed in gently while being heated with an iron. A lead was connected between the new terminal and the tap on the primary winding.

The oscillator is the conventional Ultraudion, using a 9002. It is voltage regulated by a neon bulb. Considerable thought was given to the stability of the oscillator. The oscillator tank, like the other r.f. tanks, has a high Q and is very

ruggedly mounted. All parts associated with the circuit were carefully arranged to give maximum stability. Quite a bit of experimenting was required to reduce the 60-cycle modulation of the oscillator to a minimum, the final arrangement being the insertion of a 2-millihenry choke in the cathode lead. This choke reduced the 60-cycle modulation and, at the same time, increased the output of the oscillator. Sixty or seventy volts d.c. was required at the plate of the oscillator so a choke was used in the plate circuit instead of a resistor. The oscillator operates on the low-frequency side of the signal frequency.

The power supply uses two filament transformers back-to-back with the 6.3-volt windings connected together. A 6X4 half-wave rectifier is used as it has a 6.3-volt heater and, therefore, can get its filament power from the same winding

(Continued on page 104)



United States Naval Reserve



ACCORDING to a recent directive from the Chief of Naval Personnel, holders of FCC amateur and commercial operator licenses are given special consideration for initial ratings and rapid advancement in the Naval Reserve. This special consideration applies not only to new recruits but to FCC-licensed Reservists already enrolled. The table below tells what this can mean to you:

FCC License Held	Initial Enlistment (USNR, V-6)	Advancement as Soon as Enrolled in an Electronic Warfare Company or Platoon (USNR, V-5)	Advancement as Soon as Rating Exam Is Passed — No Time-in-Grade Requirements (USNR, V-5)
Amateur:			
Class A or B	Seaman Recruit	Seaman	RM3c
Class C	Seaman Recruit	Seaman Apprentice	Seaman
Commercial Radiotelegraph:			
First Class	Seaman Recruit	Seaman	RM2c
Second Class	Seaman Recruit	Seaman	RM2c
Operator Permit	Seaman Recruit	Seaman	RM3c

The following amateur calls have been issued to Naval Reserve activities since the last list appearing on this page:

- | | |
|----------------------------|---|
| K2NRL Freeport, L.I., N.Y. | K6NMB (Marine Corps Reserve), San Diego, Calif. |
| K4NAT Sheffield, Ala. | K7NRF Bellingham, Wash. |
| K4NAU St. Petersburg, Fla. | K7NRI Kelso, Wash. |
| K4NRI Winston-Salem, N.C. | K7NRT Port Angeles, Wash. |
| K4NRQ Roanoke, Va. | K7NRV Astoria, Ore. |
| K5NAK Laurel, Miss. | K8NAF Newark, Ohio |
| K5NAM El Reno, Okla. | K9NAH Lafayette, Ind. |
| K6NAD Brawley, Calif. | K9NRT Valparaiso, Ind. |
| K6NAE Watsonville, Calif. | K0NAS Clayton, Mo. |
| K6NRZ Pasadena, Calif. | |

Navy Day QSO Party

In connection with the annual Navy Day message from the Secretary of the Navy (see facing page), plans for a Navy Day QSO Party are outlined here. It is hoped that this will become an

annual event for all amateurs, both members of the Naval Reserve and others.

Object: For amateurs who are members of the U. S. Naval Reserve to work amateurs who are not members of the Reserve.

Time: Navy Day, 27 October, 1948, starting 6:00 P.M. your local time, ending 3:00 A.M. your local time (28 October, 1948).

General Calls: USNR amateurs will call "CQ ND," non-USNR amateurs will call "CQ NR."

Naval Reserve amateurs operating their own stations will, of course, use their personal amateur call signs. Stations at regularly-authorized Naval Reserve facilities will be recognized by their special USNR amateur call signs, such as W4USN, K3USN, K1NR, K6NRA, K0NAR, KH6NR, KL7NR and all other "K" calls with letter "N" following the digit.

Exchange of Information: In each contact, participants will exchange (1) signal reports and (2) name of state or territory.

Competition: (1) USNR operators compete only with other USNR operators. (2) Non-USNR operators compete only with other non-USNR operators. In cases of stations having more than one operator, separate scores must be submitted for each operator.

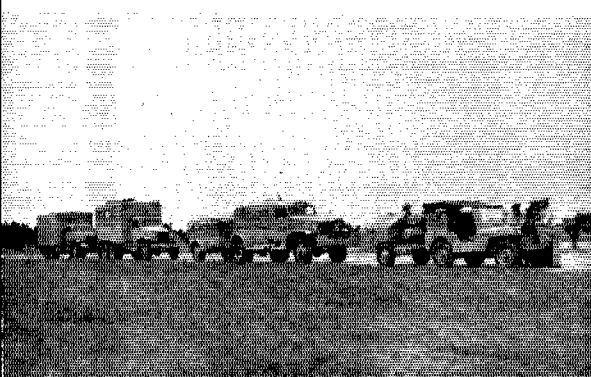
Scoring: Two (2) points for each contact between USNR and non-USNR amateurs. (Same station may be worked for credit once per band; 'phone subbands to be considered as separate bands.) Fifty (50) points for copying Navy Day message in ARRL's Navy Day Receiving Competition, and submitting a copy with contest log. Your total contact points made as above to be multiplied by the sum of number of states worked (D. C. to count as a state) plus the number of U. S. territorial prefixes worked (KH6, KL7, KP4, KV4, etc.), for final score.

Reports: Reports of participation should be mailed to ARRL Hq., and should be postmarked not later than November 6, 1948. Logs should

(Continued on page 108)

As W5USN/5, this Naval Reserve communication equipment made a good account of itself during the recent ARRL Field Day.

QST for



Navy Day Receiving Competition

To Be Held on October 27th

A MESSAGE to radio operators from the Secretary of the Navy will be transmitted on Navy Day, October 27th. In connection with this message ARRL will conduct its twentieth Navy Day Receiving Competition. All amateurs are invited to take part in this activity, which constitutes amateur radio's participation in the celebration of Navy Day.

Two messages will be transmitted, one from Radio Washington (NSS), the other from Radio San Francisco (NPG). These messages will be substantially the same in thought but will vary slightly in wording. A letter of appreciation from the Navy Department will be sent to *every person* who makes perfect copy of the text of one message. Should characters for any reason be transmitted with improper spacing such as from tape-punching errors, words containing such characters will not be counted in the grading of papers. Both messages may be copied, but only the best copy should be submitted in the competition. It is not necessary to copy both stations, and no extra credit is given for so doing. However, if both stations should be copied, please mention the fact when submitting your *best* copy so that the number of operators copying each station may be ascertained. Only the *text* (including any punctuation therein) of each message will count (not the preamble, break signs, and the like). Copy what you hear. Do not guess!

Mail copies for grading to the ARRL Communications Department, West Hartford, Conn. Send your original copies — recopying invites errors. An honor roll of letter winners and all other participants will appear in *QST*. In submitting copy please mention if you are, or have been, a member of the Naval service.

Transmissions will be approximately 25 words per minute and will be preceded by a five-minute CQ call on the following schedule: From Washington: NSS, 9:00 P.M. EST (0200 GCT), simultaneously on 122, 4390, 9425 and 12,630 kc. From San Francisco: NPG, 7:30 P.M. PST (0330 GCT), simultaneously on 115, 4390, 9255 and 12,540 kc.

For the first time, a QSO party will be held in connection with Navy Day. All amateurs are invited to take part. See facing page for complete rules.

SWITCH TO SAFETY!



October 1948

MIDWEST DIVISION CONVENTION

Wichita, Kansas, October 16th-17th

The Wichita Amateur Radio Club is rounding up a top-notch program of entertainment, technical talks, good fellowship and food for the Midwest Division Convention, October 16th and 17th, at the Hotel Broadview in Wichita, Kansas — “the nation's center.”

For those who want to know more about radio, there'll be talks on s.s.s.c. by the League's own staffer, Byron Goodman, W1DX, assistant technical editor of *QST*; one on tuning of beam antennas — a common-sense approach in everyday language by Glen Chambers, W0DJL, a radio engineer you don't have to be a radio engineer to understand; u.h.f.-v.h.f. discussion by Vince Dawson, W0ZJB; and demonstrations and descriptions of portable equipment of best commercial quality, for mobile use. Still other technical features in the making.

For those who like fun with their conventioning the city's yours: movies, special entertainment, a buffet dinner on Saturday night and banquet Sunday, and the grand chance for personal QSOs that comes only during sessions at the nation's midpoint, with hams and their ladies rallying from all parts of the nation. Yes, a special ladies' program, including a style show and bus tours.

C.w. and 'phone round tables, League business meeting, Wouff-Hong initiation at darkest midnight — all these and other features, too! Registration before October 6th, \$6.00. Write the Wichita Amateur Radio Club, P. O. Box 3, Wichita, Kansas, for details.

HAMFEST CALENDAR

MASSACHUSETTS — New England amateurs are invited again this year to the always-popular Boston Hamfest, sponsored by the Eastern Mass. Amateur Radio Assn. and the South Shore Amateur Radio Club. This year's affair — the 11th — will be staged at Mechanics Bldg., Boston, on Saturday, October 9th. The committee is hard at work on what promises to be the best program ever. Registration is \$2.00, banquet \$3.00 extra (Sept. 25th closing date for banquet tickets). For reservations write Treasurer Frank L. Baker, jr., W1ALP, 91 Atlantic Street, North Quincy, Mass.

NEW YORK — The Federation of Long Island Radio Clubs will hold their twelfth Annual Hamfest at Lost Battalion Hall in Elmhurst, L. I., N. Y., on November 18th at 8 P.M. Prize competitions, entertainment, and technical talks by prominent speakers are planned. Tickets are \$1.25 if purchased in advance, \$1.50 at the door, and may be obtained from any of the Federated clubs, from radio stores, or from Secy. Edgar E. Newman, W2RPZ, 214 Munro Boulevard, Valley Stream, L. I., N. Y.

35

Completing the Surplus-Parts Bandswitching Transmitter

Using BC-375 Components in a 7-Band Rig—Part II

BY C. VERNON CHAMBERS,* WIJEQ

IN the first installment of this article, which appeared in the September issue, the construction of the first three units of a 7-band bandswitching transmitter built from BC-375-E parts was described. These units comprised the oscillator-and-control section and the 3.5- and 7-Mc. driver-output units. With this concluding installment we proceed with the building of similar units for the 14-, 21-, 27/28- and 50-Mc. bands.

14-Mc. Unit

The circuit of the 14-Mc. unit is shown in Fig. 4. Aside from values appropriate to the higher frequency, it is essentially the same as that of the 7-Mc. section. The 12A6 doubler receives excitation from the 7-Mc. doubler of Fig. 3 and the output is fed both to the 1625s in the accompanying 14-Mc. output stage and to the 28-Mc. doubler in one of the two succeeding units. The biasing arrangement is similar to that used in the 7-Mc. section.

21-Mc. Section

A 21-Mc. unit is included for use when this band becomes available. The circuit, shown in Fig. 5, and the construction follow the same pattern as that of the preceding units. In this case, however, the 12A6 operates as a frequency tripler which receives its excitation from the driver in the 7-Mc. section. The output connection in this and the higher-frequency units is tapped down on L_1 to prevent overloading of the driver. The entire 14-Mc. unit remains idle for this band, of course. The auxiliary filament switch, S_2 in Fig. 1, is thrown to the 21-Mc. position, while S_3 is in the position shown.

27/28-Mc. Unit

As shown in Fig. 6, one or two minor variations in the standard arrangement were found to result in improved performance in the 28-Mc. unit. RFC_1 has been added in the plate circuit of the 28-Mc. doubler and by-pass condenser C_9 in the amplifier grid circuit. The 12A6 in this section receives its excitation from the 14-Mc. unit, the 21-Mc. section remaining idle. Output is fed either to the 28-Mc. output stage or to a following 50-Mc. doubler. In the case of the former, the additional capacitance of the input of the 50-Mc. doubler reduces appreciably the

drive to the 28-Mc. amplifier and so provision is made in the 50-Mc. section to disconnect the 50-Mc. doubler when the transmitter is operating at 28 Mc. A minor variation in construction is a shortening of leads in the antenna tank circuit by mounting the antenna terminals and L_3 close to the rear of C_3 .

50-Mc. Unit

The last section at the top of the rack is a 50-Mc. unit whose circuit is shown in Fig. 7. Here it was found necessary to depart considerably from the design which served for the lower frequencies. The output stage is limited to a single 1625 because of the increasing effects of tube capacitance. Even with a single tube, it is necessary to use the heavier 6L6 driver to secure adequate excitation. A few other variations in circuit will be noticed, such as the independent biasing system for the 6L6 and the supplementary screen resistor, R_6 , in the amplifier.

The panel layout is identical with that of the other sections and the rear-view photograph of the 50-Mc. unit shows that the construction also follows the general design of the others. A short length of flexible lead, equipped with a banana-plug jack which fits a plug on the 28-Mc. unit, serves as a disconnect when the 50-Mc. unit is idle, as mentioned previously. The ground points of all three subassemblies are tied together with $\frac{3}{8}$ -inch copper strip cut from roofer's-flashing copper sheet.

Coils

Dimensions for the various coils are shown in Table I. The 3.5-Mc. oscillator coil is wound on a Millen 1-inch coil form, while the antenna tank coil, L_3 , for the same band is wound on a section of heavy 3-inch cardboard tubing. The rest of the coils in the transmitter are self-supporting. Those for the 28- and 50-Mc. units are sufficiently rigid without bracing between turns. The lower-frequency coils are first wound on a form of the specified diameter and then removed and soldered to the condenser terminals or fastened to the antenna pillars as the case may be. The unit is then placed so as to bring the coil into a vertical position, and the turns adjusted to make the coil length correct and the spacing uniform. Duco cement applied generously at several points around the circumference of the top turn will run down the coil in straight lines. Repeating this

*Technical Assistant, QST.

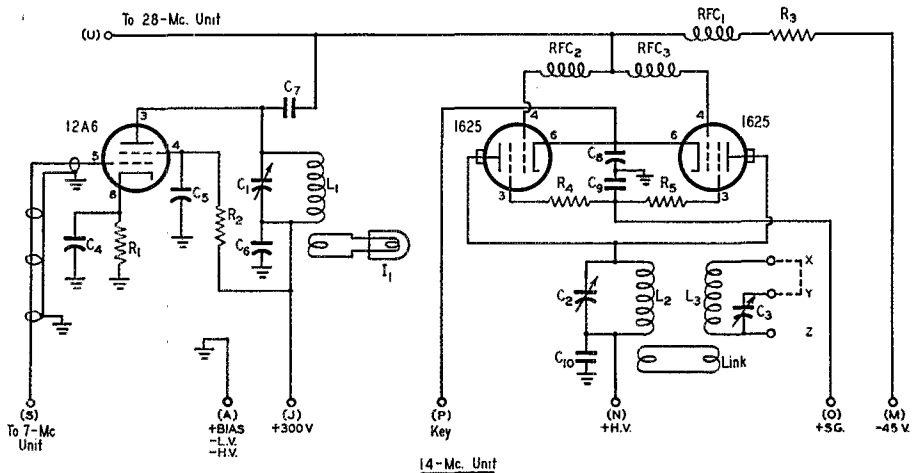


Fig. 4 — Circuit of the 14-Mc. section.

- C₁ — 100- μ fd. variable (Hammarlund APC; surplus CV-188).
- C₂* — 81- μ fd. variable (822 — T7660443P7).
- C₃* — 116- μ fd. variable (722 — T7660443P2).
- C₄, C₅, C₆ — 0.01- μ fd. 400-volt paper.
- C₇* — 90- μ fd. mica (524 — T7761442P15).
- C₈ — 0.01- μ fd. 600-volt paper.
- C₉* — 400- μ fd. mica (2608 — K7872594-6).
- C₁₀* — 0.0035- μ fd. mica (2614 — P7761663P15).

- R₁ — 560 ohms, 1 watt.
- R₂ — 22,000 ohms, 1 watt.
- R₃ — 5600 ohms, $\frac{1}{2}$ watt.
- R₄, R₅ — 68 ohms, $\frac{1}{2}$ watt.
- L₁, L₂, L₃ — See Table I.
- I₁ — 2-volt 60-ma. dial lamp.
- RFC₁* — 0.72-mh. r.f. choke (611).
- RFC₂, RFC₃ — Same as RFC₃, Fig. 2.
- * Found in BC-375-E.

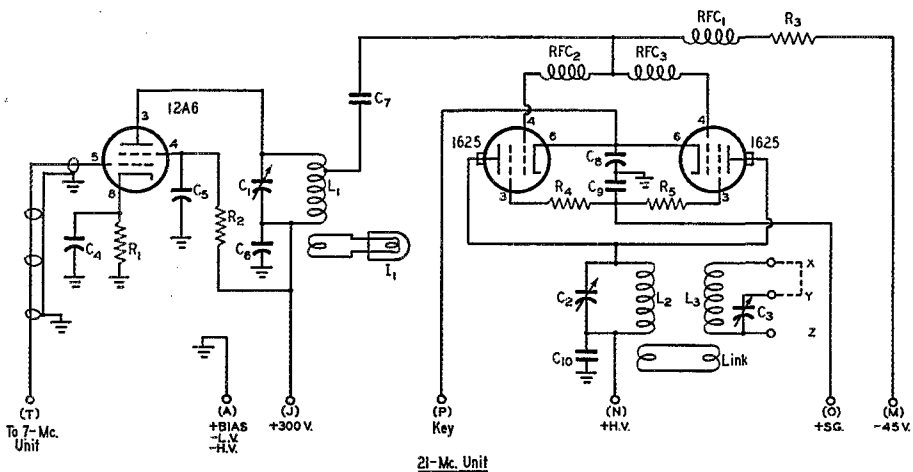


Fig. 5 — Wiring diagram of the 21-Mc. driver-amplifier.

- C₁ — 100- μ fd. variable (Hammarlund APC; surplus CV-188).
- C₂* — 66- μ fd. variable (802 — P7761569P5).
- C₃* — 77- μ fd. variable (607 — P7761569P3).
- C₄, C₅, C₆ — 0.01- μ fd. 400-volt paper.
- C₇* — 90- μ fd. mica (525 — T7761442P15).
- C₈ — 0.01- μ fd. 600-volt paper.
- C₉* — 400- μ fd. mica (509 — P7761663P1).
- C₁₀* — 0.002- μ fd. mica (2618 — P7761663P2).

- R₁ — 560 ohms, 2 watts.
- R₂ — 10,000 ohms, 1 watt.
- R₃ — 5600 ohms, $\frac{1}{2}$ watt.
- R₄, R₅ — 68 ohms, $\frac{1}{2}$ watt.
- L₁, L₂, L₃ — See Table I.
- I₁ — 2-volt 60-ma. dial lamp.
- RFC₁* — 0.7-mh. r.f. choke (704).
- RFC₂, RFC₃ — Same as RFC₃, Fig. 2.
- * Found in BC-375-E.

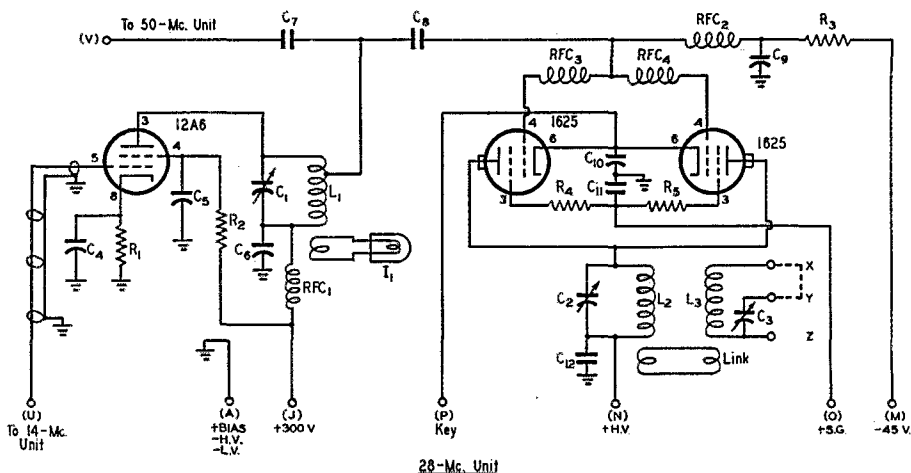


Fig. 6 — Circuit diagram of the 28-Mc. section.

- | | |
|--|---|
| C_1 — 100- μ fd. variable (Hammarlund APC; surplus CV-188). | R_1 — 560 ohms, 2 watts. |
| C_2^* , C_3^* — 26- μ fd. variable (512 & 612 — T7660443P8). | R_2 — 10,000 ohms, 1 watt. |
| C_4 , C_5 , C_6 , C_9 — 0.01- μ fd. 400-volt paper. | R_3 — 5600 ohms, $\frac{1}{2}$ watt. |
| C_7 — 100- μ fd. mica. | R_4 , R_5 — 68 ohms, $\frac{1}{2}$ watt. |
| C_8^* — 50- μ fd. mica (603 — P7761662P2). | L_1 , L_2 , L_3 — See Table I. |
| C_{10} — 0.01- μ fd. 600-volt paper. | I_1 — 2-volt 60-ma. dial lamp. |
| C_{11}^* — 400- μ fd. mica (510 — P7761663P1). | RFC_1^* — 0.365-mh. r.f. choke (804). |
| C_{12}^* — 700- μ fd. mica (2625 — P7761412P18). | RFC_2^* — 0.7-mh. r.f. choke (706). |
| | RFC_3 , RFC_4 — Same as RFC_3 , Fig. 2. |
| | * Found in BC-375-E. |

procedure several times, with an hour or two between each application, results in a surprisingly rigid job. Since the most satisfactory size of the antenna coil, L_3 , in each case will depend to a considerable extent upon the antenna system used with the transmitter, it is advisable not to complete these coils until a test has been made to

make sure that more or less turns are not required.

Power Supply

The wiring diagram of the power supply is shown in Fig. 8. It is made up of two separate supplies on a single chassis, one delivering 300

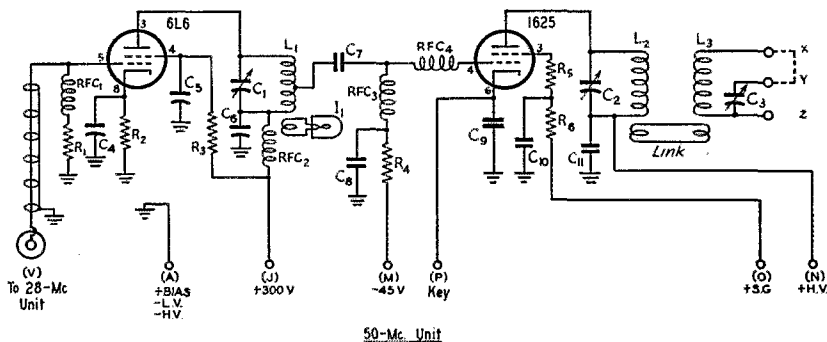
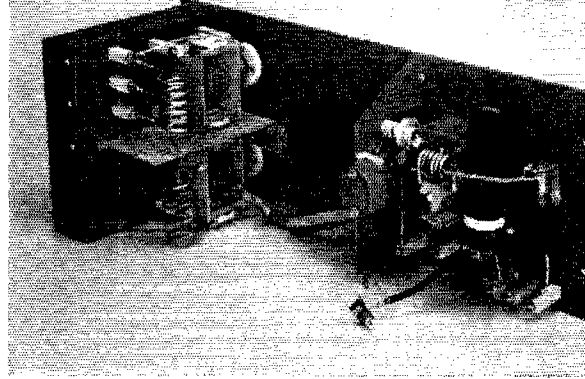


Fig. 7 — 50-Mc. circuit diagram.

- | | |
|--|--|
| C_1 — 100- μ fd. variable (Hammarlund APC; surplus CV-188). | R_2 — 400 ohms, 10 watts. |
| C_2^* , C_3^* — 26- μ fd. variable (707 & 807 — T7660443P8). | R_3 , R_6 — 10,000 ohms, 1 watt. |
| C_4 , C_5 , C_6 — 0.01- μ fd. 400-volt paper. | R_4 — 12,000 ohms, $\frac{1}{2}$ watt. |
| C_7^* — 50- μ fd. mica (623 — P7761442P11). | R_5 — 68 ohms, $\frac{1}{2}$ watt. |
| C_8 , C_9 — 470- μ fd. mica. | L_1 , L_2 , L_3 — See Table I. |
| C_{10}^* — 400- μ fd. mica (610 — P7761663P1). | I_1 — 2-volt 60-ma. dial lamp. |
| C_{11}^* — 500- μ fd. mica (2624 — P7761442P5). | RFC_1^* , RFC_2^* — 0.25-mh. r.f. choke (904 & 906). |
| R_1 — 47,000 ohms, $\frac{1}{2}$ watt. | RFC_3^* — 0.365-mh. r.f. choke (806). |
| | RFC_4^* — Same as RFC_3 , Fig. 2. |
| | * Found in BC-375-E. |

The 50-Mc. unit differs from the others principally in that the driver is a 6L6 and one 1625 is used in the output stage. The jack on the coaxial excitation lead fits a banana plug mounted near the top of the preceding 28-Mc. unit.



volts for the driver tubes and a regulated voltage of 150 for the oscillator, while the other provides either 600 volts for plate-modulated 'phone or 750 volts for c.w. operation of the output stages. Screen voltage for the 1625s is supplied through the common resistor, R_5 (Fig. 1). Since T_3 has a low-voltage bias tap, advantage is taken of it to provide a protective bias of 45 volts. If the transformer has no such tap, a 45-volt battery may be substituted. Voltage for the 12-volt heaters is obtained from a pair of 6.3-volt filament transformers with secondaries in series. If the combination delivers little or no voltage, the connections to one of the secondaries should be reversed. The construction of the power-supply unit is shown in

detail in one of the accompanying photographs.

Assembling the Units

The various units of the transmitter are mounted in a homemade relay rack made of 1 x 2-inch white pine finished black to contrast with the grey panels. If the 1 x 2 stock isn't available, the pieces can be ripped out of a 1-inch board. The base provides room for the power supply which is heavy enough to anchor the rack securely. The r.f. units are arranged in order of increasing frequency from bottom to top.

Connecting the units together is merely a

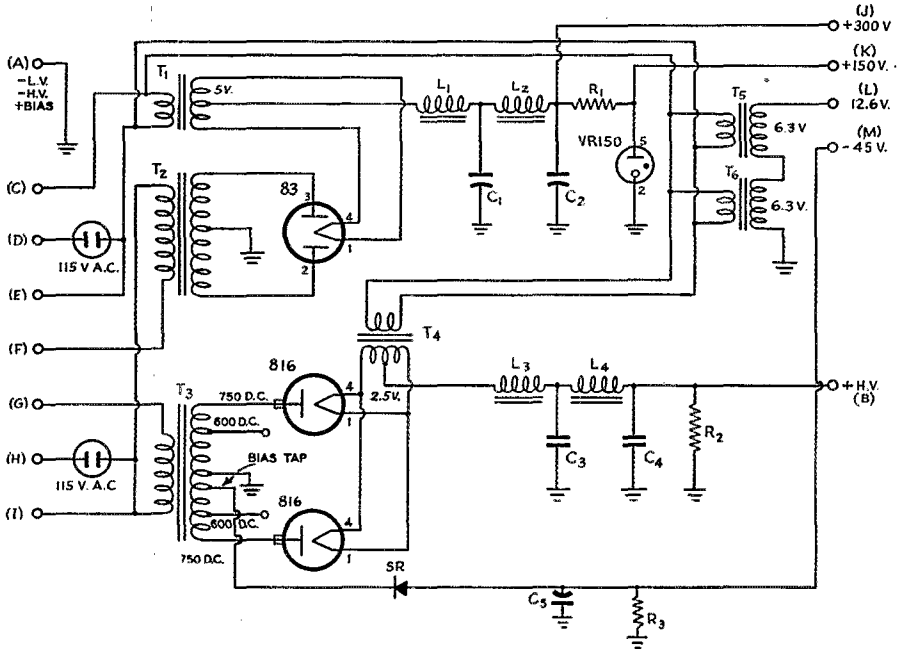


Fig. 8 — Wiring diagram of the power supply for the surplus-parts transmitter.

- C_1, C_2 — 20- μ fd. 500-volt-wkg. electrolytic (C-D WR-20).
- C_3, C_4 — 1-1-1- μ fd. 1200-volt-wkg. paper (G.E. 25F34G2).
- C_5 — 16- μ fd. 150-volt-wkg. electrolytic (C-D BR1615).
- R_1 — 5000 ohms, 5 watts.
- R_2 — 30,000 ohms, 25 watts.
- R_3 — 3300 ohms, 2 watts.
- L_1, L_3 — 4/20-hy. 300-ma. swinging filter choke (Stancor C-1720).
- L_2, L_4 — 8-hy. 300-ma. smoothing filter choke (Stancor C-1722).

- SR — Selenium rectifier, 100 ma. (Federal 403D2625).
- T_1 — 5-volt 3-amp. filament transformer (Stancor P-4088).
- T_2 — 300-volt-d.c. 275-ma. plate transformer (Stancor P-6315).
- T_3 — 750/600-volt-d.c. 300-ma. plate transformer (Stancor P-8043).
- T_4 — 2.5-volt 4-amp. filament transformer (Stancor P-6133).
- T_5, T_6 — 6.3-volt 3-amp. filament transformer (Stancor P-5014).

TABLE I
Coil Dimensions

<i>L</i> ₁				
Band	Turns	Wire	Diam.	Length
3.5 Mc.	30	20 enam.	1"	1"
7 Mc.	16	16 enam.	1"	3/8"
14 Mc.	8	12 enam.	1"	1"
21 Mc.	9*	16 enam.	1 1/2"	3/4"
28 Mc.	7*	16 enam.	1 1/2"	3/4"
50 Mc.	6*	1/8" cpr. tbg.	1 1/2"	1"
<i>L</i> ₂				
3.5 Mc.	16	12 enam.	1 3/4"	2"
7 Mc.	11	12 enam.	1 3/4"	2 1/8"
14 Mc.	7	12 enam.	1 3/4"	1 1/2"
21 Mc.	6	12 enam.	1 1/4"	1"
28 Mc.	6	1/8" cpr. tbg.	1 1/4"	2"
50 Mc.	4	1/8" cpr. tbg.	1"	2"
<i>L</i> ₃				
3.5 Mc.	22	14 enam.	3"	2 3/8"
7 Mc.	15	12 enam.	1 3/4"	2"
14 Mc.	8	12 enam.	1 3/4"	1 1/2"
21 Mc.	7	12 enam.	1 1/4"	1 1/2"
28 Mc.	8	1/8" cpr. tbg.	1 1/4"	1 3/8"
50 Mc.	6	1/8" cpr. tbg.	1"	2"

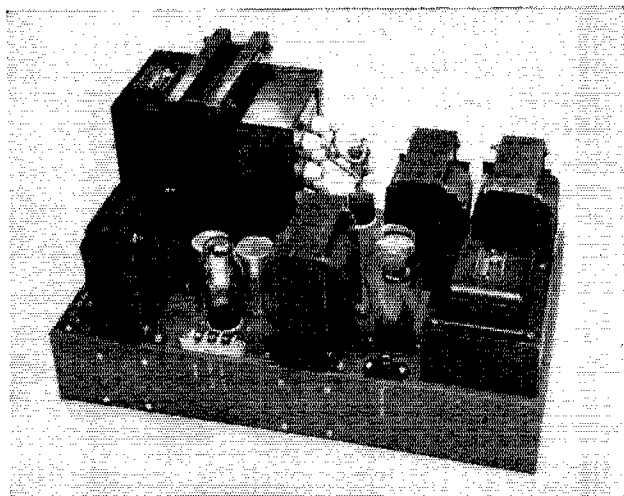
* Tapped: 21 Mc., 6 1/2 turns; 28 Mc., 5 1/2 turns; 50 Mc., 1 1/2 turns from ground end.

matter of tying all similarly-lettered terminals together, excepting, of course, those marked X, Y and Z in the antenna tuners. The common ground connection, A, should be made of copper strip, as shown in the rear-view photograph of the complete transmitter. Ordinary wire was found to be insufficient for proper operation of the 50-Mc. unit. Coaxial cable is preferable for the interstage r.f. excitation connections, especially at frequencies higher than 14 Mc. A neat job results if the power leads are cabled and tucked out of sight along the left-hand rack upright.

Adjustment

After the transmitter is assembled, it should be given a preliminary check-up, particularly to make certain that the filaments of the proper tubes, and no others, come on for each band. *R*₄ (Fig. 1) should be set for proper 6L6 heater voltage. While the transmitter was designed primarily to use crystals in the 3- to 4-Mc. region, those who wish may find it more convenient to use available 6-Mc. crystals than special crystals in the 3-Mc. region for 21- and 50-Mc. work. This means that the 12A6 in the 3.5-Mc. unit, as well as the one in the 7-Mc. section, must work at 6 Mc. While the *L*₁*C*₁ tank in the 3.5-Mc. unit will not tune to 6 Mc., sufficient excitation for the 12A6 in the 7-Mc. section is obtained with *C*₁ (Fig. 2) set at minimum capacitance. The plate dissipation of the 12A6 in the 3.5-Mc. unit is not exceeded in this detuned condition, but the detuning is sufficient to prevent oscillation in the 7-Mc. driver stage.

Aside from the above special case, the tuning of the sections should be straightforward. The oscillator and driver stages can be tuned up experimentally first by turning on the low-voltage supply only and resonating the *L*₁*C*₁ (Continued on page 110)



Front view of the dual power supply for the surplus-parts transmitter. The low-voltage supply components are lined up across the front with the larger high-voltage units at the rear. The filament transformers are underneath the chassis which measures 10 × 17 × 3 inches.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Moan, moan, double moan. We collectively quote a few rare DX-station operators who have been repeatedly run over by W pile-ups on their transmitting frequencies: "Had to QRT for a half hour as have but one crystal and couldn't get through the blankety-blank Ws who were calling me. Nor could I copy any of them because of their all being practically zero-beat."

Unless the calling stations had zeroed themselves to the DX lad or to the bird he was trying to work and/or were calling inopportunately, we fail to see anything DX-Hoggish about this deal. Verily, as long as DX stations continue to respond to calls near their own QRGs these situations cannot help but persist.

It has been ably proven by the gang at VP7NG as well as by others (AC4YN, ZP3AW, et al.) that any DX operator need only use his noodle and assert himself in order to clear his sending frequency. When the pile-up gets out of hand, use of HM, MH, LM and ML should do the job.

It's quite possible that some high-power brothers on our side don't know and don't care to look up the meaning of those signals—they're the characters who still gum up the frequency while the DX tunes elsewhere. If this is the case, said DX station can select a reasonably clear spot in the band for receiving and then break up the party with, for example, CQ DE VP7NG ANS 14120 KC ONLY K. VP7NG might have been transmitting on 14,001 kc. but it would be apparent even to Jeeves that the mob will be sending to thin air unless they head for the designated frequency. Naturally, VP7NG would have to end each QSO by specifying his approximate listening frequency or suffer the consequences of more on-frequency calls.

Obviously, such a procedure has some very good points. For one thing, Johnny-Come-Late-lies will have to tune for DX themselves instead of merely joining the nearest pile-up to find the Juicy One beneath. Then, too, DX can spread the Ws out into parts of bands that they (the DX) cannot use for transmitting (parts of 7 and 3.5 Mc.).

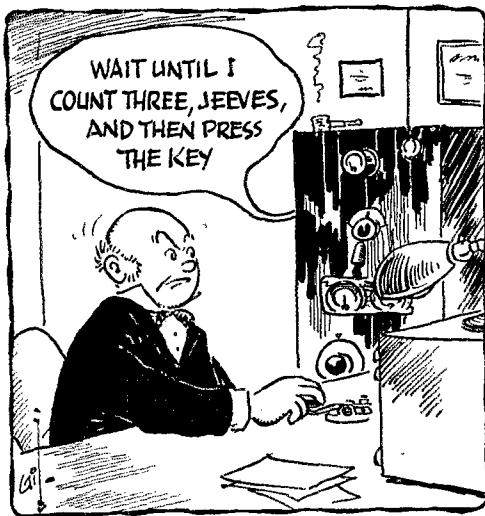
But this is old stuff and has been pointed out many times before. Yet many rare W-trodden DX stations do not seem to realize that it is certainly within their power to make their operating frequencies more tenable. To swap a QSL or not to swap is a fairly large inducement to the taking of a hint by any W!

Now you take a hint, Jeeves, and invert the mail bag right here. . . .

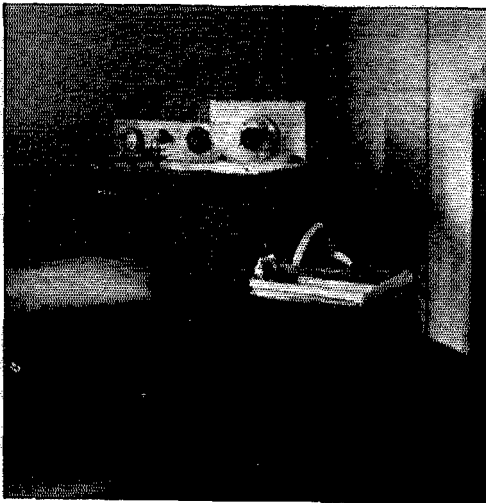
What:

If anyone other than W4BRB is fooling with *eighty* at this writing, they're keeping it a well-guarded secret. Gene is still hung up at number 49 but reports 3.5-Mc. enthusiasm being built up in the persons of VP6PX (3508), VP9D (3501), PZ1FM (3537), YN1AA, ZB1AP, VP5AO, VQ8AY, EL5B and many of the PY and LU boys. If this stuff gives the band a go during the coming season a lot of credit will have to be given W4BRB's missionary efforts.

On *forty*, things are popping a little faster. W7MKW dug up RV2/FO8 (7085), VK9GW (7170), ZLADU, W4DGW/KJ6 and KL7LJ. The latter is just 40 miles from UAØ. . . . At W3CJS we have KH6NZ (7060), KH6OJ (7060), HK3CC (7060), CM6AH (7142), CO6ZE (7060) and some Gs. All right, Jeeves, those Cubans may not be DX to Ws but they're juice for Js. . . . W9YDP accounts for KH6NA (7110), KH6SA (7143) and KP4GO (7098). Another really nice one was KM6AH (7115). . . . F9CH (7050), I1BRO (7025), HB9ET (7020), OK3RR (7030), W1PT/KP4 (7040) and PJØXP (7130) look good in the log of W4MPF. . . . Forty watts gave W2VJN a grip on HB9HQ (7040), ON4AU (7075), HP4Q (7020) while EI9Q and LA6EA were heard.



* DX Editor, QST; 1517 Fargo Ave., Chicago 26, Ill.



The old axiom that "getting out" is 90 per cent skywire and 10 per cent power is certainly supported by the performance of VK3NC. QRP-men take heart! The Lilliputian outfit shown here has pinned down over 100 countries postwar! The rig layout is a 6SK7-6V6 line-up at 4 to 5 watts input and the receiver is the ARRL Handbook 2-tube superhet. Here's the catch: Antennae consist of three Vee beams and a rhombic!

W4IUO likes to stick to *twenty* and here's why: c.w. stuff — CN8AB (14,007), VQ2GW (14,050), PIIL (14,085), OE1AD (14,090), CT3AB (14,220), EA1FC (14,020), 4UN/Rhodes (14,110), VQ8AD (14,110), EK1TF (14,015), UG6WD (14,070), UG6AB (14,090) and OH2OB (14,115); 'phone squeezings — ET3AF (14,325), IS1AYN (14,395), IS1AHK (14,330), KG6CS (14,225), VQ4ERR (14,305), VP3TW (14,290), FASGZ (14,365), TA3FAS (14,110), VK9YY (14,185), J2NZI (14,285) and J2AHA (14,160). 116 at W2GUR feature SL5AB (14,070), J6AAG (14,090), W8WEA/Truk (14,015), ST2KR (14,080), W7KMV/Iwo (14,080), LX1AS (14,025), ZA2AA (14,090), VP3JM (14,005) and VP1AA (14,050). An 807 at KH6PM gobbled up HL1AG (14,065), KB6AD (14,065), UA9KOA (14,070 t8), VP4TR (14,015), VP6CDI (14,015), VRSPL (14,020 t9c), VS7NX (14,065), YV1AZ (14,070), ZD8B (14,020), ZM6AF (14,075) and PK3XIN (14,070). W9AND got a kick out of F9LG/OX (13,990), a French Polar Expedition station. W2QHH enjoyed breezing with ZP3AW (13,995), OE3WX (14,009 t8), ZBIAS (14,020), W4FVI/KX6 (14,035), KG6DI (14,100), YRSI (14,000 t7), UQ2AB (14,115 t8), CN8EM (14,140), GC4LI (14,040), LX1AW (14,050), GD2DF/A (14,085) and HP2X (14,085 t8) and still runs 35 watts! Two members of the Indoor Dipole Club are doing well. W2ALO has 150 and W2HZY reached 175 countries, all postwar. Sheltered wires seem to perk quite well in Jersey! Rhombickish W4BPD uncorked

VQ4KTC (14,070 t8), VQ4MHA (14,135 t7), VQ4SGC (14,065 t8x), VQ5HGE (14,110), VQ5JTW (14,065 t8), XALF/VQ4 (14,095 t8), OY3IGO (14,040 t9), TA1AA (14,000), IIRC/Trieste (14,305f), ET3AB (14,340f), LX2ES (14,140), YU7AF (14,110), ZB1AB (14,010), ZD9AA (14,040 t7), XZ2JB (14,085 t7), SV1VS/MM (14,045 t7), PK5TEST (14,045), VS6AP (14,020), VS7PH (14,070 t8), and C7OK (14,005). Gus had trouble with I5EB (14,050 t5), AP2N (14,130), C9AS (14,115 t8), ZC6NT (14,090 t8), VS7LA (14,105), VS9GT (14,065 t5) and ZS4Z (14,065).

. The new rhombic at W8KPL hangs over a cornfield but it hasn't yet begun to pop. Guess most of the r.f. has been going to CR6AR (14,100), CE4AD (14,040), YS1V (14,030), YS1AE (14,090), CR7BC (14,080), CR7MB (14,030) and CR6AQ (14,060). W1FH concentrated on W6ODD/CR8 (14,040) who not long ago was passing out FIS QSOs. A pair of 136-foot Zepps is doing right by W4JFE: YN1MH (14,080), GC2FZC (14,115), TU2LO (14,040), HL1AE (14,110), J4KLT (14,080), ZB1AJ (14,100), KG6CA (14,135), KG6CU (14,020), FK8AB (14,010), KM6AH (14,018), CT2AB (14,115), ZS3EA (14,040), LBIKB (14,120) and many Russians. W8YGR plunked his 459A on 14 Mc. and collected CN8EO (14,130), VP5RS (14,160) and a bunch of Gs. Some of the voice gang that W4BA has been nailing on the high end are SV0AG, W2EJV/PK3, VP4TV, KX6AF, LX1JW, HP1LC, MB9BA, HR1CE, KH6KH/KB6, HI8WF, EL5B, VP1AP, EA7BA, KA1AI, YN1EP, J9ATT, J9ACN, VP2GG, CT1AY, CT1SX, CT1PM, TG9RJ, CN8BA, ZL1CD, VP6JR, and XAFG in Trieste.

Ten has been pretty dumpty throughout the warm weather but W6EPQ forwards some interesting dope. The man has a rhombic, a Vee and an underground dipole! And checks with certain DX indicate the latter to be superior. (That's what he said!) 'Phone contacts include chats with KW6AJ, W4FVI/KX6, ZL2BN, ZL3JO and a mittful of VKs. On 27 Mc., Keith worked VK2JW with S7 on the submerged skyhook and S8 on the diamond. W8NYG is afraid that too much publicity will ruin *eleven* as a good DX band for him. He's raised a lot of 28-Mc. Gs, D4AVL, D4AVI, OX3GG, MD5KW, EL5A, HR1MB, TI2FG, HH2CW, PY2AC, VP6CDI, ON4MS, PA0MJH, W7JEF/KG6, ZL3LE and scads of others. YV5ABP's letter comments on some unusual skip conditions in Caracas, skip on ten shortening to 70 miles at times.

Where:

A couple may be pipe dreams, but here they are. That TI6MB QTH is for air mail only.

AP4M (via RSGB)
AR1WW (via ARRL)
EA1FC P. O. Box 227, Gijon, Spain
EA3MA P. O. Box 1312, Barcelona, Spain

EP2B (via ARRL)
 F9LG/OX (to home QTH)
 FI8ZZ (via REF)
 HA9BD P. O. Box 185, Budapest, Hungary
 I1BRO Box 13, Como, Italy
 I1ER (via W3CDQ)
 J2UUU Lt. Hanson, 2nd Sig. Co., 2nd Inf. Div.,
 Fort Lewis, Washington

KW6AK/KX6 AACs, Navy 824, FPO, San Francisco,
 Calif.
 KX6AF AACs, Navy 824, FPO, San Francisco,
 Calif.
 KZ5CE 153rd AACs Det., France Field, Canal
 Zone
 OX3UD (via EDR)
 OY1A (via EDR)
 PJ0X (via W8NBK)
 PK3XF Box 400, VERON, Soerabaja, Java
 PK3XIN Box 400, VERON, Soerabaja, Java
 PK5AA Devos, % BPM Radio Stn., Balikpapan,
 Borneo, N. E. I.
 PK500 Box 12, Bandjermasin, Borneo, N. E. I.
 PK5TEST 4VB, Balikpapan, Borneo, N. E. I.
 PZ1NB Box 46, Paramaribo, Surinam
 TA1AA Box 183, Istanbul, Turkey
 TA3FAS (via ARRL)
 TI6MB P. Slipakoff, Contabilidad, Cia. Bananera
 de C/R, Limon, Costa Rica
 TR1P 175th AACs Sqdn., APO 231, % PM, New
 York, N. Y.
 VP3MBC (via ARRL)
 VP4TAW E. W. House, R. 3, 155 Fairland Way,
 Santa Cruz, Calif.
 VP4TY 161 Tragareto Rd., Port-of-Spain, Trinidad
 VQ2MS Box 41, Livingstone, Northern Rhodesia
 VQ4DFP P. O. Box 1313, Nairobi, Kenya
 VQ4SC P. O. Box 4028, Nairobi, Kenya
 VR2BC B. E. Graham Goodger, % Aeradio, Nadi
 Airport, Fiji
 VS7PH F/Lt. H. Pain, No. 53537, Officers Mess,
 Royal Air Force, Negombo, Ceylon
 VS9AL S/Ldr. Luchurst, RAF Hq., British Forces,
 Aden, Middle East

W1AZW (for EA1A) 62 Dexter St., Pittsfield, Mass.
 W7EVR/KL7 Robt. W. Edlund, General Delivery,
 Anchorage, Alaska
 W7KSG/KL7 J. Allen Call, % CAA, via Palmer, Alaska
 XALF/VQ4 Box 3024, Mombasa, Kenya
 XE2LA 655 Calle 2, Tijuana, B. C., Mexico
 YA3A (via LMRLE)
 Y81AE Abraham Nieto Garay, Academia Edison,
 San Salvador, El Salvador
 ZB1AR % APO, Malta
 ZP3AW (via ARRL)
 ZS2MI % GPO, Capetown, Union of South
 Africa

4UN/Rhodes Litz, Radio Station, Rhodes, Mediter-
 ranean

(NOTE: See I.A.R.U. News section of this QST for list of foreign QSL bureaus.)

Hats off to W1s LOP, PEK, TW, TX; W2s CJX, EMW, HAZ, HMJ, ZJ; W3s LTW, NHT; W4s BPD, DPE, IUO, VE; W5DTJ; W6MX; W9s AND, CIA, GDI, TKV; D4AFA; KH6PM.

Field Days are not restricted to the United States, by any means, contrary to the belief of some. In the recent British National Field Day, G5XB pounds brass while G8RS and G5HH look on at the G8RS/P field location. Obviously G5XB is a born contest man — note that left-handed logging while keying with the right!

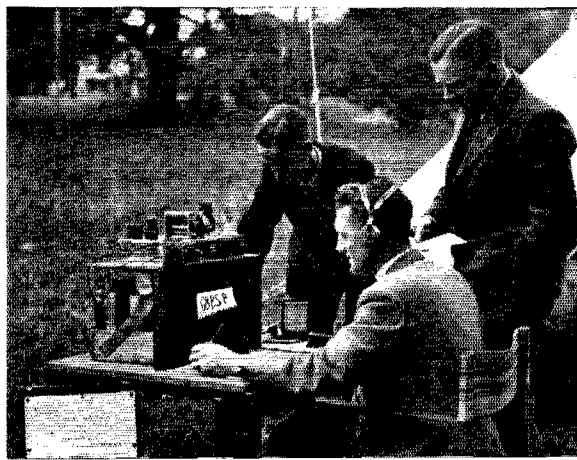
October 1948

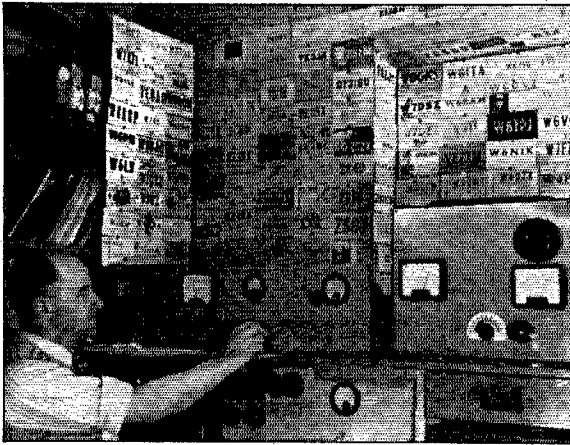


Joao E. do Lago, PY1AJ, needs little introduction to the DX gang. He's been putting out a potent signal on all DX bands, both 'phone and c.w., for years and years.

Tidbits:

Almost precipitating a riot, 4UN/Rhodes sent a single QSL verifying contacts with W4MR, W4GG and W4AIT. Photostats prevented further bloodshed. KG6DG didn't get his transfer to Ponape after all, says W9CIA. Bill also hears that VP9E heads for VS-land shortly. Good news: W6ZCY QSOd AC4YN recently and reports exceedingly good behavior during the scramble! This ZP3AW fellow who has been giving many of us a long-sought-after ZP contact is supposed to come through with cards en masse before long. He's been giving 40, 20 and 10 quite a workout using an 807 final at 70 watts. Miscellaneous antennae have been used but he's planning a set of Vees and rhombics. Hot dog! Operation in the Philippines is a little confused at this time, but KA1ACF hopes for clarified regulations in the near future. Meanwhile, the KAs still carry on. TI6MB intends to QSL 100% whether you want his card or not; now, this is the way things should be run. He's been hot after WAS on 10 and 11 'phone with 35 watts and may have his new beam perking by now. A sad line from CR7BC indicates that the Ws he's been working are mostly a bunch of stinkers — he sends everyone worked a QSL and gets peanuts in return. That card you have from LU1ZA may be just so much wallpaper, gang. Situation is being investigated on a high level pertaining to his qualifying for a





First ticketed in 1938, GW4CX has since made quite a splash on 14 and 28 Mc. Operator T. W. Coplestone is shown in the pilot seat. Transmitter: 6V6, 807 and p.p. PT15s; receiver: BC342 and converter for 28 Mc.; antennae: long wire and 3-element beam. Having worked a thousand Ws since the war, GW4CX nevertheless managed to snare 120 countries.

country under DXCC rule No. 7; LU1 isn't very British, really. . . . Append your country lists as follows, fellows: Mongolia should be changed to Mongolian Republic (Outer) and Marion Island (ZS2) should be added. This latter area is to include Marion Island and Prince Edward Island. Full details will be found in the Operating News section of this *QST*. . . . PK5AR, on Netherlands Timor, is considered part of the Java chain and cannot be counted for a Celebes and Molucca contact. (Portuguese Timor remains a separate country, CR10. Activity in the latter is nil, possibly because of the prefix; the first licensee hasn't yet finished signing his call). . . . TA3FAS and TA1AT still operate in Turkey by the skin of their teeth. Jules, via W1TX, expresses hope that ham radio will be taken care of in new legislation coming up. . . . W8LZK/KP4, formerly NY4CM, is now labeled KP4HU. Despite KP4KD's attempts to snarl him up in a swing-shift at work, Mac is right on Ev's 143-country tail. . . . A letter via W3DPA from FK8AB reveals that the latter will soon augment his 35 watts with an 8JK array. [Null fixed on W9, no doubt. — *Jeeves*] . . . ZE2JO, ex-G2CKM, ex-VQ4MNS, now takes on the moniker VQ2MS. He can be reached via the South African bureau or the listed temporary QTH. . . . The departure of the British from Palestine leaves the following active ZC6 stations: AA, AB, AC, AE, AF, AO, AW, AZ, LA, PR, SM and SQ. Arrangements for a new Israeli prefix are of course being made. . . . Anybody ever hear of General Curtis E. Le May? Well, the commanding general of the USAF in Europe is now D4AFE on A3. Thus states D4AON via W9AND. [And I thought CQ

was supposed to be the general call. — *Jeeves*] Can it, *Jeeves*, now you're getting corny. . . . GW3ZV puts a readable signal into W6BAX's receiver while using just 13 volts at 65 microamperes on the final! The former also has at hand a batch of new cards and will catch up on this detail at once. . . . If you're wondering why everything has been a lot easier to raise lately, here's the "pitch." W4FU has been suntanning his Kentucky hide in the vicinity of Sloppy Joe's, Habana, Republica de Cuba. No, *Jeeves*, he isn't there to line us up with a CM2 schedule, either. . . . WACE is a new piece of sheepskin for all to try for — "Worked All Chilean Districts." W6AM put in for No. 1. That's right, there are seven. (You're wrong, there are *not* ten districts in the U.S.; there are ten call areas. So, there!) . . . VO2CJ had some fun over Field Day as VO2CJ/A and plans greater DX activity in the future. . . . Important: Until further notice, no QSLs should be sent to Greece direct. Hold them or ship via ARRL. . . . As W9FWW, Lew worked OZ7UU on July 8, 1938. This July 8, 1948, W0FWW's CQ was answered by OZ7UU; QSO's just ten years apart almost to the minute! . . . If you heard anyone on A3 shouting a bunch of "Uncles," they were not necessarily throwing in the towel during a pile-up. W0KOE was the culprit, operating under the cognomen J2UUU while in the East. If Howard owes anyone a card they may use the listed QTH. . . . Those Swedish SL prefixes are worn by army amateur stations, according to W2IYO. . . . Always willing to try anything new, W2QHH is experimenting with a case of mumps. . . . Not content with rolling up over 200 postwar countries, G2PL is blue because he cannot get good reports like G2PU, G6XR and G6RH! . . . KL7HI and KL7PJ stump for the use of more commemorative stamps on W QSL cards to further the philatelic cause of DX so interested. . . . One or two DX men are still trying the slimy stunt of coaxing QSLs from rare DX they never worked. Having collected plenty proof of same, we'll just sit back and wait until they apply for awards and then bounce their cards like a rubber ball, the whole 100.

— . . . —
This shoe, from *The DX'er*, the organ of the Northern California DX Club, Inc., should fit a lot of us:

Patient XYL: "Are you ready yet, dear? Dinner is getting cold. . . ."

DX Man: "I wish you would stop nagging me. I told you three times in the last hour that I would be ready in a few minutes."

We suggest longer leads on keys and 'phones.

• Technical Topics —

The Clapp High-Stability Circuit

As a result of our note in August *QST* commenting on the similarity between E. O. Seiler's VFO in the November, 1941, issue¹ and J. K. Clapp's series-tuned oscillator circuit, described in May *QST* of this year,² Mr. Clapp has written us pointing out some rather important differences between the two circuits. Superficially, the two are alike in that the tube is loosely coupled to the tuned circuit and large "swamping" capacitances are connected across the tube elements. If these features completely disposed of the

the 'series' version (Fig. 1B). We are also in the same trouble in using 'butterfly' circuits, which are 'parallel' circuits.

"For a quick review of the differences, consider a tube with coupling capacitances C_3 , C_4 (Fig. 2A). The IRE article shows the equivalent impedance as a negative resistance in series with the net reactance of C_3 and C_4 in series. If a coil of the same reactance, and a resistance slightly less than the negative resistance, are connected to the tube network, a 'high- C ' oscillator results (Fig. 2B).

"If we use a *much* bigger coil, L_1 , in series with a small tuning capacitance, C_2 , of nearly the same reactance as this coil so that the *net* reactance of coil and condenser in series is the same as before (Fig. 2C), we will again obtain oscillations at the same frequency as before. (This is *not* the series-resonant frequency of the coil and tuning capacitance.) In Fig. 3, the dotted curves show the reactances of the coil and tube circuit of Fig. 2B with operation at series resonance. The point A marks the net positive reactance which must be supplied by L_1 and C_2 of Fig. 2C in series, for 'series' operation at the same frequency as before. The increased slope of the net reactance curve through point A is one reason for improved stability.

"Next consider the coil L_1 and capacitance C_1 in parallel (Fig. 4A). The combination acts as an inductance at frequencies below the resonant

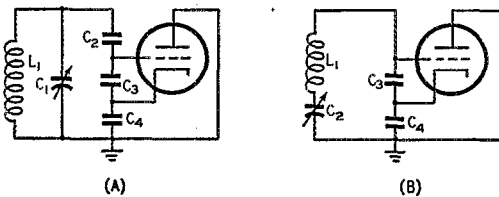


Fig. 1 — The two oscillator circuits discussed in the text. Blocking condensers, etc., are omitted in these simplified circuits, not being essential to the discussion.

stability problem the fact that in the Clapp circuit the tuning condenser is in series with the coil while in the Seiler circuit it is in parallel with it would merely be a question of choice based on convenience. The explanation below, quoted from Mr. Clapp's letter, shows why the way the tuning condenser is connected *does* affect the stability of the oscillator, and thereby makes the series-tuned circuit basically different:

"The resemblance (between the two circuits shown in Fig. 1) lies in the use of large capacitances across the tube. However, the network L_1C_1 in Fig. 1A must be an equivalent inductance and C_2 is the effective *series* tuning capacitance. Because of the circulating current in L_1C_1 the combination will not be as good an inductance as L_1 alone.

"Though not described in the *I.R.E. Proceedings*, I have analyzed and experimented with the 'parallel' version (C_2 omitted in Fig. 1A), particularly with a view to applications at low frequencies. The over-all results are distinctly poorer than with

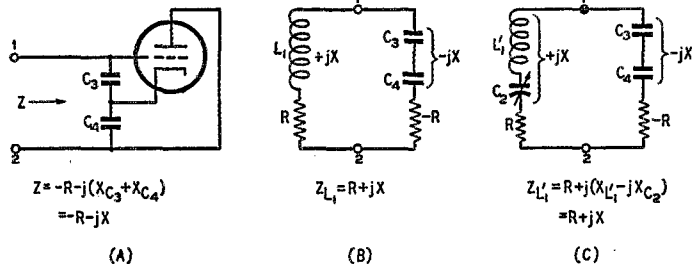


Fig. 2 — The tube and the coupling condensers, C_3 , C_4 (A) are replaced by an impedance consisting of a negative resistance and reactance in series (to the right of the terminals 1, 2, in B and C) for purposes of analysis. B shows the equivalent of a high- C circuit and C the equivalent of the series-tuned circuit.

frequency (Fig. 4B). The effective Q is the effective inductive reactance divided by the effective resistance, and is given by the equation below the figures. (Note that the effective Q is zero when the circuit is parallel resonant at the operating frequency of the oscillator. It is ob-

¹ E. O. Seiler, "A Low- C Electron-Coupled Oscillator."

² "A High-Stability Oscillator Circuit," Tech. Topics.

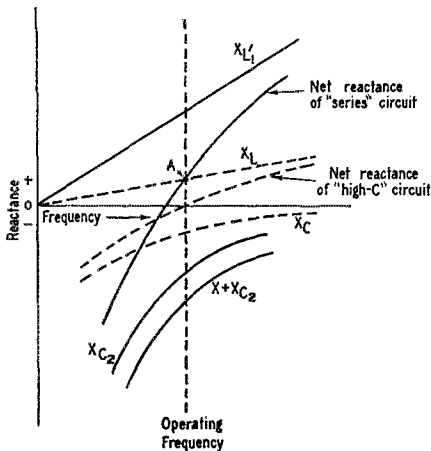


Fig. 3—Operating characteristics of high-C and series-tuned circuits. At the operating frequency, the inductive reactance X_L and capacitance reactance X_C are equal. The dashed curves show how these reactances vary with frequency in a high-C circuit. In the series-tuned circuit (solid curves) the same amount of inductive reactance must be supplied (point A) but is obtained as the difference between the inductive and capacitive reactances of the series-connected coil and condensers. The steeper slope of the net-reactance curve in this case represents an increase in the effective Q ; this improves the stability just as the high Q of a quartz crystal improves the stability of an oscillator in which it is used.

viously impossible to operate the circuit of Fig. 1A at the frequency of L_1C_1 .) The maximum effective Q (Q_0) comes at $\delta = -0.4$, approximately, and the maximum value is a small fraction of $Q_0 = 0.38Q_0$, in fact. The parallel-tuned circuit, operated to act as an equivalent inductance, has at best only one-third the Q_0 of the coil you start with. The nearer you operate to the parallel-resonant frequency the poorer the Q_0 becomes.

“Furthermore, at frequencies much lower than the parallel-resonant frequency the effective series reactance of L_1 and C_1 in parallel is but little more than that of L_1 alone. Thus the only possible benefit that could result from parallel tuning — that is, an effectively larger inductance — is not realized. What reactance is realized is obtained at the cost of spoiling the Q .”

It may throw a little more light on the situation depicted in Fig. 4 to adopt a somewhat different viewpoint than that used by Mr. Clapp. The formulas in Fig. 4 are based on varying the frequency applied to a circuit, L_1C_1 , of specified constants, whereas, in the case of an oscillator operating on a specific frequency, we are more interested in the effect of different values of capacitance at C_1 when L_1C_1 is used in the oscillator circuit of Fig. 1A. In comparing the performance of the circuits at A and B in Fig. 1 there are two cases of particular interest. One is the case where C_2 has the same value (at the

same operating frequency) in both circuits. The other is the case where L_1 has the same inductance value in both circuits (this obviously calls for a lower value of C_2 in Fig. 1A than in Fig. 1B).

In the first case, L_1C_1 must always show the same value of inductive reactance, the inductance of L_1 being adjusted to that end as different values of capacitance are used at C_1 . The circuit action can best be visualized graphically by means of the simple vector diagrams shown in Fig. 5. In A the relationship between voltage and current is shown (on an exaggerated scale) for a coil and resistance in series, without a parallel condenser. Because of the resistance, the current I_L and applied voltage E are not exactly 90 degrees out of phase but have some smaller phase angle a . The resistance is the internal resistance of the coil, and the Q of the coil is equal to $2\pi fL/R$, where f is the operating frequency. The ratio of the distance X to distance Y is equal to the coil Q and determines the phase angle.

When a condenser is added in parallel, as in B, a current I_C flows through it, 90 degrees ahead of the applied voltage. To bring the net reactance back to its former value (and thus meet the conditions for the same operating frequency as outlined above) the inductance must be decreased so that the current I_L through it can increase to the point where the projection of the resultant current, I , on the vertical axis is again equal to the distance X . If we assume that the new smaller coil has the same Q as the original coil, the phase angle of I_L will not change. However, the phase angle between the resultant current, I , and the applied voltage, E , is now smaller and is equal to the angle b . The effective Q of the parallel circuit is equal to X/Y and is

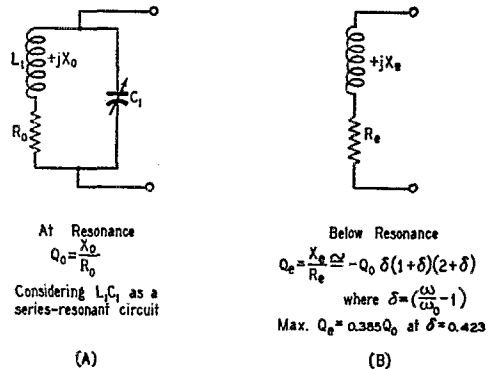


Fig. 4—Behavior of a circuit consisting of a coil and condenser in parallel. When operating below the resonant frequency the circuit shows inductive reactance and resistance, and can be represented by the equivalent series circuit shown at B. The effective Q is always less than that of the coil alone when the Q of the latter is measured at the resonant frequency of the circuit.

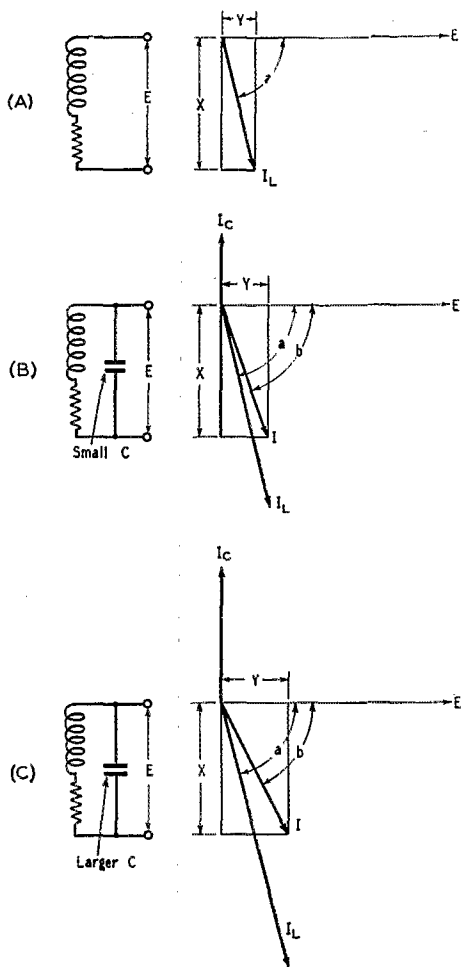


Fig. 5—These vector diagrams show graphically why a condenser in parallel with a coil decreases the effective Q between the terminals indicated. The circulating current causes a shift in the phase angle between applied voltage and line current in a direction that results in an increase in the resistive component of the parallel impedance as C is made larger and L correspondingly smaller. The diagrams are for constant applied frequency and a constant value of the inductive-reactance component of the parallel impedance.

obviously less than before, since Y has increased.

In C the effect of a still larger capacitance is shown. Because of the increase in I_L (which is still assumed to have the same phase angle, α , as before; in other words, the Q of the still smaller coil is the same as the others) the resultant current I is at a still smaller phase angle with respect to E . The ratio X/Y , the effective Q , is therefore smaller. It is not hard to see that the larger the parallel condenser becomes the worse the effect on the over-all Q of the circuit. In addition, it is doubtful if the smaller coils actually would have

as good inherent Q as the larger one. Since the stability of the circuit depends on the steepness of the net-reactance curve shown in Fig. 3 (the slope of this curve in turn is determined by the effective Q) it should be clear that the larger the parallel capacitance the poorer the stability of the oscillator.

In the second case the same coil, L_1 , is to be used in both oscillator circuits. If we assume that the capacitances of C_3 and C_4 , Fig. 1, are sufficiently large to have no material effect on the tuning, the series-tuned circuit simplifies to Fig. 6A. The source of r.f. is inserted in series at X , and the Q of the circuit is equal to the Q of the coil. The equivalent of the circuit of Fig. 1A is shown at B in Fig. 6, under the same assumption with regard to C_3 and C_4 . C_1 plus C_2 in B must be equal to C in A, since the frequency is to remain the same, and the r.f. is inserted between the two condensers as shown. By the argument above, the effective Q of this circuit is less than that of the coil alone, and thus less than that of the circuit of Fig. 6A. Hence the stability is not as good with the parallel condenser as with pure series tuning. Again the reduction in stability depends on how much capacitance is in C_1 , Fig. 6B; the smaller C_1 the better the stability becomes.

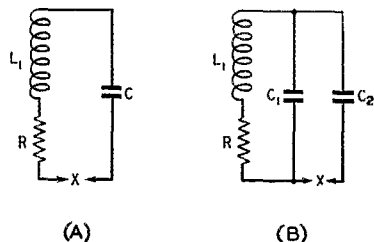
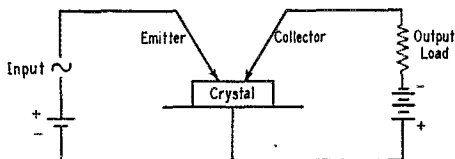


Fig. 6—Simplified diagrams of series- and parallel-tuned circuits having the same value of inductance, L_1 . In B, the sum of C_1 and C_2 is equal to the capacitance of C in A.

In this connection there is another consideration that favors the series-tuned circuit. It was pointed out previously² that the stability of the series-tuned oscillator increases as the L/C ratio is increased. The only limit to the L/C ratio that can be used in a given set-up is the Q of the coil; the higher the Q the higher the L/C ratio at which the circuit can be made to oscillate. Now if the capacitance is split into two parts as in Fig. 6B, the series condenser, C_2 , is necessarily made smaller than C by the amount of capacitance shifted to C_1 . If the circuit of Fig. 6B will oscillate at all under these conditions, it will also oscillate if C_1 is omitted entirely and a larger inductance of the same Q is used at L_1 to restore resonance. The circuit then reverts to Fig. 6A—with a further improvement in stability because of the higher L/C ratio.

The "Transistor" — an Amplifying Crystal

THERE was a time in the early days of radio when the "oscillating crystal" could be catalogued with sky hooks, left-handed monkey wrenches and striped paint, because no one knew how to amplify a signal with a galena, silicon or other crystal. All this is changed by the recent Bell Telephone Laboratories' announcement of the "Transistor," a small germanium-crystal unit that can amplify signals, and hence be made to oscillate.



Housed in a small metal tube less than one inch long and less than a quarter inch in diameter, the Transistor has no filament, no vacuum, and no glass envelope, and is made up only of cold solid substances. Two "catwhisker"-point contacts are made to a surface of the small germanium crystal, spaced approximately 0.002 inch apart.

The Transistor shown is connected as an amplifier in the accompanying sketch. The contact on the input side is called the "emitter" and the output contact is called the "collector" by the Bell Labs. A small positive bias of less than one volt is required on the emitter, and the output circuit consists of a negative bias of 20 to 30 volts and a suitable load. The input impedance is low

(100 ohms or so), and the output impedance runs around 10,000 ohms.

In operation, a small static current flows in both input and output circuit. A small current change in the emitter circuit causes a current change of about the same magnitude in the collector circuit. However, since the collector (output) circuit is a much higher-impedance circuit, a power gain is realized. Measuring this gain shows it to be on the order of 100, or 20 db., up through the television video range (5 Mc. or so). The present upper-frequency limit is said to be around 10 Mc., where transit-time effects limit the operation.

The Bell Labs have demonstrated complete broadcast-range superhet receivers using only Transistors for oscillator and amplifier functions (with a 1N34 second detector and selenium power rectifiers). An audio output of 25 milliwatts was obtained by using two Transistors in a push-pull connection. However, it seems likely that in the near future Transistors will find their maximum application in telephone amplifiers and large-scale computers, although their small size and zero warm-up time may make them very useful in hearing aids and other compact amplifiers.

It doesn't appear that there will be much use made of Transistors in amateur work, unless it is in portable and/or compact audio amplifiers. The noise figure is said to be poor, compared to that obtainable with vacuum tubes, and this fact may limit the usefulness in some amateur applications. These clever little devices are well worth keeping an eye on. — B. G.

Strays

From *I.R.T.S. News*, official organ of the Irish Radio Transmitting Society: "Many American hams have diminutive XYLs . . . microwives."

— — —

High honor has come to a former radio amateur, A. Earl Cullum, jr., of Dallas, Texas. By direction of President Truman, Mr. Cullum has been awarded the Presidential Certificate of Merit for outstanding wartime service as associate director of the Radio Research Laboratory at Harvard University. Well known on the ham bands in the '20s as 5CS, Mr. Cullum presently is head of the Dallas radio-engineering firm bearing his name.

— — —

W1FWH finds one of the popular "magic slates" a handy item for copying c.w. or making temporary notes during a voice QSO.

W0ESU had been having quite an ordeal with one of his neighbors regarding BCI. After seeing that nothing was left undone in trying to correct the difficulty, he comforted himself in the most accessible easy chair in the shack, QST in lap. A sharp rap on the door brought him to attention. Here was his BCI-troubled neighbor again, carrying a package and accompanied by a stranger. "Would you mind turning on your transmitter?" inquired the neighbor. He's brought another BCI complainant, thought ESU, but he good-naturedly agreed to comply with the request. Unwrapping the package, the neighbor produced a small radio and plugged it into the nearest a.c. outlet. He then tuned back and forth frantically on the receiver but could not pick up a trace of ESU's transmitter. Then, with an air of finality and a response that floored ESU, the neighbor turned to the stranger — a radio salesman — and said, "OK, I'll buy it!" — W0ICD



25 Years Ago

this month

"WHITE SILENCE OF ARCTIC BROKEN." Tersely, *QST* for October, 1923, announces to an anxious amateur world the good news that the MacMillan Arctic Expedition — unreported for three weeks — is safe and sound fifty miles from its objective, Flagler Bay. Confronted by the barriers of 22-hour daylight periods and almost continual static, it was only through the patient and skillful operation of R. B. Bourne, 1ANA, that operator Don Mix of the *Bowdoin* was able to get reassuring word through to the States. Now, with the advent of longer Arctic nights, amateurs in all districts can look forward to resumed communication with the hardy party in the Northland.

Crisp October weather heralds the approach of another busy operating season. In the offing are new Trans-Atlantic and Trans-Pacific Tests, our goal this year being two-way work across both waters. Detailed arrangements are being worked out by the League's Operating Department.

In an article aptly entitled "A Real Short-Wave Transmitter," Messrs. Brown, Darne and Basim of 3BWT give us a highly-practical insight into the now-famous 100-meter rig used at their station. The authors enthusiastically proclaim the potentialities of operation "below 200." Further whetting our appetite for technical fare, we have Howard J. Tyzzer's description of a double-modulation system, R. R. Ramsey's discussion of high-range low-current voltmeters, and Department Editor Mason's review of the de luxe c.w. transmitter recently installed at 2XE.

For the information of the membership, the manifold editorial and production problems bearing on the publication of a growing magazine like *QST* are outlined by the Editors. And in the interest of better service to members and public alike, Traffic Manager Schnell has compiled a 12-page up-to-date roster of the League field-organization personnel.

A light-veined offering, "Desert Radio," tells the true story of amateur radio's part in tracking down a criminal. Ludwig Stanley Landmichl is the narrator.

Tribute is paid to a number of prominent amateur stations this issue, including A. P. Daniel's 5ZX, Houston, Texas, S. Woodworth's 8AWP, Syracuse, N. Y., Lynn Wessel's 6BUM, Ukiah, Calif., and 8HJ, Elmira, N. Y.

Strays announces that Treasurer A. A. Herbert has taken up offices at Headquarters, where he will assume both secretarial and administrative duties; also that Canadian General Manager W. C. C. Duncan, Canadian 9AW, has resigned and will be succeeded by A. H. K. Russell, 9AL.

A.R.R.L. QSL BUREAU

FOR the convenience of American and Canadian amateurs, the League maintains a QSL-card distributing system which operates through volunteer district QSL managers in each call area. To secure such foreign cards as may be received for you, send your district manager a stationer's-size No. 10 stamped self-addressed envelope. If you have reason to expect a considerable number of cards, put on an extra stamp so that it has a total of six cents postage. Your own name and address go in the customary place on the face, and your station call should be printed prominently in the upper left-hand corner. If you have held other calls in previous years, submit an envelope for each such call to the proper manager — there are many thousands of uncalled-for cards in the files. All incoming cards are routed by Hq. to the home district of the call shown in the address. Therefore, cards for portable operation in other districts should be obtained from the home-district manager.

W1, K1 — Charles Mellen, W1FH, 320 Cornell St., Boston, Mass.

W2, K2 — Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.

W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.

W4, K4 — Johnny Dortch, W4DDF, 1611 East Cahal Ave., Nashville, Tenn.

W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas.

W6, K6 — Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.

W7, K7 — Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.

W8, K8 — Fred W. Allen, W8GER, 1959 Riverside Drive, Dayton 5, Ohio.

W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.

W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.

VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.

VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.

VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.

VE4 — Len Cuff, VE4LC, 236 Rutland St., St. James, Manitoba.

VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.

VE6 — W. R. Savage, VE6EO, 329 15th St. North, Lethbridge, Alta.

VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.

VE8 — Jack Spall, VE8AS, P. O. Box 268, Whitehorse, Y. T.

KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.

KZ5 — C. Z. A. R. A., Box 407, Balboa, Canal Zone.

KH6 — Andy H. Fuchikami, KH6BA, 2543 Namaau Dr., Honolulu, T. H.

KL7 — J. W. McKinley, KL7CK, Box 1533, Juneau, Alaska.

SWITCH TO SAFETY!



The Eyes Have It

Making S.W.R. Measurements with the Twin-Lamp

BY JOHN W. PADDON,* VE3QV

THOUGH it costs little and is simplicity itself to make, the Twin-lamp¹ is a useful measuring tool. It has the advantage of being rather insensitive to "parallel" feeder currents, the presence of which seriously disturbs the accuracy of measurements taken with the more elaborate bridge-type standing-wave indicators.

Twin-lamp measurements are made by observing the difference in brilliance between the two pilot lamps. Since we cannot take readings from a meter scale it might seem, at first sight, that accuracy would be impossible. However, if the precautions described in this article are taken it is possible to make Twin-lamp measurements with ample accuracy for amateur use.

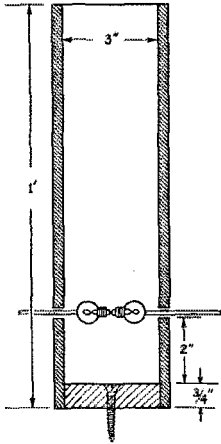


Fig. 1—Cross-sectional view of the mailing-tube visor with the Twin-lamp installed.

Our eyes are bad judges of the brightness of a single light source. On the other hand, our eyes are keen judges of the difference in brilliancy between two or more light sources. The grease-spot photometer, so dear to the heart of physics teachers, makes use of this phenomenon. If we provide our eyes with a standard of brightness we can match it to or compare it with other light sources. However, if our comparisons are to be accurate we must have controlled conditions. All stray light must be excluded and there must be no reflecting surfaces in the vicinity of the lights we are comparing.

*Technical Assistant, QST.

¹Wright, "The Twin-Lamp," QST, October, 1947.

A Twin-Lamp Viewer

To meet these requirements, all we have to do is to take a leaf out of the radar book and make a visor. The materials are universally available and very cheap. The visor can be made out of an ordinary cardboard mailing tube, having an inside diameter of three or more inches. It should be about a foot long. The walls of the tube will exclude the stray light, and if we coat the inside with India ink or a dead-black paint there will be no trouble from reflections.

Fig. 1 shows how the Twin-lamp is supported in the visor. Mark a line around the tube $2\frac{3}{4}$ inches up from the bottom; then take a razor blade or a very sharp knife and cut a slot at each end of a diameter. The slot should be rectangular and just large enough to let us work the ends of the Twin-lamp assembly through from the inside. The pilot lamps are supported by the ribbon which protrudes from either side of the visor.

Fig. 2 shows how the comparator lamp *C* goes in. This lamp should be of the same make and rating as the Twin-lamp bulbs *A* and *B*, and should be located at the same level ($2\frac{3}{4}$ inches) as the Twin-lamp. Make a hole halfway around from one slot to the other, just big enough so that the comparator lamp bulb *C* will be held securely.

There remains only the method of supporting the visor. Cut a circle out of $\frac{3}{4}$ -inch soft wood, making it just the right size so that the visor tube will be a snug fit. The top part of the disk should also be painted dead black to prevent reflections. Mounting is a matter of individual taste and convenience. The disk can be screwed to the wall near the lead-in or fastened down to a heavy baseboard for table-top use.

Calibration

To calibrate the device we will need some carbon-resistor banks. They have to be carbon resistors; wire-wound units are useless because the inductance will ruin our measurements. Small resistors look about the same on the outside, so if there is any doubt whether the resistors on hand are really carbon break one open and inspect the core to make sure.

A single one-watt resistor won't dissipate the power that is necessary to make the Twin-lamp operate at full brilliance. That is why a bank is necessary. The bank is simply a bundle of similar resistors connected in parallel and having a resultant resistance equal to what we want. The number of resistors required goes up with the

power required to operate the Twin-lamp, so it is obviously advantageous to make the Twin-lamp as sensitive as possible. Use the 60-ma. bulbs and make the coupling loop at least four inches long for 28-Mc. operation (proportionately longer on lower frequencies) and five resistors in parallel will suffice if the measurements are made quickly enough so the resistors don't overheat.

If the individual resistors used all have the same resistance value the resultant resistance is simply that value divided by the number of resistors. If we are using a 300-ohm transmission line then five 1500-ohm resistors in parallel will give us 300 ohms with a dissipation of five watts. In connecting up the bank the leads must be kept as short as possible.

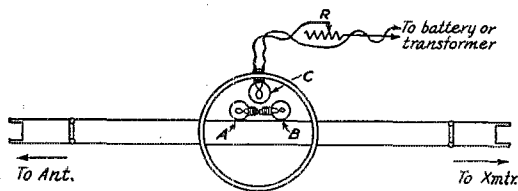


Fig. 2—The comparator lamp is mounted near the Twin-lamp bulbs at the same level. Resistor R may be a 1500- or 2000-ohm wire-wound variable.

Let's start with a 300-ohm resistor bank. Connect the Twin-lamp to the transmitter output and terminate the other end in the 300-ohm resistance. Switch on the transmitter and slowly increase power or pull in the coupling to the final. The lamp bulb nearest the transmitter will light up. Now light the comparator lamp either from batteries or a transformer having the correct operating voltage for the lamp, with the variable resistance R entirely cut out. Vary the transmitter power or coupling until the brightness of the Twin-lamp bulb equals that of the comparator bulb. Now take a squint at the other bulb in the Twin-lamp. There should be no trace of brightness in its filament at all. This is the ideal condition — the one we hope to get eventually with the antenna. The line is terminated in a resistance equal to its own impedance and the s.w.r. is 1-to-1.

Now let's go to the other extreme. Put a short across the Twin-lamp on the side away from the transmitter. As we run up the power or increase the coupling it will be seen that both lamps light with equal brilliancy. This is the worst condition. The line is terminated in a dead short and the s.w.r. approaches infinity.

Within limits, we can look at any s.w.r. we choose simply by hooking the correct value of resistance across the Twin-lamp. If we have a 300-ohm line and a 600-ohm resistor the s.w.r. is 2-to-1. If we have a 75-ohm resistor and a 300-ohm line the s.w.r. is 4-to-1. The s.w.r. is simply the result of dividing the lower figure into the higher.

Useful resistor values will be ones giving ratios of 1-to-1, 2-to-1 and 4-to-1. We can, however, have as many substitution resistors as our ambition dictates.

Let's hook on the antenna and have a look. Peering into the open end of the visor we see that both bulbs in the Twin-lamp are lit but the one nearer the transmitter is brighter. Input to the Twin-lamp is increased until the lamp on the transmitter side matches the comparator lamp. We now adjust R until the comparator lamp matches the output lamp, noting the resistor setting at which the two have the same brightness. At this point we disconnect the antenna and substitute one of the reference resistors, set R to zero resistance so the comparator lamp is again at normal brilliance, and adjust the r.f. input to the Twin-lamp to make the input lamp light to the same brilliancy as the comparator lamp. Then, on returning R to the previously-noted setting, the brightness of the output lamp can be compared with that of the comparator bulb, and thus, indirectly, with that of the output bulb with the antenna connected. If the output lamp is brighter than the comparator lamp, the s.w.r. with the antenna is higher than with the given value of load resistance; if dimmer, the s.w.r. is lower. A recheck with a new value of load will definitely "trap" the actual s.w.r. between two values indicated by the loads. We may find, for instance, that the output lamp is dimmer than the comparator lamp when the test load indicates an s.w.r. of 4-to-1, but is brighter when a test load giving an s.w.r. of 2-to-1 is used. The standing-wave ratio with the antenna connected is therefore between 2-to-1 and 4-to-1. If a closer reading than this is wanted a more finely-graduated set of load resistors may be used, but it is hardly worth while to go to such extremes.

A Twin-lamp sensitive enough to be calibrated on a few 1-watt resistors in parallel is not rugged enough to be left in the circuit when the transmitter is normally coupled to the antenna. For that purpose a second one, using higher-current lamps and a smaller coupling loop, can be used. The visor and comparator lamp won't be necessary since the "high-power" Twin-lamp will be used not for measurement but simply to give the operator assurance that all is well. If the beam motor overruns and tears off the feeders, or if the neighbors cut the antenna down, the Twin-lamp will tell you!

**SWITCH
TO SAFETY!**





The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDO

No new calls to add to the 50-Mc. WAS column, and no new DX records to report on the higher bands — with amateur radio generally weathering a spell of late-summer doldrums, deadline finds little in the way of sensational v.h.f. news. The summer sporadic-E season appears to have run out just about on schedule, around August 15th, after a summer of generally unexciting openings; and a fine aurora opening of about three days' duration early in the month provided a welcome change. On 144 Mc., conditions were generally good almost continually throughout the month, and produced numerous contacts at distances up to 500 miles or more.

The *CRPL J-Series* of radio-propagation forecasts, issued weekly by the Bureau of Standards, and giving an estimate a month in advance of disturbances of the ionosphere-storm type, proved to be reliable warnings of aurora DX openings. Beginning the afternoon of the 8th, aurora effect became pronounced, and 50-Mc. enthusiasts were treated to the best aurora session yet experienced on 6 meters, according to reports received from participants all over the northeastern portion of the country. Conditions peaked during the evening of the 8th, but aurora contacts were made on 50 Mc. for two nights following. A disturbance predicted for Aug. 1st also arrived on schedule, though it was much less widespread than the one mentioned above. A feature of the Aug. 8th opening was the large representation in VE3, contacts with this area being made by the scores of stations throughout W1, 2, 3, 8 and 9.

A recurrence of the Aug. 1st disturbance was just showing up as this material was being prepared, and the chances are good that several more aurora periods may have passed before these pages are made into a *QST*. But even with all this, there were still many operators wasting time during aurora openings by trying to work on voice. Though there are occasional periods during an aurora disturbance when 'phone signals may be readable, anyone who wants to make the most of the unique opportunity afforded by aurora for working otherwise out-of-reach areas should go on c.w. Since aurora QSOs are seldom more than an exchange of reports, why not make them on c.w., the quickest and most reliable way? At

* V.H.F. Editor, *QST*.

NEW 144-MC. HORIZONS Late-August Heat Wave Provides 2-Meter Openings

Two-meter operators who stood by their posts during the extended hot spell in late August were rewarded with several good sessions. Though no new records were set, several areas experienced openings to points not previously worked, new states were racked up, and some "impossible" paths were broken down for the first time.

Beginning August 19th, a series of openings started in the Middle West, sweeping across to the East Coast and leaving a large number of DX contacts in its wake. On the 19th, WØHXY, St. Cloud, Minn., worked W9TKL, Waukegan, and W9BBU, Elgin, Ill., believed to be the first 2-meter work between these two areas, some 400 miles apart. On the night of 22nd, WØJHS, Champlin, Minn., worked W9JVC, La Salle, and W9ZHB, Zeating, Ill., and WØKPQ, Robbinsdale, Minn., worked W9TKL, all these being around the 400-mile mark.

By the 25th it had moved eastward as far as Pittsburgh, and W3RUE was working W9s TKL, GCZ, WFC, JIL, ONO, RHL, BBU, PZS and HGE, the last two being in Wisconsin and very lively the first Pennsylvania-Wisconsin contacts on 144 Mc. The distance: about 500 miles.

All of the above were with horizontal polarization, but vertical got into the act, too. On the night of Aug. 26th the New York and Great Lakes areas were linked, when W8UKS and W8WJC worked scores of New York and New Jersey W2s, and W8UKS worked W1Y0, Milford, Conn. W2RH, Port Chester, N. Y., reported that W8UKS reached a peak of 30 db. over S9 at 3:30 A.M. on the 27th, having first been worked, with an S9 signal, at 11 P.M. W8UKS used vertical, as did all the stations worked. Contacts made by W8WJC were with cross-polarization.

least 80 per cent of all aurora work can be done only on c.w., and under those conditions the fellows who persist in using 'phone only add to the QRM. If your rig is one of those built without any thought for keying, why not take time out now and install a keying system? Most of us on the v.h.f. bands are novices with a key — you'll have no trouble with high-speed operators on 6, and when a station in a new state shows up on aurora you can plug in the key and go after him with the rest!

Random Notes

In this section each month we group interesting tidbits of operating news, details of local activity, helpful suggestions, and miscellaneous reports

received during the past month. The OES reports supply a large part of the material, and the rest comes to us in correspondence and from our hamming on various bands. We do our best to give it geographical balance, but this can only be accomplished if you, the customers, do your part. The best way to get representation for your neighborhood in these pages is to drop the writer a line at regular intervals, including the latest news. Try to make it *news*, rather than a report of something that happened weeks ago. At best, there will be a considerable time lag before dated news can appear in *QST*, but this lag can be kept to a minimum by proper reporting. News of a dated nature should be sent in at once, particularly if it occurs in the middle or latter part of a month. The normal deadline for this department is about the 25th — why not form the habit of sending along the latest dope a few days before that time? Your cooperation will help to secure *QST* mention for your local group, and it will help to make this department more interesting for all concerned.

New York — Amateurs interested in a reliable check on v.h.f. propagation along the Eastern Seaboard have several good markers in the New York-area television stations, suggests W2AOE. Now on the air are WJZ-TV, Channel 7 (sound on 177.75 Mc.), WOR-TV, Channel 9 (sound on 191.75 Mc.), WPIX, Channel 11 (sound on 203.75 Mc.) and WATV, Channel 13 (sound on 215.75 Mc.).

Hardesty, Okla. — Some ground-wave neighbors would help, but even located in a canyon some 30 miles from the nearest other ham, W5LWG has been having a lot of fun on 50 Mc. On his first opening he worked 13 states, adding several more during August. He has heard diathermy, commercial harmonics, and other signals up above 50 Mc. on numerous occasions, when no amateurs were heard, indicating that by no means all of our sporadic-E opportunities are being utilized.

Bergenfield, N. J. — TVI (and just TV) have made inroads into 50-Mc. activity in the region around New York, but W2AMJ and others want it known that there is usually something doing on the band in the late evening hours after most of the TV programs are concluded. And the TVI situation is not necessarily hopeless. Frank re-

ports. He cut down quite a bit of his trouble (that portion of it resulting from harmonic radiation) by the simple expedient of spreading the two halves of his tank coil apart, to reduce capacitive coupling, and then substituting a two-turn coupling coil having a grounded center-tap. Blocking effects in receivers very close to the antenna system have been reduced by series-tuned traps on the TV-receiver input terminals, these being tuned to W2AMJ's frequency, of course.

Calcutta, India — DX note: VE2EV confirms that AC4YN listens and tests regularly on 50 Mc., and adds that "Mr. DX" also has a 522 working on 2 meters, with a beam directed at India. Did we once hear of someone in the U.S.A. complaining that v.h.f. is discouraging because of only a few signals to be heard? VU2LL, Calcutta, VU2FQ in Lucknow, and VU2GB in Bombay are also reported to be doing v.h.f. work.

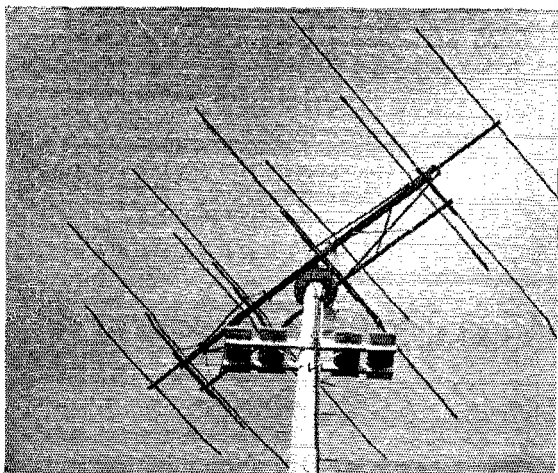
Zurich, Switzerland — Word from HB9J confirms the sad news of the passing, on July 28th, of Enzo Sala, HB9CD, Swiss representative in the 50-Mc. Hall of Fame as the result of his splendid work on 6 as HB8VK. He made the first HB-W 50-Mc. contact, and gladdened the hearts of scores of 6-meter men by making two-way contacts with all U.S. call areas except W6 and W7 during the F_2 DX last November.

Bandoeng, Java — Though amateur transmitting is forbidden for the time being in N.E.I., there is still a certain amount of v.h.f. interest there, according to correspondent Thomassen, who writes of a radio club at a school in Bandoeng, where several members have managed to construct a v.h.f. receiver from the remains of an antiquated receiver designed for other frequencies. During June they twice heard 6-meter signals believed to be American. These fellows work under conditions which would discourage any of us from even making a start, yet they keep at it. Our reporter asks for names of American amateurs with whom they might correspond regarding v.h.f. matters. If any reader has time, and would like to make a fellow-ham happy, why not drop a line (air mail preferred, as surface mail is a 2- to 3-month proposition) to T. Thomassen, Bandoeng, Progostraat 2B, Netherlands East Indies?

(Continued on page 112)

◆
The stacked 6- and 10-meter arrays at W6UXN, Inglewood, Calif.
◆

October 1948





Correspondence From Members-

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

THE AUGUST EDITORIALS

Box 1221, Southern Pines, N. C.

Editor, *QST*:

My congratulations on your common-sense plain-and-understandable editorial, "The Importance of C.W.," in August *QST*. I am certain that you and ARRL will have the backing of all hams who think in regard to these two matters. To me you have explained clearly just what is proposed and the reason for it. . . .

— Calvin H. Burkhead, W4GTH

Mullin Lane, Wilmington, Del.

Editor, *QST*:

Bravo for your August editorial.

— Joseph L. Gillson, W8GAU

98 Beneto St., E. Meadow, L. I.

Editor, *QST*:

. . . The attitude you and your staff take makes me boil. You seem to think that all the forthcoming amateurs are the offenders on the jamming bands and that all of the new men should be pushed up to 50 Mc. You are abolishing something of the old spirit of "hamming." As you know, entirely different circuits are required for the higher frequencies. You appear to me as if this idea is nothing more than an attempt to throw the poorer DX frequencies on the newer man. This principle of segregation never pays off. . . .

— Robert W. Kennedy, K2NRB
ET, USNR

810 W. Orange Ave., S. San Francisco, Calif.

Editor, *QST*:

Congratulations on your August editorial. It's one of your best, and am very pleased to see in print what most thinking amateurs have known for a long time. You hit the nail right on the head. It's too bad we can't do that to some people! Thanks for the job the League has done, and is doing.

— Ken Hughes, W6CTS

1102 State, Guthrie Center, Iowa

Editor, *QST*:

. . . I wish to congratulate heartily the Board of Directors, "B. G." and "K. B. W." for such sound, practical thinking. Every amateur in the United States should be required to read and reread each word of it all. . . .

— Gerald C. Corrigan, W0BBB

319 Churchill Road, North Charleston, S. C.

Editor, *QST*:

More than any one thing that has happened in amateur radio since I can remember, I appreciate your editorials in August *QST*. These items by "B. G." and "K. B. W." will pull more real honest amateurs who have been the backbone of amateur radio back into the fold than anything the League has done in many a year. . . .

— Jamie C. Duncan, W4BIZ

N.F.M.

292 Fairmount Ave., Hyde Park 36, Boston, Mass.

Editor, *QST*:

Since I am credited by *QST* with being the first amateur to work WAC with n.f.m., I am sure you will be interested to learn that I completed my contacts with all states and the District of Columbia on the night of August 10, 1948 — all on ten-meter 'phone, using n.f.m. on all contacts. I have no

a.m. equipment in the shack. My cards will be forwarded in a few days together with my application for the WAS certificate. Had it not been for the long wait I encountered before working Maryland and West Virginia, I would have been eligible for the certificate long ago. To date my record with n.f.m. on ten-meter 'phone is as follows: WAC eight times, WAS, WBE, 64 countries, etc.

When I adopted n.f.m. in December, 1946, I was given to understand by top-flight 'phone men that it was not much good for anything but local rag-chews. Hi! I am aiming for the DXCC with n.f.m. on ten-meter 'phone. Wish me luck!

— A. Hazelton Rice, W1UC

SIMPLICITY VS. HIGH PRICES

Box 67, Owen, Wisc.

Editor, *QST*:

I've been an SWL for quite a few years and very shortly now expect to be a full-fledged amateur. In listening on the upper reaches of the 75-meter band during the past few months, I've heard ARRL being given the business by the big wind of the Middle West, WØ —. Board-meeting minutes have been hashed over, "parliamentary shenanigans" by Headquarters officials thoroughly aired, and endless quotes from letters to and from West Hartford read until the senses reel. All this to the end that ARRL was failing miserably in promoting the general welfare of amateur radio and so on *ad infinitum*. This gentleman and his cohorts are greatly concerned over the alleged short-changing they have experienced in the matter of 'phone frequencies.

Now perhaps these fellows have a case. Not being familiar with organization politics I have formed no opinions on that but for me, the payoff and the impetus that prompted me to write this letter, came as a result of a statement I heard made in a QSO between this fellow and another WØ whose call I missed. In substance this other WØ was asking for "application-for-membership blanks in this new amateur group so tirelessly being promoted by the crusader from the Corn Belt. In the course of the conversation this applicant very disparagingly said, "Any kid can build an oscillator but how about us fellows on the air with thousands of dollars tied up in equipment."

Maybe any kid can build an oscillator. I wouldn't know about that; I'm forty and having a dickens of a time doing that very thing. However, along with thousands of hams and potential hams who can never hope to have all this high-priced equipment but to whom the romance of communication with simple circuits and equipment is a source of never-ending wonder, I can only say that I think ARRL has done a remarkable job in preserving just that for the small fry and the inarticulate.

— J. J. Crowley

S.S.S.C., ETC.

1414 Daytona Drive, Corpus Christi, Texas

Editor, *QST*:

After having patiently waited for two weeks for my July issue of *QST*, I wish to advise you that I have not received same. Of course, if it has the same theme of single-sideband gibberish and your present tactics of trying to shove it down the throats of the ham fraternity, I don't suppose I missed very much; but being more or less of an optimist I have hopes perhaps the next issue will have just standard 2-, 6-, 10-, and 20-meter transmitters, receivers, etc. Why don't you people quit trying to play a god to the hams and

(Continued on page 98)



Hints and Kinks

For the Experimenter



PLATE MODULATING THE 807

IN an attempt to obtain better audio response, the screen resistor in an 807 amplifier was bypassed, as shown in Fig. 1. The result was a very bad low-frequency parasitic that caused splatter and severe BCI. With the aid of a sensitive wavemeter similar to the one described in recent editions of the *Radio Amateur's Handbook*, the trouble-causing circuit was found to be the plate r.f. choke resonating with C_1 , C_2 and C_3 , building up something like the old Colpitts, with the screen acting as the control grid. The parasitic circuit is shown in heavy lines.

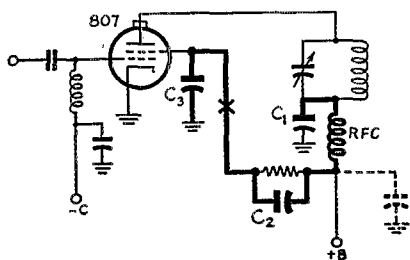


Fig. 1 — A plate-modulated 807 amplifier stage that was troubled with parasitics. The low-frequency parasitic circuit is shown in heavy lines. The method by which the trouble was cured is described in the text.

By-passing the lower end of the plate choke eliminated the parasitic, but the capacity (dotted) had to be so large that it also by-passed enough of the audio to impair speech quality. The final solution was the insertion of a 1000-ohm resistor at the point marked X. — *Harold Bernhardt, OE-341, ex-LY1HB*

CUTTING SHEET ALUMINUM

WHILE I was butchering away on some heavy-gauge aluminum, W8INL suggested that I throw the hack saw out of the window and use a carpenter's crosscut saw. With considerable misgiving, I gave it a try, and discovered that it really does work. Naturally, any carpenter will froth at the mouth at such a ghastly procedure, but what ham uses anything as it should be used? Using the saw on aluminum will not ruin it permanently, although it will probably dull faster than in wood. It does, however, speed up work in aluminum, gives a much straighter cut, and allows a long cut to be made. — *Bill Wildenhein, W8YFB*

TAPPING MINIATURE COILS

IT is always difficult to make a movable tap arrangement for small coils such as the National AR series, where the turns are so close together that almost any of the usual clip arrangements merely short out several adjacent turns.

This problem can be solved easily by using a shortened bobby pin "swiped" from the XYI's dresser. Cut off all but the last "wiggle," clean the enamel off, and solder a flexible lead to the top. This gadget makes a swell movable tap that will fit between the turns of any of the small coils, and will make a good contact without shorting turns. — *Don Geary, VE3BTS*

INDIRECTLY-LIGHTED BEAM INDICATOR

THE attractive beam indicating device shown in Figs. 2 and 3 is both inexpensive and easy to build. A great-circle map, centered on a city near your own, is framed and mounted in front of two 15-watt lamp bulbs. A Selsyn motor, coupled to its mate at the antenna, is mounted between the bulbs, and with its shaft extending through a small hole at the center of the map. A transparent compass card is placed over the map, and the

(Continued on page 128)

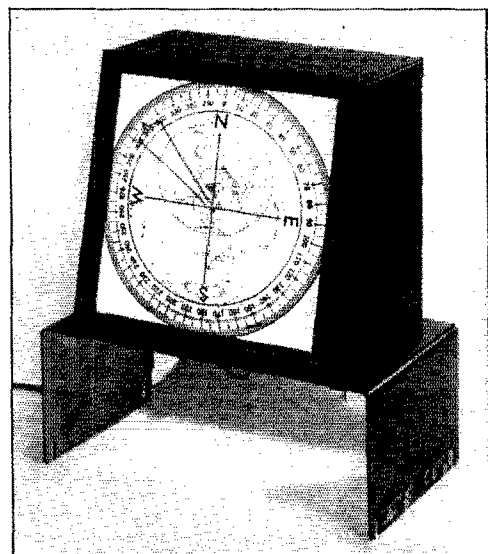


Fig. 2 — An attractive indirectly-lighted beam indicating device.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
J. A. MOSKEY, WJMY, Asst. Comm. Mgr.
ALBERT HAYES, WIHN, Natl. Emerg. Coördinator

GEORGE HART, WINJM, Communications Asst.
A. F. HILL, JR., WIQMI, Communications Asst.
LILLIAN M. SALTER, Communications Asst.

More Suggested Q-Code. Radio amateurs have always, appropriately enough, made good use of international Q-code in all instances where the meanings fitted amateur-service requirements. When ACy actions become effective several new abbreviations will be available for all services in view of modifications in the international Q-code list. VP4TY has written to suggest a wider use by amateurs of certain signals. This paragraph is to invite attention to five signals which we believe might be given general amateur utilization, the first four suggested by VP4TY. All amateurs are requested to make note of all these meanings and after an honest 60-day tryout to advise us which signals are found most useful, or on the other hand, if any are not believed necessary.

- QBT Am I missing dots? You are missing dots.
- QCM Is there a defect in my transmission? There seems to be a defect in your transmission.
- QDE What is causing the present interference? The present interference is being caused by
- QIF What frequency is [station] using? [station] is using [frequency].
- QSK Can you hear me between your signals? I can hear you between my signals

On Honest Reporting. VE4ZX writes to move that action be taken to promote higher technical standards of adjustment and operation within our own bands. Signal effects, he says, may usually be corrected by the application of simple and inexpensive techniques. Clicks, chirps, drifting and modulated signals, and other effects of maladjustment of transmitters ought to have early and thorough attention. The enjoyable season for fall operating is at hand and our signal *must* be of the best if we expect the highest approbation of the stations we work.

All concerned are urged to request and give *honest reports*. Too many amateurs who are in a rush or wish to avoid entering into signal discussions give a flattering report or ignore some of the obvious things wrong with signals, so signal-strength reports or tone reports are *always* dubious in today's amateur radio until certain other tests have been applied. Reports from stations with whom one customarily works a lot and from individually-arranged tests are of course to be relied upon. If the readability and infrequency of requests for repeats justifies, one can assume his signal is good.

DX Courtesy. The DX boys who get the results don't generally accomplish their DXCC by making haphazard calls. Many are the hours they spend in listening and studying the stations that work the DX bands. Some of the techniques may be likened to those of the fisherman who again and again studies the tides and the weather and the conditions of using line and bait, looking to the moment the elusive ones can be landed on the hook. "You have to hear them before you can work them" may be considered trite, but the *principle* of listening first and often is a valid one.

W6PB points out in *The DX'er* that one of the worst things that can happen to spoil DX for ourselves (and the DX, too) is the continual calling which some stations engage in when the DX is busy with another station. It is doubly worse, he says, when the calling station is right on top of the DX. Either the contact is spoiled for the local, or the DX gets fed up and goes off the air. This practice of excessive and unnecessary calling (which merely gums matters up) reminds us of the motorist who tries to drive with his horn but only succeeds in irritating his fellow motorists, without any beneficial results.

Common sense and courtesy should enable all hams to work the DX bands together profitably, and a new CD Operating Aid will shortly invite the attention of our DX workers across the sea to positive measures of control they can exert on these situations.

Emergency Traffic and Contests. SCM Unruh (W0AWP, Kansas) forwards comments from W0YOS, an ORS, who with others assisted so commendably in traffic-handling work attendant upon the Vanport emergency. On the Saturday (June 12th) of FD tests, W0YOS had 55 messages on the hook for many states east of the Mississippi. This operator writes, "The first station I called was W9— which identified itself as a Red Cross-sponsored amateur station in Illinois. When asked to QSP it responded, 'Sorry, no traffic.' Another W9 gave the same answer. Then W2— reported W0YOS RST 599x in N.Y.C. On being asked to QSP 5 messages for that point there came the reply, 'Can't read you, 73.' "

Is *this* the proper amateur spirit? It seems to us that *all* amateurs at *all* times ought to be willing to put aside *all* phases of amateur work whenever any opportunity for rendering service in the amateur tradition appears. As this ORS sees the

situation, the activities ARRL sponsors, and the FD in particular, are to help effect network potentialities for handling *just such situations*. We concur and wish to advise all hams that ARRL activities are in fact just the stepping-stone to the more important responsibilities and opportunities in amateur radio. It is a commentary on human nature that it has proved *necessary* to introduce competitive angles and scoring systems into special operations like the SS, DX fray, and FD in order to get participation and consequent practice in systematic and efficient operating methods. We wonder, however, if all readers of these pages will not agree with us that, in principle, every amateur should bear in mind that the net result of all our efforts is *successful two-way communication*, and that we seek opportunities to demonstrate our value and worth to the nation.

We are happy to say that in practically every such instance of a complaint there have also been amateurs who stepped forward unselfishly and spent many hours in forwarding those first-important official messages and those secondary inquiry and assurance messages that flow so freely after disasters.

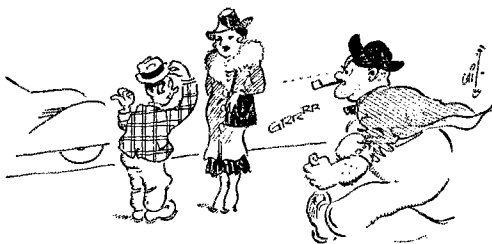
Simulated Emergency Test. The annual test of local emergency plans is about to be touched off by the responsible emergency coördinators in scores of communities. In general the tests all will be made at different times in mid-October. To get in on these tests (and every amateur should subscribe to the principles represented in the ARRL Emergency Corps) one contacts his SCM, SEC, or local EC for Emergency Corps application blanks and gets lined up with the proper local leader (emergency coördinator). He will then be identified by the membership card and advised whenever special emergency tests or activities are contemplated. Don't miss any chance to participate in this interesting organizational work dedicated to plans in the public interest for possible local contingencies.

Invitation To Accept Appointment. You are cordially invited to get the most out of amateur radio by accepting an ARRL appointment. With the coming of the cool fall days all radio signals take on that "zestful" quality. The absence of QRN and the return of vacationers to swell the volume of enjoyable ham activity in progress make operating a pleasure. Your section communications manager will welcome your application for appointments along the line of your natural interest: ORS if you are interested in traffic handling, OPS if you have a top-notch 'phone and will handle communications coming your way in responsible fashion, OBS if your SCM's quota of appointments in this category provides openings and you can guarantee good coverage of Official Bulletins, OES if you work the v.h.f.s and would like to belong to the group working in experimental classifications and swap-

ping data on v.h.f. projects. There are also openings in the leadership categories, and ARRL emergency coördinators will be appointed in communities where vacancies exist or inactive appointees must be replaced. Your SCM will be pleased to receive your monthly activity report whether or not you are now an SCM appointee.

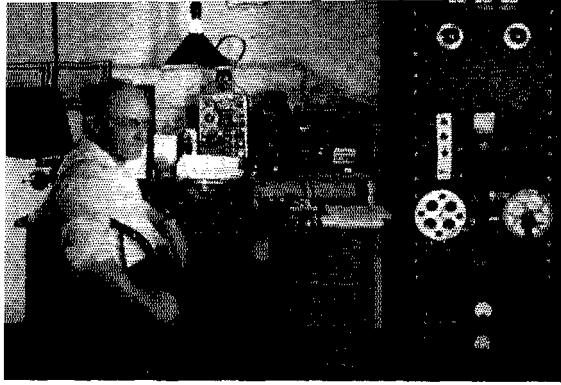
New Operating Booklet. The CD is pleased to announce the availability of the 26th edition of *Operating an Amateur Radio Station*. This 20-page booklet will be sent gratis to members on request, or to others on receipt of 10¢. This publication gives in concise form information on the best operating practice for getting results in amateur radio. It contains data on how to handle and count and report messages, with typical "fixed-text" messages. ARRL operating and fraternal awards are covered, and emergency-communication information summarized. The League's field organization is covered, by divisions and sections, with information on nominations and elections for office. ARRL-SCM appointments such as ORS, OES, OPS, etc., are covered in detail; the cooperative monitoring of ARRL observers explained; important FCC regulations summarized. The book is newly-up-to-date and you will want to have a copy in your station for reference, since there's lots of operating information between its covers. Drop a line to ARRL today for your copy. — F.E.H.

QRV? In a broad sense, some emergencies are predictable. By that we do not mean to imply that Florida is going to be hit by a hurricane during September, or that Iowa and Illinois will be paralyzed under a chilling blanket of ice during January. What we do mean is that it is more than a possibility that both of these events, and others which all of us can bring to mind, will take place during this operating season. Statistically, perhaps we could say that Florida has a



SOME DISASTERS ARE PREDICTABLE

higher "hurricane index" than Michigan, and that Iowa has a higher "blizzard-ice storm index" than Alabama. Those of us who live in regions that have proven in the past to have an appreciable leaning toward one kind of "weather emergency" or another than other regions will do well to perfect our plans for emergency operation during the next few weeks. Remember — *some emergencies are predictable.* — A.E.H.



TRAFFIC TOPICS

W7BLT/7 was set up during the Ferndale (Wash.) Pioneer Days celebration. The operators, W7s BLT, KCZ, MST, KWC, MBY, HDQ and LOQ, combined efforts to handle approximately 160 messages.

Trunk Line Atlantic-Pacific is ready for business again. The trunk covers the same areas as in the past, from coast to coast, and meets Monday through Friday at 9:30 p.m. EST on 3630 kc.

The Kentucky Section is going full blast with three nets in operation. KYP ('phone) Net is active daily at 7:00 a.m. CST on 3955 kc., KYN (c.w.) Net is on 3600 kc. Monday through Friday at 7:00 p.m. CST, and KYE (emergency) Net maintains a daily schedule in the Louisville area on 145.8 Mc. Other Kentucky amateurs who can get on 145.8 are invited to check into the KYE Net.

The N.Y.C.-L.I. Traffic Net has changed its name to NLI Traffic Net. Members operate on 3710 kc., Monday through Friday, at 7:00 p.m. EST.

The Missouri Traffic Net, MON, is active Monday through Friday at 7:00 p.m. CST on 3755 kc. Stations are needed in some parts of Missouri to give complete coverage of the section. Anyone interested contact W0UD or check into the net.

BRASS POUNDERS LEAGUE

(July Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W6FDR	202	364	1120	360	2046
W7CKT	8	44	1390	40	1482
W0HMM	1	18	594	17	630

The following make the BPL with over 100 "deliveries plus extra delivery credits":

W8TRN 158 W6YE 146

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

C. B. Keller, W9BCJ, South Bend, Indiana, ORS and OBS, has a station arranged for convenience in traffic handling and with a pronounced telegraph atmosphere. Note the sounder-type speaker mounting, typewriter well, autokeyer in rack, position of receiver directly above keys, and the old-fashioned lightshade. Probably the only accessory missing is a green eyeshade on OM Keller! W9BCJ is active on QIN Net, an alternate on Trunk Line "L." Rig is a crystal/VFO 6V6-6L6-807 exciter driving a pair of 813s at 1-kw. input and receivers are a BC-348Q and BC-923A.

The West Virginia Net is going great guns on 3770 kc. at 7:30 p.m. EST, Monday through Friday.

W5LUY, W5NWB and W5ONL are forming a "Teen-Age Net, to operate on forty meters. The frequency and time will be announced later. "Teen-agers interested in joining this net should contact W5LUY for details.

The Southern Border Net has been doing a nice job during the summer season. They are now looking for new members in Arizona, New Mexico and Texas. Contact W6BGF if interested.

WITH THE A.E.C.

The N.Y.C.-L.I. Section is presently revamping its AEC set-up by appointing ECs for each community in lieu of the "one-EC-per-county" arrangement which has been used since the post-war reopening. It is anticipated that the new arrangement will increase the efficiency of the section organization which, under SEC W2BGO, has become one of the finest in the country. Tune your receiver to 3600 kc. around 8:00 o'clock almost any evening and hear the boys at work.

The National Emergency Section (c.w. section — 3550 kc. and 7100 kc.; 'phone section — 3875 kc.) is now open for business. Manned by some of the best operators in the country, this net will monitor the above frequencies during periods of communications emergency in any part of the country in order to expedite the handling of third-party personal-inquiry traffic. It is planned that 3550, 7100 and 3875 kc. will be used strictly as "calling frequencies" — similar to the commercial use of 500 kc. — and that they will be kept reasonably clear for calls from amateurs desiring to move inquiry traffic.

Are you ready for the October Simulated Emergency Test? Contact your EC at once.

The ARRL emergency manual, *Emergency Communications*, which has heretofore been available in mimeographed form, has been revised and "dressed up," and is now a full-fledged printed booklet of sixteen pages. If you'd like one send a dime to the ARRL Communications Department — or join the AEC and get one free! (Your EC or SCM will be pleased to sign you up.)

PRIZE-ARTICLE CONTEST

• The article by A. W. Smith, W2AFJ, wins a prize in the CD Article Contest.

You are invited to submit entries in this contest. The author of each article used is awarded a \$10 prize, consisting of \$5 in U. S. Savings Stamps and \$5 in ARRL supplies or publications (except QST). Contributions may be on any subject of interest to amateur radio operators. Articles are selected on originality and value to the fraternity.

Give this contest a try. You may wish to write on Emergency Corps planning work and drills; 'phone or c.w. operating procedures; work on radio-club committees; organizing or running a club; the most interesting band for you; code-proficiency techniques; DX activities; traffic work; getting the most out of ham radio; or some subject we haven't mentioned. You are not limited; make your contribution on any topic of interest to radio amateurs. Please mark your contribution "For the CD Contest."

" . . . RADIOGRAM FER YA, MISTER"

By A. W. Smith,* W2AFJ

An anonymous W5 gave us a lot of sound advice on amateur public relations in March QST. Nothing was said, however, about the relatively unrealized potential that is represented in the rapid and accurate handling of personal messages.

Now, it isn't suggested that each active amateur set himself up as a little WU — most of us haven't room enough for the gals and the office cats anyway — but we could all assist in the development of genuine public interest and understanding by the efficient handling of a moderate amount of traffic. Mighty few people are known to have slammed the door in the face of a telegraph messenger, and that fact isn't entirely because of the knowledge that the little piece of paper he presents is more likely than not already paid for!

Not all of us have the time, the equipment or the operating skill to make BPL, and it is probable that traffic handling, as such, is the primary interest of a relatively small percentage of the operating fraternity. But suppose that we each set a monthly target — something conservative, such as 10 messages originated and/or relayed. If the traffic is handled carefully and expeditiously, that means that a minimum of 20 members of our expectant public will have it borne upon them that maybe these amateurs do something besides create BCI and TVI, after all.

Almost anything that's free looks too good to be true these days, but the very fact that a form of service is offered, and for free, seems invariably to arouse the interest of any friend or neighbor who is approached on the subject. If our hypothetical budget of 10 messages is now applied to a conservative estimate of 15,000 active stations (and I hope that is conservative), it is readily apparent that we have a tremendous and favorable potential at our disposal.

* 218 Christopher St., Montclair, N.J.

Believe me, it is a lot easier to enlist the support of a man to whom you delivered (*delivered*, that is) a message from dear old Aunt Eliza than it is to get backing from one whose sole acquaintance with amateur radio has sprung from over-hearing some 'phone discussion on the physical attributes of "Tessie who jerks sodas at the Spa," accompanied by allegedly humorous remarks that were old when the coherer was new. And we are slightly less than quite bright if we don't peer into the future far enough to realize that one day we may be mighty glad to be able to enlist a lusty public voice in our behalf. Even if we are threatened by no immediate limitation upon our activities, it's just horsensense that the more people think well of us now, the better off we will be, individually and as a group, now and in the future.

Read the section of the *Handbook* relating to message handling. Just to save you time, in the 25th edition it begins at page 523. The necessary records are simple to keep, but they are important. Equally important is the firm resolution that traffic will be moved through your station promptly, and with complete accuracy.

You may be surprised to find that handling messages is far from being a chore. There are, of course, a few die-hard amateurs who think the whole scheme is a naive one, and who will not be reluctant to advise you that they will not sully their watts with it. (This is the type that drinks beer, not because of a preference, but on the theory that the kinetic component of carbonation may operate to reduce the net effort of swallowing.) And there are some whose operating time is so limited that they have a legitimate excuse for avoiding responsibility for traffic. But in general, you will discover that this type of work improves operating ability and yields tangible returns in good will, as well as providing occasional worth-while DX opportunities.

Set up a traffic budget for the next month, or for the next week, if the XYL hasn't tagged you for unfinished business around the house. The degree to which your estimate is met by actual performance will provide an interesting check on just how well you guessed your operating ability and the effectiveness of your signal in getting through the bedlam.

And the next time the Little Woman tries to drag you out to a lecture on "Voyaging the Gowanus Canal" you can stop her cold with, "Sorry, dear. I gotta go up to the shack and balance my budget!"

BRIEF

The Pittsfield Radio Club supplied radio communication for the Stanley Club Field Day in June. The service was used for the starting of canoe races at remote parts of Pontoosuc Lake, Mass. W1s BKG, AZW, EZT, DPY and W9APY took part in the event.

CODE-PROFICIENCY PROGRAM

Have you received an ARRL Code Proficiency Certificate yet? Once each month special transmissions are made to enable you to qualify for the award. The next such qualifying run will be made on October 18th at 10:00 p.m. EST. Identical texts will be sent simultaneously by automatic transmitters from W1AW, W6WOP and W0CO. Frequencies of transmission from W1AW will be 3555, 7215, 14,150, 28,060, 52,000 and 146,000 kc., from W6WOP 7248 kc., from W0CO 3534, 7053 and 14,040 kc. Send your copies of the qualifying run to ARRL for grading, stating the call of the station you copied. If you qualify, 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 W1AW each evening, Monday through Friday, at 10:00 p.m. EST. Take advantage of these transmissions to increase your code proficiency. References to texts used on several of the practice transmissions are given below. These make it possible to check your own copy. To get sending practice hook up your own key and buzzer and attempt to send in step with W1AW.

Date Subject of Practice Text from August QST.
 Oct. 5th: 807s in Push-Pull, p. 11
 Oct. 8th: A Super-Selective C. W. Receiver, p. 16
 Oct. 11th: The "Hammock" Beam, p. 21
 Oct. 14th: The Dash Master, p. 24
 Oct. 18th: Qualifying Run, 10:00 p.m. EST
 Oct. 20th: High Power on 220 Mc., p. 32
 Oct. 22nd: The Man Before Marconi, p. 42
 Oct. 26th: The World Above 50 Mc., p. 48
 Oct. 28th: I Married a Hobby, p. 52

A.R.R.L. ACTIVITIES CALENDAR

Oct. 16th-17th: Simulated Emergency Test.
 Oct. 18th: CP Qualifying Run
 Oct. 23rd-24th: CD QSO Party
 Nov. 13th-14th, 20th-21st: Sweepstakes Contest
 Nov. 17th: CP Qualifying Run
 Dec. 17th: CP Qualifying Run
 Jan. 13th: CP Qualifying Run
 Jan. 15th: V.H.F. Sweepstakes
 Jan. 22nd-23rd: ARRL Member Party
 Feb. 11th-14th: DX Competition (c.w.)
 Feb. 15th: CP Qualifying Run
 Feb. 18th-21st: DX Competition ('phone)
 Mar. 11th-14th: DX Competition (c.w.)
 Mar. 16th: CP Qualifying Run
 Mar. 18th-21st: DX Competition ('phone)

— . . . —

Jan. 1st-Dec. 31st: Most-States V.H.F. Contest
 First Saturday night each month: ARRL Officials Nite (get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

ELECTION NOTICE

(To all ARRL Members residing in the Sections listed below:)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be 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:

Communications Manager, ARRL [Place and date]
 38 La Salle Road, West Hartford, Conn.
 We, the undersigned full members of the.....
 ARRL Section of the.....
 Division, hereby nominate.....
 as candidate for Section Communications Manager for this
 Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Kansas	Oct. 15, 1948	Alvin B. Unruh	Oct. 29, 1948
Sacramento Valley	Nov. 1, 1948	John R. Kinney	Deceased
Philippines	Nov. 15, 1948	George L. Rickard	Oct. 15, 1948
Oregon	Nov. 15, 1948	Raleigh A. Munkres	Nov. 22, 1948
South Carolina	Nov. 15, 1948	Ted Ferguson	Dec. 2, 1948
San Diego	Dec. 1, 1948	Irvin L. Emig	Dec. 16, 1948

In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Nevada	N. Arthur Sowle, W7CX	June 15, 1948
Ontario	Thomas Hunter, jr., VE3CP	June 15, 1948
Manitoba	A. W. Morley, VE4AM	June 15, 1948

In the Northern New Jersey Section of the Hudson Division, Mr. Thomas J. Lydon, W2ANW, and Mr. Thomas J. Ryan, jr., W2NKD, were nominated. Mr. Lydon received 290 votes and Mr. Ryan received 121 votes. Mr. Lydon's term of office began July 26, 1948.

In the North Carolina Section of the Roanoke Division, Mr. W. J. Wortman, W4CYB, and Mr. R. Lynn Smith, W4HEH, were nominated. Mr. Wortman received 105 votes and Mr. Smith received 82 votes. Mr. Wortman's term of office began July 26, 1948.

MEET THE SCMs

Arthur W. Morley, VE4AM, ex-VE4AAW, recently elected for another two-year term, is one of our older SCMs in years of service, having held that post in Manitoba since 1939.

A radio amateur since April 1, 1936, Morley's interests in the ham game have been varied. Aside from holding appointment as ORS and RM, he engages in CD Parties, LO-Nites, ARRL Member Parties, and Sweepstakes, and was top c.w. man in his section in the 1947 SS. Manager of TL "I," of which he has been an active member since 1937, he is largely responsible for the success of this all-Canada trunk line. He possesses WAS, Rag Chewers Club, and 25-w.p.m. Code Proficiency certificates. He is a member of the Air Force Amateur Radio System and former secretary and treasurer of the prewar Short Wave Experimenters Club. An AEC member, Art assisted in the recent Emerson emergency.



BC-457A and BC-459A rigs, plus a homebuilt job with 807 crystal driving p.p. T20s at about 100 watts and Class AB₂ 807s modulator, comprise the transmitters. Receivers are a revamped GE K80 and FB7X with two-stage preselector. Antennas are a 40-meter Zepp and a 20-meter folded dipole. For emergency, the BC-457A and BC-459A with genemotor have been used. All equipment at VE4AM is located in the living room with the full consent of the XYL, VE4JM, whom he met via the air waves while she was VE4JY.

VE4AM's one-and-only hobby is amateur radio; favorite sport: chasing his two youngsters out of the peas in the garden. During the war he was attached to the RCAF as code examiner. His occupation is fire clerk with the Commercial Union Assurance Company, Ltd.

TRAINING AIDS

Damage. Some of the Training Aids are beginning to show the effects of wear and tear, of rough usage in shipping and in the hands of some club groups. At least one Training Aid has had to be withdrawn from circulation, and more will follow if the present rate of depreciation continues.

Most of them are less than a year old, have been used by not more than half a dozen clubs. Coöperation by clubs in returning and/or forwarding has been excellent, but some are prone to shirk their duties as to handling and packaging. We take care to see that all Training Aids are in good shape when they leave here. If they are damaged when they reach you, we want to know about it. *Using clubs should take similar*

pains to make sure that there is no damage inflicted either while the material is in their hands or on its way back to Headquarters or the next user. If you shirk this responsibility, your Training Aids will not last long.

BRIEFS

In November, 1947, *QST* we reported the twice-daily schedules of W1DQ and G6BY on 14-Mc. 'phone which had been going on for several years and had proven more than 90% successful. The boys are still hard at it and have already celebrated their 1000th contact, without a single miss, in the postwar period!

— . . . —
The Canadian Amateur Radio Operators' Association, which issues the "Worked All VE Award," asks us to point out that some applicants are misinterpreting the rules. A total of 18 confirmations, *two* from each Canadian province, is required. The provinces are: Prince Edward Island, New Brunswick, Ontario, Quebec, Nova Scotia, Alberta, Manitoba, Saskatchewan, British Columbia. See January *QST* for complete rules.

POUGHKEEPSIE REGATTA

Members of the Mid-Hudson Amateur Radio Club participated in a net designed to furnish complete coverage of the Poughkeepsie Regatta on June 22, 1948.

The local organization maintained communications between the following points: referee's boat (following racing shells downstream), press boat (likewise following racers downstream), judge's boat at the finish line of the races, and a press booth situated on the west shore at the finish line. Receivers were in operation on the Mid-Hudson Bridge to receive information from various other points.

Club members who took part in this net were W2LDS and Don Cooté on the referee's boat; W2CGT and Ed Prichard were on the judge's boat; W2AGZ and W2KGU handled the set-up on the press boat; while W2IXK and W2NCI did the honors at the press booth. W2PCT, W2EHS and W2VAI operated the receivers on the bridge.

Ten-meter 'phone was used at all points, and was reliable throughout the entire race. So successful was the enterprise, in fact, that the club received a letter from Mr. Asa Bushnell, one of the officials of the Rowing Association, commending it for the efficiency with which the operation was conducted.

Early in the day the hams were instrumental in setting up the finish line. They acted as liaison among the surveyors who laid out the course.

This is the first time the local gang has taken part in the regatta since 1941 and, as seen from the above description, the operation was more than successful. Plans have already been made for even better coverage of the affair next year.

— Secy. R. H. Ward, W2TDT

JULY CD QSO PARTY

The July CD QSO Party provided ARRL appointees and officials with plenty of operating fun and competition. For the second time since postwar activity was resumed, top scoring honors went to the West Coast. W6WNI chalked up 548,960 points to lead all other participants, proving once more that the boys west of the Rockies can lick the rest of the country! You will recall that W3DGM, operating W6RBQ, demonstrated that fact in the April '47 party. Contest master W4KFC turned in a score in the half-meg bracket to place a close second. Another Virginian, W4IA, took the third position easily.

Another regular CD Party is scheduled for October 23rd-24th. Any holder of an ARRL appointment or office will be eligible to take part. If you're sincerely interested in organized operating activities, look over the list of ARRL appointments described in the booklet *Operating an Amateur Radio Station* (free upon request to League members) or the *Handbook* and see which suits your special interest and capabilities. Then write to your SCM or League headquarters for complete information on how to qualify for the appointment of your choosing. Get ready for the busy 1948-49 operating season now!

W1CRW	206,040	202	158	46
W3ADE	197,010	193	151	47
W9NH	187,060	193	141	47
W1JTD	183,360	185	150	42
W1AQE	179,490	186	145	48
W7CZY	174,290	128	99	46
W9JRI	172,260	174	149	49
W3LIW	169,990	191	142	36
W8YDR	162,900	181	132	48
W6VAQ	161,980	123	98	42
W4KVM	161,070	171	135	47
W8FFK	159,000	153	153	50
W8BES	145,116	116	93	46
W2OBU	144,300	150	150	35
W9UKT	141,075	159	124	47
W3AIZ	141,040	158	128	44
W1EOB	140,515	157	134	45
W8WXA	136,880	164	118	43
VE7AEU	133,330	105	92	42
W1LHE	131,200	154	121	43
W2QBS	123,670	160	116	33
W2DRV	122,225	153	121	34
VE3AWE	118,335	147	120	41
W1PHW	114,380	106	99	34
W9N1Y	111,600	138	116	39
W2URX	107,210	136	111	40

Others with scores over 75,000: W7JQU 98,716, W9QLW 96,640, VE7SW 96,163, W0IC 95,760, W6LUY 94,500, W3DZ 91,080, W4MVJ 90,405, W7UOM 90,387, W2IOP 92,710, W1QMI 89,060, W1QMJ 88,750, W9TAL 88,200, W7LPA 87,515, W8TAQ 85,100, W1NXX 82,885, VE1EK 79,060, W1JE 75,640.

HANDLING THIRD-PARTY TRAFFIC

It is a common belief among non-traffic-handling amateurs that the amateur service is permitted, in normal times, to handle only unimportant "noncommercial" messages, and that the important and sometimes so-called "commercial" traffic handled during time of emergency is permitted to be handled by special dispensation of the Federal Communications Commission. Nothing could be farther from the truth. Amateurs may handle *any* domestic traffic, whether "pertaining to commerce" or not, at any time, provided only that they receive no compensation, direct or indirect, for such handling. Therefore it will be seen that the handling of third-party

Claimed Scores (C.W.)

Station	Score	Con- tacts	Different Stations	Sections
W6WNI	548,960	254	181	54
W4KFC	516,600	354	232	55
W4IA	380,035	283	210	53
W1NJM	289,710	255	175	47
W2UZX	281,880	232	193	50
W6IUW	263,550	204	191	47
W2WFW	241,955	217	168	49
W7KWC	232,578	146	129	48
W9VES	229,900	214	157	52
W2CWK	225,420	215	160	44
W8CMN	223,436	144	117	49
W4FBJ	218,360	212	158	48
W3MTQ	210,700	209	149	47
W8DAE	209,090	200	152	51

One of the oldest active rag-chew nets in the country, the G-G Breakfast Club, held a picnic in July at Doheny Beach, Calif. More than forty licensed amateurs were present to enjoy the festivities and continue the spirit of good fellowship bred over the air. Active since 1930 on 80-meter 'phone, the group was renamed after World War II in memory of Charles Blalack, W6GG, late vice-president of ARRL and an ardent participant in Breakfast Club activities. Geographical distribution of membership has expanded through the years to include amateurs all the way from Vancouver to Phoenix.



traffic by amateurs during period of communications emergency is a normal extension of the third-party traffic handling carried on by amateurs from day-to-day. It is for this reason that the handling of third-party traffic, in quantity, on a daily basis if possible, provides the best possible training for those who wish to prepare themselves to be of public service should disaster strike. — A.E.H.

"WORKED-TEN" AWARDS

A "Decagon Certificate of Achievement" is offered by the Corpus Christi Radio Club to any amateur who can prove contacts with ten stations in Corpus Christi, Texas. The award is a handsome job and has as a centerpiece a decagon on whose ten sides are lettered the calls of stations worked. Applications may be addressed to Secretary Hewitt H. Penton, 1656 Armada Park, Corpus Christi, Texas.

The Nashville Amateur Radio Club issues an attractive certificate for working ten Nashville, Tennessee, stations. The rules are simple: (1) All amateurs are eligible except those in Nashville and Davidson County, Tenn. (2) Furnish the NARC secretary with the dates, times and calls of QSOs with ten Nashville amateurs. Mail applications to W. J. Johnson, W4HOJ, Secretary NARC, 2701 Belcourt, Nashville 5, Tenn.

With the cooperation of their Chamber of Commerce, the Orlando Amateur Radio Club offers a classy certificate to any amateur who works ten Greater Orlando (Orange County), Florida, stations. As background the award pictures one of their prettiest bathing beauties! Club secretary W4CMI says it is possible to work ten Orlando stations in one sitting, but mentions one exception to the rules in this connection: On the second and fourth Mondays of each month about twenty-five locals get together on 29,120 kc.; contacts made during these periods will not count toward the award. In addition to the certificate, arrangements have been made to ship a box of selected tree-ripened fruit to anyone who works five more stations than the ten required for the certificate. Applicants should list the stations worked and dates of QSO and mail to the Orlando Amateur Radio Club, Box 2067, Orlando, Fla.

COUNTRIES-LIST CHANGES

From time to time additions are made to the ARRL Countries List, the official standard used in connection with the annual DX Competition and the DX Century Club. Latest addition is Marion Island (ZS2), which will be grouped with Prince Edward Island as a separate country. Because of confusion regarding boundaries of Mongolia, the listing of that country has been changed to read Mongolian Republic (Outer). The area called Inner Mongolia is a state within the Chinese Republic, while the Mongolian Republic is an independent country.

DX CENTURY CLUB AWARDS

DXCC Certificates based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below. The countries-worked totals indicated have been certified by examination of written evidence under the award rules as published in March, 1947, QST.

HONOR ROLL

W1FH.....196	W4BPD.....178
G2PL.....188	W2BXA.....176
W6VFR.....182	G6ZO.....175
W8HGW.....182	W3GAU.....174
W3BES.....180	W1TW.....168

NEW MEMBERS

W3QJV.....167	W1RY.....103
W2ZCY.....139	W9AEH.....103
KG6AI.....121	W6MLY.....103
W2HMI.....120	G3MRL.....102
W2FUD.....119	W9YMB.....102
W9NRB.....117	W9VW.....102
VQ3HJP.....113	W1DF.....102
G4CP.....112	G5CI.....102
W2UAT.....111	W3BEN.....102
W7GUV.....111	W6TEU.....101
VE7HC.....110	W3LBG.....101
W6MUB.....110	W6JZP.....101
ZS2AG.....110	W6AYZ.....101
W1AB.....110	W2RWE.....101
W3JKO.....109	W6BD.....101
ZL3BJ.....109	W2TF.....101
ZS6EU.....108	W6FZ.....100
W7GBW.....107	W1BDS.....100
W8UDR.....107	G8FW.....100
W4NNN.....106	W6BVM.....100
W4KXN.....104	KH6II.....100
G3AZ.....104	W2RDK.....100
W6MX.....103	W6QBD.....100
OZ7CC.....103	W4KFC.....100

ENDORSEMENTS

W9ANT.....161	W2IOP.....135
W2AQW.....161	W4DKA.....134
W2GWE.....160	W6ROK.....131
W8BKP.....158	W6AM.....131
W3GHD.....156	W2CWE.....130
W7AMX.....152	W1CLX.....126
W6EBG.....151	W6RDR.....126
W2CYS.....150	W2TQC.....121
W8NEK.....150	W1ZL.....121
W8LEC.....145	W7GUH.....121
W8KC.....144	W6SRU.....121
W6WKU.....140	KF4KD.....120
W2HZY.....140	W6LDJ.....118
W2NSZ.....136	J2AHI.....113

RADIOTELEPHONE

HONOR ROLL

W1FH.....189	W1HKK.....126
W4CYU.....138	W2AFO.....123
W6DI.....135	XE1AC.....121
W1ICX.....133	W2BXA.....119
G2PL.....130	W6VFR.....118

NEW MEMBERS

G2ZB.....118	W3DHM.....110
W2APU.....112	W9FHZ.....104
W9RBI.....112	W7HTB.....102
W2QF.....112	W1BQJ.....101
W8REU.....110	W5ASG.....100

BRIEF

Dot Evans, W1FTJ, is the proud recipient of a WPR-25 award, the first to be issued to a YL outside of Puerto Rico.

• 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, Jerry Mathis, W3BES—AXA will join the E.P.A. Net when his crystal arrives. OML, KFA, VMF, DZ, WTS, NTD, 4XYS, and YLs attended a meeting of the E.P.A. Traffic Net in Philadelphia. The West Philadelphia Radio Assn. resumes regular meetings Sept. 20th at 9 p. m. in the West Philadelphia Y. M. C. A. All are cordially invited. EU visited the fine station of QEW. ASW is on s. s. c. on 3.85-Mc. phone. ELI will check in regularly on NTL for traffic. The Schuylkill ARC held its annual picnic at New Ringgold on July 25th. Club members and families were present. The Delaware Lehigh ARC, of Easton, now is ARRL affiliated. AQN is securing excellent publicity for the AEC in New York papers. Traffic: W3NHI 124, DZ 36, ELI 31, AXA 7, VMF 7.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCN, Eppa W. Darne, W3BWT—The Baltimore Amateur Radio Communications Society held a hamfest and picnic at the Triton Beach Club in mid-August. Its members made communications possible at the Sailing Races. AQV has a new speech amplifier. OPG, formerly operating as 2NDL/3, is on 7- and 14-Mc. c. w. Drake, of ADO, visited several French hams during July. KKH has worked 40 states on 28 Mc., and has crystal-controlled rig on 14 Mc. EQK, on 14-Mc. phone, gets out swell with his new beam, and worked three new countries with it the first week up. NNX has a sturdy three-element beam on 28 Mc. that recently weathered a 70-m. p. h. wind. JNN is handling lots of traffic and now has 139 countries to his credit; Oscar is on 14-Mc. phone. WU has QSOed 111 countries and is on 14-Mc. c. w. and phone. HG is back on the air after being in the hospital. CDDQ took a two-weeks vacation visiting New England and the Jersey seashores via auto. AKR is on 7 and 14 Mc. ECP is on 3.5-Mc. c. w. and 28-Mc. phone, is building 28-Mc. mobile equipment, and has an HQ-129X receiver with DB22A preselector. IEM is on 7 Mc. and is a member of the A-1 Operator Club and ROWH. JJD has been off because of office work pressure. LVJ rebuilt his Super-Pro receiver, changed the tube line-up and now has it working fine. CJT, operating BWT, made a number of European contacts on 3.5-Mc. c. w. during the past month. Traffic: W3ECP 24, IEM 22, AKR 14, KZS 11, WU 10, EQK 6, BWT 5, AKB 4.

SOUTHERN NEW JERSEY—SCM, G. W. (Bill) Tunnell, W2OXX—Activity reports hit a new low this month but the Hamilton Township gang is in there pitching with another fine issue of their news publication, *SCUTTLEBUTT*. Traffic honors go to SXK this month. ORS schedules OSB/9 regularly. ZI says work around his home is slowing him down temporarily. WTS completed his new power supply but is having 7-Mc. antenna troubles. BAY reported in person that he is rebuilding his low-frequency rig. HAZ won the Delaware Valley Club WAS Contest, having worked and confirmed forty-eight states in three months. QOK is designing a new 28-Mc. beam. OSC has his new 500-watt on 14-Mc. c. w. QKE has returned home from Liberia. The Delaware Lehigh Amateur Radio Club reports ARRL affiliation via TAV, who is secy. HEH has a big husky pole in his yard at the new QTH. SUG is scheduling VVV, who is on the schooner *Bowdoin* near northern Greenland. FXN is on 144 Mc. with an SCR-522. Our Atlantic Division Director was guest speaker at the July meetings of the SJRA and DVRA. Traffic: W2SXX 71, ORS 30, ZI 10, SUG 2, HAZ 1.

WESTERN NEW YORK—SCM, Harding A. Clark, W2PCT—SEC: SJV, RM: FCG. The ERCA has installed a new 100-watt crystal-controlled transmitter in the State Tower Bldg., Syracuse, for the Red Cross. Emergency drills are held each Monday night with mobile units participating as well as home stations. VUE has made WAS on 28 Mc. ZJ now has 90 countries and is heading for DXCC. FE divides his time between 14- and 28-Mc.

phone and c. w. TAP is working 28-Mc. c. w. in Avoca. Glad to hear FAL is out of the hospital and back on the air. Thirty-five attended an "outing" for the 28-Mc. gang given by AED at his summer home. ABM is working 7 Mc. with 5 watts. VIQ/2 and PGT conducted "The Lonely Hearts Net" during the summer for 150 students at Cranberry Lake and their YLs and XYLs. Traffic: (June) W2VIQ 25, WOE 13, (July) W2PGT 73, VIQ/2 33.

WESTERN PENNSYLVANIA—SCM, E. J. Hinsky, W3KWL—The annual hamfest put on by the SEBP&M of Pittsburgh on Aug. 1st was attended by more than 450. Speakers from ARRL and GE highlighted the affair. The c. w. men versus phone men softball game turned out to be a "hit and run" affair with the c. w. men winning 25 to 18. One of the DX visitors was 7K1Y, formerly 8TDD. 3KQD's one-buck investment won him an NC-173. The Mercer County Radio Assn. took second honors in the Hidden Transmitter Hunt. Your SCM does not know the winner of the hunt. The Fort Necessity Radio Assn. secretary, Sofranko, reports that the new club house is nearing completion. RUW burned out grid coil in final and is temporarily QRT. LAC is ready for 14-Mc. mobile. SGA and WVE are planning low frequency mobiles. CAV finds his troubles lie in BCL. Down Jeanette and Greensburg way UVD comes through with WESCO dope. ORP is new ham on 28-Mc. phone. The WESCO gang held a meeting at FII's QTH and saw television in action. KQU has burnt-out modulation transformer troubles. OOI is using flea power on 28 Mc. NJH says his new 5-inch scope works fine. UVD spoke too soon in praising his BC-459A; it's now acting up. GRZ is trying hard to master his new "Bug." NJH and LWV visited W1AW. News around the Smoky City: RAT has moved to the West Coast. The WX Net held its annual picnic July 16th. The ATA Club made 400 contacts on Field Day for 5125.5 points. PEJ and KSP did the u. h. honors. USS now is the proud owner of Class A ticket. RUW finally got his J QSL. VNE, our "Air Wave Sherlock Holmes," reports no violations noted for July. NBK now is mobile on 28 Mc. LSS tried his luck in the CD Contest. NUG moved to new QTH. LWV is rebuilding getting ready for traffic nets. NCJ made 70 contacts on 7 Mc. in CD Party. NLU spent his life's saving on an NC-173. A few items follow on what's happening on 144 Mc. RUE worked Chicago with a two-hour QSO. Also worked were Maryland, Virginia, and West Virginia. OMY is heard occasionally. Altona should be heard now that QOD is supplying 144-Mc. beams. Traffic: W3NCJ 16, LIW 4, LSS 4, GJY 3.

CENTRAL DIVISION

ILLINOIS—SCM, Wesley E. Marriner, W9AND—YTV is rearranging his shack for greater comfort and efficiency. EVJ took a two-months rest during which time he redecorated the shack and put the rig in order. New calls in Rockford are YNK, ZRU, CMU, EDJ, and EKT. KA1ABX now is in Rockford and will be on the air as W9GAE on 28-Mc. phone and c. w. Those working KA1ABX and wishing to QSL should send mail to Fred Whenschel, Organized Reserve, Illinois State Sr. Instructor's Office, 528 West State St., Rockford, Ill. YBY uses a converted BC-625A powered with a PE-103 running on 6 volts and a Gon-Set converter for mobile work. ASN is new ORS. JO moved to new QRA, 334 South Chase, Lombard. WFS has new vertical ground plane on 14 Mc. and is up to 75 countries. 1QKQ, of Vermont, was a recent visitor at MZW, just one month after their initial contact on 14 Mc. ERO is a new ham on 7 Mc. at WGN, making a total of 27 hams working there. NN recently met two old-time 1920 spark pals on 7 Mc. BRX has been on 3.85-Mc. phone for the first time since the war, renewing some old acquaintances. BRD is back in Chicago but will continue to write the DX column in QST. Write to Rod at 1517 Fargo Ave., Chicago. W9QJK, operating as D4AON in Germany, renewed ORS appointment. Ken says that all European hams are limited to 150 watts and that Lt. General Curtis E. LeMay, CG of U.S. Air Forces in Europe, has the call D4AFE on A-3. SYZ took the Class A exam. NDA works nice DX. CMC received WAS and WAC Certificates this month. DUA has new 10-20 rotary beam. WEA has had transmitter trouble. The Cahokia Amateur Radio Club elected the following: EBX, pres.; PIN, vice-pres.; ECD, secy.; UWP, treas.; WPP, sgt. at arms. EBX is new OBS. The Midwest VHF Club of Chicago held its monthly informal meeting on July 29th. Movies of the Peoria Hamfest and 144-Mc. station installations were shown. The club meets the 3rd Thursday of each month at Garfield Park. OBW sent in the above VHF Club news.

(Continued on page 66)

HIGH GAIN

How HIGH is high gain or, what is a high gain receiver? We might think at first that the more gain the better, but it is interesting to note that it is possible to have too much gain in a receiver. The question naturally arises as to how much gain is actually needed.

We might decide that we would like to be able to hear a 1 microvolt signal as the weakest signal that need be heard. Most second detectors operate best when the signal level at the detector is in the order of 1 to 10 volts. This means the gain must be sufficient to raise the 1 microvolt signal to roughly two volts which is 126 db.

We might then decide we would like to be able to listen to some of that dx that is putting in only a 0.1 microvolt signal. It would seem logical that all that is necessary is to increase the gain ten times (20 db.) to do this. However, there is one factor which must be considered in such a calculation. The first tuned circuit in a receiver has in it a certain level of thermal noise and this noise level determines the lowest signal level that can be heard. Or, saying it the other way around, we do not need any more gain in a receiver than that necessary to hear the first tuned circuit noise and actually we will use less than this gain most of the time.

A means which will give an idea of the magnitude of the thermal noise is to compute the thermal noise based on the receiver input resistance and the IF bandwidth. Typical receivers having a 300 ohm input impedance and a 2 Kc. bandwidth give a figure of .1 microvolt. This means that the maximum gain we would need between antenna and second detector in this case is about 146 db. and then the noise would be at a 2 volt level at the second detector. It also means that a .1 microvolt signal could give only a relatively poor signal to noise ratio, because signal voltage and noise voltage would be equal.

Actually, since the first RF tube will also contribute some noise, the chances of a .1 microvolt signal producing a usable signal to noise ratio are doubtful. When the antenna is connected to the receiver, we find that on many of the amateur bands the noises picked up are often of a much different character than the tube and thermal noise. Picked up noise often has higher peaks such as static crashes, ignition noise etc. with the result that a usable signal must be considerably greater than the receiver noise level and the gain required is correspondingly less than the calculated value.

It is interesting to note that the Automatic Volume Control system actually functions as an automatic gain control system. If you did build more gain than necessary into a receiver, when AVC (or AGC) is turned on the receiver gain is reduced by the AVC to the point where the receiver noise is amplified only to the detector operating level. When a signal is tuned in, the gain again automatically adjusts itself to bring the signal up to the detector operating level. This is perhaps a little different point of view than that most often used in considering Automatic Volume Control.

Getting back to a consideration of the weakest signal we can hear, we now realize that this is a function of signal to noise ratio when the gain is adequate. The tune circuit noise is unavoidable (unless you lower the temperature of the circuit to absolute zero where the thermal noise is no longer produced) so the way we can improve the signal to noise ratio is to make the tube noise a smaller proportion of the total receiver noise. In actual practice the law of diminishing returns applies here.

So to answer our original question, a truly high gain receiver is one which has enough gain so that we can hear the noise appearing at the grid of the first RF tube.

RALPH HAWKINS, W1OEX



If LUA reads this, drop a line to the SCM for your OBS Certificate as mail to you was returned. Applications for AEC membership have been forwarded to County EC's. UQT, our PAM, is whipping the Downstate Radio Club Council into shape. Doc has a nice emergency rig, a BC-606 modulated by Class B 1625s with crystal mike input which runs 75 watts using common power supply. EKO, a new Springfield ham, is a communicator for CAA. KQJ reported in ILN Net weekly during the summer and EGT kept it together this summer. The Sangamon Valley Radio Club was organized at Springfield with HSB, pres.; and JSD, secy.-treas. The club voted to endorse the Downstate Club Council. The Starved Rock Radio Club did likewise. EGV is the call of the ICRR agent at Tonica. TLC is on 3.5 Mc. again. He has a rotator on the 144-Mc. antenna. JDA rebuilt his rig to eliminate parasites. CDG took the little 654 job along on his vacation in Wisconsin. The Illinois Valley Radio Association has planned a family picnic. BJA still is looking for the 144-Mc. band. IQC has the tower up and the beam on it. The Rock River Radio Club held an informal meeting at ZHB. ECF is new ham at Nachusa. GNU has new 14-Mc. beam and is waiting for windmill man to put it up. APK took Class A exam. SRO news: New editor and assistant are RMO and QWR. KTL is the new secretary. CBZ and AAH, at Oregon, are trying 28-Mc. phone. OTZ and DNX, at Sterling, are active on 7 Mc. ECP is on 144 Mc. Traffic (June) W9SYZ 72. (July) W9KQL 16, NDA 14, SYZ 6, ASN 5, CMC 5, NN 5, WFS 4, BUK 3, DUA 3, EBX 2.

INDIANA — SCM, Charles H. Conway, W9FSG — CQH, Lakeville, whose 144-Mc. signal is well known to the Middle West gang, now has the 3300-Mc. rig perking. New Albany: ELJ has new rig under construction. ZWQ made WAS on 14 Mc. ABN's mobile caught fire and burned. BOF and AYB have mobile rigs under construction while ZYO and UVD have theirs going. WLV is chasing the rare ones on 7 and 14 Mc. New-comers to ham radio are EMA and EUC. UWF is on 14-Mc. phone. VCA is on 28-Mc. phone, but gets on 3.5 Mc. occasionally. Evansville: DGA moved into new basement shack. UIA has 36 stations on 50 Mc. and has his BC-788 a. m. converted for 420 Mc. KTX, North Liberty, leads the State in traffic this month. Vern can be found around 3900 kc. Call him for a good rag-chew. South Bend: BCJ changed OBS frequency to 3600 kc. BYY has new 28-Mc. beam. Indianapolis: DPL has new HQ-129X. LLA is on 144 Mc. BNS, CUE, and CZO are the mobile units of the Indianapolis Emergency Net. CKP and UEM are the fixed stations. Traffic: W9KTX 14, BCJ 12, DHJ 3, AQO 2, NH 1.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — LFK spent two weeks of vacation at Pleasant Lake and used IQW's 6-watt aircraft transmitter to report into net and participate in CD Party. YCV still is without a QTH that will permit an antenna and ham radio. Although CWZ's XYL kept him busy this summer, he did manage to get up a pole that is too high for any clothesline. CBE is all set for a heavy traffic season. AFT worked 8JWC in Ohio on 144 Mc. YHA is newly-appointed OBS. HWX operated portable at Birnamwood while vacationing there. JBF worked 27 states on 50 Mc. in June and July. RRA announces the arrival of new jr. operator. HEE is on 144 Mc. with 24-element beam while a pair of 304TIs keep 28 Mc. hot. LZU operated portable at State Fair. QFJ operated portable while vacationing at a lake near Shawano. EWM is a new call at Wausau. YYL operated portable at Wausau picnic with HBE's new Collins rig. QIX has a new 28-Mc. beam that lays down a real signal. RLB spent the summer building a compact and versatile all-band stand-by rig that has everything. The Badger Emergency Net meets daily at 6 p. m. on 3950 kc. The Wisconsin C. W. Net meets Monday through Friday at 6:30 p. m. on 3775 kc. An active traffic season is anticipated and your participation is invited. FHU's new duties with the Conservation Dept. have curtailed his ham activity. FZC is enthusiastic about top-loading on 28-Mc. mobile antenna. CGO has p. p. 807s on 50 Mc. RYA is installing mobile rig in the Jeep. Your activity reports on the first of each month are appreciated. Have your club secretary or activities manager send a monthly report of club and member activities. Traffic: W9ESJ 117, LFK 52, SZL 27, CWZ 19, CIH 17, DND 16, IQW 15, SIZ 9, RQM 8, MUM 2.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossoletti, W0CZD — The RRRR sponsored a big "Hamboree" picnic at Mayville Park. Among those attending were Dakota Division Director TSN, SCM GZD, WFO, KHG, HZM, RGT, VAZ, IKD, TUF, DM, ZXT, AQF, IKA, NMV, UNU, BTH, JXX, AAU, HSR, PVS, FST, CAQ, BJG, YSJ, SHI, WBY, GHN, CDO, OEL, CGM, HIV, BZJ, JNP, HFN, OYM, FGX, IPC, DPT, VE4JE, W6USL, ex-9NCL, and W0PRU. ZXT plans new fold dipped for 7 Mc. HIV and ZXT have new VFOs. IKD has 522 on 28 Mc. in his car. The North Dakota Nets are under way better than ever. The Eastern Net is on 3525 kc., the Western Net is on 3550 kc. TSN sure boils in with kw. on 3.85-Mc. phone. CAQ got a new pair of 812s on the air. NMV and BTH are working on 28-Mc. beams. Plans are underway

to organize clubs in larger cities in the western part of the State. Application forms for official appointments are free for the asking; write to me! Traffic: W0CAQ 7, GZD 6, RGT 2.

SOUTH DAKOTA — SCM, J. S. Fosberg, W0NGM — This month your SCM met more than half of the membership in person. I enjoyed every minute of the meetings held at Watertown, Mitchell, Pierre, and Rapid City in which 58 per cent of the ARRL membership was met in person, although I am sorry that 100 per cent could not be on hand. I personally wish to thank those in charge for the cooperation extended to TSN and myself. I also wish to thank SECs HDO and GLA for their fine help and I am sure that by fall South Dakota will be very close to our goal of 100 per cent membership in AEC. Another thing is the fine spirit of the northeastern section of the State in a. h. f. The fellows are almost solidly OES and UZI has 47 stations on 50 Mc. After talking to the fellows in the State it looks as if a 50-Mc. net is not out of the question. It can be done and it is up to you to get on and do the job.

MINNESOTA — SCM, Walter G. Hasskamp, W0CWB — The heat of July not only made you fellows forget to report to the SCM, but it also had many fellows operating portable or portable-mobile from all parts of the State. Among those operating portable we find TLE, HY, CWB, AGO, JDO, and 8TYN. RHA has finished a 100-watt power supply for 606 and 459. He also received his Class A license and hopes to be on 3.85-Mc. phone soon. DSF is instructing at ROTC summer camp at Chautauque, Ill. BRE was host to the July meeting of the Lake Region Radio Club, which reports the following: SIB has Class A license, HGF has a new antenna, IIC is settled in his new shack which is the envy of any ham, OPA's 14-year-old 40-ft. mast is coming down, GVO has a new beam coming, a male second harmonic has arrived at DZM's. RJF made 90 contacts in the July CD Party. BGY is getting a BC-458 going on 7 Mc. FOH is building a new ham shack. IAW has moved to Minneapolis. PIT is building new p. p. 812s final. GPH checks into the Wisconsin Net. RHT has a mobile rig in his plane. 5NWC now is ØKBJ. New calls in Minneapolis are JPH, JZX, JTW, and JVZ. FHH is on 7 Mc. with an 829-B. HAM and JPH (brothers) have a new four-element FB 28-Mc. beam up. MIM is moving to the West Coast. Visiting the SCM were HY, YUN, AGO, and JDO. CWB looked in on TLE operating fixed portable at Farm Island Lake. DON'T FORGET — ON OCTOBER FIRST THE REGULAR SCHEDULE OF THE MINNESOTA STATE NETS WILL BE RESUMED. NETS WILL MEET ON 3892-KC. PHONE EACH EVENING AT 6:15 P. M., SUNDAYS AT 9:00 A. M. and 3795-KC. C. W. EACH NIGHT EXCEPT SUNDAY AT 7:00 P. M. Traffic: W0RJR 62, GPH 43, BGY 6, DSF 6.

DELTA DIVISION

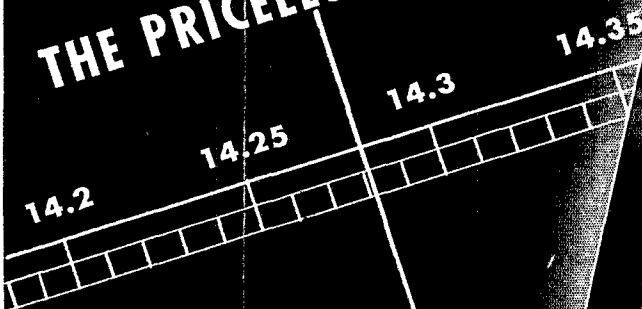
LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — LKTE, the SEC, has been rebuilding and getting things ready for the coming traffic season. You'll soon find him at his old spot on the Rebel Net. CEW, the PAM, has completed his collection of QSLs for DXCC and is back on 3.85-Mc. phone for a spell. HEJ and HEK have moved from Natchez to Monroe and are on 3.85 Mc. EB and EGK have been DX'ing on 14-Mc. phone. LSZ recently acquired an XYL. JTR paid a visit to Monroe. KYK has been on 7 Mc. mostly and has received his WAS Certificate. O.L.K. Baton Rouge, has applied for ORS appointment. IOP is bearing most of the 50-Mc. activity from this area. The CARC of Shreveport held a watermelon party during the month and everyone had a big time. BSK is working hard these days assisting in making arrangements for the Delta Division Convention. NBK still is trying to get the bugs out of his rig so he can continue with the Summer Traffic Net on 7 Mc. All members of the Delta 75 Phone Net (Louisiana section) should have their certificates. If anyone was missed, please let the SCM know about it. JET reports 14-Mc. activity. An RM is needed for organization of c. w. net for the State. Anyone interested? New OBS (Official Bulletin Station) Certificates are now available. We need several good stations in Monroe, Alexandria, Lake Charles, New Orleans, and most other medium-sized localities. All bands should be covered. We'll be looking for you at the Convention. Traffic: W5VT 10, KYK 3.

MISSISSIPPI — SCM, Harold Day, W5IGW — SEC: JHS, RM: WP, PAM: LN. From JHS comes the dope that ANP, HAV, IBO, OMK, and honor guest BSR met at the Delta Convention chairman's home and had an extra special rag session. Three member stations checked into the Magnolia Emergency Net on emergency rigs; HAV with gas-engine generator, and ANP and JHS on storage battery power. The Gulf Coast Shrimp Net welcomes back Capt. Spitz, 7JHS, MJL, with the big rig out, called the GCSN together on two watts and was heard Q5! DLA finally tamed the V-70DS. FSS is trying to figure out the identity of the ham peeping under the tent on the front cover June QST. ANP had the best attendance of any member in the Mississippi section (Magnolia) of the Tri-State Emergency Net. There have been several appointments

(Continued on page 68)

Stability...

THE PRICELESS GIFT OF CRYSTAL CONTROL



There is deep and comforting satisfaction in knowing where you are . . . not within 10 or 15 kcs. . . but EXACTLY WHERE YOU ARE. Only CRYSTAL CONTROL can give you this satisfaction. With a PR Precision CRYSTAL in your rig, you not only know where you are operating but you know you will STAY THERE! When you buy crystals, buy QUALITY . . . because quality means you get the rugged stability, accuracy and high output you have a right to expect. At today's economical cost, PRs are a real buy. They're commercial quality at amateur prices! Ask

your Jobber for the exact frequency you want . . . and he will supply you with a PR promptly. — Petersen Radio Company, Inc., 2800 W. Broadway, Council Bluffs, Iowa. (Telephone 2760)

PR Precision CRYSTALS

SINCE 1934



10 METERS
PR Type Z-5.

Harmonic oscillator. Ideal for "straight through" mobile operation. High activity Heavy drive without damage in our special circuit \$5.00

20 METERS
PR Type Z-3.

Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. High power output. Just as stable as fundamental oscillators \$3.75

40 & 80 METERS
PR Type Z-2.

Rugged, low drift fundamental oscillators. High activity and power output with maximum crystal currents. Accurate calibration . . \$2.75

cancellations for failure to send certificates to the SCM for endorsement. Please get 'em in.

TENNESSEE — SCM, Ward Buhrman, W4QT — The Kingsport Amateur Radio Club reports LNF as new president, succeeding MEA who moved to West Virginia. A contribution of ham gear was made to PAØ amateurs by the Kingsport gang, and a grateful letter of appreciation was received from PA8IDW. KPR runs nine watts on 28-Mc. 'phone. He has worked VK, ZL, KL7, etc., and has confirmations from 47 states. Will Kentucky please lend a hand? Some Eager Beavers from Oak Ridge visited the SCM at 3 A. M. and participated in some early-morning DX. FLW worked 23 stations in 12 states on 50 Mc. during July. LCB has a swell signal on 3.85-Mc. 'phone with only 25 watts. PL visited the West Hartford gang and W1AW while on vacation. He has been QRT while getting three new rigs on the air. NNN made WAC from his trailer QTH. NXT, new station in Paris, is active on 7 Mc. The 3.85-Mc. 'phone net continues active and several new stations have been added. BAQ operates on 144-Mc. and 28-Mc. mobile. DIY reports having an enjoyable time in the CD Party and turned up with a good score. CBU and MEI are 3.85-Mc. 'phone recruits. EC appointments were renewed for GHL and BD, and MP continues as OBS. CZL says new emergency-powered equipment is a success. DIJ is chasing DX on 14-Mc. c. w. FWH wants schedules on 50 Mc. FLS has been unable to get back on the air since he was visited by 5GMR. Traffic: W4CZL 25, EBQ 10, DIY 3, FLW 1.

GREAT LAKES DIVISION

KENTUCKY — SCM, W. C. Alcock, W4CDA — BAZ is concentrating on Trunk Line "J" and KYN on 3600 kc. YPR was active during the summer. KYN will be going full scale Oct. 1. MFC, Ashland's EC, will have 28-Mc. emergency mobile net lined up soon. NZE is new operator at Ashland. EDV continues with KYP (phone net) on 3955 kc. AHL uses 50 watts on 'phone net and pinch-hits as Net Control. BPE worked FBJ/4 in Glasgow on 144 Mc., DX 100 miles. LMN is new on 144 Mc. KKG is operating on 144 Mc. All stations interested in the KYE Net (145.8 Mc.) should contact our PAM, FBJ. NIX worked KYE Net (7200 kc.) a few times. FBJ handled long-haul traffic from Guam. He added 12 new countries and now has a total of 83. FKM is new OPS. NCQ is new EC for Lexington and IZU is Asst. EC. TXC kept the KYP Net going through the summer and handled traffic, too. *Blue Grass Ether Clippings*, our ham magazine, is published sporadically. So, look for it when you see it! Lexington, Louisville, and Ashland now have Emergency Coordinators signing up Emergency Corps members. There should be an EC in every radio club. Pick your man and let our SEC, BEW, know. The ARTS held a transmitter hunt on Aug. 15th, and a dinner Aug. 16th, attended by F. E. Handy. The Central Kentucky ARC held a ham reunion and picnic Sept. 12th. NEY will operate from Wiesbaden, Germany, on 7, 14, 27, and 28 Mc. and is interested in Stateside contacts. Traffic: W4FBJ 18, TXC 16, FKM 10, KKG 9, EDV 5, BPE 2, AHL 1.

MICHIGAN — SCM, Joseph R. Belian, Jr., W8SCW — SEC: GJH. RMs: NOH, PVB, and UKV. The Michigan QMN Nets will reopen Oct. 4th with three directed nets. The 5 p.m. Net will be 15 w.p.m. or less with UKV as Net Manager. The 6 p.m. Net will be 15 to 20 w.p.m. and over with PVB as Net Manager. Interest shown so far indicates another fine season is in the offing so why not join in on the fun? Check over that rig, put it on 3663 kc., and report into the net of your liking or convenience. Net Control Stations are needed and if you are interested in handling one of the nets one night per week, contact the manager of the net in which you are interested. Congrats to QFH on the new YL addition to the family and to BIU and GP for the Jr. operator additions. The Grand Rapids gang held its annual picnic on July 18th and enjoyed its usual fine turnout and good time. The Muskegon gang duplicated on Aug. 1st. YDR was intrigued by the Mon-Key at the hamfest so proceeded to build himself an electronic key. ONV has a new RME-152A. SOE has a new Collins 75-A1 receiver with a DB-22A. CTD is enjoying his new NC-173. NPL and OLV have new Collins 32-V-1 transmitters. PTN is getting set for 28-Mc. mobile. FUL, an old hand at DX, now is WAZ and has worked 172 countries postwar. UAS is DXing on 14 Mc. with a new beam and has 164 countries. FX is on 28-Mc. c.w. and is casting a hopeful eye to 27-Mc. 1. c. w. EGI is checking over his rig and building a peaked audio filter. ZCI is now Class A and is planning on p.p. 807s for a modulator. BLR reports the QMT Net is organizing nicely as a local EC Net. The Buzzard's Roost and Michigan Emergency Net continued throughout the summer and enjoyed fine attendance. TRN has a nice traffic total and makes BPL on deliveries. John has terminated his schedule with VE8NA, who is on his way home after two years of steady schedules and traffic-handling. AIJ is DXing on 14 Mc. until the QMN opens. KPL has a new rhombic antenna. AXP is installing a 50-ft. windmill tower in his yard. YAN is n.f.m. on 28 Mc. RPX has his HT-9 on the air again. CCJ is building a Stancor 150-watt rig. NNT is doing nicely on 144 and 50 Mc. UKV is rebuilding and will have more power on QMN. Don't forget to send that monthly report to me. Let me know of your activities, plans, suggestions,

etc. Traffic: W8TRN 339, UUS 72, URM 58, TBP 29, CYH 19, SCW 11, UKV 7, ARJ 4, BLR 2, CBG 2, EGI 2.

OHIO — SCM, William D. Montgomery, W8PNQ — The CARA (Columbus) family picnic on August 22nd was a big success, well attended, and with plenty of prizes. WRN reports several 144-Mc. band openings during July, with Pittsburgh, Terra Alta, Illinois, Iowa, and Wisconsin stations coming through well. RN is spending a lot of time helping his dad build a new house near Willoughby. He thinks the Buckeye Net will open about October 1st. ZAU is being plagued by new homes going up around him. He has had to change his antenna locations twice in the past six months on this account. JFC reports that CYA is a new ham in Mt. Healthy, near Cincinnati. ROX says the Cleveland Brasspounders Association probably will go en masse to the National Convention at Milwaukee. Fine business! BEW has come up with new BC-458 and 457A VFOs. PUN says the Doghose Net picnic Aug. 1st was combined with the Piqua Hamfest, resulting in a really fine gathering. In Cincinnati the Greater Cincinnati Amateur Radio Association and the Queen City Emergency Net have joined hands in the matter of the monthly publication. The *MIKE AND KEY* and the *LISTENING POST* now are published under one cover, to everyone's betterment. 4KFV hid the transmitter in the July QCEN Hidden Transmitter Hunt so well that no one was able to find it. (No one heard it, either.) From Springfield we learn that VZE and BMC have excuses for being tired — they each recently painted their houses. JRG has a new jr. operator at his house. As this may be my last report to you, I wish to express my thanks to you all for your cooperation during the past two years, without which these reports could not have been written. I hope you give the same swell support to the new SCM. So I will sign off with the report from here of the arrival of the sixth jr. operator on Aug. 1st. (Good reason for not running for SCM again, what?) Traffic: W8GZ 87, DAE 32, PUN 20, QBF 12, WAB 10, BEW 6, RN 6, TIH 6, ROX 5, CBI 3, DZO 3, EFW 2, TAQ 2.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — SCM, Charles Ham, Jr., W2KDC — Midsummer finds the usual lull but several activities and events, present and future, are outstanding. There is a tremendous interest in our new mobile bands, u.l.f. activity is at a peak, and big plans are underway for fall. BGO is on the mend after a tough session. Vin is working on the breakdown of the AEC from a county basis to a community set-up, and in our crowded area we have plenty of communities. Each major one will now have its own EC or Asst. EC. Any population center who feels it qualifies is invited to contact BGO. Suffolk already has started on this program, with UGH Asst. EC for Smithtown-Northport. Drills are held on 146.250 kc. and OQI will supply 8-Mc. rocks for 20 cents. CJZ has mobile on 3.5 Mc. in the "Old Gray Mare." Frank had the courage to "drive" her into Manhattan recently. KTU is on new hilltop. WOX and VSV are combining their rigs, OQI is on 50 Mc., but no locals are heard. FI continues to spark the Nassau gang with 12 regulars. TDN and SNO are welcomed. FQW is moving. ANN is a very consistent "driller." RTZ is on S. S. N. and E. S. N., the latter asking her to be NCS. 6 days a week! HDL had another girl. PPG also is a new father. YPI (of Headquarters) really is out for a fall traffic score. KV4AF/2 is QRL because of no skywire. URX had no luck on 'phone during the CD Contest, but he did OK on c.w. T.L.A.P. will resume schedules on Sept. 27th on 3630 kc. at 2130 EST. VAF is up to 300 watts. TUK is busy with summer school. QBS took part in his first CD Party; he also acquired a Super-Pro. DBQ is welcomed back after 6½ years. Dick is using an ART-13. VOS was in the CD Contest and now is rebuilding for fall. OBU now has VFO ready for fall and a big season. PRE handled much Oregon flood traffic on 7 Mc. YOT recently received his RCC Certificate and is ready to help others make the grade. ZVK just received his ticket and is welcomed to Brooklyn. BO is back in circulation. SIEE is active on teletype and built a W2BFD broad-band converter. VXI is building a 5-watt, and later will start a 50-watt rig. GJO made WAC after 16 years. Gene now is on 28-Mc. mobile. GHK and NZX gave the Staten Island gang some pointers on reducing TVI. PAA, the 144 Mc. using a 522, is interested in 224 Mc. and lives at Copitogue, L. I. Traffic: W2ERTZ 91, PRE 84, VNI 82, OBU 69, VOS 64, OUT 21, DBQ 10, QBS 9, VNJ 9, TUK 8, EC 6, VAF 6, URX 4.

NORTHERN NEW JERSEY — SCM, Thomas J. Lydon, W2ANW — The NNC, W. Net, 3630 kc. meets daily except Saturday at 7 p.m. The 40-meter net, 7070 kc., will meet Mondays, Wednesdays and Fridays until activity warrants daily operation. TWG has been appointed OBS. VCZ now is OBS and will transmit bulletins on 28-Mc. 'phone. GYE has moved to Bogota, KQ, DZA, FMI, MLX, MWJ, POD, and QMV are active on 230 Mc. One or more of the above stations are on every night at 9 p.m. looking for contacts. DZA is crystal-controlled on 221.8 Mc. ICA and HPV, of Livingston, are on 144 Mc. LFR is active traffic-handler again after spending the summer

(Continued on page 70)

VARIACS

FOR VOLTAGE CONTROL



THE VARIAC* — the original *continuously adjustable* auto-transformer — is the ideal voltage control for use in the amateur station. Connected to the 115-volt side of filament and plate transformers, output voltages are continuously adjustable from **ZERO** with perfect smoothness. Unlike the resistive type of control, with the VARIAC output voltages are independent of the load up to the full load rating of the unit.

The VARIAC can be connected to give output voltages up to 135 volts when used on a 115-volt line, thus compensating for low line voltage so that the full 115 volts can be maintained even if the line voltage drops as much as 17 per cent.

When used on rated line voltages, the dials of VARIACS are calibrated to read directly in output voltage. Dials are available to read with output connections for either 115 volts or 135 volts.

VARIACS are made in a number of models with load ratings from 170 watts to 7 kw; they can be ganged on a single shaft for even higher load ratings!

*Reg. as U. S. Pat. Off. VARIACS are patented under U.S. Pat. No. 2,009,013 and are manufactured and sold exclusively by General Radio Company or its authorized agents.

FOR COMPLETE DATA WRITE FOR
THE "VARIAC BULLETIN"

TYPE V-5 VARIAC

Load Rating	862 va
Input Voltage	115
Output Voltage	Zero to 115 or 135
Rated Current	5 amps.
Max. Current	7.5 amps.
Price	\$18.50



GENERAL RADIO COMPANY Cambridge 39, Massachusetts

90 West St., New York 6

920 S. Michigan Ave., Chicago 5

950 N. Highland Ave., Los Angeles 38

revamping home and riding around in that new Cadillac with a new Irish Setter, JPK, the Newark College of Engineering station, is back on the air with the aid of NWA, UUH, URJ, and YOZ. CWK is rebuilding to reduce TVI. 30KD recently moved from Pennsylvania to Plainfield and his XYL YSE has received her ticket. They are both active on SSN Traffic Net. GVZ has worked 100 countries. The Union County AEC Net meets every Tuesday at 8:30 p.m. ZD has moved to Winston-Salem and now is 4ZG. VOH has three-element beam on 28-Mc. 'phone. NKD has new rig with pair of VT-127As in final. IIN is new Emergency Coordinator for Northern New Jersey. NPF has built a television camera that really works and now is working on the transmitter. YDW spent the summer at Lake Hopatcong working as soda jerker. DRA is the new EC for Rutherford. PPH is back on the air with new power supply. KYI reports for the first time since 1939. He is on both 14 Mc. and 28 Mc. looking for DX. All Nutley amateurs interested in emergency work are invited to contact LRZ, at 204 Passaic Ave., who is secretary of the Nutley Amateur Radio Club. QEM is back on the air with 400 watts. He is NCS of the N. J. 75 Meter 'Phone Net which meets on Sunday morning at 9 A.M. on 3900 kc. While operating mobile 28-Mc. n.f.m. from New Jersey MPS worked CM9AA, who was mobile in Havana, Cuba. Dr. C. L. Littell, president of Bergen, reports that 12 members of the "Amateur Radio Club," under the supervision of Mr. Henry F. Alderfer, faculty advisor, have built and assembled equipment for an amateur station. YMO, the club station, operates on 1000 watts on a 28-Mc. a. m. band. Traffic: (June) W2CGG 215, ZT 16, CJX 12, N1Y 2. (July) W2NWA 10, CJX 8, ANW 3, N1Y 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W0PP — Fellows, you let me down this month — no reports. There is a lot of activity but you must let me know about it. Two big picnics were held on July 25th, one at Manilla and the other at Council Bluffs, with good attendance at both in spite of rainy weather. JH, FP, WPT, and PP are going hot on 3.85-Mc. mobile. FP had good contact with WPT and FP for about 300 miles and lost out because of noisy highline, using a 654. KSS has rebuilt. SWI is rebuilding. ABE is getting new highline and will be back on the air soon. 6WNV now is 0YBX, at Cherokee. ATA and VHM are new members of Iowa 75 Net. QFZ renewed OES appointment. HMM still is tops for traffic and is going strong with NFN. HMM sent in the only c. w. report. Fellows, I can't do you justice unless you report. AUL is doing a job as Des Moines EC. The Iowa 75 Net picnic was held at Marshalltown Sept. 19th. CK now is radioing; he bought a depot. It took 48 minutes to find the hidden transmitter on 144 Mc. at the Council Bluffs picnic. The finders had just passed their ham exams. The transmitter was hidden in a grain elevator with the antenna 287 feet in the air. SWI worked a KL7 and KH6 on 3.85 Mc. WCC is finishing new home. HQA is working on 144 Mc. FDL is ready for OES appointment. Fellows, it's been rough making up this report. I've got to hear from you. Hope you all had good vacations, but now let me hear about them. Traffic: W0HMM 630.

KANSAS — SCM, Alvin B. Unruh, W0AWP — IFR leads in traffic this month, mostly via the 'phone net. IZJ has new Meissner Signal Shifter. LQS joined the AEC. He has mobile and emergency equipment. AHA keeps schedules with 5LUX and 0LZY. LYF is off the air temporarily, putting concrete floors in the shack to replace the ones eaten by termites. LQS worked several Europeans with 35 watts input, after blowing 250-watt final. GOV mailed Wichita traffic from Kansas City, and requests Wichita stations to get into 3.85-Mc. 'phone net. OAQ has schedule with HRIMB, and new MB611 rig. GHR has new Mon-Key. ZAT now uses a pair of 4-125As. OTV moved to Colorado. PAH has new 8JK beam. WKA, VBQ, TVU, OAQ, and KSY renewed OES Certificates. Wichita hams mobilized during the recent storm, using 28-Mc. mobiles with NCS FPC operated by OZN at Police Headquarters. Active were ZKA, PGL, MAR, and UUS. Carried by ham cars, mobilized off-duty police officers were active throughout the night. The time for traffic activity is again approaching. Kansas Traffic Net (QKS) meets on 3610 kc. Mondays, Wednesdays, and Fridays throughout the static-free season. The 'phone net meets on 3920 kc. Write your SCM, RMs, or PAM for details. Traffic: W0IFR 22, OAQ 15, AHA 3, GOV 2.

MISSOURI — SCM, Ben H. Wendt, W0ICD — Appointments: ROB as SEC, QYA as OO, WAP, GEP, and DU as ORS. QXO is working on a 600-watt all-band 'phone-c. w. rig and hopes to work the signals he can't raise now. GEP is on vacation but is keeping up with traffic with a portable rig. MON is having trouble keeping the gang together. At present three stations are active. PWR is operating c.w. on 7 Mc. from Rolla. WAP has located at Harrisonville and is using 125 watts on 7 Mc. INK was active in emergency work during the Northwest Columbia-Oregon Flood. He is building for 7 Mc. using a 459. GNX is building his new rig around a pair of 807s. 0MG received WAC on both 14 and 28 Mc. Field Day operation was not

all roses for QMF as his battery went dead in the middle of a QSO. VMO has QSYed to Salt Lake City. MVARC (Missouri Valley Amateur Radio Club), of St. Joseph, is enthusiastic over its Field Day activities and is making plans for more emergency gear to be used in next year's contest. The AEC drills are conducted with emergency gear. The Joplin gang staged a successful ham picnic with all the trimmings. WAP is operating c. w. on 7271 and 7010 kc. with 150 watts. SKA is attending M. U. GCT and JRJ are moving their gear to the basement. New portable and mobile gear is being reported from all parts of the section. Traffic: W0QXO 104, GEP 62, KBV 16, OUD 12, EEE 10, DEA 8, IAC 8, WAP 7, GBJ 6, ICD 6, OMG 2, QMF 2, VMO 2, GCL 1, NNH 1.

NEBRASKA — SCM, William T. Gemmer, W0RQK — Nebraska has a contender for the title of "youngest ham," none other than SAI's jr. operator, KON, age 13. BBS has 950 watts into a 304TTL on 14 Mc. Clyde's DX total stands at 92 countries worked and 80 confirmed. GDB modified a BC-474 and added 6V6 amplifier and 10-ft. whip with batteries for portable on 3.5 Mc. DJB is building 813s in push-pull with 800 watts input and a BC-610 modulator. YCG has a new 3.5-Mc. antenna 50 feet in the air. Bob also installed a 654 and 12-ft. whip on his auto for mobile 3.85-Mc. 'phone. LRF is installing a 654 in his auto for emergency work. OEHK has a new three-element beam for 28 Mc. BWI is building a 20 over 10 on a 50-ft. pole. ERM is building a BC-610. OHU is starting the season with a new NC-240D. SAI came back from vacation with a new NC-173. From FQB we hear that QUA is selling out and quitting ham radio. Roy Foster, of Omaha, passed his exam on a Thursday and the following Sunday won the 144-Mc. transmitter hunt at the Council Bluffs hamfest. He used a BC-348 plus a VHF-152 and a four-element rotatable beam on his auto. GJI is back on 28 Mc. with a VT100A he won at the same hamfest. EKK is lining up the gang for emergency net. HZE took 28-Mc. mobile rig on his vacation. KJP is ready for the 3.5-Mc. net. FQB will split time between c.w. net and 27-Mc. code instruction this fall. MKP is active on 7 Mc. HGV, KCK, JJK, and JFM are new members of the AK-SAR-BEN Radio Club. Traffic: W0FQB 2.

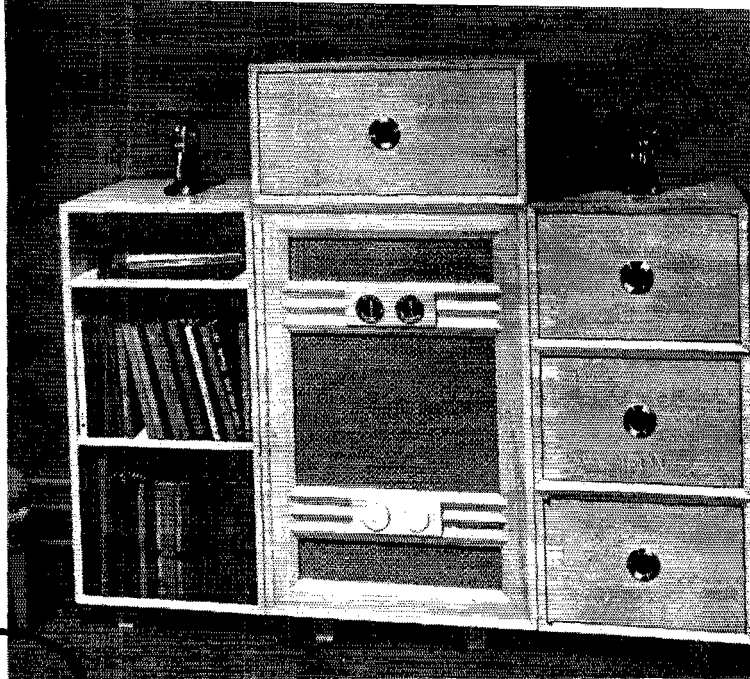
NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — The summer weather has caused the regular slump both in activity and reports. The Nutmeg Net will reopen on September 13th. Let's get going with a bang. TD is maintaining his OBS schedules only. JTD is getting his big rig ready for fall. ORP schedules 3FQB. Dick, of AV, expects to move to Newington soon. JJR is making changes in antenna arrangement for more flexibility. HYF complains of heat, TVI, and lack of activity on CN. BDI spent two weeks in Maine on vacation with portable in car on 3.5 and 7 Mc. He reports working the Hartford gang and others. QII and SJ visited AV, reporting an enjoyable time. SJ and QNV are interested in joining the Nutmeg Net. IKE is attending the summer session at Boston University. LKP is on the inactive list until the middle of September because of pressure of business. IIN reminds us of the Simulated Emergency Test coming up early in the season. Let's hope the traffic nets will be in shape to take the load of traffic. The Meriden Club, newly organized, is making plans for a permanent home and its own station. The boys also are planning an emergency set-up. BNB applied for AEC membership. College work has forced KUO to drop all traffic schedules. AV works KLPO on 7215 kc. 6:00 p.m. EST, daily, and has a direct traffic schedule with W0EVM/AOA on 14,150 kc.; 11:00 p.m. EST, daily. NTL (3670 kc., 9:00 p.m. EST, nightly) still is operating with CRW as Acting NCS and AV reports in. KUK renewed his OO appointment. There are a number of certificates in need of endorsement. Send them in, gang, otherwise appointments will have to be cancelled. Traffic: W1AW 103, BIH 59, BDI 19, QMI 8, HYF 6, ORP 4.

MAINE — SCM, F. Norman Davis, W1GKJ — SEC: LNL RM: NXX. PAM: FBJ. LZJ renewed his EC appointment. The PAWA did a fine job providing communications on 144 Mc. from start to finish for the annual Peaks Island to Portland swim. NXX has built a fine stacked rotary array for 14, 28, 50, and 144 Mc. Ek-LGV now is 2YIO, of Schenectady. Traffic: W1LKP 17, OKU 6, GKJ 5, QQY 2, NXX 1.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr. W1ALP — MVO is new EC for Revere, SS is new EC for Arlington. FL/V02FL now is OO, Class 2-3-4. The following renewed their appointments: ECs: CBY, HSB, MZR, and LJT. OBS: QHC. OPS: JCX. OES: LJT. We are sorry to have to report the death of KYN, of Newburyport. HCH is getting married. HQO is playing with a television set and working at Portsmouth Navy Yard. NXT got his commercial licenses and is working at National Co. KVT is looking for a good rig to get on the air. QW is working at Lynn Telegram News. JOJ wants some ping pong lessons. BVR attended a meeting of the So. Eastern Amateur Radio Assn. in New Bedford at which OLP, QON, ALP, LMG, PAD, MPP, and GLS were present. 4KDE is living in Watertown. LJT, KB, BL, and quite a few others

(Continued on page 72)



Jensen Customode



The answer to your HOME ENTERTAINMENT CENTER. Designed by leading furniture stylists and electronics engineers, CUSTOMODE custom cabinets give you hundreds of refined functional arrangements, enhancing all interior styles and requirements.

Four Basic Units: Reproducer Cabinet—Bass Reflex design utilizes any 15" speaker including Jensen coaxial speakers; Medium Utility Cabinet—for large equipment, communications receivers, television sets, amplifiers, etc.; Small Utility Cabinet—for tuner, amplifier, recorder, record changer, etc.; Record Cabinet—holding more than 200 records. Mahogany in Blond or Cordovan finish.

Customode's "building block" versatility enables you to create your own layouts as you wish, when you wish. Please accept our invitation to write today for free literature and scale cut-up illustration. Jensen Manufacturing Company, 6601 S. Laramie Ave., Chicago 38, Illinois.

CONNECTICUT QSO PARTY

October 9, 10, 1948

All Connecticut amateurs are cordially invited to take part in a QSO party to be sponsored by the Connecticut Wireless Assn.

Rules: 1) The Party will begin at 8:00 p.m. EST October 9th and end at 6:00 p.m. EST October 10th. 2) Any and all amateur bands may be used, and either phone, c. w., or both. C.W.-to-phone and cross-band contacts are permitted, but no extra credit is allowed for such QSOs. 3) The general call will be "CQ CN" on c. w. and "CQ Connecticut" on phone. 4) The same station may be worked but once regardless of band. 5) Exchange names of towns or cities. 6) Score 1 point per contact; multiply contact points by number of towns or cities worked for final score. 7) Reports must show times of QSO, of call of stations worked, town or city area of station worked. All reports must be postmarked no later than October 20th and should be sent to Philip Bliss, WIDXT, 68 Theodore St., Newington, 11 Conn. 8) Prizes will be awarded to the participants submitting first, second and third highest scores. All decisions of the C. W. A. Contest Committee will be final.

Here is an opportunity to see how many Connecticut stations you can work in a 24-hour period. Get on the air October 9th and 10th and meet the gang around your section!

are getting on 144 Mc. on LO-Nites. Give it a try, gang. VDY has resigned as OO and may move from these parts. New officers of the Shoreline Amateur Radio Assn. are: PRZ, pres.; IIB, vice-pres.; and MVO, secy-treas. They have a complete emergency rig for 3.5 Mc. KNI has new beam for 50 Mc. REA, in Taunton, is on 50 Mc. LXQ spent two weeks in the hospital. Ex-ILXU now is 6YWQ in Fresno, Calif. He is on 28 Mc. and would like to work the gang on the South Shore. The T-9 Radio Club held its own special Field Day in Andover. PN is working at WCC and will be on from Chatham. The Newton Emergency Net was on with EK and PX for a drill. RBK now is OO Class 2-4. NKW and LQQ have new three-element beams. LMP took an XYL. MCC is back from vacation with the merchant marine. 8AUN visited Beverly. The T-9 Radio Club held a meeting at AINK's to make preparations for the annual boat ride. PYM has Class A license and is on 3.9-Mc. phone. OBN moved to West Roxbury. QJB is keeping most traffic schedules and is going to New Jersey with portable rig. BB just got back from 6-weeks 11,000-mile trip through all W districts. VE3 and XE1, and had a rig in the car on all bands. He worked BDU every night on 7 and 14 Mc. and never missed a schedule. RBK is on 7 Mc. He has a schedule with AKN and kept schedule with KZ5CB, who is returning to U. S. A. HA is on 14 Mc. His XYL has a collection of dolls from all over the world from many of the contacts. RCQ is keeping schedules with 9AUI. MPZ lost his appendix and is rebuilding rig. WU has new transmitter with 75T's for all bands. QMJ worked 119 stations in July CD Party for 88,750 points. QIU is building rig for 7- and 3.5-Mc. 200-watt job. The Boston Hamfest committee is working hard on the October 9th affair at the Mechanics Building in Boston. See you there. Write to ALP for tickets. OLP and his XYL, QON, took a trip by car up to VE1 Land. OJY has rig in his car. He spends week ends at QTH in Chelsea and is in Worcester during the week. EKG and the XYL went on a trip to Canada. NBS is working in radio store in Boston. Traffic: (June) W1BB 16, (July) W1QMJ 38, QJB 15, BB 12, RBK 8, HA 5, RCQ 3, EMG 2, WU 2.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — SEC: UD. RM: BVR. PAM: NY. Vacations and good summer WX sure play havoc with ham radio activities. However, JE, founder of the SSN, still is batting away and has a fine traffic total. Hal is interested in OBS appointment. GZ is applicant for ORS appointment. BVR attended Burlington, Vt., hamfest and also spoke at South Eastern Massachusetts ARA at New Bedford. Perce now proudly displays WAC Certificate. BDV is operating portable at York Beach, Me., with a BC-474 at 8 watts input. MUN enjoyed vacation. PIL is recovering from his fall and gets home from the hospital on week ends. We are sorry to hear that KUX is in the hospital as the result of an auto accident. We hope for a speedy recovery. CH took a trip to California to see how the W6s work. em. RTQ is new call of QO's XYL. FBI RDB is new ORS. KDW lost his skyhook but soon will get it up and will be joining JE's SSN. TBZ has 144-Mc. mobile unit. He has appointed QBV and EAX as Asst. ECs in Fitchburg. The Massachusetts Amateur Radio Assn. has gained eight new members. NLE, OJV, QXV, and UD have converted TR4s for one and a quarter with good results. LDE has new three-element rotary. MBT eliminated BCI with n. f. m. The Springfield RC soon will have a 144-Mc. installation

in its chapter rooms, thanks to the efforts of NLE. COI has done some 144-Mc. work from Greylock but nothing startling, so says Holly. LUD spent his vacation in New Hampshire which ended up with a miniature hamfest headed by MCS. AZW was visited by JHP. Traffic: (June) W1CZ 47, IJT 12, (July) W1JE 271, GYV 4.

NEW HAMPSHIRE — SCM, Gilman K. Crowell, W1AQQ — An enjoyable evening was had at MCS's summer shack in Littleton by CKW, JMO, JNC, LTW, LUD, MMC, and PVF. The boys had a good chance to try out their 144-Mc. rigs during the evening. KEEX reports the 144-Mc. net now is operating from mobile locations and that his own 522 unit is ready for action. GTY is active on 144 Mc. with a 522 unit. AXL is working mobile on 3.98 Mc. The Coos County Radio Club has scheduled its next meeting in September. ARU and KPD were recent visitors of AP on top of Mount Washington. OFR, MUJ, LB, and Net Control LSN can be found on 50 Mc. nightly. The Nashua Club still is actively engaged in construction of its club house. DUB and OMZ have 144-Mc. sixteen-element beams. NMB can be found on 144 Mc. HTO is building a new rig and expects to have it completed soon. CRW reports traffic slow on the C. W. Net, so has taken time to get his 14-Mc. kw. going. PVF reports DX is good in Littleton. The summer net is over, boys, so let's try and drum up a little activity on our many nets. Traffic: W1CRW 62, QJY 14, QJX 6, PVF 3.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — RJN is new ham in Woonsocket on 7-Mc. c. w. days and works evenings. He is a good prospect for the "Swing-Shift" Net. QQU is taking his 522 to Saddle-Back Mountain in New Hampshire, which should make another contact for the 144-Mc. gang in New Hampshire. GNZ is building a summer home at Point Judith and resting the rig. EOF has gone with WJAR, and KOF takes his place at W. H. Edwards Co. QLD has new three-element 28-Mc. beam on the roof. BIL and BFQ are now sporting BC-221s. DDY now is with D'Andretta's Radio Supply House.

VERMONT — SCM, Burtis W. Dean, W1N10 — EWF is on 14 Mc. with 20-watt VFO and 180-ft. end-fed antenna. 2FMQ is operating portable at Chittenden Dam. NH and MEP had 22 contacts on 144 Mc. with six-element beam on Mt. Equinox during ARRL Field Day. IT and PYO have regular schedules on 144 Mc. between Newport and North Troy. ILD/KAI/AK is chief engineer at U. S. Government Radio Station in Manilla, P. I. FYL, OHD, PIT, QQN, QVS, and Dick Strom took a boat trip to Valcour Island and tested emergency equipment. PTB, OKIH, and QHT have Class A tickets. New Vermont hams are RGV, RMX, and RNF. XYL of QXU. RLS has Collins 75A receiver and 32V transmitter. AVP and OKH have OBS appointments. 2KBB and 2PVS were visitors at BARC meeting. The following appointments have been endorsed: AD, AZV, MEP, and NDL as EC; BJP as OO; MEP as OES; AVP as OPS; PAL as ORS, EWF, GQJ, QXU, and RGV have joined AEC. Traffic: W1AVP 10, EWF 10.

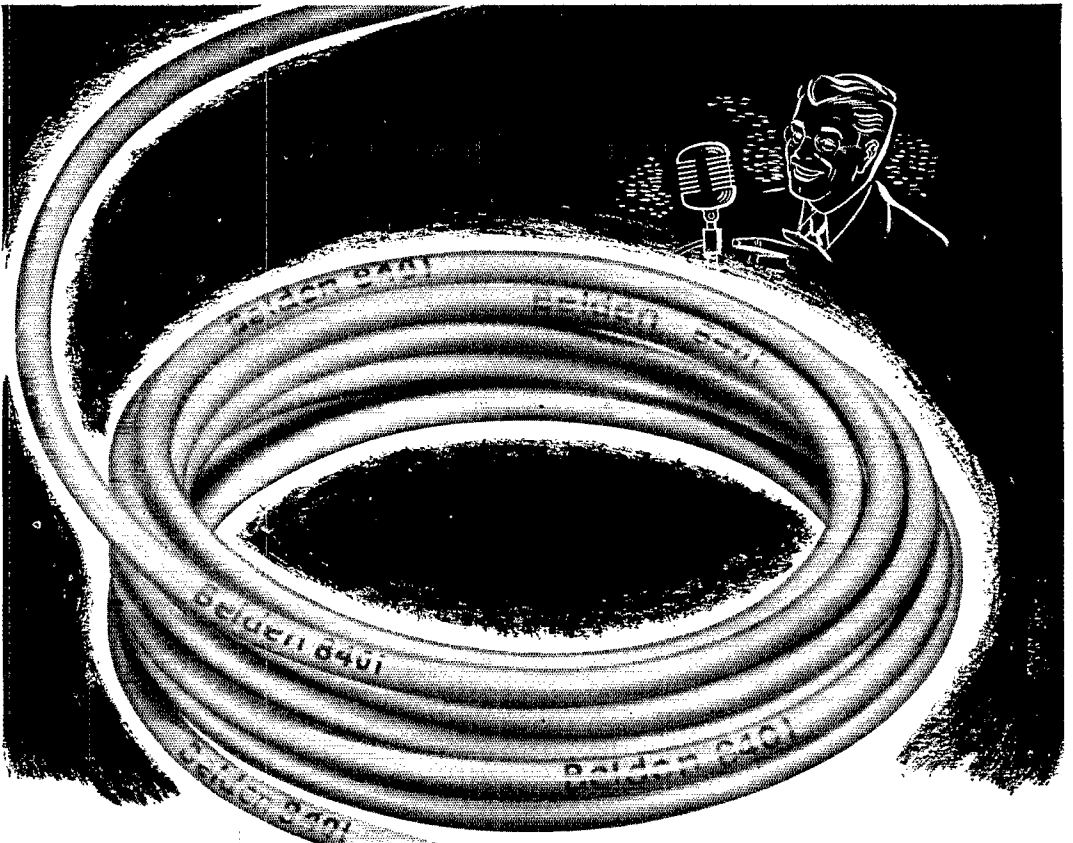
NORTHWESTERN DIVISION

ALASKA — SCM, August Hiebert, KL7PQ — One of Alaska's most active and well-liked amateurs, Wally MacDonald, KL7EU, passed away in Anchorage after a short illness. He was an old-timer in the Territory in length of years as well as amateur activity. He lived in Anchorage where he became well known for his activity on 3.85-Mc. phone. Wally will be long remembered for his keen interest in the amateur fraternity and his services to fellow Alaskans. RI reports organization of a new club in Ketchikan. He is temporary chairman and RU is temporary secretary. Ex-KL7GT, who transferred to CAA in Washington a year ago, has purchased a new house for his family, which has been increased to include George Jr. Juneau has lost three active amateurs recently. AF has taken a new assignment at Grand Island, LD has been transferred to the Signal School, and EH has gone to the Iliamna Lake CAA station.

IDAHO — SCM, Alan K. Ross, W7IWU — Sandpoint: BEO is "reactivating" after ten years, on 3.5- and 7-Mc. c. w. Mountain Home: IY schedules KL7LJ and W7KPL/ KL7 with Seattle traffic. (Note: PABL is looking for Idaho and Utah on 14,010 kc. between midnight and 2 a.m. MST.) Downey: LQU, with the UPRR, is on 14-Mc. c. w. now. Twin Falls: KEK moved to new QTH with plenty of sky-hook room. Burley: LQN, on 7-Mc. c. w. only, reports interest in emergency and traffic nets. Kendrick: New calls are MGL and MHR, Ben P. and Bennie Cook. American Falls: DMZ has been busy harvesting. Boise: HPH is new EC. GTN alternates NCS for FARM Net with TST. IWU can go 3.9-Mc. mobile anytime. Gang, I'm moving to 2105 Irene St., so write me there now. You appointment holders: Let's be active this fall and winter. Remember the FARM Net on 3935 kc. Gem Net on 3745 kc. Traffic: (June) W7LQN 20, (July) W7IY 16, LQN 12.







MONTANA — SCM, Fred B. Tintner, W7EGN — There were 122 registrations at the WGIPPH and the Waterton-Glacier International Peace Park Hamfest Assn. was formed with BXL, pres.; DSS, vice-pres.; and VE6SR, secy. The North Montana Radio Club alternately meets at

(Continued on page 74)



MORE HOURS OF SERVICE

**MICROPHONE
CABLES**

-  **8411**
-  **8401**
-  **8422**
-  **8410**
-  **8412**
-  **8423**

Belden
Radio WIRE

members' shacks in various cities in Northern Montana, East of the Divide. It is dedicated "for the advancement of the art of Amateur Radio in this area." Officers are: JIZ, pres.; and IWI, secy. The Glacier Radio Club now is affiliated with ARRL. The Montana CAP has an FB organization of about fifty members and is looking for more. For further information, contact DPK. CT has new break-in system and reports another new active ham, MKV, for Billings. BSU, at Browning, is QRL preparing his rig and antenna for ORS, TL, and CAP activities this fall. EWR is new ORS in Great Falls. BNU gets code practice on OBS job and if you can't read some words, pardon the land-line characters. Your SCM has a file of Montana radio clubs and correspondence between clubs may be forwarded via him. With the new mobile all-bands ruling in effect, club activity and EC work should be on the upgrade. Traffic: W7CT 8, EGN 6.

OREGON — SCM, Raleigh A. Munkres, W7HAZ — Reports were down to two last month, hence no write-up in this column. Reports are picking up, which is a good sign that fall activity will soon be underway. The Pendleton Club forwarded a newspaper spread complete with large pictures which is the best I've ever seen concerning amateur activities. The Pendleton Club is raising a 50-ft. pole and is putting up a 70-ft. vertical. MQ was on the job during the flood in Portland. BEE has new car complete with 28-Mc. mobile. BUS and KTF are building new homes. AEX is Net Control for AEC. Medford: SEC HLF made a trip to Portland to confer with Portland EC DIS. Klamath Falls: HOX and IPI have been running the radio school at Oregon Vocational since GPZ left to go with the cops in Oregon City. Steve Takacs now is 6DRG merely because he lives a few feet "south of the border." HVD now is OPS. Astoria: All the gang were kept busy during the recent Columbia River flood. COZ remarks that it was possible to spot a ham by the haggard look from loss of sleep and long hours at the mike and key. Philomath: Route Manager APF now calls Philomath home and will soon be back in the swing. All he needs now is a couple of poles and a little more time. FNZ has been holding down the net during Don's move. Note to all appointees: Don't forget to request renewal of your appointments as they fall due. Traffic: W7HYD 64, FNZ 29, JLU 2, MGO 2.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — The Valley Amateur Radio Club, at Puyallup, set up a booth in park during "Ezra Meeker Days" celebration and made many friends and handled lots of traffic. The shack was a very neat professional-looking job and created much favorable comment and a million questions from the crowd. Those who helped with the traffic were EHJ, IVJ, HZ, KHL, MCV, MPH, JJK, HMQ, and LEC. All traffic was relayed via WSNET and WARTS. EYS and KWC are the only OBS to request new certificates. BTV installed a pair of 250TLs in his final. WSNET had a big picnic at Redondo Beach and all the real Brasspounders in the State were there. The highlight was the cake that Maryann, FWR, made. It had the calls of all the gang on WSNET on the frosting. ZU beat RT in the c. w. copying contest for first place. ETO traveled the farthest to attend. The only "phone man present was RAO. The North Seattle Radio Club set up an operating booth at the big "Lake City Pioneer Days Celebration," where great stacks of traffic were originated by the public. The great trouble was in trying to keep the checks down, as many of them ran over 40 words. The "phone men who operated were COS, HX, MXT, JNC, JXR, and KIH. C. w. operators were KIH, RAO, and ZU. All traffic was cleared via WARTS and WSNET. FWD is building power supplies for Command sets he has converted. JC reports his gas station was held up. Van says it's OK as the thieves didn't find his rig. KWC says that the Mt. Baker Radio Club will have a station at Whatcom County Fair and that the club had a shack set up at "Old Settlers" picnic near Woodville and collected a pile of traffic. Those pounding brass were MCT, MBY, KCZ, LOQ, HDG, KWC, and BLP. We hear that the reason FRU didn't show up at WSNET picnic was because his XYL got wind that he was to be beauty judge. KNV is building a new shack. BL says 14-Mc. DX is very good now. GHI wants to work more locals on 28 Mc. CZY reports many contacts with 6ERS, 7, who is hitting all the mountains from California to British Columbia. He works WSNET and T. L. "A" on schedule and will take traffic for anywhere. CWN is building a shack in the garage. JWD and LJM QSOed on wired wireless. WSNET needs Eastern Washington traffic outlets. Traffic: W7CKT 1482, FRU 246, RAO 181, CZY 109, ACF 85, LEC 73, FWD 72, ZU 27, KWC 18, BL 13, BTV 9, KNV 7, GHI 4.

PACIFIC DIVISION

HAWAII — SCM, J. F. Souza, Jr., KH6EL — BW, the hardworking RAJ, of the Pineapple Net, now is retired from active service with the Navy and is working with CAA. PX is taking over as NCS for the Pineapple Net. LG raised AC4YN with his three-element beam atop his garage in the process of being tuned and now is reluctant about raising it to its original position atop his 60-footer. BA is having good DX with new three-element beam and BC-610. Being QSL Manager assures his early receipt of those treasured pasteboards. DK's dream of a kw. is rapidly

becoming a reality with a pair of 100THs to a three-element beam. PAI is on 14-Mc. c. w. with single 807. ED is using single 35T on 14-Mc. c. w. to sneak the illusive ones from the kilowatts.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBK, RM: CIS. ECs: CFK, TFF, and JSB. PBV reports from VQ4 Land, where he is spending some time with VQ4ERE. Bob expects to go to Arabia to visit his father, W6YEZ, before returning to this country. The Expedition had best results in making contacts while it was in Tanganyika under the call of VQ3HGE, working 122 countries and 39 zones, and lacking only Montana to make WAS. WJMJ sent in a nice traffic total. He spent a ten-day vacation at Huntington Lake, where he worked portable on 3.5 and 3.9 Mc. using 12 watts. CZG is new on the air in Mt. View. THY is using cage for antenna. 2ISQ/6 has received his modification to 6ISQ. WNI says he could not reach an agreement with the power company about using its poles for sky wire. He now is using Vee with 138 feet per leg. His score in the CD Party was 548,980. MMG made a vacation trip to New Hampshire. Al plans to rebuild to a pair of 812s in final. YMH and ZID are working 14-Mc. DX. RFF worked ON4 for a new country. TBK can be heard on 14-Mc. 'phone at times as he has received his Class A ticket. DJG keeps 28 Mc. open late at night for contacts into Atherton. CFK spent vacation in Minnesota. Ex-DZE is on 3.9-Mc. 'phone from Lakeview, Ore., with the call 7MLJ. ZUJ entertained VHE, TAN, MPS, NYS, and his XYL, AVJ, WNM and his XYL, VIQ and his XYL, and BPT and his XYL at a birthday party. Traffic: W6WJM 102, VZE 13, MMG 6, SYW 2.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, ZB, and WGN. OT, the Oakland Radio Club, is a new OBS appointee and doing an FB job. YHI has deserted 28 for 144 Mc. ZZF is burning up the air with an 829. SKI is using 809 final. YBX is using an HT-9. RRG is doing FB in running the North Bay Amateur Radio Assn. CZQ, DNX, and KEK took rigs along on their vacations. OJW is QRL a new jr. operator. BF is QRL work these days. EJA is taking a much-needed rest. YDI just finished building six 60-watt 'phone transmitters to be used in Belgian Congo. FDR turned in a 2046-message traffic report which is the highest for this section in years. ZUI is looking for those QSL cards. VDR converted BC-454 to a. c. for the XYL. LMZ is in an A1 summer slump. TT now has 175 postwar countries on c. w. and 102 on 'phone to lead the East Bay gang. PB is doing an FB job as editor of the *DX'er*, a Northern California DX Club publication. IDY is rebuilding his antenna farm. WP is trying out a vertical on 14 Mc. BUY is getting back on the air in new QTH. IKQ is QRL a much-needed rest from radio. FXX is going around with a nice smile on his face these days. Wonder what's up. UPV is making changes in his rigs. AED is keeping his fingers crossed. Hope they don't sell his house. DUB is in there plugging at that rare DX. NZ is getting to be a real DX'er. ASJ is burning up the airways on 28-Mc. 'phone. Have you seen YL's QSL cards yet? Better have a QSO with him and get one. MEK is getting about four hours sleep each day looking for that strange stuff known as DX. ZM sends 73 to his many friends. CDA still is QRL. CGG got his first batch of QSL cards from the Bureau and his wife still is sewing buttons on his vest. NOW has moved to Concord. Take note, you locals. The East Bay section members regret the death of MGC, SCM of the Sacramento Valley section. John was a great guy and will long be remembered wherever hams gather. EY has returned from vacation but speaks of everything but fishing. GEA now is on project NO. 2013. HS paid his old home town a visit along with SS, who now is 7SS. To keep posted and to keep that old ham spirit everyone should belong to some radio club. Clubs are the background of ham radio and an outlet of goodwill and organization of our grand hobby. Traffic: W6FDR 2046, VDR 153, ZUI 72, TT 17, BF 13, YDI 12, EJA 5, LMZ 2.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457. SEC: DOT. ECs: BVS, WB is building new radio room. Bud has 170 countries worked now and soon will be back after more. Better catch up with him now or never. WN is moving to new QTH. Yes, there will be another kw. up on Kilowatt Hill with the rest of the boys. ATO, now being surrounded by kilowatts, has been giving his rig a daily diet of Vitamin (B) and with frequent visits to Dr. Buckley expects soon to be the proud papa of a healthy kw. RBQ is pursuing DX. He just snagged AC4YN to make it 161 countries. BVS and family have returned from a month's vacation. CHP and VW are busy building portable-mobile gear. MBG is working to get his BC-1308 rig on 3.5-Mc. 'phone mobile. JWF is looking over his BC-1306 for mobile service. Frank says the receiver works FB in mobile service. SWP is on 7- and 480 Mc. c. w. He also is trying out low power on 144 Mc. 140 watts to a pair of HK257Bs. An old-timer, EPQ, is back on the air and going places. Keith says it seems good after being off for ten years. During July he has worked 7FDJ, Mt. St. Helens, Oreg., and 7ILL, Big Piney, Wyo., on 50 Mc. He also has worked 7 Africans and 14 Europeans on 14-Mc. c. w. Keith is using a fifty-watt Harvey Wells transmitter on an underground antenna and an HT-9, 150-watt rig on a "V"

(Continued on page 76)

*Which Capacitor
for what?*



get the right one from G-E...

These capacitors are identical, electrically. The different case styles were, most of them, developed for specific applications. However, since the capacitors *are* electrically the same, it is perfectly practical to use them interchangeably—to use a ballast capacitor on a motor, or a motor capacitor with a sign transformer.

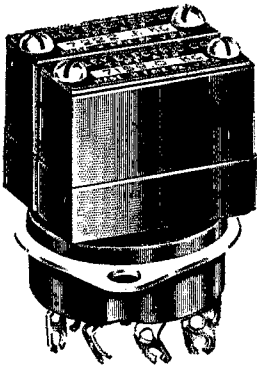
We have made just such proposals at times—and have frequently been

able to help manufacturers solve an unusual mounting or space problem, and cut their capacitor costs by recommending a unit not normally thought of for the application.

The capacitor that *you* should use of course depends on your own problem. For assistance in any specific case, get in touch with the nearest G-E Apparatus Office, or write *General Electric Company, Pittsfield, Massachusetts.*

GENERAL  ELECTRIC

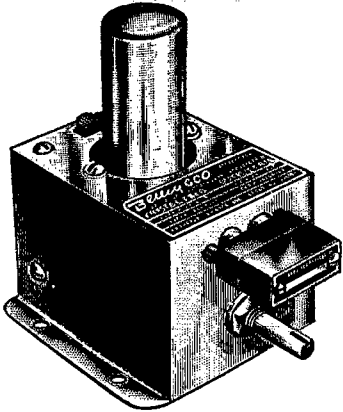
CRYSTALS



TYPE AX2, the first plated crystal for amateur frequencies, is just one example of the advanced design and "techniquality" that are yours in Bliley crystals... first on the amateur bands since 1932.

Ask your Bliley distributor for BULLETIN 35

OSCILLATORS



CCO-2A another Bliley "first" — a completely packaged crystal controlled oscillator for the 2-6-10-11 meter bands. An ideal nucleus for new construction or conversion of existing equipment. Uses Bliley Crystals Types AX2 and AX3.

Ask your Bliley distributor for BULLETIN 35

Bliley CRYSTALS

BLILEY ELECTRIC CO. • UNION STATION BLDG. • ERIE, PA.

beam northeast and southwest and rhombic east and west. He has just taken his Class A exam but hasn't heard as yet. Good luck and welcome back, Keith. HJP has taken the job of instructor at the air ROTC summer camp at Chanute Field, Ill., and his previous plans to visit San Francisco this summer have fallen through. He will be pounding brass again at PDSF during the fall and winter months. ERS reports in from Benchlake Forest Camp, Mt. Adams, Wash., where he is spending his vacation. He has along some gear and can be contacted at 6ERS/7. Not sure what band he is on, but he is a 14-Mc. c. w. man. The monthly meeting of the San Francisco Radio Club was held July 23rd at the American Legion Hall, 1641 Taraval St., San Francisco. The speaker of the evening was Mr. John Kaar, of the Kaar Engineering Co., Palo Alto. His subject, Vibrator Power Supplies, proved very interesting to all and especially to those mobile minded. Work has begun on the Red Cross Regional Radio Station with the arrival here in San Francisco of Mr. Cordorman from the Red Cross Communications Office at Washington, D. C. We are being given full cooperation, not only by the National Red Cross but also by the San Francisco Chapter. Those of you interested in Emergency Corps work will soon be given definite plans through your Coordinators. Traffic: W6JWF 50, BYS 12, ERS/7 11, NL 10.

SACRAMENTO VALLEY — Acting SCM, Ronald G. Martin, W6ZF — SECs: KME and BVK. RM: REB.

John R. Kinney, W6MGC

Members of the Sacramento Valley section were saddened to learn of the death by accidental electrocution of their SCM, John R. Kinney, W6MGC, on Sunday afternoon, July 25th. John had been working on one of his small transmitters when he accidentally contacted 500 volts. He leaves a wife, and a daughter, age 2. His interests in amateur radio were endless and his enthusiasm was an inspiration to young amateurs. In club work and section activities he always tried to do everything for the good of amateur radio. His sudden passing comes as a great shock to all of us who worked closely with him.

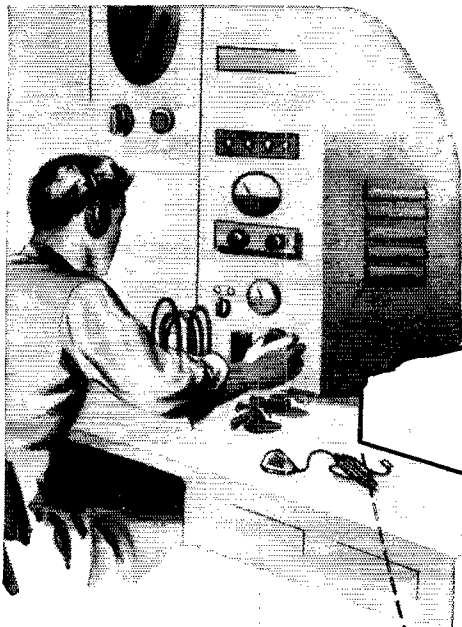
Since MGC's passing came so suddenly at the time when he was compiling the section report, please bear with us and the next issue of the section report will contain all the information you members have forwarded. It will take a month to straighten out all of the affairs and it is hoped that a large newsy report will be published next month. Please forward all reports and information to the Acting SCM at 3820 Second Avenue, Sacramento 17, by the end of each month. The hamfest at Chico in June was a big success and the hamfest committee is to be congratulated. Each year sees a better hamfest than the one before. The Chico fellows are really grand hosts. See you all there in 1949!

SAN JOAQUIN VALLEY — SCM, Ted R. Souza, W6FKL — Asst. SCM, James F. Wakefield, PSQ. UVN is still on 14 Mc. with low power and enjoys it. FJD has outgrown the old shack so he's building a new one. JWK is thinking of more power. YWQ, now in Fresno, is ex-ILXU, ex-1KTH, and is active on 7 and 28 Mc. DVL is new call in Fresno. JPS is newly-appointed SEC. Other new appointments are: KUT, EC for Fresno County, and PHL, EC for Merced County. There are other appointments open, fellows, so let's have your applications. OHB keeps Merced on the map on 3.85 Mc. PGZ is on the engineering staff of KYNO; he has a new kw. nearly ready for 3.85-Mc. phone — no connection between the two. EXH is still busy on 144 Mc. LTO is proud father of his first jr. operator. BNP has forsaken the lows for the highs and is having his troubles. MEY is quite busy with Mission Trail Net and helping to organize local Civil Air Patrol Squadron. PSQ is taking in the slack for winter operations. YE, at Fresno State, and AHO/6, at Huntington Lake, have maintained traffic schedules all summer. Traffic: W6YE 195, AHO/6 134.

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CVB — There were no reports received last month, hence no write-up for this column. It seems as if activity hit an all-time low for the summer months although we know that several fellows are busy installing mobile rigs, getting new rigs in shape for the coming winter, and rebuilding in general. MR has plans for a newer and better beam stacked with a ten over twenty. AIT is working some 3.85-Mc. phone and has a mobile rig going. CXI is having fun with a new 3.85-Mc. mobile job. The North Carolina phone gang has been active during the warm weather. The ol' N. C. Emergency Phone Net meets nightly. The N. C. Traffic Net will be in full sway again come traffic season so look

(Continued on page 78)



*What's missing
in this
Ham Shack?*

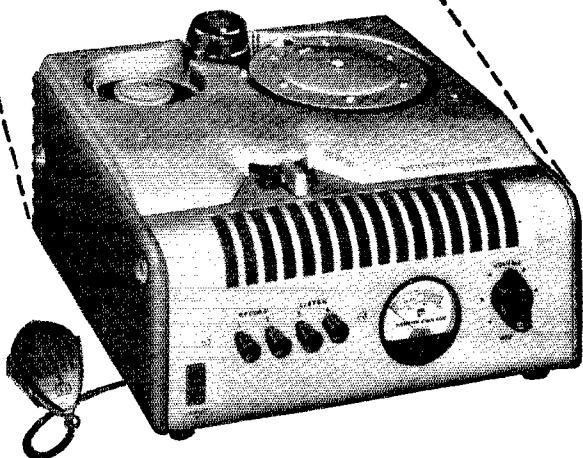
RIGHT!

**A WEBSTER-CHICAGO
MODEL 78
WIRE RECORDER**

The Webster-Chicago Model 78 Wire Recorder is a real asset in ham radio operation. It takes input from microphone, phono pickup or direct from your receiver. Outputs for external amplifier or speaker. Push-button control makes Model 78 easy to operate while you are on the air, and provides all desirable recording, playback, and erasing combinations.

Record your QSO's. Test your modulation levels and the quality of your rig. Model 78 is ideal for handling traffic . . . no chance of error in relaying important messages.

Model 78 makes a *Complete* ham shack. Try it and you won't be satisfied without one.



Stop in tomorrow and see the Webster-Chicago Model 78 Wire Recorder at your favorite ham supply house. If you use a wire recorder now check on Webster-Chicago Pre-tested Recording Wire. It pays to use the best . . . pre-tested for your protection.



WEBSTER-CHICAGO

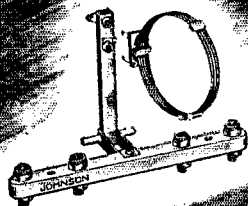
5610 BLOOMINGDALE AVENUE • CHICAGO 39, ILLINOIS

Now...

IMPEDANCE MATCHING

with NEW

JOHNSON PLUG-IN LINKS



Now, for the first time, the amateur can avail himself of matched plug-in swinging links and matched inductors that are built to commercial standards. With the new JOHNSON PLUG-IN SWINGING LINK, the days of inefficient compromise are over — attempting to use a single link with any transmission line regardless of frequency or line impedance. The new JOHNSON Plug-In link assembly permits the correct link to be used on any band — not only with JOHNSON inductors but with all conventional, competitive inductor assemblies. Simply plug in a link with the necessary turns to couple your line. Various links are available for anything from 50 to 600 ohms line impedance. Shaft permits front panel control.

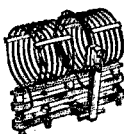
Because of the different JOHNSON Plug-In links that are available, all transmission lines from 50 to 600 ohms impedance can be coupled without any antenna tuning network, if the line is near balance at the antenna feed point. At most an amateur may require but three links, for this number covers an entire 6- to 80-meter inductor series in one power size.

Better Efficiency And Harmonic Reduction

Better efficiency and harmonic reduction are secured through the availability of two fundamental types of inductors for each band — inductors designed for use with either high-voltage low-current tubes and inductors designed for use with low-voltage high-current tubes. Each of these models is available in 150, 500 and 1,000 watt ratings. Also available in all power sizes is a complete line of semi-fixed link inductors.

Coils, jack bar assemblies, swinging link arms, etc., fit present-day competitive components. Buy what you need — all are packaged individually.

See Them at Your Dealer
or Write for
New JOHNSON Inductor
Catalog



JOHNSON

a famous name in Radio

E. F. JOHNSON CO. WASECA, MINN.

around 3605 kc. nightly. KJS, our EC, has plans underway for a greatly expanded Emergency Corps. Please cooperate with Charlie and join the Emergency Corps. IMH has been rebuilding, and to our knowledge possesses one of the very few emergency power supplies that has never quit — he owns his own generating station on a small stream and has never been flooded out. MPF is new ORS down Greenville way. KYI now is known as "Our little Nil" as well as "Gabby." DLX, DKG, GKG, and CYB are busy on 144 Mc., all experimenting with beams of many varieties. How about some more 144-Mc. activity? We know many of the gang are getting on, so let's hear from you. Please send in reports on your various activities for this column.

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE, ANG — MPS reports that the Clemson Club call is ETP and that EPJ and FFO are on the staff of professors at Clemson. BR reports that NNF is a new ham in Chester. Glad to report that BR's son, BJE, is out of the hospital and is much improved. I am indebted to DX for the news report. NZF is a new-comer at Manning. BAT and the gang at the Lab are on 28-Mc. phone. GFP has 600 watts on 28 Mc. DX has 28-Mc. mobile rig. MTW reports from John's Island that he has 30 watts on 3.5 and 7 Mc. Thanks to ANK for the report from the Charleston Club. MRJ says, "Listen to my signals when the net reopens." HTR is rebuilding with 813 final. CE is active in the Cracker Net. IZD made a trip West. DNR plans 812 p. m. with final bias supply. EDQ visited the Charleston Club. DFC, on 14-Mc. c. w. has a new shack on the Isle of Palms. ANK says his next job is to eliminate key clicks. CZN has a pair of 813s in the final. BIZ keeps schedules with LTW and 5KTF. HEV works on 3.85-Mc. phone. NZA is new Columbia ham. ANK, our new Section Emergency Coordinator, needs your help. Let's all help him put this Section on the map. It's our duty. Traffic: W4ANK 31, BIZ 25, MRJ 5, CZN 2, HTR 2.

VIRGINIA — SCM, Victor C. Clark, W4KFC — RAs IA, BZE, and KYD announce the formal reopening of the Virginia Net on Oct. 1 at 7:00 p. m. EST on 3680 kc. All active Virginia amateurs are urged to consider the merits of affiliation with VN. Do not make the mistake of regarding the Section Net as the sole property of the "traffic pushers," as its basic function is to provide the foundation for a really efficient emergency network in time of disaster, and your participation in net activities insures a degree of preparedness not otherwise possible. Regular attendance, though desirable, is not necessary, neither are high power nor high speed code ability required. New appointees: ORS — CC, FV, LRI, VE, OBS — IWO. The SCM would appreciate hearing from all appointment holders. FV is DXing on 14 Mc. until 3.85 Mc. recovers from QRN. ILI has new QTH and is raising antennas. BSB, with 100 watts and a three-element beam, is cutting a swath on 14 Mc. IML received a Public Service Certificate for work during the Florida hurricane. NCK writes that MQM has 15-watt VFO on 3.5, 7, and 14 Mc. JXH nailed Chicago for first contact with mobile rig. NRO nabbed his first W6. NXXN, a new ham in Newport News, is active on 7 Mc. AKN is constructing a five-element wide-spaced job for 144 Mc. 2YMY/MM recently was active in the Norfolk area. NLV QSOed KL7. The "Over 100" Contest is underway in the Tidewater area. DHZ schedules EL5B. KJT is back from HB9. KXN and NNN received DXCC Certificates. IA and KFC attended the National Convention with 3WU and 3KZQ. KVM worked ZP3AW on 7 Mc. BTO and LIQ visited PVRC. The Arlington club held a shindig at IWO's place. SU is grooming the rig for 3.5-Mc. DX this fall. QY, a dyed-in-the-wool 144-Mc. 'phone man, is setting his sights on the c. w. SS Contest! Traffic: W4KVM 5, KFC 4, IWO 2.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — The West Virginia C. W. Net will operate on 3770 kc. starting Oct. 1st. The net meets at 7:30 p. m. Monday through Friday. 1BUD, of Headquarters, visited MARA at Fairmont. IQVF, ex-8YCK, visited West Virginia hams while on vacation from operating duties at W1AW. FMU has new 28-watt 28-Mc. mobile rig. AHU, of Grafton, lost his life while swimming. OIC, new ORS in Mason County, is active on 3.5 and 7 Mc. JM won the West Virginia QSO Party Contest, followed by DFC and YBI. ESQ has 3.85-Mc. mobile rig with one-watt output. CCN has new 809 final and is working 14 Mc. CSF, EC for Kanawha Valley, has been converting surplus gear for use in emergency tests. ESQ, JAI, Rhodes, and YGL attended Civil Air Patrol Maneuvers at Camp Dawson. EHA has new 28-Mc. beam and is running tests on 50 and 144 Mc. with FEO, who has been confined at home because of an auto accident. 2GM, of WGY staff, visited State amateurs while on vacation. DFC loaned CLT his Stancor 60P. BWT has new three-element 28-Mc. beam. DNN reports there will be news soon on his underground antenna. HUG will be active on West Virginia Net and the Pittsburgh to Cincinnati Flood Net. Traffic: W8GBF 5, JM 4.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, W8QYT — IC, who has moved to a new QTH, is on with a pair of 807s and HQ-120. AGX is working the 28-Mc. band with a two-element wide-spaced beam and Globe Trotter transmitter. (Continued on page 80)

BE SURE YOU'RE ON THE BAND

KNOW YOUR MODULATION PERCENTAGE

MEASURE YOUR FIELD STRENGTH

With the Simpson Model 380

WAVEMETER and MODULATION INDICATOR . . .

Although Model 380 is no larger than a man's hand, it has the fine Simpson meter movement and precision engineering that assure lasting accuracy. It is protectively housed in a cast aluminum case.

You can spot your transmitter at any desired point on the band, keep constant check on percentage modulation, monitor the quality of your transmission or plot antenna field patterns. Also, you will find the Model 380 handy for searching the region between bands for harmonics and parasitics, and indicating changes in actual radiated power output. All readings are clearly and instantly indicated on a direct-reading dial.

For even greater utility, the Wavemeter is equipped with a two-foot long antenna that can be plugged into the panel well on those occasions when field strength indications are desired. Separate coils for the 10, 20, 40 and 80 meter bands, and individual, hand calibrated curves, are also furnished.

You will find that Model 380's convenient size, accuracy of calibration, and wide range of utility make it the most useful ham instrument produced in recent years.

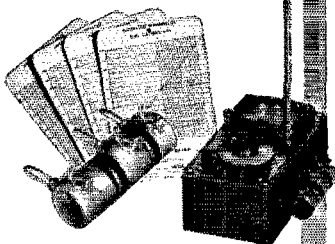
Size: 2" x 2 1/4" x 5 1/4"

Weight: 1 3/4 lbs.

Shipping weight: 2 1/2 lbs.

Dealer's net price, complete with 4 coils and 2-ft. antenna\$37.85

Leatherette-covered carrying case with separate compartments for the instrument and four coils\$6.75

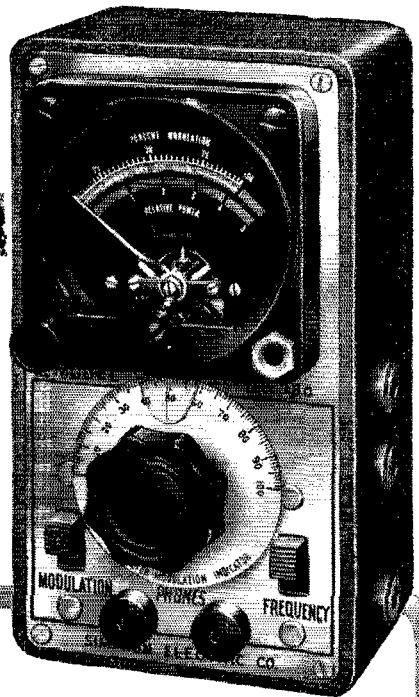


SIMPSON ELECTRIC COMPANY

5200-18 West Kinzie Street, Chicago 44, Ill.

Simpson

INSTRUMENTS THAT STAY ACCURATE



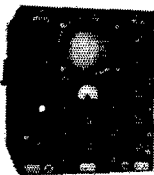
Important WAVEMETER Features

1. An accurate wavemeter, band-spread for each ham band with individual hand-drawn calibration curves and a sensitive 0-100 microammeter as a resonance indicator.
2. Separate plug-in coils for each of 10, 20, 40 and 80 meter bands supplied—coils for other bands available at slight extra cost.
3. Additional between-band coverage available at the flip of a switch.
4. Extremely sensitive field strength indicator calibrated in relative power output, for antenna adjustment and field pattern measurement.
5. Push button switch for dual meter sensitivity plus provision for a plug-in antenna covers all possible field strength conditions.
6. Provision for head phones for use in station monitoring and quality control.
7. Finally, a direct reading Percentage Modulation Indicator, with the instrument calibrated 0-110% Modulation.
8. Designed to function on the 144, 235 and 420 megacycle bands without coils, but with a quarter wave antenna section. Reads field strength and percent modulation and spots the band at these frequencies.
9. Compact in size and completely shielded in an attractively finished cast aluminum case.
10. Extremely rugged in construction, with all parts securely held in place to assure permanent accuracy.
11. To be used as a field strength indicator to determine radiation pattern.

Ask your jobber, or write for descriptive literature

**Laboratory and
Research Instruments**
ENGINEERED FOR ENGINEERS

**OSCILLOSYNCHROSCOPE
Model OL-15B**



Provides a variety of time bases, triggers, phasing and delay circuits, and extended-range amplifiers in combination with all standard oscilloscope functions.

THESE FEATURES ARE IMPORTANT TO YOU

Extended-range amplifiers: vertical, flat within 3 db 5 cycles to 6 megacycles; horizontal, flat within 1 db 5 cycles to 1 megacycle ● High sensitivity: vertical, 0.05 RMS volts per inch; horizontal 0.1 RMS volts per inch ● Single-sweep-triggered time base permits observation of transients or irregularly recurring phenomena ● Variable delay circuit usable with external or internal trigger or separate from scope ● Sawtooth sweep range covers 5 cycles to 500 kilocycles per second ● 4,000-volt acceleration gives superior intensity and definition.

For complete data request Bulletin HO-4810

SWEEP CALIBRATOR Model GL-22

This versatile source of timing markers provides these requisites for accurate time and frequency measurements with an oscilloscope:



Positive and negative markers at 0.1, 0.5, 1.0, 10, and 100 microseconds ● Marker amplitude variable to 50 volts ● Gate having variable width and amplitude for blanking or timing ● Trigger generator with positive and negative outputs.

Further details given in Bulletin HC-4810.

**STANDING WAVE RATIO METER &
HIGH GAIN AUDIO AMPLIFIER**



Standing wave voltage ratios are read directly on the panel meter of this sensitive, accurate measuring instrument. ● Frequency range 500 to 5,000 cycles per second ● Two

input channels with separate gain control for each ● "Wide-band" sensitivity 15 microvolts full scale ● "Selective" sensitivity 10 microvolts full scale ● Bolometer crystal switch adjusts input circuit to signal source.

Write for Bulletin HA-4810 containing full details of this useful instrument.



BROWNING
LABORATORIES, INC.
WINCHESTER, MASS.
ENGINEERED FOR ENGINEERS

JOR, a new ham living in north Denver, operates on 28 Mc. with 40 watts. WAP is on 7271.7 and 7010 kc. with 150 watts in Harrisonville, Mo. Mac would like to work some of his old QTC buddies in Colorado again. LZY and the traffic gang are getting ready for winter traffic on the TLS Net, which ARRL is going to make official in October. MOM, in Lamar, schedules CUG, in Boulder, every day at 6:00 A.M. AML has taken his Class A exam and expects to be on 3.85-Mc 'phone soon. The Coffee Club is active each morning from 6:00 A.M. on. The frequency is about 3975 kc. and all you need to do to join is to get on the frequency and break with your call between transmissions and you are in. OWP, PGX, MGY, 5DVH, 5DDM, 8OTR, and sometimes QYT are the regular gang. CQR has been busy directing the mobile visitors around Denver as they enter town and Harry is doing a fine job with his telephone inductive patch which does work FB. VGC is putting up a 14-Mc. antenna. RX, in Grand Junction, is on 14 Mc. with the Civil Air Patrol HT9 and will be on 3.85-Mc. as soon as the final coils arrive. Greeley, Colorado Springs, and Durango soon will be on with the same set-up. IQZ still is working the DX on 14-Mc. c. w. Traffic: W8LZY 30, MOM 6.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — FYR is rebuilding his VFO and rack and panel job. FT will be QRT for a few weeks while setting up his gear at a new QTH. SP finds time to build a new VFO and exciter unit and maintains close watch on 50 and 144 Mc. UTM maintains a weekly emergency test with battery power and is cooperating with the Red Cross. PJS soon will have a kw. on 144 Mc. UOM is back on c. w. exclusively after losing his modulation transformer via the fireworks route. TPV soon will be heard on 144 Mc. with an SCR-522. BIN was appointed EC for the Salt Lake City area. Form 1 reporting cards are available upon request. Please use them for reporting no later than the first of each month. Traffic: W7TST 21, SP 3.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW — Communications from Dauphin Island to the mainland were successfully rendered by UL, DTV, IBZ, MRL, MKK, and WKRQ during the Alabama Deer Sea Fishing Rodeo on 3870 kc. and 144.138 kc. DID has Class A license and 20-w. p. m. Code Proficiency Certificate. DYM is aboard SS *Wild Ranger*. CYV recovered from broken leg sustained while painting shack. FSW has 32-element 144-Mc. beam. ALA finally received a "J" QSL. FUJ lowered his 28-Mc. beam from treetop to housetop. EBZ uses pair of 4-125As in new final. MXU awaits transfer to D4 Land. JYB worked a ZL on 28 Mc. at 60 m.p.h. returning from W6 Land, using mobile ART-13 rig. LHW and LHV cooperate on a BC-459 on 7 Mc. FJN has bandswitching rig with 807s in final. MIH uses a 459 on 7 and 14 Mc. and works DX. MJK is promoting 144-Mc. activity. KVQ uses p. p. 807s on 3.85 and 14-Mc. 'phone. MFA qualified for Class A license to work 3.85 Mc. New calls at Auburn are NQA and NQH, and API is call requested for Alabama Polytechnic Institute. New rig at LRE uses 811s in final and same in modulator. Traffic: W4GJW 5, MXU 5.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — The East Florida Emergency Manual has been distributed. If your copy did not reach you write to SCM. Write BYF for dope on official Weather Bureau rebroadcasts. Have YOU joined the AEC? Clubs: Your recommendations for EC should be made each year. New QTHs: At Jax: EEW, GIP. At Tallahassee: NN. At Gainesville: GEJ. At Ft. Myers: LJM. At Lake Placid: BYR. AEC: Orlando reports a tie-in with Western Union. St. Pete has new set-up with the Red Cross and Western Union. BYR is new EC and has a tie-in with Police at Lake Placid. The new AEC gang in Sarasota has a tie-in with WSPB for emergency power. Net members: The traffic season is opening with a bang. Call in and urge others to do so. Write AYW and IKI for net schedules. New appointments: WS and AYW are OPS. IMI is EC. Jax: HRB is getting after more DX on 7 Mc. with 813. GIP ran up a nice score in the CD Contest. Miami: BXL made WAS with 16 watts. BT has 75A-1. BYF reports W4FVI/KX6 on 14,039 kc. every morning at 0300-1200 GMT. MKP has p. p. 812s ready for traffic season. MKP called on friends in the State during a vacation trip and was a welcome visitor at the SCM's. It's the Air Force for IJE. St. Pete: It's Class A for MCA, MCT, and LTE. GAC is running half-kw. plus 15-kv. emergency supply. St. Pete boasts of 15-year-old NOJ. West Palm Beach: FNR has 4-125As on 144 Mc. and is WACA on 50 Mc. with 33 states. Daytona Beach: ASE is on 144 Mc. with a 522. Official Experimental Stations EID, FNR, and GYO are contributing some good dope on their activities on u.h.f. and v.h.f. The section news letter has been discontinued. Let's have more reports for this column. Let's cooperate. Traffic: W4BYF 24, MINT 17, BT 13, MKP 8, FNR 6, GIP 4, GAC 2, FWZ 1.

WESTERN FLORIDA — SCM, Luther M. Holt, W4DAO — MS visited JBH. NYZ and NWC are new Pensacola calls. ACB works 3.85-Mc. 'phone. NN is heard on 3.85-Mc. 'phone from Tallahassee. MS reports contacts with 26 states on 50 Mc. EQZ is testing 3.85-Mc. equipment for hurricane-emergency work. NOX continues 7-Mc.

(Continued on page 84)

Nothing in all the World like the

Cardax

**THE ONLY HIGH LEVEL
Cardioid Crystal
Microphone**

WITH ALL THESE FEATURES

- ★ **DUAL FREQUENCY RESPONSE**
1—High Fidelity for Clear Channel.
2—Rising Characteristic for Extra Crisp Speech Signals.
- ★ **HIGH OUTPUT LEVEL**
- ★ **E-V MECHANOPHASE* CARDIOID**
Extends Front Pick-Up Range.
Overcomes Background Noise.
- ★ **ENCLOSED METAL-SEAL CRYSTAL**
Greater Moisture Protection.
- ★ **ON-OFF SWITCH**
- ★ **HIGHEST PURITY PRESSURE-CAST CASE**
- ★ **DURABLE SATIN CHROMIUM FINISH**

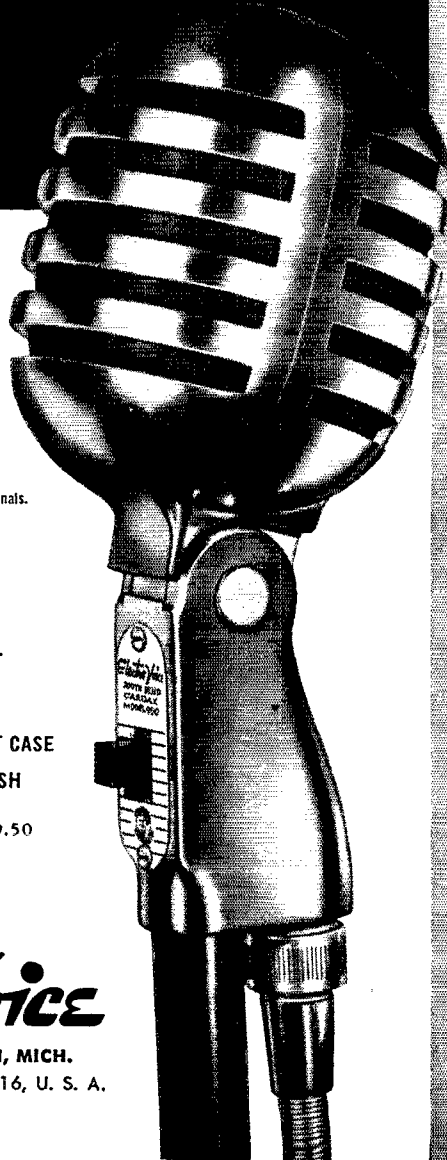
CARDAX Model 950 lists at \$39.50
WRITE FOR CATALOG
Authorized Distributors Everywhere

NO FINER CHOICE THAN

Electro-Voice

ELECTRO-VOICE, INC., BUCHANAN, MICH.
Export: 13 East 40th St., New York 16, U. S. A.
Cables: Arlab

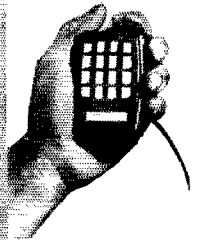
*E-V Pat. Pend. licensed under Brush Patents



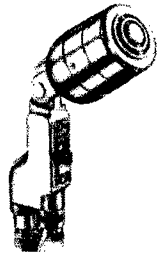
"Cardyne" Cardioid Dynamic



"Century" Crystal on Desk Stand



"Century" Mobil-Mike Carbon or Dynamic



"630" High Fidelity Dynamic



Dynamic—Model 610
Crystal—Model 910

MALLOBY HAM BULLETIN

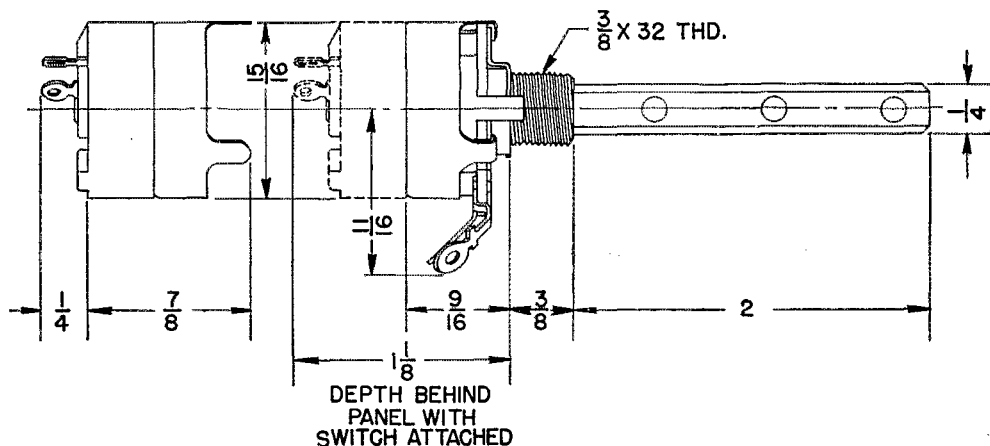
Dear OM:

When you stop to think about it, there have been few, if any, real technical improvements in the Variable Carbon Control since it first made its appearance many years ago. The average Volume Control of today still has many of the same failings its Great-grand-pappy had. For example, it still incorporates a metal shaft rubbing against a metal bearing. We've all experienced the disagreeable audible effect a little dirt on this bearing surface has in a sensitive amplifier circuit.

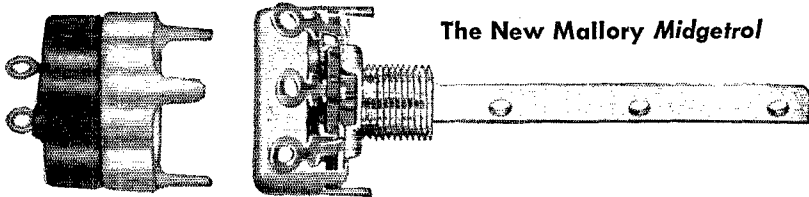
Since the first Carbon Control, it has been the usual design to provide for one, and only one, shaft bearing. As a result, shaft wobble and eccentricity of operation have plagued the innocent user.

Another sore point has been the problem of the attachable switch. In many instances the Control itself must be practically disassembled before attaching the switch. And—as if that isn't enough!—long and complicated instructions must be adhered to exactly before reasonable assurance is had that the switch will continue to function after it has been attached.

You and I have put up with these and other shortcomings for years with only an occasional squawk and a hope that some day, somewhere, some smart engineer would come up with a practical answer to a few of these problems.



MALLORY HAM BULLETIN



The New Mallory *Midgetrol*

It is with considerable pleasure and with no fear of contradiction, that I am able to announce that I have examined and actually tried a brand new Carbon Control which answers every serious complaint I've ever had about Carbon Controls. This Control is the new Mallory *Midgetrol*.

This smooth little Mallory *Midgetrol* has a one-piece molded plastic rotor assembly which does away with all metal to metal bearing surfaces. It has 2 rotor bearings, one at the front and one at the rear. The attachable switch was designed and manufactured entirely by Mallory. It is almost fool-proof, and may be attached without modifying the Control housing at all!

And that's not all! The Mallory *Midgetrol* is only $\frac{15}{16}$ " in diameter which makes it a swell bet for use in compact portable equipment. But don't let that small size fool you. By actual test its power dissipation is equivalent to that of the larger $1\frac{1}{8}$ " diameter standard Carbon Control.

I'd suggest you get one of these new Mallory *Midgetrols* from your Distributor and examine it for yourself. You're in for a pleasant surprise.

73,

YOUR ROVING REPORTER

P.S. Ask your Distributor to tell you how that flat shaft works. It's good.

YRR

P. R. MALLORY & CO., Inc.
INDIANAPOLIS 6 INDIANA

P. R. MALLORY & CO. Inc.
MALLORY

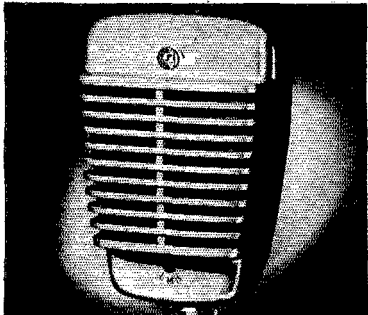
SHURE

Proudly Presents

2 OUTSTANDING MICROPHONES

The Sonodyne

NEW MOVING COIL DYNAMIC MICROPHONE



MODEL "51"

1. High output! 52 db below 1 volt per dyne per square centimeter.
2. Multi-Impedance Switch for Low, Medium, or High Impedance.
3. Wide-range Frequency Response; 70 to 9000 c. p. s.
4. Semi-directional Pickup.
5. Functional design for improved Acoustical Performance—beautiful die-cast pearl gray case.
6. Ideal for hams, public address, recording, communications, and similar applications.

Only \$37.50 list

The Versatex

THE NEW VERSATILE CRYSTAL MICROPHONE



MODEL 718A

1. Can be used by itself as a desk stand, on a floor stand, or in your hand.
2. High output; minus 53 db.
3. Specially engineered speech response.
4. Has special moisture-proofed crystal.
5. Heavy plastic case—eliminates shock hazard.
6. Contains R-F filter to prevent crystal burnout.

Only \$11.50 list

Crystal Microphones licensed under patents of The Brush Development Company

SHURE BROTHERS, Inc.

Microphones and Acoustic Devices
225 W. Huron St., Chicago 10, Illinois
Cable Address: SHUREMICRO

SHURE

(Continued from page 80)

activity. NDB, FIH, and BGI moved to 50 Mc. for the summer. MUX got BC-459A. New PARC officials are: EQR, pres.; HIZ, vice-pres.; LCV, secy.; and DAO, treas. The PARC annual banquet was attended by 40 members. QK built butterfly condenser. LRX reports new transmitter running 175 watts on all bands. GTJ visited NOX. LT promises a visit to Pensacola. GWV built code practice oscillator. DAO tried 3.85-Mc. phone for a short while. COS runs 500 watts a pair of 813s. JV made WAZ. BKQ built new speech amplifier. LRC has broad-band converter. NGS and NOG are the most active 28-Mc. stations in the section.

GEORGIA — SCM, Clay Griffin, W4DXI — AQL, the Ga. Tech Radio Club, is on all bands, phone and c.w., with a BC-610. EV has worked 106 countries on 14-Mc. c.w., 80 confirmed. BIW gave his 28-Mc. mobile rig a good test on the trip from Wilsonville, Ala., to Atlanta. Thanks to GFF for a nice report from Tifton: GFF is working on kw. rig and his XYL, NMS, is doing well on 28 Mc. MRX is rebuilding. MYA gets on in the early mornings. NZU is a new ham. FGH got married. FOO, in Eldorado, is on 3.5 Mc. OAL is a new ham in Moultrie. NIV has his beam back up after chopping it down with grass while cutting weeds in the yard (apologies to Ripley). HKA sent Albany news: YB has moved to Atlanta, KFX to Gusam. GLB has 28-, 50-, and 144-Mc. beam, motor-controlled. Cochran: BOL replaced antenna poles for 3.5 Mc., worked ZL on 7 Mc., and has almost finished 144-Mc. rig. GGD is building 100TH final. BQU is putting up 65-ft. poles for 3.85 Mc. and worked a KP4 on that band. CYC, our new Columbus Area EC, reports: NWG and NYS are two new hams. KEJ, in the Maritime Service, has been visiting home and expects to have a 28-Mc. maritime mobile rig when he returns to shipboard operating. VX has added a four-element 28-Mc. beam to his 14-Mc. beam. CBY has put up 28-Mc. beam. Tentative frequency for Columbus 28-Mc. net is 29.6 Mc. Traffic: W4BQU 8, GGD 6, BOL 3, DXI 2.

WEST INDIES — SCM, Everett Mayer, KP4KD — CO, DV, FI, and FJ signed up in the Emergency Corps. AM, HR, and FP are trying out c. w. AM works CE5 on 28-Mc. phone. HR has 49 KP4s toward WPR-50, and works W with 4 watts on 28 Mc. CH schedules W7BFF and W3EGN. DV is QRL rebuilding transmitter which AZ donated to PRARC. EZ tried 14-Mc. phone and got a surprise. FJ schedules W3IU, W1LX, W3MLY, and W2JXH when 28 Mc. permits. Ralph has received 28-Mc. phone WAS Certificate. FZ now is Class A and tried out 3.85-Mc. phone. EM is active with Collins 32RA. W8LZK now is KP4HU and W4GPO is KP4HT. GN acquired ES's old beam and ES has new four-element up. FJ, made debut on 7 Mc. JA has mobile rig in his Jeep. Get on 3560-kc. c. w. at 7 p.m. Mondays and on 3.85-Mc. phone on Wednesdays at 8 p.m. and work the gang. Needed: A Class I or II OO, an SEC and ECs. Traffic: KP4FJ 13, CH 7, EZ 3.

CANAL ZONE — The following was reported by KZ5AW: Gold Coast (Atlantic side) round table on 28.8 Mc. now includes AX, BL, CK, CE, MD, PA, and WG. CD QROed to 700 watts on 28 Mc. CK's 832 perks fine. FS covers the Isthmus with a weekly code run on 7 Mc. NB will hold down the QSL Manager's job and BG the certificate-dispensers job, while AK is in W Land. BD is sweating out a converter, CG upping a "boughten beam", and ED putting up an eight-element 28-Mc. rotary! FA is keeping FB schedules on 28 Mc. MB replaced BO as secretary, Atlantic chapter, CZARA. AU is completing a bandswitching 450-watt 7-, 14-, and 28-Mc. c. w. job. BT finally got the rig to fire up. XJ blossomed out suddenly from QRP to a VFO, an f. m. exciter plus a Millen final. AX, GD, and MZ are grooming gear for the September ARRL FMT. With his vertical 14-Mc. ground plane antenna MZ can QSO his brother in Japan any morning! Traffic: KZ5PA 8, WG 7, AX 5, CK 5.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Vincent J. Haggerty, W6IOX — Asst. SCMs, W. J. Schuch, 6CMN, and Irvin O. Hege, 6FYW. Section Emergency Coordinator: Roy Brady, UXN, 618 E. Buckthorne, Inglewood. BUK returned from a vacation trip on which he visited 2PRG. IWU had his OO and OPS Certificates endorsed and is back from his vacation. RPO works the high end of 7 Mc. Television work is temporarily curtailing ham activities of YSK. YVJ schedules his XYL via WKZ when he is on field location. CMN has nice traffic total despite being QRL with convention work. AAE is on 7 Mc. and reports that TWC and FVD are active. RAD has new RM appointment. NAZ handles traffic and personal QSOs for servicemen on Pacific islands. RXT anticipates heavier traffic at the end of the vacation season. PJ has beams pointed at Europe and the Orient and also reports traffic activity. KEI says VFG and HJJ checked into the Golden State Net from vacation sites in High Sierra Mountains. FMG is active on the SCN and PN Traffic Nets. ZOL schedules 701F regularly. CEG boosted power to 450 watts. YAW, BFTS kc. is operating portable from Attu Island in the Aleutians. BCT joined the Navy but hopes to remain active and keep his OES appointment. AM has his

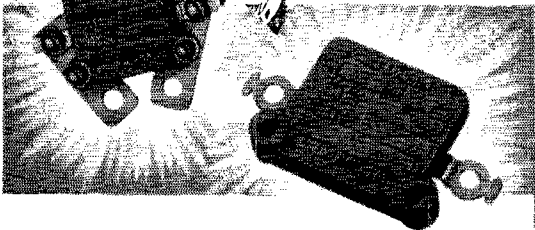
(Continued on page 86)

Quality Counts



Yes sir, quality counts in ham radio as well as in the professional field. Play safe...insist on Sangamo Quality and get stable, precise capacitors that will keep your rig on the air and give top-notch performance.

A quarter of a century of experience in building dependable capacitors is your assurance of Sangamo Quality. All leading jobbers stock the Sangamo line.

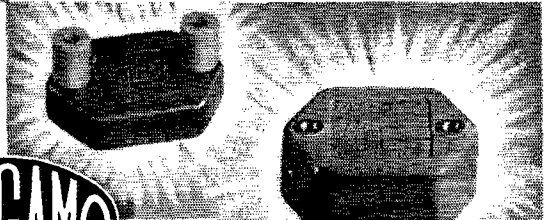


TYPE H MICA CAPACITORS

600 TO 2500 W. V. D. C.

TYPE A MICA CAPACITORS

600 TO 2500 W. V. D. C.



TYPE E MICA CAPACITORS
SPECIFICALLY DESIGNED FOR HAMS

**TYPE 71
DIACLOR**

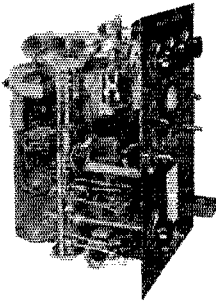
**IMPREGNATED
CAPACITORS**
600 TO 6000
W. V. D. C.



SC489

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS

**Such Engineering
Is Worth Twice The Price**



Harvey-Wells TBS-50 & TBS-50A

- ★ **Still The Same Price**
- ★ **Still The Same Quality**
- ★ **The Same Performance**

It is America's most versatile small transmitter built to professional standards by one of America's foremost builders of fine communications equipment. Hundreds now being used for mobile service as well as for fixed station use.

50 WATTS 8 BANDS
PHONE OR CW
(Class B. Modulation)
NO PLUG-IN COILS
80, 40, 20, 15, 11, 10, 6 and
2 METERS

(Completely wired and tested — not a kit)

Crystal controlled on all bands, yet requires no oscillator or multiplier tuning. Operates from AC pack or Dynamotor Supply for mobile work. New, beautiful black crackle finish.

TBS-50. Complete with tubes, only **\$99.50**

THE NEW TBS-50A

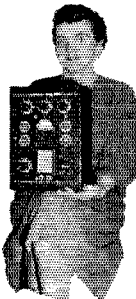
Incorporates a small three tube preamplifier with sufficient gain so that any high impedance microphone having an output level of approximately -50 db can be used.

TBS-50A, complete with tubes only

\$121.25

Send for catalogue describing Harvey-Wells Transmitters, Power Supplies, Preamplifiers and Rack Panels

**Harvey-Wells
ELECTRONICS, INC.
SOUTHBRIDGE,
MASSACHUSETTS**



long East-West rhombic up and working. MU changed his OBS to Official Bulletin Station. VAQ had a lot of fun in the latest CD Party. SML, on vacation from U. C. at Berkeley, has his BC-610 on the DX bands with an 8LO double triplex rotary beam. In July he had a visit from PY1AFB. SML also reports that the Crescenta Valley Radio Club has some 144-Mc. units and that some club members joined the Los Angeles County Disaster Relief Authority. 7DLR/6 had his ORS ticket transferred from Utah to this section and looks forward to traffic work. AKS is trying 14 Mc. with success. ASW works 29 Mc. PMV is back on the air for the first time since before the war and is active on 7- and 14-Mc. c. w. and on 29-Mc. 'phone. During the SCM's absence on an extended vacation, section affairs will be handled by CMN. Traffic: W6IOX, 243, CMN 135, RAD 81, NAZ 76, RXT 73, AKS 58, DDE 53, FYW 45, PJ 23, QAE 21, AM 10, KEI 9, FMG 6, VAQ 6, ZOL 3.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — LLO and FGG have ARC-5s on 144 Mc. KAE and KAD have a new kw. on 28 Mc. and a half-kw. on 50 Mc., and they work SAV in St. David and MES in Ft. Huachuca regularly. LQH has 250 watts on 7 Mc. LVT is on 28-Mc. n. f. m. in Benson. KQG is on 3.85 Mc. at Benson. QMG and MAP are back on the air after repairing windstorm damage. MII reports he hears Phoenix 28-Mc. stations at Eloy. KAC has a new S meter. MEK has a converted 659 on 28-Mc. 'phone. New calls: MNB, MMD, MOA, MOB, MOI, MOE, and MOW. KLA was the first on 3.85-Mc. mobile in Arizona. QZL has 150 watts on 144 Mc. and a stacked array. UPX has a new 48-ft. tower. ØRUC now is MPC on 7-Mc. c. w. in Tucson. JOK sliced off a mountain top for a new station location and has a new 7-element beam. HYQ worked 17 countries with 17 watts while he thought he was running 150 watts. MID has a new four-element wide-spaced beam. MAE has a 350-watt surplus rig on 3.85 Mc. TCQ reports working a G on 7-Mc. c. w. early in the evening. PBD has worked 3000 different hams. JMQ reports his 80th consecutive day of working ZLs on 3.85 Mc. PBY bought JIW's rig and is going to 150 watts power. 5NAF now is 7NAF on 28-Mc. 'phone and 7-Mc. c. w.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCMs, Gordon W. Brown, 6APG, and Shelley E. Trotter. 6BAM, SEC: DUP, RM: BGF. DUP has been appointed SEC to replace APG, who has done a splendid job for the past year and a half in organizing the section's Emergency Corps. In the interests of getting better acquainted with current Communications Department appointment-holders, the following lists all active appointees: Official Relay Stations: BAM, BGF, CFN, CNG, LYF, NDF, OBD, PG, and YDK. Official Experimental Stations: DEY, JUM, and WNN. Official Phone Stations: APG, CFN, CHV, FMJ, VJQ, and YDK. Official Bulletin Stations: CFN, CHV, LRU, OBD, VJQ, WUW, and YDK. Official Observers: CFN, FMJ, GC, KW, OBD, and WNN. Amateurs interested in CD appointments should contact the SCM. The calls of men holding EC appointments during construction of 28-Mc. beam. DUP is organizing 144-Mc. communication for the Annual La Jolla Rough Water Swim. BAM still schedules IQMI at Hartford. DEY is going to Georgia and Michigan on vacation. GTM now is with a kilowatt into a pair of 813s and sends in local information. AMO is preparing for SS Contest. HQM is operating mobile marine on 28 Mc. from tuna boat *Endeavour*. ITY is heard from T8TDM on 14-Mc. 'phone. BGF, BKZ, LYF, and WXW are members of the Southern Border Net (daily, at 9 p.m. on 3550 kc.) and send in their reports via radio. A new member of SBN is CQW. NA holds schedules with Avalon Bay. San Diego YLRL news is as follows: Newly-elected officers are ZYD, pres.; YXI, vice-pres.; AWW, sec.; BLF, treas. YLRL held a beach party at La Jolla during August. ZYD, YXI, and AWW attended the June installation meeting for new officers of the Los Angeles YLRL. Traffic: W6BGF 39, LYF 29, GTM 25, WXW 13, DUP 8, BAM 5, BKZ 5.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/ MNL — Asst. SCM, Joseph Bonnett, 5III, SEC. JDZ. PAM; ECE, RM: CDU. Inasmuch as my term as SCM has expired, I wish to thank all of the amateurs for the most wonderful QSOs and personal contacts I have made. During the past two years we have seen many advances made in ham radio. To the boys at Fort Worth, Dallas, Big Spring, Mineral Wells, Ranger, Abilene, Amarillo, El Paso, Waco, Henderson, Longview, Hubbard, Chico, McKinney, Rule, Odessa, Lubbock, Wichita Falls, Nacogdoches, Justin, Comanche, Denton, Texarkana, Coleman, Temple, Terrell, Electra, and other towns where there are amateurs, I say thank you. EVI is on 7 Mc. ILZ is active in the net. Los Stamford has a nice signal on 3.5 Mc. LGY is a very active OO. OTQ is a new-comer in Paris, Texas. LUD is active in Bonham. KUY is on 28-Mc. mobile. The Caravan Club had a very good turn-out on its trip to Cleburn. OCK is a new member of the Caravan Mobile Club. HSE is on 28 Mc. ALA is the new 28-Mc. 'phone DX king in Dallas. CQO is selling out. IRZ is active on 3.5 Mc. FDI, LOQ, GZH, JQY, and LTP have Class A licenses. CYJ is on 144 Mc. AJG might have a DX card for you. AZC is on 14 Mc. MAX, LUK

(Continued on page 88)

REGULATION

§ 12.136. LOGS. Each licensee of an amateur station shall keep an accurate log of station operation, including the following:

(a) The date and time of each transmission. (The date need only be entered once for each day's operation. The expression "time of each transmission" means the time of making a call and need not be repeated during the sequence of communication which immediately follows; however, an entry shall be made in the log when signing off so as to show the period during which communication was carried on.)

(b) The signature of each licensed operator who manipulates the key of a radiotelegraph transmitter or the signature of each licensed operator who operates a transmitter of any other type and the name of any person not holding an amateur operator license who transmits by voice over a radio-telephone transmitter. The signature of the operator need only be entered once in the log, in those cases when all transmissions are made by or under the supervision of the signatory operator, provided a statement to that effect also is entered. The signature of any other operator who operated the station shall be entered in the proper space for that operator's transmission.

(c) Call of the station called. (This entry need not be repeated for calls made to the

same station during any sequence of communication, provided the time of signing off is given.)

(d) The input power to the oscillator, or to the final amplifier stage where an oscillator-amplifier transmitter is employed. (This need be entered only once, provided the input power is not changed.)

(e) The frequency band used. (This information need be entered only once in the log for all transmission until there is a change in frequency to another amateur band.)

(f) The type of emission used. (This need be entered only once until there is a change in the type of emission.)

(g) The location of the station (or the approximate geographical location of a mobile station) at the time of each transmission. (This need be entered only once provided the location of the station is not changed. However, suitable entry shall be made in the log upon changing the location. Where operating at other than a fixed location, the type and identity of the vehicle or other mobile unit in which the station is operated shall be shown.)

(h) The message traffic handled. (If record communications are handled in regular message form, a copy of each message sent and received shall be entered in the log or retained on file at the station for at least 1 year.)

The

Convenient v v v Complete

ARRL LOG BOOKS

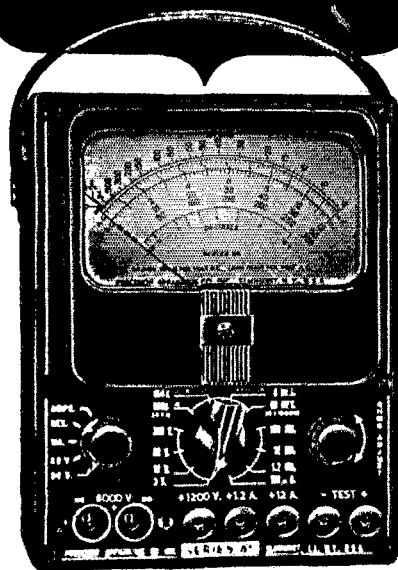
Regular Log, 3½ x 11 • 50 cents each

Mini-Log, 4 x 6¼ • 25 cents each

American RADIO RELAY LEAGUE

WEST HARTFORD, CONNECTICUT, U.S.A.

APPLICATION ENGINEERED "PRECISION" Circuit Tester 20,000 Ohms per Volt



THE NEW SERIES "85"

Compact, laboratory styled, *high sensitivity* test set "Application Engineered" for test and service-maintenance phases of modern radio-electronics-communications.

20,000 Ohms per Volt D.C. • 1000 Ohms per Volt A.C.

VOLTAGE RANGES: 0-3-12-60-300-1200-6000 A.C. & D.C.

CURRENT RANGES: 0-120 microamps; 0-1.2-12-120-MA.; 0-1.2-12 Amps D.C.

RESISTANCE RANGES: 0-6000-600K-6 Meg-60 Megohms.

DECIBEL RANGES: From -26 to +70DB.

Complete with batteries and test leads.....

\$38⁷⁵

PLUS superior physical features:

- ★ 4 1/2" wide angle meter.
- ★ Heavy duty bakelite case size 5 1/2 x 7 1/2 x 3".
- ★ Heavy gauge, anodized aluminum panel.
- ★ Rotary Range and Function Selection.
- ★ Recessed 6000 volt safety jacks.
- ★ Only two pin jacks for all standard ranges.

See this new "Precision" Test Set at all leading radio parts and ham equipment distributors. Write for the Precision 1948 catalog describing quality Electronic Test Instruments for all phases of modern radio-electronics — A.M., F.M. and TV.

PRECISION APPARATUS CO., INC.

92-27 Horace Harding Blvd., Elmhurst 13, N. Y.

Export Division: 458 Broadway, N. Y. City, U.S.A.
Cables: MORHANEX

SP, WX, and FQG are active. ENE has Mim's beam working. MBI is active in Urbandale. NRE works 28-Mc. mobile. JV is on 27 Mc. AQS and CZZ are on 144 Mc. BAM can help you get started in the USN. Don't forget to send in news for this column. If I can help in any way please write me at 2911 Elm St., Dallas. Traffic: W5CZU 220, CDU 27, ILZ 5.

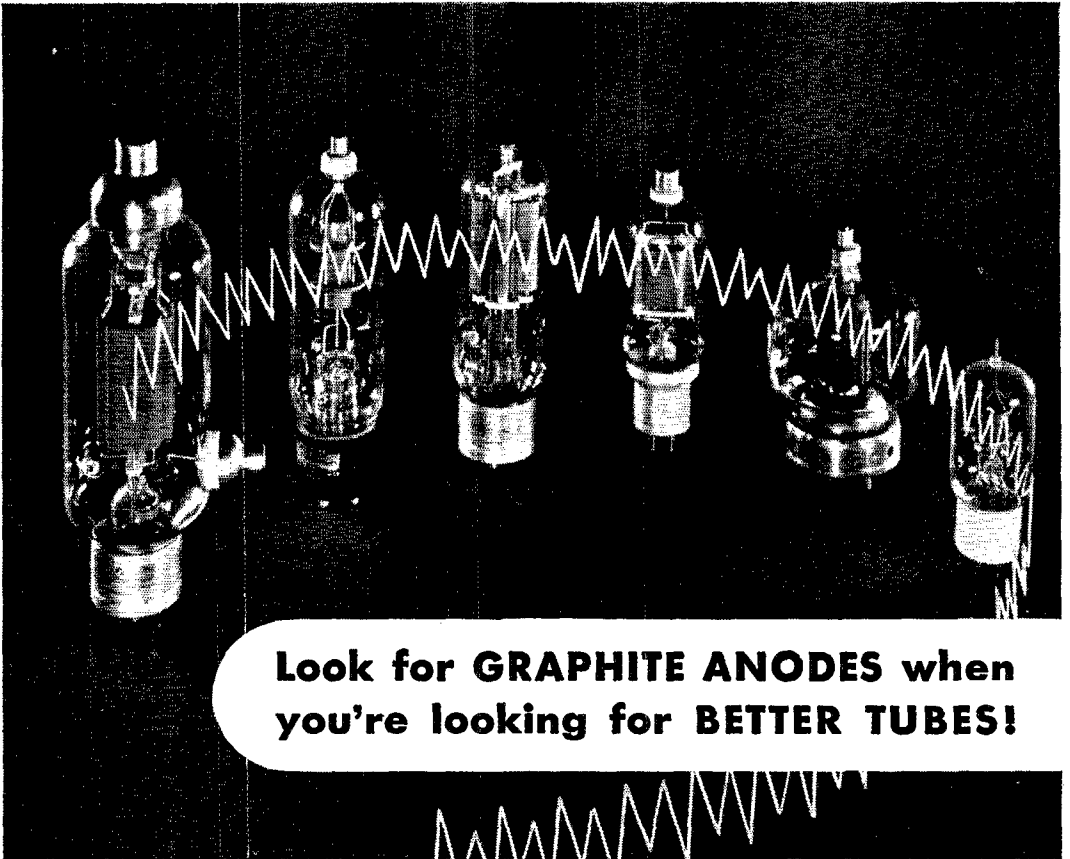
OKLAHOMA — SCM, Bert Weidner, W5HXI — HXI is on vacation so this report has been written by AHT. All licensed amateurs in Oklahoma are urged to join the AEC. Make application to your EC, SEC, or SCM and help complete emergency organization in Oklahoma. OGD is Asst. EC of Comanche County. GCM has started another code class with six embryo hams in attendance. The Oklahoma Phone Net has been reorganized with a permanent committee on rules and regulations. HGC was reflected NCS with PA and GZK as alternates. HGC has been busy with Naval Reserve activities. The Navy boys, under George's leadership, supplied radio and telephone communication for the International Round-up Cavalcade at Pawhuska. AEC groups should seek similar opportunities to serve the public and receive practical training. AHT talked to the OCARC on emergency organization. The club now has a 300-watt engine alternator. MBV has a new Federal rig and is working on power supply. CEZ now is at Lake Charles, La. IGO is moving to Albuquerque and has resigned her RM appointment. Thelma has done a great job for Oklahoma and we yield her to New Mexico with reluctance. She will be back on OLZ, however, as soon as she can get set up in her new location. Thelma recently was honored with membership in the A-1 Operators Club. OLZ continues to operate on daily schedule through QRN and new members are ODL and FPU. FEC reports he received a letter from KL7NQ, ex-W5HXI. Traffic: W5MBV 53, NMM 34, AST 26, ADB 12, KDH 8.

SOUTHERN TEXAS — SCM, Ted Chastain, W5HIP — SEC: BUY, PAM: EYV, RM: DAA, GLS, after a siege in the hospital, reports from Houston that 144-Mc. activity is going full blast. Active are KFD, ON, OVP, and DAZ, as well as a host of others. ON is building a 150-watt final for 144 Mc. JEQ is active in La Costa. KZT reports a DX total of 136. BDI has new tower and three-element 14-Mc. beam. LGL has new three-element 28- and 50-Mc. beams. EQK reports from Port Arthur that BCF has new all-band rig ending with an 813. NNF has new rig on 28 Mc. OPJ is new call in Port Arthur. PY is active in STEN (a.w.). KBP is remodeling house. OLC is on 28 Mc. with 500 watts and a new three-element beam. ESZ is active on 50 Mc. New calls in El Paso are ONG, OMC, DDP, and MMX. Congrats to JPC on acquiring a new XYL, new home, and new shack. HZJ has a converted BC-457A on 3.5 and 3.85 Mc. MPE finally got an antenna up out of doors, but still uses the indoor antenna. OFQ, in Freeport, has a BC-610. 7JHH/5 is new OPS in Austin. JHW has new all-band transmitter. KSW reports he has been kicked out of the house, to make room for his XYL's rig. MXV and JKB are new ORS. The following stations of the Port Arthur area were active in Field Day: HEL, FCD, HYD, EWP, EQK, and LTU. All were 100 per cent battery-powered and operated on 3.85-4-Mc. 'phone. Power input at each station was less than 30 watts and only emergency-type antennas were utilized. Because of the arrival of a new jr. operator, vacations, illness, and pure summer laziness, your SCM has been snowed under. I am now out of the woods and would like reports from all of you so we can keep this column going. Traffic: (June) W5MNF 543. (July) W5MN 303, ACL 38, BGG 23, JPC 10, KSW 9, LGL 3.

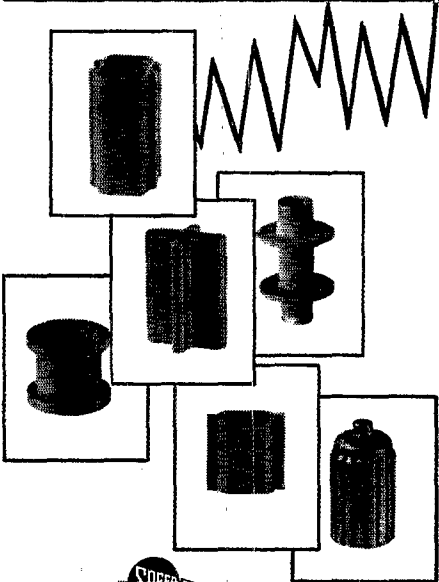
NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA. SEC: ZM, RM: HJF, PAM: FAG. The Los Alamos Radio Club held a Field Emergency Test the week end of July 24-25. Stations in the field were MYQ, UVA/5, OMR, SMA, NXE, NAS, UFA, OII, GXU, and NJR. In addition FAG, HUB, and DUH operated from their home stations. Most of the stations were in the vicinity of Los Alamos, with NAS in Logarita, Colo., NXE at Coyote, and SMA at Cuba. Power inputs ranged from 45 watts at NAS to 6 watts at SMA. Ex-HOX, now 8HOX, is enjoying his new job in Ohio. His address is Box 30, Wilmington. Rusty is on 28-Mc. 'phone at present. JYW tells us that CTV and ISW are planning 28-Mc. mobile rigs. Joe is building a low-power rig for 28 Mc. and recalibrating a BC-221AA. KAO now is a Class I OO. Congratulations, Dolph. KAO is building an n. f. m. modulator for his Signal Shifter. MYA's new QTH is 602 West Kelly Street, Silver City. Barney reports that LAJ is working 50 Mc. and is looking for a New Mexico contact. The Los Alamos Radio Club elected the following officers: MYQ pres.; OMR, vice-pres. and act. mgr.; OII secy-treas. Congratulations, fellows and gal.

CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — DQ and FQ report their schedules with 8NB and 8OE have been discontinued. ES reports his first G on 14 Mc. QG has the new 50-Mc. beam going as well as the new 829 final. QZ also has the new dual "six over ten" atop the 40-ft. tower. TA is on 3.5-Mc. c. w. NQ is on high power — a full 40 watts. With VO6EP on 14-Mc. 'phone and RP using QZ's mike, (Continued on page 90)



Look for GRAPHITE ANODES when you're looking for BETTER TUBES!



Extensive research, production and testing by the United Electronics Company and other tube manufacturers working jointly with Speer, has revealed that graphite — the only real low temperature anode — provides these outstanding advantages in transmitting tubes:

- 1. Higher Ratings**— Tubes with Speer Graphite Anodes radiate heat faster, handle 200 to 300% more power than anodes made of popular metals.
- 2. Greater Stability at High Inputs**— Even when tubes are operated in the neighborhood of 100 Mc's or over, Speer Graphite Anodes will not warp.
- 3. Longer Life**— Even under continued severe usage, Graphite Anode tubes last longer than metallic anode tubes because they operate at lower temperatures.

To meet the demands of modern equipment for superior tube performance, leading manufacturers use Speer Graphite Anodes for oscillators, amplifiers, doublers, modulators and rectifiers— your assurance of cooler, more efficient tube operation.

Speer

**CARBON COMPANY
ST. MARYS, PENNA.**

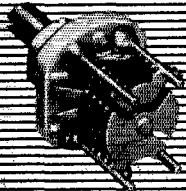
brushes • contacts • welding electrodes • graphite anodes • rheostat discs • packing rings • carbon parts
CHICAGO • CLEVELAND • DETROIT • MILWAUKEE • NEW YORK • PITTSBURGH

JOHNSON

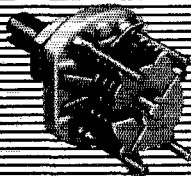
a famous name in Radio



SINGLE



BUTTERFLY



DIFFERENTIAL

**SMALLEST
AIR VARIABLES
EVER PRODUCED!**

Pictured are three of the smallest air variables ever produced. Each of the three types is available in four different capacities.

SINGLE TYPE — Takes the place of adjustable padders for trimming RF and IF oscillator circuits. Available in four models: 1.55 to 5.14 mmf, 1.73 to 8.69 mmf, 2.15 to 14.58 mmf and 2.6 to 19.7 mmf.

BUTTERFLY TYPE — Applicable wherever a small split stator tuning condenser is required. Available in four models: 1.72 to 3.30 mmf, 2.10 to 5.27 mmf, 2.72 to 8.50 mmf, and 3.20 to 11.02 mmf.

DIFFERENTIAL TYPE — For switching capacity from rotor to either of two stators, and for shifting tap on capacity divider. Available in four models: 1.84 to 5.58 mmf, 1.98 to 9.30 mmf, 2.32 to 14.82 mmf and 2.67 to 19.30 mmf.



For Full Details Write for
Latest JOHNSON Catalog

E. F. JOHNSON CO.
WASECA, MINNESOTA

will DB be next? FN now is VE3ZW. VE3ALK/VE1JM recently visited the old home town and local gang. OP is on 50 Mc. The Truro Club acquired a kw, a. c. plant for emergency work from the Town Council. The Club call is CW. New members include XK, XL, TP, MT, and QE. The N. B. YL League includes VY, VZ, and AYL. Active among the Bathurst boys are VL, ER, DU, KQ, and DG. St. John notes via the *LCARA Bulletin*: JO moved the family and rig to the summer home at Martinon. It has been transferred to Charlottetown. MW did very well in the VE/W Contest. IW is doing some yachting. EW has the best DX news of the month with 49 countries and 23 zones on 14 Mc., including the Gatti Expedition, VQ3HGE. MS reappeared on 14-Mc. 'phone with 813 final. Please send me reports on your activities, fellows.

ONTARIO DIVISION

ONTARIO — SCM, Thomas Hunter, jr., VE3CP — Assistant SCM, M. J. McMonigle, 3AWJ SEC: KM, RM; DU, ATR, BUR, AWE, and TM. On behalf of the section, many thanks to DU for a job well done. It was tough on Dave after the ban was lifted but he did an FB job. A 7-Mc. traffic net is under way on 7287 kc. with ATR as NCS. NI is now OBS for southwestern Ontario. The Kingston Amateur Radio Club elected the following new officers: GO, pres.; AOU, vice-pres.; BBY, secy.-treas. BUR visited Headquarters offices. QB now has 60 countries and higher power. ZE (Toronto) and IA (Burlington) are new ORS. BMJ now is IL and new EC in Toronto. An FB time was had at Forest by the London Amateur Radio Club and the Ontario 'Phone Club. A and B nets of the OPN are operating on 3767 kc. The Ontario Beaver Net is operating on 3535 kc. AWE, BCP, ZE, and BMG report by radio. VU is squadron controller of AFARS Net. IL, as well as playing with photography, has a radio-controlled model of HMS Hood. Hope to see a lot of the section members at the convention in Montreal. Traffic: VE3ATR 44, DU 20, KM 16, NI 16, AWE 11, BUR 9, AXQ 8, CP 8, BMG 6, AWJ 4, BCP 4, ZE 3.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — XX has n. f. m. on 3.85 Mc. KG is experimenting with 144-Mc. antennas and won second prize at MARC picnic for most portable transmitter and receiver. BB continues to handle traffic and is taking on the job of Net Manager (Canada) for TLS, which replaces Slow Speed Trunk Line. TN is trying to get antenna up. EC maintains schedules twice daily with Quebec 'Phone Net. The St. Maurice Valley ARA held a picnic at ADB's summer camp on July 11th. The Montreal ARC held a picnic again this year at the CNRA grounds, Lachine, on July 10th. CGM Reid took home first prize. ZG is operating mobile f. m. on 144 Mc. UO has a pair of 804s with 807 modulators and had a visit from ER, EA and RN are on 3.85 Mc. in Sherbrooke. ADB is on 3.7 Mc. DD is building a de luxe all-band transmitter. OD is operating from Champlain. TI is doing swell on 144 Mc. LO continues active on 7 Mc. but reports very little traffic. AGG is new in Drummondville on 7 Mc. FG assists BB in QSPing traffic at times. NR is rebuilding again while on vacation and will have a pair of 814s VFO and crystal, 5 bands, 'phone and c. w. GN reports no openings noted or reported on 144 Mc. in Montreal or the district during July. RD has Yagi beam working on 144 Mc. and uses converter to bring them in. GN reports that several VE2s are eager to carry out tests with W stations on 144 Mc. and those interested should QSO him. Traffic: VE2BB 85, EC 32, UO 11, TM 8, GL 3.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — Congratulations to the Calgary Club on a very successful hamfest under the leadership of AO. One feature was a very successful meeting held to organize the Emergency Corps in Alberta. Your cooperation in this will be appreciated. EE is new OBS on 7- and 14-Mc. c. w. AE handled emergency traffic from Fort Vermilion. EY has completed WAC and WAS on 28 Mc. AL is heard occasionally on n. f. m. with a fine signal. TK volunteered for EC and OBS work. CE and his XYL attended the hamfest. EW snagged only a EC-348 at Calgary from under the nose of PV. AH and his family vacationed in Vancouver. JL gave a very interesting talk and demonstration at the hamfest. WS is using n. f. m. on 3.85-Mc. 'phone. UT is on the staff of CJCA during summer vacation. EA and his mother attended the hamfest and continued on to the West Coast for a vacation. EE donated several pieces of valuable equipment for emergency work. The Alberta Net will reopen about October 15th. WG will carry on, on Trunk Line "1" and as RM. Emergency Coördinators are needed in all the larger centers in the district. If interested contact the SCM as soon as possible. Traffic: VE6MJ 3, AE 2.

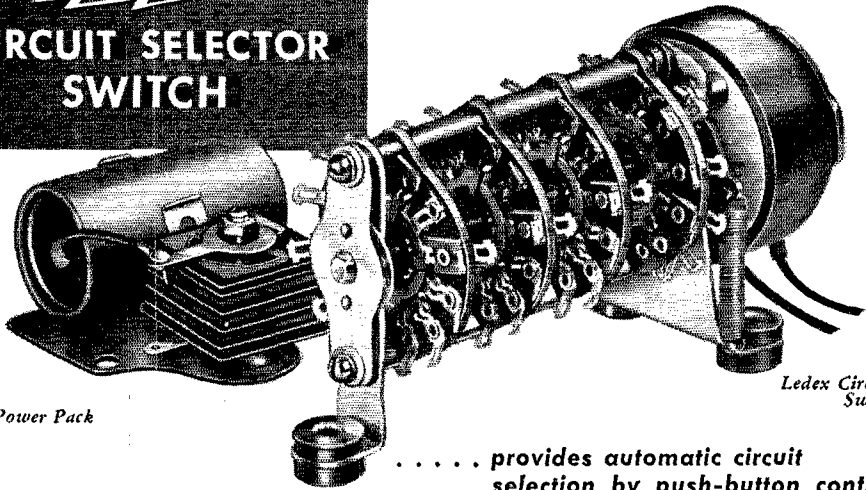
BRITISH COLUMBIA — SCM, W. W. Storey, VE7WS — NY is sporting a new four-element beam for 14 Mc. ID has been appointed SEC as well as EC. Any of you

(Continued on page 92)

LEDEX

CIRCUIT SELECTOR SWITCH

- REMOTE CONTROL
- ROTARY SOLENOID OPERATED



Power Pack

Ledex Circuit Selector Switch

..... provides automatic circuit selection by push-button control

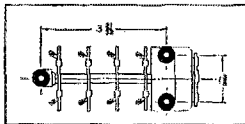
The Ledex Circuit Selector Switch was designed to provide dependable, automatic, circuit or band selection by remote control.

The rotor assembly of a gang of rotary or "wafer" switches is driven by a Ledex Rotary Solenoid. The solenoid is converted to a rapidly oscillating motor by means of a commutating switch and return spring. Power is transmitted to the wafer switch rotors by means of a unique end-engaging ratchet. The #1 "wafer" controls the

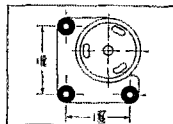
solenoid which "homes" the switch to the selected circuit.

Four models are now available from stock; either six pole, six position or three pole, twelve position. Both types are furnished with either the standard or panel mountings. The six pole, six position switches have contacts for circuit indication lights.

The entire unit is unusually powerful, compact and rugged. Each circuit selector is carefully assembled and is given thorough mechanical and electrical tests before shipment.



Standard Mounting



Panel Mounting

G. H. Leland INC.
DAYTON 2, OHIO

G. H. LELAND, INC., 157 Webster Street, Dayton 2, Ohio

Please check the following. If more than one is desired, write the number in square.

MODEL: 6 pole, 6 position or 3 pole, 12 position

MOUNTING: Standard or panel

Deliver Postpaid to:

NAME

STREET

CITY STATE

Check here for information on 6, 12 and 24 Volt D. C. Models and models employing ceramic wafers.

GET YOUR SELECTOR SWITCH PACKAGE

MAIL COUPON WITH CHECK OR MONEY ORDER FOR \$9.75

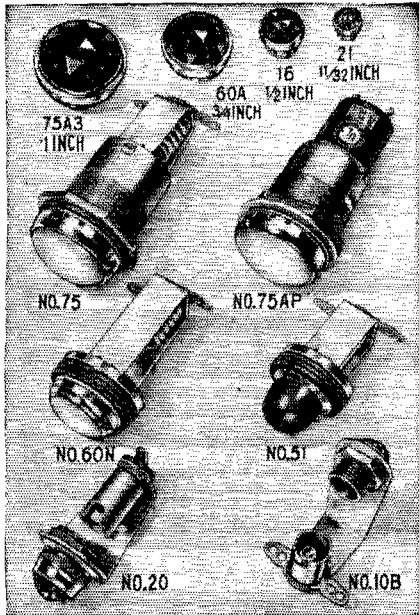
PACKAGE INCLUDES:

- SOLENOID POWERED SELECTOR SWITCH
- 6 Pole, 6 Position or 3 Pole, 12 Position
- Standard or Panel Mounting
- ITS V.—A.C. to D.C. POWER PACK
- COMPLETE WIRING DIAGRAM
- IMMEDIATE SHIPMENT \$9.75 NET
- FROM STOCK
- (Postpaid anywhere in U. S. A.)

NOTE: Residents of State of Ohio add 3% Sales Tax

DRAKE PILOT LIGHT ASSEMBLIES

WILL BEAUTIFY YOUR INSTRUMENT PANEL



Give your instrument panel that professional look with *Drake Jewel Light Assemblies!* These highly finished glass jewels and bull's-eyes, attractively mounted in polished chrome-plated holders, are exactly the same as those used by leading commercial manufacturers throughout the country. Efficient, good-looking, well made—*Drake Pilot Light Assemblies* will give you the best in performance and, at the same time, real pride in the appearance of your panel.

Ask your local jobber to show you the big Drake line. If he doesn't have a complete stock, write us for Catalog Q — just off the press.

Socket and Jewel LIGHT ASSEMBLIES

DRAKE
MANUFACTURING CO.
DEPT. Q, 1705 W. HUBBARD ST., CHICAGO 22

fellows who want to join up as EC please contact ID. The SCM would like to thank all hams who took part in the Fraser Valley Flood. AC has been appointed chairman of the 1949 ARRL Vanalta Division Convention. All B. C. OBS please note: There will be reserve OBS Certificates. Collingwood Club News: Club members who operated in Fraser Valley Flood emergency were: ABP, AKK, LF, AGP, OJ, and MH. The n. f. m. fever has thoroughly saturated AZ, who carries a pocketful of circuits to force on any unfortunate ham who crosses his path. He can be heard almost nightly on the tea-time net. AME and VF are talking of going on 28-Mc. phone this fall. LF has a beautiful 35-ft. all-dural tower, sturdy as a rock. AIH is building a VFO. AKK speaks of using n. f. m. on an 809 p. p. final; he is at present modulating an 807 doubler. At last we have the dope on how to run the final LF style! AJR now has a baby daughter. CC has built a beautiful Stacked four-element ten over three-element twenty beam, all mounted on an all-dural tower. AIG keeps blowing filter condensers with his 2200 volts. AKW brought VE3BFZ, who is visiting from Ottawa, to the last meeting. OJ puts the 28-Mc. band to bed almost nightly ABP described the type of line he is handling at work — it carries 125,000 volts. Now if we could live near there and clip on to that line.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Congrats to AD on the birth of a YL operator. Brandon and Shio have gotten together and formed the BARC with IF, pres.; DN, vice-pres.; GE, secy-treas.; and AO, publicity. The club was out on Field Day with emergency equipment. QV met W2ANH and they are visiting VE7OT. LC has his beam rotating. TC is erecting three-element 14-Mc. rotary. BF has his up. The Above 100 Club made a complete tour of TCA. HP works 7 Mc. when not busy riding trains to Moose Jaw. YZ is working on model aircraft. MJ, of Lac du Bonnet, is on 7 Mc. and was in Winnipeg on holidays. AN, at Portage, is on 7 Mc. when not busy in new store. GQ has worked 19 states and VE2, 3, and 4 on 50 Mc. YW, at Brandon, is active on 50 Mc. DQ, of Kanuchuan Rapids, was in Winnipeg for his annual trip. His only contact with the world is by ham radio and he requests that you watch for him on 3.5 or 7 Mc. TM is rebuilding and will help out on TL "I" this year. KF is keeping schedule with ND on 3.8 Mc. while the latter is portable at summer camp. FW now is at Snag, DT is n. f. m. on 3.8 Mc. EH, formerly at Berens River, is on 3.8- and 28-Mc. phone from Norway House. RO rewound high-voltage transformer for AM-JM. Keep those reports coming.

Correspondence

(Continued from page 64)

give the fellows the simple hints and help they need. *QST* is getting so that it reads like *I.R.E.* That's fine for engineers who understand such lofty data, but the beginners who need simple technical help no longer can find new simple units that they can learn from in *QST* as they used to be able to do. I am endeavoring to teach several prospective hams at the present time and am sorry to say I have had to advise the boys not to read *QST* as it only confuses them. When I started in ham radio way back your publication was swell. Either you are trying to discourage new hams and have sold out to a few of the old-time c.w. men, or you are getting senile in your old age. It is time that the powers that be should be changed at Headquarters. I, for one, after reading your recommendations to the FCC regarding Class B, am ashamed that I am a member of an organization that seems to be run either by people who try to be dictators or who are morons. — Lon A. Warner, W50LJ

Riva, Md.

Editor, *QST*:

... Our experience on the air follows closely that which has already been published. There seems to be a great number of fellows on that don't know anything about s.s.s.c. I don't mean that they are not familiar with the theory only, but these boys have never heard of it! They must be living in vacuum bottles. If they had read any of the articles in *QST*, I can't see how any amateur could have let it go without at least getting the idea of it and how to tune it, but they have. The biggest gripe is the character who fits the above and then makes a guess that it's s.s.s.c. all right, but then proceeds to say there must be something wrong with your rig because he can't copy it. He indicates either his indifference and/or ignorance by failing to see if his b.f.o. has been tried on each side of the signal, etc. What these stuffed-shirts fail to realize is that they are not only guilty of the ridiculous juvenile stunt of passing the blame, but also that they think it's taken for the truth. Usually two

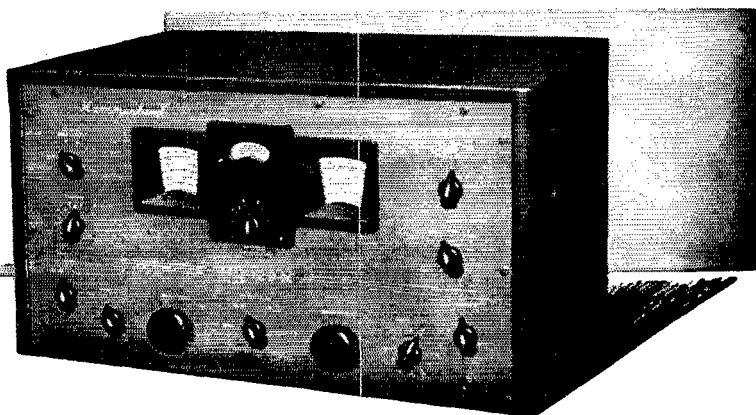
(Continued on page 84)

H **IGH SCORE**

KNEE-DEEP in QRM?

The HQ-129-X has proved its ability to dig through heavy interference. Time after time we hear "HQ" owners holding solid QSO's with stations buried deep in QRM. Good operating technique coupled with the many fine qualities of the "HQ" is a combination that can't be beat.

MORE FOR YOUR DOLLAR!



HAMMARLUND

THE HAMMARLUND MFG. CO., INC., 460 W. 34TH ST., NEW YORK 1, N. Y.
MANUFACTURERS OF PRECISION COMMUNICATIONS EQUIPMENT

SAVE 50%

NEW MEISSNER SIGNAL SHIFTER Now Available In Kit Form

\$49.75

AMATEUR NET
IN KIT FORM



\$99.50

Complete Assembled Unit

You can now own a high quality ECO at half price by building it yourself. Complete, easy to follow, step by step instructions including schematic diagram, photos and pictographs make assembling a joy. All you need is a pair of pliers, a screwdriver and a soldering iron. Everything else—including cabinet and tubes, wire and solder—is furnished. The only two difficult jobs are already done! The complicated shielded turret assembly and band spread gear mechanism are already completely built up, ready to install.

Compare these features

- Band Switching — Six position shielded turret. 10, 11, 15, 20, 40 and 80 meter bands. Blank position for additional band.
- Single Tuning Control
- Self-Contained Power Supply
- Osc. or Amp-doubler Keying
- Magic Eye Tuning Indicator
- Output, Six Watts with 807 Loafing
- Crystal Control on any Band
- Stability — Achieved by high quality components, efficient design.
- Voltage Regulation
- Zero Temperature Coefficient Capacitors
- Turret Mounted Inductors
- Exclusive MEISSNER Stand-By Circuit.

Amateurs! Here's your opportunity to own a high quality Signal Shifter at a real saving!

HERE'S MORE GOOD NEWS FOR HAMS! NBFM with New MEISSNER Phase Modulator FMX . . .

The new MEISSNER FMX PHASE MODULATOR is designed for quick conversion of the Signal Shifter to NBFM phone. The deviation control allows a swing of 5 to 10 KC at 28 mc. Input for high impedance crystal or dynamic mike is provided. Any Class C amplifier that the Signal Shifter is capable of driving becomes a phase modulated amplifier.



The FMX MODULATOR is installed in the position normally occupied by the power supply, the latter becoming a remotely located unit. Plate and filament voltages for the FMX are secured from the SIGNAL SHIFTER power supply. Tubes required: 6SJ7, 6SG7 and VR-150.

Model FMX PHASE MODULATOR, complete, less tubes, Amateur Net. **\$12.00**

ORDER AT YOUR DEALER TODAY!

SIGNAL SHIFTER KIT, Part No. 10-1207. **\$49.75**

MEISSNER

mfg. division

MAGUIRE INDUSTRIES, INC. MT. CARMEL, ILL.

Export Sales Scheel International, Inc., 4237 North Lincoln Avenue, Chicago 18, Illinois Cable Harscheel

good 100% QSOs, one preceding and one following such an accusation, reassure you that it isn't your rig at fault. Fortunately, there are about three honest open-minded amateurs who really make a sincere effort for each one like the above. These fellows are rewarded with a good QRM-free QSO and really are amazed in turn. So far each good contact (approximately 80%) results in a new s.s.s.c. supporter, which is ample reward for all the excess calling necessary to establish them. It's been fun, even more than my first contact on the air as W6HLY back in '81 or '82, I believe. . . .

I'd like to say that I'm happy to see the League behind this s.s.s.c. Keep up the good work, as I don't see any other hope for medium-frequency 'phone, inasmuch as we can't seem to get any more room. I'd like to suggest that the League sponsor or initiate talks and demonstrations at clubs and conventions as a method of getting to the di-hardards. I don't think you have to pull any punches, but don't advise threatening an order to cease a.m. analogous to the transition from spark to c.w.

— Dave Mann, W5MBY

MORE ON THE AUGUST EDITORIALS

141 Utterby Road, Malverne, L. I., N. Y.

Editor, QST:

. . . To say that the August editorials distressed me is putting it mildly. Both editorials show that Headquarters is far removed in thought and action from the rank and file of amateurs.

"B. G." sounds off on how decadent we are in our home-building practices. He forgets that many years have rolled by since the last age census. The ham without numerous family ties, the kind that takes away that leisure time, is a rare exception.

But what sense is there for proudly announcing the most undemocratic action of the League in regard to the prerogatives and privileges of the A and B licenses? This action by the Board of Directors is a totalitarian attempt by the vested interests, those who are in, to keep out those who wish to become hams. As usual this real reason is covered up by the twaddle about the importance of c.w.

We have progressed technically to the point where our equipment permits the most flexible form of communication, speech, to be used under any and all conditions. Even K. B. W. in past editorials boasted that speech was easy to copy through QRM. My own experience is that it is easier to copy speech than c.w. through QRM.

So now the Board of Directors, our representatives, wants to ram down our throats a new bunch of regs building up c.w. Using their archaic reasoning every motorist should be forced to learn to ride a horse. Every Navy man should be forced to train in sailboats. Every aviator should be forced to learn in gliders. So we hams must, says our Board of Directors, go back to the horse-and-buggy days of c.w. Those were the days when the old timers found 10 words per minute good enough for a license. Then it was raised to 13 w.p.m. to keep down the influx of amateurs. Now this same philosophy and perhaps the same 10-w.p.m. old timers, want higher code speeds to keep out the newcomers.

The last half of the editorial reveals that it isn't the importance of c.w. that motivated the Board of Directors in their arbitrary action, but the difficulty these boys are having with their DX QSOs. However, the most serious thing about this whole mess is the unauthorized action by the Board in favor of the "haves" as against the "have-nots" affecting thousands of hams and would-be amateurs. One is almost convinced that the Board is deliberately trying to disrupt the unity of the amateurs by actions which create distrust and a need for counter action. Reconsideration by the Board of its actions is necessary.

— Ben Shupack, W2JXX

REBIRTH

800 W. 29th St., Wilmington, Del.

Editor, QST:

I understand it is required that ARRL be notified when an Associate Member obtains the qualification which permits him to Full Membership. This letter is to so notify you.

Under normal circumstances, a penny postcard would be sufficient for this purpose. However, I believe that, (Continued on page 128)

Here are THE FACTS for the Radioman Who Cares about Tomorrow:

**CREI Offers the Modern Technical Education You
Need to Qualify for the Good Jobs — Good Salaries**

— Secure Features That Can Be YOURS

Face the Future and Face the Facts. Radio is moving at a pace so fast, that it is far beyond the expectations of the most optimistic authorities a short time ago. In the Communications field alone, the FCC recently predicted that a few years will bring more than 1400 standard broadcast stations — an increase of aviation ground stations from 700 to 2500 — radio-equipped railroads from 1 road to 150 — FM stations from 50 to 3000. This remarkable growth makes the most progressive radioman realize the need for authoritative training. It should be a timely warning to others that they must "re-tool" their technical knowledge in order to keep pace.

The Industry has advanced so rapidly — that, while it has created good jobs and remarkable opportunities — most of them are "over the heads" of the average radioman. That's why it is so important to prepare now. You can increase your technical ability with the thorough, practical technical education for which thousands have enrolled with CREI since 1927. CREI home study courses in Practical Radio-Electronics and Television Engineering offer you the chance to acquire the profitable knowledge and ability to enable you to keep pace with the industry.

You owe it to yourself — to your family — to equip yourself with the ability to go after and get the good jobs that are now available for adequately trained men. You can start your CREI course NOW in your spare time, but you must be ambitious and willing to study seriously. Technical education is one of the very best investments you can make. It will pay you dividends all the rest of your life. It costs only a postage stamp and a few minutes' time to write for the interesting facts.

Mail Coupon for FREE BOOKLET

If you have had professional or amateur radio experience and want to make more money, let us prove to you we have the training you need to qualify for a radio job. To help us intelligently answer your inquiry — PLEASE STATE BRIEFLY YOUR BACKGROUND OF EXPERIENCE, EDUCATION AND PRESENT POSITION.



VETERANS! CREI IS G. I. APPROVED!

Capitol Radio Engineering Institute

An Accredited Technical Institute

DEPT. Q-10, 16TH AND PARK ROAD, N.W. WASHINGTON 10, D. C.

Branch Offices:

New York (7): 170 Broadway • San Francisco (2): 760 Market St.

SURVEY PROVES FACTS!

The following are excerpts from comments made in a survey of CREI graduates recently completed. The original names and statements are in our confidential records.

"The course has been very helpful in the everyday things that crop up in the broadcast field and is especially useful to one employed in a broadcast station."

— A Chief Engineer

"My CREI training has helped me with radio theory so that I was prepared to undertake problems in design, construction installation and maintenance as they came along."

— A Chief Engineer

"I found CREI even more than I expected; I have gained confidence and respect for my fellow workers as well as my employer, and will always feel that CREI has given me the foundation necessary for whatever I may accomplish in radio."

— Maintenance and Operation

"Radio is changing so fast today that without the clear, concise training that CREI provided, I would never be able to look such things in the 'teeth,' as FM, Facsimile and Television."

— A Chief Engineer

"As far back as I can remember in my 'radio' life one eternal question mark has been before me — WHY DOES IT WORK THAT WAY? Many seem content to take another's experience and word as Gospel, but all that did for me was to make me wonder the more. Truthfully, CREI opened many doors, and things which were beyond comprehension to me when I began my Radio Electrician career in the CAA are now not only acceptable without question but fully understood."

— A CAA Radio Electrician

CAPITOL RADIO ENGINEERING INSTITUTE—
Dept. Q-10, 16th & Park Road, N. W.
Washington 10, D. C.

Mail me your FREE 24 page booklet.

Check field of greatest interest:

- PRACTICAL RADIO-ELECTRONICS TELEVISION
 BROADCASTING AERONAUTICAL RADIO ENGINEERING
 RECEIVER SERVICING INDUSTRIAL ELECTRONICS

Name

Street

City.....Zone.....State.....

I am entitled to training under the G. I. Bill.

THE NEW SUBRACO 75T

\$296.00

COMPLETE WITH 7 MC XTAL AND ALL COILS FOR 10-20-40 AND 80 METERS



INPUT
200 WATTS CW
120 WATTS PHONE ALL BANDS

FEATURES

- CW BREAK-IN
- HI-LEVEL CLASS 'B' MODULATION
- ANTENNA CHANGE-OVER RELAY
- 828 FINAL RF AMPLIFIER
- Can be used with any low power VFO and/or NBFM exciter with 40 meter output.
- Complete with 3 complete power supplies for RF section and modulator—all in the one cabinet pictured above.

WRITE FOR COMPLETE DETAILS ON THE 75T AND THE

"DASHBOARD" MOBILE



EVERYTHING AT YOUR FINGERTIPS...

...with this completely new, compact, efficiently designed, 30 watt transmitter, small enough to mount in most glove compartments or under any dash. For complete details write or see the full page ad in August QST.

PHOTO...
1/3 ACTUAL SIZE

ONLY \$79.95

less tubes and accessories

Kit of tubes \$8.00, complete with tubes and two male antenna connectors \$87.50

SUBURBAN RADIO COMPANY

82 Herman Street • East Rutherford, New Jersey

S
U
B
R
A
C
O
M
T
-
1
5
X

New Beam Design

(Continued from page 16)

It is believed that this type of tuning of either single or multiband antennas is more effective than any other method and facilitates accurate tuning to a considerable degree.

Acknowledgments

Without very helpful assistance, the development of this antenna system would have been considerably more difficult. The author's brother, Fred, W8KML, provided extensive moral and technical support in addition to spending an entire summer vacation in assisting with tuning of the system. George Caffery, W3JOO, made all the photographs — including some from precarious positions — and spent many days in assisting with tuning and field measurements. To them, the author extends his most sincere thanks and appreciation.

Happenings

(Continued from page 21)

difficulties and spurious emissions in all services, the League being represented by Assistant Secretary Budlong and Technical Director Grammer. Any hopes that regulatory standards could be quickly arrived at were abandoned as the difficulties of the subject made themselves manifest, and the conference concluded without action and without prospect of early resumption. For our part, we said that if and when FCC felt it necessary to establish harmonic standards, we would have no objection to equitable figures for the amateur, provided the protection envisaged by the creation of such rules extended both ways. There is no prospect of early action. . . . The big FCC television hearing of September 20th will concern itself primarily with the technical prospects for creating a satisfactory television service in the "high band" of roughly 500-1000 Mc. Not much is expected to be said about present TV assignments except as established TV broadcasters may indicate their preference to remain where they are. ARRL will have several representatives participating "for the duration." . . . The League continues to have the cooperation of Washington in its endeavor to get foreign amateur stations moved out of amateur bands. HSB, near the low end of "20," is the subject of our latest case. The Netherlands government has finally promised to move PJC1 out of "40" and the Venezuelan government has agreed to move its broadcasting stations out of "80" as soon as new crystals are obtained.

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.

NATURALLY AT NEWARK! PROJECTION TELEVISION BY HALLICRAFTERS

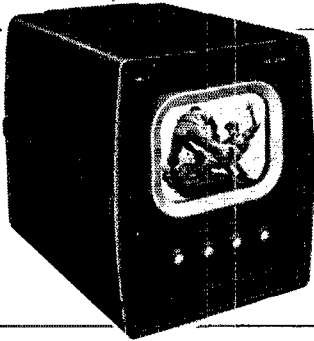
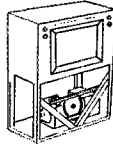
16" x 12" screen . . . 192 sq. inches
amazing performance with HALLICRAFTERS new system

Model T-68 **\$695**



- Clear, steady, optically correct picture, eliminates glare, eye fatigue without use of filters.
- Can be viewed comfortably at close range or distance.
- Uses modification of Schmidt optical system for high efficiency in minimum space.
- Excellent viewing day or night without dimming lights.
- Optical system continually stable . . . in perfect adjustment.
- Low tube replacement cost.

These big advantages . . . this big constant, sharp image made possible because of the exclusive, technically perfect HALLICRAFTERS system . . . 2½" magnetic projection triode, special optical unit, 25Kv high voltage unit. Other famous features . . . 12 channel push button selector, RF amplifier, 3 IF amplifiers, 2 Video amplifiers, improved synchronizing circuits, automatic gain control and black level control, single picture control, inter-carrier FM system. Model T-68 comes complete with 22 tubes and 3 high voltage rectifiers. Handsome polished mahogany cabinet to blend with the finest furniture. Ready to operate on 105/125 volts, 50/60 cycles. Identical set with rack (less cabinet) for custom-built installation Model T-60 **\$595**



HALLICRAFTERS 10" DIRECT VIEW!

\$295

Performance to please the expert! Sharp stable pictures, plenty of contrast. Value-priced and you still get these UNMATCHED Hallcrafters features . . . 12-channel push button tuning, RF amplifier, 3-IF amplifiers, 2 video amplifiers, improved synchronizing circuits, automatic gain control, inter-carrier FM system.

Model T-67—Table Model, complete with 22 tubes, rectifiers (10" picture tube already installed in handsome mahogany cabinet). Ready to operate on 105/125 volts, 50/60 cycles. Cat. No. A-2082.

Identical set in streamlined plastic cabinet **\$279.50**

HALLICRAFTERS FAMOUS 7" TV RECEIVER!

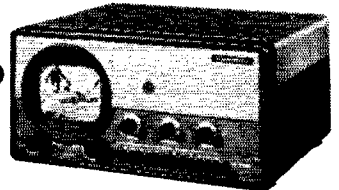
Budget-priced television . . . high priced performance! Unique circuit assures sharp, steady images in 23 sq. inch area. 12 Channel push-button tuning, clear FM reception. Complete with viewing tube installed, no special installation required, no additional costs! You'll agree . . . it's a terrific set for the money!

Model T-54—complete with 19 tubes (including 7" picture tube installed) plus rectifiers. Grey Metal cabinet. Ready to operate on 105/125 volts, 50/60 cycles. No. A-2071 **\$169.50**

Model 505—same as above in Blond or Mahogany Wood Cabinet No. A-2077 **\$179.50**

\$169.50

Model T-54
Metal Cabinet



Free

Send for your latest Newark RADIO BUYING GUIDE! A value-packed listing of 20,000 essentials in standard brand TV, sound, and communications equipment for professionals and amateurs. Use coupon below . . . NOW!



3 GREAT STORES
115 W. 45th St. & 212 Fulton St., NEW YORK
and 323 West Madison Street in CHICAGO

MAIL ORDER DIVISIONS
242 West 55th Street, NEW YORK 19, N. Y.
323 West Madison Street, CHICAGO 6, ILL.

Newark Electric Company, Inc., Dept. 1
242 W. 55th St., New York 19

Please send me the FREE Newark Buying Guide of fine radio equipment.

Name _____
Address _____
City _____ Zone _____ State _____

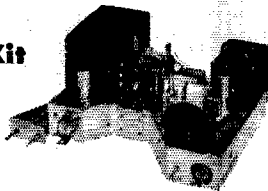
Terrific Television Buy!

Tech-Master 630-TK 10" Kit

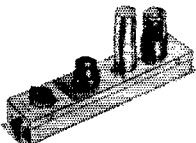
Complete with All Parts, Instructions, and 30 RCA Tubes (including 10-BP4.)

\$198.50

Duplicates in every respect the famous RCA 630TS, generally accepted as best engineered TV set available!



This Soundview 630TK kit is an exact copy of famous RCA 630TS Television set. Contains efficient RCA front end 13-channel tuner—completely factory wired and aligned with 3 RCA matched tubes, plus built-in wave trap. Complete with 30 RCA tubes (12" or 15" tube can be substituted for 10BP4 if desired). Dual controls for picture and FM sound, and for horizontal and vertical control. Kit is supplied with RCA schematic and service manual, but less wire, solder, and mtg. screws. **Cat. No. A-19752.**



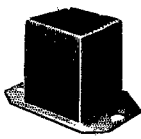
New Electro-Voice Speech Clipper

Model 1000 Speech Clipper is a "must" for overcrowded phone bands. Clips both tops and bottoms from speech frequencies that rise above a pre-set amplitude. Uses 6SC7 and 6H6 and operates directly from high impedance mike into input of speech amplifier. Requires approx. 150 V @ 5 ma, and 6.3 V @ .6 amps. **\$14.70**
No. 26925 Your Cost

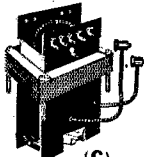
TELEVISION COMPONENTS—Special Buys!



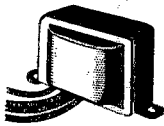
(A)



(B)



(C)



(D)

(A) **Power Transformer**—Equivalent to RCA #201T6 as used in 630TS 10" receiver. (Regularly \$27.00). Shpg. Wt. 18 lbs. **Cat. No S-826** Very Special **\$14.95**

(B) **Vertical Blocking Transformer**, Completely shielded. Very efficient at 60 cycles. **Cat. No. S-827** **\$1.49**

(C) **Horizontal Output Transformer**, with socket. RCA part #52496. Similar to RCA 211T1 except that max. voltage is 6000. For use with 8016 tube. **Cat. No. S-737** **\$3.49**

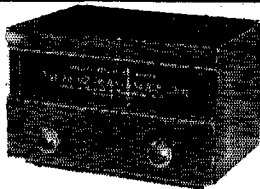
(D) **Horizontal Blocking Osc. Transformer**. Sturdy, Channel mtg. Efficiency is highest at 15,750 cycles—the repetition of horizontal sweep. **Cat. No. S-764** **\$1.25**

RCA 630 TS Metal TV Chassis, punched, formed, and plated, with 4 brackets to fit all RCA parts. **No. A-19751. Your Cost \$7.70**

Sensational General Electric FM TUNER

Covers entire FM band with Amazing Fidelity. Uses "Guillotine Tuning". Beautiful Walnut cabinet. 20 lbs. — No. A-302

Model XFM-1 **\$49.50**
Complete with 8 Tubes



RCA SERVICE MANUAL — Combined Service Notes for 630TS (8TS30) and 648PTK (Projection) TV Sets. Contains alignment data, schematics, parts lists, diagrams, layouts, etc. 64 pgs. **No. 75489** **\$1.50**

MEISSNER Model EX Signal Shifter in Kit Form (as advertised in Sept. Q.S.T.) Save 50% — Assemble it yourself. Everything supplied — exactly like factory-built unit. **Cat. No. 35335** **\$49.75**

FREE! Test, Service or Align your TV Kit in our elaborate TV Service Laboratories in all stores — FREE To Our Patrons!

AT NEWARK YOU GET IMMEDIATE DELIVERY FROM LARGEST STOCK OF ALL STANDARD MAKES OF EQUIPMENT

24 HR. SERVICE ON MAIL ORDERS AND LOCAL DELIVERIES

We are Authorized Distributors of All Standard Lines Including:

- Aerovox • Amphenol • Atlas Alliance • American TV & Radio Astatic • Arrow H & H Audio Devices • Audak • Brush Altec-Lansing • Barker & Williamson Burgess • Bliley • Barker & Howard Belden • Bogen • Browning Labs Cornell-Dubilier • Cannon • Cinch Centralab • Collins Continental Carbon • Croname Drake • Dumont • Elincor • Eby Esico • Electro-Tech • Federal Greenlee • Gordon Specialties General Industries • Garrard Guardian • GE • General Cement Gothard • Hickok • Hammarlund Hallcrafters • IRC • Jeffers Johnson • Jones • Jensen Jackson • Kester • Littlefuse Masco • Mallory McMurdo Silver • Millen • Mueller Meissner • National • Ohmite Par Metal • Park • Pickering Precision • RCA • Rider Rek-O-Kut • Reeves • Rauland Simpson • Shure • Sylvania Stancor • Supreme • Sonar Stephens • Turner • Transvision Television Assembly Co. • Tech-Master Triplett • Thordarson • UTC University • Ward • Vibroplex Weller • Webster • Weston etc.

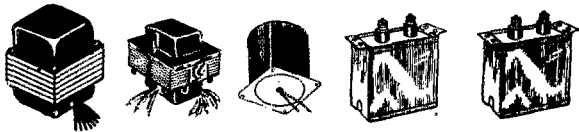
FREE!
SEND FOR OUR COMPLETE NEW CATALOG of Radio, TV, Electronic and Sound Equipment! Thousands of Radio's GREATEST VALUES!



3 GREAT STORES! Uptown at 115 West 45th Street and Downtown at 212 Fulton Street in **NEW YORK** 323 West Madison Street in the heart of **CHICAGO**

MAIL ORDER DIVISIONS: 242 West 55th St., N.Y. 19 and 323 West Madison Street, Chicago 6, Illinois

BASIC POWER SUPPLY KIT BUY



High Quality Components — Designed for Continuous Operation — Just what you need to make a low voltage power supply. These components will deliver 400 V DC at 300 Ma with condenser input, plus 6.3 V at 6 Amps. for tubes in your rig. Power and Filament transformers are ruggedly constructed — with flush type mtg. — both electrostatically shielded. Choke, rated at 4.2 Hy at 300 Ma. and used with 2-8 mfd. — 1000 V oil condensers (supplied) will give ample filtering. With the cost of power equipment increasing daily this is a Terrific Value! Complete Kit: power xformer, filament xformer, choke, two 8 mfd. — 1000 V oil-filled condensers.

Cat. No. S-854, Shpg. Wgt. 30 lbs. Special **\$11.29**

Power Transformer — 768 VCT at 305, Flush Mtg. 4 1/2 x 3 1/2 x 5 1/2" Overall Hgt. Wt. 16 lbs. No. S-851 **\$3.95**

Filament Transformer — 5 V at 6 Amps, 6.3 V at 6 Amps. Flush Mtg. 3 1/2 x 3 1/2 x 3 1/2" Overall Hgt. Wt. 5 lbs. No. S-852 **\$1.95**

Choke — 4.2 Hy at 300 Ma. DCR 78 ohms. Enclosed metal case 3 7/8" dia. x 4 1/2" H. Wt. 8 lbs. No. S-853 **\$2.95**

Oil-Filled GE Pyranol Condensers — 8 Mfd. — 1000 V. Wgt. 2 lbs. No. S-861 **\$1.69** Each

High Voltage, High Current PLATE TRANSFORMER



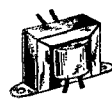
Rugged unit is ideal for medium power phone and CW xmitter. Designed to deliver 1345 volts AC, each side, CT at 500 Ma., from 110 V, 60 cycle source. Will operate for many hours without "cooking". Primary tapped for 105, 115, 125 V. 6"W x 9 1/4"L 8 3/8"H. Screw terminals on bakelite board. Inverted type mtg. Wgt. 65 lbs. No. S-877.....Special **\$14.95**

Multi-Filament Xformer



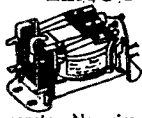
Perfect filament transformer for most medium power rigs. Used with plate xformer (above) provides basis for swell power supply. Tapped primary: 105/125 volts, 60 cycles. 6 separate secondaries: 3 windings 6.4 V @ 8 Amps., 2 windings 2.6 V @ 2.5 Amps., 1 winding 2.6 V @ 10 Amps. Will easily handle pair of 866 rectifiers plus all other tubes in Audio and RF sections of rig. Inverted flange mtg. 4 1/4 x 5 x 5 1/4"H. Wgt. 14 lbs. No. S-880.....Special **\$5.95**

6.3 V Filament Xformer



Channel Mtg. 2 3/4" between centers. 6.3 V @ 1.2 Amps. Fully impregnated wire leads. Pri: 110 V — 60 cycles. Wgt. 2 lbs. No. S-784..... **88c**

LEACH DPDT RELAY



Dependable control for xmitter power circuits. Built for industrial use. 3/16" silver contacts. DPDT—coil operates on 115 V, 60 cycles. Metal base consfr. No circuit grounded to **\$1.39**

T-178 HANDMIKE



— Brand New single button carbon mike with push-to-talk switch, 5 ft. rubber cord and PL-68 plug. Limited Quantity, Order Now! 3 lbs. **\$1.49** No. S-467.....

BY-LINES... by

Bob Gunderson
W2JIO

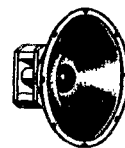


This marks the beginning of my monthly "chatter-box"... and I should like some comments as to what you would like. I have long felt the need for such a column because I wish, personally, to make your problems our problems.

We want you to feel that Newark is not only a source of radio needs, but a place where you can contribute as well as receive all sorts of dope. Tell us just what you want... technical information, any additions to our regular radio gear you want us to carry... or any criticism you might have.

Thanks in advance for all of the many helpful hints and ideas. I'll be seeing you... in person, or via the Newark ads! 73

MAGNAVOX 12" PM



SPEAKER

Will Handle 30 Watts. 55 Oz. Alnico III Magnet. 1 1/2" Pole Piece.

\$12.95

A Great Buy! Famous Deluxe Magnavox Speaker for PA or high quality home installation. Superb reproduction! 6-8 ohm voice coil with dust cover. Brand New. Fortunate purchase makes our low price possible. Quantity Limited! Shpg. Wgt. 10 lbs. No. S-850.

TRANSMITTING and SPECIAL PURPOSE TUBES



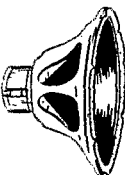
BIG SAVINGS NOW on Top Grade Tubes from Our Tremendous Stock—ALL NEW — GUARANTEED — JAN Inspected — Made for Sig. Corps. BUY NOW!

3C24/24G Transmitting Triode..... **39c \$1.80**

316A, Doorknob VHF Xmitting Tube..... **39c \$1.80**

2A1P	\$2.49	809	\$1.65
2C40	.89	810	6.95
2C44	1.35	811	1.79
2D21	.98	813	7.95
2E22	1.50	814	2.95
2X2/879	.49	815	1.69
3AP1	2.39	826	.79
3CP1	.99	829B	4.95
3CP151	.89	830B	3.95
3E29	3.49	832A	2.65
5BP4	3.95	838	3.95
6AC7	.99	843	.45
6AG5	.99	845W	3.45
6AK5	.89	872A	1.75
6C4	.29	931A	2.39
6J6	.89	954	.49
10Y	.59	955	.49
12A6	.29	957	.49
211	.69	958A	.49
304TL	1.39	959	.49
316A	.49	1619	.49
705A	2.95	1625	.49
717A	1.65	1626	.49
801A	1.49	7193	.49
803	8.95	9001	.49
804	8.95	9002	.69
805	4.95	9004	.69
807	1.15	9006	.49

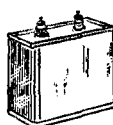
Many More Types in Our Great Stock at Bargain Prices!



RCA 12" PM SPEAKER \$4.95

Superior quality PM Speaker for general replacement. Perfect low cost unit for PA or phono use. Has Alnico V magnet. Fine construction. Voice coil impedance 6-8 ohms. An exceptional value! Less output transformer. Wgt. 7 lbs. No. S-756.

NEWARK Oil-Filled Xmitting Condensers



These new NEWARK Oil Condensers are just the thing for the power supply in your rig. Conservatively rated. Rectangular con-glass insulators. All Brand New—NOT War Surplus!

Cat No.	Cap. Mfd.	WVDC	EACH
S-858	2	2000	\$1.50
S-859	8	2000	2.75
S-860	4	3000	3.75

Prepare NOW for a Better Job in RADIO ENGINEERING



MAKE YOUR HOBBY INTO A GOOD PAYING JOB!

Don't Delay—Write Today!

New Electronic Techniques are making it easier than ever before for the properly qualified ham operator to turn his hobby into a good paying job with real security. FM, Television, Micro-Wave Relay Systems, Mobile Communications systems for railroads, trucks, buses and automobiles — offer marvelous, exciting opportunities to the ham operator — if he is qualified. The time to qualify is now!

Do you know over 50% of radio station engineers started as hams?

YOU CAN BE A BROADCAST ENGINEER, TOO

You can become a broadcast engineer easily — if you hold an FCC First Class Commercial License. To get your FCC Commercial ticket, all you need to do is to add technical training to your ham experience. Study at home in your spare time and get your FCC Commercial License in a few short weeks.

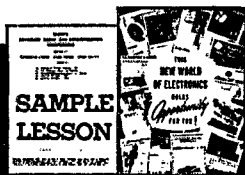
Cleveland Institute Courses Offer Complete Technical Training From Fundamentals to College-Level Engineering

- A. **Master Course in Radio Communication**
Covers complete preparation for broadcast station employment including preparation for FCC Commercial Operator License Exams.
- B. **Advanced Course in Radio Communication Engineering**
A college-level Radio Engineering course for advanced technical training.
- C. **Specialized Television Engineering**
Including post-war Television techniques
- D. **Advanced Radio Telephony for the Broadcast Operator**
Covers the engineering knowledge and technical duties required of the studio control operator, master control operator, and transmitter operator.

CIRE Graduates Get Engineering Jobs

"You may be interested to know that I am now employed at the local broadcast station, where I am a transmitter operator. I took and passed the FCC examinations last February."
Student No. 2754N12

Mail Coupon Get These FREE



Cleveland Institute of Radio Electronics

QT-10 Terminal Tower Cleveland 13, Ohio
Approved for Training under "G.I. Bill"

Cleveland Institute of Radio Electronics
QT-10 Terminal Tower, Cleveland 13, Ohio

I want to know how I can prepare for a better job in radio engineering by studying at home in spare time. Send me FREE your new Opportunity Book and a sample lesson of the course checked below.

Check here if you want FREE Booklet, "How To Pass FCC Commercial Radio Operator's License Exams (does not cover Amateur License Exams)"

NAME.....
ADDRESS.....
CITY..... STATE.....

I desire training in Course A B C D
 Veterans check here for enrollment information under G.I. Bill.

NO OBLIGATION — NO SALESMEN

Crystal Control on 144 Mc.

(Continued from page 23)

More than enough drive was obtained for the 832 final.

Did you ever look longingly at your 7200-ke. crystals and wonder how you could efficiently multiply their output frequency by 20 to get some output on 144? Some — but by no means all — can be made to take off on their 5th overtone in the oscillator circuit shown. When you get one that will, the rest is simple. Double in the second section of the first 6J6 and use the second 6J6 as a doubler with both sections in parallel or as a push-push doubler. It will take care of an 832 very nicely.

Last but not least, a word of caution: Most crystals are calibrated for operation at anti-resonance with a given value of load capacitance. The circuit shown in Fig. 1 apparently causes them to operate at a frequency much closer to the series-resonant frequency (when tuned for maximum oscillator grid current) than is normally the case — which means that the output frequency will usually be quite a bit lower than what would be expected from the figures stamped on the holder. This can amount to as much as 50 kc. at 144 Mc., so check your frequency if you are near the band-edge! Crystals designed for overtone operation are generally calibrated for operation at or near series resonance, so the possibilities of deviation are not so grave if they are used. Such crystals are available from a number of manufacturers.

[EDITOR'S NOTE: Employing the idea suggested by the authors of the preceding article, V.H.F. Editor Ed Tilton has come up with a simple two-tube transmitter for 50- and 144-Mc., using cheap and plentiful 8000-ke. surplus crystals at their third harmonic. W1HDQ will describe this rig in November QST.]

I.A.R.U. News

(Continued from page 26)

- Paraguay: R.C.P., Palma 310, Asuncion
- Peru: R.C.P., Box 538, Lima
- Philippine Islands: Elpidio G. DeCastro, Radio Training Institute, Manila
- Puerto Rico: E. W. Mayer, P. O. Box 1061, San Juan
- Portugal: R.E.P., Travessa Nova de S. Domingos, 34-1° Lisbon
- Roumania: Vasilescu, Box 326, Bucharest
- Salvador: J. F. Mejia, 7* Calle Poniente No. 76, San Salvador
- South Africa: S.A.R.L., P. O. Box 3037, Capetown
- Southern Rhodesia: Andersen, ZE2JN, Box 225, Bulawayo
- St. Vincent: VP2SA, Kingstown
- Sweden: S.S.A., Stockholm 8
- Switzerland: U.S.K.A., Postbox 1203, St. Gallen
- Trieste: A.R.A.T., P. O. Box 301
- Trinidad: Edgar H. Borde, 52 Mucurapo Rd., Port-of-Spain
- Uruguay: R.C.U., Casilla 37, Montevideo
- U.S.S.R.: Central Radio Club, Postbox N-88, Moscow
- Venezuela: R.C.V., Apartado 1247, Caracas
- Yugoslavia: Post Box 180, Ljubljana

Following usual custom, the May and October issues of QST each year will carry the above list with interim revisions and additions as necessary.

(Continued on page 10#)



BC-459

VFO

**Bandspread
Calibrated
Dial**

For 10, 15, 20
and 40
Meters

With the addition of two gears and a translucent white plastic dial with silk-screened calibrations, you can give your BC-459 that commercial VFO look and greatly increase its versatility by making it easy to QSY and to pick exact frequencies on all four bands.

The 40-meter band is spread over 270 degrees, is divided into 5 KC divisions and can be read to 1 KC with good accuracy. The dial is also calibrated for the 20, 15 and 10 meter bands. The 10-meter band is on the outer edge of the dial.

We have the complete kit in stock - it's easy to install - instructions furnished. Quantity is limited so order now. Available only from SREPCO.

STOCK NO. C-909A

BC-459 Calibrated Dial Kit

\$4.50 net

Add 20¢
for Postage

The kit can also be furnished with a blank dial for calibration of the amateur bands on modified BC-457 and 458 Transmitters. The dial has 360 degree markings and guide circles and has a mat finish which takes pencil or ink markings.

STOCK NO. C-909X

BC-457/458 Dial Kit

\$4.50 net

Add 20¢
for postage

SCR-274N Components

TRANSMITTERS

BC-457 — 4 to 5.3 Mc., Used, \$4.95 ea.
Easily modified for use as an 80-Meter CW or 75-Meter Phone, VFO or Transmitter. Conversion data furnished.

BC-458 — 5.3 to 7 Mc., Used, \$4.95 ea.
Brand New, \$5.95 ea.

Use as is for a 6 and 11-Meter VFO. Can be modified to cover 40 meters and used as VFO for 10, 15, 20 and 40.

The above Transmitters use a 1626 low drift triode in a stable oscillator circuit and parallel beam power 1625's as an amplifier. They are capable of 50 watts output.

RECEIVERS

BC-454 — 3 to 6 Mc., Used, with Dynamotor, .. \$5.95 ea.
BC-455 — 7 to 9.1 Mc., Used, with Dynamotor .. \$5.95 ea.

All of the above receivers are 6-tube superhets, compactly built and extremely sensitive. Ideal for Mobile, Fixed or Portable use. Require only the addition of a power supply, gain control, and BFO switch.

Use B-785 Brass Spine for tuning SCR-274N Receivers. Fits geared shaft of tuning condenser. 7/32" Dia. Shaft takes crank or knob with 1/4" hole. Only 9¢ each.

BC-456 Modulator, Used w/Dm-33 Dynamotor & Plugs, \$2.95

BC-456 Modulator, Brand New, less Dynamotor & Plugs, 2.95

FT-220 — 3-Section Receiver Rack,98

FT-226 — 2-Section Transmitter Rack,98

BC-451 — Transmitter Control Box,49

BC-450 — 3-Section Receiver Control Box,98

BC-442 — Antenna Relay Unit, with RF Current Meter and Vacuum Condenser, 1.95

Write for our bulletin "Conversion of the SCR-274N Transmitters" giving power supply suggestions, circuit diagram and other hints. Send 10¢ to cover mailing.

TERMS: Orders under \$3.00, cash with order; orders over \$3.00, 20% deposit, balance COD.

SREPCO

prices are net, f.o.b. Dayton, O

STANDARD RADIO & ELECTRONIC PRODUCTS CO.

135 E. Second St. · DAYTON 2, OHIO · Tel. FUlton 2174

NEW ZEALAND

The New Zealand Association of Radio Transmitters has instituted a new operating award to be known as WAP (Worked All Pacific). Application for the award should be sent via registered mail to N.Z.A.R.T., Post Office Box 489, Wellington, and must be accompanied by confirmations of two-way contacts with amateur stations in 30 or more countries in the Pacific area and a list of such confirmations to facilitate checking. Each confirmation must show a readability report of 3 or better and a minimum tone report of T8. Contacts must be made from the same call area (or country, if not subdivided) and may be either prewar or postwar. For the purposes of the award, countries indicated by the following prefixes are considered to be in the Pacific area: ZL, VK, KB6, KH6, KP6, KJ6, KG6, KX6, KM6, KW6, KS6, KA, VR1 through VR6, ZK1, 2, ZM6, FK8, FUS, FO8, VS4, VS5 Bruncei, VS5 Sarawak, VK4 Papua, VK9 T. of N.G., ZC2, PK1 through PK7, CR10, Bonin Islands, Caroline Islands, Palau Islands, Phoenix Islands (Br.), Union Islands.

SOUTH AFRICA

On November 7, 1948, a special memorial service for the radio amateurs who gave their lives in the two world wars will be broadcast from all English-speaking stations of the South African Broadcasting Corporation on their regular frequencies and by the headquarters station of the South African Radio League on the 7- and 14-Mc. amateur bands. The service will be conducted by the Rev. D. C. H. Human, ZS4T.

Headquarters notes in Radio-ZS, official journal of South African Radio League, contains information of the reelection of Messrs. Ussher and Browning as president and vice-president respectively of the society. The Department of Telecommunications, in discussing matters of mutual interest with a delegation of the Council, gave recognition of S.A.R.L.'s recently-initiated observers service as a valuable contribution to the maintenance of order on the air. The Department advised that its own monitoring service will continue to function.

The Headquarters station of S.A.R.L. has been allocated the call ZS6HQ.

ARGENTINA

A general convention of Argentine amateurs recently adopted voluntary subdivisions of bands as follows: 7.0-7.05 Mc., exclusively c.w.; rest of band, exclusively 'phone; 14.0-14.1 Mc., exclusively c.w.; 14.1-14.15 Mc., shared c.w. and 'phone; rest of band, exclusively 'phone; 23.0-28.1 Mc., exclusively c.w.; rest of band, exclusively 'phone.

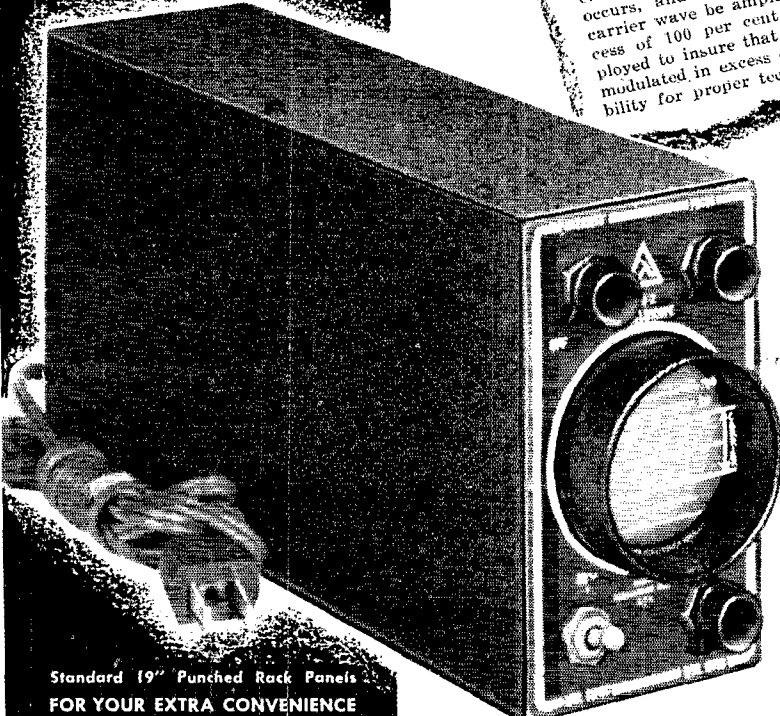
HUNGARY

The Magyar Rovidhullamu Radioamatorok Egyesulete, Box 185, Budapest, the Hungarian short-wave radio amateur league, in an effort to foster international friendship and advance amateur

(Continued on page 104)

THE F.C.C. SAYS

§ 12.133. Purity and stability of emissions. In the case of A-3 emission, the amateur transmitter shall not be modulated to the extent that interfering spurious radiation occurs, and in no case shall the emitted carrier wave be amplitude-modulated in excess of 100 per cent. Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability for proper technical operation.



ONLY
\$24⁹⁵

COMPLETE WITH TUBES
REVERSIBLE PANEL • CALIBRATED
TRACE INTENSIFIER WINDOW
INSTRUCTION BOOK
3" x 5" x 10"

Standard 19" Punched Rack Panels
FOR YOUR EXTRA CONVENIENCE



Center Upright Mounting on 5 1/2" Panel Black Wrinkle Finish 1/8" steel
Cat MM2-3PC Price 1.95



Right or Left Upright Mtg. on 5 1/2" Panel
Cat MM2-3PS Price 1.75



Center Horizontal Mtg. on 3" Panel
Cat MM2-3PC Price 1.75



Right or Left Horizontal Mtg. on 3" Panel
Cat MM2-3PS Price 1.75

IF YOUR
DEALER
CAN'T
SUPPLY YOU

For rack mounting, standard 19" steel rack panels finished in black ripple enamel are available as described above. The compact construction of the MM-2 allows a considerable amount of space for auxiliary meters and equipment on the same deck.

...WRITE



LAMBDA

MM-2 MODULATION MONITOR

Here is an unusually versatile basic oscilloscope only slightly larger than a standard multimeter. Compact, rugged, portable, simple to operate and attractively priced, it is a must for your shack. Its two inch screen provides a continuous, visual, on-the-air check of your phone transmitter so that you can see your voice as your contact hears it. The MM-2 helps you make every transmission a clean one: distortionless, properly and efficiently modulated, hum-free. The MM-2 permits you to adjust your speech amplifier, pre-emphasis and speech clipping circuits, rf, amplifier matching, excitation, etc. right on the nose. (Monitor oscilloscope patterns and their interpretation are graphically illustrated on page 312 of the 1948 ARRL Handbook.) Styled for your operating table, the MM-2 may also be incorporated as an integral part of your rig. These are a few of its features:

- Light and compact. Measures 3" x 5" x 10" and weighs only 4 1/2 lbs.
- Full set of controls including horizontal gain, and vertical and horizontal centering controls
- Built in AC power supply with a special, shielded HV transformer
- Built in 60 cycle sweep with automatic return trace blanking
- Beam switch for cutting off trace during transmitter standby periods
- Calibrated (no calculating necessary) modulation percentage scale
- Clean, stable green trace with light shield and trace intensifier window
- Provisions for external wide range sweep and deflection amplifiers
- Reversible front panel for vertical and horizontal mounting
- Standard 19" punched rack panels available for permanent installation in rack mounted equipment.

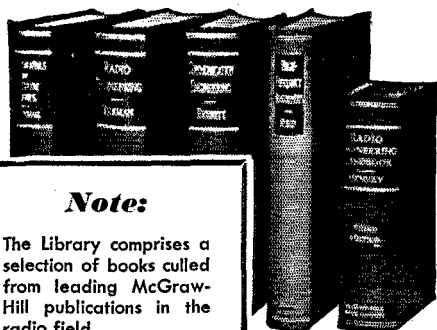
ELECTRONICS CORP.

BOX No. 55

DEPT. Q10

CORONA, N.Y.

NOW
a really high-powered
**RADIO
ENGINEERING
LIBRARY**



Note:

The Library comprises a selection of books culled from leading McGraw-Hill publications in the radio field.

- especially selected by radio specialists of McGraw-Hill publications
- to give most complete, dependable coverage of facts needed by all whose fields are grounded on radio fundamentals
- available at a special price and terms

THESE books cover circuit phenomena, tube theory, networks, measurements, and other subjects — give specialized treatments of all fields of practical design and application. They are books of recognized position in the literature — books you will refer to and be referred to often. If you are a practical designer, researcher or engineer in any field based on radio, you want these books for the help they give in hundreds of problems throughout the whole field of radio engineering.

**5 VOLS.
3319 PAGES
2289**

ILLUSTRATIONS

1. Eastman's **Fundamentals of Vacuum Tubes.**
2. Terman's **Radio Engineering.**
3. Everitt's **Communication Engineering.**
4. Hund's **High Frequency Measurements.**
5. Henney's **Radio Engineering Handbook.**

SPECIAL LOW PRICE • EASY TERMS

Special price under this offer less than cost of books bought separately. In addition, you have the privilege of paying in easy installments beginning with \$2.50 in 10 days after receipt of books and \$5.00 monthly thereafter. Already these books are recognized as standard works that you are bound to require sooner or later. Take advantage of these convenient terms to add them to your library now.

EXAMINE THESE BOOKS 10 DAYS FREE

McGraw-Hill Book Co., Inc.
330 W. 42nd St., N. Y. C. 18

Send me Radio Engineering Library for 10 days' examination on approval. In 10 days I will send \$2.50 plus five cents postage, and \$5.00 monthly till \$27.50 is paid, or return books postpaid.*

Name

Address

City.....Zone.....State.....

Company

Position.....*QST 10-48*

*SAVE! We pay postage and packing charges if you send first payment with order. Same return privilege

radio knowledge, advises Headquarters that it wishes to exchange its publication, *Radiotechnikai Vilag*, for foreign amateur radio magazines.

PHILIPPINES

Information has reached Headquarters from the *Philippine Amateur Radio Association* that a portion of the 3.5-Mc. band has been opened to them: 3.5-3.54 Mc. for A1, 3.54 to 3.6 Mc. for A3. Plans have been made to establish a local emergency net using these frequencies. It is hoped by P.A.R.A. that Philippine amateurs soon will be permitted to engage in DX activities, a privilege now denied them.

GERMANY

American amateur radio operators in Germany are being mobilized for any communications emergency. They have been asked to report to the United States Army Signal offices to assist in the implementation of Army plans to set up an emergency communications system. The Army plans call for an establishment of an extensive network of amateur stations at all major military posts throughout the American zone, primarily for intrapost communications.

15th ARRL Sweepstakes

(Continued from page 86)

aggregate scores of 'phone and c.w. reported by club secretaries and confirmed by the receipt at ARRL of contest logs constitute a club entry. Segregate club entries into 'phone and c.w. totals. Both single- and multiple-operator scores may be counted for club entries. Only the scores of bona fide club members, in a local club territory, may be included in club entries.

The highest single-operator c.w. score and the highest single-operator 'phone score in any club entry will be rewarded with a "club" certificate where at least three single-operator 'phone and/or three single-operator c.w. scores are submitted.

7) *Disqualification:* Failure to comply with the contest rules or FCC regulations shall constitute grounds for disqualification. In such cases, the decisions of the ARRL Contest Committee are final.

Converter for 220 Mc.

(Continued from page 93)

as used for the other tubes.

The 10.7-Mc. output of the converter is taken off the cathode of the 6BA6 through a piece of 50-ohm coaxial cable. A 6C4 could also be used for this stage which operates as a cathode follower.

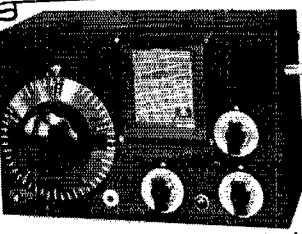
Adjustment Procedure

Set all parallel trimmers to approximately one-half capacity. Connect a vacuum-tube voltmeter to one of the mixer grids, or insert a low-range milliammeter between the junction of R_2 and R_3 and ground. Turn the neutralizing condensers fairly well out. A high negative voltage or an indication of grid current will appear if the r.f. stage is oscillating. Turn the neutralizing condensers in slowly, keeping them at about equal settings, until the negative voltage or grid current disappears. Now rotate each of the trimmers

(Continued on page 106)

Terminal offers you MORE in QUALITY-VALUE-SERVICE!

Terminal IS YOUR **Best Bet** FOR **Better Buys**



NEW YORK'S LEADING RADIO SUPPLY HOUSE

NATIONAL I-10-A RECEIVER

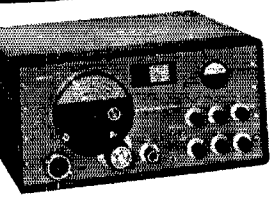
Priced for quick clearance! An improved superregenerative receiver covering all wavelengths from one to eleven meters, outstanding for performance and durability! Tubes used are 954 RF amplifier, 955 detector, 6J5 first audio, 6V6 audio output. Complete with tubes and 6 sets of plug-in coils, less speaker and power supply. **Reduced to 39⁹⁵**

MCS 8" PM speaker in matching cabinet . . . **7⁹⁵**
LIMITED QUANTITY! BRAND NEW!

SOUND VALUES IN SOUND EQUIPMENT

For the tops in quality and widest selection, visit our Sound Department! Largest stock in New York of microphones, amplifiers, tuners, record players, speakers, recorders, etc.—at lowest prices! Ask for our high fidelity sound catalog.

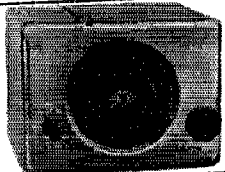
CHOOSE YOUR NEW RECEIVER FROM OUR LARGE STOCK! IMMEDIATE DELIVERY!



- HALLICRAFTERS**
- S-38, complete . . . \$47.50
 - S-40-A, complete . . . 99.50
 - S-52, complete . . . 99.50
 - S-53, complete . . . 79.50
 - SX-43, less speaker . . . 179.50
 - R-44 speaker for SX-43 . . . 19.50
 - SX-42, less speaker . . . 295.00
 - R-42 speaker for SX-42 . . . 34.50

NATIONAL

- NC-33, complete . . . \$57.50
- NC-57, complete . . . 89.50
- HFS, less power supply . . . 142.00
- 5886 pwr. supply HFS . . . 22.43
- NC-183, less speaker . . . 268.00
- NC-183 speaker . . . 14.00
- NC-240D, less speaker . . . 236.25
- NC-240D, less speaker for NC-25 speaker for NC-240D . . . 16.44
- HRO-7, COMPLETE . . . 372.45



GON-SET "TRI-BAND" CONVERTER

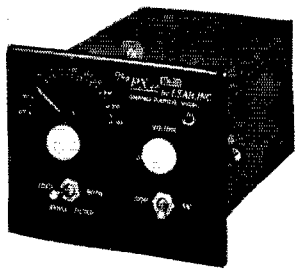
A new 3-band amateur converter covering 6, 10-11 and 15 meter bands. Compact, completely self-contained including 110 volt AC power supply. Equipped with 8 tubes, for use with any standard communications receiver. Your cost **75⁰⁰**

GUARANTEE—Every item sold by Terminal Radio Corporation is fully guaranteed.

An Exclusive Terminal Scoop!

Famous LEAR TRANSMITTER-RECEIVER FOR ALL LIGHT AIRCRAFT

The Lear TR-1B PXer transmitter-receiver combination permits the pilot to keep in touch with control towers when taking off and landing, to receive weather reports, radio range and other navigational aids. Transmits on 3105 Kc., crystal controlled, with 5 watts power output. Superhet receiver covers 195-405 Kc. with excellent sensitivity. Complete weight including transmitter-receiver, 12 volt pack, headphones, microphone and connecting cable is only 15 lbs. We've sold plenty of these sets during the summer to light-plane owners for 69.50 (marked down from 129.50 yet!) with nary a complaint. But, brother, we've still got 24 of these brand new sets in factory sealed cartons waiting for some winged hams to take them off our shelves for **only 44.95**, complete, ready for installation! If you want to know more about this set, drop us a line asking for a TR-1B circular. But hurry, because they won't be here long at this price (we hope!).



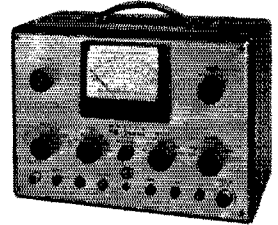
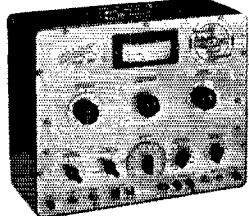
Here's what you get:

- Lear TR-1B Transmitter-Receiver
- 12 volt vibrator power supply
- Press-to-talk microphone
- Leather-band headphones
- All cables, mounting hardware and accessories ready for installation

Clearance sale price **44⁹⁵**

NEW TELEVISION TEST EQUIPMENT

From Terminal's big Test Equipment Department, we recommend these instruments for top-performance in the important field of television maintenance and design!



- HICKOK 610, Television Alignment Generator \$169.20
- RCA WV-95A, Master Voltahmyst 152.50
- RCA WR-39A, Television Calibrator 250.00
- RCA WO-58A, 5" Wide Range Oscilloscope 345.00
- RCA WR-59A, Television Sweep Generator 325.00

TERMINAL has a test instrument for every requirement! We carry DUMONT, HICKOK, JACKSON, PRECISION, RCA, SILVER, SIMPSON, SUPREME, SYLVANIA, TRIPLETT, WATERMAN, WESTON and other dependable makes! Also—PANEL METERS—the full lines of SIMPSON, TRIPLETT and WESTON!

SEE and HEAR BEFORE YOU BUY THAT TELEVISION KIT!
ALL TELEVISION KITS, including the new large screen projection sets, are on demonstration in our Newly Enlarged **TELEVISION DEPARTMENT!**

25% deposit required with mail orders. Regular terms to rated firms. Prices are F.O.B. New York.

TERMINAL RADIO CORP.

85 CORTLANDT STREET • NEW YORK 7, N. Y.

Phone: WOrth 4-3311

Cable Address: TERMRADIO

PEERLESS PACKS Value PUNCH!

PEERLESS TUBE BARGAINS!

2X2A..... 98c	631P1.....\$2.79	954..... 49c
2X2/879... 49c	705A.....\$2.95	955..... 49c
316A..... 49c	717A..... 69c	957..... 39c
5B1/5G1... \$3.95	802.....\$6.95	1619..... 49c
6AG7..... 98c	807..... 98c	1624..... 89c
6AK5..... 79c	813.....\$6.95	1625..... 49c
6C4..... 29c	836..... 98c	1626..... 49c
6J6..... 69c	837..... 98c	1629..... 49c
	923..... 98c	1635..... 98c

V.T.V.M. KIT, MODEL 221-K

Completely new, different vacuum tube voltmeter, at unusually low price! Amazing performance sets new standards of accuracy, linearity, and stability for this type of instrument. Electronic AC range to 30 Kcs is more linear and accurate than possible with copper oxide rectifier. Meter cannot be burned out. AC, DC ranges: 0-5, 10, 100, 500, 1000 volts. Ohmmeter measures 2 ohm to 1000 megohms in 5 ranges. Kit includes all components, NOTHING ELSE TO BUY! With complete set of 11 stage-by-stage wiring and assembly diagrams, and full simple instructions. **OUR LOW PRICE \$23.95**

15" MAGNAVOX SPEAKER 3.2 lb. ALNICO V MAGNET

Sensational Value! Ideal for heavy duty public address, auditoriums, theatres, etc. 2" voice coil. 6-8 ohms VC impedance. Max. 30 watts. Individually boxed. Reg. Price \$89.50. **OUR LOW PRICE, while limited stocks \$24.95** last.

LS3 MATCHING SPEAKER

6" heavy duty PM speaker. Mounted in weather-proof and wind-proof acoustically treated metal cabinet. 4000-ohm transformer mounted on speaker. Two-circuit jack on front panel. Individually boxed. **OUR LOW PRICE \$5.95**

SELENIUM RECT., 100 Ma..... Only 59c each

KIVER TELEVISION & FM BOOK—Just Released!
"TV and FM Receiver Servicing."— by M. S. Kiver. **OUR PRICE ONLY \$2.95**

UTAH 12" SPEAKER

Alnico V magnet. Easily handle 12 watts. 3-4 ohms VC imped. Individually boxed. Reg. value \$14.00. **OUR LOW PRICE \$5.75**
Lots of 6 or more. EACH.....\$5.25

ADJUSTOVOLT, Stancor P-6247

Special metered multi tap autoformer to correct line differences to operate standard equipment. 300 watts. Pri 9 taps, 55-135 volts, 50/60 cycles. Sec. 115 volts. Individually boxed. **OUR LOW PRICE \$11.95**

TELEVISION COMPONENTS

Horizontal Output — H.V. (Flyback) 10 K.V. Trans.....	\$6.25
Horizontal Blocking Oscillator Trans.....	1.75
Vertical Blocking Oscillator Trans.....	1.95
Focus Coil.....	5.25
Deflection Yoke, 50 degrees, for 10", 12", 15" Picture Tubes.....	4.95

MINIMUM ORDER \$5.00. We carry large stocks of all types of tubes—write for free list—we will be pleased to quote on other types not shown here

All prices F.O.B. Jamaica, N. Y. Please add postage

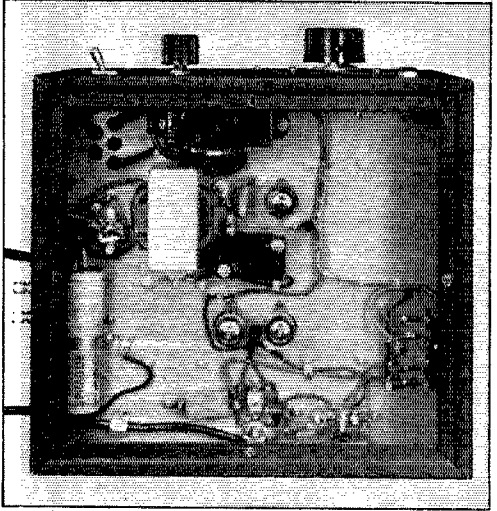
Write Department Q



92-32 Merrick Road Jamaica 3, N. Y.
Branch: 71 Murray Street, New York 7, N. Y.

Peerless Electronics Distributors Corp.
76 Willoughby St., Brooklyn 1, N. Y.

to a midpoint between the two points of oscillation. Set the oscillator to the proper frequency, or 10.7 Mc. below the signal frequency. Once the oscillator is set, the r.f. and mixer tank parallel trimmers may be adjusted for maximum background noise at the high end of the band. Bend the rotor plates of the r.f. plate tuning condenser slightly for peak noise at the low end of the band. A wavemeter may be used to check oscillator and r.f. frequencies, while listening to background noise. A signal generator, if available, is very



Bottom view of the WIPMS converter.

desirable in the alignment operation but it is not absolutely necessary. Any other suitable method of neutralization may be used. If the converter is working properly, touching the grid circuit of the r.f. tube should reduce the background noise to a very low level. There should be a very pronounced noise peak when rotating the antenna trimmer. An approximate change of two S-units in noise level was observed on the NC-183 when peaking the antenna trimmer. The gain of the r.f. stage is approximately 20 db. (10 times).

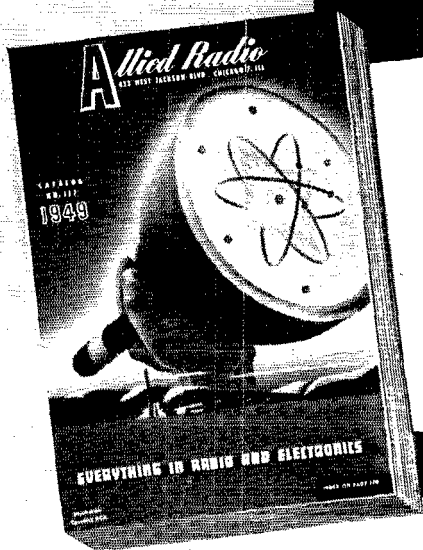
United States Naval Reserve

(Continued from page 34)

show for each contact: time, band (indicating whether 'phone or c.w.), signal report received, and state or territorial prefix (number each new state or prefix as worked). A summary should be included showing number of contacts on each band, total contacts, list of states and territorial prefixes claimed, and final score. Be sure to include your copy of the Navy Day message if you claim 50 points for copying this, and indicate whether or not you are a member of the Naval Reserve. Results will be published in QST.

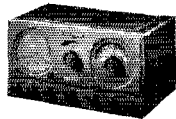
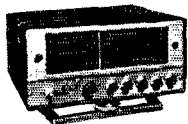
SWITCH TO SAFETY!





Your **NEW 1949
ALLIED CATALOG**
is Ready Now!
180 VALUE-PACKED PAGES

**YOU'LL FIND ALL THE NEW GEAR IN THE NEW
ALLIED CATALOG—GET YOUR COPY NOW!**



**YOU GET EVERY BUYING ADVANTAGE
WHEN YOU'RE "EQUIPPED BY ALLIED"**

- World's Largest Amateur Stocks
- A Real Break on Time Payments
- A Square Deal on Trade-Ins
- Fastest Service on All Orders
- Ham-to-Ham Personal Help

**Send for the Leading
Amateur Buying Guide**

It's ready for you—the new 1949 ALLIED Catalog—the greatest Buying Guide in Amateur Radio! Just name what you want—we've got it—all the newest and finest in receivers, transmitters, parts and station equipment, at really low, money-saving prices!

You'll save on our new Time Payment Plan—nothing like it for easy terms. You'll get a square deal through our liberal trade-in allowances. And, of course, you have the benefits of our 15-day trial on all receivers, full 90-day guarantee—and all the help in the world from our gang of old-time Hams. Follow the lead of thousands of Amateurs who depend on ALLIED for all their station needs. Write today for your FREE copy of the new 180-page ALLIED Catalog, the world's Leading Amateur Radio Buying Guide.

It Pays to be "Equipped by ALLIED"

Keep This Buying
Guide Handy . . .

FREE



ALLIED RADIO CORP., D. L. Warner, W9IBC
833 W. Jackson Blvd., Dept. 15-K-8
Chicago 7, Illinois

- Send FREE 1949 ALLIED Catalog.
- Send Time Payment details and Order Blank.
- Put my name on mailing list for the ALLIED Ham Bulletins.

Name.....

Address.....

City.....Zone.....State.....

**ALLIED
RADIO**

Everything for the Ham

At the RADIO SHACK you deal

IN REGULAR STOCKS

W1LNB
AL

W1MYJ
SAUL

W1OPF
CHARLIE

W1IBY
HERB

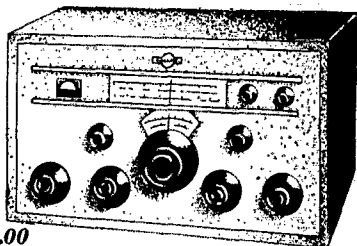
W1DNL
BOB

W9DUF
GEORGI



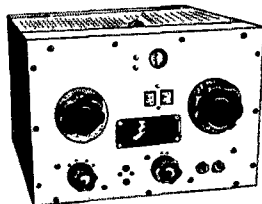
COLLINS 75A RCVR

This double-conversion, all-band receiver will give you a new concept of quality and utility. It's furnished complete with 14 tubes, power supply and loud speaker.



Amateur Net Price \$375.00
Only \$75.00 puts it in your shack!

The new MEISSNER SIGNAL SHIFTER KIT

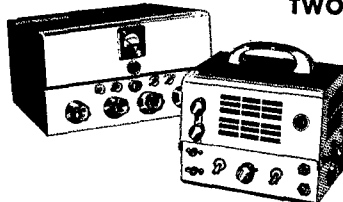


The most versatile and stable means for dodging QRM on the crowded amateur bands. Turret-mounted coils cover six bands (10, 11, 15, 20, 40, and 89 meters) with a blank for one more when needed; and the whole shielded turret is all ready to install . . . you need only pliers, screw driver and soldering iron to complete a superlative EGO that duplicates the peak performance of the factory-built model. Complete kit includes tubes and power supply.

Amateur Net Price \$49.75
Only \$9.95 puts it in your shack!

TWO NEW STANCOR XMTR KITS

ST-203-A Mobile Xmtr Kit



Compact, versatile, efficient; use it in your car; then quickly shift it to fixed station service; special mounting makes this easy. Works on a-c line in fixed station; on vibrator or dynamotor (PE-103A) mobile. Gives you two crystal-controlled frequencies in 10- and 11-meter bands, press-to-talk operation, AM phone, 27.5 watts

amplifier plate power input. Circuit uses 6V6 harmonic oscillator, 2E26 GLC amp. 6J5 grounded-grid speech amp., P.P. CLA-1 mod. Kit includes prefab chassis, mounting plate, dust cover, prepared lead wires, all components and instructions.

Amateur Net Price \$44.70
Only \$8.94 puts it in your shack or car.

ST-202-A CW Xmtr Kit

Gives you a compact, desk-type, high-frequency xmtr for CW with plenty of power. Also allows you to apply FM or AM for phone. Covers 10, 11, 15, 20, 40 and 80 meters with inter- and intra-band flexibility yet extreme simplicity of adjustment and control. Uses novel band switching exciter circuit, single-deck band-switch coil assembly and one tuning capacitor. Amplifier plate input 100-125 watts depending on tube used as R.F. Amp.; may be 35T, HK54, 811, 5514, etc. Link coil with adjustable coupling. Separate LV and HV power supplies. Kit includes cabinet, built-in chassis, panel markings, bottom plate, all components and pre-fab wiring harness, instructions.

Accessories required are: milliammeter, five tubes, plug-in 150-watt amplifier tank coils, crystals.

ST-202-A Kit . . . Amateur Net Price \$92.80
Only \$18.56 puts it in your shack!

VOLTAGE-REGULATING TRANSFORMER

BRAND NEW \$19.95

Rated 250va.; pri. 190-260V. 60 cycles; sec. 115V. at 1.74 amp. Made by SOLA.



MEG-OHM-METER
BRAND NEW \$89.50
Insulation Tester

Direct-reading to 1000 megohms. True ohmmeter with hand-driven 500-volt generator self-contained in phenolic case; test leads, instructions, carrying case.

YOU CAN STILL GET EASY TERMS ON NEW GEAR

Deposit only 20% . . . and take a year to pay the rest.

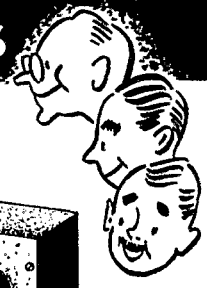
- IMMEDIATE SHIPMENT of the gear you want is assured by our complete stocks of receivers, transmitters, instruments and other amateur apparatus.
- EASY, MONEY-SAVING TERMS require only a small service charge on time payments.
- WHATEVER YOU NEED for full enjoyment of amateur radio is ready for you at the Radio Shack. C. O. D. orders filled promptly with 20% deposit.

CHECK CHOICE HERE LIST PRICE SEND US ONLY

CHECK CHOICE HERE	LIST PRICE	SEND US ONLY
COLLINS		
75A rcvr	\$ 375.00	\$ 37.50
30K xmtr	1450.00	145.00
32V-1 xmtr	475.00	47.50
310B-1 exctr	190.00	19.00
310B-3 exctr	215.00	21.50
310C-1 exctr	85.00	8.50
310C-2 exctr	100.00	10.00
70E-8 exctr	40.00	4.00
HALLICRAFTERS		
S38 rcvr	47.50	4.75
S40A rcvr	99.50	9.95
S47 rcvr	229.50	22.95
S51 rcvr	149.50	14.95
S53 rcvr	79.50	7.95
S55 rcvr	129.50	12.95
S56 rcvr	110.00	11.00
SX42 rcvr	295.00	29.50
SX43 rcvr	179.50	17.95
SP44 panadapter	49.50	4.95
T-54 TV rcvr	169.50	16.95
HT9 xmtr	350.00	35.00
HT18 xmtr	110.00	11.00
NATIONAL		
NC-33 rcvr	65.95	6.60
NC-57 rcvr	89.50	8.95
NC-173 rcvr	179.50	17.95
NC-183 rcvr	269.00	26.90
NC240D rcvr	241.44	24.14
HRO-7 rcvr	279.00	27.90
HFS	125.00	12.50
HAMMARLUND		
HQ129X rcvr	189.15	18.92
SP400X rcvr	450.00	45.00
R. A. E.		
HF-10-20 rcvr	77.00	7.70
VHF-152A rcvr	86.60	8.66
DB22A	77.00	7.70
RME-84	98.70	9.87
RME-45	198.70	19.87
MILLEN		
90800	42.50	4.25
90881	89.50	8.95
90281	84.50	8.45

We can also furnish from our complete stocks test equipment by RCA, Sylvania, Simpson, Supreme, Triplett, Precision, Dumont, Hickock . . . all on our easy terms that put equipment in your hands on a down payment of only 20%.

with MEN WHO KNOW YOUR NEEDS



IN SURPLUS STOCKS

WIHE Small DON

WINBS CHARLIE

WILDR Big DON

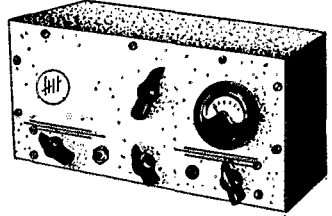
TUBE SPECIALS!

804TH	\$3.95	2X2/879	.49
Six for	23.10	3E29	3.49
807	1.15	3BP1	2.39
811	1.79	3C24/24G	.39
814	2.95	5BP1	1.49
815	1.69	5BP4	3.95
850B	3.95	6AK5	.89
866A	.98	211	.69
VR150	.79	316A	.49
6AC7	.99	705A	2.95
6AG5	.99	717A	1.65
6C4	.29	801A	1.49
6AG7	1.06	303	8.95
6J6	.89	305	4.95
6H6	.68	307	1.15
		309	1.65
		318	7.95
		832A	2.65
		886	2.25
1A3	.79	887	2.25
1A5	.65	888	3.95
1L4	.79	845	3.45
5Z3	.67	372A	1.75
6A-75	.98	931A	2.39
VR90	.75	1616	1.39
VR105	.75	1619	.49
1P23	2.95	1625	.49
3B24	1.95	1626	.49
3EF7	2.98	8A05	4.95
2K38	\$45.00	9001	.49
		9002	.69
		9003	.69
		9004	.69
		9006	.49

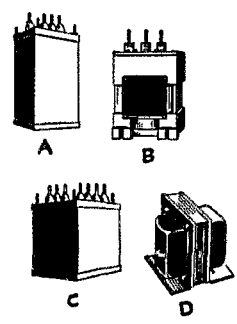
HAMMARLUND Four-20 KIT

Everything you need to assemble a genuine Hammarlund Four-20 xmtr: complete set of parts, punched chassis and cabinet, meter, tubes, sockets, resistors, capacitors, wire, insulation, hardware, 10-meter coil, and detailed instructions.

Net price only \$39.50



TRANSFORMERS, CHOKES Raytheon-Thordarson



- A. Dual Section Choke Type WX5148 — each section 1.75 Hy, 250 ma, d-c res. 42 ohms. Size 6 3/4 x 3 3/8 x 3 3/8. Wt. 7 1/2 lbs. 4 10/32 holes for mounting. **89c**
- B. Bias transformer Type U8383 — pri. 115 v. 60 cycles; sec. 215 v. CT 300 ma, 5 v. CT 6 amp. Size 5 1/2 x 6 x 4. Weight 9 1/2 lbs. **\$1.39**
- C. Bias transformer Type UX9112A — pri. 115 v. 60 cycles; sec. 280 v. CT 1.2 amp. Size 4 1/2 x 5 3/8 x 6 1/8. Wt. 15 3/4 lbs. **\$1.39**
- D. Power Transformer — Pri. 110 v.; 60c., Sec. 420 — 360 — 80 v., 250 mils. Fil. 6.3-5-2.5 v. All C.T. **\$3.69**

BRAND NEW: CW3 RADIO RECEIVER only \$10.95



Highly selective crystal-controlled superhet for fixed-frequency operation in 1900-16,500kc band. Has variable BFO, r.f. sensitivity control, audio peak limiter, built-in power supply for 115 volts a-c; rack mounting. Furnished with full set of 7 tubes; less plug-in coils; detailed instruction manual included.

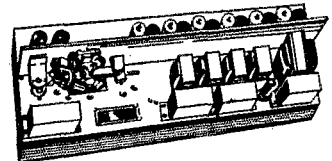
BC-604 XMTR — \$13.95

Range: 20 to 27.9 megacycles; complete with tubes and dynamotor. Used, but in good working order.

BC-603A RCVR — \$13.95

Range: 19.28 to 27.6 megacycles; complete with tubes and dynamotors. Good used condition.

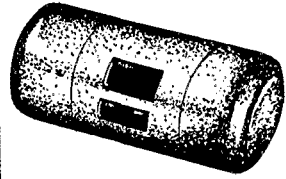
BC-406 HF SUPERHET for 2 - 5 - 10 Meters \$19.50



Famous radar-type BC-406, 15-tube Superhet complete with broad-band IF's, power supply with 4-section filter, and 15 tubes including 5 acorns.

PE-103 DYNAMOTOR

BRAND NEW—only \$5.95 (less base)



Here's your opportunity to get one of these popular units at a rock-bottom price. Operates from 6 or 12 volts d-c; delivers 160 mils at 500 volts d-c.

RADIO PHONE HANDSETS



- H-23U **\$2.95**
- Brand new, high-impedance phone, low-resistance mike; with 6-ft. cord and PL-55 and PL-68 plugs.
- TS-11 handset\$3.95
- TS-13 handset\$2.95

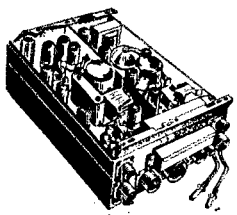
AAF HAND MIKE



Type T-17 mike with push-to-talk switch, cord, and plug. This is a carbon mike. **89c**

BRAND NEW G.E. BC-645A — ONLY \$9.95

Get going on 420 with this "hot" xmtr-rcvr for phone and i.c.w. Originally priced over \$2000, they cost you less than the price of the 15 tubes you get with the outfit. Full conversion instructions furnished.



HS12 HEADPHONES

With head band, rubber cushions, cord and plug. Used, but in A-1 condition. Only **\$1.69**

Genuine "MAC" Key Model 200 89c

Here's a price-bustin' bargain — 3/16" silver contacts . . . circuit closer . . . tear-drop base with black wrinkle finish, heavily chromed parts. A professional model at a "give-away" price.

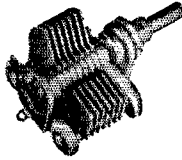


The RADIO SHACK Corp.

CABLE ADDRESS - RADIOSHACK
167 WASHINGTON ST., BOSTON, MASS., U.S.A.

LOOK

CONDENSER SPECIAL



They're going fast! Famous make double-bearing condensers, regularly listing at \$2.70 and \$3.00, isolantite insulation, semi-circular plates (straight-line capacity) .024" air-gap, 100 mmf. or 140

mmf, either size, brand new. **ONLY 89¢**

FREQUENCY METER BC-221



W4FU, W8JIN, W8FGX, all top-notch DX men, use the BC-221 to mark location of weak DX so they can quickly return to his frequency. An excellent tone or CW monitor. This instrument is accurate to .02% from 125 KC to 20 MC. Compact 150 volt power supply can be mounted in battery compartment. Add two 6AG7 voltage amplifiers and you have a terrific VFO. Complete with tubes, crystal, frequency charts. Excellent condition.....

\$39.95

With internal modulation, for signal tracing.....**\$79.50**

10 HENRY 300 MA. CHOKE



A terrific bargain. Audio Development Co. high-quality 10 Henry 300MA. filter choke. All black-crackle finish, new, 100 ohms DC resistance, very compact, 4 3/4" x 3 3/4" x 4 3/4", 10 lbs., only.....

\$3.50

STRUTHERS-DUNN RELAY

110 VOLT AC

Control all of your equipment with this one relay. 110 VAC coil, 4-pole, 2 double throw, 2 single throw, 6 amp. contacts, screw terminals, insulated base, 3" x 3 1/2", a terrific bargain at..

\$2.00



Thoradson Filament Transformer, 2.5 volt 10 A., 6.3 volt 5.5 A., 6.3 volt 1 A., 5000 volt insulation.....

\$2.95

DON'T MISS THESE SCOOPS!

- National R-300-S RF choke, 2.5 MH, 300 MA **10c**
- 2 Mfd, 1000 volt oil filled condenser, single Mfg. hole..... **59c**
- G-E Pyronol miniature 1 Mfd, 500 V., mfg. ft. **20c**
- Johnson 224, 4 prong, Steatite socket..... **15c**
- Johnson 225, 5 prong Steatite socket..... **17c**
- Johnson 211-SB, 50 watt, 4 prong, ultra-Steatite, Beryllium Copper; THE FINEST.... **69c**
- Johnson 70F20, 70 mmf, 2000 V. spacing, perfect for 807..... **1.19**
- HS-30-R ear plug type phones, new..... **39c**
- 50,000 ohm, 200 watt bleeder, ferrule type **59c**

Steinberg's

633 WALNUT STREET • CINCINNATI 2, OHIO

Bandswitching Transmitter

(Continued from page 40)

tank circuits, one after the other, with the resonance-indicator lamps. The coupling to the indicator lamps should be carefully adjusted to the minimum required to give a satisfactory indication. A low-range milliammeter connected in series at terminal *M* on the power supply will read grid current and give an approximate check on the relative power output of each of the drivers. The grid-current reading should be at least as high as the figures given in Table II which also shows the normal plate-current values. Remember that the 50-Mc. excitation lead should be disconnected while operating at 28 Mc. A further check should be made with an absorption wavemeter. Particular care should be ex-

TABLE II
Voltage and Current Chart

Stage	E_p	E_{ac}	E_k	E_g	I_p (ma.)	I_g (ma.)	
Oscillator	150	75	...	...	6.5	...	
Drivers	3.5 Mc.	305	...	...	-7.3	13	7.3
	7 Mc.	305	130	15	-90	14	3
	14 Mc.	300	200	22	-62	30	2
	21 Mc.	300	235	33	-70	45	2
	28 Mc.	300	245	33	-45	47	4
	50 Mc.	290	240	31	-65	67	1.3
Finals	3.5 Mc.	750	300	...	-110	200	4
	7 Mc.	750	300	...	-120	200	4
	14 Mc.	750	300	...	-95	200	8
	21 Mc.	750	300	...	-70	200	6
	28 Mc.	750	250	...	-70	200	5
50 Mc.	750	260	...	-80	200	4	

exercised in this respect in tuning up the 21-Mc. tripler, since the driver tank circuit covers the second as well as the third harmonic of the preceding stage.

The output stages should not be operated without a load, even during testing. A 100-watt lamp makes a good test load. At the higher frequencies it should be possible to obtain full loading (100 ma. per tube) with the load lamp linked to the output tank circuit by a few turns. At the lower frequencies, it may be necessary to tap the lamp directly across a few turns of the tank coil. When each output stage is properly loaded, the various currents and voltages shown in Table II can be checked. It will be noted that the final-amplifier grid-current readings are not the exact values recommended in tube literature. This is primarily a result of efforts to simplify the circuit by the use of a common biasing system for an output stage and the following driver stage. Nevertheless, checks showed that the tubes were operating efficiently and properly for plate modulation.

HARVEY PRESENTS

TECH-MASTER *Television Kit*

The Tech-Master Television Kit will enable you to build a duplicate of the famed RCA 630-TS television receiver, acknowledged by engineers to be the leader in the field.

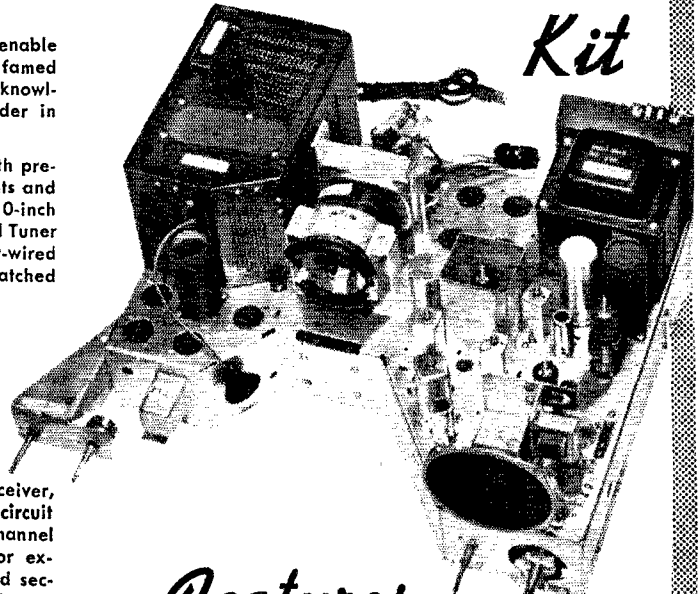
The Tech-Master kit furnishes you with pre-cut and drilled chassis, all components and 30 RCA tubes, including the 10BP4 10-inch Kinescope. The famous RCA Front-End Tuner comes completely assembled, factory-wired and aligned with 3 tested and matched RCA tubes. Large scale wiring diagrams and the detailed RCA service manual are supplied to show you how, simply and quickly, to wire and get peak performance from your completed kit.

You'll be delighted with the professional performance of this 30-tube direct view 10-inch television receiver, which features the RCA syncro-lock circuit for rock-steady pictures, full 13-channel coverage, full 4 mc. band width for exceptional picture brilliance, FM sound section and other features found only in the more expensive television receivers.

Tech-Master TV 630-TK kit, complete with all tubes and 10BP4, less incidental hardware and wire. Shipping weight: 70 lbs.....**\$198.50**

TV 630-TK kit, as above, but less 10BP4. Shipping weight: 55 lbs.....**\$168.50**

Sturdy, satin-finish walnut cabinet, custom-designed for the Tech-Master Kit. Size: Length 21", Height 11 3/4", Depth 16 1/2". Shipping weight: 38 lbs.....**\$42.50**



Features...

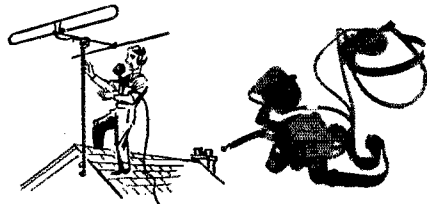
- R.C.A. Syncro-Lock Circuit
- Stabilized Vertical Hold
- Two Stage Video Amplifier
- Four Stage Picture I. F.
- Full Thirteen Channel Coverage
- Thirty Tubes
- Four Megacycle Band Width
- Exceptional Picture Brilliance
- R.C.A. Noise Saturation Circuit

FREE . . . Circuit and parts list on request.

All prices F.O.B. N.Y.C. and subject to change without notice.

Telephone: **7HRC** Longacre 3-1800

HARVEY
RADIO COMPANY, INC.
103 West 43rd St., New York 18, N. Y.

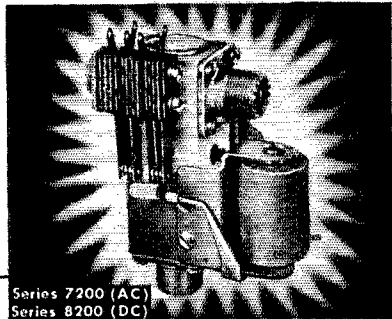


RCA SOUND POWERED PHONES

Used by leading installers for TV installations, leave both hands free for antenna adjustment. Require no external batteries, Navy type, work up to 2000 feet.

Harvey Special **\$15.00**
Pair **24.50**

ADVANCE COAXIAL RELAY



Series 7200 (AC)
Series 8200 (DC)

**New coax relay for RG-8U cable
Outside contacts for associated circuits**

New 50 ohm coax relay...

- SPDT SWITCHING OF 50 OHM RG-8U CABLE • STANDING WAVE RATIO OF 1.02
- 1/4" PURE SILVER INTERNAL CONTACTS • INSPECTION PORT NEXT TO INTERNAL CONTACTS • 3/16" PURE SILVER EXTERNAL CONTACTS UP TO DPDT FOR INDICATOR LIGHTS AND OTHER ASSOCIATED CIRCUITS • CONNECTORS ARE AMPHENOL 83-IR OR SIG. CORPS. SO-239
- POLYSTYRENE INSULATED • ANY VOLTAGE UP TO 440 V. A. C. OR 240 V. D. C.

See it at your jobber's today
PRICE \$7.50 net
\$9.30 net with aux. contacts



Advance Relays

ADVANCE ELECTRIC & RELAY CO.
1260 West 2nd Street, Los Angeles 26, Calif.
Phone Michigan 9331

50 Mc.

(Continued from page 53)

Chuquicamata, Chile — CEIAH reports receiving a card from Netherlands listener Simmons (NL595) who found 50 Mc. open at 2215 AST on June 24th. The date is in question because of water marks on the card, and CEIAH would like further information, as this would give them HAC on 50 Mc. if the report can be positively verified. The listener also reported hearing W6, 4, 1, and OA4AE at the same time, which is a jackpot hard to take!

Bothell, Wash. — The best sporadic-E opening of the summer for W7DYD was Aug. 1st, when 49 stations in 16 states were logged, between 4:55 and 8:55 P.M. Herb also heard XE2C on c.w. on July 26th, at 5:18 P.M., the only DX signal on the band at the time.

Melbourne, Australia — If there is anything good about a 50-Mc. DX season running below normal, the boys from Down Under have it: A news dispatch appearing in Australia and New Zealand papers, and picked up by the various American news agencies, credits ZL 6-meter men with noting a connection between outbreaks of poliomyelitis and 50-Mc. DX! Thanks to correspondents Hartley of WIA and Black of Berkeley, Calif., for forwarding clippings.

Hartford, Conn. — Why not some v.h.f. activity in the daylight hours? In addition to the regular Monday-night schedule at 9 P.M., which has been kept almost since the opening of the 2-meter band, some of the stations in the region around Hartford now get on the air daily at 1:30 P.M. Any of the gang who work nights, or who otherwise have a chance to operate during the daytime, are welcome to join W1s HAX, APC, JEJ and RGM, who are already operating on this schedule.

Chicago, Ill. — After a long stand as the last group still holding to vertical polarization on 144 Mc. in the Middle West, the majority of Chicago's many 2-meter stations have gone over to horizontal, according to Mel Mendelsohn, W9OBW, secretary of the Midwest V.H.F. Club. Though, as in other thickly-populated areas, verticals had long served the purpose of simplifying local work for the fellows who didn't have facilities for remotely-controlled rotaries, the change to horizontal has greatly increased the number of extended-range contacts for most of the gang, as the outlying areas have long been nearly 100 per cent horizontal.

Oak Ridge, Tenn. — Two Tennessee stations on the watch for 2-meter DX are W4FQL, Oak Ridge, and W4FBU, Fountain City. Both have 100-watt rigs. W4FBU has a corner-reflector beam and W4FQL a 4-element job.

Portland, Maine — An abandoned radar station at the summit of Mt. Agamenticus, in the southern tip of Maine, provided W1OUN and W1DEO with a beautiful site for their summer portable operation on 144 and 220 Mc. On 2 several contacts have been made at distances up

(Continued on page 114)

CALL LETTER PLATES

W8ENH

Type A-18 - For Your Car
Type A-19 - For Panel Mounting

\$2.95 POSTPAID

A large sturdy cast aluminum plate with satin-finished letters and border against a black baked enamel background. Red, green, blue and gray -- 50¢ extra. Size 2-3/4" x 8 1/2" with 1 1/2" letters.

LAPEL BUTTONS

An attractive metal button with highly polished raised letters against a black background. Other colors 50¢ extra.

W9HKZ

ACTUAL SIZE \$1.10 POSTPAID

Type A-26L With Screw Backing

Type A-26P With Pin Backing

SREPCO

STANDARD RADIO & ELECTRONIC PRODUCTS CO.
135 E. Second St. DAYTON 2, OHIO - Tel. FULTON 2174

CASH WITH ORDER
Allow 3 weeks for delivery



THE "WORLD'S LARGEST"



HAS IT IN STOCK...



BOB HENRY

Henry Radio stores in Butler, Missouri and 11240 West Olympic Blvd., Los Angeles, California have complete stocks of amateur, FM, Television, Short Wave, Communications, Recording, and other radio equipment. I promise you lowest prices, complete stocks, quick delivery, easy terms, generous trade-ins. I promise that you will be satisfied on every detail. Write, wire, phone or visit either store today.

Bob Henry
WØARA

A FEW OF THE ITEMS I STOCK ARE:

Collins 75A	\$ 375.00
Collins 32V	475.00
Collins 310B-1	190.00
Collins 310B-3	215.00
Collins 30K-1	1450.00
National NC-57	89.50
National NC-173	189.50
National NC-183	268.00
National HRO-7T	292.50
National HRO-7C	358.95
National HFS	142.00
National NC240D	236.25
Hallicrafters S38	47.50
Hallicrafters S53	79.50
Hallicrafters S40A	99.50
Hallicrafters SX43	179.50
Hallicrafters SX42	295.00
Hallicrafters SX62	269.50
Hallicrafters S47	229.50
Hallicrafters S51	149.50
Hallicrafters S58	59.50
Hallicrafters S55	129.50
Hallicrafters S54	110.00
Hallicrafters T54	169.50
Hallicrafters HT18	110.00
Hallicrafters HT19	298.00
RME HF-10-20	77.00
RME VHF-152A	86.60
RME DB22A	71.00
Hammarlund HQ129X	177.30
Gon-Set 10-11 converter	39.95
Stancor ST-203-A	44.70
Hunter Cyclomaster	169.50

Millen, Sonar, Bud, Gonset, Silver, Premax, WorkShop, Amphenol-Mims; Jensen, Meissner, Browning; I have everything.

Some prices slightly higher on the west coast.

LOW PRICES

I guarantee to sell to you as cheap as you can buy anywhere.

COMPLETE STOCKS

Hallicrafters, National, Hammarlund, Collins, Millen, RME, Meissner, Meck, Gordon, Amphenol-Mims, RCA, Vibroplex, Sonar, all other amateur receivers, transmitters, beams, parts, etc. If it is amateur or communications equipment—I can supply it.

QUICK DELIVERY

Mail, phone, or wire your order. *Shipment at once.*

EASY TERMS

I have the world's best time sale plan because I finance the terms myself. I save you time and money. I cooperate with you. Write for details.

LIBERAL TRADE-IN ALLOWANCE

Other jobbers say I allow too much. Tell me what you have to trade and what you want.

TEN DAY FREE TRIAL

Try any receiver ten days, return it for full refund if not satisfied.

FREE NINETY DAY SERVICE

I service everything I sell free for 90 days. At a reasonable price after 90 days.

FREE TECHNICAL ADVICE

and personal attention and help on your inquiries and problems.

Butler, Missouri

HENRY RADIO STORES

Los Angeles 25, Calif.

"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"



The Toast of the Trade!

It is rather remarkable how, year after year, so many of the largest and finest radio and electronic manufacturers depend on Quam for their speaker requirements.

This should be of especial significance to the serviceman. For one thing, it means that these receivers are designed with Quam Speakers as a component part and, when replacements are required, another Quam Speaker should be used to maintain the same high quality of performance.

And it also indicates the confidence these manufacturers place in Quam, and their dependence on the consistently high quality of Quam engineering and production.

Take a tip from the people who buy speakers by the thousands, always specify Quam for your replacement job!

*Write for catalog of Quam
Adjust-a-Cone Speakers*

QUAM NICHOLS COMPANY

532 East 33rd Place, Chicago 16, Illinois

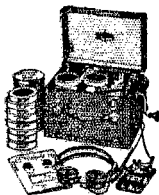
QUAM SPEAKERS ARE LISTED IN
THE RADIO INDUSTRY RED BOOK

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

50 WAS Mc.

Standings as of Aug. 30th

All-Time 1948		All-Time 1948		All-Time 1948	
W9ZHB	48	W5AJG	43	W9DWU	46
W8ZJB	48	W6ML	42	W9QUV	44
		W6VY	40	W9PK	43
W1CLS	44	W6HLD	40	W9ZHL	43
W3CIR/1	42	W5JLY	39	W9ALU	41
W1LL	40	W5FRD	38	W9QKM	37
W1HDQ	39	W5FSC	37	W9JMS	36
W1CGY	39	W5DXB	35	W9UIA	36
W1HMS	36	W5ZZF	34	W9AB	26
W1JLK	35	W5GNQ	32		
W1NF	35	W5IOP	30	W8USI	47
W1KHL	34	W5LIU	24	W8DZM	46
W1LSN	33	W5LWG	19	W8QIN	45
W1CLH	32			W8BJV	45
W1CJL	30	W6UXN	47	W8CJS	45
W1AF	27	W6OVK	40	W8KYF	44
W1EIO	24	W6ANN	38	W8TQK	42
W1HIL	21	W8BPT	35	W8SV	42
		W6AMD	35	W8INI	42
W2BYM	39	W8IWS	33	W8HXY	41
W2AMJ	38	W8FPV	31	W8JHS	41
W2IDZ	38	W6BWG	18	W8YUQ	39
W2QVH	37			W8PKD	36
W2RLV	37	W7BQX	45	W8GSW	29
W2RGV	26	W7ERA	43		
		W7DYD	41	VE1QY	28
W3OR	35	W7HEA	40	VE3ANY	27
W3OJU	35	W7FDJ	36	VE1QZ	26
W3RUE	34	W7FFE	35	G5BY	24
W3MEL	33	W7KAD	35	XE1KE	23
W3MQU	25	W7JPA	34	VE4GQ	19
		W7QAP	32	VE2KH	19
		W7ACD	28	XE2C	14
W4GJO	46	W7JPN	19	VE2GT	14
W4EQM	41	W7OWX	15	XE1QE	10
W4QN	40				
W4GIY	40	W8QYD	43		
W4EID	40	W8RFW	25		
W4DRZ	38	W8TDJ	22		
W4FBH	34	W8LBH	10		
W4GMP	34				
W4WMI	33				
W4FNR	33				
W4HVV	29				
W4FJ	26				
W4LNG	19				

Note that standings are given for the period March 1, 1946, through the present, and for 1948 only. Medallion awards are offered to the amateur working the most states during 1948 on 50, 144 and 220 Mc. and up. See January *QST*, page 150, for details.

to 300 miles or so, and the DX on 1 1/4 is W1MNF, East Orleans, Mass., about 120 miles.

Hyannis, Mass. — Horizontal polarization is gaining favor with W1BCN. On the night of Aug. 24th, Ed had been working some W2s on his vertical when he decided to give his 5-element horizontal array a try. His first CQ netted W4IKZ, Lynnhaven, Va., followed by W4JFU, Parksley, W4JQU, Hilton Village, W4CLY, Cape Henry, W4KDN, Norfolk, and W3LPQ/4, all of Virginia, and at distances up to nearly 500

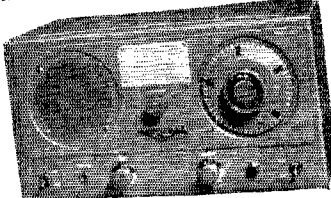
(Continued on page 116)

WHAT DO YOU NEED?

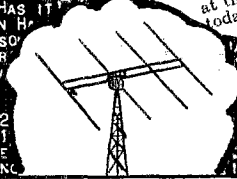
HARRISON HAS IT!

HARRISON HAS EVERYTHING!
I stock all nationally advertised parts and equipment! No matter where you see it, in a manufacturer's bulletin or some other ad, I HAVE IT at the lowest prices — so send me your want list today for **REAL SERVICE.** "Harrison Has It."
73, Bill Harrison, W2VA

AT LAST! — A REALLY HOT RECEIVER FOR 1 1/4 - 2 - 6 and 10!



Are you getting top VHF reception? Hear those signals that you've been missing! The new **NATIONAL HFS** is amazing even in commercial service. (Fire, taxi, police, aircraft, etc.)
\$125.00
AC Power Supply\$22.43
6V DC Vibrator Power Supply.....\$34.16



TOWERS

Wind resisting triangular type. Easy to erect and climb. All hot dip galvanized steel. Complete with all hardware.
SELF-SUPPORTING
53 ft. - **\$161.56**
GUYED TYPE
45 ft. - **\$54.16**
F.O.B. Missouri
Write for literature and prices on other sizes.

COLLINS 75A - 1



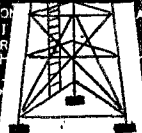
You can't afford not to have the dual conversion Collins 75A-1. Hear and work all the DX! Single purpose design — Super-hot Ham performance.
Worth more, but it's yours for only **\$375.00 complete**
Model 32V-1 — Companion Xmitter to the 75A-1.
150 Watts CW, 120 Watts Phone.
\$475.00
Harrison is your Headquarters for all Collins Ham Equipment.

SIGNAL SHIFTER

Build this new Model EX yourself and save 50%. A cinch for even a beginner to assemble in about 3 hours. Complete kit (Yep, even wire and solder!) with pre-assembled coils for 10-11, 15, 20, 40, and 80, tubes, power supply, etc. Get yours today!

\$49.75
Factory Wired and Tested\$99.50

NFM PHASE MODULATOR
Fits right in the Shifter cabinet. Completely wired — \$12.00 less tubes
Kit of tubes, \$3.09



OPEN NIGHTS New York - Wednesdays
Jamaica - Fridays
UNTIL 9:00

HARRISON HAM-A-LOG
Don't miss another copy of this interesting paper full of Ham news and Ham buys! Send us your name and call letters today.



LOOK!

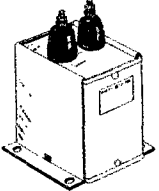
HIGH QUALITY FILTER CHOKES



COMMERCIAL GRADE — 12 real Henrys at 110 DC MA. (Conservative continuous duty rating for Signal Corps.)
NEWEST STYLE CASE — Latest RC-87 drawn steel case—2-9/16" diameter x 4" high.
Impregnated, potted, fully shielded and sealed! Sub chassis lug terminals.
\$8.00 LIST VALUE
HSS ITEM ONLY \$1.38
CH-12
Check this value and buy ALL you can use at this low, low price!

FILTER CONDENSERS

2 MFD OIL FILLED
4,000 Volt DC Working, Pyranol. Item CP4\$5.95
5,000 Volt DC Working, Dykanol. Item CP5\$8.95
(Complete with mounting brackets)
SPECIAL! Cylindrical, 1000V upright mount type. 3 for \$1.47



LONG ISLAND HAMS!
Visit our convenient Jamaica Branch — Hillside Ave. at 172nd St. Hank Fank. W2KYV. will help you with your problems.



SEE YOU AT THE ALBANY HUDSON DIVISION CONVENTION
73, W2EA "EASY ACES" OTTO EPPERS—HARRISON RADIOS STAFF CARTOONIST

EXPORT DEPT. "CABLE ADDRESS" "HARRISORAD"

HARRISON RADIO CORPORATION
12 WEST BROADWAY, NEW YORK 7, N. Y.
BArcley 7-9854

SCHEMATICS—CONVERSIONS FOR SURPLUS GEAR

ARB (GRV 46151), Complete schematic, simplified schematic (both with control boxes), and 1F and RF alignment chart. \$1.00
 BC-645, original and conversion, fixed, mobile. . . \$1.00
 BC-375-E, step-by-step conversion to AC with power pack. \$1.00
 AN/ARC-4 with RT-19/ARC-4 and control box, interconnections and cabling diagrams. \$1.00
 SCR-518-A, 6 large, clear schematics with explanatory notes, frequencies, band-pass, and complete reprint of the manual. \$2.00
 SCR-274-N receivers BC-453, 4, 5: Explanation of control and power circuits and plug terminals. Conversion of front plug to local control adapter with volume control, on-off and CW-MCW switch, AC power, Alignment. Top and bottom parts location views. Voltage and resistance readings. Rack, control box, and interconnection. 12 8½" x 11" pages. Price \$2.00
 MN-26 receiver schematic, MN-28 control-box schematic and functional diagram, IN-4 left-right indicator schematic, complete interconnection diagram and notes, conversion to 14 V, antenna characteristics, power requirements and tube functions. All for. \$1.00
 BC-348-H, K, L, or R, schematic plus AC power pack and connection instructions. \$1.00
 BC-348-J, N, Q, schematic plus AC power pack and connection instructions. \$1.00
 BC-946-B, step-by-step conversion and schematics, pictures, etc. Nothing vague! Delayed AVC and two-stage audio. 12 8½" x 11" pages. \$2.00
 AN/ARC-5 schematics: low and medium frequency receivers, transmitters, push-pull modulator, and control boxes, plus large schematic of T-23, the VHF transmitter. All for. \$1.00
 SCR-274-N transmitter schematics, including modulator, rack, and control box. \$1.00
 T-85/APT-5, power unit, 60 cy. power information, freq. and mod. adjustments, chart of counter settings, operation instructions, etc. \$1.00

SCHEMATICS: \$1.00 EACH

SCR-522	ARN-7	BC-433-G	BC-733-D
ART-13A	APN-1	APN-9	RA-10
APT-2	BC-1206-C	R-89/ARN-5A	

Please remit with order

R. GOODHEART

345½ N. Palm Drive, Beverly Hills, Calif.

KEEP YOUR SOLDERING IRON BRIGHT



THE
EASY
WAY

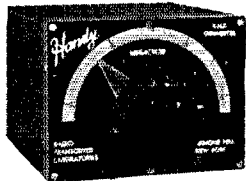
Use IRON-BRITE

A clean iron does better work. Send 50¢ and we'll send your IRON-BRITE chemically treated cleaning pad postpaid. No stamps.

The MACO Corp., Huntington, Ind.

WE GUARANTEE

that the HANDY Converters attached to your car radio will produce stronger 10/11 or 6 meter signals than many standard communications receivers. The smallest converter made with the greatest band spread dial, at the lowest ham price of \$29.95 with tubes.



Specify band when ordering — Immediate delivery

RADIO TRANSCEIVER LABORATORIES

116-23 Jamaica Ave. • Richmond Hill 18, N. Y.

miles. Nothing beyond about 250 miles was heard on vertical — but before we jump at any conclusions let us remember that Ed is getting along with a coaxial dipole for his vertical work this summer, and with that he's been working VE1QY at Yarmouth, N.S. quite easily on recent good nights.

Columbus, Ohio — 2-meter DX in a southerly direction from W8WRN is W4FBJ, Shepherdsville, Ky., about 170 miles. W4KKG, Louisville, is also worked when conditions are good. Erie, Penna., stations, W2GBK, Sherman, N. Y., and W3GKP, Silver Spring, Md., have been heard but not worked.

Louisville, Ky. — The KYE Net operates on 145.8 or 144.17 Mc. each Monday, Wednesday and Friday at 8 P.M. Interest is running high in the Louisville area, and participation by stations throughout the state is invited. It is felt that the 144-Mc. band is ideal for consistent operation over distances of 75 to 100 miles or more, and it is hoped to extend KYE operation to statewide proportions.

Mobile, Ala. — Members of the Mobile Amateur Radio Club made good use of 144-Mc. equipment in connection with the 16th Alabama Deep Sea Fishing Rodeo, July 31st-Aug. 4th. Continuous watches were maintained from 7 A.M. to midnight and 75 per cent of the Rodeo traffic was handled on 2 meters. A total of 200 messages was handled, some 25 of them being press messages averaging 250 words each. The club call, W4CIQ, was used at Dauphin Island, with W4INU, W4GHZ and W4IKM at the controls. W4DTV, with W4MRL assisting, held down the Mobile end. The path covered was about 30 miles, and signals were solid throughout the 5-day period.

Brooklyn, N. Y. — W2QYI and W2TSA have four 420-Mc. stations between them, and they are looking for business on the band. Their location is in the Sheepshead Bay area. Antennas are horizontal.

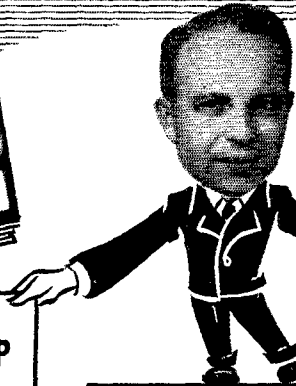
Stratford, Conn. — The nightly tests on 420 Mc. by W1PBB and W1IYO, mentioned last month, have continued through August with variable results. The two Connecticut stations heard W2ASL S6 around 10 P.M. on the 29th. On August 10th, W1JFF, Newport, R. I., heard W1IYO S3. This is a hop of about 95 miles along a coastal route. On the 16th W2ASL was heard S9-plus by both W1IYO and W1PBB at 11:15 P.M., and a bit later W2HWX was S7 to 8, the best signals yet received over this 75-mile hop.

420-Mc. Propagation Data

The recent request, in this department, for practical information on 420-Mc. propagation has brought a splendid response. It is refreshing to find that quite a few amateurs still take their hobby seriously, looking for more in it than mere routine QSOs. As early as the summer of 1946, for instance, W1BBM, North Harwich, Mass., was making frequent daily observations of the strength of WRJY, a 10-watt 438-Mc. control-

(Continued on page 118)

Here's Your... COMPLETE HAM CATALOG!



**FROM THE WORLD'S
MOST PERSONALIZED
RADIO SUPPLY HOUSE**

FREE

Our new catalogue contains all the latest Ham equipment. We feature all well known nationally advertised brands at the lowest prices.

GIANT RADIO REFERENCE MAP

Just right for your control room wall. Approximately 28" x 42". Contains time zones, amateur zones, leading shortwave stations, monitoring stations.

Mail coupon today & 25c.

**LEO I. MEYERSON
WØGFQ
C U ON 20-10 & 75 METERS**

WRL TRANSMITTERS

Designers & builders of World Famous WRL Transmitters—I answer all inquiries the same day.

LIBERAL TRADE-INS

—Tell me what equipment you have—what equipment you want—Let's trade.

E-Z PAYMENTS

—Any responsible person with a steady job can buy on time from me.

SPECIAL BARGAIN OFFERS

OIL FILLED CONDENSERS

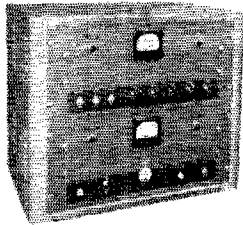
- 1 Mfd.—5000 V D.C. \$3.49
- 2 Mfd.—1000 V D.C. \$1.19
- 1 Mfd.—2000 V D.C. \$1.55
- 4 Mfd.—1500 V D.C. \$1.59

SHIELDED TRANSFORMERS

New completely Shielded Transformers to operate with all 274 series XMTR's.
1200 V.C.T. 200 MA. 5V @ 3a—Two 6.3 V.C.T. fil @ 3 A ea. Series these for 12 Volts to operate XMTR \$5.95

WRITE—WIRE
PHONE 7795

W.R.L. 150 WATT GLOBE CHAMPION TRANSMITTER KIT



**\$269.00
KIT FORM**

WRITE FOR COMPLETE DETAILS

TOP SECTION

Top Section as shown is a complete 150 Watt Exciter and R.F. Section. May be purchased separately complete with meter, tubes, 1 set of coils.
Complete Kit \$149.00
Wired—Ready to go \$159.00
NBFM can be used with this section for additional \$39.50—making a complete Phone XMTR.

BOTTOM SECTION

Bottom section as shown is a complete speech amplifier and modulator with power supply. May be purchased separately with all tubes, 3 inch meter.
Complete Kit \$105.00
Wired—Ready to go \$115.00

COMPLETE 150 WATT KIT

The complete Globe Champion Phone & CW 150 Watt XMTR includes the two sections described above and comes mounted in streamlined gray deluxe cabinet 22" wide x 15" deep x 19 1/2" high—very compact—tunes all Ham bands—has latest features.
Complete Kit \$269.00
Wired—Ready to go \$289.00

WORLD RADIO LABORATORIES
744 West Broadway
Council Bluffs, Iowa

Q-10

Please send me:
 Radio Map Send Information on popular W.R.L. Transmitters.
 New Catalog

Name

Address

City..... State.....

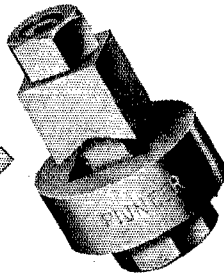
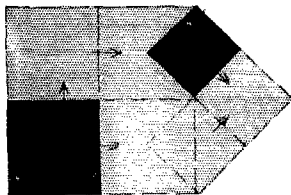


Quality Products Since 1923

THE TRADE MARK THAT MEANS
**QUALITY RADIO HARDWARE, WIRE,
 CABLE AND INSULATORS.**
WRITE FOR NEW 1948 CATALOG

BIRNBACH RADIO CO., Inc.
 145 HUDSON ST. NEW YORK, 13, N. Y.

New **PIONEER CHASSIS PUNCH**
 (Pat. Pending)

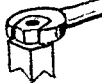


**CUTS ANY SIZE LARGER
 SQUARE OR ANGULAR HOLE**

For Transformers, I.F.'s, Plugs,
 Binding Post Strips, Sockets, Etc.

Banished forever is hand hack sawing
 or filing of holes for hard to
 mount parts. Sizes to meet every
 need.

**SIMPLE
 HAND
 WRENCH
 SCREW
 ACTION**



SIZES	SQUARE		ROUND											
	5/8	3/4	1/2	5/8	11/16	3/4	7/8	1	1 1/16	1 1/8	1 1/4	1 1/2	1 3/4	2
NET	\$2.95	\$3.50		\$1.95			\$2.15				\$2.30			\$2.65

Buy It At Your Favorite Distributor

PIONEER
 BROACH COMPANY
 LOS ANGELES 15, CALIF

RECORDS

Two-Way Work

- 50 Mc.: CEIAH — J9AAO
- 10,500 Miles — October 17, 1947
- 144 Mc.: W3GV — W0WCZ
- 660 Miles — September 18, 1947
- 235 Mc.: W1CTW — W2HWX
- 210 Miles — October 12, 1947
- 420 Mc.: W6VIX/6 — W6ZRN/6
- 186 Miles — July 27, 1947
- 1215 Mc.: W3MLN/3 — W3HFW/3
- 12.5 Miles — September 24, 1947
- 2300 Mc.: W6IFE/6 — W6ET/6
- 150 Miles — April 25, 1948
- 3300 Mc.: W6IFE/6 — W6ET/6
- 150 Miles — October 5, 1947
- 5250 Mc.: W2LGF/2 — W7QF/2
- 31 Miles — December 2, 1945
- 10,000 Mc.: W4HPJ/3 — W6IFE/3
- 7.65 Miles — July 11, 1946
- 21,000 Mc.: W1NVL/2 — W9SAD/2
- 800 Feet — May 18, 1946

circuit station at Hauppauge, L. I., a distance of about 170 miles over a coastal route. His records cover a total of 72 days of observation between July 3rd and October 25th, not including days when his equipment was out of operation during changes in antennas and receiving facilities.

During this period, the station was heard on 28 different days. With two exceptions, when the signal hit an S9 peak in the early-evening hours, all the really strong signals were received between 10:30 P.M. and 12:30 A.M. This late-evening peak, so well known to the 2-meter nighthawks, showed up on eight different nights well scattered through the observation period. On five different mornings the signal was in as late as 10:30 A.M. Of interest is reception, usually at low signal levels, on nine evenings, before 8 P.M. This is the sunset inversion, a consistent night-after-night phenomena which most v.h.f. enthusiasts miss. A lot more stuff could be worked in the hours around sundown, if more fellows would make an effort to get on earlier in the evening.

From Berkeley, Calif., W6s DSZ, JLE, ZDJ and QT sent in a combined report summarizing their 420-Mc. experience. They indicate that essentially line-of-sight paths up to about 40 miles or so are covered regularly, and greater distances (up to their present maximum or 176 miles) have been negotiated whenever they have been attempted. Short-distance paths which are not line-of-sight (up to about 10 miles or so) are also worked consistently, but with some variation from day to day. Indirect paths resulting from reflections from mountains and large structures such as the Golden Gate Bridge are common, and are particularly noticeable on non-line-of-sight hops. Often more than one such path will be in evidence.

On the difficult paths every foot of antenna height makes an improvement. Shadow effects are much more pronounced than on 50 or 144 Mc., and relatively small obstructions may

(Continued on page 120)

TELEVISION ASSEMBLY CO.'S

ARROW presents

520 Square Inch PICTURE PROJECTION TELEVISION

TELEVISION ASSEMBLY CO.

IN ASSEMBLY FORM FOR CUSTOM INSTALLATIONS

36 R.C.A. TUBES • DUMONT INPUTUNER • 12" P.M. SPEAKER • Pre-wired & Pre-tuned Picture I.F. & Sound I.F. • Pre-wired 30 KV Tripler Fly Back Power Supply • Eastman Kodak Projection Screen • Aluminum Coated Top Mirror • Bausch & Lomb f:1.9 Projection Lens • • • • •

For realism, clarity, definition and **BIG SCREEN** Televiewing, the pictures produced by this unit have no equal!

This screen is absolutely flat, precluding curvature distortion anywhere in the picture. Picture tones are true black, grey and white—high in brilliance, yet absolutely glare-free!

Easy to assemble! Everything is supplied, including prewired high voltage power supply • Dumont inputuner, wired and pretuned • 13 tube I.F. strip for picture and sound, precision Bausch and Lomb f:1.9 projection lens • Eastman Kodak projection screen, mirror • 36 RCA tubes including 5TP4 projection tube • special dipole with reflector and 60 ft. coaxial lead-in, 12" heavy duty RCA PM speaker, push-pull 12 watts audio • rack and picture frame as illustrated • all parts, wired hardware, etc. Big easy-to-follow manual of instructions and schematic data prepared and edited by renowned John F. Rider, Publisher.

WRITE FOR PRICES AND FURTHER DETAILS



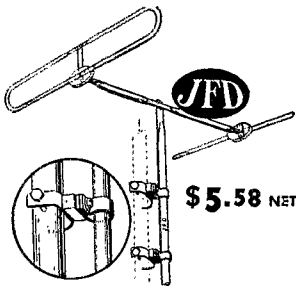
COMPLETE JFD TV ANTENNAS AND ANTENNA COMPONENTS . . .

TA-108 "UPPER BAND" TV

ATTACHABLE

FREQ. 108MC-216MC CHANNELS 7-13

Antenna with universal brackets (clamps to any low band antenna mast). Matching instructions to low band antennas included. Complete with hardware.

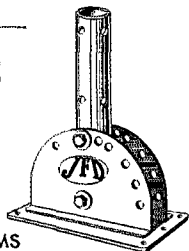


\$5.58 NET

BR-8 MULTI-PURPOSE BRACKET

\$5.94 NET

Permits mounting of masts up to 1 3/4" O.D. anywhere. No matter at which angle bracket is mounted, setting is secure and rigid.



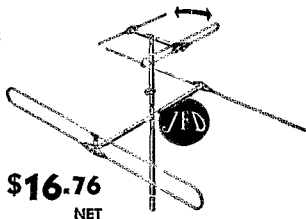
HIGHLY RECOMMENDED FOR HAM BEAMS

ARROW presents

TA-115 DUO-ORIENTING FOLDED DIPOLE

WITH REFLECTOR FREQ. 44MC-216MC CHANNELS 2-13

The upper and lower sections of this array can be oriented independently. Removes ghost effects and traffic noises. Impedance for each section 300 ohms. +4.2 DB gain over tuned dipole.

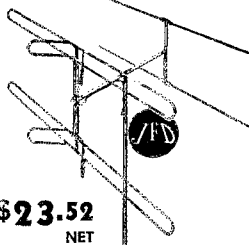


\$16.76 NET

TA-105 Double Folded Dipole

FREQ. 44MC-108MC CHANNELS 2-13

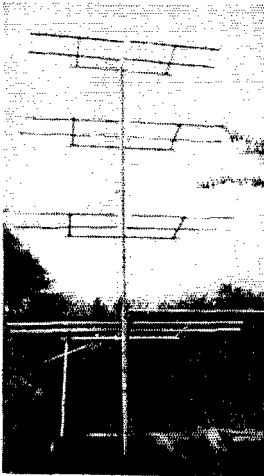
Extremely high-gain antenna designed especially for low signal and "fringe" reception areas. The addition of hi-freq lobes increases bandwidth on high channels. Impedance 50 to 260 ohms depending on stacking.



\$23.52 NET

ARROW ELECTRONICS

INCORPORATED
82 CORTLANDT STREET, NEW YORK 7, N.Y.



WIDE-SPACED TEN & TWENTY METER BEAMS

Illustrated is our 16
Element FM Beam for
100 Megs.

8, 16 and 32 ELEMENT

VERY HIGH GAIN
TWO METER, FM AND
TELEVISION BEAMS

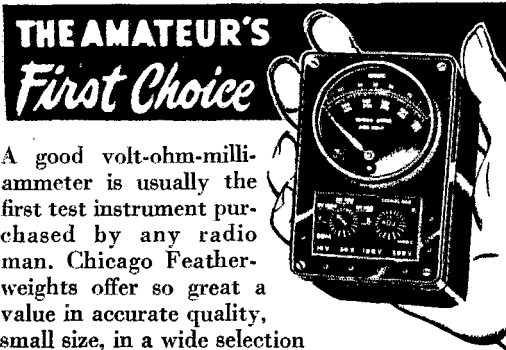
Send for Folders with Pictures

U.H.F. RESONATOR CO.

Guion Road

Rye, New York

W2BAV, W. F. Hoisington



THE AMATEUR'S *First Choice*

A good volt-ohm-milliammeter is usually the first test instrument purchased by any radio man. Chicago Featherweights offer so great a value in accurate quality, small size, in a wide selection of ranges and sensitivities, that they are the first choice of amateurs everywhere.

Chicago volt-ohm-milliammeters are priced from \$5.25 to \$26.00 depending on sensitivity, ranges, etc. At our modest prices, no ham shack need be without the benefit of this most useful instrument.

Chicago
INSTRUMENTS

See your Jobber or write
us today for Bulletin No. 11

Chicago Industrial Instrument Co.

536 W. Elm Street

Chicago 10, Ill.

120

block the direct path completely; however, with high-gain antennas a satisfactory indirect path will almost always be found. Careful orientation of the antennas is often required to prevent multipath phase distortion.

Several workers in the Bay area are experimenting with f.m. with very encouraging results, and a deviation of the order of that employed in f.m. broadcasting seems to hold considerable promise. Reduction in receiver bandwidth, from the value of four or five megacycles which is characteristic of the radar-altimeter type of unit, is resulting in marked improvements in sensitivity and signal-to-noise ratio. All work to date has been with very low power and largely with standard tubes designed for lower frequencies.

Interest in 420 Mc. is high in Southern California also. From Santa Ana, W6DEY reports that several stations in the Los Angeles area, at distances of 25 to 30 miles, are heard with good signals, as is W6DJW, at Altadena, some 35 miles away. Recently when W6WWP/6 operated from Mt. Frazier they reported W6DEY (316-A oscillator at about 2 watts output, 16-element array 15 feet high) S5 to 7. The distance is 125 miles.

In two years of operation on 420 Mc. W6UXC, Glendale, has worked about 17 stations, only six of which are line-of-sight. He has an ASB-8 receiver, a pair of 316-As, and a vertical 16-element array. Consistent operation, regardless of terrain, has been possible up to about 30 miles or so, though signals are much better if the stations in question are well away from the interposing hills. Shadow effect is much greater than on 144 Mc. in instances where direct comparisons have been made. Operation from elevated points is productive of excellent results, and stations as far away as San Diego are heard from the favorite mobile locations in the mountains in back of Los Angeles.

The excellent propagation which provided thrills in the early days of 2½-meter operation before the war opens the San Diego-Los Angeles path for two-way work on 420 Mc. One of the best east-west hops is W6ZRN, Brentwood, to W6KKG, 10 miles east of San Bernardino, a distance of more than 60 miles. W6UXC has line-of-sight possibilities only to the west, being close up to the base of some foothills, yet he reports no success in reflection-path attempts. To date, the strongest signals have always occurred with the two arrays pointed directly at one another.

An interesting point regarding aircraft flutter is brought up by W6OVK. In operation with W6QT and W6ZDJ (30 to 40 miles, not line-of-sight) Jim says that the flutter from passing aircraft, very bad on 50 Mc., and less so on 144, is nonexistent on 420. It is probable that this condition would be noted on the shorter wavelength only on reflecting bodies moving slower than aircraft speed. Several workers report that slow-moving mobile operation is most unsatisfactory on 420 Mc. on that account.

(Continued on page 122)

THE RADIO AMATEUR'S LIBRARY

These are the publications which every Amateur needs. They form a complete reference library for the Amateur Radio field; are authoritative, accurate and up to date.



<i>Title</i>	<i>Price</i>
<i>QST</i>	\$4.00 per year*
Operating an Amateur Radio Station	
	Free to members; to others 10c
The Radio Amateur's Handbook.....	\$2.00**
The Log.....	50c each
How to Become a Radio Amateur.....	25c
The Radio Amateur's License Manual.....	25c
Hints & Kinks for the Radio Amateur.....	50c
Lightning Calculators:	
a. Radio (Type A).....	\$1.00
b. Ohm's Law (Type B).....	\$1.00
A.R.R.L. Antenna Book.....	50c
The Minilog.....	25c
Learning the Radiotelegraph Code.....	25c
A Course in Radio Fundamentals.....	50c

*Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.50 in the Dominion of Canada, \$5.00 in all other countries.

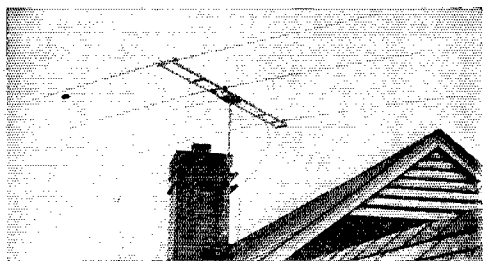
** Postpaid in Continental U. S. A. —
\$2.50, postpaid, elsewhere. (*No stamps, please*)



THE AMERICAN RADIO RELAY LEAGUE, INC.

WEST HARTFORD 7, CONNECTICUT

Ready for Your 6, 10 and 11 Meters



Premax Rotary Beam Kit

High-gain, directive! Seamless duraluminum elements, readily adjustable in length for optimum efficiency. Aluminum frame, sturdy yet light weight. One man can easily assemble and erect. Packed complete with insulators, frame, three pairs elements and hardware including T-match accessories and diagram.

Send
for
Bulletin

PREMAX PRODUCTS

DIVISION CHISHOLM-RYDER CO., INC.

4904 Highland Ave., Niagara Falls, N. Y.

THIS STURDY ROOF-MOUNTED SELF-SUPPORTING TOWER

ONLY
\$37-50

*Photo Courtesy
W3EAN
Drexel Hill, Pa.*

Why struggle with unsightly "plumbing?" Install a neat, sturdy, professional-looking tower that is a credit to your rig and your hobby. Tower illustrated is a TRYLON standard 5-ft. spread utility base, 10-ft. high. It's self-supporting and additional straight 10-ft. sections with guys may be added at any time. Approx. Shipping Wt. 109 lbs. Write to Tower and Antenna Div., Wind Turbine Co., West Chester, Pa. for Complete Details

**TRYLON
LADDER TOWERS**

To the above reports, and numerous others who have taken the trouble to send in detailed observations resulting from their 420-Mc. work, we offer our sincere thanks. Such effort is in the best amateur tradition; the sort of stuff by which we justify the continued support of our cause in high places. Keep up the good work!

Microwave Milestone

The El-Ray Amateur Radio Club of Waltham, Mass., pioneers in amateur microwave communication, scheduled an assault on the 2400-Mc. record for the week-end of July 17th, 18th and 19th. W10TH and Hugh Lyons were in business on Mt. Washington, W1JSM and W1LNX went to Provincetown on the tip of Cape Cod, and WILLS, WIAQE and Frank Mueller journeyed to Mt. Greylock, the highest point in Massachusetts, near Adams, in the northwest corner of the state. All parties carried gear for 144 and 2400 Mc.

V.h.f. propagation was poor during the entire period, and nothing unusual was worked on 144 Mc.; however, the Mt. Greylock party did get hold of 2400-Mc. pioneer, W2RMA, in Schenectady, N. Y., and tests on 2400 Mc. were arranged. The 2400-Mc. gear on the mountain, a 100-watt magnetron with a 24-inch parabola, was operated intermittently for two days, beamed on Schenectady, while W2RMA worked on his lighthouse receiver and parabolic antenna, finally locating the Greylock signal at 7 P.M. on the 19th. After two hours of adjustments and swinging of the parabolas the WILLS/1 signal was brought up to S9-plus in Schenectady, and the boys on the mountain were even able to hear W2RMA's superregen radiation! Quickly another 2C40 was rigged up for transmitting at W2RMA, and at 10 P.M. two-way contact was established on 2400 Mc. Though the hop of some 40 miles is far from a mileage record, the contact was notable in other respects: it was undoubtedly the first amateur interstate microwave communication, the first W1-W2 2400-Mc. contact, and probably the first use of a magnetron in amateur communication. It was the first instance of long-distance work by a fixed home station operating in the microwave region, and a clear-cut triumph over difficulties by all hands in the best amateur manner!

Correspondence

(Continued from page 94)

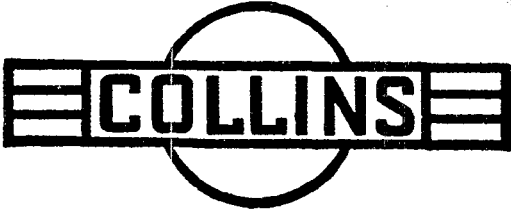
out of the thousands of amateur licenses granted by the FCC during any particular year, there are very few issued to fellows who come back after a lapse of more than twenty years — in my case twenty-one years. This being the situation, I feel that it calls for some kind of a celebration, and I'd figuratively like to drink a toast with you and Mr. Handy, Don Mix and my old pal Fran Beck, W8DB, SCM out in Milbank, So. Dakota, to commemorate the event. Here's hoping W3DB upholds the old tradition and takes up where 9DB-9CBF left off in 1927.

Twenty-one years — yep, as the ditty goes, "twenty-one years, boys, is a mighty long time." In 1927 several things conspired to force me out of the game — several successive changes of QTH, severe financial reverses (I didn't wait for the depression) and also family increases. I hated to give in to the necessity, but one day I dumped the entire outfit, 203As and all, into the ash can (actually). I even had to get rid of the DX QSL cards that I had

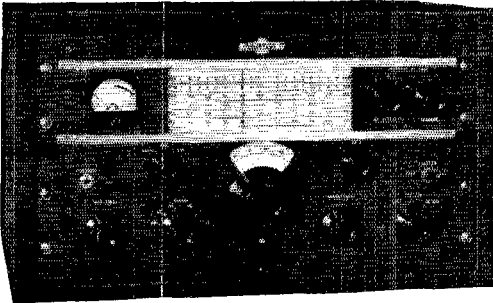
(Continued on page 124)

ELECTRONIC WHOLESALERS INC.

Exclusive Distributor for



In The Washington Area



A complete line of Collins transmitters and receivers is always on display in our spacious new showrooms. We invite your inspection of this famous equipment. . . . Just more proof that Electronic Wholesalers has all the greatest names in radio.

- 30K-1 500 WATT TRANSMITTER
- 32V-1 150 WATT TRANSMITTER
- 70E-8A VFO
- 75A-1 RECEIVER
- 310B EXCITER UNITS

Now Ready for Delivery!

SPECIALS

Mica Filled Xtal Sockets.....	5 for	29c
For 3/4" Pins		
4-Gang Ceramic Switch.....		69c
3PDT-2PDT-2PDT-SPDT		
Ferrule Type Resistor Kit.....	10 for	\$1.89
10 to 80 Watts		
Hand Keys.....		49c
R.F. Chokes 1MH 300 ma....	5 for	69c
Ceramic Standoff		
Xmitting Wall Feed Thru		
Insulator with cones and Rod		
—Porcelain—heavy duty..		75c

OIL FILLED CONDENSERS

2 MFD—600 V.....	59c
4 MFD—600 V.....	69c
2 MFD—1000 V.....	89c
4 MFD—1000 V.....	99c
.25—1000 V.....	44c

HI VOLTAGE MICAS

.01—2500 V.....	59c
.005—3000 V.....	79c
.0001—5000 V.....	89c
.001—6000 V.....	99c
APC—100 MMFD.....	44c

● What are your needs? Products of all National Manufacturers in stock — correspondence promptly answered. 25% deposit on C.O.D. orders, F.O.B. Washington, D. C.
Complete Lines of Steel and Aluminum Chassis in Stock.

Washington's Big New Radio Parts Distributor Has All the Greatest Names in Radio

Electronic wholesalers, inc.
 2010 14th STREET, N. W. • WASHINGTON 9, D. C.
 DEcatur 9041

J. F. RIDER • WALSCO • LANGEVIN • TRIPLETT • U. T. C. • BLILEY • PRECISION • RADIART • R. C. P. • AEROVOX • AMPHENOL

CLAROSTAT • HALLGRATERS • WORKSHOP • INSULINE • JENSEN • MEISSNER • R. M. E. • RAYTHEON • STEPHENS TRU-SONIC

LEEDS

The Home of RADIO

**QUALITY
PRICE
DEPEND-
ABILITY**

VARIABLE CONDENSER



Each Only 95c

6 Gang; 1 section of .00025 Mfd, 4 sections .000035 Mfd, 1 section of .00005 Mfd, with 5 air trimmers of 15 to 25 Mmfd capacity. This condenser is all silver plated.

POWERSTAT VARIABLE TRANSFORMERS

- Type 20:** 115 V. input, 0-135 V. output @ 3.0 amps. 0.4 KVA.....\$12.50
- Type 116:** mounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA.....\$23.00
- Type 116U:** unmounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA.....\$19.00
- Type 1126:** 115 V. input, 0-135 V. output @ 15.0 amps. 2.0 KVA.....\$46.00
- Type 1226:** 230 V. input, taped at 115 V. 0-270 V. output @ 9.0 amps. 2.4 KVA.....\$46.00
- Type 1156:** 115 V. input, 0-135 V. output @ 45.0 amps. 6.1 KVA.....\$118.00

SELSYN MOTORS



15 Volt AC 60 cycles. Transmitters only. Can be used to turn small beam antenna or as indicators only 3 1/2" diameter x 5 1/2" High Shipping Weight 12 lbs. Per Pair. Special Per Pair \$5.95

Wire Wound Potentiometer

100,000 ohm, precision made. G.R. type, 25 watt, 6" diameter. Brand New. \$1.95



HEAVY DUTY CHOKE

6 Henries at 550 Ma, 28 Ohms DC Resistance High voltage insulation. Completely shielded. Dimensions 3 1/2 x 4 1/2 x 5 1/2. Net Weight 15 lbs. Special.....\$4.95

OIL FILLED CONDENSERS

- 4 Mfd 600 Volt D.C. Sprague.....49c
- 8 Mfd 1000 Volt D.C. Tobe.....\$1.69
- 0.5 Mfd 600 Volt D.C. Baithub.....Each 19c
- 7.5 Mfd 330 Volt A.C. G.E.....98c
- 2 Mfd 10,000 Volt D.C. C.D.....\$13.95

SOCKETS Low Loss Steatite Wafer Sockets for 829, 832, and 813 Tubes. Each... 73c

WESTERN ELECTRIC CHOKE

18 Henries @ 100 Ma, 200 ohms D.C. Resistance Dimensions 4 3/4 x 3 3/4 x 3 3/4. New Weight 6 1/2 lbs. Each.....\$1.25

If not rated 25%, with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

LEEDS RADIO CO.

75 Vesey Street
Cortlandt 7-2612

Dept. Q510
New York City 7

garnered over a period of 5 years, to be sure that all possible sources of contamination would be cut off. If you think all that was easy, you're crazy. I kept only two things — my ARRL and ROWH lapel buttons. I still have those and I am proud to wear them — they'll give me a good start.

I wish there were some way I could personally contact all the fellows who are just beginning and tell them how good it feels to be back — how highly I value the privilege. I'd try to instill in their hearts a little of the way I feel inside, at this moment — a fraternal "all's-right-with-the-world" feeling. If my wish were granted, I am sure we would eventually have nobody who wittingly steals or ruins QSOs or any of the bickering or underhandedness that I've heard on the air the last couple of years (while brushing up on my code) — even to the extent of talking about secession from ARRL. I don't say that there should not be minority opinions — we need them and want them. However, it should be remembered that they are the minority — and of the ARRL. They are a part of our organization and should gracefully bow to the will of the majority. It certainly is possible in as democratic an organization as the ARRL to continue a gentlemanly fight for what is thought to be right.

We had a lot of fun in the old days. 'Phone men weren't battling c.w. addicts, or vice versa (except in friendly competition) and nobody tried to hog the whole show. It really was "one for all and all for one." Frankly, I can't see why it shouldn't be that way now. More QRM? Maybe, but remember that there were about 40,000 hams back in 1927 and our receivers weren't blessed with noise limiters, crystal filters, selectivity curves, double conversion, s.s.s.c. and all the other things which we have today to isolate a station. No — QRM is not the reason. The real reason is the lack of that spirit of fraternity and the fellows who lack that spirit should be ashamed of themselves, and really shouldn't be hams.

Well, I didn't intend this to become a sermon or a discourse. I only wanted to tell you that the FCC just issued me a license and saw fit to return to me my old two-letter call — W3DB — and that you will soon hear me on the air. Bottoms up again and the best of luck to you all.

— Alf M. Myhre, W3DB

"WELL DONE"

Shreveport, La.

Editor, QST:

... I cannot agree ... that membership in any other organization of amateurs is an attempt to disrupt amateur ranks. The majority of amateurs are fully aware of the important and vital part the League has played in amateur radio affairs, but if it takes concerted action to secure attention and correction of situations which the majority feel need adjustment, organizations securing truly representative expression of opinions and wishes should be welcomed. It does not follow that any other amateur radio organization is against the ARRL or trying to disrupt the League. To the ARRL members in other divisions I recommend a get-together with your director before starting criticism of him. Give him an opportunity to place his argument before your club, hamfest or convention. After all, he may have good reason for his actions.

Well, without further delay, I'll come to the point of this letter. It is to show that at least one director fulfilled the expectations of his fellow amateurs. So hats off to the members of the 1948 ARRL Board as a whole for a tough job well done.

— W. J. Wilkinson, Jr., W6VT

DX

195 N. Autumn St., San Jose, Calif.

Editor, QST:

After reading a remark in "How's DX?" for June, I am wondering if ham radio is still a hobby or turning into a profession. For example, I quote:

"VP6 — and VR5 — warn that they'd like to be called at only the proper times or they'll close their W files entirely."

We presume that this threat of a fate worse than death is to be heeded and we are somewhat in doubt as how to avoid it. Frankly, if the two DX stations refused to answer any more we I suppose we should all jump off the roof and strangle ourselves with the feeders, huh?

— Robert N. Barnes, W6ZUJ

(Continued on page 126)

Our 26th Year

LEEDS

The Home of RADIO

QUALITY—PRICE
DEPENDABILITY

CHOKES

SMOOTHING		SWINGING		EACH TYPE	
TYPE	Hy	TYPE	Hy	MA	Price
C-80	10	C-87	4-16	150	\$2.70
C-81	10	C-88	4-16	200	\$3.45
C-82	10	C-89	4-16	250	\$5.35
C-83	8	C-90	3-14	300	\$5.85

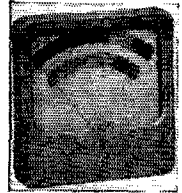
All Above 3000 Volts Insulation

METERS

100 amp.—6 volt D.C., 3 inch scale, 4½" square, Grey finish, supplied with 100 amp. shunt. Brand New. Each as illustrated. \$2.95

0-100 Ma 2" Round MacClintock \$1.95

5-0-5 Amp. Charge & Discharge 2" Round. 69c



RELAYS



altitude. Special low price. 95c

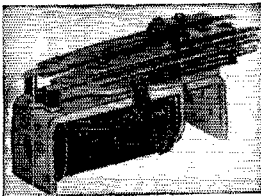
Multiple Contact

'Phone Type
No. 882—2 windings each 125 ohms.
No. 881—Single winding 12500 ohms.

49c

CS DIFFERENTIAL

Dual coil with armature pivoted between coils. All contacts normally open. Operates 220-250 Volts. 8000 Ohms each coil, contacts S.P.D.T. Controls rated 2 amps. at 110 VAC. Ideally suited for balanced or bridge type circuits where limited current or power is available. Will withstand 12 G Vibration up to 60 cycles at 35,000 feet

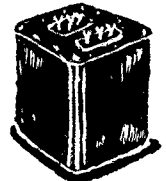


DM — 43A DYNAMOTOR

Manufactured by G.E. New. input 24 V. @ 23 amps. 7500 RPM; output 515/1030/2/8 V. @ 215/260 milliamps; filtered. Special. \$2.95

PLATE TRANSFORMER

Primary 115/230 Volt, 25-60 cycle. Secondary 820 Volts Center Tapped at 775 Ma. Hardly any voltage drop at 950 Ma. Completely shielded. Dimensions 6½ x 6½ x 7½. Net Weight 36 lbs. Special. \$7.95



FILAMENT TRANSFORMER

Primary 115-230 volt 60 cycle. Secondary 5 volts at 15 Amps., 5000 volt insulation, Swell for 35T, 75T, 100TH, 250TH, HK-54, etc. Completely shielded dimensions 4¼ x 5 x 5¼. Net Weight 10 lbs. Special. \$3.95

PLATE TRANSFORMERS

For Small Transmitters, DC Voltage Ratings are Approx. Values Obtained at Output of a 2 section Choke Input Filter. Using Mercury Vapor Rectifier Tubes. Pri. is for 115 V. 60 cy.

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. MA.	Dimensions			Price Each
				H.	W.	D.	
P 57	660-660†	500	250	4%	3½	4%	\$ 5.53
	550-550	400					
P 58	1080-1080	1000*	125	4%	3½	5	7.20
	500-500	400	150				
P 59	900-900	750	225	4%	3½	5½	6.00
	800-800	600					
P 67	1450-1450	1200	300	5%	6½	4	17.85
	1175-1175	1000					
P 68	2100-2100	1750	300	5%	6½	4¼	21.30
	1800-1800	1500					

* For dual operation with simultaneous use of both sec. ratings.
† Has 40-volt bias tap.

TUBES

3C24 Triode 100 Watts output: 6.3 Volts 3 amp. Filaments 2000 Volts plate @ 75 ma. Each 39c. \$3.50

10 for. \$3.50

2 x 2/879 Rectifier 2.5 Volts 1.5 amp 49c

FILAMENT TRANSFORMERS

2½ Volts C.T. @ 10 Amps. 7500 Volts RMS Type 40. \$2.40

6.3 Volts C.T. @ 3 Amps. 2500 Volts RMS Type 46. \$1.65

10 Volt C.T. @ 10 Amps. 3000 Volts RMS Type 316. \$4.50

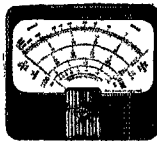
STANDARD STEEL CHASSIS

13 x 17 x 3 Black Crackle. \$2.22
13 x 17 x 4 Black Crackle. 2.58
11 x 17 x 3 Black Crackle. 1.86

Made of ¼ inch steel

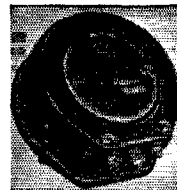
A LEEDS LEADER

- 50 microamp movement ± 2%
- 2500 ohms DC Resistance ± 2%
- Knife Edge Pointer
- 4 x 4½ Black Bakelite Case
- Easily Read Multitester Scale



This is the exact meter utilized in the G.E. YMW-1A Lab. Type Unimeter. A Great Special. Each.

\$9.75



H & H WIRE WOUND RHEOSTAT

150 Watts, 5 ohms, @ 5.48 amps., in approximately 67 steps. Resistance Wire Wound toroidally around refractory core and embedded in vitreous enamel. 4" Diameter. Depth behind panel 1¾". Makes excellent control for Toy Trains. A Buy At. \$1.95

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

LEEDS RADIO CO.

75 Vesey Street
Corlandt 7-2612

Dept. Q5 10
New York City 7

MORE POWER WITH SAME TRANSMITTER AND SAME ANTENNA

MicroMatch

AN INSTRUMENT FOR MEASURING STANDING WAVE RATIO AND RF POWER



MODEL MM1 for open wire lines: 3 through 30 MCS., 10 to 1000 watts, 70 to 300 ohms impedance. Price complete \$29.50
 MODEL MM2 (illustrated above), for coaxial transmission lines: 3 to 162 MCS., 10 to 500 watts, 52 or 72 ohms impedance, 81-1R connectors. Price coupler for 52 or 72 ohms \$19.95; indicator \$17.50. Contact your distributor.

M. C. JONES ELECTRONICS COMPANY
 BRISTOL, CONNECTICUT



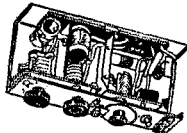
EXCITING! EXCITER BARGAIN

25 to 40 WATTS

10 to 80 METERS



FOUNDATION KIT



Engineered around the BC-610 series of plug-in tuning units. Described in the 11th edition Radio Handbook. Completed exciter uses 6AG7 crystal or electron coupled oscillator, 6L6 buffer-doubler and 807 amplifier. Kit includes four tuning units (illustrated at right above with cover removed), special 5/4" aluminum relay rack panel, socket for plug-in units and special hardware, together with full instructions and diagrams for assembling complete exciter. **\$9.95**
 No. 31A28, FU-40 Foundation, SPECIAL

PARTS KIT. Everything needed to complete exciter except tubes and power supply. Includes all mica condensers, resistors, RF chokes, sockets, meter switch, 0-200 ma meter, key jack, and miscellaneous parts. **\$9.31**
 No. 31A28A, SPECIAL Per Kit, Each

WANT RG-58/U?

Use RG-29/U—exactly the same except clear plastic cover overall. We Have It!
 A BARGAIN—No. 3A105—20 Foot Coils, Each... **49c**
 CONTINUOUS LENGTHS—50 ft. and over... **3 1/2c**
 No. 2A169. SPECIAL PER FOOT

DID YOU GET IT? THE BIG NEW B-A Catalog No. 481—EVERYTHING in Radio and Electronics. Write if you did not receive it. FREE on request.



BURSTEIN-APPLEBEE Company
 1012-14 MCGEE STREET,
 KANSAS CITY 6, MISSOURI

THE AMATEUR APPROACH

551 Bath St., Bristol, Pa.

Editor, QST:

Since reading the last issue of QST and enjoying its contents as much as ever — which has been a habit recurring at monthly intervals over the past twenty-one years — one thing has stuck in my mind and this is the mention of the need for new and individual developments and ideas among the ranks of amateurs.

This fact is not to be denied and considerable responsibility lies at the doorstep of each and every individual in our organization to give forth with his or her ideas for the mutual benefit of all concerned. At the same time renewed interest and competitive spirit among the general membership will be greatly augmented if an active plan for the publication of ideas, circuits, constructional methods, operating practices and the like is presented for the membership as a whole. Not on a highfalutin' technical plane which only the chosen few are able to understand and afford, but simple down-to-earth practical and inexpensive plans we can all take advantage of as we see fit.

Too many articles and suggested systems in the past have been entirely out of reach financially for the great mass of our members. It cannot be passed by too lightly that the rate of increase of living costs and dollar devaluation has greatly reduced the capital resources the average ham has available today for experimentation and rebuilding. Note the reaction to single-sideband operation; it is an excellent system but how many of us can afford to make the change? The net result is that we still plug along on our present rigs and must content ourselves with the attendant evils. Too many other excellent suggestions and developments have fallen by the wayside for similar reasons since the fact that only a few adopt a system and enjoy its advantages does not pay dividends. The system and/or principle which is readily useful to the majority is the one which speaks well for the one developing and the organization presenting it to its members.

Let us put on our thinking caps and come up with things we all can use and have, easily-made things which the little fellow, newcomer, old-timer and super-duper elite can all take advantage of together. In this way we weld together an efficient, democratic organization which we all will continue to support legally and fight for to the last ditch as we all have so many times in the past.

There are many things which will constitute definite improvements to the art and to the efficiency and quality of our individual rigs. If we analyze the situation there is really only one component for a ham rig that can't be made with a few simple tools right in our own shack and that is a vacuum tube. Why, then, do we continue to use the stuff that is put on the market by stuck-in-a-rut manufacturing organizations who haven't changed their drawings in the last ten years? It is simply because the current of thought in our brains follows the path of least resistance. Let's step up the plate-voltage, boys, and have a little corona discharge and maybe an arc-over.

For over two decades it has been our opinion that to be a true ham rig and a real dyed-in-the-wool amateur as little as possible of the ready-made should be used and everything possible should be built by the station licensee. That is the way to develop new ideas, new products and new life. There's no denying the fact that we learn by doing — let's see what happens if we make such endeavor interesting to everyone, great and small alike.

The present state of affairs is such that were T.O.M. still alive he would surely unleash one of his famous tirades and bring to bear the full treatment of the Rettyssnitch and kindred instruments of torture on us all — heaven forbid!

— T. J. Jones, W3CHU

CHIMNEY SUPPORTS

408 Fallowfield Ave., Charleroi, Pa.

Editor, QST:

Probably this information has been given many times in the past, but I failed to see it and probably there are several others who might benefit from a repeated publication of the same. During the past week a terrific windstorm broke down a chimney to which I had attached a 30-foot antenna mast. Whether or not the chimney would have been blown down had not the mast been attached to it is in doubt; but

(Continued on page 128)

HOT RADIO VALUES *at Sun Radio*

CRYSTALS!

In the greatest purchase of radio transmitting crystals ever made by one wholesaler in the history of the Radio Parts Industry, Sun Radio acquired title to over a half million dollars (\$500,000.00) of Army Surplus, precision built, exactly tooled crystals in moisture proof holders which are shock mounted. Please note that crystal shipments of 6 or less are packed in cloth containers to expedite handling. . . . No worry because all crystals are shock mounted and guaranteed delivered perfect. All crystals have Army MC harmonic ratings but Sun encloses directions for deriving the correct fundamental frequency in kilocycles.

CRYSTALS WITH A MILLION USES

Fractions Omitted											
kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc
412	420	429	437	445	462	470	479	490	497	506	516
413	422	430	438	446	466	472	481	491	498	507	518
414	423	431	440	447	468	473	483	492	501	508	519
415	424	433	441	448		474	484	493	502	509	523
416	425	434	442	451		475	485	494	503	511	523
418	426	435	443	453		477	487	495	504	512	
419	427	436	444			488	496				515

49¢
each

I.F. Frequency Standards	Crystal Frequency Standards 98.356kc	For Crystal Controlled Signal Generators 525kc
kc 450 451,388 452,777	kc 461,111 464,815 465,277	526,388 527,777 529,166 530,555
531,944 533,333 534,722 536,111 537,500 538,888	Easily altered for 100 kc Standard, Mounted in low loss 3 prong hldr.	535,111 536,500 537,888

99¢ each

\$3.89 each

99¢ each

200 KC CRYSTALS

Without Holders - $2\frac{1}{32} \times 2\frac{3}{32}$

69¢ each 3 for \$2.00

ASSORTED MISCELLANEOUS CRYSTALS

Fractions Omitted			
376kc	376kc	381kc	384kc
372	377	383	386
374	379		388
375	380		

39¢ each

priced at a fraction of the cost of their holders alone.

FOR HAM AND GENERAL USE

Fractions Omitted				
390kc	395kc	402kc	405kc	408kc
391	396	403	406	409
392	397	404	407	411
393	398			
394	401			

79¢ each

CRYSTALS

FOR SCR 522

5910kc	7350
6370	7490
6450	7580
6610	7810
	7930

\$1.29
each

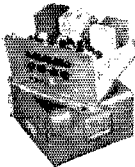
Crystals from BC 6 10

3/4" Spacing - 2 Banana Plugs

2945	2258	2360	2532	3322
2105	2260	2390	2545	3510
2125	2282	2415	2557	3520
2145	2300	2430	3202	3550
2155	2305	2435	3215	3570
2220	2320	2442	3237	3580
			3250	3945
				3955
				3995

\$1.29
each

- Payments must accompany order. Enclose 20¢ for postage and handling. Minimum order—\$2.00 plus postage.
- Crystals are shipped packed in cloth bags inasmuch as they are shock mounted. All shipments guaranteed.



RADAR RECEIVER BC-1058A \$39.95

Guaranteed excellent condition. It is a "Hot" receiver for the "Ham" and short wave experimenter covering the 174 to 210 MC Television band. Has individually slug tuned antenna R.F., Detector and oscillator circuits resulting in maximum sensitivity; contains 2 R.F. and 5 I.F. stages detector and video amplifier. Complete with 110 volt AC power supply and 14 tubes.



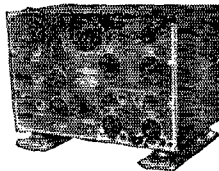
SCR-522 VHF Transceiver

Tunes 100-156 MC. Don't confuse these with other incomplete and abused 522s. Sun Radio offers electronically perfect and guaranteed 522s... AND COMPLETE with tubes, remote control box, 28 volt dynamotor (can be converted to 110 V operation), 4 crystals and ALL CABLE CONNECTORS but less cable..... **\$39.95**

• TERMS: All items F.O.B., Washington, D. C. All orders \$30.00 or less, cash with order. Above \$30.00, 25 per cent with order, balance C.O.D. Foreign orders cash with orders, plus exchange rate.

CLOSEOUT OF FAMOUS

BENDIX TA12 TRANSMITTERS



These can be easily converted to 20-40-80 meters. Crystal required for 10 meters. Each electronic coupled oscillator dial has 3000 divisions enabling quick precision shifting. This transmitter was constructed of the highest quality of precision parts, with laboratory precision. Four separate output tanks; one 4-position selector channel-switch having seven sections which changes the ECO, IPA and output tanks simultaneously.—BRAND NEW, complete with tubes.

NEW... **\$39.95** USED... **\$29.95**

ATTENTION! CLOSEOUT SPECIALS PART KITS!

- KIT 1 Asstd Mica Condensers—Unmarked, 100 for..... **\$1.50**
- KIT 2 Asstd Resistors 1/2W-1W, 100 for..... **1.00**
- KIT 3 Asstd Condensers—Tubular Bypass, 25 for..... **1.00**
- KIT 4 Asstd Condensers—Electrolytic, 25 for..... **2.00**
- KIT 5 Asstd Potentiometers—with or without switch, 10 for..... **1.00**
- KIT 6 Asstd Ballast Tubes—Line Ballasts, 10 for..... **1.00**
- KIT 7 Octal Sockets—Wafer, 25 for..... **1.00**
- KIT 8 Octal Sockets—Plastic with Flange, 20 for..... **1.00**

SPECIAL!! All 8 Kits for \$8.00

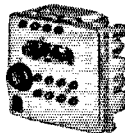


VHF TRANSMITTER

Here is one of the greatest offerings in war surplus! Hundreds sold at \$20 and now closed out at an amazingly low price. Brand new, Battery operated (67 1/2 v B and 1 1/2 v A). Frequency 80 to 105 mc. Complete with 2-1G4 tubes and full instruction manual. Ready to go on the air. Less batteries... **\$6.95**

2-6 MC PB RECEIVER

6 tubes (3-1T4, 1-1R5, 1-1S5, 1-3S4). 2-6 MC in 4 bands. Easily converted to Broadcast band with instructions furnished by us. Has R.F. stage and audio output stage to drive speaker. As pictured, less case, with **\$9.95** speaker.....



MAGNETIC HEADPHONES

2000 ohms, 8' Cords with Army plug. All unused; show slight handling... **\$2.49**



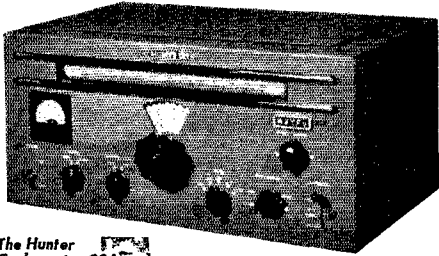
PANEL METERS

All Meters Brand New and Guaranteed

- Simpson 2" Round 0-15 D.C.-V..... **2.97**
- Triplett 2" Square 0-40 D.C.-V..... **2.97**
- Sun 2" Round 0-300 D.C.-V..... **2.97**
- GE 3" Square 0-150 A.C.-V..... **3.49**

SUN RADIO
OF WASHINGTON, D. C.
938 F STREET, N. W. WASH. 4. D. C.

ANNOUNCING A GREAT ADVANCE IN BAND SWITCHING EXCITERS



**The Hunter
Cyclomaster 20A**

- Output approximately 20 watts
- 3.5 to 29.7 mc.
- Accurate frequency calibration
- Metering of final grid and plate circuits
- Permeability Tuned oscillator and multipliers
- Built in 100kc Crystal Calibrator
- Gang tuned oscillator and multiplier stages
- Control circuits for the 1kw final
- Individually lighted bands
- Variable output control
- All this and Beauty too!

Price \$169.50 • See your distributor or send direct to

THE HUNTER MFG. CO., INC.
IOWA CITY, IOWA

Write for descriptive folder today

W8CFK

ALUMINUM CALL PLATES

Your call cast in aluminum
with black background

- and polished 1 1/4" letters. Plate size 2" by 6 1/2", 3 styles: P for panel mounting, L for car license and D for desk use. \$1.75 each postpaid.

P & H SALES CO.
619 Jasper St. Kalamazoo 31, Michigan



Founded in 1909

RADIO TELEPHONY RADIO TELEGRAPHY

Courses ranging in length from 7 to 12 months. Dormitory accommodations on campus. 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.

PORT ARTHUR COLLEGE PORT ARTHUR
TEXAS

Approved for G.I. training

all suspicion points toward the mast being at fault.

All this boils down to this bit of advice: Never attach an antenna or any part of the same to a chimney. I make this statement in spite of the fact that every antenna which I ever had during my 13 years' experience as an amateur has been connected to a chimney. I have discussed this matter with several construction men, since my chimney broke down, and they have all told me that while outwardly a brick chimney appears to be very substantial, that actually such chimneys are very susceptible to vibrations, as would be caused by an antenna swinging in the wind, because usually the final results are such as I just experienced.

— Howard F. Carson, W3LQX

NOT A HOAX

Seattle, Wash.
(Friday the Thirteenth)

Editor, QST:

I've been in this game 28 years now and up until 0048 this morning I thought I had seen and heard everything! W5MMX just called CQ. I take hold of the VFO dial and give him a blast — the whole 125 watts. He comes back okay but calls W7NLM. Ha! Here's a lid who can't read code (or one who can't send it, meaning yours truly). Well, after a couple of transmissions during which this fellow keeps calling me "Neill," I begin to smell a rat! My name's Art!

During the well-known depression, I used to print QSL cards to keep the beer crock supplied with the well-known malt. To make sample cards using no current assigned call I simply added an "M" to my own W7NL.

To make a long story longer — this W5MMX was working W7NLM. Were my plates red?

— Art Peterson, W7NL

SELECTIVITY

P. O. Box 1161, Port Arthur, Texas

Editor, QST:

Re band assignments and power input, I have only this to say: Let's design our equipment to fit the existing spectrum, rather than try to get the spectrum to fit the existing equipment.

The receiving system here uses triple detection, 6950 to 456 to 85 kc., and my only gripe are against the "stabilized VFOs" that drift about 3 kc. and over on "ten" and the "narrow-band" f.m.s that cover about 10 kc. These rotten apples really show up on our receiving set-up. We can clip the wings right off the "BC-quality" boys.

— Robert W. Hass, W6WUF/MM

PROCEDURE ON TEN

Roker House, Sunderland, England

Editor, QST:

May I, before the 28-Mc. band opens for the season, address a plea to U.S. 'phone stations? Please, fellows, when you call CQ, don't say "Tuning from 28 Mc. up." This practice naturally results in a flock of European 'phones descending onto the little 200-kc. bit supposedly reserved for c.w. Honestly, there's enough QRM there already, without 'phones adding to the chaos.

So have a heart, blokes, and if you must tune from the low end up, please commence operations at 28,200 kc.!

— Stanley Herbert, GSATU

Hints & Kinks

(Continued from page 55)

entire assembly is supported within a sloping-front box as shown in the photographs.

As an added refinement, the map itself may be "plasticized" for a small additional cost. Hams in larger cities should have no trouble in finding someone who can do this work. The result is similar to the plastic-cased discharge papers, oil-company courtesy cards, etc., that most of us have seen. If it is not possible to have the map plasticized, it may be mounted on a sheet of clear cellulose acetate.

(Continued on page 150)

IT'S PRACTICAL! IT'S CHEAP! IT'S QUICK! IT'S CONVENIENT!

Make your own QSL Cards

WITH A RUBBER STAMP

WITH YOUR OWN CALL LETTERS AND ADDRESS



PRINT AS MANY AS YOU WISH ON PENNY POST CARDS OR ANY OTHER PAPER AT VERY LITTLE COST TO YOU. WILL LAST A LIFETIME.

QSL rubber stamp with your call letters as imprint shown in post card size to make your confirmation replies. A complete kit, ready for use, consisting of rubber stamp and ink pad in your choice of colors.

RUBBER STAMP **\$196** POSTPAID ANYWHERE
Without Ink Pad

RUBBER STAMP **\$271** POSTPAID ANYWHERE
With Ink Pad in choice of Red, Green, Blue, Violet, or Black Colors.

ORDER IMMEDIATELY Enclose Money Order or Stamps. (No C.O.D.s Accepted.)

J. V. LOVE & CO.

Manufacturer of Rubber Stamps Since 1866

E. E. Joel (W5APP) Owner - GALVESTON, TEXAS

DESIGNED AND MANUFACTURED BY A HAM — W5APP

MODULATION & DRIVER TRANSFORMERS

Refer to previous issues of *QST* for illustration of these transformers.

These transformers are suitable for use with type 811, 809, TZ40, TZ20, etc. to modulate either triode or beam tube RF amplifiers. Two secondaries are provided. Impedance ratio primary to secondary number one, 2 to 1. Primary to secondary number two, 16 to 1. Will modulate up to 300 watts input. Modulation transformer, driver transformer, circuit diagrams and other information all for. \$6.90 Please include 50 cents for postage and handling.

NOTICE

OUR SUPPLY OF THESE TRANSFORMERS IS LIMITED • NO ORDERS WILL BE ACCEPTED AFTER NOVEMBER 15, 1948

Send full amount to speed delivery and save C.O.D. charges. Shipped only in the U. S., its possessions and Canada.

ELECTRONIC NAVIGATION, INC.
Box 735, Church Street Station
New York 8, N. Y.

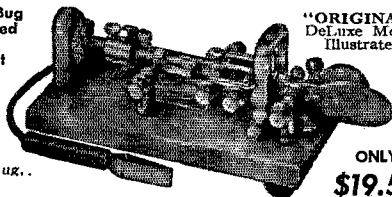
COMMERCIAL RADIO INSTITUTE

A RADIO TRAINING CENTER FOR 28 YEARS
Resident Courses Only • Broadcast, Service, Aeronautical, Television, U.H.F., Preparatory Course, Frequency Modulation and Marine telegraphy. Classes now forming for Fall term Oct. 1. Entrance examination Sept. 20th.

Literature upon request, Veteran training
Dept. B, 38 West Biddle Street, Baltimore 1, Maryland

Send Easier and Better with a DeLuxe VIBROPLEX Key

The ONLY Bug with Patented JEWEL Movement



"ORIGINAL" DeLuxe Model Illustrated

ONLY \$19.50

Reg. Trade Marks: Vibroplex Lightning Bug. Bug



The "BUG" Trade Mark identifies the Genuine Vibroplex Accept No Substitute

Until you've sent with a DeLuxe Vibroplex you'll never know how easy sending can be. No special skill required. No arm-tiring effort involved. Simply press lever — Vibroplex does the rest. Suits any hand or any style of sending. Adjustable to any speed. Beautifully finished with polished chromium base and parts. Colorful red switch knob, finger and thumb piece. DIE CUT contacts and main spring. 3/10th contacts. Complete with cord and wedge. Choice of three deluxe models: Original, Blue Racer and Lightning Bug. Order NOW! Immediate shipment. Money order or registered mail. FREE catalog.

THE VIBROPLEX CO., Inc.
633 Broadway, New York 3, N. Y.

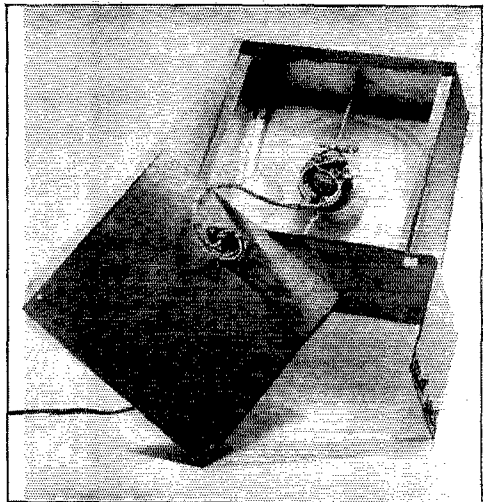


Fig. 3 — Rear view of the beam indicator, showing method of mounting the Selsyn and the lamps. Control wires are cabled and run out of the box through a 5-prong terminal mounted on the rear cover-plate.

The pointer should be made of lightweight material so that its own weight will not cause it to shift position after the beam is aimed in a given direction. If necessary, a double-ended pointer can be used, trimming the end to produce a true balance that will permit it to stay put, without putting a load on the Selsyn motor.

The unit shown was built by W1LOP of the Headquarters laboratory, from ideas suggested by himself and Jack Matthews, W3DPA.

ANOTHER SAFETY DEVICE: THE "BLEEDER METER"

BLEEDER RESISTORS sometimes open up when least expected, and when they pop, sometimes you do too. The simple expedient shown in Fig. 4 will provide a constant check on the condition of the bleeder resistor in your power supply, and will be a means of putting some of those surplus d.c. relays to work.

The relay coil is connected in series with the bleeder, between the "cold" end and ground. The relay contacts are then used to turn on a safety light placed in a conspicuous position near the "hot" plate circuit of the transmitter. Con-

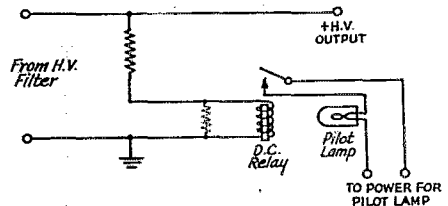


Fig. 4 — Circuit of a "bleeder meter" to provide a constant check on the condition of an all-important part of any high-voltage power supply.

nect the relay so that the light is on whenever bleeder current is flowing. Remember, of course, to look at the warning light before turning the

(Continued on page 132)

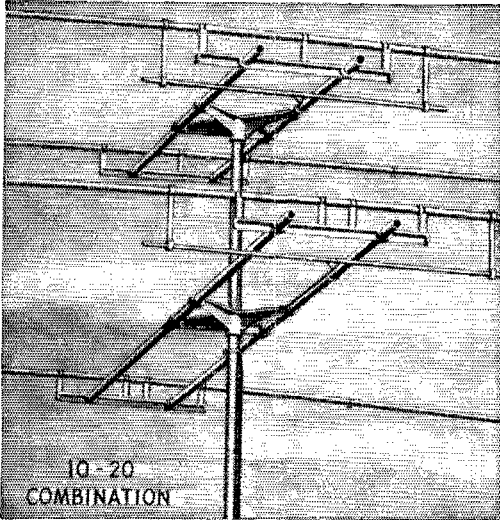
HY-LITE FOR ALL ANTENNAS

AMATEUR TV AND FM

74.95
AS PICTURED
BELOW

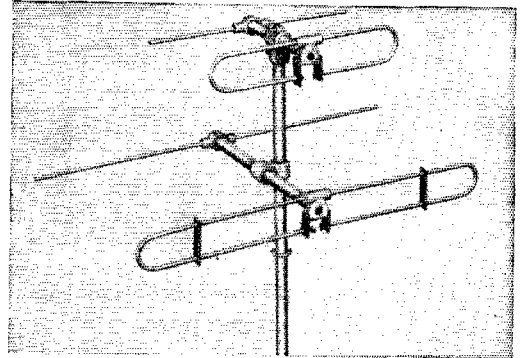
Many hams are TV conscious today. HY-LITE has a complete line of TV antennas, built of the same high grade material and strong aluminum castings found in their very popular Ham beams. HY-LITE TV antennas come in many designs and combinations, complete with 6 ft. mast, guy ring, hinge base, lugs and complete instructions for assembly. WRITE FOR OUR NEW TV CATALOG for determining the antenna or combination best suited for your needs. Price list on request. JOBBERS: Many choice locations still open. ORDER NOW.

23.00
HY 30 S.
BELOW



10-20
COMBINATION

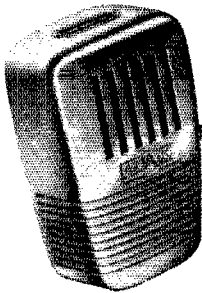
W
R
I
T
E
F
O
R
L
I
T
E
R
A
T
U
R
E



HY-LITE *Antennae* INC.
Makers of Fine Antennas for AMATEUR · FM · TELEVISION
528 TIFFANY ST., BRONX 59, N.Y.

USABILITY UNLIMITED . . . The New Astatic

Cardinal CRYSTAL, DYNAMIC AND CERAMIC MICROPHONES



● It's a pacesetter . . . a major new accomplishment in terms of quality performance at modest cost. And, still, that is only part

of the story of Astatic's new Cardinal Microphone. It has usability unlimited! It is so designed, that it may be used in a variety of ways shown in illustrations. Extra convenience in all applications is offered by optional models with Type "S" off-on switch. All models furnished in die-cast case in bright gold finish.

The Cardinal works on AC-DC or standard circuits. Crystal and Ceramic models available with substantially flat response or rising characteristics in the voice range. Dynamic models incorporate Astatic's newly developed circular, Alnico 5 magnet, which doubles flux density, providing higher output level, extended range, and more stability, permitting highest quality performance in these more compact units. CB Base, stand adapter and hang-up bracket are accessories, and may be purchased separately.

Write for prices, specifications



Lies On Its Felt
Covered Back



With CB Base
For desk use. Dark
brown plastic.



As Hand Mike
Tapered contours al-
low firm, effortless
grip.



With Hang-up Bracket
Hangs in automo-
biles, etc., safely,
easily accessible.



Mounted on Floor Stand
Special adapter is
universal fitting for
conventional stands.

Astatic Crystal Devices
manufactured under Brush
Development Co. patents



Listed in The Radio Industry RED BOOK

3-Wire Outdoor Telephone Cable

At
Less Than
1¢ Per Foot

Stock No. C-561A

525 Foot Rolls ... Only \$4.95 per roll.

Each conductor consists of four #28 steel strands for added strength and three #28 copper strands for extra conductivity and flexibility. Rubber insulation with two-ply braid covering around each conductor. Net weight 20 lbs.

A wonderful buy for any telephone or inter-communication use requiring 2 or 3 conductor cable.

Anticipate your needs on this wire!

LAY IN A STOCK NOW! YOU WILL NEVER AGAIN BE ABLE TO DUPLICATE THIS VALUE!

TERMS - cash with order; or 20% deposit, balance C.O.D.

ALL PRICES ARE NET, F.O.B. DAYTON, O.

SREPCO

STANDARD RADIO & ELECTRONIC PRODUCTS CO.
135 E. Second St. - DAYTON 2, OHIO - Tel. FULTON 2174

RADIO

TECHNICIAN and RADIO SERVICE COURSES

FM and TELEVISION

Approved under the G. I. Bill of Rights

AMERICAN RADIO INSTITUTE

101 West 63rd St., New York 23, New York

TEACHING RADIO SINCE 1935



RADIO and TELEVISION

Thorough Training in All
Technical Phases

APPROVED FOR VETERANS

WEEKLY RATES

DAYS—EVENINGS

RCA GRADUATES ARE IN DEMAND

For Free Catalog write Dept. ST-48

RCA INSTITUTES, INC.

A Service of Radio Corporation of America

350 WEST 4th ST., NEW YORK 14, N. Y.

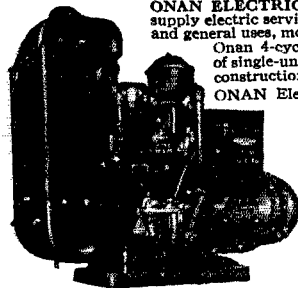
ELECTRICITY

FOR RADIO AND ELECTRONIC APPLICATIONS

ONAN ELECTRIC GENERATING PLANTS supply electric service for electronic applications and general uses, mobile or stationary. Driven by

Onan 4-cycle gasoline engines, they are of single-unit, compact design and sturdy construction.

ONAN Electric Plants are available in many sizes and models. ALTERNATING CURRENT: 350 to 35,000 watts in all standard voltages and frequencies. DIRECT CURRENT: 600 to 15,000 watts. 115 and 230 volts. BATTERY CHARGERS: 500 to 6,000 watts; 6, 12, 24, 32 and 115 volts. Write for detailed literature or engineering assistance.



D. W. ONAN & SONS 4676 Royalston Ave. Minneapolis 5, Minn.

132

plate switch off!

If the relay coil becomes hot, shunt it with a resistor, choosing a value that will still permit clean relay action but lets the coil operate without getting hot. — Bill Wildenhein, W8YFB

TRAPS FOR TVI ELIMINATION

THE simple traps shown in Fig. 5 have been found very useful in the elimination of television interference in Channel 2 (54-60 Mc.). In several cases, including one where the receiver was only 150 feet from the transmitting antenna, interference to Channel 2 has been eliminated.

The coils can be wound in a few minutes, using a 1/4-inch form. The switches shown are used to short out the traps when they are not needed (when the receiver is tuned to some other channel) because they have been found to impair the pictures on higher-frequency channels in some instances.

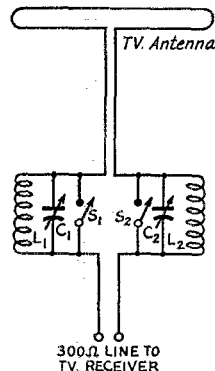


Fig. 5 — Simple traps that have been used to eliminate TVI in Channel 2. C₁, C₂ — 3-30 μfd. Ceramicon trimmers. L₁, L₂ — 18 turns No. 22 enameled, close-wound on 1/4-inch form. S₁, S₂ — S.p.s.t. ceramic knife switch.

Mount the trap assembly on a small sheet of bakelite or Plexiglas, and insert it between the television antenna and the antenna terminals on the set. With the interfering transmitter on the air, tune the traps until the interference disappears. If it is possible to get only partial improvement, try changing the size of the coils until certain that the traps are tuning the desired range. — Frank C. Hills, W2JFS

AN IMPEDANCE METER

SHOWN in Fig. 6 is a handy gadget that can be used to measure directly the impedance of chokes, transformers, large paper condensers, etc. Measurement of that unknown output transformer will be a simple job with this unit, and although its accuracy is not perfect, it is close

(Continued on page 134)

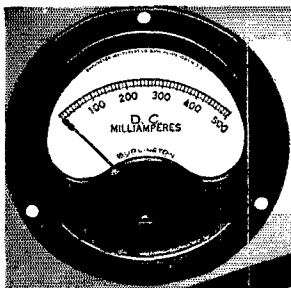
COMPLETE RADIO TRAINING!

Prepare now to accept a responsible position in Commercial Radio. New developments will demand technicians with thorough basic training, plus a knowledge of new techniques discovered during the war. Training open to high school graduates, or those with high school equivalency. Courses 6 to 18 months' duration in RADIO AND ELECTRONICS. Approved Veteran training in Radio. Write for Particulars.

VALPARAISO TECHNICAL INSTITUTE
DEPT. TN Valparaiso, Ind.

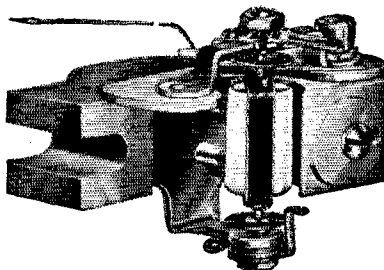
ONE OF A SERIES

BALANCE WEIGHTS



**WHY BURLINGTON PANEL INSTRUMENTS
PROVIDE UTMOST RELIABILITY . . .**

BALANCE WEIGHTS of helical type phosphor bronze, formed in a manner which eliminates slipping or shifting, are used to balance the moving element. All ranges AC and DC available in 2 1/2", 3 1/2", 4 1/2" rectangular or round case styles and are guaranteed for one year against defects in workmanship or materials. Refer inquiries to Dept. J108.



INSTRUMENT COMPANY
BURLINGTON, IOWA

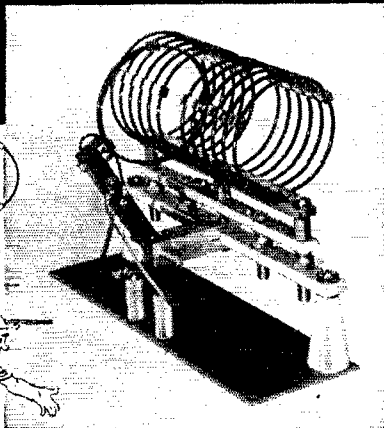
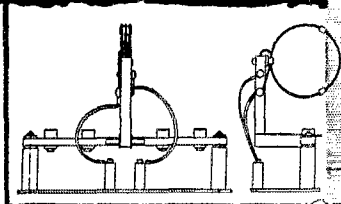
FOR ALL THE POWER YOU'LL EVER USE!

B & W HEAVY DUTY INDUCTORS



**TYPE HD . . .
for powers up
to 1000 Watts Input**

W3DGP



Here's the top of the line as far as power is concerned! B&W type HD inductors are exceptionally rugged—both mechanically and electrically! They're engineered and produced to capably handle all the power any amateur can use. Here's a coil you can depend on—because *it's built by B&W and guaranteed to handle peak loads with ease!* Supplied both without link and with variable center link, B&W type HD Inductors fill every requirement for a coil of this type.

If you're going in for power, get the best in parts and equipment—*insist on B&W Inductors!*



W3GC

Write Dept. Q-108 for your copy of the B & W Catalog for Amateurs!

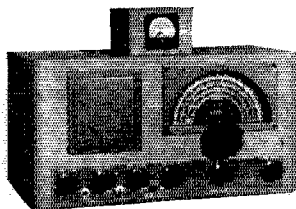
BARKER & WILLIAMSON, INC.

237 Fairfield Ave.

Upper Darby, Pa.



WE HAVE 'EM!



**THE NEW
RME
VHF 2-11
"COMPACT"
RECEIVER**

Here's a modern receiver for both AM and NFM to cover the amateur bands in the 2, 6, 10 & 11 meter range. It is complete, including the speaker and power supply.

CHECK THESE FEATURES!

CALIBRATION—In MC, temp. comp. assures accuracy.
TUNING CONTROL—Ball planetary and loaded gear.
SENSITIVITY—Less than one microvolt R.F. carrier with 30% amp. modulation, or a plus or minus 2 KC FM carrier will provide 50 milliwatts of audio freq. output. Has double I.F.
CW RECEPTION—Beat osc. with pitch control.
NOISE REDUCTION—Series type limiter.
NBFM CIRCUIT—Limiter-driver stage with ratio detector.
SIGNALS—AM, NFM, MCW, CW, ICW.
TUBES—11 plus rectifier and voltage regulator.

Net Price, less meter **\$130.00**
 Net price, carrier level S meter **\$14.00**

Write for descriptive literature
 Distributor for complete ham line

CENTRAL RADIO PARTS CO.

1723 W. Fond Du Lac Ave., Milwaukee 5, Wisconsin
 Wendell Ciganek • W9SYT

TUBES

All Brand New in Original Factory Package

1B24.....\$2.95	VT-127A \$2.95	724B ....\$1.95
2J22.....15.00	VR-150... .69	725A.....12.50
2J32.....15.95	VT-158A . 4.90	726A..... 4.75
2J38.....15.95	211..... .98	801..... .95
2J48.....15.95	250R..... 4.95	804..... 3.75
2X2A..... 1.80	388A..... 4.95	807..... 1.19
3A5..... .98	417A..... 9.80	813..... 5.95
3B24..... 1.95	417B..... 9.80	829..... 2.95
4J26.....15.95	GL434A . 7.95	832A..... 1.95
5AP1..... 2.49	446A..... .74	841..... .69
5BP1..... 1.95	450TH . .19.95	866A..... .98
5BP4..... 1.95	450TL . .19.95	WL869B .29.95
5J23.....15.95	WL530 . .19.95	884..... 1.70
5J29.....15.95	WL531 . .19.95	954..... .39
6AK5..... .98	705A..... 1.85	957..... .49
6J6..... .69	708A..... 2.00	1625..... .49
12GP7...12.50	714AY . .9.80	1626..... .49
15E..... 2.95	715B..... 9.95	1629..... .29
24G..... .49	717A..... .98	2051..... .49
RK-60... .69	723A..... 4.00	7193..... .29
CRP-72... 2.95	723A B . .6.50	8011..... .98

MINIMUM ORDER \$2.00

TERMS — Cash with order or 20% Deposit, Balance C.O.D.
 ALL PRICES ARE NET, F.O.B., DAYTON, OHIO

SREPCO

STANDARD RADIO & ELECTRONIC PRODUCTS CO.
 135 E. SECOND ST. DAYTON 2, OHIO.

enough to make it a welcome addition to any ham shack.

The principle of operation is explained by Fig. 7. The voltage is measured across a known resistance R , and then across the unknown impedance X . Then by application of the formula $Z = RE_2/E_1$ you have the impedance in ohms, or a reasonable facsimile thereof, of the unknown.

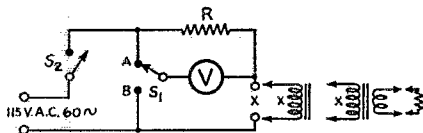


Fig. 6 — Simple impedance-measuring gadget. Unknowns are compared against known resistances as described in the text.

R — 4000 ohms.

S₁, S₂ — S.p.a.t. switch.

V — 0-150 a.c. voltmeter.

By the use of an inductance-capacitance-frequency chart, measurements can be converted easily to henrys or microfarads.

When measuring transformers, the secondary or the winding not under test must be loaded with a resistor of the value of the winding. Hence the 4-ohm voice coil of an output transformer under test must be loaded with a 4-ohm resistor if accurate primary-impedance readings are to be obtained.

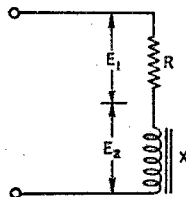


Fig. 7 — The basic circuit used in the impedance-measuring unit.

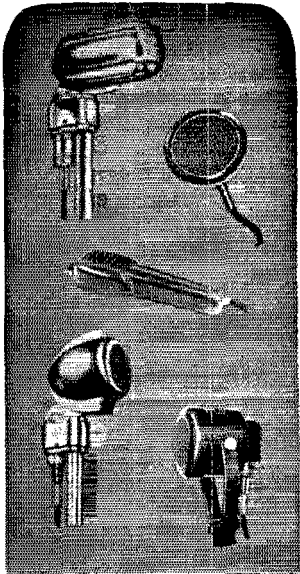
The unit in use at my shack is built in a small steel utility box, and the formula has been simplified to $Z = 4000E_2/E_1$, and is marked on a card which is pasted just above the meter. — *Kit H. Carlos, W3MJB*

Strays

"While working W0FWH on 11 meters a short time ago, my telephone rang and a sweet-voiced woman inquired if I was listening to the radio — she wanted the information for the benefit of a national radio survey. I replied, 'Yes, I'm listening to Joe, W0FWH, in Pueblo, Colo., 27.3 on the dial.' It took three repeats before the bewildered lady acknowledged that she had the information down pat. Lucky W0FWH — I'll bet he's the only ham in the country with a Hooper rating!" — *W6CCK*

SWITCH TO SAFETY!





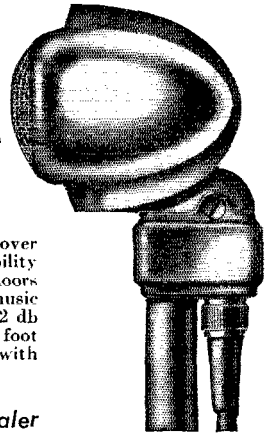
"T" is for Tops

*Tops in Value —
Tops in Performance*

TURNER MODEL 22X-22D

Crystal or Dynamic

The Turner Model 22X-22D is used the world over by amateurs. Modern styling and dependability make these Turner microphones a favorite indoors and out. Smooth response to both voice and music from 50 to 9,000 c.p.s. Effective output level 52 db below 1 volt/dyne/sq. cm. Equipped with 7 foot removable, shielded single conductor cable with quick change connector.



"T" is for Turner. Ask your dealer to show you the Turner Model 22X-22D

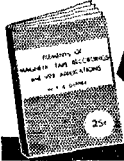
THE TURNER COMPANY

917 17th STREET, N. E. • • • CEDAR RAPIDS, IOWA



Microphones BY TURNER

Microphones licensed under U. S. patents of the American Telephone and Telegraph Company, and Western Electric Company, Incorporated. Crystals licensed under patents of the Brush Development Company.



ELEMENTS OF MAGNETIC TAPE RECORDING AND 999 APPLICATIONS
by A. C. SHANEY

Only 25c

AMPLIFIER CORP. of AMERICA

398-11 Broadway, New York 13, N. Y.

RADIO COURSES

- RADIO OPERATING
- RADIO SERVICING
- CODE
- FM TELEVISION

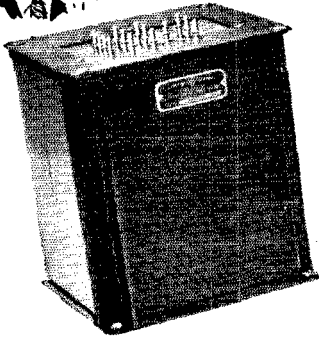
REFRIGERATION SERVICING

Personal Counselling Services for Veterans
Write for Catalog and Picture Brochure

Y. M. C. A. TRADE & TECHNICAL SCHOOLS
15 W. 63rd Street (Near Broadway) New York City



"It's KENYON Transformers For My Rig Because They Always Put Out!"



- Hams everywhere specify KENYON "T" Line Transformers! Manufactured under rigid standards, all KENYON transformers are constructed of the finest grades of material plus the skill and long experience of a highly trained competent operating staff.
- All KENYON transformers are checked progressively in the course of manufacture and are laboratory-tested upon completion to insure satisfaction. Yes, KENYON "T" Line Transformers meet the most exacting requirements of critical purchasers. For skillful engineering, progressive design and sound construction — Specify KENYON for top performance in your rig!

KENYON TRANSFORMER CO., Inc. 840 BARRY STREET NEW YORK, U. S. A.

HAMS, ATTENTION!

FOR PROMPT
MAIL ORDER SERVICE
ON
ALL HAM GEAR

Try

THE MAIL ORDER HOUSE
OF THE WEST



W. D. BRILL CO.

198 TENTH ST. - OAKLAND 7, CALIFORNIA

W6KLO

W6FIX



NOVEMBER SPECIAL AT E-M-I IS A

CRYSTAL SALE

MOUNTED CRYSTALS . . .
Brand New, Guaranteed, Sure-fire, Stable
Oscillators

7006 kcs	7140 kcs	7273 kcs
7040 kcs	7173 kcs	8006 kcs
7073 kcs	7206 kcs	8073 kcs
7106 kcs	7240 kcs	8040 kcs

Only **29¢**

each

4 for \$1

TZ40—ANOTHER REAL BARGAIN!



The TZ40 is without question one of the most versatile and useful of all transmitting tubes available to the amateur today. We have a nice lot of them, armed forces surplus spares, that have never been used—many still in the original factory cartons. All are guaranteed to be brand new and true to rated characteristics. They dissipate 40 watts without cooling, take 7.5 volts on filament and 1500 volts on the plate and operate nicely at full power on all frequencies up to 60 Mcs. These are a bargain at \$1.85 each or \$3.65 per pair.

ACT FAST—All orders subject to prior sale.

EMI is famous for Bargains, New Electronic Items, Service, the finest equipment of National, Millen, Weston, Thordarson, Johnson, Cornell-Dubilier, Clnoudograph, Radiart and many others. Order by mail, phone, wire or in person.

Terms: 20% cash with order — balance C.O.D.
If "not in stock" we'll refund by check — not credit slip.



ELECTRONIC MARKETERS, Inc.

190 VARICK STREET, NEW YORK 14, N. Y.

Phone: WAtkins 4-4540

WWV Schedule

STANDARD-FREQUENCY transmissions are made continuously, day and night, as a public service by the National Bureau of Standards over its standard-frequency station, WWV, on the following frequencies:

Mc.	Power (kw.)	Audio Freq. (cycles)
2.5	0.7	1 and 440
5.0	8.0	1 and 440
10.0	9.0	1, 440 and 4000
15.0	9.0	1, 440 and 4000
20.0	8.5	1, 440 and 4000
25.0	0.1	1, 440 and 4000
30.0	0.1	1 and 440
35.0	0.1	1

A 0.005-second pulse may be heard as a faint tick every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted at precisely one minute before each hour and each five minutes thereafter (59th minute; 4 minutes past hour, 9 minutes past hour, etc.), resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric-disturbance warnings applicable to the North Atlantic path are given at 19 and 49 minutes past each hour. If a disturbance is in progress or is anticipated within 12 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcements of the station's services and call are given by voice at the hour and half hour.

The accuracy of all the frequencies, radio and audio, as transmitted, is now better than a part in 50,000,000. Transmission effects in the medium may result in slight fluctuations in the audio frequencies as received at a particular place; the average frequency received, however, is as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.000001 second. The beginnings of the periods when the audio frequencies are resumed are synchronized with the basic time service of the U. S. Naval Observatory.

~~Strays~~

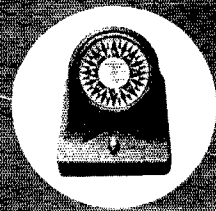
Loss of life from hurricanes has been cut to one-fortieth of its former magnitude in the past 20 years, thanks to better warning services and preparedness against disaster, states Howard C. Sumner of the U. S. Weather Bureau in *Science News Letter*. The Bureau credits organized amateur emergency communications effort for its part in helping to reduce the toll.

Is your station ready for the October Simulated Emergency Test? Contact your local emergency coordinator at once.

WORKSHOP **10 over 20 Stacked Array** **with Rotator and Indicator**

This combination is the last word in amateur antenna equipment: —

- High Gain
- Light Weight
- Rugged Construction
- Aluminum Alloy Elements
- New Model Rotator with Solenoid Brake
- Matches Directly to 72 Ohm Line



THE WORKSHOP ASSOCIATES, Inc.

Specialists in High-Frequency Antennas

63 NEEDHAM ST., NEWTON HIGHLANDS 61, MASSACHUSETTS

The Radio Amateur's **HANDBOOK**

The twenty-fifth edition of the *Handbook* is featured by the complete rewriting of the material to give a more understandable discussion of those basic facts that an amateur should know to get the most out of constructing and using his apparatus. Owners of previous editions will recognize immediately that the over-all plan of the book has been changed — achieving, we believe, the object of segregating the material so that it can be most conveniently used. A great deal of new equipment has been constructed especially for this edition. As always, the object has been to show the best of current technique through equipment designs proved by thorough testing. As the art grows, the problem of presenting a representative selection of gear grows with it — a state of affairs that is reflected in an *increase of well over a hundred pages* in this edition. New chapters on ultrahigh frequencies, station assembly, and the elimination of interference to broadcasting have been added to round out the treatment of all phases of amateur radio. The material on operating has likewise been greatly expanded. Altogether, this revision is the most comprehensive of recent years.

PRICE \$2.00 — UNITED STATES, ITS POSSESSIONS AND CANADA

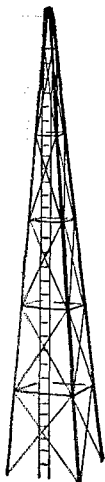
\$2.50 ELSEWHERE • BUCKRAM BOUND \$3.00

American Radio Relay League, West Hartford, Conn., U.S.A.

NOW! Famous VESTO ANTENNA TOWERS

Available for Rotary Beams, FM, TV

ON EASY MONTHLY PAYMENTS!



Width at base equal to 1/5 height.

At last, you are able to buy the famous Vesto towers on a monthly payment plan, and satisfy that desire for a good-looking, safe, permanent antenna tower. No guy wires. Simple to erect.

Easy to move. Comes to your home knocked down, with easy-to-follow directions. Made of sturdy galvanized steel. Ladder to top. Built to withstand heaviest winds.

ORDER NOW—THIS NEW, CONVENIENT WAY

Schedule of Prices Effective Sept. 15, 1948

Size	Sh. Wt.	Cash Price	Down Py't	Balance	These payments include finance chg.			
					6 mo.	9 mo.	12 mo.	
22 ft.	355 lbs.	73.50	23.50	50.00	6.16	...	...
28 ft.	430 lbs.	92.25	32.25	60.00	10.75	7.42	5.75	
33 ft.	530 lbs.	109.75	39.75	70.00	12.50	8.47	6.53	
39 ft.	630 lbs.	129.75	43.45	86.00	15.20	10.41	8.03	
44 ft.	730 lbs.	149.75	49.75	100.00	17.66	12.11	9.33	
50 ft.	860 lbs.	175.00	58.00	117.00	20.67	14.06	10.92	
61 ft.	1260 lbs.	239.75	79.75	160.00	28.26	19.37	14.93	
Tilt-Top mounting head may be ordered with tower:								
	21 lbs.	27.75	9.25	18.50	3.27	2.22	1.73	

WRITE FOR COMPLETE FREE INFORMATION AND PHOTOS OF INSTALLATIONS

Here's all you do to obtain one of these easy-to-erect towers: Just select the size you want, note the price, and send the down payment shown. Papers for your signature will be sent by return AIR-MAIL. Your order will be handled quickly, and the tower shipped from Kansas City, Mo., by

freight, collect. Sample freight rates from K. C. to various points are as follows: N. Y. area, \$2.09 per cwt.; Pacific coast, \$4.37; Denver, \$1.62; Cleveland, \$1.50; Detroit, \$1.44. Send your order now, or write for complete information. Prices subject to change. No C.O.D. shipments.

The **VESTO Co.**, 101 Main St., Parkville, Mo., Phone 258

Mass. Radio School

271 Huntington Ave., Boston 15, Mass.

For over 28 years the educational radio center of New England. Prepares for all U. S. Government Radio Operators' Licenses. Also gives Radio Technician Training. (Pre-Television). Approved courses for Veteran Training under G.I. Bill.


Send for Catalog

Licensed by Commonwealth of Mass.
Department of Education

Ham Post!

National NC 57 Receiver.....	\$89.50	Hammarlund FS-135-C Standard	\$14.25
Columbus Model 610 Converter.....	79.50	McMurdo Silver 908 "Micro Match".....	29.90
Millen 90810 HF Transmitter.....	69.75	Elnicor No. 400EA — 10 Meter Beam.....	31.20
Millen 90811 HF Amp Unit.....	33.00		
Sonor CFC Exciter.....	59.75		

DELIVERY FROM STOCK



CONTINENTAL SALES COMPANY
195-197 CENTRAL AVENUE, NEWARK 4, N. J.

SHOOTS TROUBLE FASTER!

MAKES MORE MONEY FOR YOU ON JOB OR AT SERVICE BENCH!

Signalette

MULTI-FREQUENCY GENERATOR

\$995

at distributor or post-paid, direct. Sorry, no C.O.D.'s. Ohioan's add 3% State Sales Tax.

In radio service work, time means money. Locate trouble faster, handle a much greater volume of work with the SIGNALETTE. As a trouble shooting tool, SIGNALETTE has no equal. Merely plug in any 110 V. AC-DC line, start at speaker end of circuit and trace back, stage by stage, listening in set's speaker. Generates RF, IF and AUDIO Frequencies 2500 cycles to 20 Megacycles. Also used for checks on Sensitivity, Gain, Peaking, Shielding, Tube testing. Wt. 13 oz. Fits pocket or tool kit. See at your distributor or order direct.



CLIPPARD INSTRUMENT LABORATORY, INC.

Dept. T, 1125 Bank Street, Cincinnati 14, Ohio
Qualified Jobbers write, wire for details

HAM-ADS

- (1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.
- (2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.
- (3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.
- (4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.
- (5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.
- (6) A special rate of 7¢ per word will apply to advertising in which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
- (7) Because error is more easily avoided, it is requested signature and address be printed plainly.
- (8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 10¢, \$1.50 up. Stamp for samples. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

COMMERCIAL radio operators examination, question-and-answers. One dollar per element. G. C. Waller, WSATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

SELL perfect Temco 500GA commercial kilowatt, complete for all-band operation, fone or cw, \$1000. No lower offers, please. Reason: marriage. W3LDD, 4912 Quebec NW, Washington, D. C.

BEAMS pre-focused and matched to typical lines. Large diameter duro-aluminum tubing for elements and boom. Peter C. Housekeeper, 956 Paulding St., Peekskill, N. Y.

AMATEUR radio licenses. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plus in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. \$1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

10-METER Beams, \$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

QSLs SWLS, newest designs, finest stock. Fairest prices. Fastest service. Write Dossett, W9BHV QSL Factory, 857 Burlington, Frankfort, Ind.

QSLs, Samples, Albertson, W4HUD, Box 322, High Point, N. C.

SURPLUS: Deluxe crystal finishing kits containing holders, quartz blanks, abrasive, etching fluid, complete instructions. \$2.00 each postpaid. Formerly sold \$3.75. Vesto Company, Parkville, Missouri.

QSLs! Quality cards priced right. Samples. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

SUBSCRIPTIONS, Radio publications a specialty. Earl Mead, Huntley, Mont. W7LCM.

QSLs: Kromkote cards at a fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

BEAM control cable, new material. Two #16; six #20 rubber insulated, coded, tinned conductors. Weatherproof rubber jacket. Heavy armor shield, 3/4" diameter. Price 10¢ foot. F.O.B. Chicago. Trans-World Radio-Television Corporation, 6639 S. Aberdeen St., Chicago 21, Illinois.

QSLs SWLS. Meade, W9KXL, 1507 Central Ave., Kansas City, Kansas.

FREE samples of QSLs-SWLS. Snappy service! W1HJI, Box 32, Manchester, N. H.

WILL sell low power transmitter. Prefer buyer who can look at it but interested persons may obtain details by writing. Will sell for \$60.00. F. W. Anderson, Jr., Hawkins, Wis.

FOR Sale: New and near-new power transformers, chokes and condensers, Thordarson multi-match. Mod. transformer. Also QST's. Radio's and other miscellaneous trans. equipment. Send for list. A. Martinka, 1253 Grace St., Chicago, Ill.

SIGNAL generator: Test-Rite B-45, \$18. Will consider swap for ham gear. Gordon Blanchard, W2VGM, Oneonta, N. Y.

WANTED: 20-meter bandspool coils for FB7 receiver; also general coverage coils. W2CFQ, Box 1004, Sparta, N. J.

WANTED: August 1929, October 1929 and December 1931 copies of "Proceedings of the I.R.E." Offer \$2.50 each. Write George C. Davis, 504 Munsey Bldg., Washington, D. C.

SELL HRO \$165, complete with pack, speaker, bandspread coils plus broadcast and one longwave, A-1 shape, E. Black, W2ESO, 449 West 56th St., NYC 19, Phone Plaza 7-8343.

BUD WM-78 wavemeter for sale. Brand new. \$5.00. F.o.b. W5KYK.

DISPOSING custom-built 750 watt station. Beautiful appearance, performance. Suitable living room. Finest components. Transmitter and Super-Pro receiver built into Wilcox Airport Rack with attached in-line-top table. Smaller rack contains low voltage supplies. Both racks on casters. 815 output 805 modulators. Powerstat varies input down to one watt. 2 microphone and 1 line-line inputs. Push-to-talk operation. Many other features. Pictures on request. Price, \$1050. W2TC, 14 Colonial Road, Hempstead, N. Y.

WANTED: KP-81 receiver, good condition. W9IQC, 522-4th La-Salle, Illinois.

FOR Sale: Millen variarm VFO, \$35; Millen exciter, tubes, coils 10 to 20, \$40; 450-watt final, 20 meter coils, needs finishing touches, \$35; all equipment guaranteed. Write Carl Black, W1PSY, 447 Commercial St., Provincetown, Mass.

SELLING: new BC-348, freq. meter, transmitter, tubes, etc. Send for list. Milton Kalashian, 2 Congress St., Newburyport, Mass.

FOR Sale: HQ-129-X receiver and speaker, practically new. 100-watt phone transmitter in steel cabinet. Neat, well-built rig. Also 1250-1000 volt, 500 Ma. piezo transformer and filter, chokes, bleeder, etc. 809'a, 811'a, 812-H'a, 866'a and many other good tubes and radio apparatus. Selling out completely. First offer of \$350.00 takes all. A bargain. L. W. Owens, W4MUW, Box 351, Gadsden, Alabama.

QSLs, SWLS. For distinctive cards, write McEachron, 1408 Brentwood, Austin, Texas.

BC-610E complete with speech amplifier. Several extras, \$600. A 1 inquires answered. Dick Carroll, Pekin, Ill.

C. Fritz for better QSL-SWLS! 1213 Briargate, Joliet, Illinois.

SELL or trade: HRO receiver. Coverage: 80 thru 10 meters, \$120.00. Hammarlund 420 transmitter and 411 modulator with built-in VFO. All bands. Revamped — 60 watts input, phone and c.w. 6L6 modulators. \$150.00. Cardwell BC-221 w/AC supply and modulation. \$65.00. Knochel, W9CO, Lincoln, Illinois.

ATTENTION Brother Ham! Novelty ash tray for your ham shack. Your call, name and imprint of state in gold. \$1.50 postpaid. Call-Hart Novelties, 12 Hart, W8ZTF, Sainsville, Ohio.

BEAM elements, 3/4" and 3/8" telescoping dural tubing. 3 elements 10-14 remote broadcast tuner. Sell or swap. W2FUK, H. Zambakian, Mineola, L. I., N. Y.

SELL: Supreme AF-100, like-new, used only two months, \$450.00. Ralph Cabanillas, Jr., Room 803, 9 Maiden Lane, N. Y. C., N. Y.

HALLICRAFTERS receivers. Easy payments. Atlas Radio Jobbers, Nashville, Tenn. Tel. 6-3800.

TRANSMITTER: Brand new Navy GP-7, made by Westinghouse, 125-watts c.w. 40' phone. Covers 40, 80, and 75 meters. Complete plug in coils and with slight change can cover 20 meters. 120 volts A.C. 12 to 28 volts Dc. Set is VFO control, tube line-up 803, 801, 843, 5Z3 and pair of 1016. Best offer takes. Write W3ITW, 391 Spruce St., Pottstown, Penna. All inquiries answered.

ALUMINUM 15167' O.D. tubing; two 54 ft. masts. New 803's, SCPI remote broadcast tuner. Sell or swap. W2FUK, H. Zambakian, 347 Belleville, Bloomfield, N. J.

HALLICRAFTERS S-36A receiver. \$125 or best offer; Weston 785 analyzer, \$75; Simpson 215 VOM \$23.50; Simpson 260 VOM, \$32.50; Triumph 830 oscilloscope, \$75. All items guaranteed. Raymond H. Ives, Route 2, Lake Terrace, Norfolk, Va.

HT-9 with 10m-20m-40m-80m coils. Meissner EX signal shifter. \$325.00. C. J. Ronk, W4MJJ, Box 908 Martinsville, Va.

AMATEUR gear: RME 84, with VP2 6-volt power supply, slightly used, \$99.00; beam tubing, in 12 ft. lengths, 3/8", \$1.44, 1/2", \$1.68, other sizes available. Elinor 5-element 2-meter beam, \$6.40; Elinor 6-element beam, \$24.90. Regular 30 ohm twin line, 100 ft., \$2.85; heavy-duty twin line \$0.75 per ft.; J. K. crystals, \$2.80 each. Transmitters: Harvey-Wells TS50, \$99.50; Sonar: SKT \$203.67; MB611, \$72.45; CFCVFO, \$59.75; VHF152A, \$80.60; Barker & Williamson coils and condensers; Electro-Voice microphones. Crystals: 100 Kc., guaranteed perfect. Manufactured by nationally known company. Complete with holders 3/8" pin spacing. \$2.95 postpaid. Art A. Johnson Sales, 1117 Charles St., Rockford, Ill.

QSLs? SWLS? Distinctive designs, glossy stock, one-day service. Samples. Narvestad, Granite Falls, Minn.

NATIONAL HRO (table model), recently re-aligned and overhauled. Complete with ABCD coils. Excellent condition, \$149. Details on request. W7KVP, 105 East Owens, Salem, Oregon.

AMERTRAN transformer 6200 v.o.t. 700 Ma., \$37.50, shipped freight prepaid. C. R. Woodward, W4LKP, Bowling Green, Va.

QSLs, SWLS. Finest stock, fairest prices. Dossett, W9BHV QSL Factory, 857 Burlington, Frankfort, Indiana.

CRYSTALS: Fine commercial units for SCR-522's. Police, taxi, aircraft, marine, geophysical, and other services, except amateur. Commercial re-grinding; many crystals can be economically reground to new frequencies. Inquire. Over twelve years of satisfaction and fast service! Try us first. Eideon Electronic Company, 1802 North Third, P. O. Box 31, Temple, Texas.

QSLs, SWLS. Meade, W9KXL, 1507 Central Avenue, Kansas City, Kans.

DB22A, HF-10-20, V.H.F.-152. Slightly used! Bargain! W8ZTV, P. O. Box 218, Holland, Mich.

GON-SET converter 10-14, like-new. Sell \$34.00 or trade for electric interval timer with sweep second and elapsed-time hands. W2SJJ, 158-04 Sanford Ave., Flushing, L. I., N. Y.

RECEIVER HQ-129X, \$125.00; oscilloscope RCA 155C. Make offer. Julian Craps, 2016, Colorado, Portsmouth, Va.

COLORTONE QSLs! Snappy! Bright! Different! Hams everywhere regard these as the simplest reflecting smartness and practicability! Samples? ColorTone Press, Tupelo, Miss.

WANT Howard 3-820 external speaker. Robert Bunn, 5032 Pullman, Seattle, Wash.

SELL: Nilson Radio School Master Course in radio communication. Clean, complete, 14 volumes, plus texts. \$25.00. W9QVA, 1309 N. 6th St., Burlington, Iowa.

PHOTOFLASH capacitors, \$8.00; New 828, \$6.00; 814, \$4.00; 200-watt 5000 ohm resistors, 75¢, W4BBE.

BC 610E converted and recommissioned by Hallcrafters. Complete coils, antenna tuning unit, BC-939A, and exciter units ECO or crystal on all bands 10-11-20-40-80. Spare new 250TH, pair of 100TH's, microphone, technical manual. All in excellent condition and working. \$650. W8ZET, Ashland, Ohio.

SELL: UTC xformer S-47 300 Ma., 1000-1250-1500v. each side center-tap. Like new, \$15.00. SMC-100 crystal, 100 & 1000 Kc., \$6.00. Condenser, 2 µd, 2500 v., \$1.00. James Poteracke, 1345 Sherman, Grand Rapids 6, Mich.

SELL: Echophone commercial receiver, in excellent condition. \$25.00. SW5 National receiver, best offer. Set (7) B & W 3400 transmitting coils, range 20 to 18.0 (Mc), new \$10.00. One new BC696A, 3-4 Mc xmttr, \$12.50. N. Penland, jr., W4BHM, 533 Palmetto St., Spartanburg, So. Carolina.

WANTED for cash: BC728 A-B or C complete. Also Collins TCS complete. Both to be in good condition. W2NXX, Brightwaters, L. I., N. Y.

FOR Sale: Hammarlund HQ-129X, \$110.00. National Navy RAO 6 (NG 120), \$125.00, with speakers, in fine condx. J. Dubinsky, W2LVR, 94-04 Astoria Boulevard, Jackson Heights, L. I., N. Y.

SELL: BC-342N, \$50.00; Hallcrafters SX-24, \$40.00; Abbott TR-4B, \$20.00. W2EXB, Garden Road, Vineland, N. J.

SALE: HQ-129X, in excellent condition, \$130.00. 3000 VCT, \$20. Other parts, W9HJ, 268 W. Algoma, Oshkosh, Wis.

SELL: BC-221 \$32.50, 2 Kc., 110 v. Ac., gas driven generator, 6 H.P. Briggs & Stratton eng. \$125.00; W4CYP, 1205 Stratton Ave., Nashville, Tenn.

WANTED: Stanco 60P, 10 P or 110 CM xmttr. State price and condition. All offers answered. Sell SX-25, W4NDH, Joe Gault, Box 355, Blacksburg, S. C.

HALLCRAFTERS S-20R in very good condition, including transmitter RF protector, \$45.00. W1MVV, 107 White Street, Springfield 5, Mass.

COMMERCIAL operator correspondence course. Sample questions. \$60 trade. W6VTC.

FOR Sale: Complete volumes of QST, as follows: 1922, -24, -26, -27, 1931 thru 1947; make offer. General Radio Wavemeter, Type 358, 15-240 meters; 235-year-old A. C. Grebe detector and 2-stage audio amplifier, serial 135; pair GE Kenotron, Model UV-217; National SW-3, with 20, 40, 80-meter bandpass coils and power supply. If interested, write Mrs. C. S. Hoffmann, jr., 47 Lywood Ave., Wheeling, W. Va.

QSLs, SWLS. Large variety of samples for stamp. Also your own designs. W2DEE, Maple Shade, New Jersey.

FOR Sale: National NC-57 receiver 6 months old. \$69.00. Judd Jacobson, 534 Academy St., Owatonna, Minn.

CLEANING house: filter-chokes, transmitter tubes, modulation transformers, DM-36 for 10 and 6, speakers, filters, send for bargain list. W9WFO, Park River, North Dakota.

SELL BC348M, brand new, \$75.00; BC459A, \$15.00; BC454 and BC455 receivers in original cartons, \$10.00 each. Back issues of QST, Radio, Electronics to sell. W9CMQ, J. Worley, 6043 Lowell Ave., Indianapolis, Ind.

RME-69 factory reconditioned, \$65. BC-348 AC converted, \$17.00. V. Crawford, W5JX, 4214 W. 12th St., Amarillo, Texas.

SELL: Magi-Klips kit, \$24.00. F.o.b. Fargo No. Dakota, K. Kreisler, Box 527.

SELL: Hallcrafters S20R. Very good condition. \$40.00. W2COY, 220 Bird Ave., Sidney, N. Y.

SELL: Supreme AF-100, A-1 condition, Astatic D-104 microphone, like-new, \$30.00. Will deliver within 75 miles. Charlie Harmon, W4JKV, c/o Duke Power Co., Gastonia, N. C.

SWAP latest DeForest's training, complete. Want BC348 or good communication revr. State condx. Suzuki, W9SJP, 5215 S. Kimbark Ave., Chicago 15, Illinois.

FOR Sale to highest bidder: Kilowatt rig, VFX 680 (VFO-FM modulator) PP 807 into PP 813 final link throughout. Completely switched, metered, fused, relayed. Only finest commercial components used. Every part over-rated for safety. Performance. Mounted with Super-Pro receiver in beautiful Bud 66" enclosed cabinet with roller base. Always R9 plus. Stable as a rock. Everything included for immediate operation. Just plug in and connect antenna. Chuck Mowat, W1MDG, 817 N. Virginia, Reno, Nevada.

SWAP: New RCA-Rider channelyst in carton for good HQ-129X. 10 East 15th, Washington, Ind.

RME-69 receiver for sale. Excellent condition, complete with speaker. First \$65.00 takes it. A. E. Hayes, South Street, South Coventry, Conn.

SX-42 complete with reflex speaker, tilting stand, and Panadaptor. Positively like new, \$295.00. Bob Beard, W3HAN, Box 1115, Lancaster, Penna.

125-WATT 10-meter transmitter, 3 separate units; Hallcrafters receiver SX-24; 4 element rotary beam antenna; Astatic microphone. All complete and in good working condition. Moe Reubenfeld, 141-13 77th Ave., Flushing, N. Y.

ARR-5 like S-36, like-new, converted to tune to 149 Mc/s. Narrow and broad FM and 120 ft. from 27.5 Mc/s to 149 Mc/s. Glass hood and phono input added, less speaker and power supply. Best offer over \$75.00. R. Danner, W9BVG, 1635 Farwell, Chicago, Ill.

SELLING out Reason: going back to sea. One SX-43 and speaker; 500 watt Millen final 812's; one HT18 VFO, one 522 xmttr rigged for 6 meters; One NC HFS; one 420 revr, none used more than 100 hours. Best offer takes. R. Beck, W3OAS, 2813 North Second St., Philadelphia 33, Penna.

SELL: New BC696, 3-4 Mc VFO, converted. \$10.00. W2HFM, Bedell, Merrick N. Y.

TWIN City radio hams: I offer the three big c.w. transmitters at WPCO, in place at my station, and in 'as is' operating condition, for cash, as follows: 40-meter, 1000 watts input, \$350.00; 80-meter 800 watts input, \$200.00; 20-meter 750 watts input, \$200.00; all three together, \$650.00. These rigs all crystal and temperature controlled. Make appointment to operate transmitters if interested. Sumner B. Young, W8CO, "Maplewoods", Wayzata, Minnesota.

SELL: Late model Hallcrafters S-20R receiver with S-meter, \$55. and Sonar XE-10 NBRM exciter, factory modified for 75 tone. \$33.00. Robert Craig, W1QLU, York Village, Maine.

ALUMINUM tubing, all sizes in 12 ft. lengths, write for prices. Willard Radcliff, Postoria, Ohio.

WANTED: Instruction manuals for Hammarlund Four-20 transmitter and Four-11 modulator. Want converted BC-459 and BC-696 with A.C. power supply. Gus Guillot, W5HHB, Route 4, Box 278A, Beaumont, Texas.

RME-69 with speaker, \$100. Rectifier RA69A, 300 volts, 200 Ma. and 5000 volts, 2 Ma. \$50. W. Smith, 65 Glenwood Rd., Upper Montclair, N. J.

ART-13 dynamotor or A.C. supply with cables, converted for 10 meters, also broad band converter. Corbett, West Sayville, N. Y.

SELL BC-348-Q/w/speaker in cab. and power supply, \$95.00. RCA 3" scope \$65.00. RCA ri signal Gen. \$50.00. A-1 condx. Bill Ferguson, W4NVI, Box 225, Morehead, Kentucky.

FOR Sale: National 100-X receiver, \$50.00. Merlin Schumacher, Lomira, Wis.

WANTED: Model PE-103-A and PE-104-A. Ralph Rose, 2215 S. W. Ninth St., Miami, Florida.

FOR Sale: 105 watt Concord P.A. system, very complete in every way. Beautiful design and best performance possible. In or outdoor any size installation. Used once. Inquiries will be answered in detail. Must sell for urgent need of money. System guaranteed. Wholesale cost was \$700. Any reasonable offer will take. Elwood A. Capelle, Moberidge, So. Dakota.

WANTED: SX-28 or SX-28A in good condition, with matched speaker. Will pay up to \$125.00. W3KNU, Grautoff, 124 Willow Ave., Takoma Park 12, Maryland.

SELL: Hammarlund HQ-120-X with speaker. In very good condition, \$125.00 or best offer. Roman Zouido, 23 Scales Ave., Clifton, N. J.

HEWLETT-PACKARD 205-AG audio signal generator. Sell or swap for 1947 television kit. W1KUU, 7 Shangri-La Lane, Middletown, R. I.

BARGAINS: New and used transmitters, receivers, parts. New 150-watt phone, \$199.00. 60-watt phone, \$99.00. Globe Trotter, \$57.50; Signal Shifter, \$39.00; Abbott TR-4, \$29.50; Collins 25-watt mobile, \$19.00. N. 173, SX-28, \$199.00 ea., HRC Senior, HQ-129, \$139.00 ea.; RME-45, SX-25, \$99.50 ea.; S-40, \$65.00; S-20K \$49.00; NC-44, S-38, \$35.00 ea.; many others. Large stocks, trade-ins. Free Trial. Terms financed by Leo, W9GFO. Write for bargains and best deal to World Radio Labs, Council Bluffs, Iowa.

SELL: Hallcrafters S-39 portable receiver. Good condition. Make an offer. Frank A. Eberhardt, W9FTJ, Box 141, Alexandria, Minn.

APN-4 Loran receiver and scope, complete, and in good condition. Will trade for HF-10-20. E. C. Miller, 617 E. Mo. Ave., St. Joseph, Missouri.

WANTED: Buy or borrow Supreme Model 555 Diagnostics instruction manual, 100-watt transmitter, receiver, microphone, transmitter-receiver; electric hair clippers. Longley, W2ANB, Slingerlands, N. Y.

HALLCRAFTERS SX-28 receiver, recently realigned, re-tubed, excellent electrically, mechanically, \$140.00. Gross UHP-2 ultra-phone two-meter transmitter, receiver, microphone, speaker, AC supply, dipole (complete station), \$45.00. BC221 frequency meter, original tubes, calibration book, crystal, \$30.00; "Command" type components: 190-550 receiver, used, \$12.50; brand new transmitter 3-4 megacycles \$15.00; same used \$10.00; brand new transmitter 7-9.1 megacycles \$15.00 same used, \$10.00. Assortment 100 amateur crystals, mostly FT243 holders, \$35.00. Everything guaranteed. Post Office Box 1245, Indianapolis, Indiana.

FOR Sale: New 906 McMurdo Silver signal generator, \$80.00, new 905 S-17, \$35.00, new 904 Bridge \$14.00; Personal collection. All with complete instructions. Frank M. Cotton, Rt. No. 1, Box 170, Omak, Washington.

SELL: 3-20-r, FB condx, \$15.00. FBXA complete, \$22.50. Three tube TRF, also complete \$10.00. Details: W9POC, Box 439, Carmel, Indiana.

FOR Sale: FB custom 1000 watt phone, cw rig. BSW ECO-xta exciter. PP 250TH final, 810 mods. Coils: 80-20-10, in deluxe 84 inch enclosed cabinet rack and separate exciter table unit. Rigged for remote control. Details and pictures are available. Make offer c/o WIPDA, 42 Palmer Road, Waban, Massachusetts.

WANTED: Wire recorder and SCR-522 converted for two or six meters or unconverted. Please write full details. W2NSD, 1379 East 15th St., Brooklyn 30, N. Y.

NATIONAL NC-200 with speaker, good as new, \$75. Also 115 issues QST (1936 to 1947). Make offer. W9QIX, 12314 East Outer Drive, Detroit 24, Michigan.

BEAM motor operates on 110V. AC 60 cycles. Requires 12 µd condenser. Reversible Hi-Torque 1/4 RPM. No free swing. Flat mounting surface. Light weight, sturdy. Brand new, Surplus \$5.95. Postpaid in U. S. Alvarado, Dept. ST-4, 907 S. Alvarado, Los Angeles 6, Calif.

SELL: Collins ART-13 transmitter converted for 110V, and 10 meters. 1700V D.C. supply. Heavy duty 24V rectifier supply. Custom-made cabinet. Only \$200.00 f.o.b. Mesa, Arizona. "Sleepy," W7KJU 25 So. MacDonal.

SELL Hallcrafters S-37 receiving 100 to 250 Mc. net price \$595, practically new. Sacrifice at \$400. Florac, 246 East 46 MU 2-2252, New York City.

WANTED: Collins ART-13 complete, new or like new. Complete unit desired for mobile operation. Also want suitable generator and batteries. Signed: W9NPA, C. B. Franz, 2110 Parkridge Ave., Brentwood 17, Missouri.

FOR Sale: Meisner 150-B, converted to 10 meters with doubler stage, less preamplifier. New modulation transformer, antenna relay, and extra set of tubes. \$275.00 cash and carry. Rosalia, Washington. Contact W7HVK/3, Capt. Gordon C. Lynch, Post Signal Officer, Army Medical Center, Washington 12, D. C.

WANTED: Aircraft radios: BC-348, AN/ART-13, RTA-1B, AN/APN-9, R5A/ARN-7, AN/ARC-1, AN/ARC-3, SCR-718, BC-788-C, I-152, MN-26-C. Test sets with TS- or I- prefix. State quantity, condition, and best price first letter. HI-MU Electronics, Box 105, New Haven, Conn.

QSL'S? SWL'S? QSL'S? What are your desires? Big variety. Samples, 1¢. QSL-printer Sackers, W8DED, Holland, Michigan. One-day QSL service!

WANTED: Schematic diagram for Uah model 12 transmitter kit. Steve Horvath, W8PVZ, 203 17th St., Barberton, Ohio.

WANTED: 250-500 watt modulation transformer. W2WZC, Box 114A, Morris Plains, N. J.

PWU! Not a new call sign. Just our way of saying that American hams must read "Practical Wireless", Britain's top radio-television journal, for complete details of new ideas and developments by leading British-European experimenters. Packed full with helpful "kinks" and new radio viewpoints. Annual subscription (12 issues) \$2.00 from George Newnes, Ltd. (PW.16) 342 Madison Ave., New York 17, N. Y.

CLEVELAND, Ohio, hams. Sell HRO STAL, \$125.00. D. Thompson, W8YDH, 1627 East 73rd St., EX 2212, Cleveland, Ohio.

QST's wanted: December, 1915; all 1916; February, 1917. Will buy or swap for 1917 through 1948 issues. Louis Rizoli, 100 Bay View, Salem, Mass.

WANTED: BC610D or E complete cabinets or parts. Upper and lower front panels, lower skirts, back covers, side handles, hardware, exciter deck. W. Straesser, W8BLR, 15384 Birwood, Detroit 21, Mich.

PANELS, Downmetal, for Ham gear. Gilpin, Box 638R4, Mt. Clemens, Michigan.

NEW and used Collins, National, Hallicrafters, Hammarlund, RME, Millen, Sonar, Meck, other receivers, transmitters, etc. Reconditioned S38, \$35.00; S-20, \$39.00; S-53, \$59.00; S40A, \$69.00; NC57, \$69.00; HR-10-20 \$59.00; RME-69, \$79.00; BC610, \$545.00; Millen VFO, \$19.00; Sonar XE-10, \$19.00; SX-24, SX-25, S-39, SX-28, SX-28A, SX-43, SX-42, NC-173, NC-183, HRO, VHF-152A, RME-45, HT-9, Tech-Rad T350X.M. Shipped on trial. Time payments. Write for list. Henry Radio, Butler, Missouri.

FOR Sale: 400-w 'phone/Cw, PP812 final. Modulated by PPH11. 7 ft. rack, wood cabinet. Seven meters, ant tuner, relays, modulation scope, bug, XE-10 NBFM, xtal mike, 3 power supplies, all for \$200.00 cash. SX-28A with speaker, post-war model, \$175.00. F.o.b. Ray Molony, W2NCL, 2061 St. Raymond Ave., Parkchester 62, NYC.

LAPEL pins. Your ham call engraved in white on black plastic, 1 1/4 in. by 3/4 in. with white border. 35¢ each postpaid. Lange, W2IVQ, 34 Union Ave., Belleville 9, N. J.

COMPLETE ham station. Sturdily built 1-tube transmitter, receiver; consisting of: "A" set (Sender-receiver), "B" set (sender-receiver) Intercommunication (I.C.) amplifier, dynamotor, supply unit. "A", 2 Mc/s (150 M) to 8 Mc/s (37.5 M) divided two bands. "B" VHF 230 Mc/s (1.3 M) to 240 Mc/s (1.2 M). Plus 3 control boxes, Variometer, spare set of new tubes, cables, antennas, many other spare parts; 3 new dynamic microphones and receiver head-gears. Operates A.C. or battery. Separate power supply unit 110V. A.C. Instruction books. Stands magazines, books. Equipment in perfect condition. Bargain at \$100 plus shipping. Mr. B. Golder, 638 Montgomery Street, Brooklyn, N. Y. Phone: PR-8-0887.

SELL: SX-43, R-44 speaker and Bendix TA-12 transmitter. \$200.00. Bill Foley, 52 Richardson Street, Beth, Maine.

SELL: 32V-1 Collins transmitter. In excellent condition. Acquired direct from factory. Best offer over \$375.00. J. H. Johnson, 914 12th Street, Lawrenceville, Ill.

BRAND new Hallicrafters SX-43 with R-44 speaker. Original cartons. Bought one week ago. First \$160.00 check takes it. M. H. Saltz, 1681 Prospect Place, Brooklyn, N. Y.

FOR Sale: BC-312 A.C. power supply, speaker, Goodyear noise limiter, added stage of audio "hopped up" front end, S meter and 10-11 meter tunable converter. \$75.00? H. D. Faaborg, W9ADQ, 1924 Mt. Vernon Road, Cedar Rapids, Iowa.

S-40A \$85; Mark II, \$40.00. New, complete. Other Items. Eddie Howell, Gastonia, N. C.

EX-WSGNV is now KH6RU, John K. Sanders, 1427 Aalapa Drive, Lanikai, Oahu. Misplaced friends please write.

Radar Technicians WANTED For Overseas Assignments

Technical Qualifications:

1. At least 3 years' practical experience installation and maintenance.
2. Navy veterans ETM 1/c or higher.
3. Army veterans TECH/SGT or higher.

Personal Qualifications

1. Age over 22—Must pass physical examination.
2. Ability to assume responsibility.
3. Must stand thorough character investigation.
4. Willing to go overseas for 1 year.
5. No dependents permitted overseas.

Base pay, bonus, living allowance, vacation, add up to \$7,000.00 per year. Permanent connection with company possible.

Apply By Writing To

T-94 P.O. Box 3495
Philadelphia 22, Pa.

Give complete history of your experience, particularly in radar maintenance. Interview will be arranged for successful applicants.

AMATEUR

with RAILROAD EXPERIENCE!

We require a sales engineer who has a good practical working knowledge of two fields: *Radio Communications* and *Railroading*. Growing Division of large corporation, headquarters in New York, opportunity for foreign travel. Permanent position with excellent opportunities for advancement.

Write giving full information about yourself and your qualifications

BOX 125 • QST



Have Skill, Accuracy

Be a "key" man. Learn how to send and receive messages in code by telegraph and radio. Commerce needs thousands of men. Expansion of air commerce and freight after war should create an even bigger peacetime demand for operators. The famous Candler System, maker of world's champions teaches you the "knack" of sound sense and sound consciousness that

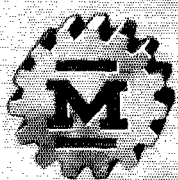
is the secret of speedy sending and receiving. Good pay, adventure. Learn at home quickly.

FREE 52-PAGE BOOK explains extra course of training. Rush name for it today. It's absolutely free.

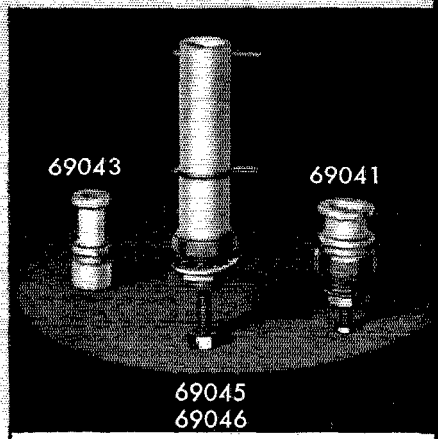
CANDLER SYSTEM CO.

Dept. 4-L, P. O. Box 928, Denver 1, Colo., U. S. A.
and at 121 Kingsway, London, W.C. 2, England

Designed for



Application



**The No. 69040 Series
of
PERMEABILITY TUNED
CERAMIC FORMS**

In addition to the popular shielded plug-in permeability tuned forms, 74000 series, the 69040 series of ceramic permeability tuned unshielded forms are available as standard stock items. Winding diameters and lengths of winding space are $1\frac{1}{2} \times \frac{7}{16}$, $\frac{1}{4} \times \frac{3}{4}$, and $\frac{1}{2} \times 1\frac{1}{8}$, for the 69041, 69043 and 69045 respectively. Nos. 69043 and 69046 have powdered iron slugs while Nos. 69041 and 69045 have copper slugs.

**JAMES MILLEN
MFG. CO., INC.**

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS



Index to Advertisers

Advance Electric & Relay Co.	112
Allied Radio Corporation	107
American Radio Institute	132
Amplifier Corp. of America	135
Arrow Electronics, Inc.	119
Astatic Corporation, The	131
Barker & Williamson, Inc.	133
Belden Manufacturing Company	75
Birnback Radio, Inc.	118
Bliley Electric Company	76
Brill Company, W. D.	136
Browning Laboratories, Inc.	80
Burlington Instrument Co.	133
Burstein-Applebee Company	126
Candler System Company	141
Capitol Radio Engineering Institute	95
Central Radio Parts Company	134
Chicago Industrial Instrument Co.	120
Cleveland Institute of Radio Electronics	100
Clippard Instrument Laboratories	138
Collins Radio Company	2
Commercial Radio Institute	130
Condenser Products Company	101
Continental Sales Company	138
Drake Manufacturing Company	92
Eitel-McCullough, Inc.	7
Electronic Marketers, Inc.	136
Electronic Navigation, Inc.	130
Electronic Wholesalers, Inc.	123
Electro-Voice, Inc.	81
General Electric Company	1, 75
General Radio Company	69
Goodheart, R. E.	116
Hallcrafters Company, The	4, 5
Hammarlund Manufacturing Co., Inc.	93
Harrison Radio Corporation	115
Harvey Radio Co., Inc.	111
Harvey-Wells Electronics, Inc.	86
Henry Radio Stores	113
Hunter Manufacturing Company	128
Hy-Lite Antennae, Inc.	131
Instructograph Company, The	114
Jensen Manufacturing Company	71
Johnson Company, E. F.	78, 90
Jones Electronics Co., M. C.	126
Kenyon Transformer Company, Inc.	135
Lambda Electronics Corporation	103
Leeds Radio Company	124, 125
Leland, Inc., G. H.	91
Love & Co., J. V.	129
McGraw-Hill Book Company	104
Maco Corporation, The	116
Mallory & Co., Inc., P. R.	82, 83
Mass Radio & Telegraph School	138
Meissner Manufacturing Company	94
Millen Mig. Co., Inc., James	142
National Company, Inc.	65, Cov. III
New York YMCA Schools	135
Newark Electric Company	97, 98, 99
Ohmite Manufacturing Co.	143
Onan & Sons, D. W.	132
P & H Sales Company	128
Peerless Radio Distributors, Inc.	106
Petersen Radio Company	67
Pioneer Broach Company	118
Port Arthur College	128
Precision Apparatus Company, Inc.	88
Premax Products Company	122
Quam Nichols Company	114
RCA Institutes, Inc.	132
Radio Corporation of America	Cov. IV
Radio Shack Corporation, The	108, 109
Radio Transceiver Labs	116
Sangamo Electric Company	85
Shure Brothers, Inc.	84
Simpson Electric Company	79
Speer Carbon Company	89
Standard Radio & Elect. Prod. Co.	102, 112, 132, 134
Steinberg's, Incorporated	110
Suburban Radio Company	96
Sun Radio of Washington	137
Sylvania Electric Products Co.	144
Terminal Radio Corporation	105
Turner Company, The	135
UHF Resonator Company	120
United Transformer Corp.	Cov. II
Valparaiso Technical Institute	132
Vesto Company	138
Vibroplex Company, Inc., The	130
Webster-Chicago Corp.	77
Wind Turbine Company	122
Workshop Associates	137
World Radio Laboratories	117

*No More
Guesswork*

with

OHMITE

Little Devil

COMPOSITION RESISTORS



You never have to guess about the resistance and wattage of any Little Devil resistor. Every unit is not only color-coded but individually marked for quick, positive identification.

Ohmite Little Devils are rugged and dependable. Millions of these tiny, molded composition resistors have been used in critical war equipment and in leading laboratories. They can be used at their full wattage ratings at 70° C (158° F) ambient temperature. They dissipate heat rapidly, have low noise level, and low voltage coefficient.

Little Devils are available in standard RMA values from 10 ohms to 22 megohms, in 1/2, 1, and 2-watt sizes. Values as low as 2.7 ohms in 1-watt size only. Tol. ±10%. Also ±5% in 1/2 and 1-watt sizes.

**Ask for them BY NAME
from your Distributor**



SEND FOR BULLETIN 135

Gives complete data and list of RMA values. Includes dimensional drawings and handy color-code. Write for it, today.

OHMITE MANUFACTURING CO.

4864 FLOURNOY STREET,

CHICAGO 44, ILL.

Be Right with **OHMITE**

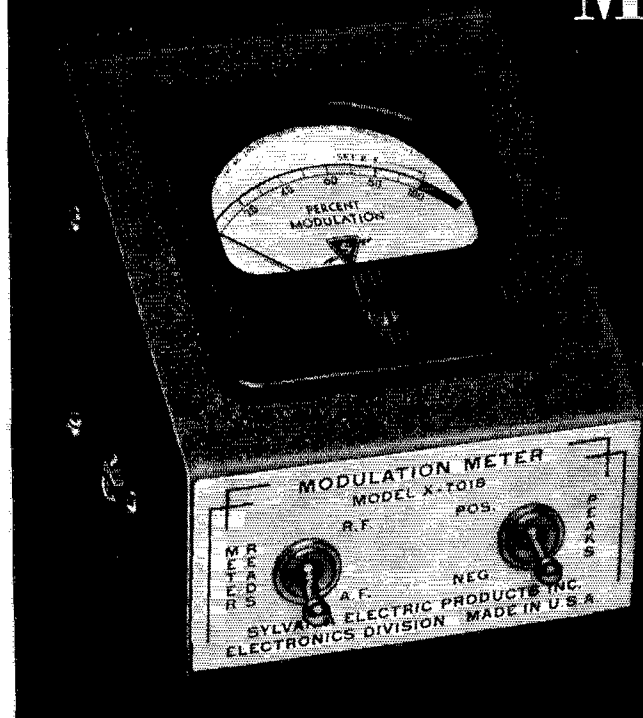
RHEOSTATS • RESISTORS • TAP SWITCHES

Sylvania's famous Modulation Meter

Type X-7018

now only

29⁵⁰



Now—because the great popularity of Sylvania's Modulation Meter Type X-7018 has led to increased production and efficiency of manufacture—you are able to obtain this special electronic development at a saving!

Compactly styled to fit the most cramped operating table, this new instrument will be of great assistance in complying with FCC regulations on

overmodulation. It will also help keep your average modulation percentage up in the effective region between 60% and 90%. Indicates carrier shift.

Take advantage of this new low price! Now you can monitor your modulation percentage and speech quality with a fine instrument currently available at low cost. See your Sylvania Distributor today!

SYLVANIA ELECTRIC

Radio Division . . . Emporium, Pa.

ELECTRONIC DEVICES; RADIO TUBES; CATHODE RAY TUBES; FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; PHOTOLAMPS; ELECTRIC LIGHT BULBS

announcing . . .
NATIONAL

TELEVISION



built by the finest craftsmen in the industry.
removes the...
be proud to own...
... now at your dealer's. See it. Also available in many
hear it, compare it. \$199.50. Dealer for \$185.00.

RCA RECEIVING TUBES

Tube Type	Max. Plate volts	Max. Screen volts	Max. Grid volts	Max. Plate Ma.	Max. Screen Ma.	Max. Grid Ma. (Note 1)	Max. Plate Dissipation (watts)	Max. Screen Dissipation (watts)	Power Output (watts) (Note 2)	Max. Freq. in Mc. (Note 3)	Grid Bias Calculator Factor (approx.) (Note 4)
RCA-6AG7	375	250	-75	30	9	5	9	1.5	7.5	30	22
RCA-6AK6	375	250	-100	15	4	3	3.5	1	4	60	9.5
RCA-6C4	300	—	-100	25	—	8	5	—	5.5	60	18
RCA-6F6	400	275	-100	50	11	5	12.5	3	14	30	7
RCA-6L6	400	300	-125	100	12	5	21	3.5	28	30	8
RCA-6N7	350	—	-100	30 (per plate)	—	5 (per grid)	5.5 (per plate)	—	14.5 (total)	30	35
RCA-6V6GT	350	250	-100	47	7	5	8	2	11	30	9

Note 1: 100,000 ohms maximum grid resistor

Note 2: Based on 70% plate efficiency

Note 3: Maximum frequency for full power output and input

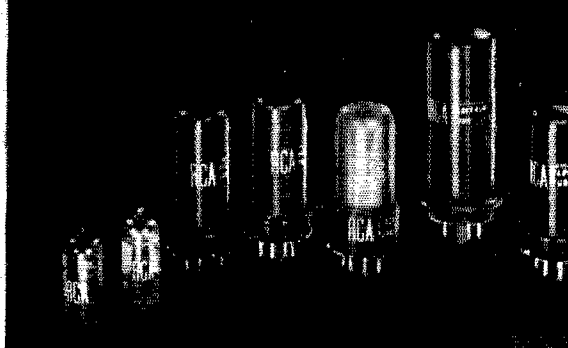
Note 4: For pentodes, this is the grid-screen amplification factor

Plenty of R-F power

inexpensively...

with RCA Receiving Tubes

• Just take advantage of the new increased high-frequency cw ratings for the seven popular RCA receiving types, listed above. These ratings are your guide to even greater receiving-tube performance and maximum life in r-f service, such as crystal oscillators, buffers, doublers . . . and low-power finals!



These seven RCA receiving tubes are tops for r-f driver applications in amateur transmitters.

For the full story on how to use the ratings in your particular application, see Ham Tips, Nov.-Dec. 1946. If you do not have a copy, ask your RCA Tube Distributor, or write RCA, Commercial Engineering, Section JM-54, Harrison, N. J.

**Absolute maximum ratings for amateur use exclusively.*

THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA

TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.

