October, 1951
40 Cents
45c in Canada

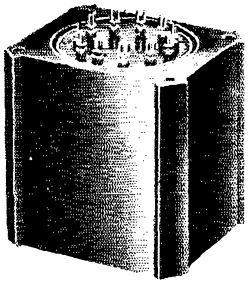
QST

devoted entirely to

amateur radio

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

Linear Standard Units...



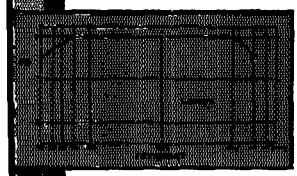
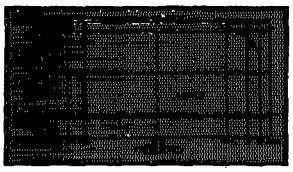
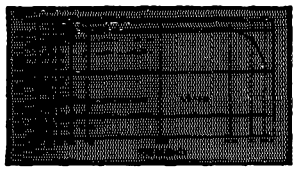
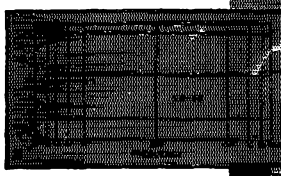
THE ULTIMATE IN QUALITY...

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	35.00
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	30.00
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	26.00
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	26.00
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	32.00
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	26.00
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	30-12,000 cycles	+20 DB	—74 DB	8 MA	26.00
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	26.00
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	28.00
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	30.00

Write for our Catalog PS-409

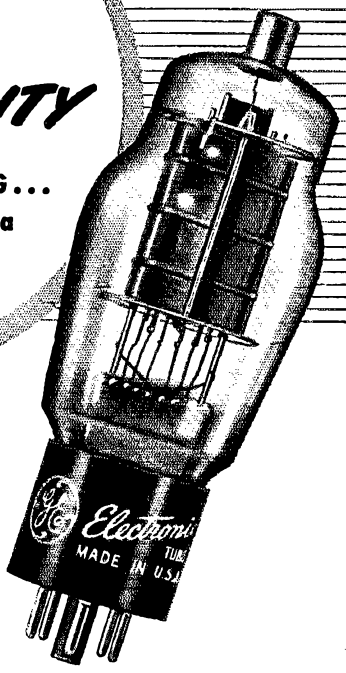
Universal Transformer Co.

150 VARICK STREET NEW YORK 13, N. Y.

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

CONTROL CENTER DEPENDABILITY

You have it in G.E.'s 6CD6-G . . . plus high perveance and a husky input!



6CD6-G Beam Power Amplifier

Heater voltage	6.3 v
Heater current	2.5 amp
Max plate voltage	700 v
Max plate current	170 ma

This staunch G-E tube will stay on the job hour after hour, giving trustworthy service while messages stream in and out. Write your own specs for a power tube for emergency use, and you've described the 6CD6-G!

Modern. You want up-to-the-minute design. Type 6CD6-G is mid-century from cap-terminal to base-pins, having been developed for current-model TV.

Ample plate dissipation. 15 w for the 6CD6-G!

High perveance. You can draw approximately 100 ma at 350 v— important in C.D. work, where you need good power with moderate voltages.

Tough. C.D. tubes may encounter sudden, high plate voltages. Ability to withstand them is essential. The 6CD6-G will handle up to 700 v uncomplainingly.

As frequency-multiplier, buffer, or final tube, the 6CD6-G does a fine job where conditions require the utmost stamina. This is a big 807-size tube that will take inputs on the order of 60 w . . . yet a standard receiving type, so economical to buy. See your G-E tube distributor today! *Electronics Department, General Electric Company, Schenectady 5, New York.*

EVER WIELD AN 85,000-VOLT PAINTBRUSH?

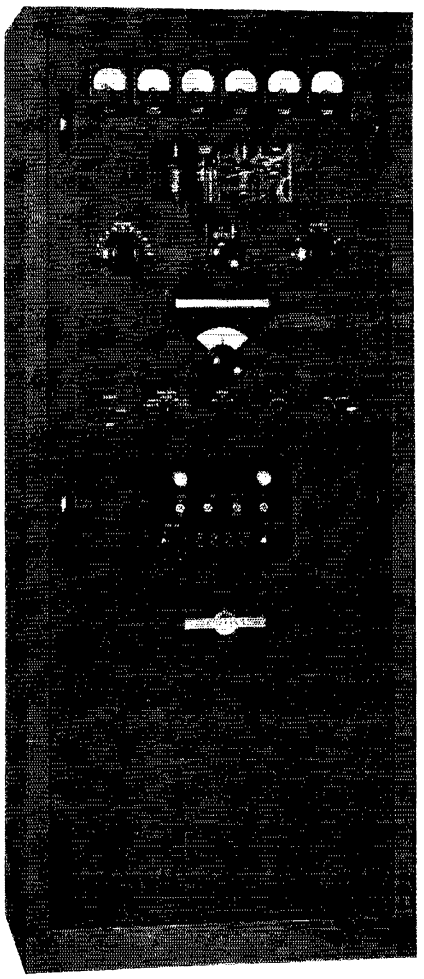
● General Electric does, on metal tubes. Paint from the spray-gun passes through a charged screen that applies a high *positive* voltage. The paint literally jumps ahead and around the tubes, to cling fast to metal of *negative* polarity. Purposes are three: (1) to coat G-E tubes evenly and smoothly, (2) to speed tube production, (3) to conserve paint, one-third of which is saved by G.E.'s electrostatic method. Savings like these are passed on directly to you in the form of G-E-tube dollar value —tops in the industry!

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

184-KA10

YOUR KW-1 IS ON ITS WAY



Shipments of this new Collins kilowatt transmitter to distributors have begun.

The performance of the KW-1 will richly reward the patience of those who have ordered it during the months since it was announced. It is as easy to operate as a Collins 32V.

Complete bandswitching of the exciter, driver and power amplifier is accomplished by a single control. Complete tuning control requires only four functions: bandswitch selection, frequency setting, PA tuning, and PA loading. Over any narrow frequency range, only frequency setting adjustment is necessary.

Using two 810 modulator tubes and two 4-250A's in the power output stage, the KW-1 provides full kilowatt input on both CW and phone. This transmitter really has authority. The speech amplifier has a peak clipper and a low level filter. In addition, a high level filter is incorporated, permitting high percentage modulation without splatter and adding greatly to intelligibility.

From the time the KW-1 was a mere gleam in the eye, its engineering has given major consideration to the amateur's TVI problem.

End to end electrically, top to bottom mechanically, here is a transmitter that will enable you to enjoy your amateur operation to the full.

QST

OCTOBER 1951

VOLUME XXXV • NUMBER 10

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut

TEL.: 3-6268 TWX: HF 88

Subscription rate in United States and Possessions, $4.00 per year, postpaid; $4.25 in the Dominion of Canada, $5.00 in all other countries. Single copies, 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 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

INDEXED BY
INDUSTRIAL ARTS INDEX

—CONTENTS—

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.

20 METERS, Type Z-3, $3.75 • 40, 80 AND 160 METERS, Type Z-2, $2.75

PR Crystals

Since 1934

USE PR AND KNOW WHERE YOU ARE

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

EXPORT SALES ONLY: Royal National Company, Inc., 75 West Street, New York 6, N. Y., U. S. A.

Section Communications Managers of the ARRL Communications Department

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

ATLANTIC DIVISION				
Eastern Pennsylvania	W3BES	Jerry Mathis	617 Crescent Ave.	Glenside
Maryland-Delaware-D.C.	W3OMN	James W. John	29 Fawcett St.	Kensington, Md.
Southern New Jersey	W2UCV	Lloyd L. Gainey	Hoffman Ave. & Marlton Pike	Merchantville
Western New York	W2PGT	Harding A. Clark	RFD 2	Manlius
Western Pennsylvania	W3KWL	Ernest J. Hlinsky	509 Beechwood Ave.	Farrell
CENTRAL DIVISION				
Illinois	W9EVJ	Lloyd E. Hopkins	27 Lynch St.	Elgin
Indiana	W9DGA,	Clifford C. McGuyer	1321 South Governor St.	Evansville 13
Wisconsin	W9RQM	Reno W. Goetsch	929 S. 7th Ave.	Wausau
DAKOTA DIVISION				
North Dakota	WØJWY	Rev. Lawrence C. Strandenaes	St. Andrew's Church	Westhope
South Dakota	WØRRN	J. W. Sikorski	1900 South Menlo Ave.	Sioux Falls
Minnesota	WØMXC	Charles M. Bove	1611 ½ E. Lake St.	Minneapolis 7
DELTA DIVISION				
Arkansas	W5DRW	Dr. John L. Stockton	P. O. Box 302	Siloam Springs
Louisiana	W5GHF	Robert E. Barr	Box 446	Springhill
Mississippi	W5JHS	Norman B. Feehan	P. O. Box 491	Gulfport
Tennessee	W1AFI	D. G. Stewart	McAlice Drive	Fountain City
GREAT LAKES DIVISION				
Kentucky	W4KKG	I. W. Lyle, jr.	R. R. 3	Jeffersontown
Michigan	W8DLZ	Norman C. MacPhail	1340 Giddings, S.E.	Grand Rapids
Ohio	W8HGW	Leslie Misch	21380 Mastick Rd.	Cleveland 26
HUDSON DIVISION				
Eastern New York	W2CLL	George W. Sleeper	76 Fuller Road	Albany 3
N. Y. C. & Long Island	W2OBU	George V. Cooke	88-31 239th St.	Bellerose 6, L. I.
Northern New Jersey	W2NKD	Thomas J. Ryan, jr.	1082 Anna St.	Elizabeth 4
MIDWEST DIVISION				
Iowa	WØPP	William G. Davis	3rd St.	Mitchellville
Kansas	WØICV	Earl N. Johnston	624 Roosevelt	Topeka
Missouri	WØGRJ	Clarence L. Arundale	1048 South Jefferson Ave.	Springfield 4
Nebraska	WØKJP	Guy R. Bailey	133 North 38 St.	Omaha 3
NEW ENGLAND DIVISION				
Connecticut	W1VB	Walter L. Glover	Glover Ave.	Newtown
Maine	W1PTL	Orestes R. Brackett	Goodrich St.	Bingham
Eastern Massachusetts	W1ALP	Frank L. Baker, jr.	91 Atlantic St.	North Quincy 71
Western Massachusetts	W1EOB	Victor W. Paounoff	26 Denton Circle	Springfield
New Hampshire	W1JNC	Norman A. Chapman	98 South St.	Concord
Rhode Island	W1CIH	Roy B. Fuller	17 Ledge Road	East Greenwich
Vermont*	W1FPS	Raymond N. Flood	2 Marlboro Ave.	Brattleboro
NORTHWESTERN DIVISION				
Alaska	KL7MZ	Josiah R. Nichols	213 Manor	Anchorage
Idaho	W7IWU	Alan K. Ross	2105 Irene St.	Boise
Montana	W7KGJ	Edward G. Brown	421 Yellowstone Ave.	Billings
Oregon	W7MQ	J. E. Roden	519 N.W. Ninth	Pendleton
Washington	W7CZY	Laurence Sebring	Route 2, Box 384	Everett
PACIFIC DIVISION				
Hawaii	KH6RU	John R. Sanders	c/o Mackay Radio & Telegraph Co. Inc., Box 2993	Honolulu
Nevada	W7BVZ	Carroll W. Short, jr.	1608 Arizona St.	Boulder City
Santa Clara Valley	W6LZL	Roy I. Couzin	7 Englewood Ave.	Los Gatos
East Bay	W6JZ	Ray H. Cornell	909 Curtis St.	Albany 6
San Francisco	W6ATO	R. F. Czelkowitz	243 Colon Ave.	San Francisco 12
Sacramento Valley*	W6CKV	Willie van de Kamp	RFD 1, Box 492A	Chico
San Joaquin Valley	W6FYM	E. Howard Hale	741 E. Main St.	Turlock
ROANOKE DIVISION				
North Carolina	W4DLX	J. C. Geasien	1832 Logie Ave.	Charlotte
South Carolina	W4AZT	Wade H. Holland	P. O. Box 116	Greenville
Virginia	W4FF	H. Edgar Lindauer	Route 1, Box 431	Annandale
West Virginia	W8JM	Donald B. Morris	303 Home St.	Fairmont
ROCKY MOUNTAIN DIVISION				
Colorado	WØIQZ	M. W. Mitchell	1959 Uinta St.	Denver 7
Utah	W7SP	Leonard F. Zimmerman	House 4	Saltair
Wyoming	W7HNI	A. D. Gaddis	P. O. Box 786	Gillette
SOUTHEASTERN DIVISION				
Alabama	W4LEN	Lewis C. Garrett	818 Maplewood Ave.	Anniston
Eastern Florida	W4FWZ	John W. Hollister	3809 Springfield Blvd.	Jacksonville
Western Florida*	W4MS	Edward J. Collins	1003 E. Blount St.	Pensacola
Georgia	W4ZD	James P. Born, jr.	25 First Ave., N.E.	Atlanta
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman, Rio Piedras, P. R.
Canal Zone	KZ5AW	Everett R. Kimmel	Box 264	Gamboa, C. Z.
SOUTHWESTERN DIVISION				
Los Angeles	W6ESR	Samuel A. Greenlee	1701 Sepulveda Blvd.	Manhattan Beach
Arizona	W7MID	Jim Kennedy	4511 N. 8th St.	Phoenix
San Diego	W6YYM	Mrs. Ellen White	3677 Wightman St.	San Diego
WEST GULF DIVISION				
Northern Texas	W5BKH	William A. Green	1834 University Blvd.	Abilene
Oklahoma	W5AHT/AST	Frank E. Fisher	104 East 11th St.	Pawhuska
Southern Texas	W5FJF	Dr. Charles Fermaglich	618 Medical Arts Bldg.	Houston 2
New Mexico*	W5BIW	Richard J. Matthias	P. O. Box 548	State College
MARITIME DIVISION				
Maritime (Nfld. & Labr. att.)	VE1DQ	A. M. Crowell	69 Dublin St.	Halifax, N. S.
ONTARIO DIVISION				
Ontario	VE3IA	G. Eric Farquhar	16 Emerald Crescent	Burlington, Ont.
QUEBEC DIVISION				
Quebec	VE2GL	Gordon A. Lynn	R.R. No. 1	Ste. Genevieve de Pierrefonds, P. Q.
VANALTA DIVISION				
Alberta	VE6MJ	Sydney T. Jones	P. O. Box 373	Edmonton, Alta.
British Columbia	VE7US	Wilf Moorhouse	324 Regina Ave.	Lulu Island
Yukon				
PRAIRIE DIVISION				
Manitoba	VE4AM	A. W. Morley	26 Lennox Ave.	St. Vital
Saskatchewan	VE5HR	Harold R. Horn	1044 King St.	Saskatoon

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

NEW low-cost FM EMERGENCY RECEIVER!

hallicrafters

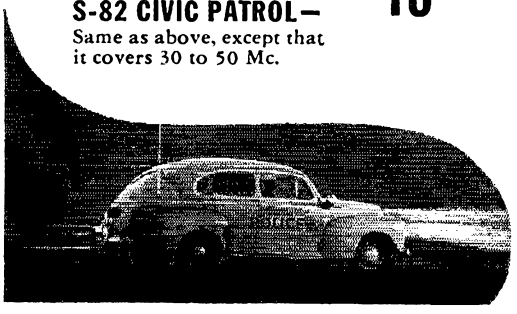
CIVIC PATROL

From Hallicrafters . . . the new set you've wanted—and need to keep you "in the know" on vital emergency messages. Reliable, low-cost—yet with all the *precision* engineering you'd expect in any Hallicrafters. And of immediate importance, the Civic Patrol is the ideal receiver for Civilian Defense communications!

S-81 CIVIC PATROL—
Covers VHF FM 152—174 Mc. 6 Tubes plus Rect.; built-in PM speaker, AC-DC.

$49.50

S-82 CIVIC PATROL—
Same as above, except that it covers 30 to 50 Mc.



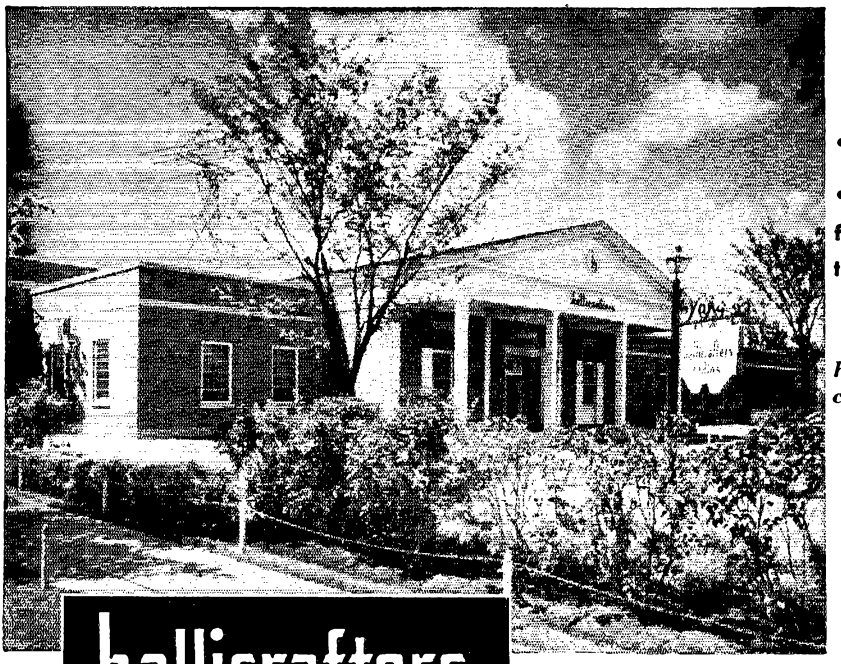
OTHER NEW MODELS

S-78A. Improved FM-AM Chassis, radiation-proofed to pass FCC standards—$89.50

S-80 DEFENDER. Broadcast-short wave, super-sensitive battery radio for emergency use or remote areas—$44.50

hallicrafters
"The Radio Most Radio"

WORLD'S LEADING MANUFACTURER OF *PRECISION* RADIO AND TELEVISION • CHICAGO 24, ILL.



hallicrafters
"The Radio Man's Radio"

Hallicrafters Block Long Main Plant—Chicago, Ill.

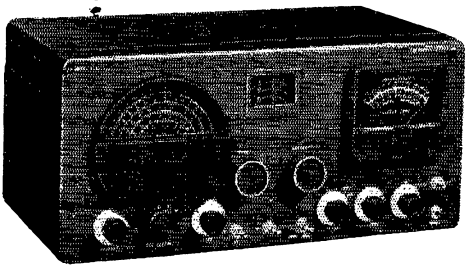
Precision Radio

famous throughout the world . . .

Hallicrafters precision instruments have been sold in 89 countries, used by 33 governments. They are remembered by veterans, prized by experts, and preferred by radio amateurs throughout the world who want a radio that is all radio.

The BIGGEST *"Ham Shack"* in the World...

From the block-long building above comes more Ham equipment than any place else in the world. Its elegant Georgian design gracefully conceals the modern precision laboratories and humming production lines within.



New **S-76 $169.50**
DUAL CONVERSION RECEIVER
WITH 50-KC 2ND I-F

A precision receiver
for every purpose
from $14.50 to $289.50.

You've read about it, you've heard about it, now here it is—with the most wanted features, at the lowest possible price.

DUAL CONVERSION (1650 kc and 50 kc)—more usable selectivity than the best crystal.

GIANT 4-in. "S" METER—calibrated in microvolts and "S" units.

MAXIMUM SENSITIVITY 2 microvolts average sensitivity with ½ volt output. One r-f, two i-f and two conversion stages.

PENCIL-THIN SELECTIVITY—500 cycle "nose" selectivity (6 db down) and 3 kc "skirt" selectivity with control of sharpest of five positions.

WORLD-WIDE COVERAGE 538-1580 kc and 1720 kc to 32 mc in 4 bands. Calibrated electrical bandspread tuning. 9 tubes plus voltage regulator and rectifier.

the hallicrafters co.

WORLD'S LEADING MANUFACTURER OF PRECISION RADIO & TELEVISION • CHICAGO 24, ILLINOIS

Announcing

Because of a deep-rooted interest in Amateur Radio, and because Hallicrafters makes more short-wave receivers than all other U.S. manufacturers combined, we are offering a Merit Award to Novice-Class Amateurs who make outstanding progress during the coming year.

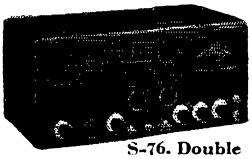
Award Given to Everyone Who Qualifies

Hallicrafters Merit Award will be given to every Novice who, during the period beginning 12:01 A.M. September 8, 1951, and ending 12:00 P.M., September 7, 1952, local time, works all states and has obtained by September 7, 1952, a General or Conditional Class Amateur License. Both Novice-Class and "regular" QSOs can be used to make up the total of 48 contacts.

Rules governing contacts and verifications thereof are the same as for ARRL W. A. S. Certificates (see p. 6, "Operating an Amateur Station"). Your package of verifications must be postmarked not later October 7, 1952.

First Ten Win S-76 Receivers, All Others $25 Cash

The first ten Novices who complete the above will receive, absolutely FREE, a Hallicrafters S-76 Receiver. All of the other Novices who complete the above will receive $25 in cash, each. Remember this is not a contest in which only *some* contestants win; *everyone* who completes the course will win either an S-76 receiver or $25 in cash. No entry blank is required, but we will be glad to have you drop us a line (Attention: WN90EP, Bill Halligan, Jr.) telling us you're going to try for the Award. Best of luck with your QSOs.



S-76. Double Conv., 50 kc 2nd i-f. 9 tubes, Rect., Reg. $169.50

hallicrafters

"The Radio Man's Radio"

WORLD'S LEADING MANUFACTURER OF PRECISION RADIO & TELEVISION • CHICAGO 24, ILLINOIS

THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

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

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

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

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

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

Past Presidents

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

• • • • •

Officers

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

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

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

Secretary . . . . . A. L. BUDLONG, W1BUD
38 LaSalle Road, West Hartford, Connecticut

Treasurer . . . . . DAVID H. HOUGHTON
38 LaSalle Road, West Hartford, Connecticut

• • • • •

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

Assistant Secretaries . . . . . JOHN HUNTOON, W1LVQ
RICHARD L. BALDWIN, W1IKE HARRY PASTON, W1DJV
38 LaSalle Road, West Hartford, Connecticut

DIRECTORS

Canadian General Manager
ALEX REID VE2BE
240 Logan Ave., St. Lambert, P. Q.
Vice-Director: William W. Butchart VE6LQ
10740 107 St., Edmonton, Alta.

Atlantic Division
WALTER BRADLEY MARTIN W3QV
1033 Arbuta Rd., Abington, Pa.
Vice-Director: Henry W. Wickenhiser, jr. . W3KWA
1112 State Ave., Cornopolis, Pa.

Central Division
WESLEY E. MARRINER W9AND
844 N. Galena Ave., Dixon 7, Ill.
Vice-Director: Charles F. Reberg W9MVZ
3900 W. 10th Ave., Gary, Ind.

Dakota Division
GOODWIN L. DOSLAND . . . . . WØTSN
Moorhead, Minn.
Vice-Director: Alfred M. Gowan . . . . . WØPHR
325 S. Menlo Ave., Sioux Falls, S. D.

Delta Division
VICTOR CANFIELD W5BSR
P. O. Box 965, Lake Charles, La.
Vice-Director: George S. Acton W5BMM
Plain Dealing, La.

Great Lakes Division
JOHN H. BRABB W8SPF
417 Ford Bldg., Detroit 26, Mich.
Vice-Director: Harold E. Stricker W8WZ
247 W. 5th St., Marysville, Ohio

Hudson Division
JOSEPH M. JOHNSTON W2SOX
423 Monmouth Ave., Bradley Beach, N. J.
Vice-Director: George V. Cooke, jr. W2OBU
88-31 239th St., Bellerose 6, L. I., N. Y.

Midwest Division
LEONARD COLLETT . . . . . WØDEA
Box 88, c/o C.A.A., Agana, Guam, M. I.
Address correspondence to the Acting Director:
ALVIN G. KEYES . . . . . WØKTQ
1201 Merchants Nat'l Bank Bldg., Cedar Rapids, Ia.

New England Division
PERCY C. NOBLE W1BVR
37 Broad St., Westfield, Mass.
Vice-Director: Frank L. Baker, jr. W1ALP
91 Atlantic St., North Quincy 71, Mass.

Northwestern Division
R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont.
Vice-Director: Karl W. Weingarten W7BG
3219 N. 24th St., Tacoma 7, Wash.

Pacific Division
KENNETH E. HUGHES W6CIS
810 W. Orange Ave., So. San Francisco, Calif.
Vice-Director: C. Porter Evans W6BF
134 Dracena Ave., Piedmont 11, Calif.

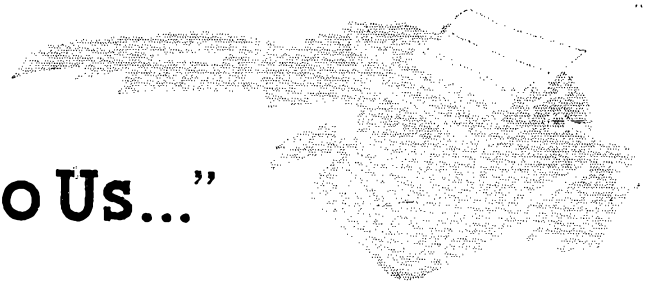
Roanoke Division
WILLIAM H. JACOBS W4CVQ
Route 6, Raleigh, N. C.
Vice-Director: Gus M. Browning W4BPD
135 Broughton St., S. E., Orangeburg, S. C.

Rocky Mountain Division
FRANKLIN K. MATEJKA . . . . . WØDD
P. O. Box 212, Estes Park, Colo.
Vice-Director: Ramon S. Walker . . . . . WØOWP
P. O. Box X, Brush, Colo.

Southeastern Division
LAMAR HILL W4BOI
104 Myrtle, Cochran, Ga.
Vice-Director: William P. Sides W4AUP
Fleming Road, Montgomery, Ala.

Southwestern Division
JOHN R. GRIGGS W6KW
10412 Don Pico Rd., RFD 2, Spring Valley, Calif.
Vice-Director: Walter R. Joos W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division
A. DAVID MIDDELTON W5CA
9 Kay Road, Tijeras, N. M.
Vice-Director: Frank E. Fisher W5AHT/AST
104 E. 11th, Pawhuska, Okla.



"It Seems to Us..."

AMATEUR MASTS — AND LEAGUE MEMBERSHIP

For nearly three years now the League and its General Counsel have been waging a fight in the courts of the land dealing with a question involving the very existence of practical amateur radio. The question: Is an amateur radio operator to be permitted the right to erect an antenna pole or tower on his own property?

Sounds odd, doesn't it? What we've all been doing in our residences these many years is suddenly challenged — threatened by zoning-ordinance provisions in numerous municipalities, on the grounds that any activity requiring the erection of a pole or tower in one's yard high above the rest of the landscape has no place in a residential area. The angles were many: that such towers are eyesores, that they depreciate surrounding property values, that they ought to be in industrial zones — yes, even that they cause TVI! But the effect would be the same — to restrict amateur operation by prohibiting the erection of masts and towers in residential areas.

This became a serious matter. Should the courts agree with the municipalities, it would for all practical purposes be the death knell of amateur radio as we know it. Watching the further development of the fashionable zoning-ordinance craze on the part of municipalities, accelerated since the war, the League decided the problem must be settled — and settled right.

A clear-cut case was necessary. The issue must be plain, and not over-involved with local politics, neighborhood TVI wars, and the like. The League examined incidents in Missouri, in Illinois, on Long Island, in Texas, in New York, and in other states. Although suggestions and advice were given in all cases, few seemed suitable as court tests of the issue. In several cases plans for court action were begun, but the issue disappeared when the municipality backed down, or when the amateur decided he didn't want to be the guinea pig. Court action was begun in the Wright case in New Jersey and the Lord case in Pennsylvania. Fortunately, both stuck. For the past two years, from the lower courts up through the appellate bodies and right to the Supreme Courts of both states, the League and the office of its General Counsel have carried the fight for the rights of amateurs to have reasonable antenna masts and towers on their property as normal residential uses. The Supreme Court of New Jersey ruled in favor of amateur radio, as reported in June *QST*. The Supreme Court of Pennsylvania has now similarly ruled, as reported elsewhere in this issue.

These weren't cases of the League supplying individual legal protection in the courts for a couple of its members. It was, as in international radio conferences, the principle of defending the position of all amateurs.

These two court cases have cost the League — meaning *you* — an amount of money approaching five figures. For example, the mere printing — not the research nor writing nor editing, mind you, but the mere printing — of *one* extensive brief in *one* stage of the courts in *one* case ran several hundreds of dollars. Newspaper reports said it was 90,000 amateurs banding together to fight the battle for one of their number in the common interest. We wish those figures were true. More accurately, it was a case of the 30,000 and more organization-minded amateurs who are members of the American Radio Relay League who banded together to carry on the fight. For the money to finance the cases came out of the League treasury — you might say, out of League membership dues.

This intangible but vitally real benefit of membership in ARRL is, unfortunately, not something you can read like *QST*, or something you can put in your rig like a new transformer or meter. It isn't as tangible even as the code practice or information bulletins you get from W1AW. But it represents a very real part of your investment in amateur radio by membership in the League.

TVI SURVEY

On page 36 of August *QST* we solicited information from members concerning their experience with TVI. What we wanted was info on the steps that you fellows had taken to alleviate your TVI, comments on the troubles common to individual makes of TV receivers, and other dope that might be useful not just to the Headquarters but to the membership at large. We had visions of receiving a great number of letters from all over the country, containing information that we could work

into a masterful summary. It would be the old story of brothers-in-arms joining together to fight a common foe, giving each other mutual support and assistance.

What happened?

One lone ham has written in response to that August request, giving complete information on how he tackled TVI and what all the factors were. Yep, just one single, solitary letter.

Well, fellows, maybe we had the wrong dope. Maybe there *isn't* any TVI problem.

Maybe.

A.R.R.L. CENTRAL DIVISION CONVENTION

French Lick, Indiana, October 20th–21st

The ARRL Central Division Convention, sponsored by the Indiana Radio Club Council, will be held at the French Lick Springs Hotel, French Lick, Ind., on Oct. 20th and 21st.

A well-rounded program of technical talks, exhibits, contests and prizes will be offered to attending amateurs, with a banquet and dancing to be held on Saturday night. Special attention has been given to the entertainment of the ladies present, including a style show, a "luncheon at French Lick" program, and a tour of the formal gardens at the hotel. There will be special meetings for mobileers, ECs, v.h.f. men, MARS, s.s.b., and many others. Among the speakers will be George Floyd, W2RYT, of General Electric, and A. L. Budlong, W1BUD, ARRL secretary.

French Lick Springs Hotel is known as one of the finest "watering spots" in the Midwest, and offers its guests a variety of sports and entertainment, not to mention an excellent cuisine. The hotel has 600 rooms, and is situated on 2000 acres of wooded and landscaped grounds in the heart of the beautiful Brown County area of southern Indiana. Hotel rates are moderate and on the American plan.

Advance registrations are $4.00 per person, and may be secured from P. O. Box 7506, Indianapolis, Ind. A postcard to that same box will bring full information on hotel rates and reservations, which may be made directly with the hotel.

Silent Keys

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

W1BEF, Everett E. Taylor, Springfield, Mass.
W2QXP, John A. Schroeder, Haddonfield, N. J.
ex-W3GHK, James E. Gantz, Cleona, Penna.
ex-W3ZO, Charles E. Frazier, Washington, D. C.
W4GWS, R. R. Milligan, Jackson, Tenn.
W6ZZH, Glen S. Pidge, Fullerton, Calif.
KL7ST/7, ex-W8TDP, Robert C. Ewing, ATC, USN, Oak Harbor, Wash.
KZ5LH, Lee R. Holt, Balboa
VE4ND, N. J. K. Dinnen, Winnipeg

18th ARRL Sweepstakes — Nov. 17th–18th and 24th–25th

How many ARRL sections and how many stations in those sections can you work in two week ends? If you are located anywhere in the League's field-organization territory (see page 6), you are cordially invited to take part in this popular annual operating activity. Any amateur bands, 'phone or c.w., may be used. The total operating time allowed each contestant is 40 hours. The Sweepstakes comprises seventy-two c.w. and seventy-two 'phone contests! 'Phone entries are compared only with other 'phone entries — c.w. scores only with other c.w. scores — in your particular section, in the competition for awards. The week-end periods starting Saturday afternoon (1500 PST or 1800 EST) on the 17th and 24th of November mark the open season for SS contacts. "CQ SS" or "Calling any Sweepstakes station" will be the calls indicating your wish to pile up a score!

A complete announcement of the contest, including the rules governing participation, will appear in November *QST*. The rules will be the same as those of the 1950 SS. Amateurs in remote ARRL sections who do not receive the November issue before the Sweepstakes may refer to November, 1950, *QST* for contest details.

Contest reporting forms will be sent to all amateurs who request them by mail or radiogram. It is not necessary to make advance entry or to use these forms, if the report form prescribed in November 1950 or in the next issue of *QST* is followed.

CU in the '51 SS!

OUR COVER

Whether you're a Novice looking ahead to your General Class ticket and the fun of operating forty and twenty, or an old timer searching for an easy-to-build rig incorporating TVI shielding and filtering, you'll find this 3-band 75-watt rig by W1TS worth considering. It's described on page 18.

A won't use a crystal filter in his receiver because "it cuts down the gain." B says it doesn't necessarily cut down the gain, but A argues that the noise is greatly reduced when the crystal is turned on in the receiver. Who is right?

(Please turn to page 128 for the answer)

ARRL Wins Pennsylvania Antenna Mast Case

Another Supreme Court Affirms Amateur Towers as Accessory Use of Residential Property

In *QST* for June [1] the League reported that the Supreme Court of New Jersey — one of the nation's outstanding judicial forums — had in its decision in *Wright v. Vogt* [2] upheld the League's contention that amateur radio operation constitutes an accessory use of residential property.

The League is now pleased to report that the Supreme Court of Pennsylvania has similarly ruled in the case of *In the Matter of the Appeal of Lord,* [3] which the League had litigated since 1948 on behalf of George D. Lord, W3MKK, of Munhall, Pennsylvania.

Lord had been denied a building permit for a 32-foot steel tower which he had erected in his back yard for the purpose of supporting a ten-meter rotary beam. The local authorities denied Lord a permit on the ground that his amateur radio tower was not an "accessory use" of residential property and was therefore unlawful under the zoning ordinance.

When Lord called upon the League for assistance the League did not hesitate. Amateur radio itself had been challenged! If a municipality could declare that amateur radio operation was not an accessory use of residential property then most amateurs would be hard put to find a location from which to operate.

At the time the Lord case arose there was only one court decision ruling upon the question of amateur radio as an accessory use of residential property.[4] Unfortunately that decision was by a divided court and thus did not provide a completely satisfactory precedent for a principle so vital to amateur radio.

So, armed only with the decision of the divided Minnesota court and a firm conviction that amateur radio was on the side of truth and justice, the League litigated the case through the entire judicial system of the Commonwealth of Pennsylvania. The trial court was well disposed toward the League's point of view; the first appellate body went off on a tangent, didn't deal with the question raised and reversed the trial court on procedural grounds; but then the Supreme Court, the court of last resort, not only agreed with our argument that operating an amateur radio station was a residential type of activity but spoke highly of the achievements of amateur radio in so ruling.

Court Praises Amateur Radio

Justice Bell, in delivering the opinion of the Court, wrote: "The importance of amateur radio in furthering science, in discovering the whereabouts of persons lost on land or sea, in furnishing and eliciting information of great value to our country, and in spreading goodwill throughout the world can hardly be exaggerated. . . ."

In view of the decisions of the highest courts of Minnesota, New Jersey and Pennsylvania upholding the view that amateur radio is indeed an accessory use customarily incidental to residential property we should be able to assume that it is the settled law throughout the land.

However, it must be pointed out that these decisions are binding only upon the courts and officials of the respective states. Obviously the League cannot litigate this question of accessory use in each of the 48 states and it should not need do so. In view of the stature of the courts which have ruled upon the question, the courts and local officials in other states should follow these precedents.

This does not mean that hereafter amateurs will have no problems with their local building inspector for there always will be officials who will either be unaware of or unwilling to heed the studied opinions of these three courts.

The amateur who is faced with the zoning problem of accessory use should be able, in most instances, to convince the local authorities that the operation of his amateur station is a residential use by referring them to the three decisions (reference to legal cases is by citation, i.e.: Wright v. Vogt, 7NJ1) for their information and guidance.

The Pittsburgh Press

PAGE 25 SUNDAY, AUGUST 12, 1951 SECTION 2

Monument to Man Who'll Take Just So Much Bossing

Sacred Right to Enjoy Land Upheld In 32-Ft. Backyard Radio Tower Battle

State's Highest Court Takes 10 Pages to Back Munhall Resident With Bedrock Words of Freedom

George D. Lord, a Munhall radio "ham," has proven, after three years in the courts, that a free American will take just so much bossing.

There stands triumphantly in his back yard at 125 [illegible] St., a 32-foot tall antenna beaming messages to radio amateurs all over the world.

To neighbors who can see its erect and gleaming height and for those in distant places—some behind the Iron Curtain—who receive its signal, it is a kind of monument to an American standing on his rights.

The Supreme Court of Pennsylvania has just said it's okay for Mr. Lord to have that aluminum tower in his yard. In doing so the high court emphasized "the sacred, absolute, inviolable right" of a man to enjoy his land. Mr. Lord is enjoying it.

The story of Mr. Lord and his big aerial goes back to 1948. [illegible]

250-Watt Transmitter

[illegible]

In Mr. Lord's name the American Radio Relay League took an appeal to the Supreme Court of Pennsylvania, whose ruling became public last week.

Court Takes 10 Pages to Say It

[illegible]

It had kind words to say for the field of amateur radio:

"The importance of amateur radio in furthering science, in discovering the whereabouts of persons lost on land or sea, in furnishing and eliciting information of great value to our country, and in spreading good-[illegible]

[1] *QST*, June, 1951, p. 39.

[2] Wright v. Vogt 7NJ1, 80A.2d 108, April, 1951.

[3] In the Matter of the Appeal of Lord, 368 Pa. 121, June, 1951.

[4] Village of St. Louis Park v. Casey, 218 Minn. 394, 16 N.W. (2d) 459.

While it is impossible to advise the amateur upon every zoning problem that may arise we can set forth the basic principles and arguments that have been developed through litigation in the past few years.

Zoning Ordinances

Zoning ordinances are modern things. Yet nearly every municipality in the land has some articulated scheme of organizing the community into sections according to the use of the property lying therein. There are rules for the residential section and there are rules for the commercial section. Generally, zoning ordinances concern amateur radio operation only as an activity carried on in a residential section.

Typically, a zoning ordinance provides that within certain specified geographical limits only one-family dwellings or structures that are accessory and customarily incidental to a residence are permitted. This may mean a garage, a dog house, a flag pole, a bird bath or an amateur radio tower. (Indeed, it required a bit of litigation to establish this last classification!) But so long as the use does not change the residential character of the property it must be considered accessory to the main use.

Since amateur radio as a matter of law and fact is carried on solely for personal reasons and without pecuniary interest the residential character of a property is not changed merely because of the presence of an amateur radio station.

Notwithstanding the fact that the courts have misconstrued the phrase "customarily incidental" so as to mean "customary" the League has successfully argued that since there are some 90,000 amateurs in this country and 120,000 in the world, most of whom operate their stations at their residences, amateur radio operation is not unique but indeed a customary activity indulged in by a great number of individuals throughout the world.

Usually, a zoning ordinance places a restriction upon the height of buildings and structures, including accessory buildings. Such restrictions are generally valid. However, if the restriction does not bear a reasonable relation to the public health, safety, morals or welfare the restriction is invalid. There is no reported decision where an ordinance was declared invalid because it unreasonably restricted the height of an amateur tower.

In the New Jersey tower case the court held that the 35-foot height restriction upon buildings imposed by the zoning ordinance didn't apply to the W2UWK 60-foot tower because the ordinance provided that church steeples, chimneys and flag poles were excepted from the height restriction. The Court in a learned discussion of statutory construction concluded that it would be utterly unreasonable to say that a structure such as a radio tower, which is of like kind to church steeples, chimneys and flag poles, would not be within the exception because not within the letter. Many zoning ordinances in effect throughout the country specifically exempt radio towers from height restrictions.

Interference Problems

The amateur zoning problem often is precipitated by a complaint of an irate citizen to the local authorities that his radio or television set is being interfered with by an amateur. Sometimes hastily, due to the irate citizen's standing in the community, the local authorities dust off the law books and they usually end up with a zoning ordinance. This is then thrown at the amateur. Mistake number one is their picking on an individual with the indomitable spirit of an amateur. Mistake number two is their attempt to justify the imposition of a provision of a zoning ordinance on the ground that the operation of the amateur station causes electrical interference to radio and television reception.

As all amateurs know, the federal government, through the Federal Communications Commission, regulates amateur radio. This regulation is based upon the federal government's constitutional power to regulate interstate commerce — and all of amateur radio is in interstate commerce. It is elemental in the law that where the Congress has, within the limit of its constitutional power, entered a field of regulation, the federal government is said to have preempted that field to the exclusion of the state governments.

The Congress did just that as long ago as 1912. More recently the Congress in enacting the Communications Act of 1934 created the Federal Communications Commission and granted to it exclusive jurisdiction over radio communications.

Clearly then, any attempt by a municipality to deal with the problem of amateur interference to other radio services would constitute an unlawful invasion into a field of regulation fully occupied by the federal government.

Lest the indomitable spirit of the amateur carry him away he should be warned that amateur radio is not entirely exempt from the operation of local laws. A municipality may legally require an amateur to obtain a building permit before erecting a tower. That procedure is an administrative device necessary to maintain control over building in the community and, in itself, does not represent unlawful regulation of amateur radio.

HAMFEST CALENDAR

SOUTH DAKOTA — Saturday and Sunday, October 6th and 7th, at Sioux Falls — South Dakota hamfest. Registration fee of $4.00 includes banquet. Advance registrations should be sent to W9PHR, 325 South Menlo Ave., Sioux Falls, S. D., before October 2nd.

TENNESSEE — Saturday and Sunday, November 3rd and 4th, at Kingsport — hamfest sponsored by the Kingsport Amateur Radio Club. A bang-up program has been arranged. Further particulars available from the Kingsport Amateur Radio Club, Inc., Kingsport, Tenn.

VIRGINIA — Saturday night and all day Sunday, October 27th and 28th, at the Hotel Jefferson, Richmond — annual hamfest of the Richmond Amateur Radio Club. Technical talks and demonstrations will be featured. The only charge will be for the dinner on Sunday, cost approximately $3.50 per person. Advance dinner reservations should be made to P.O. Box 1985, Richmond 16, Va. Room reservations should be made direct to the Hotel Jefferson.

A Civil Defense Club Project

Tri-County Radio Association Program Provides Emergency Stations and Promotes V.H.F. Activity in Northern New Jersey

BY M. P. REHM,* W2HNY

. This is the story of a club project that not only provided much-needed emergency gear, but also served to increase membership, meeting attendance, v.h.f. activity, and interest in emergency work. It is hoped that it will help inspire other groups to go to work along similar lines, without waiting for financial assistance from local government sources.

THE Tri-County Radio Association, as its name implies, covers three adjoining counties and some fifteen towns in the Plainfield, N. J., area. Several of our members had been approached by officials of our respective towns regarding emergency communication, at a time when plans for this sort of work were rather nebulous. After discussion at meetings it was decided that we needed new equipment in considerable numbers, not only for emergency work, but to get more of group working together and active on the air.

For over two years the club had maintained a station in the Plainfield Red Cross Headquarters, with gear on 80, 75, 10 and 2 meters. Crystals had been supplied for club frequencies on 10 and 2, and informal weekly schedules were kept, but not much activity resulted. Obviously, a coördinated effort was needed, so organized that everyone would take active part.

Getting Started

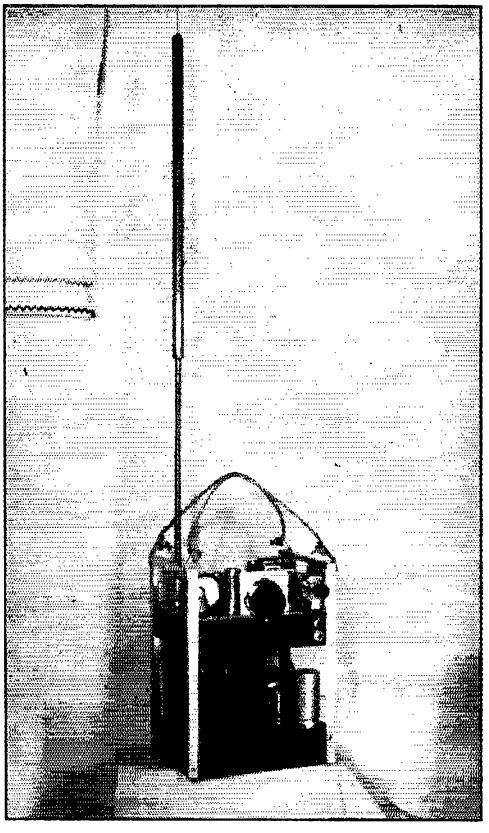
In preliminary discussions in December, 1950, a definite plan of action was mapped and set in motion. Under the leadership of W2AZL, our emergency communications group became a design and engineering committee and board of strategy. Its first decision was to concentrate on 144 Mc., in view of what happened in World War II, when all lower frequencies were washed out. Next, the types of power supplies were discussed, resulting in a decision to adapt the equipment to use with 100-ma. generator or vibrator supplies of 200- to 275-volt rating, or small a.c. supplies for home use.

Receiver suggestions ran the gamut from rush-box to full superhet, with squelch and noise limiter, but we finally settled for a superregen-superhet. This type of receiver would be somewhat broad on strong signals, but its advantages of simplicity and low cost more than outweighed this. Several possible tube complements were set up, as in Fig. 1.

For transmitting use special circuits, high-frequency crystals, and fancy modulators were discussed but rejected, for reasons of simplicity, low cost and battery economy. Crystals around 8 Mc. were still plentiful, so the decision was for a straight circuit with triode multipliers and a single-tube modulator.

Parts and Finances

Club members had been told something of the plans, and by January they were clamoring for details. The committee presented block diagrams of the equipment and everyone was asked to make spare tubes and parts available, in order that the rigs might be built for as little as possible. A Parts Committee, consisting of W2JIB and W2QPM, was set up to gather parts from members and to procure other needed parts, dispense



This is W2HNY/2, a 2-meter station in portable form, complete with storage battery, power supply and antenna system.

* President, TCRA. R.D. 2, Box 3, Plainfield, N. J.

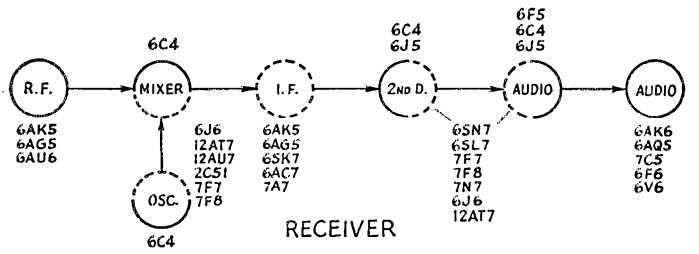
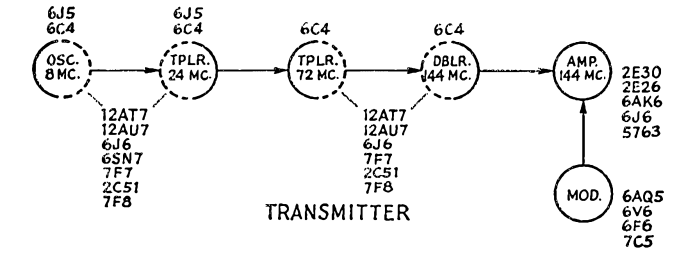


Fig. 1 — Block diagrams of the TCRA civil defense rigs.

By adhering to straightforward circuits it was possible to adapt the transmitter and receiver designs to a wide variety of tubes. With dual-purpose types the receiver requires five tubes and the transmitter four. The i.f. amplifier stage can be omitted for maximum receiver simplicity.



same, and collect funds. Members were asked to pay down five to ten dollars in advance, and extra funds were borrowed from the club treasury, so that parts could be bought in large quantities. It was decided to shoot for 20 complete units, but we felt that once the project got rolling more members would jump on the 2-meter bandwagon, so many parts were bought in larger numbers.

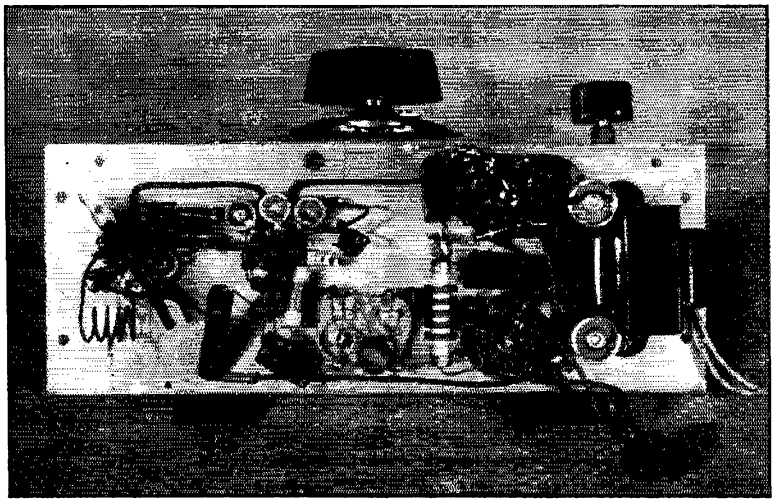
The First Working Models

With a good idea of the parts available, the design committee took over to work out a simple mechanical layout. W2AZL suggested use of a sheet-aluminum plate to hold parts, with a standard chassis upside down as a bottom cover. Separate plates would be used for the transmitter and receiver but they would be mounted in a single unit. We talked of a production line to get the units built quickly, but this was voted down in favor of having each member be responsible for his own equipment, to be made from the parts pool.

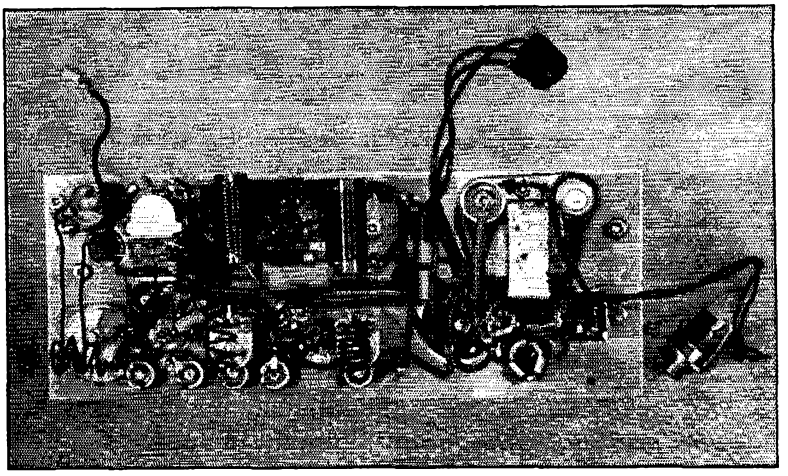
During this period, W2AZL had been working on a transmitter model, and the writer, with the help of W2YMP, was working on receiver circuits. The committee stressed the completion of the receiver first, as we reasoned that when a receiver was completed and signals heard, the incentive to finish the rest of the station would be greater. Just as the models were nearing completion, FCC announced the civil defense frequencies for the various bands. By making minor changes in the designs we could have gone on 10 or 6, but a quick huddle of the committee decided that since we were already well under way we would stay on 2. Even so, the frequency announcement, giving assurance that hams would have a specific place in civil defense operations, further spurred our project.

Production

As the receivers began to come along, several members with grid-dippers and other test equipment were put to work as "service stations" to line up the r.f. and i.f. portions. Each constructor had to have his audio and second detector working before approaching one of these for a line-up



Bottom view of the TCRA 144-Mc. receiver.



Bottom view of the 2-meter transmitter.

job. Now that receivers were being completed, the transmitter model was finished and tested on the air. Parts for the transmitter were issued and in a short time we had several of them ready for tune-up. It was amazing to see how quickly the fellows put rigs together and got them working. Being handed a chassis and some parts seemed just the right challenge.

W2QJR drew up complete schematics, and these were supplied to each constructor, with photographs of the models, complete parts lists and wiring and assembly suggestions. To keep up with those who were completing rigs, and to stimulate interest among the others, we scheduled a talk on 2-meter antennas by W2NLY. Jim gave us all the answers, and showed models of various mobile types. Our parts committee came up with some surplus vibrators and transformers, and a sample power supply was built. Some of us already had mobile power supplies that were usable, and many had the necessary a.c. supplies. We strongly urged members to put power supply, transmitter and receiver into one package, as seen in the photograph, for quick installation in the car. The project will not be considered complete until all the rigs are fully equipped for mobile operation.

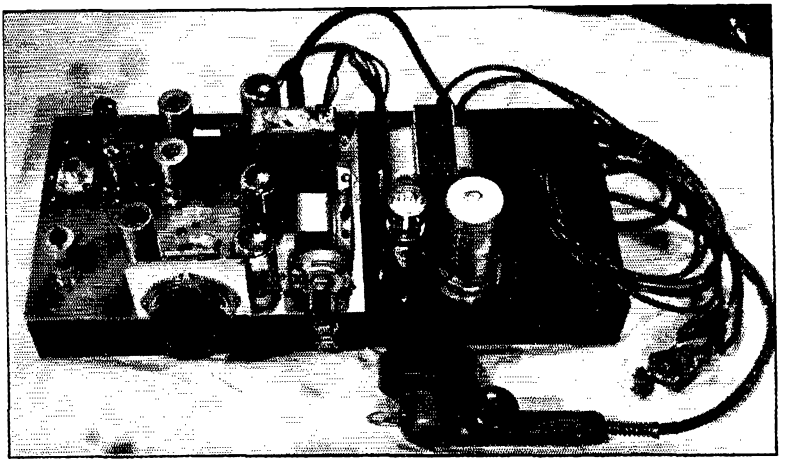
In order to bring everyone up to date on civil defense matters, we invited W2VQR to speak to the club. Lloyd is ARRL Section Emergency Coördinator for Northern New Jersey, and head of the Radio Amateur Branch of Communications on the New Jersey Civil Defense Board. Clubs in the vicinity were asked to send representatives and all local hams were invited. Seventy hams and several local officials were present, and many phases of integrating ham radio with civil defense activities were discussed. Several clubs have invited members of our group to describe our project at their meetings. It is interesting to note that most hams want to see the gear all apart, and then they want a schematic.

As this is being written we have 40 sets of parts out, with about 30 receivers and transmitters in operation. The 2-meter band is really alive locally. Many of the rigs are mobile, and our club net frequency is hot with test signals at all hours.

Equipment Details

Having canvassed the membership for tubes and parts we then gave the bargain counters a careful scrutiny before settling on the final design. We started at a time when tubes were becoming

(Continued on page 120)



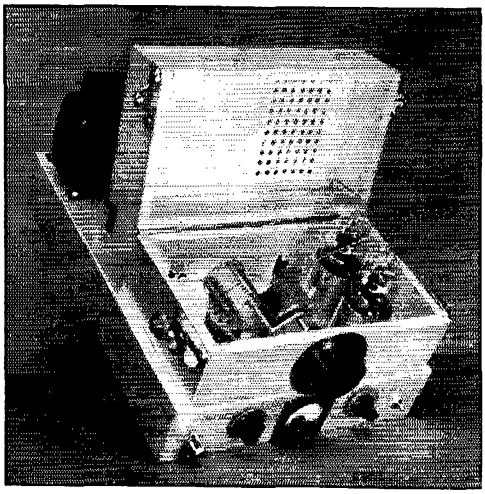
Another arrangement of the Tri-County Radio Association 2-meter gear, showing the transmitter and receiver units, left, and power supply. Note that the transmitter and receiver are built on separate aluminum plates and then mounted side-by-side on an inverted chassis of standard size.

A 75-Watt Transmitter for 3 Bands

Simplified Shielding and Filtering for TVI

BY DONALD H. MIX,* W1TS

THE transmitter shown in the photographs is a 3-stage 75-watt c.w. rig designed to cover the 80-, 40- and 20-meter bands. It is complete with built-in power supply. Plug-in coils are used only in the final amplifier. The problem of shielding has been studied with the aim of reducing labor and material to a minimum. The unit has been designed primarily with the maximum input allowable to the Novice licensee in mind. It represents an attempt to arrive at an optimum balance between power-supply and tube cost. While only certain frequencies in the 80-meter band are available to the Novice, this transmitter is something he can build with an eye toward the future, since the other frequencies will be immediately available to him as soon as he graduates to a license of higher class.



Front view of the 75-watt 3-band transmitter, showing the interior of the amplifier enclosure.

Circuit

The circuit is shown in Fig. 1. The oscillator output condenser, C_7, has a sufficient range of capacitance to cover both 80 and 40, making coil changing in this stage unnecessary. The output of the oscillator can be fed either directly to the grid circuit of the final amplifier, or to the grid of an intermediate frequency doubler for 20-meter operation. The two triode sections of the 6N7 doubler tube are connected in parallel. The doubler is cut in and out of the circuit by a system of crystal sockets and shorting plugs, instead of a switch, for simplicity. This permits the doubler coil also to be permanently mounted under the chassis for shielding purposes. The shorting plugs are Millen type 37412 with the pins wired together. When a shorting plug is inserted in J_1, the output of the oscillator is fed to the grid circuit of the amplifier. When this plug is shifted to J_2, the oscillator is connected to the doubler grid. Then a second plug inserted in J_3 connects the output of the doubler to the input circuit of the amplifier. The 6N7 cathode biasing resistor is chosen to give the same grid current as obtained on the lower-frequency bands. When not in use, this tube draws only a milliampere or two of plate current.

The desired power level in the final amplifier is most economically obtained through the use of a broadcast-receiver type power transformer within the voltage rating that will permit the use of inexpensive electrolytic condensers in the filter. This limits the available d.c. output voltage to about 450. From the viewpoint of tube cost, the 807 is the only logical choice for the final amplifier, even though it requires two of them in parallel to handle the necessary plate current for an input of 75 watts. RFC_6, RFC_7, R_9 and R_{10} are necessary to prevent v.h.f. parasitic oscillation.

The amplifier is keyed in the cathode circuit. This permits good clean keying and avoids the problem of protecting the tubes with fixed bias, a necessity that arises when the oscillator is keyed. A single milliammeter, MA_1, may be switched to read amplifier grid current, when connected across R_7, or cathode current when switched across R_8. The value of R_8 is adjusted to give a meter-scale multiplication of 10. The ARRL *Handbook* gives information on making meter shunts from copper wire.

Power Supply

The basic power-supply circuit is, of course, conventional. A choke-input filter is used to hold the voltage within the rating of the filter condensers. Reduced voltage for the oscillator and

• At first glance, it may seem rather stupid to use a pair of tubes when the required power is within the ratings of one of them. However, tube cost these days is not often the important item that it was several years ago. Unless components can be bought in surplus, the cost of power supply can easily equal or exceed the cost of the rig itself. In this instance, an attempt has been made to arrive at a minimum over-all cost for the amount of power involved — 75 watts on 3 bands.

* Assistant Technical Editor, *QST*.

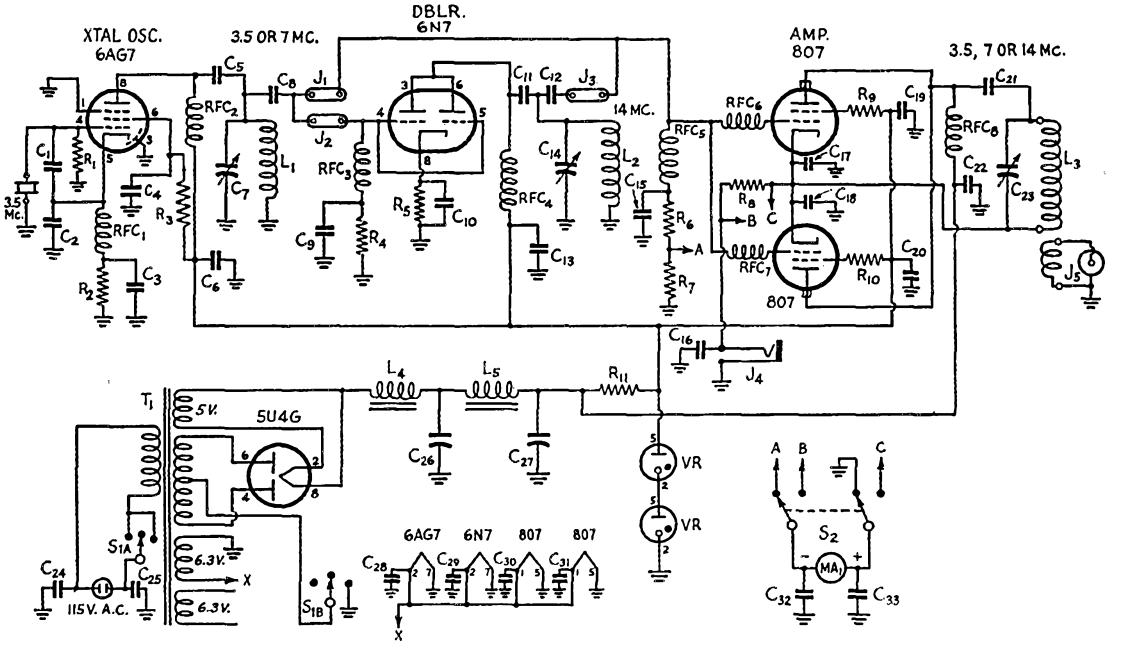


Fig. 1 — Circuit diagram of the 75-watt 3-band transmitter.

C_1 — 15-$\mu\mu$fd. mica.
C_2 — 47-$\mu\mu$fd. mica.
C_3, C_4, C_5, C_6, C_9, C_{10}, C_{11}, C_{13}, C_{15}, C_{17}, C_{18}, C_{19}, C_{20}, C_{22}, C_{24}, C_{25}, C_{28}, C_{29}, C_{30}, C_{31}, C_{32}, C_{33} — 0.001-μfd. disk ceramic.
C_7 — 335-$\mu\mu$fd. variable (National STH-335).
C_8 — 100-$\mu\mu$fd. mica.
C_{12} — 47-$\mu\mu$fd. mica.
C_{14} — 35-$\mu\mu$fd. variable (National ST-35).
C_{16} — 0.01-μfd. disk ceramic.
C_{21} — 0.001-μfd. mica or 0.01-μfd. disk ceramic.
C_{23} — 300-$\mu\mu$fd. variable (National TMS-300).
C_{26}, C_{27} — 8-μfd. 700-volt-wkg. electrolytic (C-D BRHV-708).
R_1 — 68,000 ohms, ½ watt.
R_2 — 470 ohms, 1 watt.
R_3 — 47,000 ohms, 1 watt.
R_4 — 15,000 ohms, 1 watt.
R_5, R_6 — 4700 ohms, 1 watt.
R_7 — 100 ohms, ½ watt.
R_8 — Meter multiplying shunt (see text).
R_9, R_{10} — 47 ohms, ½ watt, noninductive.
R_{11} — 2500 ohms, 25 watts.
L_1 — 7.5 μh. — 32 turns No. 22, ⅝-inch diam., 1 inch long (B & W 3008 Miniductor).
L_2 — 1.3 μh. — 12 turns No. 18, ¾-inch diam., ⅝ inch long (B & W 3011 Miniductor).
L_3 — 3.5 Mc. — 6.3 μh. — 15 turns 1½ inches diam., 1¼ inches long (B & W JEL-40 with 7 turns removed).
— 7 Mc. — 2 μh. — 9 turns 1½ inches diam., 1½ inches long (B & W JEL-20 with 3 turns removed).
— 14 Mc. — 0.8 μh. — 6 turns 1½ inches diam., 2 inches long (B & W JEL-10).
L_4, L_5 — 2.3-hy. 150-ma. filter choke (Stancor C-2304).
J_1, J_2, J_3 — Ceramic crystal socket (Millen 33102).
J_4 — Open-circuit 'phone jack.
J_5 — Coaxial connector (Jones S-101).
MA_1 — D.c. milliammeter, 25-ma. scale.
RFC_1, RFC_2, RFC_3, RFC_4, RFC_5 — 2.5-mh. r.f. choke (National R-50).
RFC_6, RFC_7 — 1-μh. r.f. choke (National R-33).
RFC_8 — 2.5-mh. r.f. choke (National R-100-S).
S_1 — Double-pole three-position rotary (Mallory 3223J).
S_2 — D.p.d.t. toggle.
T_1 — Power transformer: 600–0–600 volts r.m.s., 200 ma.; 6.3 volts, 3 amp; 5 volts, 3 amp. (Stancor P-6170 or PC-8414).
VR — VR-150 voltage-regulator tube.

doubler and also for the amplifier screens is supplied across a pair of voltage-regulator tubes. Since the high-voltage and filament windings are on a common transformer, it is necessary to remove high voltage from the oscillator during receiving periods by breaking the transformer center-tap connection. This is done by means of the power-control switch, S_1, which also controls the a.c. primary voltage to the transformer. With the switch turned to the left in Fig. 1, the filaments are lighted, but high voltage is off. In the central position, both circuits are open. With the switch turned to the right, both circuits are closed for transmitting. The central position is chosen as the all-power-off position so that the switch can be turned against the stops in switching quickly from transmitting to receiving.

Construction

The problem of suitable shielding enclosures for ham transmitters, a prime requirement if TVI is to be avoided, is one that would probably be solved quickly by manufacturers in normal times. As matters stand, however, there is no really simple means of providing an adequate enclosure. None of the presently-available cabinets is designed primarily with shielding in mind, nor can they easily be made to provide sufficient shielding and ventilation. Few amateurs are equipped to handle sheet metal in large pieces. Enclosures of screening, while almost ideal from the considerations of shielding and ventilation, are not easy to make nor do they usually have much claim to eye appeal. In recent months, we have been turning to the use of standard chassis

in various combinations as one of the easiest means available.

In this case, a 13 × 17 × 3-inch aluminum chassis is used as the base. The generous size not only makes provision for the power supply, but it also facilitates wiring with shielded wire which is not easily handled in restricted space, without experience. All parts of the oscillator and doubler circuits are shielded by mounting them underneath the base chassis. Since the amplifier must be accessible for changing coils, the components are mounted on top and shielded by an enclosure made up of two 7 × 12 × 3-inch aluminum chassis, one of which forms a cover hinged to the lower one. Good contact along the seam between the two chassis is assured by the use of a pair of ordinary window latches which easily provide considerable pull-down force. Any gap caused by inaccurately-formed chassis can be taken care of by bending the chassis lips outward with pliers wherever necessary to make a tight fit.

First lay out the power-supply components along the rear edge of the base chassis and make the mounting holes, including holes for the terminal wires from the transformer and chokes. The a.c. power-input plug is mounted in the rear edge of the chassis, close to the power transformer. Underneath, the two filter condensers are mounted on small lug strips which also provide terminals for making connections to the condensers.

Now spot the holes for the crystal socket, the sockets for the oscillator and doubler tubes which are all on a line 6 inches from the rear edge of the chassis. The tubes are central and their centers spaced 6 inches.

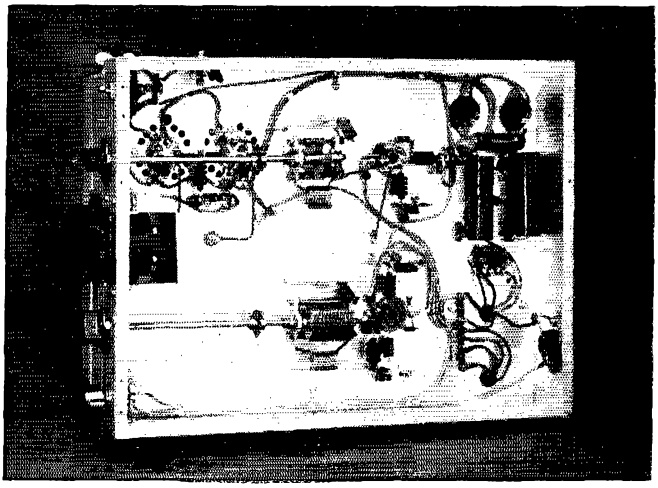
The two exciter tuning condensers, C_7 and C_{14}, are similarly spaced 6 inches apart and sufficiently to the rear of the base chassis so that their forward mounting screws come about ¼ inch behind the amplifier enclosure. The latter is set with its front edge flush with the front edge of the base chassis. The three sockets for the shorting plugs are placed as nearly as possible in the positions shown in the photographs.

Typical Meter Readings

Oscillator plate current	5 to 10 ma.
Oscillator screen current	4 to 5 ma.
Oscillator screen voltage	110 to 130.
Doubler plate current, idle	2 ma.
Doubler plate current, operating	14 ma.
Doubler grid current	2.3 ma.
Doubler cathode bias	90 v.
Doubler grid-leak bias	35 v.
Total doubler bias	125 v.
Amplifier grid current, loaded	10 ma.
Amplifier grid bias	50 v.
Amplifier screen current, loaded	22 ma.
Amplifier plate current, for 75 w	165 ma.
Amplifier cathode current, for 75 w	200 ma.
Off-resonance plate current	220 ma.
Power-supply voltage, key open	530
Power-supply voltage, key closed, amplifier loaded to 165 ma.	460

The meter is mounted at the center of the front edge of the base chassis. It is very important from the consideration of TVI that the meter be tightly shielded at the rear. The enclosure shown in the photograph of the bottom was bent up from sheet aluminum. Extension shafts with panel bearings are run from the two variable condensers underneath to the chassis front edge. The power switch and the meter switch are at the ends.

In the lower of the two smaller chassis, the sockets for the two 807s are spaced with their centers 3 inches from the edge of the chassis and about 2½ inches apart. The sockets are ringed with ¼-inch holes, which show in the bottom-view photograph, to provide ventilation for the tubes. The lower portions of the tubes are enclosed in Millen type 80007 shields and the ventilating holes must come within the diameter of the shields. The bottom plate, which must be provided to cover the bottom of the base chassis with a tight fit, should likewise be perforated in the area below the sockets. The base chassis should be provided with feet of some sort at the four corners to allow air to circulate up through the ventilating holes.



Bottom view of the 75-watt c.w. transmitter. Plenty of space is provided so that components need not be crowded.

The shaft of the condenser and a shaft-extension bearing set in the front edge of the chassis are joined by a flexible shaft coupling. The coil socket alongside the tank condenser is mounted on tubular pillars that raise the socket to clear its prongs underneath. C_{21} is attached to one of the rear stator nuts. The plate choke, RFC_8, is mounted vertically immediately to the rear on a small ceramic feed-through insulator, although

the same buttons used for the tank condenser will do. A short length of coaxial cable connects the link terminals of the coil socket to the output coaxial fitting set in the end of the chassis.

As soon as all holes have been drilled in the small chassis, it should be placed on the base chassis and all holes in the bottom of the smaller chassis should be traced on the top of the base chassis so that the two sets of holes will match exactly.

The cover chassis is attached to the lower one by means of a section of piano hinge — a hinge running the entire length of the chassis. The area over the tubes is perforated with ¼-inch holes. The two window latches should be fitted carefully so that they will exert a good pull on the top of the chassis when they are closed. If desired, the front of the unit can be provided with a panel to make it uniform in appearance with other equipment.

Underneath, a long lug strip is used as a terminal board for the transformer leads that require extension. Connections will come easiest if the ground end (–) of the filter condenser to the rear is toward the transformer and the ground end of the condenser in front toward the VR tubes. The VR voltage-dropping resistor, R_{11}, then is mounted by soldering it between the positive terminal of C_{27} (the condenser toward the front) and an insulated terminal of the lug strip holding the other condenser. A wire then connects the lower end of this resistor to Pin 5 of the VR tube toward the rear. Pin 2 of this tube connects to Pin 5 of the other VR tube and Pin 2 of the latter to ground. R.f. chokes are supported by attaching to the associated tube-socket terminal at one end and to a short lug strip at the other. The lug strip also serves as a mounting for any resistor that may be connected to the choke. All power wiring is done with shielded wire and all by-pass condensers are applied to the shielded wire in the manner described in April *QST*.[1] The braid of the wire connecting to the terminal is pushed back about ½ inch and solder is flowed around it to anchor it to the insulation. The exposed insulation is removed for about ¼ inch, and the condenser is soldered between the end of the braid and the exposed end of the wire. The braid is then grounded to the chassis at the nearest possible point. It is often simpler to run individual power wires from each socket or each choke, rather than to go from one point to the other and thence to the power-supply or other terminal with a single piece of wire. And from the standpoint of TVI reduction, it is probably preferable. Each filament, screen and cathode of the two 807s should have its individual by-pass. Where the shielded wires run parallel, they should be spot-soldered together every few inches, and hold-down lugs should be placed wherever needed to anchor the wires firmly.

The two exciter coils, L_1 and L_2, are soldered directly across the terminals of the tuning condensers. A short sleeve of spaghetti over each coil lead will help to add strength to the wire.

[1] Grammer, "By-Passing for Harmonic Reduction," *QST*, April, 1951, p. 14.

Rear view, showing the placement of the exciter tubes and the shorting-plug sockets.

The 807 sockets are turned so that their grid terminals (Pins 3) are closest. Then RFC_6 and RFC_7, end to end, should just about bridge the gap between the two terminals. The connections between the shorting-plug sockets and the junction of the two chokes are made with No. 14 wire well spaced from the chassis. This wire also is used in connecting each of the amplifier tank-condenser mounting screws to one of the two tube cathode terminals (Pins 4).

Adjustment

The VR tubes should glow soon after the power is turned on. If they do not, and a check of the wiring shows no mistake, the resistance of R_{11} should be reduced until the VR tubes light with the key closed. Variations in line voltage may require this. The transmitter should first be set up for 80-meter operation, with C_7 set at maximum capacitance and S_2 turned to read grid current. After the key is closed, turn C_7 slowly until a reading of grid current is obtained. This is the 80-meter resonance point. Now slowly reduce the capacitance of C_7 still further until another reading in grid current is obtained. This is the resonance point at 40 meters. Now, insert the shorting plugs for 20-meter operation, leaving C_7 set for 40 meters. Close the key and adjust C_{14} for maximum grid-current reading. This initial reading may be slight, but it should be possible to bring it up to normal by a slight readjustment of C_7.

With the exciter operating satisfactorily, you can now turn your attention to the amplifier. Set up again for 80-meter operation and plug the 80-meter coil in the amplifier. Adjust C_7 for maximum grid current at 80 meters. Then throw the meter switch over so that it reads cathode current. Holding the key closed, turn C_{23} to maximum capacitance and then turn it slowly

(*Continued on page 122*)

Sugar-Coated Linear-Amplifier Theory

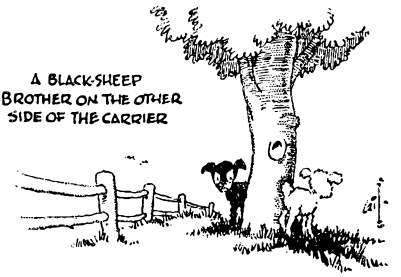
Or How To Keep a Single Sideband a Single Sideband

BY RICHARD E. LONG,* W3ASW

• Linear amplifiers too hard to get going properly? Read this account of the struggles of one of the first amateurs to get on the air with s.s.b. By his own admission he didn't know all about it — he just wanted to put a rig on the air. Then he wanted it to be *right*, and he found out how to make it so. In telling of his experiences, he has explained in simple language all of the factors that contribute to distortion in linear amplifiers. We think you will enjoy it, even if you aren't planning a s.s.b. rig for the immediate future.

HAVING been on the air for three years with a single-sideband suppressed-carrier signal, the writer has had certain experiences that he feels he should pass along to the brethren. During this period of time, at least half a dozen articles have appeared that described equipment capable of generating a good clean s.s.b. signal. Many of these rigs have been built and put on the air by progressive hams interested in this more efficient system of transmitting voice. Some of these signals are beautiful to listen to, but some leave much to be desired.

Analysis of these latter signals reveals that, while the portion of the signal that carries the intelligence is substantially a good clean s.s.b. affair, it has a "black sheep" brother on the



other side of the carrier frequency that does no earthly good insofar as delivering a signal is concerned, and it only wastes precious frequencies. In many cases they are broader than an ordinary a.m. signal, and this belies the name and purpose of s.s.b. The main difficulty seems to be that most fellows will spend a lot of time and money in building a good exciter and then forget all about what follows in the transmitter line-up. This may or may not be accidental, because I have seen only two published articles that deal with linear r.f. amplifiers for this type service, and they were somewhat loaded with mathematics and formulae. They possibly served to confuse more than to enlighten.

Probably because of the nonexistence of a good rule-of-thumb article on linears for s.s.b., many hams have adopted the attitude of making the old final handle the job. Then when it doesn't deliver the goods the way the book says it should, they start overloading all stages ahead of it until the plate current kicks up to where they think it is really going to town. This is where they usually undo all the work put in on the exciter and, incidentally, where they ruin a good s.s.b. signal.

Since all the aforementioned observations were made through experience on the air it may be well to recount how all this hullabaloo got started. Some of the brethren may see a similarity to their own troubles if they are just getting on the air with a linear amplifier. My exciter was built and put on the air in the days when W2KUJ was the only ham who had enough know-how and equipment to analyze a s.s.b. signal. He operated 20 meters and I operated 75. That made things just dandy so far as signal reports were concerned. If I got a report that did not suit me, I credited it to the fact that the other fellow didn't know what he was talking about. After all, didn't I have a filter that only passed 2.5 kc. of signal? And didn't the final plate current always fall back to nearly zero when I stopped talking? That settled it. No parasitics in the final and a 2.5-kc. filter — it must be the other fellow's receiver, etc., etc. One day I got a letter from a nonham who was doing some listening work for the National Bureau of Standards and some incidental ham monitoring. The gist of the letter was that while at first he thought I was severely overmodulating, a little checking finally showed him the signal in its true light. However, *he thought he could determine some splatter on either side of the main signal!* Sounds nasty, doesn't it? It stuck in the back of my head, and I asked a fellow ham with a selective receiver to give me a good going-over the next time he heard me on the air and see what he could find. He reported splatter, too, and suggested I try to do something about it. Frankly, I didn't know *what* to do about it!

Along about this time, W2KUJ came up to 75 from 20 and began looking over the existing s.s.b. signals. The reports he passed out were anything but gratifying. Yes, I got poor ones, too. I didn't want to believe him, but then he was the engineer who had developed a system of

* 1805 North 3rd St., Harrisburg, Penna.

s.s.b. for GE, and who was I to argue with him? It didn't take him long to determine that I really was a bonehead and that to get anything across to me required the simplest possible terms and *no mathematics*. Don wrote me an eleven-page letter describing types of distortion in linear amplifiers, as a follow-up to a discussion we had over the air. I'm saving it for a day when I can understand mathematics. However, he also made some statements and drew some pictures that I could understand, and that was the beginning of my seeing daylight. If I can pass along some of this daylight so that others can understand a few things about linear amplifiers without resorting to slide rules, vector analysis, and other math, maybe they can apply the principles to their equipment, as I did at W3ASW, and some of these "double-sideband" single-sideband signals will be eliminated. If this should happen in only one instance, the effort put forth in writing this article will be well spent.

Sources of Distortion

As a starter, let me quote from Don's letter some of the things which clicked with me. Here's the first page:

DISTORTION IN LINEARS
OR
GRAY HAIRS ON S.S.B. OP'S HEADS

In a linear amplifier, departures from a truly linear response fall into two main categories:

1) Amplification which *increases with* increased signal level (caused in many cases by overbiasing); and

2) Amplification which decreases with increased signal level. This is "limiting action," "peak squashing," or whatever term one wishes to apply to the action. Combinations of these effects can and do exist in such amplifiers.

Nothing tough about that so far. Even I understand it. A good idea of the sound of the first type of distortion could be heard on those old receivers that used a 6C6 Class C stage as a squelch to silence between stations. When the thing was about to open, the speech would be all chopped up as the amplifier swung about the cut-off point with variation in signal level. On Type 2 distortion, I've always called it "saturation," or "flattening off." You have heard it splattering all over the band long before hams began using s.s.b. Getting on with Don's letter, he draws curves and proves, by means of two pages of math, that these two types of distortion do occur. I'll believe him. Here's page 3 of his letter:

It should be pointed out that the transmission of a single pure signal through an amplifier having either of the two types of distortion will cause a series of harmonic signals to be generated. In general, these harmonic signals are not transferred to the radiating antenna (in case the amplifier is operating at radio frequencies) but the harmonic currents must flow in the output circuit. If the amplifier is "broadband," * such as an audio amplifier, the output will contain the whole series of harmonics generated, within the limits of the bandpass circuits.

No spurious signals are created by an ideal amplifier, nor are spurious signals produced by a nonlinear amplifier if adequate harmonic attenuation is provided in the output circuit *when, in this last case, only one tone is presented to the input terminals of the amplifier.*

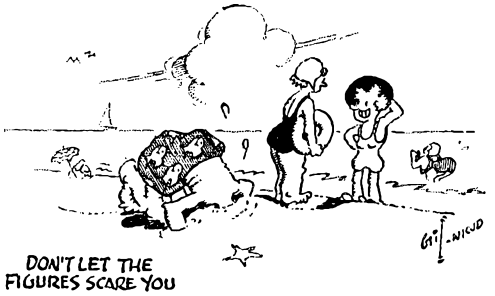
When more than one signal is impressed upon the input terminals of a nonlinear amplifier, spurious signals are generated. Many of these will not appear in the antenna circuit (if harmonic suppression is adequate), but many of them will have frequencies that are essentially in the same band as the desired signals, and therefore will appear in the output along with the desired signals.

* "Broadband" here refers to the *ratio* of the frequencies to which the output circuit will respond.

Phew! Seems to be getting a little deep, but the main thing to remember seems to be the fact about only *one* tone applied to a distorting amplifier may not show up in the output circuit as a distorted signal in all cases. This leads some fellows astray in using only one tone, or carrier, and a 'scope in adjusting a linear. Also, notice how he keeps stressing the point about harmonic suppression? There's a lot of meat there when you get to figuring out how much *C* to put in your tank circuits. Notice his statement about "more than one signal" being impressed. That's where a two-tone test comes into the picture for amplifier adjustment, and you will find that proper interpretation of what you see with a two-tone test is a very easy and simple way to adjust your amplifier. More on this later.

The next two and one-half pages of the letter contain the most gosh-awful looking mathematics and are the real reason the letter was written because they prove statements Don made to me in the contact and which I found hard to believe. I loaned the papers to several "bushy brains" whom I know and they said it is all true, so I believe it and will just pass along to you the example given and you can take it from me, it does happen "like he sez."

It seems a distorting amplifier can *put signals back on* where you spent so much time and money to *take them off!* They won't be readable things, to be sure, but they are still signals. They take up room in the spectrum, they would be classed as splatter, and they can smear an adjacent channel. I've heard this happen on numerous occasions when the operator was not aware



DON'T LET THE FIGURES SCARE YOU

that his signal was distorting. Here we go again with more of the letter. Don't let the figures scare you — they are really simple:

Suppose $F_1 = F_0 - 200$ cycles/sec. and
$F_2 = F_0 - 1000$ cycles/sec., where F_0 is the carrier frequency of a single-sideband transmitter carrying a two-tone test signal on the lower sideband, using modulation frequencies of 200 and 1000 cycles per second, respectively.

The output frequencies are:
a. $F_1 = F_0 - 200$ c.p.s.
b. $F_2 = F_0 - 1000$ c.p.s.
c. $2F_1 - F_2 = 2F_0 - 400 - F_0 + 1000$
$= F_0$ *plus* 600 c.p.s.
d. $2F_2 - F_1 = 2F_0 - 2000 - F_0 + 200$
$= F_0 - 1800$ c.p.s.

It can be seen that the signal *c* is on the "high" side of the carrier! Signal *d* is on the low side as are *a* and *b*.

So this is how amplifier distortion produces "hash" on the "other" side of the carrier.

What do all those figures mean? Just that in the output of an amplifier that is distorting due to improper bias, you will find the original two tones applied plus the intermodulation products which are shown as the second harmonic of the first beating with the fundamental of the second and vice versa. Since these are from two tones only, imagine what speech frequencies will do! Don later proves that similar products are generated in the limiting type of distortion and comes up with the following combinations:

$2F_1 - F_2, 2F_2 - F_1$ (same as Case 1)
$3F_1 - 2F_2, 3F_2 - 2F_1$ (new one)
$4F_1 - 3F_2, 4F_2 - 3F_1$ (also new)
etc., etc.

These figures mean that the third harmonic of the first will beat with the second harmonic of the second, the fourth of the second with the third of the first, etc. They indicate the existence of "intermodulation" or "cross modulation" products. If you want further proof that they exist, listen to some of the gang with limiting amplifier systems and by means of a selectable-sideband receiver adapter, check the "unwanted sideband." You will no doubt find a lot of hash. If you must have mathematical proof, send a self-addressed stamped envelope along with your right arm for payment.

How does all this apply to the actual equipment? Let's see how we can put some of these things to work for us.

Many s.s.b. transmitters consist of the generator itself (filter or phasing type) followed by one or more linear amplifiers. Low power levels (up to a few watts) are most easily handled by receiving tubes run as Class A amplifiers, so if you have followed the figures in published tables for receiving-type tubes in Class A service, you should have no trouble with these low-power stages. Remember though, *no instability caused by regeneration can be tolerated.* This means adequate, or better than adequate shielding, good separation of grid and plate leads, etc., and a fairly good *Q* in the tuned circuits. Some resistance across a grid or plate circuit may be needed. Here I had to put a 100,000-ohm resistor from a 6SK7 plate to ground to tame a 456-kc. amplifier. This all follows receiver design practices and applies wherever receiver-type tubes are used.

Driver Stages

Whatever type of exciter is used, you eventually come to the first power stage, usually an 807, acting either as a final, or as a driver for the final. It is here where trouble can and usually does occur. Many words have been written on the troubles encountered with 807 stages and Class B driver stages and, in all probability, no two cases will ever respond to the same treatment. I'll tell you what I had to do here, and you might get some ideas which may help in your case. Since I followed Art Nichols' article[1] closely, I wound up with an 807 driving a pair of 811s, as he recommends. While the voltages available here would not make even an old-type 807 blush, I couldn't find the proper ratings for an 807 in Class A service. Since the 807 is just a 6L6 with a top cap, inspection of the ratings of a 6L6 gave a set of voltages that are doing very nicely here with my old 807. Values of 350 plate volts, 250 *regulated* screen volts, and a 250-ohm cathode resistor will set the tube up in Class A operation with a load resistance of around 5000 ohms and an output of from 6 to 10 watts.

Now, with all these voltages applied, my 807 promptly took off on its own, and I didn't get it to calm down until I had read Don Mix's article[2] and applied the v.h.f. chokes he describes there. Then, with neutralization, I began to get a "cold" 807 but with not quite enough drive for the 811s. Somebody said proper impedance matching is hard to obtain if you don't have enough *C* in the plate tank. Checking the *Handbook* showed something in the vicinity of 300 $\mu\mu$fd. for a single-ended amplifier at 4 Mc. with my voltages and currents. I had been using a 100-$\mu\mu$fd. condenser here, and substitution of a 365-$\mu\mu$fd. broadcast type for it and pruning the coil to make use of about 350 $\mu\mu$fd. made a world of difference. I had plenty of drive for the final now, but since the 807 stage was still skittish at times, I suspected that some regeneration was left in it. Looking again at the load-resistance figure, and trying to remember what a tuned circuit looked like at resonance, brought out the idea that maybe a 5000-ohm resistor across the tank circuit would give a better match to the tube than a tank circuit alone. While all these are probably not the right answers to taming 807 drivers, the final result is that my 807 with the voltage specified, a high-*C* tank circuit loaded with 5000 ohms and *no neutralization* delivers enough output to drive the 811s to RCA's specification of 38 grid milliamperes in Class B service. As for that high-*C* tank, it improved the matching of impedance between driver and final, and it meets Norgaard's statement about adequate harmonic suppression in the output circuit. The 5000-ohm resistor helps a lot with another of the bugaboos: regulation of the driver-stage voltage.

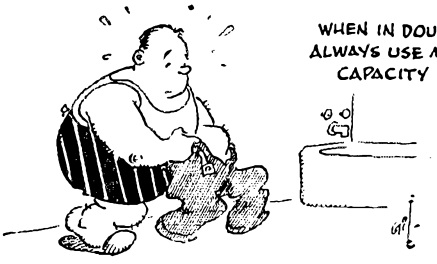
The Final Amplifier

This brings us up to the final amplifier, which also is capable of either making or breaking a good s.s.b. signal. Once more, while what I did here may not be the criterion of treatment for linear amplifiers, it may give you some ideas

[1] Nichols, "A Single-Sideband Transmitter for Amateur Operation," *QST*, January, 1948.
[2] Mix, "Amplifier Instability in Transmitters," *QST*, June, 1948.

along the right path to the best operation of yours. Although triodes are used here, and they do present a varying load when they draw grid current, many of the ideas applied will hold for the tetrode and pentode final that usually operates in the region of no grid current. Some points about these latter will be covered, since they have been discussed among the gang on the air and the information will be helpful.

Let's look at the grid tank, which is the first item encountered. The 811s will draw grid current, and that means a variable load on the driver. Don said that it is important to keep harmonic content of all circuits down by the use of adequate *Q*. Furthermore, the experience of matching the final to the driver plate indicated that high *Q* or high *C* was a good idea. Consulting the chart for tank circuits in the *Handbook* shows that for *Q*'s of 12 at 4 Mc., effective capacities may range from 50 to 1000 $\mu\mu$fd., depending upon the ratio of plate voltage to plate current. Despite the fact that these actual figures won't apply for a grid tank, they will convey the general idea of what may be encountered with various ratios, or with varying loads, which is what we have in a Class B grid circuit. Under the heaviest loading, or the least equivalent resistance, you will need the most capacity to maintain good *Q* and, although I can't tell you exactly what your load limits will be, I can tell you to use the most capacity available in order



to stay on the safe side. When in doubt, always use more capacity than is needed.

I took an average from the chart, and wound up with a 365-$\mu\mu$fd.-per-section dual broadcast-type condenser. The coil was pruned in order to use about 340 $\mu\mu$fd. of each section. This gave an effective capacity of 170 $\mu\mu$fd. in the circuit. Compare this value with the usual grid tank and you will get the idea I am trying to get across. The usual dual 75- or 100-$\mu\mu$fd. grid tuning condenser just won't do for a 4-Mc. triode amplifier in Class B where the tubes draw grid current.

What about that varying load? Let's try swamping to steady it a bit. What do I mean by swamping? Just this — connect a *noninductive* resistance across the tank circuit, to dissipate some of the excitation and offer a more nearly-constant steady load. Then, when the tubes draw more or less grid current, the over-all load on the driver will not vary as greatly as without it. How much swamping? That question has always started a lot of arguments on the air, and each fellow has his own idea about what is correct. In my case, I started with a rather high value of resistance, to keep the peaks under control, and found that I could reduce it until I started losing excitation to the final. This value proved to be somewhat below that calculated from the formulae given by Reque [3] and was near to that used to load the exciter plate tank. The natural thing to try was to make them both the same. You're right — I now have a 5000-ohm swamping resistor across each tank. This cut-and-try may not be the elite method of obtaining optimum swamping but by using it you will arrive at a good value, and it will work right along with the available excitation. Load as

heavily as the "traffic will stand." I can see eyebrows raise and arguments start on that one, but I'll stick by my guns.

Grid bias? That's easy; follow the specifications for the tube. They will be OK for a starter and may not need changing in the last adjustment, but more on that later.

In figuring the final plate tank, stay with the *Handbook*. Use the expected or wanted value of plate current at full signal with the plate voltage available and try then to go a bit more on the high-capacity side. Usually your tuning condenser won't be anywhere near large enough in capacity. Mine wasn't, and I had to make up the difference with padders. Those 50-$\mu\mu$fd. vacuum units from the Command set antenna relay boxes will do nicely, but *don't* put a single unit across the tank from plate to plate. Use two or four in a "split stator" arrangement, because unwanted harmonic currents will find a better path to ground with this arrangement. The net result here was a dual 180-$\mu\mu$fd.-per-section variable with each section padded with a 50-$\mu\mu$fd. vacuum padder. I pruned the coil to make use of the maximum capacity available.

One more item before we try to adjust the amplifier. Let's look at the plate supplies. Since the exciter uses all receiving-type tubes except the 807 driver, the best arrangement found was one good husky low-voltage supply with the 807 plate taken off ahead of the regulator. The 807 screen and all other plates are regulated with a VR-105 and VR-150 in series, and the dropping resistor adjusted for an average current through them of 25 ma. The plate supply for the final should be as "stiff" as you can make it. The line regulation here at W3ASW is very poor; turning on a 100-watt load will make quite a flicker in

[3] Reque, "Linear R.F. Amplifiers," *QST*, May, 1949.

the lights. This had me worried and I knew I would do a lot of head scratching to get around it. Line regulating transformers of the size needed are quite expensive, and electronic regulation would probably not compensate for the poor line voltage supplies. Well, here again Don Norgaard came to the rescue, with the suggestion that I use as large an output capacity on my final filter as it was possible to use. The plate voltage here averages 1400 volts and the final idles at 30 ma., so I made use of two 10-μfd. 1500-volt units along with a 10-henry 500-ma. choke (nonswinging, by the way) as a filter for the final. Use the choke-input system with all the capacity on the output side. I manage to stay fairly linear under voice operation, but a steady tone will pull the output voltage way down. Incidentally, 60 to 80 μfd. on the exciter plate supply output won't do a bit of harm.

Before getting into the loading, it is assumed that you have good neutralization and parasitic suppression in your amplifier. Here again, *in-*

stability can not be tolerated! With plate voltage applied, the bias should be adjusted to allow the tubes to draw their maximum rated plate dissipation; then rotate both tuning condensers without the antenna or exciter coupled and see if the final spills over at any point. If it does, you have more work to do. This may be a tough baby to shave, but it is a *must.* When you are sure the final behaves, return the bias to normal. My 811s required 25 ohms with 7 turns of hook-up wire wound around them in each grid lead to tame them.

Testing with a 'Scope

Up until the two-tone test was described,[3] the only dope I knew about for adjusting a final amplifier for s.s.b. was in Dawley's article.[4] He recommended applying a sine-wave signal and adjusting the coupling until rated grid current is drawn in the final. Then couple the antenna until a plate current of about 25 per cent greater than that desired is drawn. Then, with speech input, the peaks will not be chopped. Less coupling will give chopping and more will reduce the efficiency. That system worked out nicely here, but the two-tone test system will tell you so much more at a glance that it is well worth using.

If you don't have a 'scope, borrow one and make notes of optimum conditions on your final coupling and final plate current, and then try to maintain these.

Figs. 1, 2 and 3 represent what you should see on a 'scope when a two-tone test is applied to your rig. Fig. 1 shows an ideal picture with an improper bias distortion curve plotted on it. Notice the nice clean "X" crossover on the ideal, and then look at the curves or loops on the distorted curve. Fig. 2 shows another ideal picture, with the distortion curve resulting from saturation in the plate circuit plotted on it. Here the crossovers are clean but notice the rounding and flattening on the peaks. Fig. 3 shows an ideal curve compared with one having both types of distortion. Quoting Don, "Have you ever seen Figs. 1, 2 or 3 on your 2-tone test? If you can see it, it's pretty bad — believe me!"

What is a two-tone test? Just two a.f. signals separated by about 1000 cycles applied to the amplifier under test. How do you get it? On a filter rig with a "carrier insertion" or an "unbalance" control, open up a bit of carrier and at the same time apply an audio signal of approximately 1000 cycles into the front end. Vary the levels, while watching the 'scope screen, until the picture looks like or nearly like the ideal curves shown. With the phasing rigs, I understand that the introduction of a tone of about 1000 cycles into the front end of the set and the disabling of *one* balanced modulator will give the same picture.

Now carefully advance the amount of both signals applied until you either reach the limit of the power-handling capability of your final, or until the picture shows limiting distortion.

If, by adjusting coupling and drive, you can eliminate the limiting distortion, fine business. If the limiting appears at a point beyond where you want to operate your final, forget it. But then *don't overdrive that final.* This goes for all stages, by the way. A good way to stay within these limits, if you own a 'scope, is to monitor continuously with it. Make some kind of calibration mark on the screen where the flattening

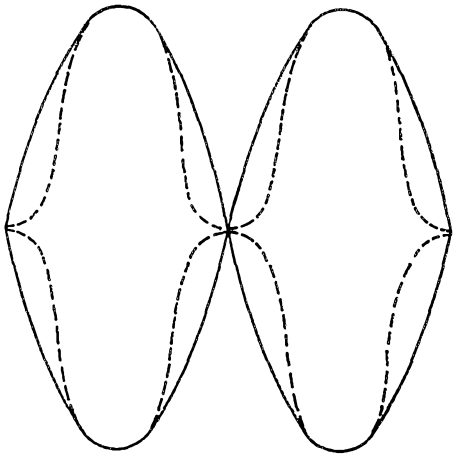


Fig. 1 — Ideal two-tone pattern (solid line) and the result of too much bias (dotted line).

[4] Dawley, "An S.S.S.C. Transmitter Adapter," *QST*, July, 1948.

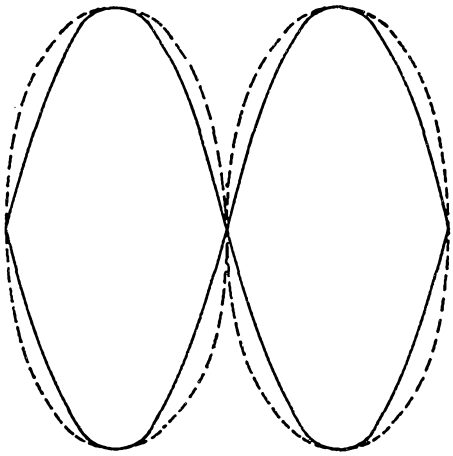


Fig .2 — With too much drive or incorrect loading, the two-tone pattern turns into the fat, squashed signal shown by the dotted line. Compare this with the ideal (solid line).

begins to show, and then stay below that point in talking. If you have borrowed the 'scope, make note of what the final plate current is when this flattening occurs and stay below that point. A still better system is to employ a limiter or clipper in the speech circuits so that you don't drive out of linearity, no matter how loud you shout. This latter system is employed here and has proven very successful. With a phasing rig, the use of a limiter or clipper means that it *must* be followed by a low-pass filter, to keep the harmonics generated in the clipper from being radiated. The adjustment of the limiter is simple: make note of the point of distortion on either the 'scope or the plate meter, and then set the output control of the limiter so as not to exceed this point.

As for the biasing type of distortion (Fig. 1), I never have seen it here with zero-bias triodes. If it should occur, check your bias supply carefully and make sure that no grid-leak action is taking place, for this would distort severely. This goes for all types of amplifiers in linear service. For my 811s, I use three flashlight cells in series, which is about right for my plate voltage.

Before I get along too far, let me say that the above-mentioned two-tone tests should be applied to your driver stage as well as the final. I find here that I limit in the plate circuit of the driver at a point that gives me about 300 watts input to the 811s. That is where I operate my rig and keep it below that point with the limiter. Three hundred watts of s.s.b. is no mean signal and, in order to get a higher input without distortion, I would have to rebuild the entire plate supply for the exciter, to raise the 807 plate voltage. It isn't worth it, according to my way of looking at it.

That about winds up the story for using zero-bias triodes in the final. A few words were promised about multielement tubes and here they are: Practically all of these should be operated as Class A, Class AB_1, Class AB_2 or as "Modulator Service." Tubes in Class AB_1 or less should not draw grid current at any time, therefore the loading of the grid circuit should not be necessary. At the same time, a higher *L*-to-*C* ratio may be needed, to get the voltage needed to drive the tubes. The loading should be applied to the output of the driver in all cases, however. With tetrodes or pentodes, where the screen voltage is the big controlling factor, the screen supply should be regulated. In such types as 807s, 829s and 4-125s, the ordinary VR tubes should suffice. "Bleed" the VRs up to nearly their maximum current so they won't go out when signal is applied. Regulation of 813 screens is something different. They draw too much screen current when going from no signal to full signal, and the VR tubes just won't handle the job. The ideal answer is electronic regulation with tubes such as 2A3s, or triode-connected 6L6s, handling the load. This same care is needed in the control-grid bias. It should be very stiff. All other items, such as plate tank, loading to antenna, etc., are the same. Don't let the tetrodes or pentodes scare you — good signals can be gotten from them. One of the cleanest signals I've heard is from W2VVC who uses 813s and drives them to about 600 watts. He has electronic regulation on his screens, very steady bias voltage, and he loads his exciter (four 6L6s as a balanced modulator) with swamping resistors to where he has just sufficient output for driving his 813s. Yes, that's heavy swamping, but believe me, it pays off. Analyze his signal sometime with a *good* receiver, and you'll find it's one of the cleanest.

Some swamping may be helpful on the grid tank to control transients, and it will be best determined by cut-and-try. Start high and work downward. It won't do any harm.

A final word about antenna loading. Try to

(Continued on page 122)

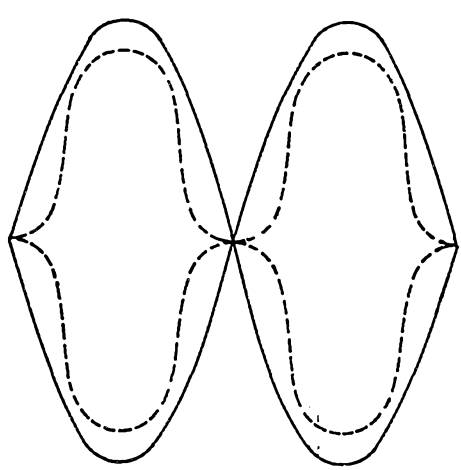


Fig. 3 — You are really in the soup with too much bias *and* too much drive or incorrect loading, because the two-tone pattern will look like the dotted line shown here.

A Low-Pass Filter for High Power

High Attenuation for Fringe Areas

BY ROY C. FOSBERG,* W1TX

THE low-pass filter shown in the photograph was designed and built for use with a 1-kw. transmitter operating in a TV fringe area. Because of the relatively high transmitting power and the close proximity of a number of neighboring roof-mounted Yagi TV antennas beamed on the rhombic of W1TX, high attenuation was a prime requirement. In addition, the design features low cost, simple construction and externally-operated tuning controls. The filter has been tested on a dummy load at 1½ kw. with an unfavorable s.w.r. without showing any signs of distress. Theoretical attenuation is a minimum of 83 db. at all frequencies above 54 Mc. and a minimum of 90 db. above 64 Mc. The cut-off frequency is 44 Mc. A maximum rejection point at 85 Mc. was built in, since only Channel 6 is being received in this vicinity with any regularity. The filter is designed for insertion in a 52-ohm coaxial line and the cost of materials and parts is less than $10.00 if all components must be purchased new. The circuit diagram is shown in Fig. 1.

Details of construction of the shielding enclosure are shown in the sketch of Fig. 2. The entire box was to have been constructed from 1/32-inch brass sheet for rigidity, but because of a shortage in the local supplier's stock, only the partition walls were made of this heavier material. The remainder is of 1/64-inch brass sheet which is much easier to bend and can be cut with tin snips. With the bracing added by the partitions, the finished job proved to be entirely adequate mechanically.

Seven pieces of brass are required. The main body of the box is cut out from 1/64-inch stock with tin snips and bent into the form of a U. This is done by marking the four bending lines on the piece and clamping it to the top of a flat piece of steel with well-formed 90-degree edges, such as a saw or drill table, with the bending line coincident with the edge of the table. The bend is then roughly made by exerting downward pressure against the overhanging part with a flat block of wood. A sharp 90-degree bend is then obtained by placing a metal angle, one or more inches wide, against the rough bend and tapping it with a hammer as the metal angle is moved back and forth along the rough-bending line. All four bends are made in this manner.

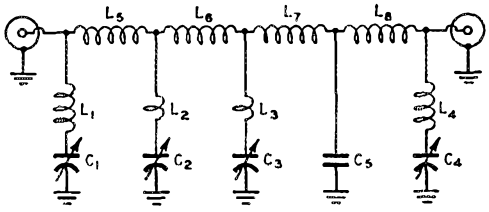
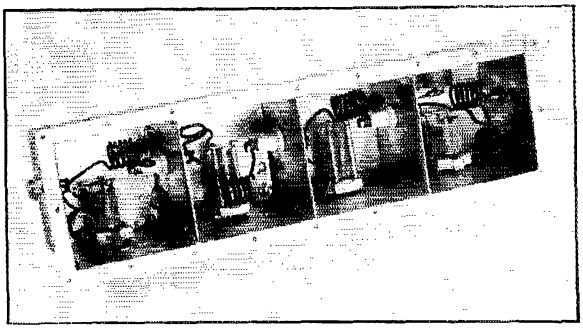


Fig. 1. — Circuit diagram of the high-power low-pass TVI filter.
C_1, C_4 — 12 $\mu\mu$fd. (100-$\mu\mu$fd. air trimmer).
C_2 — 110 $\mu\mu$fd. (140-$\mu\mu$fd. air trimmer).
C_3 — 120 $\mu\mu$fd. (140-$\mu\mu$fd. air trimmer).
C_5 — 134-$\mu\mu$fd. ceramic. (See text.)
L_1, L_4 — 0.2 μh. (4½ turns).
L_2 — 0.05 μh. (1¼ turns).
L_3 — 0.03 μh. (¾ turn).
L_5 — 0.26 μh. (5½ turns).
L_6 — 0.31 μh. (6½ turns).
L_7 — 0.35 μh. (7⅛ turns).
L_8 — 0.3 μh. (6⅛ turns).
NOTE: All coils wound on ½-inch diameter forms, No. 12 wire, 8 turns per inch. Coils should be ½-inch inside diameter when finished.

The two ends and three partition walls are cut from 1/32-inch stock with a hack saw, squared up with a file and drilled to accommodate coaxial fittings and small feed-through insulators as indicated in Fig. 2. Flanges are bent in the end pieces by clamping the tip of the piece to a line 1/32 inch beyond the shoulders in a machinist's vise, and making the bend with a hammer and block of wood. The end piece should be removed from the vise and tested in place in the main body of the box before the bend is finally formed. This will assure a good fit.

* 279 Princeton St., Hartford 6, Conn.



The high-power low-pass filter with bottom cover removed, showing the mounting of the coils and condensers.

The mounting holes for the variable condensers should now be drilled in the front of the box. The condenser-shaft holes should be drilled undersize and enlarged with a rat-tail file. This allows them to be recentered if "walking" of the drill occurs and insures a snug fit to reduce r.f. leakage.

All pieces are prepared for soldering by rubbing with sandpaper. The center partition is clamped in place and soldered along the joint on one side only. A 150-watt iron is plenty large enough for the job. Similarly, the other two partitions and the end pieces are clamped in place, one at a time, and soldered. Then the four butt joints in the flange are soldered on the bottom side.

Next the box cover is cut out and clamped in place on the flange. Holes are drilled through the cover and flange to clear 6–32 brass machine screws, spacing the holes uniformly around the flange. If desired, 6–32 brass nuts can be soldered to the underside of the flange at each hole to facilitate assembly. When finished, the box should be cleaned of all flux and surplus solder.

The photograph of the interior of the box shows the location of the parts and the rigid assembly. The coils are supported either by soldering the leads to the condenser stator-plate supporting rods or to the coaxial connectors, or by securing them to the feed-through rods, using lockwashers under the nuts. The coils should be kept as far as possible from the walls of the compartments. Coils in the same compartment should be placed at right angles to each other.

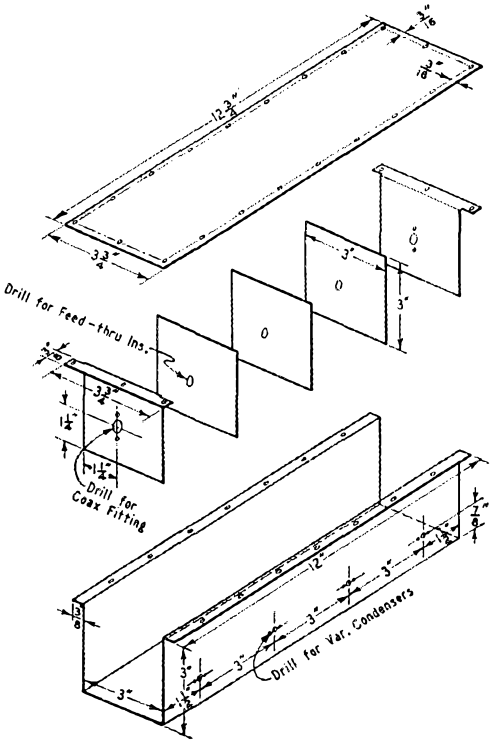


Fig. 2 — Sketch showing construction and assembly details of the enclosure for the high-power low-pass filter.

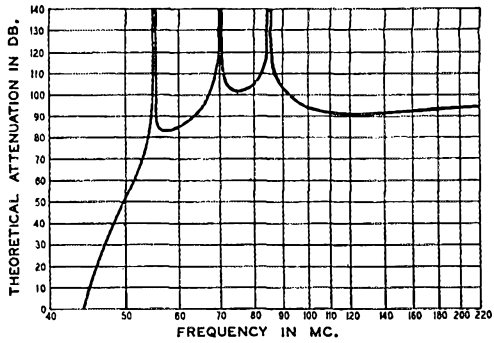


Fig. 3 — Performance curve of the four-section low-pass filter.

The condensers should be equipped with either shaft locks or indicating knobs. In my case, the two end condensers are of the screwdriver-adjustment type with shaft locks. The middle two condensers were equipped with indicating knobs. Scotch tape on which the final knob setting and corresponding frequency are indicated in India ink serves admirably as a knob positioner. C_5 is composed of two 67-$\mu\mu$fd. high-voltage ceramic units in parallel. They were taken from a surplus Collins ART-13 transmitter, being two of the three units comprising *C-124*. Any good fixed condenser of 600- or 1000-volt rating should be satisfactory.

As a finishing touch, the circuit diagram, drawn in India ink on a piece of white paper, was shellacked to the outside of the top cover. A coat of varnish was added over the paper for protection.

A handy tool for adjustment was made from a strip of brass bent in the form of an L. This strip was attached to a handle made from a 3-inch length of ¼-inch dowel by drilling the strip and attaching it to the end of the dowel with a wood screw. The brass strip should just be long enough to short the rod of the feed-through insulator to the partition wall in order to minimize the inductance added during adjustment.

Adjustment

The following is an outline of the procedure to be followed in adjusting the filter.

1) Couple the grid-dip meter, set for 55 Mc., to L_1. Short L_1 to ground at the coax connector, using the shorting tool. Set C_1 to resonance. Lock the shaft or mark the setting and frequency on Scotch tape on the front of the box.

2) Repeat with L_4 and C_4.

3) Couple the g.d. meter, set for 70 Mc., to L_2. Short L_2 to ground at the feed-through rod. Set C_2 to resonance. Lock the shaft or mark the setting.

4) Couple the meter, set for 85 Mc., to L_3. Short L_3 to ground at the feed-through rod. Set C_3 to resonance. Lock the shaft or mark the setting.

Fig. 3 shows the attenuation curve of the

(Continued on page 124)

A Frequency Spotter for the Novice

An Easily-Calibrated 50-Kc. Marker Oscillator for 80 Meters

BY RICHARD L. BALDWIN,* W1IKE

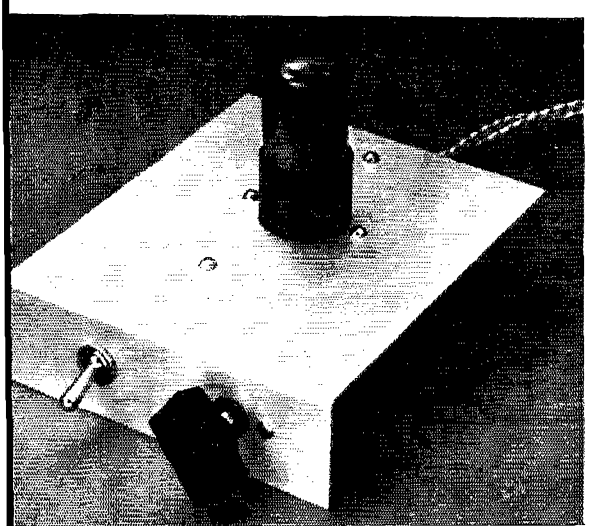
THE FCC regulation concerning checking of your transmitter frequency stipulates that such checking be done by means independent of the method used to control the transmitter frequency. In other words, just because your transmitter is crystal-controlled you are not relieved of the obligation of having some auxiliary method of checking your frequency. Use of your receiver is satisfactory, but you must be sure that *its* calibration is accurate. Some hams use calibrated frequency meters, while others use crystal oscillators operating on 100 kc., with multivibrator circuits to provide check points each 10 kc. Such arrangements allow for precise calibration of one's receiver, but the construction of a *good* frequency meter is an advanced project and 100-kc. crystals are not exactly inexpensive.

The piece of equipment we are about to describe is a 50-kc. Colpitts oscillator plus a harmonic amplifier. The 50-kc. frequency was chosen so that there would be harmonics both at 3700 kc. and at 3750 kc., the limits of the 80-meter Novice band. Used in conjunction with your regular receiver, it will enable you to be sure that your transmitter is operating within the authorized band. It is simple and inexpensive, too!

Construction

The parts are mounted on a small U-shaped aluminum chassis 5¾ by 4⅞ by 1½ inches in size. This may be purchased from almost any amateur supply house (Bud No. CB-1629) or may be bent from a piece of aluminum which you can obtain at a sheet-metal shop. Alternately, you may build this on a steel chassis of any suitable size. One version of this circuit was built in a metal box 4 by 4 by 2 inches in size, although that was crowding it a mite.

* Assistant Secretary, ARRL.



• The FCC rules and regs require that each amateur station have some means of measuring frequency with sufficient accuracy so that operation within the amateur bands is assured. This 50-kc. oscillator will satisfy that regulation both for the beginner and for the more advanced amateur. It's simple, it's inexpensive, and it does the job.

The tube-socket hole is on the center line, back 3½ inches from the front, with the key toward the front of the chassis. The filament switch and the variable condenser C_2 are mounted on the front lip, spaced evenly both from the top and from the edges. The placement is evident from the photographs. Through the rear lip is drilled a hole (which is to be insulated with a rubber grommet) out of which the power and output leads run, and also on the rear lip is mounted *RFC*. Coil L_1 is mounted between the filament switch and the variable condenser in front of the tube socket, by means of a bolt through the chassis; a three-terminal tie point is mounted between the tube socket and the grommet hole. Soldering lugs are placed under each of the bolts which hold the tube socket in place, as well as under the spacers which hold the variable condenser to the front lip of the chassis. That completes the mechanical end of building this gadget, and now you're ready to wire.

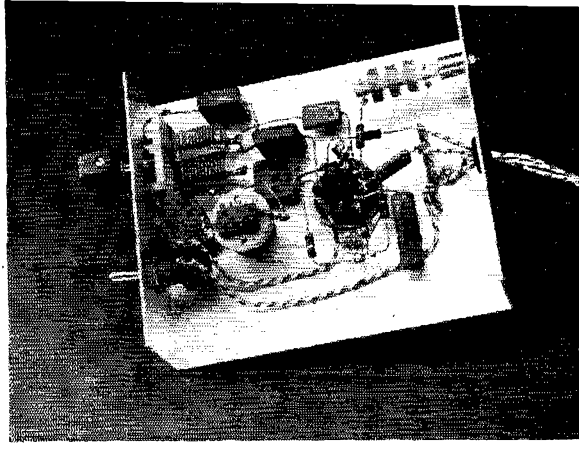
Wiring

There's nothing to it. Just follow the schematic diagram and refer to the photographs — you can't go wrong. Condenser C_1 is mounted right on top of L_1. Condensers C_3 and C_4 are the ones which are connected to the soldering lugs underneath the C_2 mounting pillars, with C_4 being the one on the outside edge of the chassis. C_6 runs from Pin 1 of the tube to the stator terminal on C_2, while C_5 runs from Pin 2 to the rotor terminal. Resistor R_1 is the one which runs from Pin 1 to ground, this ground connection being made to one of the soldering lugs connected to the tube-

♦

Top view of the frequency checker, showing the tube placement on the top of the chassis, and the filament switch and the tuning knob on the front edge.

♦



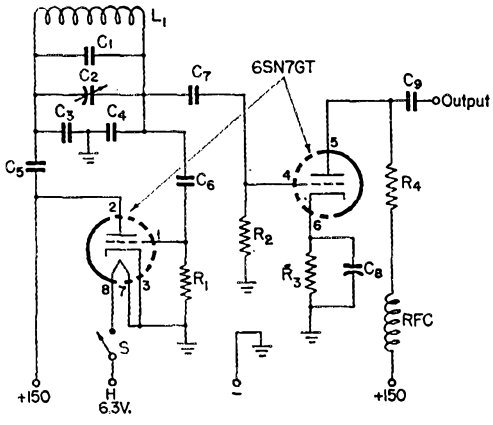
Underneath view, showing the placement of the various parts. These can be readily identified by careful study and by reference to the schematic diagram and the text. Note that the B-minus lead from the power supply is connected to a soldering lug fastened to the tie point which is to the rear of the tube socket.

♦

socket mounting plate. To this same ground connection are soldered one end of R_2 and R_3, C_8, and Pin 7 of the tube. The only connection to the soldering lug on the other side is that from Pin 3 of the tube socket. The tie point is just what its name implies — a point at which to tie various leads. In this case, we use it to tie securely the leads which run out to the power supply. These leads, of any suitable length (they should be at least long enough to reach the power supply!), may be conveniently labeled by using small bits of paper and scotch tape.

Power Supply

The power supply for this oscillator should furnish 6.3 volts for the heater of the tube and about 150 volts for the plates. A supply such as that described in the June *QST* (page 32) may be used. If you're using that same supply to power the receiver described in August *QST*, it may also be used for this frequency checker.



Parts List

C_1 — 47-$\mu\mu$fd. mica.
C_2 — 100-$\mu\mu$fd. variable (Millen 20100).
C_3 — 0.002-μfd. mica.
C_4 — 700-$\mu\mu$fd. mica.
C_5, C_6 — 0.001-μfd. mica.
C_7, C_9 — 100-$\mu\mu$fd. mica.
C_8 — 0.01-μfd. paper.
R_1 — 4700 ohms, ½ watt.
R_2 — 0.47 meg., ½ watt.
R_3 — 1000 ohms, ½ watt.
R_4 — 2200 ohms, ½ watt.
L_1 — 10 mh. (Millen 34210).
RFC—1-mh. choke (Millen 34107).
S — S.p.s.t. toggle switch.
Chassis — Bud CB-1629.
½-inch rubber grommet.
Bakelite octal tube socket.
3-terminal tie point.
Knob.
Miscellaneous 6/32 screws and nuts.
Hook-up wire.

Operation & Calibration

The easiest way to see if this gadget is working is to plug in the tube, make the power supply connections, and then connect the output lead to the antenna of your broadcast receiver. Let it warm up for a few minutes. A signal from the oscillator should then be heard every 50 kilocycles. Find a broadcast station operating right on 600 kc., 650 kc., or some other multiple of 50 kc. Tune C_2 so that you get zero beat between the oscillator and the b.c. station. Because of slight differences in coils and condensers (very few of them are the exact values that are stamped on them), it may be necessary to change the size of C_1. Trial-and-error for a few minutes will give you the right combination if you don't already have it. A further check is necessary to make sure that you have lined up the oscillator on 50 kc. exactly. Tune in another broadcast station that is operating on some other multiple of 50 kc. You should still get the beat note as in the first case. If you can't locate another b.c. station operating on a 50-kc. multiple, it will suffice to count the number of oscillator signals you get between, say, 600 kc. and 1000 kc. Including the signals heard at 600 and 1000 kc., there should be 9. In this particular example, one of the check points (either 600 or 1000 kc.) should be one of the spots where you hear a b.c. station operating on a harmonic of 50 kc. Finally you may check it against WWV. See the WWV schedule published regularly in *QST*.

With the oscillator calibrated, you are already to check your receiver. Just hook the oscillator output lead to your receiver antenna terminal. Since this unit puts out signals every 50 kc., you can get check points at 3700 and 3750 kc., the limits of the Novice band on 80 meters. In order to be sure you're on 3700 kc., the easiest way is to start at 4000 kc. (the high end of the 75-meter 'phone band) and work down toward 3700. You'll get oscillator signals at 4000, 3950, 3900, 3850, etc. Double check to be sure you have correctly spotted 3700 and 3750 on your receiver dial. Then, to check your transmitter frequency, it is

(*Continued on page 124*)

A Tuned-Line Amplifier for 144 and 220 Mc.

BY RALPH W. BURHANS,* W8FKC

OPERATION on more than one band, at 144 Mc. and higher, usually involves more than one transmitter. The amplifier shown here is an attempt to remedy this situation, and make one transmitter do the work of two. It uses conventional tuned-line tank circuits but with certain mechanical features that may be of interest to other v.h.f. men who must make a little do a lot.

Tuned lines have been recommended for use in transmitters for the frequencies from 144 Mc. up for years. They are more effective than coil-and-condenser tanks at 144 Mc., and a practical necessity at 220 Mc. Everybody knows this, but most of us are not expert machinists, so we tend to shy away from coaxial tank construction. The parallel-line open tank circuit used here falls somewhere between these two extremes, and it is within the capabilities of even haywire artists like the writer.

The amplifier uses an 832A dual tetrode with tuned lines in both plate and grid circuits. It is far more effective than other set-ups using the same tube that preceded it at W8FKC. Its efficiency drops somewhat at 220 Mc., but about 10 watts output is obtainable on this band. The main advantage of the amplifier, outside of its somewhat higher efficiency, is that it may be shifted from one band to the other with very little trouble.

Construction

A standard 5¼ by 19-inch aluminum relay rack panel serves as both panel and chassis. The grid and plate meters were used because they were available. Grid and cathode jacks, or a single meter with switching, could be used equally well. The tube socket is mounted on an aluminum bracket which is off-centered to allow the plate line to be about one inch longer than the grid line. This compensates for the difference in input and output capacitances in the 832A. The paint was scraped off the panel thoroughly at the bracket bolting points to insure good grounding.

The tuning condensers are surplus butterfly types originally used in the SCR-522 transmitter.

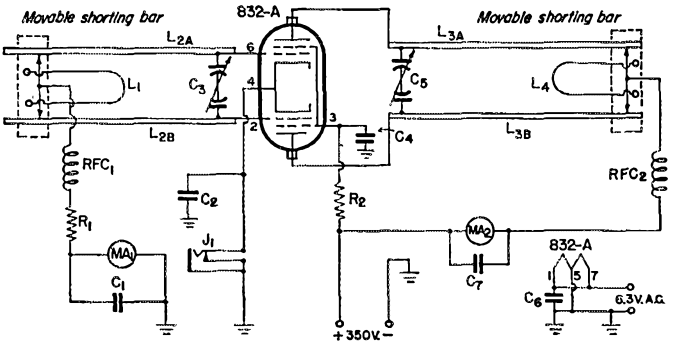


Fig. 1 — Schematic diagram and parts list for the two-band 832A amplifier.

C_1, C_2, C_4, C_6, C_7 — 500-$\mu\mu$fd. ceramic tubular.

C_3, C_5 — 10-$\mu\mu$fd.-per-section butterfly variable.

R_1 — 22,000-ohm 1-watt carbon.

R_2 — 25,000 ohms, 5 watts.

L_1, L_4 — Coupling links No. 12 wire 3½ x ¾ inch wide (144–220 Mc.). 420-Mc. link 1½ x ¾ inch wide.

L_{2A}, L_{2B} — Grid lines 6 inches long, ¼-inch copper tubing with about 1-inch copper strips for tube socket connections.

L_{3A}, L_{3B} — Plate lines 7 inches long, ¼-inch copper tubing with about 1-inch long copper braid to tube plates.

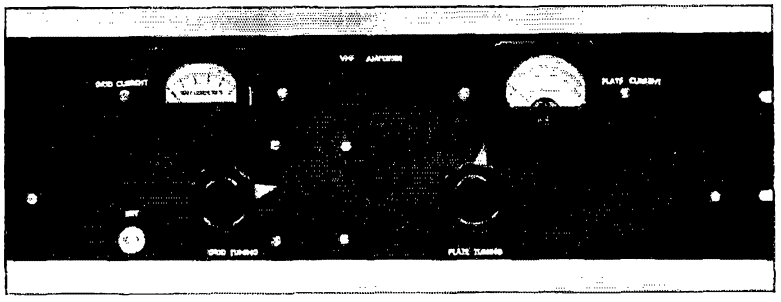
J_1 — Closed-circuit jack for keying.

RFC_1, RFC_2 — 1.7-μh. r.f. choke (Ohmite Z144).

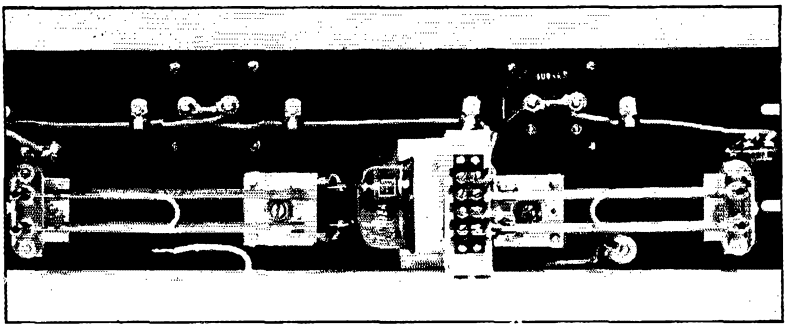
All rotor plates but one are removed, giving a tuning range of approximately 2 to 5 $\mu\mu$fd. Any of several commercially available butterfly variables can be used by a similar removal of plates.

The lines are made of ¼-inch copper tubing, with their open ends supported on National FWC insulators, giving a ¾-inch line spacing. Connection to the tuning condensers is made through fuse clips soldered to the stator terminals. The plate line is 7 inches long, with one inch additional length of shield braid for the flexible

* 120 Aurora St., Hudson, Ohio.



Panel view of the two-band v.h.f. amplifier described by W8FKC.



Rear view of the 832A amplifier, showing the tuned lines used for two-band operation. Adjustable shorting bars, having coupling loop assemblies as integral parts, are used on both lines.

lead to the tube plate connections. Plate clips were made from soldering lugs bent up to fit tightly on the tube pins. The grid line is 6 inches long, with the last inch bent at right angles to make contact to the grid terminals on the socket.

Shorting bars are made from fuse clips spaced ¾ inch and bolted to a copper strip. A National FWG binding post assembly is mounted on this bar, with a clearance of about ½ inch. These binding posts carry the input and output coupling links. The grid r.f. choke and grid leak, and the plate r.f. choke, are mounted directly on their respective shorting bars, as seen in the rear view.

Operation

No neutralization was needed on any of the bands with this layout, though provision was made for it initially. The shielded tube socket and the additional shielding afforded by the mounting bracket seem to serve well in preventing feedback. Removal of the paint from the panel at the point where the tube bracket is mounted probably contributes to the effectiveness of this shielding.

For operation on 144 Mc. the full length of both lines is used. Plate voltage is 350 on all bands, with approximately 3 ma. grid drive. Unloaded plate dip is about 30 ma. on 144 Mc., and the amplifier is loaded to 70 ma. About 15 watts output is obtained. Slightly reduced loading is used on 220 Mc., the plate current running around 60 ma. Output is about 10 watts. The plate shorting bar is about 4 inches from the tube end of the line, and the grid bar about 3½ inches.

The stage has also been operated as a tripler to 432 Mc. with about 50 ma. plate current, delivering a small amount of output. The grid line is used as for 144 Mc., and the plate shorting bar is set about 1½ inches from the tube end of the line. Operation of the stage in this way is not very satisfactory with plate modulation, but as a source of r.f. for driving an additional amplifier, or for low-power use on c.w. or with f.m., it will serve well enough. Better efficiency in tripling is obtained if the grid resistor is changed to about 50,000 ohms, and the grid drive increased to give the same grid current through this higher resistance.

The exciter used with the rig is a 12AU7 overtone oscillator-tripler, 24 to 72 Mc., followed by a 5763 doubler-tripler, to 144 or 220 Mc. This arrangement easily overdrives the final on 144 Mc., and provides the rated grid drive for 220 Mc. Its output is insufficient for driving of 832A as a tripler to 432 Mc., however, so an additional 6J6, operated as a neutralized amplifier on 144 Mc., is used for this purpose.

Strays

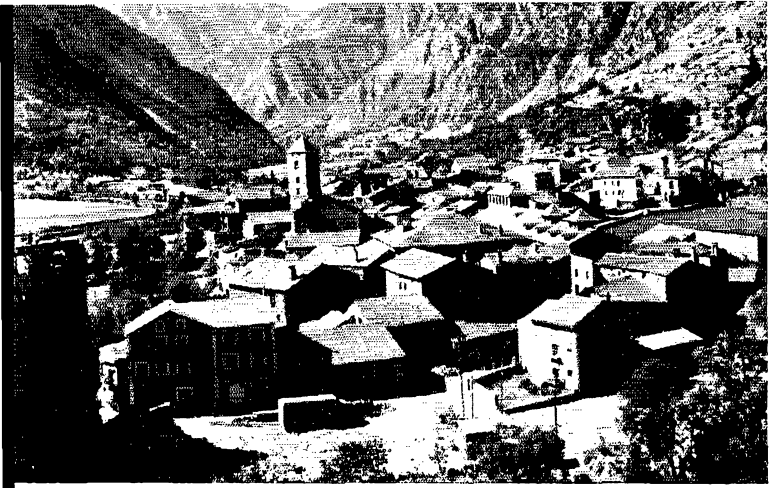
The "Always Be Careful" safety rules appearing in our September editorial have been made available in decal form by Bud Radio, Inc., and may be obtained without cost by sending a stamped, self-addressed envelope to the firm at 2118 East 55th St., Cleveland, Ohio.

—•••—

The Civil Aeronautics Administration has job openings in Alaska, Hawaii and the Pacific islands for Aircraft Communicators and in Alaska for Radio Maintenance Technicians. The former positions pay a starting base salary of $3100 annually, the latter $3450. In addition, cost-of-living differentials up to 25 per cent are paid, depending upon where assigned. Details of minimum qualification requirements and duties may be obtained from the Personnel Section, CAA Aeronautical Center, P. O. Box 1082, Oklahoma City, Okla.

Amateur radio was once again called on to perform an international public service when CT1CL relayed an urgent appeal to the United States for the new drug Varidase, to aid CT1AN's nine-year-old daughter, critically ill with spinal meningitis.

The urgent appeal was received by W4PJU of Clewiston, Fla., who had his "CQ NYC" answered by W2ZOS of Glendale, N. Y. The drug was obtained through the aid of the Long Island *Press* and its chief photographer, W2DHN. Within six hours vials of Varidase were being flown to Portugal. Later, additional quantities of the drug were purchased by the Long Island newspaper and flown overseas but unfortunately the child suffered a fatal relapse after showing improvement from administrations of the drug. Considerable nation-wide note was given this international mercy act.



A view of Andorra la Vella, capital of Andorra.

Operation Andorra

The Story of 7B4QF

BY WILLIAM I. ORR,* W6SAI, FP8AC, 3A2AF

THE number of countries that boast of no amateur activity has indeed dwindled to a handful. One of the most prominent of these is the tiny Principality of Andorra, located high in the Pyrenees Mountains between France and Spain. Isolated most of the year by the furious snows that sweep the region, it has remained an enigma to the rest of the world. It has, however, received a large amount of attention from radio amateurs interested in DX. Almost every DX-minded ham has "worked Andorra" a number of times — PX1A, PX2B and all their brothers and cousins. Unfortunately these stations were not located in Andorra, no matter how convincing a story they told to the gullible. Until June 23, 1951, there had been absolutely no amateur station operating in this tiny country. On that date, at 1632 GCT, 7B4QF commenced operation from the town of Andorra la Vella. This is the story of how this milestone in the history of amateur radio came to pass.

* * *

I suppose it has always been the fond dream of every DX man to imagine himself at the "other end" of a rare QSO. It soothes the ego to think of the rabble calling HIM, and how he will coolly and efficiently work the good operators and ignore the lids calling on his frequency. To one who has experienced this supreme thrill, there is always the desire to recapture the experience. I had this experience when I worked as FP8AC during the summer of 1950; ON4QF had the same results at LX1QF and OQ5QF; SM5UM had whetted his appetite with SM8UM/A; and W8PQQ was enjoying himself as F7AR and 3A2AC.

It was natural then, when we arranged to meet in Paris, that the uppermost thought in our minds was to plan a DX-pedition! I had been licensed as 3A2AF, and Al (W8PQQ) was planning to operate 3A2AC shortly. Obviously something "better" than this should come of this momentous meeting! A quick series of airmail letters revealed the unanimous desire to put Andorra on the air. Mick (ON4QF) had been toying with the thought of this trip for some time and had conducted some preliminary investigations into the status of amateur radio operation in that country. He had made the acquaintance of an Andorran native who owned a radio shop, but had learned little about the operation of a bona fide amateur radio station.

A tentative date of June 15th was agreed upon, and we all planned to meet in Orleans, France, at the home of F7AR. At this stage of the game none of us had the faintest idea of what we were getting into, or what Andorra would be like. An excellent article about Andorra was found in the August 1949 issue of *The National Geographic Magazine*, and that provided us with the backbone of knowledge we needed. A quick letter was sent to Yves Ramon (the friend of ON4QF) in Andorra telling him of our proposed trip and asking information on the line voltage, frequency, and the possibility of obtaining an amateur license.

On the eventful day of June 22nd the expedition assembled at the indecent hour of 6 A.M. in the plaza at Orleans, France. There were eight members of "Operation Andorra": W6SAI and XYL Sunny, F7AR and XYL Connie, SM5UM, ON4QF and his wife and daughter. The previous day had been spent loading F7AR's station into the automobiles. We also took along a complete 5-watt 'phone/c.w. transmitter and a double-conversion receiver belonging to SM5UM. They were built into an R89/ARN-5 case, and perfectly suited for such a trip. In addition, Mick took his 50-watt c.w. transmitter and a BC-348.

* 555 Crestline Drive, Los Angeles 49, Calif.

F7AR's station consisted of an HT-9 and an SX-28, with a separate VFO.

Also crammed into the bulging cars was a rich miscellany of spare tubes, wire, insulators, logbooks, autotransformers, extension cords, soldering irons and other last-minute items.

At the last moment a letter arrived from Yves telling us that the hotel was supplied with both 110 volts and 220 volts at 50 cycles, and for us to come ahead, as he had started negotiations for a license. This was welcome news!

Our expedition started off on a beautiful summer day over the wide express highway that led from Orleans to Toulouse. The drive took us through the heart of the French farmland and it was an awe-inspiring and beautiful sight. We reached Toulouse late in the afternoon. The next morning we started on the last lap to Andorra. The countryside became more rolling and shortly before noon we entered the foothills of the Pyrenees. We followed the excellent road through Foix, Ax-les-Thermes, and at the little town of Merens started the long climb into the mountains. The road narrowed and became steeper. It wound back and forth across deep gorges and flashing waterfalls. Then the ground became harsh, with few plants. The procession slowed to a snail's pace, circling over innumerable switchbacks and hairpin curves. We climbed higher until we were just below the dark clouds covering the mountain peaks. The trees and bushes had disappeared, leaving only rocky, marshy soil. The air grew foggy and a cold wind blew upon us from the pass. All at once the road branched and the right fork had a weatherbeaten sign reading, "ANDORRA — Pas de la Casa — 31 km." We all shouted when we saw the sign, and it helped to break the morbid feeling that had come over the group. We turned off the main road onto the narrow dirt road leading to Andorra. After a short drive along this goat path we reached a little plateau in the center of which stood the French and Andorran customs houses. There was a bright red gate across the roadway. Directly on the other side of the border we could see a few stores and an inn. We drove boldly up to the customs office and presented our credentials. In no time at all we had been inspected and passed and had actually entered Andorra with our equipment. Now nothing was impossible!

With this hurdle behind us, our spirits rose. We drove on a few miles to the pass (elevation 8500 feet) and stopped the cars to celebrate. It was a few steps to the snow, and a snowball battle started with F7AR getting the worse of it. "Boys, we can't miss now," said ON4QF as we got back into the cars. "We can operate from the jail if we have to!"

At this point we suddenly discovered "Radio Andorra" at 709 kc. on our car radios, booming in with a lusty signal, complete with American jazz and singing commercials. We listened to this fantastic station as we traversed the pass and began our descent into the Valley of Andorra.

What a surprise! From the cold and snow of the pass we gazed into a warm valley, with cultivated fields and tiny neat houses. The road wound down into the valley, past rushing brooks and great fields of wild flowers. Thick groves of trees were on the mountainsides, and we could see flocks of sheep and cattle in the distance.

"Shangri-La," said Sunny in a low voice.

* * *

The hotel in Andorra la Vella proved to be somewhat less than a Shangri-La, and modified our previous view considerably. We wound up a jolting cobblestone street to the top of a small hill and ground to a stop in front of an old building. It looked like a small dungeon, made of cement and stones. The entrance was barred by an immense wooden door, complete with gigantic keyhole. We pushed the door open and were greeted with a horrible odor of unwashed plumbing facilities that smote us in the face like a tidal wave.

"OH NO!" said the girls in unison, and for the first and last time our unofficial cheering section wavered and broke ranks. But we had passed the point of no return, and on we must go. The girls shrank from the doorway as if a flamethrower would erupt from it and sear them to a crisp. We entered and found ourselves in the basement! We went up to the first floor and were met by the manager. A long conversation in French between the manager and Mick ensued, with the promise of four rooms on the second floor for us. "Ask him why we can't have rooms on the third floor," said Al. The manager explained that the use of the third floor was forbidden as that floor was occupied by the police force! This startling announcement was received with something less than enthusiasm by the expedition. The manager then told us that the building to which we wished to connect our antenna was the city jail and courthouse. This gave us a very uneasy feeling, and Mick was appointed a committee of one to visit the Council of Andorra at once and request legal permission to operate the station. At this moment Yves Ramon appeared at the hotel, and after introductions, offered to take Mick to the Council. While they were out on this errand of mercy, Gus, Al and I unpacked the equipment and set it up in the hotel room. Gus scrambled over the roof and put up the dipole antenna. Just as all was ready,

The gang at 7B4QF. Back row (*l. to r.*): Mick, ON4QF; Bill, W6SAI; Al, F7AR. Seated: Gus, SM5UM, and Yves, 7B4YR.

Mick returned from his visit to the Council. The head of the Council had not given us a license, as it was not within his power, but he had given us permission to operate an amateur station, since we were legally licensed amateurs in our respective countries. The only qualification was that the equipment must be moved from the hotel to a private building. Acting upon this, it was decided to move the station immediately from the hotel to the home of Yves Ramon, our Andorran friend. Yves very kindly donated a whole ground-floor room to the cause.

Al backed his car up the narrow winding alley that night and we dismantled the station, put it in the car, and drove over to Yves' house. Yves and his friends helped us to install the equipment and erect the antenna, and in a few moments we were on the air. The next morning when Al got a good look at the street he had driven so boldly down the night before, he shuddered and said, "It was a good thing it was dark last night! If I had been able to see where I was going I never would have made it!"

* * *

It was apparent from the very start that any location we chose to operate from in the tiny country would be poor. The inhabited areas consisted of a series of deep valleys surrounded by steep mountain walls that would have defied the efforts of a mountain goat. A huge high-tension line ran along the very crest of the hill and further complicated the picture. The great-circle route to the United States ran directly through the highest and steepest mountain only a few hundred feet away from the station!

The call 7B4QF was chosen for the transmitter and the first CQ was sent out at 1632 GCT, June 23rd. It was answered by EA5AE for the first contact between Andorra and the outside world. In short order I1WBK, DL1LD, SP1SJ, G2UN, OZ2XA, G3ATU, I1XK, I1CFY and G3FXA were worked for the first ten contacts.

The next contact was with 4X4RE for our first Asian QSO. At 1813 GCT we worked Pete, G2PL, who promised to spread the good word that we were on the air. FA8RJ provided our

SM5UM and F7AR erect a dipole. The slippery tile roofs meant that bare feet were mandatory for this job. The range of mountains in the background lay directly on the great-circle route to W-land.

This proves that we were there! SM5UM, 7B4YR and W6SAI (*l. to r.*) pause at the Spanish border of Andorra during the quest for a good radio location.

first African, and PY4ZB our first South American QSO. At 2040 GCT we worked KV4AA for North America and nailed ZL2FA at 2242 for our WAC. Up to this time we had heard absolutely no W stations calling us although we had been told that a few were starting to show up. At 2255 GCT we finally heard and worked W2OW/2 for our first W QSO. We thought that now the jinx had been broken and that we would work them in rapid order, but this was not the case. We did not hear another W until W8CLX broke through at 2326 GCT. The skip to the U.S.A. was very spotty, and for the rest of the night, try as we would, we only worked 28 W stations. At 0210 GCT we worked W5ENE with a weak and watery report of RST 239, and we finally hit the jackpot with W6KIP at 0637 GCT the following morning. GM3EFV provided the first two-way 'phone QSO, and a rare 'phone QSO was had later for 7B4QF's first Andorra contact which was provided by Gus' little transmitter, using the call of 7B4UM. The next night (June 24th) we were all primed for the avalanche of W stations we expected to show up. The fickle band proved to be a traitor to our cause because no W stations were heard until 2215 GCT when W2WZ broke through. A QRZ W?? scared up a few more East Coast stations, but it was obvious that the band was in a bad way. Early the next morning we eavesdropped on an interesting QSO between W6ENV and W1FH, with Andy pumping Charley regarding our whereabouts. A few moments later eight or ten W6 stations were heard but although the 814 at 7B4QF did its best, not a single one could be raised. Disgusted with the situation, we pulled the switch and decided to explore the country in the hopes of finding a better QTH.

While all the preceding had been going on, Yves had been watching with great interest and admiration. As soon as we left the station and were safely out of sight he turned on the equipment, QSYd up to the high end of the band and

worked F9ZK and EA5CW on 'phone! When we returned we held an impromptu celebration and "issued" him the call of 7B4YR. Now we had three active stations!

The search for a better QTH had proven to be fruitless. As a last resort, Al and Mick agreed to put up a V beam on the U.S.A. and Gus and I decided to take 7B4UM up to the 8500-foot pass and operate from the car battery. Our hope was that we would get a reasonably clear shot at W-land from up there. The equipment was taken to the top of the pass and a dipole erected in a driving sleet storm. By the time we were on the air the visibility was zero and the wind was howling around us. We managed to work three stations before we decided it would be too dangerous to remain there any longer. When we drove back into town, the sun was shining, but we could look behind us and see the storm clouds gathering over the pass as though to prevent us from violating the ether!

The V beam proved to be no better than the doublet so far as the U.S.A. was concerned, and 14 Mc. was rapidly getting worse. On June 25th we decided to try 7 Mc. The beam worked excellently on this band and we received very flattering reports all over Europe — but again, no Ws. Our time was rapidly running out, so we switched back to 14 Mc. and our doublet. During the next eight hours we worked five more W stations, ending up with W3OCU. Conditions rapidly grew worse, and at 0724 GCT a contact with G2YS spelled the end of 7B4QF. Other pressing matters were at hand and we had to leave Andorra. Checking back over the logbook we found that we had recorded 480 QSOs, of which only 42 were with W stations. VE1HG gave us our only VE QSO. The remainder were mostly European stations, with a sprinkling of Africans and South Americans.

Once again we met the head of the Andorran Council and expressed our gratitude for his kind assistance and questioned him about the future of amateur radio in Andorra. He was most encouraging, and promised he would do his best to establish a permanent licensing system. Good-byes were said to Yves and his wife, who had been such excellent hosts to us. The equipment was loaded into the car, the hotel bill was paid, and we slowly drove over the mysterious pass and out of the fantastic world of Andorra and back into the Year 1951.

* * *

A recent letter from Yves stated that a French radio inspector has arrived in Andorra for the express purpose of providing a means of licensing amateur stations in that country. The REF has informed F7AR that the French Government has given informal approval (intent to take no action) regarding the expedition, and the REF will count 7B QSL cards for the DUF award. Yves hopes to be on the air shortly. As to other expeditions to Andorra, that remains to be seen. But the spell has been broken. Andorra *has* been on the air, and *will* be on again!

I.A.R.U. NEWS

ISRAEL

Recently admitted to the I.A.R.U., the *Israel Amateur Radio Club* reports a membership of 300, including short-wave listeners. Forty of the country's approximately 100 licensed amateurs are members of the club. First official license examinations were held last February by the Department of Post, Telegraph and Telephone of the Ministry of Communications. Previously, licenses were granted on a temporary basis pending the examinations. A code speed of 12 w.p.m. is required for the Class B license which permits a maximum power of 25 watts. The Class A license, permitting a maximum power of 40 watts at present, requires a code test of 16 w.p.m.

CUBA

The "Day of the Radio Amateur," celebrated on April 1st, proved to be a gala event for Cuba's amateurs this year, with many activities scheduled, highlighted by luncheons at several different cities throughout the country where amateurs gathered. Created by the *Radio Club of Cuba* in 1933, this year's event included a national contest at which prizes were awarded and a visit made to CMQ-TV by the Havana group.

Cuban amateurs and government notables gathered at a luncheon in Havana to help celebrate "Radio Amateurs Day." *Left to right:* Cmte. E. Ramos Izquierdo, vice-president of the *Radio Club of Cuba*; J. Baquere, chief of radiocommunications, Ministry of Communications; Luis Garcia Pell, CO2CQ, R.C.C. president; Jose J. Sentmanat, director of radio, Ministry of Communications; Dr. J. R. Gutierrez, Legal Department chief, Ministry of Communications; and Alberto Giro, CO2QY, founder of the *Radio Club of Cuba*.

QSL BUREAUS

The following changes and additions to the QSL bureaus of the world should be noted. The last complete list of bureaus appeared on page 62, June 1951 *QST*.

China: M. T. Young, C3MY, P. O. Box 16, Taichung, Formosa, China.

El Salvador: Oscar R. Orellana, YS1O, Apartado 329, San Salvador.

(*Continued on page 118*)

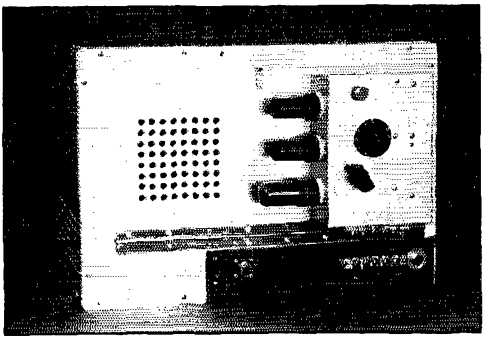
Screen-Grid Modulation of the Modern-Style 813 Transmitter

Low-Cost 'Phone As Applied to a Currently Popular Rig

BY RICHARD M. SMITH,* W1FTX

CLAMP TUBE MODULATION owes most of its current popularity to the fact that it is an inexpensive way to put a 'phone signal on the air. Most rigs of modern design use screen-grid tubes in the final amplifier stage, with a clamper tube to eliminate the need for fixed bias. On paper, it seems but a short jump from such a rig to a clamp tube-modulated 'phone. It was to be expected, then, that we would be asked how to apply the system to the 813 transmitter described in a recent issue of *QST*.[1]

The result was a series of events starting with an investigation of the screen-grid characteristics of the 813, and ending with the little modulator unit described here. It provides 'phone operation at low cost, and can be installed without requiring much more space than before the audio equipment was added. Its use is not confined to the 813 by any means. The unit can be used with almost any screen-grid tube encountered in amateur service.



This is just one of many ways the screen-grid modulator can be installed with the 813 transmitter. Compact in size, it can occupy ordinarily wasted space in the rack. Placing it on the rear of the shield enclosure results in neat, short interconnecting leads. The microphone jack is near the top of the unit in this view, with the gain control near the center and the 'phone-c.w. switch near the bottom.

Actually, we wound up with something a bit different from the clamp tube system we had in mind at the start. Investigation showed that clamp tube modulation of an 813 (and probably of other similar tubes) is wasteful of both power and equipment,[2] and that equivalent results can be obtained by means considerably less critical and more efficient.

*Technical Assistant, *QST*.

[1] Smith, "Building an 813 Transmitter — Modern Style," *QST*, July, 1951.

[2] Technical Topics, "Clamp Tube Modulation," *QST*, March, 1950.

• This isn't clamp tube modulation, but something better. It gets the same results, accomplishing them in a more efficient, less expensive way.

Abandoning the clamp tube idea and merely applying the audio voltage to the screen grid through an inexpensive driver transformer produces the desired result with a lot less fuss and bother. Changes to the transmitter are reduced to a minimum, and the entire system is easier to adjust.

Design & Construction

We selected the 6V6GT as our modulator because it is rated for 4.5 watts output as a Class A amplifier, yet its own power-input requirements are slim. Even after allowing for transformer losses, the 6V6GT has enough in reserve above our requirements to permit the application of inverse feed-back to provide good voltage regulation. While the feed-back reduces the voltage gain of the stage, this is recovered by using a 1:2 step-up ratio in the output transformer.

To drive the 6V6GT from the average crystal microphone, two stages of resistance-coupled voltage amplification are used, as shown in Fig. 1. Inverse feed-back is applied by means of R_{10} and R_{11}, which comprise a voltage divider across the primary of the output transformer. The load resistor for the 6J5 stage is returned to this divider to obtain the required feed-back.

The unit can be built in almost any form. We chose the arrangement shown in the photographs because it results in a compact modulator that can be bolted to the rear of the transmitter, thus utilizing some of the space that is ordinarily wasted in rack-mounted rigs and keeping the operating desk clear of additional encumbrances. The fact that the gain control and on-off switch are available only from the rear of the rig is of no consequence. They are usually adjusted at very infrequent intervals.

Arrangement of the parts within the 5 × 7 × 2-inch aluminum chassis is shown in the photographs. Care should be taken to shield the lead from the microphone input jack to the grid of the 6SJ7, as well as the grid leak, R_1. About the only other precaution necessary is to keep the filament transformer away from the grid of the first audio stage. This is done by placing T_1 in one corner of the chassis, and then placing a small aluminum shield partition between it and

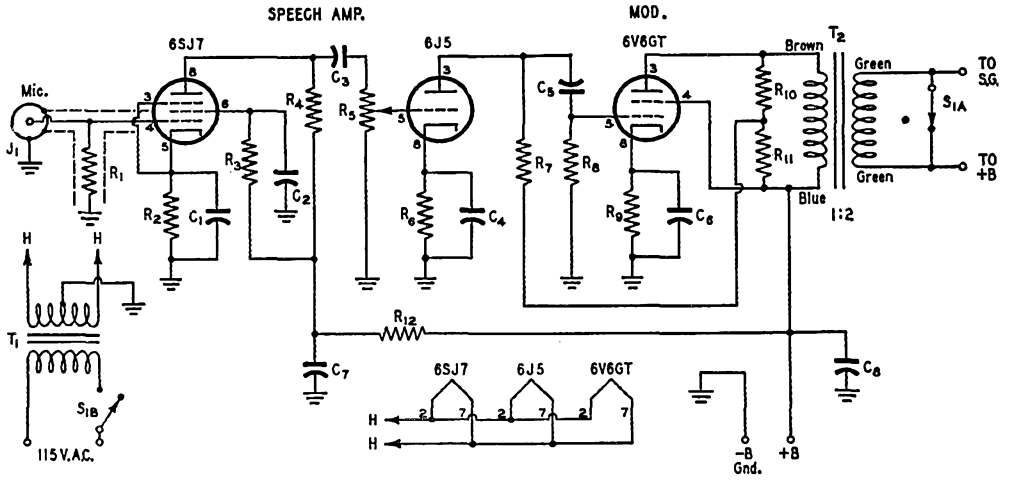


Fig. 1 — Schematic diagram of a screen-grid modulator.

C_1, C_4 — 10-μfd. 25-volt electrolytic.
C_2 — 0.1-μfd. 400-volt paper.
C_3, C_5 — 0.01-μfd. 400-volt paper.
C_6 — 50-μfd. 50-volt electrolytic.
C_7, C_8 — 10-μfd. 450-volt electrolytic.
R_1 — 2.2 megohms, ½ watt.
R_2, R_6 — 1500 ohms, ½ watt.
R_3 — 1 megohm, ½ watt.
R_4 — 0.22 megohm, ½ watt.
R_5 — 1-megohm potentiometer, audio taper.
R_7, R_8 — 0.1 megohm, ½ watt.
R_9 — 235 ohms, 2 watts. (Two 470-ohm 1-watt units in parallel.)
R_{10}, R_{12} — 47,000 ohms, 1 watt.
R_{11} — 27,000 ohms, 1 watt.
J_1 — Microphone jack.
S_1 — 4-pole 2-position rotary switch (see text).
T_1 — 6.3 volts a.c., 1-amp. filament transformer (Merit P 2944).
T_2 — Audio driver transformer, single plate to push-pull grids, with tapped primary (Stancor A-4752).

the 6SJ7 socket as shown in the bottom view. The partition is extended a bit more than is actually needed for shielding, but it also holds several tie points used in wiring the smaller components.

Placement of the gain control, the microphone input jack and the on-off switch is shown in the rear view of the assembled transmitter. A multi-circuit switch is shown in the photograph, although Fig. 1 calls for only a two-pole affair. As explained later, the extra circuits of the switch can be used to change the transmitter operation from 'phone to c.w. The terminal strip for interconnection of the two units is placed so that it will overhang a similar strip on the transmitter, making for short leads and neater installation.

Adjustment & Operation

As in control-grid modulation, screen-grid modulation requires that the amplifier be operated at considerably less than maximum carrier efficiency. It is necessary, therefore, to reduce the screen supply voltage to about half of normal. In the case of the 813, best operation can be obtained with about 250 volts d.c. applied to the screen, through the secondary of the output transformer, of course. Plate supply for the audio tubes can in most instances be obtained from the same source used for the exciter stages of the transmitter. Anything between 250 and 300 volts d.c. should do. Total drain of the modulator unit under full output is only 60 ma. at 300 volts.

Some other changes in operating conditions are necessary when the screen grid of an 813 is modulated. We found the most satisfactory arrangement to be with 1250 to 1500 volts on the plate, 250 volts on the screen, and 8 to 10 ma. grid current through a 10,000-ohm grid leak. At higher plate voltages adjustment becomes quite critical because the tube must operate at approximately 35 per cent plate efficiency. Slight misadjustment under these conditions results in exceeding the plate-dissipation rating.

Best adjustment of the amplifier can be made while observing the "wedge" pattern on an oscilloscope as described in *The Radio Amateur's Handbook*. This permits both linearity and percentage of modulation to be observed. If possible, use a constant tone input to the audio unit while adjustments are being made. If the 'scope pattern indicates nonlinear operation,[3] the cause can usually be traced to insufficient loading or excessive grid drive. Under the conditions outlined above, screen current should be 10 ma. or less, and plate current about 140 ma. A reasonably accurate check on loading can be made by tuning the plate tank condenser through resonance and watching the plate milliammeter. If a sharp dip is observed at resonance, the amplifier is too lightly loaded and nonlinear operation will result. If too heavily loaded, there will be no dip at all, and the plate of the tube will probably heat up. Under correct loading, there will be a slight dip at resonance, and the plate of

[3] Photographs of typical patterns obtained are shown on page 285 of the 1951 edition of *The Radio Amateur's Handbook*.

the tube may show a faint red color, indicating that it is operating at its 125-watt plate dissipation rating. This is about the best operating point. Greater plate efficiency will result in non-linear operation with splatter. Lower efficiency will cause excessive plate heating.

In observing the 'scope pattern, it will be noted that there is a slight departure from linearity of the negative peaks when the modulation percentage approaches 100. This shows up as a slight "blunting" of the point of the wedge pattern. This is typical of screen-modulated amplifiers, and is not ordinarily serious enough to cause concern. Provided that the gain control is set at a reasonable level so that peaks do not go beyond 100 per cent, the splatter introduced will not be objectionable.

If the modulation as indicated by the 'scope is unsymmetrical (flattening of positive peaks before 100 per cent modulation is reached), reversing the connections to the primary of the output transformer should rectify the situation.

If you don't have an oscilloscope, the following method of adjustment should be used. First, adjust the amplifier to give optimum output with 500 volts applied to the screen. This exceeds the tube ratings by 100 volts, but should not result in damage provided the tube is not operated at this level for more than the few moments it takes to tune up. Note plate current and r.f. current into the feeders. Then reduce screen voltage to 250 volts. If plate and feeder current both drop to half of their initial values, the amplifier adjustment is correct. If not, plate loading and grid excitation should be varied until this condition is approximated.

Regardless of the method used to adjust the amplifier, operating conditions should be checked whenever frequency is changed appreciably. Loading is perhaps the most critical factor involved here, and even the seemingly slight difference in load conditions experienced when changing frequency within a given band may be enough to cause a serious departure from linearity.

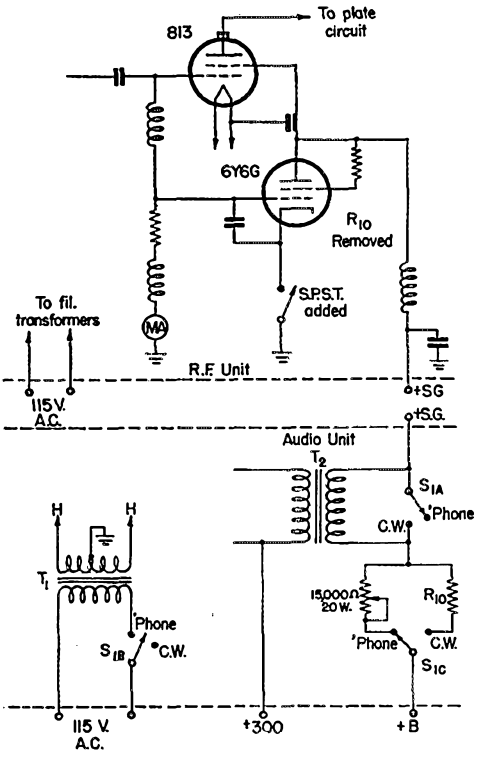
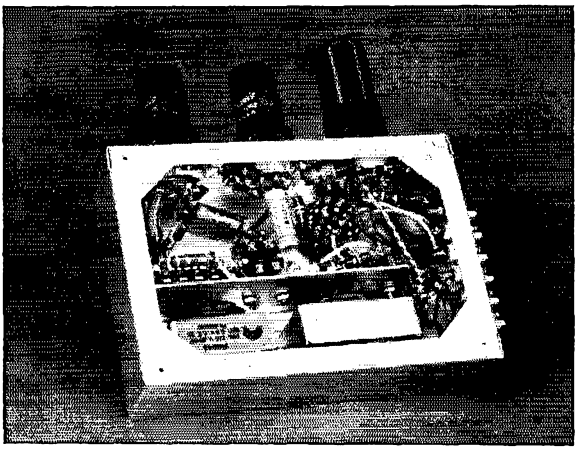


Fig. 2 — A practical application of the modulator unit. The switching action in going from 'phone to c.w. is discussed in the text. A 400-volt supply is used for c.w. operation, and the adjustable resistor is used to reduce this to 250 volts for 'phone operation. R_{10} is a 2000-ohm 10-watt unit removed from the transmitter. The switch and the resistors are mounted within the audio unit.



Bottom view of the unit, showing location of principal parts. The shield partition is insurance against hum pick-up from the filament transformer which is in the lower left corner. The output transformer is also small enough to fit inside the chassis, resulting in an extremely compact audio unit.

Application Notes

When the modulator is used with the transmitter shown in the photographs [1] a few minor modifications in the circuit of the transmitter are required. The 6Y6G clamp tube must be made inoperative, because insufficient bias for it is developed when grid current is reduced to the proper operating point. If only 'phone operation is contemplated, merely remove the 6Y6G from its socket. If both 'phone and c.w. operation are desired, a switch may be wired into the cathode circuit of the tube so that it can be grounded for c.w. use and opened for 'phone. One of the extra sections of S_1 in the modulator unit can be used for this purpose, but if you don't care to bring the cathode lead out of the transmitter, a toggle switch can be installed on the panel.

In addition, screen resistor R_{10} in the transmitter has to be reckoned with. It is needed for

(*Continued on page 124*)

Happenings of the Month

F.C.C. NOTES — AMATEUR CALL SIGNS

At its recent meeting the ARRL Board of Directors decided to ask FCC to issue two-letter calls to amateurs who had been licensed at least 25 years previously and who had been continuously under license for the past 15 years. The aim was to carry out the tradition that a two-letter call signifies seniority in the amateur game. What no one knew at the time was that as part of a campaign to reduce the workload in the face of budget cuts and increases in the rate of licensing, FCC had just about made up its mind to drop *all* special call-letter provisions from our rules. So the League's request has been rejected, and right on its heels has come a notice of proposed rule-making which will leave our rules saying, in effect, that henceforth all amateur call signs will be assigned in routine sequence. There would no longer be provisions for getting your old call back if you return to ham radio after dropping out a few years, or if you move back into a call area where you previously were licensed; no special calls for events of public interest (such as the -USA suffix for fairs and exhibits); no two-letter calls available to former holders thereof — in fact, no more new two-letter calls.

This notice having been received just as we go to press, the official position of the League has not yet been established; early Executive Committee consideration will enable League comment to be filed well in advance of the October 26th deadline.

LICENSE PLATES

Two more states have authorized call letter license plates, bringing to 14 the total number of which the Headquarters has record.

The Southwest Missouri Amateur Radio Club started the ball rolling in that state and under the guiding hand of WØHUI a bill was introduced. With the support of the amateurs, Chamber of Commerce groups, Red Cross, civil defense agencies, railroads and business organizations, the bill passed the House and Senate without a single dissenting vote, Governor Forrest E. Smith signing it into law shortly thereafter. The governor commented that he had received more mail requesting his approval of this bill than the total received for all other bills. Coöperation was the keynote of success and WØHUI was ably assisted by many Missouri amateurs, most notably WØs BGE, JXJ, TGG, EBE, GBJ, BPD, BHC and AFU.

On the same day that Missouri's governor was signing that state's bill into law, Governor Gordon Persons was affixing his signature to a similar measure for Alabama. The Birmingham Amateur Radio Club, led by its president, W4RTI, was instrumental in securing approval of this legislation. Prepared by W4EBZ and RTI, the bill did not have much trouble passing both houses with good support being received from Alabama amateurs writing and radiogramming their legislators urging support of the measure. W4s GET, EBD, NOZ and RKS along with RTI journeyed to the state capitol lobbying for passage of the bill. Credit also goes to the Alabama Emergency 'Phone Net for their assistance. Personal contact with members of the legislature was deemed important and Alabama amateurs working toward the successful passage of the call letter license plate bill made every effort to familiarize each legislator with the bill and the public service work of the amateur fraternity.

New Jersey amateurs received a jolt when the governor, in a surprise move, vetoed the license plate bill for that state, having previously assured amateur groups that he would approve it. Commending amateurs for their work, he cited costs and possible future requests from other groups for such a privilege in his veto message to the General Assembly.

An enlarged and revised League bulletin on call letter license plates is now available upon request to groups interested in securing passage of such legislation in their states.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/WØTQD will be made on October 17th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7120, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP only* will be transmitted on October 7th at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date	Subject of Practice Text from August *QST*
Oct. 3rd:	*Radio Control of Model Aircraft*, p. 12
Oct. 5th:	*Seven Bands at Low Cost*, p. 15
Oct. 9th:	*Radiological Monitoring*, p. 21
Oct. 11th:	*A First Receiver for the Novice*, p. 24
Oct. 15th:	*Ten-Meter Mobile . . .*, p. 28
Oct. 19th:	*An Easily Adjusted Low-Frequency Mobile Antenna*, p. 37
Oct. 23rd:	*Amateur Mobile Power Sources*, p. 42
Oct. 25th:	*A V.T. Voltmeter/S-Meter . . .*, p. 48
Oct. 29th:	*Crystal Lattice Filters . . .*, p. 52

Results, 17th ARRL DX Contest

THE four week ends of the 17th ARRL International DX Competition, held last February and March, were periods of intense activity on the bands from 3.5 through 28 Mc. They produced the usual burst of activity among amateurs who specialize in the romantic pursuit of radio contact with far-off places and who look forward eagerly to this annual opportunity to test their skills and add to their station DX operating achievements. The old-time DXers were in there upholding their reputations. The newcomers kept the more experienced operators on their toes trying to keep up with the furious pace usually set in all such open DX competitions. No respecter of contest periods, Old Sol and his sunspots didn't provide the coöperation extended in previous years. Propagation conditions were reported generally poorer than during the last few years. Ten meters, the band that usually gives the lower-powered stations a break, was much below par; conditions on other bands were far from optimum. With the typical determination and fortitude that are so necessary in working DX, however, contestants took the poor conditions in their stride and came up with many excellent scores.

In accordance with usual policy, the competition for awards was confined to participants in each ARRL mainland section and in each country outside the W/VE/VO area from which qualifying entries were received. In the U. S.-Canada area, 66 c.w. participants will receive certificates and 53 go to 'phone entrants. Outside W/VE/VO, 69 c.w. and 52 'phone certificate awards will be made. The calls of the award winners are listed in the accompanying score tabulations.

Highlights, C.W. Section

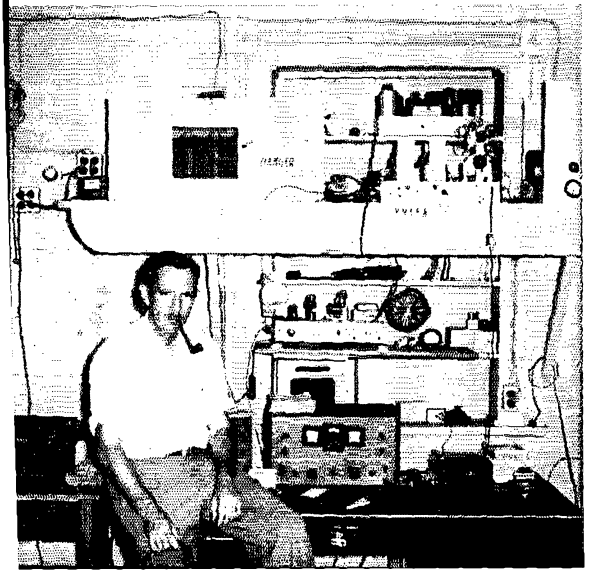
Want to see how your c.w. score stacks up against those of the top entrants in each U. S. and Canadian licensing area? Then check it against the following tabulation of W/VE/VO area leaders:

W1AXA	104,085	WØDAE	87,750
W2WZ	202,973	VE1PQ	14,841
W3LOE	293,022	VE2BK	12,546
W4KFC	247,818	VE3IJ	12,880
W5ENE	163,326	VE4RO	76,818
W6GRL	173,400	VE5QZ	4131
W7DL	68,265	VE6MC	135
W8JIN	210,357	VE7VO	31,580
W9LM	197,580	VO1W	6732

Holding a substantial lead over all other U. S.-Canadian contestants, W3LOE tallied the largest contact total, 451. Next in line were W3BES 424, W4KFC 401, W2WZ 377, W8JIN 371, W9LM 356, W8BHW 352, W6GRL 340, W4BRB 327, W5ENE 326, W2SAI 326, W3MSK 319, W6ITA 318, W6MVQ 301, W3JKO 299, W3GHS 298, W6FSJ 295, W3JTC 292, W4JDR 290, W4BGO 289, W6AM 285, W3BVN 284, W3JTK 282, W4OM 282, VE3IJ 280, W6ITY 278, W3NOH 276, W3PDX 272, W9GRV 271, W8DX 266, W3DOE 261, W6CEM 259, W1AXA 257, W2PWP 251.

John Remish, W8HRV, talked his way through 268 contacts for a multiplier of 98 and 78,792 points, the top W8 'phone score.

Highest multipliers (sum of countries-worked totals for each band) in W/VE/VO: W3LOE 219, W3BES 212, W4KFC 206, W8JIN 189, W9LM 185, W2WZ 183, W8BHW 180, W2SAI



♦

Outstanding North American c.w. scorer was Dick Spenceley, KV4AA, who racked up the terrific contact total of 2389, multiplier of 91, and 649,467 points.

Alvin U. Haugin, WØPRZ, South Dakota 'phone winner, relaxes after making 72,075 points to become the top-scoring WØ 'phone entrant.

173, W4BRB 170, W6GRL 170, W5ENE 167, W6MVQ 161, W3MSK 161, W4JDR 160, W3PBX 155, W6ITQ 155, W3GHS 152, W6FSJ 151, W4BGO 150, W4WY 150, W9GRV 149, W3JTK 148, W3JTC 147, W3BVN 146, W6AM 145, W4OM 145, W6ITY 144, W8DX 143, W6CEM 141, W3NOH 140.

Outside the U. S.-Canada area, the leading scorers in each continental area were as follows: *Africa* — EK1AO 95,574; *Asia* — 4X4RE 24,534; *Europe* — GW3ZV 102,024; *North America* — KV4AA 649,467; *Oceania* — KH6DK 367,875; *South America* — LU1DH 55,341.

Leaders in number of contacts with W/VE/VO: KV4AA 2389, KP4KF 2321, HP1BR 2047, KH6DK 1635, KH6IJ 1574, KH6MG 1466, VP7NM 1343, ZL1BY 1157, ZL1MB 962, KP4IQ 862, TF3BG 858, EA4CM 800.

With a very comfortable lead on his competition, KV4AA chalked up the top multiplier outside W/VE/VO, 91. Other high multipliers: HP1BR 79, KP4KF 79, KH6MG 78, KH6BK 75, KH6IJ 74, KP4KD 67, KP4IQ 65, ZL1BY 61, KP4JE 57, TI2TG 55.

'Phone Highlights

The following tabulation lists the high 'phone scorer in each U. S. and Canadian licensing area from which entries were submitted:

W1ATE	162,048	W9RBI	69,000
W2OFJ	67,830	WØPRZ	72,075
W3BES	126,504	VE1RR	19,740
W4DCQ	177,237	VE2ADB	18,765
W5ALB	15,960	VE3AUJ	34,560
W6HX	93,264	VE4RO	25,728
W7DL	35,820	VE5CX	342
W8HRV	78,792	VE7VO	19,737

In a close race for top contact honors, W1ATE came out on top with 422 QSOs, just exceeding the 419 contact total made by W4DCQ. Other high contact totals: W4ESK 416, W6AM 402, W4BGO 384, W3BES 368, W6HX 358, W3LTU 324, W4KWY 316, W3DOE 315, W3DHM 302, W6PWR 300, W6ITY 280, W8HRV 268, W4OM 263, WØRRZ 259, W2OFJ 238, W8REU 233, W9RBI 230, W4VAN 206, W6NIG 203, W8HUD 201, W4NTZ 200.

Highest 'phone multipliers in W/VE/VO: W4DCQ 141, W4ESK 128, W1ATE 128, W3BES 126, W3DHM 125, W4KWY 115, W3LTU 113, W3DOE 111, W4OM 108, W9RBI 100, W8REU 99, W8HRV 98, W8HUD 97, W6AM 97, W2OFJ 94, WØPRZ 93, W1BLF 93, W8NXF 91, W1BFB 89, W6HX 87, W3GHS 81, W6PWR 81, W3LOE 80, VE3AUJ 80, W2DSU 79, W6WB 76, W2PVG 75, W4VAN 75.

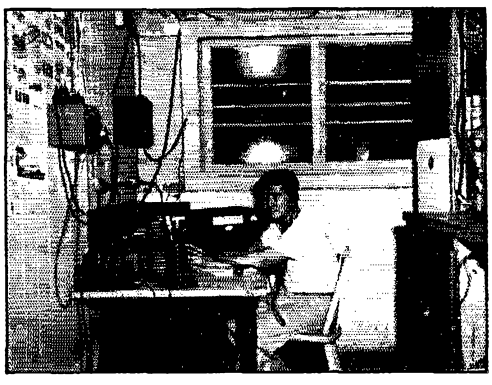
The top scorers in each continental area outside the U. S. and Canada were as follows: *Africa* — ZS6DW 47,124; *Asia* — TA3GVU 144; *Europe* — I1US 32,076; *North America* — VP6SD 195,360; *Oceania* — ZL1MQ 11,728; *South America* — HC2OS 109,680.

Top 'phone contact totals from outside W/VE/VO: VP6SD 1093, LU5AD 708, KH6IJ 693, VP7NH 636, HC2OS 610, LU6BK 584, KH6MG 580, XE2W 487, ZS6DW 476, KZ5NM 420, CN8EP 405, I1US 400, YN4CP 375.

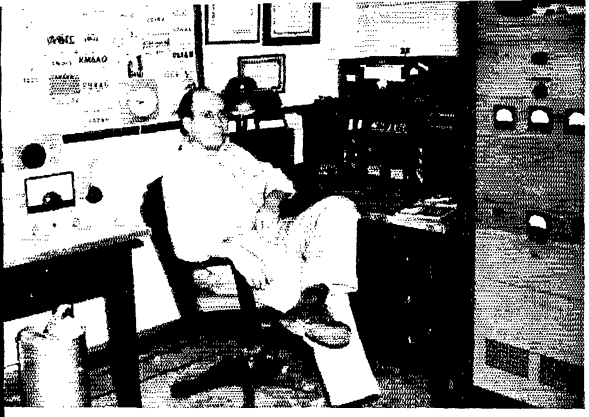
Honors for the highest multiplier scored by a participant outside the W/VE/VO area were shared by VP6SD and HC2OS, each with 60. Next in line: XE2W 56, KH6IJ 46, KH6MG 46, VP7NH 43, KP4DU 43, KL7NXI 40, KP4KD 37, TI2TG 36, YN4CB 35, KZ5NN 34, ZS6DW 33, G2PU 33, YS1IO 33, LU5AD 33.

Club Scores

The competition for the special gavel with engraved silver band, offered to the radio club whose members submitted the highest aggregate score, produced a spirited race between the Frankford Radio Club of Philadelphia and the Potomac Valley Radio Club. The Frankford group nosed out Potomac to win the award, their fourth in ARRL DX contests. The Southern California DX Club, 1950 gavel winners, deserve special mention for the seven-figure score that earned them third place.



Sadama Katahara, KH6DK, Hawaiian winner, finished up with a fancy 367,875 points, 1635 contacts and 75 multiplier, to lead all other entrants from Oceania.



Wide-spaced rotaries on 10 and 20, a fixed beam and ground plane on 40, helped Jim Ringland, W8JIN, to chalk up the top W8 c.w. score, 210,537 points.

♦

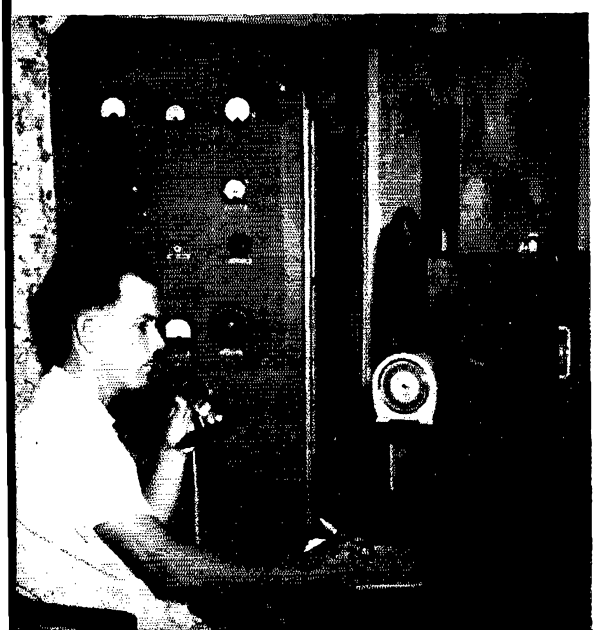
Twenty-eight other clubs entered the competition. Their aggregate scores are listed in an accompanying tabulation. Special certificates are being awarded to the leading 'phone and c.w. operators in each club that submitted the minimum number of entries required by the rules for such individual awards.

Disqualifications

The number of disqualifications in this contest was far below that usually made in DX contests. The following entrants are deemed ineligible for contest listings or awards in the 1951 DX Competition. In each case disqualification is for off-frequency operation as confirmed by a single FCC citation or advisory notice or two ARRL Official Observer measurements: C.w.: W3CDG, F8TQ. 'Phone: W3EVW.

Sidelights

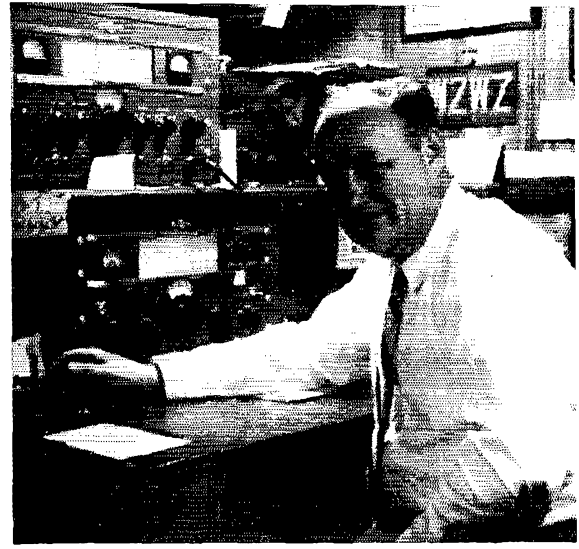
"Poorest conditions ever encountered during a contest, but best operating practice ever noted!" — *W5ZD*. . . . "10 meters a total loss, almost. Conditions rather poor, with Asian contacts a rare thing. Operating practices were good with very few 'hogging' tendencies. Good contest." — *W2FBA*. . . . "How can this fellow ZL1BY manage to call everyone by their first name during the heat of battle? I must have listened to a dozen consecutive contacts and he never missed a name!" — *W3LUL*. . . . "Not much of a score, but still lots of fun. Working 4X4RE and SVØWH on 3.5 Mc. was really a big thrill. Nothing like the ARRL DX contest!" — *W2JME*. . . . ". . . it was great fun, if for nothing else than showing the East Coast boys we can work through them!" — *WØDU*. . . . "Band conditions: 27/28 Mc. — poor; 14 Mc. — variable; 7 Mc. — fair; 3.5 Mc. — fair to good. Top DX operating honors for skill and dispatch should go to KP4KF this year." — *W1ODW*. . . . "Had fun listening to the boys banging away. Was quite thrilled to work HP1BR from here on 3.5 Mc. with low power! Maybe next year will be better set up to go after a bigger score." — *W7CWN*. . . . "It was rather rowdy at times, but I think this bit of temper was due to poor conditions rather than to poor sportsmanship. Hope to see you again next year." — *W1BIL*. . . . "I don't know how you arrange the dates for this contest, but every year we get an ice storm in the Middle West during the second half of the c.w. contest. This year, as usual, ice put both my antennas out of business for the last two days of the contest. Sure is tough when the weather gives you competition too! Pet peeves: Bum notes! W6s calling European and African DX when the DX is working the East Coast only. Stations calling DX when they don't even hear it — just riding along on someone else's call and hoping! Jamming DX frequency with calls when the DX station is trying to receive his number from a W or VE station. — *WØARH*. . . . "Conditions on 10 were terrible. Not so with 160. Too bad more fellows didn't try that band." — *W2WC*. . . . "This was my first contest since the '30s. Conditions were rather poor and was also plagued with a healthy power leak. Lack of beam a handicap — antennas low — highest point about 35 feet. Hope to do better next year. Had fun, though!" — *W6BYH*. . . . "The power and equipment used were the same as last year. Conditions were very bad on 27 and 28 Mc. and poor for the 14-Mc. band. The best band here was 7 Mc.; 3.5 Mc. was also good." — *EK1AO*. . . . "Biggest kick from working five ZLs in less than an hour on 3.5 Mc. and then my first VK right after, all with the little rig here and a new vertical antenna." — *W9BQM*. . . .



♦

Sydney Lashley, VP6SD, used a three-element rotary, HQ-120 and Eddystone 680 receivers, and 500 watts to an 813 to score 195,360 points, the leading North American 'phone entry.

John Stobbe, W2WZ, appears quite satisfied after scoring 202,973 points, the highest from the W2 area.

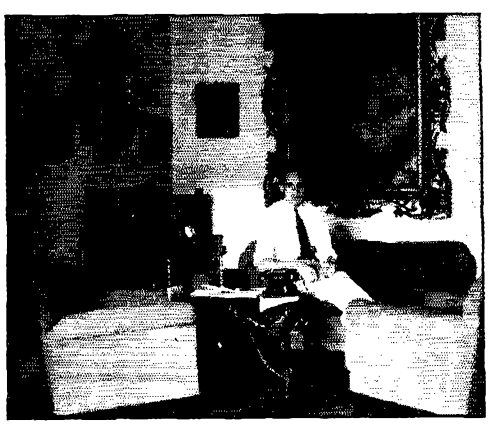


♦

"Power is obtained from low voltage overhead distribution and even with a Variac it is almost impossible to keep pace with the voltage fluctuations and my note suffered a bit at times. I hope to be on again for the 1952 contest. I have sent QSL cards for every QSO made during the contest. Many thanks for another very enjoyable contest." — *ZE3JP*. . . . "My best compliments to all U. S. amateurs for their FB receivers and antennas that pulled through my 20 watts input!" — *HB9CI*. . . . "Many thanks for a nice competition, but very sorry about the very bad conditions." — *SM6ID*. . . . "Sure glad to be able to give the W and VE boys a number. The Ws sure went wild over me. I worked as many as possible. Hope to see the gang in the next contest." — *TI2TG*.

—•••—

Make your plans *now* to take part in the 18th ARRL International DX Competition, the dates of which will be announced in November *QST*.



From this comfortable-looking corner in his home, EA4DB made 273 contacts and 16,140 points to win the 'phone award for Spain.

Get that station gear and those antennas readied beforehand. Preparations made now will pay off when the opening bell sounds next February!

—•••—

The operators of the stations listed below, although not wishing to enter for competition, did send in contest logs for checking purposes. Their assistance is gratefully acknowledged. *C.W.*: W1s ONV, CPS. W2s CDP, FE. W3s KXP, AKG, OOU, NCF, LPF. W4s AWS, PHJ. W5s USN, RX. W6s FJD, LON, NTR. W7s KBO, ETO. W8s YCT, GSJ. W9s MQK, TMU. VE1AE, VE2AIE, VE3XY, VE7WL. CR7CR. FK8AC. F9RS. G6BB. GM3EST. KL7ADQ. OK1DE. ZL3GR. *'Phone:* W1DR. W3NQC. W5CEW. W7DAA. W8s GDB, ICC. HP1BR. ST2KR.

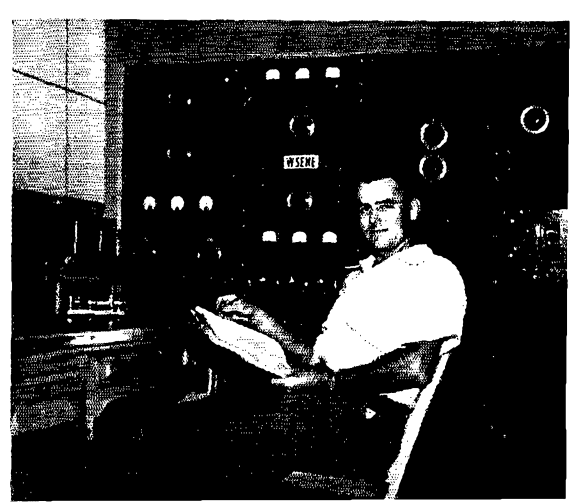
♦

Ben Holloman, W5ENE, makes a habit of winning DX contest awards. In addition to being the top W5 c.w. scorer this year, he won his fourth consecutive section award.

C.W. SCORES

Seventeenth International DX Competition

Operator of the station first-listed in each section and country is winner for that area, unless otherwise indicated. . . . Asterisks denote stations not entered in contest, reporting to assure credit for stations worked. . . . The multiplier used by each station in determining score is given with the score — in the case of U. S.-Canada this is the total of the countries worked on each frequency band used; in the case of non-W/VE/VO entries it is the total of the U. S.-Canada districts worked on each band. . . . The number of contacts established is next listed. . . . The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 100 watts; B indicates over 100 watts, up to and including 500 watts; C indicates over 500 watts. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Example of listings: W3BES 269,664-212-424-C-76, or final score 269,664; multiplier 212; 424 contacts; power over 500 watts; total operating time 76 hours. . . . Stations manned by more than one operator are grouped in order of score follow-



ing single-operator station listings in each section or country tabulation; calls of participants at multioperator stations are listed in parentheses.

ATLANTIC DIVISION

E. Pennsylvania

W3BES.....269,664-212-424-C-76
W3GHS.....135,888-152-298-C-58
W3NOH.....115 920-140-276-C-70
W3DOE.....106,488-136-261-C-61
W3EQA.....94,941-137-231-C-70
W3CPV.....89,560-123-240-C-70
W3GHD.....85,166-119-238-B- -
W3DGM.....79,611-119-223-C-60
W3ALB.....58,104-108-180-C-35
W3ADZ.....29,748- 74-134-C-33
W3CTJ.....24,156- 66-122-C-50
W3CGS.....19,662- 58-113-C-29
W3KEW.....16,560- 60- 92-C-29
W3EVW.....16,377- 53- 93-C-19
W3MLW.....16,308- 54-103-B-56
W3ORU.....10,437- 49- 71-C- -
W3ALX.....10,434- 47- 74-B- 8
W3OCU.....9596- 41- 78-C-14
W3CHH.....8832- 46- 64-B-15
W3IMV.....7437- 37- 67-B-22
W3QLW.....6039- 33- 61-B-28
W3IXN.....4611- 29- 53-B- -
W3KDF.....3936- 32- 41-B- -
W3ADE.....1560- 20- 26-B-20
W3HA.....1296- 16- 27-B- 6
W3CGS.....1104- 16- 23-C-18
W3PUD.....930- 15- 21-B-12
W3LVF.....520- 13- 14-B- 3
W3QCJ.....396- 11- 12-B- 4
W3GRS.....300- 10- 10-A- -
W3KT (W3OVV)..70,896-112-211-C- -

Md.-Del.-D.C.

W3MSK.....153,111-161-319-C-72
W3JTC.....128,772-147-292-C-80
W3PDX.....125,860-155-272-B-72
W3JTK.....125,208-148-282-C-85
W3BVN.....124,392 146-284-B- -
W3JKO.....83,948-124-299-B-58
W3FQZ.....83,025-123-225-C-75
W3KDP.....82,410-123-224-C- -
W3GRF.....58,533-109-179-B-34
W3JYS.....57,873-101-191-C-61
W3EIS.....45,120- 94-160-B-39
W3LTW.....38,223- 93-139-B-43
W3WV.....33,760- 80-141-B- -
W3AOO.....28,908- 73-132-B-25
W3LUL.....25,056- 72-120-B-32
W3EPR.....20,625- 75- 93-C-38
W3MFJ.....15 753- 59- 89-B-38
W3FQB.....14,790- 58- 85-A-24
W3MNO.....5568- 32- 58-B-13
W3CDZ.....5472- 38- 48-A-16
W3JO.....4416- 32- 46-B-36
W3LVJ.....4368- 28- 52-A-13
W3PWR.....3960- 30- 44-C- -
W3HH.....2432- 26- 44-B-13
W3NOE.....2415 23- 35-C-10
W3SEI.....690- 15- 16-B- 4
W3JZY.....48- 4- 4-A- 2
W3JQB.....48- 4- 4-B- 1

So. New Jersey

W2SAI.....169,194-173-326-C-50
W2PWP.....96,750-129-251-C-44
W2QKJ.....7378- 34- 73-B- -

W. New York

W2FBA.....61,149-109-187-B-32
W2AW.....59,946-103-194-B-50
W2DSB.....38,880- 90-144-C-43
W2MA.....30,024- 72-139-C-60
W2UWD.....28 755- 71-125-C-46
W2BJH.....17,641- 59-101-B-43
W2PJM.....13,184- 54- 82-B-18
W2TXB.....12,960- 45- 96-C- -
W2QXB.....4794- 34- 47-B-20
W2QJM.....4050- 30- 45-B-14
W2VXA.....1653- 19- 29-B- -
W2QQ.....1512- 18- 28-B-12

W. Pennsylvania

W3LOE.....293,022-219-451-B-75
W3AER.....5880- 35- 56-B-16
W3WJF.....663- 13- 17-A- 8

CENTRAL DIVISION

Illinois

W9LM.....197,580-185-356-C-78
W9GRV.....121,137-149-271-C-76
W9HUZ.....71,760-114-212-B-65
W9NII.....54,945- 99-185-C-71
W9TB.....27,805- 67-148-C- -
W9FID.....18,150- 55-110-C- -
W9FKC.....11,280- 47- 80-C-19
W9QIY.....7524- 28- 66-B-45
W9ABA.....6327- 37- 57-C-20
W9QM.....3480- 29- 40-C- -
W9GMZ.....2997- 27- 37-B-13
W9KXD.....540- 12- 15-B- 6
W9ALI.....390- 15- 26-B-15
W9PPH.....240- 8- 10-A-18
W9WIO.....126- 7- 9-A- 5

Indiana

W9UC.....1035- 15- 23-B- 6

Wisconsin

W9RQM.....68,016-109-208-C-52
W9LNM.....7425- 45- 55-B- -
W9GWK.....6192- 36- 58-B- -
W9KXK.....3024- 24- 42-A-22
W9BQM.....2736- 24- 41-A-19
W9GKK.....390- 10- 13-A- 4

DAKOTA DIVISION

No. Dakota

WØARF.....84- 4- 7-B- 3

So. Dakota

WØBLZ.....12,324- 52- 79-B-27

Minnesota

WØRXL.....31,080- 74-141-C-66
WØTKX.....15,228- 54- 94-C-30
WØJSN.....11,700- 50- 78-B-30
WØFID.....5250- 35- 56-C-24
WØDGH.....929- 17- 19-B- -
WØBRA.....3- 1- 1-B- 1

DELTA DIVISION

Arkansas

W5MPG.....27,549- 72-126-C-40
W5DRW.....15,930- 59- 90-B-27
W5PYU.....2376- 24- 33-B-16
W5AQD.....240- 8- 10-B- 8

Louisiana

W5KC.....44,370- 87-181-B-70
W5PBW.....5184- 32- 54-C-37
W5CEW.....1350- 15- 29-C- -

Mississippi

W5ZD.....54,162-102-117-C-46
W5CKY.....27,528- 74-124-B-26

Tennessee

W4NNH.....15,345- 55- 93-B-13
W4OGG.....60- 4- 5-A- 5

GREAT LAKES DIVISION

Kentucky

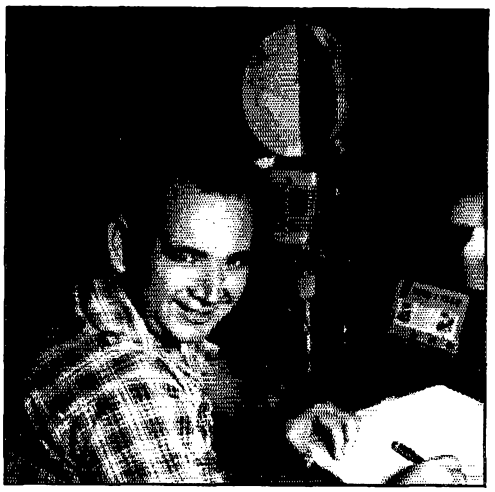
W4PN.....84,180-122-230-B-60

Michigan

W8DX.....113,480-143-266-C-85
W8CVU.....48,735- 95-171-B-55
W8UPN.....11,481- 43- 89-C-17
W8HA.....945- 15- 21-A-12
W8MCC.....429- 11- 13-A-11
W8EXZ.....360- 10- 12-A- 5

Ohio

W8JIN.....210,357-189-371-C-69
W8BHW.....185,040-180-352-C-64
W8FGX.....87,048-124-234-C-55
W8BTI.....53,295- 95-187-C-28
W8BNA.....51,060- 92-185-B-60
W8BRA.....45,792-106-144-C-30
W8HFE.....35,574- 77-155-C-23



The happy smile worn by "Paz," HC2OS, is no doubt a result of his winning the 'phone award for Ecuador and topping all other South American entrants with his 109,680 points.

W8AJW.....31,185- 81-129-A- -
W8EYE.....29,592- 72-137-B-43
W8DDS.....23,643- 71-111-C-29
W8DMD.....17,263- 61- 94-B- -
W8OBS.....16,554- 62- 90-B-60
W8PUD.....9321- 39- 81-C-49
W8DFQ.....9168- 48- 65-A-16
W8PM.....8556- 46- 62-B-25
W8DAE.....8073- 39- 69-B-27
W8NSS.....6588- 36- 61-B-17
W8BUM.....4725- 35- 25-C-19
W8KJK.....1458- 18- 27-B-15
W8WWU.....1368- 18- 24-B- 8
W8YGR.....1350- 18- 25-A- 8
W8AVT.....960- 16- 20-A- -
W8EBZ.....825- 15- 19-A- 9
W8VZE.....648- 12- 18-B-13
W8KC.....495- 12- 15-A-10
W8ZJM.....429- 11- 13-B- 3
W8OY1.....126- 6- 7-A- -
W8CPS.....70- 5- 7-C- 2
W8FRD.....48- 4- 4-A- 9

HUDSON DIVISION

E. New York

W2BYP.....79,254-119-221-C-66
W2AWF.....39,688- 82-162-C-42
W2LCB.....33,525- 75-149-B-52
W2HO.....17,214- 57-102-B-46
W2FBS.....13 650- 50- 91-B-38
W2CJM.....7257- 41- 59-B-27
W2DSU.....1235- 18- 23-B-17
W2SZ1.....48- 4- 4-C- 6

N.Y.C.-L.I.

W2WZ.....202,973-183-377-C-80
W2PBG.....85,239-123-231-C-74
W2WC.....47,232- 96-164-B-48
W2OTC.....24,684- 68-121-C-23
W2GTL.....19,323- 57-113-B-43
W2CSO.....19,080- 60-106-C-12
W2AZS.....19,368- 48- 72-C-22
W2BWC.....5994- 37- 54-B- -
W2LWI.....3168- 24- 44-B-11
W2AWH.....2900- 25- 39-B- -
W2HTT.....1136- 16- 25-C-12
W2ROJ.....1026- 18- 19-B- 5
W2HQB.....741- 13- 19-B- 8
W2JB.....576- 12- 16-B- 5
W2BVN.....504- 12- 14-A-12
W2EQG.....264- 8- 11-B- -
W2ETT.....243- 9- 9-A- 3
W2NHH.....144- 6- 8-A-14

No. New Jersey

W2ATE.....88,440-132-224-B-53
W2YTH.....49,950- 90-185-B-56
W2GNQ.....41,310- 90-153-B- -

W2JME.....38,367- 87-147-B-31
W2EQS.....20,460- 66-104-A-51
W2CGJ.....17,388- 63- 92-B- -
W2DJT.....14,448- 56- 86-B-30
W2CWK.....7080- 40- 59-A-40
W2TPJ.....3744- 32- 39-A- -
W2ZGB.....3483- 27- 43-B-40
W2HTZ.....3024- 24- 42-B-15
W2ADP.....2376- 24- 33-B-19
W2NIY.....1224- 17- 24-A- -
W2GKE.....1056- 16- 22-B-12
W2HXU.....147- 7- 7-B- 6

MIDWEST DIVISION

Iowa

WØFDL.....37,488- 88-142-C- -
WØFGW.....14,684- 56- 88-B-34
WØBFY.....1260- 21- 30-C-10
WØATA.....346- 8- 14-A- 5
WØYRN.....3- 1- 1-B- 1

Kansas

WØDAE.....87,750-130-225-C-48
WØERI.....6528- 34- 64-C-16
WØKRV.....4500- 30- 50-B-17
WØAEF.....144- 6- 8-A-

Missouri

WØBMM.....20,160- 60-112-C- -
WØGUF.....10,125- 45- 77-C-38
WØDU.....9102- 41- 74-B-24
WØBCI.....7280- 40- 61-A-30
WØARH.....3720- 24- 52-B-24
WØKGI.....1241- 17- 25-A-29
WØMCX.....27- 3- 9-B- -

Nebraska

WØBBS.....3- 1- 1-C

NEW ENGLAND DIVISION

Connecticut

W1LOP.....82 350-122-225-C-62
W1DIT.....60,244-108-186-C- -
W1TX.....51,058- 98-175-C-43
W1ODW.....30,576- 78-131-B-55
W1FTX.....27,360-76-120-B-48
W1AQT.....19,158- 62-103-B-38
W1DX.....14,432- 56- 74-B- -
W1BIH.....13,530- 55- 82-B-13
W1DHO.....9933- 43- 77-B-67
W1AJO.....8040- 43- 67-B-22
W1IKE.....2304- 24- 32-B-10
W1RWS.....1320- 20- 22-A- 4
W1LVQ.....480- 12- 14-B- 3
W1CEG.....462- 11- 14-A- 7
W1NLM.....36- 3- 4-B- 4

♦

Bill Meyer, ZS6DW, South African 'phone winner and highest-scoring African entrant — 47,124 points, 476 contacts, 33 multiplier.

QST for

CLUB SCORES

Club	Score	C.W. Winner	'Phone Winner
Frankford Radio Club	1,671,353	W3BES	W3BES
Potomac Valley Radio Club	1,491,394	W4KFC	W4ESK
Southern California DX Club	1,140,387	W6GRL	W6HX
Maui Amateur Radio Club	848,018	KH6MG	
Northern California DX Club	833,278	W6MVQ	W6NIG
Greater Cincinnati Amateur Radio Assn.	483,813	W8JIN	
The DX Club	431,895	W3GHS	W3DOE
Northwest Amateur Radio Club	290,149		
Rebel Radio Club	270,778	W4BRB	W4POF
Union de Radioaficionados Espanoles	232,853	EA4CN	EA4DB
West Park Radiops	206,478	W8BRA	W8AJW
Ridgewood Radio Club	167,598	W2ATE	
North Suburban Radio Club	153,279	W9GRV	
Albany Amateur Radio Assn.	134,299		
West Seattle Amateur Radio Club	104,085		
Winnipeg Amateur Radio Club	103,050		
Four Lakes Amateur Radio Club	83,853		W9RBI
Connecticut Wireless Assn.	80,146		
Rochester DX Assn.	71,155	W2MA	
Wisconsin Valley Radio Assn.	69,876		
York Road Radio Club	62,560	W3ALB	
Date Radio Club	59,886	W4LVV	
Concord Brasspounders	54,042		
Dayton Amateur Radio Assn.	50,986	W8OB8	
Baton Rouge Amateur Radio Club	49,554		
San Antonio Radio Club	43,599		
South Lyme Beer, Chowder & Propagation Society	17,219	W1DX	
Egyptian Radio Club	17,202		
Garden City Radio Club	7,995		
Radio Club del Alantico	7,680		
Reseau des Emetteurs français	7,343	F8TQ	

Maine

W1BPX.....98,533-137-241-C-80
W1DPJ.....11,760- 49- 80-C-36
W1NXX.....5883- 37- 53-C-13
W1ACW.....3944- 29- 45-C- -

E. Massachusetts

W1AXA.....104,085-135-257-B-72
W1BOD.....28,060- 92-153-B-42
W1DDO.....6075- 45- 45-A-18
W1ICA.....5576- 34- 55-A-22
W1SFW.....297- 9- 11-A- 7
W1DYV.....36- 3- 4-C- -

W. Massachusetts

W1JLT.....60,495-111-183-B-68
W1EOB.....3663- 33- 37-C- 6
W1FKI.....1512- 18- 28-B-10
W1ASU.....688- 16- 22-B- -

New Hampshire

W1BFT.....45,264- 92-164-A-35
W1AOQ.....22,080- 64-115-B-21
W1CRW.....7353- 43- 57-B-12
W1JIY.....6825- 35- 65-B-24

Rhode Island

W1BIL.....76,518-109-234-B-66
W1AWE.....14,352- 46-104-C- -

Vermont

W1FPS.....7104- 37- 64-B-26
W1BJP.....3948- 28- 47-B-21
W1QMM.....3078- 27- 38-A-40

NORTHWESTERN DIVISION

Montana

W7KVU.....36,036- 77-156-C-72
W7CJB.....2709- 21- 55-B-33
W7FLB.....2223- 19- 39-B-35

Oregon

W7GHB.....19,825- 61-109-B-55
W7DAA.....6052- 34- 59-B-24
W7ENW.....2599- 23- 40-C- 7
W7JLU.....1044- 12- 29-C- 4

Washington

W7DL.....68,265-111-205-C-50
W7AJS.....18,360- 54-115-B-14
W7HJC.....17,172- 54-106-C-37
W7GVV.....5376- 32- 56-A-40
W7EJD.....3870- 30- 43-B-11
W7JC.....2430- 18- 45-A-27
W7HLU.....2394- 21- 38-B-16
W7CAB.....858- 11- 26-B-22
W7EW.....756- 12- 21-B- 7
W7CSW.....186- 6- 11-B- 7
W7JXO.....45- 3- 5-A-10
W7LQL.....24- 2- 4-A- 5
W7CWN.....18- 3- 3-A- -

PACIFIC DIVISION

Nevada

W7KEV.....10,935- 45- 81-B-26
W7KIO.....3525- 25- 47-B-24

Santa Clara Valley

W6CEM.....108,429-141-259-C-65
W6CIS.....18,600- 62-100-C- -
W6SR.....17,632- 58-102-B- -
W6ZZ.....160- 5- 8-B- 4

East Bay

W6MVQ.....146,286-161-301-C-70
W6UYX.....72,285- 79-205-C-76
W6TT.....61,800-103-200-C-30
W6PB.....49,632- 92-176-C-67
W6LDD.....44,880- 88-170-B-70
W6MHB.....19,116- 59-108-B-45
W6QDE.....16,800- 56-100-C-37
W6LMZ.....12,750- 50- 85-B-25
W6ZUI.....11,745- 45- 87-C-22
W6FLT.....8658- 37- 78-B-35
W6BUY.....8568- 42- 68-C-30
W6EJA.....7524- 38- 66-B-18
W6TI.....3036- 23- 44-C-20
W6KEK (W6CTL)..42,504- 88-161-C- -

San Francisco

W6WB.....65,484-107-206-C- -
W6ATO.....45,496- 88-174-C-78
W6YC.....2320- 20- 39-B-14
W6HQN.....150- 5- 10-A- 6

Sacramento Valley

W6EFM.....19,920- 62-107-C-34
W6VBI.....48- 4- 4-B- 6

San Joaquin Valley

W6BYH.....13,524- 46- 98-C-22
W6GWQ.....4698- 29- 54-B-15
W6KEV.....2664- 24- 37-C-18

ROANOKE DIVISION

North Carolina

W4CEN.....59,792-110-201-B-47
W4KE.....27,216- 72-126-C-40
W4OG.....5202- 34- 51-C-23
W4LYV.....4230- 30- 47-B-12

Virginia

W4KFC.....247,818-206-401-C-80
W4OM.....123,105-145-282-C- -
W4KWY.....101,700-150-226-C- -
W4IA.....18,172- 59-103-B-32
W4VAN.....13,865- 47-101-B-30
W4LAP.....9447- 47- 67-B-20
W4SEB.....6669- 39- 57-B-15
W4FF.....6327- 37- 57-B- -
W4KFT.....6318- 39- 54-A-17
W4PNK.....5724- 36- 53-A-15
W4NQV.....2325- 25- 93-B- 9
W4FV.....1932- 23- 28-B- -
W4JUY.....468- 12- 13-B- 3

West Virginia

W8CDV.....1800- 20- 30-A-31

ROCKY MOUNTAIN DIVISION

Colorado

WØAZT.....18,810- 57-110-C-25

Utah

W7NCO.....1785- 17- 35-B-26
W7NPU.....266- 14- 19-B- 8

Wyoming

W7PGS.....13,980- 98-170-B-45

SOUTHEASTERN DIVISION

Alabama

W4CYC.....13,446- 54- 85-B- -

E. Florida

W4BRB.....166,770-170-327-C-75
W4LVV.....48,640- 95-172-A-49
W4CKB.....37,230- 85-146-B- -
W4RTX.....16,182- 62- 87-B- -
W4RWA.....6840- 40- 57-B- -
W4DRK.....6042- 38- 53-B-25
W4QED.....5440- 34- 54-B- -
W4POF.....5376- 32- 56-B- -
W4GAW.....3108- 28- 37-B-30
W4EEO.....1530- 17- 30-C-20
W4HKJ.....1026- 18- 19-B- 5
W4OGI.....561- 11- 17-A-14
W4RTX.....528- 11- 16-B- -
W4SAS.....3- 3- 1-A- 1
W4NVU (W4s SAT, SKC)
3584- 28-128-B-64

Georgia

W4JDR.....139,200-160-290-C-80
W4EV.....69,198-114-203-B-55

W. Florida

W4BGO.....130,050-150-289-C-74
W4NN.....35,260- 86-138-C-96

SOUTHWESTERN DIVISION

Los Angeles

W6GRL.....173,400-170-340-C-71
W6ITA.....147,870-155-318-C-78
W6FSJ.....133,635-151-295-C-90
W6TZD.....73,584-114-219-C- -
W6LER.....18,821- 59-107-C-45
W6ETJ.....11,223- 43- 87-B-25
W6GEB.....7992- 36- 74-C-44
W6YZU.....7020- 39- 60-C-38
W6ALQ.....3102- 22- 47-B-26
W6WWW.....2180- 20- 37-B-12
W6HPB.....570- 10- 19-A-19
W6DQZ.....270- 10- 9-C- -
W6UQQ.....48- 4- 4-B- 1
W6JQB.....45- 3- 5-B- 1
W6AM (W6RDR).123,975-145-285-C-6
W6GFE(W6CUQ)..87,480-117-240-C- -
W6BJU (W6CUF)..69,888-112-208-C-62

Arizona

W7LEE.....19,008- 66- 96-C-30
W7PZ.....3612- 28- 43-B-26
W7ENA.....1152- 16- 24-A-30

San Diego

W6GTM.....1275- 17- 25-C- 4
W6GTC.....96- 4- 24-A- -
W6ITY(W6BBR)..120,096-144-278-C-79

Don't let the mike fool you — CT1SQ can handle a key, too! His 60,564-point score earned him the C.W. award for Portugal.

W4WAR (W2s FRE OSB W3s QXH QXU W4s RVE RWZ SIQ W5QJR WØs BVI BVJ Robert Hunt)
5506-104-177-C-96

WEST GULF DIVISION

Northern Texas

W5ENE.....163,326-167-326-C-68
W5AWT.....4860- 30- 54-B-20
W5BNO.....2925- 25- 39-B-20
W5UMI.....2625- 21- 42-B-24
W5OLG.....858- 13- 22-A- 7

Oklahoma

W5LJI.....1938- 19- 34-B-17
W5EMY.....1035- 15- 23-A- 6

Southern Texas

W5FNA.....42,966- 93-154-C-44
W5GEL.....13,356- 53- 84-C-16
W5LBC.....9660- 46- 70-B-24
W5DML.....2772- 28- 33-C-10
W5IYR.....882- 14- 21-A-20
W5FXN.....741- 13- 19-C- 5
W5NKY.....252- 7- 12-B-12

New Mexico

W5LGS.....20,474- 58-119-B- -
W5FKB.....9462- 38- 83-B-40
W5CJP.....2580- 20- 43-B-24
W5CA.....105- 5- 7-B- 2

CANADA

Maritime

VE1PQ.....14,841- 51- 97-B-33
VE1ZZ.....12,672- 48- 88-A-50
VE1HG.....10,836- 42- 92-B-26
VE1EK.....7942- 38- 71-A-21
VO1W.....6732- 33- 68-B- -
VE1KM.....4116- 28- 49-B- 9
VE1CU.....3080- 22- 48-A-18
VE1DB.....1845- 15- 41-B-19

Ontario

VE3IJ.....12,880- 46-280-B-30
VE3CCK.....8736- 42- 70-B-33
VE3AGX.....8520- 40- 71-B- -
VE3QU.....7560- 40- 63-B-18
VE3SR.....6834- 34- 67-B-26
VE3BBR.....5346- 33- 54-A-30
VE3AP.....3075- 25- 41-B-34
VE3BMB.....1242- 18- 23-A-27
VE3BZK.....840- 14- 20-B-10
VE3YV.....432- 12- 12-A- -
VE3QT.....360- 10- 12-B- 5

Quebec

VE2BK.....12,546- 51- 82-B-22
VE2OL.....4483- 34- 44-A-21

Alberta

VE6MC.....135- 5- 9-B- 9

British Columbia

VE7VO.....41,580- 77-180-C-49
VE7VC.....27,495- 65-141-B-60
VE7EO.....16,473- 51-109-B-29
VE7YR.....5115- 31- 55-A-30
VE7FC.....4608- 24- 66-C- -
VE7CP.....4368- 26- 56-B-48

Manitoba

VE4RO.....76,818-118-217-C-70

Saskatchewan

VE5QZ.....4131- 27- 51-B-25
VE5CX.....2178- 18- 41-A-35

AFRICA

Algeria

FA8BG.....85,800- 40-715-B- -
FA9RZ.....28,086- 36-302-A- -
FA3VV.....4428- 12-123-A- -

French Morocco

CN8EJ.....40,352- 32-425-A-21
CN8AG.....5688- 12-158-A- -

French West Africa

FF8JC.....28,314- 33-286-B- -

Kenya

VQ4RF.....16,220- 20-269-B-24

Liberia

EL2P.....8218- 14-197-A-16

Mozambique

CR7EI.....1080- 8- 45-A- 3

Southern Rhodesia

ZE3JP.....45,535- 35-434-A-30
ZE3JQ.....5112- 12-142-A- -
ZE3JL.....648- 8- 27-A- -

Swaziland

ZS7C.....512- 8- 22-A- -

Tangier

EK1AO.....95,574- 51-634-B-72

Union of South Africa

ZS5U.....28,526- 34-283-A-35
ZS6FN.....3432- 11-104-A- 3

ASIA

Israel

4X4RE.....24,534- 29-278-A-30

Japan

JA2FM.....4770- 10-160-A-24

Malaya

VS2CN.....840- 5- 56-A- -

Turkey

TA3GVU.....6156- 16-132-A- -

EUROPE

Belgium

ON4QF.....72,922- 38-644-A- -
ON4NC.....2970- 11- 92-A-11
ON4TQ.....1360- 8- 58-A- -

Czechoslovakia

OK1RW.....2824- 14- 68-A- -
OK1CX.....576- 8- 24-B- -

Denmark

OZ4H.....33,600- 32-350-A- -
OZ1W.....25,748- 33-258-A- -
OZ7G.....22,134- 31-246-A-42
OZ7S.....6- 2- 2-A- 1

Eire

EI9J.....30,270- 30-307-B-17
EI5G.....5910- 15-137-B-10
EI5F.....4992- 16-105-B-17

England

G2AJ.....64,719- 47-459-B- -
G5RI.....32,526- 39-278-B-30
G6RB.....11,400- 25-152-B- -

Finland

OH6NZ.....495- 9- 19-A- 8
OH5OD.....180- 5- 12-A- -
OH3NY.....18- 2- 3-A- -

France

F3MS.....13,494- 26-174-A-18
F8VJ.....10,991- 29-127-A-23
F8TM.....3933- 19- 69-A- -
F9RO.....2756- 13- 71-A- -
F3RA.....1080- 9- 40-A- -
F9DW.....150- 5- 10-A- 7
F9ND.....84- 4- 9-A- -

Germany

DL1FF.....26,215- 35-253-B-39
DL7AA.....11,577- 17-227-B-82
DL3AB.....846- 9- 33-B- 5
DL1YA.....252- 6- 14-A- -

Gibraltar

ZB2I.....6916- 13-178-A-23

Greece

SVØAB.....1608- 10- 57-B- 2

Iceland

TF3BG.....75,360- 30-858-A-60
TF3SF.....10,904- 29-132-A-16
TF3MB.....5552- 16-119-A- -
TF3AB.....1296- 12- 36-A- 8
TF3NA.....318- 6- 19-C- 5

Italy

I1AIV.....47,533- 33-485-A-57
I1ER.....1111- 11-101-A-38

Luxembourg

LX1JU.....12,103- 19-629-A- -
LX1JW.....6150- 15-137-A- -

Madeira Island

CT3AA.....6600- 11-202-B-80

Netherlands

PAØUN.....49,236- 34-485-A-70
PAØVB.....15,300- 25-204-A-43
PAØKU.....7882- 14-189-A-26
PAØRTW.....1110- 10- 37-A-25
PAØWAC.....783- 9- 29-A- 4
PAØFLX.....600- 10- 20-A- -
PAØXYZ.....216- 4- 18-A- 8
PAØLDC.....180- 6- 10-A- 9

Norway

LA6U.....2101- 11- 67-A- -
LA3HA.....864- 8- 36-A- 4
LA9T.....240- 5- 16-A- 5
LA4K.....216- 6- 12-A- -

Poland

SP1JF.....5304- 17-104-A-23

Portugal

CT1SQ.....60,564- 42-480-B- -
CT1AL.....10,992- 24-158-A-15

Roumania

YO3RF.....95- 5- 7-A- -

Saarland

9S4AX.....7776- 16-162-A- -

Sardinia

IS1AHK.....150- 5- 10-A- -

Scotland

GM6IZ.....9504- 24-132-B-41
GM2FHH.....8925- 21-147-B- -

Spain

EA4CN.....90,098- 38-800-A-50
EA1AB.....55,284- 34-550-A-40
EA4AV.....23,400- 26-300-B-30
EA1BC.....18,432- 24-256-A-23
EA9AP.....9120- 16-194-A-12
EA3CY.....2436- 12- 70-A- 6
EA3GF.....972- 9- 37-B- 7
EA3CK.....400- 5- 27-C- 8
EA5AQ.....36- 3- 4-A- -

Sweden

SM5ARL.....1848- 14- 46-B-15
SM6ID.....1590- 10- 53-A- -
SM4UJ.....924- 7- 44-A- 2
SM5PV.....890- 10- 30-B- -
SM5AQV.....414- 6- 23-B- -
SM5UU.....231- 7- 11-B-19
SM6VY.....92- 4- 8-A- 3

Switzerland

HB9EU.....11,546- 23-168-C- -
HB9CI.....5668- 13-146-A- 9
HB9DB.....1008- 14- 24-A- 8
HB9MA.....465- 5- 31-A- 4

Yugoslavia

YU1CAG.....6426- 21-102-A-22
YU3AC.....6137- 19-103-A-11

Wales

GW3ZV.....102,024- 52-660-B-47

NORTH AMERICA

Alaska

KL7NXI.....111,282- 51-726-A-58
KL7PB.....43,965- 45-490-B-31
KL7WG.....25,480- 32-262-B-41
KL7MF.....23,100- 28-275-A-56
KL7AGB.....6- 1- 2-B- 1

Bahama Islands

VP7NM.....59,265-43-1343-B- -

Bermuda

VP9AJ.....1359- 9- 51-A- 3

Canal Zone

KZ5LY.....96,672- 53-615-B- -
KZ5CW.....360- 8- 16-A- 1

Costa Rica

TI2TG.....38,280- 55-233-B-20

Honduras

HR1AT.....8064- 24-112-B- -

Greenland

OX3SF.....14,178- 17-282-A-36
OX3WX.....4368- 14-104-A- -

Jamaica

VP9OO.....16,473- 17-323-A- -

Mexico

XE2OK.....52,290- 30-581-B- -
XE1SA.....15,656- 38-138-A- 9
XE1FE.....4080- 10-136-B- 6
XE1A.....12- 2- 2-B- -

Miquelon & St. Pierre Islands

FP8AW.....8136- 18-156-A-10

Panama

HP1BR.....477,950-79-2047-A-88
HP1LA.....18,480-24- 259-A-23

Puerto Rico

KP4KF.....550,077-79-2321-B-77
KP4IQ.....168,090-65- 862-C-35
KP4KD.....160,197-67- 796-B-19
KP4JE.....103,113-57- 603-A-25
KP4KB (KP4HU)..15,624-24- 217-A- 7

Salvador

YS1O.....26,976-32- 285-B-12

Virgin Islands

KV4AA.....649,467-91-2389-B- -

OCEANIA

Australia

VK3XK.....34,020- 35-324-A-21
VK2GW.....24,099- 29-280-A-29
VK2RA.....14,430- 37-130-A- 6
VK5BO.....10,494- 22-159-A-14
VK4QL.....4845- 17- 95-A-17
VK4XJ.....2700- 15- 60-A- 8
VK5JE.....2070- 10- 69-A- -
VK5KO.....972- 9- 36-A- 3
VK3XB.....279- 9- 11-C- 5
VK5RX.....198- 6- 11-A- -

French Oceania

FO8AC.....13,635- 27-171-B- -

Guam

KG6HU.....3211- 13- 83-A- 7

Hawaii

KH6DK.....367,875-75-1635-A- 55
KH6IJ.....349,428-74-1574-A- 61
KH6MG.....338,988-78-1466-C- 51
KH6PM.....10,824-22- 164-B- 6
KH6EL.....567- 7- 27-C- -

New Zealand

ZL1BY.....210,511-61-1157-A- -
ZL1MB.....155,844-54- 962-A- -
ZL1MQ.....65,018-43- 504-A-45
ZL2MM.....8550-15- 190-A-26
ZL1OW.....3042-18- 57-C- 6

SOUTH AMERICA

Argentina

LU1DH.....55,341- 39-485-B- -
LU9JF.....1344- 16- 34-C-25
LU7JO.....504- 8- 21-C- 9

Brazil

PY2NX.....47,215- 35-448-B-28
PY2DV.....42,455- 35-419-B-32
PY1ADA.....31,140- 30-346-B-27
PY4IE.....12,180- 15-278-B- -
PY4FT.....5808- 22- 88-B- -

Chile

CE6AB.....912- 8-114-B- -

Colombia

HK6JH.....596- 4- 51-A- 6

Falkland Islands

VP8AI.....11,466- 26-147-A-13

French Guiana

FY7YC.....10,266- 29-118-A- -

Peru

OA4BR.....46,830- 35-446-A- -
OA5A.....306- 6- 17-A- -

Uruguay

CX6AD.....6123- 13-157-A- -

Venezuela

YV5BZ.....5166- 14-123-B-34

[1] W2CEV operator

'PHONE SCORES

ATLANTIC DIVISION

E. Pennsylvania

W3BES.....126,504-126-368-C- -
W3DHM....113,250-125-302-C-70
W3LTU....109,836-113-324-C- -
W3DOE....104,895-111-315-C-56
W3GHS.....42,363- 81-175-B-32
W3HFD.....29,526- 74-133-C-22
W3EQA.....22,506- 62-123-C-47
W3IMV.....21,948- 62-118-B-28
W3KT.....21,060- 65-108-C- -
W3MQC.....20,907- 69-101-C-34
W3GHD.....11,934- 51- 78-B- -
W3IXN.....2730- 26- 35-B- -
W3PQB.....2442- 22- 37-B- -
W3CTJ.....1311- 19- 23-C-16
W3QLW.....689- 13- 18-B-11
W3HA.....546- 13 14-B- 6
W3KEW.....390- 10- 13-B-13

Md.-Del.-D. C.

W3PWR.....23,250- 62-126-C- -
W3MSK.....19,440- 60-108-C- -
W3EIS.....5883- 37- 53-B-28
W3NNX.....990- 15- 22-B- 9
W3FQB.....36- 3- 4-A- 2
W3MFJ.....3- 1- 1-B- 1

W. New York

W2MA.....19,440- 60-108-C-29
W2AW.....1020- 17- 20-B- 8
W2QXB.....216- 8- 9-B- 5
W2TXB.....192- 8- 8-C- -

W. Pennsylvania

W3LOE.....30,668- 82-125-C-32

CENTRAL DIVISION

Illinois

W9BDV.....22,312- 63-118-C-75
W9NII.....15,312- 58- 88-B-42
W9HGA.....11,520- 48- 80-A- -
W9ABA.....2772- 25- 37-C- -

Indiana

W9LQ.....7920- 40- 66-C-54

Wisconsin

W9RBI.....69,000-100-230-C-59
W9RNX.....7224- 42- 58-B-38
W9RQM.....1860- 20- 31-B- 6
W9HMG.....1020- 17- 20-B- 8

W9KXK.....1008- 14- 24-A-12
W9GWK.....27- 3- 3-B- 4

DAKOTA DIVISION

North Dakota

WØVSK.....1740- 20- 29-B- -
WØBPO.....405- 9- 15-A- -

South Dakota

WØPRZ.....72,075- 93-259-C-60
WØBLZ.....7605- 39- 65-B-30

Minnesota

WØVPI.....945- 15- 21-B- 7
WØBRA.....18- 2- 3-B- 1

DELTA DIVISION

Mississippi

W5ZD.....3198- 26- 41-C- 8

Tennessee

W4AQR.....4557- 31- 49-C-11

GREAT LAKES DIVISION

Michigan

W8REU.....68,904- 99-233-B-56
W8HUD.....57,618- 97-201-C-50
W8CLR.....15,900- 60- 89-A-33
W8UPN.....2520- 24- 35-C-12

Ohio

W8HRV.....78,792- 98-268-C-70
W8NXF.....42,515- 91-155-C-52
W8AJW.....19,825- 65-102-A-28
W8NSS.....17,025- 58- 98-B-39
W8BRA.....12,168- 52- 78-B- -
W8ZOK.....10,363- 43- 81-B-42
W8DMD.....8052- 44- 61-B- -
W8BF.....3304- 28- 40-C-10
W8RM.....1425- 19- 25-C-10
W8KC.....504- 12- 14-B- 8
W8FJR.....480- 10- 16-A- 4
W8HGW.....330- 10- 11-C- 1
W8PM.....162- 6- 9-B- 4
W8PZM.....144- 6- 8-C- 2

HUDSON DIVISION

E. New York

W2OFJ.....67,830- 94-238-C-78
W2DSU.....26,781- 79-114-B-54
W2PFU.....182- 7- 26-B- 4

N.Y.C.-L.I.

W2PBG.....42,675- 75-173-C-47
W2WZ.....14.214- 46-103-C-15
W2BWC.....2001- 23- 29-B- 7

No. New Jersey

W2ZVS.....12,210- 37-110-B-35
W2YTI.....3612- 28- 43-B-15
W2AEB.....12- 2- 2-B- 1

MIDWEST DIVISION

Iowa

WØBFY.....6612- 38- 58-C-21
WØFGW.....1134- 14- 27-B-15
WØDIB.....189- 7- 27-B- 7

Kansas

WØERI.....840- 14- 20-B- 8

Missouri

WØGUF.....24,960- 64-130-C-47
WØMCX.....8073- 39- 69-C- -
WØGEK.....4864- 26- 67-B- -

Nebraska

WØMGF.....6018- 34- 59-C-15
WØEHF.....3799- 29- 45-A- 9
WØBBS.....1156- 36- 57-C-17
WØGKL.....798- 14- 20-A-36

NEW ENGLAND

Connecticut

W1ATE.....162,048-128-422-B- -
W1ODW.....351- 9- 13-B- 4
W1AJO.....84- 4- 7-B- 3
W1LVQ.....3- 1- 1-B- 1

Maine

W1BLF.....51,894- 93-186-C-48
W1NXX.....495- 11- 15-A- 7

E. Massachusetts

W1PST 35,890- 74-163-B-70
W1MX.....19,698- 49-134-C-29
W1DYV.....105- 5- 7-C- -

W. Massachusetts

W1CJK.....4032- 28- 48-B-12

New Hampshire

W1BFT.....8778- 66-133-A- -
W1CRW.....2886- 26- 37-B- 9

Rhode Island

W1BFB.....34,710- 89-130-B-35

NORTHWESTERN DIVISION

Montana

W7FIN.....540- 12- 15-A-12

Oregon

W7EJS.....351- 9- 13-B- 7
W7GUR.....288- 8- 12-C-10

Washington

W7DL.....35,820- 60-199-C-45
W7HRH.....4485- 23- 66-C-24
W7AJS.....3510- 26- 45-B- 9
W7KIL.....693- 11- 21-B-12

PACIFIC DIVISION

Nevada

W7KIO.....4611- 29- 53-B-23

Santa Clara Valley

W6NHK.....18- 2- 3-C- 2

East Bay

W6PWR.....72,900- 81-300-C-80
W6N1G.....39,585- 65-203-A-56
W6DD.....7803 27- 97-C-44
W6KEK.....528- 11- 16-A- -
W6EJA.....24- 2- 4-B- -

San Francisco

W6WB.....39,384- 76-183-C- -
W6ATO.....11,696- 43- 92-C-50

Sacramento Valley

W6BCI (W6S VBI JLB WSD YMZ GCP W8JF)
4872- 29- 57-B-75

ROANOKE DIVISION

North Carolina

W4DCQ....177,237-141-419-C-83
W4ASQ.....3509- 29- 41-B-16
W4KE.....3- 1- 1-C- 1

Virginia

W4ESK....159-744-128-416-C-80
W4KWY. 109,020-115-316-C- -
W4OM.....84,164-108-263-C- -
W4VAN.....45,900- 75-206-B-40
W4NTZ.....36,600- 61-200-C- -
W4KFC.....17,568- 61- 96-B-31
W4LIM.....11,400- 50- 76-B-23
W4FV.....1323- 21- 21-B- -

ROCKY MOUNTAIN DIVISION

Colorado

WØNWW.....3978- 26- 51-B- -
WØWO 3- 1- 1-B- 4

SOUTHEASTERN DIVISION

Alabama

W4CYC.....21,576- 58-124-B-22
W4HA.....12,423- 41-102-C-30

E. Florida

W4POF.....17,640- 60- 98-B- -
W4CKB.....11,376- 48- 79-B- -
W4BRB 2160- 48- 79-A- 7
W4LVV.....1620- 20- 27-C-10
W4EEO 360 10- 12-B- 8
W4QED.....288- 8- 12-B- 6

W. Florida

W4BGO.....27,648- 72-384-B-30
W4AGB 990- 18- 19-B- 8

SOUTHWESTERN DIVISION

Los Angeles

W6HX.....93,264- 87-358-C- -
W6BJU.....18,513- 51-121-C-34
W6BYH.....2166- 19- 38-B-30
W6AM (W6RDR)
116,982- 97-402-C- -

Arizona

W7PZ.....54- 3- 6-B- 2

San Diego

W6ITY (W6BBR)
62,160- 74-280-C-76
W6CHV.....9522- 46- 69-B-27

WEST GULF DIVISION

Northern Texas

W5AWT.....644- 14- 16-B-14
W5BNO.....495- 11- 15-B- -

Oklahoma

W5ALB.....15,960- 40-133-A-42
W5GZK.....5586- 38- 49-B-20
W5LJI.....3528- 28- 42-B-11

Southern Texas

W5JUF.....11,132- 46- 82-B-42
W5LGS.....3393- 29- 39-B-17
W5IYR.....1914- 22- 29-A-34
W5FNA.....663- 13- 17-C- 5
W5SU.....360- 10- 36-A- 7

CANADA

Maritime

VE1RR.....19,740- 42-162-C-35
VE1CU.....1065- 15- 25-A-22

Ontario

VE3AUJ.....34,560- 80-144-C-47
VE3QA.....2525- 25- 35-B-11
VE3BJO.....2046- 22- 31-B-14

Quebec

VE2ADB....18,765- 45-139-A-43
VE2GE.....3096- 24- 43-B- -
VE2IZ.....2475- 25- 33-B-70

British Columbia

VE7VO.....19,737- 51-129-C-42

Manitoba

VE4RO.....25,728- 64-134-C-55
VE4RP.....2964- 26- 38-B-30
VE4LC.....540- 12- 15-A- 8

Saskatchewan

VE5CX.....342- 9- 13-A-12

AFRICA

Algeria

FA3JY.....1664- 13- 44-A- -
FA8BG.....714- 7- 34-A- 3

Canary Islands

EA8AX.....1044- 9- 40-A- -

Eritrea

MI3US (MI3s ZX NJ NA RP US)
15,030- 15-336-B- -

Libya

MD2AM.....1200- 10- 47-B- 7

French Morocco

CN8EP.....26,510- 22-405-A-24

Southwest Africa

ZS3S.....4636- 19- 83-A-20

Union of South Africa

ZS6DW.....47,124- 33-476-A- -
ZS6CL.....1953- 9- 74-A- -

ASIA

Malaya

VS1AX.....63- 7- 3-A- -

Turkey

TA3GVU.....144- 3- 16-A- 1

EUROPE

Belgium

ON4CC.....5664- 16-118-A-14

Denmark

OZ7TS.....14,800- 25-210-A-48
OZ3EA (OZ6BC)
2624- 16- 56-A-23

England

G2PU.....28,512- 33-288-B-30
G2AKQ.....15,160- 20-254-B-35
G3DO.....4620- 15-106 B-13

France

F9KD.....60- 4- 5-A- -

Germany

DL4VG DL4NV DL4RV
12,726- 21-203-B-96

Greece

SVØAB.....2460- 12- 69-B- 5

Iceland

TF3MB.....1265- 10- 39-A- -
TF3SF.....138- 6- 11-A- 3

Italy

I1US.....32,076- 27-400-A- -
I1BRV.....12,204- 18-226-A-31

Luxembourg

LX1JW.....7518- 21-122-A- -

Netherlands

PAØALO.....4400- 16- 94-A- -
PAØBRG.....729- 9- 27-A-25

Norway

LA9T.....27- 3- 3-A- 2

Portugal

CT1PK.....20,696- 26-267-B- -
CT1NT.....1872- 12- 52-A- 6

Spain

EA4DB 16,140- 20-273-A-28
EA4CM.....11,132- 22-174-B-25
EA8AV.....5889- 13-161-A-16
EA4CK.....522- 9- 20-A- 2

Sweden

SM5WJ.....3094- 13- 80-C-13
SM5AUP.....729- 9- 27-B- 5

NORTH AMERICA

Alaska

KL7NXI....41,760- 40-348-A-58
KL7MF.....20,328- 28-243-A-54
KL7PB.....4920- 15-110-B- 8
KL7AHM.....750- 10- 25-B-12

Bahamas

VP7NH.....75,809- 43-636-B-53

Barbados

VP6SD 195,360-60-1093-B-60

Bermuda

VP9AJ.....4455- 15- 99-B- 8

Canal Zone

KZ5NM.....42,330- 34-420-B-25

Costa Rica

TI2TG.....26,316- 36-246-B-13

Cuba

CO6OK.....16,307- 23-238-A-16
CO2ML.....8442- 21-135-B- -
CO2MG.....2940- 15- 66-C- -

Greenland

OX3WX.....4644- 18- 86-A- -
OX3GG (W6AAW W7KUW W8CUM W9FQO) 1785- 15- 40-A- 9

Honduras

HR2JM.....10,640- 20-179-A-18

Mexico

XE2W.....81,816- 56-487-A-21
XE1A.....12- 2- 2-B- -

Miquelon & St. Pierre Islands

FP8AW.....4004- 11-123-A-12

Nicaragua

YN4CB. ....38,535- 35-375-B- -

Panama

HP1LB.....12,972- 23-189-B-11
HP1GL.....3432- 12- 97-B- 5
HP1LA.....660- 10- 33-A- 1

Puerto Rico

KP4DU.....38,571- 43-299-A-60
KP4KD.....21,978- 37-198-A- 6

Salvador

YS1O.....25,377- 33-257-B-12

Virgin Islands

KV4AQ.....9870- 14-235-A-18

OCEANIA

Australia

VK4FP.....2600- 13- 67-A- -

French Oceania

FO8AB.....300- 7- 19-A- -

Hawaii

KH6IJ.....95,634- 46-693-C-45
KH6MG.....79,764- 46-580-C-43

New Zealand

ZL1MQ.....11,728- 26-151-A- -

SOUTH AMERICA

Argentina

LU5AD.....66,033- 33-708-B- -
LU6BK.. ...54,002- 31-584-B- -
LU1DH... .18,063- 27-229-B- -
LU8CW.....7600- 25-102-C- 5
LU2BM.....3444- 12- 97-A- 8
LU8AM.....456- 8- 19-B- -

Brazil

PY2CK.....4980- 20- 83-A- 3
PY2ADT.....3366- 11-102-B-10
PY4PL.....477- 9- 18-B- -
PY4KL.....405- 9- 15-A- -
PY4AJD.....336- 8- 16-B- -
PY3QX.....18- 2- 3-A- -

Chile

CE2DE.....16,325- 25-219-B- -
CE6AB.....4030- 13-105-B- -

Colombia

HK1DZ.....4560- 15-306-B- -
HK1DW.....3120- 13- 80-B- -
HK5AY.....12- 2- 2-B- -

British Guiana

VP3HAG.....5894- 14-142-A-20

Ecuador

HC2OS.....109,680- 60-610-B-68

Peru

OA4DW.....24,087- 31-261-B-18
OA4AQ.....14,424- 24-202-A-17

Uruguay

CX2CN.....4125- 11-125-A-17
CX1NE.....1221- 11- 43-C- -
CX2CO.....72- 3 8-A- -

Venezuela

YV5EA.....6227- 13-167-B-14
YV5BZ.....2145- 15- 49-B- -
YV5CL.....72- 4- 6-A- -

A.R.R.L. ACTIVITIES CALENDAR

Oct. 7th: CP Qualifying Run — W6OWP
Oct. 13th: Simulated Emergency Test
Oct. 17th: CP Qualifying Run — W1AW, WØTQD
Oct. 20th-21st: CD QSO Party (c.w.)
Oct. 27th-28th: CD QSO Party ('phone)
Nov. 5th: CP Qualifying Run — W6OWP
Nov. 17th-18th, 24th-25th: Sweepstakes Contest
Nov. 20th: CP Qualifying Run — W1AW, WØTQD
Dec. 7th: CP Qualifying Run — W6OWP
Dec. 7th-10th, 14th-16th: 10-Meter WAS Party
Dec. 19th: CP Qualifying Run — W1AW, WØTQD
Jan. 5th: CP Qualifying Run — W6OWP
Jan. 12th-13th: V.H.F. Sweepstakes
Jan. 17th: CP Qualifying Run — W1AW, WØTQD
Jan. 19th-20th: CD QSO Party (c.w.)
Jan. 26th-27th: CD QSO Party ('phone)

ANNUAL SIMULATED EMERGENCY TEST

October 13th–14th

Your Emergency Coördinator has or soon will have a bulletin from this Headquarters on the subject of the annual Simulated Emergency Test. If you are registered in the AREC, you probably already have been acquainted with local plans for participation in this Test. If you're not a member of the AREC, it behooves you to get in touch immediately with your Emergency Coördinator and ask to be registered in order that you may receive full details on this and future Tests. Your Section Communications Manager (page 6, *QST*) can give you the name and address of your EC if you do not know who he is. You are not required to be an ARRL member to register in the Amateur Radio Emergency Corps or participate in the SET.

In the event that there is no appointed Emergency Coördinator in your community or having jurisdiction over the area in which you live, there is still no reason why a group of local amateurs cannot get together and plan to participate nevertheless. The best way to do so is to recommend a local amateur who is an ARRL member to your SCM for appointment as Emergency Coördinator, so that he will receive the instructional bulletin and other helpful material for his work. In such cases, it probably will be helpful to let us know your plans so that we may send a copy of the bulletin direct to you even before we are officially notified of the appointment of an Emergency Coördinator in your community.

This year it is hoped to give more emphasis to the spontaneity of local organizations for emergency communications. While in some cases it may be necessary to indicate the time of the test rather closely in order to assure participation by local amateurs, individual amateurs generally will have no inkling of their exact part in the test until the day of the exercise. Some ECs who have really live-wire organizations will work out details only with a few top assistants, indicating to others only that the exercise will occur sometime during the week end of October 13th–14th.

Each participating station will originate a message to his Emergency Coördinator, to be sent over the air as a part of the local network drill. The EC, at the end of the exercise, will prepare a message to be sent to ARRL Headquarters indicating the calls of every local station from which messages were received, and briefly summarizing the results of the test. This differs slightly from the procedure last year, which called for a message to ARRL Headquarters from every participating station.

Emergency Coördinators will also solicit message originations from disaster chairmen of local Red Cross Chapters, communications chairmen of local civil defense, and other such officials, to their respective national headquarters. That is, ECs will report to ARRL Headquarters, Red Cross people to American National Red Cross in Washington, civil defense people to the Federal Civil Defense Administration in Washington, etc.

A liberal exchange of traffic at both local and national level will thus be affected. Red Cross stations W3PZA, W9DUA and W6CXO, assisted by numerous local amateurs in their localities, will be activated and may be considered the delivery point for any message to the American National Red Cross. Other Washington traffic may be relayed on the National Traffic System or any other of several long-haul traffic nets. W1AW and many other Connecticut amateurs will be on deck during this week end for traffic to ARRL Headquarters and to assist in relaying other traffic to its destination. The Connecticut Net frequencies of 3640 and 3880 kc. will be largely utilized for this purpose. Traffic to other points can be handled on the National Calling and Emergency Frequencies of 3550, 7100 and 14,050 kc. for c.w. and 3875 and 14,225 kc. for 'phone.

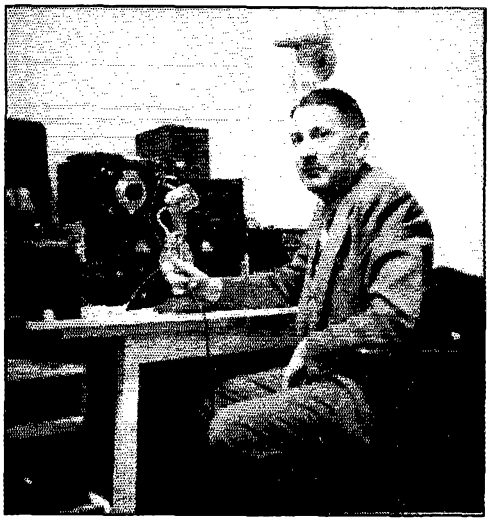
You will want to be a part of this nationwide demonstration of Amateur Radio's preparedness to handle emergency communications, both locally and nationally. Be on deck October 13th–14th!

WE had hoped to run a picture this month of some of the s.s.b. gang that showed up at the National Convention at Seattle, but it didn't arrive in time. Finding that there was no special s.s.b. meeting scheduled on the program **W6WB** organized one in a hurry, hired a hall (well, an anteroom), and in no time flat the ops and near-ops were going hot and heavy in a bull session. After introductions all around, and descriptions of the rigs in use, the questions and answers flew hot and heavy for an hour or so.

It's beginning to look like mobile s.s.b. is the thing these days, since **W6UOC/6** and **W1JEO/6** pointed the way. **W6WI** showed up at Seattle with his new mobile rig, and the first in the East is **W2VVC**. Fox has an SSB Jr. with parallel 6AG7s driving parallel 809s to 80 watts on peaks. The rig is built in two modified BC-457s. Best results so far, *in motion*, was an hour-long QSO with **W4OLL, W2AZW, W2ZKW, W9PHV, W2SNQ, W8SFA** and **W2SHN**. You must admit that some of that represents mighty good DX for 75 mobile!

Back before the ban went on, W3JTC (on c.w.) worked **PK4DA** on 20 s.s.b. the long way around, and they wonder if this is the DX record for ham s.s.b. Any other claimants?

Along DX lines, **W2EB** is still hammering away on 20, and recently worked **OZ7T** and **JA2MB**. Yoe says that the JA's signal was a real pleasure to copy in comparison with the flutter-fading JA a.m. signals. (He should hear JA2MB on the West Coast, as we did recently. Wow!) He also worked CT2AE, who became so enthused about s.s.b. that he may be a new recruit to the ranks in the very near future.



The face may not be familiar, but the name and call will ring a bell. This is Don Norgaard, W2KUJ, of Scotia, N. Y., whose signal and many excellent articles on s.s.b. techniques are known throughout the world. The temperature-controlled VFO tuned circuit and a Panadapter are sitting on top of the receiver — Don's strong microphone arm is hiding his selectable-sideband receiving adapter. Another view of the shack would show the rack housing power supply, *two* s.s.b. generators, and the "lazy linear" final (push-pull 811-As). (*Photo by W2NJR*)

Some of the s.s.b. gang in and around New York had a bit of a "do" back in June, on the occasion of a visit by W9BVU and W4MXL. How many of these fellows have you worked? *Front, l. to r.:* W2LKN, W2SNQ, W4MXL, W2AZW, W2EWL, W2JN. *Rear:* W9BVU, W2URX, W2NJR.

ON4CC has his W1JEO crystal-filter job going now, although he revised the circuit somewhat and uses a 6SN7 balanced modulator for carrier elimination. Local contacts have been made on 80 with the 6AG7 output, but the 811-A final should be on shortly.

The word is that **OE13CC** is on s.s.b. below 14,200 from 2300 to 0200 GCT. Anyone working him yet?

G3FHL had a grand time at the RSGB Convention in June, with the s.s.b. gang that included **G3CU, SM5QV, G2NX, G3CWC** and **DL1KV**. Needless to say, the bull session lasted into the wee sma' hours.

Tony, **W2ZKW**, has the 304TH final running now, with about 400 to 600 watts on peaks.

We had the pleasure of visiting **W6DMN** in San Francisco recently, and it was a wonderful experience. He uses a phasing exciter followed by an 811-A/304TH amplifier on 20 meters, and as he showed us through this transmitter he had built and adjusted himself it was hard to realize that he lost his sight some 30 years ago. A very successful professional musician, Buddy possesses remarkable hearing that undoubtedly helped in aligning the phasing exciter without the use of

(*Continued on page 126*)

Transforming Impedance with Folded Dipoles

Design Charts for Two- and Three-Conductor Dipoles

BY EARL R. THOMAS,* W2MM

• A recent analysis of the operation of the folded dipole has resulted in more accurate formulas for determining the impedance transformation that takes place as the result of using additional conductors. In this article W2MM gives handy design charts for two- and three-conductor folded dipoles.

FOLDED DIPOLES are frequently used to obtain an impedance transformation in antenna systems so that the input impedance of the system as seen by the transmission line is some value other than the radiation resistance of the antenna system itself. A particular application is that of feeding an antenna system made up of close-spaced parasitic elements because the radiation resistance of such an antenna system may frequently be of the order of 6 to 12 ohms, far different from the characteristic impedance of commonly-available transmission lines.

Guertler [1] has derived field equations for the impedance transformation for a folded dipole consisting of two elements and for a folded dipole consisting of three elements.[2] It is interesting to note that in the case of the folded dipole consisting of two elements the impedance transformation ratio is independent of the spacing between the elements only when the diameters of the two elements are equal. For other ratios of diameters, the transformation ratio becomes a function not only of the ratios of the diameters of the elements but also of the ratio of the spacing to the diameter of an element. In the case of a folded dipole consisting of three elements, the impedance transformation is independent of the spacing between elements only when the fed element is two times the diameter of the associated elements in the folded dipole.

The effect of changing the various constants is shown graphically in Figs. 1 and 2. Fig. 1 is a chart for a two-element folded dipole, and a similar chart for a three-element folded dipole is shown in Fig. 2. Since only the ratios of the dimensions d_1, d_2 and s are involved, it does not matter what units of measurement are used; it is important only that the *same* unit (inches, centimeters, etc.) be used throughout.

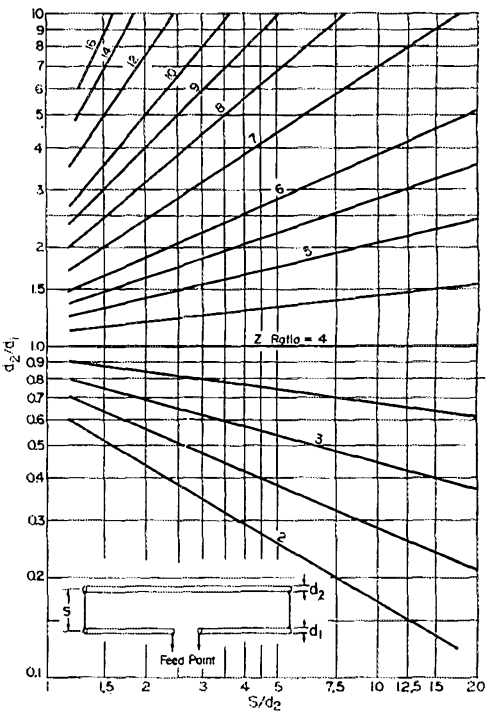


Fig. 1 — Impedance transformation ratio, two-conductor folded dipole. The dimensions d_1, d_2 and s are shown on the inset drawing. Curves show the ratio of the impedance (resistive) seen by the transmission line to the radiation resistance of the resonant antenna system.

* 245 Maple St., Englewood, N. J.

[1] Rudolph Guertler, "Impedance Transformation in Folded Dipoles," *Proc. I.R.E.*, Vol. 38, p. 1042, Sept., 1950.

[2] The following equation for a folded dipole consisting of two elements gives the impedance transformation ratio (see Fig. 1):

$$\mu = \left(\log \frac{4s^2}{d_1 d_2} \Big/ \log \frac{2s}{d_2} \right)^2$$

where

μ = impedance transformation ratio
d_1 = diameter of fed element of folded dipole
d_2 = diameter of auxiliary element of folded dipole
s = center-to-center spacing of elements in folded dipole
d_1, d_2 and s all in same units of measurement

Similarly, the equation for the impedance transformation ratio for a three-element folded dipole is (see Fig. 2):

$$\mu = \left(\log \frac{4s^3}{d_1^2 d_2} \Big/ \log \frac{s}{d_2} \right)^2$$

where

μ = impedance transformation ratio
d_1 = diameter of fed element of folded dipole
d_2 = diameter of each of the two auxiliary elements of folded dipole
s = center-to-center spacing between fed element and each auxiliary element of folded dipole
d_1, d_2 and s all in same units of measurement

To illustrate the use of the charts, suppose that a close-spaced antenna array having a resistance of 12 ohms is to be matched to 72-ohm line. The required transformation ratio is 72/12 = 6. This is well within the range of a two-element folded dipole, as shown by Fig. 1. From a practical stand-

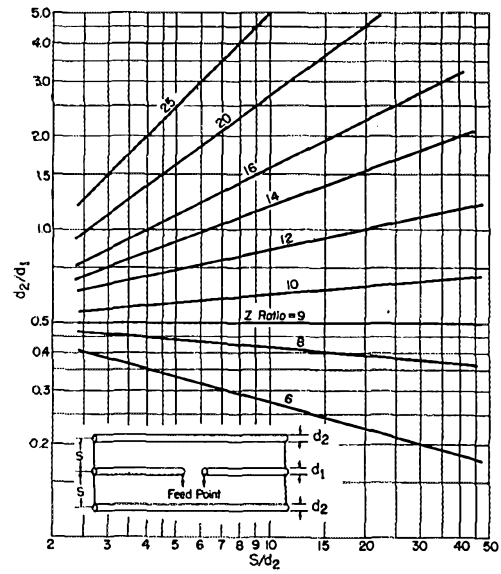


Fig. 2 — Impedance transformation ratio, three-conductor folded dipole. The dimensions d_1, d_2 and s are shown on the inset drawing. Curves show the ratio of the impedance (resistive) seen by the transmission line to the radiation resistance of the resonant antenna system.

point, it is convenient to select a d_2/d_1 ratio based on conductor diameters that may be available, and then vary the spacing to bring about the desired transformation ratio. Following the curve for a ratio of 6, it is seen that values of d_2/d_1 between 1.5 and 3 or so will fit in well with common tubing sizes. Suppose that tubing having an outside diameter of 1 inch is to be used for one element. If half-inch tubing is used for the other the ratio of d_2/d_1 will equal 2. At the intersection of the line $d_2/d_1 = 2$ with the curve for Z ratio = 6, the corresponding s/d_2 ratio is 2.4. Since d_2 is 1 inch, the spacing, s, is 2.4 inches.

Matching the same antenna to 300-ohm line would require a three-element folded dipole, since in this case the required impedance ratio is 300/12 = 25. The same tubing sizes can be used, d_2 being 1 inch and d_1 being ½ inch. The ratio d_2/d_1 is therefore 2, which intersects the curve Z ratio = 25 at $s/d_2 = 4$. The spacing, s, is therefore 4 inches.

United States Naval Reserve

July Flood Disaster

The Naval Reserve Training Center at Topeka, Kans. (KØNRZ), reports about 90 per cent of Reservists in that area were on active duty in connection with the flood disaster. Through cooperation with the ARRL, contacts were made with all 48 states to relay messages from flood victims. The Training Center at Cape Girardeau, Kans. (KØNBD), furnished a radio-equipped landing craft to the Red Cross for rescue work. The Naval Air Station at Olathe, Kans. (KØNAB), handled radio traffic for Western Union, whose wires were cut.

— • • • —

Organized Electronics Company 8-2, Harlingen, Texas (K5NAH), has been designated as the outstanding Electronics unit in the Eighth Naval District. By winning this trophy three years in succession, OEC 8-2 obtains permanent possession of same. Lieut. Cmdr. Stuart S. Jennings is commanding officer of this company.

— • • • —

Electronics Technician's Mate Robert H. Lawson (W2ZPA) recently reported for duty at the District Training Office. In the near future he hopes to be contacting his friends and other amateurs utilizing the call K1USN.

— • • • —

Volunteer Electronics Company 1-5, Somerville, Mass. (K1NRS), under command of Cmdr. C. C. Chisholm, won the First Naval District annual competition for the outstanding Volunteer Naval Reserve Electronics Company for the fiscal year ending 30 June 1951.

— • • • —

The following amateur stations of the Naval Reserve took part in the ARRL Field Day: W5USN, K5NAZ, K5NRE, K5NRC, K5NBL, K5NR, K5NRJ, K5NAS, K6NBM. Equipment from K9NR was used by W9JP.

— • • • —

Marino Alarcon, RDM1, from the Naval Reserve Training Center, El Paso, Texas (K5NRE), has joined the ham ranks with the call W5SYE.

— • • • —

To the list of Naval Reservists on active duty add: W2HAE.

— • • • —

Volunteer Electronics Company 13-23 of Great Falls, Mont. (K7NAQ), placed first in the competition between Volunteer Electronics Companies in the Thirteenth Naval District for the fiscal year ending 30 June 1951.

W5USN on location for ARRL Field Day. *L. to r.:* Cmdr. T. C. Pipes (W5PLQ), Cmdr. W. C. Ball (ex-W6MQE), Chief Radioman D. T. Biard (W5SPZ), and Lieut. Cmdr. J. P. Foster (W5HNW).

A Series-Tuned Grounded-Grid Preamplifier

Improved Receiver Performance at 28 Mc. and Higher Without Critical Adjustments

A SERIES of hyphenated adjectives just about tells the story of the preamplifier pictured herewith. It was built by Floyd A. Timberlake, W9RZP, of Chicago, who sent it in to ARRL Headquarters for tests. He calls it a series-tuned cathode-coupled grounded-grid push-pull preamplifier. Though its name sounds complicated, the circuit is simple indeed, and tests conducted on it indicate that it does just about as well, in both signal-to-noise ratio and gain, as other r.f. amplifier circuits that are somewhat more difficult to adjust properly.

The coils, L_1 and L_2, and the butterfly variable condenser, C_3, series resonant the input circuit at the signal frequency. With the cathodes tied to the stators of the tuning condenser, C_3, the system provides a pretty fair match for the 300-ohm flat lines usually employed for the frequencies from 28 Mc. up. The push-pull arrangement shown is best suited to balanced lines, of course. The plate circuit is parallel tuned in the usual way. Capacity coupling is shown, but a coupling link at the center of L_3 could also be used.

The condensers C_1 and C_2 are merely blocking devices, and need not be used unless the preamplifier is to be connected to a grounded antenna system. Such an antenna would, of course, provide a cathode-to-ground path other than that through the r.f. chokes and cathode resistors.

Values given in Fig. 1 are those shown in the photograph of the unit. This model was laid out with 28-Mc. use in mind, so its top frequency, with suitable coils, was around 100 Mc. A more compactly built unit with smaller components should do very well at 144 Mc. and higher.

Tests on the model shown indicate a gain at 29 Mc. of around 20 db., with an increase in noise level of only about 15 db. This represents a substantial improvement in noise figure, and sufficient gain to make almost any average communications receiver really come to life in the 28-Mc. band.

By substituting smaller coils the preamplifier was tested on 80 Mc. Using a general-coverage converter having no r.f. stage, working into the

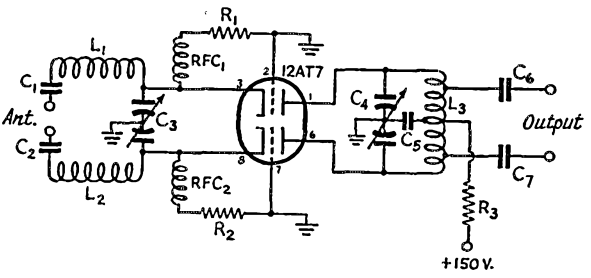
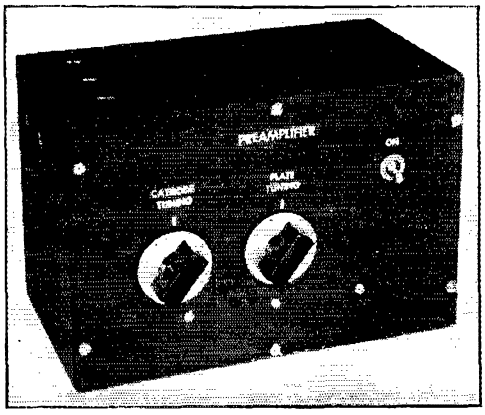
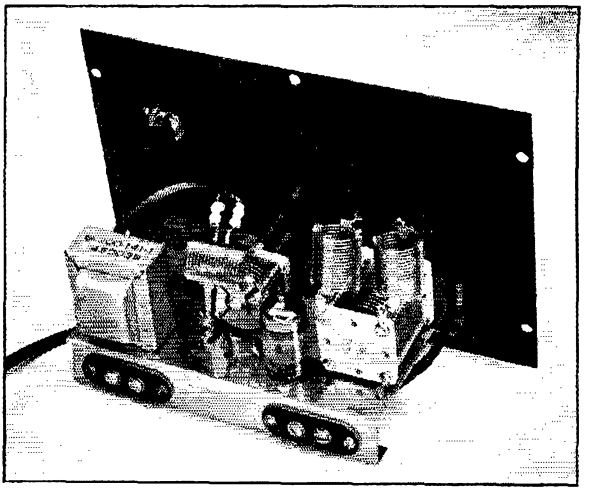


Fig. 1 — Schematic diagram of the grounded-grid preamplifier built by W9RZP. Values given are for 28 Mc.

C_1, C_2, C_5 — 0.001 mica or ceramic.
C_3 — 125-$\mu\mu$fd. butterfly variable.
C_4 — 25-$\mu\mu$fd. butterfly variable.
C_6, C_7 — 50-$\mu\mu$fd. mica or ceramic.
R_1, R_2 — 100 ohms, ½-watt carbon.
R_3 — 1000 ohms, ½-watt carbon.
L_1, L_2 — 15 turns No. 18, ¾-inch diameter, 1 inch long.
L_3 — Same, but tapped at center. C_6 and C_7 connected 1½ turns each side of center.
RFC_1, RFC_2 — 28-Mc. r.f. choke (Ohmite Z-28).



Front view of the W9RZP preamplifier in its cabinet.



Rear view of the grounded-grid preamplifier. Input circuit is at the right, output circuit in the center. The built-in power supply uses a TV booster transformer and a selenium rectifier.

same receiver as was used for the 29-Mc. tests, the W9RZP preamp effected a 5-db. improvement in signal-to-noise ratio. The indicated gain at this frequency was in the neighborhood of 12 db.

In actual listening tests on the 10-meter band, the signal-to-noise ratio was comparable to that obtained with the better low-noise preamplifier circuits, its noise figure getting well below the point of any actual advantage, in the presence of the customary antenna noise that may be found in even the quietest locations.[1]

With the 80-Mc. coils in place the unit was checked as a TV booster, with good results in the form of improved definition in an area of rather marginal reception.

— *E. P. T.*

[1] "External Noise at 28, 50 and 144 Mc.," Oct., 1950, *QST*, p. 33.

Strays

Our many readers who relived their own FCC exam room trials and tribulations by reading Fred Myers' story in September *QST* (p. 14) will be happy to learn that Fred is now WN2IHI and ending every transmission "with a cheerful laugh."

—•••—

An informative catalog (No. SD-551) containing charts and data on the many types of screw heads and nuts encountered in present-day radio gear is available to hams for the asking. Drop a penny postal to Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill.

—•••—

Boy Scout Bobby McReynolds of Trezevant, Tenn., is keenly anticipating the new series of articles on amateur radio which is to appear in *Boys' Life*. How did he get the tip-off on these articles, even before they had been announced by the publisher? 'Twas quite a coincidence. Bobby had read "America's Quickest Ham" in the July issue of *Boys' Life*, so he immediately cranked the short-wave switch on his folk's b.c. set. One of the first stations he came across was W1AW, on 20-meter 'phone, with operator "HP" telling a W9 that Assistant Editor Tom MacPherson of *Boys' Life* was a visitor at the Hq. station in search of background material for the new series!

25 Years Ago this month

October 1926

. . . The League announces a new publication, "The Radio Amateur's Handbook." Written by Communications Manager F. E. Handy, the book contains 160 pages, sells for $1.00.

. . . Approximately 60 countries now are represented in the amateur DX bands.

. . . ARRL Fieldman and Treasurer, A. A. Hebert, 1ES, has started a 12,000-mile membership-contact trip around the country.

. . . The effect of aurora on amateur signals is authoritatively discussed by W. M. Sutton, Canadian 3NI.

. . . Distances up to 600 miles have been heard during the recent 5-meter tests.

. . . Assistant Technical Editor John M. Clayton describes a 3-stage plug-in tuner that covers from 12 to 20,000 meters.

. . . The neon "glow tubes" now being sold for checking spark plugs are expected to have wide application in the testing of ham r.f. circuits.

. . . Rufus P. Turner, 3LF, uses switchable 5- and 50-watt final tubes to reduce QRM when working locally.

. . . 8ABX recommends ordinary laboratory-type test tubes as forms for r.f. chokes.

. . . Perry O. Briggs of 1BGF tuner fame details a one-man method of raising a steel mast.

FEED-BACK

In the diagram of the 6BQ7 converter, page 42, September *QST*, the value of R_2 should be 500,000 ohms instead of 50,000 ohms.

A Crystal Filter for 'Phone Reception

Simple Bandpass Filters for Improved Selectivity

BY WILLIAM E. GOOD,* W3LQE/2, EX-W8IFD

THE idea of using more than one crystal to give a narrow bandpass filter is certainly not new, but it hasn't been exploited to the fullest extent. After having this possibility pointed out by J. S. Brown, W2ZSQ, and after reading some of the recent excellent articles on crystal filters,[1,2,3] Mason's book[4] was consulted. According to Mason, a lattice-type filter with quartz crystals can have a bandpass of twice the spacing between the series- and parallel-resonant frequencies of one of the crystals.[5] In an X-cut crystal this separation may be 1.5 to 2 kc. at 465 kc., so that a bandpass of the order of 3 to 4 kc. should be possible. A circuit equivalent to the four-crystal lattice of Mason is the typical balanced crystal filter circuit with a second crystal substituted for the neutralizing or balancing condenser. This is illustrated in Fig. 1.

The crystals used in the following experiments were low-frequency crystals from the FT-241-A series, available in surplus and used in several filters described earlier in *QST*.[2,5] These crystals are either CT or DT cuts and are in the range from 370 to 500 kc. The labels on the crystals in one group run from 20.0 to 27.9 Mc. in 0.1-Mc. steps — the fundamental frequency is found by dividing the label frequency by 54, which makes the frequency steps 1.85 kc. at the fundamental. These crystals are being sold on the surplus market at reasonable prices, and they are usually listed at the low-frequency value. Another group is labeled between 28 and 38 Mc., and the fundamental frequency is found by dividing the label frequency by 72.

The frequency separation of the crystals in the first group is just about what the theory says it should be for an optimum bandpass filter. The group of curves shown in Fig. 2 was obtained from an RME-69 with its crystal filter circuit modified as in Fig. 1B.

Bandpass Characteristics

The curve of Fig. 2A is the typical response of a single-crystal filter with LC resonated to the crystal frequency and C_1 just balancing the crystal capacitance. As C_1 is made smaller, a rejection notch (parallel resonant frequency) moves in from the high-frequency side. Conversely, as C_1 is made larger than the balance capacity, the notch moves in from the low-frequency side.

By replacing C_1 with X_2 (a crystal 1.8 kc. higher than X_1), the curve of Fig. 2B is obtained. The shunt capacitances of the two crystals balance each other and no rejection notches are noticed. The top of the curve should be flat if the filter is properly terminated and LC is tuned properly. However, in most cases a 3- to 6-db. dip was noticed between the two peaks. The peaks are separated by approximately 2 kc., and one may be slightly higher than the other. The skirts are approximately 10 kc. wide at 60 db. down. The dotted curve is the i.f. passband without the crystal filter.

If a trimmer, C_2, is placed across the higher-frequency crystal, as shown in Fig. 2C, two rejection notches will appear, and they will move in toward the center frequency more or less symmetrically as C_2 is increased.

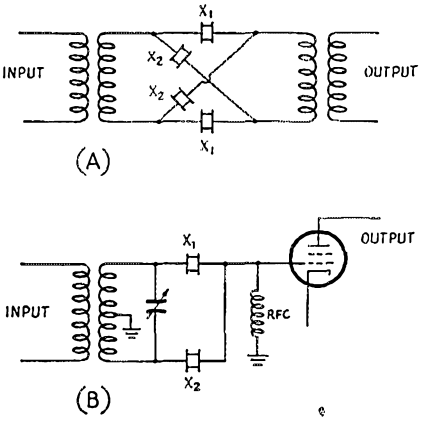


Fig. 1 — A conventional crystal lattice filter is shown at A. The bandwidth is determined by the frequency separation between the crystals X_1 and X_2.

The circuit in B behaves the same as that in A but requires only two crystals. The circuit is similar to a single-crystal filter, such as is used in a communications receiver, with the phasing condenser replaced by the second crystal.

Fig. 2D is the same as Fig. 2C except that the value of C_2 is larger and it shows how the side responses tend to rise higher as the notches come closer together. The general result is that the sides of the response curve become steeper as C_2 is increased, without appreciably affecting the separation of the two peaks. Practical values for C_2 are around 1 or 2 $\mu\mu$fd., which may be obtained readily by twisting together two short pieces of insulated wire.

It should be emphasized that *in every case LC is*

* Woodchuck Hill Road, Jamesville, N. Y.

[1] Titt, "A Dual-Crystal Q5-er," *QST*, September, 1950.

[2] Edmunds, "A Crystal-Filter S.S.B. Exciter," *QST*, November, 1950.

[3] Lowrie, "Lattice-Type Crystal Filter," *Electronics*, April, 1951.

[4] W. P. Mason, *Electromechanical Transducers and Wave Filters*, D. Van Nostrand Company, Inc., publishers.

[5] See Weaver & Brown, "Crystal Lattice Filters for Transmitting and Receiving," *QST*, June, 1951.

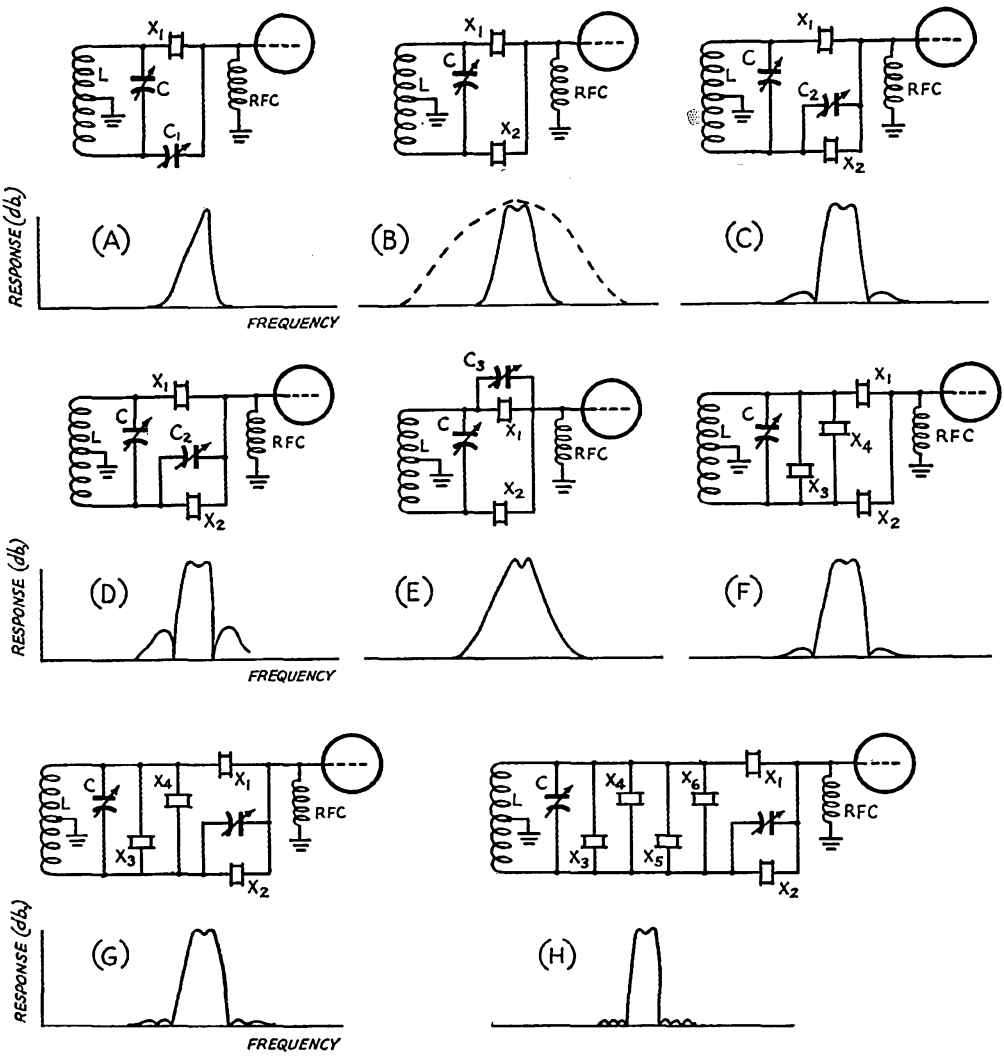


Fig. 2 — Typical response curves for the various crystal-filter circuits. See text for discussion and values of L, C, C_1, C_2, and C_3.

X_1 — 464.81 kc. (marked 25.1 Mc.).
X_2 — 466.67 kc. (25.2 Mc.).
X_3 — 462.96 kc. (25.0 Mc.).
X_4 — 468.52 kc. (25.3 Mc.).
X_5 — 461.11 kc. (24.9 Mc.).
X_6 — 470.37 kc. (25.4 Mc.).

tuned to resonance at the center of the passband. If this is not done, there will be a very pronounced dip between the two peaks, and the value of the filter will be lost. Experimentally, C is varied until the minimum dip occurs at the center of the response curve.

If C_3 is placed across the lower-frequency crystal, as shown in Fig. 2E, the skirts widen out and the dip becomes more pronounced. This is undesirable from a selectivity point of view but important to know for the experimenter who intends to work with this device.

When two crystals, higher and lower in frequency than X_2 and X_1, are placed in shunt across the circuit of Fig. 2B, the result is as shown at Fig. 2F. Their capacitance is compensated for by reducing C slightly. The two notches appear at the series resonant frequencies of the two new crystals. Essentially, they are series-resonant traps shorting out LC at their resonant frequencies. The effect, that of steepening the sides of the response curve, is similar to that obtained in Fig. 2C. However, these notches will stay put and are not subject to variations like those obtained by tuning adjustments.

If C_2 is added to X_2 in the combination shown in Fig. 2F, the original pair of notches may be introduced and their frequencies set to reduce the size of the extra humps of F, as shown in Fig. 2G. The value of C_2 may be increased to bring the new notches inside those caused by X_3 and X_4. This will give steeper sides, at the expense of

somewhat higher side lobes, and the result is a curve about 4 kc. wide at 60 db. down and 2 kc. wide at the top.

By adding still more crystals in shunt, the side lobes can be reduced still further, as shown in Fig. 2H.

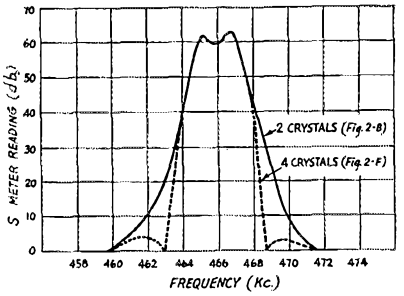


Fig. 3 — S-meter readings plotted against frequency, for the filters of Figs. 2B and 2F, made with an RME-69 receiver. Both of these filters give good voice reception, particularly if tuned for single-sideband reception.

Figs. 3 and 4 show typical curves made on an RME-69 receiver that had its crystal circuit modified. The readings were made with the S-meter, using a harmonic from a 100-kc. oscillator as the signal source, and the calibrated bandspread dial for frequency indications. The bandspread on the receiver was calibrated by using the series-resonant frequency of the crystals themselves in the circuit of Fig. 2A.

Some Practical Considerations

The i.f. transformer in the RME-69 has a center-tapped secondary (L in Fig. 2). However, there is no reason to believe that a straight secondary with two condensers (capacity divider) wouldn't be just as effective, and it would certainly be more convenient, particularly where the receiver does not have a crystal filter to start with. As for proper termination of the filter, rough calculation shows that it should be around 80,000 ohms. In practice, it doesn't seem to be too critical. The 16-mh. r.f. choke that was already in the RME-69 seemed to be satisfactory, as did 50,000- and 100,000-ohm resistors that were substituted. A tuned circuit in place of the choke did not hold down the side lobes unless it was loaded down or detuned. Presumably a fine adjustment on the center tap of L would have permitted a better balance between the two peaks. Perhaps more careful adjustment of the driving and terminating impedances would have reduced the dips between the two peaks.

Now for a little conjecture. Rather than use half a dozen (or more) crystals as in Fig. 2H, it would seem desirable to cascade two crystal filters using either two or four crystals each. In other words, make another more or less identical crystal filter in the next i.f. stage and perhaps stagger the rejection notches for the best side-lobe reduction. This would steepen the sides and reduce the skirts, without appreciably affecting the nose of the response curve.[6]

To obtain still steeper sides, it seems feasible to move X_3 and X_4 of Fig. 2F close to the center frequency. This could be done (with the present crystals) by further grinding. Apparently these wire-mounted crystals were originally trimmed to final frequency by grinding the top edge with a piece of fine emery paper[7] in the same way that one might file his fingernails. The edge of the crystal is the proper place to grind, because the vibration is a surface-shear mode, and removal of quartz from the edges will cause the frequency to increase. Some way of holding the crystal should be devised for this grinding operation, as the wire mounting is quite delicate.[8] The author ground the edge of one crystal for several minutes with some No. 1 emery paper and the frequency moved about 1 kc. This is tedious, perhaps, but it offers a possible method for moving these crystals around or making use of the ones that don't fall within the bandpass of the receiver i.f. amplifier. Mr. Roy Lewis of the General Electric crystal laboratory recommends that the crystal be washed in alcohol after grinding and that, if the frequency is going to be moved more than a few per cent, the crystal should be ground equally on opposite edges. He also suggests that the frequency might be lowered by plating with silver or possibly copper.

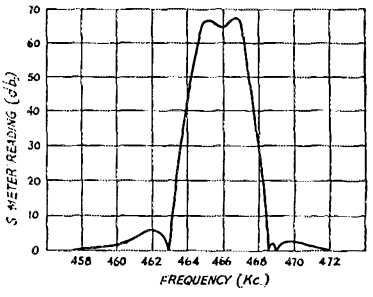


Fig. 4 — S-meter readings plotted against frequency for the filter of Fig. 2C, made with an RME-69 receiver. The value of C_2 was about 1 or 2 $\mu\mu$fd.

The bandwidths shown seem to be adequate for reasonably good 'phone reception. When the signal is tuned in, the carrier is placed on one or the other of the two peaks, and then the reception is essentially single sideband. If there is interference on that sideband, the receiver is tuned to place the carrier on the other peak. The effect of tuning through a 'phone signal is perhaps more pronounced than with the usual Q5-er. As soon as the carrier is far enough up one side of the curve to permit demodulation (detection) without too much distortion, the passband has its maximum width for one sideband. As you tune through the signal, the modulation sounds more bassy as the carrier approaches the center of the

(*Continued on page 126*)

[6] This conjecture is already confirmed by the independent work of Weaver and Brown. However, Mr. Good's manuscript was submitted before their paper was published. — *Ed.*

[7] R. A. Heising, *Quartz Crystals for Electrical Circuits*, D. Van Nostrand Company, Inc., publishers.

[8] W1SCO uses a fly-tying vise to hold the crystal. — *Ed.*

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

It may be the pressure of the times, the discouraging effect of the laws of diminishing returns, or some abstract version of flying-saucer fever on the part of a small percentage of the DX gang, but there's still no way out for justification.

We refer to a very noticeable and undeniable influx of doctored-up QSLs at the DXCC desk.

Deletion from the DXCC roll, you will agree, is rather a light sentence for such activity but it is one inevitable result. This action has occurred in the past and apparently is to continue on some small scale in the future. We'd like to minimize it to the infinitesimal — hence these cold factful words.

More acid paragraphs of denunciation concerning those involved in this repulsive subject may seem called for but would hardly make for delightful reading. A word to the wise as given above should be sufficient; a million words to the inherently unwise undoubtedly would not be, anyway.

So we'll use the space more beneficially for DX data. . . .

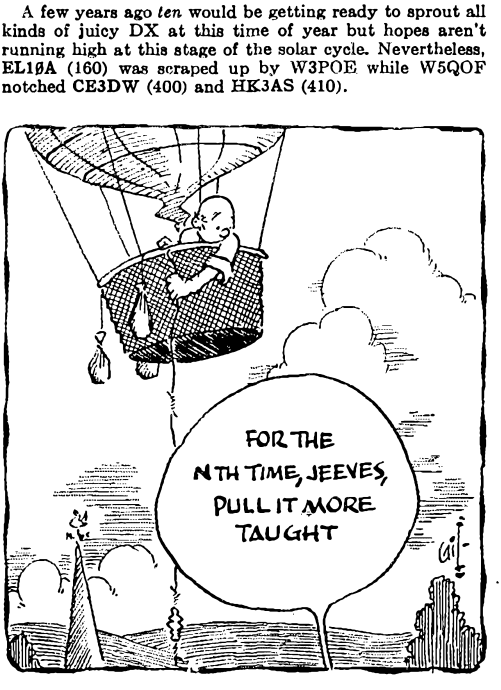
What:

One must mix in a larger dose of patience as conditions go bad if one is to keep the DX log growing, observes W9HUZ. This, a good signal and familiarity with the noise-level band layers must do the trick for Van on *twenty:* VK9XK (014), VP3s VN (080) YG (112), VQs 2JN (064) 3KIF (072) 8CB (050), VR2AS (025), VSs 6CE (086) 7NG (070) 1DU (053), VP8AI (010), ZB1CH (030), ZD6JL (078), DU6RG (039), C3FA (072), CRs 7AG (096) 9AW (066), MB9BJ (038), MD2JB (010), MP4s BAF (040) BBD (050), I1AHR/M1 (012), ZM6AK (016), F9QV/FC (035), FK8AC (004), FQ8AG (070), EA9AP (046), OE13RL (048), KB6AT (062), HC1KD (052), JA7AR (080), YU3FMC (028), YN4CB (001), YS1FM (043), SU1FX (060) and 4X4CW (033) . . . . . There have been a few good days at W3JYS, too. Lee awaits mail from HB1JJ/HE (057), HE1BQ (080), CR4AD (082), ZC4s HV (019) TF (046), OQ5RA (090), FQ8AE (084), MD2BC (058), MT1BA (050), FK8AI (025), VR2s CD (088) and CG (038).W3JYS worked several others to be found in W9HUZ's list — we'll rotate the line-up next time . . . . . VQ2GW (010), EA6AF (012), ZD2HAH (080) and OQ5AA (100) were worked by WØFID, the OQ5 emanating from the World's Fair at Leopoldville. Dick notes new cards from CR9AF, FM7WF, VR1C, KH6KL/KP6 and KM6AT — just about a dozen to go for DXCC . . . . . CR8CC (100) intrigued W5FFW and Hal added VP5BF of the Caicos (060), VQ4s CM (102) RF, ZB1BJ (008), C3AB (040), SV1SP (040) and I1AHR/M1 . . . . . A nice tally was assembled by W5JPC, including YN1OC (051), VQ3AT (081) and KG6FAA (010) . . . . . W9FWV is really getting ready to work some DX, having stocked up on some 3500 cards. Naturally, he's a printer by trade! . . . . . Trying a halfwave vertical for the first time, W8KPL ticked off DU1s AP (080) JI (120) VVS (070), KR6s CA (020) GV (100), FQ8AC (020), CP5EK, KG6FAB, YU1AG, VR1A (060), KW6AR, 4X4BX and 9S4AX (000) . . . . . MP4KAE of Kuwait, SV9FP on Crete and VK1BS, Macquarrie, occupied much of W8SYC's attention. Clint missed on the SV9 . . . . . To prove that the low-power bug isn't quite extinct in Kilofornia, W6HQN loaded up his 15-watter to work VS6, VK9, JA2 and DL6 . . . . . A folded dipole caught FP8BX, FO8AC and FA9RW for W4REZ while W6EAY raised SP6XA, TF3HA, CN8EG and OX3WX . . . . . Key work by XE1AC resulted in UA1BAR (001), UB5KCA (002), VS1DB (080) and FR7ZA (017) . . . . . W2AGW hears that FR7ZA cards are finally getting around and mentions a TTØKAA (100) whom we hope represents Tannu Tuva . . . . . North Carolina contacts were issued to YO2BF, OX3WB, LB5Q, W7JMZ/KG6, YV5BZ, FM7WF, LX1JW, GC4LI, CT3AA, FP8AW and CT2BO by W4KE . . . . . The *DXer* of the No. Calif. DX Club bolsters our tab sheet with specimens ET3Q (047), EA9BA (024), AP2N (090), FN8AD (108), VU2NB (109), ZK2AC (028 t7), YN1CO (045), CT3AB (023), FL8AM (010) and VK9QK.

Regarding *twenty 'phone,* XE1AC scored with VQ4RF (340), EA8AC (307), EA9AI (320), HC8GI (168), CS3AA (326), VR1B (195), EK1AD (309), ZM6AA (310), VS2AA (125), PX1A (108) and 3V8BA (135). Al reports conditions poor in general with scattered openings brief . . . . . VR2BT (269) and HR1KS (290) answered W5JPC and W4LVV finds VP5BF now quite active on voice from the Turks and Caicos . . . . . W5FFW was SVØWM's (350) first Okie QSO. Hal also snagged SVØAB (350), VR1G (210) on British Canton, KX6AC (250) and EK1DD (180) . . . . . EQ3FM (120) tells John DeMyer he's about to fire up 813s modulated by 805s after a session with 120-watt 807s. KC6AA (225) of Truk Isle has been pushing a consistent signal into W8 territory.

There's been some DXing going on in the *forty* range but summer atmospherics have been fierce. In the Midwest, at least, there seem to be but two seasons to the year — winter and the rainy season. W3DLI hooked VK9XK of Samuri, Papua Territory, who requests a blank card for QSL . . . . . A host of VKs, ZLs and KH6s were accumulated by W5QOF in addition to HR1AZ (020) . . . . . FG7XA, DU1MB, ZS6OS and VK7GB took W6HQN's 60-watt bait.

A few years ago *ten* would be getting ready to sprout all kinds of juicy DX at this time of year but hopes aren't running high at this stage of the solar cycle. Nevertheless, EL1ØA (160) was scraped up by W3POE while W5QOF notched CE3DW (400) and HK3AS (410).



* *New Mailing Address:* Effective immediately, please mail all reports of DX activity to DX Editor Newkirk's new QTH, 5833 North Kenmore Ave., Chicago, Ill.

VE3CJ used this gear during the DX Test as VP5BP, providing the Caymans country listing for over 370 'phone contacts. Noel hopes to return again for the next big shindig. The rig is a Lettine and the receiver an Eddystone.

Where:

No bureau changes or general addendum to note in this paragraph this trip but we might take a line or two to advise DXers, newcomers and otherwise, to keep those envelopes on file with their call-area QSL manager. It's surprising to run into fellows who work quite a bit of DX and complain about QSL returns, never realizing that a dozen or so cards may be waiting for them at the bureau . . . . . If you've been getting out lately you may be able to do some good with the following QTHs.

CE1DC	Dario Perez Garry, Casilla 255, Copiapo, Chile
CR9AW	QSL to Box 541, Hong Kong
DL4EA	Nelson L. Raymond, % PAA, Rhein-Main Airport, Germany
DL4SS	MARS, 7774 Sig. Bn., APO 403, % PM, New York, N. Y.
DU6RG	Box 406, Ilo City, Panay Island, Philippines
EA8RB	Jose Bordon, Box 27, Las Palmas, Canary Islands
EK1DD	American Legation, % VOA, Tangier, Morocco
EL1ØA	% Firestone Plantation, Harbel, Liberia
F7AT	W. Snyder, Hq. Sig. Sect., Hq. EUCOM COM Z, APO 58, % PM, New York, N. Y.
FQ8AG	(QSL via REF)
HZ1AB	APO 616, % PM, New York, N. Y.
ex-KL7AHM	W3AHM, 6000 Benalder Drive, Fairway Hills, Washington 16, D. C.
KX6AC	Navy 824, FPO, San Francisco, Calif.
OE13FN	APO 168, % PM, New York, N. Y.
OQ5AA	(QSL via OQ5RA)
PX1A	(QSL to EA3HE)
SU1FX	(QSL via RSGB)
TI8JR	Julio Ruiz R., Golfito, Costa Rica
VK1BS	QSL % Nurse J. Mills, Prince Henry Hospital, Sydney, NSW, Australia
ex-VS7KR	S/Ldr K. Rancombe, RAF, % 86 Orchard Road, St. Annes, Lancs., England
VU2JG	"Jalesh," B-10/168 Lodi Road Colony, New Delhi, India
YK1AH	P. O. Box 35, Damascus, Syria
YN3AG	(QSL to W3AG)
YU1AD	Box 48, Belgrade, Yugoslavia
3A2AG	W. Snyder, Hq. Sig. Sect., Hq. EUCOM COM Z, APO 58, % PM, New York, N. Y.
3A2AK	(QSL via F8PQ)
4X4AR	P. O. Box 111, Tel-Aviv, Israel

These by way of W1FTX, W2MLO, W3s AHM DLI JYS POE, W4KE, W5FFW, W8SYC, W9s CFT HUZ, W9s AIH FID, XE1AC, H. Ripet, J. Kiesinger and the No. Calif. DX Club's *DXer*. By all means come again!

Tidbits:

From W2IOP comes word of the very interesting DX program upcoming at the ARRL Central Division Convention, French Lick, Indiana, on October 20th and 21st. Among the features of the meeting will be the distribution of an unusual book entitled "DX Man's Zoo" which should become quite a collector's item. See you there? . . . . . Andre Latil of the contemporary FG7XA had W4LVV on hand as guest operator and Chuck really went to town. In 12 hours he rolled up some 250 QSOs, using 14-Mc. c.w. for the most part. The 10-watt 6L6 crystal oscillator raised some 20 countries and also collected QSOs on 40 and 80. QSLs for this batch of contacts will be forthcoming as soon as Chuck acquires the stock . . . . . Somebody has been swiping VP9G's call and name for use on c.w. and Bill wants it known that he works only 'phone . . . . . A note from J. DeMyer informs that KC6WC had a close-down delay that permitted him to remain on the air a while longer but he's really heading for W6 shortly. Also that ex-FE8AA in Paris is trying to dig up material for a home-brew n.f.m. receiver with John's assistance . . . . . DXer W9RQM used his summer vacation to reach 47 states on 6 meters, of all bands, and G2DHV used his holiday for some 3.5-Mc. 8-watt work as GW2DHV . . . . . ZC4XP is now very close to a DXCC on both 'phone and c.w. and is about to do something unusual for these days. Sid's going to rebuild from 150 watts down to a permanent 20 watts. Could he

VK/ZL DX CONTEST

This year celebrating Australia's Commonwealth Jubilee, the Wireless Institute of Australia, with the coöperation of the New Zealand Association of Radio Transmitters, is again sponsoring the VK/ZL DX Contest.

C.W. Period: 0001 GCT Oct. 13th to 1200 GCT Oct. 14th.

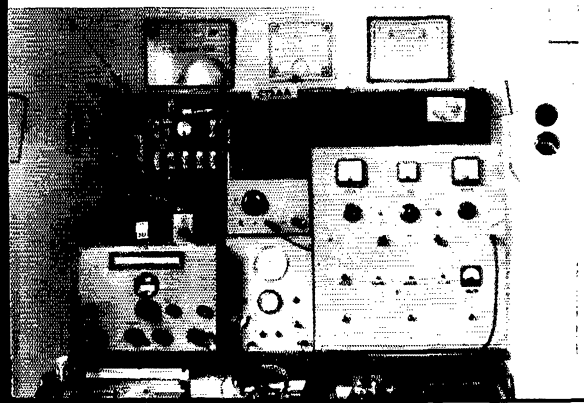
'Phone Period: 0001 GCT Oct. 20th to 1200 GCT Oct. 21st.

1. Sections: Enter either 'phone or c.w. section on any one band or all bands on 'phone and c.w. Separate logs for each section.

2. Serial Numbers: Exchange RS or RST report plus a contact serial number which must start with any number between 001 and 100 and follow in sequence for each successive contact.

3. Scoring: One point per contact multiplied by the number of VK/ZL districts worked.

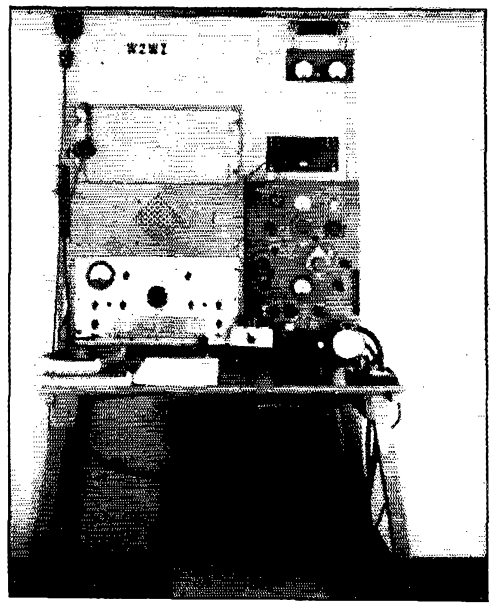
4. Logs: Date, GCT, band, call, number sent, number received, and VK/ZL district must be shown in that order. Attach a summary sheet together with the usual statement that all rules have been observed. Logs must be received by the Contest Manager, Box 1734, G.P.O., Sydney, Australia not later than January 31, 1952. A special Jubilee QSL card together with the contest results will be sent contestants submitting logs. WIA urges logs be submitted regardless of the number of contacts.



♦

On the air since 1911, A. C. de Oliveira is still widely heard and worked as CT3AA. All gear shown, except for the Marconi CR100 receiver, is home-constructed. When DX conditions are a bit slow, Al tends to his duties as Madeira QSL manager.

have been chatting with W2QHH or VO3X? . . . . . Thinking there was something familiar about a recently received OA4J card, W7KWU checked his old W6CWI QSL file and came up with another card bearing the same call and same operator's name. The QSOs confirmed were almost exactly 20 years apart! . . . . . VP7NM tells W4REZ that W4HQN/VP7 has been operating illegally and no QSLs for the lad can be handled by the Bahamas bureau . . . . . We learn that the call 3A2AC was issued to Capt. Albert H. Hix of W8PQQ and F7AR rather than to DL4QH as previously stated in this column. 3A2AC knocked off some 699 QSOs with 107 countries during its first Monaco sojourn . . . . . J. R. Kiesinger is struggling to get on the air at Accra, Gold Coast, with some abandoned U. S. Army gear. He moves around and is faced at various times with mains running from 220 volts a.c. down to 32 volts d.c. He'll welcome assistance or encouragement addressed to him at Union Trading Co., Ltd., P. O. Box 186, Accra, Gold Coast Colony . . . . . Gibraltar QSL Manager ZB2I declares that ZB2L is unlicensed; and W1GKK has already issued some 1000 FP8BX pasteboards, stating he has many more on hand if the boys will come through with the required self-addressed stamped envelopes. Not only is George doing a heavy job as the FP8BX QSL chief but he recently shipped equipment to enable the St. Pierre stalwart to get on voice (n.f.m.). W1GKK's log references are kept up to date monthly by FP8BX . . . . . Forty-watt work at W2QHH has now accounted for WPR-200 and DXCC 200-country endorsements as well as 19 of the 22 Swiss cantons for the Helvetia-22 certificate . . . . . W6EAY has interesting lines re ZM6AK: "He lives in Apia, but works some 25 miles away where his rig is located. He says the road to work is rather rough terrain and the natives are constantly after him for killing their pigs and other stock while driving to work. He vows to get on the air more often in the future and has done much to improve his signal. . . ." . . . . . Via W4KE, F8PQ stated that 3A2AK would be on the air in Monaco with French operators during early August. Hope you got them during their proposed operation on 20 and 40, 'phone and c.w. . . . . 3A2AG/F7AT is ex-DL4FA and he intended to commence Monaco activities during September. Ham radio is evidently booming the tourist trade for that small principality! . . . . . A line from ex-CE2BC to W3JYS mentions that he is now the only CE1 performing on c.w. The call is CE1DC and the QTH is covered in the "Where" section . . . . . ". . . after an enforced 6-month layoff due to the selling and purchase of new equipment, old OA4BN (the Big Noise) of the Peruvian Andes and still claiming to be the highest strictly-ham station in the world is going back on the air. . . ." The description of Bob's new layout would do justice to a most elaborate Stateside shack. QSLs will be swapped 100 per cent on the basis of cards received, all via air mail. Two new stations operating nearby at the 12,200-foot level are OA4s EE and EF. Both are active on 10 and 20 A3 and the former is equipped to work 10 through 80 meters with VFO. OA4BN is in need of a schedule with a VE in the vicinity of Haileybury or New Liskeard, Ontario, or a schedule with a W9 or WØ who could relay to that area . . . . . The gear at KL7AHM on Adak has been turned over to W7EDP/KL7 who hopes for a fast KL7 call assignment. Other actives on the island are W4JOS/KL7, W9UUY/KL7 and KL7AIZ, the latter being the Adak Radio Club station. Club activities are sponsored by the Adak Naval Station . . . . . WØAIH was enlightened by VS9AC concerning the nefarious activities of a gent pirating VS9AC on 14-Mc. c.w. The real McCoy uses 40 meters exclusively. Other VS9s currently active are AA, AH and AO. WØAIH is another member of the "How-to-Get-a-Card-from-ET9X?" club . . . . . The latest PX1A to be heard was really in Andorra and was operated by EA3HE from Hotel Meritxell in Andorra la Vieja. Dipoles, a 100-watt rig and an NC-57 receiver were employed on 20 and 40 meters, 'phone and c.w. XE1AC, who helped provide this info, reveals that another Spanish-originating ham expedition is afoot, this time to Ifni . . . . . The Potomac Valley Radio Club boys are in the process of accepting a challenge from the Southern California DX Club for high score in the next ARRL DX test. The sum of the top ten scores in each club will settle the issue. Looks as if the W9s will be mashed in the middle of this battle . . . . . Notes from the Northern California DX Club's *DXer*: You may be able to QSL AC3PT faster through JA2HB than direct. . . . XU8SR operates undercover but is in China all right. . . . VR1G on British Canton closed down but a newly-licensed VR1H is expected to be active. The August number of this organ contains a write-up on a handy "Signal Sniffer" with which one might put the whammy on harmonic-caused TVI . . . . . KP4HU's recent application for DXCC contained 103 veries, all earned on the 7-Mc. band. In turning this neat trick, Mac used either an 807 at 45 watts or an 815 at 60 watts. His antenna was a 135-foot Zepp. . . . . Overseas stations are requested to send their W7 QSLs to W7FWR, the current QSL manager, and not to ex-manager W7EYS, who is now stationed in KH6-land.



A very compact open-and-shut station is the pride of VK9GB. Operating in Rabaul, New Britain, he feeds 100 watts into Zepp antennas on 10 and 20 meters. (*Photo courtesy W2GLM*)

F9QN paid a personal visit to SVØWX and used his magic touch to raise FG8XA. F9QN is on the left. SVØWX used low power on 10 and 20 'phone to good advantage.

—•••—

Perhaps a few DXers are confusing QSL procedure with the old box-top routine, argues Jeeves. Could they have subconsciously appended to DXCC Rule 2 the words "or reasonable facsimiles thereof"?

Ten-Meter Mobile Tips

Some Suggestions for Improving the Performance and Convenience of Car Installations

BY GEORGE BONADIO,* W2WLR

THOSE who are going into mobile operation for the first time will find many problems that are not encountered in conventional installations. If any serious attempt is to be made to work anyone but locals with the car motor running, something must be done to suppress electrical noise. Power supply for both receiver and transmitter, with the car storage battery as the only source, requires special considerations not necessary when the resources of the power company are available at the nearest wall outlet. Since the antenna, even for 10-meter work, is operated under anything but favorable conditions, care must be taken to make adjustments that will get the most out of it, in receiving as well as in transmitting.

Noise

Noise clippers are seldom completely effective on generator hash and will do a good job on ignition only if the amplitude of the noise is low enough so that the stages ahead of the clipper are not blocked. In general, noise from all sources will be reduced materially if the antenna is placed at the rear of the car, away from the ignition system and the receiver vibrator pack.

Large electrolytic capacitors connected at various experimentally-determined points along the generator-to-battery line will do a great deal to take out the noise produced at the generator commutator. I found that a 500-μfd. 15-volt electrolytic at the generator output terminal and another similar unit on the generator lead at the voltage regulator did the job. I also used a 0.001-μfd. mica condenser with half-inch leads at the generator output in parallel with the electrolytic. This forms a series-resonant circuit near 28 Mc. Electrolytics should not be used at points in the battery circuit where they may place a drain on the battery when the car is idle. It is a good idea to check the resistance of such condensers at intervals. Vibration and temperature changes take their toll.

In most car-radio installations, either resistors, b.c. chokes or both are used at each spark plug and at the distributor. These are seldom effective at 28 Mc. In my case, the difficulty was solved by using Ohmite Z-28 chokes at each plug and one at the distributor outlet to the coil. Incidentally, whenever resistors are used, the motor timing should be readjusted. Failure to do this may be the reason that some car owners complain of low gasoline mileage when resistors are installed. In some cases it may help to try bonding the motor block to the car frame at various points. It is a good idea to do this anyway in cars where the battery ground connection is made to the motor block rather than to the frame.

*325 Winslow St., Watertown, N. Y.

Receiver and Transmitter Tips

In my receiving installation, which consists of a Gonset 3-30 converter working into an 8-tube Philco car radio, I found that the filtering of the vibrator supply was not sufficient to exclude vibrator hash when the converter was in use. Accordingly, a simple additional section of filter consisting of a 1000-ohm resistor and a 20-μfd. condenser was inserted in the plus-B lead to the converter.

Since the output voltage from individual vibrator packs supplying car receivers may vary considerably, the operating voltages of any converter or high-frequency receiver running from such a supply should be checked. On the Gonset converter I found that the screen voltage was down considerably from the customary 150 volts. A noticeable improvement in performance was obtained by shunting the screen resistors in the converter with other resistors to bring the screen voltage up to normal.

An important point often overlooked in 28-Mc. receivers, especially in converters for mobile use, is that maximum performance is dependent upon proper adjustment of coupling to the antenna. In my particular installation, it was found that the antenna coupling as set originally in the Gonset was too tight. The positions of the coupling coil and the trimmer condenser were adjusted for maximum response from a weak signal.

Since the transmitter is located in the trunk, close to the antenna, a coaxial line is neither necessary nor desirable. The antenna is fed through a simple short length of insulated wire from a pi-section coupler. This system lends itself better to operation over a wide range of frequencies than a system using a supposedly flat coaxial line.

Because the regulation of supply voltages available in a mobile installation is usually poor, it is advisable to use some sort of an r.f. indicator at the antenna, rather than to depend on the plate meter, if maximum output is to be realized. Filament voltages should be checked carefully under operating conditions. If the voltage is too high, it should be cut down with a suitable series resistance. Sometimes this can be done by selecting a proper wire size for the filament-supply lead.

Control System

Each mobile operator naturally has his own ideas about transmitter and power control. I have found latching-type relays particularly useful for applying power to the transmitter and changing over the antenna. These relays operate merely at the momentary contact of a doorbell button and do not impose a continuous drain on the battery. I have the circuits wired as shown in Fig. 1. Everything is controlled through the ignition switch, S_2. When this switch is closed, the filaments may be turned on and the circuits are set up for the dynamotor-control relay, Ry_3, receiver power and the receive-position coils of the change-over relays, Ry_1 and Ry_2.

S_3 and S_4 are push-button controls on the steering post. When S_3 is closed momentarily, the contacts of Ry_1 and Ry_2 are brought to the transmitting position. One contact on Ry_1 serves to operate Ry_3, starting the dynamotor. The other contact of Ry_1 opens the receiver vibrator pack. Simultaneously, Ry_2 shifts the antenna to the transmitter. It will be noted that the windings on the transmitting side of Ry_1 and Ry_2 are returned to the generator side of the battery cut-out relay so that the relays cannot be thrown to the transmitting side unless the car generator is functioning.

When S_4 is closed momentarily, Ry_1 and Ry_2 are drawn to the receiving position. Ry_1 turns on the vibrator supply and turns off the relay controlling the dynamotor, while Ry_2 shifts the antenna to the receiver. The b.c. receiver supply can also be turned on independently by S_1, the regular receiver power switch, with which the relay contacts are paralleled.

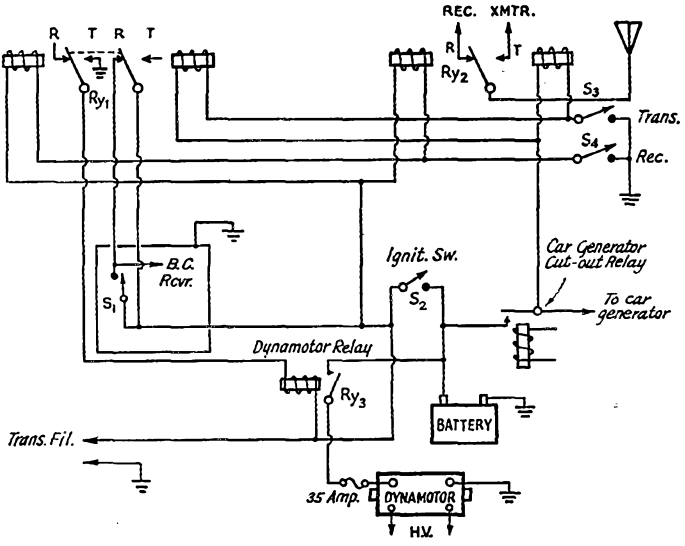


Fig. 1 — Circuit diagram of the control system used in W2WLR's mobile rig.
Ry_1, Ry_2 — 6-volt d.c. latching-type relay.
Ry_3 — Dynamotor control relay.
S_1 — B.c. receiver power switch
S_2 — Ignition switch.
S_3, S_4 — Push-button switch.

Battery-Charging System

Unless in normal use the car is driven a fair amount without using the transmitter, it may be necessary to provide greater charging generator capacity. Some of the ordinary 35-ampere generators will stand a boost to 50 or 55 amperes, but others will not, so the job should be undertaken with caution. The charging rate in regulated systems can be increased by tightening the regulator spring slightly. If this results in overheating of the generator or excessive sparking at the commutator during a normal operating period, the charging rate must be reduced to avoid damage to the generator. I adjusted the regulator spring in my case until the ammeter showed a 10-ampere increase in charge with everything, including lights and heater, running and the motor operating at high speed. The generator is still standing up well after six months of operation because the demand of maximum generator current is infrequent and unsustained. If a car is seldom operated at high speeds, the size of the generator pulley can be decreased to give the same charging rate at slower engine speeds. In cities where taxi radio got an early start, it may be possible to pick up a slow-speed generator that will handle 40 to 75 amperes. Most of these have now been replaced by rectified-a.c. systems. These generators will take care of the entire requirements of the car at engine idling speed.

Miscellaneous Suggestions

After numerous shorts developed from time to time behind the dashboard, I learned to use insulated covering over shielded wire. Solderless terminals that crimp on the end of the wire will stand up better than soldered terminals, since vibration often breaks the wire off close to the terminal. Where complicated wiring runs back and forth through the car, color-coded wire will save a lot of headaches.

All transmitter tuning condensers should be equipped with shaft locks or stiffened springs. Otherwise you'll be lucky if you don't have to stop and retune after a heavy bump.

A breast, throat or lip microphone, or a holding device, such as the Shure "Third Hand," will make mobile operation less of a strain since it leaves both hands free.

Any bright dial lights should be subdued by using series resistors to the point where glare is reduced.

I have found a standard 103-inch stainless-steel whip antenna fitted with a good spring mount very satisfactory. I operate it at full length and in spite of the fact that it has struck objects several times while traveling 50 m.p.h., it shows no kinks and stands up majestically.

A Bandswitching Multiplier-Exciter

An Easily-Constructed Unit for Five Bands

BY CHARLES A. DENE,* W3CPC

UNTIL recently, the writer has always employed triodes in the output stage, despite the fact that they require considerably greater driving power than tetrodes and thereby increase the problem of TVI. But with the latter thoughts in mind and realizing that the triodes that had given years of faithful service would soon have to be replaced, it was decided to rebuild and convert to a tetrode final. To fulfill the desired power-output requirement, a 4-250A was selected. The modest driving requirements of such a tube permit the use of a low-power exciter with tubes and other components of small size. Thus, it is not difficult to arrive at a very compact arrangement compared to that necessary for a high-power triode final.

Although it was desired, of course, to keep the exciter unit as simple as possible, certain conveniences were considered essential. Five bands were to be covered without plug-in coils, and tuning controls should be reduced to a minimum consistent with simple construction. Several circuit arrangements and tube line-ups were considered. Some of these were tried out and discarded before the finished model at last took form. Attempts at a simple broad-banded job left much to be desired. With the system tried, it was impossible to obtain uniform excitation across any band without readjustments. Further broadening of the tuning resulted in insufficient output, so this idea was abandoned. A ganged unit was then built and this proved to be far superior. Much more drive was obtained and this could easily be maintained uniform across any of the bands. No sign of instability was evident in any of the stages.

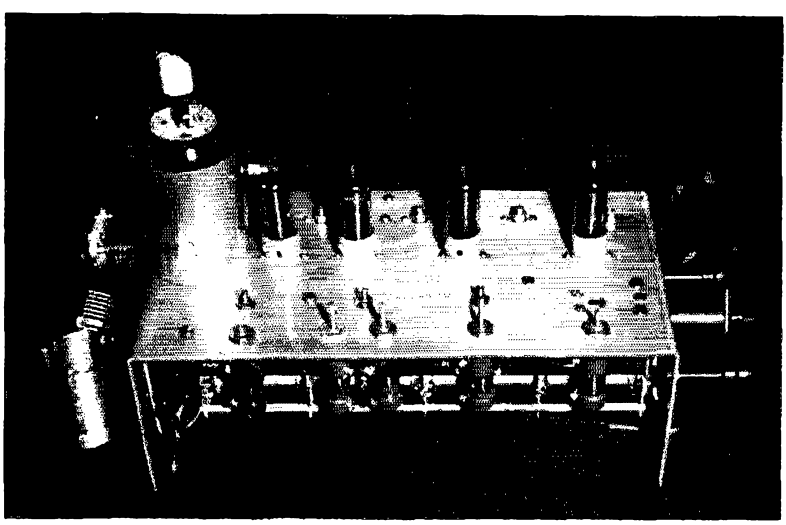
Circuit

The circuit diagram is shown in Fig. 1. In essentials, it follows the arrangement described in a previous issue by W8CVU.[1] Four 6AQ5s are used in the multiplier stages that drive an 807 output stage. The latter always works as a straight amplifier. The output of the first stage is at 3.5 Mc. The second stage works as a doubler to 7 Mc., while the third stage may be operated as a doubler to 14 Mc. or as a tripler to 21 Mc. One section of the bandswitch connects L_3 and L_4 in parallel for the latter band. The fourth stage is a doubler to 28 Mc. For each band, the bandswitch, S_1, connects the output of the appropriate multiplier stage to the grid of the 807 and selects the proper output tank-circuit inductance and link.

The tuning condensers of the four multiplier stages are ganged. C_4, C_{11}, C_{17} and C_{23} are trimmers to set the minimum circuit capacitance for tracking of the tuning gang. C_6, C_{13} and C_{19} are provided to compensate for the difference in input capacitance between the 807 and the 6AQ5s. This is necessary to prevent detuning of the multiplier stages when their output circuits are switched from the succeeding stage to the 807. All multiplier stages have combination grid-leak and cathode-resistor bias and screen voltage supplied through series resistors.

* 7137 Jackson St., Philadelphia 35, Penna.

[1] Mayer, "Miniature Tubes in a Bandswitching Exciter," *QST*, December, 1949, p. 11.



Side view of the bandswitching multiplier-driver unit.

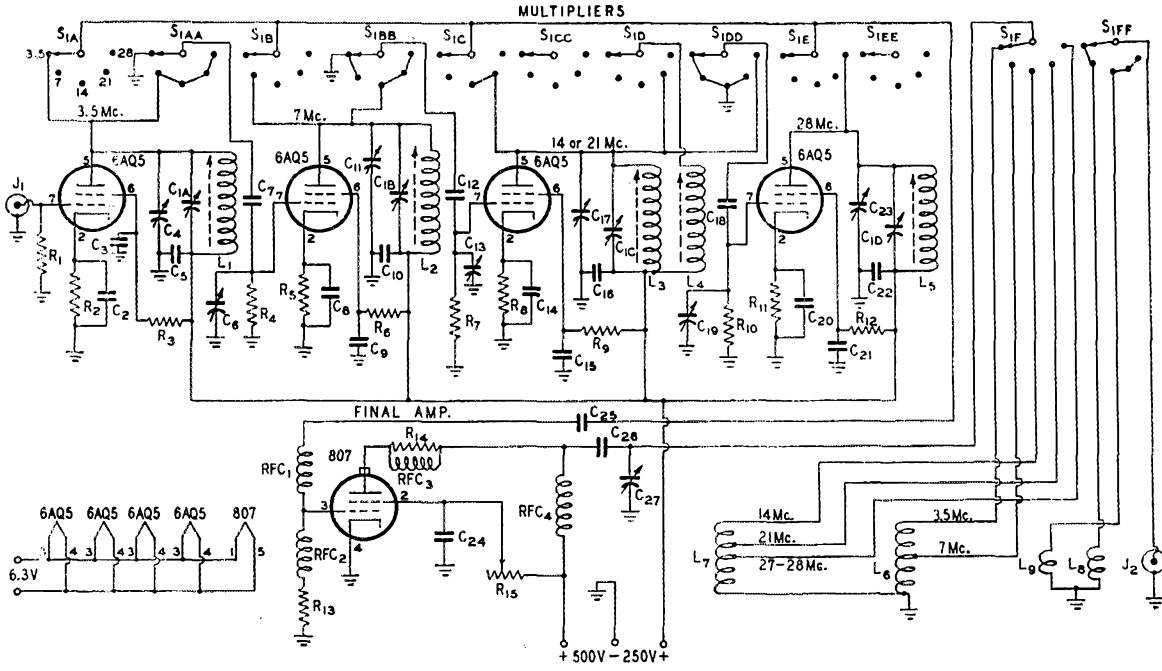


Fig. 1 — Circuit of W3CPC's bandswitching multiplier and driver.

C_{1A}, C_{1D} — 50-$\mu\mu$fd. midget variable (see text).
C_{1B}, C_{1C} — 15-$\mu\mu$fd. midget variable (see text).
C_2, C_3, C_5, C_8, C_9, C_{10}, C_{14}, C_{15}, C_{16}, C_{20}, C_{21}, C_{22} — 0.01-μfd. disk ceramic.
C_4 — 45-$\mu\mu$fd. ceramic trimmer.
C_6, C_{13}, C_{19} — 50-$\mu\mu$fd. air trimmer (APC type).
C_7, C_{12}, C_{18}, C_{25} — 100-$\mu\mu$fd. ceramic.
C_{11}, C_{17}, C_{23} — 20-$\mu\mu$fd. air trimmer (Johnson 20M11).
C_{24} — 0.005-μfd. disk ceramic.
C_{26} — 0.002-μfd. 1000-volt mica.
C_{27} — 100-$\mu\mu$fd. midget variable.
R_1, R_4, R_7, R_{10} — 0.1 megohm, ½ watt.
R_2, R_5, R_8, R_{11} — 470 ohms, 1 watt.
R_3, R_6, R_9, R_{12} — 15,000 ohms, 1 watt.
R_{13} — 15,000 ohms, 2 watts.
R_{14} — 47 ohms, 1-watt carbon.
R_{15} — 50,000 ohms, 20 watts, adjustable.
L_1 — 35 turns No. 26 enam., close-wound.
L_2 — 26 turns No. 26 enam., close-wound.
L_3 — 12 turns No. 22 enam., close-wound.
L_4 — 9 turns No. 22 enam., close-wound.
L_5 — 4 turns No. 20 enam., ½ inch long.
NOTE: Above coils wound on National XR50 slug-tuned forms.
J_1, J_2 — Coax connector.
RFC_1 — 15 turns No. 20 s.c.c., ¼-inch diam., close-wound.
RFC_2, RFC_4 — 2.5-mh. r.f. choke.
RFC_3 — 7 turns No. 20 s.c.c. wound around R_{14}.
S_1 — Ceramic rotary switch — 6 wafers, 2 circuits per wafer, 5 positions per circuit (made from Mallory type 191C or Centralab kit parts; see text).

Construction

The unit shown in the photographs is built on a simple open chassis. It is 4 inches high, 6 inches wide and 10 inches long. Where TVI is a problem it should be mounted in a suitable shielding enclosure and the power leads filtered (see *The Radio Amateur's Handbook*). The four-section tuning condenser for the multiplier stages is a surplus item. Each section originally had a maximum capacitance of 80 $\mu\mu$fd. With the aid of a grid-dip meter and a coil of known inductance, plates were removed until the two end sections were 50 $\mu\mu$fd. maximum and the two inner sections 15 $\mu\mu$fd. each. A suitable substitute for this unit would be a combination of two National UM50 ultra-midgets and two UM15s ganged with flexible shaft couplings.

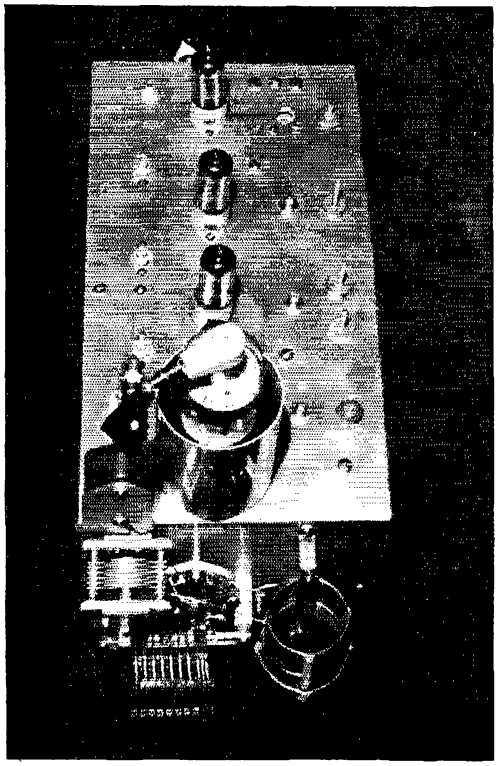
Bandswitching is accomplished by the use of six Mallory ceramic wafers. Each wafer carries two circuits. It was necessary to assemble the switch components with homemade shaft and tie rods, since they are not regularly produced in the required 12-inch length. The tie bolts were made by threading the ends of two pieces of welding rod with a 5-40 die, after chipping off the flux and sandpapering them down. The shaft was made from a piece of flat steel strip, 1/16 inch thick and ¼ inch wide. Although it is not quite so satisfactory mechanically, it should be possible to use two shorter gangs coupled together if necessary. To do this without a special shaft coupling, it is necessary to fit both ends of the shorter gangs with index heads so that the shafts will fit a standard ¼-inch round coupling.

The top of the chassis is drilled to accommodate the tube sockets, the National XR50 coil forms and the trimmer and padder condensers in rows as shown in the photographs. The gang condenser is mounted on 1-inch pillar insulators (National GS-1 less hardware) on the underside of the chassis. The bandswitch is supported between the two ends of the chassis with the tie bolts passing through the rear end where the last wafer, S_{1F}-S_{1FF}, in the 807 plate and link circuits,

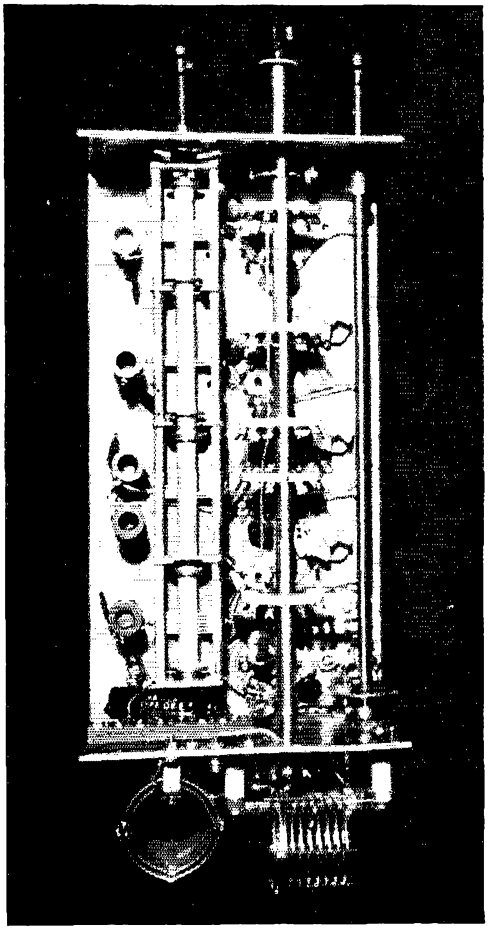
is mounted externally. This method of mounting results in a rigid job. If two smaller units are used, as suggested, additional mounts will be needed near the center.

To the left of the tube sockets in the rear top-view photograph are the submounted compensating condensers, C_6, C_{13} and C_{19}. The four tank-circuit trimmers, C_4, C_{11}, C_{17} and C_{23} are mounted between the gang condenser and the chassis with their shafts protruding through the top, to the right of the tubes, for convenient adjustment. Along the right-hand edge is the line of XR50 coil forms.

The 807 socket is mounted ¾ inch below the surface of the chassis with the aid of spacers. This shortens the plate lead somewhat and also allows the shield can to come well up on the tube. The plate lead is a piece of copper strip ⅜ inch wide. The plate parasitic-suppressor choke, RFC_3, is wound around R_{14} as a form. The plate feed choke, RFC_4, and its associated blocking condenser, C_{26}, are mounted on top in the rear corner near the 807. The condenser is fastened to a strip of polystyrene 3 inches long and 1¼ inches wide. This strip is held against the rear edge of the chassis by the mounting nut of the tank condenser, the shaft of the latter passing through the strip as well as the chassis.



Rear top view of W3CPC's exciter unit. The coax input connector and the three compensating condensers are in the row to the left. The tubes are in the second row, the tank-circuit padders in the next row and the coil slugs to the right. The output tank-circuit components are fastened to the rear of the chassis.



Bottom view of the bandswitching exciter. In this view the coils are to the left, with the ganged condensers and bandswitch to the right. The geared shaft running along the right-hand edge controls the output tank condenser.

The rear-view photograph also shows the mounting of the 807 plate coils and tank condenser, C_{27}. The latter is of the "receiver" type, but does not arc over at plate voltages up to 500. For higher plate voltage, or modulation, a unit with greater plate spacing is advisable. With the condenser in the position shown, the lead to the blocking condenser can be made quite short, but it is necessary to drive it with a pair of gears so that the shaft will not interfere with the line of compensating condensers. A flexible shaft, first tried, was not satisfactory, but it should also be possible to use pulley drive, or perhaps make use of shaft couplers of the universal-joint type.

A coax connector is provided at the rear for the output link line to the final amplifier (or antenna tuner). The input connector for VFO is placed on top of the chassis near the front. On the inner side of the rear edge of the chassis a small 7-terminal strip is mounted for making connections to power supply and meters.

(*Continued on page 128*)

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

HERE it comes again — that period in the year when activity on 6 and 2 begins to sag. The summer soldiers have had their fling, and after listening a few nights without hearing DX breaking through have decided that there is no point bothering with the frequencies above 29.7 Mc. until next May. And the regulars on the v.h.f. bands are not entirely blameless in this respect, for who among us has not been guilty of "cold-filaments listening"?

There are, of course, many sparsely-populated sections of our country where v.h.f. operation must, of necessity, be a DX-only proposition, but there are plenty of other areas where anyone who wants to make contacts on 6 or 2 should be able to do so at will, at least in the evening hours. If we all make it a point to *transmit* as well as listen, regularly; if we will see to it that no call we hear goes unanswered; if we will get together with the v.h.f. enthusiasts in our own neighborhoods, to guarantee that there will be something doing at specified times, we will have taken the steps that can keep our bands alive and interesting the year around.

The September V.H.F. Party just concluded is scheduled at this time to keep rigs on the v.h.f. bands at a time of year when many of them might otherwise be moved lower in frequency. It gave activity an early-fall shot in the arm — but it will be up to all of us to keep it going. There will be plenty of interesting propagation between now and next May, but it will do no one any good if we are *all* listening!

August in Review

After the big aurora sessions of August, 1950, the aurora shows in the same period of 1951 were somewhat disappointing. The night of Aug. 1st provided a brilliant display in Northeastern U. S., but it was of such short duration that not much v.h.f. DX was worked. W1s CLS CK HDQ and W2SFK were checking on 50 Mc. with strong auroral reflection noted around 9:15 EDST, and W2AZL, Plainfield, N. J., heard W8BFQ and upstate New York W2s on 144 Mc.

There were several bursts of aurora between Aug. 20th and 25th, but mostly too late at night for much amateur activity. W2BVU, Poughkeepsie, N. Y., worked W4AO on 144 Mc. early on the 20th, and just after midnight on the 25th, W1BCN, Hyannis, Mass., worked W8BFQ, W3QKI and VE3AIB on 144 Mc.

The month's most interesting DX resulted from other factors, however. The 50-Mc. highlight was afforded by the appearance of W4KKZ/VP7, Grand Bahama Island, on Aug. 6th. Now VP7NQ, Erv worked W1s LSN HDQ CGY CK LLL, W9UIA, W3s MQU KKN OJU PCB, and W4HVV, W5FXN and possibly others. Since that time he has been working the Florida W4s regularly on 50 Mc., and has had numerous cross-band contacts, 50–144, with his rig on the higher band. He should be in business for two-way work on 144 Mc. by the time this appears in print.

Other West Indies representation is still being supplied by KP4NX, San Juan, Puerto Rico (QSL to Box 4008, San Juan). Westy's last reported 50-Mc. DX was a contact with W4FNR on the 8th. He is also set up for 144-Mc. work, but has not yet worked off the Island on 2.

The night of the 7th is classed by 2-meter operators of the Middle West as the best of year, to date. Between 8 and 11 P.M., W9UIA, Evansville, Ind., heard 23 stations in 8 states: Indiana, Illinois, Iowa, Missouri, Kentucky, Ohio, New York and Pennsylvania. W4MKJ, Louisville, Ky., says that stations were coming in from all directions except about 45 degrees either side of south. Signals from as far west as Kansas were so loud that they were overriding nearer stations.

At the eastern end of all this were W3KWL, W3NKM and W3RUE. W3KWL was hearing dozens of W9s, most of them too weak to be copied on voice, when he worked WØIHD, Overland, Mo., on c.w. for his best DX and State No. 15 on 2. Missouri was also added, for No. 18, by W3NKM, who says that the mass of signals

***Late Reports* —**
420-MC. DX NEARS 300 MILES; FAMILIAR VOICE SIGNS CO2JF ON 50 MC.

A pronounced inversion from Nova Scotia to Virginia on Aug. 31st offered a fine opportunity for 420-Mc. DX tests. By 10 P.M. EDST W2TP, Leonia, N. J., was working W3AIR, Glenmont, Md., 200 miles. Around 11 P.M. W2QED, Seabrook, N. J., worked W1HDQ, 210 miles, with signals from W2QED stronger than on 144 Mc. W1PBB, Monroe, Conn., joined this workout for a three-way, and soon after worked W3AIR, 260 miles, for the world's home-station record for 420-Mc. DX. W3AIR was also hearing W1HDQ, 295 miles. W1PBB worked W3OWW, Stewartstown, Pa., 200 miles. The opening lasted until about 8 A.M. the following day, when rain washed out the inversion.

50-Mc. operators of the East got a pleasant surprise during the evening of Sept. 1st when an old friend, better known as HC2OT, appeared as CO2JF, Havana, Cuba, working W3BGT, W8CMS, W8NQD, W2BYM, W3MQU, W1HDQ, W3OJU and possibly others. This was Steve's first opening from Cuba, where he is presently operating on 50 and 144 Mc. only.

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

from all points in between was something to hear. All the western stations were looking for some sign of signals from farther east, but the Alleghenies were again acting in their well-known role of natural barrier.

North Carolina appears in the states-worked lists of several Midwest stations as the result of work from Mt. Mitchell, highest spot east of the Mississippi, by W9ASM/4 and WN9OGJ/4, Aug. 13th through 21st. W8BFQ, Everett, Ohio, worked W9ASM/4 for State No. 21 on 144 Mc., on the 14th, and WN9OGJ/4 on the 16th. W8WJC caught them on the 19th and 21st. W4MKJ and W4OXC of Louisville worked the North Carolina portables on the night of the 13th.

Tropospheric conditions seemed to be building up to something as the month came to a close, but no extreme DX has been reported as we write. The St. Pierre expedition, FP8AG-FP8AH, was making nightly test transmissions, with stations the length of the Atlantic Seaboard alerted, but whether they would stage a breakthrough from their remote location before the end of their stay was still in the hands of fate at our deadline.

Here and There on the V.H.F. Bands

Boharm, Sask. — Though it is true in a general way that stations in the lower latitudes get the benefit of somewhat more frequent sporadic-*E* openings, there are plenty of DX chances for 50-Mc. men farther north. VE5NC reports that radioteletype signals close to 50 Mc., presumably from Alaska, were heard on 18 different days in May, June and July of 1951. This direction compares favorably with others; 50-Mc. signals were heard from Texas on 18 days, from the Great Lakes states on 15 days, and from California 10 days.

Aurora openings at VE5NC have produced weak fluttery signals on 50 Mc. from Minnesota and Wisconsin on six occasions so far in 1951, and the 49.98-Mc. beacon station, VE9RB, has been heard nine times during auroral conditions. The teletype signals from the northwest have been heard via aurora six times this year. They are believed to come over a path of some 1200 miles, as does the Ottawa beacon, and both seem to come in on the normal geographical bearing. These observations indicate that the more northerly stations may have a better chance for DX (via aurora) than is generally realized, and that KL7s and some remote VEs might have an interesting time of it on 50 Mc. if they were to give it a serious try.

Pleasant Hill, Mo. — Making WAS on 50 Mc. does not necessarily involve the ability to work the best DX. WØINI had been resting uncomfortably in the 47 spot for months — with only Nebraska, his neighbor state to the north, to go. The elusive contact was finally made on Aug. 4th, through the coöperation of WØHVW and WØQXT, who ferried gear to Rulo, Nebr., some 100 miles to the north, giving WØINI No. 48.

Arlington, Mass. — The 50-Mc. band is proving its worth in CD planning in many ways. A recent Arlington drill coincided with a red-hot sporadic-*E* skip opening. While the 10-meter nets struggled with S9-plus interference from a dozen states, the 53.4-Mc. group carried on without a hitch. There was plenty of DX on 6 that night, too, but there was no QRM on 53.4 Mc.! So far, Arlington has 9 stations on the air on the 6-meter net, with three more under construction. Two others are in the process of conversion from 28 Mc.

Sandia Park, N. Mex. — A 2-meter expedition to Sandia Crest, a 10,600-foot elevation 9 miles northeast of Albuquerque, is being planned for Oct. 6th by W5VWU, with W5s CA LFH and LZD assisting. Operation will be on c.w. only, 144.14 Mc., with horizontal polarization. Schedules will be arranged in advance with interested parties. For periods in which no schedules have been made, transmissions will be made during the first 15 minutes of the hour to the north, the second 15 minutes to the east, the third to the south, and the fourth to the west. Operation will start at 4 P.M. MST, continuing for 24 hours.

Sherborn, Mass. — The highest 50-Mc.-only score in the June V.H.F. Party was credited to the wrong call in August *QST*. Working 72 stations in 22 sections for a total of 1584 points and second place in the Eastern Massachusetts Section totals was W1GJZ, not W1GTZ as printed.

Sheboygan, Wis. — Not so long ago 2-meter communication across Lake Michigan was considered a rare feat. W9FAN says there's nothing to it now; W8MRK, Muskegon, Mich., comes through nicely every night on their 8:45 P.M. skeds. Howard uses the f.m. band for checks on the possibility of DX in other directions.

Maplewood, N. J. — Activity on 50 Mc. has been a problem in the region from Southern Connecticut to down near Philadelphia, as a result of Channel 2 trouble, but there are quite a few stations that can operate without TVI, even so. Most of the gang have licked their harmonic problems, or are in the process of doing so, and the adjacent-channel trouble with Channel 2 is not so serious for the fellows who are not in heavily congested neighborhoods. Where the TV signal is very strong it is also possible to help out some with traps, so there are several W2s who can now operate any time they can find someone to work.

W2COT reports that an idea has been suggested by W2IDZ for helping out with the activity problem. A group of 50-Mc. men, including W2s COT IDZ MEU ZKE, W3MQU and W3KKN, now have divided up the responsi-

Standings as of August 25th

WØZJB.....48	W5VY.....47	W9ZHB.....48
WØBJV.....48	W5GNQ.....46	W9QUV.....48
WØCJS.....48	W5JTI.....44	W9HGE....47
W5AJG.....48	W5ONS.....44	WØPK.....47
W9ZHL.....48	W5ML.....44	W9VZP.....47
W9OCA.....48	W5JLY.....43	W9RQM....47
W6OB.....48	W5JME.....43	W9ALU.....47
	W5VV.....42	W9QKM....46
W1HDQ.....47	W5FAL.....41	W9UIA.....45
W1CLS.....46	W5NHD.....41	W9UNS.....42
W1CGY.....46	W5FSC.....41	
W1LLL.....44	W5HLD.....40	WØINI.....48
W1KHL.....44	W5HEZ.....38	WØQIN.....47
W1HMS.....43		WØDZM....47
W1LSN.....42	W6WNN.....48	WØNFM....47
W1EIO.....41	W6UXN.....47	WØTKX....47
	W6TMI.....45	WØKYF....47
W2RLV.....45	W6IWS.....41	WØJOL.....44
W2BYM.....44	W6OVK.....40	WØJHS.....43
W2IDZ.....43		WØPKD....43
W2AMJ.....42	W7HEA.....47	WØHVW....42
W2MEU.....42	W7ERA.....47	WØMVG....41
W2FHJ.....41	W7BQX.....45	WØIPI.....41
W2GYV.....40	W7DYD.....45	
W2QVH.....38	W7JRG.....44	VE3ANY....42
	W7BOC.....42	VE3AET....35
W3OJU.....45	W7JPA.....42	VE1QZ.....32
W3NKM.....41	W7FIV.....41	VE1QY.....31
W3MQU.....39	W7CAM.....40	XE1GE.....19
W3JVI.....38	W7ACD.....40	CO2JF 5
W4FBH.....46		
W4EQM.....44		
W4QN.....44	W8NSS.....46	Calls in **boldface** are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.
W4FWH.....42	W8NQD.....45	
W4CPZ.....42	W8UZ.....42	
W4FLW.....42	W8YLS.....41	
W4MS.....40	W8CMS.....41	
W4OXC.....40	W8RFW.....41	
W4FNR.....39	W8LBH.....39	
W4IUJ.....38	W8BFQ.....39	
W4BEN 35	W8LPD.....37	

bility for maintaining activity each night. Starting at 10 P.M., the fellow who "has the duty" makes calls, answering any station he hears. If he doesn't hear anyone he keeps calling at frequent intervals. So far there have been good-sized round tables developing every evening, and more fellows are joining the movement. Calls that haven't been heard on 6 for months are gradually reappearing, and W1s now find that turning the beam toward W2 is again worth while.

Austin, Texas — At the West Gulf Division ARRL Convention, Aug. 17th – 19th, announcement was made of a plaque award to be made to the v.h.f. operator who is judged to have done the outstanding work on the v.h.f. bands in each of the three states of the West Gulf Division during 1951. Awards will be made on the basis of the amateur's work in all phases of v.h.f. endeavor: observation and reporting of unusual conditions, experimental work with antennas or equipment, promotion of v.h.f. activity, and other factors that go to make up an unusual record of achievement. More information may be had from W5LFH, who is handling the administrative details of the award program for West Gulf ARRL Director W5CA.

Yawn Patrol

For years we have known that v.h.f. propagation is at its best in the early-morning hours. Some time back there was a concerted effort to promote morning operation, particularly on 144 Mc., but the fact that the best morning periods usually come immediately after the best late-evening openings made it rather rough on the would-be early riser, and interest in the dawn skeds sagged. Recently, the number of before-work skeds has been increasing, however.

W5IRP, Lufkin, Texas, writes that there is activity on 144 Mc. every morning between 6 and 7 A.M. CST, and that contacts up to 300 miles or so are made much more frequently than would result from the same number of man-hours expended in evening work. W5ML, Oil City, La., also finds something doing on 2 every morning.

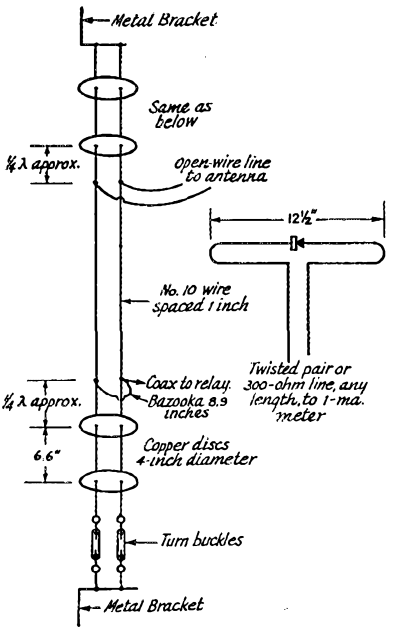
After many unsuccessful evening tries (in proportion to the successful ones) W2QED, Seabrook, N. J., and your conductor started a series of skeds on 144 Mc. at 7 A.M. EDST. It is possible to cover this 200-mile hop at night only when conditions are well above normal, but the morning sked has now been maintained daily for more than two weeks without a single miss. On the poorest mornings, signals have been nearly solid on voice, and on the better days, the average signal runs 15 to 20 db. above the noise level.

Sunday morning has been a traditional time for v.h.f. get-togethers, but in many localities other days find the v.h.f. bands deserted. If TVI or other factors are keeping evening activity low in your neighborhood, how about promoting daily operating in the early mornings. It could help to build v.h.f. occupancy — and it will result in plenty of nice tropospheric DX, if followed through regularly, winter or summer. Whether it's 50, 144, 220 or 420 you're interested in, that early-morning dividend is well worth collecting!

The World Above 420 Mc.

What feed line to use? This problem bedevils nearly all 420-Mc. men. Coaxial lines seem like the thing, since everything unshielded tends to radiate, but those loss figures for solid-dielectric coaxial lines are rather discouraging. The polyethylene-insulated parallel lines are none too good, especially in wet weather. Open-wire lines offer promise, but unless very close spacings are used the radiation loss may be excessive with these.

The transmission line problem at W2QED, Seabrook, N. J., is solved as shown in the accompanying sketch. Ken has a high antenna with a long feed line, and losses were just about nullifying the effect of the height until he put in the line shown. Made of two No. 10 wires spaced one inch apart, Ken's line is shorted twice at both ends with copper discs. This permits it to be pulled up tight between metal brackets at the top and bottom of the long vertical run, without introducing any form of insulator. A short, flexible section of spaced line at the top connects to the array itself, while the power is fed into the line from the transmitter through a coaxial line and a bazooka. The points of attachment are varied for maximum-power indication in a remote-indicating field-strength meter, also shown in the sketch. This is mounted several wavelengths away from the 32-element array, providing a reliable check on the effect of any adjustments made in the shack, an important factor, as meter indications at the transmitter itself can be very misleading at this frequency.



Some 420-Mc. hints from W2QED, Seabrook, N. J.:

At the left is a grounded feed line used for the long vertical run up to his 420-Mc. beam. Shorting copper discs placed a quarter wavelength apart at top and bottom prevent loss of r.f. to supporting structure. Power from the transmitter is fed into the line by means of coaxial line and a bazooka. A short length of open-wire line from the top end goes to the feed point on the array. Unless the vertical portion is very long, no spacers need be used.

At the right is a folded dipole with a crystal rectifier which serves as the pick-up portion of a remote-indicating field-strength meter. This is mounted in the line of fire from the array, at a distance of at least several wavelengths, and up to 100 feet or more may be used with a low-range meter. Such a device is almost a necessity in making adjustments on antenna coupling and tuning, as meter indications may be quite unreliable at 420 Mc.

W3BSV, Salisbury, Md., also uses this system. Cy reports that his field-strength indication went up by four times when he installed the low-loss transmission line. He and W2QED now work regularly on 435 Mc., a distance of about 80 miles.

Your conductor has found a remote-indicating dipole of the sort illustrated to be a most useful gadget for antenna coupling and tuning adjustments. It has been possible to make a considerable improvement in the W1HDQ signal at distant points since the field-strength device was installed. This is reflected in several S-units increase in our signal as received at W1PBB, Monroe, Conn., about 40 miles to the southwest. Regular nightly workouts are now possible over this rough path. The signal of W2QED was heard by the writer briefly on the night of August 14th, but before we could get going on 420 Ken had faded out. Hearing a signal from a distance of 200 miles away was a considerable lift to local morale, however, and daily skeds are being kept with W2QED on 144 Mc. at 7 A.M., in the hope of getting another crack at this long path. Ken's 435-Mc. signal was heard again on the morning of Aug. 29th, hitting peaks about 6 db. better than the 2-meter one, but fading out before the 420-Mc. haywire at W1HDQ could be fired up.

G5BY reports that cool and unsettled weather has hampered DX work on 435 Mc. during August, but in late

(*Continued on page 130*)

Hints and Kinks For the Experimenter

OVERMODULATION INDICATOR

THE circuit shown in Fig. 1 is an adaptation of the familiar arrangement using a diode rectifier as an overmodulation indicator. It uses one of the commonly-available TV high-voltage rectifiers, with its filament powered by r.f. from the transmitter.

A one-turn link, placed close to either the driver plate circuit or the amplifier grid coil, serves to pick up enough r.f. to light the filament

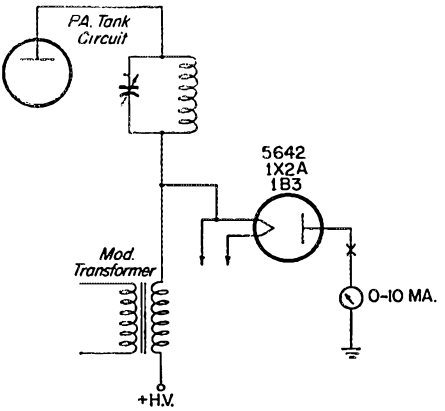


Fig. 1 — Simple overmodulation indicator using one of the new TV high-voltage rectifiers.

of the tube. Adjust the coupling of the link to the point where the filament just begins to glow visibly. Less than a quarter of a watt is needed.

The circuit as shown is quite sensitive, and might burn out the meter unless modulation percentage is carefully controlled. As "insurance" it is suggested that a resistor be inserted at point *X* to reduce the sensitivity of the gadget. Anything between 1000 and 10,000 ohms will work, depending on the sensitivity desired.

In operation, the transmitter is adjusted normally and set for 100 per cent modulation. The meter will "kick" each time 100 per cent is exceeded. — *Jim Barrett, W4KVM*

PREVENTING R.F. FEED-BACK AT 28 MC.

MOST 28-Mc. 'phone operators have at one time or another been plagued with feed-back caused by r.f. pick-up in high-impedance microphone circuits. Installations where a microphone cable about six feet long is used are likely to run into this trouble, because that length approximates resonance at 28 Mc. (depending on the velocity factor of the particular cable). Even when well shielded and by-passed, such a cable can be troublesome. Changing the length of the microphone cable may help in some cases, but a more direct approach to the problem is usually called for.

About the best way is to shunt the microphone with a series-tuned circuit installed right at the terminals of the crystal unit inside the microphone case. A 100-$\mu\mu$fd. ceramic condenser in series with ten turns of No. 20 enameled wire close-wound on a ¼-inch form will resonate close to the 28-Mc. band, and will provide a low-impedance short across the line. Slight adjustment of the inductance may be required for different cables. By-pass the inner conductor to ground at the speech amplifier chassis with a 100-$\mu\mu$fd. mica condenser. When soldering the series-tuned circuit inside of the microphone, be careful not to overheat the crystal unit.

Precise tuning of the series-resonant trap can be done with a grid-dip meter, or by connecting the microphone cable (chassis end) across the antenna and ground terminals of a receiver tuned to 28 Mc., and adjusting the inductance until there is a minimum reaction on a steady signal tuned in on the receiver. Resonance of the circuit is indicated when there is no change in the strength of the received signal when the cable is alternately connected and disconnected from the receiver. — *Fred F. Everett, WØYTY*

SPACE-CONSERVING HINT

MOST commercially-built receivers are supplied with rather large 'speaker cabinets which take up a lot of space on the operating table. At the possible sacrifice of a little audio "quality," the excess space can be used to advantage as housing for one or more of the small gadgets that usually clutter the operating position. Keying monitors, clippers, and small power supplies are just a few of the units that might be tucked away inside the 'speaker cabinet.

The type of construction used at W8ZSA makes use of the space without requiring that the cabinet be drilled or otherwise defaced. The screws used to attach the four rubber or felt "feet" are replaced with screws long enough to protrude ¼ or ⅜ inch up into the interior of the cabinet. Tapped stand-off insulators about ½ inch high are then threaded onto the screws, and a base plate is mounted on the stand-offs. The shelf thus formed can be used for mounting the auxiliary gear. Parts mounted on the shelf should be placed so that the permanent magnet of the 'speaker will not be subjected to heat from tubes or to strong magnetic fields from transformers or chokes. — *S. G. McDonald, W8ZSA/8*

Correspondence From Members-

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

THE MUNHALL CASE

125 East Larkspur St.
Munhall Gardens, Munhall, Pa.

Editor, *QST:*

I wish to take this opportunity to thank you, the League and your General Counsel. . . .

It is gratifying to know that for a very small premium the assurance of one's hobby is protected. Today we know that individually we can do nothing, collectively we are assured of our rights. In no other field is this more important than ours, where we are scattered in all parts of the country.

With this secure feeling I wish to thank you again.

— *George D. Lord, W3MKK*

[EDITOR'S NOTE: And our thanks to W3MKK for his patience while permitting the League to use his situation as a test case in establishing the rights of amateurs to have antenna masts on their home property.]

NOVICES

5 Craven Street,
Methuen, Mass.

Editor, *QST:*

I wish to express my many thanks to your station W1AW because through the code practice, I was able to get my code speed past 5 w.p.m. again after a two-year layoff.

My advice to anyone interested in code is to listen in to your transmissions to increase their speed. I shall continue to listen in as well as get on 80 meters and hope to get up to 13 w.p.m. in the near future.

— *Matthew E. Leshner, WN1TWH*

---

214 West Lincoln St.,
Blair, Nebr.

Editor, *QST:*

I am writing this to thank you for the assistance that you gave me in helping to train a friend for the Novice test, which he passed with flying colors on the 19th of July. The slow-speed code transmissions sent out by W1AW were of great benefit in his training, and the sample questions and answers in *QST* were of great help, too. All of the textbooks that were used by me in his radio training are published by the ARRL, and I have not found a better set of textbooks for a beginner.

— *Alan Lee Fleming, WØYOF*

COMPACT CONSTRUCTION

7720 Marquette Ave.,
Chicago 49, Ill.

Editor, *QST:*

In recent years, the trend in electronics has been toward more compact construction, with greater squeezing together of parts. However, such "progress" cannot be regarded as an unmixed blessing, since compactness takes its toll in other qualities.

The most important disadvantage, from the standpoint of the experimenter at least, is that both wiring and later servicing are rendered extremely difficult. It is often necessary to put parts in layers, and thus getting at a part or connection at the bottom of the heap requires the disconnection and removal of a great deal of wiring not at all related to the circuit being serviced. Furthermore, the actual operations of connecting and soldering are rendered more difficult, due to the lack of space in which to work.

The second major disadvantage of compactness is that the actual performance of the circuit is impaired, in almost every respect. First of all, the reduction in size of certain circuit components causes a severe drop in their efficiency. R.f. and i.f. coils, especially shielded ones, suffer most in this respect. (If you have access to a *Q*-meter or a.c. bridge, try measuring the inductance and *Q* of a "miniaturized" r.f. or i.f. coil, both with and without shield. The results will surprise you. Some standard-size coils show this drop in efficiency also.)

Besides the adverse effect on performance, compact construction also affects the durability and reliability of the equipment. When a number of high-current tubes or high-wattage resistors is jammed tight into a small space, the resulting heat is certain to be injurious to all the components, especially capacitors. I have seen table model sets which actually felt warm to the touch when playing, and had the wax melting from their condensers. In addition, a miniaturized part suffers in durability as well as in performance, especially if it is made for a low cost. It is no wonder that the smallest sets seem to spend the most time in the service shop!

It is commonly believed that a compact circuit arrangement is necessary for best performance of a circuit, especially at high frequencies. However, the best refutation of that idea is the excellent "demonstrator" mock-ups used for training purposes. These are constructed on large panels, with the parts spread out and with very long leads. They include everything from a.m. sets to the i.f. and video portions of TV sets, all of which work excellently, despite the loose layout. Apparently, then, compactness is *not* necessary for good circuit performance, at least below the v.h f. range. In fact, a compact layout can actually be detrimental to the performance of even a high-frequency circuit, because of stray couplings due to the closeness of parts.

Of course, such equipment as vehicular and military sets has to be designed for compactness, due to the requirements of its use, despite these limitations. Further, although home radios are not subject to these same stringent requirements, they are bought by people who desire compactness for unscientific, esthetic reasons, with no conception of the effects of such design upon the performance or reliability of the set. However, those in other lines, such as experimenters, physicists, and hams, have no irrational customers to satisfy and, for the most part, no critical space requirements. Therefore, these people can make things a lot easier for themselves and get better results in the bargain if they would let up on the squeeze, and design their rigs with plenty of room for easy wiring and good performance.

— *Charles E. Cohn*

HELP WANTED

1028 Wenonah,
Oak Park, Ill.

Editor, *QST:*

I am really desperate. I bought a McMurdo Silver model 802 receiver some months ago and have since discovered that the manufacturer is out of business and I can get the schematic nowhere. Since I received an incomplete set of coils, I also need information about them.

Somewhere there is an ARRL member who owns an 802 and will part with his instruction manual long enough for me to copy what I need and return the manual unharmed.

— *Alan Borse*

THE NEW "LICENSE MANUAL"

1265 Norwood Avenue,
Chicago 40, Ill.

Editor, *QST:*

Congratulations on the excellent job of producing the latest *License Manual.* Seeing your ad in July *QST,* I sent for one.

Boy oh boy, it contains just what I need for my license preparation (Novice). I would be willing to recommend this to anyone! It covers everything so much better than I had expected. It's worth every cent.

— *Jack Fehlandt*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
JOHN E. CANN, W1RWS, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
L. G. McCOY, W1ICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

Fall Schedule of W1AW; Periods for Novice Work. Effective with the change from Daylight to Standard Time all over the country (September 30th) W1AW operation is on the new fall schedule detailed elsewhere in these pages. The expanded schedule of seven-day-per-week code practice transmissions is being continued as well as the monthly Qualifying Runs. Practice speed ranges are 5 to 35 w.p.m., monthly certification speeds 10 to 35 w.p.m. All such runs (daily) start at 8:30 P.M. CST. Look for the twice-per-day Information Bulletins and CRPL forecasts "to all radio amateurs" — c.w. transmissions start at 7:00 and 11:00 P.M. CST and voice transmissions at 8:00 P.M. and 10:30 P.M. CST. General and operation periods are designated for two-way work with amateurs in *all frequency bands to and including 2 meters, both voice and c.w.* To contact W1AW, look up the listing of W1AW's frequency for the band you work in. Note the day and period, look then for our signal and give us a call in that period, on the band you work. Novice licensees can't come to our 3555-kc. frequency and since W1AW doesn't wish to cause undue QRM by adding its signal, except for some special reason, to the congested Novice band, we're setting two time periods of the week, for the present, for two-way 3.55-Mc. work direct with Novices using 3750-band frequencies. Each Tuesday and Thursday, after the 7:00 P.M. CST c.w. bulletin, we look for Novice calls *first* before going over the band for other calls.

Slow-Speed Nets Open to Novices. Correspondence indicates a high degree of interest in belonging to slow-speed nets for procedure and traffic. These must be between 3700 and 3750 kc. Groups working thus in state or section nets make for a high degree of fraternalism among new amateurs as well as offer the best in training for efficient operating, to get one's code ready for the General Class test.

NTS members in their regular section nets, c.w. or 'phone, are requested to designate one of their regular net members to participate in their section's slow-speed net, or work between the usual section net frequency and the slow net frequency, or work such net member after the usual net period, to exchange traffic, for most complete coverage of cities and towns.

It is requested and suggested that all new nets, slow-speed or otherwise, register through their net managers with ARRL Hq. For purposes of avoiding interference with other nets on the same frequency, the customary net-registration service of ARRL also will be carried out with respect to the Novice frequencies. In selection of an appropriate frequency for any net, monitoring carefully all through the intended days of operation for at least two consecutive weeks is recommended. Organizers of new nets may also study the ARRL Net Directory of last season to avoid conflict, keeping in mind that changes may have occurred. Selecting times *different* from those of established nets is the *only* way operation can be even relatively interference-free with the stepped-up occupancy and joint assignments effective in this part of our band.

Simulated Emergency Test. Each October ARRL schedules its annual SET. This is not an activity responsive to *QST* announcement. Each test of an organized Amateur Radio Emergency Corps group is, in effect, a "surprise" test, based on a simulated natural disaster, Civil Defense emergency, or unexpected local contingency that comes within the range of possibilities for the community concerned. The drill is based on communications plans developed by the ARRL emergency coördinator in the locality. In many cases the plans are those coördinated by amateurs with local government officials of a city or area.

In addition to this *surprise test* and reports by the local AREC official to ARRL Headquarters, this first-of-season test, spark-plugged by emergency coördinators throughout the continental United States and Canada, is the occasion for bringing all Emergency Corps records right up to snuff. The emergency coördinators "annual report" will show the present number active in the test, the number of mobiles and portables and emergency power supplies that can go the moment alerted, using the different bands.

Every FCC licensee should be registered in the AREC. Get a Form 7 if you have not filled out such a registration and get it back in the hands of your emergency coördinator before October 10th. "Full" AREC registration indicates time and participation in the exercises and current emergencies in the coming season . . . or the "Supporting Division" of the AREC should be indicated on your registration form if you do not have so much time for activity. *This is the time to get annual endorsement* of your Amateur Radio Emergency Corps card if you have held one; the initial issue and endorsement by your EC are each good for *one year.* If you have added emergency-powered equipment or changed the range of frequencies you can work be sure to fill out a new registration form and hand it to your local EC. If you can demonstrate an operative *mobile*, your registration also entitles you to a new ARRL

Official Mobile Unit card . . . also our *Emergency Radio Unit* placard for the car or rig itself.

On Frequent Identification. Nothing is so exasperating as to hear long-drawn-out calls without identification. In most cases listeners tune away so that the CQ sent with such poor judgment is often unfruitful. KL7HI writes, ". . . As I sit here twisting the dial in search of much needed DX, I am particularly interested in all CQs, hoping that at the end there will be the sign of that country not on my confirmed list. I hear one, 'CQ CQ CQ CQ CQ CQ CQ' (about here I begin to be discouraged, but I listen) 'CQ CQ CQ CQ CQ CQ CQ' (why doesn't he sign?) 'CQ CQ, etc. . . .' Without wasting any more time, I go on my way twisting dials in search of a new one. (Coming back to it I find it was a W.) I wonder how many DXers have discovered this mania and just passed up any CQ over three or four without a call sign?"—*F. E. H.*

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.

Alaska	Josiah R. Nichols, KL7MZ	Mar. 1, 1951
South Dakota	John W. Sikorski, WØRRN	July 2, 1951
North Carolina	J. C. Geaslen, W4DLX	Aug. 15, 1951
British Columbia	Wilf Moorhouse, VE7US	Aug. 22, 1951
Nebraska	Guy R. Bailey, WØKJP	Sept. 1, 1951
Indiana	Clifford C. McGuyer, W9DGA	Oct. 14, 1951

In the Southern New Jersey Section of the Atlantic Division, Mr. Lloyd L. Gainey, W2UCV, and Mr. Edward B. Kerr, sr., W2QUH, were nominated. Mr. Gainey received 105 votes and Mr. Kerr received 53 votes. Mr. Gainey's term of office began August 26, 1951.

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: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

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

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

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Quebec*	Oct. 1, 1951	Gordon A. Lynn	Dec. 15, 1951
South Carolina	Oct. 15, 1951	Wade H. Holland	Sept. 1, 1951
Vermont	Oct. 15, 1951	Burtis W. Dean	Resigned
Yukon*	Oct. 15, 1951	W. R. Williamson	Mar. 17, 1949
North Dakota	Oct. 15, 1951	Rev. L. C. Strandenaes	Dec. 20, 1951
Utah	Oct. 15, 1951	Leonard F. Zimmerman	Dec. 20, 1951
West Virginia	Dec. 14, 1951	Donald B. Morris	Feb. 15, 1952

* 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.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH....241	WØYXO..232	W2BXA..227
W8HGW..239	W6VFR...231	W3CPV...227
W3BES...233	W6ENV...231	W3GHD..226
	G2PL.....230	

RADIOTELEPHONE

W1FH....210	VQ4ERR.201	W1JCX...183
LU6AJ....202	XE1AC...198	W2BXA..182
PY2CK...202	W8HGW..195	W6DI....181
	W9RBI...186	

From July 15 to August 15, 1951, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

W5MPG..134	W3HUV..102	W9HUV..100
FA8CF...109	LA5Q.....102	W6EKC..100
F3RA.....107	ZS7C.....101	SM7ACO.100
VQ2HW..106	WØVDC..101	W3GRS...100
ZL3GQ...104	W3ORU..100	G3FXB...100
W8UPN..104	W4POF...100	

RADIOTELEPHONE

TI2TG....124	F8XP.....101	GM3DHD 100
W3HUV..101	KP4HZ...100	W6YX....100
	W6CHY..100	

ENDORSEMENTS

W6ZCY...210	GM3CSM.160	W2ICO...130
CX1FY...202	PY4IE....160	G6BB.....128
W2WZ....201	PY2OE...160	W5FXN..122
W1ADM..194	I1IR.....160	W6KYG..122
W6TI....190	PY1HX...159	W2LV....122
W1GKK..190	W5LXY..159	4X4BX...121
W3OP....190	VK6SA...151	KZ5WZ...121
W9IOD...185	W2CTO...150	W3JYS...121
ON4JW...180	W7ENW..150	W4DCW..120
G2MI....174	W3ADZ...150	WØGUV..120
W5BGP...173	W2REF...144	GM3DHD 120
W6EYR..170	CP5EK...141	G8ON....119
WØAIW...170	G3AH....136	SM3ARE.111
W5ADZ...167	W3ALB...132	G2AJB....110
W1FTX..161	G5LH....130	WØDST...110
W8KPL...161	W6PBI...130	

RADIOTELEPHONE

W3BES...172	W3BET...134	G2MI....124
W4HA....152	W3EVW...132	I1BIC ...120
W1ADM..147	W9IOD...132	WØAIW...116
W6KQY..140	W4HRR..130	WØGUV..115
WØPRZ...140	OZ7TS....130	W8AJH...110
W3GHD..136	W5EFC...130	W2VWN..110
TI2HP....135	CE3AE....128	

JULY–AUGUST CD QSO PARTIES

Listed below are the highest claimed scores for the July–August C.W. and 'Phone CD QSO Parties. The figures following each call indicate the claimed scores, number of contacts and number of ARRL sections worked. Complete results will appear in the October CD Bulletin.

C.W.

W6GEB....83,937–187–49	W2MHE....41,520–173–43
W3FQZ....72,090–262–54	W4PNK....39,380–179–44
W2SZ.....59,615–204–49	W7JGZ.....35,342– 93–41
W3FQB....58,500–218–52	W3ADE....34,200–145–45
W4AKC....56,250–225–50	WØIA.....33,135–134–47
W3QLI....54,720–228–48	W1EOB....31,500–143–42
W6YHM...53,370–129–45	W7PUM....31,302– 94–37
W2ZVW....48,750–188–50	W7MLL....31,283– 82–41
W2ZZA....46,400–195–46	W8LII.....30,530–136–43
W7KWC...44,978–117–43	W9GDI.....29,725–145–41
W1JYH....44,880–183–48	W8DAE....29,445–144–39
W6LDR....44,634–112–43	W4IA.....27,170–136–38
W9NH.....43,475–179–47	W8TZO.....26,425–144–35
WØAY.....41,595–170–47	W9KXK....26,220–135–38
W4NH.....41,520–173–48	W1NXX....25,025–136–35

'PHONE

W1BFT..... 6720– 49–24	W2PGT..... 1960– 23–14
W4KFC..... 6500– 43–26	W3EAN..... 1740– 24–12
W8NOH.... 4800– 43–20	W2ILI..... 1320– 22–12
W4FV..... 3145– 32–17	W2ATE..... 1100– 20–11
W2ZVW.... 3120– 32–16	W2ESO..... 1050– 14–10
W2MHE.... 2240– 28–16	

TRAFFIC TOPICS

The midway point in the calendar year 1951 found W3CUL leading the traffic pack by a wide margin, with a rustle of skirts and a click of high heels. By the end of June, W3CUL had already handled well over 20,000 messages, with no sign of a let-up. Mae has already amassed 204 BPL points, 26 more than the leading trafficker at this time last year. Already the holder of one record, having achieved the highest monthly traffic total in the history of amateur radio in December, 1950, Mae appears to be headed for a longer term record if the present pace can be maintained.

In the postwar column, W6CE, who has not been active and remains dormant, has been superseded at the top by Larry, W7CZY, whose traffic-handling activities have continued on a scale somewhat more limited than last year. Ben, W4PL, back from an enforced winter interlude in Florida, is back near the head of the BPL again delaying the inevitable day when he will be overtaken by the rapid advance of W3CUL.

1951	*BPL Points*	*Postwar*	*BPL Points*
W3CUL.....	204	W7CZY	735
W6KYV.....	117	W6CE	699
W6JZ.....	116	W4PL	669
W9ILH.....	109	W3CUL	605
W4PL.....	107	WØZJO	401
WØZJO.....	105	W7CKT	335
W7IOQ.....	103	W5GZU	313
W7CZY.....	93	KG6DI	277
WØTQD.....	83	W5LSN	252
W6GYH.....	82	W6JZ	252

—•••—

We hear traffic going to and coming from some of the most outlandish places on some of the traffic nets these days, and receive many inquiries concerning the legality of handling traffic with certain countries. Like most international situations, this one is beginning to get a bit complicated and we think it nearly time for a review of the facts.

International regulations (Atlantic City, 1947) prohibit the handling of communications on behalf of third parties by any station in the amateur service. Since the United States is a party to these regulations, this means you. However, the regulations also stipulate that agreements can be made between certain countries who wish to allow their amateurs to conduct communications on behalf of third parties. The United States has such agreements *only* with Canada, Chile, Ecuador, Liberia and Peru. Watch *QST* Happenings of the Month for announcement of subsequent agreements with other countries, if any.

It is, of course, legal to exchange traffic with stations in any U. S. possessions, and in the occupied countries of Germany and Japan provided such messages are to and from U. S. government personnel stationed within the occupied territory, and provided also that such traffic can be exchanged only with stations licensed by U. S. military authority, not with stations licensed by the government of the occupied country.

What to do if someone hands you a message for relay which you note is originated in a country where third-party traffic is illegal? Since it is fairly certain that this message was transmitted in the amateur bands illegally in the first place, by handling this message you would become a party to a violation of international regulations. The proper thing for you to do is to cancel the message on the spot, and so inform the station who sent it to you.

Most of the agreements we have with the countries named above include a stipulation that such messages not be of the type which would normally be handled by commercial channels. While there is no fine line of demarcation between commercial and non-commercial type messages, we think that an amateur would be within his rights and entirely on the safe side by refusing to handle, for instance, an order from a U. S. firm for a shipload of bananas from Liberia. Or don't they raise bananas in Liberia?

—•••—

How would you interpret it if, after the place of origin, you received the number 195108201023R in place of the filing time and date? You wouldn't? Well, we were just toying with the idea of how ridiculous you can get in formulating a date-time group, and this is what we came up with. This number is a date-time group to end all date-time groups, including as it does the century, year, month, date, hour, minute and time zone, in that order, two digits apiece except for the time zone, which is a letter. Naturally, no date-time group need be this detailed, the date, hour and minute ordinarily being enough for most of us. Many of us leave off the filing time and the month, sending only a number indicating the date.

Those of us who like to use a date-time group can shorten our message preambles, if they wish, by omitting the month

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for July traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL.....	145	1603	1321	265	3334
W6KYV.....	176	1276	204	1072	2728
KG6FAA.....	863	636	230	426	2155
W4PL.....	11	1043	867	154	2075
JA3AC.....	824	143	233	210	1710
WØTQD.....	12	780	720	18	1530
K4WAR.....	271	496	427	69	1263
W6BAM.....	65	470	168	302	1005
K7FAG.....	303	343	17	326	989
WØZJO.....	21	479	112	67	979
KR6AF.....	366	272	141	123	902
W6GYH.....	18	415	277	124	834
WØSCA.....	8	373	308	63	752
W6DDE.....	10	322	294	28	654
W7CZY.....	8	323	294	19	644
W7IOQ.....	72	258	245	52	627
W6UHY.....	19	302	259	43	623
W6JZ	25	295	248	40	618
WØITQ.....	6	282	167	115	570
W5GZK	25	265	258	7	555
VE3IA.....	8	274	259	5	546
W5MRK.....	10	250	204	41	505
Late Reports					
WØQXO (June)	31	481	317	160	989
WØZJO (June)	11	337	321	16	685

The following made the BPL for 100 or more *originations-plus-deliveries:*

VE1AAL	248	W8ARO	127	W6BHG	101
KG6FAB	160	W6GEB	122	Late Reports	
W6MVF	149	VE1MK	114	JA2DS (June)	240
WØKFF	147	W6HOV	104	W4NNN/Ø (June)	110
VE1AAK	145				

A message total of 500 or more or 100 or more *originations-plus-deliveries* will put *you* in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

and all other longer period indications, but for the sake of accuracy we should include the time zone, since in these days of tampering with the clocks one scarcely ever knows what time it is. Thus, Z time is ordinarily used, although for convenience it is permissible to use any time provided its zone is indicated by letter. For the information of those who like this system, examination of our hydrographic charts show that R is EST, S is CST, T is MST and U is PST. The speed with which some amateur messages travel these days makes a filing time often a good thing to have on a message. ARRL standard message preamble form does not require the use of date-time groups or the 24-hour system of indicating time, but it surely helps to do so when you are in a hurry.

—•••—

Have you registered your net? By the time this appears in print we will be busily compiling new net registration records, and copy for the first net list in November *QST* will already have been submitted. If you have not yet registered your net, do so at once so your net will appear in the next listing (January *QST*). The new net records include only those nets which have been registered with us since August 1, 1951.

—•••—

National Traffic System News. During the summer months, only six of the fourteen NTS nets at regional and area level maintained full activity; the Fifth, Sixth, Ninth and Tenth Regional and the Eastern and Pacific Area Nets operated all summer on full schedule. The First, Fourth, Seventh and Thirteenth Regional Nets operated on a reduced schedule. The Second, Third, Eighth Regional and the Central Area Nets were inactive for all practical purposes. The Twelfth Regional Net also continued its inactivity.

Net	Sessions	Tfc	High	Low	Average	Most Consistent
EAN (June).	21	395	49	4	19	1RN, 2RN
RN5.....	13	191	—	—	—	Ala., Okla.
9RN.....	27	306	20	4	11	Ill., Ind.
TEN.....	20	1027	197	15	51	———

Eastern Area Net: The summer slump hit EAN rather hard, but an NCS was on deck every night and most of the traffic was handled somehow. Representation from regional nets was spotty. 3670 kc. will be a permanent EAN frequency, to be vacated promptly at 2130 EST each night.

Central Area Net: CAN is entirely inactive pending appointment of a new manager. Any volunteers? Suggestions?

Fifth Regional Net: Activity on RN5 is on the increase, with further organizational activities in progress. Target date for full-scale operation is September 10th. Representation is needed from Mississippi, Louisiana, Western Florida and the two Texas sections.

Sixth Regional Net: RN6 is still going strong. The new operating frequency is 3640 kc.

Ninth Regional Net: 9RN is showing encouraging signs of life under the spark-plugging of W9TT. In the absence of CAN, 9RN representatives are reporting into various other nets in order to clear their traffic. A great deal of activity resulted from the recent Kansas-Missouri floods.

Tenth Regional Net: TEN continues to handle terrific amounts of traffic. The new frequency of 3560 kc. is working out fine. Much of this was handled during the recent floods in Kansas and Missouri, during some of which TEN was in operation until 2:30 A.M. Liaison is maintained with PAN, RN5, RN9, TLJ and several other nets.

Thirteenth Regional Net: VE3BUR reports that the traffic total for July was 10, with activity at a low ebb for that month. However, all traffic into and out of TRN moves promptly, with VE3BVR and VE3BL assisting.

W1AW OPERATING SCHEDULE

(Effective October 1, 1951)
(All times given are Eastern Standard Time)

The W1AW fall-winter operating schedule will feature daily code practice, increased general operating periods, and a special time for making contacts with Novice licensees. Mimeographed master schedules showing complete W1AW operation in EST, CST or PST will be sent to anyone upon request.

Operating-Visiting hours:

Monday through Friday: 1500–0300 (following day)
Saturday: 1900–0230 (Sunday)
Sunday: 1500–2230

Exceptions: W1AW will be closed from 0300 November 22nd to 1500 November 23rd in observance of the Thanksgiving Day holiday. On November 26th, W1AW will transmit a Frequency Measuring Test instead of the regular code practice. On October 17th and November 20th W1AW will transmit a Code Proficiency Qualifying Run instead of the regular code practice.

General Operation: Use the chart below for determining times during which W1AW engages in general operation on various frequencies, 'phone or c.w. Note that since the schedule is organized in EST, certain morning operating periods may fall in the evening of the previous day in western time zones. W1AW will participate in all official ARRL operating activities, using scheduled general operating periods for this purpose if necessary.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

Frequencies:

C.W. — 1885, 3555, 7120, 14,100, 52,000, 146,000 kc.
'Phone — 1885, 3950, 14,280, 52,000, 146,000 kc.

Times:

Sunday through Friday, 2000 by c.w., 2100 by 'phone.
Monday through Saturday, 2330 by 'phone, 2400 by c.w.

Code-Proficiency Program: Practice transmissions are made on the above-listed c.w. frequencies, starting at 2130 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Next certificate qualifying run from W1AW and WØTQD is scheduled for October 17th; from W6OWP, October 7th.

W1AW GENERAL-CONTACT SCHEDULE

(Effective October 1, 1951)

W1AW welcomes calls from *any* amateur station. Starting October 1st, W1AW will listen for calls in accordance with the following time-frequency chart.

EST	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0020–0100[1]	.....	.....	3555	7120	3555	7120	3555
0100–0200	.....	.....	3950	7120	3555	7120	3950
0200–0300	.....	.....	7120	3950	7120	3950	3950
1500–1600	.....	.....	14,280	28 Mc.[2]	14,100	.....	.....
1600–1700	.....	14,280	28 Mc.[2]	14,100	28 Mc.[2]	28 Mc.[2]	.....
1700–1800	.....	14,100	14,280	.....	14,280	14,100	.....
1930–2000	.....	7120	.....	7120	.....	7120	.....
2020–2100[1]	.....	7120	3555[3]	7120	3555[3]	7120	.....
2110–2130[1]	.....	3950	52 Mc.	146 Mc.	3950	3950	.....
2230–2330	.....	3555	3950	7120	1885	3555	.....
2340–2400[1]	.....	3950	1885	3950	1885	3950	.....

[1] Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0000 and 2000 on c.w. and at 2100 and 2330 on 'phone.
[2] Operation will usually be conducted on 29,000-kc. 'phone, but 28,060-kc. c.w. will be used occasionally.
[3] W1AW will listen for Novice Class licensees on 3700-3750 kc. before looking over the band for other contacts.

October is the month of the Simulated Emergency Test, the AREC activity which in recent years has rivaled the Field Day in participation. The SET has two principal functions: (1) As an annual test of our emergency communications facilities, including, in these critical times, our ties with civil defense, the Red Cross and other relief agencies, and (2) as a nationwide public demonstration of the versatility and state of preparedness of amateur radio.

In the matter of making preparation for the Test itself, the two objectives appear to conflict with each other. That is, it is undesirable to prepare a Simulated Emergency Test too far in advance, to plan it in too much detail as to time, place, date and character of incident to be met. Real emergencies have a bad habit of not announcing themselves beforehand in a good many cases. On the other hand, for an adequate public demonstration we need as much advance planning as we can muster, down to the very finest detail to make sure that things will not go wrong and give us bad instead of good publicity.

This is the dilemma in which your Headquarters and your Emergency Coördinator find themselves in setting up plans for an annual nationwide Simulated Emergency Test. In looking over last year's bulletin, we have come to the conclusion that there was a little too much advance preparation in the SET, to the extent that the public demonstration phase almost overshadowed any possible value we might get out of testing our own facilities.

The date of this year's SET is October 13th–14th. It is suggested that local ECs call a test for sometime during this week end, but not announce the exact time, or even the day, in advance. The usual bulletin will be issued from this office giving complete details and instructions, reaching ECs about the time this copy appears in print. In order to forestall the increasing quantities of traffic which last year were originated and overcrowded the National Traffic System and other traffic routings, it will this year be recommended that AREC members participating in the Test forward a message in standard ARRL form to their local EC over the local network. The EC will then originate a message to ARRL Headquarters indicating the call letters of all participating amateurs with a brief (the briefer the better) sentence concerning the nature of the Test. This, too, will more closely simulate an actual emergency, in which long-haul traffic would not normally be present in the quantities we have experienced in past years. Those amateurs who are participating in a Simulated Emergency Test without benefit of a local ARRL Emergency Coördinator will be urged to originate a message to Headquarters as in the past.

In any event, when you read this the time will be short for you to contact your Emergency Coördinator to (1) get his endorsement on your AREC registration card (or obtain a new card) and (2) become acquainted with plans for the Simulated Emergency Test and plan yourself to participate, to lend the strength of your experience and operating ability to the public record of amateur radio.

This power unit of the St. Petersburg Amateur Radio Club was constructed by the members from parts of a 1930 Plymouth, Model A Ford, Ford V-8 an autogyro, an airplane and a concrete mixer. The 3-kw. 110-volt 60-cycle generator was donated by a member. This unit will provide emergency power for the Club's station, W4GAC, at the City Hall. Shown standing, *l. to r.*: W4HUY, M. E. Kaniss, W4EYI, W4PT, R. Chaffin, C. Austin, W4LAB and W4LTE. (*Photo by W4PT.*)

On Saturday, July 7th, at 1:30 P.M., fire broke out in the plant of the Warren Chemical Company, Port Newark, New Jersey. The fire spread so rapidly that approximately half of about 200 butane and propane storage tanks exploded and scattered in large pieces and fragments in a ½-mile diameter area. Power line and telephone poles were burned off to stumps.

Early in the fire the Communications Chairman for the Elizabeth Red Cross Chapter alerted amateurs. W2PCX, W2GYG, and W2KOJ immediately opened nets on 10 and 2 meters and secured services of mobile units. W2EUI, mobile on 10, was first on the scene and supplied communications for the organizations above until late in the night. He did yeoman work while things were really hot, along with W2HFP and W2YJC. In the evening they were relieved by W2CCY. Sometime during the night or early morning W2CCY was relieved by W2LJH, W2IMM, W2KLA, and W3OZJ/2, all with mobile 10-meter units. W2OKO reported contact with Newark Red Cross and W2TJA offered paths to Brooklyn, Bronx, Nassau County and New Brunswick. W2TJA was also linked with the 75-meter net via W2CBS. During the evening W2IIN heard the news and reported to Newark Red Cross Headquarters where he operated and recruited more mobile units. On Sunday morning, W2KOJ and W2WJQ went to the scene with a mobile 2-meter unit and supplied relief. They were relieved by W2HNY and W2HVK, both 2-meter mobiles, at 3 P.M. Throughout Sunday Red Cross Headquarters was operated by W2IIN, W2MCF and W2WUD on both 2 meters and 10 meters. Communications services rendered consisted of transmitting requests for food and first-aid supplies needed and messages for workers to their families regarding their safety and expected arrival home. Unfortunately, the above does not constitute a complete list of calls of participating stations.

— *W2KOJ, EC Union County, N. J.*

Five AREC nets operated on alternate nights to supplement the p.a. system with v.h.f. communication facilities at the Home Show at the Pan-Pacific Auditorium in Los Angeles, June 14th to 24th.

Six 50-Mc. transmitters were spotted at strategic points in the huge auditorium from which queries for information on exhibitors, the stage show, lost children, etc., were relayed to a central control point for immediate answer if possible. Messages from the public were accepted and relayed to the American Legion Emergency Net for transmitting to their intended destinations. In addition to traffic to the States, over 200 messages were sent overseas to the Armed Services. Myron Thoen, W6HOV, did a great job as Traffic Manager in handling this work. The AREC nets participating were Centinela Valley, Crescent Bay, Val-Area, Mid-Cities, and the Whittier nets. Headed by Kenneth Kime, W6KSX, SEC for the Los Angeles Section, 55 local operators took part.

Six licensed radio amateurs from Marietta, Ohio, and Parkersburg, West Virginia, manned an efficient communications network during the Annual Regatta at Marietta, June 16th. W8VZ was in charge of the project and also operated the control station aboard the observation train. W8AWI and W8FPC manned a station at the crew boathouses a half mile above the Ohio River regatta course. W8MIT operated aboard the referee's boat, W8EMG on the observation train, and W8FGL at the judges' stand at the finish line. The network sent some 150 voice messages between 1 and 8 P.M., working on 29.6 Mc. All amateurs used their own equipment. Power aboard the observation train was supplied by a portable generator, loaned by the Naval Reserve at Marietta, which also provided crystals and a receiver, used by Hefner aboard the referee's boat.

♦

Section Emergency Coördinators of the Amateur Radio Emergency Corps

The Section Emergency Coördinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coördinators for the various communities in his Section. Does *your* town have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION				
Eastern Pennsylvania	W3ISE	W. T. Shreve	1507 Niessen Rd.	Oreland
Maryland-Delaware-D.C.	W3EIS	Donald McClenon		Beltsville, Md.
Southern New Jersey	W2ORS	Charles B. Roop	8 Lawrence Ave.	Barrington
Western New York	W2SJV	Ed Graf	81 King St.	Tonawanda
Western Pennsylvania				
CENTRAL DIVISION				
Illinois	W9QLZ	Geo. E. Keith, jr.	RFD 2, Box 22A	Utica
Indiana	W9PHV	Wayne L. Walter	1538 A Ave.	Newcastle
Wisconsin	W9UFX	Ted W. Kennedy	3600 McKenna Rd.	Madison 4
DAKOTA DIVISION				
North Dakota	WØHDO	Coy DeLapp	1221 E. 1st	Mitchell
South Dakota	WØGLA	Frank Mayer	703 St. James St.	Rapid City
Minnesota	WØBOL	Robert A. Prehm	1130 Delaware Ave.	St. Paul 7
DELTA DIVISION				
Arkansas	W5EA	Leo V. Brians	6th William	Carlisle
Louisiana	W5KTE	James M. Coleman	6900 Louisville St.	New Orleans
Mississippi	W5MUG	Floyd C. Teetson	122 West Fourth St.	Hattiesburg
Tennessee	W4AEE	Harry T. Carroll	616 Marthonna Rd.	Madison
GREAT LAKES DIVISION				
Kentucky	W4MGT	Henry C. Hall	434 Grosvenor Ave.	Lexington
Michigan	W8GJH	Francis E. Gary	620 Thayer Street	Flint 3
Ohio	W8UPB	Dana E. Cartwright, sr.	2979 Observatory Rd.	Cincinnati 8
HUDSON DIVISION				
Eastern New York	W2ILI	S. J. Neason	794 River St.	Troy
N.Y.C. & Long Island	W2SYW	Ray Campbell	140-70 Ash Ave.	Flushing, L. I.
Northern New Jersey	W2VQR	Lloyd H. Manamon	410½ Fifth Avenue	Asbury Park
MIDWEST DIVISION				
Iowa	WØFP	T. J. Innis	R.R. 1, Lincoln Road	Bettendorf
Kansas	WØPAH	W. G. Schrenk	1528 Pierre St.	Manhattan
Missouri	WØVRF	O. H. Huggins	3605 E. 72nd St.	Kansas City
Nebraska	WØJED	Winston C. Swanson	116 S. Main	Wayne
NEW ENGLAND DIVISION				
Connecticut	W1LKF	Peter R. de Bruyn	163 South Marshall St.	Hartford 5
Maine	W1IGW	Donald R. Dean	36 James St.	Auburn
Eastern Massachusetts	W1BL	Raymond E. Boardman	53 Thurston Road	Newton Upper Falls 64
Western Massachusetts	W1JYH	Roger E. Corey	100 Oakland St.	Springfield
New Hampshire				
Rhode Island	W1MIJ	Carl M. Getter	185 Early St.	Providence
Vermont	W1RNA	Robert L. Scott	108 Sias Ave.	Newport
NORTHWESTERN DIVISION				
Alaska	KL7PE	John H. Huber	Box 2097	Fairbanks
Idaho	W7IWU	Alan K. Ross	2105 Irene St.	Boise
Montana	W7CT	Leslie E. Crouter	608 Yellowstone Ave.	Billings
Oregon	W7HDN	Edwin C. Wiedmaier	11004 N.E. Shaver	Portland 20
Washington	W7KAA	H. D. Weeden	Route 4, Box 174	Port Orchard
PACIFIC DIVISION				
Hawaii	KH6AS	John Keawe	714 Ocean View Drive	Honolulu
Nevada	W7JU	Ray T. Warner	539 Birch St.	Boulder City
Santa Clara Valley	W6AEV	George W. Harper	101 Plymouth Ave.	San Carlos
East Bay				
San Francisco	W6NL	Samuel C. Van Liew	215 Knowles Ave.	Daly City
Sacramento Valley	W6KME	E. J. Schoenbackler	1622 "Q" Street	Sacramento 14
San Joaquin Valley	W6FYM	E. Howard Hale	741 E. Main St.	Turlock
ROANOKE DIVISION				
North Carolina	W4ZG	Roy C. Corderman	792 Oaklawn Ave.	Winston-Salem
South Carolina	W4ANK	T. Hunter Wood	Route 6, Box 690	Naval Base
Virginia	W4NAD	William E. Sampson, jr.	4801 Stuart Ave.	Richmond
West Virginia	W8FMU	Ray Wardle	501 Pythian St.	Morgantown
ROCKY MOUNTAIN DIVISION				
Colorado	WØKHQ	O. E. Cunningham	Box 178	Eads
Utah	W7JQE	John Tempest, jr.	1599 Orchard Drive	Salt Lake City
Wyoming	W7LKQ	Duane L. Williams	1022 So. Cherry, Apt. 4	Casper
SOUTHEASTERN DIVISION				
Alabama	W4ISD	P. G. Persson	123 Margaret St.	Mobile
Eastern Florida	W4IQV	Albert G. Snow, jr.	314 W. St. John Street	Lake City
Western Florida	W4ACB	S. Monte Douglas, jr.	P.O. Box 3	Tallahassee
Georgia	W4HZG	Thornton H. Smith	249 Second Ave., S.E.	Atlanta
West Indies (Cuba-P.R. V.I.)	KP4ES	Pedro J. Piza	Box 2001	Ponce, P.R.
Canal Zone	KZ5FL	Frank H. Lerchen	Box 124	Balboa
SOUTHWESTERN DIVISION				
Los Angeles	W6KSX	Kenneth L. Kime	2240 23rd St.	Santa Monica
Arizona	W7OIF	Cameron Allen	1020 E. Maryland	Phoenix
San Diego	W6NBJ	David W. Hannah	4849 E. Mt. View Dr.	San Diego 16
WEST GULF DIVISION				
Northern Texas	W5JQD	Bruce Craig	1706 27th St.	Lubbock
Oklahoma	W5AGM	Claude E. Gardner	2520 Cashion Pl.	Oklahoma City
Southern Texas	W5GLS	George N. Sharp	3541 Federal St.	Pasadena
New Mexico	W5PLK	Ben G. Raskob	P.O. Box "C"	Socorro
MARITIME DIVISION				
Maritime (Nfld. & Labr. att.)	VE1FQ	L. J. Fader	125 Henry St.	Halifax, N. S.
ONTARIO DIVISION				
Ontario	VE3KM	F. W. Clemence	2278 King St., East	Hamilton, Ont.
QUEBEC DIVISION				
Quebec	VE2SA	Gordon S. Waugh	5184 King Edward Ave.	Montreal, P. Q.
VANALTA DIVISION				
Alberta	VE6MJ	Sydney T. Jones	P.O. Box 373	Edmonton, Alta.
British Columbia	VE7DD	Cecil O. Sawyer	6650 Balsam St.	Vancouver, B. C.
Yukon				
PRAIRIE DIVISION				
Manitoba				
Saskatchewan	VE5SE	S. Ewert	Box 264	Herbert, Sask.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — PMG will not be RM of the E. Pa. net this season. He is on v.h.f. mostly. AXA is planning a 2-meter mobile and is rebuilding his 80-meter rig. NNV completed his 10-meter WAS during recent short-skip conditions. Six members of the Phil-Mont Mobile Radio Club of Glenside, Pa., in conjunction with the U. S. Navy, Capt. Paul B. Tuzo and Lt. Comdr. I. H. Bordihn directing, provided communications and spotters at the annual Plymouth Dealers Model Aircraft Meet held July 15th at the Johnsville Naval Air Station near Hatboro, Pa. With QIS and an HT-9 acting as area control, mobile units were dispatched to follow free-flight aircraft caught in thermals or strong winds. When the planes came to earth, grid coördinates from prepared Navy maps were passed to area control where RDP dispatched chase cars to the spot. One plane wandered as far as 6½ miles from base and was recovered by NIP. A K-type blimp and two Navy jeeps with v.h.f. communications also assisted in spotting. Direct communications were available on Navy v.h.f. channels and net frequency of 29,493.2 kc. Officials report 250 entries and 9000 spectators. Insofar as is known all wayward planes were recovered. Ideal weather, four miles of runways, good p.a. coverage, ample free parking, and Navy aircraft displays helped to make the event a success. The PMRC, 35 strong, provides an average of one public service a month. All are members of ARRL and AREC. Members participating in this event were QIS, VVS, EM, AAG, NIP, EML, and QQH. Mrs. LVF and Mrs. BYB now sport WN3 calls. IXN joins the ranks of the few W3s to hold the WAZ Award. Traffic: (July) W3CUL 3334, NHI 190, CAU 5, ELI 5. (June) W3ELI 8.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, James W. John, W3OMN — At the Chesapeake Amateur Radio Club meeting on August 7th MTE spoke on "How to Match a Parasitic Beam to the Feed Line." Your SCM and FWP enjoyed their visit to CARC on July 17th. Subject for the meeting was on the proposed electrical code. The Rock Creek Amateur Radio Association at its first meeting in August was given a first-hand description of the ARRL National Convention by GD and LQK. In response to a number of requests the claimed score by hands of the W3 team of the Potomac Valley Radio Club is listed. Operation was in the three-transmitter class, under thirty watts, 144 Mc., A-3 27; 28 Mc., A-3 214; 14 Mc., A-3 98, A-1 126; 7 Mc. 310; 3.8 Mc. 155; 3.5 Mc. 151; and 1.8 Mc., A-3 16; for a total of 1097. Thirteen operators participated in the W3 team and are to be congratulated on their efficient operation even though the W4 team of the PVRC scored more contacts. The Anne Arundel Radio Club became affiliated with the League during July. The Potomac-Rappahannock Valley Net continued drill participation during July with FPG, PYW, and 4BCI as net controls. PYW is very active on RTTY and anyone interested in getting a line on that activity should contact him. PTZ moved to the District of Columbia on July 7th and is temporarily QRT. TVI in his new location appears certain in view of the large number of TV sets. RNA, one of the youngest (in years) hams in the D.C. Area, is very active on 7-Mc. c.w. The TCRN was very QRL during the flood emergency in the Midwest with CVE and PRT/PZA sharing a 24-hour watch on 7042 kc. The MDD Section Net returned to its regular full-time schedule on Sept. 17th, 7:30 EST Monday through Friday. BWT is Net Manager. Traffic: W3CVE 470, PRT 211, FWP 32, NNX 10, ONB 6, IL 4, COK 3, LVJ 2.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — Haddonfield Area had its first c.d. practice. A2BAY was in charge of communications and ASG in charge of headquarters radio station, with EGP, EWN, DAJ, PAU, PFQ, PML, SDO, and GQO in active participation with portable mobile rigs. High compliments were received for efficiency from the Director. ZI is rebuilding his modulator unit. FLW has joined the MARS. The SJRA gang is all set for the annual picnic. Its official organ, *Harmonics*, is being ably edited by YPQ, assisted by ZDG and George Harrold. ZFA, and ØDEE/2 are technical editors, EGP is the artist, and SPV, DAJ, and JRO are in charge of publicity, biography, and band splatter, respectively. SPV's twin "5" 2-meter beam was up only four days, but that "darn wind" took it away! IL has returned to his activities after an FB vacation. VX is vacationing in Florida. YPQ is cooling off in Maine. We are glad to welcome Novices WN2IKQ and WN3SAQ/2 in this section. Traffic: W2ZVW 73, RG 70, K2BG 42, W2ASG 33, FLW 18, ZI 4.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — It is with deepest regret that your SCM is forced to make the announcement that the section's outstanding amateur, OMA, has asked to be relieved of his SEC duties upon orders from his physician. Walt worked hard, attended meetings, made personal appointments with Red Cross officials, and emphasized the urgent need for a communications center in the Pittsburgh Area and the necessity of qualified personnel. Thanks, Walt, for a job well done. It now remains for your SCM to appoint another SEC who is willing to carry on where Walt left off. The Erie Radio Assn. recently celebrated its 25th year since its organization. One of its founders, ex-8BHN, now 4BHN, was the speaker of the evening and gave a brief but interesting history of the club. QN says Field Day was a success, with 2478 points made and 47 operators participating. The Erie amateurs are sponsoring an Erie Radio Queen in conjunction with the Centurama. QKI, the ever-lurking vigilante of the 2-meter band, received a nice write-up on his 2-meter activities. PIY sure can write those interesting articles about ham radio which appear in the Erie papers. PWA reports the Horseshoe Radio made 266 contacts on Field Day. Operators who took part were MBB, LQD, POP, TXQ, LIV, EBY, RYN, PRO, BEY, and VPF. Sporting a DXCC certificate is TXQ. BWL now has a 2nd-class commercial radiotelegraph license. Up Oil City way, LST is heard nightly on 2 meters with a potent signal. DIL and LFX lost their beam antennas in a storm. IDJ says his civil defense net is going great guns. BRC has a new 32V-2. The Boys Club of St. Mary's reports its Field Day activities, with 985.5 points for one day. IYR now maintains schedule for traffic daily with K4USA for overseas work. AER reports things at a standstill. KUN still is kicking around at Emporium. Our old three-time winner of the section SS award, GJY, was transferred to the Sub District Radio Station at South Park for the Army. Traffic: (July) W3IYR 20, AER 18, KWL 3, KUN 2. (June) W3IYR 15.

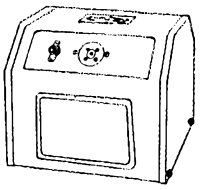
CENTRAL DIVISION

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: UFX. PAM: ESJ. RMs: CBE, CWZ. IXA received 35-w.p.m. Code Proficiency certificate on his first try. MUM, ANA, and GPI attended the National Convention in Seattle. IQM is back on after a summer recess. ANM has a c.w. rig perking again. IJT, operated by the Milwaukee AREC, was on the air continuously for 33 hours July 12–14 handling traffic in connection with the Kansas Flood. RUF, Milwaukee EC, is sub-divisional director of communications in the c.d. organization there. UFX reports increased registration of mobile activity in the State. BQM has the distinction of being the only "W" to ever have worked a ZL during their annual QRP (5-watt input) contest on 3.5 Mc. To snag some new DX, KXK has plans for a beam on 14 Mc. EWC puts out quite a signal with his "soooper" mobile on 4 Mc. ERW has more room for radio at new QTH. MYG has been putting in full time on the building of mobile rig. TRG, OUT, HCJ, and BVU are all s.s.s.c. devotees. FFB/6 is operating 7 and 14 Mc. with an 18-watt suitcase rig from California, where he is stationed with the Navy. NUW, the new club station of the WVRA at Wausau, was proud to have as its first contact a QSO with W1AW at ARRL Headquarters. PFK reports steady progress in the Motor Vehicle Dept. in lining up details for the securing of call letter license plates. KG6FI now is located in Milwaukee. LED, RLB, and RQM operated portable on 144 Mc. from Rib Mt. with signals from AFT, PYM, FAN, and LEE logged. AFT reports Novice Class activity on 144 Mc. in Milwaukee. FAN skeds 8MRK nightly on 144 Mc. CBE resigned as manager of CAN. Traffic: (July) W9ESJ 219, IXA 154, IH 74, ANM 73, IJT 62, IQW 42, NRP 28, CWZ 20, DR 20, OVO 7, RQM 4, NUW 2. (June) W9DR 26.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, J. W. Sikorski, WØRRN — Thanks to those who backed me into the SCM job. Will certainly try to deserve it. Please send in your station activi-

(Continued on page 82)



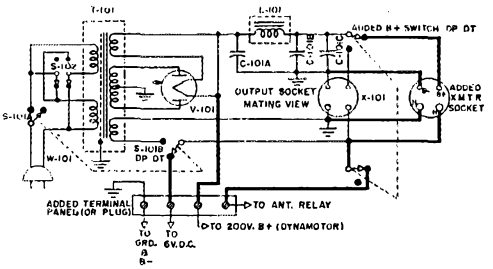
THERE seems to be a crying need for more mobile units with 2-way radio, for use in connection with civil defense activities. Although most hams have automobiles, many are loathe to punch holes in them or disturb wiring for fear of running up a bill at the local garage; or, worse than that, riling up the XYL! We know of one case where a ham's children objected to the whip on the rear of the car because it attracted too much attention.

Many hams seem to overlook the fact that the broadcast whip provided as standard equipment on most cars is at least 55" long and provides an ideal antenna for both transmitting and receiving on six and two meters. It eliminates the above mentioned objections. It is also possible, by substituting a longer whip or providing base loading, or in an emergency, clipping on an extension wire, to operate it on 10-meters.

The cigarette lighter outlet provides an easy means of obtaining 6 volt DC for a rig with a built-in power supply, where only 10 or 12 amperes drain is involved. Or where the rig has no built-in power supply, a three prong outlet socket could be wired to the car broadcast receiver for the purpose of extracting B plus, B minus and filament voltages, with a suitable switch to cut the filament circuit in the car radio when doing so. Make sure the power demands of the rig are within the capabilities of the Broadcast Receiver power supply.

In our case, a surplus dynamotor was available, but no power supply filter condensers, chokes, etc. were included in the 6-meter transmitter which was a low drain four tube rig, using an overtone crystal and complete with modulator. The receiver is an HFS which, as you know, uses an external power supply. A glance at the HFS's 5886 type power supply gave us the answer. An extra 4 prong socket was installed next to the present 4 prong socket and wired in parallel with it. A double throw switch was installed next to the AC switch to switch B plus from receiver to transmitter. (Believe it or not, 150 volts B plus does a good job in this transmitter). The same double pole double throw switch was used to put low voltage on the coaxial antenna relay for transmitting. A more ambitious soul might use a "push to talk" mike and relay in place of the switch.

In order to cut out the filament secondary when using the power supply on DC, the original AC switch was removed and a double pole double throw switch substituted and wired so as to connect the filaments to the DC supply when the AC switch is off.



5886 POWER SUPPLY *HEAVY LINES SHOW MODIFICATIONS*

A terminal panel was provided on the rear of the power supply for B plus input, A plus input, ground, and relay control voltage output. The entire power supply assembly was then "installed" on the front floor of the car with the HFS receiver on the seat for an armrest. Incidentally, the entire job of power supply modification and installation was done on a Saturday afternoon.

Although the set-up would possibly be a little inconvenient for younger and more romantic hams, it is quite efficient, entirely portable. A big advantage for CD work is that it can be operated from 110 volts AC or a 6 volt supply. Incidentally, it did a good job in the recent CD alert.

BILL BARTELL, W1PIJ

Designed for PROFESSIONALS

ACK RADIO SUPPLY CO.
2205-3rd Ave. No.
Birmingham 3, Ala.

ALLIED RADIO CORP.
833 W. Jackson Blvd.
Chicago 7, Ill.

ALMO RADIO CO.
509 Arch St.
Philadelphia 6, Pa.

WALTER ASHE RADIO CO.
1125 Pine St.
St. Louis 1, Missouri

GEORGE D. BARBEY CO.
2nd & Penn Sts.
Reading, Pa.

BLUFF CITY DISTRIBUTING CO.
905 Union St.
Memphis 3, Tenn.

C & G RADIO SUPPLY
2502 Jefferson Ave.
Tacoma, Washington

CONSOLIDATED RADIO CO.
612 Arch St.
Philadelphia 6, Pa.

THE CRAWFORD RADIO
King, Wm. & Hughson
Hamilton, Ontario, Canada

M. N. DUFFY & CO.
2040 Grand River Ave. West
Detroit 26, Mich.

W. H. EDWARDS CO.
94 Broadway
Providence, R. I.

ELECTRONIC WHOLESALERS
2010–14th St. N.W.
Washington 9, D. C.

EVANS RADIO
P.O. Box 312
Concord, N. H.

FEDERATED PURCHASER, INC.
911 So. Grand Ave.
Los Angeles 15, Calif.

FEDERATED PURCHASER, INC.
1115 S. Hamilton St.
Allentown, Pa.

FEDERATED PURCHASER CORP.
114 Hudson St.
Newark, N. J.

FEDERATED PURCHASER, INC.
701 No. Hampton St.
Easton, Pa.

FORT ORANGE RADIO DISTRIBUTING CO., INC.
904 Broadway
Albany 7, N. Y.

HARRISON RADIO CORP.
225 Greenwich St.
(10 W. Broadway)
New York 7, N. Y.

HARRISON RADIO CORP.
Jamaica Branch
172–31 Hillside Ave.
Jamaica, L. I., N. Y.

HARVEY RADIO CO., INC.
103 W. 43rd St.
New York 18, N. Y.

HATRY & YOUNG OF SPRINGFIELD, INC.
169 Spring St.
Springfield, Mass.

HATRY & YOUNG OF LAWRENCE, INC.
262 Lowell St.
Lawrence, Mass.

HENRY RADIO STORES
211 No. Main St.
Butler 1, Mo.

HENRY RADIO STORES
11240 W. Olympic Blvd.
Los Angeles 25, Calif.

THE MYTRONIC CO.
121 W. Central Parkway
Cincinnati 2, Ohio

NEWARK ELECTRIC CO.
323 W. Madison St.
Chicago 6, Ill.

OFFENBACH & REIMUS CO.
1564 Market St.
San Francisco 2, Calif.

RADIO AMATEUR CENTER
411 Hillsboro St.
Raleigh, No. Car.

THE RADIO CENTER
62 Craig St. West
Montreal, Canada

RADIO ELECTRIC SERVICE CO. OF PENNA., INC.
701 Arch St.
Philadelphia, Pa.

RADIO ELECTRIC SERVICE CO. OF PENNA., INC.
1042 Hamilton St.
Allentown, Pa.

RADIO ELECTRIC SERVICE CO. OF PENNA., INC.
916 Northampton St.
Easton, Pa.

RADIO ELECTRIC SERVICE CO. OF PENNA., INC.
3rd & Tatnall Sts.
Wilmington, Del.

RADIO ELECTRIC SERVICE CO. OF N. J., INC.
513–515 Cooper St.
Camden, N. J.

RADIO ELECTRIC SERVICE CO. OF N. J., INC.
452 N. Albany Ave.
Atlantic, N. J.

RADIO EQUIPMENT CO.
821 W. 21st St.
Norwalk 10, Va.

RADIO PARTS CO., INC.
538 W. State St.
Milwaukee 3, Wis.

RADIO PRODUCTS SALES CO.
1237–16th St.
Denver, Colo.

RADIO PRODUCTS SALES CO.
1214–1st Ave.
Seattle, Wash.

RADIO SHACK CORP.
167 Washington St.
Boston, Mass.

SREPCO INC.
135 E. 2nd St.
Dayton 2, Ohio

WESTERN DISTRIBUTORS
227 No. Santa Fe
Salina, Kansas

WORLD RADIO LABS, INC.
744 Broadway
Council Bluffs, Iowa

Eldico's TR-75TV is a 60 watt all-band cw transmitter sensibly priced, solidly designed. When the last connection is soldered, when you press your key for the first time, here is a rig that will work and work well on all bands. The TR-75TV is air-proved by hundreds in use, giving world-wide performance.

Eldico is run by hams who have all gone through the "shaky knees" stage of a first contact. Eldico engineers know what it is to sweat out mistakes in wiring that only experts can find; so while Eldico can't make you any less nervous for your first contacts, it *is* possible to lead you to them quicker by making available a *complete* transmitter kit that is performance-designed from input to output.

Best of all, Eldico TR-75TV is not "just a rig for the novice" that is soon outgrown. It is a standard 60 watt transmitter. Because it meets the requirements of the experienced ham, while incorporating the basic simplicity so necessary for the novice, the TR-75TV is a logical purchase for amateurs desiring medium power.

In addition to its many features, the TR-75TV has special design precautions to insure minimum interference to television. Special shield and bypassing makes this transmitter ideal for fringe area operation or use in highly congested areas.

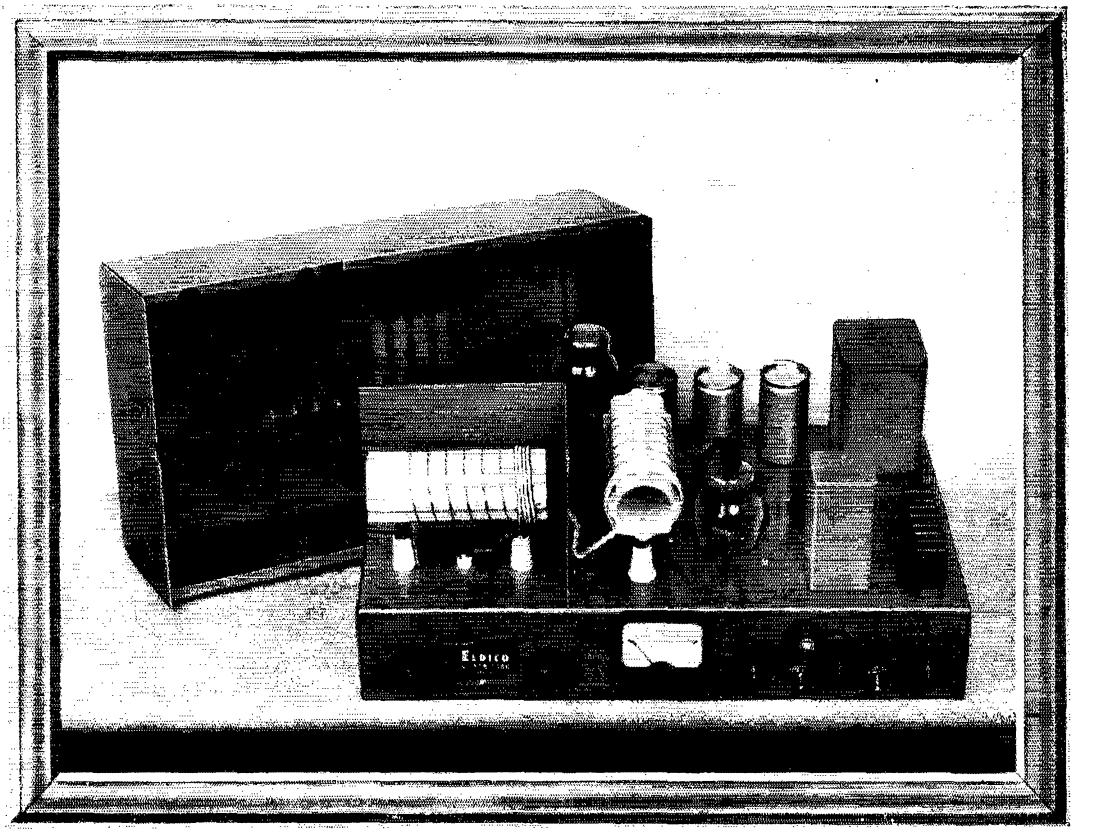
Look at these outstanding features of the TR-75TV:

Simple enough for the beginner to assemble, sturdy enough for years of trouble-free operation. Uses the time-proven crystal oscillator final amplifier combination. Circuit permits use of 80-meter or 40-meter crystals to cover all bands. Plug-in coils eliminate trick circuits. Husky power supply employing a 5U4G rectifier delivers 500 volts d.c. to the final. Pi-network output simplifies loading of transmitter with all types of antennas; ideal for multi-band operation.

All stages are metered using a meter which can be switched to oscillator plate, final grid and final plate. A terminal strip is provided to

← ← ← ALL THESE DISTRIBUTORS CARRY THE FULL LINE OF ELDICO'S FINE PRODUCTS . . . Drop in or write to your favorite and get your copy of ELDICO'S CATALOG '51

—IDEAL *for the* NOVICE



ELDICO TRANSMITTER KIT TR-75-TV

connect a modulator if radiophone operation is desired at a later date. Eldico's MD-40 Class B 6L6 modulator is designed expressly as a companion unit. Over-all size with cover 17" x 10" x 9". Complete kit (less crystal) . . . not another bolt or wire to purchase, including a smartly styled shielded cabinet to minimize television interference. For 110–120 v, 50–60 cycles.

TR-75TV, complete kit with instructions, **$59.95**

MD-40 LOW-POWER MODULATOR SPEECH AMPLIFIER

40 watts of audio, the MD-40 is a kit of the same superior parts that go into all Eldico products. The 6SJ7 drives a 6SN7 amplifier/phase inverter which in turn drives a 6SN7 driving a pair of 6L6G modulator tubes in Class AB2. The output transformer is matched from 6L6's to a Class C rf plate load of 6000 ohms. Complete with punched chassis, component parts, and the Electro Voice 915 High Level Crystal Microphone, less stand.

MD-40, complete kit including tubes and instructions **$34.95**

MD-40P, kit as specified, but including heavy duty power supply on same chassis **$44.95**

Signals of Distinction

ELDICO OF NEW YORK INCORPORATED

44-31 DOUGLASTON PARKWAY, DOUGLASTON, L. I., N. Y. • BAyside 9–8686

(Continued from page 78)

ties the first of each month. New calls: DSK, Parker; and DTB, Centerville. The Amateur Radio Club of Hot Springs now is organized, with VIW and HKI sponsoring classes twice monthly. SOV (ILL's XYL) now has Advanced Class license, and she and Ed are putting together a Viking. TI, AZE, ORE, DB, and BJV meet daily on 75, 160, and 2 meters, and claim that 2 meters works best. New appointments: CAR and FJS as OPS. The State c.w. net is considering changing its frequency. Please have your suggestions ready for the hamfest in Sioux Falls, Oct. 6-7. Traffic: WØPHR 38, RRN 4.

MINNESOTA — SCM, Charles M. Bove, WØMXC — Asst. SCM, Jean Walter, ØKYE. SEC: BOL. RM: RPT. The members of the section are rejoicing in the recovery of their SCM from a very serious illness and operation. We hope he now is over his health troubles, of which he has had quite a series. The most devastating storm in the history of the Twin Cities and vicinity occurred during July, levelling almost all our fixed-station antennas, along with thousands of large trees, although causing no great loss of life. Parts of Minneapolis were without power for six days. DNO is a new station in St. Paul, and is to be congratulated on making the grade after a number of attempts over the past two years. The St. Paul Open Golf Tournament was covered by local club members with 2-meter rigs and a fixed station at the club house for keeping the press and others up on the scores of the various matches. The Mobile Radio Corps supplied 10-meter equipment for the Minneapolis Aquatennial, keeping the main announcing center posted on events. PVS received his 1st-class radiotelephone ticket. BRA has been active from a lakeside cabin near Paynesville all summer. BOL has a new 50-foot pole. RVS bought a new car for his mobile rig. Ed Handy visited with Director Dosland one evening en route home from Seattle, and chatted from TSN with a number of the section members. RA has his n.f.m. mobile installed and has found his battery dead twice since. MRX is active in the CAP aircraft warning set-up in the upper end of the State. GKP has gone 2 meters, and now works with BBN and several stations in the St. Cloud-Anoka Area regularly. Two-meter interest is definitely picking up. Traffic: WØITQ 570, KFF 277, HEO 172, UGV 46, RA 45, BRA 14, FTJ 4.

DELTA DIVISION

ARKANSAS — SCM, Dr. John L. Stockton, W5DRW — First we would like to welcome all the hams with the new Novice Class licenses. Glad to have you as amateurs and hope that you will take an active part in the League affairs. MET now has 130 countries confirmed and has been visiting PJ5 and KP4 hams. Some of his better DX included UR2, 9S4, and CR5. Nice going, Dick. AY predicts an active EC organization for L.R. this fall. STU has 807 on 7 Mc. and is working on WAS. 4IFC/5 is new EC in Cabot. Welcome to Arkansas, Bill. NBG will be working on his Master's Degree at the U. of Mo. this fall. Best of luck, Bob. WN5TID has nine watts on 3723 kc. and says it's working out FB. WN5TIC has 616 into an 807 on 3740 kc. and plans on being on 144-Mc. 'phone soon. LUX, ICS, HPL, BAB, OUI, and DRW received Public Service certificates from Western Union for traffic handled during the February sleet storm. All hams with appointments, please check the date of expiration and send in for renewal if you haven't already done so. The traffic season should be getting a good start now. Traffic: W5EA 26, STU 7, WN5TIC 2.

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — The Keesler Amateur Club elected the following officers: RMC, pres.; SMD, vice-pres.; PMN, secy.; 6WGK/5, treas.; 4QBM/5, act. mgr. Burnie Mattox, ex-DL4OD, now is W5TBI and welcomes old friends. Ski will be heard from DL4-Land. SGM now is on with 300 watts. RUT now has his Advanced Class ticket and is checking into the Hurricane Net on 'phone. SPK is using constant carrier modulation at 1000 watts. RUT is new NCS for the Shrimp Net with RMC as Alt. NCS. QN8 is NCS for the Gulf Coast Hurricane Net with QMQ as Alt. NCS. Don't forget to drop your Route Manager, WZ, a card for time and frequency of the slow-speed c.w. net on 80 meters. RHG has a nice signal on 75-meter 'phone with converted BC-457A. AGB has new Advanced Class ticket. 3GBB and 3II were visitors on the Coast and checked into the Ten-Meter Shrimp Net mobile. Let's have reports from the northern part of the State.

TENNESSEE — SCM, D. G. Stewart, W4AFI — Tennessee Section C.W. Net resumed operation Sept. 10th on 3635 kc. Please note new frequency. This change was made to clear Novice assignment. All are urged to meet this Net as often as possible and help our new Route Manager, BAQ, make the coming fall and winter season a highly successful one. The Memphis Club staged a picnic, complete with softball game between the 'phone and c.w. gangs, along with a hidden transmitter hunt for the mobiles. New 28-Mc. mobiles are DIX and LVJ. LVG operates MM from cruiser on the Mississippi. New Novice Class amateurs in Memphis are WN4TGR, THC, THG, THQ, TIB, TIH, and TIL. Welcome to our ranks, fellows. BAQ, EWC, IIY, OGG, and SCF were active in Kansas Flood

(Continued on page 84)

For

DEPENDABLE EFFICIENCY

Choose JOHNSON Variable Condensers

Excellent design, careful workmanship and quality materials are combined in the manufacture of JOHNSON Variable Condensers to assure highest stability of the tuned circuit.

The entire JOHNSON line features high quality steatite insulation and sturdy construction — your assurance of long, dependable service — whether for amateur or commercial service.

TYPE C & D

Unusually economical for quality condensers. Types C and D have .051" thick, rounded aluminum plates, large laminated rotor brushes. Air gap from .080" to .250" (Type D) and .125" to .500" (Type C). Panel space, Type C, 5½" W x 5⅜" H. Type D, 4¼" W x 4" H.

TYPE E & F

Rugged, compact units for low and medium power transmitters. Aluminum plates .032" thick, rounded edges. Stainless steel shafts. Air gap from .045" to .125" (Type E) and .045" or .075" (Type F). Panel space, Type E, 2⅝" square; Type F, 2 1/16" square.

TYPE M—Miniature, Smallest Built!

Ideal for VHF, miniature test equipment, etc. Soldered construction, silver plated beryllium copper contact spring, split sleeve rotor bearings — no shaft wobble. Made in single and differential models up to 19.6 mmf and butterfly up to 11 mmf. Panel space only ⅝" x ¾". Air gap .017".

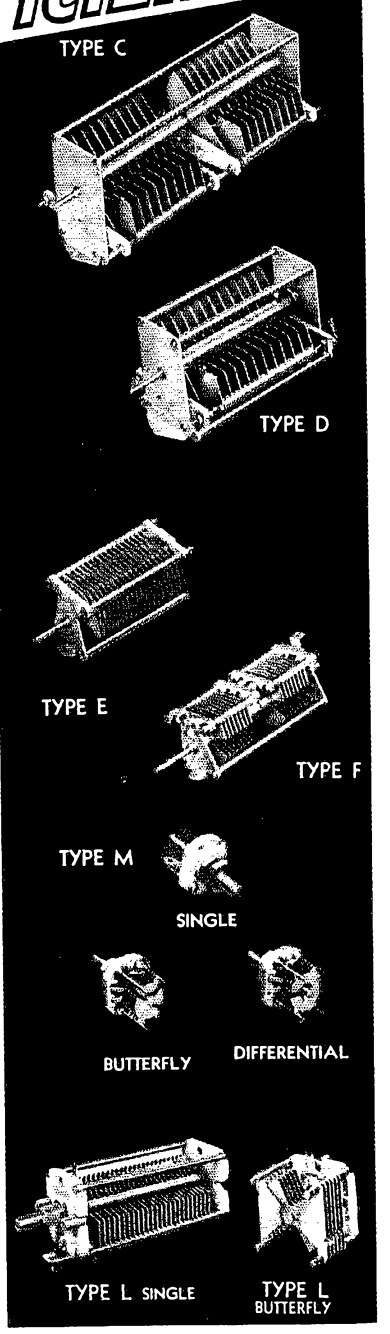
TYPE L

Ceramic soldered — no eyelets or rivets to loosen. All brass, soldered construction. "Bright alloy" plated. Ideal for rough service. Beryllium copper contact spring, silver plated. Made in butterfly, single and differential types. Panel space 1⅜" square. Air gap .030". Also furnished in .020", .060" and .080".

WRITE TODAY FOR JOHNSON CONDENSER CATALOG

TYPE N

Small mounting space requirements. extremely high voltage rating and fine adjustment make these neutralizing condensers ideal. Air gaps .125", .250" and .375".



JOHNSON *a famous name in Radio*

E. F. JOHNSON CO., WASECA, MINNESOTA

traffic. OOA is leaving for school and can be heard from AQL. PMR is the proud recipient of a new 2nd-class radiotelephone ticket. NJE received Public Service certificate from Western Union for work in the February ice storm. FLW reports occasional openings on 50 Mc. and heard the beacon station of HHK for the first time. HHK beacon runs 26 watts with antenna up about sixty feet. West Tenn. 28-Mc. Net meets each evening at 2000 CST with the following: HQM NCS, NVY Alt. NCS, FLW, FWX, PKE, RHO, RKN, RMJ, and SJJ. BKI is the call of AKJ's XYL, recently licensed. New Emergency Coördinator for Knoxville is HI, with HHQ handling the Fountain City Area. FWH, former OES, has moved to Georgia. Traffic: (July) W4PL 2075, OGG 82, BAQ 42, AEE 40, OOA 34, HQM 10, FLW 9, PMR 2, NDC 1. (June) W4OOA 32, NDC 3.

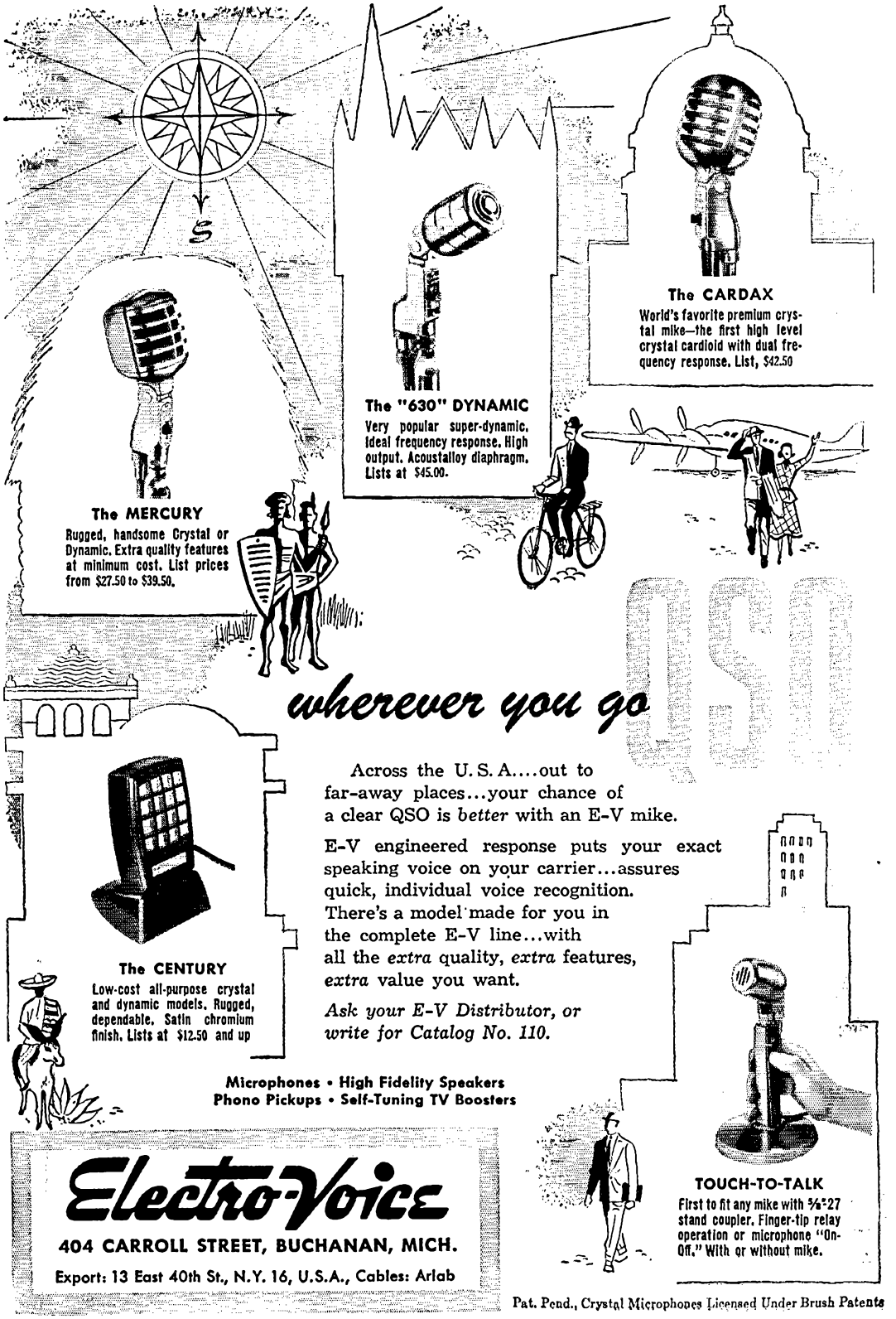
GREAT LAKES DIVISION

KENTUCKY — SCM, I. W. Lyle, jr., W4KKG — KQI, Great Lakes Division Asst. Director, spent his vacation in Colorado. RQV was in the hospital for awhile. MFI reports into the emergency net regularly each Monday night. Likewise SKE, a real on-the-ball new ham. HGR, using clamp tube modulation, has a swell-sounding rig. He works 28-Mc. 'phone surrounded by TV sets with no TVI. VP sends in a negative report as OO and says it's nice to find the bands sounding better. CDA says the lake is cooler than his shack so he is saving his filaments. KZF adds VHF-152 to his receiver line-up. The Louisville gang was fortunate in having a chance to become acquainted with some of the West Coast amateurs here on location while filming a picture for Warner Bros. at Fort Knox. Among them were 6APQ and 6WK. Come back again, fellows. You're always welcome in Kentucky. MDB has a super-pro and new Class A license. Mike belongs to the wear-out-a-microphone-a-month-club! MKJ has a super array way up there for 144 Mc. OXC did right well in the V.H.F. Contest. KMX has new HT-9 going. SFD had his rig struck by lightning with terrific damage resulting. I have been hearing of a lot of new amateur activity in the State of late and I would appreciate a card from you new hams at the end of each month so I can let the rest of the fellows know about you. Mail me one now! Is everyone ready for the coming season? Things are getting ripe about now so let's tune up, gang, and keep Kentucky on the map. Traffic: W4CDA 9, RQV 4, SKE 4, KKG 3.

MICHIGAN — SCM, Norman C. MacPhail, W8DLZ — Asst. SCM ('phone): R. B. Cooper, 8AQA. Asst. SCM (c.w.), J. R. Beljan, 8SCW. SEC: GJH. PAMs: JUQ and TTY. RMs: UKV and YKC. New appointments: OPS to WNY and YWF in the Upper Peninsula; EC to RHD (Emmet and Cheboygan Counties) and SYQ (Antrim, Grand Traverse, and Leelanau Counties). July was a great month for picnics. The U.P. gang held a daisy up Negaunee way. The Tri-County Club had a terrific turnout at Kensington Park, near Detroit, on the 28th. Over 500 were there, with approximately 350 calls represented and some 200 mobiles. The Detroit gang was in charge of the biggest parade in the 250-year history of that City. It went off like clockwork and the parade lasted from 2:00 to 7:15 P.M. Truly a high compliment to Michigan amateurs, as the President of the United States was present and in the parade! The *DARA Bulletin* has a "new look," thanks to the Briggs Manufacturing Company and DZT. TTY has moved to Ohio. ZBT is recovering from a serious car accident. MCV vacationed in W6-Land. TBP is working up a c.w. rig for traffic. HKT is back from a two-week cruise at Boston (courtesy USNR). DOI is taking it easy from NCS duties on QMN. ILP vacationed in WØ-Land. CSI and FHY are collaborating on a kw. job for use this fall in traffic. ZLK reports SYQ and ZWM now are mobile. RJC was off the air for 23 days with transmitter troubles. The Kansas Flood whopped up some mighty fine traffic scores for NZZ and WVL. The Genesee Club at Flint has completed its 2-meter transceiver project. Twenty-seven rigs are available to those participating in disaster-preparedness training. The 8 A.M. Overseas Traffic Net is going strong Mon. through Fri. with QBO, NZZ, and BKV particularly active. The biggest rash of calls in many a moon broke out the last week of the month, with WN8s thicker'n fleas on a Georgia dog. Now is the time for every club to pitch in and make these newcomers welcome. IV is splitting cycles with an HRO-50-1. ZUI is in Adak, Alaska, looking for Michigan QSO on 7 and 14 Mc. ABH is on 'phone after 22 years of smoke signals. Traffic: (July) W8ELW 440, RJC 159, NZZ 146, WVL 130, TZD 124, DLZ 107, DAP 103, ZLK 92, QBO 47, IKX 32, ILP 31, IV 28, QPO 25, AQA 17, COW 14, ABH 12, LLD 12, FX 11, EGI 6, QGZ 5, ZEE 3, QIX 2. (June) W8WNT 40, DOI 14, TBP 8, IV 7, NZZ 4.

OHIO — SCM, Leslie Misch, W8HGW — Asst. SCMs, C. D. Hall, 8PUN, and J. E. Siringer, 8AJW. SEC: UPB. JFC, the downstate DX man, reports good 7-Mc. results with his new long wire. EIB still is working on his tower. The Columbus gang is compiling names and calls of the 5000 amateurs in Ohio for the Auto License Bureau. HDF is a new ham in Findlay. New Class A ticket holders are

(*Continued on page 86*)


The CARDAX
World's favorite premium crystal mike—the first high level crystal cardioid with dual frequency response. List, $42.50
The "630" DYNAMIC
Very popular super-dynamic. Ideal frequency response. High output. Acoustalloy diaphragm. Lists at $45.00.
The MERCURY
Rugged, handsome Crystal or Dynamic. Extra quality features at minimum cost. List prices from $27.50 to $39.50.
wherever you go
QSO
Across the U. S. A....out to far-away places...your chance of a clear QSO is *better* with an E-V mike.
E-V engineered response puts your exact speaking voice on your carrier...assures quick, individual voice recognition. There's a model made for you in the complete E-V line...with all the *extra* quality, *extra* features, *extra* value you want.
Ask your E-V Distributor, or write for Catalog No. 110.
The CENTURY
Low-cost all-purpose crystal and dynamic models. Rugged, dependable. Satin chromium finish. Lists at $12.50 and up
TOUCH-TO-TALK
First to fit any mike with 5/8"-27 stand coupler. Finger-tip relay operation or microphone "On-Off." With or without mike.
Microphones • High Fidelity Speakers
Phono Pickups • Self-Tuning TV Boosters
Electro-Voice
404 CARROLL STREET, BUCHANAN, MICH.
Export: 13 East 40th St., N.Y. 16, U.S.A., Cables: Arlab
Pat. Pend., Crystal Microphones Licensed Under Brush Patents

ACQ, FBZ, FCX, FDR, and VRK. DMD made his 'phone DXCC. PBX is building a new shack. RDZ finally acquired an XYL. FYO is new MARS station. DZX is starting a slow-speed net in September. EZE had a score of 14,430 in the last CD Contest. CAS is on his way overseas with the Army. Traffic: W8ARO 465, FYO 322, DZX 256, DAE 160, AL 35, EZE 31, AJW 26, WE 23, WAB 20, JFC 13, DXO 10, GZ 10, PMJ 6, QIE 6, DZO 4, EOW 1.

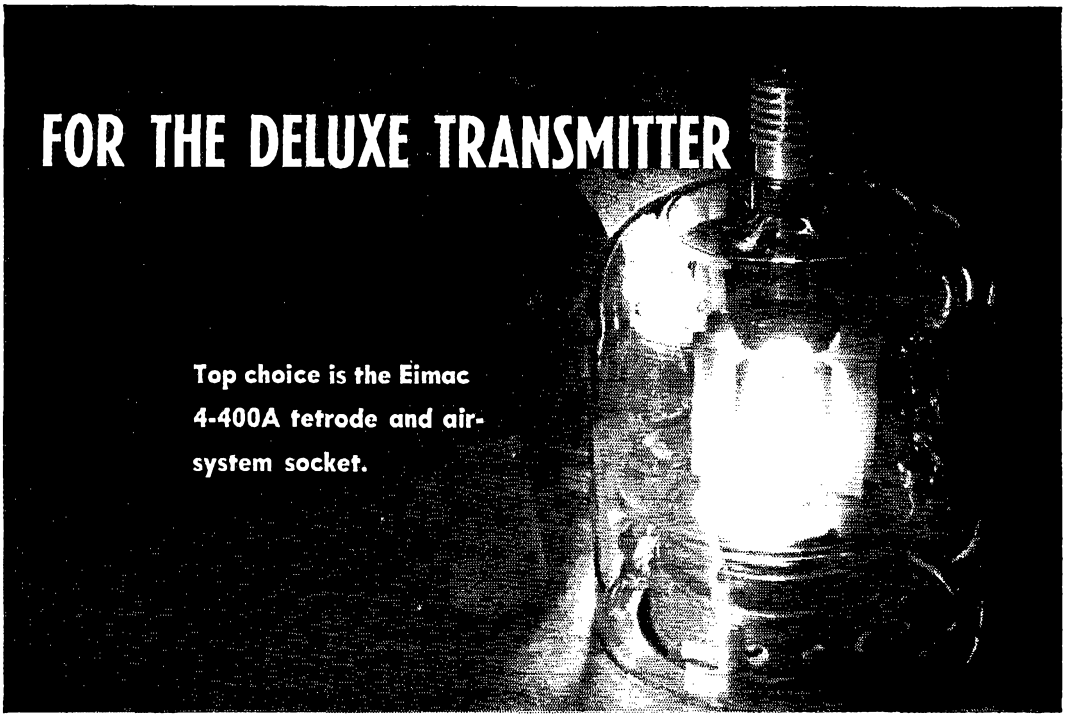
HUDSON DIVISION

EASTERN NEW YORK — SCM, George W. Sleeper, W2CLL — SEC: ILI. RMs: TYC, KBT. PAMs: NIV, ILI, IJG. It is with regret that the resignation of NJF as SEC is announced. Gay has gone with the Navy, Electronics Branch Bureau of Ordinance. The section hereby thanks Gay for his splendid past contributions to the section, and extends him best wishes for success in his new work. CEV advises that he is leaving the section for a try with the merchant marine. The best of everything to you, Guy. ILI is appointed SEC as of this writing. Steve is well known to many through his work as EC and as Asst. SEC. SNN reports good AREC activity in Yonkers and reports the first hospital installation. Mobiles also are on the increase. PCQ reports Orange Co. AREC has a building to house 6 channels on 2 meters at a full gallon 1387 feet above sea level. AWQ writes from the Canal Zone. Red is with the Navy and can be contacted at KZ5RF on 7-, 14-, and 28-Mc. c.w. or 14- and 28-Mc. 'phone. SUL had FB meeting with Schenectady and Albany AREC. The meeting was held at AWF's shack and resulted in a plan of considerable merit. SUL has been transferred to a remote spot somewhere near Poughkeepsie. FZW reports that his ham activities will be curtailed for a while. It seems that certain chores at home must be completed before the dog-house door opens again. LRW is back on the high iron with the high QTC score this month. BNC still is piling up big totals. 8DSX, ex-2CDQ, visited your SCM recently. AARA is planning its annual clam bake. The SARA is on vacation. How about some news from WARA and other clubs? Please note again that your activity reports must be mailed to reach me by the 6th of each month. EQD advises he is well and extends his best to the section. Keep us posted, Fred. Appointments made: 8ERL/2, EC for Tarrytown; VO, EC for Briar Cliff; HXQ, EC for Rye. Traffic: W2LRW 352, BNC 222, TYC 124, PHO 84, GTI 17, CLL 11, BVF 8, FEN 6, BRS 5, 1TX 2.

NEW YORK CITY AND LONG ISLAND — SCM George V. Cooke, jr., W2OBU — SEC: SYW. RMs: TUK, PRE. In the recent Propane Gas Tanks explosions and fire at Newark, N. J., TJA/2 rendered an invaluable service, aiding for many hours in relaying messages to outside relief agencies. Participating with TJA/2 were OKO/2 at the scene, BPV, WX, CBT, YHN, QBM, GQP, PIX, TZF, KVG and many other N.Y.C.-L.I. and N.N.J. AREC members, mobile and walkie-talkie; some standing by for possible assistance with others policing the 2-meter band to reduce QRM. TJA/2 had a 2-meter rig on the roof of a high Manhattan hotel which gave him greater coverage than the ground stations. Four major disasters in this area in less than a year prove the invaluable aid, fine coöperation and training of our AREC organization. ZOS performed another outstanding phase of our hobby by aiding in securing a rare drug for an afflicted Portuguese girl, forwarding it and maintaining schedules to assist further if necessary. AREC/c.d. programs are being stepped up and increased drills are being conducted. In Nassau, with FI as EC, county-wide drills were held during the month with an average of 50 fixed stations and 6 mobile. ZAI is in charge of 10-meter drills. Ten stations are set up at different village headquarters and 50 stations additionally are needed to complete coverage into all villages. BIV, Brooklyn EC, has charged DLP with all 10-meter AREC operations. QGK, Sophie, is doing a very fine secretarial job for the Brooklyn group, publishing a weekly bulletin and doing all the paper work. Five drills are held weekly; an alerting system has been worked out and a manual of operations has been circulated. VKF, Staten Island EC, reports weekly AREC/c.d. drills are held and that EFA and GEZ have been assigned to duty in Turkey. PRE, Manhattan EC, states an increase of 13 new mobile stations during the month and 3 drills held with excellent results. In the Bronx, DUP as EC, test runs were held from several points with AREC members and proved successful with 5-40 watts in plotting the Borough for dead spots. JSV, Queens EC, reports continued excellent attendance on 2- and 10-meter AREC nets and for same AVI, DVK, DVN, FMK, KVG, OG, QFA, TJA, PAG, and ZOS received Section Net certificates. The newest member of the Queens 2-meter AREC Net is WN2ISM and more Novices are signing up. WN2IDK and WN2JIG were among the first Novice tickets issued on the Island. All Novice licensees are invited to send the SCM data on their gear. RTZ is back again after recuperation in W4-Land and states traffic activity will resume in October. VL received ORS appointment. GFO, ex-4KKM, now is stationed at Fort Monmouth. EGV worked his way into the Rag Chewers Club. The Lake Success, Nassau, and Mid-

(*Continued on page 88*)

FOR THE DELUXE TRANSMITTER



Top choice is the Eimac 4-400A tetrode and air-system socket.

Modern in design . . . unchallenged in performance . . . the 400-watt Eimac 4-400A tetrode and the Eimac air-system socket are the answer for those who want the ultimate in transmitters.

Used singly or in pairs for CW or phone, the 4-400A will coast along with power to spare. They can be driven by a receiving tube, making VFO control a snap.

The Eimac air-system socket available for use with the 4-400A assures good input-output shielding and simplifies cooling.

Consider this outstanding tube for your next rig. Drop us a postcard for complete data.

Eimac 4-400A

RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR
Class-C Telegraphy or Telephony
TYPICAL OPERATION

D-C Plate Voltage	3000	Volts
D-C Screen Voltage	500	Volts
D-C Grid Voltage	−220	Volts
D-C Plate Current	350	Ma.
D-C Screen Current	46	Ma.
D-C Grid Current	19	Ma.
Screen Dissipation	23	Watts
Grid Dissipation	1.9	Watts
Peak R-F Grid Input Voltage	320	Volts
Driving Power	6.	Watts
Plate Power Input	1050	Watts
Plate Dissipation	250	Watts
Plate Power Output	800	Watts

A new "Quick Reference" catalog on Eimac's Wide Variety of Tube Types is yours for the asking.

Eimac TUBES

EITEL-McCULLOUGH, INC.
San Bruno, California
Export Agents: Frazar & Hansen, 301 Clay St., San Francisco, California

Island Clubs handled traffic out of the annual Mineola Fair. AD brought his music and rig to new QTH in Hempstead. The Nassau Radio Club boasts of aiding ten successful Novices in getting their tickets, with the following combinations: WN2KEB/KFV, who are XYL and OM; WN2KDP, XYL of VL; and WN2KAE, daughter of CB. AOD is using new fifteen-element horizontal beam on 420 Mc. PF was in Fort Monmouth for two-weeks training and operated K2USA and A2MON. BO returned from an 8700-mile trip through the West. EC tells us TLAP will resume full operation on Oct. 1st. TUK installed TBS-50 in his car to work 3.8, 14, and 28 Mc. Traffic: (July) W2BO 315, MQB 102, OJX 68, OBU 51, JBQ/2 47, EC 46, TUK 28, VX 26, OUT 25, JZX 24, PF 23, DXN 20, BQP 6. (June) W2GP 58, IN 33, JBQ 29.

NORTHERN NEW JERSEY — SCM, Thomas J. Ryan, jr., W2NKD — Yours truly and VQR (SEC of N.N.J.) would like to hear from the secretary of every radio club in the section so that we may line up a schedule of visits to each club. If we make one meeting every week, by the spring we should have visited all the clubs. With so much information about civil defense coming out from time to time, it would be very helpful if we passed along that information as we made the rounds of the clubs. So please ask the secretary of your club to drop me a line, giving me the meeting dates of your club and a roster of club officers. KLA and YRB, both members of the 102nd Armored Cavalry (National Guard), completed two weeks of training at Pine Camp, N.Y. They were in touch nightly with the folks at home, using an SCR-399 (BC-610 transmitter and BC-342 receiver). DHE, regular Army instructor for signal units in the N. J. Guard, was also at camp. His home QTH is Nutley. He uses the call K2WAH at Sussex Ave. Armory in Newark. Another ham at camp was PQS, communication officer of the 114th. Inf. Regt. Combat Team. LDG has black and white and color movies of Field Day ready for the first meeting of the Irvington ARC. Look out for him! — he's been taking pistol practice all summer at the Essex County Court House. ZBY reports a 3000-watt Onan portable manual generator has been installed in the Chapter House of the Central Bergen (Bergen County) Chapter of the Red Cross. They have erected antennas and made suitable wiring installations so that any type of ham equipment may be moved in on short notice and operated. COT received Canal Zone certificate. N1O, using the call of LU2CX while out of the country, returned during August. PRW worked as portable W1 from Maine. JUC is working 28-Mc. mobile. CCS continues to do an excellent job on the Transcontinental 'Phone Net, always handling a big total of traffic every month — 247 total for July is a lot of traffic to handle on 'phone. JKH now is using his new three-element beam on 14 Mc. The first reported Novice licensee in the section is WN2JDU, of North Plainfield. His name is Bill and he works for Bendix at Teterboro. He is working 144 Mc. CWK says a 522 was installed in the Highland Park police station to hook it up with the headquarters of c.d. in Middlesex County. CWK received 3.5-Mc. WAC endorsement. ZEP received WAC and new HRO all in one month! VYB is attending Naval School in Key West, Fla. RQI finished 144-Mc. mobile rig for use in the c.d. net. Please remember to get after your club secretary in connection with my request at the beginning of the column. Traffic: W2CCS 247, CUI 146, OUS 6, NIY 4, RQI 4, COT 3, CWK 1.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — The Waterloo Club reports good Field Day activity with two fixed portable stations and six mobile participating. One fixed station used motor generator power and portable antenna masts. The other was operated from storage batteries and the antenna was supported by a balloon. DFF, DFE, and DEU are new hams in Waterloo. BGQ now is Class A. 9MQV, ex-ØQAO, writes from Black River Falls, Wis. SCA is back in the harness again. He's earned another BPL. In June the Maytag Company in Newton had an open house at which a ham station was set up under the Newton Radio Clubs call, WML. 4NNN/Ø snagged BPL for originating 109 as a consequence of the Maytag Open House. SCA reports T.E.N. active seven nights a week during the Kansas Flood. DRV is a new ham in Burlington. YTA's modulator made him a good c.w. man again. The Iowa 75 'phone net held its annual picnic at Mitchellville July 22nd with 98 in attendance. The Des Moines Club held its picnic the same day with 72 in attendance. PP vacationed in the Wyoming Mountains. He and his brother, UZE, communicated between cars on the way to the vacation spot in Medicine Bow National Forest. Traffic: (July) WØSCA 752, QVA 106, YTA 56, BDR 16. (June) W4NNN/Ø 110.

KANSAS — SCM, Earl N. Johnston, WØICV — Thanks a lot for all the reports on the Kansas Flood emergency operations. I personally want to congratulate and thank all of you who participated in this huge job that was so well done. The letters and good will I receive from the governmental agencies, railroads, utilities companies,

(*Continued on page 90*)

the National Guard, and other agencies that you served convince me that you are recognized as being a vital and important group, not only in times of emergency but any time. I'm proud of the big traffic report, but most of all I'm proud of the gang that did a swell job. On July 29th the Johnson County Radio Amateurs Club held its first annual picnic at the farm of EIB, which was highlighted by contacting 1AW. Contacts in a dozen states, including California, New York, and Utah, also were made. Members present were CLA, CLH, BIO, DVV, EIB, HJW, IIJ, MOX, NZP, and WMH. The Club was formed in February of this year for the purpose of assisting the civil defense organization and other interested public service bodies in Johnson County, by furnishing an integrated amateur radio communications system operating within the County. The Club, as a group, participated in the annual ARRL Field Day in June, and the Missouri-Kansas flood emergency in July. Traffic: WØBLI 358, JDX 248, VDP 195, FDJ 184, NIY 179, JFE 162, CBK 102, BDK 82, HAU 58, KXL 37, IJV 10, LIX 7.

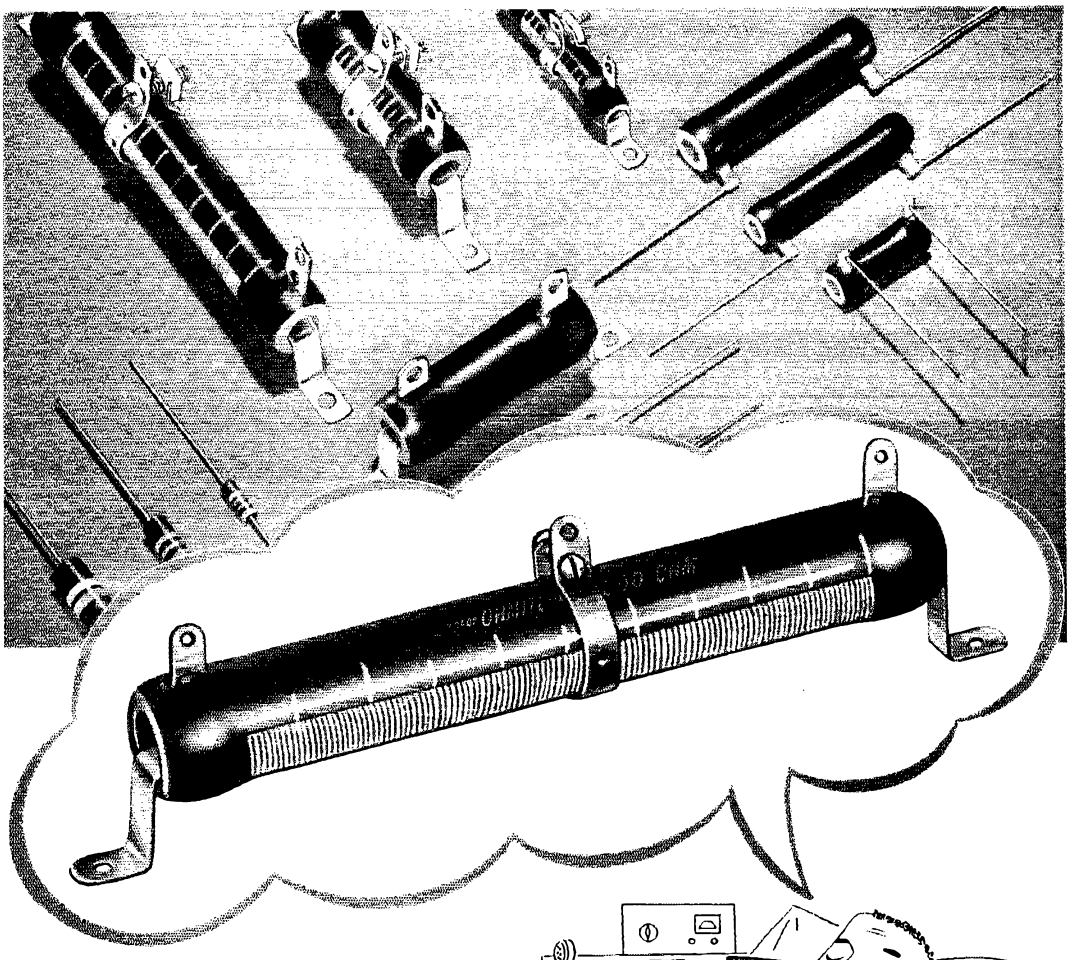
MISSOURI — SCM, Clarence L. Arundale, WØGBJ — The Heart of America Radio Club played an important part in the flood emergency communications in the Kansas City Area. The club station, RVG, located in the Red Cross Building, was assisted by approximately 60 mobile units which operated in shifts, day and night, for almost a week. Heavy traffic was handled for the Red Cross, Army, Navy, police and fire departments, airlines and broadcast stations. The Egyptian Radio Club did a fine job in furnishing communications in the flood area of East Alton and St. Charles. The Club made extensive use of mobile units in addition to fixed stations. The Club also held its regular picnic on July 4th, which was well attended. DU worked FB8, FR7, 3A2, and FG7, to bring the total countries worked to 205. QXO's traffic was off because of his being confined to bed with a recurrence of trouble from a ruptured spinal disc. OMG is TVling his transmitter. LSA has a new country home with plenty of antenna space. AXL, BAF, and EBE are installing mobile equipment. PLY has added two new states on 144 Mc. QMF has added Collins 75A-1 to match the 32V-2. WAP alerted MON and TXN for flood emergency traffic but the Nets' facilities were not required at that time. The Show-me Net is having poor operating conditions on Sundays. SAN resumed schedule on September 16th. Traffic: (July) WØQXO 313, WAP 193, HUI 33, EBE 19, GAR 13, BAF 8, ARH 6, QMF 6, FIR 4, GBJ 2, JEJ 2, NNH 1. (June) WØQXO 989.

NEBRASKA — SCM, Scott E. Davison, WØOED — This will be my last monthly squib to the gang, as next month the new SCM will take over. Your new SCM couldn't be a nicer "guy" — KJP. Best of luck to you, Guy. The Pioneer Radio Club's new officers are AZC, pres.; UVU, vice-pres.; ADK, secy.-treas.; VBJ, act. mgr. A new radio club has been organized at Grand Island with CC president and HSO secretary-treasurer. CC took part in the emergency work in Kansas with his mobile. RYG reports work has kept him inactive this summer. Your SCM has been off the air for some time because of moving to a new home. QHG has 400 watts on now to his 810s. NKG has a new harmonic at his house. AQJ has new mobile rig. TQD banged out another BPL again with his overseas traffic. Lyle also was busy with flood traffic. The Lincoln and Fremont Clubs were guests of the Sioux City Club at a family picnic in Sioux City the last Sunday in August. Would like to call your attention to fall activities again. Get in one of the nets this coming winter and be ready for anything. Please mail your monthly reports and news items to KJP, the new SCM. I wish to thank you all for the fine coöperation the past two years of my term in office and hope you will give Guy the same loyal support. It's been swell meeting and working with all of you and will see you on the air this coming season. So it's adios from the dog that barks all night — Scotty. Traffic: WØTQD 1530, AY 256, RYG 234, QHG 120, DMY 21.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — Your SCM wishes to apologize for missing the last two issues with this report. A somewhat abrupt decision to change "my way of life" for the time being eliminated my available spare time. Your continuing reports are appreciated, and all correspondence will be brought up to date shortly. CTI reports 29 licensed hams now are members of the Norwalk C.D. Unit. QBO is out of the hospital after a 40-day siege. APA has a commission as 1st lieutenant in the State Guard. The Connecticut State Guard needs ham operators badly and anyone interested should get in touch with VW. QDT is Asst. EC for Woodbridge. CUH is remodeling the 'phone rig. BD just completed a new end-loaded 3.5-Mc. antenna. BD, an old-timer, has just moved to this section from Vermont. AOS just received his Advanced Class ticket, and reports a large number of visitors at his shack this summer. KAT and MVH have new 75-meter mobiles. MSJ has left WELI, and PDI is taking over his job. OTD and STB are active on 75-meter 'phone. AH is planning a new 7-Mc. vertical. LVX has new jr. operator. OAX, new EC for South Coventry, is completing

(Continued on page 92)



You rest easy
when your rig
uses Dependable

OHMITE RESISTORS

You can forget about resistor troubles with reliable OHMITE resistors in your rig. That's because these sturdy vitreous-enameled units have earned an unmatched reputation for dependability—among amateurs, engineers, designers, and servicemen the world over. And . . . the Ohmite line of wire-wound resistors is the most complete on the market, today, with types and sizes for just about every place in your equipment. You'll find it pays to . . . *be right with OHMITE!*

WRITE for Stock Catalog

OHMITE MFG. CO.
4864 Flournoy St.
Chicago 44, Ill.

OHMITE®
RHEOSTATS
RESISTORS
TAP SWITCHES

CONNECTICUT QSO PARTY
October 27-28, 1951

All Connecticut amateurs are cordially invited to take part in the Fourth Annual Connecticut QSO Party to be sponsored by the Connecticut Wireless Assn.

Rules: 1) The Party will begin at 5:00 P.M. EST October 27th and end at 11:00 P.M. EST October 28th. 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 counted but once regardless of band. Mobile, portable and home stations covered by the same station license all constitute the same station. 5) Exchange names of town areas. 6) Score 1 point per contact; multiply contact points by number of town areas worked for final score. 7) Reports must show times of QSO, call of stations worked, town area of station worked. All reports must be postmarked no later than November 15th and should be sent to George Hart, W1NJM, 66 Highland St., Newington, Conn. 8) Prizes will be awarded to the winners. 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 30-hour period. Get on the air October 27th and 28th and meet the gang around your section!

a nice mobile-emergency set-up, and is getting organized with his local civil defense unit. He reports new hams, WN1TUX and WN1TUO, in his town. LHE reports the Stamford gang set up for Field Day this year for the first time with good results. Traffic: (July) W1AYC 123, AW 48, HYF 40, BVB 24, APA 20, QBO 15, RFJ 12, RWS 11, KV 6, CTI 2, ODW 2. (June) W1AYC 130, AW 129, BDI 92, KYQ 73, HYF 69, CGS 55, QBO 9, CTI 4, ODW 4, AOS 1. (May) W1NJM 176, BDI 124, AW 66, CTI 55, FOB 17, BVB 16, YU 9, ODW 3.

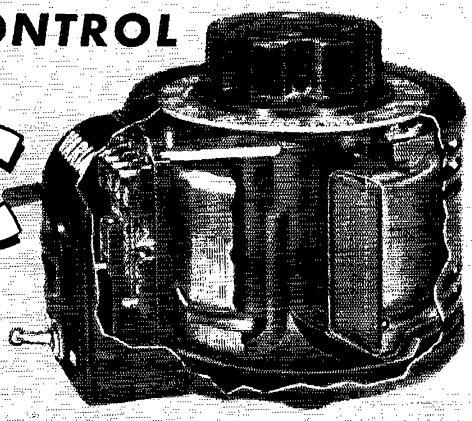
MAINE — SCM, Orestes R. Brackett, W1PTL — Operation on the nets dropped off during the summer months. With a total strength of 138 full members and 23 supporting members in the Emergency Corps it is reported that very little coöperation is received by the SEC insofar as reports are concerned. There has been a c.d. test drill at Hebron with two mobiles participating. Most of the work was done by the Oxford County Group, which is to be commended on its fine work, although there seemed to be a lack of portable a.c. power units. The boys of the PAWA did themselves proud on the hamfest held at Portland July 28th. About 370 attended, including two WØs, several W2s, and even some VE3s and VE2s. SWZ has come up with a dual mobile rig for both 3.8 and 28 Mc. and is doing a bang-up job. AMR really has that mobile on the air at last but it seems that as yet he cannot compete with his rival, AFT. KL7BD/1 now is living at Gorham and working for CAA. ARV is getting that s.s.b. bug, so who knows what will happen. OLQ has signed up for OPS and also has received a Sea Gull Net certificate. RSC, at Bar Harbor, has a very fine signal on 3.8 Mc. OEN finally went and got himself an XYL. JIS is making good use of that new VFO and sure does get around. A group of about 40 attended a ten-meter ground wave get-together at the camp of FEE, outside of Skowhegan. Traffic: W1LKP 52, BTY 47, QQY 41, OLQ 13, PTL 9, ITU 7, SJN 7, QEK 5.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — NFQ is new EC for Foxboro. Appointments endorsed for another year: QMD as OBS; MVO as EC for Revere; BB as EC for Winthrop; LML, BDU, and JCK as ORS; KNI as OES; BB and BHW as OO. We regret to have to announce the death of EKT, who was well known on 50 Mc. TQQ, Weymouth, and TUP, Quincy, are new hams. FWS and QJK have Class A licenses. IHA is putting a 28-Mc. rig in the car. AMK has 28- and 144-Mc. rig in his car. VA is stationed in Norfolk, Va., and is on 3.5 Mc. AEZ/MM is on 144 Mc. on his boat. 4SRA is ex-1QJS, AKN's son. WB, in Belmont, worked W2-Land on 147.7 Mc. BTE has gone back to South America. The following took part in a drill on 28 Mc. for c.d. work in Sector 5, with Director Macdonald and ALP at GOU's as NC: RXR and RWY, Braintree; QKY, Canton; SMV, Cohasset; SAI and NID, Hull; FWS, Milton; CQN, Norwood; QVN, Randolph; DW, Westwood; PIG, Weymouth. NYV is in Tokyo. KL7AJC, ex-1PDG, will be on 14 and 28 Mc. looking for W1s. LML has rig in his car on 28 Mc. BGH is at Buzzards Bay with portable rig on 144 Mc. JWC is on 28 Mc. BGW is on 3.8- and 144-Mc. 'phone. NKW has new NC-183 and is on 3.5- and 7-Mc. c.w. from Nahant. PWV reports 14 members in Newton c.d. drill in July. The net will be on the last Tuesday of the month at 7.30 P.M. on 145.62 Mc. BL and LMU at-

(Continued on page 94)

for SMOOTH VOLTAGE CONTROL

Variac®



— the original continuously-adjustable auto-transformer — is the ideal device for controlling any a-c operated equipment. VARIACS not only supply perfectly smooth control of voltage from zero, but also furnish output voltages 17% above line voltage. VARIACS are correctly designed for many years of trouble-free operation. Data below are for single-phase operation. Polyphase and other ganged assemblies are available.

Single Phase Data

	Input Voltage	KVA	OUTPUT Output Voltage	OUTPUT Amperes Rated	OUTPUT Amperes Maximum	Type of* Mounting	Type	Price
Type 200-B	115	0.17	0-115 0-135	1	1.5 1.0	1	200-B	$12.50
Type V-5	115	0.86	0-115 0-135	5	7.5 5.0	1 2 3	V-5 V-5M V-5MT	18.50 20.50 25.00
	230	0.60	0-230 0-270	2	2.6 2.0	1 2 3	V-5H V-5HM V-5HMT	21.00 23.00 27.50
Type V-10	115	1.5	0-115 0-135	10	13.0 10.0	1 2 3	V-10 V-10M V-10MT	33.00 35.50 40.00
	230	1.2	0-230 0-270	4	5.2 4.0	1 2 3	V-10H V-10HM V-10HMT	34.00 36.50 41.00
Type V-20	115	3.	0-115 0-135	20	26.0 20.0	4	V-20M	55.00
	230	2.4	0-230 0-270	8	10.4 8.0	4	V-20HM	55.00
Type 50	115	5. 10.	0-115 0-115	40 80	45.0 90.0	4 5	50-A 50-AG2	140.00 310.00
	230	7. 14.	0-230 0-230	20 40	31.0 62.0	4 5	50-B 50-BG2	140.00 310.00

The trade name Variac is registered at the U. S. Patent Office. Variacs are patented under U. S. Patent No. 2,009,013 and are manufactured and sold only by General Radio Company or its authorized agents.

* 1 Unmounted model.
2 Protective Case around windings.
3 Protective Case, terminal cover line switch, convenience outlet and line cord.
4 Protective Case, terminal cover and BX outlet.
5 Two gang assembly — requires type 50-P1 choke — $12.00.

Write for the NEW Variac Bulletin

GENERAL RADIO Company

275 Massachusetts Avenue, Cambridge 39, Mass.

90 West Street NEW YORK 6 920 S. Michigan Ave. CHICAGO 5 1000 N. Seward St. LOS ANGELES 38

tended the hamfest at Portland. TAA won a Gonset converter. NO has returned from California. SS was guest speaker at the Portland Hamfest. DWO and PCR are members of MARS. KNI worked VE3RW and Tennessee on 50 Mc. and is building a receiver for 420 Mc. AAL is working Boston on 144 Mc. The new frequency of the Eastern Mass. Net is 3660 kc. If there is any interest in a slow-speed net among the Novices on 3745 kc., please contact JCK or ALP. MNK is going into the Navy. The T-9 Radio Club had a moonlight sail out to MVQ's camp on Bakers Island. SUR, Mansfield EC, has appointed KQF as Asst. EC for 3.5, 7, 14, and 28 Mc. and ODQ as Asst. EC for 50, 144, and 225 Mc. Doc Martin, of Malden, has the call WN1TVI. The Malden Amateur Radio Assn. has been formed with HKQ as trustee, HOH, pres., FSN, vice-pres.; HMK, secy.; and NXG treas. They meet the first Monday of each month at the c.d. radio headquarters, 22 Mountain Ave. BHW is at Pinehurst for the summer. The Gypsy Radio Club has been formed in Haverhill with SNZ, pres.; HP, vice-pres.; William Tift, secy.; STA, treas.; MRQ, trustee. Meetings are held the first Wednesday of each month at members' QTHs. IWR won a TBS-50 at Portland. LHT is mobile on 28 Mc. QZS has moved to Atkinson, N. H. HP built a grid-dip meter. BMQ, Dartmouth, is on 28 Mc. HMS has TBS-50 and tri-band converter and Leece-Neville alternator in his car. MHN is on 3.8 Mc. each night. AVY reports that New Bedford and the Cape are full of mobile rigs on 3.8 Mc. AVY and BJK had their first QSO since 1925. MUM is on 3.8 Mc. after four years on 14 Mc. ONK, APN, CTZ, WU, and AVY are on 28 Mc. BB, BDU, HX, and RM are on the committee to receive donations for a going-away gift for ZS6XQ, who is leaving for his home in Mafeking, South Africa. NMK, in Hingham, has rig in his car on 28 Mc. and SXN is on 28 Mc. The Melrose c.d. group worked with the Radiological Monitoring Section Team 5, State Civil Defense Agency and Atomic Energy Commission in a test. Traffic: W1EMG 246, SS 167, THU 107, TY 86, JCK 78, LM 34, NUP 32, AAL 26, PU 18, AVY 14, WU 5, DWO 2, PYM 2.

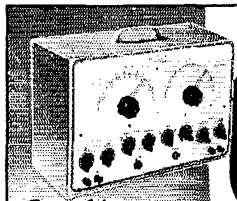
WESTERN MASSACHUSETTS — SCM, Victor W. Paounoff, W1EOB — SEC: JYH. RM: BVR. Net frequency, 3725 kc., at 7 P.M. Mon., Wed., and Fri. Slow-speed net meets at 6:30 P.M. Mon. and Fri. I hope everyone was successful with summer rebuilding programs and all are ready for the activities of the coming season. The West. Mass. Net is part of the National Traffic System. Members are eligible for certificates after a suitable show of interest. Our SEC, JYH, moved into a brand-new home at 67 West Allen Ridge Road, Springfield, about September 1st. RZG has been very busy preparing for entrance into Yale this fall. He was one of the winners of a Ford-Yale scholarship this year. BDV sojourned at York Beach, Me., for the summer. The article on his new mobile antenna was well received. AGM is moving to the hills of Shutesbury. MOK filled in as NCS for Region II while RDR vacationed in Tennessee. RHU and BVR held up West. Mass. Net during the summer. COI can only work DX on 14 Mc. with his new rig. GZ is doing a real bang-up job as NCS for the various Region 9 nets. MUN still is calling them close on FMT. EOB expects to move into his new home early in October. AREC nets are organized in practically every community in Western Massachusetts. See your local EC for details and join the gang in this public service activity. Traffic: (July) W1RHU 106, BVR 67, GZ 24, AGM 17, MOK 4. (June) W1GZ 18.

NEW HAMPSHIRE — SCM, Norman A. Chapman, W1JNC — RM: CRW. Here we go to the Fourteenth N. H. ARRL Convention at the Carpenter Hotel, Manchester, Oct. 6th. Remember to B.Y.O.L., "Bring Your Old Lady." RZN enjoyed his vacation visiting his old friends in the Great Bay Radio Club and has returned to Georgia. TBS is a member of the famous BPL. Keep your r.f. gain down, as POK reports he is adding another stage to his rig. Speaking of automobile call plates, did you know that GDE has HI-88 and FTJ has 7388? New General Class ticket holders are: TNF, Franklin; TRM, Auburn; TWO, Nashua. Who holds the first Novice license in New Hampshire? The following calls have been reported: WN1TTU, Concord; TVQ, Nashua; TXE, Rochester. A Lobster, Clam, and Clam Broth Hamfest was held at the shack of MCS at Patridge Lake, Littleton. Epicureans present: CKW, GQJ, JMO, LUD, MCS, QXZ, RNE, TAC, TDR, and fifteen SWLs. Hope you all enjoyed your summer vacations and are ready to participate in the fall and winter activities coming up. CU at Manchester. Traffic: (July) W1CRW 410, JNC 30, QJX 20, MCS 13, POK 8. (June) W1CRW 382, QGU 12.

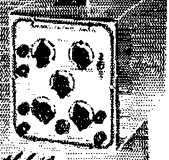
VERMONT — Acting SCM, Raymond N. Flood, W1FPS — Hi, gang. Burt has asked me to act as SCM until election time so send your monthly report to me by the 1st of each month. The Tri-County ARC has its club station license with the call TRZ. The first local Novice licensee was club member Vito Rizzi, with the call WN1TXN. SIO is installing 75-meter mobile rig. RNA has resigned as SEC. Any applicants for the job, please communicate with your Acting SCM. Emergency Coördinators, please send monthly reports to the Acting SCM until a new

(*Continued on page 96*)

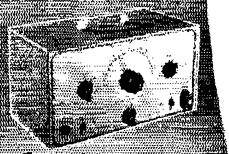
New 1952 HEATHKITS



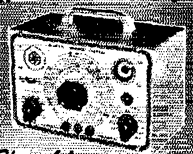
Heathkit TELEVISION GEN. KIT $39.50



Heathkit ELECTRONIC SWITCH KIT $19.50



Heathkit AUDIO GEN. KIT $34.50

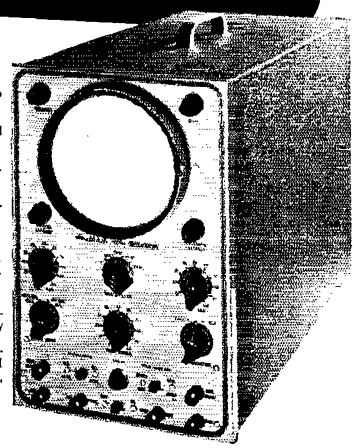


Heathkit CONDENSER CHECKER KIT $19.50

Heathkit R. F. SIGNAL GEN. KIT $19.50

Heathkit A.C. VOLTMETER KIT $29.50

Heathkit 5" OSCILLOSCOPE KIT



- New "spot shape" control for spot adjustment — to give really sharp focusing.
- A total of ten tubes including CR tube and five miniatures.
- Cascaded vertical amplifiers followed by phase splitter and balanced push-pull deflection amplifiers.
- Greatly reduced retrace time.
- Step attenuated — frequency compensated — cathode follower vertical input.
- Low impedance vertical gain control for minimum distortion.
- New mounting of phase splitter and deflection amplifier tubes near CR tube base.
- Greatly simplified wiring layout.
- Increased frequency response — useful to 5 MC.
- Tremendous sensitivity .03 RMS per inch Vertical .6V RMS per inch Hor.
- Dual control in vernier sweep frequency circuit — smoother acting.
- Positive or negative peak internal synchronization.
- Multivibrator type Wide Range Sweep Generator.

A brand new 1952 Heathkit Oscilloscope Kit with a multitude of outstanding features and really excellent performance. A scope you'll truly like and certainly want to own.

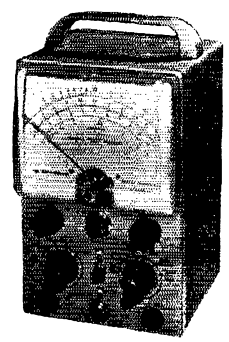
The kit is complete with all parts including all tubes, power transformer, punched and formed chassis, etc. Detailed instruction manual makes assembly simple and clear — contains step-by-step instructions, pictorials, diagrams, schematic, circuit description and uses of scope. A truly outstanding value.

MODEL 0-7

SHIPPING WT. 24 LBS.

$43.50

Heathkit VACUUM TUBE VOLTMETER KIT



- New styling — formd case for beauty.
- New truly compact size — Cabinet 4⅛" deep x 4-1/16" wide x 7⅜" high.
- Quality Simpson 200 microamp meter.
- New ohms battery holding clamp and spring clip — assurance of good electrical contact.
- Highest quality precision resistors in multiplier circuit.
- Calibrates on both AC and DC for maximum accuracy.
- Terrific coverage — Reads from ½V to 1000V AC, ½V to 1000V DC, and .1 to over 1 billion ohms resistance.
- *Large, clearly marked meter scales indicate ohms, AC Volts, DC Volts, and DB — has zero set mark for FM alignment.*
- New styling presents attractive and professional appearance.

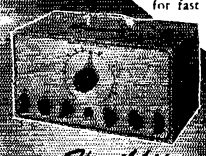
The 1952 Model Heathkit Vacuum Tube Voltmeter! Newly designed cabinet combines style and beauty with compactness. Greatly reduced size to occupy a minimum of space on your work-bench. Covers a tremendous range of measurements and is easy to use. Uses only quality components including 1% precision resistors in multiplier circuit for greatest accuracy. Simpson 200 microamp meter with easy to read scales for fast and sure readings.

All parts come right with kit, and complete instruction manual makes assembly a cinch.

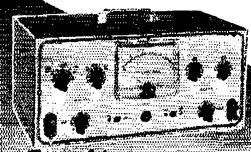
MODEL V-5

SHIPPING WT. 5 LBS.

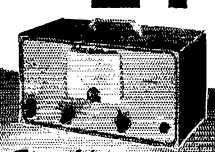
$24.50



Heathkit SQUARE WAVE GEN. KIT $29.50



Heathkit INTERMODULATION ANALYZER $39.50



Heathkit AUDIO FREQ. METER KIT $34.50

YOU SAVE BY ORDERING DIRECT FROM MANUFACTURER

EXPORT AGENT
ROCKE INTERNATIONAL CORP.
13 E. 40th ST.
NEW YORK CITY (16)
CABLE ARLAB-N.Y.

The HEATH COMPANY

. . . BENTON HARBOR 9, MICHIGAN

SEC has been appointed. TRR is Robert Weber, of Poultney. 2TWE is acting chief engineer at WHWB. MMV, NLO, MMN, ELJ, OAK, VE2HY, LYD, TDR, JLZ, QXZ, BJP, RWX, SVT, KJG, TJ, IR, RNA, and 3EEB attended the annual c.w. net picnic at Crystal Lake, Barton, Vt. QXZ has HRO-50T1 receiver. NLO and a jr. operator, TJ and XYL, OKH, QNM, AHN, GNF, and PZX attended the Portland Hamfest. The Burlington ARC treasure hunt was held Aug. 19th. Traffic: W1OAK 38 AVP 35, RNA 16.

NORTHWESTERN DIVISION

ALASKA — SCM, Josiah R. Nichols, KL7MZ — The Interior Alaskan Hamfest was held July 28th and 29th at Copper Center, Alaska. Some fish were caught and many ham-fish (?) stories told. AN did "The Face on the Barroom Floor" — not what you think, but a real good act. Mobiles present, all on 75 meters were: KL7s RE, BK, CL, AH, AN, ADA, DB, AET, ZR, RZ, UM, and MZ; also one aeronautical mobile, LV, and one aeronautical mobile almost there but weathered in KL7LJ, whose XYL, incidentally, won first prize. Following is a list of all calls present (I hope I did not miss anyone): KL7s WW, AHY, AGD, AN and XYL ZR, OA, ABN, RE, BK, SX, PQ, PJ and XYL YG, AGU, EC, AH, DB, YV, CL, RZ, ADA, LV, AET, ZM, NT, AFR, AAG, W7MED/KL7, and MZ.

IDAHO — SCM, Alan K. Ross, W7IWU — Moscow: A nice letter was received from WJT. He schedules his father (3CIQ) twice a week on 7155 kc. Aberdeen: FBD says he really has been knocking off some rare DX. He has about 110 countries but needs more QSL cards for DXCC. Any other DX men in Idaho, let's hear from you please. Boise: Our Gem State Radio Club was host to F. E. Handy at a special meeting July 30th. It was most enjoyable and informative. The new Gem Net frequency is 3638 kc. 3745 kc. remains as a slow-speed net. See July *QST*. RM for Gem Net and EC for Boise is GHT. NHO is taking over the slow-speed net. Civil defense at the state level is shaping up nicely, and all ECs have their instructions. You fellows in towns that have no EC, send your AREC membership blank to me, and if you have local c.d. officials, contact them by all means and place your names in their files. Traffic: W7GHT 74, LQU 14, BAA 10.

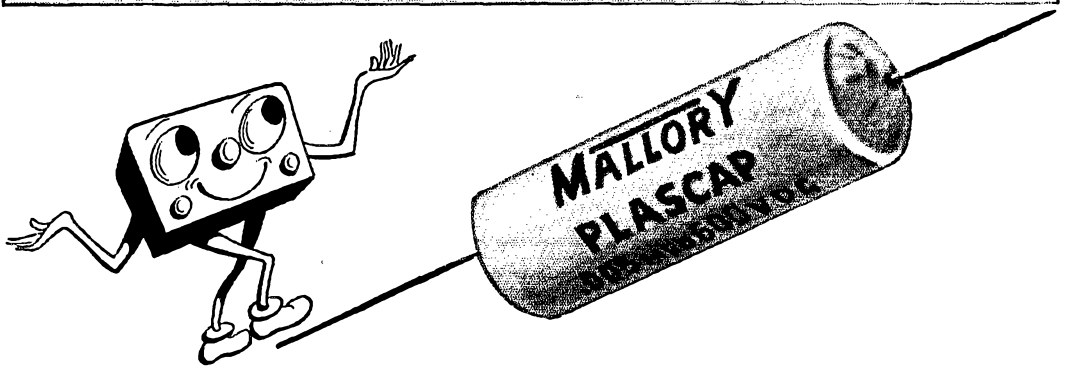
MONTANA — SCM, Edward G. Brown, W7KGJ — A few of the Montana gang were able to attend the National Convention in Seattle. CPY, CVQ, PX, BNU, FTX, FGR, and KGJ were able to make the trip. IWW and CPY took shut-in LCM to the Wyoming Hamfest held near Buffalo, Wyo. CT vacationed in his new trailer house and did some fishing in the northwestern part of the State. CPY, CT, ED, AYG, LXN, COH, OOY, NPV, and KGJ attended the hamfest at Big Springs, Idaho, about 20 miles south of West Yellowstone. The Great Falls gang was fortunate in having F. E. Handy, 1BDI, attend a meeting there August 1st. Ed Handy spoke to the gang on many interesting phases of the League and reported on the Convention activities. KGJ attended the Great Falls meeting en route from Seattle. KGF is sporting a new Pontiac. Pete has returned from a vacation trip to W8-Land. KUH vacationed in Montana and Idaho. We have no reports on the activities of the Glacier Hamfest. The Billings gang was busy setting up an amateur radio booth at the Midland Empire Fair. Traffic: W7CVQ 32, KGJ 18, NWB 10, BNU 3.

OREGON — SCM, J. E. Roden, W7MQ — NRJ, formerly of Montana, now is located in Pendleton, and has replaced PIU as radio technician for Forest Service. PON is a newly-licensed ham and works for the Pendleton Fire Dept. HDN is new SEC for Oregon, replacing HLF who has resigned because of other commitments. The Oregon gang owes Dwight a lot of thanks for being instrumental in organizing the AREC in Oregon the past several years, a fine job, well done. KVG had as his guest 1DX, from Headquarters, and after promising By a lot of good fishing had to apologize for lack of water in the streams around LaGrande but did manage to show him a few deer and elk tracks. GLK, of Ashland, is another one of Oregon's YLs to receive her Class A ticket. ADX now has completed installation of his new 10-meter beam, a real masterpiece of construction. ESJ is busy doing some rebuilding when not busy at his place of business. KL already is busy making plans for making the OARA Convention to be held at Eugene in 1952 the biggest and best State Convention ever. EX has forsaken amateur radio temporarily for the bee-raising hobby. The OEN gang reduced power during the big Army maneuvers in August and coöperated in every way possible so as not to cause any QRM, although outside of the area involved. NUR is active in OSN and RACES, as well as MARS. AJN is busy trying to keep OSN alive during the summer slump and will welcome any newcomers. Traffic: W7AIZ 174, HDN 137, II 104, MQ 87, AJN 64, BSY 63, OVO 54, HJU 26, GNJ 25, BDN 17 ADX 14, KTG 13, AHZ 11, JKU 11, MBE 6, NUR 5.

WASHINGTON — SCM, Laurence Sebring, W7CZY — SEC: KAA. RM: FIX. PAM: NRB. FRU is working on a VFO. Don, ZU, reports Don, jr., received his Tech-

(Continued on page 98)

MALLORY HAM BULLETIN



The MALLORY PLASCAP*
Can Put New Pep In Your Old Receiver!

An average communications receiver has more than 25 paper tubular capacitors in its circuit. As a result, the chance of one or more of these capacitors becoming sub-standard and reducing the over-all performance of the set is quite likely—especially if the equipment is several years old.

As a matter of fact, there are probably many communications receivers in daily amateur service which, unknown to their owners, have gradually lost new-set pep as a result of leaking, inefficient and aged paper by-pass and coupling capacitors.

Unfortunately, sub-standard or inferior paper capacitors are not always apparent as a well-defined fault in the set's operation. A gradual reduction in gain in I.F. stages over a period of time, an occasional unexplained indication of R.F. or I.F. instability, audio distortion, or sluggish and erratic signal level meter operation may be the only outward signs that important by-pass or coupling capacitors are beginning to show their age.

When these symptoms begin to appear, it is time for drastic action. To delay, invariably means serious trouble with time off the air while repairs are made.

If there is any doubt at all about a paper capacitor in your equipment, the safest thing to do is replace it with a new Mallory Plascap plastic paper tubular capacitor, for the Plascap has exactly the kind of electrical characteristics you can depend upon. Separately molded plastic cases, pre-impregnated cartridges, special Mallotrol† impregnating oil, and moisture resistant Mallocene† plastic seal assures you of uniformly high insulation resistance (IR) and stable operation over the long life of the capacitor.

The Plascap is exactly the kind of capacitor you can depend on to put your equipment back in good operating condition. Ask to see it at your Mallory Distributor. In the meantime don't forget those other fine Mallory parts carried by your Distributor. They include volume controls, rheostats, pads, wire-wound potentiometers, dry electrolytic capacitors, dry disc rectifiers, rotary, push button and lever action switches, vibrators and vibrator power supplies.

*Reg. U.S. Pat. Off.
†Trade Mark

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

P.R. MALLORY & CO. Inc.
MALLORY

nician and Novice Class licenses with the call WN7PRZ, and is using a single 807 on 80 meters with a converted Command receiver. AMZ is building kitchen cabinets. ZY went to Oregon for his vacation. ECX was busy during the Pioneer Days celebration. GJG was busy at the Convention trying to see everything. EMP has changed the final of his big rig. OPO, OO from Walla Walla, is building a kw. rig and put up an 8JK beam. The Lake Washington emergency net operates on 29 Mc. every Thursday at 7 P.M. PST. AWG/HWK is building a mobile rig. KCU reports that her YM, EQN, built a combination electronic keyer and monitor and she is trying to tame the "thing". KAA opened his own radio shop. Between research at WSC, LEN is constructing an 829B fixed station rig, 10 to 75 mobile and 5" oscilloscope. ACJ is working on mobile gear and sound on film movies. BMK works 28-Mc. 'phone and 7-Mc. c.w. CSD is using a 701A surplus tube in a kw. rig. GND spent the summer in WSC survey camp on 75-meter 'phone. IHL has a 6J6 tube on 420 Mc. JWJ has been trying out new loading coil on 75-meter mobile. KIL is working for the Geodetic Survey in Spokane. KIT spent the summer as relief operator at KIRO. LEG uses only 15 watts to a 15-foot vertical on 75-meter 'phone. LOF is building a new house. LTK, is NCS of Northwest Section MARS Net. OZY works 28-Mc. 'phone and MARS schedules. NWK was shipped to Guam and works home through MSI. KZP engineered all installations at the National Convention. LOZ was the M.C. at the ROWH Initiation. IKT and AJF are mobile with AJF VFO on three bands. PGY has a 3-over-3 beam on a telephone pole. VI is using 4-watt Collins rig on 28 Mc. while rebuilding his ART-13. GWQ is active on 28-Mc. mobile from Marysville. JOO, PED, and CZY are mobile in Everett. LVB spent his vacation collecting butterflies in the Okanogan. BX checks into WARTS from Centralia. Traffic: (July) W7CZY 644, IOQ 627, FRU 217, BA 181, FIX 131, TH 99, NRB 96, ZU 84, AWG 69, KCU 42, DRA 29, EAU 29, KIX 29, MBY 21, NWP 21, KAA 15, GAT 12, LVB 9. EVW 8, APS 4, OPO 3. (June) W7TH 204.

PACIFIC DIVISION

HAWAII — SCM, John R. Sanders, KH6RU — The Honolulu Mobile Club held another of its popular Hidden Transmitter Hunts with several valuable prizes awarded. EM, his XYL, and RU represented Hawaii at the Seattle Convention. BA visited several W6s and took in the West Coast IRE Convention. MN has completed rebuilding at his new QTH. AN is planning new 14-Mc. beam. OA made an extended trip to the Mainland. RU stirred up 144 Mc. in the Bay Area operating mobile/W6. ADY skeds QL/KC6 on Truk. *Far Pacific Area:* KG6AAD is building compact 300-watt rig and still trying for DXCC. KG6FAA now has dual operating positions from renovated and rewired station building. KG6FAB is building new 14- and 28-Mc. rotaries and modifying BC-610 for 28 Mc. JA3AC and KR6AF still report traffic totals above BPL, although the summer slump has cut into all totals. To avoid long mail delays, Far Pacific stations are urged to forward activity reports and traffic totals via radio on or about the first of each month. Traffic: (July) KG6FAA 2155, JA3AC 1710, KR6AF 902, KG6FAB 363, KH6ADY 26, (June) JA2DS 332.

NEVADA — SCM, Carroll, W. Short, jr., W7BVZ — SEC: JU. ECs: HJ, JLM, JVW, KIO, KOA, MBQ, TJY, VO, and ZT. RM: PST. OPS: JUO. Nevada State frequencies 3660, 7225, and 29,360 kc. Ed Perkins, WN7PRM, licensed in mid-July is Nevada's first Novice. Ed is on 3703 kc. from Boulder City. VR reports Elko's newest is Bob Romans, PEW. QAY is doing a swell job getting the license plate law straightened out with State officials. DVJ had nice publicity for ham radio in the 'Vegas paper from Guam traffic. MJB reports MRN is back in Reno from 'Vegas. K7NRU is on 7225 kc. NWU's Collins transmitter went haywire so Zeke is stuck on 28 Mc. until it returns from the factory. JOS and PAR, his XYL, are sure their oldest boy, Bish, will be a Novice soon. VO, JOS's OM, is on 7225 kc. TJY has separate kw. finals on 3.8 and 50 Mc. JU attended the Seattle Convention. JUO lost his beam in a windstorm. C U on 7225 kc.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — Fall activities are being planned now that the summer months are drawing to a close. Fairs are rearing their heads and participation is a must if ham radio can be justly represented, not just a message-gathering spree. Plans are under way for the annual participation of the Santa Clara County Fair by SCCARA. Welcome to WN6NEE, the first Novice who has been reported to me. Code and theory classes by QIE have helped greatly. The San Mateo County 144-Mc. net is QRL until October. CDX attended the National Convention in Seattle. JIV is going mobile on 28 Mc. ZXS and JKC are building a new QTH in Belmont. The North Peninsula Electronics Club made 485 contacts on Field Day. HC was elected president of the Central California Radio Council. CIS is working madly on narrow-minded f.m. rig. MMG is back on the air after a vacation in W1-Land. CAZ is re-

(*Continued on page 100*)

NEW!

1952 ALLIED CATALOG

COMPLETE UP-TO-DATE 212 VALUE-PACKED PAGES

YOUR COMPLETE GUIDE TO ALL THE NEWEST STATION GEAR

ALLIED gives you Every Buying Advantage

- 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

Your Buying Guide for Everything in Radio, TV and Industrial Electronics

You'll want the latest *complete* ALLIED Catalog not only to meet *all* your station needs, but to provide you with *everything in electronic supplies* — always at lowest prevailing prices. Your ALLIED Catalog brings you the largest stocks available of special tubes, parts, test instruments, audio equipment, recorders, radio and TV components. And ALLIED gives you the advantages of speedy delivery, expert personal help and low money-saving prices. Save time, effort and money — fill *all* your electronic supply needs at *dependable* ALLIED RADIO.

FREE *SEND FOR YOUR 1952 ALLIED CATALOG NOW*

Everything for the Ham

ALLIED RADIO

833 W. Jackson Blvd., Chicago 7, Illinois

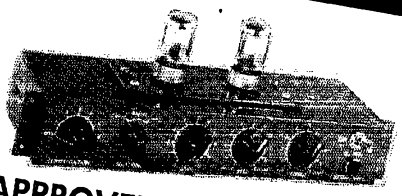
building home rig. YHM is keeping busy on the traffic nets and helping out with NCS on RN6 while JZ and others are on vacation. FBW advises that his XYL, DHV, now is a member of the Old Timers Club. NW is getting back in the swing after a lengthy lay-off. We all hope WGO will be back on his feet soon after a siege in the hospital. FTG reports that c.d. activity is going fine up Palo Alto way but he has to submit his resignation as EC for that Area. I am sorry to see this as FTG did a real good job getting the gang going. NW is new ORS. Traffic: W6BPT 263, HC 117, YHM 76, NW 20.

EAST BAY — SCM, Horace R. Greer, W6TI — Just a reminder that your new SCM, Ray H. Cornell, JZ, took over the SCM job as of Aug. 16th, so send in all your news and reports to him at 909 Curtis Street, Albany 6, Calif. Old SCMs never die or fade away they just go a little nuts in time. As this is my last report I will try to make it short and sweet. YDI was late with his report last month. DOU comes to life with a report and is playing around with radioteletype. JVE has been sent to Chicago. JZ had a good time at the Seattle Convention, making the trip with WZJO, 6JK, and RLB. NGC has received his Class A license so has been active on 3.8- and 14-Mc. 'phone. EJA reports very high noise level of late, cutting down his DX. The last meeting of the Central California Radio Council was held in Vallejo on July 11th. A good turnout was on hand and each club representive gave all the latest dope on his club. After the July 30th meeting of the SARO the Club made a trip to KGO-TV and the evening was enjoyed by all those present. The Mission Trail Net sure had a bang-up affair at Coyote over the week end of July 1st. The following officers were recommended by the nominating committee: BPT, VTS, and JZU, pres.; JZU and QZ, vice-pres.; UII and FMJ, treas.; ZQL and WSH, secy.; DUP, JDN, and KZF, Emergency Coördinator. The final results will be forthcoming shortly. IDY is becoming reinterested in ham radio. PB's finals, one for each band, glow like Christmas tree lights. Looks like a big commercial layout. BUY gets on now and then but has been rather QRL work. MHB cleaned up his shack, new floor and everything. TT was up in Wyoming catching the big ones. GIZ has a nice sock on 14 Mc. ZUI is knocking over the new contacts. NZ is enjoying his new Collins receiver. PWR is moving to the country. RM is QRL work but gets on now and then with low power. YI is chasing the hard ones on 14-Mc. 'phone. DUB is back on the air with low power in new QTH. TI now has worked 200 countries with 193 confirmed. 73 and the best of luck, gang, and thanks again for all the help. Traffic: W6JZ 618, NGC 37, EJA 10, YDI 6, TI 2.

SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone: JU 7-5561. SEC: 6NL. Phone PL 5-6457. *San Francisco Area:* EC: BYS. Asst. EC: JWF. SWP, San Francisco's most consistent traffic man, reports he is now — and I quote — "Cutting paper dolls at Globe Wireless." He is working the graveyard shift. SR, a past-president of the SFRC, has been elected president of the Northern California DX Club, succeeding ATO. WB and DMN are heard consistently working domestic and DX stations with very fine s.s.b. on 14 Mc. HJP, now signing AF7FAE from Everett, wishes contacts in San Francisco. I regret to announce that CXL recently was killed. The Emergency Corps 2-meter net is active, as well as a similar 10-meter net. It is hoped that all amateurs will operate during TV hours in order to establish what TVI, if any, they have. Then, with a little diplomacy, work, and education of the TV listeners in your immediate vicinity, it is very likely you will be able to operate without complaints. But the situation must be FACED, and not put off, for each succeeding month puts more TV sets in operation in your neighborhood. The problem should be attacked while it is small and not yet out of bounds, and then continuous watch should be kept on each new TV installation in your neighborhood, and an immediate test made with each. You will find, assuming that your transmitter is harmonic-free, that practically every case is fundamental blocking, and curable with a high-pass filter, WHICH IT IS THE TV OWNER'S RESPONSIBILITY TO PROVIDE. Note that the filter is always more effective if mounted INSIDE the set, where the twin lead enters the chassis, with the ground strap of the filter soldered directly to the chassis. THE INSTALLATION OF A FILTER INSIDE THE SET SHOULD BE DONE BY THE OWNER'S SERVICE MAN, UNDER YOUR SUPERVISION, so that no blame is directed at you if the TV set develops trouble. In the San Francisco area, ONLY Channel 4 can be interfered with by HARMONIC of 7, 14, or 28 Mc. Trouble on the two other channels is FUNDAMENTAL. A high-pass filter, such as the Drake 300 ohm, should be one of the standard tools in your tool kit, to make a preliminary check by attaching to the outside of the TV set, at the antenna convenience terminal, and grounding the case by as short a wire as possible to the chassis, or NO wire if the filter grounding lug will reach. Have on hand copies of the ARRL reprint of New York FCC Engineer Kiser's excellent article for the TV listener to read, available to ARRL members upon receipt of a request at Headquarters with sufficient postage to prepay the mail of the number of copies needed. Ray Kastl of the

(*Continued on page 102*)

APPROVED . .
but definitely!

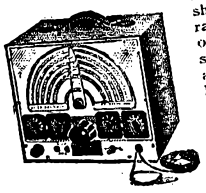


APPROVED A-800 PREAMP FOR "WILLIAMSON" AND OTHER AUDIO AMPLIFIERS

Sensational new 4-stage preamp designed for high quality amplifiers such as Williamson, Radio Craftsmen, etc. Consists of 2-stage compensated preamp for G.E. and Pickering magnetic cartridges (also Audax with slight resistor change). This is followed by 2-stage tone compensating non-resonant control circuit with 3 record equalization positions for G.E. and 3 similar positions for Pickering. Also includes: bass compensation and treble controls, and a selector switch for tuner/magnetic/crystal, plus on-off power switch and jeweled pilot! Power requirements: fil. volts 6.3V AC or DC, fil. current 6A, plate voltage 250-300V DC, plate current at 300VDC 7 ma. No power supply, but has power line cord fed into preamp chassis through a toggle switch and terminated in a power outlet, enables user to plug in main amplifier and control all equipment with a single switch. Two 7F7 dual triode tubes on a shock-mounted separate center deck to prevent microphonism. Preamp measures 12″ wide, 4″ deep, 2″ high plus tube height. The A-800 is the perfect answer to the hitherto unsatisfied need for a hi-fi "front end" for music lovers' favorite main amplifier!

33-246 Approved A-800 . . . . . **Net $37.50**

A-300 FM-TV SWEEP GENERATOR—WIRED OR KIT



Identical in appearance to Model A-200 shown above and provides frequency range of 2 to 227 mc in 3 bands of overlapping coverage — without necessity of band switching! Plus calibration and reference scales! Sweep width is 50 kc to approximately 10 mc; 10 to 1 ratio tuning controls, plus phasing control, RF output control, output selector switch, horizontal sweep output. Maximum output is 500,000 micro-volts! 12 x 10 x 8″. For 105-125 V 60 cy. Ship. wt. 25 lbs.

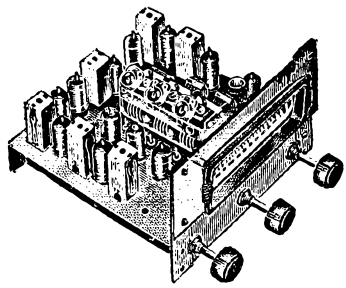
32-079 Approved A-300K, complete kit . . . . . **Net $26.95**
32-078 Approved A-300, Factory wired . . . . . **Net $43.45**

TV FIELD STRENGTH METER

Model A-460. A must for the television installation man. Antennas may now be oriented quickly and precisely for maximum signal pickup, thus reducing actual work to a one-man operation. Measures actual television station signal strength on a 6-inch indicating meter. Checks efficiency of various antenna combinations, TV receiver radiation, interfering signals, efficiency of boosters. Gray steel cabinet 12 x 10 x 8″. Power supply self contained. Complete with 6 tubes. 115 VAC 60 cy. Ship. wt. 25 lbs.

32-080 Approved A-460 . . . . . **Net $87.45**

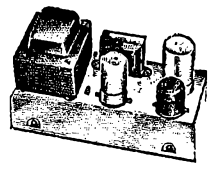
APPROVED A-710 FM-AM TUNER



Drift-free genuine Armstrong FM circuit plus standard broadcast for home music centers, to complete your amplifier-speaker-tuner installation! Both FM and AM have tuned rf stages, separate rf and i.f. channels, separate diode detector, new-type permeability-tuned i.f. transformers, and super-efficient miniature tubes throughout. FM tubes: 6AG5, 6C4, 6J6, 4—6AU6, 6AL5, AM tubes: 2—6BA6, 6BE6, 6AT6 (common to AM-FM). Easy reading horizontal slide rule dial 88-108 mc and 540-1800 kc — a vertical tuning dial is available for $2.50 extra if desired. Tuner chassis is complete with 12 miniature tubes, horizontal tuning dial, escutcheon plate and knobs, operating instructions and circuit diagram. Chassis size 8¼ W, 5⅜ H, 8 D. Net wt. 5½ lbs. Power requirements: 179 VDC 20 mils and/or 140 VDC 37 mil. 6.34. 4 amp. Important: tuner does not include power supply, therefore if you do not have one meeting these requirements, purchase Model A-620 universal power supply (listed below) which was made specifically for A-710 AM/FM tuner.

36-206 A-170 Tuner less supply . . . . . **Net $63.25**

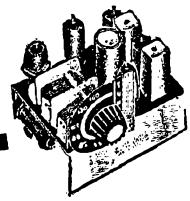
A-620 UNIVERSAL POWER SUPPLY



Made to be used in conjunction with A-710 tuner, this fine Approved Electronics supply comes complete with: electrostatically shielded hum-free power supply, cable connector plug, 7Y4 rectifier, choke filter system, completely wired and tested, plus instructions. 117 volt 60 cycle. Specifications: 6.3 V at 4 amps., 140 VDC at 37 ma, 170 VDC at 20 ma. Chassis size: 2½ W, 4⅜ H, 8 D. Net wt. 5½ lbs.

36-207 . . . . . **Net $12.05**

AM SUPERHET TUNER



Model A-600. A miniature-type tuner (540 to 1600 KC) with big unit design! Here's an easy way to add on AM radio to your P.A. system, portable amplifier, wire recorder, etc. Measures only 5 W x 4 D x 4½″ H. Self contained 115 AC power supply with approximately 10 V high impedance audio output. Permeability tuned IF transformers. Maximum output adjustable in 3 steps; 10-5-1 volts. Supplied complete with 4 tubes (6BE6, 6BA6, 6AT6, 7YA), operating instructions, circuit diagram, attached 5 ft. antenna and 2½ ft. shielded leads.

36-202 AC operation . . . . . **Net $21.95**

FREE 192-Page 1952 Catalog!

If you are not on our mailing list, write TODAY for your all-NEW 1952 mail order catalog published only a few weeks ago. It's one of the most authoritative in-stock buying guides for radio-TV parts, sets, books and tools!

NAME _____

STREET _____

TOWN _____

STATE _____

RADIO SHACK
167 Washington St., Boston 8, Mass.

SFRC is a new novice, WN6NYD. *Marin Area:* EC: KNZ. One of the newly-appointed ORS, FYJ, reports in with traffic. *Santa Rosa Area:* EC: IEN. HQN again reports with traffic. *Eureka Area:* EC: SLX. SLX was lucky enough to attend the Seattle Convention, and win a free airplane ride. SFRC meets the 4th Friday at 1641 Taraval St., S.F. HAMS meets the 2nd Friday at 1625 Van Ness Ave., S.F. Marin RAC meets the 2nd Friday at Engr. Lecture Room, Marin College, Kentfield. Tamalpias RC meets the 3rd Friday at 232 Mirimar Ave., San Rafael. Sonoma Co. RAC meets the 1st Wednesday at Grace Bros. Brewery, 2nd St., west of Freeway, Santa Rosa. Humboldt ARC meets the 2nd and 4th Fridays at YMCA Rooms, Mun. Audit., "E" St., Eureka. Traffic: W6SWP 23, FYJ 18, HQN 14, BIP 8, ATO 4.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKV — Asst. SCMs: Northern Area, 6YNM; Central Area, CKV; Southern Area, ZYV. SEC: KME. ECs: Met. Sacramento, BVK; Walnut Grove, AYZ; Dunsmuir, JDN; Mt. Shasta City, EWG; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OBS: AF, BTY. PAM: ZYV. OES: PIV, GHE. OOs: ZYV, YNM, BTY, GDO, YV. OPS: JDN. Nets: Sac. Emergency (city) AUO NCS. Sac. Valley Net, JEQ NCS. Mother Lode, UNT NCS. Tall Pine, YNM NCS. *Northern Area:* JDN is back from vacation and MTN get-together at Coyote. HRJ, of Redding, is ATT at Montgomery Creek. ZYG is home from college with four-element beam on 28 Mc. ELO has Harvey-Wells mobile. DDC is active in AREC. *Central Area:* MON is a new ham in Chico. PJV is selling out and moving to Alaska. VZK is caretaker at Corning Airport. HBM is mobile on 3.8 Mc. AF spent his vacation in Illinois. FGW has new 160-meter antenna. *Southern Area:* SUP. GHP, KKL, UNT, OXG, and ERR of the Placer Radio Club have 100 per cent c.d. communications set-up for Roseville. ASE is 28-Mc. mobile. 6ZF now is 3ZF at Washington, D. C. Traffic: W6JDN 100.

SAN JOAQUIN VALLEY — SCM, E. Howard Hale, W6FYM — SEC: FYM. ECs: BCL, CQI, EHN, FIP, GCS, HZE, JPU, and VRF. RM: GJP. ORS: HU, GJP, JQB, and LRQ. OBS: GS, EXH, GRA, OHT, and GWQ. OES: RJE and UWY. OOs: FKL and JQB. Two new appointees in the section are JQB as Official Observer, Class III and IV, and GWQ as Official Bulletin Station. HAB, of Turlock, now is in the Air Force stationed at Lackland AFB, San Antonio, Tex. LRQ reports from Bakersfield that he is the first station from this section to be on s.s.s.c. 75-meter 'phone. John Huntoon, 1LVQ, of ARRL Headquarters staff, spoke to the Stockton, Modesto, and Turlock Clubs in a combined meeting at Modesto Aug. 6th and to the Fresno Club Aug. 7th. Some faces from this section seen by your SCM at the National ARRL Convention in Seattle were QON, WJF, and FEA. SRX is moving from Fresno to Oklahoma City and VTZ is leaving for Los Angeles. Activities must certainly be low this month as only two activity reports and the Fresno Club bulletin were received. Can't write a column without the reports, gang, and I'm no mind-reader, so how about getting them to me before the 7th of each month? Traffic: W6LRQ 12, FYM 2.

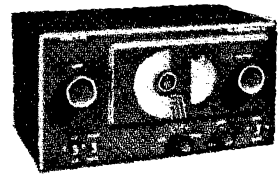
ROANOKE DIVISION

NORTH CAROLINA — Acting SCM, J. C. Geasler, W4DLX — SEC: ZG. PAMs: DLX and NAL. RM: AKC. Let's hope the summer season is the reason for low activity and few reports this month. Let me remind you again that if you fellows don't send in reports the SCM has little to use for material. This activity report is not just for ARRL members and appointees but for all hams in the State of North Carolina. The following took a very active part in the July CD Party on c.w.: AKC, BDU, DLX, OTE, REZ, and RFM. You fellows who don't get in these parties are missing a lot of fun. SVD is a new ham in Charlotte on 3.5-Mc. c.w. with a nice rig. RNA, of Raleigh, is sporting a new Advanced Class ticket. Director CVQ is burning up 6 meters with a new super-duper set-up. Where are all the v.h.f. men in N.C.? How can the boys make WAS on 6 meters if we don't get on the band? TBE is a new one at Camp Lejeune. The 80-meter c.w. band has turned up a nice group of Novices. So far the SCM has found WN4TFF, Red Scott, and his XYL, Edna Scott, WN4TFH, both in Charlotte; also WN4TES, Bill Covington, and WN4TEW, Paul Horton, in Durham. All you 'phone men who stay off c.w. because you don't want to show your poor ability to the Hot Bug Boys, get down and work the Novices. They will be proud to show your QSL cards to friends. Help the Novices along and prove to them that Point Four in the Amateurs' Code means something and is not just a bunch of words used to fill up page 8 in the '51 *Handbook*. Traffic: W4AKC 114, DLX 15, REZ 6, DGU 1.

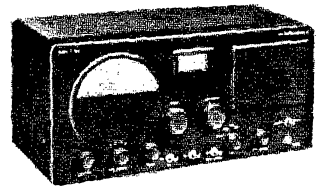
SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT — NWB, of Travelers Rest, has made WAS on 7 Mc. and also is active on 3.8 and 28 Mc. CPZ has 800 watts on 50 Mc. and has worked 42 states on that band. We wish to welcome these new Novice hams: WN4TFE, Charleston; WN4TGH, Ninety-Six; and WN4THZ, Easley. TGH will be active on 2, 11, and 80 meters and would like

(*Continued on page 104*)

if You Want **MORE** *in a Receiver*

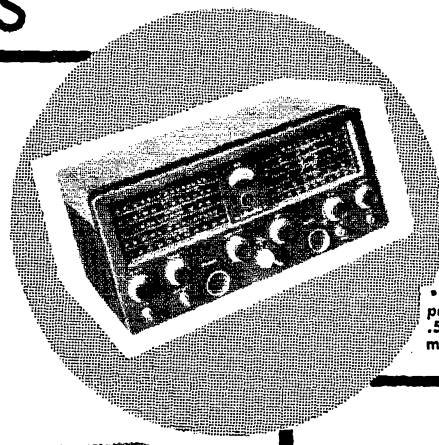


• S-38B — The ideal Ham — SWL — BCL — receiver. Beginners delight! $49.50

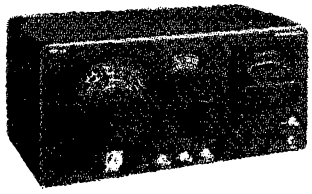


• S-40B — New version of the Hams old favorite Top Performance! Medium price!! $99.95

HARRISON HAS



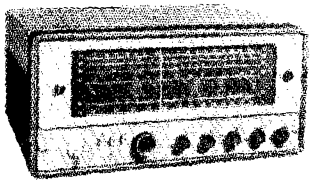
• SX-71 — Designed especially for the Ham. .538 to 35 Mc, plus 6 meter. With NBFM! $199.50



• S-76 — More new desirable features than any other set on the market, regardless of price. $169.50

hallicrafters

"The Radio Man's Radio"



• SX-62 — The finest receiver for the all-wave listener. Hi-fidelity audio! $289.50

Yes, Hallicrafters gives more. And — Harrison HAS the equipment you want. Everything for the shack but the license! Any make — any model — if it's currently available anywhere, Harrison Has It!! (But — order NOW!)

Lowest prices—Top trade-in allowance—Square deal
— Guaranteed —

HARRISON RADIO CORPORATION
225 GREENWICH STREET
(10 West Broadway, at Barclay St.)
NEW YORK 7, N. Y.

to hear from the 2-meter gang in the State. TAW is new in Charleston. ANK handled considerable Kansas emergency traffic. DCE has daily sked with JA2CW and can handle all traffic for the Far East. FFH is on 3.8 and 14 Mc. K4FBD now is on regularly from Donaldson Air Force Base in Greenville. STH is a new station on 28 Mc. in Aiken. The Greenville Club has resumed regular meetings. The Traveling Hams Club of S. C. held a meeting in Augusta, Ga., twice during the month of August. This group is made up of traveling salesmen such as DX, NJG, EDQ, AZT, etc., who find themselves in the same town regularly. GZO is new c.d. communications coördinator for the Greenville Area. The SCM would like to have reports from the Novice hams as to equipment and bands worked. Activity reports from the older fellows also would be welcome. Traffic: (July) W4ANK 238, DCE 99, FFH 36, AZT 18. (June) W4ANK 201, FFH 16, AZT 10, CPZ 6, DX 6, NWB 6.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — Members of the Virginia section radiated in abundance at the National Convention held in Seattle. Those known to have attended included some members of Potomac Valley Radio Club, viz: CC, IA, EMJ, ABY, NTZ, ESK, KJT, BFO, and KFC. Vic expanded his attendance by having field days with many hams en route by personal visits and operated in the July CD Party in Arizona as 4KFC/7. 1BUD attended the Skyline Drive Hamfest sponsored by the Shenandoah Valley Radio Club. FF and NUU have discovered after two years that they occupied almost adjacent office space in pursuit of their Pentagon duties and enjoyed a luncheon QSO in celebration. News at hand from Langley Field informs of the transfer of Sgt. Howard Riddle, SDK, to Washington Hdqtrs. Command. MAK, Jimmy Sims, takes over at K4AIR and says to count on resumption of that station in net affiliations again this fall. KYD likewise agrees to renew net activities after a lull caused by extra duties for the Navy. FV's XYL added new QRM apparatus to his busy activities as VFN heavy man by presenting him with a YL. LMY returned to North Carolina. RRA reports excellent results with 11-meter mobile. 30SM/4, former skipper of USS *Franklin D. Roosevelt*, was promoted to rear admiral and has assumed command of the Naval Air Station at Patuxent, Md. SIY installed mobile TBS-50 equipment. PAS and CVO are moving to Great Lakes Naval Station. CVO will maintain his present QTH in Virginia and continue occasional activities from there as well as 4CVO/9. KYD renewed commercial license, installed 10-meter mobile and cleaned up TVI. VFN opened on Sept. 10th using the frequency 3835 kc. VN and VSN will crash through on 3680 kc. Watch the *VN Bulletin* for specific operational data as to NCS and QTR. LW expects to join VSN with a 60-watter. Traffic: W4NUU 142, PWX 49, K4AIR 44, W4KFC 12, LK 7 FV 5.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — CFB has new 1-kw. rig on 14 Mc. with new rotary beam. PNR reports someone borrowing his call on 7 and 14 Mc. The Beckley Club appointed VPO to the State Radio Council. GRO is working on a new rig with 807s for 10 to 160 meters. CSF, QHG, ATF, CLX, AII, WDH, F8H, UYR, VCT, LGB, DMF, SHU, and CKW have all completed mobile rigs in the Charleston Area. The Stonewall Jackson Club and the MARA held a joint picnic at Lake Riley, near Weston. 2GM, Junior Barnes, formerly of Grafton, looks for West Virginia stations on 75 and 80 meters. JM visited 3SGO and was appointed publicity director for Marion County Hobby Council. MCR visited State hams while on vacation. VCA and BWD have been active on 50 Mc. with good results. GCZ operated portable from Monroe County during August. DFC visited 4ZA in Virginia while on vacation. UNS operated low-power 'phone while on a trip to Indiana. I regret to report the death of Sterling Queen, former amateur in Clarksburg. Amateurs working in the West Virginia County Contest are looking for Wirt, Pleasant, Morgan, and Jefferson Counties. Don't overlook FYD for a Wayne County contact. Traffic: W8DFC 36, CLX 1.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SEC: KHQ. Asst. EC: PGX. RMs: ZJO, LZY. KHQ reports the Colorado Springs Club is growing by leaps and bounds and that its emergency set-up takes a back seat to none. SGG also reports the same re the Colorado Springs Club. He is NCS for the Colorado Springs 10-meter mobile net. ZJO attended the National Convention in Seattle. You're right, ZJO made BPL last month and this month so he still is doing FB in the traffic-handling game. Yours truly had an FB vacation in Los Angeles and Hollywood where I met 6PKK who had been QSOed several times. He gave a good demonstration of honest-to-gosh TVI. From there we went to South Dakota where we visited GPX and several of the North Platte boys and SRX, in Yankton. 1QZ has a Gonset 3-30 in the car and it won't be too long before the transmitter will be in it to keep it company. EEI, formerly 2EEI, now is in Denver with United Airlines as a lead communications operator. SUP received his Class A license and

(Continued on page 106)

BOB HENRY, WØARA, OFFERS YOU:

LOW PRICES: I sell to you as cheap or cheaper than you can buy anywhere.

COMPLETE STOCKS: Collins, Hallicrafters, National, Hammarlund, RME, Millen, Harvey-Wells, Meissner, Gonset, Meck, Johnson, RCA, all other amateur receivers, transmitters, beams, TV, AM-FM, Polic-Alarm and Monitoradio, high fidelity amplifiers and speakers, test equipment, tubes, parts, etc. I can supply nearly any equipment shown in any catalog or advertisement and at lowest prices.

BEST TRADE-IN ALLOWANCE: Customers in all parts of the USA trade with me because I allow so much. Tell me what you have to trade and what you want. I also buy equipment.

TIME PAYMENTS: You can order anything on terms. I finance the terms myself to save you time and bother. Customers everywhere in the USA find my terms best. Write for details.

QUICK DELIVERY: Mail, phone, or wire your order. It will be shipped promptly. I can be reached nearly 24 hours a day, 7 days a week.

TEN-DAY TRIAL: Try any communications receiver ten days -- if you return it your only cost is shipping charges.

PERSONAL ATTENTION: The Butler store is run by Bob Henry, WØARA, and the Los Angeles store by Ted Henry, W6UOU. We make the deals ourselves. We finance the time payments ourselves. That way we have the lowest overhead and can do more for you. That's why YOU AND I CAN DO BUSINESS. Write, phone, or visit either store. Export orders solicited.

73.

Bob Henry
WØARA

Butler 1, Missouri
Phone: 395

HENRY RADIO STORES

11240 Olympic Blvd.
LOS ANGELES 25
BRadshaw 2-2917

"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"

is burning up 75 meters. Incidentally, his name is Dale Campbell and he calls his station the Campbell Soup Station! QCX visited in Salt Lake City and attended a club meeting and met F. E. Handy. DQO is a new ham in Brush. This makes an average of one ham for each 400 population! OPF spent vacation in California. PSB is sponsoring a club in Brush High School. SFS is busy with model airplane club. QYL is active on 160 meters. LEK is planning a mobile rig. Traffic: (July) WØZJO 979, IC 235, KHQ 28, OWP 11, QCX 9. (June) WØZJO 685.

UTAH — SCM, Leonard F. Zimmerman, W7SP — LQE reports that he has completed his new transmitter using band-pass tuning and 150 watts on all bands; he also sends us the dope on most of the Ogden gang. NXC is on with a three-band mobile. OKA received his Class A ticket and is mobile on 75 meters and is building 500 watts for the home QTH. NHQ has a 32V-2 and GO-9 conversion, clamp tube modulated, and is ready to go on 3.5, 7, and 14 Mc. GPN has a 500-watt supermodulated rig about finished and also is set to go on 144 Mc. LBY has moved to new QTH and is rebuilding. UQB operates 7- and 14-Mc. c.w. JIU has moved from Wellsville to Salt Lake. ØREF is new Ogden resident and has just received the call 7PMV. OCT has moved to Ogden and is on 75- and 40-meter c.w. He says he will sked and QSL anyone needing Utah for WAS. KSH is QRT while building a new home. NPY and OSV report new jr. operators, a boy and a girl in that order.

WYOMING — SCM, A. D. Gaddis, W7HNI — SEC: LKQ. PAM: KFV. GZG reports from Laramie attempting sked with KG6AAE. The Wyoming Hamfest at South Fork Inn was well attended and the gang voted to return there for 1952. We sincerely hope for a bigger and better 'fest for next year through more effort from all who are interested in promoting State activity. JRG needs Utah, Maine, Vermont, and Rhode Island for WAS on 6 meters. How about some report cards, fellows?

SOUTHEASTERN DIVISION

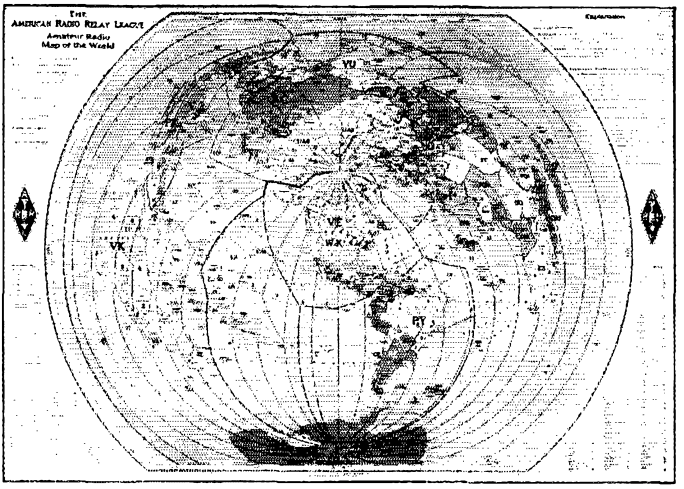
ALABAMA — SCM, Lewis Garrett, W4LEN — SEC: ISD. DXB is on 75 meters with 400 watts to Class B linear final. The Mobile Club as usual is doing a fine job handling traffic from fishing rodeo and used 2 and 6 meters from island to mainland, with 75 and 80 meters for deliveries. MI will be in Fitzsimmons General Hospital for about a year. RLG's XYL is checking into AENP. PHR is on 75 and 80 meters with 600 watts. FVT and KAC went mobile for vacation operating. FGT is planning mobile operation to Texas and back. BMM has the old signal from a new ham shack. RCE is on 75 meters from Tuscaloosa. ØACK, who has been operating K4FAG, is leaving Craig AFB and returning to Macan, Ohio. Good luck, Don. RTD is operating from New Orleans, but keeping up AENP activity. DOL, ALG, RCE, and BKN are new calls on AENP. PWS, Union Springs, is a new call on AENB. RYV and FDL, although moved from the State, are keeping up AENB activity. SUF is on 7- and 14-Mc. c.w. AUP and BCU had a fine vacation signal from Panama City. Thanks to AUP, CYC, and HFP for a fine time in the first postwar Alabama QSO Party. Traffic: W4KIX 90, HFP 27, LEN 14, DXB 5, SUF 2, ICO 1.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — A bunch of pretty certificates are adorning sundry shack walls but we don't hear their owners in the contests or see their calls in the traffic lists at the end of the column. So, suppose we jump back into the swim with a big splash this new season and support the nets and the contests. The nets are starting off again. Palmetto on 3675 kc. is opening up. The Florida 'phone net on 3940 kc. is rolling the stuff along. Probably the best public service record during the past year was run up by PJU, at Clewiston, particularly so for his relay work during the North Dakota blizzards last winter, Kansas floods this year, and in procuring rare medicine for delivery to Portugal. Thanks, PJU, for strengthening the prestige of ham radio. At this particular instant OCG, at Oakland, probably has the most number of network affiliations. Ft. Lauderdale: IM, EC for Broward, reports emergency frequencies are 7140 and 29,400 kc. with 7 mobile units. Ft. Meade: AXY put in a Harvey-Wells for mobile. Jacksonville: HWA, EEW, NMG, and IZ have plans completed for relaying outboard race positions from Jacksonville to St. Augustine. Tampa: DES is off to Boston Medical Center. Luck to you, Speedy. Lake City: IQV, our SEC, is back on the air after rebuilding burned-down home. Nice to hear you, Al. The special WxBu network will fill a long-needed service with their WX equipment furnished by the Miami WX office. Miami: The Dade Radio Club has new emergency truck with several transmitters and receivers. St. Petersburg: The new mobile emergency-powered generator is completed and it is snazzy! Traffic: W4PJU 205, RWM 28, FWZ 25, LMT 10, IM 7, IYT 4, KWA 4, AXY 3, DES 3, PNS 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — PLE is getting his emergency group well organized. PLA is enjoying mobile rig. SZH, our newest ham is giving 10 meters a fit. PTK is getting out FB with the new HT-9. PQW has an ART-13 going great guns on all bands. SAW has received orders and will be leaving us.

(Continued on page 108)

No Matter Where He Is—Work Him!



PUT UP THE RIGHT ANTENNA

AIM IT WITH THE MAP

As soon as you hear a DX station you can see exactly where he is—because the country prefixes are not just listed in the marginal index; they're printed on the countries, themselves. You can tell his direction from you, and his distance. There's no question about which continent he's in—boundaries of the six continents are plainly marked. 267 countries are clearly outlined.

The time zones are plainly marked, too. Call areas of thirteen countries are shown. Principal cities are designated. There's a scale of miles, another of kilometers. Printed on heavy map paper measuring 40" wide x 30" high, in 8 colors that really stand out, this new ARRL World Map is easily read from your operating position. 267 countries are clearly outlined.

40" x 30" 8-Color Map **$2.00**

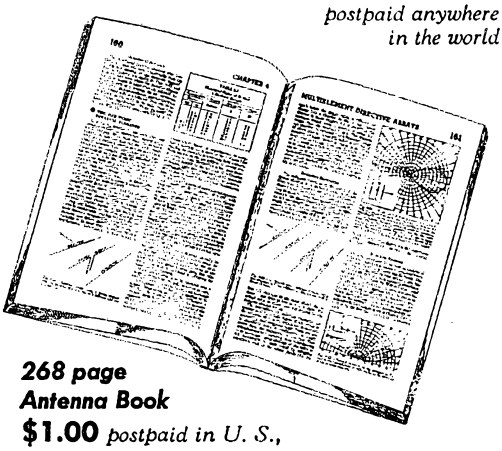
postpaid anywhere in the world

BUILD IT FROM THE ANTENNA BOOK

A good antenna will take the place of hundreds of watts of power: power of your transmitter, power of the transmitter on the other end of the QSO. It will put your signal where you want it to go and it will bring in the signal you want to hear.

The 268 page Antenna Book with its many pictures and diagrams gives full instructions on how to build the antenna you've always wanted. It gives dimensions and shows radiation patterns. It tells how to match the transmission line to it, what you can expect from it.

Whether it's a rotary beam on 20, a 160 meter job in a less-than-80-meter space, a VHF multi-element affair or some other, the antenna you are going to put up is fully described in the ARRL Antenna Book.



268 page Antenna Book

$1.00 *postpaid in U. S., U. S. possessions, Canada. $1.25 elsewhere*

All prices in this advertisement are in U. S. funds

38 LA SALLE ROAD

THE AMERICAN RADIO RELAY LEAGUE, INC.

WEST HARTFORD 7, CONNECTICUT

PAA is building all-wave antenna for 32V-2. BKQ and NJB are QRL speed boats. FHQ is heard going FB on 28 Mc. and has new HRO-50T1. TL is heard on 75 meters. JM has FB clamp-tube modulated rig on 3.8 Mc. MFY is becoming expert on frequency measurements. UC is renewing ticket. VR keeps 7 Mc. occupied. NRX is putting out FB signal on 28 Mc. NOX was heard on 14-Mc. 'phone. PRP also is awaiting orders. AXP has been ill. JBJ is being heard from again. ECT has been heard on 7 Mc. MUX is the traffic man. HJA has TV receivers at both QTHs. MS is enjoying 32V-1 purchased from 8AW. BFD still works in the wee sma' hours. CNK says kw. or nothin'. QU still grinds crystals. TL keeps 75 meters hot from Panama City.

GEORGIA — SCM, James P. Born, jr., W4ZD — HZG, our new SEC, has in process a very sound plan which will make our section as well protected and covered via radio as one could expect. The amateurs in East Point, College Park, Hapeville, Jonesboro, and Forrest Park have organized a new radio club with the following officers: EJC, pres.; ORJ, vice-pres.; EYQ, secy.; GLX, treas.; EJN act. mgr. The club meets the third Tuesday of every month at the Auditorium in Hapeville. FBH has a new 50-Mc. Wallman converter and still is leading this section with 46 states on 50 Mc. RKK has moved to Americus and is active on 3.8-Mc. 'phone. PYM is active on 144-Mc. 'phone and would like to form a net with other cities. Congratulations to K4WAR on the FB job in handling traffic from the Kansas Flood Area. The Hapeville civil defense control center, under the direction of POI, held a simulated emergency drill July 31st, with 12 mobiles and 15 fixed stations. Congratulations to POI and the Hapeville c.d. control center on the good job in connection with the c.d. test. OSE is doing an FB job as EC for Hall County and reports 100 per cent enrollment. HKA has moved to Brunswick. KXX is working on TVI elimination. Mr. George "Pup" Phillips, Atlanta Civil Defense Director, was guest speaker at the Atlanta Radio Club's August meeting and gave an interesting talk on the amateur's part in the civil defense program. Traffic: K4WAR 1263, W4ZD 39, HKA 35, BOC 29, LYG 23, FBH 22, OSE 9, MTS 7.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES. UW transferred from CAA to FCC. KV4AO has his old call, KP4BJ. KD is the first KP4 to get WAC-80 sticker. W4LA now is with CAA in San Juan. NX is the first KP4 on 50 Mc.; he has all districts except 6, 7, 9, and Ø. W4LVV operated as FG7XA while at Guadeloupe and advises the call is permanently assigned to a native. DJ installed Gonset 3–30 in his car. CK and CU are active on 75-meter mobile. DV has kw. on 14 Mc. and installed 2-kw. emergency power plant. ID, at R. C. headquarters, has new microphone. W4KKD/KP4 keeps in touch with home at Miami using miniature receiver/transmitter. The 3925-kc. net meets daily 5:30 P.M. to 10 P.M. W2JYH's XYL is visiting all KP4s they worked from N.Y.C. Alicia, CL, is pushing a bill for amateur license plates. ES has kw. on 3925 kc. and a new 'phone-patch. BI and BQ are active on 3925 kc. IF meets the 3925-kc. net via MARS station FAA at Ramey AFB. CP is putting up 60-foot poles. The PRARC mobile Field Day contest was won by CK mobile and CC fixed. Traffic: KP4DJ 10, DV 5.

CANAL ZONE — SCM, Everett Kimmel, KZ5AW — Canal Zone amateurs, with deep regret, record the name of Lee R. Holt, KZ5LH, in the list of Silent Keyes. BL retired from service and will make his home in New England, spending his leisure days operating W1SYR. AK also has retired and is building an antenna farm in Arkansas. Both were voted life-time memberships in CZARA. With smiles and cigars MD is celebrating the arrival of a harmonic, a future YL operator. Congratulations to WZ on his straight-from-the-shoulder essay on key clicks in the current *CZARA Bulletin*. AU heads a committee to acquire a suitable emergency power unit for CZARA. New calls: CB, FI, IF, LT PM, and VE. AC6s AW, FJ, JD, and WA will get a lick at 20,994 kc. in reorganized MARS drills. NM, PC, and WA will act as NCS.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Samuel A. Greenlee, W6ESR — SEC: KSX. RMs: CMN, DDE, FYW, LDR. Plenty of activity this month, despite the summer slump. "Pat-on-the-Back" department goes to the traffic men. Whether 'phone or c.w., these men are giving everything they have to the cause of humanity, and to raise the amateur ever higher in the esteem of our fellowman. KYV, GYH, DDE, HOV, UHY, GEB, MVF and BHG made BPL. QIW reports that BTZ has worked eleven countries in one month with 12 watts. KMS fell off his chair when a "G" answered his 10-watt CQ; both on 14-Mc. c.w. 4SRH/6 at Camp Cook, Mars station, now is 6WAL running a kw. on all bands. CK has so many schedules we wonder when he finds time to eat. UHY is temporarily QRX (working hours). It looks like NAZ is picking up her traffic schedules again. LSO and FE are set up with 'phone patches. FYW's first report as prexy of the Paso Robles Radio Club says they plan a display of gear and a station at the County Fair in August and will handle traffic; the Club station, ZOJ, is set up for emergency operation; and that YCZ

(Continued on page 110)


Meissner
TRU SONIC
Victoreen
American Beauty
CLAROSTAT
hallicrafters
Eimac
TUBES
THORDARSON
Jensen
AMPHENOL
Utah
RCA
distributors
are known
by the products
they handle
CRL
Mueller
UTC
Rauland
national
Belden
AEROVOX
CORNELL-DUBILIER
CAPACITORS
SPRAGUE
GARRARD
RAYTHEON
STANCOR
ERIE
PAR METAL
ELECTRONIC HOUSINGS
MALLORY
TRIPLETT
Vector
ADVANCE
RELAYS
OHMITE
IRC
Simpson
FEDERAL
TELEPHONE & RADIO
FTR
B&W
EVEREADY
ASTATIC
WESTON
JOHNSON
alliance
ALTEC
LANSING CORPORATION
Pickering
PRECISION
ALPHA
KRAEUTER
BUD
SWITCHCRAFT
Bliley
CRYSTALS
GREENLEE
WELLER
ELECTRIC CORP.
3M
COMPANY
SHURE
SANGAMO
Electro-Voice
BURGESS
HICKOK
TERMINAL
RADIO CORPORATION
Distributors of Radio & Electronic Equipment
85 CORTLANDT STREET
NEW YORK 7, N. Y. Phone: WOrth 4-3311

made Class A. BHG has a new 75-A. CKO traded in his call for K6EA (he is ex-ØEA). That T9 signal of DTY comes from a 6L6! HLZ is kept hopping with traffic and writing for the *Blazer*, magazine of the Mission Trail Net. BLY says the Radio 50 Club #2 handles all Whittier c.d. communications. YVJ QSOs VK3 on 7 Mc. the hard way, with 30 watts. IOX is resuming his net contacts. TDW reports: FNG has nice clamp-tube modulation; Mr. and Mrs. FPQ had a picnic for 40 of the "Old Goats Net" at his QTH, the Point Loma Lighthouse; "Fish Net" members held an outing in the High Sierras; and the Golden State Emergency Net now is on 3.5 and 144 Mc. According to HOV the American Legion Net (3975 kc.) is organizing a slow-speed c.w. net on 3775 kc. Did you ever listen to DDE handle traffic — at 45 per? Wow! EBK now has 275 watts, 'phone and c.w. KYV is most unhappy about one of his "JA" schedules. It seems the "feller" only gave him 827 messages this month! COZ writes that GAE has new HT-9 and HUS is mobile on 3.5 Mc. LDR is rebuilding. MVF says 100 watts plus poor QTH calls for higher power pronto. CEE is new proxy of the YL Club of L.A. Other officers: AVF, ex-VE3QL, KER, UHA, QOG, WSV, NZP, and YZU. YLs contact AVF, the secretary, regarding this live outfit. AREC notes per KSX, the SEC: The annual picnic of the Centinella Valley AREC at Zuma Beach was a huge success. The Long Beach Emergency Net lost a fine EC because of work-load but VMW, the new EC, is doing a bang-up job with that fine net. Already one of the largest, the Val-Area Net has gained 65 per cent membership under VCU. AREC is credited with a new Novice licensee; Vance Graham, "emcee" at the L.A. Home Show, was so impressed with the job the boys did at the Show that now he is one of us. The section is mighty proud, suh, of its more than 700 AREC members. The SCN (3650 kc.) wants more outlets. Contact LDR, the RM. Your SCM attended the SE and Citrus Belt Radio Clubs — both are recommended for a fine evening. Thanks also to BUK, FZO, GET, LKF, MU, and OIW for reports. Traffic: W6KYV 2728, GYH 834, *DDE* 654, *UHY* 623, GEB 231, MVF 188, HOV 183, DBY 164, BHG 111, LDR 60, CK 43, BLY 41, LSO 39, VG 38, NAZ 26, HLZ 25, FE 11, KSX 11, COZ 7, AM 6, TDW 6, CMN 4, FMG 3, ZOJ 3, DTY 2, KOY 2, LKF 2, OHX 2, YVJ 2.

ARIZONA — SCM, Jim Kennedy, W7MID — New calls on 75 meters are KUJ and OQS, Ajo; RMB, Tucson; MHE and UDI, Phoenix. New Class As are OZM and KUJ. A new call from Fort Huachuca is PFM. LSK took in the Seattle Convention. LUK left for Denver after one July night in Phoenix. OYJ is in Massachusetts in the Navy and Arizona loses an ardent traffic man. PKU and PMD are heard with FB signals from Tucson, with 15 watts on 7 Mc. PZ reports his total is up to 81 countries. JGZ has revived the 3515-kc. c.w. net (AZN) and would like for any and all of you to meet with him any week night at 2000 MST. Traffic is on the upswing in Arizona as our airfields are reactivated and we need an active c.w. net. This is it! MLL is sending code practice on 75 meters. PLM has a new SX-71. PLX is on 3.5 and 7 Mc. from Snowflake. QAP, JGZ, PUM, NDJ, and MID were heard in the July CD Party. LLO has a rig at his Mt. Lemon cabin for week-end operation on 28 Mc. TCQ has a new 150-watt rig on 14 and 28 Mc. UPF has 750 watts on 14 Mc. and reports lots of DX. I had a pleasant visit with Vic Clark, 4KFC, as he stopped over night en route to the West Coast. Vic is a former Arizona SCM and he asked to be remembered to everyone. Traffic: K7FAG 989, NRZ 71, W7JGZ 28.

SAN DIEGO — SCM, Ellen White, W6YYM — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN; Thomas H. Wells, 6EWU. SEC: NBJ. RM: IZG. ECs: DEY and VJQ. ELQ has handed the reins of the RM job to IZG for a rest, after splendid coöperation managing SSN. He highly recommends IZG to the c.w. post. AREC activities in San Diego County are keeping up well despite the usual summer toll of activity. AREC check-ins in Orange County are maintaining good averages. The ARRL Open Meeting held on the 10th of August in San Diego drew over 85 hams. A fine time was had by all with the section well represented. BAM had a rough month with QRN and poor conditions but managed to total 1005 for BPL once again. Latest ORS, GTC, is digging right in on SSN. ERZ is starting on a half-gallon rig, strictly from scratch. GTC reports the following: His cousin, Bill, 14, the son of ZOM, now is WN6MWN. The neighbor next door to GTC now is MGT and is active on 7 Mc. HDN is starting to knock off some DX with his new ten-meter beam. YLRL activity is spurting ahead, lead by the YLRL president, Ruth, JKE. ZSA came home lucky from the Seattle Convention and promptly won a door prize at the ARRL meeting in San Diego. Any ham in the section desiring information on appointments is urged to contact me. Traffic: (July) W6BAM 1005, ELQ 153, IZG 77. (June) W6ELQ 121.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, W5BKH — Asst. SCM, Joe G. Buch, 5CDU. SEC: AAO. RMs: GZU, LSN. PAM: IWQ. Appointments were

(*Continued on page 112*)

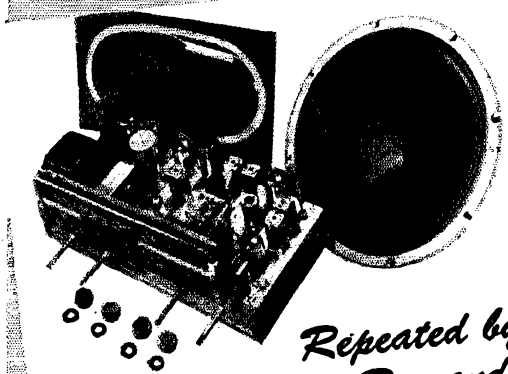
THERE IS NOW ONLY ONE NEWARK ELECTRIC CO.

and it is located at 323 W. MADISON ST., CHICAGO, ILL.

Still Supplying the Finest in Radio, TV and Electronics Promptly From Stock . . . At the Lowest Possible Prices!

We Have No Branch Offices or Stores

Save ON THESE AMATEUR VALUES



Repeated by Popular Demand

NEWARK'S FM-AM RECEIVER

Hi-fi FM-AM chassis featuring push-pull audio output. FM circuit is drift-compensated. Has full range bass-treble tone control and phono jack with built-in preamp for magnetic pickups. Chassis is complete with 12" PM speaker, built-in AM and FM antennas, 12 tubes (including rectifier), all hardware, and escutcheon. Size, 13½x9x9". Wt., 20 lbs.

96G034. SPECIAL PRICE..... $69.50

G. E. TRANSMITTING CAPACITORS

While they last, Newark is offering these top-quality Pyranol-filled transmitting capacitors at less than manufacturer's cost! Conservatively rated at 1 mfd, 5000 volts. Porcelain insulators. Hermetically sealed in metal case, 3¾x4¼x4½". Complete with mounting brackets. All brand new units. Shpg. wt., 7 lbs.

54G004. SPECIAL PRICE..... $6.95

HI-FI OUTPUT TRANSFORMERS

Save on these 50-watt output transformers — they're terrific values at the sensational low price of $2.45! Match push-pull parallel or push-pull 6L6, 6V6, 807, and other tubes to 4, 8, 16 ohm voice coil; also 60 and 250 ohm line. Range: 30 to 50,000 cps. For use in high-powered PA amplifiers. 4000 ohms primary, P to P. Case, 4½ x 3⅞" dia. Shpg. wt., 7 lbs.

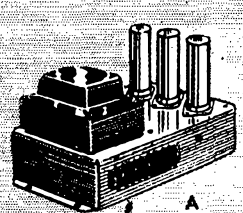
54G101. Special Price..... $2.45

Multi-Filament Transformer. Has six CT secondaries: (3) 6.4 V @ 8A; (2) 6 V @ 2.5A; (1) 2.6 V @ 10A. Size, 4¼x5x5¼". Shpg. wt., 14 lbs.
54G100. Special Price..... $3.29

Filter Choke. 6.5 hy @ 230 ma. 3000 volts insulation. Size, 5x7½". Shpg. wt., 23 lbs.
54G102. Special Price..... $2.95

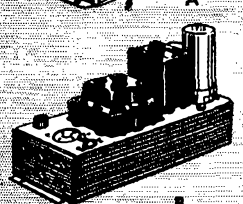
Filter Choke. 4.2 hy @ 300 ma. 78 ohms. 2500 volts insulation. Size, 4½x3½" dia. Wt., 9 lbs.
54G103. Special Price..... $2.49

RCA WIRED POWER SUPPLIES



A

Fig. A. For 110 volts, 60 cycles. Delivers 250 V @ 50 ma, 100 V @ 15 ma, 6.3 V @ 2.5 amps and −24 V bias. Hum level 94 db below 250 V and 57 db below 100 V. Chassis, 4¾x8x2". Less 5Y3 rect. Wt., 8 lbs.
54G400. ..... 6.95



B

Fig. B. Output: 250-300 V @ 2-8 ma. or 280-320 V @ 8-16 ma. Filament: 6.0-6.3 V, adjustable @ 1.5 A. Hum level 90 db below 300 V @ 10 ma. Size, 3½ x 10¼ x 6". Less 80 rectifier. Wt., 6 lbs.
54G401. ..... 4.95

Send for NEWARK'S 160 PAGE FREE CATALOG

The New Electronics Reference Book!

for

AMATEURS • INDUSTRIAL USERS

NEWARK ELECTRIC COMPANY

323 W. MADISON ST. • CHICAGO 6, ILLINOIS

made to QHR as EC and RHP as OPS. The NETEN has elected LEZ and VIM as NCS and alternate, respectively. Considerable Kansas flood emergency traffic was handled by the Tex/Ok traffic net, which is made up largely from members of the several emergency nets. This traffic net automatically reverts to a fast-operating emergency net on call and is available every day. If you have trouble, call in on 3960 kc. and a circuit will be established. Welcome to Pampa ARC, recently organized, with IWQ pres.; IJQ, trustee; SIN, custodian; and HGF, program director. ETARC has elected new officers as follows: LZU, QQU, and RHP, president, vice-president, and secretary. The Big Spring ARC held a watermelon feast. AWT has run his DX score to 104 countries. A one-family round table on 75 meters with ACU, JUN, JQD, and PTK leads the way in that line. Can any family group beat four of a kind? SWK should meet SQW and start a new elite ham club for the blind. ROH celebrated the arrival of a son by radio dispatch. OBE was transferred to Bell Telephone Labs. IJC has radioteletype receiving equipment in operation and soon will have transmitter. Traffic: W5BKH 338, GZU 200, RHC 198, ARK 154, KRZ 137, CVW 108, IWQ 95, AWT 68, EBW 68, LEZ 65, QHI 63, RHP 40, SGR 27, HBD 23, VIM 6, POG 3.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM, RM: FOG, PAMs: (160-80-20) GZK; (11 meters and higher) ATJ. Floods in Kansas, Missouri, and Oklahoma resulted in communications emergency in which a number of Oklahoma amateurs participated. In addition to monitoring and policing net frequencies of neighboring states and clearing traffic from the flood area, our own flood problems at Miami resulted in active participation. RFD moved into Miami before the situation became critical and established communication with OPEN. ATB and BCO flew their own planes the following day with OEH, GPD, OK, and PSR as relief operators. Mobiles MQV, BBS, JBX, JJR, and NLB went to the flood area, and with PHH and JML operating walkie-talkies provided excellent communications for the disaster officials. Fixed stations of OPEN and others participated in this action, providing needed outlets and guarding net frequency. MGH was of particular assistance as relay station when the going was rough. Joplin, Mo., came to our assistance with a self-powered portable station for Wyandotte which had only one shaky telephone circuit left. Thanks for the fine cooperation of ØIHK, PKI, CAB, EIK, WIY, UZJ, and QJP. We appreciate also the service of the Kansas Net stations that provided stand-by service for the flood control center at Tulsa. PA organized the set-up which may develop into a permanent stand-by service. SWM is a new one in Oklahoma City. Oklahoma County AREC had a hamfest with some 20 mobiles present, including 7LFZ and ØBSD. Correction: TCQ lost his new Packard by fire, not MFX, as reported in September *QST*. Traffic: W5GZK 555, MRK 505, AHT 218, FOG 144, OQD 123, FOM 110, JHA 50, EHC 38, MFX 35, MQI 33, RIT 8.

SOUTHERN TEXAS — SCM, Dr. C. Fermaglich, W5FJF — The annual HARC Hamfest was a huge success. NKM is with General Electric in Richland, Wash., and will be looking for the old gang on 3.5, 3.8, and 7 Mc. ACL reports that KR6GR/W5PVJ says that he is moving on to where he *can't* get a ham ticket. AQE, new EC for Kermit, reports poor conditions and QRN has limited activity on the nets this month. QOF would like to see more activity in c.w.-c.d. in Southern Texas. PWO has moved from Beaumont to Albuquerque, N. M., and is with AEC. MN works Hit and Bounce Net on 7155 kc. and has a regular schedule with PTV. PY is organizing San Antonio Emergency Net (SAEN) to operate on 144 Mc. in conjunction with civil defense. RAL is NCS and RMP is ANCS. RAL and RMP have been appointed Asst. ECs. PY is active in STEN, SAEN, and Tex. State Guard Radio Net, which recently had a very fine meeting of communications officers in Houston. SLX moved to Beaumont and will be on from U. of Tex. this fall. NIY is keeping up with ham activity through skeds. NHB has been vacationing in Bandera and reports TOM Net is growing. VL has been appointed Assistant Director. The SARC, at the suggestion of EYB, is planning a contest to stimulate 2-meter activity. PY, RAL, and UB are planning it. PTR made A-1 Operator Club. RMP is organizing 10-meter net. RAL is acting as NCS. BE is back on the air using an all-band "V" beam. GKI and LFM are back from J-Land. FMG has completed sixteen-element 2-meter array. UB is building a 4-over-4 for 2 meters. IPT reports as follows: TARC had FB Field Day with AMK, PYC, QGD, RHU, IPT JIB, LFW, LM, MTE, and PNP participating. PYC will be a DL4 soon. LFW is on 75 meters. QOT is working DX on 14 Mc. CDY, KWX, NH, DUQ, QHZ, and QFB were visiting participants on Field Day. RHU now has Advanced Class license and is mobile on 75 meters. QCE once more is active. PNP and RFG vacationed in Colorado. IPT has new jr. operator. OJD now is active from the hospital on 7 Mc. PTV is handling lots of traffic on Hit and Bounce. RN5, and STX. APP is a full member of AREC. JRV is new Official Mobile Unit on 75. PTV reports lots of good activity on 50 Mc. this month. Traffic: W5PTV 417, MN 387, QDX 143, RIH 123, QFA 78, JRV 56,

(Continued on page 114)

HARVEY HAS THE GEAR YOU WANT!

IN STOCK

FOR IMMEDIATE DELIVERY

The NEW SLUG-TUNED mallard

mobile converter for 10, 20 and 75 meters

Attractive! Sturdy! Efficient!

A sensitive converter that's as stable as a rock! Has plenty of band spread with accurate calibration on a large, well-illuminated dial scale.

Features slug-tuned coil design plus other new advancements.

Installation is a breeze! Only three connections . . . all plug-in!

***the* mallard**

10 / 20 / 75 — $39.95 (Amateur Net)

IMMEDIATE DELIVERY

All brands of mobile antennas and mounts.

CHICAGO TRIAD

Transformers for all applications IN STOCK

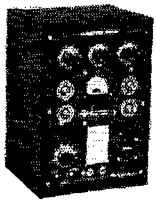
VISIT HARVEY'S AUDIO-TORIUM — Come in and visit our new Sound Department... all these items and many more on working display at all times.

HARVEY-WELLS XMTRS

. . . have everything from 2 to 80 meters, for fixed or mobile operation.

H-W is the transmitter you will use for years. Best for Hams, Business Organizations, Government Departments, Emergency Services and Civilian Defense.

2 BANDMASTER MODELS



Senior $111.50
DeLuxe $137.50

BANDMASTER POWER SUPPLIES

APS-50 for 110 A.C., $39.50

DPS-50 for 6 or 12 V. 6V .....$87.50, 12V $54.50

SUPERIOR POWERSTATS

Smooth, efficient voltage control, 0-135 volts output from 115 volt AC line. Models also for 230 volt input. Write for free literature. Models for table and panel mounting.

Type 20, 3 amp.....$12.50
116, 7.5 amps, table mtg..... 23.00
116U, 7.5 amps, panel mtg... 18.00
1126, 15 amps..... 46.00
1156, 45 amps.....118.00

New—ELDICO—2 Meter XMITTER-RECEIVER

VHF superhet for amateur, civilian defense and CAP . . . mobile or fixed station operation. 144-150 mc. 10 tubes. Sensitive, stable, selective. Vernier tuning.

TRANSMITTER — Crystal controlled, 144-150 mc. 7 standard tubes. Coax connectors. Uses any power supply providing 300 v. at 200 ma. Screwdriver adjusted tuning controls.

Metal cabinets, in baked hammertone enamel, 5½ x 9½ x 5½ in., with universal mounting flanges.

Receiver, in kit form, net $59.95
Receiver, wired and tested, net 94.95
For external local oscillator, add $5.00 to above.
Transmitter, in kit form, net $49.95
Transmitter, wired and tested, net 74.95

Prices are less power supply & speaker

WRITE for catalog describing the complete line of ELDICO equipment, also the popular TVI Manual.

Telephone: LUxemburg 2-1500

HARVEY RADIO COMPANY, INC.

103 West 43rd St., New York 18, N. Y.

HARVEY delivers these famous Emergency Receivers Immediately!

High quality emergency band FM receivers for application. ANYWHERE you are you can HEAR police calls, fire alarms, bus dispatchers, railroad communication, ships at sea, etc.

POLICE ALARM

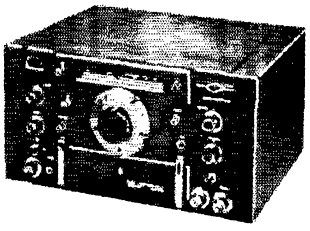
Mobile FM Receiver 152

Model M-101 covers 152 mc to 162 mc Band $72.50
Model M-51 covers 30 to 50 mc's.

MONITORADIO

For Home or Fixed Location

Model PR-31 for 30 to 50 mc band . . . $44.95 complete.
Model PR-8 for 152 to 162 mc band . . . $44.95, complete with 14" whip indoor antenna.



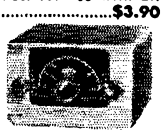
NATIONAL HRO-50T1

All the world-famous, time-tested HRO features plus the highest degree of skirt selectivity ever achieved in a general communications receiver!

(less speaker) $383.50

Gonset Converters

3-30 Gonset Converter; 10-11 Gonset Converter; 20 Meter Gonset Converter; 75 Meter Gonset Converter. Shipping weight each, 4½ lbs.....$44.75
Gonset Tri-Band Converter.....$47.60
Model B Noise Clipper.....$9.25
Universal Steering Post for use with all Gonset Converters $3.90



NEW GONSET TWO-METER CONVERTER; superheterodyne... same size and appearance as Tri-Band Converter and FM Tuner. $44.50

NEW GONSET FM COMMUNICATIONS TUNER; for all 2-way FM radio telephone communications; 30-40 mc; 40-50 mc; 88-108 mc; 152-162 mc. $59.50 net. (Other frequency ranges available on special order.)

DeLuxe Model (separate squelch tube, pilot light switch).....$69.50 net

NOTE: In view of the rapidly changing price situation in both complete units and components we wish to emphasize that all prices are subject to change without notice, and are Net, F.O.B., N.Y.C.

QEM 42, PY 30, ONG 22, ABQ 11, FIW 10, QOF 7, AQE 6, BCN 6, ACL 4, IPT 2.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — Acting SCM, Richard J. Matthias, W5BIW. SEC: PLK. PAM: BIW. PAM v.h.f.: FAG. RM: NKG. ZU represented New Mexico as Acting SCM at the Convention in Austin. The 75-meter net is on three times per week; 7 A.M. Sun., 6 P.M. Tues. and Thurs. The New Mexico c.w. net is on 7176/7175 kc. 7:00 P.M. MST Mon. through Fri. RMJ is on Saturday and Sunday too. The New Mexico Mars Net is curtailed to one day per week for the duration of the summer. An award for outstanding v.h.f. man in the State has been announced by the Director for outstanding performance during 1951 on any amateur frequencies from 144 Mc. up. An individual placque award will be made to the high man in each state in the West Gulf Division (New Mexico, Texas, Oklahoma). Special QSLs will be sent to all who report to Hams Associated, Tijeras, New Mex., sponsors of the free-flight balloon test which was announced on ARRL Official Bulletin Nr. 304. FAG ran a special schedule of tests for v.h.f. until Sept. 15th. The Sandia Base Club heard a talk by SDW, Lt. R. L. Warren, USN, on the subject of "Radiological Survey Instruments," on July 23rd. The Los Alamos Club reported that a severe radio blackout marked the opening of the Field Day contest hours on June 23rd. The Mesilla Valley Club's new call is SRW. RFO resigned as secretary and the newly-elected secretary is SBG. At the Club's Aug. 9th meeting an interesting talk was given by SAZ on "Helical Beam Antennas." Traffic: W5RMJ 274, NKG 55, ZU 20, SU 2.

CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ. FQ says the new crews at the D.O.T. stations in VE8-Land are appearing on the 14-Mc. band. We have heard 8TL and 2UW on with good 'phone signals. The second c.d. practice test run was made in the Halifax-Dartmouth Area by the HARC committee and, making use of the two Club lighting plants as well as all available mobiles, was completely "emergency-powered." More gear and operators are needed for future runs of this nature. We note that RP's daughter is the first WREN to join up in Canada. A nice report was received from East Coast Sigs. R.A.C. via VW who, in addition to handling a bit of traffic, has added two new countries to his list — VQ4 and CR4. AW and PT have joined our list of 3.8-Mc. mobile stations. HC has acquired another TA-12 transmitter. Increased traffic totals in the Cape Breton Area are due to the AFARS mobile booth operated in North Sydney during Old Home Week and to the two mobile transmitters at the Championship Snipe Races July 26th to 28th. OM handles the usual bunch. Traffic: VE1AAL 265, AAK 239, MK 223, HY 180, FQ 173, DS 170, ABF 132, TO 52, JS 30, OM 27, ZM 20, VW 8, AB 6, XII 6.

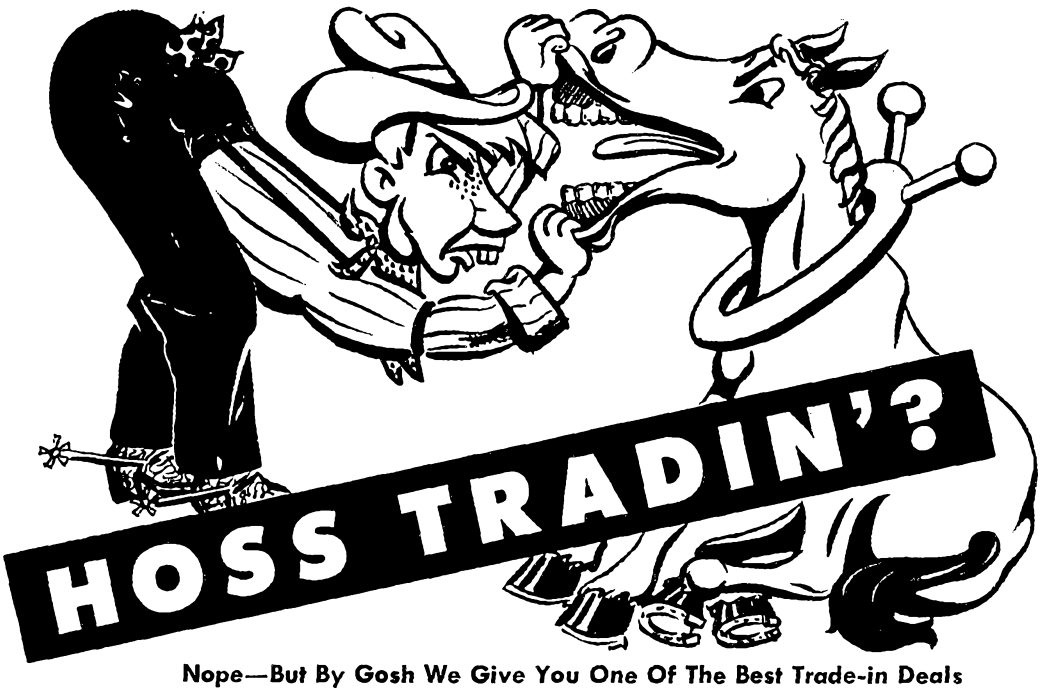
ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — July — the month of vacations, floods, picnics, hamfest and visiting. GI vacationed in the Northland. YR, with mobile, went to Maritimes. EAM obeys orders and takes no rig on holidays. W9ZYP visited BVR and IA. ATR made the front page of the local newspaper on his fine coöperation in Kansas Flood traffic handling. IA handled flood traffic and again makes BPL. AX, chief controller AFARS gives timely message to all hams in an editorial in the June issue of AFARS *Affairs*. Something novel in the way of picnics in southern Ontario was the one held by some 33 mobiles recently. With an estimated attendance of 150 people the gas-buggy boys journeyed to Kinsey Beach on Lake Erie. W9DWF enjoyed VE hospitality there. Swimming, QSO contests, and eats were the highlights. The first of what was voted an annual affair looks like a "must" for next year. Emergency power was used to operate portable station to direct the cars to the site. DEG, getting a break on the opening on ten meters, worked W4HTR from his car. ABP is in new house at Albion Falls. AYW, WE, and BPE are rebuilding. QT took to the farm in Orangeville for two weeks. AXS is on 14 Mc. AHO was plenty busy during jelly-making session. OJ enjoys 75-meter mobile during summer lull. AVS has a swell time in the CD Party: TX is very active in nets. BKR and BEX, Gord and Vi, visit PH. To AYW we extend our sincere sympathy on the recent passing away of his father. Thanks for reports again, gang. Traffic: (July) VE3IA 546, ATR 130, TX 56, AHO 48, APS 43, BUR 41, BNQ 39, EAM 28, WE 24, AYW 19, YJ 18, PH 8, GI 3. (June) VE3BMG 70, VD 7.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — RA has changed QTH from Chicoutimi to Marieville and was on the air from new location ten days after moving. AHK has a pair of RK39s on 75-meter 'phone from Sorel with antenna about 12 ft. above ground and gets out well.

(Continued on page 116)



Nope—But By Gosh We Give You One Of The Best Trade-in Deals on Used Communication Equipment in The Business For New . . .

hallicrafters

RECEIVERS

New HALLICRAFTERS S-76
Shpg. wt. 44 lbs.
Only $169.50 (Less speaker)

All prices F. O. B. St. Louis • Phone: CHestnut 1125

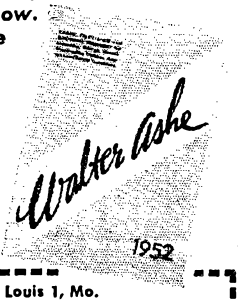
A COMPLETE SERVICE

Our 4-story building is stocked with everything in Radio, Electronics, Parts and Supplies for Industry—Schools —Gov't. Agencies and Research Laboratories.

So trade used (factory-built) equipment now. Wire, write, phone or use the handy coupon today!

FREE CATALOG!

164 value-crammed pages of everything in Radio, Electronics and Television. The "treasure chest" of values.



Walter Ashe RADIO CO.
THE HOUSE OF "SURPRISE" TRADE-INS
1125 PINE ST. • ST. LOUIS 1, MO.

Walter Ashe Radio Co., 1125 Pine St., St. Louis 1, Mo.
☐ *Rush "surprise" Trade-in-offer on my used*_____
(State make and and model no.)
for _____
(List new Hallicrafters equipment desired) 0-10-81
☐ Rush Free Copy new 1952 Catalog.
NAME_____ ADDRESS_____
CITY_____ Zone_____ STATE_____

DH, in Greenfield Park, has a pair of 810s modulated with TZ40s on 75-meter 'phone. AFI is building new 2-meter rig using clamp tube modulation. ANR, in Eastern Townships, has 807 clamp tube modulated. HI, HY, XO, AFV, and TA attended the Portland Hamfest, with HY winning the foot-sending contest. QN sends a nice report. He skeds QEN, AFARS, and South Shore Nets. He reports that last Field Day ten new members joined Quebec and district Emergency Corps. EC reports things quiet during the summer in St. Maurice Valley; he is maintaining skeds with AEM, OD, and AOB daily. AO reports that API, in Joliette, has a class of five embryo hams who should be ripe for exams in September. CA reports his far north skeds changing with the boys up there being relieved, but he still handles some traffic for them. ACM already is planning next year's Field Day activities! NT gets on 14-Mc. c.w. occasionally from his QTH on lake shore. NJ reports 28 Mc. opening up and some nice QSOs again. OS and EX are looking over the mobile situation to see what band to activate. By the time this appears PQN will be getting in shape for fall activities. Just a reminder, let's hear you in on 3570 kc. at 7 P.M. Traffic: VE2AO 47, CA 47, QN 13, EC 10, GL 5.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — MB has been attending summer school and plans a trip to Ottawa in connection with rifle-shooting competition. EO reports he is extremely busy with his regular work and has little time for ham radio. Our PAM, OD, says gardening and hail storms have cut his activity to a minimum. HM has been batching for a time. His XYL made a trip to Halifax. HI has taken a job with local broadcasting station. LQ is planning a trip to W-Land. MJ and his XYL had a real enjoyable trip to Saskatchewan Hamfest. EH, WS, and EA attended the National Convention in Seattle. TH, IX, HB, HC, and the gang on the Coronation Area Emergency Net still are active on Sunday mornings on 3780 kc. The Peace River gang meets at noon on Sundays and would appreciate reports from any of the gang. Listen for them on 75-meter 'phone. YM took part in recent emergency in Southern Alberta and had a nice traffic score. NA is back from vacation and hopes to be more active. WO expects to be on 28-Mc. 'phone real soon. Traffic: VE6YM 70, OD 40, EO 26, MJ 12.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — For the information of those who couldn't make the ARRL National Convention in Seattle, here is a little of what was taken away by the VE7s: BQ, BC series receiver; AC, grid-dip meter; MQ and AHH, Micro-Match units; Mrs. UW, Mrs. Mac (QS), and FB, a flight in a fifty-passenger aircraft. ANC is heading for Hay River and will be signing VE8 very soon. CX paid a surprise visit to Vancouver. US, as mobile, has been putting out good signals from all the places he has been of late. Where is MQ mobile? FB has a Morrow converter and now doesn't know what type of rig to make for the car. AOB is going mobile. The North Shore ARC still is increasing in membership and activity. AFH was in town and says he will be kicking the dust off the rig soon. TG, our 100-watt mobile in Victoria, landed in the ditch putting him in the sick bay. UZ has been seen in a mechanical baby buggy and talking mobile. WM is planning u.h.f. mobile. DH must be on holidays as nothing has been heard from him. DF now is in the local R.I.'s office. He will be visiting you for station inspection. How's the log and the other things dear to our R.I.? Letters to the SCM are giving less and less information for this activity report.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM. PAM: FA. It is our sad duty to report the passing of ND. Norman was this section's oldest amateur, being 81 at the time of his death. The entire section extends its deepest sympathy to his family. DG has returned from the East after a year's business trip and again will be active on all bands. Ex-4GW returned home to be married. Congrats, Gerry. DP spent the holidays in VE3-Land. 7ALE spent the holidays in Winnipeg and on a trip here stopped at 6FH's to get him on 14 Mc. 7ALA (ex-4FW, 8FW) has returned to St. Vital and says no more North Country for him. 5BH is operating portable in St. James. HP, HL, ER, DJ, and 5BH/4 hold nightly round tables on 75 meters lasting from two hours up. All are RCC now. The fall season will be here when this is published, so let's have your reports this year. The Manitoba 'phone net will be operating on 3760 kc. at 7.00 P.M. and all are welcome. NCSs will be required and our PAM, FA, will be looking for volunteers.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — AS puts out an FB mobile signal on 3.5 and 14 Mc. MA has left for Winnipeg and a position with CKY. RC has taken a place on the CBC staff, also at Winnipeg. EW has been transferred overseas for two years with the Air Force. FY, BU, and DN, along with other AFARS members, were flown by the Air Force to the West Coast to participate in the National Convention at Seattle. The Regina Club.

(*Continued on page 118*)

Our 29th Year **LEEDS** "The Home of RADIO" QUALITY – PRICE DEPENDABILITY

LYSCO TRANSMASTER

35 watt transmitter exciter for 10 to 160 meters. Break in keying illuminated dial, PA plate meter . . . modulation tie in, grid meter jack and built in power supply. 6AG7 OSC, 6AG7 Buffer, 807 P.A., VR150 and 5U4G rectifier. 115V AC, 60 cycles. Output low impedance 50 ohm line. Complete with tubes in black wrinkle finish cabinet. 17"L. X 9"H. X 11"D.

Model 600 TVI Suppressed $143.95
Model 500 Standard $131.95

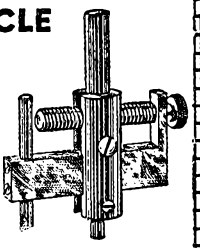
Descriptive bulletin on request.

Model 50 Antenna Coupler designed to feed long wire from transmitter ..... $ 14.50

MICRO CIRCLE CUTTER

FOR METAL WOOD • PLASTICS

- Micrometer type size control
- Extra heavy duty beam
- Special beam locking mechanism



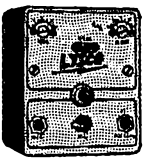
At all dealers

Model	Type	Size	Price
I	Round shank	4 inch	$5.00
I	Square shank	4 inch	5.00
S	Round shank	6 inch	7.50

LYSCO MOBILE TRANSMASTERS

25 watts—clamp Tube Modulation For 10-20-75 Meters

Lysco presents a new line of mobile transmitters with built in antenna relay for push to talk operation, clamp type audio for 100% A.M. Modulation, tuning adjustment from front panel. Power input 500V. D.C. at 125 Ma.—6.3V. A.C./D.C. at 1.35 Amps. Comes in beautiful rounded drawn case, black wrinkle finish, with attractive silk screened front panel. Size 4"W. x 4½"H. x 6"D.



Model	Band	Tubes Used
A 114	20	3-6AQ5
B 114	20	3-6V6GT
A 129	10	3-6AQ5
B 129	10	3-6V6GT
A 175	75	3-6AQ5
B 175	75	3-6V6GT

Less Tubes $29.95 **With Tubes $33.55**

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. M.A.	Dimensions H.	W.	D.	Price
P-3157	660-660 / 550-550	500 / 400	250	4⅜	3 13/16	4⅜	$8.08
P-3158	1080-1080 / 500-500	1000 / 400	125 / 150	4⅜	3 13/16	5	10.00
P-3159	900-900 / 800-800	750 / 600	225	4⅜	3 13/16	5⅛	9.70
P-3167	1450-1450 / 1175-1175	1200 / 1000	300	5¾	6⅛	4	24.12
P-3168	2100-2100 / 1800-1800	1750 / 1500	300	5¾	6⅛	4½	30.58
P-4062	2900-2900 / 2385-2385	2500 / 2000	300	8½	6½	5⅝	47.04

RAYTHEON VOLTAGE STABILIZERS

Positive Stabilization ±½%

Input 95-130 volts, 60 cycles single phase; output 115 volts stabilized to ±½%. *Output 6.0 or 7.5 volts stabilized ±½%.

No.	Output Capacity Watts	Net Weight lbs.	Price
VR-6110	15	4	$ 16.00
VR-6101*	30	5	18.00
VR-6111	30	5	18.00
VR-6112	60	8	25.00
VR-6113	120	14	33.00
VR-6114	250	25	52.00
VR-6115	500	45	81.00
VR-6116	1000	92	135.00
VR-7B	2000	200	245.00

*Output 6.0 or 7.5 volts stabilized ± ½%.

SUPERIOR POWERSTATS

Smooth, efficient voltage control. 0 to 135V. output from 115V. AC line.

Type 20 (illustrated 3 amps.....$12.50
116 for table mtg 7.5 amps..... 23.00
116U for panel mtg 7.5 amps... 18.00
1126 15 amps..... 46.00
1156 45 amps.....118.00

Also available for 230 volt input. Write for descriptive literature.

G.E. Vibrator Transformer

Input: 6V
Output: 240V at 62Ma. **$1.25**
Fully Shielded
Brand New

ALUMINUM CHASSIS

7x5x2....18 gauge.....$0.82		10x14x3..16 gauge.....$2.26	
7x7x2....18 gauge.....$0.92		15x7x3...16 gauge.....$1.76	
9x7x2....18 gauge.....$1.03		17x10x3..16 gauge.....$2.20	
5x10x3...18 gauge.....$1.12		17x13x3..14 gauge.....$2.82	
7x11x2...18 gauge.....$1.06		17x13x5..14 gauge.....$3.67	
12x10x3..18 gauge.....$1.62			

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 7-3440 Dept. QS 9 New York City 7

with club station NN, put on an amateur display at the Regina Exhibition. TE now is mobile and works out well. BZ reports activities at a low ebb on Rosetown Area Emergency Net because of the gang working on the land. Ex-5DW now is signing VE7ABQ at Prince Rupert. DR, his XYL, and FY and YF spent three weeks camping and kept in touch with home QTH via mobiles. The name of their camp? QRinN. PJ is waiting for power-line completion to get away from bad line fluctuations. The "Naicam Hamfest" met at Stony Lake with YF, LS, WB, LC, KB, PK, FY, and DR attending. VB sports a new trailer. Traffic: VE5HR 44, TE 13, YF 4.

IARU News

(Continued from page 87)

CZECHOSLOVAKIA

In a letter dated December 7, 1950, the *Ceskoslovensti Amateri Vysilaci* resigned from the I.A.R.U. The Headquarters addressed the C.A.V., asking that they reconsider but no reply being received, the resignation became effective March 7, 1951, a ninety-day notice being required by the I.A.R.U. Constitution. Later advice indicates that the C.A.V. has been dissolved and its membership incorporated into the Czechoslovakian trade unions.

A.R.R.L QSL BUREAU

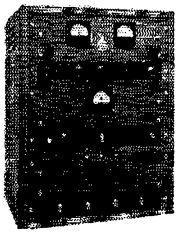
The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

For a list of overseas QSL bureaus, see page 62, June '51 *QST*.

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — Walter Musgrave, W8NGW, 1294 East 188th, Cleveland 10, Ohio
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 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, 286 Rutland St., St. James, Man.
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, 1330 Mitchell St., Victoria, B. C.
VE8 — Roy Walton, VE8CZ, Box 534, Whitehorse, Y. T.
KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KZ5 — P. C. Combs, KZ5PC, Box 407, Balboa, C. Z.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska

FELLOWS—HERE'S A REAL BARGAIN FOR YOU MOBILE FANS.

Leo I. Meyerson
WØGFQ

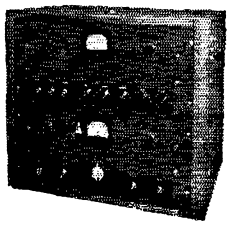


NEW WRL 400-A GLOBE KING TRANSMITTER

HIGH POWER—MORE WATTS PER DOLLAR

Our newest model with increased power—400 watts Phone, 425 watts CW. Incorporates some of the latest TVI protective features. Efficient performance on all bands — 10 to 160 on phone and CW. Provisions for ECO. Complete with tubes, meters, and one set of coils. Low Down Payments.

KIT FORM **$439.45** WIRED-TESTED **$459.45**



WRL 150 WATT GLOBE CHAMPION TRANSMITTER

MORE WATTS PER DOLLAR

R.F. Section a complete 150 watt XMTR. Provisions for ECO. Automatic fixed bias on Final and Buffer. Class B Speech Modulator. 150 watt input — 10 thru 160 meter bands. Complete with tubes, meters. Low Down Payments.

KIT FORM **$279.00** WIRED **$299.00**

FREE
1951 WRL CATALOG

NEW LOG BOOK

For mobile or fixed station. Spiral binding — turns up — lies flat. Full column log listing all FCC required info. Log will accommodate 1,525 stations. Front and back covers show "Q" signals, phonetic alphabet, and amateur international prefixes. **25¢**

Good condition Motorola, Model P69-13, deluxe fixed frequency 8 tube super-heterodyne receivers equipped with two vibrators, automatic volume control, squelch circuit, and noise silencer. Less controls and speaker. Any type PM speaker can be used.

MODEL P69-13, 8 tube . . **$29.50**
MODEL P69-12, 6 tube (same as above) **$19.50**

Crystals for above sets $2.75 each. (Please state type of converter to be used so proper crystal frequency will be sent you.)

EXTRA SPECIAL
GOOD CONDITION

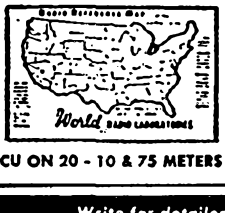
Collins 32RA 100 watt XMTR. **$125.00**

Collins 32 MA 100 watt XMTR. **$99.50**

LOW DOWN PAYMENTS
NAME YOUR TERMS
PERSONALIZED SERVICE

Let me know what you have to trade, any make or model. I'll allow you more for your present equipment. WRL buys more equipment . . . WRL sells more equipment. Our large volume of sales means faster turnover, greater savings for you! We finance our own paper . . . no red tape! Get guaranteed satisfaction from the "World's Most Personalized Radio Supply House."

GIANT RADIO REFERENCE MAPS



CU ON 20 - 10 & 75 METERS

Just right for your control room walls. Approximately 28" x36". Contains time zones, amateur zones, monitoring stations. Mail coupon today and . . . . . **25¢**

WRL 10 METER BEAM

Plumber's delight 3 element beam quickly assembled; furnished with Gamma match. Extremely light; all aluminum construction; grounded antenna; very low priced. Furnished less mast and lead. Full instructions furnished.

Narrow spaced **$15.95**
Wide spaced **$17.95**

GUARANTEED CRYSTALS

IN HOLDERS Type FT-243
160 METER
1.8 to 1.825 1.875 to 1.9
1.9 to 1.925 1.925 to 2.0
$1.25 ea.
80-40 METER
3.5 to 4.0 7.0 to 7.4
98¢ ea.

Please state frequency. We will come as close as possible. No refunds or exchanges please.

Write for detailed XMTR specification sheets.

WRITE - WIRE PHONE 7795

World Radio LABORATORIES INCORPORATED
COUNCIL BLUFFS, IOWA

EVERYTHING IN RADIO

World Radio Laboratories, Inc.
744 West Broadway Q10
Council Bluffs, Iowa

Please send me:

- ☐ Radio Map
- ☐ New Catalog
- ☐ List of Guaranteed Used Equipment
- ☐ Globe King Info
- ☐ Globe Champion Info
- ☐ Log

Name_____

Address_____

City_____ State_____

Civil Defense Project

(Continued from page 17)

scarce, so we kept away from popular TV numbers as far as possible. The receiver design used a 6AK5 r.f. stage, a 12AT7 mixer-oscillator, 7N7 second detector and first audio, and a 7C5 second audio, but as may be seen from the block diagram many substitutions can be made. A stage of i.f. amplification can be added, but very careful shielding is needed. The r.f. stage reduces possible front-end radiation, and cuts image response. An i.f. of 18 Mc. was selected, after the initial 21-Mc. design showed TVI tendencies.

Assembly notes given to members suggested that after mounting all parts the audio and second-detector portions be wired and checked first. The "service station" was the next stop. Usual procedure was to check the second-detector frequency in a communications receiver for the 18-Mc. rush, or both primary and secondary of the i.f. transformer can be set with a grid-dipper. Front-end coils can be set with a grid-dipper, or they can be adjusted while receiving test signals near the middle of the band. All receivers so far checked have shown a sensitivity of one microvolt or better for a noticeable dip in the rush.

The standard transmitter line-up uses two 12AT7 or 2C51 dual triodes, a 6AK6 output tube, and a 7C5 modulator, with possible alternatives as in Fig. 1. Construction and assembly methods are similar to the receiver.

An antenna changeover relay coil is in series with the negative high voltage. When power is applied to the unit the relay will be open, or in the transmit position. As the filament and plate voltages come up, the transmitter starts to draw current and the relay goes to the receive position. The push-to-talk switch shorts out the relay coil, opening the relay to the transmit position. This arrangement allows the rigs to be used on either a.c. or d.c. without circuit changes. Power connections are standard for all rigs, and have been agreed on by several clubs in the area for possible interchange of sets and supplies in the event of an emergency.

With a coaxial antenna on the rear of the writer's car numerous contacts have been made up to 35 miles, from a favorable location. Car-to-car operation is good for three to five miles in open country.

The project was outlined to all club members initially by letter, and weekly meetings notices after that always contained some reference to keep interest high. At each meeting a period was set aside for going over problems that developed in connection with individual rigs. The entire project has been one of coöperation between members, and the success in getting it well on the way to completion shows the result of teamwork learned from many Field Day experiences. Many valuable suggestions have been received from other clubs that are busy on similar work.

Widespread interest, spread principally by word of mouth, is developing in other areas and

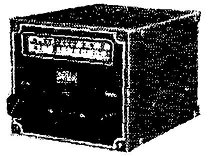
(Continued on page 122)

Ham's Paradise!

OLDTIMER OR NOVICE

ONE OF AMERICA'S GREAT RADIO STORES

NEW SONAR MOBILE SR-9 RCVR



Indispensable when you must hear what's coming through, in mobile or fixed operation, CD, CAP or emergency activity. More than a monitor, more than a converter—it's a 9-tube superhet receiver with over-all sensitivity better than .5 microvolt. Tiny—only 4$\frac{9}{16}$" high, 5$\frac{3}{16}$" wide, and 5$\frac{11}{16}$" deep. Yet SR-9 gives you built-in automatic noise limiter, voltage regulated oscillator, precision slide rule dial.

Your choice of 2, 6, 10 meters and commercial frequencies, AM and FM. **$72.45**

NEW SONAR MOBILE MB-26 XMTR

Like SR-9 Rcvr, this crystal-controlled 6-tube Xmtr goes everywhere, fits anywhere, employs latest v.h.f. techniques! Lets you send clear signal, no matter how grueling the going. Output: 6 watts. Power consumption: equivalent to car bright lights. Just 6½" high, 7" wide, 5⅞" deep. Built-in antenna relay system, power filter network. Low maintenance—standard tubes. Power and antenna co-ax connectors on front panel.

8 or 24 Mc. crystal, overtone type. Screw-driver adjusted tuning control.

$72.45

Ward SPP-18 2 MTR Mobile Antenna **$3.96**

For Home or Fixed Location

POLICALARM Model PR-31 for 30 to 50 mc band. Complete **$44.95**

MONITORADIO Model PR-8 for 152 to 162 mc band. Complete with 14" whip indoor antenna **$44.95**

Mobile FM Receiver 152

Model M-101 covers 152 mc to 162 mc. Band **$72.50**

Model M-51 covers 30 to 50 mc's. Band **$72.50**

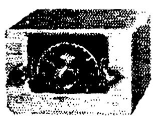
Gonset Converters

3-30 Gonset Converter; 10-11 Gonset Converter; 20 Meter Gonset Converter; 75 Meter Gonset Converter. Shipping wgt. each, 4½ lbs. . **$44.75**

Gonset Tri-Band Converter . . **$47.60**

Model B Noise Clipper **$9.25**

Universal Steering Post for use with all Gonset Converters **$3.90**



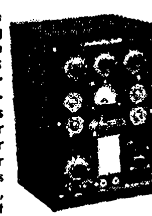
NEW GONSET TWO-METER CONVERTER; superheterodyne . . . same size and appearance as Tri-Band Converter and FM Tuner. **$44.50**

NEW GONSET FM COMMUNICATIONS TUNER; for all 2-way FM radio telephone communications; 30-40 mc; 40-50 mc; 88-108 mc; 152-162 mc. Net **$59.50**

(Other frequency ranges available on special order.)

DeLuxe Model (separate squelch tube, pilot light switch). Net **$69.50**

Harvey-Wells Xmtrs



. . . have everything from 2 to 80 meters for fixed or mobile operation. H-W is the transmitter you will use for years. Best for Hams, Business Organizations, Government Departments, Emergency Services and Civilian Defense.

2 Bandmaster Models

Senior **$111.50**

DeLuxe **$137.50**

Bandmaster Power Supplies

APS-50 for 110 A.C. **$39.50**

DPS-50 for 6 or 12 V. 6V. . . . **$87.50**, 12V. . . . **$54.50**

ARE WE EMBARRASSED!

Orders Still Arriving For Our Used

LEECE-NEVILLE

Mobile A. C. Alternator Systems and We are all

SOLD OUT!

All we have left of these fine A.C. systems are the Generators. Accessories required to complete these sets may be obtained, New, from your local Leece-Neville Dealer. 60-80 Amp. A.C. Generators, Bargain at Only (each) **$35.00**

80 MTR Transmitting Station

FOR THE NOVICE

1—Transmitter Kit **$15.95**
(as described in May QST)

2—Power Supply Kit
(for above) **9.95**
(see June QST)

3—Antenna Kit
(80 MTRS) **2.95**

$28.85

COMBINATION SPECIAL

All three kits are available separately at prices indicated beside each kit. Complete instructions with each kit) **$25.95**

Did You Get Your Bulletin "Q"?

Niagara Radio Supply Corp.

Phone DIgby 9-1132-3-4

DEPT. Q101 160 Greenwich Street, New York 6, N. Y.

NIAGARA'S GUARANTEE OF SATISFACTION
All items ordered must meet with full approval or your money back.

many requests for more information are coming in. The volume of such requests has reached the point where it is no longer possible for us to supply individuals with copies of our plans. We will, however, be glad to send single sets to authorized club representatives, if they will take care of duplicating them for their own use.

75-Watt Transmitter

(Continued from page 21)

backward, watching for a dip in cathode current. The first dip you encounter should be resonance at 80 meters. This setting should be marked down and always used thereafter when tuning up on 80 meters. You can now do the same for the other two bands, always first setting C_{23} at maximum and tuning for the first dip in cathode current.

A coaxial cable should be connected at the output connector, thence to a low-pass filter and from there through another piece of cable to an antenna tuner. Reference should be made to the ARRL *Handbook* for antenna coupling and tuning and the use and construction of a low-pass filter. It may be advisable also to use a shielded keying lead.

The accompanying table shows the average values of currents and voltages to be expected. This transmitter has been operated on the air alongside a TV receiver without causing any visible interference when used with a low-pass filter.

Linear-Amplifier Theory

(Continued from page 27)

use some kind of indicator in the feed line or in the output circuit somewhere. Many fellows have gone overboard in coupling the antenna to the final. Their plate current will show that they are driving way up near the limit the law allows, with the exciter loafing along. Inserting an r.f. ammeter in the feed line (a 52-ohm coax line, in the case I'm referring to) showed that the actual output doubled when the coupling was reduced to where the final drew considerably less input.

We have all learned a lot about radio in getting these Donald Ducks on the air, but every ham I talk to who is using s.s.b. tells me he is getting all of the old thrills over again in making contacts with it. Why? It must be in the satisfaction of a job well done, because if your work's slipshod, you just don't get the right results with single sideband.

Low-Pass Filter

(Continued from page 29)

filter. The writer believes that the high order of attenuation afforded by this filter will eliminate all TVI caused by harmonic radiation from the antenna, when inserted in the coaxial line beyond the final tank circuit, regardless of channel. However, if the builder desires to make the "infinite-rejection" points of the filter coincide with the frequency of operation of the TV stations normally received in his particular area, the coils can be easily redesigned to accomplish this.[1] This filter in conjunction with adequate d.c. lead filtering and shielding should eliminate all traces of harmonic TVI for the ham.

[1] Grammer, "Eliminating TVI with Low-Pass Filters," *QST*, Feb., Mar., Apr., 1950.

Frequency Spotter

(Continued from page 31)

only necessary to reduce the sensitivity of your receiver either by decreasing the r.f. gain control or disconnecting the antenna and making sure that your transmitter signal lies between the proper calibrated check points which you established with this 50-kc. oscillator. Don't neglect to occasionally recheck the calibration of the oscillator.

Simple, isn't it? Yes, simple insurance against getting an FCC blast for working off frequency.

Screen-Grid Modulation

(Continued from page 40)

c.w. operation, but is merely in the way for 'phone. Rather than bring leads out from the resistor so that it can be switched, remove it from the transmitter and relocate it in the audio unit, as shown in the circuit of Fig. 2. This shows a practical arrangement for switching the rig between 'phone and c.w. operation. For c.w. the screen is operated at 400 volts, which is far too much for 'phone service. Another of the extra sections of S_1 can be used to insert the proper dropping resistor to reduce the voltage from 400 to 250. If a 400-volt supply is used, the 15,000-ohm adjustable resistor shown in Fig. 2 should do the job. Adjust the slider to produce 250 volts at the screen input terminal under full operating load.

When switching from 'phone to c.w., S_1 performs the following functions: Section *A* shorts the secondary of the output transformer to prevent its damage by keying transients. Section *B* opens the primary of the filament transformer, thus rendering the audio tubes inoperative. Section *C* restores R_{10} to the screen supply lead so that the clamp tube can operate properly. Section *D* can be used to close the cathode circuit of the 6Y6G, unless this is done by a separate switch as described above. Both R_{10} and the 15,000-ohm resistor can be mounted inside the audio unit, although they are not shown in

(Continued on page 126)

the photographs because they are not essential parts of the modulator and are required only in the special application being discussed.

All things considered, this screen modulator unit is a worthwhile addition to any screen-grid amplifier. It may not permit you to have quite as husky a 'phone signal as you might like to have, but it is far less costly than plate modulation of the same transmitter would be. In most cases it can be operated from existing power supplies, and it can be tucked away in any odd corner of the rack, so that going on 'phone can be accomplished with a minimum of cost, both in dollars and space.

Single Sideband

(Continued from page 61)

a 'scope, and when he tells you there is something wrong with your signal, you can rest assured that it is so — even if you can't hear it yourself. We felt like a babe in the woods around his shack, and our only contribution was an observation about the heating of the 304TH plate — he had had no way to check it! (Incidentally, it was running just right.)

We sometimes wonder if the s.s.b. gang doesn't worry a little too much about carrier suppression. As a matter of pride it's nice to get the carrier down so low that no one can possibly hear it, but with no carrier at all it leaves nothing for a receiving operator to work on. With a little carrier he can zero beat, or his YRS-1 can lock in, but with none at all there is absolutely no reference whatsoever. Are we missing a point somewhere along the line?

— *B. G.*

Filter for 'Phone

(Continued from page 58)

passband, but it quickly returns to a more natural-sounding signal as the carrier reaches the other edge. With the filter of Fig. 2H, it is surprising to see how quickly an interfering heterodyne drops out as the receiver is tuned. It is also possible to use the trick of the s.s.b. gang, and tune the carrier quite far down on the side and then inject a local carrier (b.f.o.) tuned to zero beat with the carrier.

This arrangement also works quite well for c.w. reception, giving good selectivity without the critical tuning of a sharp single-crystal filter. The hardened c.w. man would probably prefer the method of ex-G3CMJ,[1] where the two crystals are much closer together in frequency. It should not be too difficult to switch between three crystals to give a 'phone or c.w. filter that would surpass the usual crystal filter. During c.w. reception the extra (off-frequency) crystal could be switched to the shunt position, to give better rejection.

(Continued on page 128)

Some crude tests were made with the two crystals two channels (3.7 kc.) apart and three channels (5.55 kc.) apart. The passbands were relatively wider; however, the center dip began to be very pronounced in the latter case.

It can be concluded that the use of two or more crystals at present i.f. frequencies permits passbands that are wide enough for good voice operation and whose characteristics compare favorably with the best narrow-band coil-and-condenser techniques.

Multiplier-Exciter

(Continued from page 66)

Adjustment

Set the bandswitch to the 3.5-Mc. position. Set the gang condenser at about three-quarters of maximum capacitance. Set C_4 to about half maximum. Connect a VFO and set it to the center of the 3.5-Mc. band. Adjust the slug in L_1 for maximum 807 grid current. If the coils have been wound correctly, no difficulty should be experienced in obtaining these adjustments.

For 7 Mc., set the bandswitch to the second position and set C_{11} to half capacitance. Thus far, the exciter has been used for 'phone operation exclusively. For c.w. operation, a 45-volt battery and 4000-ohm resistor in series should be substituted for R_{13} to provide protection for the 807. Keeping the gang set at the original position for 3.5 Mc., adjust the slug in L_2 for maximum 807 grid current. Corresponding adjustments are made for the 14-, 21- and 28-Mc. bands. No difficulties were experienced in getting the unit to provide adequate and essentially constant grid current to the 807 across all bands. In fact, it was necessary to reduce plate voltage on the multiplier stages to bring the grid current down to the proper rated level. With 250 volts on the multipliers, the grid current ran 9 ma. on 80, 40 and 20, and 7 ma. on the other two bands with the 807 loaded. With an r.f. choke in series with the negative voltmeter lead, measure the voltage across R_4 and adjust C_6 for maximum reading.

Conclusions

It is felt that the time and effort spent on this unit has been well worth while and no doubt the simplicity will appeal to many of the gang who are looking for a bandswitching unit that is neither complicated nor expensive to build. Parts for the unit shown in the photograph cost about $34.00 less tubes.

Answer to **QUIST QUIZ** *on page 12*

B is right. The crystal filter may or may not reduce the gain, depending upon its design. The noise is reduced because the bandwidth of the receiver is narrowed and, all other things being equal, the noise is proportional to the bandwidth. Actually, the reduction in noise may make the signal appear to be stronger, or "stand out above the noise."

50 Mc.

(*Continued from page 89*)

July he managed contacts with GW2ADZ, Central Wales, 175 miles, G3GOP, Southampton, 119 miles, and G3FZL, London, 180 miles. The hop to GW2ADZ is particularly noteworthy, as the signal from G5BY starts out at 450 feet above sea level and must go over Dartmoor, 2000 feet, Exmoor, 1700 feet, and the Black Mountains, 1800 feet, along the way.

420-Mc. Operating Note: More and more stations are coming on with crystal control, selective receivers and high-gain antennas. Time and again it has been found that the greatest barrier to making contacts has been locating the other fellow in the band. Much more effective tuning for weak signals could be done if the users of crystal control would get together on the frequencies used. It is suggested that all crystal-controlled operation be carried on between 432 and 436 Mc., to this end. Crystal-controlled converters can then be used successfully and the "DX band" scanned with ease. When are *you* on, and on what frequency?

2-Meter Standings

	Call	States	Areas	Miles
	W1HDQ	16	6	650
	W1IZY	15	6	750
	W1MNF	14	5	570
	W1BCN	13	5	500
	W1CTW	12	4	500
	W1KLC	12	4	500
	W2BAV	21	7	1175
	W2NLY	18	6	750
	W2PAU	16	6	740
	W2DFV	13	5	350
	W2CET	12	5	405
	W2DPB	12	5	500
	W2QED	12	5	365
	W2FHJ	12	5	—
	W2QNZ	12	5	—
	W2BVU	12	4	260
	W2ORI	8	6	570
	W3NKM	18	7	660
	W3RUE	17	7	760
	W3QKI	16	7	820
	W3KWL	15	7	560
	W3LNA	14	7	720
	W3GKP	14	6	610
	W3OWW	13	6	600
	W3KBA	13	6	—
	W3KUX	12	5	575
	W3PGV	12	5	—
	W3LMC	11	4	400
	W4MKJ	16	7	665
	W4HHK	15	6	660
	W4JDN	13	6	—
	W4JFV	13	5	830
	W4IKZ	13	5	650
	W4JFU	13	5	720
	W4LVA	13	5	400
	W4OXC	13	7	500
	W4CLY	12	5	720
	W4JHC	12	5	720
	W4OLK	12	5	720
	W4FJ	12	5	700
	W5JTI	14	5	670
	W5QNL	10	5	1400
	W5AJG	8	3	1260
	W5ML	8	3	725
	W5ERD	8	3	570
	W5VX	7	4	—
	W5VY	7	3	1200
	W5CVW	7	2	560
	W5ABN	7	2	450
	W5SWV	7	2	—
	W5FBT	6	2	500
	W5FEK	6	2	500
	W5IRP	6	2	410
	W5ONS	5	2	950
	W5FSC	5	2	500
	W5JLY	4	2	650
	W6ZL	2	2	1400
	W6WSQ	2	2	1390
	W2PJA/6	2	2	1390
	W6ZEM/6	1	1	415
	W6GGM	1	1	300
	W6YYG	1	1	300
	W8WJC	21	7	775
	W8BFQ	21	7	775
	W8WXV	18	8	1200
	W8UKS	18	7	720
	W8EP	17	7	—
	W8WRN	16	6	670
	W8RWW	14	7	500
	W8WSE	14	6	620
	W8FQK	13	7	—
	W8CYE	12	6	—
	W8BAX	12	—	655
	W8CPA	12	—	650
	W9FVJ	20	7	790
	W9UCH	19	7	750
	W9SUV	19	7	—
	W9EQC	17	7	820
	W9BOV	15	6	—
	W9WOK	15	5	690
	W9AFT	14	—	—
	W9NFK	12	7	690
	W9UIA	12	7	540
	W9FPE	11	5	800
	W9GTA	11	5	540
	WØNFM	14	7	660
	WØIHD	13	6	725
	WØEMS	13	5	1080
	WØZJB	12	7	1097
	WØWGZ	11	5	760
	WØHXY	8	3	—
	WØJHS	7	3	—
	VE3AIB	12	6	600
	VE1QY	11	4	900
	VE3BOW	8	5	520
	VE3BQN	7	4	540
	VE3BPB	6	4	525
	VE3DER	6	4	450
	VE3EAH	5	4	380

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 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 take 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.*

WANT: Collins PTO unit will buy or swap. Have Western Electric ten meter mobile rig complete with mike and 6 volt dynamotor. Write Lewis McCoy, 38 LaSalle Rd., West Hartford 7, Conn.

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, 100, $1.75 up. Stamp for samples. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

MOTOROLA used equipment communication equipment bought and sold, W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS. Radio publications a specialty. Earl Meade, Huntley, Montana. W7LCM.

QSL'S-SWL's. Mead, WØKXL, 1507 Central Avenue, Kansas City, Kans.

LEARN Morse Code in just 8 hours! Code-Voice Record method gets you ready for Novice Class license,good Army job in radio. You get 4 sides of code instruction on two 10-in. 78 RPM Vinylite records in handsomely illustrated, completely detailed album. Send only $4.00. Money-back guarantee. Dept. Q1, The Raybrun Company, Box 66, Orangeburg, N. Y.

5-Element 2-meter beams. Riverside Tool Co., Box 87, Riverside, Ill.

WANTED: Old radio magazines and catalogs prior to 1925. Send list and prices — or will trade. Vance Phillips, W6GH, Hope Ranch, Santa Barbara, Calif.

WANTED: Teletype 1/40th HP synchronous motor W6ITH, Moraga, Calif.

QSLS, SWLS. C. Fritz, 1213 Briargate, Joliet, Illinois.

WANTED: March and May 1916 QSTs. 200 copies for sale 1920 to 1951 at 25¢. WØMCX, 1022 N. Rockhill Rd., Rock Hill 19, Mo.

WANTED: Your surplus radio receivers, transmitters, ARC-1, ARC-3, ART-13. We buy anything. What have you? Tom Allen, 562 Atlantic Ave., Brooklyn 17, N. Y.

QSLS! Taprint, Little Rock, Mississippi.

CRYSTALS! Bassett precision Type 100A (FT-243) within 80, 40, 20 bands or MARS channels at $1.50 each. Specify exact frequency and include postage. Rex Bassett, Inc., Bassett Building, Fort Lauderdale, Florida.

BALLOONS: Radiosonde, 12′ bursting. 3 for $2.00 Phone patch schematics, practical discussion, $1.00. C. E. Nichols, W1MRK, 57 Hancock, Auburndale, Mass.

QSLS: Uncle Fred's QSLs. Three colors and up. Rainbow map QSLs. Special DX QSLs. Bargain QSLs. Samples rushed, 10¢. Uncle Fred, Box 86, Lynn, Penna.

WANTED: DeForest Responder, Arc Radiophone, Audion Boxes, Marconi Coherer, Magnetic Detector, Type D, E & Multiple Tuners; other gear prior to 1920. Franklin Wingard, Rock Island, Illinois.

FOR Sale: Revere tape recorder, practically new, used for code practice, 2 rolls tape; $110. SRC 522 receiver and transmitter and Dynamotor, $30. Faust H. Boyd, W9LQI, Ashton, Illinois.

BC-610 TVI free, with Collins 310-B3 exciter. Will sell separate or as a unit. W8VLV.

THOSE not receiving QSL's from W6NQG/KM6 or KM6AB for QSO during 1947 send QSL to KH6WW.

SELL: VFO Millen all band, like new, $98. Walter Sackett, 1429 Bever Ave., Cedar Rapids, Iowa.

SELL 206 copies QST. Good to excellent condition, complete 1931–45, remainder 1926–31 with few from older years missing. All packed with two ancient Handbooks in wood box, ready for collect shipment from Milford, Nebr. Make best offer. Burt Hansen, W6HOZ (formerly WØGDB) 304 E. Fairview, Inglewood, Calif.

QSLS? SWLS? Modernistic? Cartoons? Rainbow? Photographics? Don-Beauties! QSL samples 10¢. Sakkers, W8DED, 53 E. 7th St., Holland, Mich.

WANTED: Marconi, Electro Importing, Wireless Specialty, De-Forest apparatus. Early wireless books and magazines. "Ultimate" bug key. Year Book of Wireless Telegraphy and Telephony for 1913, 1914, 1915, 1916. L. Rizoli, W1AAT, 100 Bay View Ave., Salem Mass.

HARVEY-WELLS TBS50C, coaxial ant. relay, Carter 6/425 volt dynamotor, Shure 505B mike, Gonset Tri-Band, less than 3 hrs oprs. time, cost over $250. Sell for $175: Hallicrafters SP44 Panadaptor $50. Want: Collins 30K in good condx. WØDCU, 1317 Locust, Des Moines, Iowa.

WANTED: 32V-1 or 32V-2. Cash. W7PMC. Greenough, Montana.

FOR Sale: Complete station. Collins 75A-1 rcvr, custom built 250-watt AM NBFM VFO-xtal transmitter, 813 final; oscilloscope, microphone, etc. All perfect. Make cash offer. W6VSQ, 2014 13th Ave., Oakland 6, Calif.

WILL swap large cartridge collection for any type amateur equipment preferably UHF or VHF. Write for details. W5TGQ, 5303 Ennis, Houston, Texas.

SELL all new equipment 6-5VCT @ 30 amps filament transformers 110/220V primary 20KV insulation, 1.87 KVA 110V 60 cycle 1800 rpm generator and exciter, emergency broadcast receivers with 1000 hour battery, BC-458 sealed carton, SX-24 with matched speaker good condition. Want 32V2; 20-meter beam, good camera W2PUK, Glen Ridge, N. J.

PORTABLES, Bantams and antenna dope in Bantam transmitter manual. Send $1 to B & B Labs, Box 3281, Station F, Atlanta, Ga.

10 and 20-meter beams. $23.25 up. Aluminum tubing, etc. Willard Radcliff, Fostoria, Ohio.

HRO7R complete, new condition. Meissner signal shifter. Late model, never used. Best offer. W7CPV.

WANTED: BC-654A, PE-103A, PE-104A, GN-45, BC-348, BC-342, BC-312, BC-221, ART-13, ARC-1, RA-34, TCS sets, parts, war surplus test equipment. Arrow Appliance, 525 Union, Lynn, Mass.

QUARTZ crystals for all services. Also new surplus tubes and equipment. Bargain prices. Tubes: 832, $5.95, 832-A, $9.45. Breon Laboratories, Williamsport, Penna.

SELLING for best offer custom-built 1 KW final Eimac 4–400–A, de-TVI'd, original model as shown p. 127 West Coast handbook, 12th edt. Together with 500 watt modulator shown p. 191 same handbook. Complete with brand new condx Collins 310-B-1 exciter. Joe Tabor, 19215 Westphalia, Detroit, Mich.

FOR Sale or trade: ART-13, 522S receivers ARC-1, W7IOA, Box 184, Avondale, Arizona.

SELL brand new BC4559A, BC696A, BC455, BC1206C, good used BC453B, BC454, RT34/APS13, BC624 (522 rcvr), BC 223A with TU17A and TU25A, FT244A rack. One each of above. Best offer. Good prop pitch motor, $10. New JAN 6J6, 6AG5, $1. Also misc. JAN tubes. Almost new standard coil TV202 tuner, $15. All F.o.b. North Plainfield, N. J. W2JME, Harms, 225 Maple Ave.

SCOTT marine receiver complete with all tubes and factory instruction book with schematic. Model SLRM. Covers 0.54 to 18.6 meg. Built-in spkr, 115 volt a.c. or d.c. Good condx. $100. Mel Whitaker, WN9OFR, New Lenox, Ill.

TOP cash for your receiver. Electronic Labs, 2444 "D", Lincoln, Nebr.

PLATE transformers. New. Kenyon secondary 4520 volts ct primary 110 v. 60 cycles, 1450 watts, weight 75 pounds. $49.50 each, two for $75. F.o.b. Kansas City, Mo., Art Wearth, 6014 El Monte, Mission, Kans.

USED equipment: National SRR super-regenerative receiver with tubes and coils, $12.50; Millen 90700 Vari-arm VFO, $29.50; Sonar VFX-680 NBFM exciter, $45; several BC-645 transmitter-receivers each $15; RME VHF-152A converter, $69.50; others. Write for latest list to Carl Evans W1BFT at Evans Radio, Concord, N. H.

WANTED: Indices to "QS" volumes 6 to 19, both inclusive. Also "Pink Sheet" one-page supplement to October, 1919 "QST" announcing lifting of transmission ban, and April, 1919 8-page pamphlet entitled "Getting Together Again", mailed to League members before publication of "QST" resumed after World War I. Sumner B. Young, WØCO, Route 3, Wayzata, Minn.

WANTED: WRL transmitter. For sale: Triplett 1696A modulation monitor, Weston micro-relay controlled directly by photo-cell Box 382, Newark, N. J.

WANTED: Radio officers for Merchant Marine. $400 per month or more. Men who hold or who formerly held 1st Cl. 2nd Cl or TLT radiotelegraph license and 6 months ship radio operating experience. Radio Officers Union, 1440 Broadway, New York, N. Y.

HRO5TA1 bandspread, general coils 1.5–30 Mcs., matching power supply, speaker. Voltage regulated, $165. Stancor 202, 125 w., c.w., 35T final, 6V6-6L6 bandswitching exciter, two power supplies, compact, commercial, coils for 10–80M, $70. Also wanted: compact AM transmitter. State line-up, features, condition, age, price, and wanted also active xtals for all bands. State type of holder, freq. price. Lt. Julius M. Hoffer, W8UFH, 662 AC & W Sqdn, Apco, Ohio.

ANY active code classes in Philly? Stevenson 2–2176.

LOOKING for following: U.S. Govt. Printing Office Edition Call Books; commercial ship stations 1922, 25 amateur stations 1926. Want all years. Large sized Call Books. Also paper cover edition of ARRL Handbooks for 1929, '30, '38, '48, '49. Front cover very good or like-new appearance for permanent library. Catalogues describing old wireless equipment. Need Dec. 1915, 1916 QST's to complete file. Have following to exchange: May, June '17 QST. U.S. Govt. Prtg. Office edition "Rules & Regulations" 1914, 19. QST 1919 List of Amateur Stations. Pink "Ban-Off" sheet. Electrician Mechanic, Wireless Age, Robert L. Willits, W1PN, 53 Hemenway St., Boston, Mass.

QSLs, SWLs. High quality. Reasonable prices. Samples. Bob Teachout, W1FSV, 40 Elm St., Rutland, Vt.

FOR Sale: Collins 75A-1 rcvr in perfect condition, $275. Cash only, no trades. Wes Marriner, W9AND, 844 N. Galena Ave., Dixon, Illinois.

FOR Sale: Stancor ST-202-A transmitter, 100 watts 10 thru 80, c.w., provisions for connecting modulator, with tubes, less final tank coils, uses B&W BVL series; and rebuilt surplus ARA rcvr, new IF lineup, 6-volt tubes, 6 volt Vibrapack mounted in dynamotor well, and remote head for tuning, on-off and volume, with 4 foot connecting cables. 550 to 1550 Mcs. Make me a cash offer. H L. Hendricks, W6KVW, 3112 Newton Ave., San Diego 13, Calif.

PANADAPTOR: Genuine PC-203A like new, grey crackle, just factory serviced and converted to 500 Kc IF for Collins 75A1. Easily changed back to 456. New extra CR tube, manual complete, prepaid $75. WØJRQ, Warner, 534 16th, Denver, Colo.

SELL: TCS-12; Dumont, #241, 164E 'scopes; 1-222-A Sig. Gen. BC-221, BC-348, BC-342. Amplidyne, Selsyn Amplifier, Federal Sig. Gen. #804. T. Clark Howard, 46 Mt. Vernon St., Boston 8, Mass. W1AFN.

EXPERIMENTER retiring. Laboratory equipment, sets, parts, books available. Detailed list 10¢. M. N. Abramovich, 9903 Lorain, Silver Spring, Md.

BARGAINS: New and reconditioned Collins, National, Hallicratters, Hammarlund, RME, Millen, Gonset, Harvey-Wells, others. Reconditioned S38 $29; S53, $49; S40, $69; SX43, $119; NC173, $149; NC183, $199; HROSTAI, $159; HRO7, $189; HRO50, $279; HQ-129X, $139; SP400X, $259; DB22A, $49; HF-10-20, $49; VHF152A, $59; RME-45, $89; SX25, SX24, SX28A, SX42, Collins 75A, others. Shipped on approval. Terms. List free. Henry Radio, Butler, Mo.

SELL: TCS12 complete 110 volt a.c., TCS8 complete 12/24 volt d.c. BC-221AK, TS174U, LM15, BC348, BC312, BC191A, A. VanBreems, Colonial Road, New Canaan, Conn.

WANTED: Broadcasting transmitter from 1 KW to 10 KW. Surinach, Goya 7, Tangier, Morocco.

FOR Sale: New BC-221-Q, original calibration book, canvas carrying case, $75. Meissner DeLuxe signal shifter, all coils, very excellent condition, $37.50. New V-70-D triode, $3.50. HQ-129X and spkr, new, unopened carton, $165. Capt. James Craig, jr., 332 Henry Clay Blvd., Lexington 5, Ky.

RADIO Officers wanted for large Philadelphia oil company's tanker fleet. $409.50 per month to start; 64 days per year paid leave and vacation; disability benefits, FCC radio telegraph license required. Reply to P.O. Box 8138 Philadelphia 1. Penna and show complete experience.

ONE BC610 in top shape. Converted for 10. $350. J. Peck, 47 Exchange St., Auburn, N. Y.

QSTs for sale: one of the most complete files of QST in existence. Comprise 393 copies from 1916 to date. Solid from Sept. 1919 to August 1951. Write for complete list. Clarence N. Crapo, W9VD, 2111 E. Newton Ave., Milwaukee 11, Wis.

SELL: 300 watt A.M. phone 6 ft. enclosed rack. Seven meters. 1. KW. power supply. $100. Local preferred. W2BAA, FL. 9-4009. R. E. Ballner 22-12 128th College Pt., L. I., N. Y.

SELL: SX-25 built-in speaker, perfect, $55. SCR522 xtals Dyna. $22. Gates, 506 Wisconsin Ave., Oak Park, Ill.

TRADE or sell: transformer 4000V ct 500 Ma, fil. trans. 5 volt, 12 H 700 Ma. choke (2) 3mfd, 3000 V condensers (2) 83Js. Want: TBS-50, make offer. Ellis B. Hall, 2635 Chesterton Drive, San Diego 11, Calif.

VIBROPLEX original deluxe, new unopened carton, for sale or swap. Want 2500 volt power supply parts, APS-13. W6RLB, 1546 Spruce, Berkeley, Calif.

BARGAINS: Extra special! Motorola P-69-13 mobile receivers, $29.50; Globe King $315; HT9, $199; HRO7, $199; Temco 75GA, $225; Collins 32RA $125; Collins 32MA, $99.50; Collins 75A1, $295; new 150-watt 'phone $199; HRO-5T, $175; Hallicrafters S-47 $119; RME-45, $99; SX-17 $89.50; Meissner EX signal shifter, NC46, S40A, $69.50; VHF 152A, $69.00; SX24, $69; Globe Trotter, $57.50; new Meissner signal calibrators, $24.95; MB-611, $29; 90800 exciter, $29.50; XE10, $14.95 and many others. Large stock trade-ins. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Inc., 740-42-44 West Broadway, Council Bluffs, Iowa.

FOR Sale: RCA 10 M mobile transmitter, in excellent condition, and complete with Gonset converter and noise limiter, Dynamotor, mike. $95. W1SUQ.

FOR Sale: RG-8U in 29 ft. lengths with fittings. $2.00. New 832A's $5.00, 829B's, $6.00 each. C. F. Moretti, W2AIH.

WANTED: Some good HY75 tubes. W1BB.

HARVEY-WELLS TBS-50C for sale. Brand new. Never used. Best offer above $90. Also Master Mobile spring mount and 96 inch antenna. Both for $10. C. H. Willard, W2EZB, 609 Vine St., Liverpool, N. Y.

SELL: HRO-7, power supply, regular amateur coils, broadcast coils E & F and NBFM unit, $199. National HFS receiver with power supply, $99. Pair of Eimac 4-125A tubes, new, with sockets, $35. Amphenol-Mims beam rotator with set each of 3-element 10 and 20 meter Gordon adjustable elements $250. E. F. O'Brien 86-10-34th Ave., Jackson Heights, L. I., N. Y.

WANT: 6v. dynamotor about 300 v. 250 Ma., output tube tester, Millen 6DO. Will buy or trade, have tremendous stock of tubes, parts, also BC-1147 Federal communications receiver 2 RF stages. Morton Savada, 1115 Broadway, New York 10, N. Y.

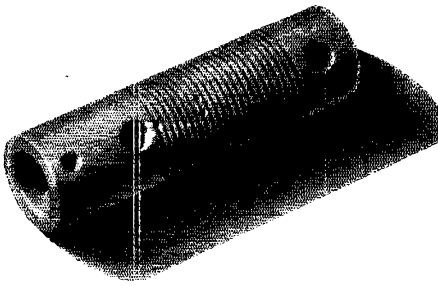
NEW crystals for all commercial services at economical prices, also regrinding or replacement crystals for Broadcast, Motorola, Link, G-E and other commercial types. Over sixteen years of satisfaction and fast service! Edison Electronic Co., P. O. Box 31, 1802 No. Third St., Temple, Texas. Phone 3-3901.

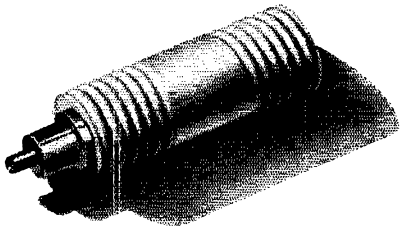
450 Watt final amp. 812A PP complete with 40 mtr. coils, 2 Simpson meters (grid and plate), Vernier dial, 8¾" x 19" rack panel, own fila. xfrmr, $40; VX-101 Deluxe VFO. A complete all-band, enclosed, 807 final, VFO-xmitter. Band switching, large calibrated dial, brand-new condition, used only a few hours. Cost over $100. Only $65.00. Rack cabinet 26½" panel space, 28" high, black, rear door missing, door on top. $10. ARC-5 xmitter, 2.1 to 3 Mc. New not converted, $7.50; R-4/ARR 2 rcvr. Used. As is, $5.00 — 15" Jensen spkr. Excellent woofer $10. Signal generator, 7 Mc. to 15 Mc I-198-A, converted, can be used as a 40 and 20 mtr, VFO stable, $15.00. Lysco 10-mtr mobile converter, used, $15.00. All items F.o.b. New York City. W2PDH, 47-47 39th Pl., L.I.C., 4 N. Y. Stillwell 6-2259.

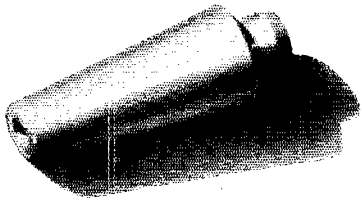
HALLICRAFTERS S37 and speaker and one S17, both $125, or will trade for rifles. Prefer frontier pistols, Cal. 45. Scott Radio Service, 45 Hudson St., Ridgewood, N. J. Phone RI 6-1581.

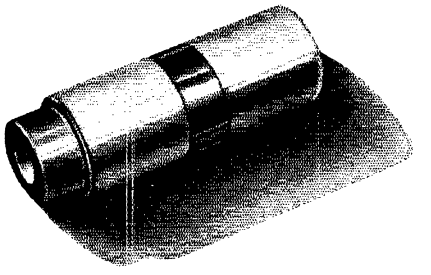
Index of Advertisers

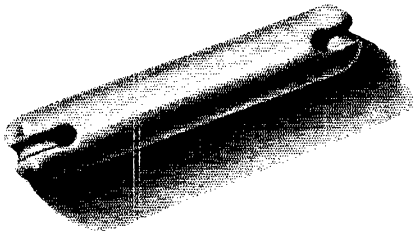
For HF insulation specify the best!

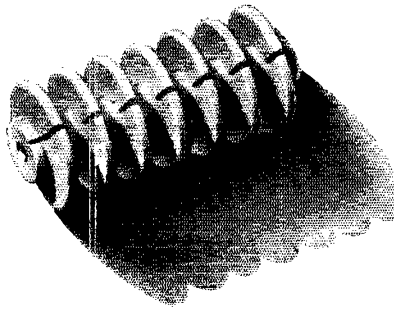












ALSIMAG

U. S. PATENT NO. 2,214,703 AND OTHER CLAIMS PENDING

Custom Made Technical Ceramics

SOLD ONLY TO MANUFACTURERS

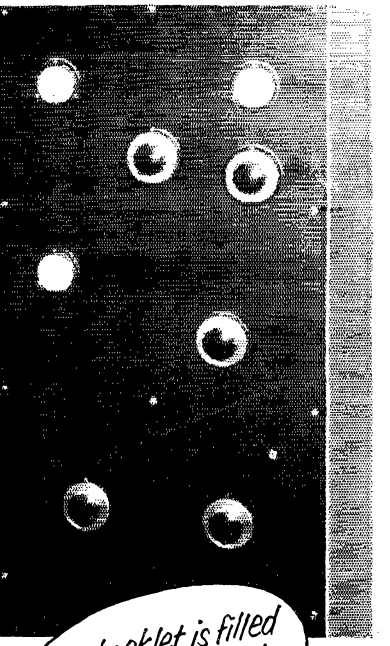
AMERICAN LAVA CORPORATION

50TH YEAR OF CERAMIC LEADERSHIP

Chattanooga 5, Tennessee

"For dependability, I'll take Sylvania tubes every time,"

says Paul Mark, WØCVN



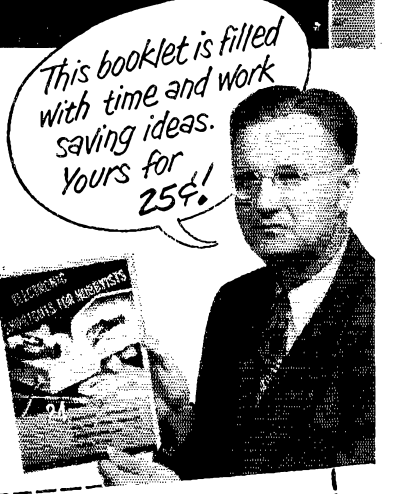
"I have relied on Sylvania tubes since the earliest 'ham' days and have always found them dependable, especially in emergencies," says Paul Mark, WØCVN, Wichita.

Paul, a charter member of the Wichita Radio Amateur Club, has been an amateur for 27 years. He has a WAC certificate and has worked 117 countries, both phone and CW. His transmitter has 620 watts input and uses a 3 element beam.

Radio is a business as well as a hobby with Paul, a communications engineer well qualified to say: "Take a tip from me, for long life and dependability, insist on Sylvania tubes."

★ ★ ★

Get this book of 24 simplified electronic applications. You'll have a lot of fun, save time . . . save money, too. Mail coupon and 25¢ for your copy NOW!



SYLVANIA

SYLVANIA ELECTRIC PRODUCTS INC. 1901-1951 FIVE DECADES OF PROGRESS 50th ANNIVERSARY

RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; FLUORESCENT TUBES, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS; TELEVISION SETS

Sylvania Electric Products Inc.
Dept. R-4110, Emporium, Pa.

Enclosed please find 25¢ for my copy of "Electronic Shortcuts for Hobbyists."

Name_____

Street_____

City_____ Zone____ State____

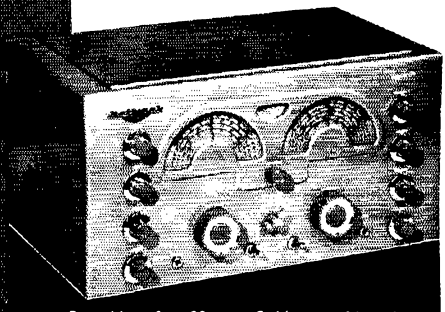
PRINTED IN U.S.A.
RUMFORD PRESS
CONCORD, N.H.

Millions have read

the best-seller and

seen the movie!.....

totally submerged.....*
yet kept on working!



the "voice" and "ears" of

KON-TIKI

the greatest true adventure of our time!

Millions now know the thrilling story of how six men crossed the Pacific on a crude raft. Far fewer know that the "voice" and "ears" — the radio transmitter and receiver — used on that storm-swept voyage were built by National! Never had radio equipment taken such a terrific beating! Yet it never failed because it was built the only way National knows how to build — *to work and keep on working!*

see inside — then decide

National

©

EST. 1914

NATIONAL COMPANY, Inc.

MALDEN, MASSACHUSETTS

RCA publications every amateur should have

Newcomers and Oldtimers alike can count on the authoritative RCA Tube Publications to keep them up-to-date . . . just as they can count on the quality of RCA Tubes to keep them on the air.

RCA Ham Tips is issued every other month, and contains dope on tube applications, new circuits, and new equipment designs, that you can put to practical everyday use. It's free . . . and you can get your copy from the nearest RCA Tube Distributor.

RCA Headliners for Hams is a storehouse of information on the ratings and operating conditions of RCA transmitting-type tubes . . . so arranged that you can easily choose the tubes for a rig for any power and any frequency band. It's yours for the asking through any RCA Tube Distributor.

RCA Tube Instruction Booklets provide design and application data on non-receiving tube types. Single copy is available free of charge through your RCA Tube Distributor, or from RCA, Commercial Engineering, Harrison, N. J. Be sure to mention tube type booklet desired.

RCA RC-16 Receiving Tube Manual gives technical data on more than 460 RCA receiving tubes and kinescopes . . . including classification charts, operating data, and socket connections. Contains over 300 pages. Only 50 cents at your RCA Tube Distributor.

Put these authoritative, up-to-date RCA Publications to work for you . . . and follow up by using genuine RCA quality tubes in the familiar red-black-and-white cartons.

RADIO CORPORATION of AMERICA

ELECTRON TUBES — **HARRISON, N. J.**